

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Safety in installations for electroheating and electromagnetic processing –  
Part 6: Particular requirements for high frequency dielectric and microwave  
heating and processing equipment**

**Sécurité dans les installations destinées au traitement électrothermique et  
électromagnétique –  
Partie 6: Exigences particulières pour les équipements de chauffage et de  
traitement diélectriques à hautes fréquences et à hyperfréquences**



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COMMISSION

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## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	9
3 Terms and definitions .....	9
3.1 General concepts.....	9
3.2 Equipment and state of equipment.....	11
3.3 Parts and accessories.....	13
4 Classification and subdivision of equipment and installations.....	13
4.1 Classification by processing frequency.....	13
5 Risk assessment .....	14
6 General provisions.....	14
7 Protection against hazards from electric shock .....	15
8 Protection against hazards from electric or magnetic fields.....	17
9 Protection against hazards from radiation.....	20
10 Protection against hazards from thermal influences.....	21
11 Protection against hazards from fire .....	21
12 Protection against hazards from fluids .....	22
13 Specific requirements for components and subassemblies .....	22
14 Control of the installation or equipment.....	22
15 Protection against mechanical hazards.....	23
16 Protection against hazards resulting from use .....	23
17 EMC .....	23
18 Verification and testing .....	23
19 Information for use .....	23
Annex A (normative) List of significant hazards.....	24
Annex B (normative) Limits to touch currents.....	25
Annex C (normative) Non coherent optical radiation – Limits and risk classes.....	26
Annex D (normative) Electric and magnetic fields .....	27
Annex E (normative) Surface temperature limits .....	28
Annex F (normative) EH, EPM and fire.....	29
Annex G (normative) Marking and warning.....	30
Annex H (informative) Guidelines on using this document.....	31
Annex I (informative) Connection with ISO 13577 (all parts).....	32
Annex J (informative) Requirements specific to the EU and associated countries.....	33
Annex AA (normative) Information for use.....	34
AA.1 General.....	34
AA.2 Labelling.....	34
Annex BB (normative) Measurements and evaluations of the high frequency emission and contact current.....	37
BB.1 General.....	37
BB.2 Conditions of equipment operation for measurements .....	37
BB.3 Evaluation of the HF field characteristics .....	37

BB.4	Electric, magnetic fields, and contact currents.....	38
BB.5	Limiting values, continuous energising of the processing frequency source.....	39
BB.6	Limiting values, intermittent energising of the processing frequency source .....	39
BB.7	Relaxation for processing frequencies up to 41 MHz .....	39
BB.8	Risk classes.....	40
BB.9	Instrumentation .....	40
Annex CC	(normative) Measurements and evaluations of the microwave emission .....	44
CC.1	Conditions for measurement .....	44
CC.2	Measurement details.....	44
CC.3	Risk classes.....	44
CC.4	Instrumentation .....	45
Annex DD	(informative) Rationales for the high frequency emission limits and measurements .....	49
DD.1	The biological effects of HF emissions from 3 MHz to 300 MHz.....	49
DD.2	Today's agreed limits for operator safety .....	49
DD.3	Differences between the concepts in the cited standards and this document.....	50
DD.4	Field behaviour .....	51
DD.5	Conclusions .....	60
Annex EE	(informative) Rationales for the microwave barrier and associated microwave leakage tests.....	62
EE.1	Standard measurement of microwave emission.....	62
EE.2	Microwave hazards – SAR basic restriction.....	63
EE.3	Microwave hazard evaluation – free space exposure method .....	63
EE.4	Microwave hazards from openings in cavities, and from exit and entrance ports .....	64
EE.5	Time averaging .....	65
EE.6	Conclusions and modifications of the standards for ovens with a cavity door .....	66
Bibliography	.....	67
Figure AA.1	– Examples of warning sign and labels .....	35
Figure AA.2	– Labels at open HF applicators and handheld or open MW applicators.....	35
Figure BB.1	– Large HF barrier for a conveyorised heating equipment scenario.....	42
Figure BB.2	– Conditions for a HF plastic welding equipment.....	43
Figure CC.1	– Large barrier for conveyorised microwave heating equipment.....	46
Figure CC.2	– Small microwave access barrier for conveyorised microwave heating equipment.....	47
Figure CC.3	– Vertical-only MW barriers for conveyorised microwave heating equipment.....	48
Figure DD.1	– The overall complete scenario (left) with details .....	53
Figure DD.2	– Field maxima with linear scaling (six top images) and decibel scaling (six bottom images) .....	55
Figure DD.3	– Quiver plots of momentary total fields at the same time phase .....	56
Figure DD.4	– Power density patterns in the body-parts receiving the highest exposure values .....	57
Figure DD.5	– E field comparisons 30/100 MHz, and 100 MHz field polarisation .....	58
Figure DD.6	– SAR maxima at 100 MHz in the scenario with only the body present .....	59
Table 101	– Dimensional requirements for HF/MW barriers.....	21
Table DD.1	– Maximum power densities in circularly cylindrical muscle objects irradiated by 100 MHz plane waves with the E field parallel to the axis .....	60

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## **SAFETY IN INSTALLATIONS FOR ELECTROHEATING AND ELECTROMAGNETIC PROCESSING –**

### **Part 6: Particular requirements for high frequency dielectric and microwave heating and processing equipment**

#### FOREWORD

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IEC 60519-6 has been prepared by IEC technical committee 27: Industrial electroheating and electromagnetic processing. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011.

This edition constitutes a technical revision.

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

- a) the structure has been redrafted according to the IEC 60519-1:2020;
- b) the scope and object have been redrafted;
- c) the terms/definitions, normative references and bibliography have been updated and completed;

- d) all requirements and content from IEC 60519-6:2011 which are included in IEC 60519-1:2020 were removed to avoid any duplication;
- e) inclusion of high frequency equipment which was previously covered by IEC 60519-9:2005 (withdrawn). This edition constitutes an extension to high frequency equipment.

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

Draft	Report on voting
27/1142/FDIS	27/1144/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts in the IEC 60519 series, published under the general title *Safety in installations for electroheating and electromagnetic processing*, can be found on the IEC website.

The clauses of this part 6 of the IEC 60519 series (called Particular Requirements) supplement or modify the corresponding clauses of IEC 60519-1:2020 (*General Requirements*), hereinafter called Part 1.

In this standard, the following print types are used:

- requirements and definitions: in roman type;
- NOTES: in smaller roman type;
- terms defined in Clause 3 in this document and in Part 1 are in **bold type**, from Clause 1.

This part of IEC 60519 is to be read in conjunction with Part 1. It supplements or modifies the corresponding clauses of Part 1. Where the text indicates a “modification” of, “addition” to or a “replacement” of the relevant provision of Part 1, these changes shall be made to the relevant text of Part 1. Where no change is necessary, the words “This clause of Part 1 is applicable” are used. When a particular subclause of Part 1 is not mentioned in this part, that subclause applies as far as is reasonable. When a particular subclause of Part 1 is not applicable, the word “void” is used.

Additional specific provisions to those in Part 1, given as individual clauses or subclauses, are numbered starting from 101.

NOTE The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

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

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- withdrawn,
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- amended.

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## INTRODUCTION

Some types of **electroheating equipment**, including the **workload**, can emit hazardous levels of infrared radiation. It has been agreed in the IEC Technical Committee 27 that IEC 60519-12 addresses these infrared radiation aspects for this document.

This document presumes that the **manufacturer** possesses sufficient knowledge in equipment design, manufacturing and documentation in accordance with good engineering practise, and that the installation or equipment is operated and maintained only by personnel consisting of **skilled or instructed persons**.

This document is intended to verify whether the installation or equipment meets the requirements of safety, by design, and numerical verification if carefully carried out, site acceptance tests, routine tests or inspection.

## SAFETY IN INSTALLATIONS FOR ELECTROHEATING AND ELECTROMAGNETIC PROCESSING –

### Part 6: Particular requirements for high frequency dielectric and microwave heating and processing equipment

#### 1 Scope

This clause of Part 1 is modified by the following regarding the areas of application.

##### *Modification:*

This part of IEC 60519 is applicable to equipment using high frequency or microwave energy alone or in combination with other kinds of energy for industrial heating and processing of materials. It is also applicable to **HF** and **MW generators** made available to **users** as separate units.

This part is applicable to equipment operating in the frequency range 3 MHz to 300 GHz, with the following limitations.

- This document applies to only high frequency **dielectric heating** and **processing** as defined in 3.1.103. It does not apply to induction heating, which it is possible to carry out in the lower part of the specified frequency band and is covered by IEC 60519-3, with magnetic field safety aspects addressed in IEC TS 62997:2017, the latter to be replaced by a technical report (TR) or by a revised technical specification (TS).
- The ISM centre frequencies for **dielectric heating** and **processing** of industrial interest are narrow bands about 6,78 MHz, 13,56 MHz, 27,12 MHz and 40,68 MHz. Different field **emission** measurement procedures and limiting values are applicable, depending on the **processing frequency** in the high frequency range 3 to 300 MHz. Specifications are in Annex BB.
- This document specifies limits for microwave **emission** only for the ISM frequencies between 800 MHz and 6 MHz, as specified in Annex CC. For other microwave frequencies the **basic restriction** and IEC 62311 apply.
- The foundations for compliance with **emission** values are the **basic restrictions**, referred to in the IEEE/ANSI C95.1:2019 and Directive 2013/35/EU. However, maximum **HF processing frequency** electric and magnetic field values are taken from the IEEE/ANSI C95.1:2019 standard, as indicated in Annex BB.
- This document is not applicable to:
  - appliances for household and similar use (covered by e.g. IEC 60335-2-25);
  - commercial use (covered by IEC 60335-2-90 and IEC 60335-2-110);
  - laboratory use (covered by IEC 61010-2-010);
  - medical high frequency equipment and accessories (covered by IEC 60601-2-2).

NOTE 101 Since high frequency and microwave tunnel ovens and also some other types of microwave and high frequency equipment are sometimes intended either for commercial, laboratory or industrial use, the following criteria are suitable for determination of the classification as industrial equipment:

- commercial equipment is typically designed and planned for series production of many identical units, whereas industrial equipment is typically produced in small series or even as single units. The processed goods are consumed or ready for final use at the end of the heating process.
- laboratory heating equipment is for preparing material in a laboratory environment, and the processed material is immediately available for investigations or further processing. Regular production of large quantities of material is not foreseen.