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Safety in electroheat installations - Part 3: Particular requirements for induction and conduction heating and induction melting installations (IEC 60519-3:1988)

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EUROPEAN STANDARD

EN 60519-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1995

UDC 621.365:614.8:697.2  
ICS 25.180.10

Supersedes HD 491.3 S1:1990

Descriptors: Electroheat installations, heating, induction, conduction, melting

English version

**Safety in electroheat installations**  
**Part 3: Particular requirements for induction and**  
**conduction heating and induction melting installations**  
(IEC 519-3:1988, modified)

Sécurité dans les installations  
électrothermiques  
Partie 3: Règles particulières pour les  
installations de chauffage par induction  
et par conduction et pour les  
installations de fusion par induction  
(CEI 519-3:1988, modifiée)

Sicherheit in Elektrowärmeanlagen  
Teil 3: Besondere Anforderungen an  
induktive und konduktive  
Erwärmungsanlagen und an  
Induktionsschmelzanlagen  
(IEC 519-3:1988, modifiziert)

This European Standard was approved by CENELEC on 1995-09-20. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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**CENELEC**

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### Foreword

The text of the International Standard IEC 519-3:1988, prepared by IEC TC 27, Industrial electroheating equipment, together with common modifications prepared by the German national committee, was approved by CENELEC as HD 491.3 S1 on 1990-03-05.

This Harmonization Document was submitted to the formal vote for conversion into a European Standard and was approved by CENELEC as EN 60519-3 on 1995-09-20.

The following date was 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) 1996-09-01

Annexes designated "normative" are part of the body of the standard. In this standard, appendix A and annex ZA are normative. Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 519-3:1988 was approved by CENELEC as a European Standard with agreed common modifications as given below.

### COMMON MODIFICATIONS

14.4.1 Replace the second paragraph by:

Monitoring is not necessary in the case of connections that serve for the discharge of electrostatic charges or the like. It must not be applied in high-frequency applications where the inductor is protected by guards which, when removed, prevent operation of the heater.

Appendix A Replace the title of table 41A by:

Admissible touch voltage as a function of duration  
(see subclause 14.2.1)

Delete note 2 of table 41A.

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EN 60519-3:1995  
INDUSTRIAL ELECTROHEATING EQUIPMENT  
PART 3: HEATERS  
1995  
CENELEC  
LUXEMBOURG

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 50(841)	1983	International electrotechnical vocabulary Chapter 841: Industrial electroheating	-	-
IEC 364-4-41	1982 <sup>1)</sup>	Electrical installations of buildings Part 4: Protection for safety Chapter 41: Protection against electric shock	-	-
IEC 519-1	1984	Safety in electroheat installations Part 1: General requirements	EN 60519-1	1993

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1) IEC 364-4-41:1977 is harmonized as HD 384.4.41 S1:1980.

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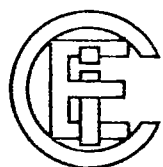
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# NORME INTERNATIONALE INTERNATIONAL STANDARD

CEI  
IEC  
519-3

Deuxième édition  
Second edition  
1988



Commission Electrotechnique Internationale

International Electrotechnical Commission

Международная Электротехническая Комиссия

## Sécurité dans les installations électrothermiques

Troisième partie: Règles particulières pour les installations  
de chauffage par induction et par conduction  
et pour les installations de fusion par induction

## Safety in electroheat installations

Part 3: Particular requirements for induction and conduction  
heating and induction melting installations

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY IN ELECTROHEAT INSTALLATIONSPart 3: Particular requirements for induction and conduction  
heating and induction melting installations

## FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

## PREFACE

This standard has been prepared by IEC Technical Committee No. 27: Industrial electroheating equipment.

This publication replaces the first edition published in 1975.

The text of this standard is based on the following documents:

Six Months' Rule	Report on Voting	Two Months' Procedure	Report on Voting
27(C0)81	27(C0)84	27(C0)86	27(C0)88

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Further information can be found in the relevant Reports indicated in the table above.

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Other IEC publications quoted in this standard:

- Publication Nos. 50(841) (1983): International Electrotechnical Vocabulary (IEV), Chapter 841: Industrial Electroheating.
- 364-4-41 (1982): Electrical installations of buildings, Chapter 41: Protection against electric shock.
- 519-1 (1984): Safety in electroheat installations, Part 1: General requirement.

## SAFETY IN ELECTROHEAT INSTALLATIONS

### Part 3: Particular requirements for induction and conduction heating and induction melting installations

#### 1. Scope

1.1 This standard shall be read in conjunction with IEC Publication 519-1.

1.2 It consists of:

- a general section covering requirements common to both induction and conduction heating installations and induction melting installations and,
- two sections, A and B, giving specific requirements for each type of installation.

1.3 *The standard applies to*

- installations for induction and conduction heating of solids, at low, medium and high frequencies. (For conduction heating, use of direct current is also included);
- installations for induction melting, holding and superheating at low, medium and high frequencies;
- those parts of the conveying or handling equipment of the electro-heat installation, which are within the influence of the heating section.

Examples of application:

Installations for induction and conduction heating of slabs, billets, rods, strip, wire, tubes, rivets, etc., for subsequent hot forming and heat treatment.

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Installations with induction crucible furnaces or induction channel furnaces.

#### 2. Definitions

*Note.*- Terms relating to this publication are defined in IEC Publications 519-1 and 50(841).

Terms which are not defined in IEC Publication 519-1 but considered essential for this publication are presented as follows.

### 2.1 *Induction heating* (IEV 841-05-01, modified)

Method of heating in which the heat is generated by currents in the charge, induced electromagnetically.

### 2.2 *Conduction heating* (direct resistance heating) (IEV 841-02-02 modified)

Resistance heating in which current passes through the material to be heated and is not induced electromagnetically.

### 2.3 *Heating section*

That part of the equipment in which heating by induction or conduction takes place.

### 2.4 *Inductor* (IEV 841-05-06 modified)

The component (e.g., coil(s)) of induction heating or melting equipment, carrying an alternating current and designed to create the magnetic field which induces currents in the charge (IEV 841-10-13).

### 2.5 *Contact system*

The component of a conduction heating work station by which the charge is electrically connected to the heating circuit.

### 2.6 *Induction crucible furnace* (IEV 841-05-18)

An induction melting or holding furnace in which the heat is generated directly in the charge, or in the crucible containing it by means of one or more inductor coils arranged around the crucible.

### 2.7 *Induction channel furnace* (IEV 841-05-19)

An induction melting or holding furnace forming a transformer whose secondary circuit comprises the molten metal contained in a channel made of refractory material and which is connected to a refractory lined chamber also containing molten metal, into which charge pieces to be heated are placed.

## 3. Inductor

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3.1 Where the inductor or parts of it are intended to be replaced due to wear or exchanged to meet a new production requirement, the manufacturer's instructions shall be followed.

3.2 Should the effect of cooling of the inductor become insufficient and cause danger to personnel or damage to essential parts of the equipment, an alarm signal shall be given and the heating power switched off automatically.