

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Heating cables with a rated voltage of 300/500 V for comfort heating and prevention of ice formation

Câbles chauffants de tension assignée 300/500 V pour le chauffage des locaux et la protection contre la formation de glace



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HEATING CABLES WITH A RATED VOLTAGE OF 300/500 V
FOR COMFORT HEATING AND PREVENTION
OF ICE FORMATION**

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 60800 has been prepared by IEC technical committee 20: Electric cables.

This third edition cancels and replaces the second edition, published in 1992, and constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

- introduction of heating cable sets;
- testing of heating cable sets, including the integrated cold-lead, cold-lead splice and end-termination in twin and multicore cable sets, in addition to the heating cable;
- introduction of requirements for installation instructions;
- reduction to two, instead of three, mechanical classes, one for cables intended for installation with a low risk of mechanical damage (M1) and one for cables intended for installation with a higher risk of mechanical damage (M2);
- elimination of reference to specific materials to be used as insulation and sheath;
- introduction of routine and sample tests.

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

FDIS	Report on voting
20/1057/FDIS	20/1066/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

INTRODUCTION

This International Standard is intended to provide a comprehensive overview of the essential requirements and testing appropriate to electrical resistance heating cables used for comfort heating and prevention of ice formation. While some of this work already exists in national standards or international standards, this standard has collated much of this existing work.

This standard provides a means to verify the electrical, thermal and mechanical durability of resistive heating cables, so that in normal use their performance is without danger to the user or surroundings. Compliance is checked by carrying out all the tests specified in this standard.

HEATING CABLES WITH A RATED VOLTAGE OF 300/500 V FOR COMFORT HEATING AND PREVENTION OF ICE FORMATION

1 Scope and object

This International Standard is applicable to, and specifies requirements for, resistive heating cables for low temperature applications such as comfort heating and the prevention of ice formation. These cables and cable sets may comprise either factory fabricated or field (work-site) assembled units, and which are heating cables assembled in accordance with manufacturer's instructions.

Bare conductors and protected conductors to be supplied at voltages equal to, or less than, 50 V are excluded from the scope of this standard.

NOTE Terminations and gland fittings are outside the scope of this standard.

Typical applications include, but are not limited to:

- surface heating installed in or under surfaces;
- direct and storage heating;
- snow melting and frost protection of roofs, gutters, pipes, etc.

Heating cables for industrial and commercial applications are specified in the IEC 62395 series [1]¹ as are mineral insulated heating cables.

Applications in which the operating sheath temperature exceeds 100 °C are outside the scope of this standard.

The object of this standard is to ensure that electrical resistance heating cables operate safely under their normal defined conditions of use. This is achieved by:

- employing heating cables of the appropriate construction that meet the test criteria detailed in this standard;
- including, for cables with an electrical protective component, a metallic braid, concentric wires or sheath, or other suitable electrically conductive material for protective purposes in case of fault;
- ensuring that the cables operate at safe temperatures with respect to the materials used in the construction of the cables and their installations according to national regulations.

2 Normative references

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.

IEC 60050-461, *International Electrotechnical Vocabulary – Part 461: Electric cables*

IEC 60228, *Conductors of insulated cables*

¹ References in square brackets refer to the bibliography.

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

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 60811-1-1, *Common test methods for insulating and sheathing materials of electric cables and optical cables – Part 1-1: Methods for general application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

IEC 60811-1-2:1985, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 1-2: Methods for general application – Thermal ageing methods*
Amendment 1 (1989)
Amendment 2 (2000)

IEC 60811-1-3, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 1-3: General application – Methods for determining the density – Water absorption tests – Shrinkage test*

IEC 60811-1-4, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 1-4: Methods for general application – Tests at low temperature*

IEC 60811-2-1, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance, hot set and mineral oil immersion tests*

IEC 60811-3-1, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 3-1: Methods specific to PVC compounds – Pressure test at high temperature – Tests for resistance to cracking*

IEC 62395-1:2006, *Electrical resistance trace heating systems for industrial and commercial applications – Part 1: General and testing requirements*

ISO 4892-3:2006, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-461, together with the following, apply.

3.1

armouring

mechanical reinforcement of the cable

NOTE The reinforcement can be made of one or more layers of steel wires or braid, or of a metallic sheath or other suitable material.

3.2

cold lead

electrically insulated conductor or conductors used to connect a heating cable to the branch circuit and designed so that it does not produce significant heat

3.3

connection splice

sealed splice, connecting the heating cable to the cold lead