

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC online collection - oc.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 60800

Edition 4.0 2021-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.20

ISBN 978-2-8322-1042-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
4 Mechanical classification	11
5 Requirements for marking	11
6 Requirements for installation instructions	12
7 General requirements for construction of heating cables	13
7.1 General	13
7.2 Conductors	13
7.3 Insulation	14
7.4 Electrically conducting screen	14
7.5 Armouring	14
7.6 Sheath	14
7.7 Moisture resistance	14
8 Testing	15
8.1 Type tests – General requirements	15
8.2 Type tests – Detailed test requirements	15
8.2.1 Electrical resistance of heating conductors and screen	15
8.2.2 Water immersion and temperature cycling test	16
8.2.3 Verification of rated output for parallel heating cables	17
8.2.4 Verification of start-up current for parallel heating cables	17
8.2.5 Penetration test for electrically conductive screen	17
8.2.6 Flammability test	18
8.2.7 Deformation test for installation classification	19
8.2.8 Cold impact test	20
8.2.9 Cold bend test	21
8.2.10 Ageing test for insulation	22
8.2.11 Ageing test for non-metallic sheath	22
8.2.12 Compatibility test	22
8.2.13 Weathering and UV resistance test	22
8.2.14 Tensile test	23
8.2.15 Reverse winding test	24
8.2.16 Heat shock test	24
8.2.17 Shrinkage test for insulation and sheath	25
8.2.18 Hot set test	25
8.2.19 Cyclic ageing test for the heating cable	25
8.2.20 Cyclic ageing test for splices and end seals	26
8.2.21 Checking of the durability of markings	26
8.2.22 Pressure test at high temperature for insulation and sheath	26
8.3 Routine and sample tests	27
8.3.1 General remarks	27
8.3.2 Voltage test	27
8.3.3 Heating cable resistance and output verification	27

8.3.4 Insulation thickness 27

8.3.5 Sheath thickness 27

8.3.6 Hot set test 28

Annex A (normative) Weathering and UV resistance test 29

Bibliography 30

Figure 1 – Typical arrangement for splice testing 18

Figure 2 – Typical arrangement for end seal testing 19

Figure 3 – Cold bend test 21

Figure 4 – Jaws for tensile machine 24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HEATING CABLES WITH A RATED VOLTAGE UP TO
AND INCLUDING 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60800 has been prepared by IEC technical committee 20: Electric cables. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2009. This edition constitutes a technical revision.

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

- a) modification of the title: "up to and including", has been introduced;
- b) update of IEC 60811 references;
- c) introduction of a test for mechanical properties of sheaths after the water immersion and temperature cycling test;
- d) introduction of a weathering and UV resistance test according to ISO 4892-2:2013, Annex A.

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

Draft	Report on voting
20/1972/FDIS	20/1991/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. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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.

INTRODUCTION

This document 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 document has collated much of this existing work.

This document 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 document.