SVENSK STANDARD

SS-EN IEC 60228, utg 2:2024

Fastställd	Sida	Ansvarig kommitté
2024-09-25	1 (27)	SEK TK 20

Kraftkablar och installationskablar – Ledare

Conductors of insulated cables

Som svensk standard gäller europastandarden EN IEC 60228:2024. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60228:2024.

Nationellt förord

Europastandarden EN IEC 60228:2024

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60228, Fourth edition, 2023 - Conductors of insulated cables**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60228, utg 1:2005 med eventuella tillägg, ändringar och rättelser gäller ej fr o m 2027-06-12.

ICS 29.060.20

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60228

August 2024

ICS 29.060.20

Supersedes EN 60228:2005/corrigendum May 2005; EN 60228:2005

English Version

Conductors of insulated cables (IEC 60228:2023)

Ames des câbles isolés
(IEC 60228:2023)

Leiter für Kabel und isolierte Leitungen
(IEC 60228:2023)

This European Standard was approved by CENELEC on 2024-06-12. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 60228:2024 E

SEK Svensk Elstandard

SS-EN IEC 60228, utg 2:2024

European foreword

The text of document 20/2125/FDIS, future edition 4 of IEC 60228, prepared by IEC/TC 20 "Electric cables" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60228:2024.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-03-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-06-12

This document supersedes EN 60228:2005 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60228:2023 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IECEE OD-5014	-	IEC Systemof Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System), Committee of Testing Laboratories (CTL), Instrument Accuracy Limits	-	-

Annex ZB
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e. g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause	Special national condition
Table 3	**Cyprus, Ireland, United Kingdom** *Add*:

1,25	0,21	15,6	16,1

NOTE This conductor is for cables which are intended for use on appliances fitted with 13 A plugs conforming to BS 1363-1 or I.S. 401

Table C.1 **Cyprus, Ireland, United Kingdom**
Add:

1,25	–	–	1,7

IEC 60228

Edition 4.0 2023-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Conductors of insulated cables

Ames des câbles isolés

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.20

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONDUCTORS OF INSULATED CABLES

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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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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60228 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 2004. This edition constitutes a technical revision.

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

a) a description of Milliken conductors has been added;

b) nominal cross-sectional areas above 2 500 mm^2 have been added;

c) the old 2 500 mm^2 aluminium resistance value has been corrected and a new value introduced.

For legacy systems where the 2 500 mm^2 aluminium conductor was designed taking into account the value presented in previous editions and no longer tabulated, then the original design can be maintained and still utilized.

The suppliers can furthermore utilize such superseded design of 2 500 mm^2 aluminium conductors either in systems already designed and qualified but not delivered or for example to produce repair and additional spare lengths for delivered systems.

The choice of utilizing the original superseded design of 2 500 mm^2 aluminium conductors or a new one based on the new resistance tabulated value is a matter of agreement between the supplier and final users.

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

Draft	Report on voting
20/2125/FDIS	20/2131/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/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, or
- revised.

INTRODUCTION

This document is intended as a fundamental reference standard for IEC technical committees and National Committees in drafting standards for electric cables, and to the National Committees in drafting specifications for use in their own countries. These committees select from the tables of this general standard the conductors appropriate to the particular applications relevant to them and either include the applicable details in their cable specifications or make appropriate references to this document.

CONDUCTORS OF INSULATED CABLES

1 Scope

This document specifies the nominal cross-sectional areas, in the range 0,5 mm^2 to 3 500 mm^2, for conductors in electric power cables and cords of a wide range of types. Requirements for numbers and sizes of wires and resistance values are also included. These conductors include solid, stranded and Milliken, copper, aluminium and aluminium alloy conductors in cables for fixed installations and flexible copper conductors.

This document does not apply to conductors for telecommunication purposes.

The applicability of this document to a particular type of cable is as specified in the standard for the type of cable.

Unless specified otherwise in a particular clause, this document relates to the conductors in the finished cable and not to the conductor as made or supplied for inclusion into a cable.

Conductors described in this document are specified in metric sizes.

Informative annexes provide supplementary information covering temperature correction factors for resistance measurement (Annex B) and guidance on dimensional limits of circular conductors (Annex C).

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.

IECEE OD-5014, *Instrument Accuracy Limits*