

**SLOVENSKI STANDARD
SIST EN 60702-1:2002****01-september-2002****Nadomešča:
SIST HD 586.1 S1:1998**

Kabli z mineralno izolacijo in njihovi priključki z naznačeno napetostjo, ki ne presega 750 V - 1. del: KabliMineral insulated cables and their terminations with a rated voltage not exceeding 750 V
- Part 1: Cables

Mineralisolierte Leitungen mit einer Bemessungsspannung bis 750 V - Teil 1: Leitungen

(standards.iteh.ai)Câbles à isolant minéral et leurs terminaisons de tension assignée ne dépassant pas
750 V - Partie 1: Câbles[SIST EN 60702-1:2002](https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002)<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002>**Ta slovenski standard je istoveten z: EN 60702-1:2002****ICS:**

29.060.20 Kabli Cables

SIST EN 60702-1:2002 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60702-1:2002

<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002>

EUROPEAN STANDARD

EN 60702-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2002

ICS 29.060.20

Supersedes HD 586.1 S1:1994

English version

**Mineral insulated cables and their terminations
with a rated voltage not exceeding 750 V
Part 1: Cables
(IEC 60702-1:2002)**

Câbles à isolant minéral et leurs
terminaisons de tension assignée
ne dépassant pas 750 V
Partie 1: Câbles
(CEI 60702-1:2002)

Mineralisierte Leitungen mit einer
Bemessungsspannung bis 750 V
Teil 1: Leitungen
(IEC 60702-1:2002)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60702-1:2002

<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-11d1830d44/SIST-EN-60702-1-2002>

This European Standard was approved by CENELEC on 2002-03-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 document 20/490/FDIS, future edition 3 of IEC 60702-1, prepared by IEC TC 20, Electric cables, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60702-1 on 2002-03-01.

This European Standard supersedes HD 586.1 S1:1994.

The following dates were 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) 2002-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-03-01

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

iTeh **Endorsement notice** STANDARD PREVIEW (standards.iteh.ai)

The text of the International Standard IEC 60702-1:2002 was approved by CENELEC as a European Standard without any modification.

SIST EN 60702-1:2002
<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002>

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 60227-1 ¹⁾ | 1993 | Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V Part 1: General requirements | - | - |
| IEC 60228 (mod) | 1978 | Conductors of insulated cables - First supplement: Guide to the dimensional limits of circular conductors | HD 383 S2 ²⁾ | 1986 |
| IEC 60331-21 | 1999 | Tests for electric cables under fire conditions - Circuit integrity Part 21: Procedures and requirements - Cables of rated voltage up to and including 0,6/1,0 kV | - | - |
| IEC 60332-1 ³⁾ | 1993 | Tests on electric cables under fire conditions Part 1: Test on a single vertical insulated wire or cable | - | - |
| IEC 60702-2 | 2002 | Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V Part 2: Terminations | EN 60702-2 | 2002 |
| IEC 60754-2 (mod) | 1991 | Test on gases evolved during combustion of materials from cables - Determination of degree of acidity (corrosivity) of gases by measuring pH and conductivity | HD 602 S1 ⁴⁾ | 1992 |

¹⁾ HD 21.1 S3:1997, which is related to, but not directly equivalent with, IEC 60227-1:1993, applies instead.

²⁾ HD 383 S2 includes supplement A:1982 to IEC 60228.

³⁾ EN 50265-1:1998 and EN 50265-2-1:1998, which are related to IEC 60332-1:1993, apply.

⁴⁾ HD 602 S1 is superseded by EN 50267-1:1998 and EN 50267-2-3:1998.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|
| IEC 60811-1-1 | 1993 | Insulating and sheathing materials of electric and optical cables - Common test methods Part 1-1: General application - Measurement of thickness and overall dimensions - Tests for determining the mechanical properties | EN 60811-1-1 | 1995 |
| IEC 60811-1-4 | 1985 | Insulating and sheathing materials of electric and optical cables - Common test methods Part 1-4: General application - Tests at low temperature | EN 60811-1-4 ⁵⁾ | 1995 |
| IEC 60811-3-1 + corr. May | 1985 1986 | Part 3-1: Methods specific to PVC compounds - Pressure test at high temperature - Tests for resistance to cracking | EN 60811-3-1 | 1995 |
| IEC 61034-2 | 1997 | Measurement of smoke density of cables burning under defined conditions Part 2: Test procedure and requirements | - | - |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60702-1:2002

<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002>

⁵⁾ EN 60811-1-4 includes corrigendum May 1986 and A1:1993 to IEC 60811-1-4.

NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60702-1

Troisième édition
Third edition
2002-02

**Câbles à isolant minéral et leurs terminaisons
de tension assignée ne dépassant pas 750 V –**

**Partie 1:
Câbles**

iTeh STANDARD PREVIEW

**Mineral insulated cables and their terminations
with a rated voltage not exceeding 750 V –**

SIST EN 60702-1:2002

[http://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-](http://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002)

**Part 1:
Cables**

[b087a86ba040/sist-en-60702-1-2002](http://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002)

© IEC 2002 Droits de reproduction réservés — Copyright - all rights reserved

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'éditeur.

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 the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

S

*Pour prix, voir catalogue en vigueur
For price, see current catalogue*

CONTENTS

| | |
|------------------------------------------------------|----|
| FOREWORD..... | 7 |
| 1 Scope..... | 9 |
| 2 Normative references | 9 |
| 3 Definitions | 11 |
| 4 Voltage designations | 11 |
| 4.1 500 V cable (light duty grade)..... | 11 |
| 4.2 750 V cable (heavy duty grade)..... | 11 |
| 5 Conductors..... | 13 |
| 6 Insulation | 13 |
| 6.1 Composition | 13 |
| 6.2 Thickness..... | 13 |
| 7 Metallic sheath | 13 |
| 7.1 Material..... | 13 |
| 7.2 Sheath thickness | 13 |
| 7.3 Sheath diameter and ovality | 13 |
| 8 Optional outer covering | 13 |
| 8.1 General..... | 13 |
| 8.2 Material..... | 15 |
| 8.3 Halogen-free covering..... | 15 |
| 8.4 Thickness of covering..... | 15 |
| 9 Marking | 15 |
| 10 General notes on tests..... | 17 |
| 11 Routine tests | 17 |
| 11.1 General..... | 17 |
| 11.2 Conductor resistance..... | 17 |
| 11.3 Insulation resistance | 19 |
| 11.4 Integrity of insulation and copper sheath | 19 |
| 11.5 Spark test on outer covering..... | 19 |
| 11.6 Diameter and ovality over copper sheath..... | 21 |
| 12 Sample tests | 21 |
| 12.1 General..... | 21 |
| 12.2 Voltage test..... | 21 |
| 12.3 Thickness of outer covering..... | 23 |
| 12.4 Flame retardance | 23 |
| 12.5 Emission of acidic and corrosive gases | 23 |
| 12.6 Smoke emission | 23 |
| 13 Type tests | 25 |
| 13.1 General..... | 25 |
| 13.2 Voltage test on completed cable..... | 25 |
| 13.3 Resistance of copper sheath | 25 |
| 13.4 Thickness of insulation | 25 |
| 13.5 Thickness of copper sheath..... | 27 |

iTeh STANDARD PREVIEW

(standards.iteh.ai)

SIST EN 60702-1:2002

[https://standards.iteh.ai/catalog/standards/sist/4f98027f-b00-4379-9b3c-](https://standards.iteh.ai/catalog/standards/sist/4f98027f-b00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002)[b087a86ba040/sist-en-60702-1-2002](https://standards.iteh.ai/catalog/standards/sist/4f98027f-b00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002)

| | | |
|------|--------------------------------------------------------|----|
| 13.6 | Bending test | 27 |
| 13.7 | Flattening test | 35 |
| 13.8 | Fire resistance | 37 |
| 14 | 500 V mineral insulated cable (light duty grade) | 37 |
| 14.1 | Code designation | 37 |
| 14.2 | Rated voltage | 37 |
| 14.3 | Construction | 37 |
| 14.4 | Dimensions | 37 |
| 14.5 | Requirements | 39 |
| 15 | 750 V mineral insulated cable (heavy duty grade)..... | 39 |
| 15.1 | Code designation | 39 |
| 15.2 | Rated voltage | 39 |
| 15.3 | Construction | 41 |
| 15.4 | Dimensions | 41 |
| 15.5 | Requirements | 45 |

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60702-1:2002

<https://standards.iteh.ai/catalog/standards/sist/4f98027f-fb00-4379-9b3c-b087a86ba040/sist-en-60702-1-2002>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MINERAL INSULATED CABLES AND THEIR TERMINATIONS
WITH A RATED VOLTAGE NOT EXCEEDING 750 V –**
Part 1: Cables

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60702-1 has been prepared by IEC technical committee 20: Electric cables.

This third edition of IEC 60702-1 cancels and replaces the second edition of IEC 60702-1 published in 1988 and its amendment 1 published in 1992, and constitutes a technical revision.

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

| | |
|-------------|------------------|
| FDIS | Report on voting |
| 20/490/FDIS | 20/510/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 3.

The committee has decided that the contents of this publication will remain unchanged until 2012. At this date, the publication will be

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

MINERAL INSULATED CABLES AND THEIR TERMINATIONS WITH A RATED VOLTAGE NOT EXCEEDING 750 V –

Part 1: Cables

1 Scope

This standard applies to mineral insulated general wiring cables with copper or copper alloy sheath and copper conductors and with rated voltages of 500 V and 750 V. Provision is made for a corrosion-resistant extruded outer covering over the copper sheath, when required. This outer covering is not specified for the purpose of electrical insulation of the metal sheath.

Requirements for terminations for use with these cables are specified in IEC 60702-2.

The purpose of this standard is to specify mineral insulated cables that are safe and reliable when properly used, to state the manufacturing requirements and characteristics to achieve this, and to specify methods for checking conformity with those requirements.

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 60227-1:1993, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60228:1978, *Conductors of insulated cables*

IEC 60331-21:1999, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

IEC 60332-1:1993, *Tests on electric cables under fire conditions – Part 1: Test on a single vertical insulated wire or cable*

IEC 60702-2:2002, *Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V – Part 2: Terminations*

IEC 60754-2:1991, *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

IEC 60811-1-1:1993, *Common test methods for insulating and sheathing materials of electric cables and optical cables – Part 1: Methods for general application – Section 1: Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*