

SLOVENSKI STANDARD

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Električni kabli - Navodilo za uporabo kablov z naznačeno napetostjo, ki ne presega 450/750 V - 1. del: Splošna navodila

Electric cables - Guide to use for cables with a rated voltage not exceeding 450/750 V - Part 1: General guidance

Kabel und Leitungen - Leitfaden für die Verwendung von Kabeln und isolierten Leitungen mit einer Nennspannung nicht über 450/750 V - Teil 1: Allgemeiner Leitfaden

Câbles électriques - Guide d'emploi des câbles avec une tension assignée n'excédant pas 450/750 V - Partie 1: Lignes directrices

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Supersedes HD 516 S2:1997 (partially) + A1:2003 (partially) + A2:2008 (partially)

English version

**Electric cables -
Guide to use for cables with a rated voltage not exceeding 450/750 V
(U_0/U) -
Part 1: General guidance**

Câbles électriques -
Guide d'emploi des câbles avec une
tension assignée n'excédant pas 450/750
V (U_0/U) -
Partie 1: Lignes directrices

Kabel und Leitungen -
Leitfaden für die Verwendung von Kabeln
und isolierten Leitungen mit einer
Nennspannung nicht über 450/750 V
(U_0/U) -
Teil 1: Allgemeiner Leitfaden

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CENELEC

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Europäisches Komitee für Elektrotechnische Normung

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Contents

Page

| | |
|---|----|
| Foreword..... | 4 |
| Introduction..... | 5 |
| 1 Scope..... | 6 |
| 2 Normative references..... | 6 |
| 3 Terms and definitions..... | 6 |
| 4 Safety..... | 7 |
| 4.1 General..... | 7 |
| 4.2 Selection and installation..... | 7 |
| 4.3 Cables in fixed installations..... | 8 |
| 4.4 Flexible cables..... | 9 |
| 5 Limiting conditions..... | 10 |
| 5.1 General..... | 10 |
| 5.2 Voltage..... | 10 |
| 5.3 Current-carrying capacity..... | 11 |
| 5.4 Thermal effects..... | 12 |
| 5.5 Fire characteristics..... | 13 |
| 5.6 Mechanical stress..... | 13 |
| 5.6.1 General..... | 13 |
| 5.6.2 Tension..... | 13 |
| 5.6.3 Bending..... | 14 |
| 5.6.4 Compression..... | 15 |
| 5.6.5 Torsion..... | 16 |
| 5.7 Compatibility..... | 16 |
| 5.8 Dynamic stresses (electromechanical stress)..... | 16 |
| 6 Initial and periodic verifications..... | 16 |
| 7 Packaging, storage and handling/transportation..... | 16 |
| 7.1 Packaging..... | 16 |
| 7.2 Storage..... | 16 |
| 7.3 Handling/transportation..... | 17 |
| Annex A (informative) Types of usage..... | 18 |
| Annex B (informative) Classes of duty..... | 19 |
| Annex C (informative) Current ratings (copper conductors)..... | 21 |
| Annex D (informative) Duty cycles, current ratings and voltage drop for arc welding cables (copper conductors)..... | 23 |
| Figure 1 — Definition of internal bending radius..... | 14 |
| Table 1 - Spacing of supports for non-armoured cables in accessible positions..... | 9 |
| Table 2 — Maximum permitted voltages against rated voltage of cable..... | 10 |

| | |
|---|-----------|
| Table 3 — Minimum recommended bending radii at cable temperatures of (20 ± 10) °C | 15 |
| Table C.1 - Current rating for thermoplastic light and ordinary duty flexible cable | 21 |
| Table C.2 - Current rating for cross-linked flexible cable | 21 |
| Table C.3 - Current rating for cross-linked heavy duty flexible cable | 22 |
| Table D.1 — Ambient temperature correction factors | 23 |
| Table D.2 — Current rating for single cycle operation over a maximum period of 5 min | 24 |
| Table D.3 — Current rating for repeat cycle operation based on 5 min repeat period | 24 |
| Table D.4 — Current rating for repeat cycle operation based on a 10 min repeat period | 25 |
| Table D.5 — Voltage drop at normal and elevated temperatures | 25 |

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Foreword

This document (EN 50565-1:2014) has been prepared by Technical Committee CLC/TC 20, "Electric cables".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-02-17
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-02-17

This document together with Part 2 supersedes HD 516 S2:1997.

EN 50565-1:2014 and EN 50565-2:2014 includes the following significant technical changes with respect to HD 516 S2:1997:

Both parts of EN 50565 refer to cable types specified in EN 50525, replacing the reference to the HD 21 and HD 22 cable types. Part 1 provides general recommendations and guidance, Part 2 covers specific guidance for each cable type in EN 50525, like designation, constructional details, recommendations for installation, conditions and limits of operation, temperature limits and recommended use/suitability.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

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

Introduction

This European Standard provides guidance for equipment manufacturers, installers and end-users on the properties of low voltage electric cables, and the limitations that are deemed to be necessary in order to safeguard life, buildings, and goods. It also gives a reasonable certainty on cable life time expectation relevant to its application, i.e. the duration of acceptable performance considered as reasonable for a cable used in a fixed installation for the distribution of electricity in a building is more than that for flexible cable.

It is not possible to cover all the uses that the installers or users may wish to use for a specific type of cable. The use other than the recommended ones could result in a lowering of safety and/or in a reduction in the expected life of the cable. If a cable is intended to be used outside the recommended uses the cable manufacturer should be consulted for advice.

In specific cases where guidance is not given, it is recommended that specific advice of the cable manufacturer is sought.

In some countries, legislation may limit the use of certain cable types and define additional requirements for cable installation practice.

Additional information on installation practice is given in HD 60364 and HD 384 series of specifications, and national regulations/code practices.

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1 Scope

This European Standard provides guidance to help installers, cabling designers and end users to understand the characteristics of electric cables, with a rated voltage not exceeding 450/750 V (U_0/U) or equivalent d.c. voltages, so that the cable can be selected, installed and operated in a safe way. It is applicable to those cable types that are specified in EN 50525 (all parts).

The guidance given in this European Standard can also be applicable to low-voltage cables of a similar type to those specified in EN 50525 but not specifically mentioned in those standards. In these cases, it is advisable to seek additional advice from the cable manufacturer.

Legal or statutory requirements do take precedence over the guidance given in this document.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50525 (all parts), *Electric cables — Low voltage energy cables of rated voltages up to and including 450/750 V (U_0/U)*

EN 50565-2, *Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V – Part 2: Specific guidance related to EN 50525 cable types*

EN 60079 (all parts), *Electrical apparatus for explosive gas atmospheres (IEC 60079, all parts)*

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1)*

HD 384 (all parts), *Electrical Installations of buildings*

HD 60364 (all parts), *Low voltage electrical Installations (IEC 60364, all parts)*

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

IEC 60287 (all parts), *Electric cables — Calculation of the current rating*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-461, HD 60364 and HD 384 standard series and the following apply.

3.1

internal wiring

wiring mechanically protected by being enclosed within a casing of equipment or by other equivalent means

3.2

skilled person

person with technical knowledge or sufficient experience to enable him/her to avoid dangers which electricity may create

3.3

instructed person

person adequately advised or supervised by skilled persons to enable him/her to avoid dangers which electricity may create

4 Safety

4.1 General

Safety of a cable means that the product does not present an unacceptable risk of danger to life or property whilst being used in its intended manner.

The duration of acceptable performance of a particular type of cable depends upon the type of use, installation or electrical apparatus and on the particular combination of influences relating thereto. For example, the duration of acceptable performance considered as reasonable for a cable used in a fixed installation for the distribution of electricity in a building is more than that for flexible cable.

The test methods and test parameters described in the EN Standards referred to in Clause 1 are only for the purposes of checking design with respect to safety and quality assurance. They do not indicate that the cables are suitable for service under conditions equivalent to the test conditions.

Cables shall not be used for any purpose other than the transmission and distribution of electricity, and shall be installed, jointed or/and connected to apparatus only by suitably skilled or instructed personnel.

4.2 Selection and installation

4.2.1 All cables shall be selected so as to be suitable for the voltages and currents likely to occur.

4.2.2 Cables shall be selected so that they are suitable for the intended operating conditions and equipment classification. Examples of operation conditions are:

- a) voltage;
- b) current;
- c) protective measures;
- d) grouping of cables;
- e) method of installation;
- f) accessibility.

4.2.3 Cables shall be selected so that they are of a type designed to be suitable for any external influences which might exist. Examples of external influences are:

- a) ambient temperature;
- b) presence of rain, steam or accumulation of water;
- c) presence of corrosive, chemical or polluting substances;
- d) mechanical stresses (such as through holes or sharp edges in metal work), impact or vibration;
- e) fauna (such as rodents);

- f) flora (such as mould);
- g) radiation (such as sunlight).

Annex A gives an explanation of the different types of usage (i.e. indoor/outdoor).

4.2.4 Cables shall be so selected, installed, protected, used and maintained as to prevent danger so far as it is reasonably practicable.

4.2.5 Care shall be taken during the installation and termination of cables so as not to damage the cables. For cables with sheaths, it is recommended that the minimum length of sheath is removed in order not to change the mechanical characteristics of the cable in this critical part of the installation. Also, when removing cable sheaths, damage to the insulation shall be avoided.

4.2.6 Cables covered by this guide to use, shall not be directly or indirectly buried in the ground. Some National Regulations allow temporary installation of some heavy duty flexible cables directly or indirectly in the ground (please see relevant National Regulations).

4.2.7 Cables shall be prevented from being in contact with or close to hot surfaces, unless they are of a type intended for such conditions. It should be noted that thermoplastic insulated and/or sheathed cables have a relatively low melting temperature, and very careful consideration of the temperatures involved shall be made before selection and use of this type of cable.

4.2.8 In an installation that may be subject to damage by fauna (such as rodents) additional protection is required.

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4.3 Cables in fixed installations

Cables shall be supported adequately. The recommended maximum spacing of supports is given in Table 1. In deciding the actual spacing required, the fixing method, the likelihood of vibration and the mass of the cable between the supports shall be taken into account.

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Cables shall not be damaged by any mechanical restraint used for their support.

In the case of single-core cables, the spacing also depends on the dynamic forces due to a short-circuit current; the manufacturer's recommendations shall be observed (see 5.8).

Cables which have been in use can be damaged if they are disturbed. This can arise from the effect of natural ageing on the physical properties of the materials used for cable insulation and sheathing which can ultimately result in hardening of these materials.

Cables for fixed installation shall not be installed in contact with water, unless specifically designed for such purposes.

Table 1 — Spacing of supports for non-armoured cables in accessible positions

| Overall diameter (D) of cable ^a (mm) | Maximum spacing of clips ^{b c} (mm) | |
|--|--|----------|
| | Horizontal | Vertical |
| $D \leq 9$ | 250 | 400 |
| $9 < D \leq 15$ | 300 | 400 |
| $15 < D \leq 20$ | 350 | 450 |
| $20 < D \leq 40$ ^d | 400 | 550 |

^a For flat cables this is taken as the measurement of the major axis.

^b The spacings stated for horizontal runs may also be applied to runs at an angle of more than 30° from the vertical. For runs at an angle of 30° or less than the vertical, the vertical spacings are applicable.

^c The spacing stated in this table is a maximum. Reduced spacing may be required for various reasons, for example, the fixing method used, vibration, weight of cable.

^d For the spacing of supports for cables of overall diameter exceeding 40 mm, and for single core cables having conductors of cross-sectional area 300 mm² and larger, the manufacturer's recommendations shall be observed.

4.4 Flexible cables

4.4.1 Flexible cables shall be used for connections to all mobile equipment. The length of such cables shall not be so great as to prevent the short circuit protective device from operating correctly. Such cables shall also be of a minimum practical length to reduce the risk of mechanical damage.

4.4.2 Flexible cables shall be selected and used with due reference to the appropriate class of duty.

Annex B gives information on classes of duty.

4.4.3 Where thermoplastic flexible cables are acceptable, consideration shall be given to the use of extensible leads as a means of limiting the length of the connection.

4.4.4 Flexible multicore control cables, if installed so that they are continually flexed, shall be protected in a manner which minimises the possibility of abrasion, cutting and sharp bends.

4.4.5 Flexible cables shall not be used as fixed wiring unless they are contained in an enclosure affording mechanical protection, with the following two exceptions:

- final connection to fixed equipment when the duty type of the cable is at least ordinary duty or higher;
- fixed installations in temporary buildings when the duty type of the cable is heavy duty.

4.4.6 Flexible cables shall not be installed in plaster.

4.4.7 Exposed lengths of flexible cable used as final connections to fixed equipment shall be as short as practicably possible and shall be directly connected to the fixed wiring in a manner that is appropriate to the equipment and the method of termination.

4.4.8 Flexible cables shall not be subject to excessive tension (see 5.6.2), crushing, abrasion, torsion and kinking, particularly at the inlet of the appliance and at the point of connection to the fixed wiring. They shall not be damaged by any strain relief or clamping device.

4.4.9 Flexible cables shall not be placed under carpets or other floor coverings, where there is:

- a) any risk of thermal insulating effects, leading to excessive temperature rise (see 5.4.1a); or
- b) any risk of damage due to furniture or equipment resting on them or traffic passing over them.