SLOVENSKI STANDARD
SIST HD 627 S1:1998

01-februar-1998

Večžilni in večparni kabli za nadzemno in podzemno inštalacijo

Multicore and multipair cables for installation above and below ground

Vieladrige und vielpaarige Kabel für die Verlegung in Luft und in Erde

Câbles multiconducteurs et multipaires pour installation dans l'air et dans le sol

Ta slovenski standard je istoveten z: **HD 627 S1:1996**

ICS:

29.060.20 Kabli Cables

SIST HD 627 S1:1998 **en**

HARMONIZATION DOCUMENT

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

HD 627 S1

October 1996

ICS 29.060.20

Descriptors: Underground electrical wiring system, overhead electrical line, electric cable

English version

Multicore and multipair cable for installation above and below ground

Câbles multiconducteurs et multipaires pour installation dans l'air et dans le sol

This Harmonization Document was approved by CENELEC on 1996-07-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

Up-to-date lists and bibliographical references concerning such national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in two official versions (English, French).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, 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

Ref. No. HD 627 S1:1996 E

FOREWORD

This Harmonisation Document was prepared by WG10 of CENELEC Technical Committee TC20, Electric Cables. It was agreed by TC20 at its Rotterdam meeting (March 1995) to be submitted for formal vote by National Committees.

The document contains the following Parts, arranged according to the main constructional features of the cables covered:

Part 1 General requirements
Part 2 Special test methods
Part 3 Multicore and multipair cables for use underground
Part 4 Multicore and multipair halogenated cables complying with HD 405.1
Part 5 Multicore and multipair halogenated cables complying with HD 405.3 or similar
Part 6 Multicore and multipair halogen-free cables complying with HD 405.1
Part 7 Multicore and multipair halogen-free cables complying with HD 405.3 or similar

Each of Parts 3-7 inclusive are further divided into particular sections and, by decision of the Technical Board (D68/047) National Committees need at present only implement in their national language those sections having national applicability. The obligation remains however to announce the full HD in public by titles and numbers, and also to withdraw any conflicting national standards.

Page numbering reflects the arrangement into Parts and particular sections, e.g. Page 5-M-3 is page 3 of particular section M of Part 5.

References to other HDs, ENs and international standards are given in the particular parts or sections.

The draft was submitted to the CENELEC members for formal vote in January 1996 and was approved by CENELEC as HD 627 S1 on 1996-07-02. By decision of the Technical Board (D81/139) this HD exists only in English and French.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level	(doa)	1996-12-01
- latest date by which the HD has to be implemented at national level by publication of a harmonised national standard or by endorsement	(dop)	1997-06-01
- latest date by which the national standards conflicting with the HD have to be withdrawn	(dow)	1997-06-01

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PART 6 Multicore and multipair halogen-free cables complying with HD 405.1

6-E: 450/750V multicore cables with common screen

PART 7 Multicore and multipair halogen-free cables complying with HD 405.3 or similar

7-A1: Multicore cables with copper conductors, single wire armoured and unarmoured with non-halogenated sheath
7-A2: Multipair cables with copper conductors single wire and double steel tape armoured with non-halogenated sheath
7-B1: 500V multiquad cables with a metallic covering
7-B2: 750V multicore cables with a metallic covering
7-D1: 450/750V multicore cables without screen
7-D2: 450/750V multicore cables with concentric conductor
7-F1: 1kV XLPE insulated and non-halogenated sheathed multicore cables
7-F2: 300V armoured and unarmoured XLPE insulated and non-halogenated sheathed and screened instrumentation cables
7-G: Cables in pairs, triples and quads with copper conductors, metallic screen and having halogen free all-non-metallic components
7-H: 0.6/1kV multicore cables with and without a concentric conductor
7-K: 150V multicore and multipair cables with and without a metallic covering
7-L1: Cables in pairs and triples and multicore cables with circular copper conductors and metallic covering
7-L2: Multipair and multicore cables with circular copper conductors for plug-in connections
7-M: EPR or XLPE insulated and ZH sheathed multicore cables and polyethylene insulated and ZH sheathed multipair cables

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MULTICORE AND MULTIPAIR CABLE FOR INSTALLATION ABOVE AND BELOW GROUND

PART 1 : GENERAL REQUIREMENTS

PART 1: GENERAL REQUIREMENTS

CONTENTS

REFERENCES

Part 1 of HD 627 incorporates by dated or undated reference, provisions from other publications. These 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 Part 1 of HD 627 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 60811	Common test methods for insulating and sheathing materials of electric cables
HD 21	PVC insulated cables of rated voltages up to and including 450/750V
HD 22	Rubber insulated cables of rated voltages up to and including 450/750V
HD 186	Marking by inscription for the identification of cores of electric cables having more than five cores
HD 383	Conductors of insulated cables
HD 405	Tests on electric cables under fire conditions
HD 602	Test on gases evolved during the combustion of materials from cables: Determination of degree of acidity (corrosivity) of gases by measuring pH and conductivity
HD 605	Electric cables: Additional test methods
HD 606	Measurement of smoke density of electric cables burning under defined conditions
IEC 189-1	Low frequency cables and wires with PVC insulation and PVC sheath - General test and measuring methods

MULTICORE AND MULTIPAIR CABLE FOR INSTALLATION ABOVE AND BELOW GROUND

PART 1 - GENERAL REQUIREMENTS

1. General

1.1 Scope

HD 627 applies to multicore and multipair rigid and flexible conductor cables for fixed installations having a rated voltage up to 1kV and operating at a voltage above 80V rms. The insulation and sheath may be either thermoplastic or thermosetting, halogenated or halogen free.

The cables are mainly intended for use in power generating plants and sub-stations and some for direct burial in conjunction with utility operations. Cables may have specific fire performance requirements. Cables designed to be installed within the containment area of nuclear power plants (LOCA cables), or cables specifically designed to be radiation resistant are not included in this HD.

This Part 1 specifies the General Requirements applicable to these cables; additional or deviating requirements are given in the particular sections of this HD.

Test methods are given in EN 60811, HD 21, HD 22, HD 186, HD 383, HD 405, HD 602, HD 605, HD 606, IEC 189 and this HD.

The particular types of cables for each category of fire performance are specified in Parts 3 to 7.

1.2 Object

The objects of this Harmonisation Document are:

- to standardise cables that are safe and reliable when properly used, in relation to the technical requirements of the system of which they form a part;
- to state the characteristics and manufacturing requirements directly or indirectly bearing on safety;
- to specify methods for checking conformity with those requirements.

2. Definitions

2.1 Definitions relating to insulating and sheathing compounds

2.1.1 Insulating and sheathing compounds

The types of insulating and sheathing compound covered in this HD are listed below together with their abbreviated designations.

2.1.1.1 Thermoplastic polyvinyl chloride compound (PVC)

Combinations of materials suitably selected, proportioned and treated, of which the characteristic constituent is polyvinyl chloride or one of its co-polymers. The same term also designates compounds containing both polyvinyl chloride and certain of its co-polymers.

2.1.1.2 Cross-linked ethylene propylene rubber (EPR)

A compound based on ethylene propylene rubber or similar (EPM or EPDM) which when cross-linked complies with the requirements given in the particular sections.

2.1.1.3 Cross-linked polyethylene (XLPE)

A thermosetting material formed by the cross-linking of thermoplastic polyethylene compound either by chemical or irradiation methods so as to comply with the requirements given in the particular sections.

2.1.1.4 Ethylene copolymers

Thermoplastic or cross-linked materials in which the characteristic constituent is a copolymer of ethylene such as EVA, EEA, EMA, compounded so as to comply with the requirements given in the particular sections.

2.1.1.5 Chlorinated synthetic elastomeric compound

A vulcanised compound in which the characteristic constituent is polychloroprene rubber (PCP) or other chlorinated synthetic elastomer, such as CSP, CPE or NBR/PVC compounded so as to comply with the requirements given in the particular sections.

NOTE: The abbreviations PCP, CSP and CPE are those in common use. Equivalent codings according to ASTM are CR, CSM and CM.

2.1.1.6 Aromatic based compound

A thermoplastic compound based on aromatic polymers e.g. polyphenylene oxide (PPO), polybutylene terephthalate (PBT), polyetheretherketone (PEEK) which comply with the requirements given in the particular sections.

2.1.1.7 Polyethylene

A thermoplastic material compounded so as to comply with the requirements given in the particular sections.

2.1.2 Type of compound

The category in which a compound is placed according to its properties, is determined by specific tests. The type designation is not directly related to the composition of the compound.

2.2 Definitions relating to the tests

NOTE: Tests classified as Sample (S) or Routine (R) may be required as part of any Type Approval Schemes.

2.2.1 Type tests (Symbol T)

Tests required to be made before supplying a type of cable covered by this HD on a general commercial basis in order to demonstrate satisfactory performance characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable material, design or type of manufacturing process which might change the performance characteristics.

2.2.2 Sample tests (Symbol S)

Tests made on selected lengths of completed cable, on samples of completed cable, or components taken from a completed cable adequate to verify that the finished product meets the design specifications.

2.2.3 Routine test (Symbol R)

Tests made on all production cable lengths to demonstrate their integrity.

2.3 Rated voltage

The rated voltage of a cable is the reference voltage for which the cable is designed, and shall be given in the particular sections.

The rated voltage is expressed by the combination of the following values Uo/U expressed in kV or V.

Uo is the rms value between any insulated conductor and 'earth' (metal covering of the cable or the surrounding medium); for example Uo = 0.6kV.

U is the rms value between any two phase-conductors of a multicore cable or of a system of single-core cables; for example U = 1.0kV.

Where cables are installed underground in parallel with high voltage feeders for long lengths voltages may be induced as a result of faults in the power circuits. Appropriate voltage tests may be specified to check the adequacy of the insulation where such occurrences are likely.

3. Marking

3.1 Indication of origin

Cables shall be provided with an identification of origin consisting of:

1. Either the manufacturer's identification thread

2. or the continuous marking of the manufacturer's name or trademark, or (if legally protected) identification number, by one of the three following methods:

   (a) printed tape within the cable;

   (b) printing in a contrasting colour on the insulation of at least one core;

   (c) printing, indenting or embossing on the outer surface of the cable.

3.1.1 Continuity of marks

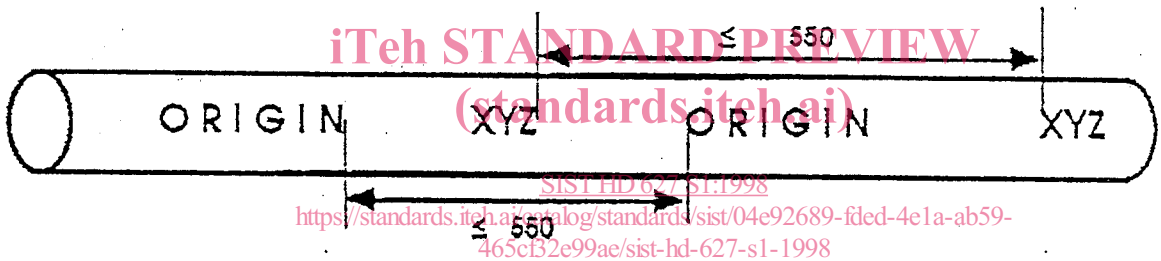
Unless otherwise specified in the particular section, each specified mark shall be regarded as continuous if the distance between the end of the mark and the beginning of the next identical mark does not exceed:

550mm if the marking is on the outer surface of the cable. 275mm if the marking is:

(i) on the insulation of a sheathed cable;
(ii) on a tape within a sheathed cable

NOTE: A 'Specified Mark' is any mandatory mark covered by this Part of the HD or by the particular requirements of Part 3 onwards of this HD.

The diagram below shows an example of the marking as used on the outer surface of the cable, where the word 'ORIGIN' is for the mandatory information required for sub-clause 3.1, and 'XYZ' is one of any other mandatory marks.



3.2 Additional marking

Additional marking requirements may be specified in the particular sections.

3.3 Durability

Printed markings shall be durable. Compliance with this requirement shall be checked by the test given in sub-clause 2.5.4 of HD 605. The printed legend shall be legible after carrying out the test.

3.4 Legibility

All markings shall be legible. Printed markings shall be in contrasting colours.

All colours of the identification thread shall be easy to recognise or easily be made recognisable, if necessary, by cleaning with a suitable solvent.

3.5 Common marking

Under consideration

3.6 Use of the name CENELEC

The name CENELEC, in full or abbreviated, shall not be directly marked on, or in, the cables.

4. Core identification

The cores shall be identified by colours or numbers when specified in the particular sections. Colouring shall be achieved by the use of coloured insulation or by a coloured surface.

When identification is by numbers, they shall be printed in a colour which contrasts with the core colours. Marking shall comply with HD 186 unless otherwise specified.

Colours shall be clearly identifiable and durable. Durability shall be checked by the test given in sub-clause 2.5.4 of HD 605.

Compliance with these requirements shall be verified by visual examination.

For paired, tripled and quadded cables the individual cores in each unit shall be identified.

When required by the particular section, each unit shall be identified.

Compliance with these requirements shall be verified by visual examination.

Detailed requirements for the identification scheme are given in the particular sections.

5. General requirements for the construction of cables

5.1 Conductors

5.1.1 Material

Conductors shall be either plain or metal-coated annealed copper.

5.1.2 Construction

The maximum diameters of the wires of flexible conductors, and the minimum number of the wires of rigid conductors, shall be in accordance with HD 383, unless otherwise specified in the particular sections.

The classes of the conductors relevant to the various types of cables are given in the particular sections.

Conductors shall be circular in shape, and solid metal, stranded or flexible.

5.1.3 Check of construction

Compliance with the requirements of sub-clauses 5.1.1 and 5.1.2 including the requirements of HD 383 shall be checked by inspection and by measurement.

5.1.4 Electrical resistance

The resistance of each conductor at 20°C shall be in accordance with the requirements of HD 383 for the given class of conductor unless otherwise specified in the particular sections.

Compliance shall be checked by the test given in sub-clause 3.1.1 of HD 605.

5.1.5 Separator tape

A separator tape may be placed between the conductor and insulation. Unless otherwise specified, it shall be non-hygroscopic.

It shall be easily removable from the conductor.

5.2 Insulation

5.2.1 Material

The insulation shall be a compound as specified for each type of cable in the particular sections.

The test requirements and the reference to test methods are specified in the particular sections.

The maximum conductor temperature in normal operation may be stated in the particular sections where appropriate.

5.2.2 Application to the conductor

The insulation may consist of one or more bonded layers.

It shall be so applied that it fits closely on the conductor or over the separator tape, and it shall be possible to remove it without damage to the insulation itself, to the conductor or to the metal coating if any. If required, compliance shall be checked by inspection and by manual test.