SLOVENSKI STANDARD
SIST HD 22.12 S1:1998

01-februar-1998

Rubber insulated cables of rated voltages up to and including 450/750 V - Part 12: Heat resistant EPR cords and flexible cables

Rubber insulated cables of rated voltages up to and including 450/750 V -- Part 12: Heat resistant EPR cords and flexible cables

Gummi-isolierte Leitungen mit Nennspannungen bis 450/750 V -- Teil 12: Wärmebeständige Schlauchleitungen mit EPR-Isolierhülle

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Conducteurs et câbles isolés au caoutchouc de tension assignée au plus égale à 450/750 V -- Partie 12: Câbles souples à isolation EPR résistant à la chaleur

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Ta slovenski standard je istoveten z: **HD 22.12 S1:1996**

ICS:

29.060.20 Kabli Cables

SIST HD 22.12 S1:1998 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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HARMONIZATION DOCUMENT **HD 22.12 S1**

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT May 1996

ICS 29.060.20

Descriptors: Insulated conductor, insulated cable, flexible cable, rubber, etylene-propylene, heat resistant material, protective sheath, insulation, designation, construction, dimension, test, data table

English version

Rubber insulated cables of rated voltages up to and including 450/750 V
Part 12: Heat resistant EPR cords and flexible cables

Conducteurs et câbles isolés au caoutchouc de tension assignée au plus égale à 450/750 V
Partie 12: Câbles souples à isolation EPR résistant à la chaleur

Isolierte Starkstromleitungen mit einer Isolierhülle aus Gummi mit Nennspannungen bis 450/750 V
Teil 12: Wärmebeständige Schlauchleitungen mit EPR Isolierhülle

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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 three official versions (English, French, German).

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

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Foreword

HD 22 was originally adopted by CENELEC on 9th July 1975.

Edition 2 of HD 22 was implemented on 1st January 1984, and at that time contained four parts.

Since 1984, new parts have been published, original parts amended and in addition HD 505 has superseded HD 385 as the cross-reference for test methods.

This new Part 12 to HD 22 introduces cords and flexible cables based on heat-resistant EPR insulation, and was approved by TC 20 at its Helsinki meeting in May 1994 to go to the Unique Acceptance Procedure.

HD 22 now has the following parts:

HD 22.1 S2	-	General requirements (with A1 to A10 inclusive)
HD 22.2 S2	-	Test methods (with A1 to A4 inclusive)
HD 22.3 S3	-	Heat resistant silicone rubber insulated cables
HD 22.4 S3	-	Cords and flexible cables
HD 22.5	-	(Spare)
HD 22.6 S2	-	Arc welding cables
HD 22.7 S2	-	Cables with increased heat resistance for internal wiring for a conductor temperature of 110 °C
HD 22.8 S2	-	Polychloroprene or equivalent synthetic elastomer sheathed cable for decorative chains
HD 22.9 S2	-	Single core non-sheathed cables for fixed wiring having low emission of smoke and corrosive gases
HD 22.10 S1	-	EPR insulated and polyurethane sheathed flexible cables
HD 22.11 S1	-	EVA cords and flexible cables
HD 22.12 S1	-	Heat resistant EPR cords and flexible cables
HD 22.13 S1	-	Single and multicore flexible cables, insulated and sheathed with crosslinked polymer and having low emission of smoke and corrosive gases
HD 22.14 S1	-	Cords for applications requiring high flexibility

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This Harmonization Document was prepared by the Technical Committee CENELEC TC 20, Electric cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as HD 22.12 S1 on 1996-03-05.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 1996-09-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 1997-03-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 1997-03-01

For products which have complied with the relevant national standard before 1997-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-03-01.

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1. Scope

This part (Part 12) of the HD details the particular specifications for heat-resistant EPR or equivalent synthetic elastomer insulated and heat-resistant EPR or CSP or equivalent synthetic elastomer sheathed cords and flexible cables of rated voltages up to and including 450/750V for use with a conductor temperature not exceeding 90°C.

All cables shall comply with the appropriate requirements given in Part 1 of this HD, and the individual types of cable shall each comply with the particular requirements of this Part.

NOTE: The overall dimensions of the cables in this part of HD 22 have been calculated in accordance with EN 60719.

2. Normative references

HD 22.12 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 apply hereafter. For dated references, subsequent amendments to or revisions of any of these publications to HD 22.12 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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HD 186	Marking by inscription for the identification of cores of electric cables having more than five cores
HD 383	Conductors of insulated cables (Endorsing IEC 228 and 228A)
HD 405.1	Tests on electric cables under fire conditions. Part 1: Test on a single vertical cable (Endorsing IEC 332-1)
EN 60719	Calculation of the lower and upper limits for the average outer dimensions of cables with circular copper conductors and of rated voltages up to and including 450/750V.
EN 60811	Common test methods for insulating and sheathing materials of Electric Cables

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3. Ordinary heat-resistant EPR or equivalent synthetic elastomer insulated and sheathed cord and cable for a maximum conductor temperature of 90°C

3.1 Code designation

H05BB-F

3.2 Rated voltage

300/500V

3.3 Construction

3.3.1 Conductor

Number of conductors: 2, 3, 4 or 5.
The conductors shall be in accordance with the requirements given in HD 383 for Class 5 conductors. The wires may be plain or tinned.

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3.3.2 Separator

A separator of suitable material may be applied around each conductor.

3.3.3 Insulation

The insulation shall be rubber compound of Type EI 7 applied around each conductor.

The insulation shall be applied by extrusion.

The insulation thickness shall comply with the specified value given in Part 12, Table I, column 2.

3.3.4 Assembly of cores and filler, if any

The cores shall be twisted together.

A centre filler may be used.

3.3.5 Sheath

The sheath shall be rubber compound of Type EM 6 applied around the cores.

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The thickness of sheath shall comply with the specified value given in Part 12, Table I, column 3.

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The sheath shall be extruded in a single layer and applied in such a way that it fills the spaces between the cores.

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The sheath shall be capable of being removed without damage to the cores.

The colour of sheath is not specified, but if black is used it shall be subject to the test for carbon black content given in Part 12 Table II, with a requirement for a minimum level as given for EM 6 in Part 1 Table II.

3.3.6 Overall diameter

The mean overall diameter shall be within the limits given in Part 12, Table I, columns 4 and 5.

3.3.7 Outer markings

To distinguish the cords and cables from types insulated and sheathed with 60°C rated EPR or equivalent, at least the mandatory marking BB shall be printed or embossed on, or indented into the sheath.

The marking shall be continuous, in accordance with Part 1, sub-clause 3.1.1.

3.4 Tests

Compliance with the requirements of Part 12, sub-clause 3.3 shall be checked by inspection and by the tests given in Part 12, Table II.

3.5 Guide to use (Informative)

See HD 516.

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TABLE I
DIMENSIONS OF TYPE H05BB-F

1	2	3	4	5
Number and nominal cross-sectional area of conductors	Thickness of insulation Specified value	Thickness of sheath Specified value	Mean overall diameter	
			Lower Limit	Upper Limit
(mm^2)	(mm)	(mm)	(mm)	(mm)
2 x 0,75	0,6	0,8	5,7	7,4
2 x 1	0,6	0,9	6,1	8,0
2 x 1,5	0,8	1,0	7,6	9,8
2 x 2,5	0,9	1,1	9,0	11,6
3 x 0,75	0,6	0,9	6,2	8,1
3 x 1	0,6	0,9	6,5	8,5
3 x 1,5	0,8	1,0	8,0	10,4
3 x 2,5	0,9	1,1	9,6	12,4
3 x 4	1,0	1,2	11,3	14,5
3 x 6	1,0	1,4	12,8	16,3
4 x 0,75	0,6	0,9	6,8	8,8
4 x 1	0,6	0,9	7,1	9,3
4 x 1,5	0,8	1,1	9,0	11,6
4 x 2,5	0,9	1,2	10,7	13,8
4 x 4	1,0	1,3	12,7	16,2
4 x 6	1,0	1,5	14,2	18,1
5 x 0,75	0,6	1,0	7,6	9,9
5 x 1	0,6	1,0	8,0	10,3
5 x 1,5	0,8	1,1	9,8	12,7
5 x 2,5	0,9	1,3	11,9	15,3

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TABLE II
Tests for Type H05BB-F

1	2	3	4	5
Ref. No.	Tests	Category of test	Test method described in	
			HD/EN	Clause
1.	Electrical tests			
1.1	Resistance of conductors	T, S	22.2	2.1
1.2	Voltage test on cores according to specified insulation thickness			
1.2.1	- at 1500V up to and including 0,6mm	T	22.2	2.3
1.2.2	- at 2000V exceeding 0,6mm	T	22.2	2.3
1.3	Voltage test on completed cables at 2000V	T, S	22.2	2.2
1.4	Absence of faults on insulation	R	22.2	2.6
1.5	Surface resistance of sheath	T	22.2	2.7
2.	Provisions covering constructional and dimensional characteristics			
2.1	Checking of compliance with constructional provisions	T, S	22.1	Inspection and manual tests
2.2	Measurement of thickness of insulation	T, S	22.2	1.9
2.3	Measurement of thickness of sheath	T, S	22.2	1.10
2.4	Measurement of overall diameter			
2.4.1	Mean value	T, S	22.2	1.11
2.4.2	Ovality	T, S	22.2	1.11
2.5	Solderability test (Untinned Conductors)	T	22.2	1.12
3.	Mechanical properties of insulation			
3.1	Tensile test before ageing	T	60811-1-1	9.1
3.2	Tensile test after ageing in the air oven	T	60811-1-2	8.1.3.2a
3.3	Tensile test after ageing in the air bomb	T	60811-1-2	8.2
3.4	Hot set test	T	60811-2-1	9
4.	Mechanical properties of sheath			
4.1	Tensile test before ageing	T	60811-1-1	9.2
4.2	Tensile test after ageing in air oven	T	60811-1-2	8.1.3.1
4.3	Hot set test	T	60811-2-1	9
5.	Mechanical strength of completed cable			
5.1	Flexing test(*) followed, after immersion in water, by a voltage test			
	- at 1500V on cores with specified insulation thickness up to and including 0,6mm	T	22.2	3.1 and 2.3
	- at 2000V on cores with specified insulation thickness exceeding 0,6mm	T	22.2	3.1 and 2.3
6.	Tests at low temperature			
6.1	Bending test for insulation	T	60811-1-4	8.1
6.2	Bending test for sheath (†)	T	60811-1-4	8.2
6.3	Elongation test for sheath (‡)	T	60811-1-4	8.4
7.	Carbon black content of sheath (where applicable)	T	60811-4-1	11
8.	Ozone resistance test for insulation and sheath (either method may be used)	T		
	(a) Method A		60811-2-1	8
	(b) Method B		22.2	7.3

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(*) Not applicable to cables with conductors greater than 4mm²
(†) Only applicable to cables having mean overall diameters up to and including 12,5mm
(‡) Only applicable if the mean overall outer diameter of the cables exceeds 12,5mm

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4. Heavy heat-resistant EPR or equivalent synthetic elastomer insulated and sheathed cord and cable for a maximum conductor temperature of 90°C

4.1 Code designation

H07BB-F

4.2 Rated voltage

450/750V

4.3 Construction

4.3.1 Conductor

Number of conductors: 1, 2, 3, 4 or 5

The conductors shall comply with the requirements given in HD 383 for Class 5 conductors. The wires may be plain or tinned.

4.3.2 Separator

A separator of suitable material may be applied around each conductor.

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4.3.3 Insulation

The insulation shall be rubber compound of Type EI 7 applied around each conductor.

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The insulation shall be applied by extrusion.

The insulation thickness shall comply with the specified value given in Part 12, Table III, column 2.

4.3.4 Proofed textile tape

A proofed textile tape may be applied on each core for conductor cross-sections larger than 4mm².

The tape shall be applied to the insulation in such a manner that it can be removed without damage to the insulation.

4.3.5 Assembly of cores and filler, if any

The cores shall be twisted together.

A centre filler may be used.

In the case of cores having conductors of large cross-section a textile tape may be applied around the core assembly before application of the sheath, provided that the finalised cables shall not have any substantial cavity in outer interstices between the cores.

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4.3.6 Sheath

The cores shall be covered with a sheath.

The sheath shall be made up as follows:

(a) For cables with a specified sheath thickness up to and including 2.4mm - sheath in a single layer, rubber compound of type EM 6.

(b) For cables with a specified sheath thickness greater than 2.4mm - either in a single layer, rubber compound of type EM 6 - or in two layers, with both layers made of rubber compound of type EM 6.

The thickness of sheath shall comply with the specified value given in Part 12, Table III, columns 3, 4 and 5.

The sheath applied in a single layer or the inner layer of the sheath in two layers shall, for cables with 2 to 5 cores, fill the spaces between the cores.

The sheath shall be capable of being removed without damage to the cores. Where taped cores are employed, some transfer of proofing from the tapes to the sheath is permissible.

The colour of sheath is not specified, but if black is used it shall be subject to the test for carbon black content given in Part 12 Table IV, with a requirement for a minimum level as given for EM 6 in Part 1 Table II.

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4.3.7 Overall diameter

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The mean overall diameter shall be within the limits given in Part 12, Table III, columns 6 and 7.

4.3.8 Outer markings

To distinguish the cords and cables from types insulated and sheathed with 60°C rated EPR or equivalent, at least the mandatory marking BB shall be printed or embossed on, or indented into, the sheath.

The marking shall be continuous, in accordance with Part 1, sub-clause 3.1.1.

4.4 Tests

Compliance with the requirements of Part 12, sub-clause 4.3 shall be checked by inspection and by tests given in Part 12, Table IV.

4.5 Guide to use (informative)

See HD 516