

SLOVENSKI STANDARD
SIST HD 22.13 S2:2007**01-julij-2007****BUXca Yý U****SIST HD 22.13 S1:1998****SIST HD 22.13 S1:1998/A1:2000**

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Cables of rated voltages up to and including 450/750 V and having cross-linked insulation -- Part 13: Halogen-free flexible cables having low emission of smoke

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Starkstromleitungen mit vernetzter Isolierhülle für Nennspannungen bis 450/750 V - Teil 13: Halogenfreie flexible Leitungen mit geringer Entwicklung von Rauch

[SIST HD 22.13 S2:2007](#)

Conducteurs et câbles isolés avec des matériaux réticulés de tension assignée au plus égale a 450/750 V - Partie 13: Câbles souples à faible émission de fumées

Ta slovenski standard je istoveten z: HD 22.13 S2:2007

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English version

**Cables of rated voltages up to and including 450/750 V
and having cross-linked insulation -
Part 13: Halogen-free flexible cables having low emission of smoke**

Conducteurs et câbles isolés avec
des matériaux réticulés de tension
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Partie 13: Câbles souples
à faible émission de fumées

Starkstromleitungen mit vernetzter
Isolierhülle für Nennspannungen
bis 450/750 V -
Teil 13: Halogenfreie flexible Leitungen
mit geringer Entwicklung von Rauch

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This Harmonization Document was approved by CENELEC on 2006-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level. [log/standards/sist/1aa08a75-9e65-4ce6-bf20-99de72170d95/sist-hd-22-13-s2-2007](https://standards.iteh.ai/standards/sist/1aa08a75-9e65-4ce6-bf20-99de72170d95/sist-hd-22-13-s2-2007)

Up-to-date lists and bibliographical references concerning such national implementations 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

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Foreword

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 22.13 S2 on 2006-12-01.

This Harmonization Document supersedes HD 22.13 S1:1996 + A1:2000.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 2007-06-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 2007-12-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 2008-12-01

HD 22, *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation*, now has the following parts:

HD 22.1 S4	General requirements
HD 22.2 S3 ¹⁾	Test methods
HD 22.3 S4	Heat resistant silicone rubber insulated cables
HD 22.4 S4	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 S3	Single core halogen-free non-sheathed cables for fixed wiring having low emission of smoke
HD 22.10 S2	EPR insulated and polyurethane sheathed flexible cables
HD 22.11 S2	EVA cords and flexible cables
HD 22.12 S2	Heat resistant EPR cords and flexible cables
HD 22.13 S2	Halogen-free flexible cables having low emission of smoke
HD 22.14 S3	Cords for applications requiring high flexibility
HD 22.15 S2	Multicore cables insulated and sheathed with heat resistant silicone rubber
HD 22.16 S2	Water resistant polychloroprene or equivalent synthetic elastomer sheathed cables

¹⁾ HD 22.2 has been superseded by EN 50395 and EN 50396

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1 Scope

This part (Part 13) of the HD details the particular specifications for single and multicore halogen-free flexible cables of rated voltage 450/750 V, insulated and sheathed with cross-linked compound, and having low emission of smoke.

Each cable shall comply with the appropriate requirements given in Part 1 of this HD and 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

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.

EN 50266-2-4	Common test methods for cables under fire conditions – Test for vertical flame spread of vertically-mounted bunched wires or cables – Part 2-4: Procedures – Category C
EN 50267-2-1	Common test methods for cables under fire conditions – Tests on gases evolved during combustion of material from cables – Part 2-1: Procedures – Determination of the amount of halogen acid gas
EN 50267-2-2	Common test methods for cables under fire conditions – Tests on gases evolved during combustion of materials from cables – Part 2-2: Procedures – Determination of degree of acidity of gases for materials by measuring pH and conductivity
EN 50334	Marking by inscription for the identification of cores of electric cables
EN 50363-5	Insulating, sheathing and covering materials for low voltage energy cables – Part 5: Halogen-free, cross-linked insulating compounds
EN 50363-6	Insulating, sheathing and covering materials for low voltage energy cables – Part 6: Halogen-free, cross-linked sheathing compounds
EN 50395	Electrical test methods for low voltage energy cables
EN 50396	Non electrical test methods for low voltage energy cables
EN 60228	Conductors of insulated cables (IEC 60228)
EN 60332-1-2	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame (IEC 60332-1-2)
EN 60684-2	Flexible insulating sleeving – Part 2: Methods of test (IEC 60684-2)
EN 60811 (series)	Insulating and sheathing materials of electric and optical fibre cables – Common test methods (IEC 60811 series)
EN 61034-2	Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements (IEC 61034-2)

3 Cables with one to five cores

3.1 Code designation

H07ZZ-F

3.2 Rated voltage

450/750 V

NOTE 600/1 000 V when this cable is used in fixed installations (see HD 516).

3.3 Construction

3.3.1 Conductor

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

The conductors shall comply with the requirements given in EN 60228 for Class 5 conductors. The wires may be plain or tinned.

3.3.2 Separator

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

3.3.3 Insulation

The insulation shall be a cross-linked compound, Type EI 8 to EN 50363-5, applied around each conductor

The insulation shall be applied by extrusion. It may consist of one or two layers. All tests shall be applied to the complete insulation, which must meet the requirements for Type EI 8.

The insulation thickness shall comply with the specified value given in Table 1, column 2.

The insulation resistance shall not be less than the value given in Table 1, column 8.

3.3.4 Assembly of cores and filler, if any

The cores of cables having two to five 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 finished cables shall not have any substantial cavity in the outer interstices between the cores.

3.3.5 Sheath

The cores shall be covered with a sheath.

- (a) For cables with a specified sheath thickness up to and including 2,4 mm
 - sheath in a single layer, cross-linked compound of type EM 8 to EN 50363-6.
- (b) For cables with a specified sheath thickness greater than 2,4 mm
 - sheath either in a single layer, cross-linked compound of type EM 8 to EN 50363-6
 - or in two layers, with the inner layer made of one of the cross-linked compounds type EM 8 or EM 10 to EN 50363-6 and the outer layer of the cross-linked compound type EM 8 to EN 50363-6.

The thickness of sheath shall comply with the specified value given in Table 1, 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 core(s).

For non-electrical tests on sheaths in two layers see Part 1, Subclause 5.5.2.2.

3.3.6 Overall diameter

The mean overall diameter shall be within the limits given in Table 1, columns 6 and 7.

3.3.7 Outer marking

The cable shall have the marking H07ZZ-F printed or embossed on, or indented into, the outer surface of the sheath. The marking, which shall meet the requirements of Subclauses 3.2 and 3.3 of Part 1, shall be legible.

3.4 Tests

Compliance with the requirements of Subclause 3.3 shall be checked by inspection and by the tests given in Table 2.

The requirements to be met for the compatibility test shall be as given in Annex A.

3.5 Smoke emission of cable

When tested in accordance with the method and procedure given in EN 61034-2, all sizes of cable shall exceed 60 % light transmittance throughout the test.

3.6 Guide to use (informative)

See HD 516.

Table 1 – Dimensions of Type H07ZZ-F

1	2	3	4	5	6	7	8
Number & nominal cross sectional area of conductors	Thickness of insulation Specified value	Thickness of sheath Specified value			Mean overall diameter		Minimum insulation resistance at 70 °C
		One layer	Two layers		Lower limit	Upper limit	
			Inner layer	Outer layer			
mm ²	mm	mm	mm	mm	mm	mm	MΩ·km
1 x 1,5	0,8	1,4	-	-	5,7	7,1	0,012
1 x 2,5	0,9	1,4	-	-	6,3	7,9	0,010
1 x 4	1,0	1,5	-	-	7,2	9,0	0,0094
1 x 6	1,0	1,6	-	-	7,9	9,8	0,0081
1 x 10	1,2	1,8	-	-	9,5	11,9	0,0076
1 x 16	1,2	1,9	-	-	10,8	13,4	0,0062
1 x 25	1,4	2,0	-	-	12,7	15,8	0,0058
1 x 35	1,4	2,2	-	-	14,3	17,9	0,0049
1 x 50	1,6	2,4	-	-	16,5	20,6	0,0048
1 x 70	1,6	2,6	1,0	1,6	18,6	23,3	0,0041
1 x 95	1,8	2,8	1,1	1,7	20,8	26,0	0,0040
1 x 120	1,8	3,0	1,2	1,8	22,8	28,6	0,0036
1 x 150	2,0	3,2	1,3	1,9	25,2	31,4	0,0036
1 x 185	2,2	3,4	1,4	2,0	27,6	34,4	0,0036
1 x 240	2,4	3,5	1,4	2,1	30,6	38,3	0,0034
1 x 300	2,6	3,6	1,4	2,2	33,5	41,9	0,0033
1 x 400	2,8	3,8	1,5	2,3	37,4	46,8	0,0031
1 x 500	3,0	4,0	1,6	2,4	41,3	52	0,0030
1 x 630	3,0	4,1	1,6	2,5	45,5	57	0,0026
2 x 1	0,8	1,3	-	-	7,7	10,0	0,013
2 x 1,5	0,8	1,5	-	-	8,5	11,0	0,012
2 x 2,5	0,9	1,7	-	-	10,2	13,1	0,010
2 x 4	1,0	1,8	-	-	11,8	15,1	0,0094
2 x 6	1,0	2,0	-	-	13,1	16,8	0,0081
2 x 10	1,2	3,1	1,2	1,9	17,7	22,6	0,0076
2 x 16	1,2	3,3	1,3	2,0	20,2	25,7	0,0062
2 x 25	1,4	3,6	1,4	2,2	24,3	30,7	0,0058

Table 1 (continued)

1	2	3	4	5	6	7	8
Number & nominal cross sectional area of conductors	Thickness of insulation Specified value	Thickness of sheath Specified value			Mean overall diameter		Minimum insulation resistance at 70 °C
		One layer	Two layers		Lower limit	Upper limit	
			Inner layer	Outer layer			
mm ²	mm	mm	mm	mm	mm	mm	MΩ·km
3 x 1	0,8	1,4	-	-	8,3	10,7	0,013
3 x 1,5	0,8	1,6	-	-	9,2	11,9	0,012
3 x 2,5	0,9	1,8	-	-	10,9	14,0	0,010
3 x 4	1,0	1,9	-	-	12,7	16,2	0,0094
3 x 6	1,0	2,1	-	-	14,1	18,0	0,0081
3 x 10	1,2	3,3	1,3	2,0	19,1	24,2	0,0076
3 x 16	1,2	3,5	1,4	2,1	21,8	27,6	0,0062
3 x 25	1,4	3,8	1,5	2,3	26,1	33,0	0,0058
3 x 35	1,4	4,1	1,6	2,5	29,3	37,1	0,0049
3 x 50	1,6	4,5	1,8	2,7	34,1	42,9	0,0048
3 x 70	1,6	4,8	1,9	2,9	38,4	48,3	0,0041
3 x 95	1,8	5,3	2,1	3,2	43,3	54	0,0040
3 x 120	1,8	5,6	2,2	3,4	47,4	60	0,0036
3 x 150	2,0	6,0	2,4	3,6	52	66	0,0036
3 x 185	2,2	6,4	2,5	3,9	57	72	0,0036
3 x 240	2,4	7,1	2,8	4,3	65	82	0,0034
3 x 300	2,6	7,7	3,1	4,6	72	90	0,0033
4 x 1	0,8	1,5	-	-	9,2	11,9	0,013
4 x 1,5	0,8	1,7	-	-	10,2	13,1	0,012
4 x 2,5	0,9	1,9	-	-	12,1	15,5	0,010
4 x 4	1,0	2,0	-	-	14,0	17,9	0,0094
4 x 6	1,0	2,3	-	-	15,7	20,0	0,0081
4 x 10	1,2	3,4	1,4	2,0	20,9	26,5	0,0076
4 x 16	1,2	3,6	1,4	2,2	23,8	30,1	0,0062
4 x 25	1,4	4,1	1,6	2,5	28,9	36,6	0,0058
4 x 35	1,4	4,4	1,7	2,7	32,5	41,1	0,0049
4 x 50	1,6	4,8	1,9	2,9	37,7	47,5	0,0048
4 x 70	1,6	5,2	2,0	3,2	42,7	54	0,0041
4 x 95	1,8	5,9	2,3	3,6	48,4	61	0,0040
4 x 120	1,8	6,0	2,4	3,6	53	66	0,0036
4 x 150	2,0	6,5	2,6	3,9	58	73	0,0036
4 x 185	2,2	7,0	2,8	4,2	64	80	0,0036
4 x 240	2,4	7,7	3,1	4,6	72	91	0,0034
4 x 300	2,6	8,4	3,3	5,1	80	101	0,0033

Table 1 (continued)

1	2	3	4	5	6	7	8
Number & nominal cross sectional area of conductors	Thickness of insulation Specified value	Thickness of sheath Specified value			Mean overall diameter		Minimum insulation resistance at 70 °C
		One layer	Two layers		Lower limit	Upper limit	
			Inner layer	Outer layer			
mm ²	mm	mm	mm	mm	mm	mm	MΩ·km
5 x 1	0,8	1,6	-	-	10,2	13,1	0,013
5 x 1,5	0,8	1,8	-	-	11,2	14,4	0,012
5 x 2,5	0,9	2,0	-	-	13,3	17,0	0,010
5 x 4	1,0	2,2	-	-	15,6	19,9	0,0094
5 x 6	1,0	2,5	1,0	1,5	17,5	22,2	0,0081
5 x 10	1,2	3,6	1,4	2,2	22,9	29,1	0,0076
5 x 16	1,2	3,9	1,5	2,4	26,4	33,3	0,0062
5 x 25	1,4	4,4	1,7	2,7	32,0	40,4	0,0058

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