SLOVENSKI STANDARD
SIST HD 22.9 S3:2007

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Nadomeģ a:
SIST HD 22.9 S2:1998
SIST HD 22.9 S2:1998/A1:1999

Kabli z omreģeno izolacijo za naznaļ ene napetosti do vkljuļ no 450/750 V - 9. del: Enoģilni neoplaģļ eni brezhalogenski kabli za stalno pokabljenje z nizko emisijo dima

Cables of rated voltages up to and including 450/750 V and having cross-linked insulation -- Part 9: Single core halogen-free non-sheathed cables for fixed wiring having low emission of smoke

Starkstromleitungen mit vernetzter Isolierhülle für Nennspannungen bis 450/750 V - Teil 9: Einadrige Leitungen ohne Mantel für feste Verlegung mit geringer Entwicklung von Rauch und korrosiven Gasen im Brandfall

Conducteurs et câbles isolés avec des matériaux réticulés de tension assignée au plus égale a 450/750 V - Partie 9: Câbles monoconducteurs sans gaine pour installation fixe, ayant une faible émission de fumée et de gaz corrosifs

Ta slovenski standard je istoveten z: **HD 22.9 S3:2007**

ICS:

29.060.20 Kabli Cables

SIST HD 22.9 S3:2007 **en;fr;de**

HARMONIZATION DOCUMENT

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

HD 22.9 S3

February 2007

ICS 29.060.20

Supersedes HD 22.9 S2:1995 + A1:1999

English version

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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.

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. HD 22.9 S3:2007 E

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 22.9 S3 on 2006-12-01.

This Harmonization Document supersedes HD 22.9 S2:1995 + A1:1999.

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

In order that this revision of Part 9 of HD 22 does not introduce unnecessary changes to long-established clause numbers, the normative references (which would otherwise be inserted as Clause 2) are given in Annex A.

1) HD 22.2 has been superseded by EN 50395 and EN 50396

Contents

Tables

1 Scope

This particular Part (Part 9) of the HD details the specifications for single core halogen-free non-sheathed cables for fixed wiring of rated voltage up to and including 450/750 V, insulated 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 to this part of HD 22 have been calculated in accordance with EN 60719.

2 Single core non-sheathed cable with rigid conductors for general purposes

2.1 Code designation

H07Z-U for cables with solid conductors.
H07Z-R for cables with stranded rigid conductors.

2.2 Rated voltage

450/750 V

NOTE 600/1 000 V when this cable is used in fixed installations with mechanical protection, within switchgear and control gear - see HD 516.

2.3 Construction

2.3.1 Conductor

Number of conductors : 1

The conductors shall comply with the requirements of EN 60228.

Class 1 Solid conductor
Class 2 Stranded conductors

The wires may be plain or tinned.

2.3.2 Separator

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

2.3.3 Insulation

The insulation shall be a polyolefin cross-linked material, Type EI 5 to EN 50363-5, applied around the 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 shall meet the requirements for Type EI 5.

The insulation thickness shall comply with the specified value given in Table 1, column 3.

The insulation resistance shall not be less than the value given in Table 1, column 6.

2.3.4 Overall diameter

The mean overall diameter shall be within the limits given in Table 1, columns 4 and 5.

2.3.5 Outer markings

The cable shall have the marking H07Z-U (or H07Z-R) printed or embossed on, or indented into, the insulation. The marking, which shall meet the requirements of Subclauses 3.2 and 3.3 of Part 1, shall be legible.

2.4 Tests

Compliance with the requirements of Subclause 2.3 of this Part 9 shall be checked by inspection and by the tests given in Table 2.

2.5 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.

2.6 **Guide to use** (informative)

See HD 516.

Table 1 - General Data for Types H07Z-U and H07Z-R

1	2	3	4	5	6
Nominal cross-sectional area of conductors	**Class of conductor (EN 60228)**	**Thickness of insulation** **Specified value**	**Mean overall diameter**		**Minimum insulation resistance at 90 °C [a]**
			Lower limit	**Upper limit**	
mm^2		mm	mm	mm	MΩ·km
1,5	1	0,7	2,6	3,3	0,011
1,5	2	0,7	2,7	3,4	0,010
2,5	1	0,8	3,2	4,0	0,010
2,5	2	0,8	3,3	4,1	0,009
4	1	0,8	3,6	4,6	0,0085
4	2	0,8	3,8	4,7	0,0077
6	1	0,8	4,1	5,2	0,0070
6	2	0,8	4,3	5,4	0,0065
10	1	1,0	5,3	6,6	0,0070
10	2	1,0	5,6	7,0	0,0065
16	2	1,0	6,4	8,0	0,0050
25	2	1,2	8,1	10,1	0,0050
35	2	1,2	9,0	11,3	0,0043
50	2	1,4	10,6	13,2	0,0043
70	2	1,4	12,1	15,1	0,0035
95	2	1,6	14,1	17,6	0,0035
120	2	1,6	15,6	19,4	0,0032
150	2	1,8	17,3	21,6	0,0032
185	2	2,0	19,3	24,1	0,0032
240	2	2,2	22,0	27,5	0,0032
300	2	2,4	24,5	30,6	0,0030
400	2	2,6	27,5	34,3	0,0028
500	2	2,8	30,5	38,2	0,0028
630	2	2,8	34,0	42,5	0,0025

[a] The values of insulation resistance were calculated using the following formula, and based on a volume resistivity of 1 x 10^8 Ω.m at 90 °C.

R = 0,0367 log D/d

where:

R = Insulation resistance in MΩ.km at 90 °C

D = Nominal diameter over insulation (mm)

d = Diameter of the circumscribed circle of the conductor (mm)

Table 2 - Tests for Types H07Z-U and H07Z-R

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	50395	5
1.2	Voltage test at 2 500 V	T, S	50395	6
1.3	Insulation resistance at 90 °C	T	50395	8.2
1.4	Absence of faults in insulation	R	50395	10
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	50396	4.1
2.3	Measurement of overall diameter	T, S	50396	4.4
3	**Insulation material tests**	T	50363-5 [a]	
4	**Impact test at -5 °C**	T	60811-1-4	8.5
5	**Tests under fire conditions**			
5.1	Test on single vertical cable	T	60332-1-2	-
5.2	Smoke emission	T	61034-2	-
5.3	Assessment of halogens for all non-metallic materials	T, S	22.9	Annex B

[a] This EN includes all the test methods and requirements for the material. Material to be tested is taken from the finished cable.

3 Single core non-sheathed cable with flexible conductors for general purposes

3.1 Code designation

H07Z-K

3.2 Rated voltage

450/750 V

NOTE 600/1 000 V when this cable is used in fixed installations with mechanical protection, within switchgear and control gear - see HD 516.

3.3 Construction

3.3.1 Conductor

Number of conductors : 1
The conductors shall comply with Class 5 requirements given in EN 60228.
The wires may be plain or tinned.

3.3.2 Separator

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

3.3.3 Insulation

The insulation shall be a polyolefin cross-linked material, Type EI 5 to EN 50363-5, applied around the 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 shall meet the requirements for Type EI 5. The insulation thickness shall comply with the specified value given in Table 3, column 2.
The insulation resistance shall be not less than the value given in Table 3, column 5.

3.3.4 Overall diameter

The mean overall diameter shall be within the limits given in Table 3, columns 3 and 4.

3.3.5 Outer markings

The cable shall have the marking H07Z-K printed or embossed on, or indented into, the insulation. 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 4.

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 3 - General data for Type H07Z-K

1	2	3	4	5
Nominal cross-sectional area of conductors	**Thickness of insulation** **Specified value**	**Mean overall diameter**		**Minimum insulation resistance at 90 °C** [a]
		Lower limit	**Upper limit**	
mm^2	mm	mm	mm	MΩ·km
1,5	0,7	2,8	3,5	0,010
2,5	0,8	3,4	4,3	0,009
4	0,8	3,9	4,9	0,007
6	0,8	4,4	5,5	0,006
10	1,0	5,7	7,1	0,0056
16	1,0	6,7	8,4	0,0046
25	1,2	8,4	10,6	0,0044
35	1,2	9,7	12,1	0,0038
50	1,4	11,5	14,4	0,0037
70	1,4	13,2	16,6	0,0032
95	1,6	15,1	18,8	0,0032
120	1,6	16,7	20,9	0,0029
150	1,8	18,6	23,3	0,0029
185	2,0	20,6	25,8	0,0029
240	2,2	23,5	29,4	0,0028

[a] The values of insulation resistance were calculated using the following formula, and based on a volume resistivity of 1 x 10^8 Ω.m at 90 °C.

R = 0,0367 log D/d

where:

R = Insulation resistance in MΩ.km at 90 °C

D = Nominal diameter over insulation (mm)

d = Diameter of the circumscribed circle of the conductor (mm)