

**SLOVENSKI
STANDARD**

SIST HD 22.11 S1:1998

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Rubber insulated cables of rated voltages up to and including 450/750 V - Part 11:
EVA cords and flexible cables

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SIST HD 22.11 S1:1998

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ICS 29.060.20

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Descriptors: Insulated conductor, insulated cable, flexible cable, outer sheath, rubber, vulkanized rubber, synthetic rubber, heat resistance, designation, dimension, test, marking

English version

**Rubber insulated cables of rated voltages
up to and including 450/750 V
Part 11: EVA cords and flexible cables**

Conducteurs et câbles isolés au
caoutchouc de tension assignée au plus
égale à 450/750 V
Partie 11: Câbles souples à
isolation EVA

Isolierte Starkstromleitungen mit einer
Isolierhülle aus Gummi mit
Nennspannungen bis 450/750 V
Teil 11: EVA Schlauchleitungen

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This Harmonization Document was approved by CENELEC on 1995-02-15. 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 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

Foreword

HD22 was originally adopted by CENELEC on 9th July 1975.

Edition 2 of HD22 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Since 1984, new parts have been published, original parts amended, and in addition HD 505 has superseded HD 385 as the cross-reference for test methods.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 11 to HD 22 introduces EVA insulated and sheathed flexible cords and was approved by TC20 at its Helsinki meeting in May 1994 to go forward for formal voting.

HD22 now has the following parts:

- HD22.1 S2 - General requirements (with AM1 to AM10)
- HD22.2 S2 - Test methods (with AM1 to AM4 inclusive)
- HD22.3 S2 - Heat resistant silicone rubber insulated cables (with AM1)
- HD22.4 S3 - Cords and flexible cables
- HD22.5 - (Spare)
- HD22.6 S1 - Arc welding cables
- HD22.7 S1 - Cables with increased heat resistance for internal wiring for a conductor temperature of 110°C
- HD22.8 S2 - Polychloroprene or equivalent synthetic elastomer sheathed cable for use as decorative chains
- HD 22.9 S1 - 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 compound and having low emission of smoke and corrosive gases
- HD 22.14 S1 - Cords for applications requiring high flexibility

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

The text of the draft was submitted to the formal vote and was approved by CENELEC as HD 22.11 S1 on 1995-02-15.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 1995-09-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 1996-03-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 1996-03-01

For products which have complied with the relevant national standard before 1996-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-03-01.

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1. Scope

This part (Part 11) of the HD details the particular specifications for vulcanised EVA or equivalent synthetic elastomer insulated and vulcanised EVA or equivalent synthetic elastomer sheathed cords and flexible cables of rated voltages up to and including 300/500V for use with a conductor temperature not exceeding 110°C.

All cables shall comply with the appropriate requirements given in Part 1 and the individual types of cable shall each comply with 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 22.11 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 hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to HD 22.11 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

HD 383	Conductors of insulated cables (Endorsing IEC 228 and 228A)
HD 505	Common test methods for insulating and sheathing materials of Electric Cables (Endorsing IEC 811)
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

3. Ordinary heat-resistant EVA or equivalent synthetic elastomer insulated and EVA or equivalent synthetic elastomer sheathed cord and cable for a maximum conductor temperature of 110°C

3.1 Code designation

H05GG-F for circular cables
H05GGH2-F for flat cables

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.

3.3.2 Separator

A separator of suitable material shall be applied around each conductor if the conductors are plain. If the conductors are tinned the use of a separator is optional.

3.3.3 Insulation

The insulation shall be rubber compound of Type EI 3 applied around each conductor.

The insulation shall be applied by extrusion.

The insulation thickness shall comply with the specified value given in Part 11, Table I, column 2.

3.3.4 Assembly of cores and filler, if any

Circular cables: the cores shall be twisted together. A centre filler may be used.

Flat cables: the cores shall be laid parallel.

3.3.5 Sheath

The sheath shall be rubber compound of Type EM 4 applied around the cores.

The sheath thickness shall comply with the specified value given in Part 11, Table I, column 3.

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

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

3.3.6 Overall dimensions

The mean overall diameter of circular cables and mean overall dimensions of flat cables shall be within the limits given in Part 11, Table I, columns 4 and 5.

3.3.7 Outer markings

To distinguish the cords and cables from tough ordinary EPR sheathed types, at least the mandatory marking GG shall be printed or embossed on, or indented into the sheath.

The marking shall be continuous, in accordance with Part 1, sub-clause 3.3.1.

3.4 Tests

Compliance with the requirements of Part 11, sub-clause 3.3 shall be checked by inspection and by the tests given in Part 11, Table II.

3.5 Guide to use (Informative)

See HD 516.

TABLE 1
 Dimensions of Type HO5GG-F and HO5GGH2-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 dimensions	
			Lower limit	Upper limit
(mm ²)	(mm)	(mm)	(mm)	(mm)
2 x 0.75	0.6	0.8	5.7 or 3.7 x 6.0	7.4 or 4.7 x 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

TABLE II
TESTS FOR TYPES H05GG-F and H05GGH2-F

1	2	3	4	5
Ref. No.	Tests	Category of test	Test method described in	
			HD	Clause
1.	<u>Electrical tests</u>			
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 cores 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.	<u>Provisions covering constructional and dimensional characteristics</u>			
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.	<u>Mechanical properties of insulation</u>			
3.1	Tensile test before ageing	T	505.1.1	9.1
3.2	Tensile test after ageing in the air oven	T	505.1.2	8.1.3.1
3.3	Tensile test after ageing in the air bomb	T	505.1.2	8.2
3.4	Hot set test	T	505.2.1	9
3.5	Bending test for insulation at low temperature	T	505.1.4	8.1
4.	<u>Mechanical properties of sheath</u>			
4.1	Tensile test before ageing	T	505.1.1	9.2
4.2	Tensile test after ageing in air oven	T	505.1.2	8.1.3.1
4.3	Tensile test after ageing in air bomb	T	505.1.2	8.2
4.4	Hot set test	T	505.2.1	9
4.5	Bending test for sheath at low temperature ⁽¹⁾	T	505.1.4	8.2
4.6	Elongation test for sheath at low temperature ⁽²⁾	T	505.1.4	8.4
5.	<u>Mechanical strength of completed cable⁽³⁾</u>	T	22.2	3.1 and 2.3
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 - at 2000V on cores with specified insulation thickness exceeding 0.6mm			

(1) Only applicable to cables having mean overall diameters up to and including 12.5mm
(2) Only applicable if the mean overall diameter of the cable exceeds 12.5mm
(3) Not applicable to cables having conductors greater than 4mm².