

**Termoplastilise isolatsiooniga kaablid  
nimipingega kuni 450/750 V. Osa 14:  
Paindkaablid halogeenivaba  
termoplastilise isolatsiooni ja mantliga**

Cables of rated voltage up to and including 450/750 V and having thermoplastic insulation - Part 14:  
Flexible cables (cords), insulated and sheathed with  
halogen-free thermoplastic compounds

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-HD 21.14 S1:2003 sisaldab Euroopa standardi HD 21.14 S1:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 17.07.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-HD 21.14 S1:2003 consists of the English text of the European standard HD 21.14 S1:2003.</p> <p>This document is endorsed on 17.07.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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**Cables of rated voltage up to and including 450/750 V  
and having thermoplastic insulation  
Part 14: Flexible cables (cords), insulated and sheathed  
with halogen-free thermoplastic compounds**

Câbles avec isolant thermoplastique  
de tension assignée au plus égale  
à 450/750 V

Partie 14: Câbles souples (cordons),  
isolés et gainés avec des mélanges  
thermoplastiques sans halogène

Leitungen mit thermoplastischer  
Isolierhülle für Nennspannungen  
bis 450/750 V

Teil 14: Flexible Leitungen,  
Schlauchleitung mit thermoplastischen  
halogenfreien Werkstoffen

This Harmonization Document was approved by CENELEC on 2003-05-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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

HD 21 was originally adopted by CENELEC on 9 July 1975.

Edition 2 of HD 21 was implemented on 1 January 1984 and at that time, contained five parts.

Since 1984 new parts have been published and the original parts revised.

Part 14 has been developed from Vilamoura Notification BT(BE/NOT)5 and introduces a range of flexible cords and cables equivalent to those in Clauses 4 and 5 of HD 21.5 but with halogen-free thermoplastic insulation and sheath. Consequently, and in parallel, the general title of HD 21 has been amended to cover cables with any type of thermoplastic insulation.

HD 21 now has the following parts:

HD 21.1 S4	General requirements
HD 21.2 S3	Test methods
HD 21.3 S3	Non-sheathed cables for fixed wiring
HD 21.4 S2	Sheathed cables for fixed wiring (reprint)
HD 21.5 S3	Flexible cables (cords)
HD 21.6	(Spare)
HD 21.7 S2	Single core non-sheathed cables for internal wiring for a conductor temperature of 90 °C
HD 21.8 S2	Single core non-sheathed cables for decorative chains
HD 21.9 S2	Single core non-sheathed cables for installation at low temperatures
HD 21.10 S2	Extensible leads
HD 21.11 S1	Cables for luminaries
HD 21.12 S1	Heat-resistant flexible cables (cords)
HD 21.13 S1	Oil resistant PVC sheathed cables with two or more conductors
HD 21.14 S1	Flexible cables (cords), insulated and sheathed with halogen-free thermoplastic compounds

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 21.14 S1 on 2003-05-01.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 2003-11-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 2004-05-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 2006-05-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, Annexes A, B, C, D and F are normative and Annex E is informative.

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## 1 Scope

This Part 14 details the particular specifications for flexible cables (cords) of rated voltage up to and including 300/500 V, insulated and sheathed with halogen-free thermoplastic compound and having low emission of smoke and corrosive gases when exposed to fire. These cables are intended for the connection of domestic appliances to the fixed supply.

All cables shall comply with the appropriate requirements given in Part 1 of HD 21 and with the particular requirements of this Part 14.

NOTE 1 The overall dimensions of cables in this part of HD 21 have been calculated in accordance with EN 60719.

NOTE 2 Low emission of smoke is checked in accordance with EN 50268-2. Low emission of corrosive gases is checked as part of the check for absence of halogens (see Annex C).

## 2 Normative references

This Harmonization Document 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 21.14 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50265-2-1	Common test methods for cables under fire conditions – Test for resistance to vertical flame propagation for a single insulated conductor or cable – Part 2-1: Procedures – 1 kW pre-mixed flame
EN 50267-2-1	Common test methods for cables under fire conditions – Tests on gases evolved during combustion of materials from cables – Part 2-1: Procedures – Determination of the amount of halogen acid gas
EN 50267-2-2	Part 2-2: Procedures – Determination of degree of acidity of gases for materials by measuring pH and conductivity
EN 50268-2	Common test methods for cables under fire conditions – Measurement of smoke density of cables burning under defined conditions – Part 2: Procedure
EN 60684-2	Flexible insulating sleeving – Part 2: Methods of test (IEC 60684-2)
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 450/750 V (IEC 60719)
EN 60811 Series	Insulating and sheathing materials of electric and optical cables - Common test methods (IEC 60811 Series)
HD 21 Series	Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation
HD 22 Series	Cables of rated voltages up to and including 450/750 V and having cross-linked insulation
HD 383 S2	Conductors of insulated cables – First supplement: Guide to the dimensional limits of circular conductors (IEC 60228 + IEC 60228A, mod.)
HD 605 S1	Electric cables – Additional test methods

### 3 Insulated and sheathed flexible cords of rated voltage 300/300 V

#### 3.1 Code designation

H03Z1Z1-F for circular cords  
H03Z1Z1H2-F for flat cords

#### 3.2 Rated voltage

300/300 V

#### 3.3 Construction

##### 3.3.1 Conductor

Material: plain copper.

Number of conductors: 2, 3 and 4.

The conductors shall comply with the requirements given in HD 383 for class 5 conductors.

##### 3.3.2 Insulation

The insulation shall be thermoplastic compound TI 6, according to Annex A, applied around each conductor.

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

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

##### 3.3.3 Assembly of cores

Circular cord: the cores shall be twisted together.

Flat cord: the cores shall be laid parallel.

The assembly of circular cord shall have a practically circular cross-section.

The assembly of cores may be surrounded by a separator which shall not adhere to the cores.

##### 3.3.4 Sheath

The sheath shall be thermoplastic compound TM 7, according to Annex B, applied around the cores.

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

The sheath may fill the spaces between the cores, thus forming a filling, but it shall not adhere to the cores.

##### 3.3.5 Overall dimensions

The mean overall diameter of circular cords, and the mean overall dimensions of flat cords, shall be within the limits given in Table 1, columns 4 and 5.

##### 3.3.6 Outer marking

The cord shall have the marking H03Z1Z1-F (for circular types) or H03Z1Z1H2-F (for flat types) printed or indented or embossed on the outer surface of the cord. The marking, which shall meet the requirements of 3.2 and 3.3 of Part 1, shall be legible.

### 3.4 Tests

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

### 3.5 Guide to use (informative)

See Annex E.

**Table 1 - General data for types H03Z1Z1-F and H03Z1Z1H2-F**

1	2	3	4	5	6
Number and nominal cross-sectional area of conductors mm <sup>2</sup>	Thickness of insulation Specified value mm	Thickness of sheath Specified value mm	Mean overall dimensions		Minimum insulation resistance at 70 °C MΩ•km
			Lower limit mm	Upper limit mm	
2 x 0,5	0,5	0,6	4,6 or 3,0 x 4,9	5,9 or 3,7 x 5,9	0,011
2 x 0,75	0,5	0,6	4,9 or 3,2 x 5,2	6,3 or 3,8 x 6,3	0,010
3 x 0,5	0,5	0,6	4,9	6,3	0,011
3 x 0,75	0,5	0,6	5,2	6,7	0,010
4 x 0,5	0,5	0,6	5,4	6,9	0,011
4 x 0,75	0,5	0,6	5,7	7,3	0,010



**Table 2 - Tests for types H03Z1Z1-F and H03Z1Z1H2-F**

1	2	3	4	5
Ref No.	Tests	Category	Test method described in:	
			HD or EN	(Sub)Clause
<b>1</b>	<b>Electrical tests</b>			
1.1	Resistance of conductors	T, S	HD 21.2	2.1
1.2	Voltage test on completed cable at 2 000 V	T, S	HD 21.2	2.2
1.3	Voltage test on cores at 1 500 V	T	HD 21.2	2.3
1.4	Insulation resistance at 70 °C	T, S	HD 21.2	2.4
1.5	Long term resistance of insulation to d.c.	T	HD 21.2	2.5
1.6	Absence of faults on insulation	R	HD 21.2	2.6
1.7	Surface resistance of sheath	T	HD 21.2	2.8
<b>2</b>	<b>Provisions covering constructional and dimensional characteristics</b>			
2.1	Checking of compliance with constructional provisions	T, S	HD 21.1	Inspection and manual tests
2.2	Measurement of thickness of insulation	T, S	HD 21.2	1.9
2.3	Measurement of thickness of sheath	T, S	HD 21.2	1.10
2.4	Measurement of overall dimensions			
2.4.1	Mean value	T, S	HD 21.2	1.11
2.4.2	Ovality	T, S	HD 21.2	1.11
<b>3</b>	<b>Mechanical properties of insulation</b>			
3.1	Tensile test before ageing	T	EN 60811-1-1	9.1
3.2	Tensile test after ageing	T	EN 60811-1-2	8.1.3.1
<b>4</b>	<b>Mechanical properties of sheath</b>			
4.1	Tensile test before ageing	T	EN 60811-1-1	9.2
4.2	Tensile test after ageing	T	EN 60811-1-2	8.1.3.1
<b>5</b>	<b>Compatibility test on cable</b>	T	EN 60811-1-2	8.1.4
<b>6</b>	<b>Pressure test at high temperature</b>			
6.1	Insulation	T	EN 60811-3-1	8.1
6.2	Sheath	T	EN 60811-3-1	8.2
<b>7</b>	<b>Tests at low temperature</b>			
7.1	Bending test for insulation	T	EN 60811-1-4	8.1
7.2	Bending test for sheath	T	EN 60811-1-4	8.2
7.3	Impact test	T	EN 60811-1-4	8.5