



**SLOVENSKI STANDARD**  
**SIST HD 22.1 S2:1998/A16:1998**  
**01-februar-1998**

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**Rubber insulated cables of rated voltages up to and including 450/750 V - Part 1:  
General requirements - Amendment A16**

Rubber insulated cables of rated voltages up to and including 450/750 V -- Part 1:  
General requirements

Gummi-isolierte Leitungen mit Nennspannungen bis 450/750 V -- Teil 1: Allgemeine  
Anforderungen

Conducteurs et câbles isolés au caoutchouc, de tension assignée au plus égale à  
450/750 V -- Partie 1: Prescriptions générales

**iTeh STANDARD PREVIEW**  
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<https://standards.iteh.ai/catalog/standards/sist/4ed6a1c7-09d5-4ae5-a6c2-003d77f07fd2/sist-hd-22-1-s2-1998-a16-1998>

**Ta slovenski standard je istoveten z: HD 22.1 S2:1992/A16:1994**

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**ICS:**

29.060.20      Kabli      Cables

**SIST HD 22.1 S2:1998/A16:1998      en**

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HARMONIZATION DOCUMENT

HD 22.1 S2/A16

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

October 1994

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REPUBLIKA SLOVENIJA  
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO  
Urad RS za standardizacijo in meroslovje  
LJUBLJANA

Descriptors: See HD 22.1 S2:1992

ENGLISH VERSION

SIST..... HD 22.1 S2/A16 .....  
PREVZET PO METODI RAZGLASITVE

Rubber insulated cables of rated voltages up to  
and including 450/750 V  
Part 1: General requirements

-02- 1998

Conducteurs et câbles isolés  
au caoutchouc, de tension  
assignée au plus égale à 450/750 V  
Première partie: Prescriptions  
générales

Isolierte Starkstromleitungen  
mit einer Isolierung aus Gummi  
mit Nennspannungen bis 450/750 V  
Teil 1: Allgemeine Anforderungen

## iTeh STANDARD PREVIEW

(standards.iteh.ai)

This amendment A16 modifies the Harmonization Document HD 22.1 S2:1992. It was approved by CENELEC on 1994-05-15. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this amendment on a national level.

Up-to-date lists and bibliographical references concerning national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French and 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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Ref. No. HD 22.1 S2:1992/A16:1994 E

### FOREWORD

At the request of the CENELEC Technical Committee TC 20, Electric cables, a draft amendment to HD 22.1 S2:1992 was submitted to the formal vote in December 1993.

The text of the draft was approved by CENELEC as amendment A16 to HD 22.1 S2 on 15 May 1994.

The following dates were fixed:

- latest date of announcement  
of the amendment at national level (doa) 1995-01-15
- latest date of publication of  
a harmonized national standard (dop) 1995-07-15
- latest date of withdrawal of  
conflicting national standards (dow) 1995-07-15

For products which have complied with HD 22.1 S2:1992 and its amendments before 1995-07-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1996-07-15.

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

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Sub-clause 5.2.1

After the first sentence add the following type to the list of compounds:

"Type EI 6 for cables insulated with ethylene-propylene rubber or equivalent synthetic elastomer for handling down to -40°C".

In the list of maximum continuous operating temperatures add the following:

"Insulation compound EI 6 : 90°C."

Table I

Add compound EI 6 as attached.

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Add new compound EI6 to Table 1

1	2	3	4	5	6
Ref. No.	Test	Unit	Type of compound	Test method described in	
			EI6	HD	Clause
1.	Maximum rated conductor temperature	°C	90		
1.1	<u>Tensile strength and elongation at break</u>				
1.1.1	Properties in the state as delivered			505.1.1	9.1
1.1.1	Values to be obtained for the tensile strength:				
1.1.2	- median, min.	N/mm <sup>2</sup>	5.0		
1.1.2	Values to be obtained for the elongation at break:				
1.1.2	- median, min.	%	200		
1.2	Properties after ageing in air oven			505.1.2	8.1.3.2a
1.2.1	Ageing condition: <sup>(2)(4)</sup>				
1.2.1	- temperature	°C	135 ± 2		
1.2.1	- duration of treatment	h	7x24		
1.2.2	Values to be obtained for the tensile strength:				
1.2.2	- median, min.	N/mm <sup>2</sup>	5.0		
1.2.2	- variation <sup>(1)</sup> max.	%	± 30		
1.2.3	Values to be obtained for elongation at break:				
1.2.3	- median, min.	%	-		
1.2.3	- variation <sup>(1)</sup> max.	%	± 30		
1.3	(spare)				
1.4	Properties after ageing in the oxygen bomb for seven days				
1.4.1	Ageing conditions: <sup>(4)</sup>				
1.4.1	- temperature	°C			
1.4.1	- duration of treatment	h			
1.4.2	Value to be obtained for the tensile strength:				
1.4.2	- median, min.	N/mm <sup>2</sup>			
1.4.2	- variation <sup>(1)</sup> max.	%			
1.4.3	Values to be obtained for the elongation at break:				
1.4.3	- median, min.	%			
1.4.3	- variation <sup>(1)</sup> max.	%			
1.5	Properties after ageing in the air bomb				
1.5.1	Ageing conditions				
1.5.1	- temperature	°C	-		
1.5.1	- duration of treatment	h	-		
1.5.2	Values to be obtained for the tensile strength				
1.5.2	- median, min.	N/mm <sup>2</sup>	-		
1.5.3	Values to be obtained for the elongation at break				
1.5.3	- variation, max.	%			

Table 1 (continued)

1	2	3	4	5	6
Ref. No.	Test	Unit	Type of compound	Test method described in	
			EI6	HD	Clause
	Maximum rated conductor temperature	°C	90		
2.	<u>Hot set test</u>			505.2.1	9
2.1	Conditions of treatment:				
	- temperature	°C	250 ± 3		
	- time under load	min	15		
	- mechanical stress	N/cm <sup>2</sup>	20		
2.2	Test Requirements				
	- max. elongation under load	%	100		
	- max. elongation after unloading	%	25		
3.	<u>Pressure test at high temperature</u>				
3.1	Test conditions				
	- force exerted by blade				
	- K value : 1.0				
	- duration of heating under load	h			
	- temperature	°C			
3.2	Result to be obtained				
	- median of the depth of penetration, max.	%			
4.	<u>Ozone resistance test</u>				
4.1	Method A			505.2.1	8
	Test conditions				
	- test temperature	°C	25 ± 2		
	- test duration	h	24		
	- ozone concentration	ppm	250 to 300		
4.2	Method B			22.2	7.3
	- test temperature	°C	40 ± 2		
	- test duration	h	72		
	- ozone concentration	pphm	200 ± 50		
4.3	Result to be obtained		Absence of cracks		
5.	<u>Bending test at low temperature</u>			505.1.4	8.1
5.1	Test conditions:				
	- temperature	°C	-50 ± 3		
	- period of application of low temperature		see HD505.1.4 Sub-clause 8.1.4 and 8.1.5		
5.2	Result to be obtained		Absence of cracks		

Table 1 (concluded)

1	2	3	4	5	6
Ref. No.	Test	Unit	Type of compound	Test method described in	
			EI6	HD	Clause
6.	Maximum rated conductor temperature (Spare)	°C	90		
7.	Compatibility test <sup>(5)</sup>			505.1.2	8.1.4
7.1	Ageing conditions: - temperature	°C	100 ± 2		
7.2	- duration of treatment Values to be obtained for the tensile strength:	h	7x24		
	- median, min.	N/mm <sup>2</sup>	5.0		
	- variation <sup>(1)</sup> max.	%	± 30		
7.3	Values to be obtained for the elongation at break:				
	- median, min.	%	-		
	- variation <sup>(1)</sup> max.	%	± 30		

- Variation is the difference between the median value after ageing and the median value without ageing, expressed as a percentage of the latter.
- Unless otherwise specified in the relevant cable specifications a rotating fan inside the oven is normally permissible when testing rubber compound. However, in case of dispute, ageing shall be carried out in an oven which is designed to operate without a fan rotating inside it.
- No limit for positive tolerance.
- Ageing of Type EI4 and EI6 shall be carried out with the conductor in place; if it is expected that the conductors cannot be removed after ageing without damaging the insulation, then the ageing test shall be carried out with at least 70% of the conductor strands in place.
- Only applicable when called up by the particular cable standard.