SLOVENSKI STANDARD
SIST HD 22.1 S2:1998/A20:1998

01-februar-1998

Rubber insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements - Amendment A20

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

Ta slovenski standard je istoveten z: **HD 22.1 S2:1992/A20:1996**

ICS:

29.060.20 Kabli Cables

SIST HD 22.1 S2:1998/A20:1998 **en**

HARMONIZATION DOCUMENT

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

HD 22.1 S2/A20

May 1996

UDC 621.315.211.2.027.457-777.1/.2-777.6.001.2.002.2.001.4(083.71)(083.73)621.315.616
ICS 29.060.20

Descriptors: See HD 22.1 S2:1992

English version

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

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

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

This amendment A20 modifies the Harmonization Document HD 22.1 S2:1992; it was approved by CENELEC on 1996-03-05. 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 such 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, 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

This amendment 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 amendment A20 to HD 22.1 S2:1992 on 1996-03-05.

The following dates were fixed:

- latest date by which the existence of the amendment has to be announced at national level (doa) 1996-09-01
- latest date by which the amendment has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 1997-03-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1997-03-01

For products which have complied with HD 22.1 S2:1992 and its amendments A11:1992 to 19:1995 before 1997-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-03-01.

Text of A20 to HD 22.1 S2

Sub-clause 5.2.1

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

'Type EI 7 for cables insulated with ethylene-propylene rubber or equivalent synthetic elastomer.'

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

'Insulation compound EI 7 : 90°C'

Table I

Add compound EI 7 as attached.

Sub-clause 5.5.1

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

'Type EM 6 for cables insulated with compound EI 7 and sheathed with a compound of ethylene-propylene rubber or equivalent synthetic elastomer.

'Type EM 7 for cables insulated with compound EI 7 and sheathed with a compound of chlorosulfonated polyethylene or equivalent synthetic elastomer.

Table II

Add compounds EM 6 and EM 7 as attached.

TABLE I

Requirements for the non-electrical tests for vulcanised rubber insulation

1	2	3	4	5	6
Ref. No.	Tests	Unit	Type of compound EI 7	Test method described in	
				HD/EN	Clause
	Maximum rated conductor temperatures	°C	90		
1.	Tensile strength and elongation at break				
1.1	Properties in the state as delivered			60811-1-1	9.1
1.1.1	Value to be obtained for the tensile strength: - median, min.	N/mm²	5,0		
1.1.2	Value to be obtained for the elongation at break: - median, min.	%	200		
1.2	Properties after ageing in air oven			60811-1-2	8.1.3.2a
1.2.1	Ageing conditions: (2)(4) - temperature - duration of treatment	°C h	135 ± 2 7 x 24		
1.2.2	Value to be obtained for the tensile strength: - median, min. - variation (1), max.	N/mm² %	5,0 ±30		
1.2.3	Value to be obtained for the elongation: - median, min. - variation (1), max.	% %	- ±30		
1.3	(Spare)				
1.4	(Spare)				

TABLE I
(continued)

Requirements for the non-electrical tests for vulcanised rubber insulation

1	2	3	4	5	6
Ref. No.	Tests	Unit	Type of compound EI 7	Test method described in	
				HD/EN	Clause
	Maximum rated conductor temperature	°C	90		
1.5	Properties after ageing in the air bomb			60811-1-2	8.2
1.5.1	Ageing Conditions (4)				
	- temperature	°C	127 ± 2		
	- duration of treatment	h	40		
1.5.2	Value to be obtained for the tensile strength:				
	- median, min.	N/mm²	-		
	- variation, (1) max.	%	± 30		
1.5.3	Value to be obtained for the elongation at break				
	- median, min.	%			
	- variation, max.	%	± 30		
2.	Hot set test			60811-2-1	9
2.1	Conditions of treatment				
	- temperature	°C	250 ± 3		
	- time under load	min.	15		
	- mechanical stress	N/cm²	20		
2.2	Test requirements				
	- max. elongation under load	%	100		
	- max. elongation under unloading	%	25		
3.	(Spare)				
4.	Ozone resistance test				
4.1	Method A				
	Test conditions			60811-2-1	8
	- test temperature	°C	25 ± 2		
	- test duration	h	24		
	- ozone concentration	ppm	250 to 300		
4.2	Method B				
	Test conditions			22.2	7
	- test temperature	°C	40 ± 2		
	- test duration	h	72		
	- ozone concentration	pphm	200 ± 50		
5.	Low temperature tests			60811-1-4	8.1
5.1	Bending test				
5.1.1	Test conditions				
	- temperature	°C	-35 ± 2		
	- period of application of low temperature			see EN 60811-1-4 sub-clause 8.1.4 and 8.1.5	
5.1.2	Result to be obtained		no cracks		

TABLE I
(concluded)

Requirements for the non-electrical tests for vulcanised rubber insulation

1	2	3	4	5	6
Ref. No.	Tests	Unit	Type of compound EI 7	Test method described in	
				HD/EN	Clause
	Maximum rated conductor temperature	°C	90		
5.2	Elongation test			60811-1-4	8.3
5.2.1	Test conditions - temperature - period of application of low temperature	°C	-35 ± 2	see EN 60811-1-4 sub-clause 8.3.4 and 8.3.5	
5.2.2	Results to be obtained: - elongation without break, minimum	%	30		
6.	(Spare)				
7.	Compatibility test(6)				
7.1	Ageing conditions - temperature - duration of treatment	°C h	100 ± 2 7x24	60811-1-2	8.1.4
7.2	Value to be obtained for the tensile strength - median, min. - variation (1) max.	N/mm² %	5.0 ±30		
7.3	Value to be obtained for the elongation at break - median, min. - variation (1) max.	%	±30		

NOTES

(1) Variation is the difference between the median value after ageing and the median value without ageing, expressed as a percentage of the latter.

(2) Unless otherwise specified in the relevant cable specifications a rotating fan inside the oven is normally permissible when testing rubber compounds. However, in case of dispute, ageing shall be carried out in an oven which is designed to operate without a fan rotating inside it.

(3) No limit for the positive tolerance.

(4) Ageing of Types EI 4 and EI 7 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.

(6) The compatibility test applies only where specified in the particular cable standard.

TABLE II

Requirements for the non-electrical test for vulcanised rubber sheath

1	2	3	4	5	6	7
Ref. No.	Test	Unit	Type of compound		Test method described in	
			EM 6	EM 7	HD/EN	Clause
1.	Tensile strength and elongation at break					
1.1	Properties in the state as delivered				60811-1-1	9.2
1.1.1	Values to be obtained for the tensile strength: - median, min.	N/mm²	7,0	10,0		
1.1.2	Values to be obtained for the elongation at break: - median, min.	%	250	250		
1.2	Properties after ageing in air oven				60811-1-2	8.1.3.1
1.2.1	Ageing conditions: (3) - temperature - duration of treatment	°C h	120±2 3x24	120±2 7x24		
1.2.2	Value to be obtained for the tensile strength: - median, min. - variation (2) max.	N/mm² %	7,0 -	- ±30		
1.2.3	Values to be obtained for the elongation at break: - median, min. - variation (2) max.	% %	200 -	- ±40		
1.2.4	Continued Ageing Conditions: - temperature - total duration of treatment	°C h	120±2 10 x 24	- -		
1.2.5	Values to be obtained for the tensile strength: - variation (4) max.	%	±20	-		
1.2.6	Values to be obtained for the elongation at break: - variation (4) max.	%	±30	-		
1.3	Mechanical properties after immersion in mineral oil				60811-2-1	10
1.3.1	Test conditions - temperature of oil - duration of immersion in oil	°C h	- -	100±2 24		
1.3.2	Values to be obtained for the tensile strength - variation (2) max.	%	-	±40		
1.3.3	Values to be obtained for the elongation at break - variation (2) max.	%	-	±40		