



CE Technical Documents

**Product Name: Cable & Tough Rubber Sheathed Flexible Cables
TEBAOFLEX CABLE**

Applied Directive : Low Voltage Directive 2014/35/EU

Document No.: XMT0202600330W/LVD

Date: 2025.03.30

Revision: V0

Tested By:

John Chen - Engineer

Reviewed By:

Amy Zhang - Lab Manager

SHANGHAI XIMO TESTING TECHNOLOGY CO., LTD
NO 5131, CHUANNANFENG ROAD, PUDONG NEW AREA, SHANGHAI, CHINA

Applicant	Jiangsu Tebaoflex Special Cable Co.,Ltd
Address	Room No. 201,Building 3,No.77 Wusongbang Road,Fuqiao Town,Taicang City,Suzhou City,Jiangsu Province China.
Test Item Description	
Product Name :	Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLE
Standard :	DIN VDE 0250-812; DIN VDE 0250-813; DIN VDE 0250-814;DIN VDE 0250-815; DIN VDE 0250-602;DIN VDE 0250-605; VDE 0250-606;DIN VDE 0282.
Model:	See annex I
Test Case Verdicts	
Test case does not apply to the test object :	N(.A .)
Test item does meet the requirement :	P(ass)
Test item does not meet the requirement :	F(ail)
General Remarks	
◆ This report shall not be reproduced except in full without the written approval of the testing laboratory. ◆ The test results presented in this report relate only to the item tested. ◆ Clause numbers between brackets refer to clauses in see annex II. ◆ “(see remark #)”refers to a remark appended to the report. ◆ “(see Annex #)”refers to an annex appended to the report. ◆ Throughout this report a point is used as the decimal separator.	

Copy of Marking Plate

Product Name :Cable & Tough Rubber Sheathed Flexible
TEBAOFLEX CABLE



Model : NSSHÖU

Jiangsu Tebaoflex Special Cable Co.,Ltd

Room No. 201,Building 3,No.77 Wusongbang Road,Fuqiao Town,Taicang
City,Suzhou City,Jiangsu Province China.

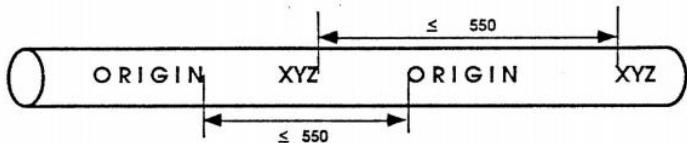
Clause	Requirement - test	Result-Remark	Verdict
4	General purpose cables		-
4.1	Ordinary duty flexible cables		P
4.1.1	Code designation		P
	The code designation is 62893 IEC 121 for halogen free cables with sheath compound EVM-1 and 62893 IEC 122 for halogen free cables with sheath compound EVM-2.		P
4.1.2	Rated voltage		P
	300/500 V		P
4.1.3	Construction		P
4.1.3.1	Sizes of cable		P
	The sizes of cable shall be: 1,5 mm ² and 2,5 mm ² – 3 power cores		P
4.1.3.2	Insulation		P
	The insulation of the power cores shall be compound of type EVI-2 to IEC 62893-1.		P
4.1.3.3	Assembly		P
	The cores shall be twisted together.		P
	A tape may be applied around the core assembly before application of the sheath		P
4.1.3.4	Sheath		P
	The sheath shall be compound of type EVM-1 to IEC 62893-1 for cable type 62893 IEC 121 and EVM-2 to IEC 62893-1 for cable type 62893 IEC 122.		P
	The sheath shall not adhere to the cores. The assembly of cores may be surrounded by a separator and/or filler which shall not adhere to the cores.		P
	The application of the sheath shall give the finished cable a practically circular shape.		P
4.1.3.5	Marking		P
	The cable shall be marked with the corresponding code designation		P
	The marking shall comply with Clause 6 of IEC 62893-1:2017.		P
4.1.4	Requirements		P
	Each cable shall comply with the appropriate requirements		P

Clause	Requirement - test	Result-Remark	Verdict
	given in IEC 62893-1, and the particular requirements of this document		
	Testing shall be in accordance with Annex A of this standard, and the relevant tests indicated in column 6 of Table A.1. a) The thicknesses of insulation and sheath shall conform to Table B.1 for type 121 and Table B.2 for type 122. b) The requirements to be met for the compatibility test shall be as given in Annex A of IEC 62893-1:2017. c) The tests conditions and requirements to be met for the cold impact test shall be as given in 5.8 of IEC 62893-2:2017. d) The tests conditions and requirements to be met for the crush resistance test shall be as given in 5.7 of IEC 62893-2:2017.		P
4.2	Heavy duty flexible cables		P
4.2.1	Code designation		P
	The code designation is 62893 IEC 123 for halogen free cables with sheath compound EVM-1 and 62893 IEC 124 for halogen free cables with sheath compound EVM-2.		P
	The code designation is 62893 IEC 125 for cables with sheath compound EVM-3.		P
4.2.2	Rated voltage		P
	450/750 V		P
4.2.3	Construction		P
4.2.3.1	Sizes of cable		P
	The sizes of cable shall be: power cores: 1,5 mm² – 3 cores 2,5 mm² to 35 mm² – 3, 4 and 5 cores control or pilot cores: number not specified, for size see 8.2 of IEC 62893-1:2017		P
4.2.3.2	Insulation		P
	The insulation for power cores shall be compound of Type EVI-2 according to IEC 62893-1.		P
	The insulation for pilot or control cores shall be compound		P

Clause	Requirement - test	Result-Remark	Verdict
	of Type EVI-1 or EVI-2 according to IEC 62893-1.		
4.2.3.3	Assembly		P
	The cores shall be twisted together.		P
	A centre filler may be used.		P
	The assembly of cores may be surrounded by a separator and or filler which shall not adhere to the cores		P
	A screen according to 8.6 of IEC 62893-1:2017 may be applied.		P
4.2.3.4	Sheath		P
	The sheath shall be compound of type EVM-1 according to IEC 62893-1 for cable type 62893 IEC 123, EVM-2 according to IEC 62893-1 for cable type 62893 IEC 124 and EVM-3 for cable type 62893 IEC 125.		P
	The sheath shall not adhere to the cores		P
	For circular cables, the application of the sheath shall give the finished cable a practically circular shape		P
4.2.3.5	Marking		P
	The cable shall be marked with the corresponding code designation.		P
	The marking shall comply with Clause 6 of IEC 62893-1:2017.		P
4.2.4	Requirements		P
	Each cable shall comply with the appropriate requirements given in IEC 62893-1, and the particular requirements of this document.		P
	Testing shall be in accordance with Annex A, and the relevant tests indicated in column 7 and column 8 of Table A.1.		P
	a) The thicknesses of insulation and sheath shall conform to Table B.3 for type 123 and Table B.4 for types 124 and 125. b) The requirements to be met for the compatibility test shall be as given in Annex A of IEC 62893-1:2017. c) The tests conditions and requirements to be met for the cold impact test shall be as given in 5.8 of IEC 62893-2:2017. d) The tests conditions and requirements to be met for the crush resistance test shall be as given in 5.7 of IEC		P

Clause	Requirement - test	Result-Remark	Verdict																																																																																				
	62893-2:2017																																																																																						
5	Guide to use of the cables		-																																																																																				
	General guidance information given in IEC 62440 shall be used. In addition, the specific information from Table 1 and Table 2 shall be taken into account for the products specified in this document.		P																																																																																				
	<table><tr><th colspan="3">Table 1 – Intended use of charging cables for EV (environmental conditions)</th></tr><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>Code designation</td><td>62893 IEC 121 and 122</td><td>62893 IEC 123, 124 and 125</td></tr><tr><td>Shape of cable</td><td>Round</td><td>Round</td></tr><tr><td>Conductor construction</td><td>Class 5</td><td>Class 5</td></tr><tr><td colspan="3">1 Duty ^a</td></tr><tr><td>1.1 Ordinary</td><td>+</td><td>+</td></tr><tr><td>1.2 Heavy</td><td>-</td><td>+</td></tr><tr><td colspan="3">2 Presence of water</td></tr><tr><td>2.1 Condition AD 7 ^b</td><td>+</td><td>+</td></tr><tr><td colspan="3">3 Corrosive of polluting substances</td></tr><tr><td>3.1 Condition AF 3 ^b</td><td>+</td><td>+</td></tr><tr><td colspan="3">4 Impact</td></tr><tr><td>4.1 Condition AG 2 ^b</td><td>-</td><td>+</td></tr><tr><td colspan="3">5 Vibrations</td></tr><tr><td>5.1 Condition AH 3 ^b</td><td>+</td><td>+</td></tr><tr><td colspan="3">6 Flora</td></tr><tr><td>6.1 Condition AK 2 ^b</td><td>-</td><td>-</td></tr><tr><td colspan="3">7 Fauna</td></tr><tr><td>7.1 Condition AL 2 ^b</td><td>-</td><td>-</td></tr><tr><td colspan="3">8 Outdoor use</td></tr><tr><td>8.1 Condition AN 3 ^b</td><td>-</td><td>+</td></tr><tr><td>8.2 Permanent ^c</td><td>+</td><td>+</td></tr><tr><td colspan="3">9 Frequent flexing</td></tr><tr><td></td><td>+</td><td>+</td></tr><tr><td colspan="3">10 Frequent torsion</td></tr><tr><td></td><td>+</td><td>+</td></tr><tr><td colspan="3">^a "+" = acceptable ^c "-" = not suitable ^a See Annex C of IEC 62440:2008 for definitions. ^b See Annex A of IEC 62440:2008 for definitions. ^c See Annex B of IEC 62440:2008 for definitions.</td></tr></table>	Table 1 – Intended use of charging cables for EV (environmental conditions)			1	2	3	Code designation	62893 IEC 121 and 122	62893 IEC 123, 124 and 125	Shape of cable	Round	Round	Conductor construction	Class 5	Class 5	1 Duty ^a			1.1 Ordinary	+	+	1.2 Heavy	-	+	2 Presence of water			2.1 Condition AD 7 ^b	+	+	3 Corrosive of polluting substances			3.1 Condition AF 3 ^b	+	+	4 Impact			4.1 Condition AG 2 ^b	-	+	5 Vibrations			5.1 Condition AH 3 ^b	+	+	6 Flora			6.1 Condition AK 2 ^b	-	-	7 Fauna			7.1 Condition AL 2 ^b	-	-	8 Outdoor use			8.1 Condition AN 3 ^b	-	+	8.2 Permanent ^c	+	+	9 Frequent flexing				+	+	10 Frequent torsion				+	+	^a "+" = acceptable ^c "-" = not suitable ^a See Annex C of IEC 62440:2008 for definitions. ^b See Annex A of IEC 62440:2008 for definitions. ^c See Annex B of IEC 62440:2008 for definitions.				P
Table 1 – Intended use of charging cables for EV (environmental conditions)																																																																																							
1	2	3																																																																																					
Code designation	62893 IEC 121 and 122	62893 IEC 123, 124 and 125																																																																																					
Shape of cable	Round	Round																																																																																					
Conductor construction	Class 5	Class 5																																																																																					
1 Duty ^a																																																																																							
1.1 Ordinary	+	+																																																																																					
1.2 Heavy	-	+																																																																																					
2 Presence of water																																																																																							
2.1 Condition AD 7 ^b	+	+																																																																																					
3 Corrosive of polluting substances																																																																																							
3.1 Condition AF 3 ^b	+	+																																																																																					
4 Impact																																																																																							
4.1 Condition AG 2 ^b	-	+																																																																																					
5 Vibrations																																																																																							
5.1 Condition AH 3 ^b	+	+																																																																																					
6 Flora																																																																																							
6.1 Condition AK 2 ^b	-	-																																																																																					
7 Fauna																																																																																							
7.1 Condition AL 2 ^b	-	-																																																																																					
8 Outdoor use																																																																																							
8.1 Condition AN 3 ^b	-	+																																																																																					
8.2 Permanent ^c	+	+																																																																																					
9 Frequent flexing																																																																																							
	+	+																																																																																					
10 Frequent torsion																																																																																							
	+	+																																																																																					
^a "+" = acceptable ^c "-" = not suitable ^a See Annex C of IEC 62440:2008 for definitions. ^b See Annex A of IEC 62440:2008 for definitions. ^c See Annex B of IEC 62440:2008 for definitions.																																																																																							
	<table><tr><th colspan="3">Table 2 – Recommended use of charging cables for EV</th></tr><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>Code designation</td><td>Recommended use</td><td>Comments</td></tr><tr><td>62893 IEC 121 and 122</td><td>Intended for use for charging mode 1 of IEC 61851-1.</td><td>Max. storage temperature: +45 °C</td></tr><tr><td>62893 IEC 123, 124 and 125</td><td>Intended for use for charging modes 1, 2 and 3 of IEC 61851-1.</td><td>Min. temperature for installation and handling: -25 °C They are intended for use indoor and outdoor.</td></tr></table>	Table 2 – Recommended use of charging cables for EV			1	2	3	Code designation	Recommended use	Comments	62893 IEC 121 and 122	Intended for use for charging mode 1 of IEC 61851-1.	Max. storage temperature: +45 °C	62893 IEC 123, 124 and 125	Intended for use for charging modes 1, 2 and 3 of IEC 61851-1.	Min. temperature for installation and handling: -25 °C They are intended for use indoor and outdoor.		P																																																																					
Table 2 – Recommended use of charging cables for EV																																																																																							
1	2	3																																																																																					
Code designation	Recommended use	Comments																																																																																					
62893 IEC 121 and 122	Intended for use for charging mode 1 of IEC 61851-1.	Max. storage temperature: +45 °C																																																																																					
62893 IEC 123, 124 and 125	Intended for use for charging modes 1, 2 and 3 of IEC 61851-1.	Min. temperature for installation and handling: -25 °C They are intended for use indoor and outdoor.																																																																																					

Clause	Requirement - test	Result-Remark	Verdict																
4	Rated voltage		-																
	The rated voltage of a cable is the reference voltage for which the cable is designed.		P																
	The rated voltage in an alternating current system, is expressed by the combination of two values U_0/U, expressed in volts, where: a) U_0 is the r.m.s. value between any insulated conductor and “earth” (metal covering of the cable or the surrounding medium); b) U is the r.m.s. value between any two phase conductors of a multicore cable or of a system of single core cables.		P																
	In an alternating current system, the rated voltage of a cable or cord shall be at least equal to the nominal voltage of the system for which it is intended. This condition applies to the values of both U_0 and U .		P																
	The operating voltage of a system may permanently exceed the nominal voltage of the system. The maximum permanent permitted operating voltage of the cable is stated in Table 1.		P																
	Table 1 — Examples of maximum permitted voltages against rated voltage of cable <table><tr><th rowspan="3">Rated voltage of cable U_0/U</th><th colspan="2">Maximum permanent permitted operating voltage of the cable</th></tr><tr><th colspan="2"> AC  3-phase AC </th></tr><tr><th>Conductor-earth</th><th>Conductor-conductor</th></tr><tr><th>V</th><th>U_0 max (V)</th><th>U max (V)</th></tr><tr><td>300/500</td><td>320</td><td>550</td></tr><tr><td>450/750</td><td>480</td><td>825</td></tr></table>	Rated voltage of cable U_0/U	Maximum permanent permitted operating voltage of the cable		 AC  3-phase AC 		Conductor-earth	Conductor-conductor	V	U_0 max (V)	U max (V)	300/500	320	550	450/750	480	825		P
Rated voltage of cable U_0/U	Maximum permanent permitted operating voltage of the cable																		
	 AC  3-phase AC 																		
	Conductor-earth	Conductor-conductor																	
V	U_0 max (V)	U max (V)																	
300/500	320	550																	
450/750	480	825																	
5	Marking		-																
5.1	Indication of origin		P																
	Cables shall be provided with an identification of origin consisting of: a) either the manufacturer’s identification thread; b) or the continuous marking of the manufacturer’s name or his trademark, or (if legally protected) his identification number, by one of the three following methods: 1) printed tape within the cable; 2) printing, indenting or embossing on the insulation of at least one core. Any core may be chosen;		P																

Clause	Requirement - test	Result-Remark	Verdict
	3) printing, indenting or embossing on the sheath.		
5.2	Continuity of marking		P
	Each specified marking shall be regarded as continuous if the distance between the end of the mark and the beginning of the next identical mark does not exceed: a) 550 mm if the marking is on the outer sheath of the cable; b) 275 mm if the marking is: 1) on the insulation of a sheathed cable; 2) on a tape within a sheathed cable. NOTE A "Specified Marking" is any marking that is prescribed as a normative requirement by this EN.		P
	Other marking, such as that required under recognized voluntary third party approval schemes, may also follow the requirements of this subclause.		P
	Figure 1 shows an example of the marking as used on the outer sheath of the cable.		P
	 Figure 1 — Example of marking		P
5.3	Use of the name CENELEC		P
	The name CENELEC, in full or abbreviated, shall not be marked on, or in the cables.		P
5.4	Code designation		P
	Each cable shall have its full code designation according to requirements in this standard marked continuously (see 5.2) on the sheath: — EVC (Electric Vehicle Cable); — code designation: H05BZ5-F or H05BZ6-F or H07BZ5-F or H07BZ6-F; — number and nominal cross section of power cores; — additional core(s) (CC and/or CP) with number and nominal cross section, if any;		P

Clause	Requirement - test	Result-Remark	Verdict
	— rated voltage; — number of cable standard. EXAMPLE For code designation: EVC H07BZ5-F 5 × 6 + 2x0,5 450/750 V EN 50620		
5.5	Additional voluntary marking		P
	Additional markings, for example the year of manufacture, are permitted, but are not requirements of this standard. If an additional marking is applied it shall neither conflict nor interfere with the required markings in 5.1 and 5.4. Any additional voluntary marking shall be throughout the length of the cable, and shall be on the external surface of the cable.		P
	Such markings, which are permitted to be applied on the same line as the obligatory marking, or on an additional line, shall be repeated at intervals not exceeding 1 100 mm.		P
5.6	Additional requirements		P
5.6.1	Durability		P
	Printed markings shall be durable. Compliance with this requirement shall be checked by the test given in EN 50396:2005, 5.1.		P
5.6.2	Legibility		P
	All markings shall be legible.		P
	The colours of the identification threads shall be easy to recognize or easily made recognizable, if necessary by cleaning with any permitted safe petroleum-based solvent.		P
6	Requirements for the construction of cables		-
6.1	Conductors		P
6.1.1	Material		P
	The conductors shall be class 5 flexible copper conductors in accordance with EN 60228.		P
	The Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLEs of conductors shall be plain or metal coated, for example with tin or silver. Coated Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLEs shall be covered with a continuous layer of the coating. There shall be no visible gaps in the		P

	continuous layer, when examined with normal or corrected vision.		
--	--	--	--

Clause	Requirement - test	Result-Remark	Verdict
6.1.2	Electrical resistance		P
	The resistance of each conductor at 20 °C shall be in accordance with the requirements of EN 60228. Compliance shall be checked by the test given in EN 50395:2005, Clause 5.		P
6.2	Sizes of cable		P
	The sizes of cable shall be: — power cores 300/500 V – 1,5 mm ² and 2,5 mm ² - 3 core; — power cores 450/750 V – 1,5 mm ² 3 core and 2,5 mm ² to 35 mm ² - 3, 4 and 5 core; — CC/CP cores– 0,5 mm ² to 1,0 mm ² - number of cores not specified		P
6.3	Insulation		P
6.3.1	Material		P
	The insulation shall be halogen-free compound EVI-2 for power cores, and EVI-1 or EVI-2 for CC/CP cores.		P
	In all cases the insulation shall meet the requirements given in Table 2.		P
6.3.2	Application to the conductor		P
	The insulation shall be applied by extrusion, such that it fits closely on the conductor, but does not adhere to it. It shall be possible to remove it without damage to the insulation itself, to the conductor or to the metal coating if any. It is permitted to apply the insulation in a single layer, or in a number of cohesive layers.		P
	NOTE Insulation applied in more than one layer does not conform to the definition of “double insulation” given, for instance, in HD 60364		P
	Compliance shall be checked by inspection and by manual test.		P
6.3.3	Thickness		P
	The mean value of the thickness of insulation of the power cores shall be not less than the specified value for each size of cable shown in the Table 4a and 4b.		P
	However, the thickness at any place may be less than the specified value provided that the difference does not exceed		P

Clause	Requirement - test	Result-Remark	Verdict
	0,1 mm + 10 % of the specified value.		
	Compliance shall be checked by the test given in EN 50396:2005, 4.1.		P
	For CP/CC cores the minimum wall thickness at any point shall not be less than 0,33 mm.		P
6.3.4	Core identification		P
6.3.4.1	General		P
	Each power core in the cable shall be identified by colour, see 6.3.4.2.		P
	Each control and/or pilot core (CP/CC) in the cable shall be identified either by colour, see 6.3.4.2 or numbering, see 6.3.4.3.		P
6.3.4.2	Core identification by colours		P
6.3.4.2.1	General requirements		P
	Identification of the cores of a cable shall be achieved by the use of coloured insulation or by a coloured surface like in EN 50525-1		P
	Each core of a cable shall have only one colour, except the core identified by a combination of the colours green-and-yellow.		P
	The green-and-yellow core, if any, shall comply with the requirement of 6.3.4.3		P
	The colours green and yellow, when not in combination, shall not be used for any multicore cable.		P
6.3.4.2.2	Colour scheme		P
	Colour scheme for power cores shall be in accordance with HD 308 S2: — three-core cable: green-and-yellow, blue, brown; — four-core cable: green-and-yellow, brown, black, grey; — five-core cable: green-and-yellow, blue, brown, black, grey.		P
	The colours of pilot and/or control cores shall be clearly identified and different to the power cores.		P
	The colours shall be clearly identifiable and durable. Durability shall be checked by the test given in EN 50396:2005, 5.1.		P
6.3.4.2.3	Colour combination green-and-yellow		P

Clause	Requirement - test	Result-Remark	Verdict
	The combination of the colours green-and-yellow shall be such that, on any 15 mm length of the core, one of these colours covers at least 30 % and not more than 70 % of the surface of the core, the other colour covering the remainder of that surface. NOTE This requirement is in accordance with EN 60445.		P
	Compliance shall be checked using one of the test methods in EN 50396:2005, 5.2.		P
6.3.4.3	Core identification by numbers for control, pilot (CC,CP) cores		P
6.3.4.3.1	General requirements		P
	The insulation of the cores shall be of the same colour and numbered sequentially.		P
	The numbering shall start by number 1.		P
	The numbers shall be printed in arabic numerals on the outer surfaces of the cores. All the numbers shall be of the same colour, which shall contrast with the colour of the insulation. The numerals shall be legible		P
6.3.4.3.2	Preferred arrangement of marking		P
	The numbers shall be repeated, at regular intervals along the core in accordance with the axial arrangement described in EN 50334.		P
6.3.4.3.3	Durability		P
	Printed numerals shall be durable. Compliance with this requirement shall be checked by the test given in EN 50396:2005,5.1		P
6.4	Assembly of cores		P
	The cores shall be twisted together. A tape may be applied over the core assembly.		P
	A centre-core is not permitted. A centre-filler of suitable material may be applied.		P
	The maximum length of lay shall be not more than 20 times the diameter of the assembly of laid up cores.		P
6.5	Other components		P
6.5.1	General		P
	Interstitial fillers may be included in the construction of the cables.		P

Clause	Requirement - test	Result-Remark	Verdict
6.5.2	Interstitial fillers		P
6.5.2.1	Composition		P
	Fillers shall be composed of one of the following or of any combination of the following: — a compound based on polymeric materials; or — natural or synthetic textiles; or — paper.		P
6.5.2.2	Requirements		P
	Fillers shall fill the spaces between the cores, and shall not adhere to the cores. The fillers shall be capable of being removed without damage to the cores.		P
	There shall be no harmful interactions between the fillers and the insulation and/or the sheath. Compliance shall be checked as part of the compatibility test requirements.		P
6.6	Sheath		P
6.6.1	Material		P
	The sheath compound EVM-1 (Z5) or EVM-2 (Z6) shall be used.		P
	The requirements for the sheath materials are specified in Table 3.		P
6.6.2	Application		P
	The sheath shall be applied by extrusion and shall consist of a single layer or two adherent layers.		P
	The sheath shall not adhere to the cores, and shall be capable of being removed without damage to the cores.		P
	Assemblies of cores shall be surrounded by tapes, or by the sheath itself, or by a combination of these. In all cases there shall be no substantial cavities between the assembled cores and the next immediate layer.		P
	In some case interstitial fillers may be allowed and may also fill any such cavities.		P
	The application of the sheath shall give the finished cable a practically circular shape.		P
6.6.2.1	Sheath in a single layer		P
	The sheath shall be applied as a homogeneous layer either		P

Clause	Requirement - test	Result-Remark	Verdict
	EVM-1 or EVM-2. If EVM-1 is used the sheath can be extruded in two layers of EVM-1 only if the layers are bonded together		
6.6.2.2	Sheath in two layers		P
	a) Inner layer. The inner layer of the sheath shall be EVI-2. b) Outer layer. The outer layer of the sheath shall be EVM-2. Layers shall be bonded together.		P
6.6.3	Thickness		P
	The mean value of the thickness of the sheath shall be not less than the specified value for each type and size of cable shown in the Table 4a and 4b.		P
	However, the thickness at any place may be less than the specified value provided that the difference does not exceed 0,1 mm + 15 % of the specified value		P
	For two-layer constructions the inner layer shall be maximum of 40 % of the specified value for wall thickness in Table 4b for the particular type of cable.		P
	Compliance shall be checked by the test given in EN 50396:2005, 4.2.		P
6.6.4	Colour		P
	The colour shall be throughout the whole of the sheath (or the whole of the outer layer in a two layer construction).		P
	Durability shall be checked by the test given in EN 50396:2005, 5.1.		P
	For permanent outdoor use, the sheath shall be protected against discoloration due to UV.		P
7	Requirements		-
	Each cable shall comply with the requirements given in this European Standard.		P
	Testing shall be in accordance with Table 5. NOTE For non-electrical tests on sheaths in two layers see EN 50525-1.		P
	The dimensions of the cables shall conform to Table 4a or		P

Clause	Requirement - test				Result-Remark	Verdict
	1.2	Properties after ageing in oven		EN 60811-401		
	1.2.1	Ageing conditions:				
		- temperature	°C		135 ± 2	135 ± 2
		- duration of treatment	h		7 × 24	7 × 24
	1.2.2	Values to be obtained for the tensile strength:				
		- median, min.	N/mm ²		—	—
		- variation, max.	%		± 30	± 30
	1.2.3	Values to be obtained for the elongation at break:				
		- median, min.	%		—	—
		- variation, max.	%		± 30	± 30
	1.3	Hot set test		EN 60811-507		
	1.3.1	Conditions				
		- Temperature	°C		—	200 ± 3
		- Time under load	min		—	15
		- mechanical stress	N/cm ²		—	20
	1.3.2	Values to be obtained				
		- elongation under load, max.	%		—	100
		- permanent elongation after cooling, max.	%		—	25
	1.4	Pressure test at high temperature		EN 60811-508		
	1.4.1	Conditions				
		- duration of heating under load	h		4	
		- temperature	°C		120 ± 2	
	1.4.2	Result to be obtained				
		Median of the depth of indentation, max	%		50	
	1.5	Test at low temperature		EN 60811-504		
	1.5.1	Cold bend test for diameter ≤ 12,5 mm				
	1.5.1.1	Conditions:				
		- temperature	°C		-40 ± 2	-40 ± 2
		- duration of conditioning	h		16	16
	1.5.1.2	Results to be obtained:			no cracks	no cracks
	1.5.2	Cold elongation test for diameter > 12,5 mm				
	1.5.2.1	Conditions:		EN 60811-505		
		- temperature	°C		-40 ± 2	-40 ± 2
	1.5.2.2	Values to be obtained:				
		- elongation at break, min.	%		30	30 (C ₂)
	1.6	Shore hardness	IRHD Shore D	ISO 48 HD 605 S2:2008	2.2.1	≥ 50 (D)
						P

Clause	Requirement - test	Result-Remark	Verdict
--------	--------------------	---------------	---------

Table 3 — Requirements for halogen free sheathing compounds						
1	2	3	4	5	6	7
Ref. No.	Test	Unit	Test method described in		Type of compound	
			standard	clause	EVM-1	EVM-2
1	Mechanical characteristics					
1.1	Properties before ageing		EN 60811-501			
1.1.1	Values to be obtained for the tensile strength:					
	— median, min.	N/mm ²			20,0	10,0
1.1.2	Values to be obtained for the elongation at break:					
	— median, min.	%			300	150
1.2	Properties after ageing in oven		EN 60811-401			
1.2.1	Ageing conditions:					
	— temperature	°C			110 ± 2	120 ± 2
	— duration of treatment	h			7 × 24	7 × 24
1.2.2	Values to be obtained for the tensile strength:					
	— median, min.	N/mm ²			—	—
	— variation, max.	%			± 30	± 30
1.2.3	Values to be obtained for the elongation at break:					
	— median, min.	%			300	—
	— variation, max.	%			± 30	± 30
1.3	Hot set test		EN 60811-507			
1.3.1	Conditions					
	— Temperature	°C			—	250 ± 3
	— Time under load	min			—	15
	— mechanical stress	N/cm ²			—	20
1.3.2	Values to be obtained					
	— elongation under load, max.	%			—	100
	— permanent elongation after cooling, max.	%			—	25
1.4	Test at low temperature					
1.4.1	Cold bend test for diameter ≤ 12,5 mm		EN 60811-504			
1.4.1.1	Conditions:					
	— temperature	°C			-40 ± 2	-40 ± 2
	— duration of conditioning	h			16	16
1.4.1.2	Results to be obtained:					
	Cold elongation test for diameter > 12,5 mm				no cracks	no cracks
1.4.2	Conditions:		EN 60811-505			
1.4.2.1	— temperature		°C		-40 ± 2	-40 ± 2
1.4.2.2	Values to be obtained:					
	— elongation at break, min.	%			30	30

P

Clause

Requirement - test

Result-Remark

Verdict

1	2	3	4	5	6	7
Ref. No.	Test	Unit	Test method described in		Type of compound	
			standard	clause	EVM-1	EVM-2
1.5	Requirements after water immersion		EN 50395:2005	10.3		
1.5.1	Test conditions					
	- Temperature	°C			80 ± 2	70 ± 2
	- Time under load	h			7 × 24	7 × 24
1.5.2	Values to be obtained					
	- median, elongation, min.	%			300	-
	- variation, elongation, max.	%			± 30	± 30
	- variation, tensile load, max.	%			± 30	± 30
1.6	Properties after immersion in mineral oil IRM 902		EN 60811-404			
1.6.1	test conditions:					
	- temperature	°C			100 ± 2	100 ± 2
	- duration of treatment	h			7 × 24	7 × 24
1.6.2	Values to be obtained for the tensile strength:					
	- variation, max.	%			± 40	± 40
1.6.3	Values to be obtained for the elongation at break:					
	- median, min.	%			300	-
	- variation, max.	%			± 30	± 40
1.7	Heat shock test		EN 60811-509			
1.7.1	Test conditions:					
	- temperature	°C			150 ± 2	-
	- duration of treatment	h			1	-
1.7.2	Results to be obtained				No cracks	-
1.8	Pressure test at high temperature		EN 60811-508			
1.8.1	Test conditions:					
	- duration of heating under load	h			4	
	- temperature	°C			100 ± 2	
1.8.2	Result to be obtained					
	Median of the depth of indentation, max.	%			50	
1.9	Tear strength		EN 50395:2005	10.2		
	Mean value to be obtained, min	N/mm			40	10
2.0	Resistance against saponification		EN 50395:2005	10.1		
	Mean value to be obtained, max	50 mg of KOH/g			200	-

P

P

Clause	Requirement - test	Result-Remark	Verdict																																																																																																																																																																																																																																								
	Table 4a — Dimensional and insulation resistance values of H05BZ5-F and H07BZ5-F * <table><tr><th>Rated voltage U₀/U</th><th>1 Number and nominal cross sectional area of conductors</th><th>2 Insulation thickness power core Specified value</th><th>3 Sheath thickness Specified value</th><th>4 Mean overall diameter Lower limit Informative value</th><th>5 Mean overall diameter Upper limit Informative value</th><th>6 Minimum insulation resistance at 20 °C</th><th>7 Minimum insulation resistance at 90 °C</th></tr><tr><td>V</td><td>mm²</td><td>mm</td><td>mm</td><td>mm</td><td>mm</td><td>MΩ·km</td><td>MΩ·km</td></tr><tr><td>300/500</td><td>3 × 1,5</td><td>0,6</td><td>1,0</td><td>7,9</td><td>10,1</td><td>9,4</td><td>0.0094</td></tr><tr><td>300/500</td><td>3 × 2,5</td><td>0,6</td><td>1,0</td><td>9,1</td><td>11,5</td><td>7,6</td><td>0.0076</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>3 × 1,5</td><td>0,7</td><td>1,0</td><td>8,2</td><td>10,5</td><td>10,5</td><td>0.0105</td></tr><tr><td>450/750</td><td>3 × 2,5</td><td>0,7</td><td>1,0</td><td>9,3</td><td>11,9</td><td>8,6</td><td>0.0086</td></tr><tr><td>450/750</td><td>3 × 4</td><td>0,7</td><td>1,1</td><td>10,8</td><td>13,8</td><td>7,1</td><td>0.0071</td></tr><tr><td>450/750</td><td>3 × 6</td><td>0,7</td><td>1,2</td><td>12,3</td><td>15,7</td><td>6,1</td><td>0.0061</td></tr><tr><td>450/750</td><td>3 × 10</td><td>0,7</td><td>1,4</td><td>14,8</td><td>19,0</td><td>4,9</td><td>0.0049</td></tr><tr><td>450/750</td><td>3 × 16</td><td>0,7</td><td>1,5</td><td>17,6</td><td>22,6</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>3 × 25</td><td>0,9</td><td>1,7</td><td>21,9</td><td>28,0</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>3 × 35</td><td>0,9</td><td>1,9</td><td>25,7</td><td>32,9</td><td>3,3</td><td>0.0033</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>4 × 2,5</td><td>0,7</td><td>1,0</td><td>10,2</td><td>13,1</td><td>8,6</td><td>0.0086</td></tr><tr><td>450/750</td><td>4 × 4</td><td>0,7</td><td>1,1</td><td>11,9</td><td>15,2</td><td>7,1</td><td>0.0071</td></tr><tr><td>450/750</td><td>4 × 6</td><td>0,7</td><td>1,2</td><td>13,5</td><td>17,3</td><td>6,1</td><td>0.0061</td></tr><tr><td>450/750</td><td>4 × 10</td><td>0,7</td><td>1,4</td><td>16,4</td><td>20,9</td><td>4,9</td><td>0.0049</td></tr><tr><td>450/750</td><td>4 × 16</td><td>0,7</td><td>1,6</td><td>19,7</td><td>25,2</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>4 × 25</td><td>0,9</td><td>1,9</td><td>24,6</td><td>31,5</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>4 × 35</td><td>0,9</td><td>2,1</td><td>28,9</td><td>37,0</td><td>3,3</td><td>0.0033</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>5 × 2,5</td><td>0,7</td><td>1,2</td><td>11,7</td><td>15,0</td><td>8,6</td><td>0.0086</td></tr><tr><td>450/750</td><td>5 × 4</td><td>0,7</td><td>1,3</td><td>13,5</td><td>17,3</td><td>7,1</td><td>0.0071</td></tr><tr><td>450/750</td><td>5 × 6</td><td>0,7</td><td>1,4</td><td>15,4</td><td>19,7</td><td>6,1</td><td>0.0061</td></tr><tr><td>450/750</td><td>5 × 10</td><td>0,7</td><td>1,5</td><td>18,3</td><td>23,4</td><td>4,9</td><td>0.0049</td></tr><tr><td>450/750</td><td>5 × 16</td><td>0,7</td><td>1,7</td><td>22,0</td><td>28,1</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>5 × 25</td><td>0,9</td><td>2,0</td><td>27,5</td><td>35,2</td><td>3,9</td><td>0.0039</td></tr><tr><td>450/750</td><td>5 × 35</td><td>0,9</td><td>2,3</td><td>32,4</td><td>41,5</td><td>3,3</td><td>0.0033</td></tr></table> * Mean overall dimension values in Table 4a are referring to constructions with one or two control core(s).	Rated voltage U ₀ /U	1 Number and nominal cross sectional area of conductors	2 Insulation thickness power core Specified value	3 Sheath thickness Specified value	4 Mean overall diameter Lower limit Informative value	5 Mean overall diameter Upper limit Informative value	6 Minimum insulation resistance at 20 °C	7 Minimum insulation resistance at 90 °C	V	mm ²	mm	mm	mm	mm	MΩ·km	MΩ·km	300/500	3 × 1,5	0,6	1,0	7,9	10,1	9,4	0.0094	300/500	3 × 2,5	0,6	1,0	9,1	11,5	7,6	0.0076									450/750	3 × 1,5	0,7	1,0	8,2	10,5	10,5	0.0105	450/750	3 × 2,5	0,7	1,0	9,3	11,9	8,6	0.0086	450/750	3 × 4	0,7	1,1	10,8	13,8	7,1	0.0071	450/750	3 × 6	0,7	1,2	12,3	15,7	6,1	0.0061	450/750	3 × 10	0,7	1,4	14,8	19,0	4,9	0.0049	450/750	3 × 16	0,7	1,5	17,6	22,6	3,9	0.0039	450/750	3 × 25	0,9	1,7	21,9	28,0	3,9	0.0039	450/750	3 × 35	0,9	1,9	25,7	32,9	3,3	0.0033									450/750	4 × 2,5	0,7	1,0	10,2	13,1	8,6	0.0086	450/750	4 × 4	0,7	1,1	11,9	15,2	7,1	0.0071	450/750	4 × 6	0,7	1,2	13,5	17,3	6,1	0.0061	450/750	4 × 10	0,7	1,4	16,4	20,9	4,9	0.0049	450/750	4 × 16	0,7	1,6	19,7	25,2	3,9	0.0039	450/750	4 × 25	0,9	1,9	24,6	31,5	3,9	0.0039	450/750	4 × 35	0,9	2,1	28,9	37,0	3,3	0.0033									450/750	5 × 2,5	0,7	1,2	11,7	15,0	8,6	0.0086	450/750	5 × 4	0,7	1,3	13,5	17,3	7,1	0.0071	450/750	5 × 6	0,7	1,4	15,4	19,7	6,1	0.0061	450/750	5 × 10	0,7	1,5	18,3	23,4	4,9	0.0049	450/750	5 × 16	0,7	1,7	22,0	28,1	3,9	0.0039	450/750	5 × 25	0,9	2,0	27,5	35,2	3,9	0.0039	450/750	5 × 35	0,9	2,3	32,4	41,5	3,3	0.0033		P
Rated voltage U ₀ /U	1 Number and nominal cross sectional area of conductors	2 Insulation thickness power core Specified value	3 Sheath thickness Specified value	4 Mean overall diameter Lower limit Informative value	5 Mean overall diameter Upper limit Informative value	6 Minimum insulation resistance at 20 °C	7 Minimum insulation resistance at 90 °C																																																																																																																																																																																																																																				
V	mm ²	mm	mm	mm	mm	MΩ·km	MΩ·km																																																																																																																																																																																																																																				
300/500	3 × 1,5	0,6	1,0	7,9	10,1	9,4	0.0094																																																																																																																																																																																																																																				
300/500	3 × 2,5	0,6	1,0	9,1	11,5	7,6	0.0076																																																																																																																																																																																																																																				
450/750	3 × 1,5	0,7	1,0	8,2	10,5	10,5	0.0105																																																																																																																																																																																																																																				
450/750	3 × 2,5	0,7	1,0	9,3	11,9	8,6	0.0086																																																																																																																																																																																																																																				
450/750	3 × 4	0,7	1,1	10,8	13,8	7,1	0.0071																																																																																																																																																																																																																																				
450/750	3 × 6	0,7	1,2	12,3	15,7	6,1	0.0061																																																																																																																																																																																																																																				
450/750	3 × 10	0,7	1,4	14,8	19,0	4,9	0.0049																																																																																																																																																																																																																																				
450/750	3 × 16	0,7	1,5	17,6	22,6	3,9	0.0039																																																																																																																																																																																																																																				
450/750	3 × 25	0,9	1,7	21,9	28,0	3,9	0.0039																																																																																																																																																																																																																																				
450/750	3 × 35	0,9	1,9	25,7	32,9	3,3	0.0033																																																																																																																																																																																																																																				
450/750	4 × 2,5	0,7	1,0	10,2	13,1	8,6	0.0086																																																																																																																																																																																																																																				
450/750	4 × 4	0,7	1,1	11,9	15,2	7,1	0.0071																																																																																																																																																																																																																																				
450/750	4 × 6	0,7	1,2	13,5	17,3	6,1	0.0061																																																																																																																																																																																																																																				
450/750	4 × 10	0,7	1,4	16,4	20,9	4,9	0.0049																																																																																																																																																																																																																																				
450/750	4 × 16	0,7	1,6	19,7	25,2	3,9	0.0039																																																																																																																																																																																																																																				
450/750	4 × 25	0,9	1,9	24,6	31,5	3,9	0.0039																																																																																																																																																																																																																																				
450/750	4 × 35	0,9	2,1	28,9	37,0	3,3	0.0033																																																																																																																																																																																																																																				
450/750	5 × 2,5	0,7	1,2	11,7	15,0	8,6	0.0086																																																																																																																																																																																																																																				
450/750	5 × 4	0,7	1,3	13,5	17,3	7,1	0.0071																																																																																																																																																																																																																																				
450/750	5 × 6	0,7	1,4	15,4	19,7	6,1	0.0061																																																																																																																																																																																																																																				
450/750	5 × 10	0,7	1,5	18,3	23,4	4,9	0.0049																																																																																																																																																																																																																																				
450/750	5 × 16	0,7	1,7	22,0	28,1	3,9	0.0039																																																																																																																																																																																																																																				
450/750	5 × 25	0,9	2,0	27,5	35,2	3,9	0.0039																																																																																																																																																																																																																																				
450/750	5 × 35	0,9	2,3	32,4	41,5	3,3	0.0033																																																																																																																																																																																																																																				
	The overall dimensions of cables have been calculated in accordance with EN 60719.		P																																																																																																																																																																																																																																								

Clause	Requirement - test	Result-Remark	Verdict																																																																																																																																																																																																																																																
	Table 4b — Dimensional and insulation resistance values of H05BZ6-F and H07BZ6-F ^a <table><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><th>Rated voltage U₀/U</th><th>Number and nominal cross sectional area of conductors</th><th>Insulation thickness power core Specified value</th><th>Sheath thickness Specified value</th><th>Mean overall diameter Lower limit Informative value</th><th>Mean overall diameter Upper limit Informative value</th><th>Minimum insulation resistance at 20 °C</th><th>Minimum insulation resistance at 90 °C</th></tr><tr><td>V</td><td>mm²</td><td>mm</td><td>mm</td><td>mm</td><td>mm</td><td>MΩ·km</td><td>MΩ·km</td></tr><tr><td>300/500</td><td>3 × 1,5</td><td>0,6</td><td>1,5</td><td>8,9</td><td>11,6</td><td>9,4</td><td>0,0094</td></tr><tr><td>300/500</td><td>3 × 2,5</td><td>0,6</td><td>1,6</td><td>10,1</td><td>13,2</td><td>7,6</td><td>0,0076</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>3 × 1,5</td><td>0,7</td><td>1,5</td><td>9,2</td><td>11,8</td><td>10,5</td><td>0,0105</td></tr><tr><td>450/750</td><td>3 × 2,5</td><td>0,7</td><td>1,6</td><td>10,5</td><td>13,5</td><td>8,6</td><td>0,0086</td></tr><tr><td>450/750</td><td>3 × 4</td><td>0,7</td><td>1,7</td><td>12,1</td><td>15,5</td><td>7,1</td><td>0,0071</td></tr><tr><td>450/750</td><td>3 × 6</td><td>0,7</td><td>1,9</td><td>13,7</td><td>17,5</td><td>6,1</td><td>0,0061</td></tr><tr><td>450/750</td><td>3 × 10</td><td>0,7</td><td>2,1</td><td>16,3</td><td>20,8</td><td>4,9</td><td>0,0049</td></tr><tr><td>450/750</td><td>3 × 16</td><td>0,7</td><td>2,4</td><td>19,4</td><td>24,9</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>3 × 25</td><td>0,9</td><td>2,8</td><td>24,2</td><td>30,9</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>3 × 35</td><td>0,9</td><td>3,2</td><td>28,4</td><td>36,3</td><td>3,3</td><td>0,0033</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>4 × 2,5</td><td>0,7</td><td>1,7</td><td>11,6</td><td>14,9</td><td>8,6</td><td>0,0086</td></tr><tr><td>450/750</td><td>4 × 4</td><td>0,7</td><td>1,9</td><td>13,4</td><td>17,2</td><td>7,1</td><td>0,0071</td></tr><tr><td>450/750</td><td>4 × 6</td><td>0,7</td><td>2,0</td><td>15,2</td><td>19,4</td><td>6,1</td><td>0,0061</td></tr><tr><td>450/750</td><td>4 × 10</td><td>0,7</td><td>2,3</td><td>18,1</td><td>23,2</td><td>4,9</td><td>0,0049</td></tr><tr><td>450/750</td><td>4 × 16</td><td>0,7</td><td>2,6</td><td>21,7</td><td>27,7</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>4 × 25</td><td>0,9</td><td>3,1</td><td>27,0</td><td>34,5</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>4 × 35</td><td>0,9</td><td>3,5</td><td>31,7</td><td>40,6</td><td>3,3</td><td>0,0033</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>450/750</td><td>5 × 2,5</td><td>0,7</td><td>1,8</td><td>12,9</td><td>16,5</td><td>8,6</td><td>0,0086</td></tr><tr><td>450/750</td><td>5 × 4</td><td>0,7</td><td>2,0</td><td>14,9</td><td>19,1</td><td>7,1</td><td>0,0071</td></tr><tr><td>450/750</td><td>5 × 6</td><td>0,7</td><td>2,2</td><td>16,9</td><td>21,7</td><td>6,1</td><td>0,0061</td></tr><tr><td>450/750</td><td>5 × 10</td><td>0,7</td><td>2,5</td><td>20,3</td><td>25,9</td><td>4,9</td><td>0,0049</td></tr><tr><td>450/750</td><td>5 × 16</td><td>0,7</td><td>2,8</td><td>24,2</td><td>31,0</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>5 × 25</td><td>0,9</td><td>3,4</td><td>30,2</td><td>38,7</td><td>3,9</td><td>0,0039</td></tr><tr><td>450/750</td><td>5 × 35</td><td>0,9</td><td>3,9</td><td>35,6</td><td>45,5</td><td>3,3</td><td>0,0033</td></tr></table> ^a Mean overall dimension values in Table 4b are referring to constructions with one or two control core(s).		1	2	3	4	5	6	7	Rated voltage U ₀ /U	Number and nominal cross sectional area of conductors	Insulation thickness power core Specified value	Sheath thickness Specified value	Mean overall diameter Lower limit Informative value	Mean overall diameter Upper limit Informative value	Minimum insulation resistance at 20 °C	Minimum insulation resistance at 90 °C	V	mm ²	mm	mm	mm	mm	MΩ·km	MΩ·km	300/500	3 × 1,5	0,6	1,5	8,9	11,6	9,4	0,0094	300/500	3 × 2,5	0,6	1,6	10,1	13,2	7,6	0,0076									450/750	3 × 1,5	0,7	1,5	9,2	11,8	10,5	0,0105	450/750	3 × 2,5	0,7	1,6	10,5	13,5	8,6	0,0086	450/750	3 × 4	0,7	1,7	12,1	15,5	7,1	0,0071	450/750	3 × 6	0,7	1,9	13,7	17,5	6,1	0,0061	450/750	3 × 10	0,7	2,1	16,3	20,8	4,9	0,0049	450/750	3 × 16	0,7	2,4	19,4	24,9	3,9	0,0039	450/750	3 × 25	0,9	2,8	24,2	30,9	3,9	0,0039	450/750	3 × 35	0,9	3,2	28,4	36,3	3,3	0,0033									450/750	4 × 2,5	0,7	1,7	11,6	14,9	8,6	0,0086	450/750	4 × 4	0,7	1,9	13,4	17,2	7,1	0,0071	450/750	4 × 6	0,7	2,0	15,2	19,4	6,1	0,0061	450/750	4 × 10	0,7	2,3	18,1	23,2	4,9	0,0049	450/750	4 × 16	0,7	2,6	21,7	27,7	3,9	0,0039	450/750	4 × 25	0,9	3,1	27,0	34,5	3,9	0,0039	450/750	4 × 35	0,9	3,5	31,7	40,6	3,3	0,0033									450/750	5 × 2,5	0,7	1,8	12,9	16,5	8,6	0,0086	450/750	5 × 4	0,7	2,0	14,9	19,1	7,1	0,0071	450/750	5 × 6	0,7	2,2	16,9	21,7	6,1	0,0061	450/750	5 × 10	0,7	2,5	20,3	25,9	4,9	0,0049	450/750	5 × 16	0,7	2,8	24,2	31,0	3,9	0,0039	450/750	5 × 25	0,9	3,4	30,2	38,7	3,9	0,0039	450/750	5 × 35	0,9	3,9	35,6	45,5	3,3	0,0033		P
	1	2	3	4	5	6	7																																																																																																																																																																																																																																												
Rated voltage U ₀ /U	Number and nominal cross sectional area of conductors	Insulation thickness power core Specified value	Sheath thickness Specified value	Mean overall diameter Lower limit Informative value	Mean overall diameter Upper limit Informative value	Minimum insulation resistance at 20 °C	Minimum insulation resistance at 90 °C																																																																																																																																																																																																																																												
V	mm ²	mm	mm	mm	mm	MΩ·km	MΩ·km																																																																																																																																																																																																																																												
300/500	3 × 1,5	0,6	1,5	8,9	11,6	9,4	0,0094																																																																																																																																																																																																																																												
300/500	3 × 2,5	0,6	1,6	10,1	13,2	7,6	0,0076																																																																																																																																																																																																																																												
450/750	3 × 1,5	0,7	1,5	9,2	11,8	10,5	0,0105																																																																																																																																																																																																																																												
450/750	3 × 2,5	0,7	1,6	10,5	13,5	8,6	0,0086																																																																																																																																																																																																																																												
450/750	3 × 4	0,7	1,7	12,1	15,5	7,1	0,0071																																																																																																																																																																																																																																												
450/750	3 × 6	0,7	1,9	13,7	17,5	6,1	0,0061																																																																																																																																																																																																																																												
450/750	3 × 10	0,7	2,1	16,3	20,8	4,9	0,0049																																																																																																																																																																																																																																												
450/750	3 × 16	0,7	2,4	19,4	24,9	3,9	0,0039																																																																																																																																																																																																																																												
450/750	3 × 25	0,9	2,8	24,2	30,9	3,9	0,0039																																																																																																																																																																																																																																												
450/750	3 × 35	0,9	3,2	28,4	36,3	3,3	0,0033																																																																																																																																																																																																																																												
450/750	4 × 2,5	0,7	1,7	11,6	14,9	8,6	0,0086																																																																																																																																																																																																																																												
450/750	4 × 4	0,7	1,9	13,4	17,2	7,1	0,0071																																																																																																																																																																																																																																												
450/750	4 × 6	0,7	2,0	15,2	19,4	6,1	0,0061																																																																																																																																																																																																																																												
450/750	4 × 10	0,7	2,3	18,1	23,2	4,9	0,0049																																																																																																																																																																																																																																												
450/750	4 × 16	0,7	2,6	21,7	27,7	3,9	0,0039																																																																																																																																																																																																																																												
450/750	4 × 25	0,9	3,1	27,0	34,5	3,9	0,0039																																																																																																																																																																																																																																												
450/750	4 × 35	0,9	3,5	31,7	40,6	3,3	0,0033																																																																																																																																																																																																																																												
450/750	5 × 2,5	0,7	1,8	12,9	16,5	8,6	0,0086																																																																																																																																																																																																																																												
450/750	5 × 4	0,7	2,0	14,9	19,1	7,1	0,0071																																																																																																																																																																																																																																												
450/750	5 × 6	0,7	2,2	16,9	21,7	6,1	0,0061																																																																																																																																																																																																																																												
450/750	5 × 10	0,7	2,5	20,3	25,9	4,9	0,0049																																																																																																																																																																																																																																												
450/750	5 × 16	0,7	2,8	24,2	31,0	3,9	0,0039																																																																																																																																																																																																																																												
450/750	5 × 25	0,9	3,4	30,2	38,7	3,9	0,0039																																																																																																																																																																																																																																												
450/750	5 × 35	0,9	3,9	35,6	45,5	3,3	0,0033																																																																																																																																																																																																																																												
	The overall dimensions of cables have been calculated in accordance with EN 60719		P																																																																																																																																																																																																																																																

Clause	Requirement - test	Result-Remark	Verdict
--------	--------------------	---------------	---------

Table 5 — Tests for complete cable						
1	2	3	4	5	6	7
Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables	
					300/500 V	450/750 V
1	Electrical test					
1.1	Measurement of the resistance of conductor		T,S	EN 50395 2005, Clause 5		
1.1.1	Values to be obtained, max				see EN 60228	see EN 60228
1.2	Voltage test on cores		T,S	EN 50395 2005, Clause 7		
1.2.1	Test conditions:					
	- length of sample	m			5	5
	- minimum period of immersion in water	h			1	1
	- temperature of the water	°C			20 ± 5	20 ± 5
1.2.2	Applied voltage (IEC AC 50) according to specified thickness of insulation:					
	- up to and inc. 0,6 mm	V			1 500	2 000
	- exceeding 0,6 mm	V			2 000	2 500
1.2.3	Duration of each application of voltage, minimum	min			5	5
1.2.4	Result to be obtained				No breakdown	No breakdown
1.3	Voltage test on completed cable		T,S	EN 50395 2005, Clause 6		
1.3.1	Test conditions:					
	- minimum length of the sample	m			20	20
	- minimum period of immersion in water	h			1	1
	- temperature of the water	°C			20 ± 5	20 ± 5
1.3.2	Voltage applied (IEC AC 50)	V			2 500	3 500
1.3.3	Duration of each application of voltage, minimum	min			15	15
1.3.4	Result to be obtained				No breakdown	No breakdown
1.4	Absence of faults on insulation		R	EN 62230		
1.4.1	Test conditions:				see EN 62230	see EN 62230
1.4.2	Result to be obtained				No breakdown	No breakdown

P

Clause	Requirement - test				Result-Remark	Verdict																																																																																																																										
	<table><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><th rowspan="2">Ref No</th><th rowspan="2">Test</th><th rowspan="2">Unit</th><th rowspan="2">Category of test</th><th rowspan="2">Test method</th><th colspan="2">Rated voltage of cables</th></tr><tr><th>300/500 V</th><th>450/750 V</th></tr><tr><td>1.5</td><td>Check on absence of faults on insulation</td><td></td><td>R</td><td></td><td></td><td></td></tr><tr><td>1.5.1</td><td>Voltage test</td><td></td><td></td><td>EN 50395:2005, 10.3</td><td></td><td></td></tr><tr><td>1.5.2</td><td>Test conditions: Applied voltage (15 AC 3) according to specified thickness of insulation: - up to and inc. 0,6 mm - exceeding 0,6 mm</td><td>V V</td><td></td><td></td><td>1 500 2 000</td><td>2 000 2 500</td></tr><tr><td>1.5.3</td><td>Duration of each application of voltage, minimum</td><td>min</td><td></td><td></td><td>5</td><td>5</td></tr><tr><td>1.5.4</td><td>Result to be obtained</td><td></td><td></td><td></td><td>No breakdown</td><td>No breakdown</td></tr><tr><td>1.6</td><td>Measurement of insulation resistance</td><td></td><td>T,S</td><td></td><td></td><td></td></tr><tr><td>1.6.1</td><td>Cables at 20°C</td><td></td><td></td><td>EN 50395:2005, 8.1</td><td></td><td></td></tr><tr><td>1.6.1.1</td><td>Test conditions: - length of sample - minimum period of immersion in water - temperature of the water</td><td>m h °C</td><td></td><td></td><td>5 2 20</td><td>5 2 20</td></tr><tr><td>1.6.1.2</td><td>Result to be obtained</td><td>MΩ.km</td><td></td><td></td><td>min. as stated in Table 4a/b</td><td>min. as stated in Table 4a/b</td></tr><tr><td>1.6.2</td><td>Cables at 90°C</td><td></td><td></td><td>EN 50395: 2005, 8.1</td><td></td><td></td></tr><tr><td>1.6.2.1</td><td>Test conditions: - length of sample - minimum period of immersion in water - temperature of the water</td><td>m h °C</td><td></td><td></td><td>5 2 90</td><td>5 2 90</td></tr><tr><td>1.6.2.2</td><td>Result to be obtained</td><td>MΩ.km</td><td></td><td></td><td>min. as stated in Table 4a/b</td><td>min. as stated in Table 4a/b</td></tr><tr><td>1.7</td><td>Surface resistance of sheath</td><td></td><td>T,S</td><td>EN 50395:2005, Clause 11</td><td></td><td></td></tr><tr><td>1.7.1</td><td>Test conditions: - voltage applied, 15 DC 3 - duration of test</td><td>V min</td><td></td><td></td><td>100 to 500 1</td><td>100 to 500 1</td></tr><tr><td>1.7.2</td><td>Result to be obtained</td><td>Ω</td><td></td><td></td><td>≥ 10⁹</td><td>≥ 10⁹</td></tr></table>						1	2	3	4	5	6	7	Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables		300/500 V	450/750 V	1.5	Check on absence of faults on insulation		R				1.5.1	Voltage test			EN 50395:2005, 10.3			1.5.2	Test conditions: Applied voltage (15 AC 3) according to specified thickness of insulation: - up to and inc. 0,6 mm - exceeding 0,6 mm	V V			1 500 2 000	2 000 2 500	1.5.3	Duration of each application of voltage, minimum	min			5	5	1.5.4	Result to be obtained				No breakdown	No breakdown	1.6	Measurement of insulation resistance		T,S				1.6.1	Cables at 20°C			EN 50395:2005, 8.1			1.6.1.1	Test conditions: - length of sample - minimum period of immersion in water - temperature of the water	m h °C			5 2 20	5 2 20	1.6.1.2	Result to be obtained	MΩ.km			min. as stated in Table 4a/b	min. as stated in Table 4a/b	1.6.2	Cables at 90°C			EN 50395: 2005, 8.1			1.6.2.1	Test conditions: - length of sample - minimum period of immersion in water - temperature of the water	m h °C			5 2 90	5 2 90	1.6.2.2	Result to be obtained	MΩ.km			min. as stated in Table 4a/b	min. as stated in Table 4a/b	1.7	Surface resistance of sheath		T,S	EN 50395:2005, Clause 11			1.7.1	Test conditions: - voltage applied, 15 DC 3 - duration of test	V min			100 to 500 1	100 to 500 1	1.7.2	Result to be obtained	Ω			≥ 10 ⁹	≥ 10 ⁹	P
1	2	3	4	5	6	7																																																																																																																										
Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables																																																																																																																											
					300/500 V	450/750 V																																																																																																																										
1.5	Check on absence of faults on insulation		R																																																																																																																													
1.5.1	Voltage test			EN 50395:2005, 10.3																																																																																																																												
1.5.2	Test conditions: Applied voltage (15 AC 3) according to specified thickness of insulation: - up to and inc. 0,6 mm - exceeding 0,6 mm	V V			1 500 2 000	2 000 2 500																																																																																																																										
1.5.3	Duration of each application of voltage, minimum	min			5	5																																																																																																																										
1.5.4	Result to be obtained				No breakdown	No breakdown																																																																																																																										
1.6	Measurement of insulation resistance		T,S																																																																																																																													
1.6.1	Cables at 20°C			EN 50395:2005, 8.1																																																																																																																												
1.6.1.1	Test conditions: - length of sample - minimum period of immersion in water - temperature of the water	m h °C			5 2 20	5 2 20																																																																																																																										
1.6.1.2	Result to be obtained	MΩ.km			min. as stated in Table 4a/b	min. as stated in Table 4a/b																																																																																																																										
1.6.2	Cables at 90°C			EN 50395: 2005, 8.1																																																																																																																												
1.6.2.1	Test conditions: - length of sample - minimum period of immersion in water - temperature of the water	m h °C			5 2 90	5 2 90																																																																																																																										
1.6.2.2	Result to be obtained	MΩ.km			min. as stated in Table 4a/b	min. as stated in Table 4a/b																																																																																																																										
1.7	Surface resistance of sheath		T,S	EN 50395:2005, Clause 11																																																																																																																												
1.7.1	Test conditions: - voltage applied, 15 DC 3 - duration of test	V min			100 to 500 1	100 to 500 1																																																																																																																										
1.7.2	Result to be obtained	Ω			≥ 10 ⁹	≥ 10 ⁹																																																																																																																										

Clause	Requirement - test				Result-Remark	Verdict																																																																																																																																																																																																																																																					
	<table><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><th>Ref No</th><th>Test</th><th>Unit</th><th>Category of test</th><th>Test method</th><th colspan="2">Rated voltage of cables</th></tr><tr><td></td><td></td><td></td><td></td><td></td><th>300/500 V</th><th>450/750 V</th></tr><tr><td>1.8</td><td>Capacity of CP core to all power cores.</td><td></td><td>T</td><td>EN 50289-1-5:2001, 4.3.1</td><td></td><td></td></tr><tr><td>1.8.1</td><td>Test conditions:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- frequency</td><td>kHz</td><td></td><td></td><td>1</td><td>1</td></tr><tr><td></td><td>- temperature of the water</td><td>°C</td><td></td><td></td><td>60 ± 5</td><td>60 ± 5</td></tr><tr><td>1.8.2</td><td>Result to be obtained</td><td>pF/m</td><td></td><td></td><td>≤ 150</td><td>≤ 150</td></tr><tr><td>1.9</td><td>Long term resistance of power cores to  DC </td><td></td><td>T</td><td>EN 50396:2005, Clause 9</td><td></td><td></td></tr><tr><td>1.9.1</td><td>Test conditions:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- length of sample</td><td>m</td><td></td><td></td><td>5</td><td>5</td></tr><tr><td></td><td>- duration of test</td><td>h</td><td></td><td></td><td>240</td><td>240</td></tr><tr><td></td><td>- temperature of the water</td><td>°C</td><td></td><td></td><td>80 ± 5</td><td>80 ± 5</td></tr><tr><td></td><td>-  DC  voltage applied</td><td>V</td><td></td><td></td><td>600</td><td>900</td></tr><tr><td></td><td>Result to be obtained</td><td></td><td></td><td></td><td>no breakdown</td><td>no breakdown </td></tr><tr><td>1.9.2</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td>Constructional and dimensional tests</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>2.1</td><td>Checking of compliance with constructional provisions</td><td></td><td>T, S</td><td>Inspection and manual test</td><td>Clause 6 of this standard</td><td>Clause 6 of this standard</td></tr><tr><td>2.2</td><td>Measurement of thickness of insulation</td><td></td><td>T, S</td><td>EN 50396:2005, 4.1</td><td>see Table 4a/4b</td><td>see Table 4a/4b</td></tr><tr><td>2.3</td><td>Measurement of thickness of sheath</td><td></td><td>T, S</td><td>EN 50396:2005,  4.2 </td><td>see Table 4a/4b</td><td>see Table 4a/4b</td></tr><tr><td>2.4</td><td>Measurement of overall dimensions</td><td></td><td>T, S</td><td></td><td></td><td></td></tr><tr><td>2.4.1</td><td>- Mean value</td><td>mm</td><td>T, S</td><td>EN 50396:2005, 4.4.1</td><td>see Table 4a/4b</td><td>see Table 4a/4b</td></tr><tr><td>2.4.2</td><td>- ovality</td><td>%</td><td>T, S</td><td>EN 50396:2005, 4.4.2</td><td>15 %</td><td>15 %</td></tr><tr><td>3</td><td>Insulation material test</td><td></td><td>T</td><td>this standard</td><td>Table 2</td><td>Table 2</td></tr><tr><td>4</td><td>Sheath material test</td><td></td><td>T</td><td>this standard</td><td>Table 3</td><td>Table 3</td></tr><tr><td>5</td><td>Resistance of sheath against N-oxalic acid</td><td></td><td>T</td><td>EN 60811-404</td><td></td><td></td></tr><tr><td>5.1</td><td>Test condition:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- temperature</td><td>°C</td><td></td><td></td><td>23 ± 5</td><td>23 ± 5</td></tr><tr><td></td><td>- duration</td><td>h</td><td></td><td></td><td>168</td><td>168</td></tr><tr><td>5.2</td><td>Result to be obtained:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- tensile strength, variation</td><td>%</td><td></td><td></td><td>max. ± 40</td><td>max. ± 40</td></tr><tr><td></td><td>- elongation at break</td><td>%</td><td></td><td></td><td>≥ 100</td><td>≥ 100</td></tr><tr><td>6</td><td>Resistance of sheath against N-sodium hydroxide</td><td></td><td>T</td><td>EN 60811-404</td><td></td><td></td></tr><tr><td>6.1</td><td>Test condition:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- temperature</td><td>°C</td><td></td><td></td><td>23 ± 5</td><td>23 ± 5</td></tr></table>					1	2	3	4	5	6	7	Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables							300/500 V	450/750 V	1.8	Capacity of CP core to all power cores.		T	EN 50289-1-5:2001, 4.3.1			1.8.1	Test conditions:							- frequency	kHz			1	1		- temperature of the water	°C			60 ± 5	60 ± 5	1.8.2	Result to be obtained	pF/m			≤ 150	≤ 150	1.9	Long term resistance of power cores to  DC 		T	EN 50396:2005, Clause 9			1.9.1	Test conditions:							- length of sample	m			5	5		- duration of test	h			240	240		- temperature of the water	°C			80 ± 5	80 ± 5		-  DC  voltage applied	V			600	900		Result to be obtained				no breakdown	no breakdown 	1.9.2							2	Constructional and dimensional tests						2.1	Checking of compliance with constructional provisions		T, S	Inspection and manual test	Clause 6 of this standard	Clause 6 of this standard	2.2	Measurement of thickness of insulation		T, S	EN 50396:2005, 4.1	see Table 4a/4b	see Table 4a/4b	2.3	Measurement of thickness of sheath		T, S	EN 50396:2005,  4.2 	see Table 4a/4b	see Table 4a/4b	2.4	Measurement of overall dimensions		T, S				2.4.1	- Mean value	mm	T, S	EN 50396:2005, 4.4.1	see Table 4a/4b	see Table 4a/4b	2.4.2	- ovality	%	T, S	EN 50396:2005, 4.4.2	15 %	15 %	3	Insulation material test		T	this standard	Table 2	Table 2	4	Sheath material test		T	this standard	Table 3	Table 3	5	Resistance of sheath against N-oxalic acid		T	EN 60811-404			5.1	Test condition:							- temperature	°C			23 ± 5	23 ± 5		- duration	h			168	168	5.2	Result to be obtained:							- tensile strength, variation	%			max. ± 40	max. ± 40		- elongation at break	%			≥ 100	≥ 100	6	Resistance of sheath against N-sodium hydroxide		T	EN 60811-404			6.1	Test condition:							- temperature	°C			23 ± 5	23 ± 5	P
1	2	3	4	5	6	7																																																																																																																																																																																																																																																					
Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables																																																																																																																																																																																																																																																						
					300/500 V	450/750 V																																																																																																																																																																																																																																																					
1.8	Capacity of CP core to all power cores.		T	EN 50289-1-5:2001, 4.3.1																																																																																																																																																																																																																																																							
1.8.1	Test conditions:																																																																																																																																																																																																																																																										
	- frequency	kHz			1	1																																																																																																																																																																																																																																																					
	- temperature of the water	°C			60 ± 5	60 ± 5																																																																																																																																																																																																																																																					
1.8.2	Result to be obtained	pF/m			≤ 150	≤ 150																																																																																																																																																																																																																																																					
1.9	Long term resistance of power cores to  DC 		T	EN 50396:2005, Clause 9																																																																																																																																																																																																																																																							
1.9.1	Test conditions:																																																																																																																																																																																																																																																										
	- length of sample	m			5	5																																																																																																																																																																																																																																																					
	- duration of test	h			240	240																																																																																																																																																																																																																																																					
	- temperature of the water	°C			80 ± 5	80 ± 5																																																																																																																																																																																																																																																					
	-  DC  voltage applied	V			600	900																																																																																																																																																																																																																																																					
	Result to be obtained				no breakdown	no breakdown 																																																																																																																																																																																																																																																					
1.9.2																																																																																																																																																																																																																																																											
2	Constructional and dimensional tests																																																																																																																																																																																																																																																										
2.1	Checking of compliance with constructional provisions		T, S	Inspection and manual test	Clause 6 of this standard	Clause 6 of this standard																																																																																																																																																																																																																																																					
2.2	Measurement of thickness of insulation		T, S	EN 50396:2005, 4.1	see Table 4a/4b	see Table 4a/4b																																																																																																																																																																																																																																																					
2.3	Measurement of thickness of sheath		T, S	EN 50396:2005,  4.2 	see Table 4a/4b	see Table 4a/4b																																																																																																																																																																																																																																																					
2.4	Measurement of overall dimensions		T, S																																																																																																																																																																																																																																																								
2.4.1	- Mean value	mm	T, S	EN 50396:2005, 4.4.1	see Table 4a/4b	see Table 4a/4b																																																																																																																																																																																																																																																					
2.4.2	- ovality	%	T, S	EN 50396:2005, 4.4.2	15 %	15 %																																																																																																																																																																																																																																																					
3	Insulation material test		T	this standard	Table 2	Table 2																																																																																																																																																																																																																																																					
4	Sheath material test		T	this standard	Table 3	Table 3																																																																																																																																																																																																																																																					
5	Resistance of sheath against N-oxalic acid		T	EN 60811-404																																																																																																																																																																																																																																																							
5.1	Test condition:																																																																																																																																																																																																																																																										
	- temperature	°C			23 ± 5	23 ± 5																																																																																																																																																																																																																																																					
	- duration	h			168	168																																																																																																																																																																																																																																																					
5.2	Result to be obtained:																																																																																																																																																																																																																																																										
	- tensile strength, variation	%			max. ± 40	max. ± 40																																																																																																																																																																																																																																																					
	- elongation at break	%			≥ 100	≥ 100																																																																																																																																																																																																																																																					
6	Resistance of sheath against N-sodium hydroxide		T	EN 60811-404																																																																																																																																																																																																																																																							
6.1	Test condition:																																																																																																																																																																																																																																																										
	- temperature	°C			23 ± 5	23 ± 5																																																																																																																																																																																																																																																					

Clause

Requirement - test

Result-Remark

Verdict

	<table> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> </tr> <tr> <th>Ref No</th> <th>Test</th> <th>Unit</th> <th>Category of test</th> <th>Test method</th> <th colspan="2">Rated voltage of cables</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <th>300/500 V</th> <th>450/750 V</th> </tr> <tr> <td>6.2</td> <td>- duration Result to be obtained:</td> <td>h</td> <td></td> <td></td> <td>168</td> <td>168</td> </tr> <tr> <td></td> <td>- tensile strength, variation - elongation at break</td> <td>% %</td> <td></td> <td></td> <td>max. ± 40 ≥ 100</td> <td>max. ± 40 ≥ 100</td> </tr> <tr> <td>7</td> <td>Compatibility test</td> <td></td> <td>T</td> <td>EN 60811-401</td> <td>Annex A</td> <td>Annex A</td> </tr> <tr> <td>8</td> <td>Cold impact test at -40 ± 2 °C Result to be obtained</td> <td></td> <td>T</td> <td>Annex C</td> <td>no crack</td> <td>no crack</td> </tr> <tr> <td></td> <td> Text deleted </td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11</td> <td>Ozone resistance at complete cable</td> <td></td> <td>T</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11.1</td> <td>Method A</td> <td></td> <td></td> <td>EN 60811-403</td> <td></td> <td></td> </tr> <tr> <td>11.1.1</td> <td>Test conditions:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>- temperature</td> <td>°C</td> <td></td> <td></td> <td>25 ± 2</td> <td>25 ± 2</td> </tr> <tr> <td></td> <td>- duration</td> <td>h</td> <td></td> <td></td> <td>24</td> <td>24</td> </tr> <tr> <td></td> <td>- ozone concentration (by volume)</td> <td>%</td> <td></td> <td></td> <td>(250-300) × 10⁻⁴</td> <td>(200-300) × 10⁻⁴</td> </tr> <tr> <td></td> <td>OR</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11.2</td> <td>Method B</td> <td></td> <td></td> <td>EN 50396:2005, 8.1.3</td> <td></td> <td></td> </tr> <tr> <td>11.2.1</td> <td>Test conditions:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>- temperature</td> <td>°C</td> <td></td> <td></td> <td>40 ± 2</td> <td>40 ± 2</td> </tr> <tr> <td></td> <td>- relative humidity</td> <td>%</td> <td></td> <td></td> <td>55 ± 5</td> <td>55 ± 5</td> </tr> <tr> <td></td> <td>- duration</td> <td>h</td> <td></td> <td></td> <td>72</td> <td>72</td> </tr> <tr> <td></td> <td>- ozone concentration (by volume)</td> <td>%</td> <td></td> <td></td> <td>(200 ± 50) × 10⁻⁶</td> <td>(200 ± 50) × 10⁻⁶</td> </tr> <tr> <td>11.3</td> <td>Result to be obtained</td> <td></td> <td></td> <td></td> <td>no cracks</td> <td>no cracks</td> </tr> </table>	1	2	3	4	5	6	7	Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables							300/500 V	450/750 V	6.2	- duration Result to be obtained:	h			168	168		- tensile strength, variation - elongation at break	% %			max. ± 40 ≥ 100	max. ± 40 ≥ 100	7	Compatibility test		T	EN 60811-401	Annex A	Annex A	8	Cold impact test at -40 ± 2 °C Result to be obtained		T	Annex C	no crack	no crack		 Text deleted 						11	Ozone resistance at complete cable		T				11.1	Method A			EN 60811-403			11.1.1	Test conditions:							- temperature	°C			25 ± 2	25 ± 2		- duration	h			24	24		- ozone concentration (by volume)	%			(250-300) × 10 ⁻⁴	(200-300) × 10 ⁻⁴		OR						11.2	Method B			EN 50396:2005, 8.1.3			11.2.1	Test conditions:							- temperature	°C			40 ± 2	40 ± 2		- relative humidity	%			55 ± 5	55 ± 5		- duration	h			72	72		- ozone concentration (by volume)	%			(200 ± 50) × 10 ⁻⁶	(200 ± 50) × 10 ⁻⁶	11.3	Result to be obtained				no cracks	no cracks	P
1	2	3	4	5	6	7																																																																																																																																																						
Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables																																																																																																																																																							
					300/500 V	450/750 V																																																																																																																																																						
6.2	- duration Result to be obtained:	h			168	168																																																																																																																																																						
	- tensile strength, variation - elongation at break	% %			max. ± 40 ≥ 100	max. ± 40 ≥ 100																																																																																																																																																						
7	Compatibility test		T	EN 60811-401	Annex A	Annex A																																																																																																																																																						
8	Cold impact test at -40 ± 2 °C Result to be obtained		T	Annex C	no crack	no crack																																																																																																																																																						
	 Text deleted 																																																																																																																																																											
11	Ozone resistance at complete cable		T																																																																																																																																																									
11.1	Method A			EN 60811-403																																																																																																																																																								
11.1.1	Test conditions:																																																																																																																																																											
	- temperature	°C			25 ± 2	25 ± 2																																																																																																																																																						
	- duration	h			24	24																																																																																																																																																						
	- ozone concentration (by volume)	%			(250-300) × 10 ⁻⁴	(200-300) × 10 ⁻⁴																																																																																																																																																						
	OR																																																																																																																																																											
11.2	Method B			EN 50396:2005, 8.1.3																																																																																																																																																								
11.2.1	Test conditions:																																																																																																																																																											
	- temperature	°C			40 ± 2	40 ± 2																																																																																																																																																						
	- relative humidity	%			55 ± 5	55 ± 5																																																																																																																																																						
	- duration	h			72	72																																																																																																																																																						
	- ozone concentration (by volume)	%			(200 ± 50) × 10 ⁻⁶	(200 ± 50) × 10 ⁻⁶																																																																																																																																																						
11.3	Result to be obtained				no cracks	no cracks																																																																																																																																																						

Clause	Requirement - test					Result-Remark	Verdict																																																																																																																																																																															
	<table><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><th>Ref No</th><th>Test</th><th>Unit</th><th>Category of test</th><th>Test method</th><th colspan="2">Rated voltage of cables</th></tr><tr><td></td><td></td><td></td><td></td><td></td><th>300/500 V</th><th>450/750 V</th></tr><tr><td>12</td><td>Weathering/UV-resistance</td><td></td><td>T</td><td>Annex F</td><td></td><td></td></tr><tr><td>12.1</td><td>Result to be obtained</td><td></td><td></td><td></td><td>no cracks</td><td>no cracks</td></tr><tr><td>13</td><td>Shrinkage test at complete cable</td><td></td><td>T</td><td>EN 60811–503</td><td></td><td></td></tr><tr><td>13.1</td><td>Test conditions:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- temperature</td><td>°C</td><td></td><td></td><td>120 ± 5</td><td>120 ± 5</td></tr><tr><td></td><td>- duration</td><td>h</td><td></td><td></td><td>1</td><td>1</td></tr><tr><td></td><td>- length L of sample</td><td>mm</td><td></td><td></td><td>500 ± 5</td><td>500 ± 5</td></tr><tr><td>13.2</td><td>Result to be obtained:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>- shrinkage</td><td>%</td><td></td><td></td><td>max. 3</td><td>max. 3</td></tr><tr><td>14</td><td>Test under fire conditions</td><td></td><td>T, S</td><td>EN 60332–1-2</td><td></td><td></td></tr><tr><td>14.1</td><td>Result to be obtained</td><td></td><td></td><td></td><td>EN 60332–1-2, Annex A</td><td>EN 60332–1-2 Annex A</td></tr><tr><td>15</td><td>Test on gases evolved during combustion of materials from cables</td><td></td><td>T</td><td></td><td></td><td></td></tr><tr><td>15.1</td><td>Determination of acidity (by pH measurement) and conductivity</td><td></td><td></td><td>EN 60754-2</td><td>pH ≥ 4.3 Conductivity ≤ 45µS/mm</td><td>pH ≥ 4.3 Conductivity ≤ 45µS/mm</td></tr><tr><td>15.2</td><td>Measurement of low level of halogen content by ion chromatography</td><td></td><td></td><td>EN 60754-3</td><td>Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g</td><td>Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g</td></tr><tr><td>16</td><td>Mechanical strength of completed cable</td><td></td><td>T</td><td></td><td></td><td></td></tr><tr><td>16.1</td><td>Flexing test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables up to 4 mm²</td><td></td><td></td><td>EN 50396:2003, 6.2 EN 50395:2005, Clause 7</td><td></td><td></td></tr><tr><td></td><td>- number of cycles</td><td></td><td></td><td></td><td>30 000</td><td>30 000</td></tr><tr><td>16.1.1</td><td>Result to be obtained</td><td></td><td></td><td></td><td>no crack, no breakdown</td><td>no crack, no breakdown</td></tr><tr><td>16.2</td><td>Cyclic bending test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables larger 4 mm²</td><td></td><td></td><td>ISO 19642-2:2023, 5.3.4¹</td><td></td><td></td></tr><tr><td></td><td>- number of cycles</td><td></td><td></td><td></td><td>5 000</td><td>5 000</td></tr><tr><td>16.2.1</td><td>Result to be obtained</td><td></td><td></td><td></td><td>no crack, no breakdown</td><td>no crack, no breakdown</td></tr><tr><td>17</td><td>Resistance against chemicals</td><td></td><td>T</td><td>Annex D</td><td></td><td></td></tr></table>						1	2	3	4	5	6	7	Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables							300/500 V	450/750 V	12	Weathering/UV-resistance		T	Annex F			12.1	Result to be obtained				no cracks	no cracks	13	Shrinkage test at complete cable		T	EN 60811–503			13.1	Test conditions:							- temperature	°C			120 ± 5	120 ± 5		- duration	h			1	1		- length L of sample	mm			500 ± 5	500 ± 5	13.2	Result to be obtained:							- shrinkage	%			max. 3	max. 3	14	Test under fire conditions		T, S	EN 60332–1-2			14.1	Result to be obtained				EN 60332–1-2, Annex A	EN 60332–1-2 Annex A	15	Test on gases evolved during combustion of materials from cables		T				15.1	Determination of acidity (by pH measurement) and conductivity			EN 60754-2	pH ≥ 4.3 Conductivity ≤ 45µS/mm	pH ≥ 4.3 Conductivity ≤ 45µS/mm	15.2	Measurement of low level of halogen content by ion chromatography			EN 60754-3	Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g	Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g	16	Mechanical strength of completed cable		T				16.1	Flexing test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables up to 4 mm²			EN 50396:2003, 6.2 EN 50395:2005, Clause 7				- number of cycles				30 000	30 000	16.1.1	Result to be obtained				no crack, no breakdown	no crack, no breakdown	16.2	Cyclic bending test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables larger 4 mm²			ISO 19642-2:2023, 5.3.4 ¹				- number of cycles				5 000	5 000	16.2.1	Result to be obtained				no crack, no breakdown	no crack, no breakdown	17	Resistance against chemicals		T	Annex D			P
1	2	3	4	5	6	7																																																																																																																																																																																
Ref No	Test	Unit	Category of test	Test method	Rated voltage of cables																																																																																																																																																																																	
					300/500 V	450/750 V																																																																																																																																																																																
12	Weathering/UV-resistance		T	Annex F																																																																																																																																																																																		
12.1	Result to be obtained				no cracks	no cracks																																																																																																																																																																																
13	Shrinkage test at complete cable		T	EN 60811–503																																																																																																																																																																																		
13.1	Test conditions:																																																																																																																																																																																					
	- temperature	°C			120 ± 5	120 ± 5																																																																																																																																																																																
	- duration	h			1	1																																																																																																																																																																																
	- length L of sample	mm			500 ± 5	500 ± 5																																																																																																																																																																																
13.2	Result to be obtained:																																																																																																																																																																																					
	- shrinkage	%			max. 3	max. 3																																																																																																																																																																																
14	Test under fire conditions		T, S	EN 60332–1-2																																																																																																																																																																																		
14.1	Result to be obtained				EN 60332–1-2, Annex A	EN 60332–1-2 Annex A																																																																																																																																																																																
15	Test on gases evolved during combustion of materials from cables		T																																																																																																																																																																																			
15.1	Determination of acidity (by pH measurement) and conductivity			EN 60754-2	pH ≥ 4.3 Conductivity ≤ 45µS/mm	pH ≥ 4.3 Conductivity ≤ 45µS/mm																																																																																																																																																																																
15.2	Measurement of low level of halogen content by ion chromatography			EN 60754-3	Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g	Chlorine ≤ 1,0 mg/g Fluorine ≤ 1,0 mg/g Bromine ≤ 1,0 mg/g Iodine ≤ 1,0 mg/g																																																																																																																																																																																
16	Mechanical strength of completed cable		T																																																																																																																																																																																			
16.1	Flexing test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables up to 4 mm²			EN 50396:2003, 6.2 EN 50395:2005, Clause 7																																																																																																																																																																																		
	- number of cycles				30 000	30 000																																																																																																																																																																																
16.1.1	Result to be obtained				no crack, no breakdown	no crack, no breakdown																																																																																																																																																																																
16.2	Cyclic bending test followed, after immersion in water, by a voltage test at 2 000 V on cores for cables larger 4 mm²			ISO 19642-2:2023, 5.3.4 ¹																																																																																																																																																																																		
	- number of cycles				5 000	5 000																																																																																																																																																																																
16.2.1	Result to be obtained				no crack, no breakdown	no crack, no breakdown																																																																																																																																																																																
17	Resistance against chemicals		T	Annex D																																																																																																																																																																																		
^a requirement for conductivity max. 40 µS/mm																																																																																																																																																																																						
^b other test criteria have to be agreed between manufacturer and customer																																																																																																																																																																																						

Clause	Requirement - test	Result-Remark	Verdict
4	General requirements		-
	The EV supply equipment shall be so constructed that an EV can be connected to the EV supply equipment so that in normal conditions of use, the energy transfer operates safely, and its performance is reliable and minimises the risk of danger to the user or surroundings.	Comply with all relevant requirements of IEC 61851 series	P
5	Classification		-
5.1	Characteristics of power supply and output		P
5.1.1	Characteristics of power supply input		P
	The EV supply equipment shall be classified according to the supply network system that it is intended to be connected to: – EV supply equipment connected to AC supply network; – EV supply equipment connected to DC supply network.	DC	P
	The EV supply equipment shall be classified according to the electric connection method: – Plug and cable connected; – Permanently connected.	Plug and cable connected	P
5.1.2	Characteristics of power supply output		P
	The EV supply equipment shall be classified according to the type of current the EV supply equipment delivers: – AC EV supply equipment; – DC EV supply equipment; – AC and/or DC EV supply equipment.	DC	P
5.2	Normal environmental conditions		-
	The EV supply equipment shall be classified according to the environmental conditions and use: – indoor use; – outdoor use.		P
5.3	Special environmental conditions		P
	The EV supply equipment may be classified according to their suitability for use in special environmental conditions other than those specified in this document, if declared so by the manufacturer.		N/A
5.4	Access		P
	The EV supply equipment shall be classified according to the location they are intended for:		P

Clause	Requirement - test	Result-Remark	Verdict
	– equipment for locations with restricted access; – equipment for locations with non-restricted access.		
5.5	Mounting method		P
	The EV supply equipment shall be classified according to the type of mounting: a) stationary equipment; – mounted on walls, poles or equivalent positions: • flush mounted; • surface mounted. – pole/column/pipe-mounted – floor mounted – ground mounted.		P
	b) non stationary equipment – portable equipment; – mobile equipment.		P
5.6	Protection against electric shock		P
	The equipment shall be classified according to the protection against electric shock: – class I equipment; – class II equipment; – class III equipment.		P
5.7	Charging modes		P
	The EV supply equipment shall be classified according to 6.2: – Mode 1; – Mode 2; – Mode 3; – Mode 4.		P
6	Charging modes and functions		-
6.1	General		P
	Clause 6 describes the different charging modes and functions for energy transfer to EVs.		P
6.2	Charging modes		P
6.2.1	Mode 1		P
	Mode 1 is a method for the connection of an EV to a standard socket-outlet of an AC supply network, utilizing a cable and plug, both of which are not fitted with any supplementary pilot or auxiliary contacts.		P
	The rated values for current and voltage shall not exceed:		P

Clause	Requirement - test	Result-Remark	Verdict
	– 16 A and 250 V AC, single-phase, – 16 A and 480 V AC, three-phase		
	EV supply equipment intended for Mode 1 charging shall provide a protective earthing conductor from the standard plug to the vehicle connector.		P
	Current limitations are also subject to the standard socket-outlet ratings described in 9.2.		P
6.2.2	Mode 2		P
	Mode 2 is a method for the connection of an EV to a standard socket-outlet of an AC supply network utilizing an AC EV supply equipment with a cable and plug, with a control pilot function and system for personal protection against electric shock placed between the standard plug and the EV.		P
	The rated values for current and voltage shall not exceed: – 32 A and 250 V AC single-phase; – 32 A and 480 V AC three-phase.		P
	Current limitations are also subject to the standard socket-outlet ratings described in 9.2.		P
	EV supply equipment intended for Mode 2 charging shall provide a protective earthing conductor from the standard plug to the vehicle connector.		P
	Mode 2 equipment that is destined to be mounted on a wall but is detachable by the user, or to be used in a shock resistant enclosure shall use protection equipment as required by IEC 62752.		P
6.2.3	Mode 3		P
	Mode 3 is a method for the connection of an EV to an AC EV supply equipment permanently connected to an AC supply network, with a control pilot function that extends from the AC EV supply equipment to the EV.		P
	EV supply equipment intended for Mode 3 charging shall provide a protective earthing conductor to the EV socket-outlet and/or to the vehicle connector.		P
6.2.4	Mode 4		N/A
	Mode 4 is a method for the connection of an EV to an AC or DC supply network utilizing a DC EV supply equipment, with a control pilot function that extends from the DC EV supply equipment to the EV.		N/A

Clause	Requirement - test	Result-Remark	Verdict
	Mode 4 equipment may be either permanently connected or connected by a cable and plug to the supply network.		N/A
	EV supply equipment intended for Mode 4 charging shall provide a protective earthing conductor or protective conductor to the vehicle connector.		N/A
	Additional requirements for DC EV supply equipment are given in IEC 61851-23.		N/A
6.3	Functions provided in Mode 2, 3 and 4		P
6.3.1	Mandatory functions in Modes 2, 3, and 4		P
6.3.1.1	General		P
	The following control pilot functions shall be provided by the EV supply equipment: • Continuous continuity checking of the protective conductor according to 6.3.1.2; • Verification that the EV is properly connected to the EV supply equipment according to 6.3.1.3; • Energization of the power supply to the EV according to 6.3.1.4; • De-energization of the power supply to the EV according to 6.3.1.5; • Maximum allowable current according to 6.3.1.6.	Comply with the requirement	P
	If EV supply equipment can supply more than one vehicle simultaneously, it shall ensure that the control pilot function performs the above functions independently at each connecting point.		P
6.3.1.2	Continuous continuity checking of the protective conductor		P
	While charging in Mode 2, the electrical continuity of the protective earthing conductor between the ICCB and the respective EV contact shall be continuously monitored by the ICCB.		P
	While charging in Mode 3, the electrical continuity of the protective earthing conductor between the EV charging station and the respective EV contact shall be continuously monitored by the EV supply equipment.		P
	While charging in Mode 4, the electrical continuity of the protective conductor between the EV charging station and the respective EV contact shall be continuously monitored by the EV supply equipment.		P

Clause	Requirement - test	Result-Remark	Verdict
	The EV supply equipment shall disconnect the supply to the EV in case of: • loss of electrical continuity of the protective conductor (i.e. open control pilot circuit), within 100 ms. • incapacity to verify the continuity of the protective conductor (e.g. short circuit between pilot Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLE and protective conductor), within 3 s.	Comply with the requirement	P
6.3.1.3	Verification that the EV is properly connected to the EV supply equipment		P
	The EV supply equipment shall be able to determine that the EV is properly connected to the EV supply equipment.		P
	Proper connection is assumed when the continuity of the control pilot circuit is detected.		P
6.3.1.4	Energization of the power supply to the EV		P
	The EV socket-outlet or the vehicle connector shall not be energized unless the control pilot function between EV supply equipment and EV has been established correctly with signal states allowing energization.		P
	The presence of such states does not imply that energy will be transferred between the EV supply equipment and the EV as this may be subject to other external conditions, e.g. energy management system.		P
	If the EV requests ventilation, the EV supply equipment shall only energize the system if such ventilation is provided by the installation or the premises.		P
6.3.1.5	De-energization of the power supply to the EV		P
	If the control pilot signal is interrupted the power supply to the EV shall be interrupted according to 6.3.1.2		P
	If the control pilot signal status no longer allows energization, the power supply to the EV shall be interrupted but the control pilot signalling may remain in operation.		P
6.3.1.6	Maximum allowable current		P

	A means shall be provided to inform the EV of the value of the maximum current it is allowed to draw. The value of the maximum current permitted shall be transmitted and shall not exceed any of the following: • the rated output current of the EV supply equipment,	provided	P
--	--	----------	---

Clause	Requirement - test	Result-Remark	Verdict
	• the rated current of the cable assembly.		
	The transmitted value may change, without exceeding the maximum allowed current, to adapt to power limitations, e.g. for load management.		P
	The EV supply equipment may interrupt the energy supply if the current drawn by the EV exceeds the transmitted value.		P
6.3.2	Optional functions for Modes 2, 3 and 4		P
6.3.2.1	General		P
	The optional functions that are implemented shall be indicated in the manual and shall fulfil the requirements of 6.3.2.	Meet the requirements of 6.3.2	P
	Other functions can be provided.		P
6.3.2.2	Ventilation during supply of energy		P
	EV supply equipment can exchange information with installation regarding the request and presence for ventilation.		P
6.3.2.3	Intentional and unintentional disconnection of the vehicle connector and/or the EV plug		P
	A mechanical or electromechanical means shall be provided to prevent intentional and unintentional disconnection under load of the vehicle connector and/or plug according to IEC 62196-1.		P
6.3.2.4	Mode 4 using the combined charging system		N/A
	The combined charging system as described in Annex CC of IEC 61851-23:2014 and ISO 17409 shall be so designed that: • AC chargeable EVs with a basic vehicle inlet do not require any means to protect the EV against DC voltage at the inlet. • AC EV supply equipment does not require any means to be self-protected against DC voltage coming from the EV.		N/A
	For DC charging, digital communication shall be established between the vehicle and the DC EV charging station that validates the DC energy transfer. The DC supply to the vehicle shall not be connected until such complete validation from the vehicle is achieved.		N/A
	A combined interface extends the use of a basic interface for AC and DC charging.		N/A

Clause	Requirement - test	Result-Remark	Verdict
	DC charging can be achieved by using separate and additional DC power contacts to supply DC energy to the EV or by using power contacts placed at the position of the AC power contacts of a basic interface, if the vehicle connector and the vehicle inlet are both suitable for DC.		N/A
	The basic portion of the combined vehicle inlet can be used with a basic connector for AC charging only or with a combined connector having separate contacts for AC or DC charging.		N/A
	AC and DC power transfer shall not occur through the combined interface at the same time.		N/A
	The combined interface used for DC charging shall only be used with the "Combined Charging System" described in Annex CC of IEC 61851-23:2014.		N/A
	Analysis and design of the EV supply equipment using a basic interface for DC shall apply a risk analysis according to IEC 61508 (all parts) applying a severity level of at least S2 for the function preventing the risk of unintended DC voltage output.		N/A
7	Communications		-
7.1	Digital communication between the EV supply equipment and the EV		P
	Digital communication is optional for Modes 1, 2 and 3.		P
	For Mode 4 the digital communication as described in IEC 61851-24 shall be provided to allow the EV to control the EV supply equipment.		P
7.2	Digital communication between the EV supply equipment and the management system		P
	Telecommunication network or telecommunication port of the EV supply equipment, connected to the telecommunication network, if any, shall comply with the requirements for connection to telecommunication networks according to Clause 6 of IEC 60950-1:2005.	Comply with the standard requirement	P
8	Protection against electric shock		-
8.1	Degrees of protection against access to hazardous-live-parts		P
	The different parts of the EV supply equipment as mentioned shall fulfil the following requirements:	Meet the requirement	P

Clause	Requirement - test	Result-Remark	Verdict
	• IP ratings for enclosures shall be at least IPXXC; • vehicle connector when mated with vehicle inlet: IPXXD; • plug mated with socket-outlet: IPXXD; • vehicle connector intended for Mode 1 use, not mated: IPXXD; • vehicle connector intended for Mode 2 use, not mated: IPXXB and fulfilling the following: Minimum opening of the contact equal to the clearance according to IEC 60664-1 considering overvoltage category 2 (e.g. the value given in IEC 60664-1 for 230 V/400 V is 2,5 kV rated impulse voltage withstand that implies 1,5 mm separation of contacts) and inhibits the charging and warns the user in case of welded contact.		
	• vehicle connector and EV socket-outlet intended for Mode 3 use, not mated: IPXXB provided it is associated directly upstream with a mechanical switching device (see also 12.3) and fulfilling one of the following: a) minimum opening of the contact equal to the clearance according to IEC 60664-1 considering overvoltage category 3 (e.g. the value given in IEC 60664-1 for 230 V/400 V is 4 kV rated impulse voltage withstand that implies at least 3 mm separation of contacts); b) presence of monitoring of the switching contacts associated with a means to operate another mechanical switching device providing isolating function upstream the above in case of fault of operation of the switching device upstream the accessory; c) presence of shutters on live entry hole of the socket-outlets or connectors for case C.		P
8.2	Stored energy		P
8.2.1	Disconnection of plug connected EV supply equipment		P
	For plug connected EV supply equipment, where the connection pins are accessible after unplugging, one second after disconnecting the standard plug from the standard socket-outlet, the voltage between any combination of accessible contacts of the standard plug shall be less than or equal to 60 V DC or the stored charge available shall be less than 50 μ C.		P
8.2.2	Loss of supply voltage to permanently connected EV		P

Clause	Requirement - test	Result-Remark	Verdict
	supply equipment		
	The voltage between power lines or power lines and protective earthing conductor, when measured at the input supply terminals of the EV supply equipment, shall be less than or equal to 60 V DC or the stored energy shall be less than or equal to 0,2 J within 5 seconds after disconnecting the power supply voltage to the EV supply equipment.	Accord with 2.1.1.7 of IEC 60950-1:2005	P
8.3	Fault protection		P
	Fault protection shall consist of one or more protective measures as permitted according to IEC 60364-4-41: • automatic disconnection of supply; • double or reinforced insulation; • electrical separation if limited to the supply of one item of current-using equipment; • extra low-voltage (SELV and PELV).	Compliance	P
	Electric separation is fulfilled if there is one electrically separated circuit for each EV.		P
8.4	Protective conductor		P
	The protective earthing conductor and the protective conductor shall be of sufficient rating in accordance with requirements of IEC TS 61439-7.	Comply with the standard requirement	P
	For Modes 1, 2 and 3, a protective earthing conductor shall be provided between the AC supply input earthing terminal of the EV supply equipment and the EV.		P
	Mode 4 EV supply equipment shall provide either: a) a protective earthing conductor from the input earthing terminal of the AC supply network to the EV - or b) a protective conductor from the EV supply equipment to the EV if fault protection is based on electric separation.		N/A
	For Modes 3 and 4 permanently connected EV supply equipment, protective earthing conductors shall not be switched.		P
8.5	Residual current protective devices		-
	EV supply equipment can have one or more connecting points to supply energy to EVs.		P
	Where connecting points can be used simultaneously and		P

Clause	Requirement - test	Result-Remark	Verdict
	are connected to a common input terminal of the EV supply equipment, they shall have individual protection incorporated in the EV supply equipment.		
	If the EV supply equipment has more than one connecting point that cannot be used simultaneously then such connecting points can have common protection devices.		P
	EV supply equipment that includes an RCD and that does not use the protective measure of electrical separation shall comply with the following: • The connecting point of the EV supply equipment shall be protected by an RCD having a rated residual operating current not exceeding 30 mA; • RCD(s) protecting connecting points shall be at least type A; • RCDs shall comply with one of the following standards: IEC 61008-1, IEC 61009-1, IEC 60947-2 and IEC 62423; • RCDs shall disconnect all live conductors.		P
	Where the EV supply equipment is equipped with a socket-outlet or vehicle connector for AC use in accordance with IEC 62196 (all parts), protective measures against DC fault current shall be taken. The appropriate measures shall be: • RCD type B or • RCD Type A and appropriate equipment that ensures the disconnection of the supply in case of DC fault current above 6 mA.		P
8.6	Safety requirements for signalling circuits between the EV supply equipment and the EV		-
	Any circuit for signalling, which extends beyond the EV supply equipment enclosure for connection with the EV (e.g. control pilot circuit), shall be extra low voltage (SELV or PELV) according to IEC 60364-4-41.		P
8.7	Isolating transformers		-
	Isolating transformers (excluding safety isolating transformers used for signalling) shall comply with the requirements of IEC 61558-1 and IEC 61558-2-4.	Pass muster	P
9	Conductive electrical interface requirements		
9.1	General		-
	Clause 9 provides a description of the conductive electrical		P

Clause	Requirement - test	Result-Remark	Verdict
	interface requirements.		
9.2	Functional description of standard accessories		P
	Standard accessories used for EV supply equipment shall be in accordance with IEC 60309-1, IEC 60309-2 or IEC 60884-1 or the national standard. Standard accessories that are intermateable with interfaces described in the IEC 60320 series shall not be used for EV supply equipment.	Pass muster	P
	Socket-outlets and plugs designed for household and similar use might not be designed for extended current draw or continuous use at maximum rated currents and might be subject to national regulations and standards for supply of energy to an EV.		P
9.3	Functional description of the basic interface		P
	General requirements and ratings shall be in accordance with the requirements specified in IEC 62196-1.	Comply with the standard requirement	P
	The basic interface is specified in 6.5 of IEC 62196-1:2014. The following contacts are indicated: • up to three phases (L1, L2, L3); • neutral (N); • protective conductor (PE); • control pilot (CP); • proximity contact (PP).		P
	It may be used either for single-phase or for three-phase or both.		P
	Ratings and requirements for the use of the basic interface shall be in accordance with the requirements specified in IEC 62196-2.	In conformity with the requirements specified in IEC 62196-2	P
9.4	Functional description of the universal interface		P
	General requirements and ratings shall be in accordance with the requirements specified in IEC 62196-1.	In conformity with the requirements specified in IEC 62196-1	P
	The universal interface is specified in 6.4 and Table 2 of IEC 62196-1:2014.		P
9.5	Functional description of the DC interface		P
	General requirements and ratings shall be in accordance	In conformity with	P

Clause	Requirement - test	Result-Remark	Verdict
	with the requirements specified in IEC 62196-1.	the requirements specified in IEC 62196-1	
	The DC interface, configurations and ratings are specified in 6.6 and Table 4 of IEC 62196-1:2014.		P
	Ratings and requirements for the use of DC interface shall be in accordance with the requirements specified in IEC 62196-3.		P
9.6	Functional description of the combined interface		P
	The combined interface is specified in 6.7 and Table 5 of IEC 62196-1:2014.		P
	General requirements and ratings shall be in accordance with the requirements specified in IEC 62196-1.	In conformity with the requirements specified in IEC 62196-1	P
	Ratings and requirements for the use of the combined interface with alternating current shall be in accordance with the requirements specified in IEC 62196-2.		N/A
	Ratings and requirements for the use of the combined interface with direct current shall be in accordance with the requirements specified in IEC 62196-3.		P
9.7	Wiring of the neutral conductor		P
	Where accessories according to IEC 62196 are used for three phase supply the neutral conductor shall always be Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLEd to the accessories.		P
	Where accessories according to IEC 62196 are used for single phase supply, the terminals L (L1) and N (Neutral) shall always be Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLEd.		P
	Wiring instructions shall be provided in the manual (see 16.1).	See the instruction manual in detail	P
10	Requirements for adaptors		
	Vehicle adaptors shall not be used to connect a vehicle connector to a vehicle inlet.		P

	Adaptors between the EV socket-outlet and the EV plug shall only be used if specifically designated and approved by the vehicle manufacturer or by the EV supply equipment manufacturer and in accordance with national requirements, if any (see 16.2).		P
	Such adaptors shall comply with the requirements of this		P

Clause	Requirement - test	Result-Remark	Verdict
	standard, and the other relevant standards governing either the EV plug or EV socket-outlet portions of the adaptor. The adaptors shall be marked to indicate the specific conditions of use allowed by the manufacturer, e.g. IEC 62196 series.		
	Such adaptors shall not allow transitions from one mode to another.		P
11	Cable assembly requirements		-
11.1	General		P
	The cable assembly shall be provided with a cable that is suitable for the application.		P
	Cable assemblies shall not allow transitions from one mode to another. This does not concern Mode 2 cable assemblies that are constructed according to IEC 62752.		P
11.2	Electrical rating		P
	For case C, the voltage and current ratings of the cable assembly shall be compatible with the rating of the EV supply equipment.		P
	For accessories requiring current coding according to Annex B and IEC 62196-2, the maximum value of the current coding as indicated in Clause B.2 shall be in accordance with the current rating of the cable assembly.		P
	Cables used with accessories according to IEC 62196-2 for Mode 3 case B, shall have a minimum withstand I^2t value of 75 000 A ² s.		P
11.3	Dielectric withstand characteristics		P
	Dielectric withstand characteristics of the cable assembly shall be as indicated for the EV supply equipment in 12.7.	Pass muster	P
	For Class I equipment: between live part and earth with test voltage for Class I equipment;		P
	For Class II equipment: between live part and exposed conductive parts with test voltage for Class II equipment.		P
11.4	Construction requirements		P
	A cable assembly shall be so constructed that it cannot be used as a cord extension set.		P
	A cable assembly may include one or more cables, which may be in a flexible tube, conduit or Cable & Tough Rubber Sheathed Flexible Cables TEBAOFLEX CABLE way.		P

	The cable may be fitted with an earth-connected metal		P
--	---	--	---

Clause	Requirement - test	Result-Remark	Verdict
	shielding.		
	The cable insulation shall be wear resistant and maintain flexibility over the full temperature range required by the classification of the EV supply equipment.	Pass muster	P
11.5	Cable dimensions		P
	The maximum cable length shall be in accordance with the national codes if any.		P
11.6	Strain relief		P
	The strain relief of the cable in the vehicle connector, EV plug or in the standard plug shall be as specified in the relevant product standard (e.g. IEC 62196-1, IEC 60309-1 or IEC 60884-1).		P
	For case C the strain relief at the EV supply equipment shall be in accordance with the requirements in IEC 62196-1.		P
11.7	Cable management and storage means for cables assemblies		P
	For case C EV supply equipment, a storage means shall be provided for the vehicle connector when not in use.		P
	For case C EV supply equipment the lowest point of the vehicle connector when stored shall be located at a height between 0,5 m and 1,5 m above ground level.		P
	For case C EV charging stations with cables of more than 7,5 m, a cable management system shall be provided. The free cable length shall not exceed 7,5 m when not in use.		P
	Prevention of overheating of cables or cable assemblies used in stored or partially stored position shall be ensured.		P
	Compliance is checked according to Clause 22 of IEC 61316:1999 for cable reel storage.		P
12	EV supply equipment constructional requirements and tests		-
12.1	General		P
	The control means and the protection means in Mode 2 EV supply equipment that is intended to be used both as stationary equipment and as portable equipment shall comply with IEC 61851-1 and with IEC 62752.		P
	For case C EV supply equipment, the output cable assembly is considered part of the assembly for testing		P

Clause	Requirement - test	Result-Remark	Verdict
	purpose.		
	Electric devices and components of EV supply equipment shall comply with their relevant standards. The tests of devices and components shall be carried out with the specimen, or any movable part of it, placed in the most unfavourable position that can occur in normal use.		P
	For extreme environment or other special service conditions, see IEC TS 61439-7.		P
12.2	Characteristics of mechanical switching devices		P
12.2.1	General		P
	Switching devices within EV supply equipment intended to supply the connecting points shall comply with their relevant standards, with at least the characteristics as given in 12.2.		P
12.2.2	Switch and switch-disconnector		P
	Switches and switch-disconnectors shall comply with IEC 60947-3.		P
	For AC applications, switches and switch-disconnectors shall have a rated current, at a utilization category of at least AC-22A, not less than the rated current of the circuit that they are intended to operate in.		P
	For DC applications, switches and switch-disconnectors shall have a rated current, at a utilization category of at least DC-21A, not less than the rated current of the circuit that they are intended to operate in.		P
	Compliance is checked by inspection.		P
12.2.3	Contactors		P
	Contactors shall comply with IEC 60947-4-1.		P
	For AC applications, contactors shall have a rated current, at a utilization category of at least AC-1, not less than the rated current of the circuit that they are intended to operate in.		P
	For DC applications, contactors shall have a rated current, at a utilization category of at least DC-1, not less than the rated current of the circuit that they are intended to operate in.		P
	Compliance is checked by inspection.		P

Clause	Requirement - test	Result-Remark	Verdict
12.2.4	Circuit-breaker		P
	Circuit breakers, if any, shall comply with IEC 60898-1 or IEC 60947-2 or IEC 61009-1.		P
	Compliance is checked by inspection.		P
12.2.5	Relays		P
	Relays used to switch the main current path shall comply with IEC 61810-1 with the following minimum characteristics: • 50 000 cycles, • contact category: CC 2.		P
12.2.6	Inrush current		P
	AC EV supply equipment shall withstand the inrush current according to 8.2.2 of ISO 17409:2015.		P
	The following values are specified in ISO 17409: • After closing the contactor in the EV supply equipment at the peak value of the supply voltage, the EV supply equipment shall be able to withstand 230 A peak within the duration of 100 μ s. • During the next second the EV supply equipment shall be able to withstand 30 A (rms).		P
	Compliance to this requirement can be verified by test on the complete EV supply equipment or on the individual switching device according IEC TS 61439-7.		P
	The protection means shall be selected not to trip for inrush current.		P
12.2.7	Residual direct current monitoring device (RDC MD)		P
	This will be covered in the future IEC 62955 (under consideration).		P
12.3	Clearances and creepage distances		P
	The clearances and creepage distances in the EV supply equipment, installed as intended by the manufacturer, shall be in accordance with the requirements specified in IEC 60664-1.		P
	Parts of the EV supply equipment directly connected to the public AC supply network shall be designed according to overvoltage category IV.		P
	Permanently connected EV supply equipment shall be designed according to a minimum overvoltage category III except for the socket-outlet or the vehicle connector in		P

Clause	Requirement - test	Result-Remark	Verdict
	case C where a minimum overvoltage category II applies.		
	EV supply equipment supplied through a cable and plug shall be designed according to a minimum overvoltage category II.		P
	Equipment that is intended to be used under the conditions of a higher overvoltage category shall include appropriate overvoltage protective device (see 4.3.3.6 of IEC 60664-1:2007).		P
12.4	IP degrees		P
12.4.1	Degrees of protection against solid foreign objects and water for the enclosures		P
	Enclosures of the EV supply equipment shall have an IP degree, according to IEC 60529 as follows: • indoor use: at least IP41; • outdoor use: at least IP44.		P
	Compliance is checked by test in accordance with IEC 60529.		P
	The minimum IP degree for socket-outlets and the vehicle connectors shall be in accordance with their appropriate standards.		P
	IPX4 may be obtained by the combination of the socket-outlet or connector and the lid or cap, EV supply equipment enclosure or EV enclosure.		P
12.4.2	Degrees of protection against solid foreign objects and water for basic, universal and combined and DC interfaces		P
	The minimum IP degrees for ingress of objects and liquids shall be: • Indoor use: – vehicle connector when mated with vehicle inlet: IP21; – EV plug mated with EV socket-outlet: IP21; – vehicle connector for case C when not mated: IP21; – vehicle connector for case B when not mated: IP24.		P
	• Outdoor use: – vehicle connector when mated with vehicle inlet: IP44; – EV plug mated with EV socket-outlet: IP44; – vehicle connector when not mated: IP24; – vehicle connector for case B when not mated: IP24; – socket-outlet when not mated: IP24.		P
	Compliance is checked by test in accordance with IEC		P

Clause	Requirement - test	Result-Remark	Verdict
	60529.		
	IPX4 may be obtained by the combination of the socket-outlet or connector and the lid or cap, EV supply equipment enclosure or EV enclosure.		P
12.5	Insulation resistance		P
	The insulation resistance measured with a 500 V DC voltage applied between all inputs/outputs connected together (power source included) and the accessible parts shall be: • for a class I EV supply equipment: $R > 1 \text{ M}\Omega$; • for a class II EV supply equipment: $R > 7 \text{ M}\Omega$.		P
	For this test all extra low voltage (ELV) circuits shall be connected to the accessible parts during the test. The measurement of insulation resistance shall be carried out with the protective impedances disconnected, and after applying the test voltage for the duration of 1 min and immediately after the damp heat continuous test of IEC 60068-2-78, test Ca, at $40 \text{ }^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$ and 93 % relative humidity for four days.		P
	The conditioning test for the insulation test and the touch current can be avoided if the conditioning for test of 12.9 followed by test of 12.5, 12.6 and final test of 12.9, are conducted sequentially in that order.		P
12.6	Touch current		P
	The touch current between any AC supply network poles and the accessible metal parts connected with each other, and with a metal foil covering insulated external parts, is measured in accordance with IEC 60990 and shall not exceed the values indicated in Table 1.		P
	The touch current shall be measured within one hour after the damp heat continuous test of IEC 60068-2-78, test Ca, at $40 \text{ }^{\circ}\text{C} \pm 2 \text{ }^{\circ}\text{C}$ and 93 % relative humidity for four days, with the electric vehicle charging station connected to AC supply network in accordance with IEC 60990.		P
	The test voltage shall be 1,1 times the maximum rated voltage.		P
	This test shall be made when the EV supply equipment is functioning with a resistive load at rated output power.		P

Clause	Requirement - test	Result-Remark	Verdict
	Circuitry that is connected through a fixed resistance or referenced to earth (for example, proximity function and control pilot function) are disconnected before this test.		P
	The equipment is fed through an isolating transformer or installed in such a manner that it is isolated from the earth.		P
12.7	Dielectric withstand voltage		P
12.7.1	AC withstand voltage		P
	The dielectric withstand voltage, at power frequency of 50 Hz or 60 Hz, shall be applied for 1 min as follows: 1) For a class I EV supply equipment. ($U_n + 1\,200\text{ V}$) (r.m.s.) in common mode (all circuits in relation to the exposed conductive parts) and differential mode (between each electrically independent circuit and all other exposed conductive parts or circuits) as specified in 5.3.3.2 of IEC 60664-1:2007. 2) For a class II EV supply equipment. 2 times ($U_n + 1\,200\text{ V}$) (r.m.s.) in common mode (all circuits in relation to the exposed conductive parts) and differential mode (between each electrically independent circuit and all other exposed conductive parts or circuits) as specified in 5.3.3.2.3 of IEC 60664-1:2007. 3) For both class I and class II AC EV supply equipment where the insulation between the AC supply network and the extra low voltage circuit is double or reinforced insulation, 2 times ($U_n + 1\,200\text{ V}$) (r.m.s.) shall be applied to the insulation.		P
	Alternatively the test can be carried out using a DC voltage equal to the AC peak values.		P
	For this test, all the electrical equipment shall be connected, except those items of apparatus which, according to the relevant specifications, are designed for a lower test voltage; currentconsuming apparatus (e.g. windings, measuring instruments, voltage surge suppression devices) in which the application of the test voltage would cause the flow of a current, shall be disconnected. Such apparatus shall be disconnected at one of their terminals unless they are not designed to withstand the full test voltage, in which case all terminals may be disconnected.		P

Clause	Requirement - test	Result-Remark	Verdict
12.7.2	Impulse dielectric withstand (1,2 μ s/50 μ s)		P
	The dielectric withstand of the power circuits at impulse test shall be tested according to IEC 60664-1.		P
	The impulse voltage shall be applied to live parts and exposed conductive parts.		P
	The test shall be carried out in accordance with the requirements of IEC 61180		P
	Parts of the EV supply equipment directly connected to the public AC supply network shall be tested according to overvoltage category IV.		P
	Permanently connected EV supply equipment shall be tested according to an overvoltage category III except for the socket-outlet or the vehicle connector in case C where an overvoltage category II applies.		P
	EV supply equipment supplied through a cable and plug shall be tested according to an overvoltage category II.		P
	12.8 Temperature rise		
12.8	Temperature rise		P
	EV supply equipment shall comply with IEC TS 61439-7.		P
12.9	Damp heat functional test		P
	Following the conditioning defined below, the EV supply equipment is deemed to pass the test, if, it passes the normal sequences test according to A.4.7 of Annex A. The precision of the timing does not need to be verified.		P
	Conditioning: – For indoor units, 6 cycles of 24 h each to a damp heat cycling test according to IEC 60068-2-30 (Test Db) at (40 $\pm$ 3) °C and relative humidity of 95 %; – For outdoor units, two 12 day periods, with each period consisting of minimum temperature functional test at relative humidity of 95 %.		P
12.10			P
	The EV supply equipment shall be pre-conditioned in accordance with IEC 60068-2-1, test Ab, at the minimum operating temperature (either -5 °C for indoor, -25 °C outdoor or lower values declared by the manufacturer $\pm$ 3 K) for (16 $\pm$ 1) h		P
	The EV supply equipment is deemed to pass the test, if, immediately after the preconditioning, it passes the		P

Clause	Requirement - test	Result-Remark	Verdict
	sequences test according to A.4.7 of Annex A while at the minimum operating temperature. The precision of the timing does not need to be verified.		
12.11	Mechanical strength		P
	For Mode 2 EV supply equipment the minimum degree of protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262.		P
	After the test, the samples shall show that: – the IP degree according to 12.5 is not impaired; – no part has moved, loosened, detached or deformed to the extent that any safety functions are impaired; – the test did not cause a condition that results in the equipment not complying with the strain relief requirements, if applicable; – the test did not result in a reduction of creepage and clearance between uninsulated live parts of opposite polarity, uninsulated live parts and accessible dead or grounded metal below the minimum acceptable values; – the test did not result in any other evidence of damage that could increase the risk of fire or electric shock.		P
13	Overload and short-circuit protection		-
13.1	General		P
	Where connecting points can be used simultaneously and are intended to be supplied from the same input line, they shall have individual protection incorporated in the EV supply equipment.		P
	If the EV supply equipment presents more than one connecting point then such connecting points may have common overload protection means and may have common short-circuit protection means, if those protection means provide the required protection for each of the connecting points (e.g. the common protection device shall have a rating no higher than the lowest rating of the connecting points).		P
	If the EV supply equipment presents more than one		P

Clause	Requirement - test	Result-Remark	Verdict
	connecting point then such connecting points may have common overload protection means and may have common short-circuit protection means, if those protection means provide the required protection for each of the connecting points (e.g. the common protection device shall have a rating no higher than the lowest rating of the connecting points).		
	If the EV supply equipment presents more than one connecting point that cannot be used simultaneously then such connecting points can have common protection means.		P
	Such overcurrent protective devices shall comply with IEC 60947-2, IEC 60947-6-2 or IEC 61009-1 or with the relevant parts of IEC 60898 series or IEC 60269 series.		P
13.2	Overload protection of the cable assembly		P
	The EV charging stations or Mode 2 EV supply equipment shall provide overload protection for all cases for all intended cable conductor sizes if not provided by the upstream supply network.		P
	The overload protection may be provided by a circuit breaker, fuse or combination thereof.		P
	If overload protection is provided by a means other than a circuit breaker, fuse or combination thereof, such means shall trip within 1 min if the current exceeds 1,3 times the rated current of the cable assembly.		P
13.3	Short-circuit protection of the charging cable		P
	The EV charging stations or Mode 2 EV supply equipment shall provide short-circuit current protection for the cable assembly if not provided by the supply network.		P
	In case of short-circuit, the value of I^2t at the EV socket-outlet of the Mode 3 charging station shall not exceed 75 000 A ² s.		P
	In case of short-circuit, the value of I^2t at the vehicle connector (Case C) of the Mode 3 charging station shall not exceed 80 000 A ² s.		P
14	Automatic reclosing of protective devices		-
	The automatic or remote reclosing of protective devices after tripping in the EV supply equipment shall only be		P

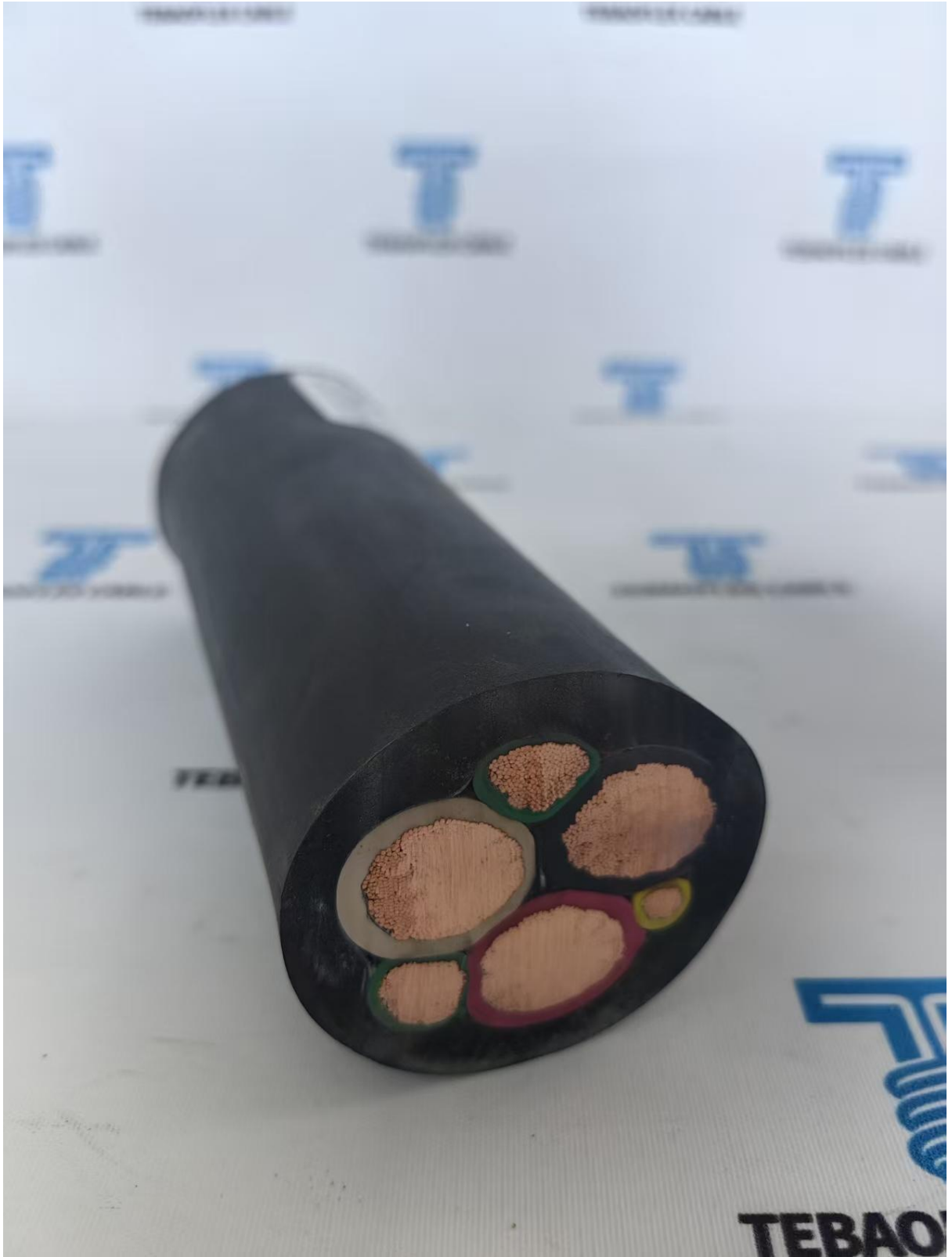
Clause	Requirement - test	Result-Remark	Verdict
	possible in case the following requirement is fulfilled: • the socket-outlet shall not be mated to a plug. This shall be checked by the EV supply equipment.		
	For automatic or remote reclosing automatic reclosing devices (ARDs) with an assessment means may be used.		P
	The EV supply equipment may close the contactor during an automatic or remote reset cycle to establish conductivity between the protection device and the socket-outlet.		P
	By this procedure the EV supply equipment can check the circuit up to the socket-outlet to be free of fault current.		P
	For case C the EV supply equipment shall not provide automatic or remote reclosing of protective devices.		P
15	Emergency switching or disconnect (optional)		-
	Emergency switching or disconnect equipment shall be used either to disconnect the supply network from EV supply equipment or to disconnect the socket-outlet(s) or the cable assembly(ies) from the supply network.		P
	Such equipment shall be installed in accordance with national rules.		P
	Such equipment may be part of the supply network or either the EV charging station or the Mode 2 supply equipment.		P
16	Marking and instructions		-
16.1	Installation manual of EV charging stations		P
	The installation manual of EV charging stations shall indicate the classification as given in Clause 5.		P
	The EV supply equipment manufacturer shall state the interface characteristics specified in Clause 5 of IEC TS 61439-7:2014 in the manual where applicable. Wiring instructions shall be provided.		P
	If protective devices are included in the EV charging station, the manual shall indicate the characteristics of those protection devices explicitly describing the type and rating. The information may be provided in a detailed electric diagram.		P
	If the protective devices are not in the EV charging station, the manual shall indicate all information necessary for the		P

Clause	Requirement - test	Result-Remark	Verdict
	installation of external protection explicitly describing the type and rating of the devices to be used.		
	It is recommended that the installation manual be made available to future customers.		P
	If the EV charging station has more than one connection of the equipment to the AC supply network, and does not have individual protection for each connecting point to the vehicles, then the installation manual shall indicate that each connection of the equipment to the AC supply network requires individual protection.		P
	The installation manual shall indicate if the optional function for ventilation is supported by the charging station (6.3.2.2).		P
	The installation manual shall indicate ratings or other information that denote special (severe or unusual) environmental conditions of use, see 5.3.		P
16.2	User manual for EV supply equipment		P
	User information shall be provided by the manufacturer on the EV supply equipment or in a user's manual.		P
	Such information shall state: • which adaptors or conversion adapters are allowed to be used, or • which adaptors or conversion adapters are not allowed to be used, or • that adaptors or conversion adapters are not allowed to be used, and • that cord extension sets are not allowed to be used.		P
	The user manual shall include information about national usage restrictions.		P
16.3	Marking of EV supply equipment		P
	The EV supply equipment manufacturer shall provide each EV supply equipment with one or more labels, marked in a durable manner and located in a place such that they are visible and legible during installation and maintenance:		P
	a) EV supply equipment manufacturer's name, initials, trade mark or distinctive marking; b) type designation or identification number or any other		P

Clause	Requirement - test	Result-Remark	Verdict
	means of identification, making it possible to obtain relevant information from the EV supply equipment manufacturer; c) "Indoor Use Only", or the equivalent, if intended for indoor use only;		
	The EV supply equipment manufacturer shall provide each EV supply equipment with one or more labels, marked in a durable manner and located in a place such that they are visible and legible during installation: d) means of identifying date of manufacture; e) type of current; f) frequency and number of phases in case of alternating current; g) rated voltage (input and output if different); h) rated current (input and output if different) and the ambient temperature used to determine the rated current; i) degree of protection; j) all necessary information relating to the special declared classifications, characteristics and diversity factor(s), severe or unusual environmental conditions of use, see 5.3.		P
16.4	Marking of charging cable assemblies case B		P
	Cable assemblies for Mode 1 Case B or Mode 3 Case B shall be marked in a durable manner with the following information: a) manufacturer's name or trade mark; b) type designation or identification number or any other means of identification, making it possible to obtain relevant information from the manufacturer; c) rated voltage; d) rated current; e) number of phases. f) degree of protection		P
	Marking for the entire cable assembly shall be provided in a clear manner by a label or equivalent means.		P
	Compliance is checked by inspection and by 16.5.		P
16.5	Durability test for marking		P
	Marking made by moulding, pressing, engraving or similar, including labels with a laminated plastic covering, shall not		P

Clause	Requirement - test	Result-Remark	Verdict
	be submitted to the following test.		
	The markings required by this standard shall be legible with corrected vision, durable and visible during use.		P
	Compliance is checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit.		P
	After the test, the marking shall be legible to normal or corrected vision without additional magnification. It shall not be easily possible to remove marking plates and they shall show no curling.		P

APPENDIX A— TEST PHOTOGRAPH



EC Declaration of conformity

Council Directive 2014/35/EU on Low Voltage Directive

**Jiangsu Tebaoflex Special Cable Co.,Ltd
Room No. 201,Building 3,No.77 Wusongbang Road,Fuqiao Town,Taicang
City,Suzhou City,Jiangsu Province China.**

Certify that the product described is in conformity with the Directive
2014/35/EU as mended

**Product Name: Cable & Tough Rubber Sheathed Flexible Cables
TEBAOFLEX CABLE**

**Item No:
See Annex**

The product has been assessed by the application of the following standards:

**DIN VDE 0250-812; DIN VDE 0250-813;
DIN VDE 0250-814;DIN VDE 0250-815;
DIN VDE 0250-602;DIN VDE 0250-605;
VDE 0250-606;DIN VDE 0282.**

Issue place and date

Company stamp and Signature of authorized personnel

Annex

Model :

300/500V,450/750V,0.6/1kV,1.8/3kV,3.6/6kV,6/10kV,8.7/15kV,12/20kV,18/30kV
 NSSHÖU,NSSHOEU,NSHÖU-J,NSHÖU-O,NSSHOU 3E,NSSHOU 3E +ST,
 2YSLGCGÖU,NSHOEU
 NNTSWÖU,NTSWÖU-J,NTSWÖU-
 O,NTSCEWÖU,NTSCGEWÖU,NTSCGEWÖU+FO,NTSCGECECWÖU
 NTSCGERLWÖU,NTSKCGERLOEU,NTSCGEWÖEU,NTMCGETMPU,NTMCGCWOU,NTMCGE
 WÖU
 NTMCWOU,NTMTWÖEU,NTMCWÖEU,N3GHSSHCH,N3GHSSYCY,NSSHCGEÖEU ,NSSHCGE
 ÖU
 NTSKCGECWÖU,NTMTWÖU,NTMTWÖEU,NTSKCGEWOU,NTSKCGECWÖEU-
 CH,NTSFLCGEWÖEU
 NSHO,NSHOU,NSHTÖU,NSHTÖU-J,NSHTÖU-JK,NSHTÖU-JK-G,NSHTÖU-J-G,NSHTÖU-J-E
 NSHTÖU-J-F,NSSHOU,NSSHOU-J,NSSHOU-JK,NSHTÖU-JZK,NSHTÖU-JZ,NSGTOEU-
 J,N3GHSSYCY
 NSSHTÖU,NSSHOU-J-G,NSSHOU-J-F,NTSCGECWÖU(TSCGEWÖU),NTSCGECWÖU + FO
 (N) TSCGECWÖU-S ((N)TSCGECWÖU (SM)),NTSCGECWÖU-K
 SIÖU,SIÖU-J,SIÖU-JK,NSIÖU,NSSIÖU,NSSIÖU-J,NSSIÖU-JK,NHMRGÖU-J,NHMRGÖU-O
 (N)HMRGÖCU,NHGHCÖU
 NSGAFÖU
 NYHSSYCY,NYHSSYCY - PVC 3.6/6 kV,N3GHSSYCY - Rubber 3.6/6 kV to 12/20 kV
 (N)3GHSSHCH
 NSHXAFÖ,NSHXAFÖE
 H07RN-F,H05RN-F/H05RNH2-F,A07RN-F,H07RN8-F
 VDE-0282 Part-16:H07RN8-F
 VDE 0282 Part-12:H05BN4-F,H07BN4-F
 VDE-0282 Part-10:H05BQ-F,H07BQ-F,H05BB-F /H07BB-F
 DIN VDE 0282-14:H03RT-H
 VDE-0282 Part-15:H05SS-F/H05SST-F
 VDE 0282 P-11:H05GG-F
 PUR-HF D12Y11YU11Y
 PUR-HF D12YST11YU11Y
 D12Y11Y-J,D12Y11Y-O