SLOVENSKI STANDARD
SIST EN 50620:2017

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Električni kabli - Kabli za napajanje električnih vozil

Electric cables - Charging cables for electric vehicles

Kabel und Leitungen - Ladeleitung für Elektrofahrzeuge

Câbles électriques - Câbles de charge pour véhicules électriques

Ta slovenski standard je istoveten z: **EN 50620:2017**

ICS:

29.060.20	Kabli	Cables
43.120	Električna cestna vozila	Electric road vehicles

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English Version

Electric cables - Charging cables for electric vehicles (BT(DE/NOT)259)

Câbles électriques - Câbles de charge pour véhicules électriques (BT(DE/NOT)259)

Kabel und Leitungen - Ladeleitung für Elektrofahrzeuge (BT(DE/NOT)259)

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European Committee for Electrotechnical Standardization
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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 50620:2017) has been prepared by CLC/TC 20, Electric cables.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-11-12
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2020-05-12

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1 Scope

This standard specifies design, dimensions and test requirements for halogen-free cables with extruded insulation and sheath having a voltage rating of up to and including 450/750 V for flexible applications under severe condition for the power supply between the electricity supply point or the charging station and the electric vehicle (EV).

The EV charging cable is intended to supply power and if needed communication (details see EN 61851-1 and the EN 62196 series) to an electric vehicle. The charging cables are applicable for charging modes 1-3 of EN 61851-1. The cables in this standard with rated voltage 300/500 V are only permitted for charging mode 1 of EN 61851-1.

The maximum conductor operating temperatures for the cables in this standard is 90 °C.

The cables may be:

a) an integral part of the vehicle (case A of EN 61851-1); or

b) a detachable cable assembly with a vehicle connector and AC supply connection to a socket outlet (case B of EN 61851-1); or

c) permanently attached to a fixed charging point (case C of EN 61851-1).

This standard describes cables whose safety and reliability is ensured when they are installed and/or used in accordance to the guide to use EN 50565-1 and Annex B.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 228, *Automotive fuels — Unleaded petrol — Requirements and test methods*

EN 590, *Automotive fuels — Diesel — Requirements and test methods*

EN 50289-1-5:2001, *Communication cables — Specifications for test methods — Part 1-5: Electrical test methods - Capacitance*

EN 50289-4-17, *Communication cables — Specifications for test methods — Part 4-17: Test methods for UV resistance evaluation of the sheath of electrical and optical fibre cable*

EN 50334, *Marking by inscription for the identification of cores of electric cables*

EN 50395:2005, *Electrical test methods for low voltage energy cables*

EN 50396:2005, *Non electrical test methods for low voltage energy cables*

EN 50525-1:2011, *Electric cables — Low voltage energy cables of rated voltages up to and including 450/750 V (U0/U) — Part 1: General requirements*

EN 60228, *Conductors of insulated cables (IEC 60228)*

EN 60332-1-2:2004/A1:2015, *Tests on electric and optical fibre cables under fire conditions — Part 1-2: Test for vertical flame propagation for a single insulated wire or cable — Procedure for 1 kW pre-mixed flame (IEC 60332-1-2:2004*/A1:2015*)*

EN 60719, *Calculation of the lower and upper limits for the average outer dimensions of cables with circular copper conductors and of rated voltages up to and including 450/750 V (IEC 60719)*

EN 60811-401, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 401: Miscellaneous tests — Thermal ageing methods — Ageing in an air oven (IEC 60811-401)*

EN 60811-403, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 403: Miscellaneous tests — Ozone resistance test on cross-linked compounds (IEC 60811-403)*

EN 60811-404, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 404: Miscellaneous tests — Mineral oil immersion tests for sheaths (IEC 60811-404)*

EN 60811-501, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 501: Mechanical tests — Tests for determining the mechanical properties of insulating and sheathing compounds (IEC 60811-501)*

EN 60811-503, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 503: Mechanical tests — Shrinkage test for sheaths (IEC 60811-503)*

EN 60811-504, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 504: Mechanical tests — Bending tests at low temperature for insulation and sheaths (IEC 60811-504)*

EN 60811-505, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 505: Mechanical tests — Elongation at low temperature for insulations and sheaths (IEC 60811-505)*

EN 60811-506, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 506: Mechanical tests — Impact test at low temperature for insulations and sheaths (IEC 60811-506)*

EN 60811-507, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 507: Mechanical tests — Hot set test for cross-linked materials (IEC 60811-507)*

EN 60811-508, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 508: Mechanical tests — Pressure test at high temperature for insulation and sheaths (IEC 60811-508)*

EN 60811-509, *Electric and optical fibre cables — Test methods for non-metallic materials — Part 509: Mechanical tests — Test for resistance of insulations and sheaths to cracking (heat shock test) (IEC 60811-509)*

EN 61851-1, *Electric vehicle conductive charging system — Part 1: General requirements (IEC 61851-1)*

EN 62230, *Electric cables — Spark-test method (IEC 62230)*

HD 308 S2, *Identification of cores in cables and flexible cords*

HD 605 S2:2008, *Electric cables — Additional test methods*

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 14572:2011, *Road vehicles — Round, sheathed, 60 V and 600 V screened and unscreened single- or multi-core cables — Test methods and requirements for basic- and high-performance cables*

ISO 22241-1, *Diesel engines — NOx reduction agent AUS 32 — Part 1: Quality requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
type test
T
test required to be made before supplying a type of cable covered by this standard on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: Type tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials, design or type of manufacturing process which might change the performance characteristics.

3.2
sample test
S
test made on samples of completed cable, or components taken from a completed cable adequate to verify that the finished product meets the design specifications

3.3
routine test
R
tests made on all production cable lengths to demonstrate their integrity

3.4
halogen-free material
when used in cables designated halogen-free, material complying with the assessment of halogen requirements in Table 5

3.5
type of compound
category in which a compound is placed according to its properties, as determined by specific tests

Note 1 to entry: The type designation is not directly related to the composition of the compound.

3.6
EVI
insulation compound for cables in this standard

3.7
EVM
sheathing compound for cables in this standard

3.8
CP core
control pilot core
core in the cable which serve the basic control function to operate a charging cable

Note 1 to entry: For further information see EN 61851-1.

3.9
CC
control core
core in the cable for additional control and measurement functions

4 Rated voltage

The rated voltage of a cable is the reference voltage for which the cable is designed.

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.

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.

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.

Table 1 — Examples of maximum permitted voltages against rated voltage of cable

Rated voltage of cable	Maximum permanent permitted operating voltage of the cable	
	a.c.	3-phase a.c.
U_0/U	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

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;

3) printing, indenting or embossing on the sheath.

5.2 Continuity of marking

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.

Other marking, such as that required under recognized voluntary third party approval schemes, may also follow the requirements of this subclause.

Figure 1 shows an example of the marking as used on the outer sheath of the cable.

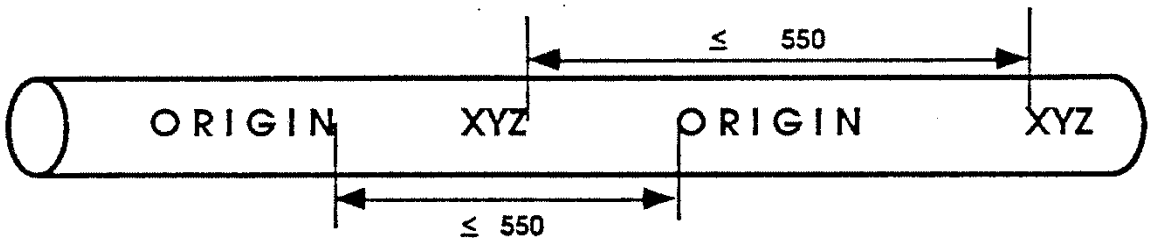

Figure 1 — Example of marking

5.3 Use of the name CENELEC

The name CENELEC, in full or abbreviated, shall not be marked on, or in the cables.

5.4 Code designation

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;

— 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

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.

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.

5.6 Additional requirements

5.6.1 Durability

Printed markings shall be durable. Compliance with this requirement shall be checked by the test given in EN 50396:2005, 5.1.

5.6.2 Legibility

All markings shall be legible.

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.

6 Requirements for the construction of cables

6.1 Conductors

6.1.1 Material

The conductors shall be class 5 flexible copper conductors in accordance with EN 60228.

The wires of conductors shall be plain or metal coated, for example with tin or silver. Coated wires shall be covered with a continuous layer of the coating. There shall be no visible gaps in the continuous layer, when examined with normal or corrected vision.

6.1.2 Electrical resistance

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.

6.2 Sizes of cable

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 and 1,0 mm^2 - number of cores not specified.

6.3 Insulation

6.3.1 Material

The insulation shall be halogen-free compound EVI-2 for power cores, and EVI-1 or EVI-2 for CC/CP cores.

In all cases the insulation shall meet the requirements given in Table 2.

6.3.2 Application to the conductor

The insulation shall be applied by extrusion, such that it fits closely on the conductor, but it shall be possible to remove it without damage to the insulation itself, to the conductor or to the metal coating, if present. It is permitted to apply the insulation in a single layer, or in a number of coherent layers.