IEC TS 62893-4-2

Edition 1.0 2021-06

TECHNICAL SPECIFICATION

Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV – Part 4-2: Cables for DC charging according to mode 4 of IEC 61851-1 – Cables intended to be used with a thermal management system

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.060.20; 43.120

ISBN 978-2-8322-9915-9

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Terms and definitions 7
4 General purpose cables – Heavy duty flexible cables 8
4.1 Code designation 8
4.2 Rated voltage 8
4.3 Construction 8
4.3.1 Conductor material 8
4.3.2 Sizes of cable 8
4.3.3 Insulation 8
4.3.4 Screen(s) (optional) 8
4.3.5 Tubes 9
4.3.6 Core identification 9
4.3.7 Assembly 9
4.3.8 Sheath 9
4.3.9 Marking 9
4.3.10 Inductance between power cores 10
4.4 Requirements 10
5 Liquid coolants 10
5.1 Type of coolant 10
5.2 Pressure tests for tubes 10
6 Guidance on use of cables 11
Annex A (normative) Tests for completed cables 13
Annex B (normative) Tables for cable dimensions and insulation resistance 15
Annex C (normative) Bending test 17
C.1 Test method 17
C.2 Apparatus 17
C.3 Results and calculations 17
Annex D (normative) Screen 19
Annex E (informative) Cable inductance between DC+ and DC− 20
E.1 General 20
E.2 Test method 20
E.3 Specimen 20
E.4 Results and calculations 20
Annex F (normative) Compatibility test of coolant 21
F.1 General 21
F.2 Apparatus 21
F.3 Preparation of samples 21
F.4 Procedure 21
F.5 Results and calculations 22
Bibliography 23

Figure C.1 – Apparatus for cyclic bending 18

Table 1 – Intended use of charging cables for EV (environmental conditions) 11
Table 2 – Recommended use of charging cables for EV..... 12
Table A.1 – Tests for cable types 62893 IEC 129, 130 and 131 13
Table B.1 – General data for type 129 (EVM-1)..... 15
Table B.2 – General data for type 130 (EVM-2) and type 131 (EVM-3)..... 16

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

CHARGING CABLES FOR ELECTRIC VEHICLES OF RATED VOLTAGES UP TO AND INCLUDING 0,6/1 kV –

Part 4-2: Cables for DC charging according to mode 4 of IEC 61851-1 – Cables intended to be used with a thermal management system

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 62893-4-2 has been prepared by IEC technical committee 20: Electric cables. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

DTS	Report on voting
20/1942/DTS	20/1961/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This document is to be read in conjunction with IEC 62893-1:2017, IEC 62893-1:2017/AMD1:2020 and IEC 62893-2:2017.

A list of all parts in the IEC 62893 series, published under the general title *Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

CHARGING CABLES FOR ELECTRIC VEHICLES OF RATED VOLTAGES UP TO AND INCLUDING 0,6/1 kV –

Part 4-2: Cables for DC charging according to mode 4 of IEC 61851-1 – Cables intended to be used with a thermal management system

1 Scope

This part of IEC 62893 applies to cables for DC charging according to mode 4 of IEC 61851-1. These cables are intended to be used with a thermal management system such as that specified in IEC 61851-23.

Charging cables specified in IEC 62893 (all parts) are intended to be used for electrical appliances of class II equipment.

Maximum conductor operating temperature for the cables in this document is 90 ºC.

The test methods specified are given in IEC 62893-2, IEC 60227-2, IEC 60245-2, IEC 60332-1-2, IEC 62821-1:2015, Annex B and in the relevant parts of IEC 60811.

IEC 62440 is intended to be used as guidance on the safe use of cables in this document together with specific guidance in Clause 6 of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60227-2:1997, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 2: Test methods*
IEC 60227-2:1997/AMD1:2003

IEC 60245-2, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 2: Test methods*
IEC 60245-2:1994/AMD1:1997
IEC 60245-2:1994/AMD2:1997

IEC 60332-1-2, *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 60364-5-54, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*

IEC 60445:2017, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60811-401:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 401: Miscellaneous tests – Thermal ageing methods – Ageing in an air oven*
IEC 60811-401:2012/AMD1:2017

IEC 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 61851-1, *Electric vehicle conductive charging system – Part 1: General requirements*

IEC 61851-23, *Electric vehicle conductive charging system – Part 23: DC electric vehicle charging station*

IEC 62440:2008, *Electrical cables with a rated voltage not exceeding 450/750 V – Guide to use*

IEC 62821-1:2015, *Electric cables – Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltage up to and including 450/750 V – Part 1: General requirements*

IEC 62893-1:2017 *Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV – Part 1: General requirements*
IEC 62893-1:2017/AMD1:2020

IEC 62893-2:2017, *Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV – Part 2: Test methods*

IEC Guide 117:2010, E*lectrotechnical equipment – Temperatures of touchable hot surfaces*

ISO 1402, *Rubber and plastics hoses and hose assemblies – Hydrostatic testing*

EN 50289-1-12:2005, *Communication cables – Specifications for test methods – Part 1-12: Electrical test methods – Inductance*