ICS 43.120 SLOVENSKÁ TECHNICKÁ NORMA November 2019

STN	**Systém nabíjania elektrických vozidiel vodivým prepojením** **Časť 1: Všeobecné požiadavky**	**STN** **EN IEC 61851-1** 34 1590

Electric vehicle conductive charging system - Part 1: General requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/19

Obsahuje: EN IEC 61851-1:2019, IEC 61851-1:2017

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61851-1

July 2019

ICS 43.120

Supersedes EN 61851-1:2011

English Version

Electric vehicle conductive charging system - Part 1: General requirements (IEC 61851-1:2017)

Système de charge conductive pour véhicules électriques - Partie 1: Exigences générales (IEC 61851-1:2017)

Konduktive Ladesysteme für Elektrofahrzeuge - Teil 1: Allgemeine Anforderungen (IEC 61851-1:2017)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 61851-1:2019 E

European foreword

The text of document 69/436/FDIS, future edition 3 of IEC 61851-1, prepared by IEC/TC 69 "Electric road vehicles and electric industrial trucks" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61851-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-01-05
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-07-05

This document supersedes EN 61851-1:2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 61851-1:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 62053-21:2003	NOTE Harmonized as EN 62053-21:2003 (not modified)
ISO 4628-3:2016	NOTE Harmonized as EN ISO 4628-3:2016 (not modified)
IEC 60063:2015	NOTE Harmonized as EN 60063:2015 (not modified)
IEC 60068-2-2	NOTE Harmonized as EN 60068-2-2
IEC 60068-2-5:2010	NOTE Harmonized as EN 60068-2-5:2011 (not modified)
IEC 60068-2-6:2007	NOTE Harmonized as EN 60068-2-6:2008 (not modified)
IEC 60068-2-14:2009	NOTE Harmonized as EN 60068-2-14:2009 (not modified)
IEC 60068-2-27:2008	NOTE Harmonized as EN 60068-2-27:2009 (not modified)
IEC 60068-2-52:1996	NOTE Harmonized as EN 60068-2-52:1996 (not modified)
IEC 60068-2-53:2010	NOTE Harmonized as EN 60068-2-53:2010 (not modified)
IEC 60068-2-75	NOTE Harmonized as EN 60068-2-75
IEC 60364-6:2016	NOTE Harmonized as HD 60364-6:2016 (not modified)
IEC 60947-1:2007	NOTE Harmonized as EN 60947-1:2007 (not modified)

IEC 60947-1:2007/A1:2010	NOTE Harmonized as EN 60947-1:2007/A1:2011 (not modified)
IEC 60947-1:2007/A2:2014	NOTE Harmonized as EN 60947-1:2007/A2:2014 (not modified)
IEC 60947-6-1:2005	NOTE Harmonized as EN 60947-6-1:2005 (not modified)
IEC 61140	NOTE Harmonized as EN 61140
IEC 61439-1:2011	NOTE Harmonized as EN 61439-1:2011 (not modified)
IEC 61540	NOTE Harmonized as HD 639 S1
IEC 61558-1:2005	NOTE Harmonized as EN 61558-1:2005 (not modified)
IEC 61558-1:2005/A1:2009	NOTE Harmonized as EN 61558-1:2005/A1:2009 (not modified)
IEC 61558-2-4:2009	NOTE Harmonized as EN 61558-2-4:2009 (not modified)
IEC 61558-2-12:2011	NOTE Harmonized as EN 61558-2-12:2011 (not modified)
IEC 61558-2-16:2009	NOTE Harmonized as EN 61558-2-16:2009 (not modified)
IEC 61558-2-16:2009/A1:2013	NOTE Harmonized as EN 61558-2-16:2009/A1:2013 (not modified)
IEC 61851-21-2	NOTE Harmonized as EN 61851-21-2[1]
IEC 61980-1	NOTE Harmonized as EN 61980-1[2]
IEC 62262:2002	NOTE Harmonized as EN 62262:2002 (not modified)
ISO/IEC 15118 (series)	NOTE Harmonized as EN ISO 15118 (series)
ISO 13849-1:2015	NOTE Harmonized as EN ISO 13849-1:2015 (not modified)
ISO 15118-3	NOTE Harmonized as EN ISO 15118-3

[1] Under preparation. Stage at time of publication: FprEN 61851-21-2

[2] Under preparation. Stage at time of publication: prEN 61980-1

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60038 (mod)	-	IEC standard voltages	EN 60038	2011
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2013
IEC 60309-1	-	Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements	EN 60309-1	1999
			+ A1 (mod)	2007
			+ A2	2012
IEC 60309-2	-	Plugs, socket-outlets and couplers for industrial purposes - Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories	EN 60309-2	1999
			+ A1 (mod)	2007
			+ A2	2012
IEC 60364-4-41 (mod)	-	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2017
			+ A11	2017
IEC 60364-5-54	-	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors	HD 60364-5-54	2011
			+ A11	2017
IEC 60529	2013[3]	Degrees of protection provided by enclosures (IP Code)	-	-

[3] Dated as no equivalent European standard exists.

Publication	Year	Title	EN/HD	Year
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60884-1	2002[3]	Plugs and socket-outlets for household and similar purposes -- Part 1: General requirements	-	-
IEC 60898	series	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations	EN 60898	series
IEC 60898-1 (mod)	-	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 1: Circuit-breakers for a.c. operation	EN 60898-1	2019
IEC 60947-2	-	Low-voltage switchgear and controlgear - Part 2: Circuit-breakers	EN 60947-2	2017
IEC 60947-3	-	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	2009
			+ A1	2012
			+ A2	2015
IEC 60947-4-1	-	Low voltage switchgear and controlgear – Part 4-1: Contactors and motorstarters – Electromechanical contactors and motor-starters	EN IEC 60947-4-1	2019
IEC 60947-6-2	-	Low-voltage switchgear and controlgear - Part 6-2: Multiple function equipment - Control and protective switching devices (or equipment) (CPS)	EN 60947-6-2	2003
			+ A1	2007
IEC 60950-1 (mod)	2005	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	2006
-	-		+ A11	2009
-	-		+ A12	2011
-	-		+ AC	2011
IEC 60990	-	Methods of measurement of touch current and protective conductor current	EN 60990	2016
IEC 61008-1 (mod)	-	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) - Part 1: General rules	EN 61008-1	2012
			+ A1 (mod)	2014
			+ A2 (mod)	2014
			+ A11	2015
			+ A12	2017

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Publication	Year	Title	EN/HD	Year
IEC 61009-1 (mod)	-	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules	EN 61009-1	2012
			+ A1 (mod)	2014
			+ A2 (mod)	2014
			+ A11	2015
			+ A12	2016
IEC 61180	-	High-voltage test techniques for low-voltage equipment - Definitions, test and procedure requirements, test equipment	EN 61180	2016
IEC 61316	1999	Industrial cable reels	EN 61316	1999
IEC/TS 61439-7	2014	Low-voltage switchgear and controlgear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicles charging stations	-	-
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems	EN 61508	series
IEC 61558-1	-	Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests	EN 61558-1[4]	—
IEC 61558-2-4	-	Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers	EN 61558-2-4	2009
IEC 61810-1	-	Electromechanical elementary relays - Part 1: General and safety requirements	EN 61810-1	2015
IEC 61851	series	Electric vehicle conductive charging system	EN IEC 61851	series
IEC 61851-23	2014	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station	EN 61851-23	2014
IEC 61851-24	2014	Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging	EN 61851-24	2014
IEC 62196	series	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles	EN 62196	series

[4] Under preparation. Stage at time of publication: FprEN 61558-1:2017

Publication	Year	Title	EN/HD	Year
IEC 62196-1 (mod)	2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements	EN 62196-1	2014
IEC 62196-2	2016	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories	EN 62196-2	2017
IEC 62196-3	2014	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers	EN 62196-3	2014
IEC 62262	-	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)	EN 62262	2002
IEC 62423 (mod)	-	Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses	EN 62423	2012
IEC 62752	-	In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)	EN 62752	2016
ISO 17409	2015	Electrically propelled road vehicles - Connection to an external electric power supply - Safety requirements	EN ISO 17409	2017

Annex ZZ
(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / subclause(s) of this EN	Remarks / Notes
1. General Conditions		
(a) the essential characteristics, the recognition and observance of which will ensure that electrical equipment will be used safely and in applications for which it was made, shall be marked on the electrical equipment, or, if this is not possible, on an accompanying document	1 Scope 2 Normative References 3 Terms and Definitions 5 Classification 17 Marking and instructions	
(b) the electrical equipment, together with its component parts, shall be made in such a way as to ensure that it can be safely and properly assembled and connected	4 General requirement 6.3.1.2 Continuous continuity checking of the protective conductor 6.3.1.3 Verification that the EV is properly connected to the EV supply equipment 6.3.2.3 Intentional and unintentional disconnection of the vehicle connector and/or the EV plug 9 Conductive electrical interface requirements 10 Requirements for adaptors 1 Cable assembly requirements (incl. chapter12)	

Safety objectives of Directive 2014/35/EU	Clause(s) / subclause(s) of this EN	Remarks / Notes
(c) the electrical equipment shall be so designed and manufactured as to ensure that protection against the hazards set out in points 2 and 3 is assured, providing that the equipment is used in applications for which it was made and is adequately maintained	Details see points 2 and 3	
2. Protection against hazards arising from the electrical equipment		
(a) persons and domestic animals are adequately protected against the danger of physical injury or other harm which might be caused by direct or indirect contact	8 Protection against electric shock 9 Conductive electrical interface requirements 13.4 IP Degree 13.6 Touch current 15 Automatic reclosing of protective devices	
(b) temperatures, arcs or radiation which would cause a danger, are not produced	6.3.2.3 Intentional and unintentional disconnection of the vehicle connector and/or the EV plug 9 Conductive electrical interface requirements 13 EV supply equipment constructional requirements and tests 14 Overload and short-circuit protection	
(c) persons, domestic animals and property are adequately protected against non-electrical dangers caused by the electrical equipment which are revealed by experience	13 EV supply equipment constructional requirements and tests	
(d) the insulation is suitable for foreseeable conditions	13.5 Insulation resistance 13.7 Dielectric withstand voltage	
3. Protection against hazards which may be caused by external influences on the electrical equipment		
(a) meets the expected mechanical requirements in such a way that persons, domestic animals and property are not endangered	4 General requirements 13.11 Mechanical strength	

EN IEC 61851-1:2019 (E)

Safety objectives of Directive 2014/35/EU	Clause(s) / subclause(s) of this EN	Remarks / Notes
(b) is resistant to non-mechanical influences in expected environmental conditions, in such a way that persons, domestic animals and property are not endangered	13.3 Clearances and creepage distances 13.4 IP degrees 13.6 Touch current 13.7 Dielectric withstand voltage 13.8 Temperature rise 13.9 Damp heat functional test 13.10 Minimum temperature functional test	
(c) does not endanger persons, domestic animals and property in foreseable conditions of overload	11 Cable assembly requirements 14 Overload and short-circuit protection 14.2 Overload protection of the cable assembly 14.3 Short-circuit protection of the charging cable	

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

IEC 61851-1

Edition 3.0 2017-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electric vehicle conductive charging system – Part 1: General requirements

Système de charge conductive pour véhicules électriques – Partie 1: Exigences générales

IEC 61851-1:2017-02(en-fr)

IEC 61851-1

Edition 3.0 2017-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electric vehicle conductive charging system – Part 1: General requirements

Système de charge conductive pour véhicules électriques – Partie 1: Exigences générales

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –

Part 1: General requirements

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.
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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.

International Standard IEC 61851-1 has been prepared by IEC technical committee 69: Electric road vehicles and electric industrial trucks.

This third edition cancels and replaces the second edition published in 2010. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) The contents of IEC 61851-1:2010 have been re-ordered. Numbering of clauses has changed as new clauses were introduced and some contents moved for easy reading. The following lines give an insight to the new ordering in addition to the main technical changes.
b) All requirements from IEC 61851-22 have been moved to this standard, as work on IEC 61851-22 has ceased.

c) Any requirements that concern EMC have been removed from the text and are expected to be part of the future version of 61851-21-2[1].

d) Clause 4 contains the original text from IEC 61851-1:2010 and all general requirements from Clause 6 of IEC 61851-1:2010.

e) Clause 5 has been introduced to provide classifications for EV supply equipment.

f) Previous general requirements of Clause 6 have been integrated into Clause 4. Clause 6 contains all Mode descriptions and control requirements. Specific requirements for the combined use of AC and DC on the same contacts are included.

g) Clause 9 is derived from previous Clause 8. Adaptation of the description of DC accessories to allow for the DC charging modes that have only recently been proposed by industry and based on the standards IEC 61851-23, IEC 61851-24 as well as IEC 62196-1, IEC 62196-2 and IEC 62196-3. Information and tables contained in the IEC 62196 series standards have been removed from this standard.

h) Clause 10 specifically concerns the requirements for adaptors, initially in Clause 6.

i) Clause 11 includes new requirements for the protection of the cable.

j) Specific requirements for equipment that is not covered in the IEC 62752 remain in the present document.

k) Previous Clause 11 is now treated in Clauses 12 to 13. The requirements in 61851-1 cover the EV supply equipment of both mode 2 and mode 3 types, with the exception in-cable control and protection devices for mode 2 charging of electric road vehicles (IC-CPD) which are covered by IEC 62752.

l) Clause 14 gives requirements on automatic reclosing of protection equipment.

m) Clause 16 gives requirements for the marking of equipment and the contents of the installation and user manual. This makes specific mention of the need to maintain coherence with the standards for the fixed installation. It also contains an important text on the markings for temperature ratings.

n) Annex A has been reviewed to introduce complete sequences and tests and to make the exact cycles explicit. Annex A in this edition supersedes IEC TS 62763 (Edition 1).

o) Annex B is normative and has requirements for proximity circuits with and without current coding.

p) Previous Annex C has been removed and informative descriptions of pilot function and proximity function implementations initially in Annex B are moved to Annex C.

q) New informative Annex D describing an alternative pilot function system has been introduced.

r) Dimensional requirements for free space to be left around socket-outlets used for EV energy supply are given in the informative Annex E.

s) The inclusion of protection devices within the EV supply equipment could, in some cases, contribute to the protection against electric shock as required by the installation. This is covered by the information required for the installation of EV supply equipment in Clause 16 (Marking).

The text of this standard is based on the following documents:

FDIS	Report on voting
69/436/FDIS	69/469/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

1 Under preparation.

A list of all parts of the IEC 61851 series, under the general title *Electric vehicle conductive charging system* can be found on the IEC website.

In this standard, the following print types are used:

– *test specifications and instructions regarding application of Part 1: italic type.*

– notes: smaller roman type.

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This standard is the first part of the IEC 61851 series of standards that gives the general requirements for the supply[2] of electric energy to Electric road vehicles[3]. It is to be noted that the vehicle and the EV supply equipment[2] make up a complete system that is covered by a number of IEC and ISO standards.

IEC 61851 covers the mechanical, electrical, communications, EMC and performance requirements for EV supply equipment used to charge electric vehicles, including light electric vehicles.

IEC 61851 is divided into several parts as follows:

– *Part 1: General Requirements*,
This document gives the general requirements that serve as a basis for all the subsequent standards in the series. It includes the requirements for AC EV supply equipment.

– *Part 21-1[4]: Electric vehicle onboard charger EMC requirements for conductive connection to an AC/DC supply*. This part will cover requirements for EMC onboard the vehicle.

– *Part 21-2[5]: EMC requirements for OFF board electric vehicle charging systems*. This part will cover all requirements for AC and DC EV supply equipment. EMC requirements for wireless power transfer systems (WPT) will not be included.

– *Part 23: DC electric vehicle charging station* (2014).This part covers the requirements for DC charging stations both permanently wired and cable and plug connected.

– *Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging* (2014). This part provides the requirements for communication between the vehicle and the DC charging stations of Part 23.

IEC 61851-3 subseries is under development and is intended to cover EV supply equipment with a DC output not exceeding 120 V where reinforced or double insulation or class III is used as the principal means of protection against electric shock (information on scope as available on 3/2016).

– *Part 3-1: Electric vehicles conductive power supply system – Part 3-1: General Requirements for Light Electric Vehicles (LEV) AC and DC conductive power supply systems.*

– *Part 3-2: Electric vehicles conductive power supply system – Part 3-2: Requirements for Light Electric Vehicles (LEV) DC off-board conductive power supply systems.*

– *Part 3-3: Electric vehicles conductive power supply system – Part 3-3: Requirements for Light Electric Vehicles (LEV) battery swap systems.*

– *Part 3-4: Electric vehicles conductive power supply system – Part 3-4: Requirements for Light Electric Vehicles (LEV) communication.*

– *Part 3-5: Electric vehicles conductive power supply system – Part 3-5: Requirements for Light Electric Vehicles communication – Pre-defined communication parameters.*

– *Part 3-6: Electric vehicles conductive power supply system – Part 3-6: Requirements for Light Electric Vehicles communication –Voltage converter unit.*

– *Part 3-7: Electric vehicles conductive power supply system – Part 3-7: Requirements for Light Electric Vehicles communication – Battery system.*

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2 The term “supply or electric energy” is used to designate energy flow to and from the electric vehicle. The term “charging” used in the title is also used to designate such energy flow.

3 The reader is advised to refer to the definitions clause 3 for this and all subsequent terms that are used in this document.

4 Under preparation.

5 Under preparation.

Documents directly related to the present document:

– ISO 17409:2015, *Electrically propelled road vehicles – Connection to an external electric power supply – Safety requirements.*

  This document gives requirements for electric vehicle that is to be connected to the EV supply equipment. It covers all the classes of vehicles that are in the scope of ISO/TC 22/SC 37.

– IEC 62752:2016, *In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD).*

  This product standard gives the requirements for Mode 2 cable assemblies that include supplementary protective and control devices that allow the safe connection of a vehicle to a mains socket-outlet of an installation.

– ISO/IEC 15118 (all parts*), Road vehicles — Vehicle to grid communication interface*

  This series of documents gives the description and the requirements for high level data communication between the EV and the EV supply equipment.

Requirements for wireless power transfer systems are given in IEC 61980-1.

ELECTRIC VEHICLE CONDUCTIVE CHARGING SYSTEM –

Part 1: General requirements

1 Scope

This part of IEC 61851 applies to EV supply equipment for charging electric road vehicles, with a rated supply voltage up to 1 000 V AC or up to 1 500 V DC. and a rated output voltage up to 1 000 V AC. or up to 1 500 V DC.

Electric road vehicles (EV) cover all road vehicles, including plug-in hybrid road vehicles (PHEV), that derive all or part of their energy from on-board rechargeable energy storage systems (RESS).

This standard also applies to EV supply equipment supplied from on-site storage systems (e.g. buffer batteries).

The aspects covered in this standard include:

- the characteristics and operating conditions of the EV supply equipment;
- the specification of the connection between the EV supply equipment and the EV;
- the requirements for electrical safety for the EV supply equipment.

Additional requirements may apply to equipment designed for specific environments or conditions, for example:

- EV supply equipment located in hazardous areas where flammable gas or vapour and/or combustible materials, fuels or other combustible, or explosive materials are present;
- EV supply equipment designed to be installed at an altitude of more than 2 000 m;
- EV supply equipment intended to be used on board on ships;

Requirements for electrical devices and components used in EV supply equipment are not included in this standard and are covered by their specific product standards.

EMC requirements for EV supply equipment are expected to be covered in the future IEC 61851-21-2[6].

Requirements for bi-directional energy transfer are under consideration and are not in this edition of IEC 61851-1.

This standard does not apply to:

- safety aspects related to maintenance;
- charging of trolley buses, rail vehicles, industrial trucks and vehicles designed primarily for use off-road;
- equipment on the EV;
- EMC requirements for equipment on the EV while connected, which are covered in IEC 61851-21-1;
- Charging RESS off board of the EV;

6 Under consideration.

- DC EV supply equipment that relies specifically on double/reinforced insulation or class III protection against electric shock. See IEC 61851-23 or the future IEC 61851-3 series.

The IEC 61851 series covers all EV supply equipment with the exception of in-cable control and protection devices for mode 2 charging of electric road vehicles (IC-CPD) which are covered by IEC 62752.

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 60038, *IEC standard voltages*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60309-1, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

IEC 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

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

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC 60898 (all parts), *Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60898-1, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-4-1, *Low voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC 60947-6-2, *Low-voltage switchgear and controlgear – Part 6-2: Multiple function equipment – Control and protective switching devices (or equipment) (CPS)*

IEC 60950-1:2005, *Information technology equipment – Safety – Part 1: General requirements*

IEC 60990, *Methods of measurement of touch current and protective conductor current*

IEC 61008-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009-1, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61316:1999, *Industrial cable reels*

IEC TS 61439-7:2014, *Low-voltage switchgear and controlgear assemblies – Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicles charging stations*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61558-1, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

IEC 61558-2-4, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*

IEC 61810-1, *Electromechanical elementary relays – Part 1: General and safety requirements*

IEC 61851 (all parts), *Electric vehicle conductive charging system*

IEC 61851-23:2014, *Electric vehicle conductive charging system – Part 23: DC electric vehicle charging station*

IEC 61851-24:2014, *Electric vehicle conductive charging system – Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging*

IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*

IEC 62196-1:2014, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

IEC 62196-2:2016, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 2: Dimensional compatibility and interchangeability requirements for a.c.pin and contact-tube accessories*

IEC 62196-3:2014, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62423, *Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses*

IEC 62752, *In-Cable Control and Protection Device for mode 2 charging of electric road vehicles (IC-CPD)*

ISO 17409:2015, *Electrically propelled road vehicles – Connection to an external electric power supply – Safety requirements*