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**Elektrisch angetriebene Straßenfahrzeuge –
Kontaktlose Energieübertragung –
Sicherheits- und Interoperabilitätsanforderungen (ISO 19363:2020);
Englische Fassung EN ISO 19363:2021**

Electrically propelled road vehicles –
Magnetic field wireless power transfer –
Safety and interoperability requirements (ISO 19363:2020);
English version EN ISO 19363:2021

Véhicules routiers électriques –
Transmission d'énergie sans fil par champ magnétique –
Exigences de sécurité et d'interopérabilité (ISO 19363:2020);
Version anglaise EN ISO 19363:2021

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Nationales Vorwort

Dieses Dokument (EN ISO 19363:2021) wurde vom Technischen Komitee ISO/TC 22 „Road vehicles“ in Zusammenarbeit mit dem Technischen Komitee CEN/TC 301 „Straßenfahrzeuge“, dessen Sekretariat von AFNOR (Frankreich) gehalten wird, erarbeitet.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 052-00-37 AA „Elektrisch angetriebene Straßenfahrzeuge“ im DIN-Normenausschuss Automobiltechnik (NAAutomobil).

Dieses Dokument enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 1/2004 nur die englische Fassung von EN ISO 19363:2021.

Dieses Dokument legt Anforderungen fest und beschreibt den Betrieb der fahrzeugseitigen Komponenten zur kontaktlosen Energieübertragung (MF-WPT) für das Laden von Antriebsbatterien von elektrisch angetriebenen Fahrzeugen. Es ist zur Anwendung für Personenkraftfahrzeuge und leichte Nutzfahrzeuge vorgesehen.

Die fahrzeugseitigen Komponenten, die diese Anforderungen erfüllen, sind vorgesehen für den Betrieb mit den infrastrukturseitigen Komponenten, welche die Anforderungen für die kontaktlose Energieübertragung aus der Reihe IEC 61980 erfüllen.

Für die in diesem Dokument zitierten Dokumente wird im Folgenden auf die entsprechenden deutschen Dokumente hingewiesen:

IEC 61980-2	siehe	DIN IEC 61980-2; VDE V 0122-10-2
IEC 61980-3	siehe	DIN IEC 61980-3; VDE V 0122-10-3
IEC 60664 (all parts)	siehe	DIN EN 60664 (alle Teile); VDE 0110 (alle Teile)
ISO 4130	siehe	DIN ISO 4130
IEC 61786-1	siehe	DIN EN 61786-1; VDA 0848-786-1
IEC 62311	siehe	DIN EN IEC 62311; VDE 0848-311

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN (www.din.de) durch eine Suche nach der Dokumentennummer aufgerufen werden.

Nationaler Anhang NA (informativ)

Begriffe

Die Benummerung der folgenden Begriffe ist identisch mit der Benummerung in der englischen Fassung.

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- ISO Online Browsing Platform: verfügbar unter <https://www.iso.org/obp>
- IEC Electropedia: verfügbar unter <https://www.electropedia.org/>

3.1

Ausrichtung

relative Position in x- und y-Richtung des *Sekundärgerätes (3.15)* zum *Primärgerät (3.9)* für einen gegebenen *Sekundärgerätefreiraum zum Grund (3.16)*

Anmerkung 1 zum Begriff: Das Koordinatensystem entspricht ISO 4130.

3.2

Toleranzfläche der Ausrichtung

beabsichtigte *WPT (3.22)*-Betriebsfläche in x- und y-Richtung für einen gegebenen *Sekundärgerätefreiraum zum Grund (3.16)*

3.3

zentraler Ausrichtungspunkt

geometrisches Zentrum für die *Toleranzfläche der Ausrichtung (3.2)*

Anmerkung 1 zum Begriff: Die Position des zentralen Ausrichtungspunktes eines *MF-WPT-Systems (3.8)* hängt von den spezifischen zentralen Ausrichtungspunkten des *Primärgerätes (3.9)* und des *Sekundärgerätes (3.15)* ab.

3.4

elektrisch angetriebenes Fahrzeug

EV

Fahrzeug mit einem oder mehreren elektrischen Antrieb(en) für die Fahrzeugfortbewegung

[QUELLE: ISO 6469-3:2018, 3.15, modifiziert — Die Abkürzung „EV“ wurde hinzugefügt.]

3.5

EV-Gerät

im Fahrzeug befindlicher Bausatz eines *WPT-Systems (3.23)*

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.6

EV-Hauptstromkreis

EVPC, en: electric vehicle power circuit

Sekundärgerät (3.15) und *EV-Leistungselektronik* (3.7), sowie elektrische und mechanische Verbindungen umfassender, im Fahrzeug befindlicher Bausatz

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.7

EV-Leistungselektronik

im Fahrzeug befindliche Komponenten zur Umwandlung von Leistung und Frequenz des *Sekundärgerätes* (3.15) in Gleichstrom zur Einspeisung in das *EVPC* (3.6)

Anmerkung 1 zum Begriff: Siehe Bild1.

3.8

Magnetfeld-WPT-System

MF-WPT-System

magnetisches Feld nutzendes *WPT-System* (3.23)

3.9

Primärgerät

nicht im Fahrzeug befindliches Gerät, welches das Magnetfeld für *WPT* (3.22) erzeugt und formt

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.10

Schutzbereich

Volumen in und um ein Fahrzeug, welches einheitliche Anforderungen hinsichtlich der Auswirkungen der Gefahren von elektromagnetischen Feldern stellt

3.11

Nennausgangsleistung

maximale Leistung, für deren konsistente Bereitstellung während eines Ladezyklus das *EVPC* (3.6) ausgelegt ist

3.12

wiederaufladbares Energiespeichersystem

RESS, en: rechargeable electrical storage system

wiederaufladbares System zur Energiespeicherung zum Zwecke der Bereitstellung elektrischer Energie für den elektrischen Antrieb

BEISPIEL Batterie, Kondensator, Schwungrad.

[QUELLE: ISO 6469-1:2019, 3.22]

3.13

Referenz-EVPC

für Prüfungszwecke bereitgestelltes *EVPC* (3.6)

3.14

Referenz-Versorgungsstromkreis

für Prüfungszwecke bereitgestellter *Versorgungsstromkreis* (3.19)

3.15**Sekundärgerät**

im Fahrzeug befindliche Komponente, welche das magnetische Feld aufnimmt

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.16**Sekundärgerätefreiraum zum Grund**

vertikaler Abstand zwischen der Bodenfläche und dem niedrigsten Punkt des *Sekundärgerätes* (3.15), einschließlich des Gehäuses

Anmerkung 1 zum Begriff: Die untere Oberfläche muss nicht plan oder parallel zum Boden sein.

3.17**stationärer Zustand**

Zustand des Systems, bei dem alle Zustands- und Ausgabevariablen zeitlich konstant bleiben, während alle Eingabevariablen konstant sind

[QUELLE: IEC 60050-351:2006, 351-24-09]

3.18**Versorgungsgerät**

nicht im Fahrzeug befindlicher Komponentenbausatz eines *WPT-Systems* (3.23)

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.19**Versorgungsstromkreis**

nicht im Fahrzeug befindlicher Komponentenbausatz, bestehend aus dem *Primärgerät* (3.9) und der *Versorgungsleistungselektronik* (3.20) sowie den elektrischen und mechanischen Verbindungen

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.20**Versorgungsleistungselektronik**

nicht im Fahrzeug befindlicher Komponentenbausatz zur Umwandlung von Leistung und Frequenz des Versorgungsstromnetzes in die vom *Primärgerät* (3.9) benötigte Leistung und Frequenz

Anmerkung 1 zum Begriff: Siehe Bild 1.

3.21**Spannungsklasse B**

Klassifikation einer elektrischen Komponente oder eines Stromkreises mit einer maximalen Arbeitsspannung von (> 30 und $\leq 1\,000$) V AC (rms) oder (> 60 und $\leq 1\,500$) V DC

3.22**drahtlose Leistungsübertragung****WPT**

Übertragung elektrischer Energie von einer Stromquelle zu einer elektrischen Ladung ohne galvanische Verbindung

3.23**WPT-System**

System, das alle nötigen Komponenten für *WPT* (3.22) und Steuerung enthält

— Leerseite —

English Version

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Elektrisch angetriebene Straßenfahrzeuge -
Kontaktlose Energieübertragung -
Sicherheits- und Interoperabilitätsanforderungen
(ISO 19363:2020)

This European Standard was approved by CEN on 1 March 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

European foreword

The text of ISO 19363:2020 has been prepared by Technical Committee ISO/TC 22 "Road vehicles" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 19363:2021 by Technical Committee CEN/TC 301 "Road vehicles" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.

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

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According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 19363:2020 has been approved by CEN as EN ISO 19363:2021 without any modification.

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 System structure	4
5 Requirements regarding environmental conditions	5
6 Classification	5
7 MF-WPT power transfer requirements	6
7.1 General	6
7.2 Frequency	6
7.3 Geometrical operating space	6
7.4 Requirements for output power	7
7.5 Requirements for power transfer efficiency	8
7.6 Requirements for output voltage	8
7.6.1 Performance requirements at different output voltage levels	8
7.6.2 Voltage ripple and voltage overshoot	8
7.7 MF-WPT power transfer test procedure	8
7.7.1 General	8
7.7.2 Test setup	8
7.7.3 Test procedure	10
8 Requirements for communication and MF-WPT activities	13
9 EMC requirements	14
10 Safety requirements	14
10.1 Protection in case of unintended power transfer	14
10.2 Protection against electric shock	14
10.2.1 General	14
10.2.2 Insulation coordination	14
10.3 Protection against thermal incidents	15
10.3.1 General	15
10.3.2 Overload protection and short-circuit protection	15
10.4 Protection of persons against electromagnetic effects	15
10.4.1 General	15
10.4.2 Protection areas	15
10.4.3 Requirements for protection of persons against exposure to hazardous electromagnetic fields	16
10.4.4 Requirements to protect the functionality of AIMDs	16
10.5 Protection against overheating	17
11 Owner's manual and marking	17
11.1 Owner's manual	17
11.2 Marking	17
Annex A (normative) Reference supply power circuit for EVPCs with a rated output power $\leq 3,7$ kW	18
Annex B (normative) Reference supply power circuit for EVPCs with a rated output power $\leq 11,1$ kW	23
Annex C (informative) Example for a different implementation of a supply power circuit	27
Annex D (informative) Conformance demonstration for protection of persons against electromagnetic effects	81

Bibliography	39
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, SC 37, *Electrically propelled vehicles*.

This first edition cancels and replaces ISO/PAS 19363:2017, which has been technically revised. The main changes compared to the previous edition are as follows:

- MF-WPT classes and z- classes eliminated;
- compatibility classes introduced;
- reference devices changed to off-board devices and description updated;
- communication and functional requirements deleted.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document prescribes the usage of the wireless power transfer technology to charge electrically propelled road vehicles and has been developed based on ISO/PAS 19363.

Status of technological development:

This document specifies requirements for on-board components of a wireless power transfer systems. It gives guidance in terms of safety and performance and additionally addresses interoperability to off-board components from different manufacturers to, for example support the development of public wireless charging infrastructure. Even if the technology itself is well known, the implementation in a vehicle is new and demands to meet the very specific requirements of the automotive industry. This document is based on limited experience with series development and production. Current and future product developments will continuously prove (and disprove) the applicability of this document to further improve the contents, especially regarding the interoperability between systems from different manufacturers.

Cooperation during document development:

This document has been developed in intense cooperation with IEC/TC 69 WG7, which is establishing the IEC 61980 series. The IEC 61980 series covers the requirements for the off-board components in correspondence to the application of on-board components according to this document. Furthermore, SAE J2954 is standardising wireless power transfer systems in the United States of America. An exchange between the groups was continuously sustained during the document development. Even though there is no complete harmonization at this stage, several contents are comparable.

Electrically propelled road vehicles — Magnetic field wireless power transfer — Safety and interoperability requirements

1 Scope

This document defines the requirements and operation of the on-board vehicle equipment that enables magnetic field wireless power transfer (MF-WPT) for traction battery charging of electric vehicles. It is intended to be used for passenger cars and light duty vehicles.

This document addresses the following aspects for an EV device:

- safety requirements;
- transferred power and power transfer efficiency;
- ground clearance of the EV device;
- functionality with associated off-board systems under various conditions and independent of manufacturer;
- test procedures.

EV devices that fulfil the requirements in this document are intended to operate with supply devices that fulfil the MF-WPT related requirements in the IEC 61980 series.

NOTE 1 Charging of a vehicle in motion is not considered in this edition.

NOTE 2 Bi-directional power transfer is not considered in this edition.

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.

ISO 6469-3:2018, *Electrically propelled road vehicles — Safety specifications — Part 3: Electrical safety*

ISO 20653, *Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access*

IEC 61980-2, *Electric vehicle wireless power transfer (WPT) Systems — Part 2: specific requirements for communication between electric road vehicle (EV) and infrastructure with respect to wireless power transfer (WPT) systems*

IEC 61980-3, *Electric vehicle wireless power transfer (WPT) systems — Part 3: Specific requirements for the magnetic field power transfer systems*

ICNIRP 2010, *Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz – 100 kHz)*

CISPR 11, *Industrial, scientific and medical equipment — Radio-frequency disturbance characteristics — Limits and methods of measurement*

IEC 60664 (all parts), *Insulation coordination for equipment within low-voltage systems*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1 alignment

relative position in x- and y-direction of the *secondary device* (3.15) to the *primary device* (3.9) for a given *secondary device ground clearance* (3.16)

Note 1 to entry: The coordinate system conforms with ISO 4130.

3.2 alignment tolerance area

intended *WPT* (3.22) operating area in x- and y-direction for a given *secondary device ground clearance* (3.16)

3.3 centre alignment point

geometrical centre of the *alignment tolerance area* (3.2)

Note 1 to entry: The position of the centre alignment point of an *MF-WPT system* (3.8) depends on the specific centre alignment points of the *primary device* (3.9) and *secondary device* (3.15).

3.4 electrically propelled vehicle EV

vehicle with one or more electric drive(s) for vehicle propulsion

[SOURCE: ISO 6469-3:2018, 3.15, modified — The abbreviation "EV" has been added.]

3.5 EV device

on-board component assembly of *WPT system* (3.23)

Note 1 to entry: See Figure 1.

3.6 EV power circuit EVPC

on-board component assembly, comprising the *secondary device* (3.15) and *EV power electronics* (3.7), as well as the electrical and mechanical connections

Note 1 to entry: See Figure 1.

3.7 EV power electronics

on-board component that converts the power and frequency from the *secondary device* (3.15) to the DC power output of the *EVPC* (3.6)

Note 1 to entry: See Figure 1.

3.8 magnetic field WPT system MF-WPT system

WPT system (3.23) using magnetic field

3.9

primary device

off-board component that generates and shapes the magnetic field for *WPT* (3.22)

Note 1 to entry: See Figure 1.

3.10

protection area

volume in and around the vehicle that has uniform requirements with regard to effects of exposure to electromagnetic fields

3.11

rated output power

maximum power the *EVPC* (3.6) is designed to deliver consistently during a charging cycle

3.12

rechargeable energy storage system

RESS

rechargeable system that stores energy for delivery of electric energy for the electric drive

EXAMPLE Battery, capacitor, flywheel.

[SOURCE: ISO 6469-1:2019, 3.22]

3.13

reference EVPC

EVPC (3.6) that serves for testing purposes

3.14

reference supply power circuit

supply power circuit (3.19) that serves for testing purposes

3.15

secondary device

on-board component that captures the magnetic field

Note 1 to entry: See Figure 1.

3.16

secondary device ground clearance

vertical distance between the ground surface and the lowest point of the *secondary device* (3.15) including the housing

Note 1 to entry: Note to entry: The lower surface does not need to be planar or parallel to the ground surface

3.17

steady state

state of a system at which all state and output variables remain constant in time while all input variables are constant

[SOURCE: IEC 60050-351:2006, 351-24-09]

3.18

supply device

off-board component assembly of *WPT system* (3.23)

Note 1 to entry: See Figure 1.

3.19

supply power circuit

off-board component assembly, comprising the *primary device* (3.9) and *supply power electronics* (3.20), as well as the electrical and mechanical connections

Note 1 to entry: See Figure 1.

3.20

supply power electronics

off-board component that converts the power and frequency from the supply network to the power and frequency needed by the *primary device* (3.9)

Note 1 to entry: See Figure 1.

3.21

voltage class B

classification of an electric component or circuit with a maximum working voltage of (>30 and $\leq 1\,000$) V AC (rms) or (>60 and $\leq 1\,500$) V DC, respectively

3.22

wireless power transfer

WPT

transfer of electrical energy from a power source to an electrical load without galvanic connection

3.23

WPT system

system comprising all necessary components for *WPT* (3.22) and control

4 System structure

To establish a general baseline for the requirements defined in this document, in IEC 61980-2 and in IEC 61980-3, the MF-WPT system is structured into functional entities. Figure 1 shows this structure of functional entities in an exemplary architecture.

NOTE Figure 1 is not meant to give an indication on hardware packaging.