



SLOVENSKI STANDARD
oSIST prEN ISO 19363:2021
01-januar-2021

**Cestna vozila na električni pogon - Brezžični prenos energije z magnetnim poljem -
Zahteve glede varnosti in interoperabilnosti (ISO 19363:2020)**

Electrically propelled road vehicles - Magnetic field wireless power transfer - Safety and interoperability requirements (ISO 19363:2020)

iTeh STANDARD PREVIEW

Véhicules routiers électriques - Transmission d'énergie sans fil par champ magnétique -
Exigences de sécurité et d'interopérabilité (ISO 19363:2020)

Ta slovenski standard je istoveten z: prEN ISO 19363
oSIST prEN ISO 19363:2021
<https://standards.iteh.ai/catalog/standards/sist/2003-16c3-2021-44fd-9bba-5774fdbbfc54/osist-pr-en-iso-19363-2021>

ICS:

43.120 Električna cestna vozila Electric road vehicles

oSIST prEN ISO 19363:2021 **en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 19363:2021](https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021)

<https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021>

INTERNATIONAL
STANDARD

ISO
19363

First edition
2020-04

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

*Véhicules routiers électriques — Transmission d'énergie sans fil par
champ magnétique — Exigences de sécurité et d'interopérabilité*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 19363:2021](https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021)

<https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021>



Reference number
ISO 19363:2020(E)

© ISO 2020

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 19363:2021
https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fdbbfc54/osist-pren-iso-19363-2021](https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fdbbfc54/osist-pren-iso-19363-2021)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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.....	31

Bibliography 39

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 19363:2021](https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021)
<https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021>

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.

ISO 19363:2020(E)

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.

ITEH STANDARD PREVIEW

(standards.iteh.ai)

[oSIST prEN ISO 19363:2021](https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021)

<https://standards.iteh.ai/catalog/standards/sist/a7903d62-3101-44fd-9bba-5774fd1bbfc54/osist-pren-iso-19363-2021>

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*

ISO 19363:2020(E)

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](#).

ISO 19363:2020(E)

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

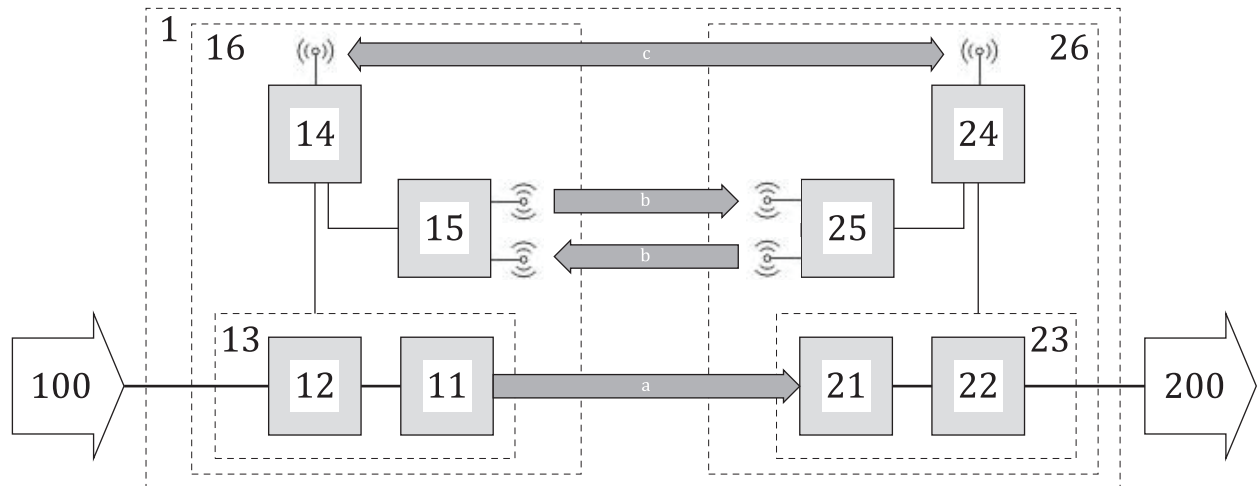
system comprising all necessary components for *WPT* (3.22) and control

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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.



Key

1	MF-WPT system	21	secondary device
11	primary device	22	EV power electronics
12	supply power electronics	23	EV power circuit
13	supply power circuit	24	EV communication controller (EVCC)
14	supply equipment communication controller (SECC)	25	EV device P2PS controller
15	supply device P2PS controller	26	EV device
16	supply device	200	RESS
100	supply network		

NOTE The functional elements 14, 15, 24, and 25 are addressed in IEC 61980-2.

a Wireless power flow.

b Wireless P2PS interface.

c Wireless communication interface.

Figure 1 — Example of system structure

5 Requirements regarding environmental conditions

Components of the EV device installed at the underbody of the EV shall have IP degree IP6K7 and IP6K9K according to ISO 20653.

The environmental requirements applicable to a particular EV device shall be identified and agreed between the vehicle manufacturer and the supplier. The EV device shall withstand and retain its degree of protection under the typical mechanical loads and stresses the EV device is subjected to in its intended mounting position.

NOTE ISO 16750 (all parts) and ISO 21498 (all parts) contain information for guidance.

6 Classification

This document specifies requirements that address the following aspects of MF-WPT systems:

- system safety ([Clause 10](#)),
- system performance ([Clause 7](#)), and
- interoperability.