SLOVENSKI STANDARD
oSIST prEN IEC 63281-2-1:2022

01-december-2022

Osebni e-prevozniki - 2-1. del: Preskusna metoda za skupni čas delovanja e-skuterja ob upoštevanju okoljskih pogojev dejanske uporabe

Personal e-Transporters - Part 2-1: Test method for total run time of e-scooter with consideration to environmental conditions of actual use

Ta slovenski standard je istoveten z: **prEN IEC 63281-2-1:2022**

ICS:

43.120	Električna cestna vozila	Electric road vehicles

oSIST prEN IEC 63281-2-1:2022 **en**

125/67/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 63281-1 ED1**	
DATE OF CIRCULATION: **2022-10-14**	CLOSING DATE FOR VOTING: **2023-01-06**
SUPERSEDES DOCUMENTS: **125/31/CD, 125/44/CC**	

IEC TC 125 : E-TRANSPORTERS			
SECRETARIAT: Belgium		SECRETARY: Mr Bram Rotthier	
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 21,TC 61,TC 69,TC 77,TC 106,CIS/D		PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.	
FUNCTIONS CONCERNED: ☒ EMC	☒ ENVIRONMENT	☐ QUALITY ASSURANCE	☒ SAFETY
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.		☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Personal e-Transporters - Safety requirements and test methods

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 10
3.1 audible warning device 10
3.2 battery pack 10
3.3 battery system 10
3.4 brake 10
3.5 brake system 11
3.6 cargo e-Transporter 11
3.7 charging of a battery 11
3.8 deck 11
3.9 enclosure 11
3.10 EPAC 11
3.11 e-Transporter 11
3.12 EVs 12
3.13 folding system 12
3.14 footrest 12
3.15 intended use 12
3.16 leakage 12
3.17 locking device 12
3.18 locking mechanism 12
3.19 operating device 12
3.20 passenger cars 13
3.21 personal e-Transporter 13
3.22 public space 13
3.23 self-balancing e-Transporter 13
3.24 warning indicators and signals 13
4 Risk assessment 14
5 Test conditions 14
5.1 Test road 14
5.2 Test environment 14
5.3 PeT under test 14
6 General safety requirements 15
6.1 Materials 15
6.1.1 Non-metallic materials 15
6.1.2 Metal materials 15
6.2 Enclosure 15
6.3 Shape and appearance of PeT 15
6.3.1 sharp corners and edges 15
6.3.2 Protrusions 15
6.3.3 Accessible clearances for movable segments 15
6.4 Warning indicators and signals 16

6.4.1 General 16
6.4.2 Warning indicators and signals for users 16
6.4.3 Warning indicators and signals for third parties 16
6.5 Charging lock 17
6.6 Functional and components 17
6.6.1 Footrest or deck 17
6.6.2 Electrical power on/off control 17
6.6.3 Folding system 18
6.6.4 Battery system requirements 19
6.6.5 Charger 19
6.6.6 Ability to hold position 19
6.7 Main technical performance requirements 19
6.7.1 Maximum design speed 19
6.7.2 Brake performance 21
6.8 Hot Surfaces 22
7 Electrical safety 22
8 Functional safety 22
9 Mechanical safety 22
9.1 Enclosure protection class 22
9.2 Static strength 22
9.2.1 Structure strength 22
9.2.2 Handlebar and steering column strength 23
9.3 Dynamic strength (drop) 25
9.4 Vibration 25
9.5 Impact 27
10 Environmental 27
10.1 Partial water immersion 27
10.2 Salt spray resistance 28
10.3 Change of temperature 28
10.4 Low and high temperature operation 28
10.4.1 Low temperature operation test 28
10.4.2 High temperature and high humidity operation test 29
11 Marking and instruction 29
11.1 General 29
11.2 Product nameplate 30
11.2.1 Nameplate information 30
11.2.2 Durability 30
11.3 Safety and warning signs 30
11.4 Instructions 31
Annex A (informative) List of significant hazards for the PeT 32
Annex B (normative) Light, warning device, and on-off symbols 34
Bibliography 35

Figure 1 Example of the deck (top view of a mono-wheel) 17
Figure 2 Test road example 20
Figure 3 Examples of the fixation of the load 24
Figure 4 Examples for the torque test 25
Figure 5 Random Vibration Test Curves for the PeT 27

Figure 6 The temperature change of the thermal chamber 28
Table 1 Safety functions related to defined hazards 22
Table 2 Categorization of vehicle for vibration tests 26
Table 3 Test levels at test curve frequency break points 26

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PERSONAL E-TRANSPORTERS - SAFETY REQUIREMENTS AND TEST METHODS

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.

International Standard IEC XXXXX has been prepared by IEC technical committee 125: Personal e-Transporters (PeTs).

In the case of a **new edition replacing a previous edition**, complete the following text. In the case of a first edition, delete it, as it does not apply.

This XXX edition cancels and replaces the XXX edition published in [publication_date], Amendment 1:[publication_date] and Amendment 2:[publication_date]. This edition constitutes a technical revision.

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

a) …;

The text of this International Standard is based on the following documents:

FDIS	Report on voting

XX/XX/FDIS	XX/XX/RVD

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://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.

The National Committees are requested to note that for this document the stability date is 20XX..

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

INTRODUCTION

This International Standard has been developed to cope with the rapidly evolving personnel e-transporters. Personnel e-transporters have become common in **public space**s and roads, some of which can reach speeds of 25 km/h or even higher, and the applications and global market size are expected to grow significantly. In order to protect safety for persons and public facilities, besides basic safety requirements, comprehensive safety requirements and test methods such as riding safety for people and for e-transporters shall also be considered. Based on the current situation, this international standard provides comprehensive safety requirements and corresponding test methods for personnel e-transporters, which is convenient for manufacturers and test departments to use.

The following are not covered by this document because they are handled by other TCs:

- IEC TC 69

- ISO TC 149

- ISO TC 22

PERSONAL E-TRANSPORTERS - SAFETY REQUIREMENTS AND TEST METHODS

1 Scope

This document specifies safety requirements for Personal e- Transporters

This document is applicable to electrically powered Personal e-Transporters（PeT） which are used in private and public area, where the speed control and/or the steering control is electric/electronic.

The PeT may have provisions for transport of cargo and may be for private or commercial (including sharing service) use.

This document is not applicable for EVs as: EPACs, E-bikes, mopeds, motorcycles and passenger cars.

This document does not apply to:

— PeT that are considered as toys;

— PeT that are intended for competition;

— PeT that are intended for medical care;

— PeT that have a rated voltage of more than 100 VDC or 240 VAC;

— PeT without an on-board driving operator.

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 60034-1, *Rotating electrical machines - Part 1: Rating and performance*

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

IEC 60068-2-2, *Environmental testing - Part 2-2: Tests - Test B: Dry heat*

IEC 60068-2-11, *Basic environmental testing procedures - Part 2-11: Tests - Test Ka: Salt mist*

IEC 60068-2-14:2009, *Environmental testing - Part 2-14: Tests - Test N: Change of temperature*

IEC 60068-2-64, *Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance*

IEC 60068-2-75, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*

IEC 60335-2-29, *Household and similar electrical appliances - Safety - Part 2-29: Particular requirements for battery chargers*

IEC 60335-2-114, *Household and similar electrical appliances - Safety - Part 2-114: Particular requirements for self-balancing personal transport devices for use with batteries containing alkaline or other non-acid electrolytes*

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

IEC 60695-11-10, *Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods*

IEC 60812, *Failure modes and effects analysis (FMEA and FMECA)*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments*

IEC 61508-1, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements*

IEC 62133-1:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 1: Nickel systems*

IEC 62133-2, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems*

ISO 2248, *Packaging — Complete, filled transport packages — Vertical impact test by dropping*

ISO 4210-9, *Cycles — Safety requirements for bicycles -- Part 9: Saddles and seat-post test methods*

ISO 6742-1, *Cycles — Lighting and retro-reflective devices — Part 1: Lighting and light signalling devices*

ISO 6742-2, *Cycles — Lighting and retro-reflective devices — Part 2: Retro-reflective devices*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13849-1, *Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design*

ISO 14878, *Cycles — Audible warning devices — Technical specification and test methods*

ISO 18243, *Electrically propelled mopeds and motorcycles — Test specifications and safety requirements for lithium-ion battery systems*

EN 17128:2020, *Light motorized vehicles for the transportation of persons and goods and related facilities and not subject to type approval for on-road use - Personal light electric vehicles (PLEV) - Requirements and test methods*

EN 50604-1, *Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods*

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:

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

3.1
audible warning device

AWD

device designed for the purpose to warn people by an audible signal

NOTE 1 to entry: Including all types of technologies (i.e., bells, horns, electronic audible warning device).

[SOURCE: ISO 14878:2015, 3.3]

3.2
battery pack

energy storage device that includes cells or cell assemblies normally connected with cell electronics, power supply circuit and overcurrent shut-off device, including electrical interconnections, interfaces for external systems

NOTE 1 to entry: See A.2 for further explanation.

NOTE 2 to entry: Examples of external systems are cooling, voltage class B, auxiliary voltage class A and communication.

[SOURCE: ISO 12405-4:2018, 3.2]

3.3
battery system

energy storage device that includes cells or cell assemblies or **battery pack**(s) (3.2) as well as electrical circuits and electronics

NOTE 1 to entry: See A.3.2 and A.3.3 of ISO 12405-4:2018 for further explanation. **Battery system** components can also be distributed in different devices within the vehicle.

NOTE 2 to entry: Examples of electronics are the BCU and contactors.

[SOURCE: ISO 12405-4:2018,3.3]

3.4
brake

part of the braking system where the forces opposing the movement of the e-Transporter is developed