SLOVENSKI STANDARD
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Mopedi in motorna kolesa na električni pogon - Metode preskušanja in varnostne zahteve za sisteme z litij-ionskimi baterijami (ISO/DIS 18243:2024)

Electrically propelled mopeds and motorcycles - Test specifications and safety requirements for lithium-ion battery systems (ISO/DIS 18243:2024)

Elektrisch angetriebene Mopeds und Motorräder - Prüfspezifikation und Sicherheitsanforderungen für Lithium-Ionen basierte Batteriesysteme (ISO/DIS 18243:2024)

Cyclomoteurs et motocycles à propulsion électrique - Spécifications d'essai et exigences de sécurité pour les systèmes de batterie au lithium-ion (ISO/DIS 18243:2024)

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

Cyclomoteurs et motocycles à propulsion électrique — Spécifications d'essai et exigences de sécurité pour les systèmes de batterie au lithium-ion

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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).

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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*, Subcommittee SC 38, *Motorcycles and mopeds*.

This second edition cancels and replaces the first edition (ISO 18243:2017), which has been technically revised.

The main changes are as follows:

— New safety requirement of undertemperature condition;

— New safety requirement of overcurrent protection;

— Alignment with ISO 6469-1 and ISO 12405-4;

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

Lithium-ion based battery systems are an efficient alternative energy storage system for electrically propelled mopeds and motorcycles. The requirements for lithium-ion based battery systems to be used as power source for the propulsion of electrically propelled mopeds and motorcycles are significantly different to those batteries used for consumer electronics or stationary usage.

This document provides specific test procedures for lithium-ion battery packs and systems specifically developed for propulsion of mopeds and motorcycles. This document specifies such tests and related requirements to ensure that a battery pack or system is able to meet the specific needs of the mopeds and motorcycles industry.

It enables mopeds and motorcycles manufacturers to choose test procedures to evaluate the characteristics of a battery pack or system for their specific requirements.

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

1 Scope

This document specifies the test procedures for lithium-ion battery packs and systems used in electrically propelled mopeds and motorcycles.

The specified test procedures enable the user of this document to determine the essential characteristics on performance and safety of lithium-ion battery packs and systems. The user is also supported to compare the test results achieved for different battery packs or systems.

This document enables setting up a dedicated test plan for an individual battery pack or system subject to an agreement between customer and supplier. If required, the relevant test procedures and/or test conditions of lithium-ion battery packs and systems are selected from the standard tests provided in this document to configure a dedicated test plan.

NOTE 1 Electrically power-assisted cycles (EPAC) cannot be considered as mopeds. The definition of electrically power-assisted cycles can differ from country to country. An example of definition can be found in the REGULATION (EU) No 168/2013

NOTE 2 Testing on cell level is specified in IEC 62660 (all parts).

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 13063-3, *Electrically propelled mopeds and motorcycles — Safety specifications — Part 3: Electrical safety*

ISO 16750-1, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 1: General*

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

IEC 60068-2-30, *Environmental testing — Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-47, *Environmental testing — Part 2-47: Tests – Mounting of specimens for vibration, impact and similar dynamic tests*

IEC 60068-2-52, *Environmental testing — Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution).*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
battery control unit
BCU
electronic device that controls, manages, detects, or calculates electric and thermal functions of the battery system and that provides communication between the battery system and other vehicle controllers

Note 1 to entry: See A.3.1 for further explanations.

[SOURCE: ISO 12405-4:2018, 3.1]

3.2
battery pack
energy storage device that includes cells or cell assemblies normally connected with cell electronics, high voltage circuit and over current shut-off device including electrical interconnections, interfaces for external systems (e.g. cooling, high voltage, auxiliary low voltage and communication)

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

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

3.3
battery pack subsystem
any assembly of components of the battery pack which stores energy

[SOURCE: ISO 6469-1:2019 3.24, modified — "RESS components" replaced by "components of the battery pack"]

3.4
battery system
energy storage device that includes cells or cell assemblies or battery pack(s) as well as electrical circuits and electronics (e.g. BCU, contactors)

Note 1 to entry: See A.3.1 and A.3.2 for further explanation. Battery system components can also be distributed in different devices within the vehicle.

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

3.5
capacity
total number of ampere-hours that can be withdrawn from a fully charged battery under specified conditions

[SOURCE: ISO 12405-4:2018, 3.4]

3.6
cell electronics
electronic device that collects and possibly monitors thermal and electrical data of cells or cell assemblies and contains electronic for cell balancing, if necessary

Note 1 to entry: The cell electronics can include a cell controller. The functionality of cell balancing can be controlled by the cell electronics or it can be controlled by the BCU.

[SOURCE: ISO 12405-4:2018, 3.5]

3.7
conductive part
part which can carry electric current

[SOURCE: ISO 13063-3:2022 3.6]

3.8
customer
party interested in using the battery pack or system and, therefore, orders or performs the test

EXAMPLE vehicle manufacturer.

[SOURCE: ISO 6469-1:2019 3.6]

3.9
electric chassis
conductive parts of a vehicle that are electrically connected and whose potential is taken as reference

[SOURCE: ISO 13063-3:2022, 3.11]

3.10
energy round trip efficiency
ratio of the net DC energy (W·h discharge) delivered by a DUT during a discharge test to the total DC energy (W·h charge) required to restore the initial SOC by a standard charge

[SOURCE: ISO 12405-4:2018, 3.11]

3.11
explosion
sudden release of energy sufficient to cause pressure waves and/or projectiles that may cause structural and/or physical damage to the surrounding area

[SOURCE: ISO 6469-1:2019 3.10]

3.12
isolation resistance
resistance between live parts of voltage class B electric circuit and the electric chassis as well as the voltage class A system

[SOURCE: ISO 13063-3:2022, 3.18]

3.13
leakage
escape of liquid or gas except for venting

[SOURCE: ISO 6469-1:2019 3.15]

3.14
live part

conductor or conductive part (3.4) intended to be energized in normal use, but by convention, not the electric chassis

[SOURCE: ISO 13063-3:2022, 3.19]

3.15
maximum operating temperature
highest value of the temperature at which the systems/components can be operated continuously

[SOURCE: ISO 6469-1:2019, 3.17]

3.16
maximum working voltage
highest value of a.c. voltage (r.m.s.) or of d.c. voltage which may occur in an electrical system under any normal operating conditions according to the manufacturer's specifications, disregarding transients

[SOURCE: ISO 13063-3:2022, 3.20]

3.17
overcurrent protection
protection intended to operate when the current is in excess of a predetermined value

[SOURCE: ISO 6469-1:2019, 3.21]

3.18
passenger compartment
space for occupant accommodation, bounded by at least 4 of the following: the roof, floor, side walls, doors, outside glazing, front bulkhead and rear bulkhead, or rear gate, as well as by the electrical protection barriers and enclosures provided for protecting the occupants from direct contact with voltage class B live parts

Note 1 to entry: The same term and definition except replacing “high voltage” by “voltage class B” is described in Regulation No 136 Amendment 1 of the Economic Commission for Europe of the United Nations (UN/ECE).

3.19
rated capacity
supplier’s specification of the total number of ampere-hours that can be withdrawn from a fully charged battery pack or system for a specified set of test conditions such as discharge rate, temperature, discharge cut-off voltage, etc.

[SOURCE: ISO 12405-4:2018, 3.16]

3.20
removable battery pack
battery pack that is designed to be taken out from the vehicle by the vehicle by the vehicle user

[SOURCE: ISO 13063-1:2022 3.14, modified — “RESS” replaced by “battery pack”, Note 1 deleted]

3.21
room temperature
RT
temperature of (25 ± 2) °C

[SOURCE: ISO 12405-4:2018, 3.17]

3.22
rupture
loss of mechanical integrity of the enclosure of the DUT resulting in openings that do not fulfil protection degree IPXXB according to ISO 20653

Note 1 to entry: Predetermined openings for venting are not considered as rupture.

[SOURCE: ISO 6469-1:2019 3.25]

3.23
sign of battery current
discharge current is specified as positive and the charge current as negative

[SOURCE: ISO 12405-4:2018, 3.18]

3.24
state of charge
SOC
available capacity in a battery pack or system expressed as a percentage of rated capacity

[SOURCE: ISO 12405-4:2018, 3.20]

3.25
standard charge for top off
SCH
additional charge which eliminates possible SOC reduction after SCH at RT followed by thermal equilibration at a different temperature

[SOURCE: ISO 12405-4:2018, 3.21]