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Electrically propelled road vehicles — Dimensions and designation of secondary lithium-ion cells

*Véhicules routiers à propulsion électrique — Dimensions et
désignation d'accumulateurs 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO/IEC Publicly Available Specification (ISO/IEC PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO/IEC Technical Specification (ISO/IEC TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/IEC PAS or ISO/IEC TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/IEC PAS or ISO/IEC TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/IEC PAS 16898 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 21, *Electrically propelled road vehicles*.

Introduction

The vehicle traction battery system as a large and very costly component of an electrically propelled vehicle has a huge influence on the vehicle design. Depending on vehicle dimensions and package constraints, the shape of battery packs and systems has to follow a top-down procedure. The dimensional requirements on lithium-ion cells for automotive application are given by the battery system, which is influenced by the vehicle design. Therefore, this Publicly Available Specification (PAS) was developed in a joint ISO and IEC Working Group consisting of experts from the automotive industry, the automotive suppliers, the battery and the cell industry.

Today there is a huge variety of different cell types and dimensions on the market. When a traction battery system design is finished based on one specific cell, a change to another cell or cell supplier is quite difficult or may not be possible. It is necessary to reduce this variety in order to:

- lower the cell costs through encouraging competition and allowing cell suppliers access to the worldwide market,
- enable an exchange of the cells from different suppliers during and after the battery system development, and
- support the battery system design by specifying basic outer dimensions per known design type of lithium-ion cells for automotive traction battery systems.

By specifying only a certain number of cell dimensions for vehicle propulsion, this PAS aims to reduce the number of different dimensions. It should furthermore ensure that cells of the dimensions as listed in this PAS will be used in the long term by the vehicle manufacturers for their current and future models. Cells of these dimensions need to be available for the vehicle production time, plus the vehicle life time, plus the legally required spare part availability time.

This PAS lists only those battery cells, chosen from the currently existing variety, which will be used for the current and planned vehicle models and which are currently available. This PAS does not exclude the usage of other cell dimensions in vehicle models.

This PAS is not intended to restrict the development of cell technology. Therefore no requirements are specified in this PAS for the cell chemistry, the usage of materials or any electrical characteristics.

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Electrically propelled road vehicles — Dimensions and designation of secondary lithium-ion cells

1 Scope

This Publicly Available Specification (PAS) specifies a designation system as well as the shapes and dimensions for secondary lithium-ion cells for integration into battery packs and systems used in electrically propelled road vehicles including the position of the terminals and any over-pressure safety device (OPSD). It is related to cylindrical, prismatic and pouch cells.

The cell designation according to this PAS is intended to be applied to the cells used for electrically propelled road vehicles. This PAS does not apply to cells specifically used for mopeds, motorcycles and vehicles not primarily defined as road vehicles, i.e. material handling trucks or forklifts.

The cell dimensions listed in this PAS are recommended but not restricted for use in passenger cars up to 3,5 t.

The inner design, the cell chemistry, the electrical characteristics and any further properties of the cells are not defined in this PAS.

2 Normative references

The following referenced documents are indispensable for the application 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 62660-1, *Secondary lithium-ion cells for the propulsion of electric road vehicles — Part 1: Performance testing*

3 Terms and definitions

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

3.1

cylindrical cell

secondary lithium-ion cell with a cylindrical hard case housing, terminal and over-pressure safety device

3.2

over-pressure safety device

OPSD

safety device to limit the gas pressure inside the cell

EXAMPLE burst disc, pressure valve or predetermined breaking point

3.3

pouch cell

secondary lithium-ion cell with a laminated housing consisting of compound foil and terminal

3.4

prismatic cell

secondary lithium-ion cell with a prismatic hard case housing, terminal and over-pressure safety device

3.5

secondary lithium-ion cell

secondary single cell whose electrical energy is derived from the insertion/extraction reactions of lithium ions between the anode and the cathode

NOTE 1 A secondary cell is a basic manufactured unit providing a source of electrical energy by direct conversion of chemical energy. The cell consists of electrodes, separators, electrolyte, container and terminals and is designed to be charged electrically.

NOTE 2 In this PAS, "cell" means the secondary lithium-ion cell to be used for the propulsion of electric road vehicles.

3.6

terminal

point of connection of the cell with other electric circuit elements

3.7

Type A cell

cell with terminals located on the same side of the cell

3.8

Type B cell

cell with terminals located on the opposite side of the cell

3.9

Type C cell

cell other than Type A or Type B

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4 Shape of construction and constituent parts of secondary lithium-ion cell

4.1 Shape of construction

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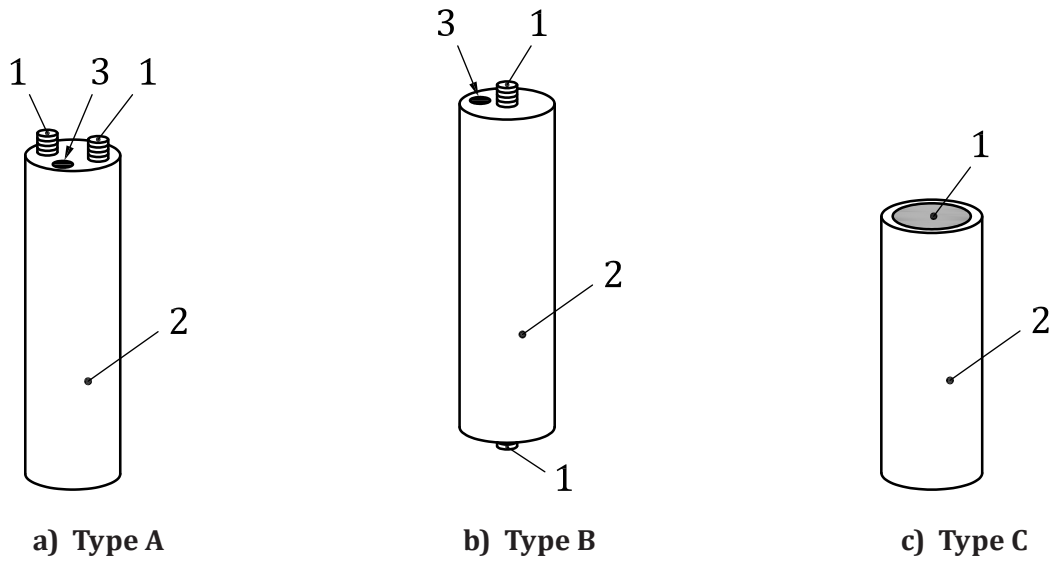
4.1.1 General

There are at least the following three construction shapes of cell:

- cylindrical cell;
- prismatic cell;
- pouch cell.

4.1.2 Cylindrical cell

The cylindrical cell consists of a cell housing and one or two terminals. Figure 1 shows the types of cylindrical cell according to the location of the terminals.



Key

- 1 terminal
- 2 cell housing
- 3 OPSD

NOTE 1 For Type C, the cell housing may be used as terminal.

NOTE 2 The OPSD for Type C is often combined with the terminal, but may also be located elsewhere.

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Figure 1 — Cylindrical cell

4.1.3 Prismatic cell

The prismatic cell consists of cell housing and one or two terminals. Figure 2 shows the types of prismatic cell according to the location of the terminals.