IEC 62928

Edition 1.0 2017-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Rolling stock – Onboard lithium-ion traction batteries

Applications ferroviaires – Matériel roulant – Batteries d'accumulateurs de traction embarquées au lithium-ion

IEC 62928:2017-12(en-fr)

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FOREWORD

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International Standard IEC 62928 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/2317/FDIS	9/2329/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

In the 90s the market started developing mainly portable lithium technology batteries. Existing standards for lithium-ion batteries currently focus on small portable batteries:

- IEC 61960-3:2017, Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications – Part 3: Prismatic and cylindrical lithium secondary cells and batteries made from them
- IEC 62133 (all parts): 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.

These above mentioned documents do not cover large cells and batteries for industrial and railway applications, which are non-portable and weigh hundreds of kilograms.

TC 21 and SC 21A decided to start work on large capacity lithium cells and batteries:

- IEC 62619:2017, Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries for use in industrial applications,
- IEC 62620:2014, Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications.

The documents are often generic and mention railway applications only as an example.

Therefore, this document is developed for specifying the requirements for railway traction applications.

In addition, TC 9 has developed the following document:

- IEC 62864-1:2016, Railway applications – Rolling stock – Power supply with onboard energy storage system – Part 1: Series hybrid system

IEC 62864-1:2016 specifies the general requirements for the onboard energy storage system as a system level. The hierarchy of standards is shown in Figure 1 of IEC 62864-1:2016.

It is part of a series of standards, referring to each other. The hierarchy of the standards used in the railway specific area related to IEC 62928 is as follows:

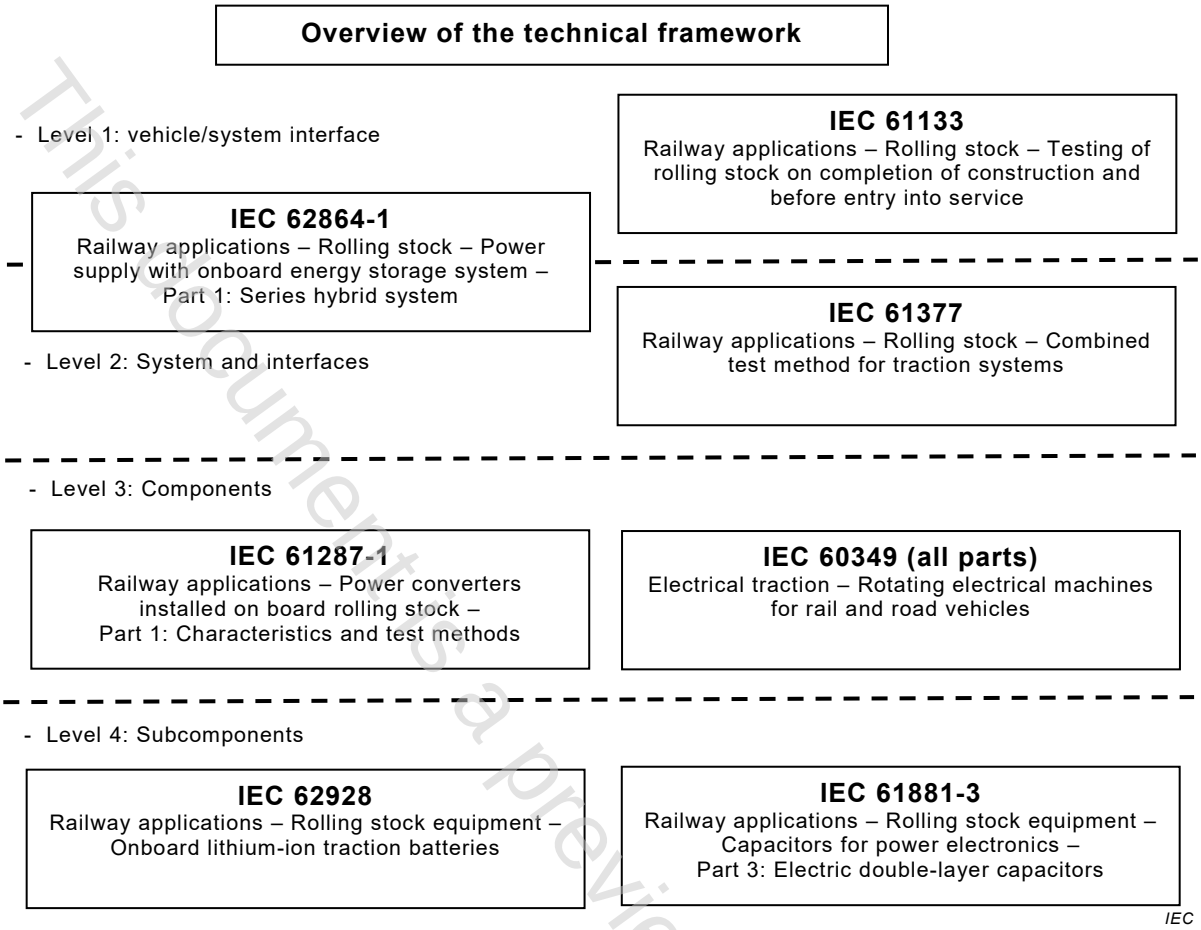

Figure 1 – Hierarchy of standards related to IEC 62928

The standards listed in Figure 1 are not exhaustive.

RAILWAY APPLICATIONS – ROLLING STOCK – ONBOARD LITHIUM-ION TRACTION BATTERIES

1 Scope

This document applies to onboard lithium-ion traction batteries for railway applications.

This document specifies the design, operation parameters, safety recommendations, data exchange, routine and type tests, as well as marking and designation.

Battery systems described in this document are used for the energy storage system (ESS) for the traction power of railway vehicles such as hybrid vehicles as defined in IEC 62864-1:2016. Auxiliary batteries to supply power only to the auxiliary equipment are excluded.

Subcomponents within the battery systems, e.g. battery management system (BMS) and battery thermal management system (BTMS), are also covered in this document.

Power conversion equipment (e.g. chopper, converter, etc.), inductors, capacitors and switchgear are excluded from the scope of this document.

General requirements for onboard ESS are described in IEC 62864-1:2016.

This document specifies the lithium-ion battery technology but does not prevent the use of battery technologies other than lithium-ion technology for application as traction batteries.

A hybrid energy storage system, which uses two or more energy storage technologies combined, e.g. a traction battery and double layer capacitors, is not covered in this document. However, if different technologies of energy storage systems are used on the same railway vehicle and managed independently, each independent energy storage system is covered by its own document.

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 60050-482:2004, *International Electrotechnical Vocabulary – Part 482: Primary and secondary cells and batteries*

IEC 60050-811:2017*, International Electrotechnical Vocabulary – Chapter 811: Electric traction*

IEC 60051 (all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*

IEC 60077-1, *Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules*

IEC 60077-5, *Railway applications – Electric equipment for rolling stock – Part 5: Electrotechnical components – Rules for HV fuses*

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

IEC 60571, *Railway applications – Electronic equipment used on rolling stock*

IEC 60850, *Railway applications – Supply voltages of traction systems*

IEC 61373, *Railway applications – Rolling stock equipment – Shock and vibration tests*

IEC 61991, *Railway applications – Rolling stock – Protective provisions against electrical hazards*

IEC 62236-3-2, *Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus*

IEC 62278:2002, *Railway applications – Specification and demonstration of reliability, availability, maintainability and safety (RAMS)*

IEC 62279, *Railway applications – Communications, signalling and processing systems – Software for railway control and protection systems*

IEC 62497-1, *Railway application – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*

IEC 62498-1:2010, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*

IEC 62619:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements secondary lithium cells and batteries for use in industrial applications*

IEC 62620:2014, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

IEC 62864-1:2016, *Railway applications – Rolling stock – Power supply with onboard energy storage system – Part 1: Series hybrid system*

ISO/IEC Guide 51: 2014, *Safety aspects – Guidelines for their inclusion in standards*

ISO 7010, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482, IEC 60050-811 and ISO/IEC Guide 51, as well as the following 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