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Railway applications - Hydrogen and fuel cell systems for rolling stock - Part 2: Hydrogen fuel system

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Railway applications - Hydrogen and fuel cell systems for rolling stock - Part 2: Hydrogen fuel system

FOREWORD

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IEC 63341-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways. It is an International Standard.

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

Draft	Report on voting
9/3220/FDIS	9/3255/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63341 series, published under the general title *Railway applications - Hydrogen and fuel cell systems for rolling stock*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

This document considers general requirements for gaseous hydrogen fuel system installed on-board rail vehicles.

Design and performance requirements for fuel cell power systems are specified in IEC 63341-1. Performance test methods for fuel cell power systems are specified in IEC 63341-3.

ISO/TC 197, Hydrogen technologies, ISO/TC 22/SC 37, Electrically propelled vehicles, and SAE Fuel Cell Standards Committee carry out standardization activities on hydrogen storage technologies such as:

- ISO 17268, *Gaseous hydrogen land vehicle refuelling connection devices*
- ISO 19881, *Gaseous hydrogen – Land vehicle fuel containers*
- ISO 19882, *Gaseous hydrogen – Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers*
- ISO 19887-1, *Gaseous Hydrogen – Fuel system components for hydrogen fuelled vehicles – Part 1: Land vehicles*
- ISO 23273, *Fuel cell road vehicles – Safety specifications – Protection against hydrogen hazards for vehicles fuelled with compressed hydrogen*

These documents are mainly oriented to road vehicle applications. Therefore, this document is intended to augment them by adding specific requirements for the railway applications.

The hierarchy of standards is shown in Figure 1. The list is not exhaustive.

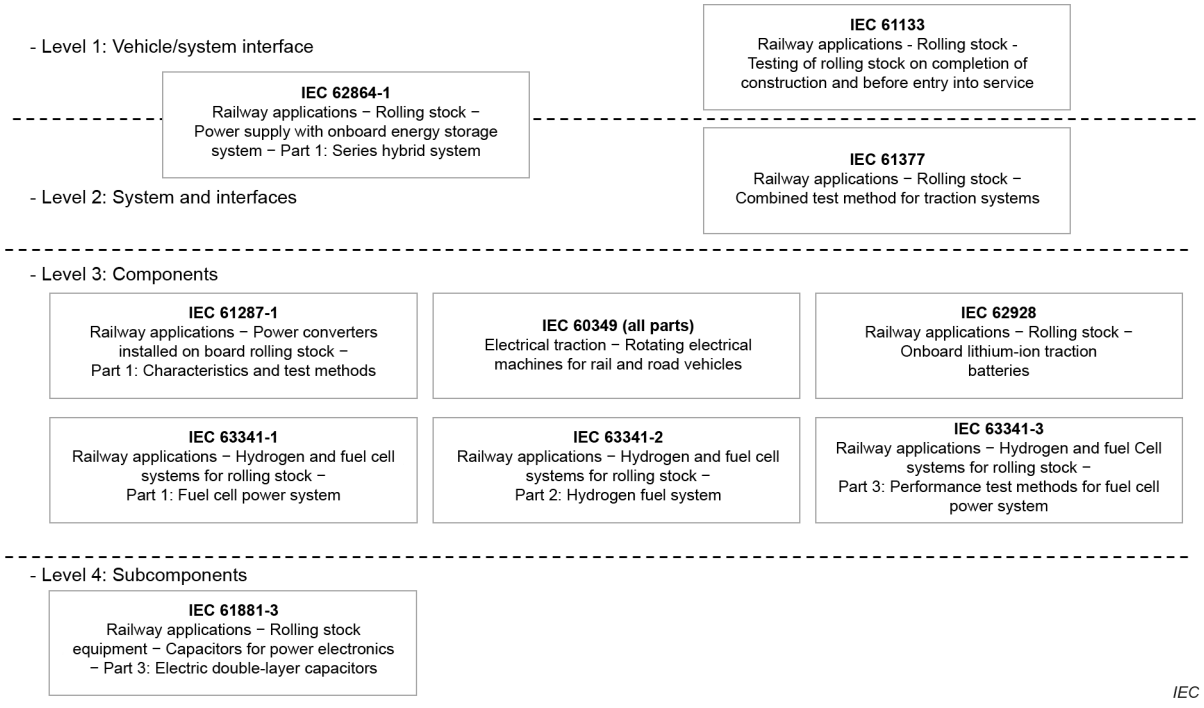

Figure 1 – Hierarchy of standards related to IEC 63341

1 Scope

This part of IEC 63341 applies to on-board hydrogen fuel systems (HFSs) used to supply the fuel cells for the traction power and the auxiliaries supply of railway vehicles (such as hybrid vehicles as defined in IEC 62864-1).

NOTE This document can also be used for applications with hydrogen internal combustion engines.

This document applies to hydrogen storage in gaseous form. Other means of storage (such as liquid, liquid cryo-compressed, metal hydrides) are not covered in this document.

This document applies to any rolling stock type (e.g. light rail vehicles, tramways, streetcars, metros, commuter trains, regional trains, high speed trains, locomotives).

This document defines:

– the scope of supply of hydrogen fuel system and the description of the interfaces with sub-systems internal and external to the rolling stock such as fuel cell power system, fuelling station systems;
– the environmental constraints;
– the design requirements to support HFS compliance with railway applications;
– the safety and reliability requirements to design and install the HFS for railway applications;
– the marking and labelling requirements;
– the requirements related to storage, transportation, installation and maintenance;
– the validation (type, routine and investigation tests) requirements.

This document addresses the on-board mechanical, fluidic and electrical interfaces between the on-board hydrogen fuel system and fuelling station. The fuelling station, fuelling protocol and communication for the fuelling protocol are not in the scope of this 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 60529, *Degrees of protection provided by enclosures (IP Code)*

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

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 62497 (all parts), *Railway applications - Insulation coordination*

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

IEC 63341-1:2025, *Railway applications - Hydrogen and fuel cell systems for rolling stock - Part 1: Fuel cell power system*

ISO 9223, *Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation*

ISO 17268, *Gaseous hydrogen land vehicle refuelling connection devices*

ECE/TRANS/180/Add.13/Amend.1 UN GTR No. 13, *UN Global Technical Regulation on Hydrogen and Fuel Cell Vehicles*