



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 63341-1:2024**  
**01-maj-2024**

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**Železniške naprave - Vozna sredstva- Sistemi gorivnih celic za vozna sredstva - 1.  
del: Sistemi gorivnih celic**

Railway applications - Rolling stock - Fuel cell systems for propulsion - Part 1: Fuel cell system

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**Ta slovenski standard je istoveten z: prEN IEC 63341-1:2024**

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**ICS:**

27.070	Gorilne celice	Fuel cells
45.060.01	Železniška vozila na splošno	Railway rolling stock in general

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9/3049/CDV

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IEC TC 9 : ELECTRICAL EQUIPMENT AND SYSTEMS FOR RAILWAYS	
SECRETARIAT: France	SECRETARY: Mr Denis MIGLIANICO
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 105	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING  <b>Attention IEC-CENELEC parallel voting</b>  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.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE: <b>Railway applications – Hydrogen and fuel cell systems for rolling stock – Part 1: Fuel cell power system</b>
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PROPOSED STABILITY DATE: 2028

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## RAILWAY APPLICATIONS – HYDROGEN AND FUEL CELL SYSTEMS FOR ROLLING STOCK

### Part 1: Fuel Cell Power System

#### FOREWORD

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International Standard IEC 62XXX has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

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

FDIS	Report on voting
9/XX/FDIS	9/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.

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## 1 INTRODUCTION

2 This standard considers general requirements for all fuel cell power systems installed onboard  
3 rolling stock for railway applications.

4 TC105 decided to start work on generic fuel cell technologies covering different industrial  
5 sectors:

- 6 • IEC 62282 series: Fuel Cell Technologies:
  - 7 ○ IEC 62282-2-series: Fuel Cell Modules
  - 8 ○ IEC 62282-3-series: Stationary fuel cell power systems
  - 9 ○ IEC 62282-4-series: fuel cell power systems for electrically powered industrial  
10 trucks

11 These standards are often generic and do not cover the specific requirements for railway  
12 applications.

13 Therefore, this standard is developed for specifying the requirements for railway applications.

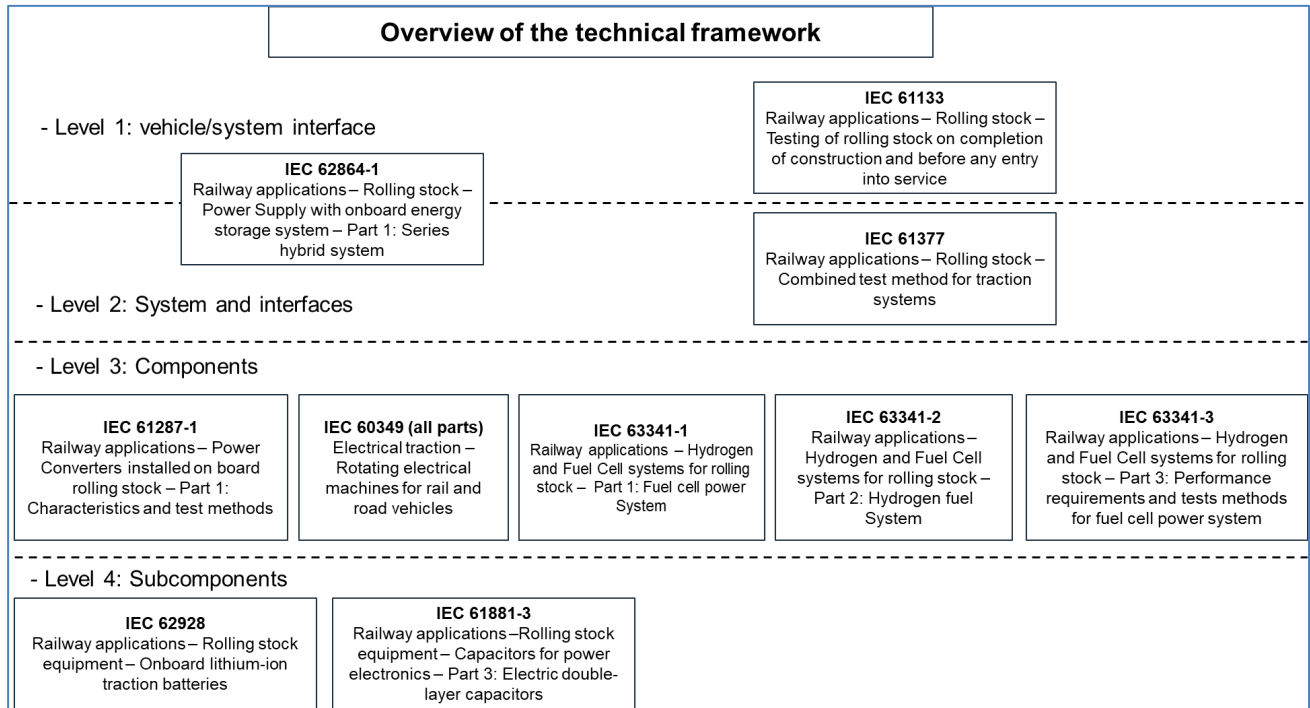
14 In addition, TC 9 has developed the following standards for the subsystems, which are related  
15 or have interfaces to the fuel cell power system.:

- 16 • IEC 62864-1:2016, Railway applications – Rolling Stock – Power Supply with onboard  
17 energy storage system – Part: 1 Series hybrid system
- 18 • IEC 61287-1, Railway applications – Power converters installed onboard rolling stock-  
19 Part 1: Characteristics and test methods
- 20 • IEC 60349 series, Electrical traction – rotating electrical machines for rail and road  
21 vehicles
- 22 • IEC 62928, Railway applications – rolling stock equipment – onboard lithium-ion traction  
23 batteries

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

26

27 Figure 1.



**Figure 1: Hierarchy of standards related to IEC 63341**

The standards listed in

Figure 1 are not exhaustive.

IEC 63341 series consists of the following parts:

Part 1: Fuel Cell Power System (FCPS)

Part 2: Hydrogen Fuel System (HFS)

Part 3: Performance requirements and test methods for fuel cell power system

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# RAILWAY APPLICATIONS – HYDROGEN AND FUEL CELL SYSTEMS FOR ROLLING STOCK

## Part 1: Fuel Cell Power System

### 1 Scope

This standard applies to fuel cell power system installed onboard rolling stock for railway applications (e.g. light rail vehicles, tramways, streetcars, metros, commuter trains, regional trains, high speed trains, locomotives). Fuel cell power systems specified in this standard are used for the traction power and the auxiliary supply of railway vehicles such as hybrid vehicles as defined in IEC 62864-1:2016, and in case of use as an auxiliary onboard power source.

This standard applies to the fuel cell technology called PEMFC: Proton Exchange Membrane Fuel Cell, with the use of hydrogen as fuel source and the use of air as oxidant source.

This standard is linked to IEC 63341-3 part defined as “Railway applications - Hydrogen and Fuel cell systems for rolling stock - Part 3: Performance requirements and tests methods for fuel cell power system”. IEC 63341-3 describes the performance test method to validate the FCPS performance.

Hydrogen fuel system described in IEC 63341-2 is not considered as a part of the fuel cell power system.

Power conversion equipment is described in IEC 61287-1 and will be not considered in this document.

This standard focuses on:

- the scope of supply and the description of the interfaces (fluidic, electrical, thermal and mechanical) of the fuel cell power system,
- the description of the environmental conditions,
- the specification and description of all the requirements to ensure the fuel cell power system compliancy with a railway application,
- the process to validate the fuel cell power system sizing required for a specific load profile,
- the safety, reliability and protection requirements to design the fuel cell power system for railway application,
- the marking and labelling requirements,
- the requirements related to storage, transportation, installation and maintenance,
- the tests (type, routine and investigation) required to validate the fuel cell power system

This standard with the other parts is used in conjunction with other related IEC standards for auxiliary equipment used for railway rolling stock applications.

## 81 2 Normative references

82 The following documents are referred to in the text in such a way that some or all of their  
83 content constitutes requirements of this document. For dated references, only the edition cited  
84 applies. For undated references, the latest edition of the referenced document (including any  
85 amendments) applies.

86

87 *IEC 62498-1:2010, Railway applications – Environmental conditions for equipment – Part 1:*  
88 *Equipment on board rolling stock - Edition 1.0*

89

90 *IEC 61373: Railway applications – Rolling stock equipment – Shock and vibration tests - Edition 2.0;*  
91 *Incorporates Corrigendum 10/2011*

92

93 *IEC 60077-1: Railway applications - Electric equipment for rolling stock - Part 1: General service*  
94 *conditions and general rules - Edition 2.0*

95

96 *IEC 60529: Degrees of Protection Provided by Enclosures (IP Code) - Edition 2.0*

97

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

100

101 *IEC 60617, Database : Graphical symbols for diagrams*

102

103 *IEC 61991: Railway applications – Rolling stock – Protective provisions against electrical hazards -*  
104 *Edition 2.0*

105

106 *IEC 60571: Railway applications – Electronic equipment used on Rolling stock Rolling stock –*  
107 *Electronic equipment*

108

109 *IEC 60349-2: 2010, Electric traction – Rotating electrical machines for rail and road vehicles – Part 2:*  
110 *Electronic converter-fed alternating current motors - Edition 3.0*

111

112 *IEC 60349-4:*

113 *IEC 60751: Industrial platinum resistance thermometers and platinum temperature sensors - Edition*  
114 *2.0*

115

116 *IEC 62497-1: Railway applications – Insulation coordination – Part 1: Basic requirements –*  
117 *Clearances and creepage distances for all electrical and electronic equipment - Edition 1.1;*

118

119 *IEC 62635 - Guidelines for end-of-life information provided by manufacturers and recyclers and for*  
120 *recyclability rate calculation of electrical and electronic equipment*

121

122 *ISO 21106 - Railway applications — Recyclability and recoverability calculation method for rolling*  
123 *stock*

124

125 *ISO 14687: 2019, Hydrogen fuel quality – Product specification*

126

127 *ISO 9227: Corrosion tests in artificial atmospheres — Salt spray tests*

128 *IEC 60034-14: Rotating electrical machines - Part 14: Mechanical vibration of certain machines with*  
129 *shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity - Edition 4.0*

130

131 *IEC 62282-2-100: 2020, Fuel cell technologies - Part 2-100: Fuel cell modules – Safety*

132

133 *IEC 62282-3-100: 2019, Fuel cell technologies – Part 3-100: Stationary fuel cell power systems –*  
134 *Safety - Edition 2.0*

135

- 136 *IEC 62282-4-101:2022, Fuel cell technologies – Part 4-101: Fuel cell power systems for propulsion*  
137 *other than road vehicles and auxiliary power units (APU) – Safety of electrically powered industrial*  
138 *trucks - Edition 1.0*  
139
- 140 *ISO 7010: 2019 Graphical symbols – Safety colours and safety signs – Registered safety signs (ISO*  
141 *7010:2019)*  
142
- 143 *ISO 3744: 2010, Acoustics — Determination of sound power levels and sound energy levels of noise*  
144 *sources using sound pressure — Engineering methods for an essentially free field over a reflecting*  
145 *plane*  
146
- 147 *ISO 3746: 2011, Acoustics - Determination of sound power levels and sound energy levels of noise*  
148 *sources using sound pressure - Survey method using an enveloping measurement surface over a*  
149 *reflecting plane*  
150
- 151 *IEC 61709: 2019, Electric components – Reliability – Reference conditions fo failure rates and stress*  
152 *models for conversion - Edition 3.0*  
153
- 154 *ISO 9223: 2012, Corrosion of metals and alloys - Corrosivity of atmospheres - Classification,*  
155 *determination and estimation*  
156
- 157 *Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus*

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