

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Fuel cell technologies –  
Part 2: Fuel cell modules**

**Technologies des piles à combustible –  
Partie 2: Modules à piles à combustible**



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**FUEL CELL TECHNOLOGIES –****Part 2: Fuel cell modules****FOREWORD**

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International Standard IEC 62282-2 has been prepared by IEC technical committee 105: Fuel cell technologies.

This second edition cancels and replaces the first edition, published in 2004, its amendment 1 (2007) and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- inclusion of definitions for hazards and hazardous locations based on the IEC 60079 series;
- the general safety strategy is modified to reflect the needs for different application standards. The modifications are in line with similar modifications made to IEC 62282-3-100;
- the electrical components clause is modified to reflect the needs for different application standards. The modifications are in line with similar modifications made to IEC 62282-3-100;

- the marking and instructions have been enlarged to provide the system integrator with the necessary information.

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

FDIS	Report on voting
105/378/FDIS	105/389/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.

A list of all the parts in the IEC 62282 series, published under the general title *Fuel cell technologies*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex B lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this standard.

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

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- withdrawn,
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## INTRODUCTION

Fuel cell modules are electrochemical devices which convert continuously supplied fuel, such as hydrogen or hydrogen rich gases, alcohols, hydrocarbons and oxidants to d.c. power, heat, water and other by-products.

Fuel cell modules are sub-assemblies that are integrated into end-use products incorporating one or more fuel cell stacks and, if applicable, additional components.

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## FUEL CELL TECHNOLOGIES –

### Part 2: Fuel cell modules

#### 1 Scope

This part of IEC 62282 provides the minimum requirements for safety and performance of fuel cell modules and applies to fuel cell modules with the following electrolyte chemistry:

- alkaline;
- polymer electrolyte (including direct methanol fuel cells)<sup>1</sup>;
- phosphoric acid;
- molten carbonate;
- solid oxide;
- aqueous solution of salts.

Fuel cell modules can be provided with or without an enclosure and can be operated at significant pressurization levels or close to ambient pressure.

This standard deals with conditions that can yield hazards to persons and cause damage outside the fuel cell modules. Protection against damage inside the fuel cell modules is not addressed in this standard, provided it does not lead to hazards outside the module.

These requirements may be superseded by other standards for equipment containing fuel cell modules as required for particular applications.

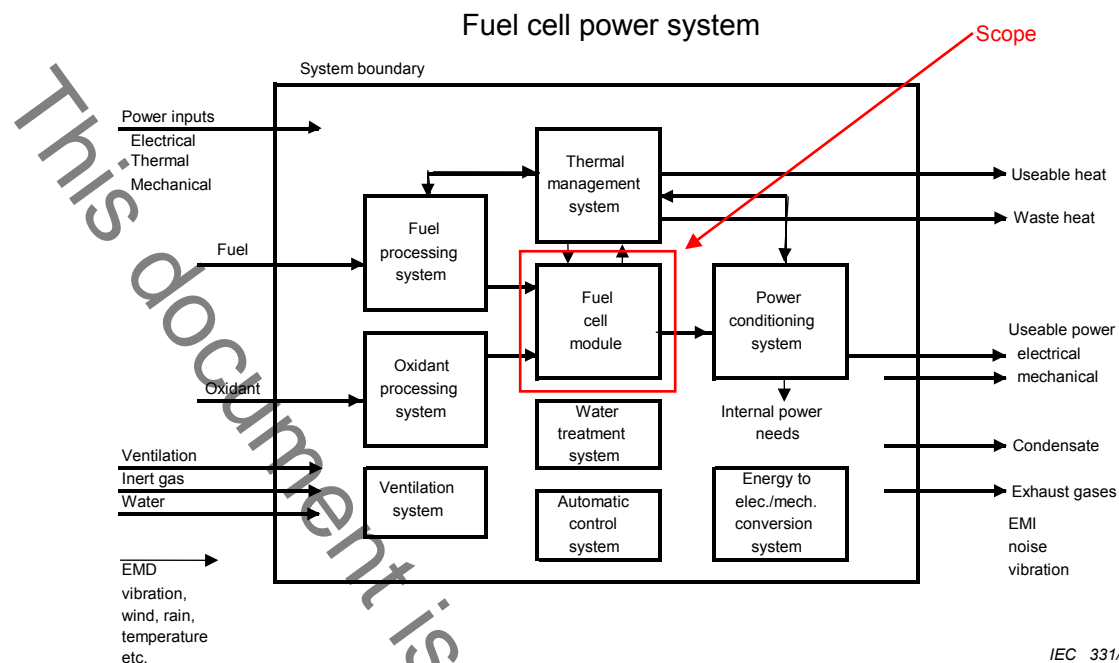
This standard does not cover road vehicle applications.

This standard is not intended to limit or inhibit technological advancement. An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the purpose of these requirements and, if found to be substantially equivalent, may be considered to comply with this standard.

The fuel cell modules are components of final products. These products require evaluation to appropriate end-product safety requirements.

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<sup>1</sup> Also known as proton exchange membrane fuel cell.



#### Key

EMD electromagnetic disturbance  
EMI electromagnetic interference

**Figure 1 – Fuel cell system components**

This standard covers only up to the d.c. output of the fuel cell module.

This standard does not apply to peripheral devices as illustrated in Figure 1.

This standard does not cover the storage and delivery of fuel and oxidant to the fuel cell module.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60079-10 (all Parts 10), *Explosive atmospheres – Part 10: Classification of areas*

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60352 (all parts), *Solderless connections*

IEC 60512-15 (all parts), *Connectors for electronic equipment – Tests and measurements – Part 15: Connector tests (mechanical)*

IEC 60512-16 (all parts) *Connectors for electronic equipment – Tests and measurements – Part 16: Mechanical tests on contacts and terminations*

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

IEC 60617, *Graphical symbols for diagrams*

IEC 60695 (all parts), *Fire hazard testing*

IEC 60730-1, *Automatic electrical controls for household and similar use – Part 1: General requirements*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 62040-1, *Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS*

IEC 62061, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

ISO 13849-1, *Safety of machinery – Safety related parts of control systems – Part 1: General principles for design*

ISO 23550, *Safety and control devices for gas burners and gas-burning appliances – General requirements*

EN 50178, *Electronic equipment for use in power installations*

### 3 Terms and definitions

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

#### 3.1

##### **acceptance test**

contractual test to prove to the customer that the item meets certain conditions of its specification

[SOURCE: IEC 60050-151:2001, 151-16-23] [1]<sup>2</sup>

#### 3.2

##### **allowable differential working pressure**

maximum pressure difference between the anode and cathode side specified by the manufacturer which the fuel cell module can withstand without any damage or permanent loss of functional properties

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<sup>2</sup> References in square brackets refer to the bibliography.