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Irish Standard
I.S. EN IEC 62282-2-100:2020

# Fuel cell technologies - Part 2-100: Fuel cell modules - Safety

**I.S. EN IEC 62282-2-100:2020**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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| EN IEC 62282-2-100:2020 | 2020-06-19 |

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## National Foreword

I.S. EN IEC 62282-2-100:2020 is the adopted Irish version of the European Document EN IEC 62282-2-100:2020, Fuel cell technologies - Part 2-100: Fuel cell modules - Safety

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN IEC 62282-2-100

June 2020

ICS 27.070

Supersedes EN 62282-2:2012 and all of its amendments and corrigenda (if any)

English Version

# Fuel cell technologies - Part 2-100: Fuel cell modules - Safety (IEC 62282-2-100:2020)

Technologies des piles à combustible - Partie 2-100: Modules à piles à combustible - Sécurité (IEC 62282-2-100:2020)

Brennstoffzellentechnologien - Teil 2-100: Brennstoffzellenmodule - Sicherheit (IEC 62282-2-100:2020)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

The text of document 105/782/FDIS, future edition 1 of IEC 62282-2-100, prepared by IEC/TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62282-2-100:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-06-11

This document supersedes EN 62282-2:2012 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 62282-2-100:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---|---|---|
| IEC 60812 | NOTE | Harmonized as EN IEC 60812 |
| IEC 61025 | NOTE | Harmonized as EN 61025 |
| ISO/IEC 80079-20-1:2017 | NOTE | Harmonized as EN ISO/IEC 80079-20-1:2019 (not modified) |
| ISO 1307 | NOTE | Harmonized as EN ISO 1307 |
| ISO 1402 | NOTE | Harmonized as EN ISO 1402 |
| ISO 10619-1 | NOTE | Harmonized as EN ISO 10619-1 |
| ISO 10619-2 | NOTE | Harmonized as EN ISO 10619-2 |
| ISO 10619-3 | NOTE | Harmonized as EN ISO 10619-3 |
| IEC 62282-3-100 | NOTE | Harmonized as EN IEC 62282-3-100 |
| IEC 60079 (series) | NOTE | Harmonized as EN IEC 60079 (series) |

# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60079-10-1 | - | Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres | EN 60079-10-1 | - |
| IEC 60204-1 | - | Safety of machinery - Electrical equipment of machines - Part 1: General requirements | EN 60204-1 | - |
| IEC 60335-1 | - | Household and similar electrical appliances - Safety - Part 1: General requirements | EN 60335-1 | - |
| IEC 60352 | series | Solderless connections | EN 60352 | series |
| IEC 60512-15 | series | Connectors for electronic equipment - Tests and measurements - Part 15: Connector tests (mechanical) | EN 60512-15 | series |
| IEC 60512-16 | series | Connectors for electronic equipment - Tests and measurements - Part 16: Mechanical tests on contacts and terminations | EN 60512-16 | series |
| IEC 60529 | - | Degrees of protection provided by enclosures (IP Code) | - | - |
| IEC 60617 | series | Graphical symbols for diagrams | EN 60617 | series |
| IEC 60695 | series | Fire hazard testing | EN 60695 | series |
| IEC 60730-1 | - | Automatic electrical controls - Part 1: General requirements | EN 60730-1 | - |
| IEC 61010-1 | - | Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements | EN 61010-1 | - |
| IEC 61204-7 | - | Low-voltage switch mode power supplies - Part 7: Safety requirements | EN IEC 61204-7 | - |
| IEC 61508 | series | Functional safety of electrical/electronic/programmable electronic safety-related systems | EN 61508 | series |

**EN IEC 62282-2-100:2020 (E)**

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 62040-1 | - | Uninterruptible power systems (UPS) - Part 1: Safety requirements | EN IEC 62040-1 | - |
| IEC 62061 | - | Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems | EN 62061 | - |
| IEC 62282-4-101 | - | Fuel cell technologies - Part 4-101: Fuel cell power systems for propulsion other than road vehicles and auxiliary power units (APU) - Safety of electrically powered industrial trucks | EN 62282-4-101 | - |
| IEC 62368-1 | - | Audio/video, information and communication technology equipment - Part 1: Safety requirements | EN IEC 62368-1 | - |
| IEC 62477-1 | 2012 | Safety requirements for power electronic converter systems and equipment - Part 1: General | EN 62477-1 | 2012 |
| - | - | | + A11 | 2014 |
| ISO 13849-1 | - | Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design | EN ISO 13849-1 | - |
| ISO 23550 | - | Safety and control devices for gas burners and/or gas-burning appliances - General requirements | - | - |

IEC 62282-2-100

Edition 1.0 2020-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

## Fuel cell technologies –
## Part 2-100: Fuel cell modules – Safety

## Technologies des piles à combustible –
## Partie 2-100: Modules à piles à combustible – Sécurité

IEC 62282-2-100 :2020-05(en-fr)

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IEC 62282-2-100

Edition 1.0 2020-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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## Fuel cell technologies –
## Part 2-100: Fuel cell modules – Safety

## Technologies des piles à combustible –
## Partie 2-100: Modules à piles à combustible – Sécurité

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# FUEL CELL TECHNOLOGIES – Part 2-100: Fuel cell modules – Safety

## FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62282-2-100 has been prepared by IEC technical committee 105: Fuel cell technologies.

This first edition cancels and replaces IEC 62282-2, published in 2012.

This edition includes the following significant technical changes with respect to IEC 62282-2:2012:

- references to IEC 60050-485[1] instead of IEC TS 62282-1;
- update of normative references;
- update of definitions, in particular **fuel cell module** for **normal operation**;
- leakage values under normal and abnormal operation have been addressed;
- a delayed ignition test has been included;
- protective measures to limit gas leakage have been included;

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[1] Under preparation. Stage at the time of publication IEC BPUB 60050-485:2019.

- the requirements for insulation between live parts and **SELV** have been updated;
- the general safety strategy has been 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 has been modified to reflect the needs for different application standards; the modifications are in line with similar modifications made to IEC 62282-3-100;
- protective earthing as part of the module or bonding as a measure within the installation has been introduced;
- a dielectric strength test has been completely updated by referring to IEC 62744-1 for voltages up to 1 000 V AC/1 500 V DC;
- a new “pressure drop method” leakage test method has been included;
- terms such as normal/abnormal e.g. in conjunction with operating conditions are used in a more consistent way;
- inclusion of definitions for **hazards** and **hazardous situations** based on the IEC 60079 series;
- the marking and instructions have been enlarged to provide the system integrator with the necessary information;
- a new Annex A addressing significant **hazards**, **hazardous situations** and events dealt with in this document, and linked to 4.1 (General safety strategy) has been added.

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

| FDIS | Report on voting |
|---|---|
| 105/782/FDIS | 105/793/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.

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

NOTE In this document, the following print type is used:

– terms defined in Clause 3: **in bold type**.

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

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.

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# FUEL CELL TECHNOLOGIES – Part 2-100: Fuel cell modules – Safety

## 1 Scope

This part of IEC 62282 provides safety related requirements for construction, operation under normal and abnormal conditions and the testing of **fuel cell modules**. It applies to **fuel cell modules** with the following electrolyte chemistry:

- alkaline;
- polymer electrolyte (including direct methanol **fuel cells**)[2];
- 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 document 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 document, provided it does not lead to **hazards** outside the module.

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

This document does not cover **fuel cell** road vehicle applications.

This document 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 document can be examined and tested according to the purpose of these requirements and, if found to be substantially equivalent, can be considered to comply with this document.

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

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2 Also known as proton exchange membrane fuel cell.