# 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)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch


**About the IEC**
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

**IEC publications search - webstore.iec.ch/advsearchform**
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - webstore.iec.ch/justpublished**
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

**IEC Customer Service Centre - webstore.iec.ch/csc**
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

**Electropedia - www.electropedia.org**
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC Glossary - std.iec.ch/glossary**
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

---

**A propos de l'IEC**
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

**A propos des publications IEC**
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

**Recherche de publications IEC - webstore.iec.ch/advsearchform**
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

**IEC Just Published - webstore.iec.ch/justpublished**
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

**Service Clients - webstore.iec.ch/csc**
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

**Electropedia - www.electropedia.org**
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

**Glossaire IEC - std.iec.ch/glossary**
67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 27.070

ISBN 978-2-8322-8031-7

# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

# 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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;

_____

[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.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

# 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.

---

2 Also known as proton exchange membrane fuel cell.