IEC 62282-6-107

Edition 1.0 2024-04

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

## Fuel cell technologies – Part 6-107: Micro fuel cell power systems – Safety – Indirect water-reactive (Division 4.3) compounds

## Technologies des piles à combustible – Partie 6-107: Systèmes à micropiles à combustible – Sécurité – Composés hydroréactifs indirects (Division 4.3)



IEC 62282-6-107:2024-04(en-fr)



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

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

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# FUEL CELL TECHNOLOGIES –

# Part 6-107: Micro fuel cell power systems – Safety – Indirect water-reactive (Division 4.3) compounds

## FOREWORD

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IEC 62282-6-107 has been prepared by IEC technical committee 105: Fuel cell technologies. It is an International Standard.

This first edition, together with the other parts of the IEC 62282-6-1XX series, cancels and replaces IEC 62282-6-100:2010 and IEC 62282-6-100:2010/AMD1:2012.

This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 62282-6-100:2010 and IEC 62282-6-100:2010/AMD1:2012:

a) A new structure has been set up: IEC 62282-6-101 covers the general safety requirements common to all fuel types whereas IEC 62282-6-102 and subsequent parts of the IEC 62282-6-1XX series cover particular requirements for individual fuel types.

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

| Draft | Report on voting |
|---|---|
| 105/1018/FDIS | 105/1033/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 62282 series, published under the general title *Fuel cell technologies*, can be found on the IEC website.

This document is to be used in conjunction with IEC 62282-6-101:2024 and is not to be used as a stand-alone document. This document provides additional requirements specific to water-reactive fuel formulations, which apply in addition to the general requirements specified in IEC 62282-6-101:2024. The (sub)clause numbers in this document are aligned with those of IEC 62282-6-101:2024 and are intended to provide additional information and refined requirements, as appropriate.

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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months from the date of publication.

# FUEL CELL TECHNOLOGIES –

# Part 6-107: Micro fuel cell power systems – Safety – Indirect water-reactive (Division 4.3) compounds

## 1 Scope

This part of IEC 62282 covers micro fuel cell power systems, micro fuel cell power units and fuel cartridges using hydrogen produced from water-reactive (UN Division 4.3) compounds as fuel. These systems and units use proton exchange membrane (PEM) fuel cell technologies. The designs can include fuel processing subsystems to derive hydrogen gas from the water-reactive fuel formulation.

This document only applies to water-reactive (UN Division 4.3) solid compounds which solely evolve hydrogen gas upon contact with water (or non-hazardous aqueous solutions). This document does not apply to compounds with a subsidiary hazard risk, or which are not permitted to be transported by air according to the International Civil Aviation Organization (ICAO) Technical Instructions.

IEC 62282-6-101:2024, Figure 1 is applicable.

## 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 62282-6-101:2024, *Fuel cell technologies – Part 6-101: Micro fuel cell power systems – Safety – General requirements*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62282-6-101 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

**3.1**
**fuel**
water-reactive (UN Division 4.3) solid formulation of compounds comprising constituents selected from the following groups used as fuel for an indirect PEM micro fuel cell power system: (water reactive) mixtures, metals, alloys, compounds or chemical hydrides of the following materials: sodium, calcium, magnesium, borohydride compounds, silicon, silicon dioxide, iron, nickel, cobalt, aluminium

Note 1 to entry: The formulation may contain a non-hazardous activator to facilitate the production of hydrogen, or a stabilizer to modulate or inhibit the production of hydrogen or both.

**3.2**
**borohydride compound**
sodium or potassium borohydride, or a mixture thereof

**3.3**
**liquid fuel component**
Class 8 (corrosive), or non-hazardous, aqueous solutions, which may contain activators, inhibitors, or freezing point suppressors

Note 1 to entry: Liquid fuel components are used to react with the water-reactive fuel to produce hydrogen.

**3.4**
**activator**
substance that facilitates the production of hydrogen from fuel, such as a catalyst

**3.5**
**stabilizer**
substance that modulates or inhibits the production of hydrogen from fuel

## 4 Safety principles

The safety principles included in IEC 62282-6-101:2024, Clause 4 apply in their entirety to technologies included in this document.

## 5 General safety requirements

### 5.1 General

The general safety requirements of IEC 62282-6-101:2024, 5.1 shall apply as written with the following addition.

NOTE The limited quantity exception for cargo transport of fuel cell cartridges containing water-reactive fuel is 500 g of solid fuel according to the UN Model Regulations. For passenger carriage in the aircraft cabin or in checked baggage the maximum quantity of water reactive fuel permitted inside the cartridge is 200 g of solid fuel according to the 2013 edition of the ICAO Technical Instructions.

### 5.2 Chemical safety requirements

Consistent with IEC 62282-6-101:2024, Table 4, the following limits given in Table 1 shall apply for the emission and gas loss measurements for micro fuel cell power systems and fuel cartridges tested in accordance with this document.