

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Fuel cell technologies – **STANDARD PREVIEW**  
Part 3-300: Stationary fuel cell power systems – Installation  
(standards.iteh.ai)

Technologies des piles à combustible –  
Partie 3-300: Systèmes à piles à combustible stationnaires – Installation  
<https://standards.iteh.ai/catalog/standards/sist/c512c007-4c90-4454-8c25-9e5ca9107a3d/iec-62282-3-300-2012>



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**FUEL CELL TECHNOLOGIES –****Part 3-300: Stationary fuel cell power systems –  
Installation**

## FOREWORD

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International Standard IEC 62282-3-300 has been prepared by IEC technical committee 105: Fuel cell technologies.

IEC 62282-3-300 cancels and replaces IEC 62282-3-3, published in 2007, and constitutes a technical revision.

IEC 62282-3-300 includes the following significant technical changes with respect to IEC 62282-3-3:

- addition in the scope to avoid overlapping between IEC 62282-3-100 and IEC 62282-3-300 concerning safety related requirements;
- updating normative references and definitions;
- requirements applicable to the stationary fuel cell removed, so that the target of this standard focuses on "installation risks";

- level of CO reduced for small fuel cell power systems which exhaust directly into a utility shed where they are installed, and where the shed is to ensure safety;
- requirement for using a combustible gas detection system modified;
- reference to the gas valve standard ISO 23551-1 added.

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

FDIS	Report on voting
105/377/FDIS	105/388/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 parts of the IEC 62282 series, under the general title *Fuel cell technologies*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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## INTRODUCTION

This International Standard covers the installation of stationary fuel cell power systems that are built in compliance with IEC 62282-3-100.

The requirements of this standard are not intended to constrain innovation. Installations employing materials and/or methods differing from those detailed in this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

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## FUEL CELL TECHNOLOGIES –

### Part 3-300: Stationary fuel cell power systems – Installation

#### 1 Scope

This part of IEC 62282 provides minimum safety requirements for the installation of indoor and outdoor stationary fuel cell power systems in compliance with IEC 62282-3-100 and applies to the installation of the following systems:

- intended for electrical connection to mains directly or with a readily accessible, manually operable switch or circuit-breaker;
- intended for a stand-alone power distribution system;
- intended to provide AC or DC power;
- with or without the ability to recover useful heat.

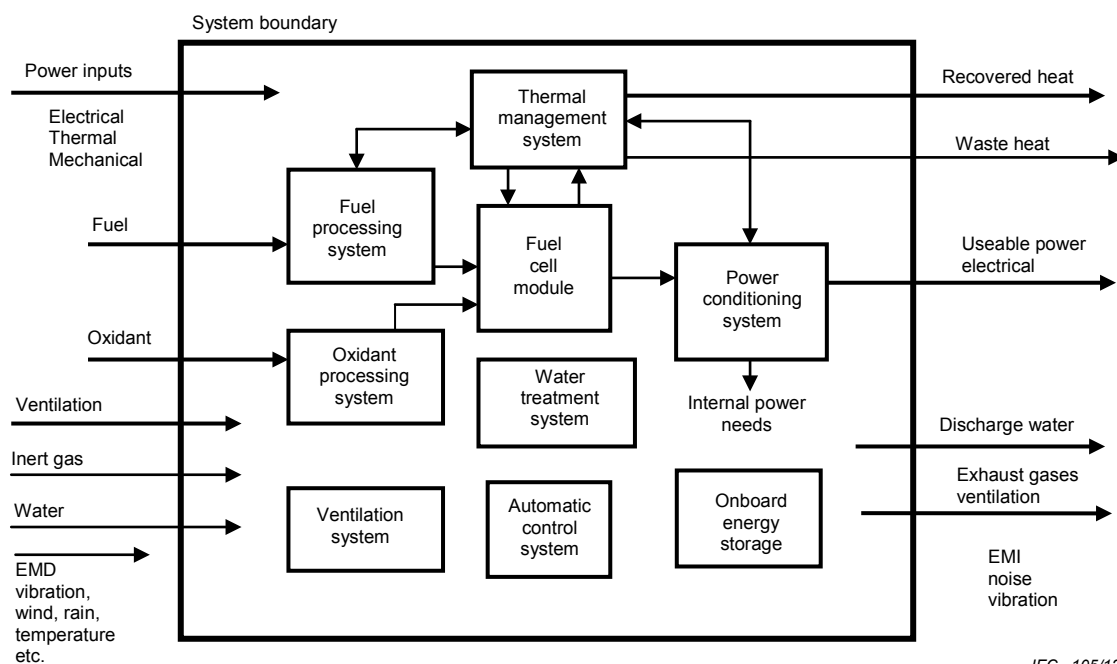
This standard is limited to those conditions that may be created by the installation process that can lead to personnel hazards or damage to equipment or property external to the fuel cell power system.

This standard does not cover the safety requirements of the stationary fuel cell power system which are covered by IEC 62282-3-100.

Additionally, this standard does not cover:

- fuel supply and/or fuel storage systems;
- auxiliary media supply and disposal;
- switches or circuit-breakers;
- portable fuel cell power systems;
- propulsion fuel cell power systems;
- APU (auxiliary power units) applications.

A typical stationary fuel cell power system installation is represented in Figure 1.



IEC 105/12

**Key**  
 EMD electromagnetic disturbance  
 EMI electromagnetic interference

**Figure 1 – Fuel cell power system**

Fuel cell power systems are divided into two categories:

- small systems;
- large systems.

Terms and definitions are given in Clause 3.

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

IEC 60079-29-1, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*

IEC 60079-29-2, *Explosive atmospheres – Part 29-2: Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen*

IEC 62282-3-100:2012, *Fuel cell technologies – Part 3-100: Stationary fuel cell power systems – Safety*

ISO 1182, *Reaction to fire tests for building and transport products – Non-combustibility test*

ISO 14121, *Safety of machinery – Risk assessment*

ISO 23551-1, *Safety and control devices for gas burners and gas-burning appliances – Part 1: Automatic valves*

### 3 Terms and definitions

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

#### 3.1

##### **accessible (operator access area)**

area to which, under normal operating conditions, one of the following applies:

- access can be gained without the use of a tool;
- the means of access are deliberately provided to the operator;
- the operator is instructed to enter, regardless of whether or not a tool is needed to gain access.

Note 1 to entry The terms "access" and "accessible", unless qualified, relate to operator access area as defined above.

#### 3.2

##### **approved**

acceptable to the authority having jurisdiction

#### 3.3

##### **authority having jurisdiction**

##### **AHJ**

organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure

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#### 3.4

##### **exhaust**

gases removed from a fuel cell power system and not reused

#### 3.5

##### **exhaust system**

gas-conveying system for moving gases from a source to a point of discharge

#### 3.6

##### **fire prevention**

measures directed toward avoiding the inception of fire

#### 3.7

##### **fire protection**

methods of providing for fire control or fire extinguishment

#### 3.8

##### **fire risk evaluation**

detailed engineering review of a plant's construction features and operating processes conducted to ensure that applicable fire prevention and fire protection requirements for safeguarding life and physical property are met

#### 3.9

##### **forced ventilation**

movement of air and its replacement with fresh air by mechanical means

#### 3.10

##### **indoor installation**

fuel cell power system completely surrounded and enclosed by walls, a roof and a floor

### 3.11

#### **installation**

- location where a fuel cell power system is sited as a unit or built as an assembly
- act to install a fuel cell power system

### 3.12

#### **large fuel cell power systems**

fuel cell power systems having a net electrical output of more than 10 kW

### 3.13

#### **lower flammability limit**

#### **LFL**

lowest concentration of a flammable gas/vapour in air in which flame is propagated

### 3.14

#### **natural ventilation**

movement of air and its replacement with fresh air due to the effects of wind and/or temperature gradients

### 3.15

#### **non-combustible**

not capable of supporting combustion in accordance with ISO 1182 or equivalent method

### 3.16

#### **outside or outdoor installation**

power system installation that is not an indoor installation. When permitted by local or national regulations, an open-air structure with partial roof and/or walls may be considered an outdoor installation

### 3.17

#### **portable fuel cell power system**

fuel cell power system that is not intended to be permanently fastened or otherwise secured in a specific location

### 3.18

#### **rooftop installation**

power system installation located on the roof of a building

### 3.19

#### **room ventilation**

air supply to the room for cooling, heating, makeup atmosphere, safety ventilation

Note 1 to entry This air can be taken from indoors or outdoors.

### 3.20

#### **small fuel cell power system**

fuel cell power system having a net electrical output up to 10 kW

### 3.21

#### **stationary**

permanently connected and fixed in place

## 4 General safety requirements and strategy

A fuel cell power system and associated equipment, components and controls shall be installed in accordance with the manufacturer's instructions. Based on the quantity of fuel and other stored energy (e.g. flammable materials, pressurized media, electrical energy, mechanical energy, etc.) within the fuel cell power systems, there is a need to eliminate hazards to personnel or damage to equipment or property external to the fuel cell power

system as far as rationally possible. The general safety strategy for the installation of the fuel cell power systems shall be established according to the following sequence:

- Avoid the possible release of combustible and/or toxic gases and pollutant gases, liquids and solids.
- Eliminate hazards to personnel or damage to equipment or property external to the fuel cell power system and the related installation as far as rationally possible, when such energy or gases are released almost instantaneously.
- Provide appropriate safety markings concerning the remaining risks of hazards.

Special care shall be taken to address the following:

- Mechanical hazards – Sharp surfaces, tripping hazards, moving masses and instability, strength of materials and liquids or gases under pressure.
- Electrical hazards – Contact of persons with live parts, short-circuits, high voltage.
- Thermal hazards – Hot surfaces, release of high temperature liquids or gases, thermal fatigue.
- Fire and explosion hazards – Flammable gases or liquids, potential for explosive mixtures during normal or abnormal operating conditions, potential for explosive mixtures during fault conditions.
- Malfunction hazards – Unsafe operation of installation related equipment due to failures of software, control circuit or protective/safety components or incorrect manufacturing or misoperation.
- Material and substance hazards – Material deterioration, corrosion, embrittlement, toxic releases, choking hazards (e.g. by replacing oxygen by inert purge gases).
- Waste disposal hazards – Disposal of toxic materials, recycling, disposal of flammable liquids or gases.
- Environmental hazards – Unsafe operation in hot/cold environments, rain, flooding, wind, earthquake, external fire, smoke.

## 5 Siting considerations

### 5.1 General siting

The fuel cell power system shall comply with IEC 62282-3-100.

A fuel cell power system(s) and associated equipment, components, and controls shall be sited in accordance with the manufacturer's instructions and meet the following requirements:

- It shall be placed and fixed firmly so that it will not be easily moved, toppled, or dislocated.
- It shall be located and secured as necessary so that the system and equipment will not be adversely affected by wind, and seismic events. It shall be protected so as not to be adversely affected by rain, snow, ice, water and or freezing temperatures, unless the system and installation equipment is designed for those conditions.
- Sites for large power systems shall be protected against access by unauthorized persons if required by the location and installation environment. Fire department access shall be provided.
- It shall be located outside of potentially hazardous atmospheres as defined by IEC 60079-10, unless approved for the specific installation.
- It shall be sited so that the power system and equipment do not adversely affect building exits.
- It shall be located so that the power system(s) and components of a fuel cell power system and their respective vent or exhaust terminations are separated from doors, windows, outdoor intakes and other openings into a building to prevent introduction of exhaust gases into the building.