
Tehnologije gorivnih celic - 3-100. del: Nepremični elektroenergetski sistemi z gorivnimi celicami - Varnost

Fuel cell technologies - Part 3-100: Stationary fuel cell power systems - Safety

Brennstoffzellentechnologien - Teil 3-100: Stationäre Brennstoffzellen-Energiesysteme - Sicherheit

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Technologies des piles à combustible - Partie 3-100: Systèmes à piles à combustible stationnaires - Sécurité

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27.070 Gorilne celice Fuel cells

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

Technologies des piles à combustible -
Partie 3-100: Systèmes à piles à
combustible stationnaires -
Sécurité
(CEI 62282-3-100:2012)

Brennstoffzellentechnologien -
Teil 3-100: Stationäre Brennstoffzellen-
Energiesysteme -
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(IEC 62282-3-100:2012)

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European Committee for Electrotechnical Standardization
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Foreword

The text of document (105/371/FDIS), future edition 1 of IEC 62282-3-100, prepared by IEC/TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62282-3-100:2012.

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) 2012-12-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-03-22

This document supersedes EN 62282-3-1:2007.

EN 62282-3-100:2012 includes the following significant technical changes with respect to EN 62282-3-1:2007:

- a) general reorganization of the safety requirements;
- b) major changes for addressing electrical safety requirements for internal components;
- c) clarifications for numerous requirements and tests, particularly the pressure leakage and strength tests;
- d) expanded wind tests;
- e) additional tests for condensate discharge and ventilation leakage.

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

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

Endorsement notice

The text of the International Standard IEC 62282-3-100:2012 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 60079-20-1 | NOTE | Harmonized as EN 60079-20-1. |
| IEC 60812 | NOTE | Harmonized as EN 60812. |
| IEC 61025 | NOTE | Harmonized as EN 61025. |
| IEC 61511-1 | NOTE | Harmonized as EN 61511-1. |

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--|----------------------|---|-------------------------|--------------|
| IEC 60079-0 | - | Explosive atmospheres - Part 0: Equipment - General requirements | - | - |
| IEC 60079-2 | - | Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p" | EN 60079-2 | - |
| IEC 60079-10 | Series | Explosive atmospheres - Part 10: Classification of areas | EN 60079-10 | Series |
| IEC 60079-29-1 | - | Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases | EN 60079-29-1 | - |
| IEC 60079-30-1 | - | Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements | EN 60079-30-1 | - |
| IEC 60204-1 | - | Safety of machinery - Electrical equipment of machines Part 1: General requirements | EN 60204-1 | - |
| IEC 60335-1 (mod) + corr. July + corr. April | 2010 2010 2011 | Household and similar electrical appliances - Safety - Part 1: General requirements | EN 60335-1 | 2012 |
| IEC 60335-2-51 | - | Household and similar electrical appliances - Safety - Part 2-51: Particular requirements for stationary circulation pumps for heating and service water installations | EN 60335-2-51 | - |
| IEC 60417 | Data-base | Graphical symbols for use on equipment | - | - |
| IEC 60529 | 1989 | Degrees of protection provided by enclosures (IP Code) | EN 60529 + corr. May | 1991 1993 |
| IEC 60730-1 | - | Automatic electrical controls for household and similar use - Part 1: General requirements | EN 60730-1 | - |
| IEC 60730-2-5 | - | Automatic electrical controls for household and similar use - Part 2-5: Particular requirements for automatic electrical burner control systems | EN 60730-2-5 | - |
| IEC 60730-2-6 | - | Automatic electrical controls for household and similar use - Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements | EN 60730-2-6 | - |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|---------------|-------------|
| IEC 60730-2-9 | - | Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls | EN 60730-2-9 | - |
| IEC 60950-1 | - | Information technology equipment - Safety - Part 1: General requirements | EN 60950-1 | - |
| IEC 61000-3-2 | - | Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase) | EN 61000-3-2 | - |
| IEC 61000-3-3 | - | Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection | EN 61000-3-3 | - |
| IEC/TS 61000-3-4 | - | Electromagnetic compatibility (EMC) - Part 3-4: Limits - Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A | - | - |
| IEC/TS 61000-3-5 | - | Electromagnetic compatibility (EMC) - Part 3-5: Limits - Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 75 A | - | - |
| IEC 61000-3-11 | - | Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current <= 75 A and subject to conditional connection | EN 61000-3-11 | - |
| IEC 61000-6-1 | - | Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments | EN 61000-6-1 | - |
| IEC 61000-6-2 | - | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments | EN 61000-6-2 | - |
| IEC 61000-6-3 | - | Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments | EN 61000-6-3 | - |
| IEC 61000-6-4 | - | Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments | EN 61000-6-4 | - |
| IEC 61508 | Series | Functional safety of electrical/electronic/programmable electronic safety-related systems | EN 61508 | Series |
| IEC 62040-1 | - | Uninterruptible Power Systems (UPS) - Part 1: General and safety requirements for UPS | EN 62040-1 | - |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|----------------|-------------|
| IEC 62061 | - | Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems | EN 62061 | - |
| IEC/TS 62282-1 | - | Fuel cell technologies - Part 1: Terminology | - | - |
| IEC 62282-3-200 | - | Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods | EN 62282-3-200 | - |
| ISO 3864-2 | - | Graphical symbols - Safety colours and safety - signs - Part 2: Design principles for product safety labels | - | - |
| ISO 4413 | - | Hydraulic fluid power - General rules relating to systems | EN ISO 4413 | - |
| ISO 4414 | - | Pneumatic fluid power - General rules relating to systems | EN ISO 4414 | - |
| ISO 5388 | - | Stationary air compressors - Safety rules and code of practice | - | - |
| ISO 7000 | - | Graphical symbols for use on equipment - Index and synopsis | - | - |
| ISO 10439 | - | Petroleum, chemical and gas service industries - Centrifugal compressors | EN ISO 10439 | - |
| ISO 10440-1 | - | Petroleum and natural gas industries - Rotary-type positive displacement compressors - Part 1: Process compressors (oil-free) | EN ISO 10440-1 | - |
| ISO 10440-2 | - | Petroleum and natural gas industries - Rotary-type positive displacement compressors - Part 2: Packaged air compressors (oil-free) | EN ISO 10440-2 | - |
| ISO 10442 | - | Petroleum, chemical and gas service industries - Packaged, integrally geared centrifugal air compressors | EN ISO 10442 | - |
| ISO 12499 | - | Industrial fans - Mechanical safety of fans - Guarding | EN ISO 12499 | - |
| ISO 13631 | - | Petroleum and natural gas industries - Packaged reciprocating gas compressors | EN ISO 13631 | - |
| ISO 13707 | - | Petroleum and natural gas industries - Reciprocating compressors | - | - |
| ISO 13709 | - | Centrifugal pumps for petroleum, petrochemical and natural gas industries | EN ISO 13709 | - |
| ISO 13849-1 | - | Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design | EN ISO 13849-1 | - |
| ISO 13850 | - | Safety of machinery - Emergency stop - Principles for design | EN ISO 13850 | - |
| ISO 14847 | - | Rotary positive displacement pumps - Technical requirements | EN ISO 14847 | - |
| ISO 15649 | - | Petroleum and natural gas industries - Piping - | - | - |
| ISO 16111 | - | Transportable gas storage devices - Hydrogen-absorbed in reversible metal hydride | - | - |

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|----------------|-------------|
| ISO 23550 | - | Safety and control devices for gas burners and gas-burning appliances - General requirements | - | - |
| ISO 23551-1 | - | Safety and control devices for gas burners and gas-burning appliances - Particular requirements - Part 1: Automatic valves | - | - |
| ISO 23553-1 | - | Safety and control devices for oil burners and oil-burning appliances - Particular requirements - Part 1: Shut-off devices for oil burners | EN ISO 23553-1 | - |
| ISO 26142 | - | Hydrogen detection apparatus - Stationary applications | - | - |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FUEL CELL TECHNOLOGIES –**Part 3-100: Stationary fuel cell power systems –
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 62282-3-100 has been prepared by IEC technical committee 105: Fuel cell technologies.

IEC 62282-3-100 cancels and replaces IEC 62282-3-1 published in 2007. IEC 62282-3-100 constitutes a technical revision.

IEC 62282-3-100 includes the following significant technical changes with respect to IEC 62282-3-1:

- a) general reorganization of the safety requirements;
- b) major changes for addressing electrical safety requirements for internal components;
- c) clarifications for numerous requirements and tests, particularly the pressure leakage and strength tests;
- d) expanded wind tests;

e) additional tests for condensate discharge and ventilation leakage.

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

| FDIS | Report on voting |
|--------------|------------------|
| 105/371/FDIS | 105/384/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 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.

A bilingual version of this standard may be issued at a later date.

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INTRODUCTION

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

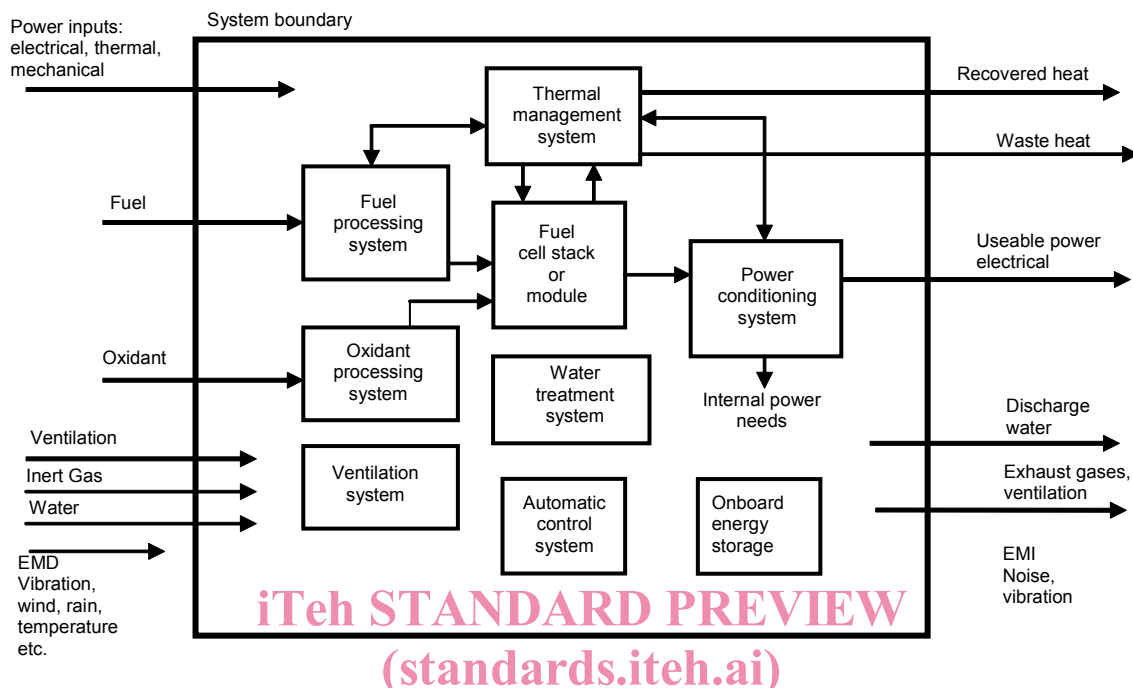


Figure 1 – Stationary fuel cell power systems

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The overall design of the power system anticipated by this standard forms an assembly of integrated systems, as necessary, intended to perform designated functions, as follows.

- **Fuel processing system** – System of chemical and/or physical processing equipment plus associated heat exchanges and controls required to prepare, and if necessary, pressurize, the fuel for utilization within a fuel cell power system.
- **Oxidant processing system** – System that meters, conditions, processes and may pressurize the incoming supply for use within the fuel cell power system.
- **Thermal management system** – System that provides heating or cooling and heat rejection to maintain the fuel cell power system in the operating temperature range, and may provide for the recovery of excess heat and assist in heating the power train during start-up.
- **Water treatment system** – System that provides all the necessary purification treatment of the recovered or added water for use within the fuel cell power system.
- **Power conditioning system** – Equipment that is used to adapt the electrical energy produced by the fuel cell stack(s) to application requirements as specified by the manufacturer.
- **Automatic control system** – System(s) that is composed of sensors, actuators, valves, switches and logic components that maintain the fuel cell power system parameters within the manufacturer's specified limits including moving to safe states without manual intervention.
- **Ventilation system** – System that provides air through forced or natural means to the fuel cell power system's enclosure.
- **Fuel cell modules** – Equipment assembly of one or more fuel cell stacks which electrochemically converts chemical energy to electric energy and thermal energy intended to be integrated into a power generation system.