



**SLOVENSKI STANDARD**  
**SIST EN 62282-5-1:2008**  
**01-januar-2008**

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**Tehnologija gorivnih celic - 5. del: Naprave s prenosnimi gorivnimi celicami - Varnost (IEC 62282-5-1:2007)**

Fuel cell technologies - Part 5-1: Portable fuel cell power systems - Safety

Brennstoffzellentechnologien - Teil 5-1: Portable Brennstoffzellen-Energiesysteme - Sicherheit

Technologies des piles a combustible - Partie 5-1: Systemes a piles a combustible portables - Sécurité

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Ta slovenski standard je istoveten z: **EN 62282-5-1:2007**  
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**ICS:**

27.070            Gorilne celice    Fuel cells

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EUROPEAN STANDARD

**EN 62282-5-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2007

ICS 27.070

English version

**Fuel cell technologies -  
Part 5-1: Portable fuel cell power systems -  
Safety  
(IEC 62282-5-1:2007)**

Technologies des piles à combustible -  
Partie 5-1: Systèmes à piles  
à combustible portables -  
Sécurité  
(CEI 62282-5-1:2007)

Brennstoffzellentechnologien -  
Teil 5-1: Portable Brennstoffzellen-  
Energiesysteme -  
Sicherheit  
(IEC 62282-5-1:2007)

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This European Standard was approved by CENELEC on 2007-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 105/135/FDIS, future edition 1 of IEC 62282-5-1, prepared by IEC TC 105, Fuel cell technologies, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62282-5-1 on 2007-06-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2008-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-06-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62282-5-1:2007 was approved by CENELEC as a European Standard without any modification.

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## Annex ZA (normative)

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

The following referenced documents are indispensable for the application 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 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 60034	Series	Rotating electrical machines	EN 60034	Series
IEC 60068-2-75	- <sup>1)</sup>	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997 <sup>2)</sup>
IEC 60079-10	- <sup>1)</sup>	Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas	EN 60079-10	2003 <sup>2)</sup>
IEC 60079-15	- <sup>1)</sup>	Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection "n" electrical apparatus	EN 60079-15	2005 <sup>2)</sup>
IEC/TR 60079-20	- <sup>1)</sup>	Electrical apparatus for explosive gas atmospheres - Part 20: Data for flammable gases and vapours, relating to the use of electrical apparatus	-	-
IEC 60204-1 (mod)	- <sup>1)</sup>	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	2006 <sup>2)</sup>
IEC 60216-4-1	- <sup>1)</sup>	Electrical insulating materials - Thermal endurance properties - Part 4-1: Ageing ovens - Single-chamber ovens	EN 60216-4-1	2006 <sup>2)</sup>
IEC 60335-1 (mod)	- <sup>1)</sup>	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1 + A11 + A12	2002 <sup>2)</sup> 2004 2006
IEC 60364-4-41 (mod)	- <sup>1)</sup>	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2007 <sup>2)</sup>
IEC 60439-1	- <sup>1)</sup>	Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies	EN 60439-1	1999 <sup>2)</sup>

<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60529	- <sup>1)</sup>	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 <sup>2)</sup> 1993
IEC 60664-1	- <sup>1)</sup>	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	200X <sup>3)</sup>
IEC 60695-2-11	- <sup>1)</sup>	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001 <sup>2)</sup>
IEC 60695-2-13	- <sup>1)</sup>	Fire hazard testing - Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials	EN 60695-2-13	2001 <sup>2)</sup>
IEC 60695-11-5	- <sup>1)</sup>	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2005 <sup>2)</sup>
IEC 60695-11-10	- <sup>1)</sup>	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	1999 <sup>2)</sup>
IEC 60695-11-20	- <sup>1)</sup>	Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods	EN 60695-11-20	1999 <sup>2)</sup>
IEC 60730-1 (mod)	- <sup>1)</sup>	Automatic electrical controls for household and similar use - Part 1: General requirements	EN 60730-1 + A12 + A13 + A14 + A15 + A16	2000 2003 2004 2005 2007 2007
IEC 60730-2-5 (mod)	- <sup>1)</sup>	Automatic electrical controls for household and similar use - Part 2-5: Particular requirements for automatic electrical burner control systems	EN 60730-2-5 + A11	2002 <sup>2)</sup> 2005
IEC 60730-2-17	- <sup>1)</sup>	Automatic electrical controls for household and similar use - Part 2-17: Particular requirements for electrically operated gas valves, including mechanical requirements	-	-
IEC 60812	- <sup>1)</sup>	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	EN 60812	2006 <sup>2)</sup>
IEC 60884-1	- <sup>1)</sup>	Plugs and socket-outlets for household and similar purposes - Part 1: General requirements	-	-

<sup>3)</sup> To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60934	- <sup>1)</sup>	Circuit-breakers for equipment (CBE)	EN 60934	2001 <sup>2)</sup>
IEC 60950-1 (mod)	- <sup>1)</sup>	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	2006 <sup>2)</sup>
IEC 60990	- <sup>1)</sup>	Methods of measurement of touch current and protective conductor current	EN 60990	1999 <sup>2)</sup>
IEC 61000-3-2	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	2006 <sup>2)</sup>
IEC 61000-3-3	- <sup>1)</sup>	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 + corr. July	1995 <sup>2)</sup> 1997
IEC 61000-6-1	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments	EN 61000-6-1	2007 <sup>2)</sup>
IEC 61000-6-2	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2 + corr. September	2005 <sup>2)</sup> 2005
IEC 61000-6-3	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	EN 61000-6-3	2007 <sup>2)</sup>
IEC 61000-6-4	- <sup>1)</sup>	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	EN 61000-6-4	2007 <sup>2)</sup>
IEC 61025	- <sup>1)</sup>	Fault Tree Analysis (FTA)	EN 61025	2007 <sup>2)</sup>
IEC 61032	- <sup>1)</sup>	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	1998 <sup>2)</sup>
IEC 61140	- <sup>1)</sup>	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2002 <sup>2)</sup>
IEC 61340-2-1	- <sup>1)</sup>	Electrostatics - Part 2-1: Measurement methods - Ability of materials and products to dissipate static electric charge	EN 61340-2-1	2002 <sup>2)</sup>
IEC 61511-3	- <sup>1)</sup>	Functional safety - Safety instrumented systems for the process industry sector - Part 3: Guidance for the determination of the required safety integrity levels	EN 61511-3	2004 <sup>2)</sup>
IEC 61779-4 (mod)	- <sup>1)</sup>	Electrical apparatus for the detection and measurement of flammable gases - Part 4: Performance requirements for group II apparatus indicating a volume fraction up to 100 % lower explosive limit	EN 61779-4	2000 <sup>2)</sup>

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61779-6	- <sup>1)</sup>	Electrical apparatus for the detection and measurement of flammable gases - Part 6: Guide for the selection, installation, use and maintenance of apparatus for the detection and measurement of flammable gases	-	-
IEC 61882	- <sup>1)</sup>	Hazard and operability studies (HAZOP studies) - Application guide	-	-
IEC 62040-1-1	- <sup>1)</sup>	Uninterruptible power systems (UPS) - Part 1-1: General and safety requirements for UPS used in operator access areas	EN 62040-1-1 + corr. August	2003 <sup>2)</sup> 2004
IEC 62040-1-2	- <sup>1)</sup>	Uninterruptible power systems (UPS) - Part 1-2: General and safety requirements for UPS used in restricted access locations	EN 62040-1-2 + corr. August	2003 <sup>2)</sup> 2004
IEC 62282-2	- <sup>1)</sup>	Fuel cell technologies - Part 2: Fuel cell modules	EN 62282-2	2004 <sup>2)</sup>
ISO 3864	Series	Graphical symbols - Safety colours and safety signs	-	-
ISO 4080	- <sup>1)</sup>	Rubber and plastics hoses and hose assemblies - Determination of permeability to gas	EN ISO 4080	1995
ISO 7000	- <sup>1)</sup>	Graphical symbols for use on equipment - Index and synopsis	-	-
ISO 15156-1	- <sup>1)</sup>	Petroleum and natural gas industries - Materials for use in H <sub>2</sub> S-containing environments in oil and gas production - Part 1: General principles for selection of cracking-resistant materials	EN ISO 15156-1	2001 <sup>2)</sup>
ISO 15394	- <sup>1)</sup>	Packaging - Bar code and two-dimensional symbols for shipping, transport and receiving labels	-	-
ISO 15649	- <sup>1)</sup>	Petroleum and natural gas industries - Piping	-	-
ISO 16110-1	- <sup>1)</sup>	Hydrogen generators using fuel processing technologies - Part 1: Safety	-	-
ISO/TS 16528	- <sup>1)</sup>	Boilers and pressure vessels - Registration of Codes and Standards to promote international recognition	-	-



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**Technologies des piles à combustible –**

**Partie 5-1:  
Systèmes à piles à combustible portables –  
Sécurité**

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Fuel cell technologies –

Part 5-1: [SIST EN 62282-5-1:2008](https://standards.iteh.ai/catalog/standards/sist/505d0642-3e4a-4f3e-ab62-892566c563e2/sist-en-62282-5-1-2008)

[Portable fuel cell power systems –  
Safety](https://standards.iteh.ai/catalog/standards/sist/505d0642-3e4a-4f3e-ab62-892566c563e2/sist-en-62282-5-1-2008)

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue*

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FUEL CELL TECHNOLOGIES –****Part 5-1: Portable 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 62282-5-1 has been prepared by IEC technical committee 105: Fuel cell technologies.

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

FDIS	Report on voting
105/135/FDIS	105/139/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 IEC 62282 series, published under the general title *Full cell technologies*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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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## FUEL CELL TECHNOLOGIES –

### Part 5-1: Portable fuel cell power systems – Safety

#### 1 Scope

This part of IEC 62282 covers construction, marking and test requirements for a.c. and d.c. type portable fuel cell systems. These fuel cell systems are movable and not fastened or otherwise secured to a specific location. The purpose of the portable fuel cell system is to produce useable power.

This standard applies to a.c. and d.c. type portable fuel cell systems, with a rated output voltage not exceeding 600 V a.c., or 850 V d.c. for indoor and outdoor use in a non-hazardous area.

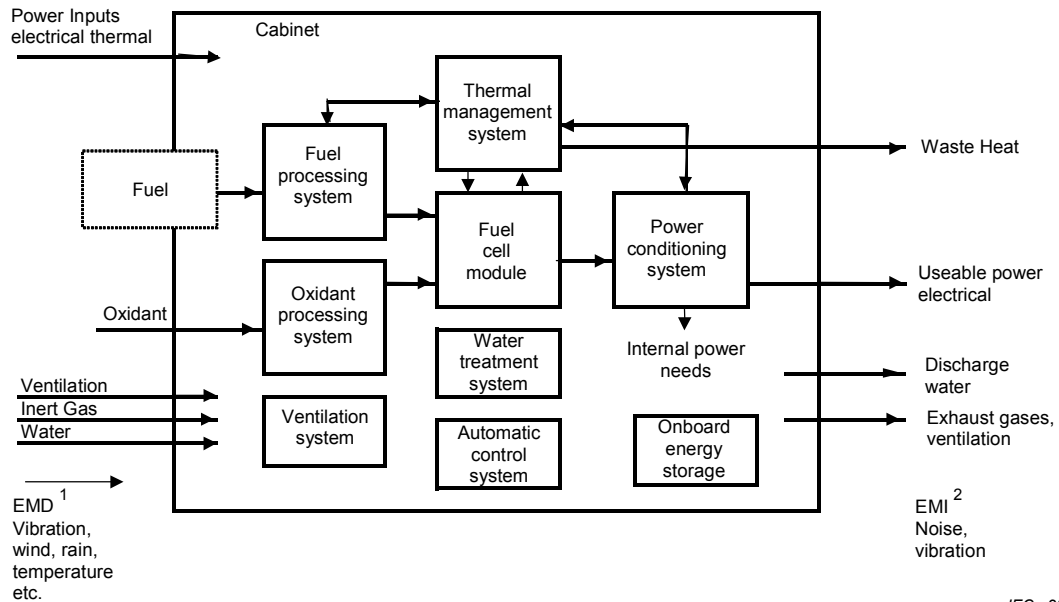
This standard does not apply to portable fuel cell systems that are:

- a) permanently connected (hard wired) to the electrical distribution system;
- b) permanently connected to a utility fuel distribution system;
- c) exporting power to the grid;
- d) for propulsion or auxiliary power of road vehicles;
- e) micro fuel cell systems.

The following fuels and fuel feedstocks are considered within the scope of this standard:

- natural gas;
- liquefied petroleum gas, such as propane and butane;
- liquid alcohols, for example methanol, ethanol;
- gasoline;
- diesel;
- kerosene;
- hydrogen;
- metals (e.g. Mg, Al or Zn) or metal alloys immersed in electrolyte (e.g. aqueous solutions of salts or alkali) in air or oxygen;
- chemical hydrides.

This standard does not preclude the use of similar fuels or oxidants from sources other than air provided the unique hazards are addressed through additional requirements.



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IEC 285/07

### Key

- <sup>1</sup> EMD: Electromagnetic disturbance [SIST EN 62282-5-1:2008](https://standards.iteh.ai/catalog/standards/sist/en-62282-5-1-2008)  
<sup>2</sup> EMI: Electromagnetic interference [SIST EN 62282-5-1:2008](https://standards.iteh.ai/catalog/standards/sist/505d0642-3e4a-4f3e-ab62-892366c563e2/sist-en-62282-5-1-2008)

**Figure 1 – Portable fuel cell power systems**

### 1.1 System boundary

The overall design of a portable fuel cell system anticipated by this standard shall form an assembly of some or all of the following systems (see Figure 1), integrated as necessary, to perform designated functions, as follows:

**Fuel processing system** – chemical processing equipment including any associated heat exchanges and controls required to convert input fuel to a composition suitable for the fuel cell stack.

**Oxidant processing system** – subsystem that meters, conditions processes, and may pressurize the incoming oxidant supply for use within the fuel cell power system.

**Thermal management system** – subsystem intended to provide cooling and heat rejection in order to maintain thermal equilibrium within the fuel cell power system, and, if necessary, to affect the recovery of excess heat and to assist in heating the power train during start-up.

**Power conditioning system**- equipment which is used to change the magnitude or waveform of the voltage, or otherwise alter or regulate the output of a power source.