



# SLOVENSKI STANDARD

## SIST EN 62282-5-1:2013

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**Tehnologija gorivnih celic - 5-1. del: Naprave s prenosnimi gorivnimi celicami - Varnost**

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

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

Technologies des piles à combustible - Partie 5-1: Systèmes à piles à combustible portables - Sécurité

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**Ta slovenski standard je istoveten z: EN 62282-5-1:2012**

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27.070            Gorilne celice    Fuel cells

**SIST EN 62282-5-1:2013**    **en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 62282-5-1**

November 2012

ICS 27.070

Supersedes EN 62282-5-1:2007

English version

**Fuel cell technologies -  
Part 5-1: Portable fuel cell power systems -  
Safety  
(IEC 62282-5-1:2012)**

Technologies des piles à combustible -  
Partie 5-1: Systèmes à piles à  
combustible portables -  
Sécurité  
(CEI 62282-5-1:2012)

Brennstoffzellentechnologien -  
Teil 5-1: Portable Brennstoffzellen-  
Energiesysteme -  
Sicherheit  
(IEC 62282-5-1:2012)

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 105/396/FDIS, future edition 2 of IEC 62282-5-1, prepared by IEC/TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62282-5-1:2012.

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) 2013-07-23
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-10-23

This document supersedes EN 62282-5-1:2007.

EN 62282-5-1:2012 includes the following significant technical changes with respect to EN 62282-5-1:2007:

- normative references and definitions have been updated (e.g., hazardous locations, micro fuel cell power systems, transportable equipment, etc.);
- subclause 4.2.2 has been updated (referencing an alternative test method in response to a comment);
- the limit on flammable atmospheres has been reduced from 50 % of LFL to 25 % of LFL in 4.5.4 and in 7.20;
- subclause 4.14 and the corresponding tests in 7.22 have been updated to include more effluents and criteria to establish if a system is suitable for indoor or outdoor operation;
- specific criteria for oxygen detector sensor performance requirements have been revised in 7.21;
- subclause 7.18 has been updated with a new test method and new drop heights in response to comments;
- Table 1 has been added giving limits on emission of effluents using limits drawn from the micro fuel cell power system standard.

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 62282-5-1:2012 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 60439-1	NOTE	Harmonized as EN 60439-1.
IEC 62282-6-100	NOTE	Harmonized as EN 62282-6-100.
ISO 15156-1	NOTE	Harmonized as EN ISO 15156-1.

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## 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 60034	Series	Rotating electrical machines	EN 60034	Series
IEC 60068-2-75	-	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-2	-	Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"	EN 60079-2	-
IEC 60079-10	-	Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas	EN 60079-10	-
IEC 60079-15	-	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"	EN 60079-15	-
IEC 60079-20-1	-	Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data	EN 60079-20-1	-
IEC 60079-29-1	-	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases	EN 60079-29-1	-
IEC 60086-4	-	Primary batteries - Part 4: Safety of lithium batteries	EN 60086-4	-
IEC 60204-1 (mod)	2005	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1 + corr. February	2006 2010
IEC 60216-4-1	-	Electrical insulating materials - Thermal endurance properties - Part 4-1: Ageing ovens - Single-chamber ovens	EN 60216-4-1	-
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 60364-4-41	-	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	-
IEC 60529	-	Degrees of protection provided by enclosures - (IP Code)		-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60664-1	-	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	-
IEC 60695-2-11	-	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	-
IEC 60695-2-13	-	Fire hazard testing - Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignition temperature (GWIT) test method for materials	EN 60695-2-13	-
IEC 60695-11-5	-	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	-
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-
IEC 60695-11-20	-	Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods	EN 60695-11-20	-
IEC 60730-1 (mod)	2010	Automatic electrical controls for household and similar use - Part 1: General requirements	EN 60730-1	2011
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 60730-2-17	-	Automatic electrical controls for household and similar use - Part 2-17: Particular requirements for electrically operated gas valves, including mechanical requirements	-	-
IEC 60812	-	Analysis techniques for system reliability - Procedure for failure mode and effects analysis (FMEA)	EN 60812	-
IEC 60884-1	-	Plugs and socket-outlets for household and similar purposes - Part 1: General requirements	-	-
IEC 60934	-	Circuit-breakers for equipment (CBE)	EN 60934	-
IEC 60950-1 (mod) + corr. August	2005 2006	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1 + A11 + A12 + AC	2006 2009 2011 2011
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61000-3-2	-	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq$ 16 A per phase)	EN 61000-3-2	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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 $\leq 16$ A per phase and not subject to conditional connection	EN 61000-3-3	-
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 61025	-	Fault Tree Analysis (FTA)	EN 61025	-
IEC 61032	-	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	-
IEC 61140	-	Protection against electric shock - Common aspects for installation and equipment	EN 61140	-
IEC 61439-1	-	Low-voltage switchgear and controlgear assemblies - Part 1: General rules	EN 61439-1	-
IEC 61508-1	-	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements	EN 61508-1	-
IEC 61511-1	-	Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and software requirements	EN 61511-1	-
IEC 61511-3	-	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	-
IEC 61882	-	Hazard and operability studies (HAZOP studies) - Application guide	-	-
IEC 62040-1	-	Uninterruptible Power Systems (UPS) - Part 1: General and safety requirements for UPS	EN 62040-1	-
IEC 62040-2	-	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements	EN 62040-2	-
IEC 62133	-	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications	EN 62133	-



<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62282-2	-	Fuel cell technologies - Part 2: Fuel cell modules	EN 62282-2	-
ISO 3864	Series	Graphical symbols - Safety colours and safety - signs		-
ISO 4080	-	Rubber and plastics hoses and hose assemblies - Determination of permeability to gas	EN ISO 4080	-
ISO 7000	-	Graphical symbols for use on equipment - Index and synopsis	-	-
ISO 7010	-	Graphical symbols - Safety colours and safety signs - Registered safety signs	EN ISO 7010	-
ISO 15649	-	Petroleum and natural gas industries - Piping	-	-
ISO 16000-3	-	Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds - Active sampling method	-	-
ISO 16000-6	-	Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS/FID	-	-
ISO 16017-1	2000	Indoor, ambient and workplace air - Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography - Part 1: Pumped sampling	EN ISO 16017-1	2000
ISO 16110-1	2007	Hydrogen generators using fuel processing technologies - Part 1: Safety	-	-
ISO 16111	-	Transportable gas storage devices - Hydrogen- absorbed in reversible metal hydride		-
ISO 16528	-	Boilers and pressure vessels - Registration of Codes and Standards to promote international recognition		-

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# INTERNATIONAL STANDARD

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**Fuel cell technologies –** **STANDARD PREVIEW**  
**Part 5-1: Portable fuel cell power systems – Safety**  
(standards.iteh.ai)

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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.

This second edition cancels and replaces the first edition, published in 2007, and constitutes a technical revision.

The major technical changes with respect to the first edition are as follows:

- IEC normative references and definitions have been updated (e.g., hazardous locations, micro fuel cell power systems, transportable equipment, etc.);
- subclause 4.2.2 has been updated referencing an alternative test method in response to a comment;
- the limit on flammable atmospheres has been reduced from 50 % of LFL to 25 % of LFL in 4.5.4 and in 7.20;
- subclause 4.14 and the corresponding tests in 7.22 have been updated to include more effluents and criteria to establish if a system is suitable for indoor or outdoor operation;

- specific criteria for oxygen detector sensor performance requirements have been revised in 7.21;
- subclause 7.18 has been updated with a new test method and new drop heights in response to comments;
- Table 1 has been added giving limits on emission of effluents using limits drawn from the micro fuel cell power system standard.

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

FDIS	Report on voting
105/396/FDIS	105/404/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 in the IEC 62282 series, published 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 [SIST EN 62282-5-1:2013](https://standards.iteh.ai/catalog/standards/sist/a7077910-1368-429e-8182-6247b7e06e64/sist-en-62282-5-1-2013)
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A bilingual version may be issued at a later date.