SLOVENSKI STANDARD
oSIST prEN IEC 62286-6-401:2023

01-julij-2023

Tehnologije gorivnih celic - 6-401. del: Elektroenergetski sistemi z mikro gorivnimi celicami - Izmenljivost moči in podatkov - Preskusne metode delovanja prenosnih računalnikov

Fuel cell technologies - Part 6-401: Micro fuel cell power systems - Power and data interchangeability - Performance test methods for laptop computers

Ta slovenski standard je istoveten z: **prEN IEC 62282-6-401:2023**

ICS:

27.070	Gorilne celice	Fuel cells

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105/982/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 62282-6-401 ED1	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-05-26	**2023-08-18**
SUPERSEDES DOCUMENTS:	
105/902/CDV, 105/981/RVC	

IEC TC 105 : FUEL CELL TECHNOLOGIES	
SECRETARIAT:	SECRETARY:
Germany	Mr David Urmann
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD:
TA 19	☐
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

Fuel cell technologies – Part 6-401: Micro fuel cell power systems – Power and data interchangeability – Performance test methods for laptop computers

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FUEL CELL TECHNOLOGIES –

Part 6-401: Micro fuel cell power systems – Power and data interchangeability – Performance test methods for laptop computer

FOREWORD

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IEC 62282-6-401 has been prepared by IEC technical committee 105: Fuel cell technologies. It is an International Standard.

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

Draft	Report on voting
105/XX/FDIS	105/XX/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 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 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,
- replaced by a revised edition, or
- amended.

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FUEL CELL TECHNOLOGIES –

Part 6-401: Micro fuel cell power systems – Power and data Interchangeability – Performance test methods for laptop computer

1 Scope

This part of IEC 62282 covers the requirements for the performance test methods of a micro fuel cell/battery power system, consisting of a fuel cell system with secondary battery for laptop computers.

For this purpose, this document covers electrical performance test for the fuel cell/battery hybrid system. This document also covers performance test methods which focus on the power and data interchangeability with the micro fuel cell power system and laptop computer and other characteristics for BOP (balance of plant) installed for laptop computer applications with fuel cell/battery hybrid system. This document applies to gaseous hydrogen-fuelled fuel cell power, liquid hydrogen-fuelled fuel cell power, direct methanol fuel cell power, and battery hybrid power pack systems.

The following fuels are considered within the scope of this document:

– gaseous hydrogen;
– liquid hydrogen compounds
– methanol.

This document does not apply to reformer-equipped fuel cell power systems.

A block diagram of micro fuel cell power system is shown in Figure 1. This document covers configuration, the mode of hybridization and operation modes for fuel cell/battery power systems.

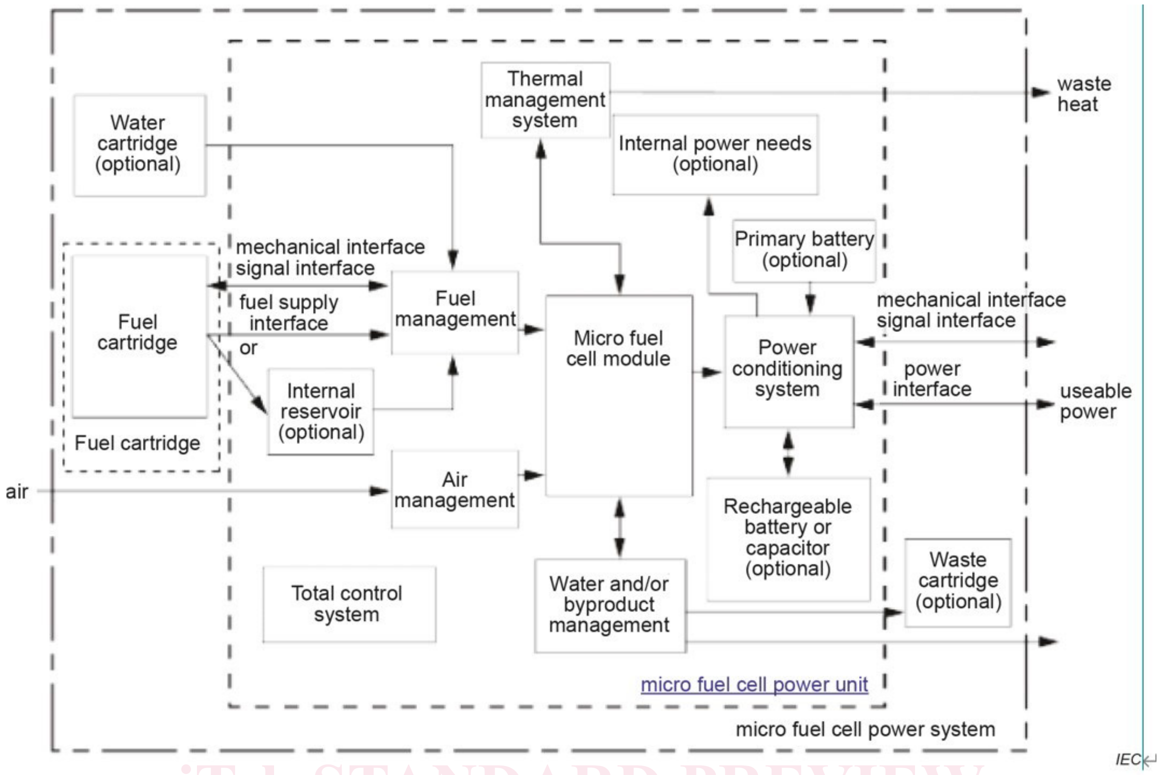

Figure 1 – Micro fuel cell power system block diagram

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 60050-485, *International Electrotechnical Vocabulary (IEV) – Part 485: Fuel cell technologies*, available at www.electropedia.org

IEC 62282-4-101, *Fuel cell technologies – Part 4-101: Fuel cell power systems for propulsion other than road vehicles and auxiliary power units (APU) – Safety of electrically powered industrial trucks*

IEC 61204, *Low-voltage power supply devices, d.c. output – Performance characteristics*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given IEC 60050-485 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

3.1.1
fuel cell/battery hybrid system
fuel cell power system combined with a battery, for delivering useful electric power

Note 1 to entry: The fuel cell power system can deliver electric power, charge the battery, or both. The system can deliver and accept electric energy.

[SOURCE: IEC 60050-485:2020, 485-09-18]

3.1.2
fuel cell power system
generator system that uses one or more fuel cell modules (IEV 485-09-03) to generate electric power and heat

[SOURCE: IEC 60050-485:2020, 485-09-01]

3.1.3
micro fuel cell power system
micro fuel cell power unit and associated fuel cartridges that is wearable or easily carried out by hand

[SOURCE: IEC 60050-485:2020, 485-09-21]

3.1.4
DC output voltage
voltage between the output terminals under operating conditions

Note 1 to entry: The output voltage is expressed in V.

[SOURCE: IEC 60050-485-13-03]

3.1.5
DC output current
output current that can be continuously supplied to the load side

3.1.6
DC output power
output that can be continuously supplied to the load side, expressed as the product of output voltage and output current

3.1.7
DC output plug
accessory having pins designed to engage with the contacts of a socket-outlet, also incorporating 9means for the electrical connection and mechanical retention of flexible cables or cords

[SOURCE: IEC 60050-442-03-01]

3.1.8
secondary battery
secondary cell
cell which is designed to be electrically recharged

Note 1 to entry: The recharge is accomplished by way of a reversible chemical reaction. Secondary batteries can be based on lithium-ion, meta-air, lead acid or nickel-metal hydride chemistries, rechargeable by the fuel cell system or external power.

[SOURCE: IEC 60050-482:2004, 482-01-03, modified – The words "secondary battery" have been added as a term.]

3.1.9
active hybrid system
hybrid system equipped with a DC/DC converter between the fuel cell and the battery, adjusting the voltage of each power source to the bus voltage and managing the power sharing between each power source

3.1.10
state of charge
available capacity in a battery pack or system expressed as a percentage of rated capacity

3.1.11

rated power

maximum continuous electric power output that a fuel cell power system is designed to achieve under normal operating conditions specified by the manufacturer

3.1.12

balance of plant(BOP)

supporting and auxiliary components based on the power source or site-specific requirements and integrated into a comprehensive fuel cell power system

3.2 Abbreviated terms

BOP balance of plant

SOC state of charge

4 General principles for measurements

4.1 Test environments

The controlled ambient test conditions shall be as follows:

– temperature: 25 °C ± 5 °C;

– humidity: 65 % ± 20 % relative humidity;

– pressure: between 91 kPa (abs) and 106 kPa (abs).

For each test run, the laboratory conditions shall be measured. As air quality may affect fuel cell power system performance, laboratory air composition (CO_2, CO, SO_2 and so forth) shall be reported with the test result.

4.2 Measurement accuracy

The measurement parameters and minimum measurement accuracies shall be as follows:

– voltage: ±1 %;

– current: ±1 %;

– time: ±1 %;

– weight: ±1 %;

– temperature: ±2 °C;

– humidity: ±5

– pressure: ±5 %;

– vibration frequency: ±1 Hz (5 Hz < frequency ≤ 50 Hz) or ±2 % (frequency > 50 Hz);

– volume: ±2 %.

Test equipment should be chosen in a way that the systematic uncertainty of measurement for electrical efficiency is below ±1 % system except ±5 of relative humidity for electrical efficiency.

In order to reach the desired efficiency uncertainties, the following systematic measurement uncertainties of the equipment are recommended. They are given in percentage of measured/calculated values or as absolute values for temperature:

– fuel gas flow rate: ±1 %;