SIST

SLOVENSKI STANDARD
oSIST prEN IEC 62282-3-202:2024

01-april-2024

Tehnologije gorivnih celic - 3-202. del: Nepremični elektroenergetski sistemi z gorivnimi celicami - Metode za preskušanje učinkovitosti za majhne energetske sisteme z gorivnimi celicami, ki jih je mogoče dopolniti z dodatnim generatorjem toplote za delovanje več enot s sistemom za upravljanje energije

Fuel cell technologies - Part 3-202: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system

Ta slovenski standard je istoveten z: **prEN IEC 62282-3-202:2024**

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27.070	Gorilne celice	Fuel cells

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105/1020/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 62282-3-202 ED1	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2024-02-02	**2024-04-26**
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105/961/CD, 105/990A/CC	

IEC TC 105 : FUEL CELL TECHNOLOGIES

SECRETARIAT:	SECRETARY:
Germany	Mr David Urmann
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD ☐
TC 8, TC 57, TC 120, SyC Smart Energy	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 3-202: Stationary fuel cell power systems – Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system

PROPOSED STABILITY DATE: 2027

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FUEL CELL TECHNOLOGIES –

Part 3-202: Stationary fuel cell power systems – Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system

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IEC 62282-3-202 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/standardsdev/publications.

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.

INTRODUCTION

This part of IEC 62282 provides consistent and repeatable test methods for the electrical thermal and environmental performance of small stationary fuel cell power systems.

This document limits its scope to small stationary fuel cell power systems (electric power output below 10 kW) and provides test methods specifically designed for them in detail. It is based on IEC 62282-3-201.

For multiple units operation, each electric power output of the unit is limited to below 10kW.

This document is intended for manufacturers of small stationary fuel cell power systems and/or those who evaluate the performance of their systems for certification purposes.

Users of this document may selectively execute test items that are suitable for their purposes from those described in this document. This document is not intended to exclude any other methods.

This document describes type tests and their test methods only, in this document, no routine tests are required or identified, and no performance targets are set.

FUEL CELL TECHNOLOGIES –

Part 3-202: Stationary fuel cell power systems – Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system

Scope

This document provides performance test methods specialized for the thermal and electrical characteristics which are required by an energy management system to effectively share the heat and power of networked small stationary fuel cell power systems. These test methods are applied for each small stationary fuel cell power system. This document covers small stationary fuel cell power systems which can be complimented with a supplementary heat generator and/or a thermal storage system such as:

output: rated electric power output of less than 10 kW for each system;

output mode: grid-connected/independent operation or stand-alone operation with alternating current (AC) output not exceeding 240 V or direct current (DC) output;

operating pressure: maximum allowable working pressure of less than 0.1 MPa (G) for the fuel and oxidant passages;

fuel: Gaseous fuel (natural gas, liquefied petroleum gas, propane, butane, hydrogen) or liquid fuel (kerosene, methanol);

oxidant: air.

This document does not apply to small stationary fuel cell power systems with electricity storage other than (small scale) back-up power for safety, monitoring and control.

Note: Regarding data linkage for conducting performance tests specified in this document with operating management systems (Energy Management System) of multiple Fuel Cell Power System (mFCPS), an appropriate IEC standard is recommended to select and implement. The related standards are IEC 61850-7-420, IEC 61850-90-27, IEC 62394 Ed4.0, IEC 62746-10-1, IEC 62746-10-3 Ed.1, etc. The data linkage and implementation for realizing the functions of the system that monitors mFCPS and peripherals differ depending on the vendor of the mFCPS control system, so the methods for data linkage and implementation are not specified in this document.

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 62282-3-200:2015, *Fuel cell technologies – Part 3-200: Stationary fuel cell power systems – Performance test methods*

Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

IEC Electropedia: available at http://www.electropedia.org/

ISO Online browsing platform: available at http://www.iso.org/obp

cold state
state of a fuel cell power system at ambient temperature with no power input or output, ready for start-up

[SOURCE: IEC 60050-485:2020, 485-21-01, modified — "ready for start-up" added.]

electrical efficiency
ratio of the average net electric power output produced by a fuel cell power system to the average fuel power input supplied to the fuel cell power system

Note 1 to entry: The lower heating value (LHV) is assumed unless otherwise stated

[SOURCE: IEC 60050-485:2020, 485-10-02, modified — "electrical" instead of "electric" in the term; "average net electric power output" instead of "net electric power"; "average fuel power input" instead of "total enthalpy flow".]

electric energy input
integrated value of electric power input at the electric input terminal

[SOURCE: IEC 62282-3-201:2021, 3.8]

electric energy output
integrated value of electric power output at the electric output terminal

[SOURCE: IEC 62282-3-201:2021, 3.9]

electric power input
electric power input at the electric input terminal of the fuel cell power system

[SOURCE: IEC 62282-3-201:2021, 3.10]

electric power output
electric power output at the electric output terminal of the fuel cell power system

[SOURCE: IEC 62282-3-201:2021, 3.11]

fuel cell power system
generator system that uses one or more fuel cell modules to generate electric power and heat

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

fuel input
amount of natural gas, hydrogen, methanol, liquid petroleum gas, propane, butane, or other material containing chemical energy entering the fuel cell power system while it is working at the specified operating conditions

[SOURCE: IEC 62282-3-201:2021, 3.13]

fuel power input
fuel energy input per unit of time

[SOURCE: IEC 62282-3-201:2021, 3.14]

heat recovery efficiency
ratio of the average recovered thermal power output of a fuel cell power system to the average total power input supplied to the fuel cell power system

[SOURCE: IEC 60050-485:2020, 485-10-04, modified — “the average recovered thermal power output” instead of “recovered heat flow”; “average total power input” instead of “total enthalpy flow”; Note 1 to entry deleted.]

heat recovery fluid
fluid circulating between the fuel cell power system and a heat sink for recovering the thermal energy output

[SOURCE: IEC 62282-3-201:2021, 3.16]

hot restart
start operation of the fuel cell power system before the power system temperature condition reach the “cold state”

inert purge gas
inert gas or dilution gas, not containing chemical energy, supplied to the fuel cell power system during specific conditions to make it ready for operation or shutdown

Note 1 to entry: Dilution gas containing chemical energy shall be considered as fuel.

[SOURCE: IEC 62282-3-201:2021, 3.17]

integrated fuel input
volume or mass of fuel consumed by the fuel cell power system under specified operating conditions

[SOURCE: IEC 62282-3-201:2021, 3.18]

interface point
measurement point at the boundary of a fuel cell power system at which material or energy, or both, either enters or leaves

Note 1 to entry: This boundary is intentionally selected to accurately measure the performance of the system, including all normal operation, both steady state and transient. If necessary, the boundary or the interface points of the fuel cell power system (Figure 1) to be assessed should be determined by agreement between the parties.

Note 2 to entry: Typical conditions to be standardized refer to fuel and oxidant parameters, like compositions, flow rates, temperature, pressure and humidity, as well as to the fuel cell parameters, like temperature.

[SOURCE: IEC 60050-485:2020, 485-09-12]

minimum electric power output
minimum net power output, at which a fuel cell power system is able to operate continuously at a steady state

[SOURCE: IEC 62282-3-201:2021, 3.21]

net electric power output
power generated by the fuel cell power system and available for external use

[SOURCE: IEC 60050-485:2020, 485-14-03, modified — “output” added to the term, Notes 1 and 2 to entry deleted.]

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

[SOURCE: IEC 60050-485:2020, 485-14-04, modified — “electric” and “output” added to the term, Note 1 to entry deleted.]

ramp-up energy
electric and/or chemical (fuel) energy required for transitioning from zero or minimum net electric power output to rated net electric power output

[SOURCE: IEC 62282-3-201:2021, 3.28, modified — “zero or minimum” instead of “positive”; “after start-up” deleted.]

ramp-up time
duration required for transitioning from zero or minimum net electric power output to rated net electric power output

[SOURCE: IEC 62282-3-201:2021, 3.29, modified — “zero or minimum” instead of “positive”; “after start-up” deleted.]

ramp-down energy
electric and/or chemical (fuel) energy required for transitioning from rated net electric power output to minimum or zero net electric power output

ramp-down time
duration required for transitioning from rated net electric power output to minimum or zero net electric power output

recovered heat
thermal energy that has been recovered for useful purpose

Note 1 to entry: The recovered heat is measured by determining the temperatures and flow rates of the heat recovery fluid (water, steam, air or oil, etc.) entering and leaving the thermal energy recovery subsystem at the interface point of the fuel cell power system.

[SOURCE: IEC 62282-3-201:2021, 3.30]

recovered thermal power
recovered heat per unit of time

[SOURCE: IEC 62282-3-201:2021, 3.31]

shutdown energy
sum of electric and/or chemical (fuel) energy required during the shutdown time

[SOURCE: IEC 62282-3-201:2021, 3.32]

shutdown time
duration between the instant when a shutdown action is initiated at rated electric power output and the instant when the cold state or storage state, as specified by the manufacturer, is attained