Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems

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NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62282-3-201:2025 sisaldab Euroopa standardi EN IEC 62282-3-201:2025 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62282-3-201:2025 consists of the English text of the European standard EN IEC 62282-3-201:2025.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.11.2025.	Date of Availability of the European standard is 14.11.2025.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 27.070

EUROPEAN STANDARD

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EN IEC 62282-3-201

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Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems (IEC 62282-3-201:2025)

Technologies des piles à combustible - Partie 3-201: Systèmes à piles à combustible stationnaires - Méthodes d'essai des performances pour petits systèmes à piles à combustible (IEC 62282-3-201:2025)

Brennstoffzellentechnologien - Teil 3-201: Stationäre Brennstoffzellen-Energiesysteme - Leistungskennwerteprüfverfahren für kleine Brennstoffzellen-Energiesysteme (IEC 62282-3-201:2025)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 105/1114/FDIS, future edition 3 of IEC 62282-3-201, prepared by TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62282-3-201:2025.

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) 2026-11-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2028-11-30

This document supersedes EN 62282-3-201:2017 and all of its amendments and corrigenda (if any).

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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 61672-1	NOTE	Approved as EN 61672-1
IEC 61672-2	NOTE	Approved as EN 61672-2
IEC 62282-3-200:2025	NOTE	Approved as EN IEC 62282-3-200: —[1] (not modified)
ISO 6974 (series)	NOTE	Approved as EN ISO 6974 (series)
ISO 6975	NOTE	Approved as EN ISO 6975
ISO 7941	NOTE	Approved as EN 27941
ISO 9000	NOTE	Approved as EN ISO 9000
ISO 10523	NOTE	Approved as EN ISO 10523
ISO 11541	NOTE	Approved as EN ISO 11541
ISO 80000 (series)	NOTE	Approved as EN ISO 80000 (series)

[1] Under preparation. Stage at the time of publication: EN IEC 62282-3-200:2025.

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Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems

FOREWORD

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IEC 62282-3-201 has been prepared by IEC technical committee 105: Fuel cell technologies. It is an International Standard.

This third edition cancels and replaces the second edition published in 2017 and Amendment 1:2022. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) revision of Introduction;
b) revision of terms and definitions;
c) revision of Table 1;
d) revision of Figure 1, Figure 2, Figure 3 and Figure 4;
e) revision of measurement instruments (10.2);

f) revision of minimum required measurement systematic uncertainty (10.4);
g) revision of test conditions (Clause 11);
h) revision of operating process (Clause 12);
i) revision of fuel consumption test (14.2);
j) revision of heat recovery test (14.4);
k) revision of Figure 13 and Figure 14;
l) revision of calculation of results (14.14.4);
m) revision of Annex A and Annex B.

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

Draft	Report on voting
105/1114/FDIS	105/1128/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 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 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, or
- revised.

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 (electrical power output below 10 kW, which is typical for residential, small commercial and off-grid applications) and provides test methods specifically designed for them in detail. It is based on the latest edition of IEC 62282-3-200, which generally describes performance test methods that are common to all types of fuel cells.

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

Users of this document can 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.

1 Scope

This part of IEC 62282 provides test methods for the electrical, thermal, and environmental performance of small stationary fuel cell power systems that meet the following criteria:

- output: rated electric power output of less than 10 kW;
- output mode: grid-connected/independent operation or stand-alone operation with single-phase AC output or 3-phase AC output not exceeding 1 000 V, or DC output not exceeding 1 500 V;

  NOTE The limit of 1 000 V for alternating current comes from the definition for "low voltage" given in IEC 60050-601:1985, 601-01-26.
- operating pressure: maximum allowable working pressure of 0,1 MPa (gauge) for the fuel and oxidant passages;
- fuel: gaseous fuel (natural gas, liquefied petroleum gas, propane, butane, hydrogen, etc.) or liquid fuel (kerosene, methanol, etc.);
- oxidant: air.

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

This document provides test methods to be carried out under laboratory conditions.

This document covers fuel cell power systems whose primary purpose is the production of electric power and whose secondary purpose can be the utilization of heat. Accordingly, fuel cell power systems for which the use of heat is primary, and the use of electric power is secondary are outside the scope of this document.

All systems with integrated batteries are covered by this document. This includes systems where batteries are recharged internally or recharged from an external source.

This document does not cover additional auxiliary heat generators that produce thermal energy.

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.

CISPR 11, *Industrial, scientific, and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement*

IEC 61000-3-2, *Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-6-1:2016, *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
background noise level
sound pressure level of ambient noise at the measurement point

Note 1 to entry: This measurement is taken as described in 15.2 with the fuel cell power system in the cold state.

3.2
battery
electrochemical energy storage device that provides energy input to auxiliary machines and equipment necessary to operate the fuel cell power system and/or provides electric energy output

Note 1 to entry: Back-up batteries for control software memory and similar applications are not included.

3.3
cold state
state of a fuel cell power system, which is entirely at ambient temperature with no power input or output, ready for start-up

Note 1 to entry: Power input to a control device for monitoring the fuel cell power system during cold state is not considered.

[SOURCE: IEC 60050-485:2020, 485-21-01, modified – "which is entirely" and "ready for start-up" added; Note 1 to entry added.]

3.4
degradation rate
reduction of the electrical efficiency of a stationary fuel cell power system per time of operation

Note 1 to entry: The degradation rate is expressed in efficiency per cent points per time (%/h).