

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

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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 62282-3-201:2013)**

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
(CEI 62282-3-201:2013)

Brennstoffzellentechnologien -
Teil 3-201: Stationäre Brennstoffzellen-
Energiesysteme -
Leistungskennwerteprüfverfahren
(IEC 62282-3-201:2013)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 105/444/FDIS, future edition 1 of IEC 62282-3-201, prepared by IEC TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62282-3-201:2013.

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) 2014-05-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-08-15

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Endorsement notice

The text of the International Standard IEC 62282-3-201:2013 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 61672-2	NOTE	Harmonised as EN 61672-2.
ISO 6326 Series	NOTE	Harmonised in EN ISO 6326 series.
ISO 6974 Series	NOTE	Harmonised in EN ISO 6974 series.
ISO 6975	NOTE	Harmonised as EN ISO 6975.
ISO 6976	NOTE	Harmonised as EN ISO 6976.
ISO 7941	NOTE	Harmonised as EN 27941.
ISO 11541	NOTE	Harmonised as EN ISO 11541.

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 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	-
IEC 62282-3-200	-	Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods	EN 62282-3-200	-
ISO 5815	Series	Water quality - Determination of biochemical oxygen demand after n days (BOD _n)	-	-
ISO 6060	-	Water quality - Determination of the chemical oxygen demand	-	-
ISO 6798	-	Reciprocating internal combustion engines - Measurement of emitted airborne noise - Engineering method and survey method	-	-
ISO 9000	-	Quality management systems - Fundamentals and vocabulary	EN ISO 9000	-
ISO 10523	-	Water quality - Determination of pH	EN ISO 10523	-
ASTM F2602	-	Standard Test Method for Determining the Molar Mass of Chitosan and Chitosan Salts by Size Exclusion Chromatography with Multi-angle Light Scattering Detection (SEC-MALS)	-	-

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INTRODUCTION

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

This international standard limits its scope to small (below 10 kW electric power output) stationary fuel cell power systems and provides test methods specifically designed for them in detail. It is based on IEC 62282-3-200, that generally describes performance test methods that are common to all types of fuel cells.

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

This standard is to be used by manufacturers of small stationary fuel cell power systems and/or those who evaluate the performance of their systems for certification purposes.

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

FUEL CELL TECHNOLOGIES –

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

1 Scope

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

- output: nominal 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 to 1 000 V comes from the definition for "low voltage" given in IEC 601-01-26.

- operating pressure: maximum allowable working pressure of less than 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 standard covers fuel cell power systems whose primary purpose is the production of electric power and whose secondary purpose may be the utilization of by-product heat. Accordingly, fuel cell power systems for which the use of heat is primary and the use of by-product electric power is secondary are outside the scope of this standard.

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

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

2 Normative references

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.

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

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

ISO 5815 (all parts), *Water quality – Determination of biochemical oxygen demand after n days (BOD_n)*

ISO 6060, *Water quality – Determination of the chemical oxygen demand*

ISO 6798, *Reciprocating internal combustion engines – Measurement of emitted airborne noise – Engineering method and survey method*

ISO 9000, *Quality management systems – Fundamentals and vocabulary*

ISO 10523, *Water quality – Determination of pH*

ASTM F2602, *Standard Test Method for Determining the Molar Mass of Chitosan and Chitosan Salts by Size Exclusion Chromatography with Multi-angle Light Scattering Detection (SEC MALS)*

3 Terms and definitions

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

3.1

noise level

sound pressure level produced by the fuel cell power system measured at a specified distance in all operation modes

Note 1 to entry: Expressed as decibels (dB) and measured as described in 15.2.

3.2

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.

3.3

battery

electrochemical energy storage device that provides energy input to support parasitic loads and/or provides electric energy output

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

3.4

cold state

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

[SOURCE: IEC/TS 62282-1:2010, definition 3.110.1, modified – addition of "ready for start-up"]

3.5

discharge rate

mass of discharged exhaust gas component per unit of time

3.6

discharge water

water that is discharged from the fuel cell power system

Note 1 to entry: Discharge water does not constitute part of a thermal recovery system.

3.7

electric efficiency

ratio of the average net electric power output of a fuel cell power system at a given duration to the average fuel power fed to the same fuel cell power system at the same duration

[SOURCE: IEC/TS 62282-1:2010, definition 3.30.1 modified – original definition has been modified and the NOTE dropped]