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ILNAS-EN 62282-3-201:2017/ A1:2022

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

Technologies des piles à combustible - Partie 3-201: Systèmes à piles à combustible stationnaires - Méthodes d'essai des performances pour petits

Brennstoffzellentechnologien - Teil 3-201: Stationäre Brennstoffzellen-Energiesysteme - Leistungskennwerteprüfverfahren für

03/2022

National Foreword

This European Standard EN 62282-3-201:2017/A1:2022 was adopted as Luxembourgish Standard ILNAS-EN 62282-3-201:2017/A1:2022.

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- Participate in the design of standards
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62282-3-201:2017/A1

March 2022

ICS 27.070

English Version

Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems (IEC 62282-3-201:2017/AMD1:2022)

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 62282-3-201:2017/AMD1:2022)

Brennstoffzellentechnologien - Teil 3-201: Stationäre Brennstoffzellen-Energiesysteme - Leistungskennwerteprüfverfahren für kleine Brennstoffzellen-Energiesysteme (IEC 62282-3-201:2017/AMD1:2022)

This amendment A1 modifies the European Standard EN 62282-3-201:2017; it was approved by CENELEC on 2022-03-10. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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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

Ref. No. EN 62282-3-201:2017/A1:2022 E

European foreword

The text of document 105/839/CDV, future IEC 62282-3-201/AMD1, prepared by IEC/TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62282-3-201:2017/A1:2022.

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) 2022-12-10
•	latest date by which the national standards conflicting with the document have to be withdrawn	(dow) 2025-03-10

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Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62282-3-201:2017/AMD1:2022 was approved by CENELEC as a European Standard without any modification.

IEC 62282-3-201

Edition 2.0 2022-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

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

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 62282-3-201:2017-08/AMD1:2022-02(en-fr)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FUEL CELL TECHNOLOGIES –

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

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 62282-3-201:2017 has been prepared by IEC technical committee 105: Fuel cell technologies.

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

Draft	Report on voting
105/839/CDV	105/866/RVC

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 Amendment 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 to Amendment 1

This amendment to IEC 62282-3-201:2017 provides a method of estimating the electric and heat recovery efficiency of small stationary fuel cell power systems for a duration of up to ten years of operation. Furthermore, this amendment to IEC 62282-3-201:2017 provides an evaluation method for electric demand-following small stationary fuel cell power systems, which are operating at changing levels of power output. It has been developed as a reference for the life cycle assessment calculations in IEC TS 62282-9-101.

3 Terms and definitions

Add, at the end of Clause 3, the following new entries:

3.41
test duration
duration of the complete test for the estimation of the electric and heat recovery efficiency up to ten years of operation, comprising a specific number of test runs

3.42
degradation rate
reduction of the electric 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).

4 Symbols

Table 1 – Symbols and their meanings for electric/thermal performance

Replace the existing title of Table 1 with the following new title:

Symbols and their meanings for electric and thermal performance

Under the header relating to "Time", in the unit column for "Test duration", add the unit "h" after "s" and insert between the existing definitions of "Test duration" and "Start-up time" the following new symbol, definition and unit, as shown:

t	**Time**	
Δt	Test duration	s, h
Δt_a	Number of hours between point s and point a	h
Δt_{st}	Start-up time	s

Under the header relating to "Efficiency", add, after the last existing definition of "Operation cycle electrical efficiency", the following new symbols, definitions and units:

$\eta_{el,est,av}$	Estimated average electric efficiency during one year of operation	%
$\eta_{el,est}(k)$	Estimated electric efficiency at the end of year k	%
$\eta_{el,init}$	Calculated value of the linear regression of the electric efficiency at the time of point a	%
$\Delta\eta_{el}$	Approximated degradation rate of the electric efficiency	%/h
$\eta_{th,est}(k)$	Estimated heat recovery efficiency at the end of year k	%

9 Test set-up

Add, after the first paragraph and before Figure 3, the following new paragraph:

For the electric demand-following test (14.14), the electric load shall be capable of applying or simulating an electric load profile to the system. It may be replaced or upgraded by a device, which is capable of doing this. Alternatively, the tested small stationary fuel cell power system may be equipped with means for setting and operating a load profile.

14 Type tests on electric/thermal performance

Replace the existing title of Clause 14 with the following new title:

Type tests on electric and thermal performance

Add, at the end of 14.12.11, the following new subclauses:

14.13 Estimation of electric and heat recovery efficiency up to ten years of operation

14.13.1 General

The main objective of this test is to identify and evaluate the environmental performance of a small stationary fuel cell power system based on life cycle approach. The test estimates the electric efficiency through lifetime due to long term effects on the small stationary fuel cell power system.

NOTE Approximating the degradation rate on small stationary fuel cell power systems is only useful if there is substantial daily operation, which is not the case for e.g. backup power systems.

Figure 16 shows an example of electric efficiency during ten years of operation.