Irish Standard
I.S. EN 62282-4-102:2017

Fuel cell technologies - Part 4-102: Fuel cell power systems for industrial electric trucks - Performance test methods

I.S. EN 62282-4-102:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN 62282-4-102:2017 is the adopted Irish version of the European Document EN 62282-4-102:2017, Fuel cell technologies - Part 4-102: Fuel cell power systems for industrial electric trucks - Performance test methods

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62282-4-102

June 2017

ICS 27.070

English Version

Fuel cell technologies - Part 4-102: Fuel cell power systems for industrial electric trucks - Performance test methods (IEC 62282-4-102:2017)

Technologies des piles à combustible - Partie 4-102: Systèmes à piles à combustible pour chariots de manutention électriques - Méthodes d'essai des performances (IEC 62282-4-102:2017)

Brennstoffzellen-Technologien - Teil 4-102: Antriebe mit Brennstoffzellen-Energiesystemen für elektrisch betriebene Flurförderfahrzeuge - Leistungskennwerteprüfverfahren (IEC 62282-4-102:2017)

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European foreword

The text of document 105/635/FDIS, future edition 1 of IEC 62282-4-102, prepared by IEC TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62282-4-102:2017.

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)	2018-02-15
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-05-15

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The text of the International Standard IEC 62282-4-102:2017 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 62282-3-200	NOTE	Harmonized as EN 62282-3-200.
IEC 62282-4-101	NOTE	Harmonized as EN 62282-4-101
ISO 6060	NOTE	Harmonized as EN ISO 6060
ISO 6976	NOTE	Harmonized as EN ISO 6976
ISO 10523	NOTE	Harmonized as EN ISO 10523

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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61672-1	-	Electroacoustics - Sound level meters -- Part 1: Specifications	EN 61672-1	-
IEC 62282-3-201	-	Fuel cell technologies -- Part 3-201: Stationary fuel cell power systems -- Performance test methods for small fuel cell power systems	EN 62282-3-201	-
IEC 62282-6-300	-	Fuel cell technologies -- Part 6-300: Micro fuel cell power systems - Fuel cartridge interchangeability	EN 62282-6-300	-
ISO 9000	-		EN ISO 9000	-
ISO 14687-2	-	Hydrogen fuel_- Product specification_- Part_2: Proton exchange membrane_(PEM) fuel cell applications for road vehicles	-	-

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IEC 62282-4-102

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fuel cell technologies – Part 4-102: Fuel cell power systems for industrial electric trucks – Performance test methods

Technologies des piles à combustible – Partie 4-102: Systèmes à piles à combustible pour chariots de manutention électriques – Méthodes d'essai des performances

IEC 62282-4-102:2017-04(en-fr)

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INTERNATIONAL STANDARD

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Fuel cell technologies –
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FUEL CELL TECHNOLOGIES –

Part 4-102: Fuel cell power systems for industrial electric trucks – Performance test methods

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62282-4-102 has been prepared by IEC technical committee 105: Fuel cell technologies.

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

FDIS	Report on voting
105/635/FDIS	105/642/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62282 series, under the general title *Fuel cell technologies*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of IEC 62282-4 provides consistent and repeatable test methods for the electric/thermal and environmental performance of fuel cell power systems for industrial electric trucks.

The IEC 62282-4 series deals with categories such as safety, performance, and interchangeability of fuel cell power systems for propulsion other than road vehicles and auxiliary power units (APUs). Among the categories mentioned above, this document (IEC 62282-4-102) focuses on fuel cell power systems for industrial electric trucks because such an application is urgently demanded in the world.

This part of IEC 62282-4 describes type tests and their test methods only. No routine tests are required or identified, and no performance targets are set in this standard.

Fuel cells used in industrial electric trucks, such as forklift trucks, are hybrids and so operate in several different modes. Similarly, forklift trucks operate in different modes. The purpose of this document is to evaluate the fuel cell system in the various combinations of fuel cell modes and forklift truck modes. This document will break down these different modes and provide a framework for designing and evaluating a fuel cell system for use specifically in a forklift truck.

This part of IEC 62282-4 is to be used by manufacturers of fuel cell power systems used for industrial electric trucks and/or those who evaluate the performance of their systems for certification purposes.

Users of this document 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.

FUEL CELL TECHNOLOGIES –

Part 4-102: Fuel cell power systems for industrial electric trucks – Performance test methods

1 Scope

This document covers performance test methods of fuel cell power systems intended to be used for electrically powered industrial trucks.

The scope of this document is limited to electrically powered industrial trucks. Hybrid trucks that include an internal combustion engine are not included in the scope. The scope of this standard will be applicable to material-handling equipment, e.g. forklifts.

This document applies to gaseous hydrogen-fuelled fuel cell power systems and direct methanol fuel cell power systems for electrically powered industrial trucks.
The following fuels are considered within the scope of this standard:

– gaseous hydrogen, and

– methanol.

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

This document covers fuel cell power systems whose fuel source container is permanently attached to either the industrial truck or the fuel cell power system. A fuel source container of the detachable type is not permitted.

This document applies to DC type fuel cell power systems, with a rated output voltage not exceeding 150 V DC for indoor and outdoor use.

Fuel cell power systems intended for operation in potentially explosive atmospheres are excluded from the scope of this document.

This document does not cover the fuel storage systems using liquid hydrogen.

All systems with integrated energy storage systems are covered by this document. This includes systems, for example, batteries for internal recharges or recharged from an external source.

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

IEC 62282-3-201, *Fuel cell technologies – Part 3-201: Small stationary fuel cell power systems – Performance test methods for small fuel cell power systems*

IEC 62282-6-300, *Fuel cell technologies – Part 6-300: Micro fuel cell power systems – Fuel cartridge interchangeability*