AS IEC 62282.8.301:2025
IEC 62282-8-301:2023

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Fuel cell technologies

Part 8.301: Energy storage systems using fuel cell modules in reverse mode — Power-to-methane energy systems based on solid oxide cells including reversible operation — Performance test methods



AS IEC 62282.8.301:2025

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The following are represented on Committee ME-093:

- Australian Gas Association
- Australian Hydrogen Council
- Chemistry Australia
- Energy Networks Australia
- Engineers Australia
- Gas Energy Australia
- Gas Technical Regulators Committee
- Institute of Electrical Inspectors
- National Association of Testing Authorities Australia
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A Standard always has the following parts:

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(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

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(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee ME-093, Hydrogen Technologies.

The objective of this document is to specify performance test methods of power-to-methane systems based on solid oxide cells (SOCs). Water, CO_2, and electricity are supplied to the system to produce methane and oxygen.

This document is identical to and has been reproduced from, IEC 62282-8-301:2023, *Fuel cell technologies — Part 8-301: Energy storage systems using fuel cell modules in reverse mode—Power-to-methane energy systems based on solid oxide cells including reversible operation — Performance test methods.*

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IEC 62282-8-301 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
105/968/FDIS	105/983/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.

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

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INTRODUCTION

This part of IEC 62282 describes performance evaluation methods for electric energy conversion systems based on power-to-methane systems using solid oxide cells (SOCs) and methanation reactors.

A typical application of the power-to-methane systems is an electrolytic production of methane as the energy carrier suitable for a large-scale, long-term storage and transportation.

The combustion heat of methane per mol is about three times larger than that of hydrogen. Methane is easily liquefied, which makes it suitable for storage and transportation via existing infrastructures for natural gas (tanks, pipelines, tankers, or trucks) as well as for being easily utilized by conventional equipment. Also, the use of "green methane" (produced by renewable electricity) or "carbon neutral methane" in place of "fossil methane" is a promising option in the near future.

The IEC 62282-8 series aims to develop performance test methods for power storage and buffering systems based on electrochemical modules (combining electrolysis and fuel cells, in particular reversible cells), taking into consideration both options of re-electrification and substance (and heat) production for the sustainable integration of renewable energy sources.

Under the general title "Energy storage systems using fuel cell modules in reverse mode", the IEC 62282-8 series consists of the following parts:

- IEC 62282-8-101: Test procedures for the performance of solid oxide single cells and stacks, including reversible operation
- IEC 62282-8-102: Test procedures for the performance of single cells and stacks with proton exchange membrane, including reversible operation
- IEC 62282-8-103[1]: Alkaline single cell and stack performance including reversible operation
- IEC 62282-8-201[2]: Test procedures for the performance of power-to-power systems
- IEC 62282-8-202[3]: Power-to-power systems - Safety
- IEC 62282-8-3xy (all parts): Power-to-substance systems

As a priority dictated by the emerging needs for industry and the opportunities for technological development, IEC 62282-8-101, IEC 62282-8-102 and IEC 62282-8-201 were initiated jointly.

This document is the first of the IEC 62282-8-3xy series.

1 Under consideration.

2 Second edition under preparation. Stage at the time of publication: IEC CDV 62282-8-201:2023.

3 Under consideration.

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NOTES