AS ISO 14687:2025
ISO 14687:2025

Hydrogen fuel quality — Product specification



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- Australia New Zealand Industrial Gas Association
- Australian Gas Association
- Australian Hydrogen Council
- Australian Industry Group
- Chemistry Australia
- Energy Networks Australia
- Engineers Australia
- Gas Energy Australia
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This page explains the meaning of the language and structure of this Standard.

Refer to Standards Australia's Standardisation Guide 006 for more details about drafting rules.

Australian and Australian/New Zealand Standards are voluntary unless they are referenced in legislation or called up in contracts.

Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(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.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(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 to supersede AS ISO 14687:2020.

The objective of this document is to specify the minimum quality characteristics of hydrogen fuel as distributed for utilization in residential, commercial, industrial, vehicular and stationary applications.

This document is applicable to hydrogen fuelling applications, which are listed in Table 2.

This document is identical to, and has been reproduced from, ISO 14687:2025, *Hydrogen fuel quality — Product specification.*

As this document has been reproduced from an international document, a comma is to be read as a full point when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 197, *Hydrogen technologies*.

This second edition cancels and replaces the first edition (ISO 14687:2019), which has been technically revised.

The main changes are as follows:

— a new Grade of hydrogen quality for internal combustion engine (Grade F) applications has been added in Informative Annex F;

— rationale for each Grade D specification has been moved from ISO19880-8 to this document;

— each specification for each Grade has been modified reflecting recent research work and change in industrial needs.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

In recent years, the landscape for using hydrogen as a fuel has changed significantly in response to its potential to contribute to the reduction of greenhouse gas emissions. This shift is influenced by challenges on both the hydrogen supply side, such as production technologies and supply chain infrastructure, and also the hydrogen energy usage side, including advancements in fuel cell and combustion technology. To address these changing conditions, the hydrogen fuel specifications in this document have been updated.

The hydrogen fuel specifications for proton exchange membrane (PEM) fuel cell applications in this document are primarily based on research, development and data on the following items [2][3][4][5][6][7][8][9][10][11][12][13][14]:

— PEM fuel cell catalyst and fuel cell tolerance to hydrogen fuel impurities;

— effects/mechanisms of impurities on fuel cell power systems and components;

— impurity detection and measurement techniques for laboratory, production and in-field operations;

— fuel cell vehicle demonstration and stationary fuel cell demonstration results.

Grade D and grade E in this document are intended to apply to PEM fuel cells for road vehicles and stationary appliances, respectively. These aim to facilitate the provision of hydrogen of reliable quality balanced with acceptable lower cost for the hydrogen fuel supply.

In addition, Grades F-1 and F-2 are newly specified in this edition to apply to hydrogen internal combustion engines for use in vehicular and stationary applications, respectively. The new Grades were placed in an informative annex (Annex F) to allow experience to be gained with this fuel quality prior to inclusion in the normative text.

While this document reflects the state-of-the-art at the date of its publication, the rapid development of quality requirements for hydrogen technology applications would necessitate future revisions in response to technological progress.

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Hydrogen fuel quality — Product specification

1 Scope

This document specifies the minimum quality characteristics of hydrogen fuel as distributed for utilization in residential, commercial, industrial, vehicular and stationary applications.

This document is applicable to hydrogen fuelling applications, which are listed in Table 2.

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.

ISO 19880-8, *Gaseous hydrogen — Fuelling stations — Part 8: Fuel Quality Control*

ISO 19880-9, *Gaseous hydrogen — Fuelling stations — Part 9: Sampling for fuel quality analysis*

ISO 21087, *Gas analysis — Analytical methods for hydrogen fuel — Proton exchange membrane (PEM) fuel cell applications for road vehicles*

3 Terms, definitions and abbreviations

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Terms and definitions

3.1.1
boundary point
<proton exchange membrane *fuel cell* (3.1.7) for stationary applications> point between the *hydrogen fuel supply equipment* (3.1.13) and the PEM *fuel cell power system* (3.1.9) at which the quality characteristics of the hydrogen fuel are to be determined

3.1.2
constituent
component (or compound) found within a hydrogen fuel mixture

3.1.3
contaminant
impurity that adversely affects the components within the *fuel cell system* (3.1.8), the *fuel cell power system* (3.1.9) or the hydrogen storage system

Note 1 to entry: An adverse effect can be reversible or irreversible.

3.1.4
customer
<proton exchange membrane *fuel cell* (3.1.7) for stationary applications> party responsible for sourcing hydrogen fuel in order to operate the *fuel cell power system* (3.1.9)

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