AS ISO 19885.1:2025
ISO 19885-1:2024

Gaseous hydrogen — Fuelling protocols for hydrogen-fuelled vehicles

Part 1: Design and development process for fuelling protocols



AS ISO 19885.1:2025

This Australian Standard® was prepared by ME-093, Hydrogen Technologies. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 1 December 2025.

This Standard was published on 19 December 2025.

The following are represented on Committee ME-093:

- 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
- Gas Technical Regulators Committee
- Institute of Electrical Inspectors
- National Association of Testing Authorities Australia
- The University of Adelaide

This Standard was issued for comment as DR AS 19885.1:2025

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals and new products by visiting:

www.standards.org.au

ISBN: 978 1 76175 552 1

AS ISO 19885.1:2025
ISO 19885-1:2024

Australian Standard®

Gaseous hydrogen — Fuelling protocols for hydrogen-fuelled vehicles

Part 1: Design and development process for fuelling protocols

First published as AS ISO 19885.1:2025.

© ISO 2025 — All rights reserved
© Standards Australia Limited 2025

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

How to read this Standard

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.

The objective of this document is to address the design and development of fuelling protocols for compressed hydrogen gas dispensing to vehicles with compressed hydrogen storage of fuel.

The document does not address dispensing of compressed hydrogen gas to vehicles with hydride-based hydrogen storage systems as well as the dispensing of liquefied or cryo-compressed hydrogen.

This document is intended to be used for a wide range of applications including, but not limited to, the following:

(a) Light, medium, and heavy-duty road vehicles.

(b) Motor bicycles and tricycles, carts, and trailers.

(c) Off-road vehicles.

(d) Fork-lift and other industrial trucks.

(e) Rail locomotives and powered cars.

(f) Airplanes and drones.

(g) Maritime ships, boats, and barges.

This document is identical to, and has been reproduced from, ISO 19885-1:2024, *Gaseous hydrogen — Fuelling protocols for hydrogen-fuelled vehicles — Part 1: Design and development process for fuelling protocols.*

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.

NOTE: IEC 60204-1 has been adopted in Australia by AS/NZS 4024.1204 and is to be used for the application of this document.

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.

© Standards Australia Limited 2025

Contents

Page

Preface ..... **v**
Foreword ..... **vii**
Introduction ..... **viii**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 Abbreviations and symbols **7**
5 General description of the fuelling protocol design and development process **8**
6 Definition of fuelling protocol requirements for dispensing **9**
6.1 Definition of basic requirements for the fuelling protocol 9
6.2 Definition of the fuelling envelope 9
6.2.1 Fuelling requirements based on vehicle regulations and standards 9
6.2.2 Additional information for vehicle requirements when regulatory requirements and standards are not available 10
6.2.3 Requirements based on dispenser design and operating characteristics 11
6.3 Dispenser application considerations 11
7 Fuelling protocol design and definition **12**
7.1 Fuelling protocol design 12
7.2 Communications between the vehicle and dispensing system 12
7.3 Risk assessment and fault management 13
8 Development and verification of the fuelling protocol **14**
8.1 Verification of the fuelling protocol 14
8.2 Documentation and standardization of the fuelling protocol 16
9 Validation of the fuelling protocol in the dispenser control systems **17**
Annex A (Normative) **Development requirements for fuelling protocols of road vehicles** **18**
Annex B (Informative) **Information and Guidance for Clauses 6 Through 9** **27**
Bibliography **35**

© Standards Australia Limited 2025

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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*.

A list of all parts in the ISO 19885 series can be found on the ISO website.

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.

© Standards Australia Limited 2025

Introduction

This document is intended to identify and describe requirements for the design and development of hydrogen dispenser fuelling protocols and address issues with current protocols with regard to their acceptance and thoroughness of verification as well as the safe implementation in dispenser systems.

This document is intended to coordinate with the ISO 19880 series with regard to road vehicles and, at the same time, address a more general need with the regard to fuelling a far broader range of vehicles. This document can help to address technical details of the fuelling process and will allow ISO 19880-1 to be streamlined and focus on basic requirements of the fuelling station.

This document is expected to be the first part in a series dealing with fuelling protocols for a broad range of vehicle applications.

Additionally, the requirements for the development process in this document are robust and can be considered for extension to other container-fuelling applications in the future.

© Standards Australia Limited 2025

Australian Standard®

Gaseous hydrogen — Fuelling protocols for hydrogen-fuelled vehicles

Part 1: Design and development process for fuelling protocols

1 Scope

This document addresses the design and development of fuelling protocols for compressed hydrogen gas dispensing to vehicles with compressed hydrogen storage of fuel.

The document does not address dispensing of compressed hydrogen gas to vehicles with hydride-based hydrogen storage systems as well as the dispensing of liquefied or cryo-compressed hydrogen.

This document is intended to be used for a wide range of applications including, but not limited to, the following:

— light, medium, and heavy-duty road vehicles,

— motor bicycles and tricycles, carts, and trailers,

— off-road vehicles,

— fork-lift and other industrial trucks,

— rail locomotives and powered cars,

— airplanes and drones, and

— maritime ships, boats, and barges.

This document applies to a wide spectrum of development situations ranging from companies developing a fuelling protocol for their specific products or applications to standards development organizations (SDOs) developing a consensus-based fuelling protocol for a broad segment of the industrial or commercial market. Additionally, combinations between the two extremes are possible, where, for example, companies start design and development as a way of defining a proposal for new work by an SDO to complete development and publish the document as a consensus-based standard (including technical justification for compliance to this document).

This document defines requirements for the design and development of the fuelling protocols. These requirements can be integrated into the existing design and development processes to ensure that the fuelling protocol is fully verified and that the generated documentation is sufficient for the proper implementation and safe use of the fuelling protocols in dispensing systems for the targeted application.

In addition to addressing the design and development of fuelling protocols for general applications, Annex A provides specific requirements and information relative to fuelling protocols for road vehicles at public fuelling stations based on ISO 19880-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all 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 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

© Standards Australia Limited 2025