International Standard

ISO 19880-2

First edition
2025-02

Gaseous hydrogen — Fuelling stations —

Part 2: Dispensers and dispensing systems

Carburant d'hydrogène gazeux — Stations de ravitaillement — Partie 2: Dispositifs et systèmes de distribution

Reference number
ISO 19880-2:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025
All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 General **7**
5 Requirements **8**
5.1 General material requirements 8
5.2 Construction and assembly requirements 9
5.2.1 General construction and assembly 9
5.2.2 Housings and cabinets 10
5.3 Dispenser hydrogen systems 10
5.4 Piping and fittings 11
5.5 Overpressure protection devices 12
5.6 Filters 12
5.7 Valves 13
5.8 Venting 13
5.9 Dispenser fuelling assembly 13
5.10 Breakaway devices 14
5.11 Instruments for gaseous hydrogen systems 14
5.12 Metering 15
5.13 Precoolers and precooler control 15
5.14 Electrical equipment and wiring 15
5.14.1 General electrical requirements 15
5.14.2 Bonding and grounding 15
5.14.3 Safety instrumented systems 15
5.14.4 Illumination 16
5.14.5 Payment terminals or fuelling authorizing systems 16
5.14.6 Electromagnetic compatibility and interference (EMC) 16
5.15 Emergency shutdown system (ESS) 16
6 Dispensing requirements **17**
6.1 Control of dispensing 17
6.2 Dispensing temperature, pressure and flow rate 17
6.3 Pressure integrity check (leak check) 17
6.4 Fuelling protocol and process limits 18
6.5 Post dispensing 18
7 Dispenser fault management **18**
8 Marking **18**
8.1 General requirements 18
8.2 Dispenser name plate 19
8.3 Self-serve dispenser instructions 19
9 Qualification tests **19**
9.1 General 19
9.2 Standard test conditions 19
9.3 Proof pressure test 20
9.3.1 Acceptance criteria 20
9.3.2 Test method 20
9.4 Leakage test 20
9.4.1 Acceptance criteria 20
9.4.2 Test method 20
9.5 Impact test 20

© ISO 2025 – All rights reserved

9.5.1 Acceptance criteria 20
9.5.2 Test method 21
9.6 Dispenser shutdown test 21
9.6.1 Acceptance criteria 21
9.6.2 Test method 21
9.7 Hose rupture 22
9.7.1 General 22
9.7.2 Acceptance criteria 22
9.7.3 Test method 22
9.8 Hose breakaway test 23
9.8.1 Acceptance criteria 23
9.8.2 Test method 23
9.9 Prevention of electrostatic discharge 23
9.9.1 Acceptance criteria 23
9.9.2 Test method 23
9.10 Dispenser ground continuity test 24
9.10.1 Acceptance criteria 24
9.10.2 Test method 24
9.11 Dielectric voltage-withstand test 24
9.11.1 Acceptance criteria 24
9.11.2 Test method 24
9.12 Dispenser cabinet test 25
9.12.1 Acceptance criteria 25
9.12.2 Test method 25
9.13 Marking material adhesion and legibility test 25
9.13.1 Acceptance criteria 25
9.13.2 Test method 25

10 Routine tests 26

11 Product literature 26
11.1 General 26
11.2 Installation 26
11.3 Maintenance and service 26
11.4 Operation 27

Annex A (informative) **Dispenser system types 28**

Annex B (informative) **Examples of hazardous area classification 30**

Annex C (normative) **Marking class requirements 33**

Bibliography 35

© ISO 2025 – All rights reserved

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 19880 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.

© ISO 2025 – All rights reserved

Introduction

The purpose of this document is to promote the implementation of hydrogen-powered land vehicles through the creation of performance-based safety and testing requirements for compressed hydrogen fuel dispensers. The successful commercialization of hydrogen land vehicle technologies requires codes and standards pertaining to fuelling stations, vehicle fuel system components and the global homologation of standards requirements for technologies with the same end use. This will allow manufacturers to achieve economies of scale in production through the ability to manufacture one product for global use.

This document is a part of the ISO 19880 series for hydrogen fuelling stations with its scope limited to compressed hydrogen dispensers for land vehicles that use hydrogen as fuel. Dispensers are a major component of hydrogen fuelling stations, without which hydrogen vehicles will not become a significant element of mobility in the future. This document includes requirements for manufacture, commissioning and routine maintenance of dispensers in order to ensure the safe operation of dispensing hydrogen to vehicles.

Note Annex A has additional information about the range of options for dispenser systems.

© ISO 2025 – All rights reserved

Gaseous hydrogen — Fuelling stations —

Part 2: Dispensers and dispensing systems

1 Scope

This document specifies safety requirements and test methods for the components and systems that enable the transfer of compressed hydrogen to a hydrogen vehicle, as addressed in ISO 19880-1, by a hydrogen dispenser with dispensing pressures up to the H70 pressure class designation.

This document applies to a hydrogen dispensing system, referred to as a "dispenser"; the configuration of the dispenser can range from:

a) a dispenser cabinet, located in the fuelling area, that can perform all of the functionality needed to deliver hydrogen to a vehicle, to

b) a minimum set of components mounted in or on (as applicable) a dispenser cabinet or other supporting structure as appropriate, with the remaining functionality provided elsewhere in the hydrogen fuelling station.

A dispensing system includes the user and vehicle interface and can include components starting from the hydrogen supply, such as a connection to the banking system, a cooling unit, a dispenser control system, a flow meter, a pressure sensor, a fuel temperature sensor, an ambient temperature sensor, user interface and a fuelling hose assembly. Not all dispensing system equipment has to be physically housed within the enclosure at the dispensing area, as long as the specification of component design or type and location are adequate to ensure that the overall process meets the requirements in this document.

This document specifies the requirements for hydrogen dispensers and can provide specific references to other standards for individual components included in the hydrogen dispenser, such as valves (ISO 19880-3) and hoses (ISO 19880-5).

This document specifies general requirements for supporting the fuelling protocol and directs the user to ISO 19880-1 for additional requirements and the test methods required to verify proper fuelling protocol implementation.

This document does not specify the accuracy of flow meters that can be used to meter dispensed fuel.

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 3601-1, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 3601-2, *Fluid power systems — O-rings — Part 2: Housing dimensions for general applications*

ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*

ISO 3864-2, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*

ISO 4126 (all parts), *Safety devices for protection against excessive pressure*

© ISO 2025 – All rights reserved

ISO 80079-36, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements*

ISO 80079-37, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"*

ISO 14687, *Hydrogen fuel quality – Product specification*

ISO 15649, *Petroleum and natural gas industries — Piping*

ISO 17268, *Gaseous hydrogen land vehicle refuelling connection devices*

ISO 19880-1:2020, *Gaseous hydrogen — Fuelling stations — Part 1: General requirements*

ISO 19880-3, *Gaseous hydrogen — Fuelling stations — Part 3: Valves*

ISO 19880-5, *Gaseous hydrogen – Fuelling stations – Part 5: Dispenser hoses and hose assemblies*

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60364, *Low-voltage electrical installations*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

SAE J2600, *Compressed Hydrogen Surface Vehicle Fuelling Connection Devices*

SAE J2601, *Fuelling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles*

3 Terms and definitions

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

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

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

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

3.1
breakaway device
device on the *fuelling hose* (3.11) that disconnects the hose from the *dispenser* (3.5) when a tension limit is exceeded and blocks the flow of hydrogen from the *dispenser* (3.5), e.g. if the vehicle moves away with the *fuelling hose* (3.11) connected to the vehicle

[SOURCE: ISO 19880-1:2020, 3.50]

3.2
component pressure rating
maximum pressure at which it is permissible to operate a component as specified by the *manufacturer* (3.15) at a specified temperature

Note 1 to entry: Components designed with a maximum allowable pressure per the European PED represent the component pressure rating by the *manufacturer* (3.15) as indicated by the value of "PS".

Note 2 to entry: See Annex E of ISO 19880-1 for discussion of pressure terminology and its application to *dispensing systems* (3.6).

Note 3 to entry: Unless otherwise specified, the pressure in this document is expressed in gauge pressure.

[SOURCE: ISO 19880-1:2020, 3.10 modified – Notes 2 to 4 to entry deleted with Note 5 to entry of the source definition renumbered as Note 2 to entry.]

© ISO 2025 – All rights reserved