INTERNATIONAL STANDARD

ISO 17268

Third edition
2020-02

Gaseous hydrogen land vehicle refuelling connection devices

Dispositifs de raccordement pour le ravitaillement des véhicules terrestres en hydrogène gazeux

Reference number
ISO 17268:2020(E)

© ISO 2020



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2020 – All rights reserved

Contents

Page

Foreword ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 General construction requirements **3**

5 Nozzles **5**

6 Receptacles **7**

7 Design verification test procedures **8**
7.1 General requirements 8
7.2 Test conditions 8
7.3 Nozzle tests 8
7.4 Receptacle tests 8
7.5 User — Machine interface 8
7.6 Dropping 9
7.7 Leakage at room temperature 9
7.8 Valve operating handle 10
7.9 Receptacle vibration resistance 10
7.10 Abnormal loads 10
7.11 Low and high temperatures 11
7.11.1 Purpose 11
7.11.2 General 11
7.11.3 Leakage tests 11
7.11.4 Operation tests 11
7.12 Durability and maintainability 12
7.12.1 Purpose 12
7.12.2 Nozzle durability test 12
7.12.3 Receptacle check valve durability test 13
7.12.4 Receptacle durability test 13
7.12.5 Connected nozzle and receptacle durability test 13
7.13 Sealing material aging test 13
7.13.1 Purpose 13
7.13.2 Oxygen aging test procedure 14
7.13.3 Ozone aging test procedure 14
7.14 Non-metallic material hydrogen resistance test 14
7.15 Electrical resistance 14
7.16 Hydrostatic strength 14
7.17 Corrosion resistance 15
7.17.1 Purpose 15
7.17.2 General 15
7.17.3 Nozzle test 15
7.17.4 Receptacle test 15
7.18 Deformation 15
7.19 Contamination test 15
7.20 Thermal cycle test 16
7.21 Pre-cooled hydrogen exposure test 16
7.22 Misconnected nozzle test 16
7.23 Upward/downward nozzle compatibility test 17
7.23.1 General 17
7.23.2 Upwards nozzle compatibility test 17
7.23.3 Downwards nozzle compatibility test 17
7.24 Washout test 18
7.25 User abuse test 18

© ISO 2020 – All rights reserved

7.26 Freezing test 18
7.27 Rocking test 19
7.28 Communication test 20
8 Instructions **20**
9 Marking **21**
Annex A (normative) **Receptacle/nozzle interface envelope** **22**
Annex B (normative) **Hydrogen receptacles** **23**
Annex C (normative) **Loose fit test fixtures** **29**
Annex D (normative) **Tight fit test fixtures** **34**
Annex E (normative) **Wear pattern test fixtures** **39**
Annex F (informative) **Example hex design** **44**
Bibliography **45**

 © ISO 2020 – 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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 268, *Cryogenic vessels and specific hydrogen technologies applications*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 17268:2012), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 1, Clause 2, 3.1, 4.9. 5.8, 5.9, 5.17, 6.1, 6.9, 7.2, 7.5, 7.7, 7.8, 7.12.2, 7.12.3, 7.12.4, 7.16, 7.22, 7.25, 7.26, 7.27, 7.28, Clause 9, Table 1, Figure 3, Figure 4, Annex A, Annex B, Annex C, Annex D, Annex E and Annex F have been modified.

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 2020 – All rights reserved

Gaseous hydrogen land vehicle refuelling connection devices

1 Scope

This document defines the design, safety and operation characteristics of gaseous hydrogen land vehicle (GHLV) refuelling connectors.

GHLV refuelling connectors consist of the following components, as applicable:

— receptacle and protective cap (mounted on vehicle);

— nozzle;

— communication hardware.

This document is applicable to refuelling connectors which have nominal working pressures or hydrogen service levels up to 70 MPa.

This document is not applicable to refuelling connectors dispensing blends of hydrogen with natural gas.

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 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 12103-1, *Road vehicles — Test contaminants for filter evaluation — Part 1: Arizona test dust*

ISO 15501-1, *Road vehicles — Compressed natural gas (CNG) fuel systems — Part 1: Safety requirements*

3 Terms and definitions

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 https://www.iso.org/obp

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

3.1
communication hardware
infrared data association (IrDA) components which are used to transmit signals from the vehicle (*receptacle*) (3.15) to the dispenser (*nozzle*) (3.11) and designed to meet SAE J2799 or equivalent

© ISO 2020 – All rights reserved

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

Note 1 to entry: Components designed to the maximum allowable pressure per the European Pressure Equipment Directive (PED) represent the component ratings by the manufacturer that is indicated by the value of "PS."

Note 2 to entry: See Table 1 for required component pressure ratings for various *pressure classes* (3.13) of fuelling *connectors* (3.3).

Note 3 to entry: Further guidance on dispenser pressure terminology is included in ISO 19880-1.

Table 1 — Dispensing system pressure levels and refuelling connector ratings

***NWP* (3.10) of vehicle (*receptacle*) (3.15) or *HSL* (3.7) of dispenser (*nozzle*) (3.11)**	***Pressure class* (3.13)**	***Maximum operating pressure (MOP)* (3.9)**	**Minimum dispenser component pressure rating (PS)**
Equal to NWP of the vehicle storage system per vehicle label		*1,25 × HSL/1,25 × NWP* *Highest fill pressure during normal fuelling*	*1,375 × HSL* *Highest permissible set-point for dispenser pressure protection in ISO 19880-1:—*, 8.2.2.3
11 MPa	H11	13,75 MPa	15,125 MPa
25 MPa	H25	31,25 MPa	34,375 MPa
35 MPa	H35 or H35HF[a]	43,75 MPa	48,125 MPa
70 MPa	H70	87,5 MPa	96,25MPa

[a] High-flow connectors for heavy-duty commercial vehicles.

3.3
connector
joined assembly of *nozzle* (3.11) and *receptacle* (3.15) which permits the transfer of hydrogen

3.4
cycle
process of making a positive connection between the *nozzle* (3.11) and the *receptacle* (3.15), pressurizing to the *maximum operating pressure* (3.9), depressurizing and disconnecting

3.5
dry helium
helium with a dew point adequate to prevent condensation during testing and at least 99 % pure

3.6
dry hydrogen
hydrogen which meets or exceeds the quality level in ISO 14687-2

3.7
hydrogen service level
HSL
pressure level used to characterize the hydrogen service of the dispenser based on the *NWP* (3.10) rating of the vehicle

Note 1 to entry: The numerical value of HSL also matches the number after the "H" in the *pressure class* (3.13).

Note 2 to entry: HSL is expressed in MPa.

© ISO 2020 – All rights reserved

3.8
leak test gas
gas for testing leaks that consists of *dry hydrogen* (3.6), or *dry helium* (3.5), or blends of a minimum 10 % of hydrogen or helium with nitrogen

3.9
maximum operating pressure
MOP
highest pressure that is expected for a component or system during normal operation

Note 1 to entry: Further guidance on dispenser pressure terminology is included in ISO 19880-1.

Note 2 to entry: The maximum operating pressure is 125 % of the *nominal working pressure* (3.10) or *hydrogen service level* (3.7), as applicable, for the purpose of testing of *nozzles* (3.11) and *receptacles* (3.15) in this document.

3.10
nominal working pressure
NWP
pressure of a full vehicle compressed hydrogen storage system at a gas temperature of 15 °C

Note 1 to entry: See ECE/TRANS/180/Add. 13 Global Technical Regulation No. 13 clause II-3.37.

Note 2 to entry: See Table 1 for NWPs covered in this document.

Note 3 to entry: Further guidance on pressure terminology is included in ISO 19880-1.

Note 4 to entry: NWP is also known as “settled pressure” in ISO 10286.

3.11
nozzle
device connected to a fuel dispensing system, which permits the quick connect and disconnect of fuel supply to the vehicle or storage system

3.12
positive locking device
device with the feature which requires actuation of an interlocking mechanism to achieve proper connection of the *nozzle* (3.11) to the *receptacle* (3.15) before pressure is applied

3.13
pressure class
non-dimensional rating of components that indicates the components are designed to dispense hydrogen to road vehicles at the required pressure and temperature

Note 1 to entry: See Table 1 for pressure classes of fuelling *connectors* (3.3).

Note 2 to entry: Further guidance on dispenser pressure terminology is included in ISO 19880-1.

3.14
protective cap
means to prevent dirt and other contaminants from getting into the inlet of the vehicle *receptacle* (3.15)

3.15
receptacle
device connected to a vehicle or storage system which receives the *nozzle* (3.11)

Note 1 to entry: This can also be referred to as a fuelling inlet of gas filling port in other documents.

4 General construction requirements

4.1 Nozzles and receptacles shall be designed in accordance with reasonable concepts of safety, durability and maintainability.

© ISO 2020 – All rights reserved