

CcH2 - CRYO-COMPRESSED HYDROGEN GAS

GASEOUS HYDROGEN LAND
VEHICLE REFUELLING
CONNECTION DEVICES
WHITE PAPER PROCESS

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The following document based on the ISO 17268.

The informations and details of this document (incl. content) are publicated under following link:

[ISO 17268:2020\(en\), Gaseous hydrogen land vehicle refuelling connection devices](#)

Further, the necessary amendments for a CcH₂ storage system are described, regarding to the deviation from the standard ISO 17268 document.

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White Paper Process CcH₂

Description of the amendments required to ISO 17268. The main changes compared to the current edition are as follows:

3.9 maximum operating pressure MOP

highest CGH₂ pressure that is expected for a component or system during normal operation **and highest CcH₂ operating pressure (blow-off pressure).**

3.10 nominal working pressure NWP

CGH₂: pressure of a full vehicle compressed hydrogen storage system at a gas temperature of 15 °C.

CcH₂: pressure of a full vehicle cryocompressed hydrogen storage system at a gas temperature of **243°C to 65°C.**

4.5 Nozzles and receptacles shall be manufactured of materials suitable and compatible for use with compressed **and cryo-compressed** hydrogen at the pressure and the temperature ranges to which they will be subjected as specified in 3.2, 5.8 and 6.9. Materials used in the construction of nozzles, receptacles and protective caps shall be non-sparking or spark-reducing. All pressure bearing and wetted components shall also be made from material that is compatible with deionised water. Non-metallic material compatibility shall be documented by the component manufacturer or an independent third party.

4.9 CGH₂: Communications hardware which is supplied by the manufacturer and permanently integrated into the nozzle shall be attached to the nozzle and subjected to all of the nozzle tests. The communications hardware shall operate correctly upon completion of the all type and quality testing.

CcH₂: As a design criterion, communication devices in the nozzle is not required.

5.1 CGH₂: Nozzles shall couple with receptacles of equal or higher nominal working pressures and they shall be designed so that they will not couple with receptacles of lower nominal working pressures. The nozzle shall extend to within 1 mm of the stop ring for all nominal working pressures. Nozzles shall be designed so that they will not couple with gaseous fuelled vehicles other than GHLV.

CcH₂: Nozzles shall couple with receptacles of equal or higher nominal working pressures and they shall be designed so that they will not couple with receptacles of lower nominal working pressures. The nozzle shall extend to within 1 mm of the stop ring for all nominal working pressures. Nozzles shall be designed so that they will not couple with non-cryogenic GHV.

- 5.6 CGH₂: The H11 and H25 nozzles shall fit within the envelope described in ISO 15501-1. All other nozzles shall fit within the envelope specified in Annex A.

CcH₂: under investigation.

- 5.8 CGH₂: The nozzle shall be designed to operate at ambient temperatures ranging from -40°C to 65 °C and at hydrogen gas temperatures ranging from -40 °C to 85 °C.

CcH₂: The nozzle shall be designed to operate at ambient temperatures ranging from -40 °C to 65 °C and at hydrogen gas temperatures ranging from -251 °C to 85 °C.

- 5.10 CGH₂: The nozzle shall not have any mechanical means of opening the receptacle check valve.

CcH₂: The nozzle may have mechanical means for opening the receptacle check valve.

- 5.17 Note: The communication has to be observed for the CGH₂ Systems.

Note: The communication can be observed for the CcH₂ Systems.

- 6.1 CGH₂: Standard receptacle dimensions: A CGH₂ receptacle shall be in accordance with the design specifications detailed in Annex B1.

CcH₂: Standard receptacle dimensions (under investigation): A CcH₂ receptacle shall be in accordance with the design specifications detailed in Annex B2.

Note: A CcH₂ receptacle shall be in accordance with the design specifications detailed at a later stage.

- 6.9 a) CGH₂: The receptacle shall be designed to operate at hydrogen gas temperatures ranging from -40 °C to 85 °C.

CcH₂: The receptacle shall be designed to operate at hydrogen gas temperatures ranging from -251°C to 85 °C.

Definition of Cryogas storage system pressure level (40 MPa)

The system pressure according to ISO Standard is 40 MPa.

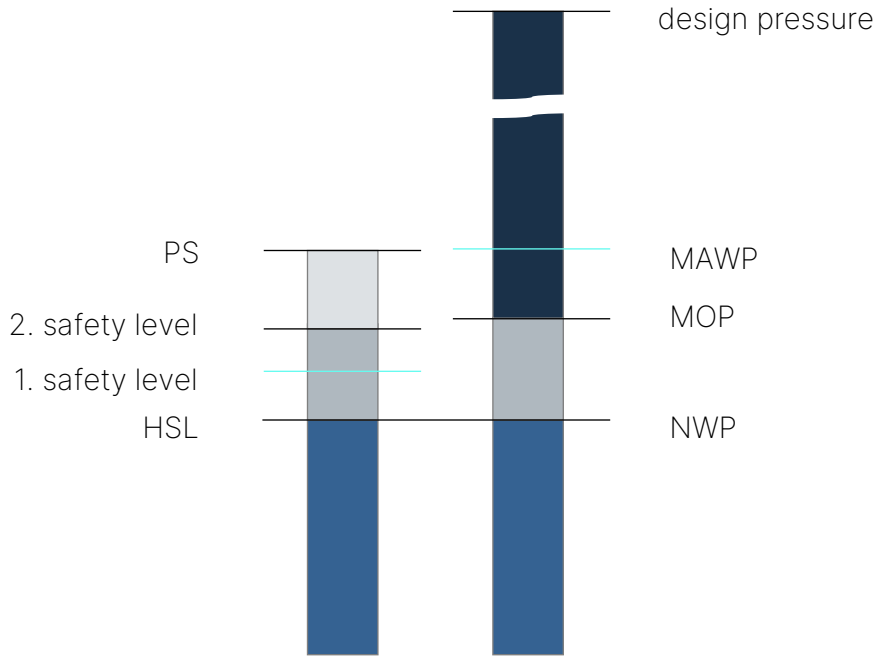


Figure 1: Definition of pressure level

refuelling station

nomenclature	description	HSL x	p [MPa]
PS	Minimum dispenser component pressure rating	1.24	49.5
2. safety level	PRD: fully open	1.21	48.4
	PRD: start (min. activate pressure)	1.10	44.0
1. safety level	refuelling control system: stop refuelling	1.05	42
HSL	hydrogen service level	1.00	40

vehicle

nomenclature	description	NWP x	p [MPa]
design pressure	vessel - burst pressure	2.25	90
MAWP	PRD	1.24	49.5
MOP	blow off pressure	1.125	45
NWP	nominal working pressure	1.00	40