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Road vehicles — Compressed gaseous Hydrogen (CGH2) and Hydrogen/Natural gas blends fuel system components —

Part 5:
Manual cylinder valve

Véhicules routiers — Composants des circuits d'alimentation pour hydrogène gazeux comprimé (CGH2) et mélanges de gaz naturel et hydrogène —

Partie 5: Valve manuelle du cylindre

ICS: 43.060.40

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Foreword

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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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 25, *Road vehicles using gaseous fuels*.

ISO 12619 consists of the following parts, under the general title *Road vehicles — Compressed Gaseous Hydrogen (CGH2) and hydrogen/Natural gas blends fuel system components*:

— *Part 1: General requirements and definitions*

— *Part 2: Performance and general test methods*

— *Part 3: Pressure regulator*

— *Part 4: Check valve*

— *Part 5: Manual cylinder valve*

Road vehicles — Compressed gaseous Hydrogen (CGH2) and Hydrogen/Natural gas blends fuel system components —

Part 5:
Manual cylinder valve

1 Scope

This International Standard specifies general requirements and definitions of Compressed Gaseous Hydrogen (CGH2) and Hydrogen/Natural gas blends fuel system components, intended for use on the types of motor vehicles defined in ISO 3833. It also provide general design principles and specifies requirements for instructions and markings.

It is applicable to vehicles using Compressed Gaseous Hydrogen (CGH2) in accordance with ISO 14687-1 or ISO 14687-2 and Hydrogen/Natural gas blends using natural gas in accordance with ISO 15403-1 and ISO/TR 15403-2. It is not applicable to the following:

a) liquefied hydrogen (LH2) fuel system components located upstream of, and including, the vaporizer;

b) fuel containers;

c) stationary gas engines;

d) container mounting hardware;

e) electronic fuel management;

f) refuelling receptacles.

NOTE 1 It is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this International Standard and tested according to the appropriate functional tests.

NOTE 2 All references to pressure in this International Standard are to be considered gauge pressures unless otherwise specified.

NOTE 3 This Standard may not apply to fuel cell vehicles in compliance with international Regulations.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3833:1977, *Road vehicles — Types — Terms and definitions*

ISO 6722-1:1996, *Road vehicles — Unscreened low-tension cables — Part 1: Test methods*

ISO 6722-2:1996, *Road vehicles — Unscreened low-tension cables — Part 2: Requirements*

ISO 6722-3:1993, *Road vehicles — Unscreened low-tension cables — Part 3: Conductor sizes and dimensions for thick-wall insulated cables*

ISO 6722-4:1993, *Road vehicles — Unscreened low-tension cables — Part 4: Conductor sizes and dimensions for thin-wall insulated cables*

ISO 14687-1, *Hydrogen fuel — Product specification — Part 1: All applications except proton exchange membrane (PEM) fuel cell for road vehicles*

ISO/TS 14687-2, *Hydrogen Fuel — Product Specification — Part 2: Proton exchange membrane (PEM) fuel cell applications for road vehicles.*

ISO 12619-1, *Road vehicles — Compressed gaseous hydrogen (CGH2) and hydrogen/natural gas blend fuel system components — Part 1: General requirements and definitions*

ISO 12619-2, *Road vehicles — Compressed gaseous hydrogen (CGH2) and hydrogen/natural gas blend fuel system components — Part 2: Performance and general test methods*

ISO 12619-3, *Road vehicles — Compressed gaseous hydrogen (CGH2) and hydrogen/natural gas blend fuel system components — Part 3: Pressure regulator*

ISO 12619-4, *Road vehicles - Compressed Gaseous Hydrogen (CGH2) and hydrogen/Natural gas blends fuel system components - Part 4: Check valve*

ISO 15869, *Gaseous hydrogen and hydrogen blends — Land vehicle fuel tanks*

ISO 15403-1, *Natural gas — Natural gas for use as a compressed fuel for vehicles — Part 1: Designation of the quality*

ISO/TR 15403-2, *Natural gas — Natural gas for use as a compressed fuel for vehicles — Part 2: Specification of the quality*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 12619-1 shall apply.

4 Marking

Marking of the component shall provide sufficient information to allow the following to be traced:

a) the manufacturer's or agent's name, trademark or symbol

b) the model designation (part number)

c) the working pressure or pressure and temperature range

The following additional markings are recommended:

d) the direction of flow (when necessary for correct installation)

e) the type of fuel

f) electrical ratings (if applicable)

g) the symbol of the certification agency (if applicable)

h) the type approval number

i) the serial number or date code

j) reference to ISO 12619 Standard.

Marking shall remain legible for the life of the component and shall not be removable without destroying or defacing the marking. Permanent adhesive labels are permissible, or markings may be etched, stamped, or moulded into the component.

NOTE 1 Specific information required for each component can be found in ISO 12619-4 and subsequent parts of this International Standard.

NOTE 2 This information can be provided by a suitable identification code on at least one part of the component when it consists of more than one part.

5 Construction and assembly

The manual cylinder valve shall comply with the applicable provisions of ISO 12619-1 and ISO 12619-2, and with the tests specified in Clause 6 of this International Standard.

6 Tests

6.1 Applicability

The tests required to be carried out are indicated in Table 1.

Table 1 — Tests applicable

Test	Applicable	Test procedure as required by ISO 12619-2	Specific test requirements of this part of ISO 12619
Hydrostatic strength	X	X	X (see 6.2)
Leakage	X	X	X (see 6.3)
Excess torque resistance	X	X	
Bending moment	X	X	
Continued operation	X	X	X (see 6.4)
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Ozone ageing	X	X	
N-pentane	X	X	
Heat ageing	X	X	
Electrical overvoltages			
Non-metallic material immersion	X	X	
Pre-cooled hydrogen exposure test	X		X
Material requirements	X	-	-
Non metallic material compatibility to hydrogen	X		X
Automotive fluid exposure	X		X
Vibration resistance	X	X	
Brass material compatibility	X	X	

6.2 Hydrostatic strength

Test the manual cylinder valve according to the procedure for testing hydrostatic strength specified in ISO 12619-2. The test pressure shall be 2 times the working pressure.

6.3 Leakage

Test the manual cylinder valve at the temperatures and pressures given in Table 2.

Table 2 — Test temperatures and pressures

Temperature ° C	**Pressure** Factor X Working Pressure	
	First	Second
- 40 or −20°C as applicable	0.75xWP	0.025xWP
20	0.025xWP	1.5xWP
85	0.05xWP	

6.4 Continued operation

6.4.1 Test the manual cylinder valve in accordance with the procedure for testing continued operation given in ISO 12619-2, for 2 000 cycles, but lower the downstream pressure of the test fixture to less than 0,5 MPa (5 bar), and perform the leakage test in accordance with 6.3 of this part of ISO 12619.

6.4.2 Following cycling and leakage re-testing, the manual cylinder valve shall be capable of completely opening and closing when a torque no greater than the appropriate one specified in **Table 3** is applied to the component handle in a direction that opens it completely and in the opposite direction. The test shall be conducted with the valve pressurized at service pressure.

Table 3 — Torque test

Test Temp.	**Ambient Temp.**	**- 40°C**
Component inlet size mm	**Max. torque** N · m	**Max. torque** N · m
6	1,7	3,4
8 or 10	2,3	4,5
12	2,8	11,3

6.4.3 Conduct the test at the appropriate maximum temperature according to 4.4 of ISO 12619-1, then repeat the test at a temperature of −40 °C and with the appropriate maximum torque specified in **Table 3** above.

6.4.4 Following cycling and leakage re-testing and the torque testing, perform the hydrostatic test in accordance with 6.2 of this part of ISO 12619.

