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Road vehicles — Compressed natural gas (CNG) fuel system components —

Part 4: Manual valve

Véhicules routiers — Composants des systèmes de combustible gaz naturel comprimé (GNC) —

Partie 4: Valve manuelle

Reference number
ISO 15500-4:2001(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 15500 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15500-4 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 25, *Road vehicles using natural gas*.

ISO 15500 consists of the following parts, under the general title *Road vehicles — Compressed natural gas (CNG) fuel system components*:

— *Part 1: General requirements and definitions*

— *Part 2: Performance and general test methods*

— *Part 3: Check valve*

— *Part 4: Manual valve*

— *Part 5: Manual cylinder valve*

— *Part 6: Automatic valve*

— *Part 7: Gas injector*

— *Part 8: Pressure indicator*

— *Part 9: Pressure regulator*

— *Part 10: Gas-flow adjuster*

— *Part 11: Gas/air mixer*

— *Part 12: Pressure relief valve (PRV)*

— *Part 13: Pressure relief device (PRD)*

— *Part 14: Excess flow valve*

— *Part 15: Gas-tight housing and ventilation hose*

— *Part 16: Rigid fuel line*

— *Part 17: Flexible fuel line*

— *Part 18: Filter*

— *Part 19: Fittings*

Road vehicles — Compressed natural gas (CNG) fuel system components —

Part 4: Manual valve

1 Scope

This part of ISO 15500 specifies tests and requirements for the manual valve, a compressed natural gas fuel system component intended for use on the types of motor vehicles defined in ISO 3833.

This part of ISO 15500 is applicable to vehicles using natural gas in accordance with ISO 15403 (mono-fuel, bi-fuel or dual-fuel applications). It is not applicable to the following:

a) liquefied natural gas (LNG) 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 part of ISO 15500 and tested according to the appropriate functional tests.

NOTE 2 All references to pressure in this part of ISO 15500 are to be considered gauge pressures unless otherwise specified.

NOTE 3 This part of ISO 15500 is based upon a service pressure for natural gas as a fuel of 20 MPa [200 bar[1)]] settled at 15 °C. Other service pressures can be accommodated by adjusting the pressure by the appropriate factor (ratio). For example, a 25 MPa (250 bar) service pressure system will require pressures to be multiplied by 1,25.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15500. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15500 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, *Road vehicles — Types — Terms and definitions*.

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2

ISO 15403, *Natural gas — Designation of the quality of natural gas for use as a compressed fuel for vehicles*.

ISO 15500-1, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 1: General requirements and definitions*.

ISO 15500-2, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 2: Performance and general test methods.*

3 Terms and definitions

For the purposes of this part of ISO 15500, the terms and definitions given in ISO 15500-1 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 service 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;

h) the type approval number;

i) the serial number or date code;

j) reference to this part of ISO 15500.

NOTE 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

5.1 The manual valve shall comply with the applicable provisions of ISO 15500-1 and ISO 15500-2, and with the tests specified in clause 6 of this part of ISO 15500.

5.2 Manual valve handles, when provided, shall be securely attached to the valve spindle.

5.3 A manual valve with 90° rotation from "on" to "off" position shall be provided with rigidly secured stops to limit rotation. The valve handle shall be perpendicular to the direction of flow in the "off" position.

5.4 A manual valve may be used as a service valve.

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 15500-2	Specific test requirements of this part of ISO 15500
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	
Electrical overvoltages			
Non-metallic synthetic immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	

6.2 Hydrostatic strength

Test the manual valve according to the procedure for testing hydrostatic strength specified in ISO 15500-2. The test pressure shall be 100 MPa (1 000 bar).

6.3 Leakage

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

Table 2 — Test temperatures and pressures

Temperature °C	Pressure MPa [bar]	
	First test	Second test
– 40	15 [150]	0,5 [5]
20	0,5 [5]	30 [300]
85 to 120	1 [10]	

6.4 Continued operation

6.4.1 Test the manual valve in accordance with the procedure for testing continued operation given in ISO 15500-2, for 10 000 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 15500.

6.4.2 Following cycling and leakage re-testing, the manual 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 valve handle in a direction that opens it completely and in the opposite direction.

Table 3 — Torque test

Component inlet size mm	**Max. torque** N · m
6	1,7
8 or 10	2,3
12	2,8

6.4.3 Conduct the test at the appropriate maximum temperature according to 4.4 of ISO 15500-1:2000, then repeat the test at a temperature of – 40 °C and with the appropriate maximum torque specified in Table 4, below.

Table 4 — Torque test repeated

Component inlet size mm	**Max. torque** N · m
6	3,4
8 or 10	4,5
12	11,3