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ISO 15500-3

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

Part 3: Check valve

Véhicules routiers — Composants des systèmes de combustible gaz naturel comprimé (GNC) —
Partie 3: Valve de contrôle

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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 (see www.iso.org/directives).

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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.

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 41, *Specific aspects for gaseous fuels*.

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This third edition cancels and replaces the second edition (ISO 15500-3:2012), which has been technically revised. It also incorporates the Amendment ISO 15500-3:2012/Amd.1:2016. The main changes compared to the previous edition are as follows:

— serial number or data code became mandatory in marking;

— update of continued operation clause.

A list of all parts in the ISO 15500 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.

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Introduction

For the purposes of this document, all fuel system components in contact with natural gas have been considered suitable for natural gas as defined in the ISO 15403 series. However, it is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this document and tested according to the appropriate functional tests.

All references to pressure in this document are considered to be gauge pressures unless otherwise specified.

This document is based on a service pressure for natural gas used as 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.

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

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

Part 3:
Check valve

1 Scope

This document specifies tests and requirements for the check valve, a compressed natural gas (CNG) fuel system component intended for use on the types of motor vehicles defined in ISO 3833.

This document is applicable to vehicles (mono-fuel, bi-fuel or dual-fuel applications) using natural gas in accordance with the ISO 15403 series. 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.

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

ISO 15500-2:2016, *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 document, the terms and definitions given in ISO 15500-1 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/

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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 working pressure and temperature range;

d) the serial number or date code.

The following additional markings are recommended:

— the direction of flow (when necessary for correct installation);

— the type of fuel;

— the electrical ratings (if applicable);

— the symbol of the certification agency;

— the type approval number;

— a reference to this document.

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.

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5 Construction and assembly

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The check valve shall comply with the applicable provisions of ISO 15500-1 and ISO 15500-2, and with the tests specified in Clause 6. Tolerances should follow the specifications of ISO 15500-2.

6 Tests

6.1 Applicability

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

Table 1 — Applicable tests

Test	Applicable	Test procedure as required by ISO 15500-2	Specific test requirements of this document
Hydrostatic strength	X	X	X (see 6.2)
Leakage	X	X	X (see 6.3)
Excess torque resistance	X	X	
Bending moment	X[a]	X	
Continued operation	X	X	X (see 6.4)
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Ozone ageing	X	X	
Heat ageing	X	X	
Automotive fluids	X	X	

[a] Not applicable for check valves built into other components.

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Table 1 *(continued)*

Test	Applicable	Test procedure as required by ISO 15500-2	Specific test requirements of this document
Electrical over-voltages			
Non-metallic material immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	
[a] Not applicable for check valves built into other components.			

6.2 Hydrostatic strength

Test the check valve according to the procedure for testing hydrostatic strength specified in ISO 15500-2. The test pressure shall be 2,5 times the working pressure.

6.3 Leakage

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

Table 2 — Test temperatures and pressures

Temperature °C	Pressure Factor × working pressure (WP)	
	First test	Second test
−40 or −20	0,75 × WP	0,025 × WP
20	0,025 × WP	1,5 × WP
85 or 120	0,05 × WP	

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6.4 Continued operation

The check valve shall be able to withstand 20 000 cycles of operation and 240 h of chatter flow when tested according to the following procedure.

a) Connect the check valve to a test fixture and apply 125 %service pressure or 100 % working pressure in six pulses to the check valve inlet with the outlet closed, then vent pressure from its outlet. Lower the pressure on the check valve's outlet side to between 0 and a maximum of 0,5 times the working pressure prior to the next cycle.

b) Following 20 000 cycles of operation, subject the check valve to 240 h of chatter flow at a flow rate that causes the most chatter. After this test, the check valve shall comply with the leakage test according to 6.3.

Failure in any sense during the procedure shall constitute a failure of the check valve. All parts shall remain in position and function properly after this test.

Following this test, the check valve shall comply with the hydrostatic strength test according to 6.2.

Test the check valve in accordance with the procedure for testing continued operation given in ISO 15500-2:2016, Clause 9.

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