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ISO 15500-12

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

Part 12: Pressure relief valve (PRV)

Véhicules routiers — Composants des systèmes de combustible gaz naturel comprimé (GNC) —
Partie 12: Soupapes de sécurité à la pression

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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).

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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 41, *Specific aspects for gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 15500-12:2001), which has been technically revised.

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 in stainless steel*

— *Part 17: Flexible fuel line*

— *Part 18: Filter*

— *Part 19: Fittings*

— *Part 20: Rigid fuel line in material other than stainless steel*

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

Part 12: Pressure relief valve (PRV)

1 Scope

This part of ISO 15500 specifies tests and requirements for the pressure relief valve (PRV), 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 15403-1 (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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *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 and the following apply.

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

3.1
set pressure
pressure at which it is intended that the PRV opens

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) working pressure and temperature range.

The following additional markings are recommended:

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

— the type of fuel;

— electrical ratings (if applicable);

— the symbol of the certification agency;

— the type approval number;

— the serial number or date code;

— a 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

The PRV 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 — 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)
Operational	X		X (see 6.5)
Corrosion resistance	X	X	

Table 1 *(continued)*

Test	Applicable	Test procedure as required by ISO 15500-2	Specific test requirements of this part of ISO 15500
Oxygen ageing	X	X	
Ozone ageing	X	X	
Heat ageing	X	X	
Automotive fluids	X	X	
Electrical over-voltages			
Non-metallic material immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	

6.2 Hydrostatic strength

Test the PRV according to the procedure for testing hydrostatic strength specified in ISO 15500-2 to at least 2,5 times its working pressure.

For the purposes of this test, the PRV's mechanism shall be removed and its orifice blocked.

6.3 Leakage

Test the PRV at –40 °C or –20 °C, room temperature and 85 °C or 120 °C (if required by the operating conditions), at working pressure.

6.4 Continued operation

The PRV shall be capable of withstanding 600 cycles of operation when tested according to the provisions of the continued operation test procedure given in ISO 15500-2 and the following.

a) A test cycle consists of, first, pressurizing the PRV to the set pressure. This action shall cause the PRV to open and vent. Once the valve is venting, reduce the inlet pressure; when the PRV re-seats, the cycle is finished.

b) After 600 cycles, test the PRV for leakage at 20 °C ± 5 °C at its working pressure. Cycle time shall be within a period of 10 s ± 2 s.

6.5 Operational test

6.5.1 General

Verify the opening and re-seating pressures of the PRV. The opening pressure shall be equal to the set pressure ±5 % at 20 °C, –40 °C or –20 °C (as applicable) and 85 °C or 120 °C (as required by the operating conditions).

6.5.2 Test procedure

Three randomly selected samples shall be subjected to the following test procedure. This test has three steps, which shall be conducted in the order given. Appropriate test media shall be chosen (i.e. air, nitrogen, or natural gas). If the test medium is not natural gas, then the calculated flow values shall be corrected for natural gas.

a) Establish the opening and re-seating values for the samples at 20 °C ± 2 °C. Do this by first slowly pressurizing the inlet of the sample to 110 % of the set pressure, noting the value at which it first opens.