
**Road vehicles — Compressed natural
gas (CNG) fuel system components —
Part 7:
Gas injector**

*Véhicules routiers — Composants des systèmes de combustible gaz
naturel comprimé (GNC) —
Partie 7: Injecteur de gaz*

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Contents

	Page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Marking	2
5 Construction and assembly	2
6 Tests	3
6.1 Applicability	3
6.2 Pneumatic strength	3
6.3 Continued operation	3
6.3.1 Bench durability	3
6.3.2 Temperature	4
6.4 Insulation resistance	5
Bibliography	6

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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.

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 15500-7:2002)~~, 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*

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

Part 7: Gas injector

1 Scope

This part of ISO 15500 specifies tests and requirements for the gas injector and/or fuel rail, 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 injectors intended for high-pressure injection to the combustion chamber, or 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 fuel of 20 MPa [200 bar¹⁾] 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:—²⁾, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 2: Performance and general test methods*

1) 1 bar = 0,1 MPa = 10⁵ Pa 1 MPa = 1 N/mm²

2) To be published. (Revision of ISO 15500-2:2012).

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15500-1 and the following apply.

3.1 duty cycle

percentage of time that the gas injector is operating in the period

3.2 period

P

time elapsed between the beginning of one injection pulse and the beginning of the next injection pulse

Note 1 to entry: It is expressed in milliseconds.

3.3 fuel rail assembly

component consisting of gas injector(s) and fuel rail integrated into one component

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 and temperature range.

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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

5.1 The gas injector shall be in the closed position when de-energized.

5.2 The gas injector 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 — Test applicable

Test	Applicable to injector and fuel rail assembly	Applicable to fuel rail	Test procedure as required by ISO 15500-2	Specific test requirements of this part of ISO 15500
Pneumatic strength	X	X		X (see 6.2)
Leakage	X	X	X	
Excess torque resistance	X	X	X	
Bending moment	X	X	X	
Continued operation	X			X (see 6.3)
Corrosion resistance	X	X	X	
Oxygen ageing	X	X	X	
Ozone ageing	X	X	X	
Heat Ageing	X	X	X	
Automotive Fluids	X	X	X	
Electrical overvoltages	X		X	
Non-metallic material immersion	X	X	X	
Vibration resistance	X	X	X	
Brass material compatibility	X	X	X	
Insulation resistance	X			X (see 6.4)

6.2 Pneumatic strength

This test has two parts, with the procedures to be carried out in the sequence as given below.

- a) Apply two times the working pressure to the inlet and outlet of the gas injector and/or fuel rail for a period of at least 3 min. On completion of this procedure, the gas injector and/or fuel rail shall remain gas-tight.
- b) Increase the gas pressure from two times the working pressure up to a maximum of four times the working pressure, until such time as the gas injector and/or fuel rail leaks or bursts.

On completion of this procedure, the gas injector and/or fuel rail shall not have burst before leaking.

NOTE If the gas injector fails in the closed position due to its construction, then it is considered to have passed both parts of this test.

The test samples used for this test shall not be used for any other tests.

6.3 Continued operation

6.3.1 Bench durability

Prior to this test, the gas injector or fuel rail assembly shall pass the leakage test in accordance with ISO 15500-2:—, Clause 6, and the insulation resistance test given in [6.4](#).