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

**Part 11:  
Gas/air mixer**

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

*Partie 11: Mélangeur air/gaz*



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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](http://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](http://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 15500-11:2001), 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*

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

## Part 11: Gas/air mixer

### 1 Scope

This part of ISO 15500 specifies tests and requirements for the gas/air mixer, 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<sup>1)</sup>) 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 apply.

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

## 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.

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 gas/air mixer 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

There are many types of gas/air mixers available. This part of ISO 15500 gives requirements for three different existing designs: positive and negative pressure venturi, which have no moving parts, and variable orifice. As gas/air mixer designs vary, so will the tests required.

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 <sup>a</sup> | X   | X (see 6.2)  |
| Leakage  | X              | X   | X (see 6.3)  |
| Excess torque resistance   |                |   |  |
| Bending moment   |                |   |  |
| Continued operation  | X <sup>b</sup> | X   | X (see 6.4)  |
| Corrosion resistance   | X              | X   | X (see 6.5)  |
| 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   |  |
| <sup>a</sup> Gas/air mixers that have a working pressure of <0,1 MPa (1 bar) are not required to be strength tested.<br><sup>b</sup> Gas/air mixers with no moving parts, or with parts that are only moved at the time of installation or servicing, are not required to be tested for continued operation. |                |   |  |

## 6.2 Hydrostatic strength

Test the gas/air mixer according to the procedure for testing hydrostatic strength specified in ISO 15500-2, at 4 times the working pressure, recommended by its manufacturer or 600 kPa, whichever is greater.

## 6.3 Leakage

Test the gas/air mixer at the temperatures of -40 °C or -20 °C ( as applicable), room temperature and 120 °C; the minimum test pressure shall be either 1,25 times the working pressure or 150 kPa, whichever is greater.

## 6.4 Continued operation

If the gas/air mixer's components move repeatedly during engine operation, then it shall undergo 100 000 cycles from minimum to maximum flow. At the completion of this test, the gas/air mixer shall comply with 6.3 at room temperature.

The duration of each cycle shall be no less than 10 s.

## 6.5 Corrosion resistance

If materials or designs susceptible to corrosion are used in the component, then the corrosion resistance test as given in ISO 15500-2 shall be performed.