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

**Part 21:
Discharge line closures**

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

Partie 21: Fermeture des lignes de décharge

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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 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.

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

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.

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 ISO 15403-1. 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 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.

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

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

Part 21: Discharge line closures

1 Scope

This document specifies tests and requirements for discharge lines closures, 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 15403-1. 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.

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, *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.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

discharge line closure

device used to keep contamination out of a relief line while still permitting escape of gas from the line to the atmosphere

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 serial number or date code.

The following additional markings are recommended:

- the working pressure or working pressure and temperature range;
- 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;
- a reference to this document, i.e. ISO 15500-21.

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 discharge line closure 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.

Discharge line closures may be single use, such as for pressure relief devices (PRDs), or repeated use, as for pressure relief valves (PRVs). In either case, the discharge line closure is expected to repeatedly vent low flow rates from leakage without losing function.

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			
Leakage			
Excess torque resistance	X	X	
Bending moment	X	X	
Continued operation	X		X (see 6.2)
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Ozone ageing	X	X	

Table 1 (continued)

Test	Applicable	Test procedure as required by ISO 15500-2	Specific test requirements of this document
Heat ageing	X	X	
Automotive fluids	X	X	
Electrical over-voltages			
Non-metallic material immersion			
Vibration resistance	X	X	
Brass material compatibility	X	X	
Internal leakage vent test	X		X (see 6.3)
Water jet protection	X		X (see 6.4)

6.2 Continued operation

Discharge line closures intended for repeated use shall pass the following test. Install the device as per the manufacturer's recommended procedure.

Perform 600 cycles of the following, with at least 50 cycles performed at $-40\text{ }^{\circ}\text{C}$ or lower and at least 50 cycles at $85\text{ }^{\circ}\text{C}$ or higher. The remainder shall be done between $15\text{ }^{\circ}\text{C}$ and $25\text{ }^{\circ}\text{C}$. The cycle time shall be $(10 \pm 2)\text{ s}$.

- a) Pressurize the vent line to achieve the manufacturer's rated flow for at least two seconds.
- b) Stop the flow.

After cycling, the discharge line closure shall pass the water jet protection test in 6.4.

6.3 Internal leakage vent test

Apply a controlled flow of $(30 \pm 10)\text{ Ncm}^3/\text{h}$ of nitrogen, air or methane/natural gas to the inlet of the discharge line closure until the pressure stabilizes. The vent line closure shall vent the gas flow without damage and shall not retain more than $0,2\text{ MPa}$.

Perform the test at $-40\text{ }^{\circ}\text{C}$ ($+0\text{ }^{\circ}\text{C} - 5\text{ }^{\circ}\text{C}$), room temperature, and $85\text{ }^{\circ}\text{C}$ ($-0\text{ }^{\circ}\text{C} + 5\text{ }^{\circ}\text{C}$).

CAUTION — Testing with methane/natural gas could result in dangerous situations. Care should be taken to avoid flammable explosive hazard.

6.4 Water jet protection

Mount the part as per the manufacturer's recommended procedures.

Use a pressure washer having a pressure of $(8-10)\text{ MPa}$ and a flow rate of at least 14 L/min , and a flat stream nozzle with a fan angle of $(10-20)^{\circ}$. Use water at a temperature between $40\text{ }^{\circ}\text{C}$ and $60\text{ }^{\circ}\text{C}$.

Spray the part directly towards the outlet direction of discharge. If the part is not rotational symmetrical, it or the spray shall be rotated along the axis of discharge at $(10-12)\text{ s}$ per rotation at each angle of spray. If some angles do not occur in actual use when installed per the manufacturer's recommended procedure those angles may be omitted from the test.

The spray fan orientation, relative to the spray fan spread pattern, shall be perpendicular to the sweep direction. The spray shall come from a nozzle held at a distance of 10 cm to 15 cm from the part. Spraying shall occur at incremental angles of 0° , 30° , 60° , 90° , 120° , and 150° to the axis of rotation symmetry axis for 30 s each.

The part shall not be damaged and shall not allow any water to enter the vent line.