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

**Part 13:
Pressure relief device (PRD)**

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

Partie 13: Dispositifs de limitation de pression
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15500-13 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 25, *Vehicles using gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 15500-13:2001), 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

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

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Introduction

For the purposes of this part of ISO 15500, all fuel system components in contact with natural gas have been considered suitable for natural gas as defined in ISO 15403. However, 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.

All references to pressure in this part of ISO 15500 are considered to be gauge pressures unless otherwise specified.

This part of ISO 15500 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.

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

Part 13: Pressure relief device (PRD)

1 Scope

This part of ISO 15500 specifies tests and requirements for the pressure relief device (PRD), a compressed natural gas (CNG) 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 (mono-fuel, bi-fuel or dual-fuel applications) using natural gas in accordance with ISO 15403.

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 referenced documents are indispensable for the application 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.

3.1

activation pressure

rupture pressure

pressure, as specified by the pressure relief device (PRD) manufacturer, at which a PRD is designed to activate to permit the discharge of the cylinder

3.2

activation temperature

temperature, as specified by the pressure relief device (PRD) manufacturer, at which a PRD is designed to activate to permit the discharge of the cylinder

3.3 fusible material

metal, alloy, or other material capable of being melted where the melting is integral to the function of the pressure relief device (PRD)

3.4 parallel-combination relief device

pressure relief device (PRD) activated by high temperature or pressure acting separately

NOTE This device may be integrated into one device that has independent pressure-activated and thermally-activated parts. It may also be formed by two independent devices (one pressure-activated and one thermally-activated) that act independently. Each part of the device shall not interfere with the operation/activation of the other part. The device shall be able to vent the content of the cylinder through any one of the parts of the PRD independently. The device shall be able to vent the content of the cylinder if the pressure- and thermally-activated parts open simultaneously

3.5 pressure-activated relief device

pressure relief device (PRD) activated by pressure

3.6 burst disc rupture disc

operating part of a pressure-activated pressure relief device (PRD) which, when installed in the device, is designed to burst at a predetermined pressure to permit discharge of the cylinder

3.7 series-combination relief device

pressure relief device (PRD) activated by a combination of high temperature and pressure acting together

3.8 thermally-activated relief device

pressure relief device (PRD) activated by high temperature

3.9 yield temperature

temperature at which the fusible material becomes sufficiently soft to activate the device and to permit discharge of the cylinder

NOTE 1 There are several possible scenarios for a vehicle involved in a fire. The PRD is intended to reduce the risk of cylinder rupture under most of these scenarios while keeping a low risk of accidental activation. Experience shows that the best solution depends on the type of cylinder the PRD is mounted on.

NOTE 2 The suggested configuration for PRDs is parallel-combination or thermal relief device for every type of cylinder. Series PRDs may only be used in type 1 steel cylinders.

4 Marking

If the PRD is a stand-alone component, marking shall provide sufficient information to allow the following to be traced:

- a) the manufacturer's or agent's name, trademark or symbol;
- b) the fusible material yield temperature or PRD activation temperature (see Annex A), and the rupture disc pressure rating or activation pressure, as appropriate;
- c) the type of relief device (thermally-activated, series-combination, parallel-combination, etc.).

If there is a possibility that the PRD could be installed with the flow in the wrong direction, the PRD shall be marked with an arrow to show the direction of flow.

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 PRD shall comply with the applicable provisions of ISO 15500-1 and ISO 15500-2, and with the tests specified in Clause 6 of this part of ISO 15500.

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 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 ^a	X	X (see 6.4)
Continued operation	X	X	X (see 6.5)
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Electrical over-voltages	X	X	
Non-metallic material immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	
Accelerated life	X	X	X (see 6.6)
Benchtop activation	X	X	X (see 6.7)
Thermal cycling	X	X	X (see 6.8)
Condensate-corrosion resistance	X	X	X (see 6.9)
Flow capacity	X	X	X (see 6.10)

^a This test is to confirm proper design and construction of stand-alone, externally-threaded PRD designs and is not required if the PRD is internally imbedded in the valve body.

6.2 Hydrostatic strength

6.2.1 Housing

The manufacturer shall either physically test the housing or prove its strength by calculation.

6.2.1.1 Test procedure

6.2.1.1.1 Inlet passage strength

One piece shall be tested with pressure applied to the inlet, with the internal releasing components in the normally closed position. Pressure-activated elements such as burst discs may be modified, replaced with a plug or removed for the purpose of this test. The test shall be performed according to the procedure given in ISO 15500-2 using a pressure of 2,5 times the working pressure at 20 °C ± 5 °C.