INTERNATIONAL STANDARD

ISO 14469

First edition
2017-01

Road vehicles — Compressed natural gas (CNG) refuelling connector

Véhicules routiers — Connecteur de remplissage en gaz naturel comprimé (GNC)

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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. 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. 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

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

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This first edition of ISO 14469:2016 cancels and replaces the first edition of ISO 14469-1:2004, ISO 14469-2:2007 and ISO 14469-3:2006, which have been technically revised.

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Introduction

This document was developed to use in the examination, testing and certification of newly produced compressed natural (CNG) gas vehicle fuelling nozzles and receptacles and, as such, applies only to the nozzles and receptacles used in CNG fuelling systems, and not to the system itself.

A nozzle certified to this International Standard will be functionally compatible from a safety and performance perspective with all listed receptacles of compatible profile and system pressure. Similarly, a certified receptacle will be functionally compatible from a safety and performance perspective with all listed nozzles of compatible profile and system pressure.

As there may eventually be many different kinds of nozzles and receptacles available from a variety of manufacturers which, for safety reasons, have to be all compatible with one another, this document specifies a series of receptacle profiles. These standard profiles incorporate the design specifications (mating materials, geometry and tolerances) which may be considered in the certification of a submitted nozzle or receptacle.

The construction and performance of nozzles and receptacles are based on the observation that three main parameters affect user safety and system compatibility.

a) Service pressure

All nozzles and receptacles are designed to have a service pressure of either 20 MPa (200 bar) for B200 and C200 connectors or 25 MPa (250 Bar) for B250 and C250 connectors.

b) Design life

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Frequency of use is the second parameter to be considered. Since frequency of use will differ with the nozzle/receptacle application (i.e. public sector, fleet employee and residential), all receptacles will be tested at 10 000 connect/disconnect cycles for compliance with this document. In addition, all nozzles will be tested according to the following frequency use classifications, as applicable:

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— Class A Nozzle, specifying high frequency use, with a cycle life of 100 000 cycles and equating to approximately 100 fills per day for three years;

— Class B Nozzle, specifying medium frequency use, with a cycle life of 20 000 cycles and equating to approximately 10 fills per day for five years.

c) Training

Operator training required is in accordance with national requirements.

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Road vehicles — Compressed natural gas (CNG) refuelling connector

1 Scope

This document specifies CNG refuelling nozzles and receptacles constructed entirely of new and unused parts and materials, for road vehicles powered by compressed natural gas. A CNG refuelling connector consists of, as applicable, the receptacle and its protective cap (mounted on the vehicle) and the nozzle.

This document is applicable only to such devices designed for a service pressure of 20 MPa (200 bar) and 25 MPa (250 bar), to those using CNG according to ISO 15403-1 and ISO 15403-2 and having standardized mating components, and to connectors that prevent natural gas vehicles from being fuelled by dispensers with service pressures higher than that of the vehicle, while allowing them to be fuelled by dispensers with service pressures less than or equal to the vehicle fuel system service pressure.

This document refers to service pressures of 20 MPa and 25 MPa for:

— size 1: B200 and B250;

— size 2: C200 and C250.

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NOTE All references to pressures, given in megapascals and bar[1)] are considered gauge pressures, unless otherwise specified.

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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 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 15500-2, *Road vehicles — Compressed natural gas (CNG) fuel system components — Part 2: Performance and general test methods*

ISO 15501-1, *Road vehicles — Compressed natural gas (CNG) fuel systems — Part 1: Safety requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

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

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3.1
dry air
air with moisture content such that the dew point of the air at the required test pressure is at least 11 °C below the ambient test temperature

3.2
hydrostatic pressure
pressure to which a component is taken to verify the structural strength of the component

3.3
working pressure
maximum pressure that a CNG refuelling connector can be expected to withstand in actual service

3.4
service pressure
settled pressure of 20 MPa (200 bar) at a uniform gas temperature of 15 °C for B200 and C200 connectors or 25 MPa (250 Bar) for B250 and C250 connectors

3.5
positive locking means
feature which requires actuation of an interlocking mechanism to allow connection/disconnection of the nozzle from the receptacle

3.6
CNG refuelling nozzle
device which permits quick connection and disconnection of fuel supply hose to the CNG receptacle in a safe manner, hereafter referred to as nozzle

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3.7
CNG refuelling receptacle
device connected to a vehicle or storage system which receives the CNG refuelling nozzle and permits safe transfer of fuel, hereafter referred to as receptacle

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3.8
CNG refuelling connector
joined assembly of CNG refuelling nozzle and receptacle, hereafter referred to as connector

4 General construction requirements

4.1 Nozzles and receptacles manufactured in accordance with this document shall be designed in accordance with reasonable concepts of safety, durability and maintainability.

4.2 Nozzles and receptacles shall be well fitted and manufactured in accordance with good engineering practice. All construction requirements may be met by either the construction specified in this document or another construction that gives at least equivalent performance.

4.3 Nozzles and receptacles shall be

— designed to minimize the possibility of incorrect assembly,

— designed to be secure against displacement, distortion, warping or other damage, and

— constructed to maintain operational integrity under normal and reasonable conditions of handling and usage.

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4.4 Nozzles and receptacles shall be manufactured of materials suitable and compatible for use with CNG at the pressure and the temperature ranges to which they will be subjected (see Clause 1).

The minimum temperature range shall be selected by the manufacturer between the following ranges:

— 40 °C to 85 °C or 120°C as applicable;

— 20 °C to 85°C or 120 °C as applicable.

NOTE 1 The lower temperature limit depends on whether the component is to be used for mild or cold weather

NOTE 2 The high temperature limit depends on whether the component will be installed inside the engine compartment (120°C) or outside of the engine compartment (85°C).

4.5 Nozzles and receptacles constructed of brass shall use brass alloys with a copper mass content ≤70 %. This will ensure proper material compatibility with all the constituents of natural gas.

4.6 Separate external three-way valves shall be constructed and marked so as to indicate clearly the open, shut and vent positions.

4.7 Nozzles and receptacles shall be operated either to connect or disconnect without the use of tools.

4.8 The receptacle shall be mounted on the vehicle in accordance with ISO 15501-1.

4.9 Jointing components shall provide gas-tight sealing performance.

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5 Nozzles

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5.1 Nozzles shall be one of the three types according to a), b) and c). See also Annex A.

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a) Type 1 is a nozzle for use with dispensing hoses that remain fully pressurized at dispenser shutdown.

The nozzle shall not allow gas to flow until a positive connection has been achieved. The nozzle shall be equipped with an integral valve or valves, incorporating an operating mechanism which first stops the supply of gas and safely vents the trapped gas before allowing the disconnection of the nozzle from the receptacle. The operating mechanism shall ensure that the vent valve is in the open position before the release mechanism can be operated and that the gas located between the nozzle shut-off valve and the receptacle check valve is safely vented prior to nozzle disconnection (see 10.2).

b) Type 2 is a nozzle for use with dispensing hoses that remain fully pressurized at dispenser shutdown. A separate three-way valve connected directly, or indirectly, to the inlet of the nozzle is required to safely vent trapped gas prior to nozzle disconnection. The nozzle shall not permit the flow of gas if unconnected. Venting is required prior to disconnection of the nozzle (see 10.2).

c) Type 3 is a nozzle for use with dispensing hoses which are automatically depressurized — 0,5 MPa (5 bar) and below — at dispenser shutdown (see 10.2).

In addition, nozzles shall be classified in terms of cycle life as follows:

— Class A, specifying high frequency use, with a cycle life of 100 000;

— Class B, specifying low frequency use, with a cycle life of 20 000.

5.2 Venting or de-pressurization of all nozzle types is required prior to disconnection. Disconnection of all nozzles shall be able to be accomplished in accordance with 10.2.

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5.3 The method for attaching the nozzle to the fuel dispensing system hose shall not rely on the joint threads between the male and female threads for sealing (e.g. conical threads).

5.4 The three-way valve exhaust port of Type 1 and Type 2 nozzles shall be protected from the ingress of foreign particles and fluid which would hamper the operation of the valve.

5.5 The portions of a nozzle which are held by the user for connection or disconnection may be thermally insulated.

5.6 A Type 1 nozzle shall bear a marking indicating the direction of the open and shut operation if it contains a rotating actuation mechanism.

5.7 The interface surface of the nozzle shall be constructed of material having a hardness >75 Rockwell B (HRB 75) and shall be non-sparking and conductive (see 10.11.5 and 10.15).

The exposed surfaces of the nozzles shall be made of non-sparking materials (see 10.11.5 and 10.15).

5.8 Nozzles shall comply with the performance requirements of Clause 10 to ensure interchangeability.

6 Standard receptacle dimensions

6.1 Standard receptacle dimensions Size 1 (B200, B250)

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A Size 1 receptacle shall comply with the design specifications shown in Figure 1 and 2.

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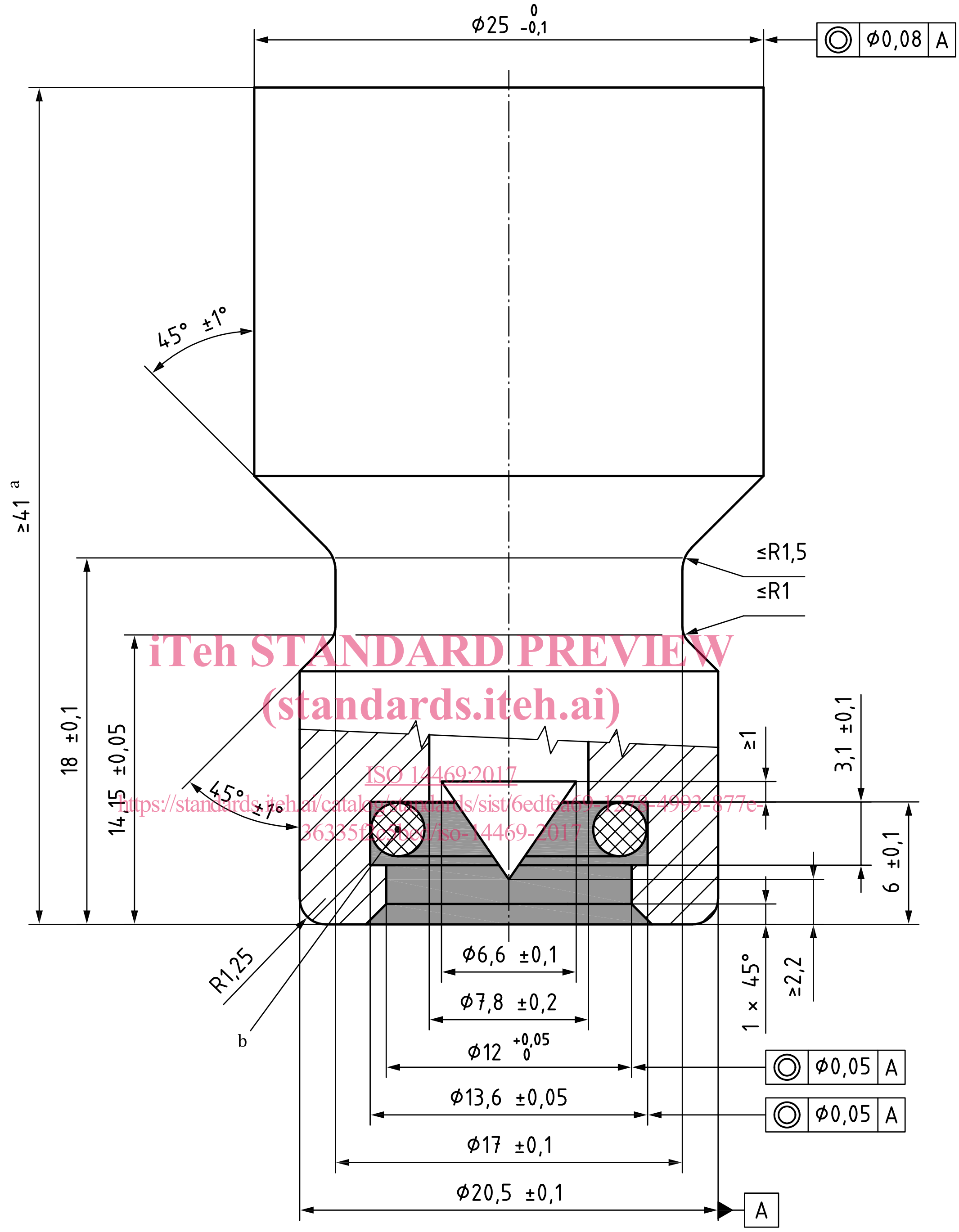
Dimensions in millimetres
Surface roughness ≤ *Ra* 3,2 µm



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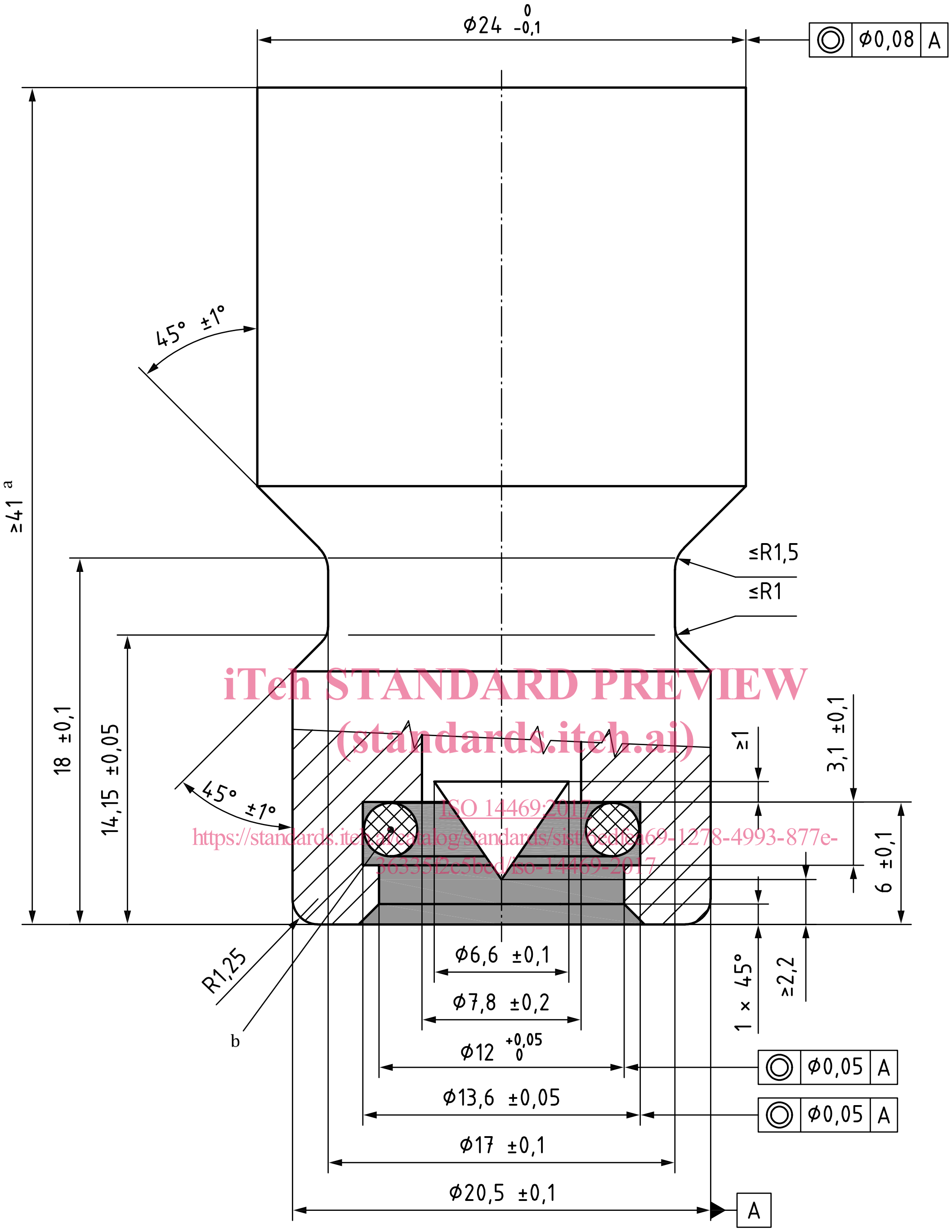
Key

(grey area)	This area shall be kept free of all components
a	Minimum length of the receptacle that is clear of provisions for attachment of the receptacle or protective caps.
b	Sealing surface equivalent to N°110 O-ring of dimensions:

— Internal diameter: 9,19 ± 0,127; width: 2,62 ± 0,076;
— Sealing surface finish: 0,8 µm to 0,05 µm;
— Material hardness: 75 HRB minimum.

Figure 1 — B200 receptacle

Dimensions in millimetres



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Key

(grey area)	This area shall be kept free of all components
a	Minimum length of the receptacle that is clear of provisions for attachment of the receptacle or protective caps.
b	Sealing surface equivalent to N°110 O-ring of dimensions:

— Internal diameter: 9,19 ± 0,127; width: 2,62 ± 0,076;

— Sealing surface finish: 0,8 µm to 0,05 µm;

— Material hardness: 75 HRB minimum.

Figure 2 — B250 receptacle

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6.2 Standard receptacle dimensions size 2 (C200, C250)

A Size 2 receptacle shall comply with the design specifications detailed in Figures 3 and 4.

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