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Road vehicles — Liquefied natural gas (LNG) integrated low pressure refuelling and venting connector — 1,8 MPa connector

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Foreword

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

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.

Road vehicles — Liquefied natural gas (LNG) integrated low pressure refuelling and venting connector — 1,8 MPa connector

1 Scope

This document specifies liquefied natural gas (LNG) refuelling nozzles and receptacles constructed entirely of new and unused parts and materials for road vehicles powered by LNG.

An LNG refuelling connector consists of, as applicable, the receptacle and the nozzle. This document is applicable only to such devices designed for a working pressure of 1,8 MPa to those using LNG as vehicle fuel and having standardized mating components.

NOTE All references to pressures in this document are considered gauge pressures, unless otherwise specified.

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

ISO 19723 (all parts), *Road vehicles — Liquefied natural gas (LNG) fuel systems*

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:

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

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

3.1
check valve
part of the receptacle, or of the nozzle, mounted inside which prevents return flow or venting of fuel after the nozzle was disconnected from the receptacle

3.2
cycle life
number of refuelling cycles, as specified in this document, which the component can withstand without leak or without another fail of function

3.3
device
nozzle or receptacle

3.4
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

3.5
liquefied natural gas
LNG
cryogenic liquid produced by reducing the temperature of natural gas to about –162 °C at atmospheric pressure (depending on LNG composition)

3.6
LNG refuelling connector
joined assembly of *LNG refuelling nozzle* (3.7) and *LNG refuelling receptacle* (3.8) for refuelling and venting via one channel

3.7
LNG refuelling nozzle
device (3.3) which permits quick connection and disconnection of fuel supply hose to the LNG receptacle in a safe manner

3.8
LNG refuelling receptacle
device (3.3) connected to a vehicle or storage system which receives the *LNG refuelling nozzle* (3.7) and permits safe transfer of fuel

3.9
maximum service pressure
maximum pressure of the fuel delivered by the fuelling station

3.10
working pressure
maximum allowable pressure
maximum pressure that an *LNG refuelling connector* (3.6) can be expected to withstand in actual service

3.11
hydrostatic pressure
pressure to which a component is taken to verify the structural strength of the component

3.12
high humidity weather conditions
weather condition with 95 % to 100 % relative humidity at T = + 20 °C

3.13
poppet
movable closing part of the *check valve* (3.1)

3.14
positive locking device
feature which requires actuation of an interlocking mechanism to allow connection/disconnection of the nozzle from the receptacle

3.15
vapour spillage space
dead volume in the LNG refuelling connector between the nozzle and the receptacle measured with trapped water

3.16
non-sparking materials
materials that do not contain, by mass, more than: 7,5 % in total of magnesium, titanium and zirconium

Note 1 to entry: According to IEC EN 60079-0:2011 Clause 8.3 for EPL Gb.

4 General construction requirements

4.1 Design

LNG nozzles and receptacles shall be:

— designed to minimize the possibility of incorrect assembly;

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

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

— able to ensure safe transfer and leak-tight connection at high humidity weather conditions (e.g. freezing or ice crystal damage).

4.1.1 Spillage

LNG nozzles and receptacles shall be designed with a vapour spillage space less than 1 cm^3.

4.1.2 Positive locking device

It shall not be possible, without first actuating the locking release mechanism, to disconnect with normal actuating forces (maximum 100 N or 3 Nm). Under unsafe conditions when an uncontrolled release of LNG can happen which may cause damage to the user and/or the environment.

4.1.3 Design cycle life

All receptacles shall be tested to a durability test for 10 000 coupling cycles for compliance with this document. In addition, all nozzles shall be tested to a durability test for 20 000 cycles.

NOTE 10 000 cycles means one fill per day for 27 years.

4.2 Pressure rating

Working pressure	1,8 MPa
Maximum service pressure	1,5 MPa
Hydrostatic test pressure	2.5 times working pressure

4.3 Working temperature

Working temperature range: –162 °C to +85 °C.

4.4 Materials

LNG nozzles and receptacles shall be manufactured of materials suitable and compatible for use with LNG at the pressure and the temperature ranges to which they will be subjected.

4.4.1 Corrosion protection

Corrosion-resistant materials shall be used (see 10.9). Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in contact with each other (analog ISO 15500-2).

4.4.2 Material of the bodies of the receptacle and of the nozzle

Material of the bodies of the pressure containing housings shall be:

a) suitable for the working temperature range,

b) conductive [only conductive materials that comply with the electric conductivity test (see 10.8)] and

c) non-sparking according to 3.16.

4.5 Operation

LNG nozzles and receptacles shall be so designed as to be operated without the use of tools and excessive force for connecting and disconnecting (see 7.2).

4.6 Sealing exchange

Design of a device and its check valve sealing shall make possible service of the check valve sealing from the front side using suitable jig and related tools.

4.7 Installation

The receptacle shall be installed according to ISO 19723-1 and ISO 19723-2.

5 Nozzles

5.1 Venting depressurization

Venting depressurization of all nozzle types is required prior to disconnection.

5.2 Identification

The nozzle shall bear a marking in accordance with Clause 9, if necessary, indicating the direction of the open and shut off operation of the actuating mechanism.

6 Standard receptacle dimensions

The receptacle shall comply with the dimensions, stroke and forces shown in Figure 1.