



SLOVENSKI STANDARD

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Vozila na zemeljski plin - Polnjenje in delovanje - Polnilne postaje za oskrbo z utekočinjenim zemeljskim plinom - Priključki za raztovarjanje

Natural gas vehicles - Fuelling and operation - Natural gas fuelling stations - LNG unloading connector

Gasfüllanlagen - LNG-(Ent-)Ladekupplung für mobile LNG-Lagerung

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Gasfüllanlagen - LNG-(Ent-)Ladekupplung für mobile LNG-Lagerung

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prEN 17921:2022 (E)

European foreword

This document (prEN 17921:2022) has been prepared by Technical Committee CEN/TC 326 “Natural gas vehicles - Fuelling and operation”, the secretariat of which is held by TSE.

This document is currently submitted to the CEN Enquiry.

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Introduction

The transport of LNG over the road in Europa is organized through ADR regulations. This European Agreement concerning the International Carriage of Dangerous Goods by Road specifies the safety procedures of the road tanker and driver. The design, construction, operation, maintenance and inspection including equipment safety and control devices for LNG fuelling stations are described in EN ISO 16924:2016 “Natural gas fuelling stations — LNG stations for fuelling vehicles”.

This document describes a harmonized (un)loading connector for LNG road tanker at LNG fuelling stations.

While LNG is also transported by rail, European regulations are organized through the International Carriage of Dangerous Goods by Rail (RID). The same configuration as defined by this document, can be utilized for LNG RID applications.

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1 Scope

This document provides the design for an LNG (un)loading connector between LNG road tanker and LNG fuelling stations. This document can be also used for LNG rail tenders. This document includes requirements for (at least):

- functional description of the LNG Unloading Receptacle and LNG Unloading Nozzle;
- technical layout description of the LNG Unloading Receptacle.

The technical layout description of the LNG Unloading Nozzle is not part of this document.

The basic functional requirement of the LNG unloading connector are as follows:

- to prevent leakage of methane during operation and in particular during disconnecting;
- easy handling, no spillage and purging with nitrogen during disconnecting.

The loading connector between the LNG road tanker and the LNG terminal is not covered by this document.

See Figure 1.

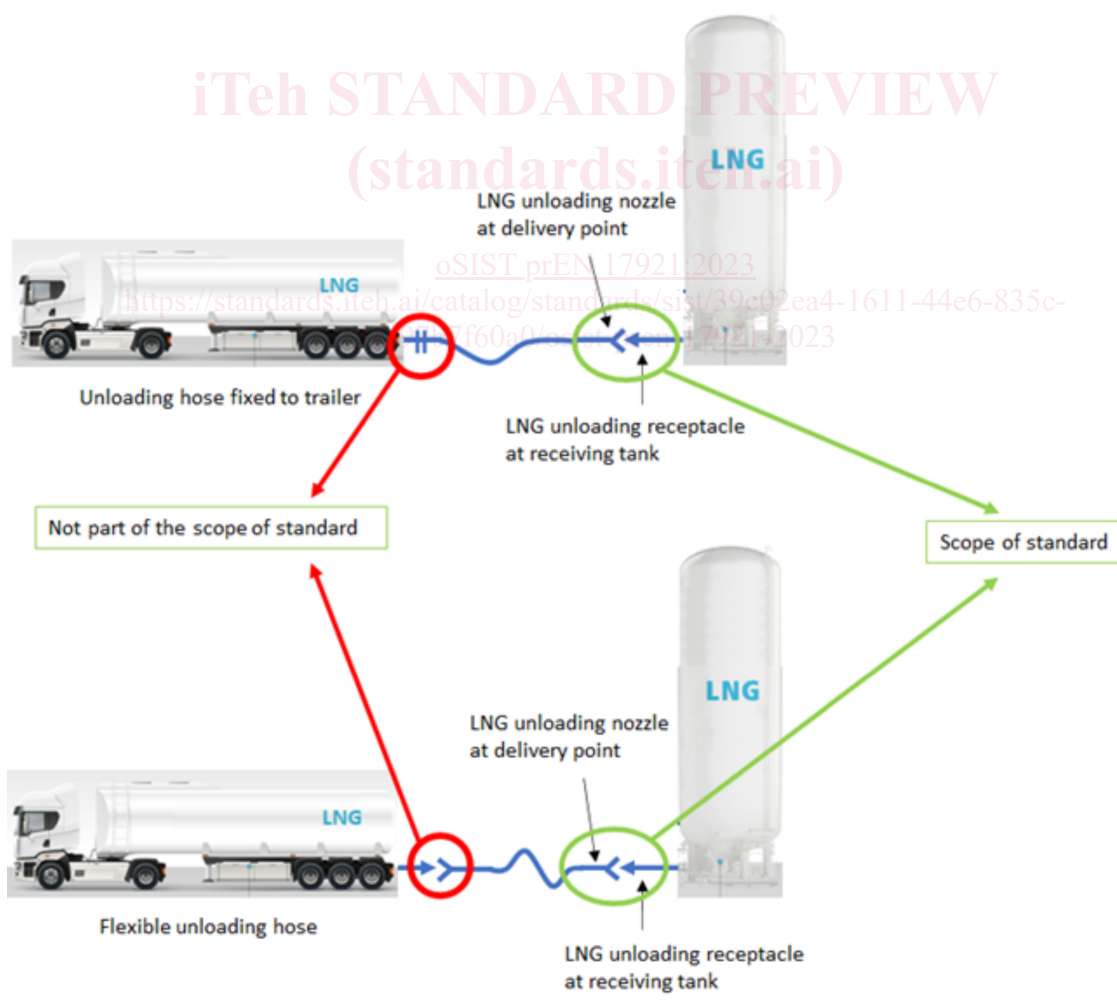


Figure 1 — Scope of the document

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 16903:2015, *Petroleum and natural gas industries — Characteristics of LNG, influencing the design, and material selection*

ISO 16924:2016, *Natural gas fuelling stations — LNG stations for fuelling vehicles*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 5208:2015, *Industrial valves — Pressure testing of valves*

EN 10272:2016, *Stainless steel bars for pressure purposes*

EN 12266-1:2012, *Industrial valves — Testing of metallic valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements*

EN 12516-1:2014+A1:2018, *Industrial valves — Shell design strength — Part 1: Tabulation method for steel valve shells*

EN 12516-2:2014+A1:2021, *Industrial valves — Shell design strength — Part 2: Calculation method for steel valve shells*

ISO 6708:1995, *Pipework components — Definition and selection of DN (nominal size)*

EN 13480-1:2017, *Metallic industrial piping: General*

EN ISO 9227:2017, *Corrosion tests in artificial atmospheres — Salt spray tests ISO 9227:2017*

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

3.1

offloading

process of transferring LNG from the LNG road tanker to the LNG storage of the fuelling station

3.2

LNG offloading area

area where the LNG road tanker connects to the LNG fuelling station for offloading LNG into the LNG storage tank

3.3

LNG transfer point

connection point between the hose of the LNG tanker and the fixed pipeline to the LNG storage tank

prEN 17921:2022 (E)**3.4****LNG road tanker**

vehicle to carry bulk LNG on the road

Note 1 to entry: For example, a cryogenic vacuum insulated tank mounted on a truck or semi-trailer or an ISO container, fixed on a truck or trailer.

3.5**LNG unloading connector**

joined assembly of LNG unloading nozzle (3.7) and LNG unloading receptacle (3.6)

3.6**LNG unloading receptacle**

device (3.8) connected to the unloading point of an LNG fuelling station which permits quick connection and disconnection of the unloading hose between LNG road tanker and LNG fuelling station storage

3.7**LNG unloading nozzle**

device (3.8) connected to the unloading hose of the LNG road tanker which permits a quick connection and disconnection with the LNG Unloading Receptacle to safely transfers LNG to the LNG storage of a fuelling station

3.8**device**

LNG unloading nozzle or receptacle

3.9**maximum allowable working pressure MAWP**

maximum pressure to which the LNG unloading connector is designed to be subjected and which is the basis of determining the strength of the connector

3.10**working pressure**

pressure to which the LNG unloading connector is designed to be subjected to during normal operation

3.11**working temperature**

temperature to which the LNG unloading connector is designed to be subjected to during normal operation

3.12**check valve**

part of the LNG unloading receptacle and of the LNG unloading nozzle mounted inside, preventing return flow or venting of fuel after the LNG unloading nozzle was disconnected from the LNG unloading receptacle

3.13**cycle life**

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

3.14**obturator**

closing part of the check valve

4 Functional requirements

4.1 General requirement

A dry LNG unloading connector is required for the LNG transfer between LNG road tanker and LNG storage.

- a) The LNG unloading receptacle certified to this document shall be functionally compatible from a safety and performance perspective with all types of LNG unloading nozzles of compatible profile and system pressure.

The LNG unloading receptacle profile is specified in this document. An LNG unloading nozzle shall mate with this LNG unloading receptacle profile.

4.2 Functional description of the LNG unloading connector

4.2.1 General

The LNG unloading receptacle manufactured in accordance with this document shall be designed with reasonable concepts of safety, durability, and maintainability.

LNG unloading connectors shall be:

- a) designed to minimize the possibility of incorrect assembly;
- b) designed to be secure against displacement, distortion, warping, or other damage;
- c) constructed to maintain operational integrity under normal and reasonable conditions of handling and usage;
- d) residual amount of methane vapor escaping into atmosphere during disconnection process;
- e) the design of the connector shall ensure that the connection can be made without the use of excessive force.

4.2.2 Dry connector

LNG unloading connector with integrated shut off valves which are opening when connecting and closing when disconnecting. Integrated interlock function ensure that the valves are closed, before connectors can be fully disconnected.

4.2.3 Protective cap

An LNG unloading receptacle manufacturer validated cap or equivalent design feature shall be provided to prevent dust, moisture, and other foreign debris from entering the LNG unloading receptacle. This also requires prevention of the dust entry through the venting holes. The cap has to allow small gas venting originated by warming the cold gas inside or a minor leak of the receptacle poppet (see 4.2.7).

4.2.4 Type of mounting

The LNG unloading receptacle shall have provisions to be firmly attached to the unloading point and shall comply with applicable abnormal load tests.

4.2.5 Positive locking

The transfer of LNG can only start when a positive connection is made between the LNG unloading receptacle and LNG unloading nozzle. LNG unloading receptacles and LNG unloading nozzles shall be so designed as to be operated without the use of tools and excessive force for connecting and disconnecting.