



SLOVENSKI STANDARD
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Zunanje polnilne postaje za plinasti vodik in postopki polnjenja

Outdoor hydrogen refuelling points dispensing gaseous hydrogen and incorporating filling protocols

Gasförmiger Wasserstoff - Betankungsanlagen - Teil 1: Allgemeine Anforderungen

Points de ravitaillement en hydrogène en extérieur distribuant de l'hydrogène gazeux et intégrant des protocoles de remplissage

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Outdoor hydrogen refuelling points dispensing gaseous hydrogen and incorporating filling protocols

Points de ravitaillement en hydrogène en extérieur
distribuant de l'hydrogène gazeux et intégrant des
protocoles de remplissage

Gasförmiger Wasserstoff - Betankungsanlagen - Teil 1:
Allgemeine Anforderungen

This European Standard was approved by CEN on 25 June 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 17127:2018) has been prepared by Technical Committee CEN/TC 268 “Cryogenic vessels and specific hydrogen technologies applications”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under Mandate M/533 given to CEN by the European Commission and the European Free Trade Association.

It applies to vehicles covered by GTR13.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

The European Commission in its standardization request M/533 of March 12th, 2015, aims to ensure that technical specifications for interoperability of refuelling points are specified in European Standards compatible with the relevant International Standards. These specifications aim to meet the European needs, be compatible and aligned as much as possible with relevant International Standards and as far as possible with existing refuelling infrastructure already in place and leave room to accommodate the adopted standard to local technical, analytical and regulatory needs. The requested European Standards aim to be technologically and commercially neutral and based on the know-how currently in possession of the EU industry and of the public sector on a fair, reasonable and non-discriminatory basis.

According to the legal requirements given in the Alternative Fuels Infrastructure Directive (AFID) and M/533, European Standards specifying only the required specifications for ensuring the interoperability of refuelling points have to be provided. European standards and common requirements with respect to “interoperability” mean the capacity of an infrastructure to supply energy that is compatible with all vehicle technologies and allows seamless EU-wide mobility and a clear definition of fuel pressure and temperature levels and connector designs¹.

The European Standardization Organizations (ESOs) should adopt European Standards in accordance with Article 10 of Regulation (EU) No 1025/2012 of the European Parliament and of the Council, and those standards should be based on current International Standards or ongoing international standardization work, where applicable.

Direction from the standardization request M/533 for European Standards for hydrogen supply are to develop European Standards containing technical solutions for interoperability with technical specifications in regard to Article 5 and point 2 of Annex II, in particular for:

- a) outdoor hydrogen refuelling points dispensing gaseous hydrogen;
- b) hydrogen purity dispensed by hydrogen refuelling points;
- c) fuelling algorithms and equipment of hydrogen refuelling points;
- d) connectors for vehicles for the refuelling of gaseous hydrogen.

This document specifies Items a) and c). Item b) is covered by EN 17124 and Item d) by EN ISO 17268.

¹ The energy to be supplied is hydrogen as a fuel and this fuel is dispensed in a hydrogen refuelling station meeting interoperability requirements.

1 Scope

This document defines the minimum requirements to ensure the interoperability of public hydrogen refuelling points including refuelling protocols that dispense gaseous hydrogen to road vehicles (e.g. Fuel Cell Electric Vehicles) complying with applicable regulations.

The safety and performance requirements for the entire hydrogen refuelling station (HRS), addressed in accordance with existing relevant European and national legislation, are not included in this document.

NOTE Guidance on considerations for hydrogen refuelling stations (HRS) is provided in ISO/TS 19880-1.

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.

EN 17124, *Hydrogen fuel — Product specification and quality assurance — Proton exchange membrane (PEM) fuel cell applications for road vehicles*

EN ISO 17268, *Gaseous hydrogen land vehicle refuelling connection devices (ISO 17268)*

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>

NOTE Units used in this document follow SI (International System of Units).

3.1 compressed Hydrogen Storage System

CHSS

hydrogen storage on-board vehicle, as defined in the GTR#13

3.2 hydrogen refuelling station

HRS

facility for the dispensing of compressed hydrogen vehicle fuel and includes the supply of hydrogen compression, storage and dispensing systems

3.3 HRS Interoperability

capacity of an infrastructure to supply hydrogen at the HRS/vehicle interface that is compatible with road vehicles and allows seamless EU-wide mobility through applying clear definitions of connector designs, fuel quality, pressure levels and temperatures

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3.4 maximum allowable working pressure

PS
maximum pressure permissible in a vessel or system at the temperature specified for the pressure.

Note 1 to entry: The maximum allowable working pressure may also be defined as the design pressure, the maximum allowable operating pressure, the maximum permissible working pressure, or the maximum allowable pressure for the rating of pressure vessels and equipment manufactured in accordance with national pressure vessel codes.

3.5 maximum/minimum allowable temperature

TS
values of the maximum/minimum temperatures at which safe and good functioning of the component is ensured and for which it has been designed, as specified by the manufacturer

3.6 maximum operating pressure

MOP
highest pressure that is expected for a component or system during normal operation

3.7 nominal working pressure

NWP
pressure of a full vehicle CHSS at a gas temperature of 15 °C

Note 1 to entry: See GTR#13 Clause II-3.37, on Page 54.

Note 2 to entry: For road vehicles, this is typically 35 MPa or 70 MPa.
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3.8 refuelling protocol

automated process to ensure safe filling of vehicles, called refuelling algorithms in the Alternative Fuel Infrastructure Directive (2014/94/EU)

3.9 safety distance

distance to acceptable risk level or minimum risk-informed distance between a hazard source and a target (human, equipment or environment) which will mitigate the effect of a likely foreseeable incident and prevent a minor incident escalating into a larger incident

3.10 safety measure

measure intended to protect a protected item located outside the facility from the effects of an identifiable gas leak caused by a malfunction when the facility is not operated as intended

Note 1 to entry: Safety measures include, but are not limited to, safety distances, sufficiently tall pressure relief lines, firewalls.

3.11**state of charge****SOC**

ratio of compressed hydrogen storage system (CHSS) hydrogen density to the density at maximum operating pressure rated at the standard temperature 15 °C, expressed as a percentage and computed based on the gas density per the formula below:

$$SOC (\%) = \frac{\rho(P, T)}{\rho(NWP, 15^\circ C)} \times 100 \quad (1)$$

Note 1 to entry: The densities of the two major pressure classes at 100 % SOC are:

- density of H₂ at 35 MPa and 15 °C = 24,0 g/l;
- density of H₂ at 70 MPa and 15 °C = 40,2 g/l.

3.12**hydrogen Service Level****HSL**

pressure level in MPa used to characterize the hydrogen service of the dispenser based on the NWP rating of the vehicle

Note 1 to entry: The numerical value of HSL also matches the number after the “H” in Pressure Class.

3.13**pressure class**

non-dimensional rating of components that indicates the components are designed to dispense hydrogen to road vehicles at the required pressure and temperature

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Note 1 to entry: The numbers following H in the pressure class are numerically the same as HSL, but the HSL identifies only the level of the dispensing service whereas the pressure class designation shows the component are fully capable of meeting the pressure and temperature requirements for dispensing hydrogen at the indicated service level.

Note 2 to entry: See Annex A for definitions of pressure terminology and their application to dispenser system and filling stations, in general.

4 Abbreviated terms

H35 Indication for 35 MPa NWP hydrogen fuelling as defined in EN ISO 17268

H70 Indication for 70 MPa NWP hydrogen fuelling as defined in EN ISO 17268

5 Characteristics and properties of hydrogen refuelling points**5.1 General requirements**

The hydrogen refuelling point will be able to refuel hydrogen vehicles certified according to UNECE R134 or Regulation (EC) No 79/2009 without compromising their specification limits.

NOTE 1 Assumptions made on the minimum characteristics of the hydrogen vehicle necessary to ensure interoperability with the refuelling points defined in this document are outlined in Annex A.