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Gaseous hydrogen — Fuelling stations —

Part 1: General requirements

Carburant d'hydrogène gazeux — Stations-service —

Partie 1: Exigences générales

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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 (see 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 (see 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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 197, *Hydrogen technologies.*

This first edition cancels and replaces ISO/TS 19880-1:2016, which has been technically revised.

The main changes compared to the ISO/TS 19880-1:2016 are as follows:

— where appropriate, guidance information from the TS was converted to requirements;

— the difference between the risk assessment and the design requirement clauses were clarified and references were added to ensure that the appropriate clauses were linked;

— Annex A from the TS on safety distances was removed;

— Annex C from the TS on hydrogen quality control was removed to ISO 19880-8;

— the presentation of the information was improved and much of the guidance information was moved to informative annexes.

A list of all parts in the ISO 19880 series can be found on the ISO website.

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.

Gaseous hydrogen — Fuelling stations —

Part 1: General requirements

1 Scope

This document defines the minimum design, installation, commissioning, operation, inspection and maintenance requirements, for the safety, and, where appropriate, for the performance of public and non-public fuelling stations that dispense gaseous hydrogen to light duty road vehicles (e.g. fuel cell electric vehicles).

This document is not applicable to the dispensing of cryogenic hydrogen, or hydrogen to metal hydride applications.

Since this document is intended to provide minimum requirements for fuelling stations, manufacturers can take additional safety precautions as determined by a risk management methodology to address potential safety risks of specific designs and applications.

While this document is targeted for the fuelling of light duty hydrogen road vehicles, requirements and guidance for fuelling medium and heavy duty road vehicles (e.g. buses, trucks) are also covered.

Many of the generic requirements within this document are applicable to fuelling stations for other hydrogen applications, including but not limited to the following:

— fuelling stations for motorcycles, fork-lift trucks, trams, trains, fluvial and marine applications;

— fuelling stations with indoor dispensing;

— residential applications to fuel land vehicles;

— mobile fuelling stations; and

— non-public demonstration fuelling stations.

However, further specific requirements that can be necessary for the safe operation of such fuelling stations are not addressed in this document.

This document provides requirements for and guidance on the following elements of a fuelling station (see Figure 1 and Figure 2):

— hydrogen production/delivery system:

  — delivery of hydrogen by pipeline, trucked in gaseous and/or liquid hydrogen, or metal hydride storage trailers;

  — on-site hydrogen generators using water electrolysis process or hydrogen generators using fuel processing technologies;

  — liquid hydrogen storage;

  — hydrogen purification systems, as applicable;

— compression:

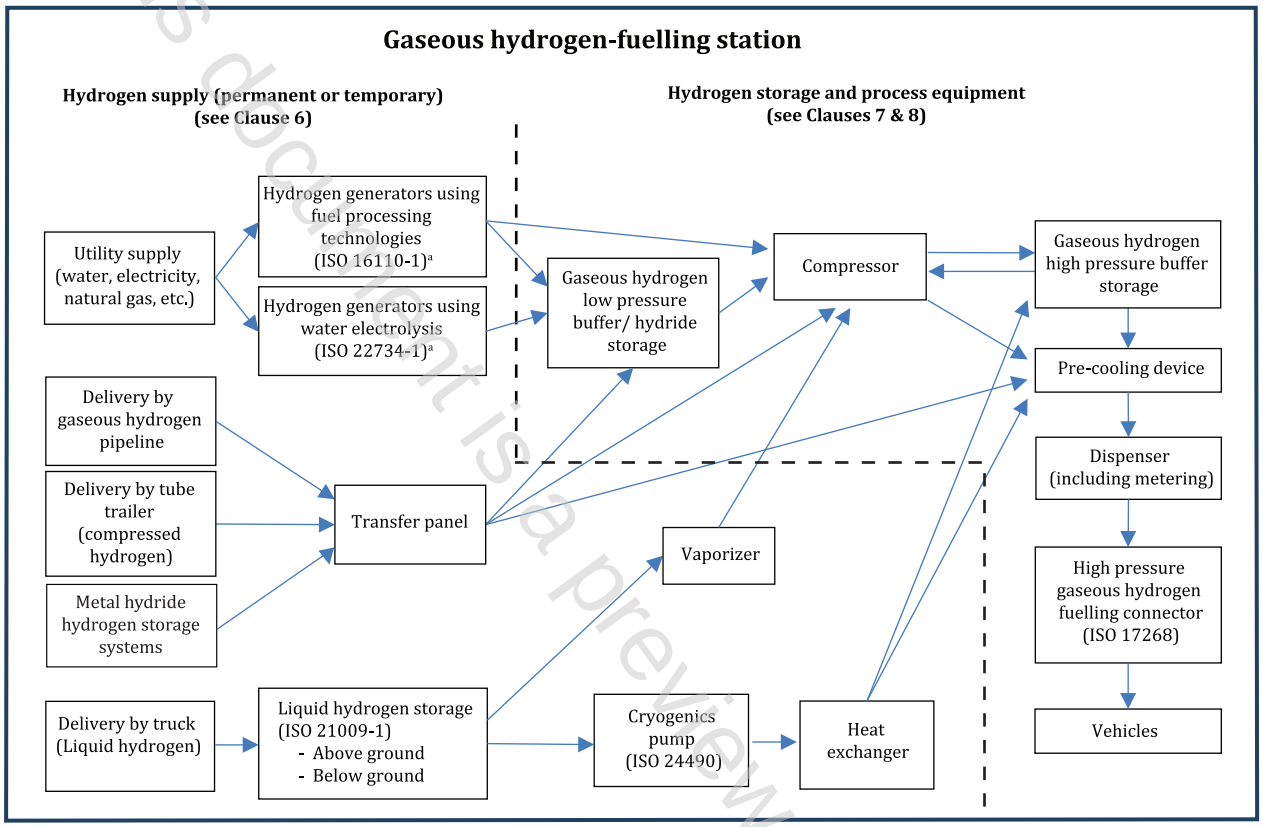
  — gaseous hydrogen compression;

— pumps and vaporizers;

— gaseous hydrogen buffer storage;

— pre-cooling device;

— gaseous hydrogen dispensing systems.



a May include a buffer vessel (or accumulator) for dampening or adjusting flow of compressor suction inlet.

Figure 1 — Example of typical elements that a fuelling station consists of, including hydrogen supply

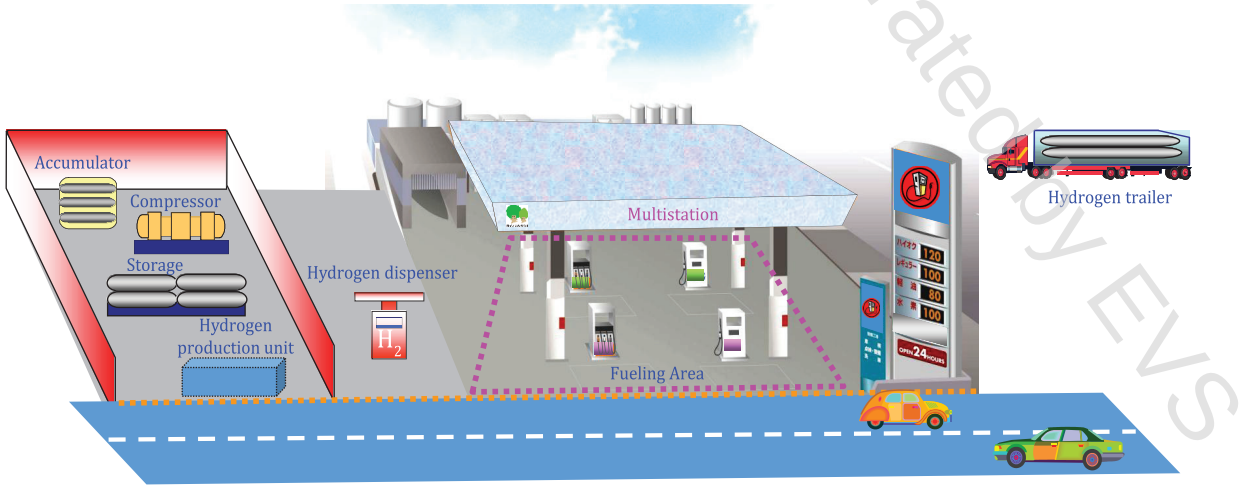


Figure 2 — Image of an example hydrogen fuelling station

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 13850, *Safety of machinery — Emergency stop function — Principles for design*

ISO 14687, *Hydrogen fuel — Product specification*

ISO 15649, *Petroleum and natural gas industries — Piping*

ISO 17268, *Gaseous hydrogen land vehicle refuelling connection devices*

ISO 19880-8, *Gaseous hydrogen — Fuelling stations — Part 8: Hydrogen quality control*

ISO 21013-1, *Cryogenic vessels — Pressure-relief accessories for cryogenic service — Part 1: Reclosable pressure-relief valves*

ISO 21013-2, *Cryogenic vessels — Pressure-relief accessories for cryogenic service — Part 2: Non-reclosable pressure-relief devices*

ISO 21013-3, *Cryogenic vessels — Pressure-relief accessories for cryogenic service — Part 3: Sizing and capacity determination*

ISO 22734, *Hydrogen generators using water electrolysis*

ISO/IEC 80079 (all parts), *Explosive atmospheres*

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 62282-3-100, *Fuel cell technologies. Stationary fuel cell power systems. Safety*

EN 13445-5, *Unfired pressure vessels. Inspection and testing*

SAE J2600: 2015-08, *Compressed Hydrogen Surface Vehicle Fuelling Connection Devices*

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
acceptance criteria
<risk or harm > acceptable level of risk or *harm* (3.34), locally defined as:

— a tolerable risk value; or

— a specified harm level; or

— requirements in a prescriptive document