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Gaseous hydrogen — Fuelling stations —

Part 5: Dispenser hoses and hose assemblies

Carburant d'hydrogène gazeux — Stations de ravitaillement —
Partie 5: Flexibles et assemblages flexibles pour distributeurs

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Foreword

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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 document 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).

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

This second edition cancels and replaces the first edition (ISO 19880-5:2019), which has been technically revised.

The main changes are as follows:

— subclause 7.2.3 revised test gas and pass/fail criteria;

— subclause 7.7.2 revised to add temperature tolerance;

— editorial changes.

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.

Introduction

This document specifies the implementation of performance-based testing for components of dispensing systems and fuelling stations that are based on proven engineering principles, research and the combined expertise of gas utilities, fuel providers, manufacturers, users, and others having specialized experience.

The successful commercialization of hydrogen vehicle technologies requires codes and standards pertaining to fuelling stations, vehicle fuel system components, and the global homologation of standards requirements for technologies with the same end use. Essentially this will allow manufacturers to achieve economies of scale by producing one product for use globally.

International harmonization contributes to reducing technical barriers and stimulates related markets. A series of documents that address hydrogen-fuelled vehicles and fuelling stations is being developed. These documents will provide internationally homologized minimum safety performance criteria at the component level, thus providing a foundation to build a safe “fuelling system”.

This document is based on ANSI/CSA HGV 4.2-2022.

This document was developed based on five pressure classes of wire or textile reinforced hoses and hose assemblies suitable for use with gaseous hydrogen for hydrogen dispensing. This is based on technologies in use at the time of the development of the requirements.

In the future, other types and classes of hoses and hose assemblies will need to be evaluated to determine the suitability of requirements in this document.

This document applies to newly manufactured hoses and hose assemblies for connecting a dispenser to a high-pressure fuelling nozzle.

A nozzle vent hose is included in this document; however; the pressure rating may be lower than the nozzle rating, based on the nozzle and dispenser design.

For general hydrogen safety information, see ISO/TR 15916.

Gaseous hydrogen — Fuelling stations —

Part 5: Dispenser hoses and hose assemblies

1 Scope

This document specifies the requirements for wire or textile reinforced hoses and hose assemblies suitable for dispensing hydrogen up to 70 MPa nominal working pressure, in the operating temperature range of −40 °C to 65 °C.

This document specifies safety requirements for material, design, manufacture and testing of gaseous hydrogen hose and hose assemblies for hydrogen fuelling stations.

This document does not apply to the following hoses and hose assemblies:

a) those used as part of a vehicle high pressure on-board fuel storage system;

b) those used as part of a vehicle low pressure fuel delivery system; and

c) flexible metal hoses.

NOTE 1 This document was developed primarily for hoses and hose assemblies for dispensing high-pressure hydrogen from refuelling dispensers to hydrogen vehicles. ISO 16964 addresses hoses used to deliver hydrogen from a transportable vessel (e.g. trailer) into a buffer storage of a station.

NOTE 2 Hose assemblies include a hose with connectors on each end (see Figure 1). Each connector has two basic functional elements that are addressed as described below.

a) Coupling to hose. This function is defined by requirements and verified (along with the hose itself) by performance-based tests in this document.

b) Fitting for transition and connection to the piping system or equipment. This function is addressed by reference to appropriate hydrogen equipment standards and piping codes.

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 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 4671, *Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies*

ISO 6802, *Rubber or plastics hoses and hose assemblies — Hydraulic impulse test with flexing*

ISO 6803, *Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing*

ISO 7326:2016, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8031:2020, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance and conductivity*

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*

ISO 8331, *Rubber and plastics hoses and hose assemblies — Guidelines for selection, storage, use and maintenance*

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

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

ISO 16964, *Gas cylinders — Flexible hoses assemblies — Specification and testing*

ISO 19880-1, *Gaseous hydrogen — Fuelling stations — Part 1: General requirements*

ISO 20485, *Non-destructive testing — Leak testing — Tracer gas method*

ISO 30013, *Rubber and plastics hoses — Methods of exposure to laboratory light sources — Determination of changes in colour, appearance and other physical properties*

IEC 60243-1, *Electric strength of insulating materials — Test methods — Part 1: Tests at power frequencies*

IEC 62631-3-1, *Dielectric and resistive properties of solid insulating materials — Part 3-1: Determination of resistive properties (DC methods) — Volume resistance and volume resistivity — General method*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 8330, ISO 19880-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

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

3.1
connector
mating parts that can be put together to form a "connection" which permits the transfer of fluids, electric power, or control signals

Note 1 to entry: *Fittings* (3.4) are a type of connector used in piping systems.

EXAMPLE Connectors commonly used in hydrogen systems are as follows:

a) The fuelling nozzle “connector” mates with the receptacle “connector” on the vehicle to form the connection for transfer of compressed hydrogen between the dispenser and the vehicle, as defined in ISO 17268 for this specific application.

b) The hose assemblies have connectors on each end that allow *coupling* (3.2) to the hoses and connection to the piping system (e.g. hose breakaway device or fuelling nozzle).

c) Control systems often use electrical connectors to allow rapid and secure assembly or replacement.

3.2
connection fitting
connection part consisting of a fitting inserted into a hose and a mechanical joint

3.3
coupling
integrated structure of *nipple* (3.9) and socket with end portion of a hose crimped together

Note 1 to entry: See Figure 1