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Liquid hydrogen — Land vehicle fuelling system interface

Hydrogène liquide — Interface des systèmes de remplissage pour véhicules terrestres

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Contents

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 13984 was prepared by Technical Committee ISO/TC 197, *Hydrogen technologies.*

Introduction

The fuelling system interface described in this International Standard is intended to be used in conjunction with fuel tanks constructed in accordance with ISO 13985.

NOTE Pursuant to the agreement reached during the sixth plenary meeting of ISO/TC 197, the basic allowable stresses shown in Table 1 of this International Standard have been changed.

Liquid hydrogen — Land vehicle fuelling system interface

1 Scope

This International Standard specifies the characteristics of liquid hydrogen refuelling and dispensing systems on land vehicles of all types in order to reduce the risk of fire and explosion during the refuelling procedure and thus to provide a reasonable level of protection from loss of life and property.

This International Standard is applicable to the design and installation of liquid hydrogen (LH_2) fuelling and dispensing systems. It describes the system intended for the dispensing of liquid hydrogen to a vehicle, including that portion of the system that handles cold gaseous hydrogen coming from the vehicle tank, that is, the system located between the land vehicle and the storage tank.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1106-3:1984, *Recommended practice for radiographic examination of fusion welded joints — Part 3: Fusion welded circumferential joints in steel pipes of up to 50 mm wall thickness.*

ISO 1182:—[1)], *Reaction to fire tests for building products — Non-combustibility test.*

ISO 9303:1989, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Full peripheral ultrasonic testing for the detection of longitudinal imperfections.*

ISO 10286:1996, *Gas cylinders — Terminology.*

ISO 11484:1994, *Steel tubes for pressure purposes — Qualification and certification of non-destructive testing (NDT) personnel.*

ISO 12095:1994, *Seamless and welded steel tubes for pressure purposes — Liquid penetrant testing.*

ISO 13663:1995, *Welded steel tubes for pressure purposes — Ultrasonic testing of the area adjacent to the weld seam for the detection of laminar imperfections.*

ISO 13664:1997, *Seamless and welded steel tubes for pressure purposes — Magnetic particle inspection of the tube ends for the detection of laminar imperfections.*

ISO 13665:1997, *Seamless and welded steel tubes for pressure purposes — Magnetic particle inspection of the tube body for the detection of surface imperfections.*

[1)] To be published. (Revision of ISO 1182:1990)

ASTM A240/A240M-97a, *Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 10286 and the following apply.

3.1
design pressure
pressure used in the formula for the calculation of the minimum wall thickness for each component in the piping system

NOTE The design pressure should be not less than the pressure at the most severe condition of coincident internal or external pressure and temperature (minimum or maximum) expected during service.

3.2
fuel tank
liquid hydrogen reservoir, installed on a vehicle, with appurtenances for connecting to a refuelling station

3.3
inspector
qualified person employed by a recognized independent national or international agency

3.4
liquid hydrogen
LH_2
hydrogen that has been liquefied, i.e. brought to a liquid state

NOTE Liquefaction may be achieved by chilling and compression or other means, such as the magnetocaloric effect.

3.5
maximum permissible operating pressure
MPOP
maximum effective gauge pressure allowable in the piping system in its operating condition

3.6
noncombustible material
material that does not ignite, burn, support combustion or release flammable vapours when subjected to fire or heat in accordance with ISO 1182

3.7
operating pressure
gauge pressure at which the piping system operates

NOTE Operating pressure should not exceed the maximum permissible operating pressure.

3.8
service temperature range
temperature ranging from that of liquid hydrogen (– 253 °C) to an assumed ambient temperature of 54 °C

3.9
storage tank
liquid hydrogen reservoir, located at the refuelling station, to supply the land vehicle with liquid hydrogen