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Gaseous hydrogen — Fuelling stations —

Part 7: Rubber O-rings

Carburant d'hydrogène gazeux — Stations-service —

Partie 7: Joints toriques en caoutchouc

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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 Technical Committee ISO/TC 197, *Hydrogen technologies*.

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

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Gaseous hydrogen — Fuelling stations —

Part 7: Rubber O-rings

1 Scope

This document specifies the requirements for rubber O-rings and their housing dimensions, which seal gaseous hydrogen, in high-pressure hydrogen devices for gaseous hydrogen fuelling stations, such as valves, filters, joints, breakaways and other such devices. This document is applicable to O-rings suitable for sealing hydrogen gas of up to 70 MPa nominal working pressure, in the operating temperature range of −40 °C to 65 °C.

This document contains safety requirements for the design of O-rings and their housing dimensions, compound design, and test methods for seal systems. This document applies to newly manufactured O-rings for hydrogen gas seal in high-pressure hydrogen devices used in hydrogen fuelling stations.

NOTE 1 This document was developed using the ISO 3601 series.

NOTE 2 This document was developed based on several temperature classes of rubber O-rings suitable for use with high-pressure hydrogen seals in devices for gaseous hydrogen stations.

NOTE 3 The operating temperature is not a temperature of the hydrogen gas to be sealed by the O-ring gas seal system. Regardless of the operating temperature, the hydrogen gas temperature to be sealed can rise up to 180 °C.

NOTE 4 The O-ring seal system for the high-pressure hydrogen devices are designed by the device manufacturers. The detailed specifications of the O-rings and design of static or non-static high-pressure hydrogen seal systems for the high-pressure hydrogen devices are determined as agreed upon between the interested parties by referring to this 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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48-2:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 815-1:2019, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 1382, *Rubber — Vocabulary*

ISO 1629, *Rubber and latices — Nomenclature*

ISO 2921, *Rubber, vulcanized — Determination of low-temperature characteristics — Temperature-retraction procedure (TR test)*

ISO 3601-1:2012, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes*

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ISO 3601-1, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 3601-2:2016, *Fluid power systems — O-rings — Part 2: Housing dimensions for general applications*

ISO 3601-2, *Fluid power systems — O-rings — Part 2: Housing dimensions for general applications*

ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*

ISO 3601-4, *Fluid power systems — O-rings — Part 4: Anti-extrusion rings (back-up rings)*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 14687:2019, *Hydrogen fuel quality — Product specification*

ISO 18899, *Rubber — Guide to the calibration of test equipment*

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

ASTM D1414, *Standard Test Methods for Rubber O-Rings*

ASTM D1414-15, *Standard Test Methods for Rubber O-rings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1382, ISO 5598 and 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
operating temperature
environmental temperature in which a device equipped with an O-ring gas seal system operates

4 Inside diameters, cross-section diameters and tolerances

4.1 Configuration

The shape of the O-ring shall be toroidal, as shown in Figure 1.

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