AS 16110.1:2020

Australian STANDARD®

Hydrogen generators using fuel processing technologies

Part 1: Safety (ISO 16110-1:2007, MOD)

STANDARDS Australia

AS 16110.1:2020

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Hydrogen generators using fuel processing technologies

Part 1: Safety (ISO 16110-1:2007, MOD)

First published as AS 16110.1:2020.

Preface

This Standard was prepared by the Standards Australia Committee ME-093, Hydrogen Technologies.

The objective of this document is to specify requirements for packaged, self-contained or factory matched hydrogen generation systems with a capacity of less than 400 m^3/h at 0 °C and 101,325 kPa, herein referred to as hydrogen generators, that convert an input fuel to a hydrogen-rich stream of composition and conditions suitable for the type of device using the hydrogen (e.g. a fuel cell power system or a hydrogen compression, storage and delivery system).

It applies to hydrogen generators using one or a combination of the following input fuels:

(a) Natural gas and other methane-rich gases derived from renewable (biomass) or fossil fuel sources, e.g. landfill gas, digester gas, coal mine gas.

(b) Fuels derived from oil refining, e.g. diesel, gasoline, kerosene, liquefied petroleum gases such as propane and butane.

(c) Alcohols, esters, ethers, aldehydes, ketones, Fischer-Tropsch liquids and other suitable hydrogen-rich organic compounds derived from renewable (biomass) or fossil fuel sources, e.g. methanol, ethanol, di-methyl ether, biodiesel.

(d) Gaseous mixtures containing hydrogen gas, e.g. synthesis gas, town gas.

This document is applicable to stationary hydrogen generators intended for indoor and outdoor commercial, industrial, light industrial and residential use.

It aims to cover all significant hazards, hazardous situations and events relevant to hydrogen generators, with the exception of those associated with environmental compatibility (installation conditions), when they are used as intended and under the conditions foreseen by the manufacturer.

This document is an adoption with national modifications, and has been reproduced from, ISO 16110-1:2007, *Hydrogen generators using fuel processing technologies — Part 1: Safety*. The modifications are additional requirements and are set out in Appendix ZZ which has been added at the end of the source text.

Appendix ZZ lists the variations to ISO 16110-1:2007, for the application of this document in Australia.

As this document has been reproduced from an International Standard, the following applies:

(i) In the source text “this part of ISO 16110” should read “this document”.

(ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

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 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 16110-1 was prepared by Technical Committee ISO/TC 197, *Hydrogen technologies*.

ISO 16110 consists of the following parts, under the general title *Hydrogen generators using fuel processing technologies:*

— *Part 1: Safety*

— *Part 2: Procedures to determine efficiency*

Introduction

The machine concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this part of ISO 16110.

This part of ISO 16110 provides requirements and recommendations relating to hydrogen generators using fuel-processing technologies so as to promote:

— safety of persons and property;

— consistency of control response; and

— ease of maintenance.

High performance is not to be obtained at the expense of the essential factors mentioned above.

NOTES

Australian Standard®

Hydrogen generators using fuel processing technologies

Part 1: Safety (ISO 16110-1:2007, MOD)

1 Scope

This part of ISO 16110 applies to packaged, self-contained or factory matched hydrogen generation systems with a capacity of less than 400 m^3/h at 0 °C and 101,325 kPa, herein referred to as hydrogen generators, that convert an input fuel to a hydrogen-rich stream of composition and conditions suitable for the type of device using the hydrogen (e.g. a fuel cell power system or a hydrogen compression, storage and delivery system).

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— fuels derived from oil refining, e.g. diesel, gasoline, kerosene, liquefied petroleum gases such as propane and butane;

— alcohols, esters, ethers, aldehydes, ketones, Fischer-Tropsch liquids and other suitable hydrogen-rich organic compounds derived from renewable (biomass) or fossil fuel sources, e.g. methanol, ethanol, di-methyl ether, biodiesel;

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It aims to cover all significant hazards, hazardous situations and events relevant to hydrogen generators, with the exception of those associated with environmental compatibility (installation conditions), when they are used as intended and under the conditions foreseen by the manufacturer.

NOTE A list of significant hazards and hazardous situations dealt with in this part of ISO 16110 is found in Annex A.

This part of ISO 16110 is a product safety standard suitable for conformity assessment as stated in IEC Guide 104, ISO/IEC Guide 51 and ISO/IEC Guide 7.

2 Normative references

The following referenced documents are indispensable for the application 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 4080, *Rubber and plastics hoses and hose assemblies — Determination of permeability to gas*

ISO 4413, *Hydraulic fluid power — General rules relating to systems*

ISO 4414, *Pneumatic fluid power — General rules relating to systems*

ISO 5388, *Stationary air compressors — Safety rules and code of practice*

ISO 10439, *Petroleum, chemical and gas service industries — Centrifugal compressors*

ISO 10440-1, *Petroleum and natural gas industries — Rotary-type positive-displacement compressors — Part 1: Process compressors (oil-free)*