



Hydrogen standards release summary July 2020



AS 16110.1:2020, *Hydrogen generators using fuel processing technologies, Part 1: Safety* (ISO 16110-1:2007, MOD)

HYDROGEN PRODUCTION

OBJECTIVES Aims to cover significant hazards, hazardous situations and events relevant to hydrogen generators when they are used as intended, with the exception of those associated with environmental compatibility (installation conditions).

USE CASES Applicable to stationary hydrogen generators intended for indoor and outdoor commercial, industrial, light industrial and residential use.

It applies to packaged, self-contained or factory matched hydrogen generation systems with a capacity of less than 400 m³/h (at stp) that convert a feedstock 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). Feedstocks includes natural gas and other methane rich gases, fuels derived from oils and alcohols and a number of others.

Potential application could be small scale generation (nominally <850 kg/day) using natural gas for a direct source or gas network, or biogas feed to generate H₂ for use.

AS ISO 16110.2:2020, *Hydrogen generators using fuel processing technologies, Part 2: Test methods for performance*

HYDROGEN PRODUCTION

OBJECTIVES Describes how to measure and document the performance of stationary hydrogen generators for residential, commercial and industrial applications.

USE CASES Applicable to stationary hydrogen generators intended for indoor and outdoor commercial, industrial, light industrial and residential use and is the companion to AS ISO 16110.1.

The standards provides prescriptive requirements for measurement techniques, test plans, test procedures, calculations and test reports for hydrogen generators. As hydrogen generator systems may vary depending on conversion processes, this standard provides a baseline to enable hydrogen generator systems to be equally compared for performance.

AS ISO 14687:2020, *Hydrogen fuel quality – Product specification*

HYDROGEN PRODUCTION & USE

OBJECTIVES Specifies the minimum quality characteristics of hydrogen fuel for utilisation in vehicular and stationary applications.

USE CASES Depending on the end-use application, the quality of hydrogen required will vary. For example, use in fuel cells (stationary and mobile) requires a high purity of hydrogen with very low contaminants to avoid catalyst poisoning or mechanical damage, whereas for combustion applications the minimum requirements are not as severe. This standard identifies a number of end-uses for each grade and provides industry agreed minimum quality requirements.

It is expected that this standard will provide the quality basis from a technical, safety and commercial perspective for hydrogen systems in Australia (similar to AS 4564:2020, *General-purpose natural gas*).

AS 22734:2020, *Hydrogen generators using water electrolysis – Industrial, commercial, and residential applications* (ISO 22734:2019, MOD)

HYDROGEN PRODUCTION

OBJECTIVES Defines the construction, safety and performance requirements of packaged or factory matched hydrogen gas generation appliances, using electrochemical reactions to electrolyse water to produce hydrogen and oxygen gas.

USE CASES Applicable for both Alkaline and Proton Exchange Membrane (PEM) electrolyser stacks and packages. It provides details on the mechanical and electrical design and installation requirements as well as advice on package control system and test methods.

This standard will be important for Australia to provide a set of minimum requirements when comparing electrolysers for equipment selection and project planning for installation.

SA TS 19883:2020, *Safety of pressure swing adsorption systems for hydrogen separation and purification (ISO/TS 19883:2017, MOD)*

HYDROGEN PRODUCTION

OBJECTIVES Defines safety measures and applicable design features for the design, commissioning and operation of pressure swing absorption systems for hydrogen separation and purification.

USE CASES Applies to hydrogen pressure swing absorptions (PSA) systems, stationary and skid-mounted, that are used to separate and purify hydrogen post hydrogen generation. The PSA systems can be used downstream of any hydrogen generation technology.

Sets out the general hazardous associated with PSA systems, safety requirements in the field and specifications of equipment and piping. It also provides examples system diagrams and locations of safety critical devices e.g. relief valves.

The use of PSA systems for hydrogen purification is anticipated in Australia to enable supply of hydrogen to the required quality for end use.

AS ISO 16111:2020, *Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride*

HYDROGEN STORAGE

OBJECTIVES Defines the requirements for material, design, construction and testing of metal hydride transportable hydrogen gas storage systems. Excludes use as an on-board fuel storage solution for hydrogen-fuelled vehicles.

USE CASES New and improved hydrogen storage techniques are required for hydrogen gas. Absorption of hydrogen onto alloys means hydrogen can be transported in a solid form at a high density and later released. Metal hydride assemblies could be used as fuel cell cartridges; fuel storage contained and storage/release of high-purity hydrogen supplies for niche applications.

AS ISO 19881:2020, *Gaseous hydrogen – Land vehicle fuel containers*

HYDROGEN MOBILITY

OBJECTIVES Specifies the requirements for material, design, manufacture and testing of serially produced, refillable, permanently attached containers intended for the storage of fuel cell grade compressed hydrogen gas for land vehicle operation.

USE CASES The standard supports the implementation of hydrogen-powered land vehicles through delivery of performance-based testing requirements for fuel containers and is one of a suite of standards needed to enable successful commercialisation of hydrogen land vehicle technologies. Standardisation of vehicle fuel system components supports the evolving market for hydrogen powered vehicles.

AS 19880.3:2020, *Gaseous hydrogen – Fuelling stations, Part 3: Valves (ISO 19880-3:2018, MOD)*

HYDROGEN MOBILITY

OBJECTIVES This standard specifies the requirements and test methods for the safe performance of high pressure gas vales used in hydrogen refuelling stations up to H70 designation.

USE CASES Hydrogen infrastructure for fuelling hydrogen vehicles is essential. The development of safety standards for fuelling stations and components supports safe operations of these stations. Valves are a critical component as the control the flow and shut it down in an emergency.

Hydrogen fuelling station infrastructure is already deployed in Australia as part of a number of projects with several new projects also planning stations.

Part of a broader suite covering hydrogen fuelling station requirements. Assessment for adoption for other parts of the ISO 19880 suite for fuel stations is underway.