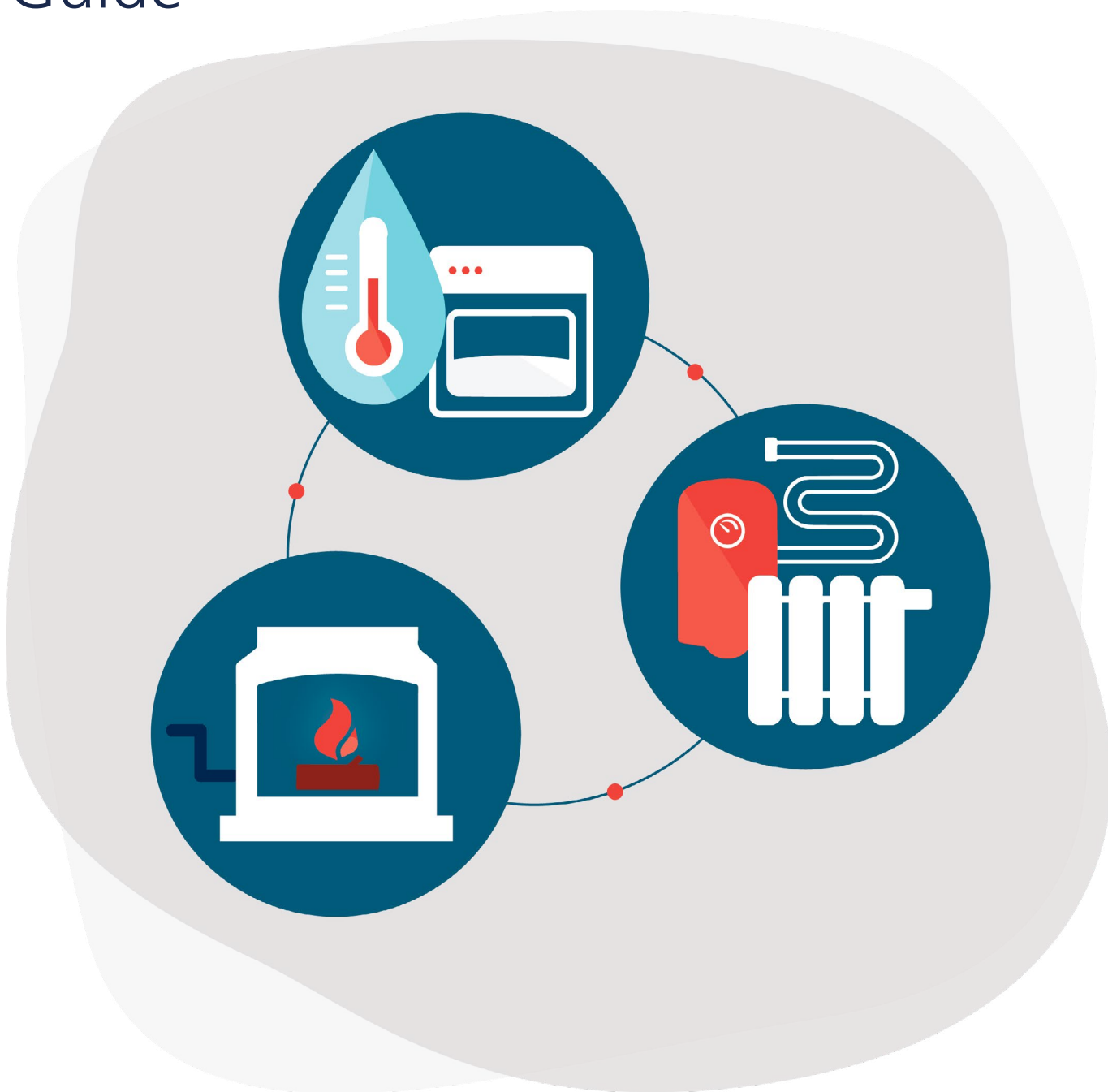


**PAS 4444:2020**

# Hydrogen-fired gas appliances – Guide



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# Foreword

This PAS was sponsored by the Department for Business, Energy and Industrial Strategy (BEIS). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 30 April 2020.

Acknowledgement is given to Bob Walsh of Sarem Consulting, as the technical author, and the following organizations that were involved in the development of this PAS as members of the steering group:

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Acknowledgement is also given to the members of a wider review panel who were consulted in the development of this PAS.

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This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

The PAS process enables a guide to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further development as a British

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## Information about this document

As a guide, this PAS takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

In order to gather live feedback on the PAS in its first six months of publication, BSI are also hosting the text of the PAS online, and invite you to comment on the PAS during this time period, in order to assess the usefulness of this PAS and inform any future revisions of it. In order to participate on this, please supply your name, contact details and email address to the email address provided on the inside back cover of this PAS. Once you have provided that information to that email address, BSI will then send you an automatic email that will provide you with the link to our Standards Development Portal where you can provide your comments on the PAS.

## Presentational conventions

The guidance in this PAS is presented in Roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is "should".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

Identified issues generating subsequent requirements and supporting tests are detailed and referenced to the relevant appliance standard/clause.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

Guidance in this standard is drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause G.4, which states, "The wording of a guide is in the form of descriptive statements and recommendations, using the present tense and the auxiliary "should" for recommendations".

## Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a PAS cannot confer immunity from legal obligations.

# 1 Scope

This PAS gives guidance on the development and construction of hydrogen-fired gas appliances, which are either purpose-built to use hydrogen or are designed to be converted to use hydrogen.

The PAS covers the functional specification of the appliance, including specific advice on the demonstration of safety, including reasonably foreseeable conditions to stress the appliance in excess of that which it is likely to experience in normal service. It also covers the setting of limit (upper and lower) hydrogen supply pressures and limit voltages. It discusses the possible arrangement of fittings and devices acknowledging the application to hydrogen-fired appliances.

The PAS also covers tests regarding both delayed ignition and unintended ignition of accumulated gas (which has leaked from the gas circuit) within the case of the appliance and/or its flue.

It also covers advice on manufacturer's instructions regarding installation of such appliances (including fluing) and their servicing requirements.

The PAS is intended to be used as a supplement to existing standards and generally assumes that any default performance requirements (for example, noise or pressure rating) align with those of an equivalent 2<sup>nd</sup> family gas appliance unless specifically stated otherwise.

The PAS also provides guidance on aligning with the essential requirements at the time of publication of the PAS of the Gas Appliance Regulation (GAR) for appliances burning hydrogen [1]. Annex A provides a list of these essential requirements and indicates where they are addressed in the clauses of this PAS.

This PAS has been developed with reference to the product standards given as normative references but might be applicable to other similar products (see Annex B).

This PAS is not applicable to industrial or process equipment.

This PAS is for use by the manufacturers of hydrogen-fired gas appliances and manufacturers of gas appliances that are designed to be converted to use hydrogen.

The PAS may also be of interest to Notified Bodies, other appliance test houses and anyone who might be engaged in testing these appliances.

**NOTE 1** *This PAS is intended to prepare the UK gas industry for "hydrogen ready" appliances, including appliances designed to be converted to use hydrogen.*

**NOTE 2** *This PAS has been developed on the basis that currently hydrogen limit test gases do not exist and are to be the subject of a wider discussion. Accordingly, other test means have been suggested so as to stress the appliance in excess of that which it is likely to experience in normal service.*