

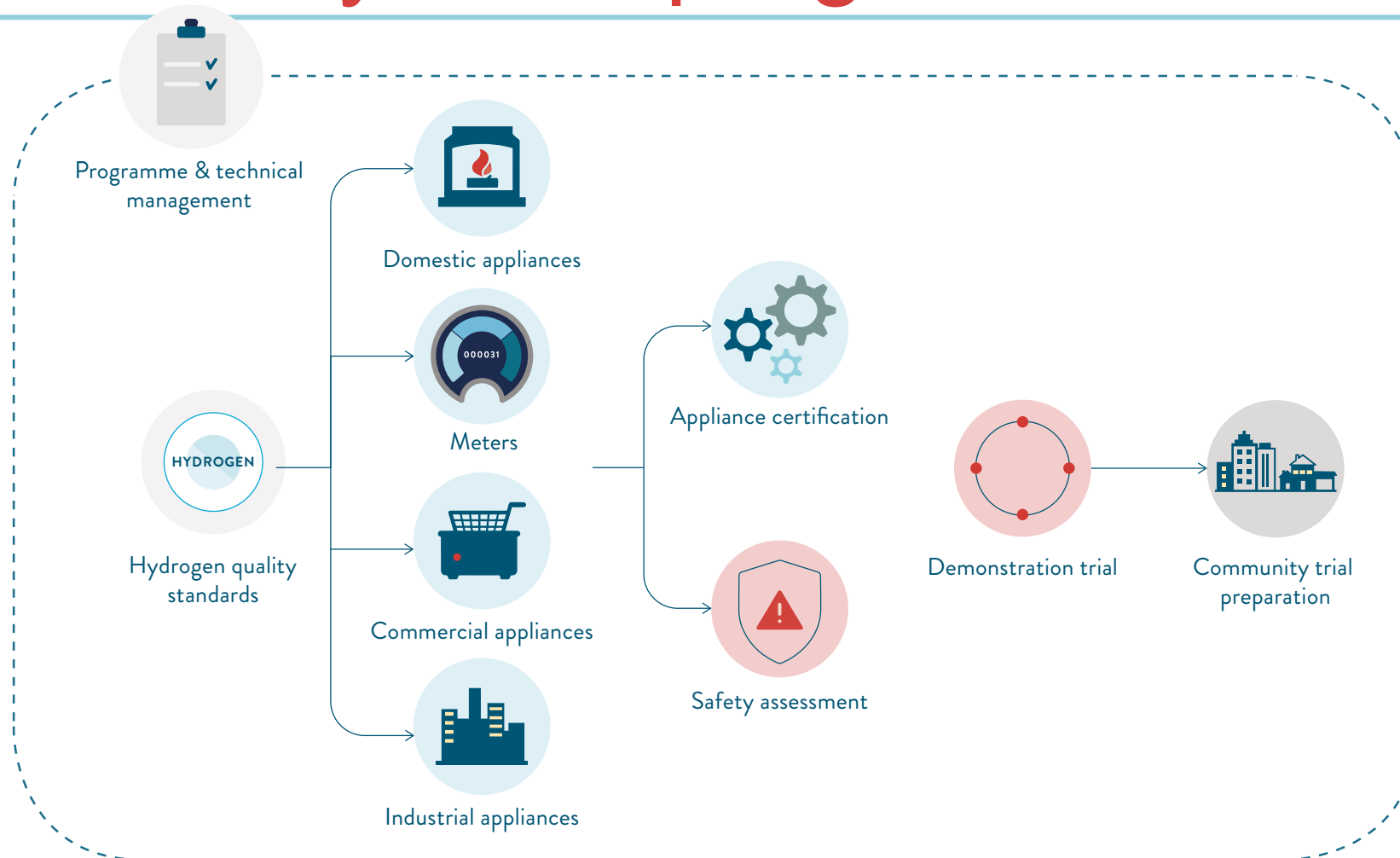
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WP3: BSI PAS4444

Hydrogen Fired
Gas Appliances
Guide

PAS 4444

Hy4heat programme



Hy4Heat programme timeline overview

2018

2019

2020

2021

Hy4Heat ends



WP1&9 PMC Managing WPs in preparation for a Community Trial



WP2 Quality and standards



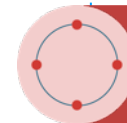
WP7 Safety and risk assessment



WP3 Development of appliance certification



WP4 Development of certified domestic appliances and WP10 Metering development



WP8 Demonstration trials



WP5 Commercial appliances
Understanding the market

Potential commercial appliance development



WP6 Industrial appliances
Understanding the market

Potential industrial appliance development

Possible
Community Trial



Work package 3

- Hydrogen appliances could be certified under the GAR
- The ability and/or capability to test and certify hydrogen appliances exists
- Currently no specific (harmonised) standards for testing hydrogen appliances but, like other unconventional gas appliances these are tested using a combination of standards or creating bespoke test methods to demonstrate compliance

Consensus required on how existing standards will be used

There will be differences in how appliances need be tested

Why BSI and PAS?

- Need to develop some standardised guidance on how to apply current standards to ensure consistency across the industry
- BSI is the National Standards Body whose standards are widely used to test and certify gas appliances
- Developed by and in collaboration with industry stakeholders
- To support WP4 development and the wider industry
- Considered too early to revise existing standards due to limited experience and a PAS allows for guidance to be developed now

PAS 4444 draft scope

- The PAS gives guidance on the development and construction of hydrogen-fired gas appliances which are either purpose-built to use hydrogen or might be converted to use hydrogen in the future
- The PAS covers the functional specification of the appliance, including specific advice on the demonstration of safety, including worst case conditions to stress the appliance in excess of that it is likely to experience in normal service. It also covers the setting of limits (upper and lower) hydrogen supply pressures and limit voltages. It discusses the possible arrangements of fittings and devices that might help demonstrate compliance with the Gas Appliance Regulations.

PAS 4444 draft scope, *cont*

- The PAS also covers tests that manufacturers should consider adopting regarding both delayed ignition and unintended ignition of gas within the case of the appliance and / or its flue
- It also covers advice on manufacturer's instructions regarding installation of such appliances (including flues) and their servicing requirements
- The PAS generally assumes that any default performance requirements (for example noise or pressure rating) align with those of an equivalent 2nd family gas appliance, unless specifically stated otherwise

PAS 4444 draft scope, *cont*

- The PAS is for use by the manufacturers of hydrogen fired gas appliances within the scope of the Gas Appliance Regulations and to manufacturers of conventional 2nd family gas appliances that might be converted to hydrogen at some date in the future
- The PAS is also of use to Notified Bodies

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Indicative key dates

SG review (~2 weeks)	14/6 – 27/6/19
SG Meeting 1 (resolution of SG comments on Draft 1)	w/c 5/7/19
Review panel consultation (~4 weeks)	3/9 – 30/9/19
SG Meeting 2 resolution of public comments on Draft 2	w/c 10/10/19
SG editorial review	14/11 – 20/11/18
PAS publication	Jan 2020

PAS4444

This PAS is specific to mainstream new gas appliances (cookers, gas fires, water heaters and boilers) flue type B and type C.

This PAS is not applicable to the conversion of installed gas appliances for use on hydrogen gas.

This PAS is currently not applicable to other types of gas fired appliances suitable for firing hydrogen firing:

- Flameless / catalytic burners
- Internal combustion engines
- Fuel cells - refer to EN 62282
- Gas turbines
- Industrial boilers
- Steam boilers

PAS4444

The prime focus of the document is to consider residential appliances as these account for the volume of installed products. However due to the overlap of domestic/commercial products and standards, it is the intention that the PAS will be applicable to commercial products and will be developed to include those products currently outside of the scope.

Normative references

BS EN 30 - Cookers

BSEN 203 - Catering equipment

BS EN 26 - Instantaneous water heaters

BS EN 89 - Storage water heaters

BS EN 509 - Decorative fuel effect gas appliances

BS EN 15502 - Gas fired central heating boilers

BS 7977 - Radiant convectors

BS EN 62282 - Fuel cell standard used for guidance



Hy4Heat