



heat transfer society

WEBINAR FORUM

25th JULY 2025

“Operational and safety considerations in research and development of ammonia combustion systems”

Professor Richard Marsh

*Head of Department of Mechanical and Medical Engineering
Cardiff University*



This work demonstrates the scale-up of a laboratory scale atmospheric swirl burner operating on a blend of ammonia and hydrogen from approximately 10kW thermal power towards 500kW thermal power. Additionally, a safety case study of an explosion incident is reported, with findings of the ensuing investigation useful to any party interested in combusting ammonia/hydrogen blends at scales relevant to industrial use. Direct photographs of the visible flame and emissions of NO, NO₂, N₂O, NH₃, O₂ and H₂O were recorded along with ultraviolet and visible light spectrometry. Wide-angle photos from the laboratory's CCTV system as well as photos of inside the combustion chamber are used to outline the cause of the explosion and improvements to the safety systems are reported. During nominal operation, acceptable flame stability was found at all thermal powers tested and minimum emissions were found for near stoichiometric flames at higher thermal powers. UV spectrometry demonstrated potential for indicating equivalence ratio and NO emissions at high thermal power. Findings from the post-incident safety

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investigation include requirements for extensive filtration in pipework upstream of control valves, refinement of ignition systems and the need to develop independent and standardised flare systems specifically for NH₃/H₂ blends.

The presentation will start at **12 noon** (for one hour).

Free Webinar Registration Link: [HERE](#)

Professor Richard Marsh

Richard Marsh is a Professor of Engineering at Cardiff University, specialising in energy systems. His expertise covers thermodynamics, combustion and energy management in both applied and fundamental research. His main research interests are combustion of alternative fuels, hydrogen, ammonia and biomass. He has over 25 years' experience in gas turbines, fuel injection and industrial heat research, with a variety of industrial collaborators such as Rolls-Royce, Tata Steel, RWE and Siemens.

Members are encouraged to share this notice with colleagues who may be interested in this discussion.

Future events

- ❖ 27th March 2026, 60th HTS Annual Dinner - Grand Connaught Rooms, 61-65 Great Queen St, London WC2B 5DA.

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If undelivered, please return to Simon Parsons, 25 Parkside Avenue, Bromley, Kent BR1 2EJ
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