

using Hydrogen as a fuel source

Hydrogen's inherent physical properties, much like other flammable compounds such as natural gas, can be safely managed through robust design protocols.

Hazardous Area Classification

Work carried out by HSL for the HyDeploy Trial at Keele University looked at concentrations of up to 20% Hydrogen blended in Natural Gas (NG). The results showed that volumetric release rates could be up to 10% higher for the blend than NG, and dispersion distances (to ½ LFL) could be up to 15-25% further for the blend. HSL proposed pragmatic, conservative modified criteria to be applied at HyDeploy to the Natural Gas Standard IGEM/SR/25 for the blend. Further work will be required to allow these criteria to be used outside the HyDeploy Project.

BS EN60079-20-1:2010

- NG with up to 25% hydrogen is Group IIA
- Hydrogen is Group IIC
- Both NG and hydrogen have a T1 temperature class

Figure 2: Hydrogen Classification to BS EN 60079-20-1:2010

In contrast, standards addressing Hazardous Area Classification for pure Hydrogen or Hydrogen blends above 20% are in wide use already. The Energy Institute (EI) Model Code of Safe Practice EI 15⁵ guides that any mixture containing above 30% volume Hydrogen should be treated as Hydrogen. The corresponding EI representative fluid category is G(ii). The HSL tool, Quadvent⁶, is also recommended for classifying zones and calculating extents.

Industry Codes and Standards

A number of organisations provide internationally recognised codes with respect to Hydrogen, including; the European Industrial Gases Association (EIGA); the National Fire Protection Association (NFPA) and; the American Compressed Gas Association (CGA). In the UK there is the British Compressed Gases Association, and a number of gas suppliers (e.g. BOC) have their own internal standards. These are particularly useful for identifying requirements for standard separation and segregation distances for hydrogen storage.

Implementing a Hydrogen Economy

Understanding the risks involved with using Hydrogen, and ensuring the necessary steps are taken to mitigate and control the hazards, is therefore vital to enabling the use of Hydrogen as an alternative fuel source.

Further information about implementing a Hydrogen Economy in the North West can be found in the HyNet website, or from

the North West Hydrogen Alliance; an organisation created to promote and influence the delivery of a hydrogen economy in the North West region through collaboration between industry, academia and government.

About the Author



Clare Dunkerley is a Process Safety Consultant at Otto Simon Limited. Clare is a TUV Rheinland certified Safety Instrumented Systems Engineer specialising in Functional Safety, including Functional Safety Management, LOPA, SIF architecture design, software specification and functional safety assessment. Clare has a background in DCS and

process design engineering, and has worked as lead engineer for relief system studies for multiple clients and DCS and SIS application design engineer for plants in the chemical, petrochemical and waste management sectors.

An active member of the North West Hydrogen Alliance, Otto Simon Limited is working at the forefront of technical innovation for the Hydrogen market. We are providing engineering expertise and project management services to develop feasibility, commercialisation, and process safety studies for utilising blended hydrogen and for the re-purposing of equipment to use pure hydrogen as a fuel source for industrial sites in the North West.

Resources

<https://hynet.co.uk>

www.nwhydrogenalliance.co.uk

www.ottosimon.co.uk

¹ <https://www.theecc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

² <https://www.gov.uk/government/publications/hydrogen-supply-competition/hydrogen-supply-programme-successful-projects-phase-2>

³ <https://hynet.co.uk/>

⁴ <https://hydeploy.co.uk/>

⁵ <https://publishing.energyinst.org/topics/asset-integrity/ei-model-code-of-safe-practice-part-15-area-classification-for-installations-handling-flammable-fluids>

⁶ <https://www.hsl.gov.uk/publications-and-products/quadvent-2>