Instrumentation in hazardous areas – challenges and solutions

What is a Hazardous Area?

A hazardous area is a location where the potential for fire or explosion exists due to the potential for ignitable gas, vapour, or dust to be present in the atmosphere. Examples of these locations include oil & gas facilities, chemical processing plants, and pharmaceutical manufacturers.

How does this affect instrumentation manufacturers?

Instrumentation manufacturers who see hazardous areas as a potential market typically have a choice: to develop products from the ground up to comply with regulations and standards in their chosen markets or to adapt existing safe area products.

The former option is often feasible for simpler systems and higher production volumes, while more complex and bespoke systems, for example, gas analysers, often require a custom approach to adapt the product, with assistance from specialist companies like Expo Technologies.

This case study outlines how Expo collaborated with a gas analyser manufacturer to adapt a standard system for use within a hydrogen refueling application.

Case Study Overview

As the hydrogen distribution network for fuel cell electric vehicles (FCEVs) grows, so does the need to guarantee the quality of the hydrogen fuel. A leading analytical instrument manufacturer wished to develop a hazardous area version of their standard H2 analyser for use within the H2 supply chain for FCEVs. They came to Expo because of our expertise in hazardous area solutions for safe area equipment, as well as our experience with flammable gas analysers.

Challenges

Having settled on purge and pressurisation (Ex p) as the best protection method, there was an additional complication: although the sample flow of H2 was small, the enclosure would still be classed as having an "internal source of release" (ISOR) – that is the potential for a release of flammable gas inside the protected enclosure itself.

This required additional safety features and a more complex certification process under the Ex p standard: BS EN 60079-2. Additionally, the client wished to avoid excessive modification of the analyser for this application if possible.

Outcome

Expo's engineers worked with the client to design a bespoke Ex p enclosure. After the initial enclosure purge, the system provided a constant airflow through the enclosure at a sufficient rate to dilute any leak of the incoming H2 sample gas to below 25% of the lower explosive limit as required by the standard.

As an additional safety feature, Expo installed a certified H2 leak detector inside the enclosure, interlocked to the incoming power.

Expo's consultancy team developed the certification plan along with a Notified Body to deliver the required certification.

Conclusions

Without the right approach, developing products for hazardous areas can present costly challenges to instrumentation manufacturers. Early engagement with a specialist company, which has an in-depth understanding of the applicable standards and potential solutions, is highly recommended.

If you have a hazardous application for your instrumentation and need a certified solution, contact Expo Technologies:

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