

Development of a hazardous area Electrodeionization system

Working with a Norwegian engineering consultancy to develop hazardous area water treatment systems for installation on Floating Production Storage & Offloading (FPSO) vessels.

Background

FPSOs are self-contained floating vessels used by the offshore oil and gas industry for the production and processing of hydrocarbons, and for the storage of oil.

In a similar way to fixed production platforms, many areas onboard an FPSO will be classified as hazardous, requiring all equipment and systems to be certified for safe use. This case outlines one such project.



Project Brief

Our client, a specialist engineering consultancy company based in Norway, needed to source certified Electrodeionization (EDI) systems to provide ultra-pure process water onboard several FPSOs. EDI cells and their control systems were readily available for safe area applications, but no suitable hazardous area systems existed. Due to the physical size and weight of the cells, a Purged and Pressurized (Ex p) enclosure was the only feasible protection method. The client contacted Expo as the clear leader in this field.

Challenges

- Due to footprint limitations, each pressurized enclosure system would be required to contain 2 off EDI cells and associated controls, hence large enclosures would be required, suitable for unusually heavy contents, each cell having an empty weight in excess of 150kg.
- Thermal management had to be considered as the FPSOs would be deployed to warm climates.
- The EDI process generates small quantities of both hydrogen and oxygen, which are normally piped away safely to vent. However, in the event of a leak into the pressurized enclosure, a potentially dangerous situation could occur. Mitigation was therefore required.
- The systems were to be designed to be suitable for Zone 1 certification.

Outcome

- A joint feasibility study was carried out with the client, prior to agreeing the final enclosure design.
- The specially reinforced enclosures featured sliding rail systems to allow the EDI cells to be loaded inside, one above the other, before being locked into place. Special flanged connections were provided for the water feed and return flows, as well as the vent gas piping.
- To mitigate the risk of hydrogen or oxygen leakage, hazardous area certified gas leak detection systems were installed to monitor both upper and lower EDI cell compartments.
- A Type-X Minipurge was fitted, with internal distribution piping to ensure full purging of the upper control's enclosure and the two EDI cell compartments in series.
- Custom sun shields were installed on most available external surfaces to limit the impact of direct sunlight once the FPSOs were deployed.
- After final fit-out, the enclosures will be inspected & certified by Expo.

Expo Products and Services

MiniPurge type X

IECEX, ATEX & UL certified purge and pressurization systems for Zone 1, Class I Div 1 applications.

Features :

- Global approvals
- Purge flow capacity up to 900 NI/min
- Leakage Compensation or Continuous Flow
- Stainless steel enclosure construction



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Custom Enclosure Service



Some projects call for special shapes and sizes of enclosures, non-standard features, or very special applications, and may also require input from a Notified Body during the design phase or final certification.

With Expo's fully custom process, a dedicated engineer will work with you to develop exactly what you need and agree on a detailed budget and project timeline with milestones. As this is a highly flexible service, we can adapt the plan if your project requirements change.

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Design & Consultancy Services

Expo Technologies' team of consultants and certification engineers have the experience and knowledge to support our customers through the certification process for equipment to be used in Hazardous Areas.

From concept design through to maintenance, Expo Technologies works with you to reduce the risks and accelerate your entry into global markets.

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