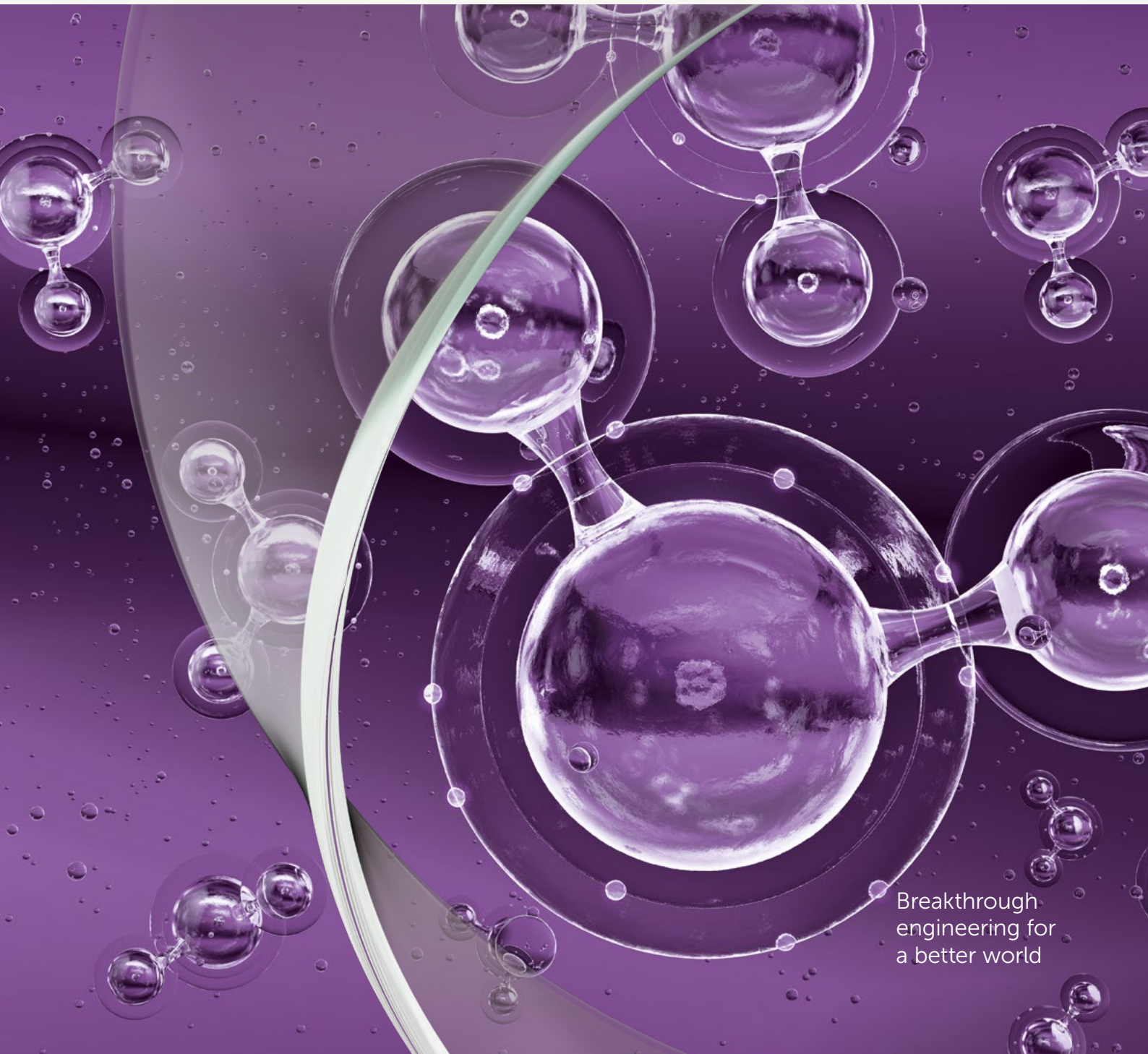
Fluid Control

Our product brands:
IMI Buschjost
IMI FAS
IMI Herion

How to prevent:
Hydrogen and Oxygen mixing in your Separator



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Breakthrough engineering for a better world

We create breakthrough solutions which accelerate the safety, reliability and performance of everyday processes. Our valves and complete system solutions control liquids and gases, enabling machine builders to improve design functionality and keep safety and sustainability at the forefront of innovation.

For over 80 years, we have helped our customers improve the reliability and efficiency of their machines for diverse end markets. Working in close customer partnership, we continuously push the boundaries of technology, offering a wide selection of components and tailored solutions. Meeting equipment manufacturers' needs includes everything from helping provide traceability for consumers, to reducing waste in critical resources and delivering a premium cup of coffee.

Through flexible, scalable and agile innovation, we help our customers solve their current challenges and create competitive advantage for the future.

Breakthrough engineering you can count on.

Want to prevent hydrogen and oxygen mixing in your separator loop with a flow control system but unsure of the necessary components?

Look no further! Here are the top three ways to do just that. All based on our experience of working with leading electrolysis OEMs.

FIND OUT MORE:
fluidcontrol.imiplc.com

●● Most electrolyser OEMs and operators tell us they struggle with the following three challenges. ●●

The three challenges in Electrolysis

① Complexity & Constraints

Engineers face complex electrolyser system designs which are required to satisfy certification and functionality requirements. To make the overall system function, hundreds of parts are needed, including oxygen / potassium hydroxide (KOH) separation vessels, KOH / water solution regulators (which are relevant for alkaline systems but not needed for PEM electrolysers), de-ionized water units, de-oxo dryer units, and nitrogen panels for purging. Not even mentioning all the piping.

Given the recent ramp up of hydrogen infrastructure projects, engineers also face time constraints. And at the same time, they have to ensure they keep up-to-speed with industry developments, evolving standards

(i .e.: SIL2 certification) and growth demands. Things become even more complex when you don't know how to design a particular sub-system to meet all the safety requirements of your risk analysis (i.e.: avoiding the mix of gases in the separator loop).

② Reliability & Serviceability

Once the system is up and running, the operations team may have to grapple with unreliable and difficult to service components, which can lead to unplanned and expensive downtime.

In many cases, key components such as valves, regulators and filters were not designed specifically for hydrogen use and have a limited lifetime. And when things fail, servicing them is a complex and time-consuming undertaking. What before seemed simple, like choosing an O-ring, now needs attention.

When choosing the proper material for oxygen mixed with KOH in alkaline systems, careful consideration must be given to both ensuring compatibility with the gas and preventing frequent maintenance due to KOH-related corrosion.

③ Fragmented supply chains

The significance of the supply chain and purchasing requirements for the electrolyser cannot be understated, along with complex design and operational issues. A supply chain that is disjointed and challenging to manage is a problem for many operators, pushing up the total cost of ownership over the course of a system.

Due to the large number of components, several suppliers must be involved in the design and procurement process. Partnering with businesses that can provide a wider portfolio is essential to reducing the time it takes to release a product onto the market and making life easier for the manufacturer of electrolysers.

Three ways to reduce complexity and increase lifetime

How to reduce complexity and increase lifetime in the electrolyser and purification systems:

1 Electric actuation:

A typical electrolyser's piping and instrumentation system will encompass 15-20 valves alone, as part of a multitude of components that also include regulators and process control solutions.

In most applications these are air or pneumatically operated, which require an entire sub-system of their own including an air compressor, FRLs and air preparation equipment, plus the associated piping and tubing. The sub system must also comply with all safety-related requirements such as ATEX, as well as being able to operate successfully in both warm and cold environments.

An answer to reducing system complication could lie in the specification of electric actuation solutions that can help focus on reducing the number of subsystems needed. This provides cost and operational benefits by way of a significant reduction in the total number of components. In turn, delivering fewer potential leak points, higher component reliability and, ultimately, a less complex system design.

System solution developments - including those supplied by Norgren - are increasingly emerging to seamlessly facilitate a transition to purely electrically operated components. Both OpEx and CapEx considerations can be influenced through having less components to purchase, service, or at risk of failure. Add in the advantages of BUS systems to further reduce wiring complexity and electric actuation should be viewed as a real driver for system improvement across several areas.

2 Component integration:

Again, the typical electrolyser system requires the purchase and implementation of many fittings, tubes, pipes, and general assemblies. But is the prescribed way the best way? Is there an opportunity to eliminate a percentage of the many components that add to the multipart and potentially inefficient running of the electrolyser, and at the same time tackle the issues associated with fragmented supply chains?

The promising attributes of manifolds equipped with modular functionality offer a credible solution. Through integration of different functions such as valves, regulators, and filters, it is feasible to reduce the overall quantity of fittings and piping. This not only eliminates potential leak points in the system, but it also delivers installation timescale benefits, as well as reducing the overall footprint of the system section. Such an approach has already gained traction in the development of natural gas applications as well as traditional hydraulic applications.

3 Serviceability:

The reliability of components so they deliver a prolonged and improved lifetime is key to operational efficiency. This means specifying component solutions that have a proven testing and simulation background and have been developed for the exact needs of station builders and operators.

Where servicing is required, the complex electrolyser and purification environments where components operate within can often prove problematic. Typical systems see entire components removed from process lines for servicing which is time-consuming and can lead to leak issues when reassembled. Sometimes they are serviced before the theorical end of life because of the wrong material choice for internal or soft materials during the design phase.

The remedy lies in cartridge type components which can be serviced without the need to remove the entire body from the piping. Again, potentially difficult servicing needs are mitigated, time is saved, and servicing costs minimized.

Finally, condition monitoring of essential components can support overall aims to reduce complex system need and increase efficiencies. Integrated solutions that feature sensors and transmitters to monitor pressure and temperature are ideal in this sense. Generated data not only provides a transparent view on the status of the component, but it also enables better informed decision making for predictive maintenance schedules in the future.

Ready to reduce complexity and cost in your Electrolysis?

Conclusion:

As the demand for hydrogen-based energy solutions intensifies, it is vital that the supporting infrastructure (such as electrolysers) required to support it is effective both from a cost and operational perspective.

Pursuing all three avenues outlined above will result in simpler, more cost-effective electrolysers that are easier to maintain and operate.

Book a call with the IMI Hydrogen experts today:

FIND OUT MORE:
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Trusted by hydrogen system OEMs around the world

Our solutions are battle proof and have seen millions of hours in operation.

120
Green Hydrogen Projects

7.000+
Solutions Shipped

35
Years of Expertise