Water treatment for electrolyzers Solutions for Hydrogen Production

Hydrogen – Transforming our Economy

The global pursuit of more sustainable sources of energy and mobility is transforming our economy. Hydrogen has emerged as a promising vector due to its versatility as a fuel or feedstock. **Hydrogen** can play several major roles in the **energy transformation**, contributing to the **decarbonization** of transportation, heat, and energy sources -both industrial and domestic-, and as greener feedstock, to produce ammonia or methanol, for example. The hydrogen economy is gaining momentum, with remarkable growth expected in the next decades.

DuPont Water Solutions

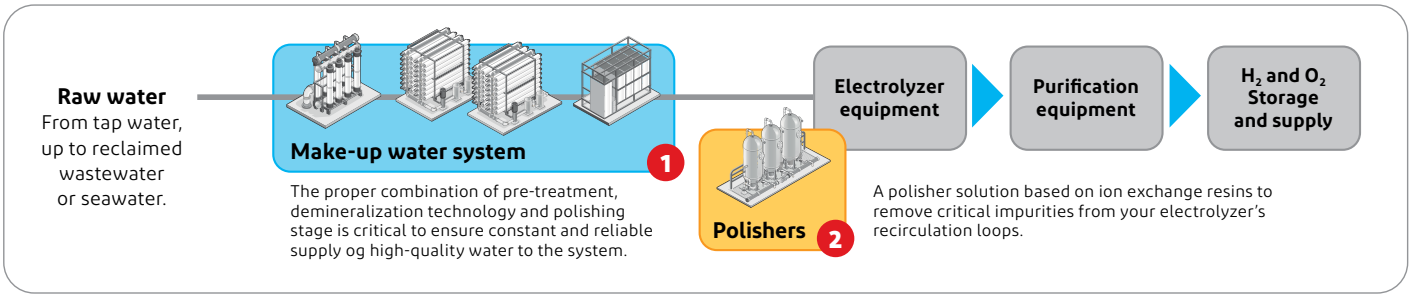
At DuPont Water Solutions, we develop solutions that meet the world's growing water and energy demands. Our diverse portfolio of technologies and solutions – **the broadest portfolio in the industry of core water treatment technologies** – addresses a broad range of water treatment applications and is designed to help you overcome water challenges to produce your desired quality and quantity of water. Our best-in-class technical team supported by R&D has accumulated decades of experience across all technologies to create solutions that address a broad variety of challenges.

The Green Hydrogen Challenge

Hydrogen can be produced by several methods from different feedstocks, but the most sustainable technology is termed Green Hydrogen, in which the Hydrogen is produced from water by renewable energy powered electrolysis. Electrolysis is the process of electrically splitting the water molecules into hydrogen and oxygen gas. There are various types of **electrolyzers**, and they all **rely on high purity water** as the feedstock to produce hydrogen. The water quality and dynamic water chemistry have a direct influence on the lifetime of the membrane, electrodes, and catalysts that make up the electrolyzers, and as a result the overall efficiency of the operations. It is critical that water quality is well understood and managed to ensure efficient operation and maximize the lifetime of the components.

Water for Hydrogen

Either from tap water, surface water, reclaimed wastewater or seawater, water requires treatment to reach the required quality for electrolysis; the treatment line is typically named **make-up water treatment system** and consists of a combination of technologies in three main stages: a **pre-treatment** to remove solids, colloids, and organic matter; a **demineralization** stage to remove bulk dissolved solids; and a **polishing** to remove the residuals to a minimum level. The selection of the technologies will not only determine the water quality but also the overall recovery rate (water efficiency) and energy consumption, among other features. Additionally, to prevent the accumulation of critical impurities in the electrolyzer loops, **dedicated polishing** is required, and its design must be in accordance with the electrolyzer type.



1 Solutions for the make-up water line

In the configuration of a make-up water system, DuPont Water Solutions can contribute with an unparalleled portfolio of technologies: for the pre-treatment, DuPont™ IntegraTec™ Ultrafiltration (UF), a softening treatment with DuPont™ AmberLite™ ion exchange resins or DuPont™ B-Free™ to reduce the risk of biofouling downstream, among other options; for the demineralization stage, a multi-pass system based on Filmtec™ Reverse Osmosis (RO) elements; and finally, for the polishing step, our DuPont™ Electrodeionization (EDI) modules or DuPont™ AmberLite™ and AmberTec™ ion exchange resins in mixed bed configuration. Our understanding of water chemistry and the complexity of individual constituents enables us to define the **appropriate configuration consistent with the project needs and context**. For more information follow this link or scan the QR code beside.

2 Polishers for the electrolyzer protection

The electrolyzer polishers are designed for the specific challenges associated with maintaining water purity within the Balance of Stack. To remove traces of impurities, **the resin itself needs to be of high quality and purity** while at the same time able to **withstand thermal and chemical stress.** Using intentionally designed polishers with high-quality DuPont™ AmberLite™ or DuPont™ AmberTec™ ion exchange resins will prevent the accumulation of impurities, even under the thermal and chemical stress of the loop.

Contact us

https://www.dupont.com/water/contact-us.html

Customer collaboration Projects

DuPont Water Solutions works closely with key stakeholders in the hydrogen value chain to provide state-of-the-art multi technology water purification solutions that ensure a constant high-quality feed to the hydrogen production units.
Supported by our knowledge of the application, World-class R&D and innovation capabilities, we envision strategic partnerships to solve today's needs and **jointly create the future of the technology**.

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Water Solutions
www.dupontwatersolutions.com

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