MECO
A GRUNDFOS COMPANY

WATER TREATMENT FOR GREEN HYDROGEN

ULTRAPURE WATER: THE KEY TO GREEN HYDROGEN PRODUCTION

Successful hydrogen production relies on the right water treatment — especially the water source and the water electrolysis process, during which electricity is used to split water into hydrogen and oxygen.

With our expertise, state-of-the-art water purification equipment, and global service capabilities, MECO ensures a reliable, ultrapure solution that spans from the water source to the core of the electrolyzer.

STARTING AT THE SOURCE

Depending on your location and project size, you might have different water sources available. Each source will come with unique requirements for your water treatment system. MECO offers pretreatment, final treatment, along with polishing steps including softening to deionization. Our team of experts will help you choose the best option based on your source water and electrolyzer technology.

WATER SOURCES & CONSIDERATIONS

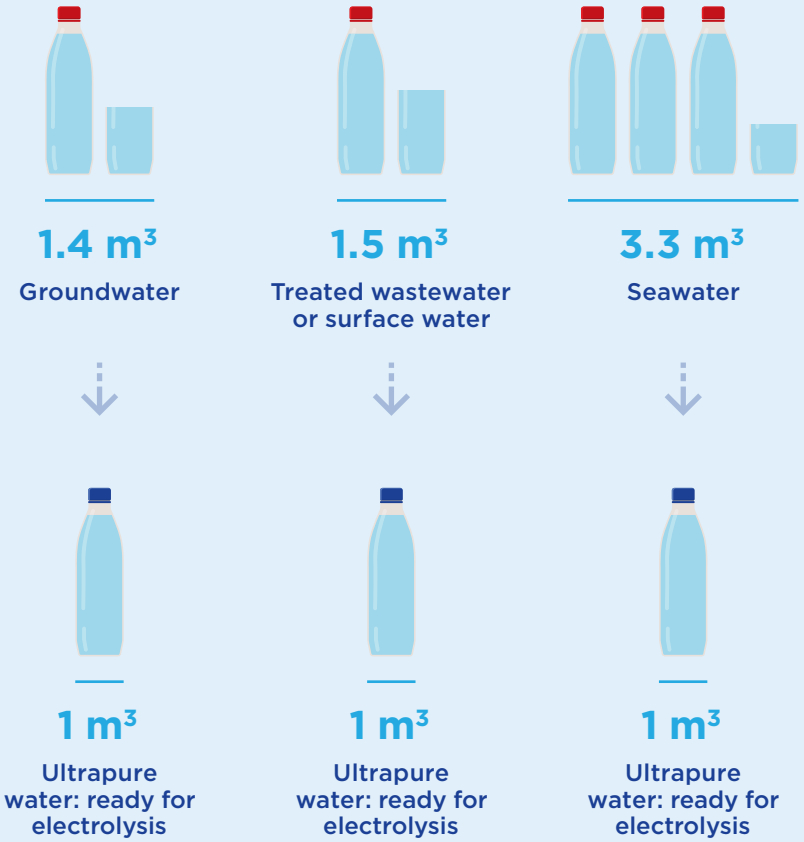
- **Groundwater:** A stable water source, but it can contain iron, manganese, and ammonium.
- **City water:** Easy access for smaller projects, but contains chlorine and chloramine.
- **Treated wastewater:** Varies in quality and has a potentially high load of organics.
- **Sea water:** High salinity and content of metal ions.

FAQ

HOW MUCH SOURCE WATER IS NEEDED TO PRODUCE HYDROGEN?

The amount of water required is a crucial factor in determining the impact of a green hydrogen production facility on the local water system. It is important to remember that the water purification process requires water itself–meaning the ratio of source water to ultrapure water is not 1:1.

Let's consider an example: A hydrogen plant designed to produce 1 tonne of hydrogen would need 9 m^3 of ultrapure water. In order to obtain that amount of ultrapure water, one would need to extract either 12 m^3 of groundwater, 13 m^3 of treated wastewater, or 30 m^3 of seawater.

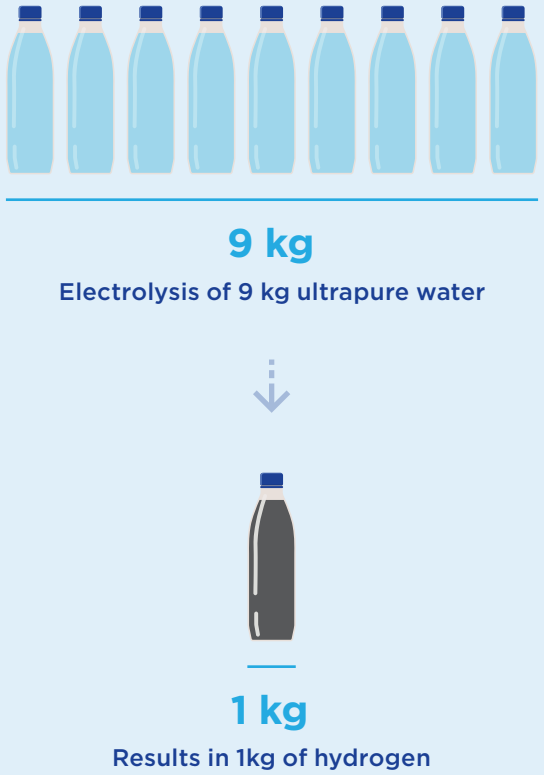


FAQ

HOW MUCH ULTRAPURE WATER IS NEEDED TO PRODUCE HYDROGEN?

Ultrapure water is the primary feedstock used to produce hydrogen. Cooling water may also be required during the electrolysis process.

The rule of thumb is that it takes 9 L ultrapure water to produce 1 kg of hydrogen. How much water is needed will also depend on the production capacity, as well as the power rating (MW) and efficiency of the electrolysis equipment.

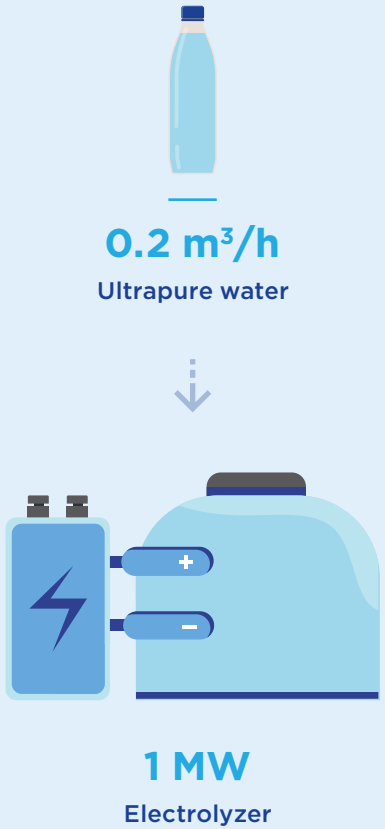


FAQ

HOW MUCH ULTRAPURE WATER IS NEEDED PER MEGAWATT (MW)?

In order to design a water treatment system, it is necessary to know the consumption rate of ultrapure water. The amount of ultrapure water needed per MW depends on how much energy the electrolyzer needs to convert the 9 L of ultrapure water into 1 kg of hydrogen.

Given that 9 L of ultrapure water is required to produce 1 kg of hydrogen, it equals a consumption rate of 163-200 L/h of ultrapure water per MW electrolysis.

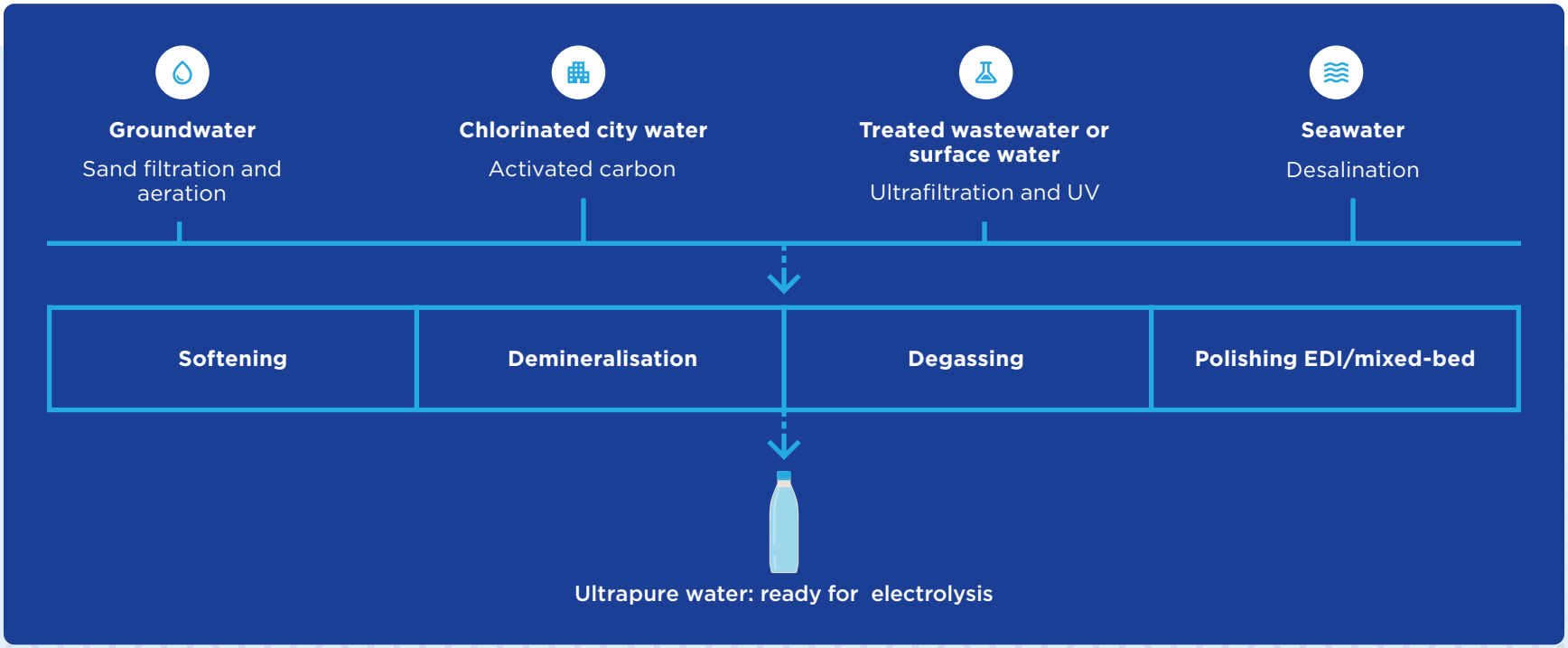


The quantity of ultrapure water required per MW depends on the efficiency of the electrolyzer

THE PROCESS: TREATING WATER FOR HYDROGEN PRODUCTION

Water treatment for hydrogen production consists of a pretreatment step that is determined by the sourced water and is followed by polishing.

The polishing steps can differ depending on the electrolyzer technology but will consist of one or more treatment steps from softening to deionization.



MASTER*pak*™ MICRO

THE TURNKEY SYSTEM FOR ULTRAPURE WATER GENERATION

Designed with sustainability in mind, the MASTER*pak*™ MICRO unifies loop operation and make-up operation into one simple system customized to your plant requirements. Our systems consistently produce water required for Alkaline water electrolysis (AWE), Proton Exchange Membrane (PEM), and Solid Oxide Electrolyzer Cell (SOEC) including all ASTM types I, II, III, IV grade water quality.

The MASTER*pak*™ MICRO reduces your environmental water and energy footprint, lowering OPEX cost for chemicals, water, electricity, and square footage while reducing the risk of biological loop contamination and potential product contamination.

MASTER*pak*™ MICRO OVERVIEW

- Complete turnkey ultrapure water system
- Product water quality meets Alkaline water electrolysis (AWE) and Proton exchange membrane (PEM) electrolysis requirements
- Low OPEX cost for chemicals, water, electricity and square footage
- Reduced environmental water and energy footprint
- Integrated controls system
- Reduced capital and operational costs
- Supported by MECO's full range of on-site services, including service deionization tanks that are regenerated in a dedicated plant, eliminating the risk of loop contamination from co-mixing resin with an industrial or water reuse application
- Reduced noise level at 60 dB versus competitors at 80 dB
- ASTM Type I, II, III, and IV Grade Water Quality
- Makeup or generation capacities from 1,000 - 30,000 GPD
- Up to 50% lower power consumption

ENGINEERED & MANUFACTURED IN SAN DIEGO, CA

MECO acquired San Diego-based company, Water Works, Inc., a fully integrated manufacturer and service provider for industrial ultrapure water systems, in order to strengthen our ultrapure water solutions offerings in the industrial, life sciences, and biopharmaceutical markets. All green hydrogen equipment is engineered and manufactured at the Water Works facility, providing customers with the highest-quality products and service for hydrogen production.

WHAT SETS MECO APART

Expertise: Customized water treatment systems tailored to your source water quality, safeguarding your electrolyzer by preventing not only membrane damage but also clogging, scaling, corrosion, and electrolyte degradation.

Turnkey Systems: Plug-and-play systems that are prepackaged on a single skid for quick deployment, fast installation, and ease of use.

Training: Ongoing education and training including service seminars, lunch and learns, and webinars, covering water plant operation, troubleshooting, maintenance, and more.

Service: 24-hour support including on-site water room management, preventative maintenance, and emergency response, ensuring your water treatment system remains up and running.

Sustainability: MECO recognizes the critical role that water plays in supporting life on our planet. Our systems recover as much water as possible – minimizing the amount of wastewater discharged into the environment – and reduce energy consumption with energy-efficient technologies.

PURE WATER TREATMENT SINCE 1928

MECO is a global pioneer in designing and manufacturing water purification equipment. Our systems produce life-saving drugs, power green hydrogen, and hydrate soldiers worldwide. For the past 95+ years, we've forged a legacy of excellence in cutting-edge water technology, delivering optimal solutions to meet evolving needs.

Since November 2021, MECO has been part of the Grundfos Group and embraces Grundfos' global ambition to pioneer solutions to the world's water and climate challenges and improve people's quality of life.

UNITED STATES

HOUSTON, TX

12603 Southwest Freeway,
Suite 500
Stafford, TX 77477
+1.281.276.7600

MANDEVILLE, LA

68375 Compass Way East
Mandeville, LA 70471
+1.985.249.5500

SAN DIEGO, CA

5490 COMPLEX STREET,
STE #602
San Diego, CA 92123
+1.858.499.0119

ASIA-PACIFIC

SINGAPORE

390 Havelock Road
#03-06 King's Centre
Singapore 169662
+65.6836.7500

EUROPE

IRELAND

Roselawn House, University
Business Complex
National Technology Park
Co. Limerick, Ireland
+353.61.512.130

WWW.MECO.COM

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