10 Material Solutions to Fuel Hydrogen Future

It's no secret that hydrogen economy is around the corner. More than 1,000 projects worth $320 billion have already been announced globally, says McKinsey research.

Is Equipment Ready for Hydrogen?

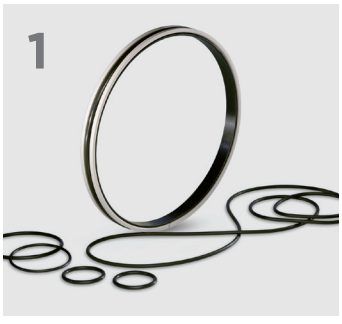
Most of the valves, compressors, electrolyzers, and other key equipment needed to produce, store, and transport hydrogen are not ready to take on the biggest challenges presented by hydrogen:

- High permeability of hydrogen can cause sealing issues and metal embrittlement.
- Hydrogen's low lubricity can lead to wear and friction issues.
- Exposure to hydrogen and long-term pressure cycling is impacting polymers (fatigue, change in dimensional and mechanical properties…)
- Extractables and leachables in hydrogen can cause contamination of fuel cells.
- High impeller tip speed required to compress hydrogen with centrifugal compressors is barely achievable with metal.

Greene Tweed Has Customers Covered – No Excuses, No Exceptions

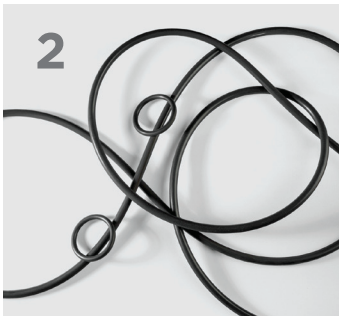
With over 200 engineers working across three continents, Greene Tweed is ready with a range of high-performance elastomers, thermoplastics, composites, and engineered components that make machinery dependable, efficient, and safe in hydrogen power applications.

HERE ARE A FEW:



Fusion® 938

RGD-resistant FKM elastomer that demonstrates remarkable stability in demanding hydrogen environments at very high pressure.

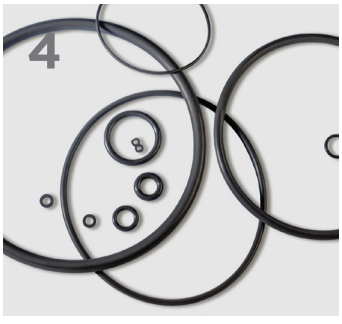


Fusion® 665

New generation ultra-low temperature-FKM elastomer that has extremely low compression set and broad chemical compatibility.

Xyfluor®

Highly fluorinated elastomer that exhibits excellent chemical compatibility with all major media found in electrolysers and fuel cells, such as hydrogen, oxygen, potassium hydroxide, sulfuric acid, and phosphoric acid.



Chemraz®

High-purity FFKM seals and sealing solutions, built to handle the most demanding conditions, and are ideal for very low extractable levels required in fuel cell applications.

HERE ARE A FEW:

Arlon 3000XT®

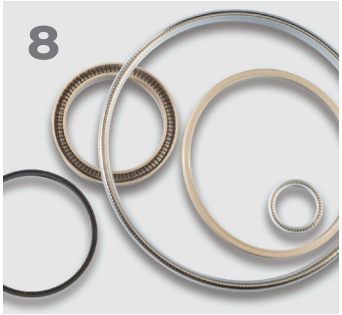
The world's first and only crosslinked PEEK-based polymer is ideal for electrolyzers and fuel cells that need material solutions that can withstand challenges such as chemical compatibility or degradation of mechanical properties at increased temperatures.

WR® 600

The Carbon Fiber reinforced PFA composite material provides exceptional chemical resistance to a variety of harsh chemistries, including hydrogen environment.

Avalon® 56

High-performance modified PTFE that is ideal for valve stem seals and valve seats in hydrogen services.

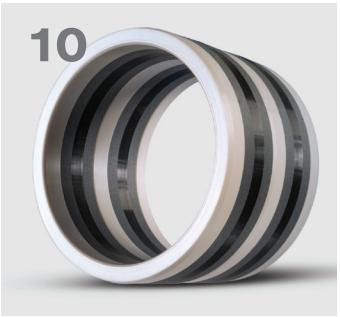


MSE®

Unidirectional metallic spring energized PTFE contact seals suitable for hydrogen services. Spring helps keep robust seal for temperature and pressure cycling, with softer seal jackets able to seal small hydrogen molecules.

GT® Ring

'T'-shaped cross section elastomer with hydromechanically activated anti-extrusion rings that deliver excellent performance in hydrogen temperature and pressure cycling applications, with less demanding surface finish requirements than spring energized lip seals.



V-Stacks

V-rings that keep fugitive emissions low to stay safe when working with hydrogen and are ideal for valve stem seals.

About Greene Tweed

Greene Tweed is the manufacturer that meets critical industry demands with trusted performance. We engineer sealing solutions, connectors, and structural components to outperform and outlast in the world's harshest environments. For 160 years, we've served clients in upstream & downstream oil and gas, aerospace, defense, semiconductor, and other sectors with a custom, collaborative approach that delivers certainty for their crucial operations.

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