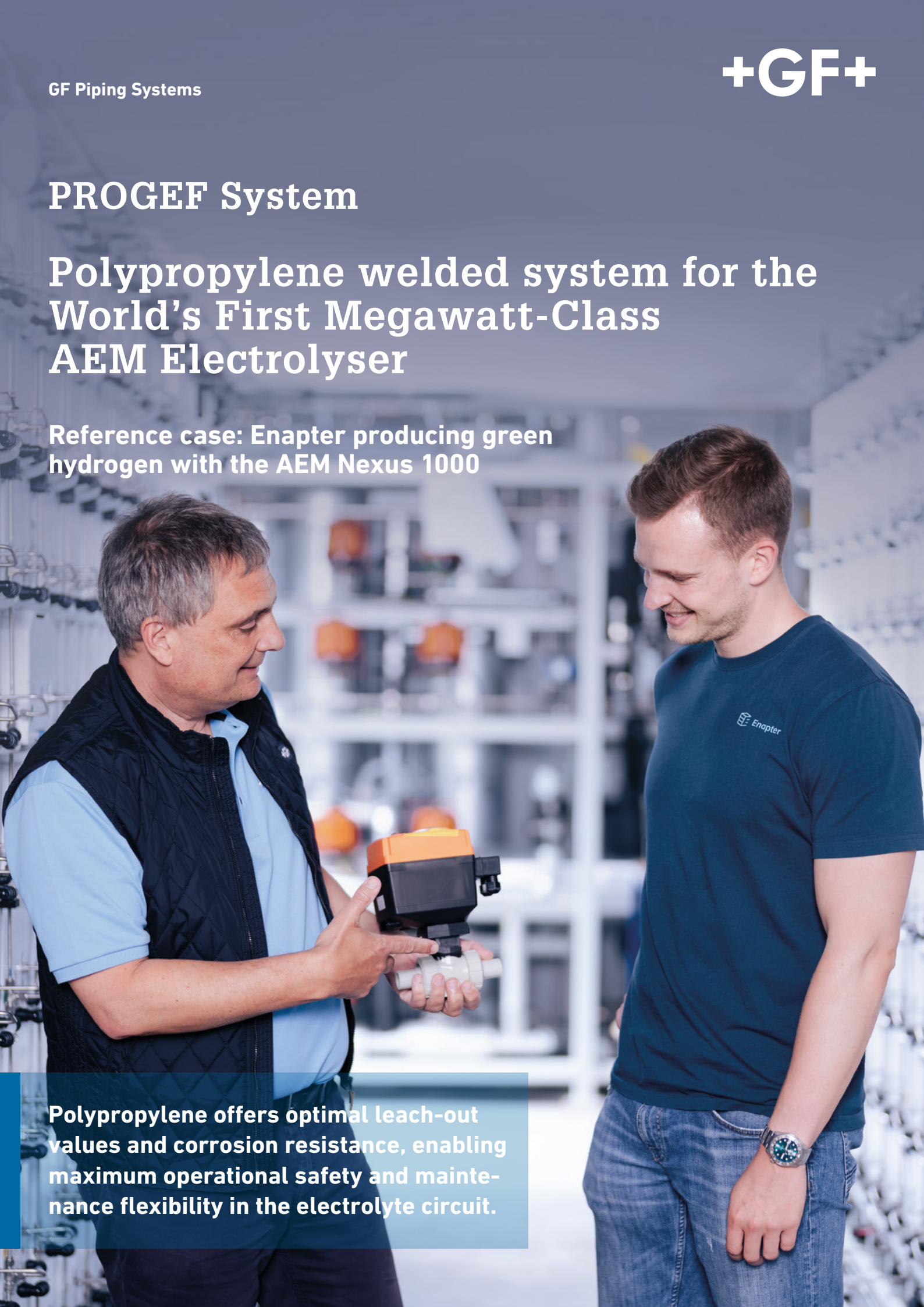
GF Piping Systems

# PROGEF System

# Polypropylene welded system for the World's First Megawatt-Class AEM Electrolyser

## Reference case: Enapter producing green hydrogen with the AEM Nexus 1000




**Polypropylene offers optimal leach-out values and corrosion resistance, enabling maximum operational safety and maintenance flexibility in the electrolyte circuit.**

# Maximum operational safety thanks to our PROGEF piping system

Enapter

Green hydrogen is a promising energy vector that has the potential to reduce dependency on fossil fuels. Enapter proudly stands as Germany's leading manufacturer of AEM electrolysers. These advanced systems efficiently separate water into hydrogen and oxygen. Utilizing customized GF design drawings, prefabricated PROGEF PP-H piping components with Type 542 ball valves and electrically actuated Type 546 Pro ball valves were thoughtfully installed.

### Project background

Enapter sought a material that offers chemical resistance, corrosion resistance, low maintenance requirements, and high reliability for transporting the low concentrated potassium hydroxide KOH electrolyte in the AEM Nexus. This containerized solution produces approximately 450 kg of green hydrogen daily using 420 electrolysis stacks. Additionally, the requirement included both manual and electrically actuated valves for the purpose of isolating the stack strings from the operating system to facilitate service and maintenance operations.

### Selected technical solution

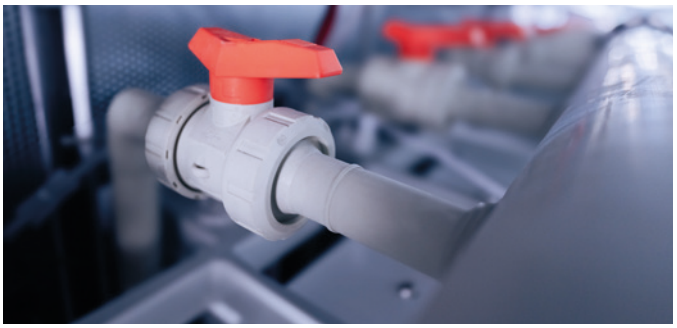
The PROGEF PP-H distribution pipes for the KOH circuit offer a secure and efficient transport solution, owing to their excellent chemical resistance and low leach-out properties of ions and dissolved organic substances, measured in total organic carbon (TOC*). Our polypropylene piping solution PROGEF meets the ultrapure water-KOH mixture process conditions at up to 65°C and 3 bar, preventing contamination and featuring high rigidity, excellent surface quality, resulting in long lifecycles. Furthermore, the electrically actuated ball valve 546 Pro allows for a modular setup, easy operation, flexibility, and high process reliability. This electric control system enables efficient and automated shut-off of individual system parts, thereby facilitating independent maintenance and testing.

### Achieved improvements

The installation of the partially custom-made PP-H distribution and collector pipes was accomplished with efficiency and ease, thanks to using pre-welded assemblies with flange connections. The plug-and-play ball valves have been instrumental in facilitating targeted commissioning and decommissioning of individual strings, allowing for adaptable maintenance work on the stacks. Integrating the PROGEF system has effectively mitigated the risk of contamination in the KOH circuit, ensuring a resilient and dependable operational process. Furthermore, incorporating mechanically connectable modules has streamlined the installation process, resulting in significant time savings. The punctual and reliable delivery of components, coupled with expert guidance from material selection to installation, played a pivotal role in the expeditious and successful completion of the project.

* TOC = Total Organic Carbon (TOC) denotes the quantity of carbon present in organic compounds within water. In stack electrolysers, the TOC level is of paramount importance as it serves as an indicator of the existence of organic impurities within the water.

During thorough preliminary discussions, the operation of the electrolyser was carefully reviewed to determine the most suitable material.



The installation of 84 ball valves allows for the convenient isolation of the distribution or collection pipes from the system, facilitating peace of mind for tests and maintenance.

## Customer benefits

- **Efficient assembly and commissioning are facilitated through pre-welded assemblies**
- **Prevention of stack contamination: PP-H is effective in preventing stack contamination by minimizing the leaching of ions and Total Organic Carbon (TOC*) in the KOH circuit when compared to metal piping, owing to its material neutrality towards the medium**
- **Comprehensive service from material selection to installation and a timely delivery, supported by many years of expertise as polymer piping system supplier**

## Where next?

**Visit our Hydrogen page**

**More about PROGEF**

Visit our webpage to get in touch with your local specialist:
**www.gfps.com/our-locations**



+GF+

GFDO_RF_00057_EN (08.24)