



h-tec

Hydrogen Technology for Energy Solutions



Electrolysers and Fuel Cells

h-tec at a glance

The company h-tec Wasserstoff-Energie-Systeme GmbH was founded in 1997 by Uwe Kueter and Stefan Hoeller. h-tec currently has two divisions: h-tec Education, which produces products for educational and demonstration purposes, and h-tec Industrial, which is developing hydrogen technology for commercial use. Since 1997, the Education division has built a reputation for innovation and for meeting customers' demands with high quality products. As a leading educational supplier, h-tec sells about 10,000 units per year, about 85% of them outside of Germany. These development activities in the educational field have allowed h-tec to amass fuel cell know-how, refine PEM hydrogen technology and build systems that can be scaled up for commercial use and serial production. As a result, h-tec has great confidence the commercial potential of hydrogen energy technology, since the untapped industrial market is much larger than the total educational market.

With this much larger industrial market in mind, h-tec's industrial division has been working since 1999 on market research, materials testing and prototypes, with the goal of producing a high-quality product range that delivers an industry-leading power to price ratio, and can be used in a wide variety of applications.

This ambitious goal required a technological breakthrough, and h-tec achieved it in 2003/4 during a research project funded by the WTSH (Promotion of Economy and Transfer of Technology Schleswig-Holstein GmbH). h-tec's proprietary prototype designs for simple, efficient fuel cells and electrolyzers are optimized for economical serial production.

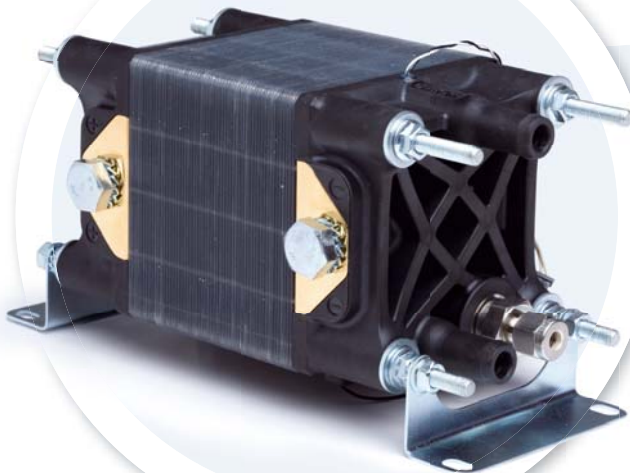


h-tec Industrial Products

PEM Pressure Electrolysis System EL30

Uses electrical energy to split water into hydrogen and oxygen. Suitable for storing excess energy produced by, e.g., wind turbines or solar cells, or anywhere hydrogen is needed for fuel cells or industrial processes.

- Up to 2.4 Nm³/h H₂ (10 kW_{el})
- Target up to 3.0 MPa (30 bar)
- Incl. control and data interface
- 19" rack
- Designed for serial production



PEM Fuel Gas Generator Stack OxHy30

Special electrolyser. Produces hydrogen/oxygen in a mix. Useful for, e.g., craft welding or industrial production.

- Produces H₂/O₂ mixture of up to 500 l/h
- Designed for serial production
- Suitable coolers and pumps are available on request



PEM Fuel Cell Systems FCA45 / FCA90 / FCA180

Converts the chemical energy of hydrogen directly into electricity.

The only byproduct is pure water.

- Air-cooled fuel cell system
- Currently up to 100 W power, more powerful systems up to 5 kW in preparation
- Self-humidifying, external humidification not necessary
- Integrated system consisting of temperature sensors, pressure sensor, valves, air supply, air filter, control and data interface
- High overall system efficiency due to low power consumption by the components
- Optional extra: single cell voltage evaluation
- Designed for serial production
- LT PEM and HT PEM technology

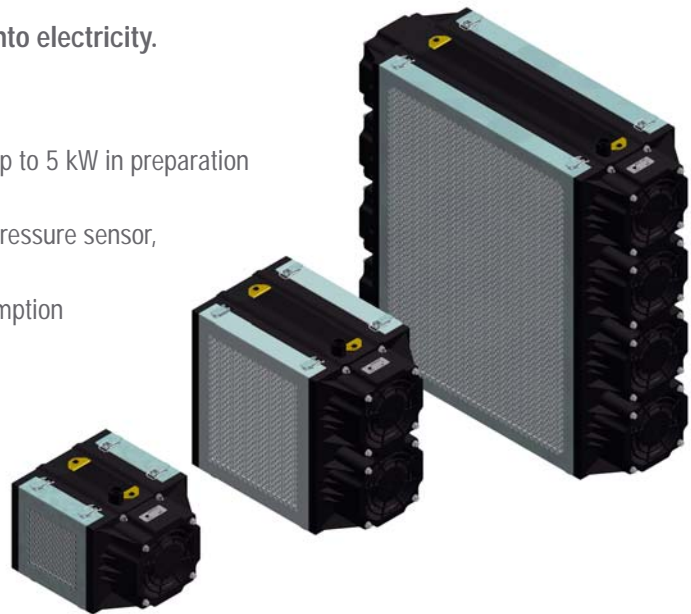


Plate Heat Exchanger PHE50

- Suitable for deionised water
- Adjustable cooling capacity
- Variable fittings
- Pressure-resistant up to 0.6 MPa (6 bar)
- Designed for serial production





h-tec in brief

- Developer and producer of electrolyser and fuel cell technology
- Founded: 1997
- Team of 30 employees
- Based in Luebeck, Germany
- Two Business divisions

h-tec Industrial – PEM electrolysers (up to 2.4 Nm³/h H₂) and PEM fuel cells (up to 5 kW) for portable and stationary industrial applications.

h-tec Education – Since 1997, one of the world's leading suppliers of solar hydrogen technology for schools, universities, vocational training and demonstrational/PR activities.

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