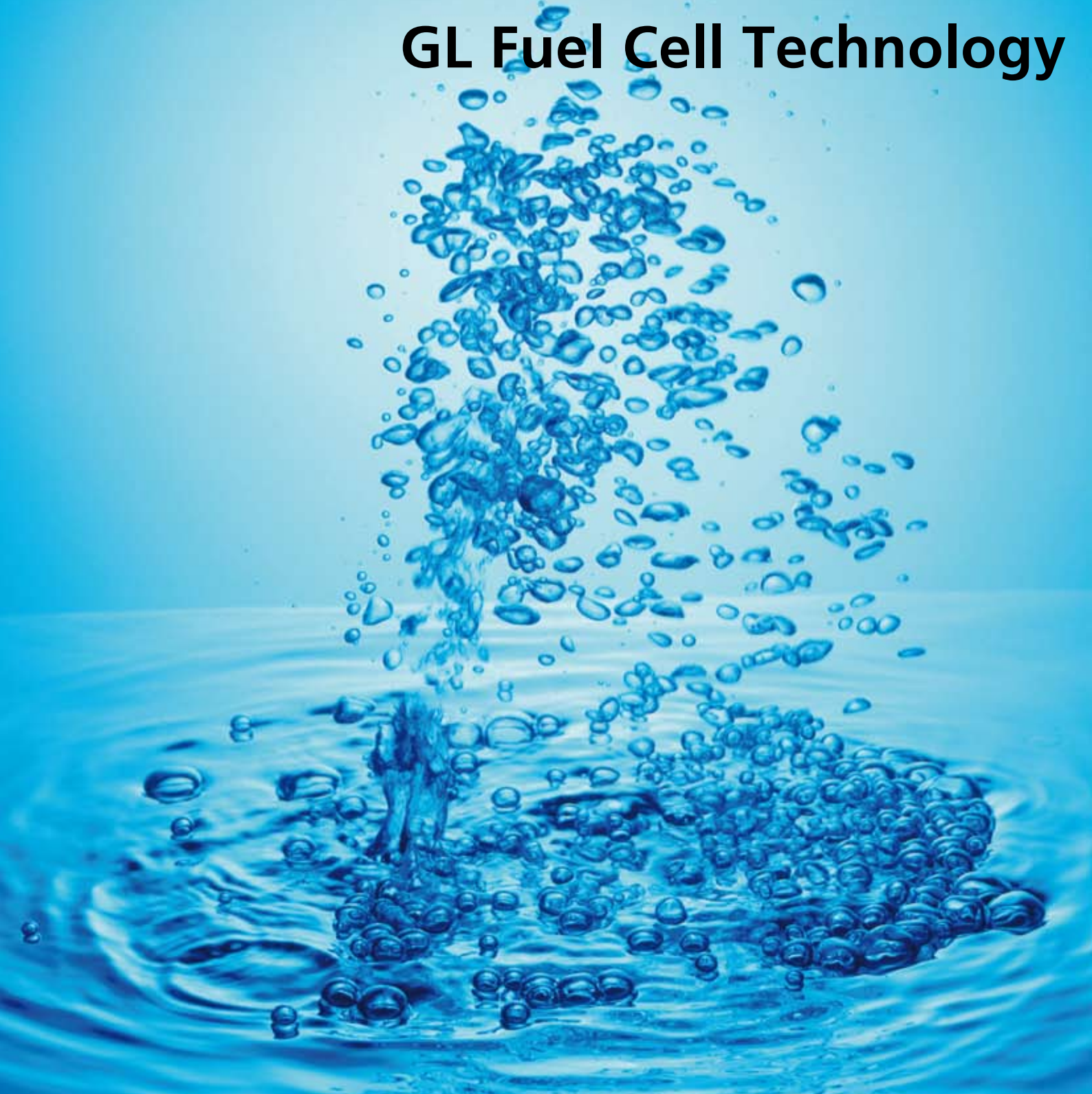


For a cleaner tomorrow GL Fuel Cell Technology



Innovative propulsion systems for ships and boats

Setting standards

Germanischer Lloyd (GL) sets standards in technology, safety and quality for the maritime and industrial sectors. As one of the leading classification societies, GL is responsible for the technical safety of around 6,650 ships and currently has more than 1800 newbuildings on the order books. Apart from classifying ships, GL operates as a technical monitoring and inspection organisation with a global network employing more than 4,400 personnel working from 208 offices in 77 countries.

Shaping the future of energy

Fuel cell system applications already have a power range from a few kW up to several hundred kW. Low noise and vibration levels can be of great benefit to ships. GL verifies and certifies fuel cell systems in line with its own regulations and state-of-the-art technology. The safety standards set down in the GL Guidelines for Fuel Cell Systems have already been used for units of up to 160 kW.

GL participates in European projects such as CELINA, where GL worked with Airbus, Dassault und Air Liquide to research into fuel cell system applications in aeronautics. Moreover, the world's first fuel cell-powered passenger ship for up to 100 passengers has been developed as part of the EU-LIFE project zemships (zero emission ships). Now she is operating on an inner-city lake in Hamburg – with a hydrogen fuel cell system designed to GL Guidelines and certified by GL. *Elding I*, a recently launched whale-watching vessel in Iceland, is part of the SMART-H₂ project. This demonstration project is testing various types of hydrogen-fuelled equipment for vehicles and vessels.

Profiting from GL services

Commercial shipping or leisure boating – whatever your interest, you can benefit from our experience and expertise in fuel cell, hydrogen, gas or reformer technology.

The services we provide include:

- Advice on fuel cell, hydrogen, gas or reformer technology together with related applications, operations, specifications and simulations
- Review and approval leading to the classification of fuel cell, hydrogen and gas systems
- Component certification and type approval
- Safety assessments of entire fuel cell, hydrogen, gas and reformer technology systems (FMEA, HAZOP and fault tree analysis)



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