

# Plate-and-shell made tougher

Alfa Laval DuroShell is a specially engineered plate-and-shell heat exchanger for demanding marine duties, such as LPG/E cargo reliquefaction or low-pressure LNG vaporization in fuel gas supply. Compact and thermally efficient, it is also extremely robust. A unique internal construction, whose features include a patented roller coaster plate pattern and strengthening distribution tubes that run through the plate pack, makes DuroShell highly resistant to thermal and pressure fatigue.



### Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again. We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

### How to contact Alfa Laval

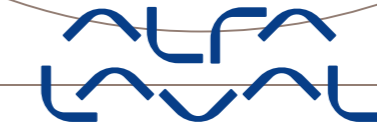
Contact details for all countries are continually updated on our web site. Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information.

## Benefits

- Reliability and lifetime are increased by the patented roller coaster pattern, which eliminates potential weak spots by ensuring even expansion around the plate circumference.
- Robustness is enhanced by distribution tubes that extend through the plate pack, ensuring the best distribution of media and strengthening the plate pack itself.
- The effect of vibrations due to compression or phase change is minimized through pre-compression of the plate pack.
- Fatigue resistance is maximized through laser welding, which achieves the most accurate weld with the least heat stress on the surrounding material.
- Fouling is minimized by the patented roller coaster pattern, which means long intervals between cleanings and increased time in operation. This ensures higher performance over time.

See more at [www.alfalaval.com/duroshell](http://www.alfalaval.com/duroshell)

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# Reliably cool under pressure

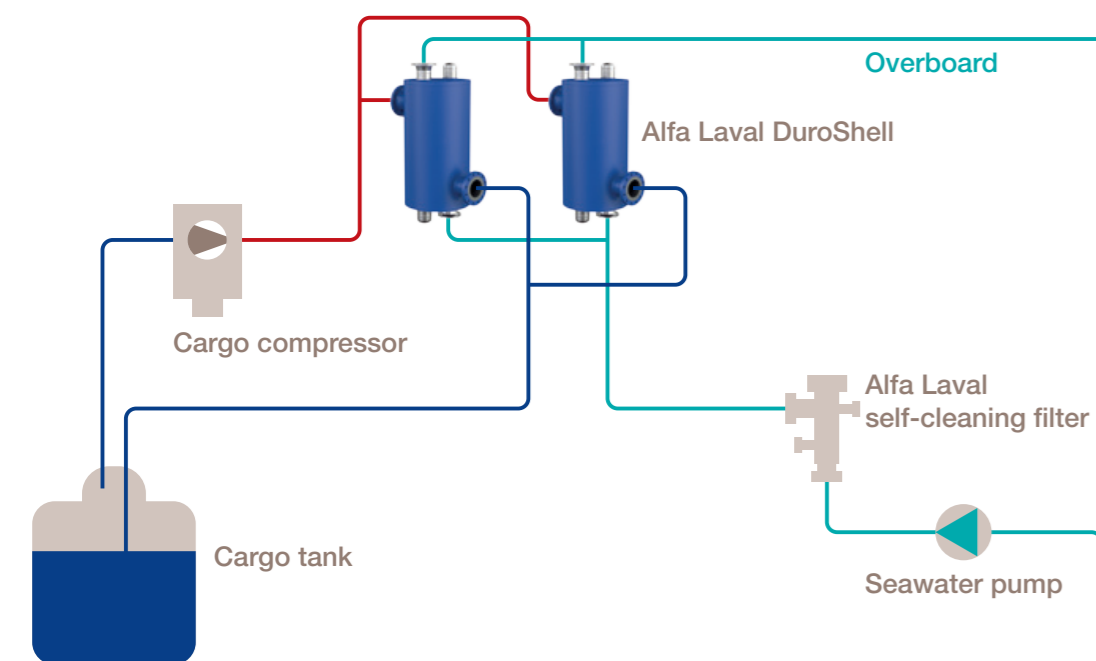
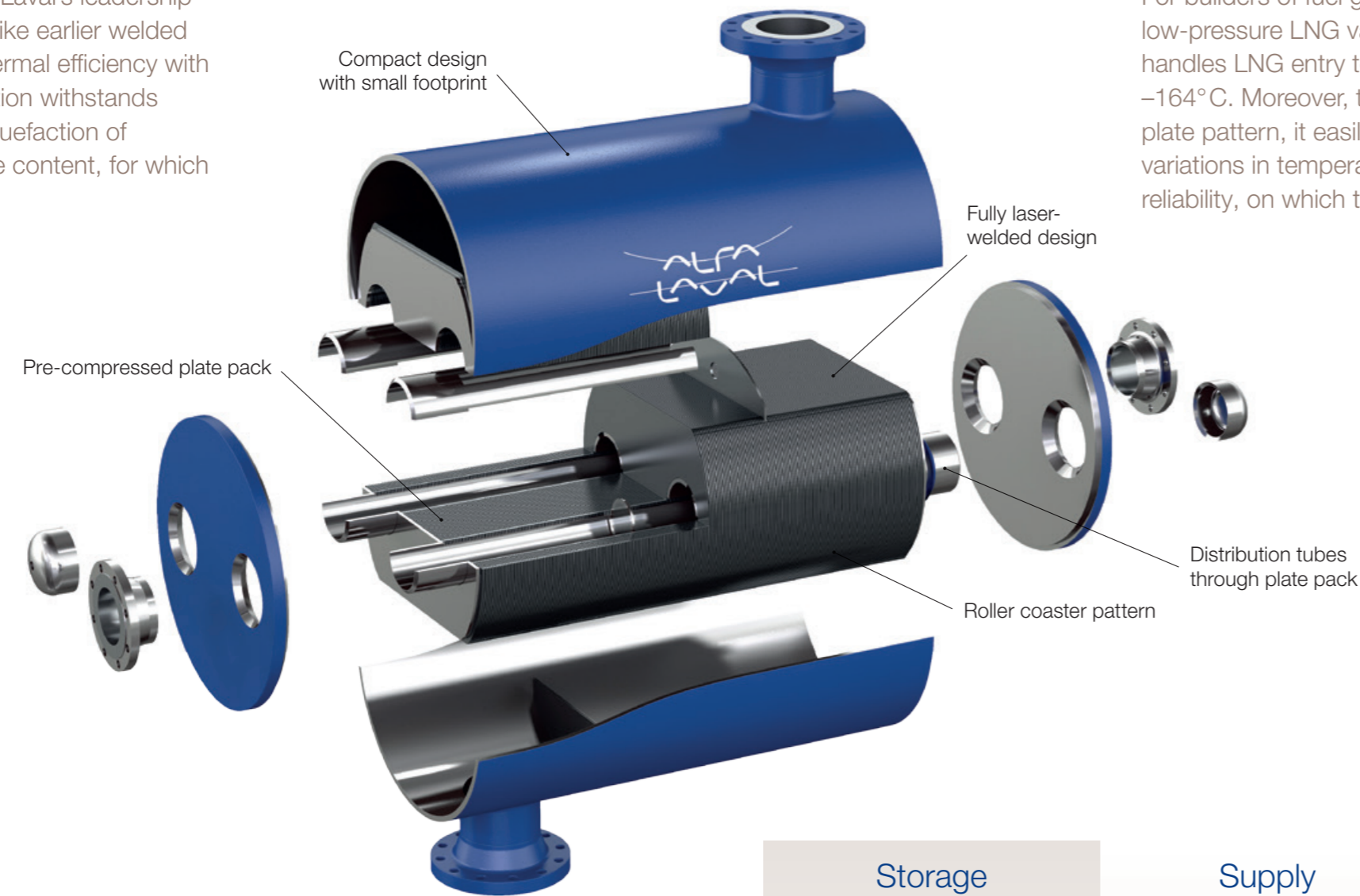
Alfa Laval DuroShell for marine thermal applications



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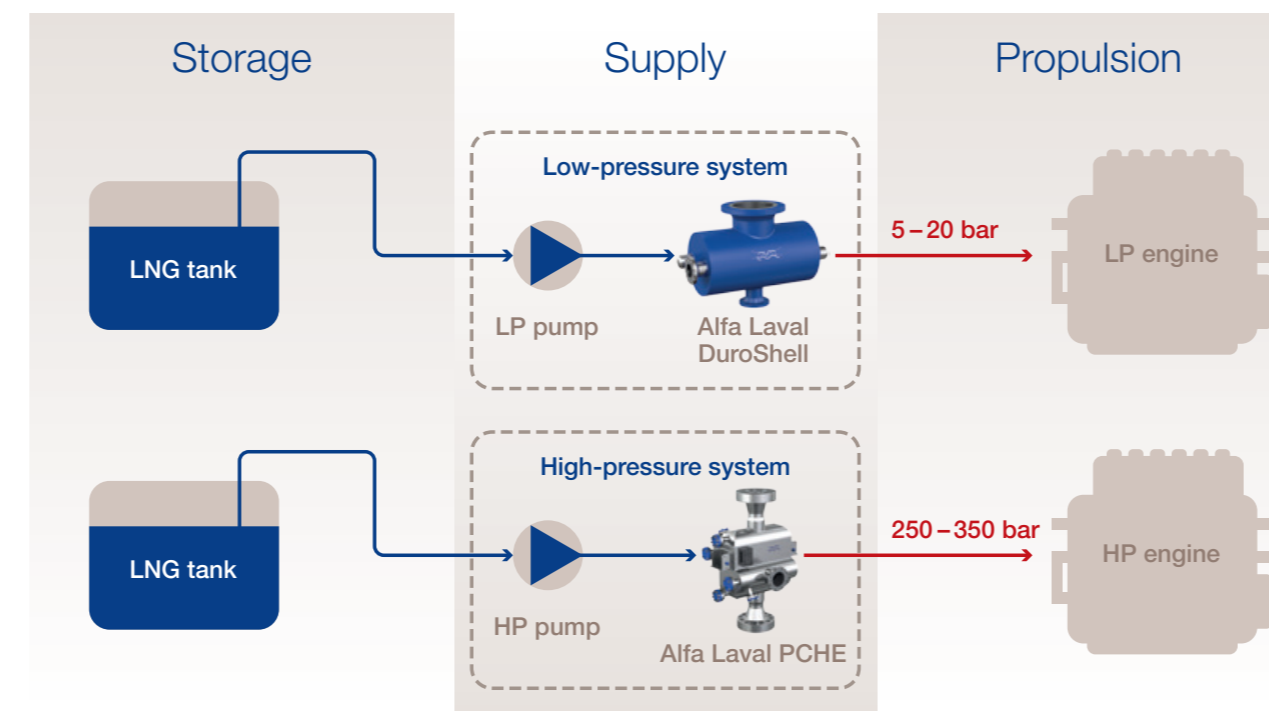
## DuroShell in LPG/E cargo reliquefaction

DuroShell continues – and strengthens – Alfa Laval’s leadership in heat exchangers for cargo condensation. Like earlier welded solutions from Alfa Laval, it combines high thermal efficiency with a very small footprint. But its robust construction withstands much higher pressures. DuroShell allows reliquefaction of commercial propane cargo with higher ethane content, for which higher condensation pressures are required.



## DuroShell in fuel gas supply

For builders of fuel gas systems, DuroShell is ideal as a low-pressure LNG vaporizer. Though highly compact, it handles LNG entry temperatures that may be as low as  $-164^{\circ}\text{C}$ . Moreover, thanks to its patented roller coaster plate pattern, it easily withstands large differences and variations in temperature. This robustness ensures high reliability, on which the vessel’s propulsion depends.



## Our heat exchangers in gas systems

DuroShell is part of a full portfolio of Alfa Laval heat exchangers, suitable for marine gas applications ranging from low-pressure to high-pressure duties. Each type merges compact design with the highest reliability and thermal efficiency.

### Alfa Laval DuroShell

Alfa Laval DuroShell is an exceptionally robust plate-and-shell heat exchanger. Its innovative design is ideal for duties such as LPG/E cargo reliquefaction or low-pressure LNG vaporization in fuel gas supply.

### Alfa Laval AlfaNovaM

The Alfa Laval AlfaNovaM is a fusion-bonded plate heat exchanger made from 100% stainless steel. Due to its copper-free construction, it can be used with ammonia or any other refrigerant media.

### Alfa Laval PCHE

The Alfa Laval printed circuit heat exchanger (PCHE) is a diffusion-bonded heat exchanger for gas applications with pressures over 100 bar, such as LNG vaporization in high-pressure fuel gas supply systems.

### Alfa Laval CBM

The Alfa Laval CBM is a copper-brazed and extremely compact heat exchanger. Due to its gasket-free design and wide performance range, it is used in a variety of applications in cargo and fuel gas systems, for example as a refrigerant economizer or gas heater.

### Semi-welded plate heat exchangers

In Alfa Laval semi-welded plate heat exchangers, one side is sealed with laser welds and the other with gaskets. This adds serviceability but allows the use of aggressive media and higher pressures than fully gasketed models. This means the heat exchangers can be used in refrigerant applications.

