



Top performance when the going gets tough

The Alfa Laval DuroShell plate-and-shell heat exchanger



DuroShell – plate-and-shell made tougher

Alfa Laval DuroShell is a specially engineered plate-and-shell heat exchanger ideal for demanding duties, such as corrosive, high-pressure and high-temperature applications. Incorporating many innovative features to optimize customers' process performance, it takes heat exchange to a new level.

Suitable for a wide range of applications

With its exceptional fatigue resistance, the compact-sized Alfa Laval DuroShell plate-and-shell heat exchanger opens up a whole new world of possibilities. Designed for use with liquids, gases and two-phase mixtures at pressures up to 100 barg (1450 psig), in both PED and ASME, and at temperatures up to 450 °C (842 °F), Alfa Laval DuroShell is suitable for a wide range of aggressive media.

The DuroShell range

Alfa Laval DuroShell is available in three sizes, S, M and L, with heat transfer surface areas ranging between 2–235 m² (21.5–2529 ft²). Heat exchange plates are in 316L stainless steel, or titanium, with the pressure vessel shell in carbon steel, or 316L stainless steel, both depending on the aggressiveness of the fluid media. With its fully welded construction there is not a single gasket throughout the heat exchanger.



Benefits

- Maximum uptime due to robust design that optimizes resistance to fatigue
- Minimum energy consumption and environmental impact due to high thermal efficiency
- Minimized installation cost due to small footprint and light weight
- High operating pressure due to unique, patented design
- High security against leakage due to fully welded construction

How it works

Revolutionary technology

Based on our groundbreaking DuroCore technology, Alfa Laval DuroShell features a patented roller coaster plate pattern for exceptional fatigue resistance, maximum turbulence and minimized fouling and clogging.

The heart of DuroShell is a cylindrical pack of uniquely cut, laser-welded heat-transfer plates that leave an open channel on each side of the shell, thus enabling multi-pass design. The plate side distribution tubes go all the way through the plate pack and ensure the best distribution of media onto the heat exchange surface. Having the distribution tubes running inside the shell also adds to the strength of the plate pack.

Welds that meet your challenges

With laser technology we can achieve the most accurate weld with less heat impact on the surrounding material. This results in a weld with less stress and significantly improved fatigue properties. Alfa Laval's fully welded heat exchangers use established laser welding that has been proven through thousands of installations around the world.

Optimized flow

Alfa Laval DuroShell operates with one media on the plate side and the other on the shell side, both of which can be rated up to the full 100 barg (1450 psig). In the single-pass configuration the exchanger works in pure cross-flow. In the multi-pass arrangement this approximates to a global counter-current configuration.

Since the nozzles on the shell side are completely independent to those on the plate side the heat exchanger is perfect for asymmetric flow duties.

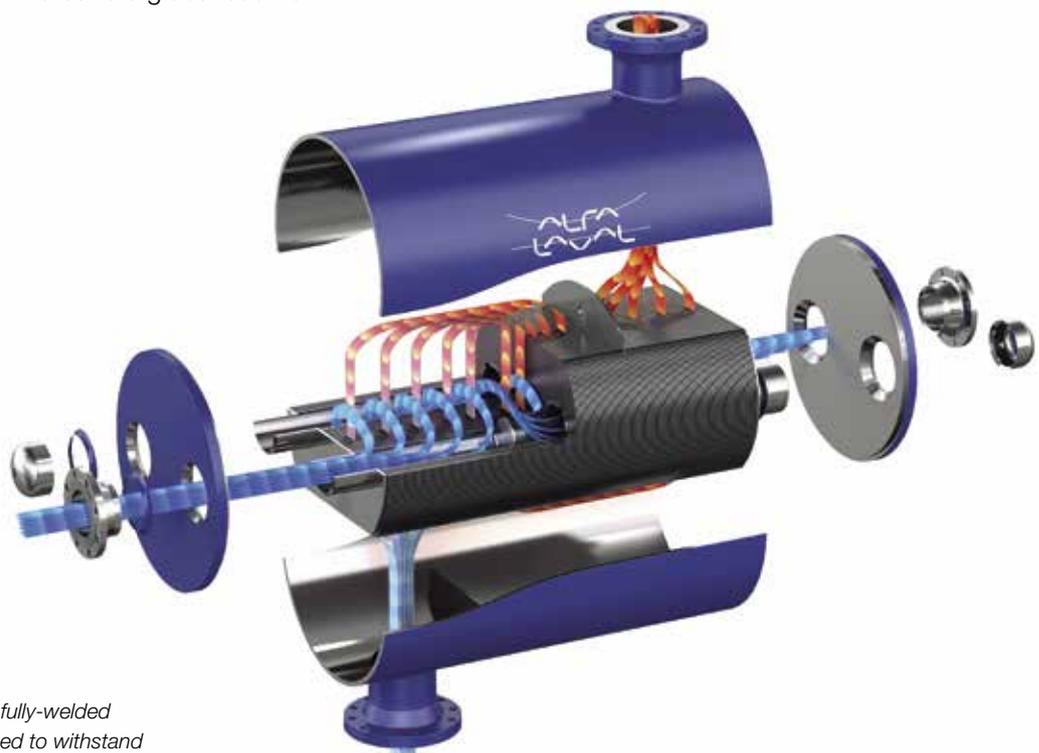
Robust design

AlfaLaval DuroShell is specifically designed to withstand variations in temperature and pressure. To accomplish that we had to move away from the traditional plate-and-shell design with its weak, peak-stressed spots.

Traditionally corrugated chevron pattern promotes expansion and contraction in one dimension only. This makes the plates sensitive to fatigue failures. DuroShell's unique and patented roller coaster plate pattern is equally strong in all directions. The result is a plate pack that is robust against both thermal and pressure fatigue.

Less maintenance

Designed for high turbulence, even at low velocities, Alfa Laval DuroShell's unique plates minimize fouling. Unlike high-maintenance shell-and-tube units that are more complicated to clean, DuroShell is easily cleaned by backflushing or cleaning in place.



The robust, fatigue-resistant, fully-welded Alfa Laval DuroShell is designed to withstand variations in temperature and pressure.

Designed with demanding duties in mind

Alfa Laval DuroShell meets the challenges of tough liquid-to-liquid and two-phase duties in many demanding high-pressure and high/low-temperature applications, such as:

Oil and gas

Offshore gas compression

TEG dehydration

Gas sweetening

NGL fractionation

Crude oil pre-heating

Pressure regulating stations

Small-scale LNG modules



Power

Boiler feed water pre-heaters

District heating condensers

Evaporators, reboilers and condensers in ORC applications

Fuel gas heaters

Gland steam condensers

Other auxiliary applications such as boiler blowdown coolers



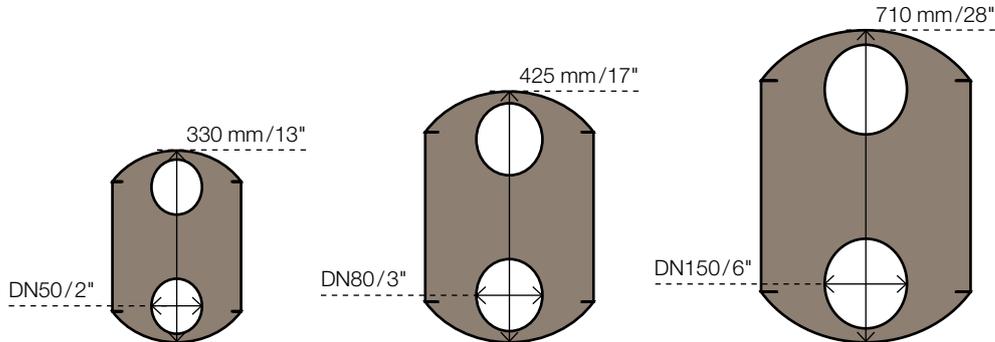
Petrochemical

Mechanically demanding high-pressure applications that require a small footprint

Batch control system for cyclical duties



The cut-wing plate allows fluid distribution and multi-pass on shell side. As the plate pack diameter matches the shell inner diameter, there is no need for a flow diverter against by-pass.



Does the jobs of shell-and-tubes

- For liquids, gases and two-phase mixtures
- For temperatures up to 450 °C (842 °F)
- For pressures up to 100 barg (1450 psig)
- For aggressive media
- For evaporation
- For condensation

Does the jobs that gasketed plate heat exchangers cannot

- For high pressures and temperatures that exceed the capabilities of gasketed plate heat exchangers
- For organic solvent/solvent interchangers when aggressive media are used
- For use as a heater or cooler when extremely high or low temperatures prevent the use of gaskets

Technical specifications

Design pressure

CE/PED	Vacuum to 100 barg (1450 psig)
ASME	Vacuum to 100 barg (1450 psig)
SELO	Vacuum to 99 barg (1450 psig)

Design temperature

Carbon steel shell:	-45 °C to 450 °C (-49 °F to 842 °F)
316L stainless steel shell:	-196 °C to 450 °C (-320 °F to 842 °F)

Maximum heat transfer surface

DuroShell S	15 m ² (161 ft ²)
DuroShell M	56 m ² (603 ft ²)
DuroShell L	235 m ² (2529 ft ²)

Standard connections

	Plate side	Shell side
DuroShell S	50 mm (2")	25–200 mm (1–8")
DuroShell M	80 mm (3")	25–300 mm (1–12")
DuroShell L	150 mm (6")	25–500 mm (1–20")

Pressure rating

PN16, PN40 & PN100
ASME Class 150, 300, 600, 900

Standard materials

Plates	316L stainless steel or Titanium Grade 1
Shell/covers/nozzles	Carbon steel gr60 (painted) or 316L stainless steel (not painted)

Quality that spans the globe

Alfa Laval has an extensive service network. For more information about our services, visit www.alfalaval.com/service-and-support

Part of a complete product range

As the world's leading provider of heat transfer solutions, Alfa Laval has a comprehensive range of heat exchangers – from gasketed and copper-brazed to fusion-bonded and fully welded – to meet virtually every need.

Customers around the globe rely on Alfa Laval for the convenience of a one-stop-shop for all of their heat transfer needs.

Innovation beyond R&D

Our research and development aims at fulfilling customers' future needs in terms of innovative technical solutions, high reliability and availability, minimum environmental impact and the lowest possible product lifecycle costs.

But at Alfa Laval, innovation goes beyond the research and development function including the entire value chain: from R&D to engineering, manufacturing, distribution, and aftersales services. For us, innovation is all about creating customer value.

Comprehensive global support

Alfa Laval Service offers a broad range of parts, components and services, covering the whole product lifecycle from startup, support and maintenance, to improvements and monitoring.

Whatever the challenge, whenever needed, we are there. To ensure 24/7 availability and support, Alfa Laval Service operates service centres across the globe combined with a vast network of service engineers for on-site maintenance and services.

With access to the most up-to-date technology and extensive technical training for our service teams, we enable you to prolong the lifetime of your equipment.



Alfa Laval has an extensive service network. For more information about our services, visit www.alfalaval.com/service-and-support



Global reach, local presence

- More than a century of heat exchanger expertise
- Quality you can count on
- Worldwide service network
- Technical support where and when you need it
- Efficient logistics and fast, reliable delivery

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered 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, foodstuff, 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 website. Please visit www.alfalaval.com to access the information direct.

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