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, food-stuffs, starch and pharmaceuticals.

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

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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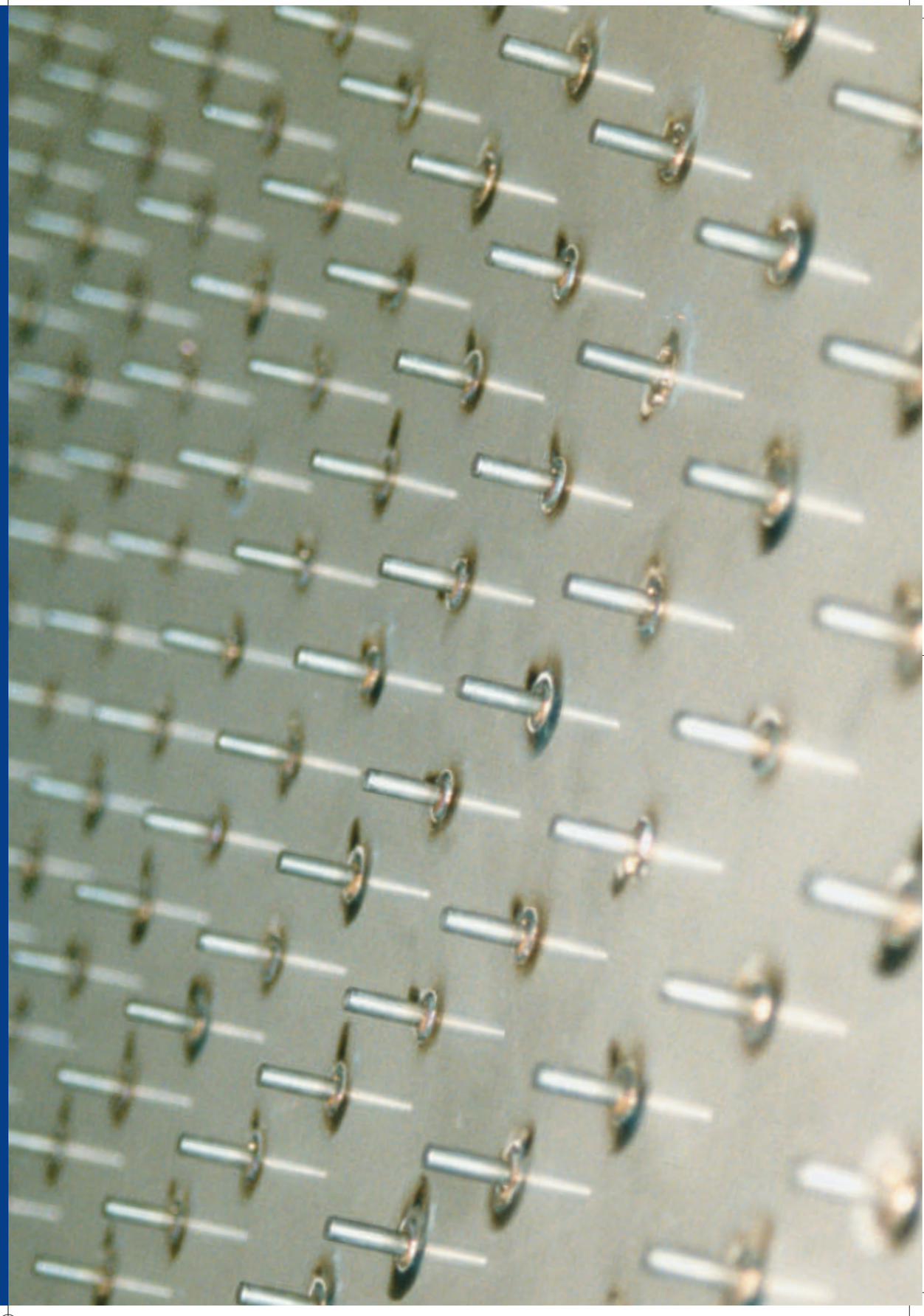
Alfa Laval – spiral heat exchangers

The all-round heat transfer solution

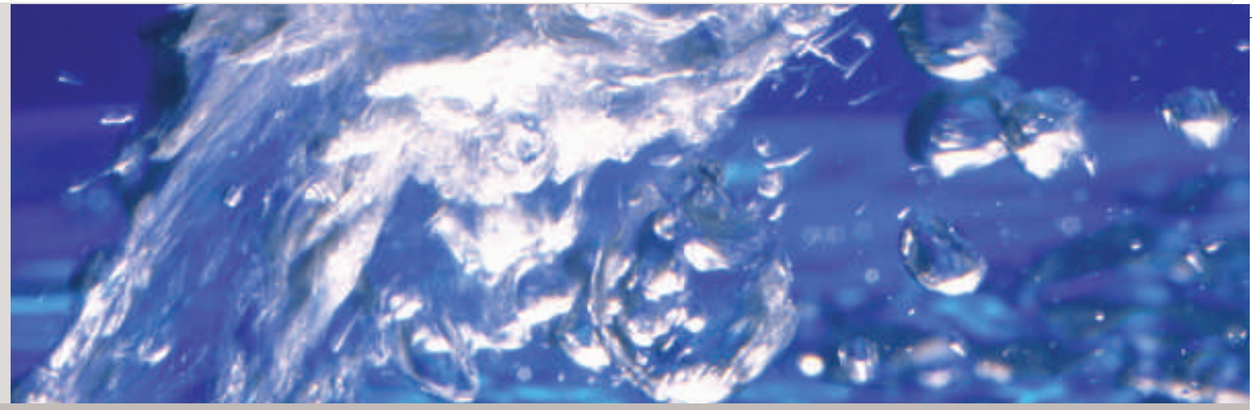
Spiral-shaped heat exchangers are not a new idea – but Alfa Laval has perfected the design.

Exceptional compactness and self-cleaning design make Alfa Laval spiral heat exchangers extremely versatile. Ideal for everything from dirty fluids to high vacuum condensation.



The perfect solution

From dirty fluids to high vacuum condensation – spiral heat exchangers from Alfa Laval can do it all



The idea of using spiral-shaped fluid channels for heat transfer arose in response to a particular customer's process problem. Other technologies had failed, but in this case a spiral proved to be the perfect solution.

That was nearly 70 years ago.

Today, spiral heat exchangers fit perfectly into Alfa Laval's extensive product portfolio – still providing customers with optimum process solutions.

Spiral heat exchangers are particularly useful when a process is "dirty" or "difficult". In such circumstances, spiral heat exchangers have clear advantages over other products that employ heat exchange technologies.

Alfa Laval spiral heat exchangers are designed on the basis of our extensive thermal and mechanical experience, acquired from both our customers and our production sites.

Product ranges
We provide fixed-size and customized product ranges to meet the needs of our customers.

Fixed-size ranges
We make small units for general use, and for application-specific purposes such as the wastewater industry.

Customized range
To meet requirements for a range of sizes and specifications, the majority of the spiral heat exchangers we supply are individually customized.

Customer needs met with customized design
No two customers are alike, and neither are their plants or their processes. To meet all these different needs, engineering solutions and process equipment must be adaptable.

Each Alfa Laval spiral heat exchanger design can be customized to meet the precise process and application needs of individual customers.

Unique shape has unique properties
A spiral heat exchanger is precisely what it says – a circular heat exchanger with two concentric spiral channels, one for each fluid.

The curved fluid channels provide optimum heat transfer and flow conditions for a wide variety of fluids, while keeping the overall size of the unit to a minimum.

The result is a heat exchanger that provides maximum heat transfer efficiency, while only taking up a minimum of installation space.

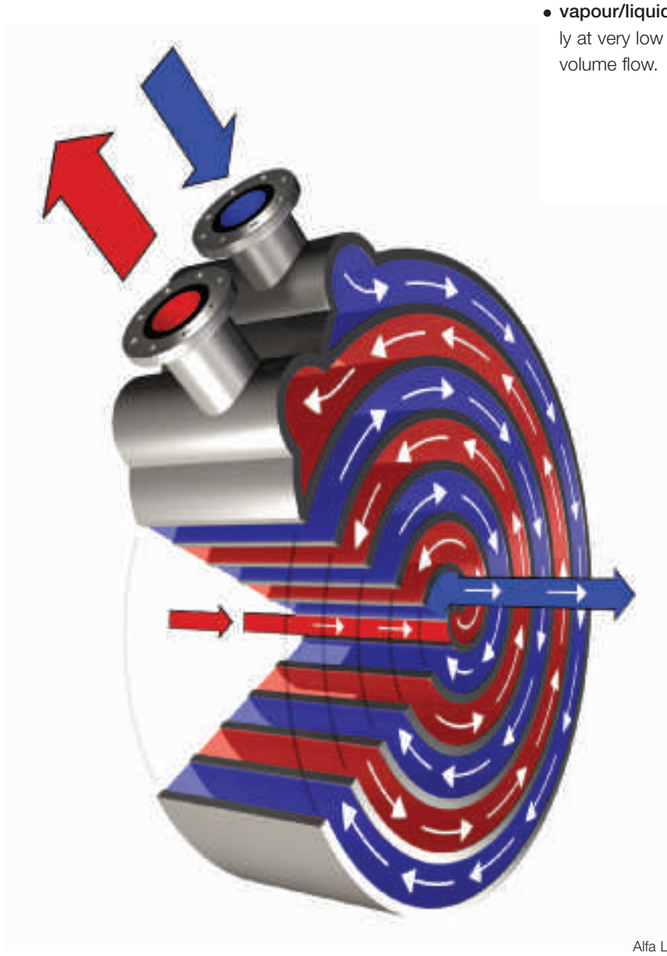
Strong on customized solutions
The spiral heat exchanger is a very versatile product.

Many of the duties performed by heat exchangers require one channel per fluid, and this can be a distinct benefit.

The design, shape and size of the spiral channels can be customized so that they are a perfect match for the demands associated with a wide range of process fluids, thermal duties and industrial applications.

Heat exchange duties that benefit from the strengths of spiral heat exchangers include:

- **liquid/liquid** heating, cooling or heat recovery, where one or both of the fluids may cause fouling.
- **vapour/liquid** condensing, particularly at very low pressure and/or high-volume flow.



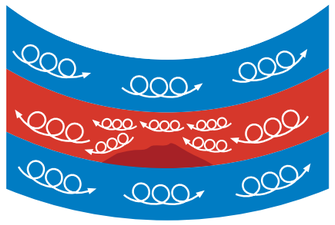
The self-cleaning heat exchanger for demanding liquid/liquid duties

Single channel technology makes keeping clean easier

Unique performance – the spiral's high efficiency and easy access design make heat recovery possible with two fouling fluids – shown here at a municipal sludge pasteurization plant.

Some customers choose spiral heat exchangers to boost the performance of their existing processes. Others use them for thermal duties in processes that would otherwise simply be impossible.

Whether replacing existing "inefficient" technology or being used in revolutionary new applications, spiral heat exchangers are the first choice for processes that involve demanding liquid/liquid duties.



Single channel technology – what goes in must come out
As the name indicates, single channel technology means that both fluids occupy a single channel, which allows fully counter-current flow. One fluid enters the centre of the unit and flows towards the periphery. The other fluid enters the unit at the periphery and moves towards the centre.

The channels are curved and have a uniform cross section, which creates a "spiralling" motion within the fluid.

The fluid is fully turbulent at a much lower velocity than in straight tube heat exchangers, and each fluid travels at constant velocity throughout the whole unit. This removes any likelihood of dead spots and stagnation.

Solids are thus kept in suspension, and the heat transfer surfaces are kept clean by the scrubbing action of the spiralling flow.

Self-cleaning keeps costs down
The self-cleaning properties of spiral heat exchangers ensure that the reliable performance of efficient heat transfer is guaranteed, with minimum down time for maintenance.

In some duties where alternative heat exchangers would need regular cleaning, disassembly, repair and maintenance, a spiral heat exchanger performs for much longer periods, and only requires maintenance during routine plant shutdowns.

Fewer units
The increased thermal efficiency resulting from the fully counter-current flow very often means that a particular assignment requires fewer spiral heat exchangers than the straight-tube alternative.

Lower installation costs
Spiral heat exchangers only require a very small area for mounting and access, resulting in lower unit installation costs compared with other heat exchangers.

Fewer units, less down time
In a coke oven plant, four shell-and-tube units were replaced by just one spiral heat exchanger. This saved space and cost, while increasing performance at the same time.

Easy access
When processes involve fluids that are capable of causing a high degree of fouling, it is important to have easy access to the inside of the heat exchanger for cleaning and inspection.

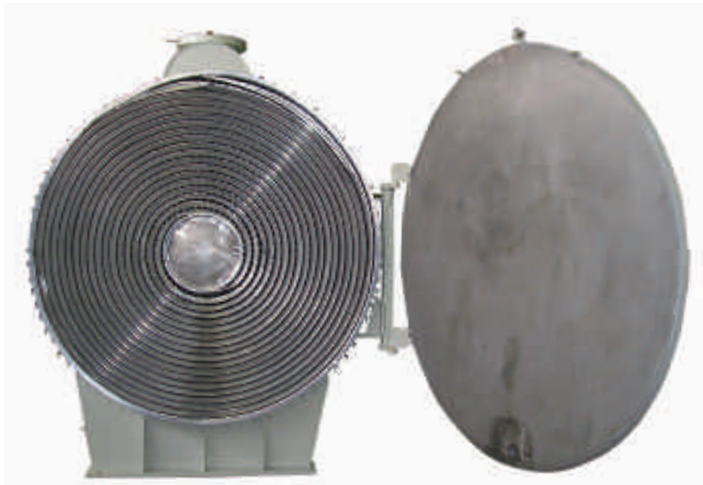
Compared with other types of heat exchanger, spiral units provide the best access to their heat transfer area – with no special tools or lifting equipment required.

Each fluid channel is easily accessed via its cover, exposing the whole of the heat transfer surface.

Two covers enable one or two fouling fluids
Both hot and cold channels are designed to perfectly match the special needs of the fluids being used and the thermal duty being performed. This provides total operational security when using either one or two fluids that cause high fouling.

This is a major advantage for customers that want to recover heat from one dirty fluid to another.

Spiral units are the only type of heat exchangers capable of direct heat interchange between two fluids that cause high fouling.



Full draining for batch operation
All spiral heat exchangers can be drained in position, without any need to disconnect pipework or to open the units.

For applications where complete draining of the process fluid is required on a regular basis, the spiral heat exchanger can be installed in an upright position.

This is particularly useful for batch production processes as it makes it possible to empty all fluid from the unit between batches.

The customized condenser

The versatility of spiral heat exchangers makes them ideal for customized solutions

Working closely with our customers helps them to optimize their processes and introduce new forms of heat exchange – such as this fully built condensing tower with three spiral bodies.

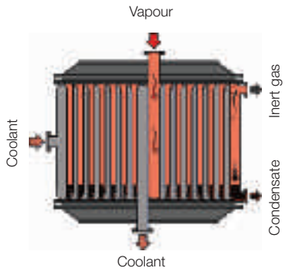
One of the best examples of the flexibility of a spiral heat exchanger is its capability as a condenser.

Different condensing duties place different demands on a heat exchanger. The desired condensing performance is achieved by determining the flow path of the vapour.

Alfa Laval spiral condensers perfectly complement Alfa Laval's other process condensers – the AlfaCond and the Compabloc – to provide customers with a full range of condensers for the entire range of their processes and applications.

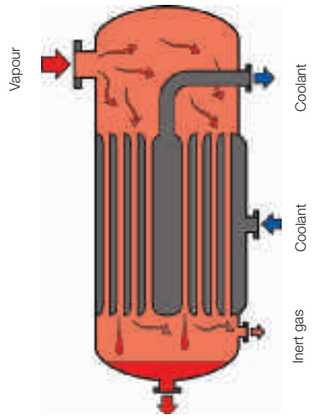
Maximum product recovery with counter-current condensing
To condense a mixture of vapours and inert gases, a heat exchanger needs a long flow path. In a spiral heat exchanger this is easily achieved, as the vapour flows in a direction that is counter-current to the cooling liquid.

This results in a very compact condenser with the best heat transfer efficiency for maximum product recovery. The counter-current spiral condenser can also be designed to sub-cool the condensate and/or the inert gases.



Cross-flow condensing with the lowest possible pressure drop
Condensing large volumes of pure vapour needs a unit with a large cross-sectional area and a short flow path. To achieve this, the vapour passes through the condensing channel in cross flow.

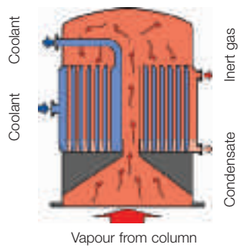
When the vapour/condensate operate in cross flow, the pressure drop is virtually undetectable. This makes the spiral condenser ideal for systems that operate at very low pressure.



Two units in one – cross-flow and counter-current paths in the same unit
The flexible flow-path arrangement and installation possibilities provided by spiral heat exchangers give them important advantages compared with other condensing solutions.

Two heat exchange duties can be performed within a single spiral to further reduce capital equipment costs, and to maximize operating efficiency.

For example, a spiral heat exchanger can act as a condenser and sub-cooler for condensate and/or inert gases, or as a pre-heater to remove sub-cooling for vaporizer and reboiling duties.



Installation costs reduced still further
Because of their function, condensers are often mounted high up at the top of distillation columns.

Due to this high placing, all the ancillary equipment must be supported on a separate structure. This greatly increases the costs of installation, running and maintenance.

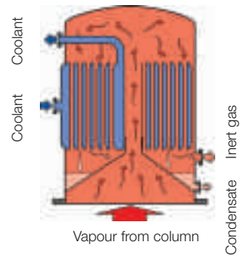
Spiral condensers, however, are available as self-contained units or, more importantly for many customers, as a column-mount to fit directly onto or within an existing distillation column or stripper tower.

It is also possible to build more than one spiral heat exchanger unit into a complete condensing tower to accommodate multiple condensing stages, such as cooling water, chilled water and refrigerant.

Direct mounting of a spiral condenser at a stripper tower reduces installation costs, increases product recovery and reduces pollutant escape.

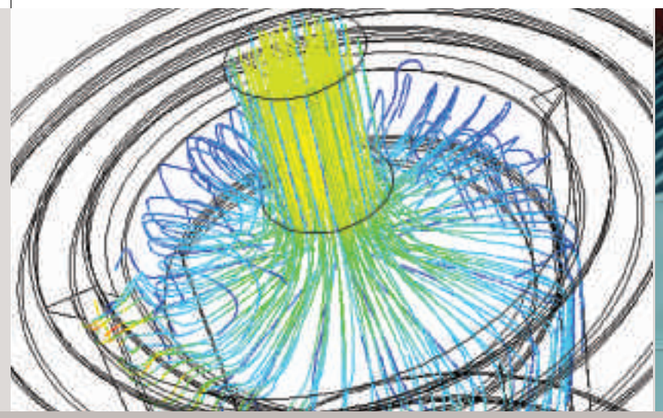
Condensers can also separate
Separation of the condensate produced from the inert gases takes place inside the spiral. Condensate can therefore easily be fed back into the column for reflux, or removed for further processing, without the need for external separation equipment.

Fitting a spiral condenser to a tower thus not only increases condensing performance, but also reduces ancillary equipment costs and removes the need for support structures.



History, experience and expertise

It takes experience to build the kind of expertise that provides answers



The largest manufacturer of heat transfer equipment in the world
Our worldwide sales and service representatives ensure that we can provide excellent local service to all prospective and existing customers, while also drawing on the wider experience and expertise accumulated within our global organization.

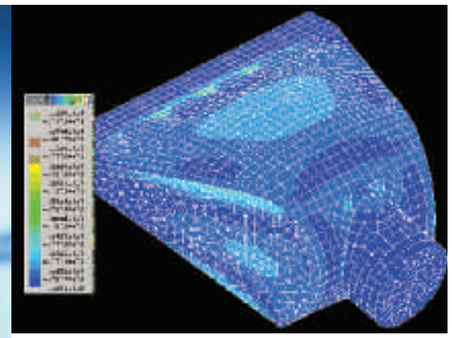
This wealth of knowledge and experience is especially relevant to the spiral heat exchanger.

Alfa Laval has been making spiral heat exchangers for more than forty years. During this period, Alfa Laval has produced more than 30,000 spiral units for a wide variety of industries and customers all over the world.

Today, Alfa Laval has three production sites that provide worldwide supply and service to its spiral heat exchanger customers.

They are situated in:
- France
- The United States
- India

Please contact your local Alfa Laval representative to arrange a visit and request a tour of our facilities.



Continual development
Spiral heat exchangers are a well-established product, and have been around for a long time. Nevertheless, Alfa Laval heat exchangers are designed using the very latest techniques and testing methods.

Our sales staff are equipped with sophisticated, state-of-the-art calculation and quotation tools.

Our manufacturing and R&D departments are constantly working to make improvements on production techniques and component design – again drawing on the vast pool of skills and know-how available within Alfa Laval.

Inspiration from our customers
Our best source of information and inspiration is our customers.

Spiral heat exchangers are customized products, engineered to meet the needs of each new installation. After all, no two customers are alike, and neither are their plants or their processes.

Over time, spiral heat exchangers have become standard equipment for a great many processes in many industries.

We enjoy working closely with our customers to meet the challenge of improving their processes. Selecting spiral heat exchangers can help customers in the following ways:
- by improving an existing thermal duty
- by helping to develop alternative solutions and new processes

Whatever the duty, Alfa Laval has an extensive catalogue of references, the necessary experience, and a complete heat exchanger product portfolio. We are confident of being able to recommend the best heat exchange solution for your process.

Performance and applications

Performance range

	Minimum	Maximum
Area range per body	1 m^2 10 ft^2	700 m^2 7000 ft^2
Design temperature	-100 °C -150 °F	400 °C 750 °F
Design pressure	Full vacuum	40 barg and above 580 psig and above
Pressure vessel codes	PED, ASME, AS1210 and others	
Standard construction materials	Stainless steel, carbon steel	
Other construction materials	Any metal that can be cold formed and welded – including Duplex, titanium, Hastelloy, 904L	

Typical applications

Type of fluids and gases	Fouling liquids – containing solids, fibres, liquors, slurries and sludges. Gases – pure vapour and mixtures with inert gases.
Type of duty	**Liquid/liquid** – preheating, heating, cooling, interchanging, heat recovery. **Vapour/liquid** – top condensers, reflux condensers, vacuum condensers, vent condensers, reboilers, gas coolers.
Type of industry	• Petrochemical • Refinery • Steel making • Pulp and paper • Metal/ore processing • Wastewater treatment • Pharmaceutical • Vegetable oil processing • Distillery

Nonstop Performance

A lifetime commitment
For us at Alfa Laval, our obligation to you as a customer does not stop short at delivery. Our Parts & Service organization is there to ensure that your process always runs at peak performance. This is a commitment that extends throughout the lifetime of the system. We call it Nonstop Performance.

Nonstop Performance is based on our global network of experts, who are always on standby to provide you with genuine spare parts on site, in more than 50 countries, 365 days a year, right around the clock.

In terms of service, we speak your language. Alfa Laval service is based on a profound insight into the needs of the process industry. We see every product as part of a process and understand the role it plays within that process. We can therefore work in close collaboration with you to tailor an individual service package that matches your requirements perfectly.

Service must result in bottom-line benefits. We therefore help you to calculate the savings that will result from any proposed service package, and the real-term benefits it will provide.

Challenge us to show you!