



Imagine. Create. Deliver.

Technology you can build on for diesel and gas engines

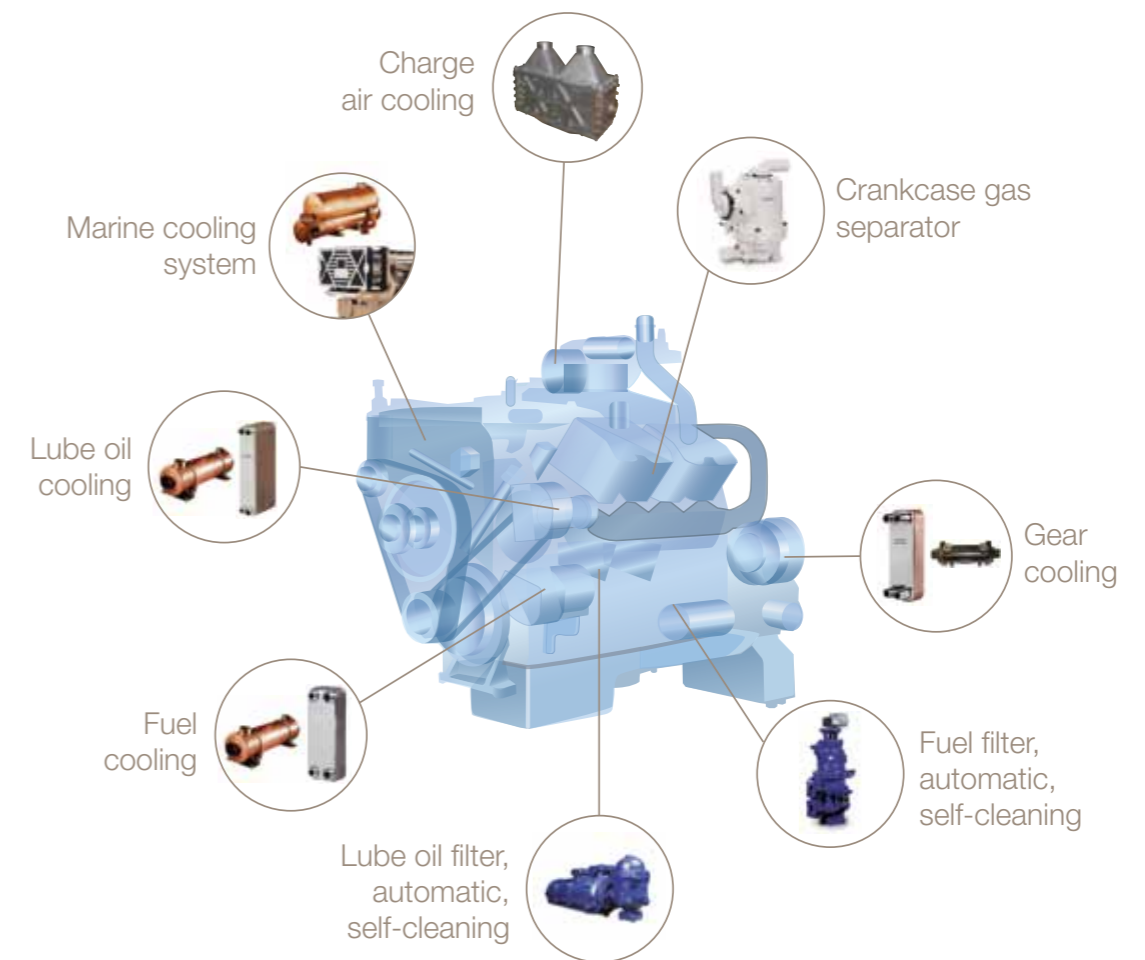




Complete engine solutions

Alfa Laval has a close relationship with the engine and vehicle OEMs. As an established original equipment supplier, we deliver quality solutions for diesel and gas engines and transport vehicles manufacturers. Our product development activities focus on providing custom solutions for you and your end customers' needs.

Our advanced solutions ensure that your state-of-the-art engines and vehicles perform efficiently – with the lowest life-cycle costs and minimum impact on the environment.



High quality, reliable solutions

Manage the total cost of your engine. Alfa Laval is your partner in performance.

A global brand with advanced products

With more than 125 years of experience, Alfa Laval has secured its reputation as a world leader in separation, heat transfer and fluid handling technologies throughout a wide range of industries.

OEMs around the world deliver more reliable, better performing diesel and gas engines to their mining, railway, marine, power generation and industrial customers.

Alfa Laval integrated systems provide lifetime solutions to your challenges.

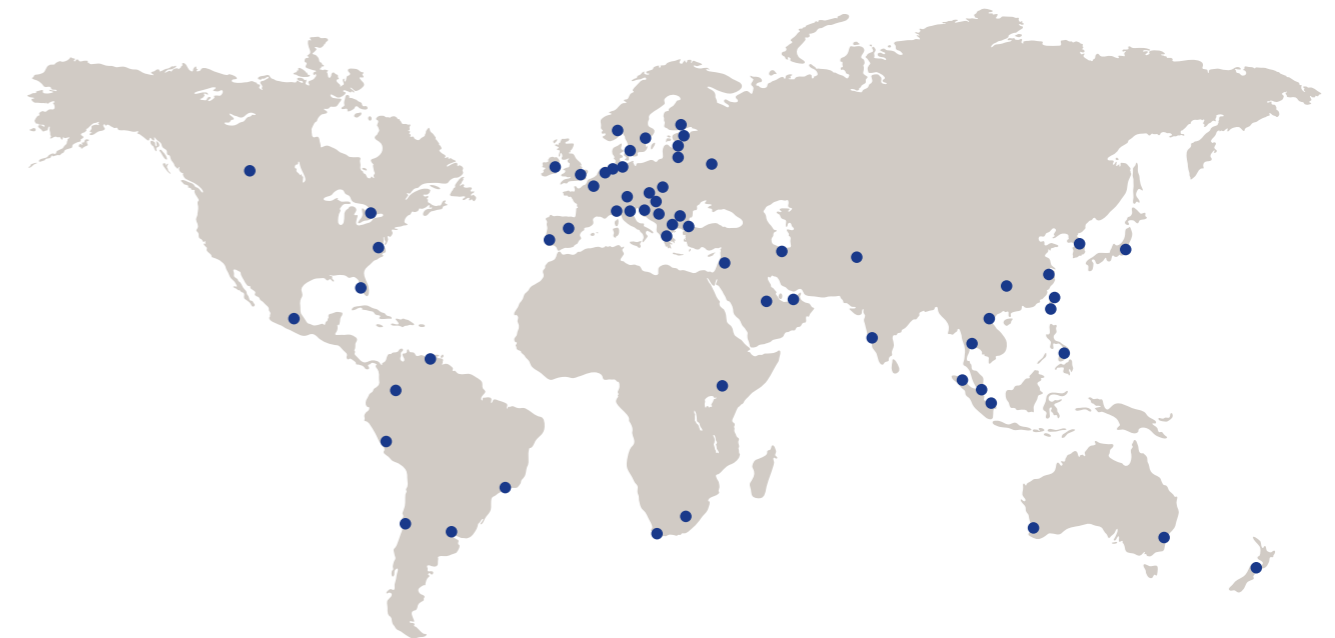
Environmental Sustainability

Our products increase your engine's performance and reduce its environmental impact by:

- Extending engine lifetime
- Extending oil lifetime
- Eliminating the need for filter cartridge disposal
- Extending or eliminating service intervals
- Reducing parasitic loading
- Reducing crankcase emissions

Partners in performance

Alfa Laval systems and products are backed by our global sales and service network. We have production facilities located strategically throughout the world, assuring you of just-in-time delivery to keep your production running efficiently and economically. When your supply chain is on time, you have less to worry about.



Total service commitment
Alfa Laval's global customer support network comprises more than 100 sales offices, 50 services centers and hundreds of field engineers.



Oil cleaning

Separation and filtration solutions



Fuel oil filter: designed for full flow filtering of fuel oils for trunk piston and crosshead engines



Eliminator Filter: self-cleaning lube oil filter with integral separator



Lubricating oil filter



Engine integrated Eliminator Filter for Cummins QSK19 engine

Our continuous pursuit of innovative cleaning solutions ensures superior protection for your engine, significantly increased uptime and reduced operating costs. Your customers will appreciate the improved engine life and longer uptime between maintenance intervals.

Advanced filtration solutions

Alfa Laval's automatic, self-cleaning filtration system does more than clean your lube oil and fuel. It can increase the value of your engine, lowering operating costs and providing end users with easier and less frequent maintenance.

Our Eliminator Filter combines self-cleaning filtration with advanced centrifuge technology. The filter manages the full backflush flow to improve cleaning efficiency and promote oil conservation. You won't need to inventory cartridge filters or dispose of them, which means reduced costs and eliminated liability associated with spilled oil during cartridge change-outs.

Soot management

Modern engines have retarded ignition and higher operating temperatures, resulting in increased soot production, clogged lube oil filters, higher consumption of spare parts and costly replacement of the oil. The Eliminator Filter directs abrasive particles to the centrifuge for removal. Capable of removing particles down to and below 2 μm , the centrifuge cleans the lube oil more efficiently than any bypass filter on the market.

Eco-minded

Many engines endure severe conditions typical to the marine, mining, power generation, rail, military, construction, and oil and gas industries. We've worked directly with customers and OEMs for decades to meet their increasingly stringent demands for reliable engine protection and oil cleanliness. The Eliminator Filter operates with a very low and continuous oil pressure drop throughout the engine's life reducing parasitic loading.

Bolts right on

We uniquely design your filter to bolt onto your engine, with little to no modifications. Lightweight and compact, they easily adapt to your specifications and require no external power source.

Sealed oil system

A leading cause of warranty claims on engines is the constant exposure of the oil system to dirt and foreign particles that occurs during regular oil filter change-outs. Our automatic full flow filters are designed to last the life of your engine without the need for service. This provides a sealed oil system and eliminates reliability issues associated with engines fitted with disposal filters.

Take confidence in adopting a solution that meets or exceeds specifications, including burst pressures up to three times those of cartridge filters. This eliminates the need for a bypass of the filter during cold starts, further protecting your engine.



"Alfa Laval had proven themselves. We had been running fuel centrifuges since the 90s," said **Ozzie Osbourne**, **Ingram Port Engineer** of a key motivator in the decision to deepen their relationship with Alfa Laval.

Ingram Barge Company, a subsidiary of Ingram Industries, a Nashville-USA-based company, has been one of America's leading inland waterway carriers, moving dry and liquid bulk commodities along the Mississippi River System and the Gulf Intracoastal Waterway, since 1946.

Ingram's fleet relied on aging shell-and-tube heat exchanger technology and filter pots that presented significant and ongoing operational and maintenance issues and hindered their desire to adhere to a zero harm environmental policy. Enter the Alfa Laval Eliminator™ combination filter and Heron centrifuge.

After upgrading, the benefits rang so deeply that after three years, there has been no need for maintenance. The Eliminator does just what it says it will do. Problems, inconveniences, expenses ... eliminated. And now, the company is equipping their entire fleet.



MMB
Belt driven solids retaining separator for the purification or clarification of fuel and lubricating oils for diesel and gas engines or steam and gas turbines



MAB
Gear driven solids retaining separator for the purification or clarification of fuel and lubricating oil for diesel and gas engines or steam and gas turbines



MIB
Compact solids retaining separator featuring direct drive for the purification or clarification of fuel oil for diesel engines



Emmie.2
Mobile centrifugal separator effectively removes both particles and water from oils – dramatically increasing hydraulic oil service life and extending final filtration life

Separation and filtration solutions

To meet stringent emission legislations, achieve peak fuel efficiency and generate the highest power density, modern engines require clean fuel free of dirt and water.

Delivered fuel quality is typically uncontrolled and dirty. If the fuel is not cleaned properly it can lead to:

- Frequent filter changes
- Costly injector and fuel system repairs
- Poor engine performance

Alfa Laval fuel separators help to ensure maximum uptime of your engine, elimination of frequent filter changes, stocking and disposal as well as reduce unscheduled maintenance of your engine.

Alfa Laval was founded on its centrifugal separator technology. Utilizing this technology, with enhanced high efficiency disc stack technology, our fuel separators can effectively remove particles, as small as sub micron, and water from fuel.

Fuel separators can eliminate the pre-filters typically fitted to the engine or genset – substantially increasing the lifetime of the final stage fuel filters, while unscheduled downtime for fuel injector and fuel system repairs is greatly reduced.

Crankcase gas cleaning

Eliminate oil from crankcase gas

Utilizing patented and proven Alfa Laval disc stack centrifugal separator technology the Defender 500 achieves greater than 98 percent cleaning efficiency of crankcase gases. This results in greatly reduced emissions, and for closed crankcase systems offers greater turbocharger efficiency and peak intercooler performance over the life of the gas or diesel engine. The integrated crankcase pressure regulator ensures constant pressure control over the life of the engine. The separated oil is returned to the sump, reducing engine oil consumption.

The Defender is sealed for life so it requires absolutely no maintenance or service during the engine's lifetime.

Designed for the toughest duties

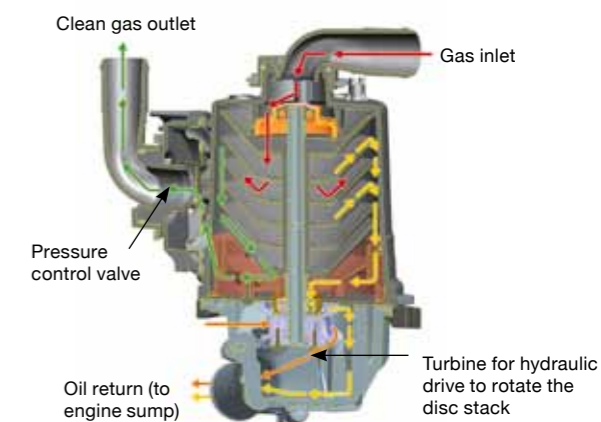
The Defender 500 is designed for a built-on-engine installation. Off-road features make it even more resistant to higher operating temperatures, enabling operation at greater angles of roll and pitch, such as those encountered in marine, military, off road or rail applications. The all-metal casing and hose/pipe connections contribute to its robustness and minimize the risk of fatigue damage.

Built with the environment in mind

The Defender captures the oil from the crankcase exhaust and returns it to the engine sump, reducing oil consumption. No replacement filters are ever needed, so there is no filter disposal either. With a cleaning efficiency greater than 98 percent, this separator notably prolongs an engine's lifetime, with no external power needed. It has been technically developed to help you meet global emissions regulations today and into the future.



Alfa Laval Defender 500



Cooling efficiency

Complete range of cooling solutions

The Alfa Laval edge is your edge

Alfa Laval offers compact, highly efficient integrated cooling solutions for engines to meet today's and future power density and legislative demands. Engine manufacturers face ever tightening emission requirements and partnering with suppliers of advanced technologies can assist OEMs in bringing smart, cost-efficient solutions to market.

We build on this concept for you—integrating multiple components and functions to reduce weight and space, improve performance and provide a complete system solution. Alfa Laval's long history of working with diesel and gas engine, transmission and vehicle manufacturers and end users makes us the first choice for optimal design and operation.

Integrated cooling solutions

The Alfa Laval Integrated Cooling System (ALICS) is completely self contained. You no longer need to manage multiple suppliers or order and install loose components. ALICS arrives at your facility ready to bolt directly to the engine.

Features include:

- Multiple duty heat exchangers
- Expansion tank
- De-aeration chambers
- Thermostats
- Mounting brackets
- Bypass or crossover piping into a single, compact solution

ALICS works in any business model. Solutions range from plate packs to assembled plate heat exchangers, or complete shell-and-tube heat exchanger units. We take responsibility for the design and integration of the ALICS so engine manufacturers save design and engineering resources to work on core products.

Even existing engines can benefit from new technology and gain market advantage. ALICS can be designed to fit existing, as well as new, engines.

Marine cooling experience

Marine cooling has the combined challenge of a seawater environment along with even higher horsepower ratings and severe stop and go operation. We use a range of materials from titanium plates to copper nickel shell-and-tube designs to provide the best level of corrosion protection for your applications.

Cooling with compact, efficient heat exchangers

Our brazed plate heat exchangers are designed to be compact and lightweight. Alfa Laval developed the original brazed plate model, featuring efficient heat transfer with a small footprint.

The thin stainless steel channel plates are vacuum brazed together using copper brazing material. The brazed construction eliminates the need for gaskets, making the brazed heat exchanger ideal in high temperature, high pressure applications, like lubricating oil, fuel, hydraulic oil, transmission cooling and heat recovery.

Patented fusion-bonded technology

Alfa Laval's revolutionary AlfaNova is a 100 percent stainless steel, "copper free" plate heat exchanger - with the plates diffusion bonded together using breakthrough technology patented by Alfa Laval. The stainless steel construction provides high levels of corrosion resistance, and the counter-current flow makes it easy to extract heat efficiently. AlfaNova is ideal for use in extreme temperature and pressure fatigue conditions – construction able to withstand over 1,020°F (550°C).

Efficient gasketed plate heat exchangers

As the world's largest producer of gasketed plate heat exchangers, Alfa Laval's compact and efficient titanium and stainless steel plate heat exchanger technology provides very high efficiency in a compact package. Our broad range of plate heat exchangers offers a solution for most applications.

Alfa Laval's high performance gaskets ensure excellent sealing across many applications and operating temperatures. The gasketed design also readily absorbs vibration and shock making it ideal for on engine applications.

The heat exchangers are designed for ease of service and can be returned to 100% operational levels without expensive cleaning procedures.



Titanium plate ALICS installed on 10V MTU 2000 engine



Copper nickel shell-and-tube ALICS for 11 liter marine diesel engines



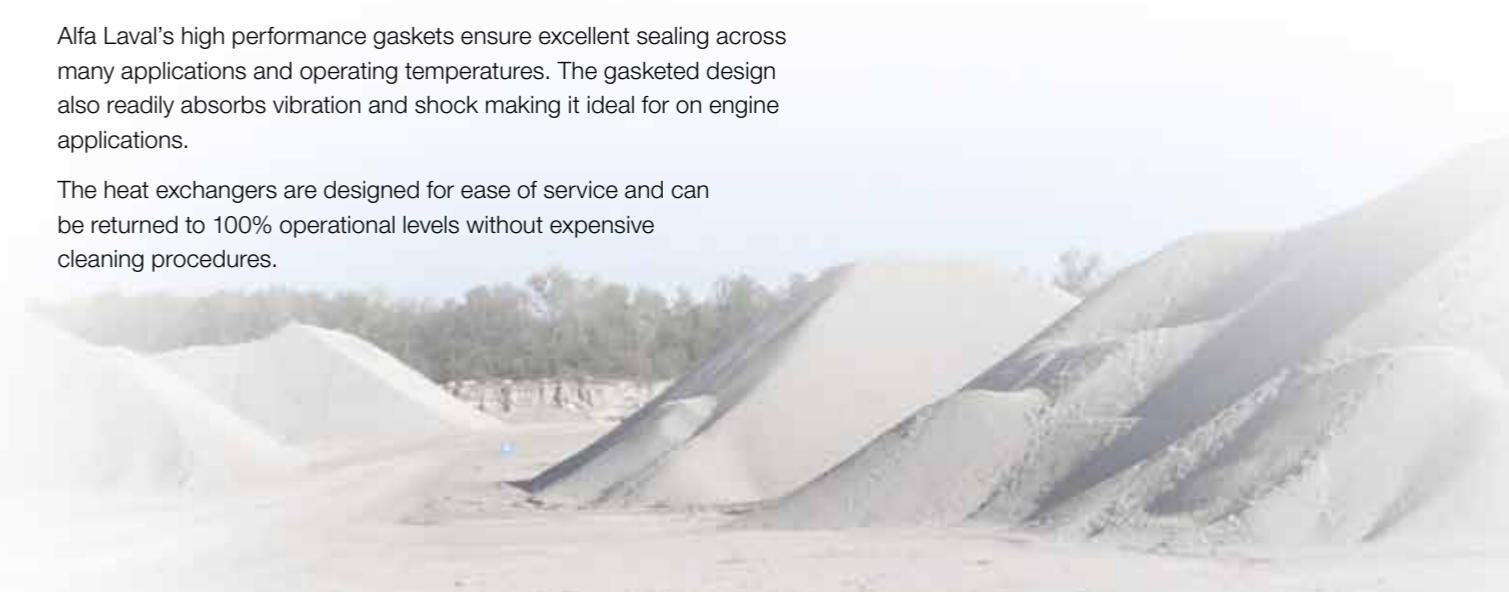
Complete range of compact brazed heat exchangers



Range of fusion-bonded AlfaNova heat exchangers made of 100% stainless steel



Modular titanium plate ALICS



Cooling efficiency

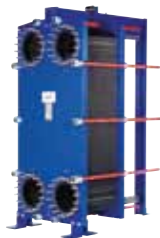
Complete range of cooling solutions



Wide range of radiators for stationary applications



Charge air coolers: designed for heavy duty on- and off-highway applications



Gasketed plate heat exchangers can be custom designed for specific requirements



Braided shell-and-tube heat exchanger is designed for high pressure, high temperature applications, like transmission cooling

Limiting fouling and ease of service

Alfa Laval achieves high efficiency with its patented plate designs that maximize heat transfer and allow us to utilize the thinnest plates in the industry, further increasing heat transfer efficiency. The designed in flow turbulence along the plates substantially reduces the risk of fouling leading to longer uptime with reduced maintenance and operating costs.

Brazed shell-and-tube technology

This rugged, highly efficient heat exchanger is designed for high pressure, low pressure drop and high temperature applications, like transmission cooling. It is manufactured with similar, non-ferrous tube and shell materials – eliminating thermal expansion problems, as the shell-and-tube expand at the same rate.

Brazed shell-and-tube heat exchangers can be easily customized to fit specific customer requirements and are suitable for a variety of applications. They provide maximum efficiency, and are able to withstand high flow rates with a low pressure drop.

Radiators

Alfa Laval offers a broad range of radiators for stationary applications. These radiators are designed to achieve an optimized exchange of thermal energy between air and a fluid. The heart of our air heat exchanger is the finned coil, built up from a circuit of interconnected tube serpentine and fins to increase the heat-exchanging surface. Thanks to the combination of key design variables (coil materials, coil geometry, casing design, fan type), Alfa Laval radiators can be tailored to give maximum efficiency and minimum energy consumption.

For varying duties Alfa Laval radiators can be split into two completely independent operating heat exchangers that save energy. Fans can be located to either pull or push air through the radiator depending upon your requirements. With a wide range of sound pressure level alternatives we can offer you designs particularly suited to demanding, noise-sensitive environments.

Charge air coolers

Increasing emission standards and higher power density engine designs require lower intake manifold temperatures, while boosting turbocharger compressor pressures. This is placing greater demand on charge air cooler technology for compressed air cooling performance, robustness and compactness. Alfa Laval offers an increasingly diverse range of efficient charge air coolers for marine and industrial applications.

Alfa Laval charge air coolers feature aluminum or copper fins with varying fin densities, to meet your engine's performance needs. This technology is available in rectangular or round fin configurations with tubes fixed utilizing our expanded tube technology or our revolutionary rubber end sheet technology. To meet your compact packaging requirements our engineers provide integrated housings that compactly and efficiently fit the charge air cooler seamlessly into your engine.

Revolutionary rubber end sheet technology

Alfa Laval has developed a polymer tube end sheet that effectively and efficiently secures the tube bundle in the shell. The tube ends are pressed into the rubber end sheet which itself is securely pressed into the outer shell. Traditional brazing or soldering of the tube bundles is eliminated.

This design naturally absorbs the vibration, shock and thermal expansion found in an engine environment, whether for liquid to liquid cooling or charge air cooling. The result is a robust heat exchanger with a longer life. This technology is applicable for shell-and-tube liquid to liquid heat exchangers or tube-and-fin charge air coolers.

The design flexibility of the Alfa Laval shell-and-tube heat exchangers allows for easy tailoring of single and double pass coolers with various connection orientations to fit specific OEM engine manufacturer requirements.



Brazed shell-and-tube featuring rubber tube sheet technology



Charge air cooler features a proven, robust design



Charge air cooler featuring rubber tube sheet technology



Reliable delivery

Around the world...around the clock

Operations

To remain competitive, you need to keep your operations running on schedule, delivering the highest quality while doing everything possible to reduce costs.

Alfa Laval understands volume production, delivering a million units each year from manufacturing facilities strategically located around the world. With all our locations linked via a powerful global network, depending on the product, we can provide easy, immediate delivery around the clock. This enables us to reliably support your just-in-time release requirements.

Streamlined order processing: E-business, EDI

When you become an Alfa Laval partner, our order handling systems can be electronically interfaced with yours. This ensures greatest cost efficiencies and highest order accuracy. For your convenience, we also offer Web-based ordering.

Quality

Alfa Laval has received and maintained quality management and quality system standards including ISO 9001, ISO 14001 across most of our facilities, and we offer and meet APQP processes at our facilities primarily servicing the engine and vehicle OEMs.

Solid foundation

Alfa Laval has been here for you since 1883. We are committed to a relationship that extends throughout the lifetime of the product or system. Our mission is to raise your productivity, reduce your downtime and ensure "Nonstop Performance" for your systems through our worldwide network of service and distribution centers. This is true whether you serve global markets or a local one.

Service Centers

Our international presence provides you with the convenience of regional service centers and field service options in more than 50 countries. Our turnkey service reduces unplanned downtime, extends machine life, allows for quick turnaround and takes the overall maintenance burden away from you so that you can focus on your business.

Customer service

Alfa Laval has the resources to offer 24/7 response throughout the lifetime of your product. We are ready to serve you – whether you are in need of technical expertise, Alfa Laval genuine spare parts, service quoting, training, field service scheduling, or just general information.

Training

On-site or at one of our Alfa Laval facilities, we will provide you with the training you need to maintain optimal performance of your systems.



Production centers in China, France, India, Italy, South Korea, Sweden and USA



35-40 new products annually with more than 300 patents



Manufacturing and technology expertise throughout production and testing facilities

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

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

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