



# Empowering solutions

Equipment and services for engine power applications



Your



# link in the fuel chain



Whether you work with diesel engines themselves or their application in power generation, your choice of auxiliary equipment plays a vital role in your success.

And no choice is more secure than Alfa Laval.

Alfa Laval is a leading supplier of auxiliaries with a long history of serving engine builders and power contractors. Through strong relationships and many decades of cooperation, we've come to understand both installation and operational needs.

Today we can serve you even more fully, now that Aalborg Industries is a part of Alfa Laval. Looking to the future, our complementary expertise and combined resources will mean further opportunities to strengthen your engine-related business and reduce its environmental impact.

The engine and the fuel chain around it are central to your business. And you are the centre of ours.





# A first look inside

Alfa Laval provides a wide range of products that serve the needs of the engine power industry. Our systems, equipment and services cover everything from critical operations to lighter duties, providing both lifecycle economy and long-term peace of mind.

## ALFA LAVAL AT POWER PLANTS

6

Alfa Laval offers a complete portfolio of engine power auxiliaries. Our efficient and reliable solutions, which handle a wide variety of operations, can make a difference in many areas of an engine power installation.

▶ Alfa Laval at power plants

6

## OIL TREATMENT

8

We deliver reliable, high-efficiency treatment solutions for a wide range of oil types. In addition to solutions for safeguarding engine performance, we offer solutions that safeguard the environment by dealing with oily waste.

▶ Separation	10
▶ Fuel conditioning	13
▶ Crankcase gas cleaning	15
▶ Oily waste reduction	16
▶ Filtration	18
▶ Cleaning-in-Place	19

## COOLING AND HEATING

20

Our cooling and heating solutions let you take full control of the thermal energy at your facility. A complete selection of radiators and plate heat exchangers ensures the best possible match of product and function.

▶ Radiators	22
▶ Engine cooling	26
▶ Steam condensing	26
▶ Mineral oil preheating	27
▶ Filtration	28
▶ Cleaning-in-Place	29

## WASTE HEAT RECOVERY

30

Our Aalborg solutions for recovering waste heat take advantage of the surplus energy that already exists on site. The result is reduced fuel consumption, which positively affects both your economy and the environment.

▶ Exhaust gas heat recovery	32
-----------------------------	----

## DESALINATION

34

Our freshwater generators are an economical way to produce high-quality technical water on site, or to create added value by using waste heat to generate large freshwater volumes for onward sale.

▶ Seawater desalination	36
▶ Water heating and circulation	39

## ALFA LAVAL ON ENGINE

40

Alfa Laval offers a range of OEM solutions that handle filtering, separation and cooling. Incorporated directly into the engine, they add value by enhancing performance and ensuring trouble-free operation over the long term.

▶ Alfa Laval on engine	40
------------------------	----

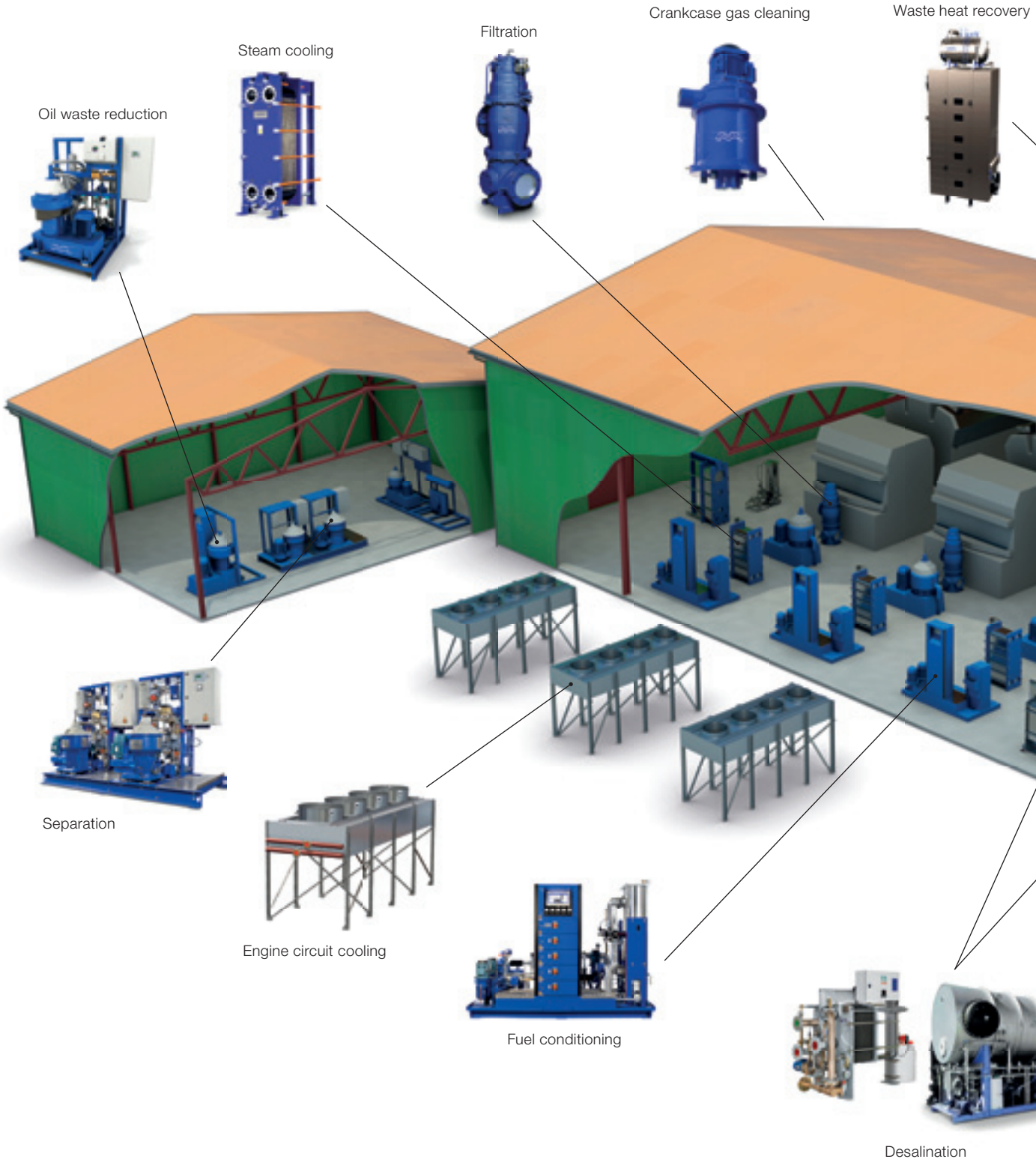
## PEACE OF MIND

42

No matter how remote the site, the experts of our Parts & Service team specialize in extending performance. With expertise and support, they help maximize your uptime and minimize lifecycle costs.

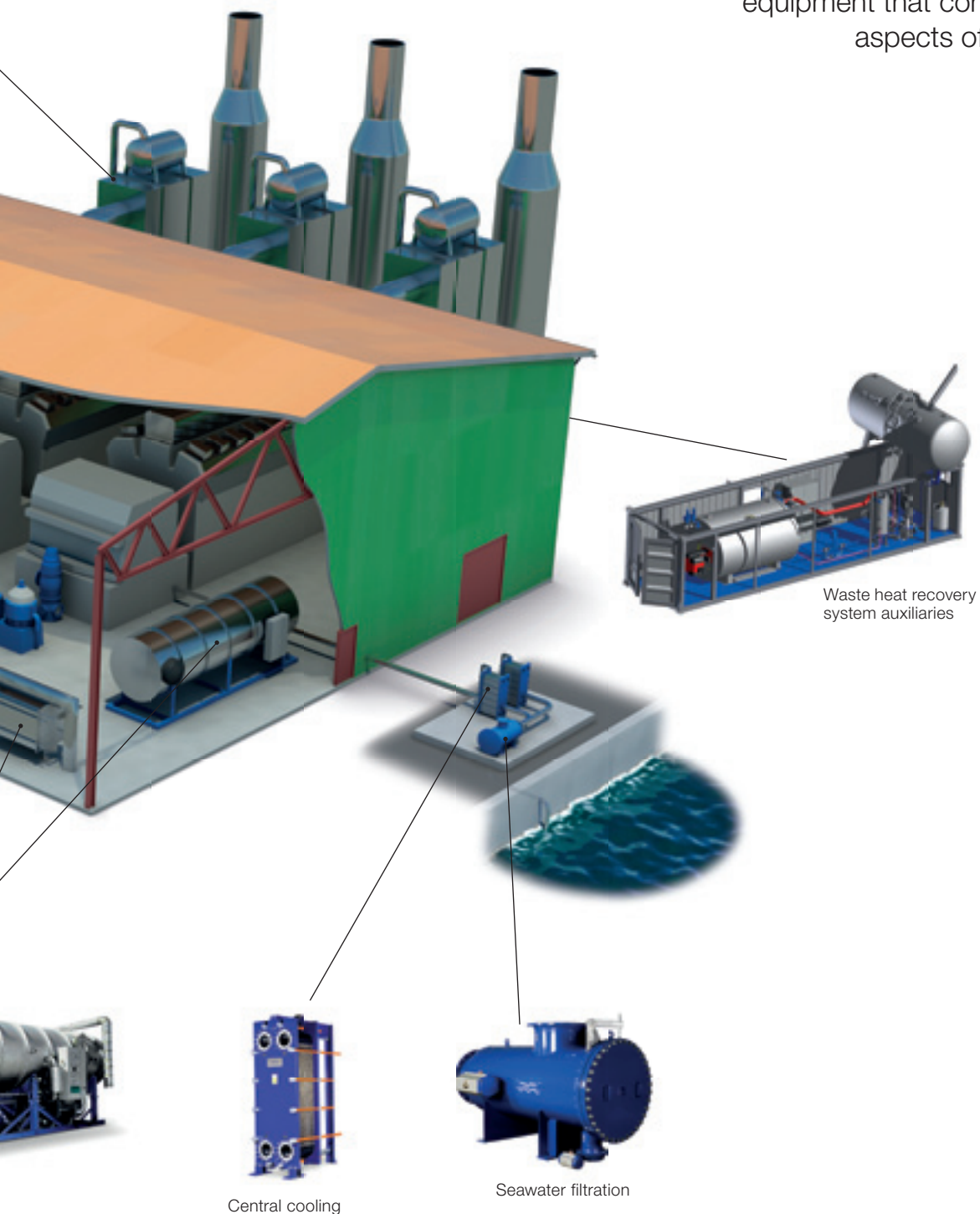
▶ Peace of mind	42
-----------------	----





# Alfa Laval at power plants

The ease of use, cost efficiency and high reliability that characterize Alfa Laval solutions have made a difference at engine power installations worldwide. Now that Aalborg Industries is a part of Alfa Laval, we offer an even more extensive range of equipment that contributes to many aspects of plant operation.









# Oil treatment

As a recognized leader in oil treatment, Alfa Laval is the ideal partner to help you get more out of mineral oils. By efficiently removing fuel impurities and extending the lifetime of lubricants, our solutions bring long-term protection and economy to engine power installations.



## A full scope of supply

Alfa Laval provides thorough protection for your engine power business with complete oil treatment from bunker tanks to main engine. Having built centrifugal separators for over a century, we offer more separation experience than any other supplier. But we also bring you solid expertise in boosters, filters and working with alternative fuels, as well as groundbreaking solutions for dealing with oily waste.

Designed for continuous, reliable operation under the harshest conditions, our oil treatment solutions combine low operating cost with high peace of mind.

## The easy choice

Simplicity and reliability have always been Alfa Laval hallmarks, and they can be seen more clearly than ever in today's oil treatment solutions. With features like CentriShoot and CentriLock, our separator discharge

system and bowl-locking mechanism, we've decreased equipment complexity – and with it both risk and wear.

Likewise, we use modular components and plug-and-play principles that facilitate installation, commissioning and maintenance. So whether you're preparing a new facility or converting an existing one, the choice of Alfa Laval has immediate advantages with ongoing benefit.



# Separation

## S and P Flex separation systems

Alfa Laval's S and P Flex separation systems are the result of continuous technical development and innovative design solutions. They combine the high efficiency, low sludge output and low operating cost of Alfa Laval self-cleaning centrifugal separators with a truly flexible scope of supply, producing a market-leading solution with many benefits.

## Key benefits

### ■ Optimal performance and highest efficiency

A fine-tuned bowl design with an optimized disc stack ensures optimal performance and the best possible separation efficiency, which means reduced load on filters and other equipment downstream. S separators also feature unique Alcap technology for continuous monitoring of the cleaned oil.

### ■ High reliability

Advances in internal design, as well as other technical features created with Alfa Laval expertise, increase system reliability and your peace of mind.

### ■ Easy installation

The small physical size of the separators, combined with the flexible delivery options of the S and P Flex range, simplifies positioning and installation on site.

### ■ Easy operation and service

The EPC 60 controller, which is a part of all deliveries, is designed for intuitive menu navigation and "one-button" starts and stops. Its modular construction enables faster troubleshooting and I/O board replacement.

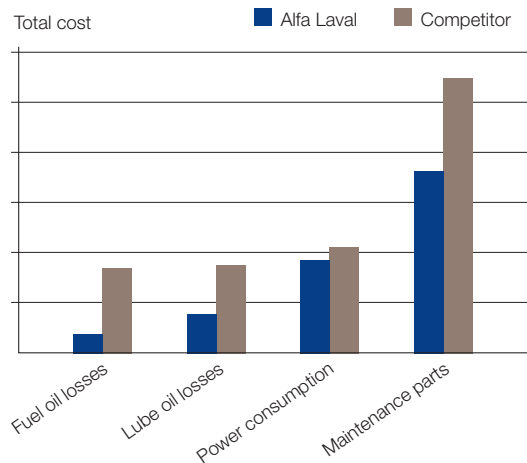
### ■ Lowest lifecycle cost (LCC)

Alfa Laval separation equipment offers the lowest oil losses, lowest power consumption, least maintenance and fewest wear parts on the market. With Alfa Laval, you are thus ensured the lowest LCC and the shortest payback time on your equipment investment.

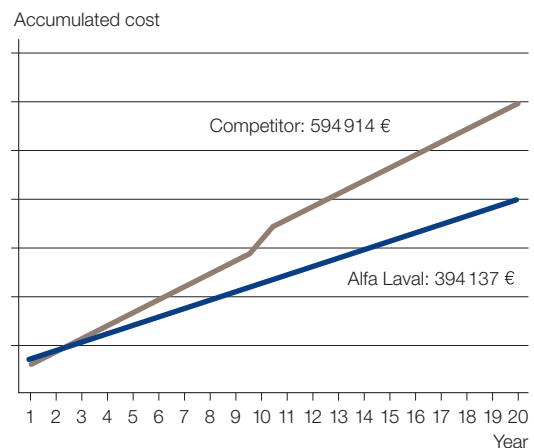
### Low-wear mechanical platform

S separators 921-987 and P separators 626/636 are built on a low-wear mechanical platform that features CentriShoot and CentriLock. The CentriShoot discharge system has a fixed discharge slide that flexes gently to expose the discharge ports, thereby eliminating metal-to-metal wear. The CentriLock bowl-locking system uses a lightweight, non-threaded snap ring that prevents wear by allowing easy removal without a sledgehammer.

### Typical lifecycle cost (LLC) over 20 years

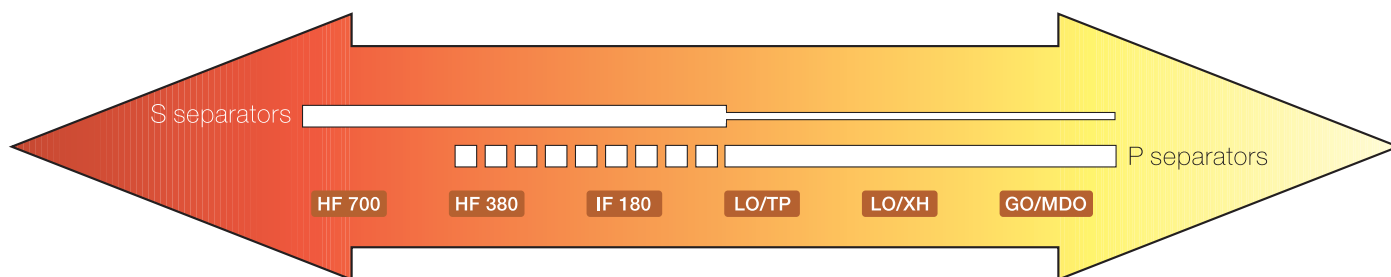


### Accumulated cost over 20 years



The graphs above are examples of typical lifecycle cost. To find out how much you could save, please contact your local Alfa Laval representative to make your own LCC calculation.





## S separators

S separators feature Alcap technology, which means they are particularly suitable for cleaning heavy fuel oils and other residual oils of high and varying density. Based on a measurement of water content in the clean oil outlet, they automatically adjust the oil/water interface within the separator bowl.

- Compatibility with all fuel and lubricating oils (Alcap)
- Oil densities up to 1010 kg/m<sup>3</sup>
- Viscosities up to 700 cSt/50°C (higher on request)
- Minimal sludge volumes and oil losses
- Performance monitoring in full flow via water-in-oil monitor



## P separators

P separators are designed to handle uniform oils of consistent and lower densities, such as lubricating and marine diesel oils. Because they utilize purifier technology, in which the separation level is set with a gravity disc, they do not automatically compensate for density fluctuations.

- Compatibility with lubricating, distillate and marine diesel oils
- Oil densities up to 991 kg/m<sup>3</sup>
- Viscosities up to 600 cSt/50°C (higher on request)
- Low sludge volumes and oil losses

### Green advantages

*Alfa Laval's S and P separators have optimized bowls and other design features that lead to exceptional efficiency. No matter which model you choose, you can count on low water consumption, energy consumption and oil losses, which means less sludge to dispose of and a reduced burden on the environment.*

## Flexible supply

### Flex system

A separator with ancillaries in the form of optimized block components provides full say over the use of space. This allows for local modularization or do-it-yourself assembly.

### Flex modules

A compact separator module can be built to a customer-specified configuration from a wide range of skids and machine blocks. Multi-modules and mixed modules are possible for the simultaneous treatment of different types of mineral oils.



MMB 305



MAB 103B



MIB 303

## MMB and MAB

Robust, compact and easy to install, the manually operated MMB and MAB separator systems are ideal for small-scale applications. Complete systems for purifying or clarifying mineral oils, they feature simple operation and a large sludge space, which extends the operating period between manual cleanings. The MMB system is also belt driven and features an internal paring disc for discharge of clean oil.

- Easy serviceability
- Proven equipment with low maintenance and spare parts consumption
- Compatibility with lubricating, distillate and diesel oils (MDO)

## MIB 303

The low-maintenance MIB 303 operates as a purifier for distillate and marine diesel oil. An excellent solution for oil cleaning in smaller applications, its compact design allows for plug-and-play installation in very confined spaces. The MIB 303 removes solid impurities and reduces the risk of bacterial growth in the tanks, thereby extending the interval between filter replacements and cutting costs.

- Suitable for oils with a maximum density of 920 kg/m<sup>3</sup> at 15°C
- Maximum separation temperature: 70°C
- Capacity:
  - 760 l/h of diesel/gas oil
  - Max. 460 l/h of lubricating oil



# Fuel conditioning

## Fuel Conditioning Module, FCM

The Fuel Conditioning Module is a pre-tested, “start-and-forget” booster module that takes the guesswork out of fuel conditioning. Based on a compact, modular design that can be configured for any installation layout, it treats heavy diesel fuel so that it meets the specified requirements for cleanliness, pressure, temperature, viscosity and flow rate. The system is fully automated, with a range of automatic self-cure functions that safeguard operation should a problem occur. But it also offers great flexibility, featuring manual alternatives for all critical functions and effortless operation via remote control.

- Simple, flexible installation
- Pre-installed components, connections and controls
- User-friendly layout with easy access to all components
- Control and monitoring functions combined in a single control panel
- Pressure transmitters for enhanced control capability
- Automatic changeover from DO to HFO mode
- Easy integration and full remote operation

Main equipment (standard version):

- Low-pressure supply pumps
- Automatic oil filter
- Flow and pressure transmitters
- Mixing pipe with deaeration function
- High-pressure circulation pumps
- Oil heaters
- Viscosity transducer
- Control cabinet



Fuel Conditioning Module

### Handling multiple fuels

*Alfa Laval's fuel conditioning systems maintain performance when changing between light and heavy fuels. Their embedded ramp function, combined with the Visco-Temp function in our EPC50 B and EPC50 V controllers, prevents temperature shocks to fuel pumps and injectors and minimizes engine maintenance costs by keeping viscosity stable.*

### Green advantages

*Alfa Laval's Fuel Conditioning Module ensures that clean fuel of the correct viscosity is circulated under constant pressure and at a high flow rate through the injector pump block. This enables efficient engine operation in accordance with manufacturer specifications, which results in optimal combustion and reduced emissions.*



Viscochief MKII

## Viscochief MKII viscosity control system

The Viscochief MKII is a second-generation viscosity control system for use in fuel oil conditioning systems. It determines fuel viscosity by measuring how much the torsional vibration of a pendulum in the fuel is dampened, a method which ensures the most accurate viscosity measurement. Requiring no special attention during normal operation, the Viscochief MKII can be installed with the EPC50 V controller for both local and remote operation.

- Compact design
- Modern control system and sensor technology
- Electronically controlled pendulum vibration
- Possibility to integrate with automation systems

Other available equipment:

- Steam and electric heating systems (can be controlled manually if controller electronics are not functioning)
- Steam regulating valve with remote position indication
- HFO/DO changeover valve



# Crankcase gas cleaning

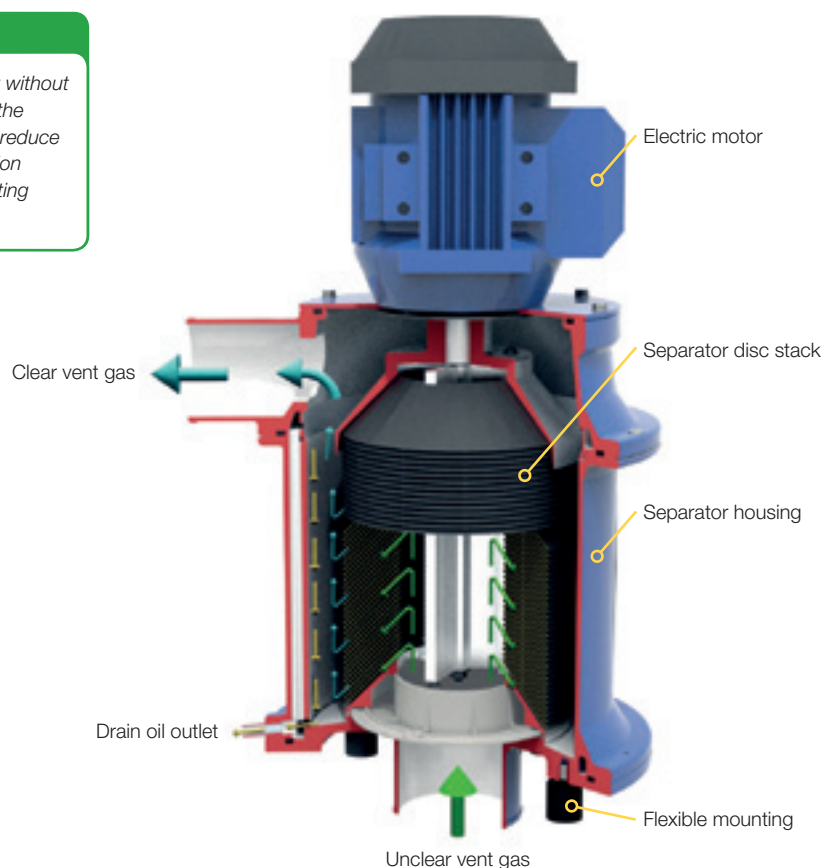
## PureVent

PureVent is a compact separator patented by Alfa Laval and developed in cooperation with Wärtsilä. By using centrifugal separation to remove oil and particles from crankcase gas, it offers an opportunity to further reduce engine emissions. Crankcase gas enters at the bottom of the separator and passes into the disc stack, where centrifugal force presses the oil and soot out between the discs. The virtually oil-free air can then be released into the atmosphere, while the oil that collects on the inside of the PureVent housing is recirculated as lubrication or drained off for incineration or deposit.

- Suitable for crankcase gas and other oily mist emissions
- 98–99.9% separation efficiency at 40–150 m<sup>3</sup>/h
- Provides stable pressure in the engine crankcase, whereas filters can clog and change the pressure drop
- Only 30 l in size
- Major service every 16 000 hours or five years, whichever comes first

### Green advantages

*PureVent eliminates oil mist and protects the environment without negatively affecting engine performance. In fact, it allows the recirculation of collected oil as lubrication, which helps to reduce your overall oil consumption. By using centrifugal separation instead of filters, it returns virtually oil-free air without creating paper waste for disposal.*



# Oily waste reduction

## PureBilge

PureBilge is an efficient and cost-effective oily water treatment system, designed for continuous use in real-life conditions. By means of high-speed centrifugal separation, it provides fully automatic single-stage operation, even in the presence of difficult emulsions. Besides reducing oil in water content to less than 5 ppm, PureBilge is modular and requires no large holding tanks. Moreover, it is designed to work without chemicals and requires little maintenance, especially compared to solutions with filters and static coalescers.

- IMO MEPC.107(49) compliance ( $\leq 15$  ppm oil in water)
- Continuous, automated operation
- Ability to handle varying feed and oil shocks
- Low waste production and lifecycle cost
- Optimized bowl and emulsion-preventing XLrator disc inlet
- Compact, plug-and-play design
- Capacity: 2500-5000 l/h

Equipment (delivered as a module):

- BWPX 307 centrifugal separator
- Ancillaries and control cabinet with EPC 60 Bilge controller
- Oil-in-water monitor
- Feed pump (separate module)

### Green advantages

*PureBilge cleans oily water with the help of high-speed separation technology. Highly reliable, the system operates continuously and produces less waste and reject than static solutions such as filters and coalescers. Its already high separation efficiency is enhanced by its XLrator disc inlet, which gently accelerates the bilge water to prevent the creation of further emulsions.*





## MSPX sludge and waste treatment system

Alfa Laval's MSPX sludge and waste treatment system is a highly effective centrifuge system for treating waste oil and sludge from diesel installations. By continuously separating these products into their three basic constituents – water, oil and sludge – it ensures maximum waste recovery and contributes to more cost-effective processing and disposal. The compact, plug-and-play system has a flexible design that comprises pumping, heating and separation modules.

- Substantial savings in waste oil and sludge handling costs
- Effective pre-treatment of water prior to discharge into oily water tank
- Possibility of a smaller holding tank for waste oil and sludge
- Enhanced performance when MP 205 conditioner is injected prior to the feed pump
- Small footprint (complete module approx. 2 m<sup>2</sup>)
- Capacity: 200-500 l/h, depending on the use of MP205

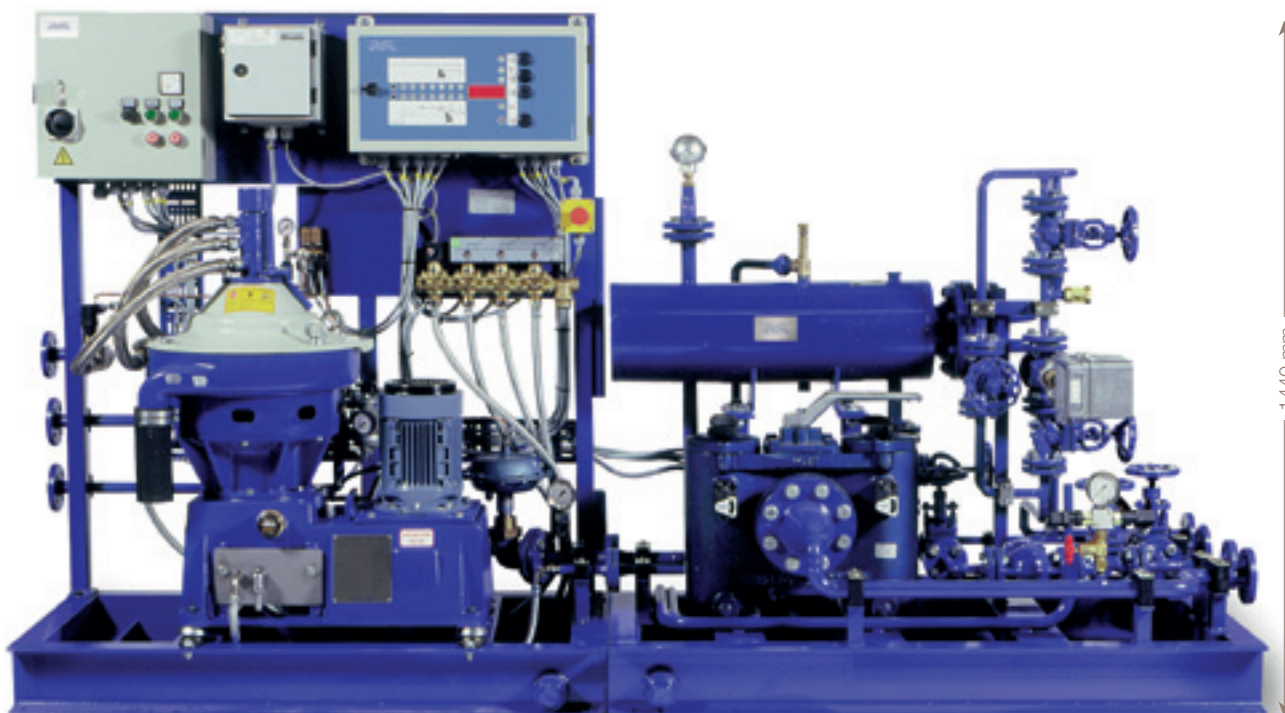
### Green advantages

*The MSPX system combines economic benefit with environmental peace of mind. It recovers a maximum amount of oil for incineration and similar processes, leaving far less sludge for disposal. Most importantly, however, the MSPX ensures proper oily water quality. Oil and impurities are removed early on, which enables the oily water system to operate more effectively.*

Equipment (delivered as modules):

- MSPX 303 separator
- Feed pump
- Heater
- EPC41 control unit
- Chemical dosing unit MP 205 (optional)

MSPX 303



# Filtration

## Automatic full-flow filters

Alfa Laval's automatic full-flow filters are compact and lightweight, requiring a minimum of space in an installation. They offer reliable engine protection, with a low and constant pressure drop over the filter and continuous automatic backflushing. Thanks to a diversion chamber and backflushing treatment system, the clean oil used in the backflushing process can be recirculated for lower sludge volumes and greater savings.

- Low installation, operation and maintenance costs
- Full-flow filtering of:
  - Fuel oils for diesel engines
  - Lubricating oils for cross-head and trunk piston diesel engines
- Wide range of models and capacities, including an electrically-driven filter for fuel oil
- No external power source required for lubricating oil filters



Fuel oil filter (electrically driven)



Lubricating oil filter

### Green advantages

*The disc-type filter elements in Alfa Laval's full-flow filters have great advantages over cartridge-type filters. Their robust construction prolongs the filter lifetime by eliminating the risk of cracking in the filter surface. Most importantly, however, they eliminate the environmental disadvantages associated with filter cartridge disposal.*

## Eliminator, CCU

Suitable for lubricating oil treatment for engines burning HFO, DO, distillate or gas fuels, the Alfa Laval Eliminator, or CCU (Combined Cleaning Unit), is a unique combination of two key components in a shared housing. A full-flow automatic filter stops abrasive particles, thus protecting the engine, while a high-efficiency disc stack centrifuge on the backflushing phase of the filter efficiently cleans the lubricating oil.



Eliminator, CCU

### Green advantages

*The Eliminator forms a sealed lube oil circuit, which protects both the oil and the environment. Contaminants are kept from entering the system, while the oil is prevented from spilling or leaking out. In addition, continuous cleaning by the high-efficiency centrifuge gives the oil extra longevity – in some cases doubling its operational life.*



# Cleaning-in-Place

## Cleaning-in-Place (CIP) system for separators

The Cleaning-in-Place system is a simple and effective way to increase separator performance and lower costs. It hooks up to the separator directly, cleaning the bowl, oil inlets and oil outlets without any dismantling. Not only does this save man-hours, it lowers spare parts consumption since there is no extra wear due to disassembly. The cleaning liquids used with the system are water-based and contain a non-hazardous, organic acid mixture.

- No need for manual cleaning of bowl interior
- Improved separation efficiency due to cleaner bowl
- Same cleaning liquid works with both lubricating oil and fuel oil separators

## Cleaning-in-Place (CIP) chemicals for separators

Alfa Laval CIP chemicals for separators are designed to keep your equipment in peak condition without endangering the environment. They make use of Alfa Laval's line of Alpacon chemicals, which contain a unique raw material based on fermented whey. This makes them both non-hazardous and biodegradable.



CIP type 10M

### Green advantages

*Alfa Laval's high-performance Alpacon chemicals contain BIOGEN ACTIVE®, a renewable acid mixture made from fermented whey, fruit acids and water. Non-hazardous and readily biodegradable, they pose no health risks and can be used without protective equipment.*





# Cooling and heating

Alfa Laval has a long history in heat transfer and leads the way in developing efficient thermal solutions. Not only do our compact cooling and heating products excel in engine cooling, they offer physical and operational advantages in virtually all thermal applications on site.



## Degrees of difference

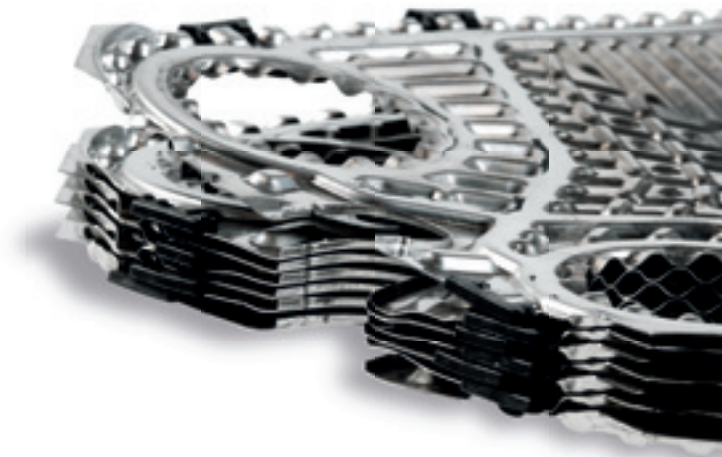
Alfa Laval's air heat exchangers (AHEs) and plate heat exchangers (PHEs) are standard-setters in the engine power industry. Representing decades of heat transfer experience, they can be found in countless power-generating facilities worldwide.

It was Alfa Laval who led the shift toward to today's compact and energy-efficient solutions, and we continue to push thermal limits in what many consider an already mature technology. By optimizing heat transfer and minimizing fouling, our innovations have maximized cooling capacity and simplified access to cheap and concentrated heat energy.

## Building for performance

Today, Alfa Laval's heat transfer solutions are an ideal match of precision, reliability and operating economy. Our PHEs, for example, contain plates that are pressed in a single step, creating a uniform plate that can more easily withstand the stress of demanding applications.

In addition, our solutions offer a high level of flexibility. With a wide variety of base materials, elastomers, geometries, casings, fan types and assembly techniques, we can create a custom heat transfer solution that's precisely matched to your application needs.



# Radiators

## FBLG

Built specifically for a customer-requested capacity, the FBLG radiator is designed for heavy applications and for outdoor use even in the most extreme conditions. Its motors, which come prewired to lockable safety switches, are equipped with H-class insulation and have IP55 protection, apart from the condensing water outlets. The fans are direct-driven axial units suitable for use with frequency converters, and partitions between the fans allow them to be run individually to regulate cooling capacity. A combined FBLG model is available for simultaneous cooling of the LT and HT engine circuits.

- 1240 mm or 2000 mm fan diameters
- Corrugated fins with optional coating
- Stepwise fan control and special fan motors (EX-classed, NEMA, etc.) available
- Multiple installations with several radiators side-by-side
- Compatibility with all liquids that do not corrode copper
- Standard configuration: copper tubes and aluminium fins (2.5 - 4.0 mm spacing)
- Casework: galvanized steel, Aluzinc
- Capacity: customer specified



FBLG

## AlfaSolar

Due to its many sound-level alternatives, the AlfaSolar is an ideal radiator for installation in demanding, noise-sensitive environments. Two fan sizes and five fan speeds are available, along with complete fan control systems that offer stepwise or variable-speed control. The heat-transfer section of the AlfaSolar, which is built on a floating mounting that compensates for heat expansion, can be multi-circuited or equipped with a sub-cooling circuit. In addition, it can be fitted with an optional water-spraying system that increases heat transfer during short loading peaks.

- Many fan and control options for reaching desired noise limits
- Vertical or horizontal air flow
- Fin coating and vibration dampers available
- Motor heating available
- Compatibility with all liquids that do not corrode copper
- Standard configuration: copper tubes and aluminium fins (2.3 - 4.0 mm spacing)
- Casework: galvanized steel
- Capacity: 37-1651 kW (water, EN 1048)



AlfaSolar



## AlfaBlue (BDM, BDD)

Radiators in the AlfaBlue series are innovative heat exchangers with excellent heat transfer properties. The series offers a wide range of different sizes and materials, as well as different configurations. AlfaBlue radiators are available for both horizontal and vertical airflow, either in single (M) or dual (D) coil executions. All units can be run under frequency control for energy savings and noise reduction, and combined versions are available for cooling of the LT and HT circuits.

- Fan diameters from 630 mm to 1000 mm
- Horizontal or vertical air flow
- Several fin alternatives
- Compatibility with all liquids that do not corrode copper
- Standard configuration: copper tubes and aluminium fins (2.1-4.0 mm spacing)
- Casework: pre-galvanized steel, epoxy coating, white paint RAL 9002
- Capacity: 16-1028 kW (water, EN 1048)



AlfaBlue

## AlfaBlue Reverse (BRC, BRM, BRD and BRD6)

Radiators in the AlfaBlue Reverse series, which feature a reverse fan positioning and Alfa Laval's innovative fin corrugation, combine excellent heat transfer properties with a minimal fluid volume. BRC and BRM models use a new coil geometry and possess one row of fan motors, whereas BRD and BRD 6 models utilize two different tube sizes and are fitted with two rows of fan motors. All units can be run under frequency control for energy savings and noise reduction, and combined versions are available for cooling of the LT and HT engine circuits.

- 910 mm fan diameter
- Stepwise or variable-speed fan control
- Different motor types and number of poles for optimizing performance and noise level
- Fin coating and vibration dampers available
- Compatibility with all liquids that do not corrode copper
- Standard configuration: copper tubes and aluminium fins (2.1 - 4.0 mm spacing)
- Casework: galvanized steel
- Capacity: customer specified



AlfaBlue Reverse

# Engine cooling

## Gasketed plate heat exchangers

Gasketed plate heat exchangers (PHEs) from Alfa Laval are an ideal answer to engine cooling needs. The plates are created with an advanced one-step pressing technique, forming thin but strong plates that handle shocks, vibrations and high pressure. The plate design is well suited to engine cooling, which means that fewer plates are necessary and maximum use is made of the available pressure drop.

- Optimized cooling efficiency
- Optimum heat transfer properties
- Easy installation and low operating cost
- Long service intervals and low maintenance costs
- Long-lasting glued or clip-on gaskets that withstand tough applications



Gasketed plate heat exchanger

Applications for gasketed plate heat exchangers include:

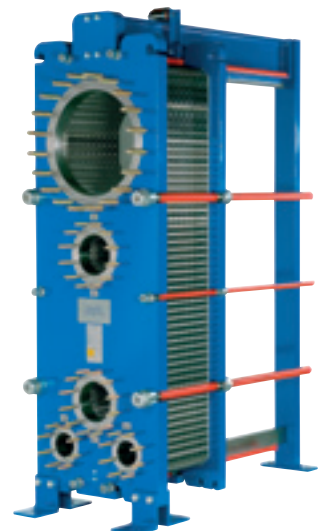
- Lubricating oil cooling
- Jacket water cooling
- General oil cooling/heating duties
- General water heating

# Steam condensing

## Gasketed plate heat exchangers, AlfaCond series

Gasketed plate heat exchangers (PHEs) from Alfa Laval's AlfaCond series are specially engineered for condensing applications at low pressures. With their unique plate geometry, strong plate design and heat-resistant gaskets, they easily withstand application demands. Moreover, their effective heat transfer allows for a reduction in cooling flow rate, which means a lower pump investment and reduced energy cost. They even create a major space savings, since their design is far more compact than the shell-and-tube models previously used in these applications.

- Reduced operating costs
- Ease of maintenance and shorter downtime
- High turbulence, little fouling
- Efficient sub-cooling
- Small footprint
- Extendable design for easy capacity increases
- Stainless steel and titanium models available



AlfaCond 600

### Green advantages

*AlfaCond can be used on site as a turbine condenser in waste-heat recovery systems. A waste-heat recovery system utilizes the heat of the exhaust fumes to generate additional electricity.*



# Mineral oil preheating

## HEATPAC CBM

The HEATPAC CBM is a cost-effective and virtually maintenance-free solution for mineral oil preheating. It consists of corrugated steel plates, mounted to form separate channels through which the oil and heating medium flow in opposite directions. A copper brazing material seals and holds the plates together, ensuring optimal heat transfer efficiency and pressure resistance. Thanks to its compact and lightweight design, the HEATPAC CBM is easy to install or retrofit, even in very confined spaces.

- Low-cost investment
- Optimum use of space
- Minimum maintenance – no replacement parts
- Two types, each with 20, 40, 60, 80 or 100 plates



HEATPAC CBM

- Thermal oil, steam or hot water as heating medium
- Capacity: up to 30 m<sup>3</sup>/h

Optional equipment:

- Temperature control equipment
- Regulating valve
- Relief valve

# Filtration

## Automatic self-cleaning filter, ALF

Simple and cost-effective to install, the automatic self-cleaning filter protects a plate heat exchanger when using seawater as a cooling medium. Installed between the seawater pumps and the PHE itself, it continuously removes debris from the cooling water at the seawater intake. Collected debris is automatically removed without disrupting the liquid flow. The filter is easy to service, since the filter basket can be removed without removing the pipes.

- Prevention of PHE clogging
- Continuous, automatic cleaning process
- Short flushing period with flexible regulation of flushing intervals
- Low pressure drop
- Easy service without removing pipes
- Electrical, pneumatic or hydraulic actuators

Available in two models:

- ALF-S (stainless steel)
- ALF-R (rubber-lined carbon steel)

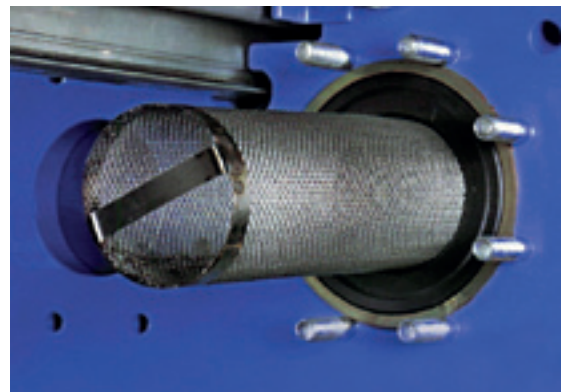


ALF

## Port filter

The port filter is a low-cost alternative to the ALF filter. Installed in the seawater inlet port of a plate heat exchanger, it prevents the PHE from clogging with debris that may have passed through the main seawater intake filters/strainers. Removal of the port filter for maintenance is performed from the pressure plate side of the PHE, which means that dismantling of the inlet pipework is avoided.

- Materials: AISI 316L, titanium, 254 SMO
- Standard mesh size:  $\text{Ø } 1.5 \Delta 2.33 \text{ mm}$



Port filter

# Cleaning-in-Place

## Cleaning-in-Place (CIP) systems for PHEs

Alfa Laval CIP chemicals for PHEs are designed to keep your equipment in peak condition without endangering the environment. All of the chemicals are non-hazardous, and many of them are also biodegradable. Most gentle is the general-use line of Alpacon chemicals, which contains a unique raw material based on fermented whey.

- Easy operation
- Prolonged gasket life – no damage
- Heating of cleaning chemicals with electricity or steam
- Compatibility with spiral, shell-and-tube, gasketed, welded and brazed heat exchangers
- A range of models and sizes available



## Cleaning-in-Place (CIP) chemicals for PHEs

Alfa Laval CIP chemicals for PHEs are designed to keep your equipment in peak condition without endangering fragile marine ecosystems. All of the chemicals are non-hazardous, and many of them are also biodegradable. Most gentle is the general-use line of Alpacon chemicals, which contains a unique raw material based on fermented whey.

Chemicals for general use:

- Alpacon Descalant
- Alpacon Degreaser

PHE-specific chemicals:

- AlfaPhos
- AlfaCaus
- AlfaNeutra
- AlfaAdd



### Green advantages

*Alfa Laval's high-performance chemicals for CIP systems are non-hazardous, which means that no health risks are posed and no protective equipment is necessary. They are also safe for the environment, as they are based to the greatest possible extent on gentle, natural materials.*







# Waste heat recovery

Today's modern engine systems are considerably more efficient than their predecessors. Yet much of the energy they produce still goes to heat rather than power. By recapturing this energy and putting it to use, Alfa Laval reduces both fuel consumption and emissions.



## From waste to win

The recovery of waste heat is a unique opportunity that benefits operating economy as much as it does the environment. With as much as 25% of an engine's fuel energy going into the exhaust flow as waste heat, there are substantial savings to be made when that energy is recovered.

For decades, Alfa Laval's Aalborg waste heat recovery systems have delivered fuel savings and reductions in harmful emissions. Optimized for each individual application, they allow the utilization of exhaust gas waste heat to create process steam and hot water, produce extra electricity, heat fuel oil and/or supply district heating and cooling.

## Comprehensive benefits

Our extensive know-how and decades of experience worldwide let us design and install systems that maximize economic and environmental gains. We deliver complete solutions that include not only high-efficiency exhaust gas heat recovery boilers, but also all main accessories and control systems.

With our solutions, you can better accommodate your operational needs while at the same time coping with rising fuel prices and tightening environmental regulations. As you cut fuel use and thereby costs, you also limit your production of emissions.



# Exhaust gas heat recovery

## Aalborg AV-6N

Intended for steam and/or hot water production, the Aalborg AV-6N is a robust and highly efficient boiler with gilled water tubes. Designed to improve a plant's overall efficiency, it can recover heat from diesel engines, gas engines or other sources. The boiler's compact and flexible design, which makes it easy to install, also allows cleaning during operation, which minimizes engine shutdowns and increases plant availability. Natural circulation is used in the standard steam configuration with resulting advantages for reliability, safety and energy efficiency, although traditional forced-circulation models are available if specifically requested.

- Vertical installation
- Suitability for the most demanding operating conditions
- Excellent match for applications with maximum heat demand
- Ability to operate in several pressure levels
- Unique supporting arrangement that resists vibration and thermal stress
- Maintenance-friendly tube arrangement
- No circulation pumps in standard steam configuration
- Bare-tube option available as Aalborg AV-8N
- Practically no pressure or capacity restrictions in diesel and gas power plant applications.
- Typical operating range: 5–40 bar(g)



Alfa Laval Aalborg AV-6N

## Aalborg AV-6H

Designed to produce hot water by means of recovered heat, the Aalborg AV-6H is a highly efficient boiler with gilled water tubes and a counterflow design. Typically used after a gas engine, it operates with forced circulation and has been proven to ensure fast and effective cleaning of condensed lube oil residuals in gas engine applications. The boiler comes as a compact and pre-assembled module that is fast and easy to install. Nonetheless, it is designed to provide maximum access for maintenance and service, with a flexible layout that incorporates an integrated walkable service area.

- Horizontal installation
- Low operational weight
- Ready-to-install delivery
- Minimized gas pockets
- Suitability for district heating via hot water
- Practically no pressure or capacity restrictions in diesel and gas power plant applications.
- Typical operating range: 5–40 bar(g)



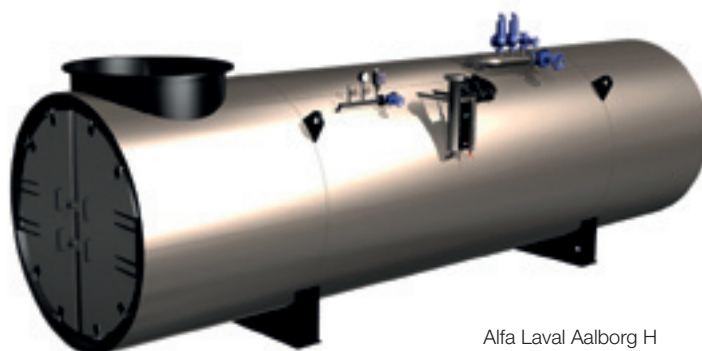
Alfa Laval Aalborg AV-6H



## Aalborg H/HW

Designed for waste heat recovery after gas or diesel engines, Aalborg H/HW (formerly UNEX H/HW) boilers are available with vertical or horizontal layouts. The Aalborg H, which is used for steam generation, has an integrated steam space and employs natural circulation. The Aalborg HW, which is used in hot water applications, has flow-optimizing baffle plates and employs forced circulation. Both models have a simple and reliable construction comprised of bare smoke tubes, which are welded to tube plates at both ends of the shell.

- Horizontal or vertical installation
- Excellent vibration resistance
- Stable output due to relatively large water volume
- Excellent match for HFO heating or applications with low to moderate steam demands
- Integrated exhaust gas bypass system for capacity modulation
- Valves and instrumentation with a selectable range of automation
- Suitability for district heating via hot water
- Typical operating range: <20 bar(g)



Alfa Laval Aalborg H



Alfa Laval Aalborg HW

### Green advantages

*Alfa Laval's Aalborg heat recovery boilers have a typical capacity of 500–20 000 kWth depending on the heat source. By reclaiming this thermal energy rather than letting it go to waste, substantial reductions can be made in the consumption of fossil fuels. This leads to economic savings, but also to environmental benefits in the form of reduced CO<sub>2</sub> output and cleaner emissions.*







# Desalination

Many power installations are located where seawater is in easy reach, which makes vacuum distillation an attractive alternative for producing fresh water. Alfa Laval's freshwater generators yield high-quality fresh water, which can be used both for technical purposes and for onward sale.



## Fresh new advances

Alfa Laval has been a pioneer in producing cost-efficient fresh water from seawater. Over 50 years ago, we introduced thermally driven freshwater generators with dual-plate-pack technology, which were not only smaller than shell-and-tube installations, but also far less sensitive to scaling.

Today we've taken our multi-effect concept even further, creating a freshwater generator where vacuum distillation occurs within a single plate pack. The revolutionary AQUA, which houses the vacuum in the plate pack itself, contains three-in-one titanium plates on which evaporation, separation and condensation all occur.

## Creating liquid assets

When seawater is available to your power facility, producing fresh water through vacuum distillation has economic advantages over reverse osmosis. Moreover, the

high-quality fresh water has a use beyond scrubbers and other technical equipment.

It can also be a source of revenue.

Alfa Laval can provide custom-built, high-capacity systems that use waste heat from the engines to produce large quantities of freshwater. This means your facility can earn money not only by generating power, but also by selling fresh water onward to nearby industries or municipalities.





# Seawater desalination

## AQUA

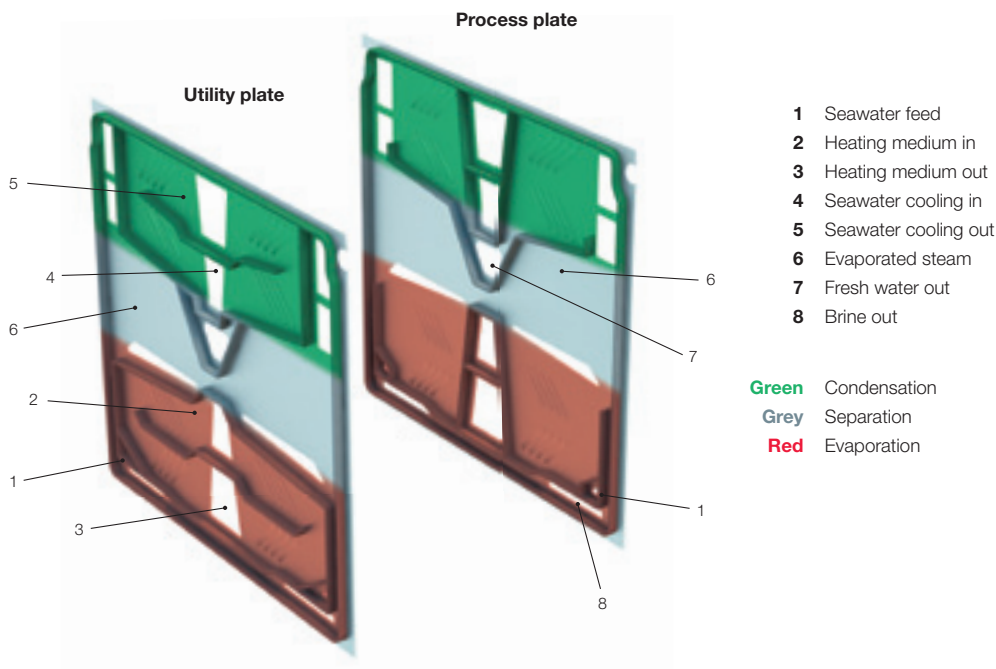
The AQUA freshwater generator from Alfa Laval is a major leap forward in freshwater generation technology. Because it utilizes only half as much seawater as other freshwater generators, it requires only half the pump capacity and half the pumping energy. This is achieved through pioneering plate technology, in which the whole distillation process is handled in a single plate pack and with one type of titanium plate. AQUA is easy to install and maintain, and its capacity can often be expanded with the help of additional plates.

- 3-in-1 plate technology (evaporation, separation, condensation)
- Half the pumping requirements of other freshwater generators
- Smaller pumps and pipework – reduced investment
- Minimum footprint and hold-up volume
- Minimum scaling and less need for cleaning chemicals
- Easy maintenance at long intervals
- Wetted parts in titanium
- Maximum salinity: 2 ppm
- Capacity range: 3.1–60 m<sup>3</sup>/24 h



### Green advantages

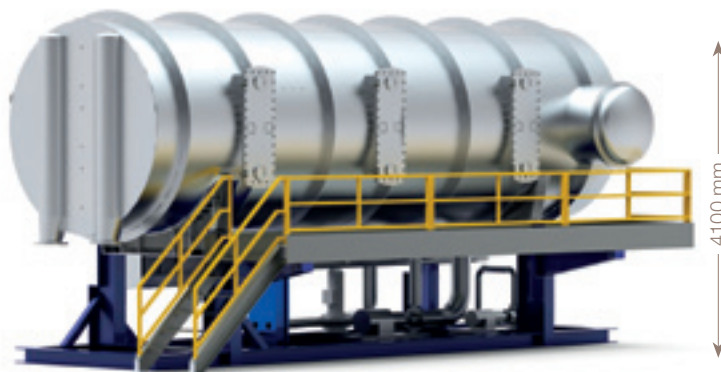
*Because the AQUA freshwater generator uses only half the seawater flow of other freshwater generators, pumping requirements are cut by 50%. This allows smaller seawater pumps to be used, and it means that the pumps consume less fuel. Since the burning of fossil fuel is directly tied to emissions, this in turn reduces the CO<sub>2</sub> output related to the freshwater generator.*



## Multi-effect desalination plant, MEP

Alfa Laval's multi-effect plate freshwater generator, MEP, is capable of generating large volumes of high-quality fresh water for domestic and technical use. Using waste heat from the engines or low-pressure steam as a heat source, the MEP distils seawater by means of titanium plate heat exchangers that are integrated into the evaporator/condenser chambers. Each MEP is custom-designed for a specific installation using the highest-grade materials, which together with the optimized process design ensure the highest reliability, the least downtime, and the longest and most economical service life.

- Low production cost
- State-of-the-art and user-friendly control technology
- Fast startup and quick response to load changes
- Titanium plates that resist seawater corrosion
- Patented plate design and falling film process for high thermal efficiency
- Unique construction that allows direct access to heating surfaces
- Evaporator vessel of AISI 316L steel
- High distillate purity and salinity of 5-10 ppm
- Capacity range: 200-3000 m<sup>3</sup>/24 h per unit



Multi-effect desalination plant, MEP

### Green advantages

*The MEP desalination plant offers the lowest possible consumption of both power and chemicals. The power consumption of the 4-effect MEP-4-750 desalination unit, for example, is less than 2.5 kWh/m<sup>3</sup>. Moreover, the MEP needs neither a seawater circulation pump nor any anti-foam injection, and its total anti-scalant consumption is less than that of traditional MSF units.*

## DPU and JWP freshwater generators

Designed for automatic operation, DPU and JWP freshwater generators use vacuum distillation to provide a constant supply of fresh water from seawater. With titanium plates in the heat exchangers and non-ferrous materials throughout, they have a low scaling rate and non-corroding vital parts. Moreover, they require little maintenance and no adjustment once tuned to operating conditions. All models have front cover accessibility, and the two-stage DPU saves energy by using vapour from the first stage as a heating medium for the second.

- Compact, lightweight design
- Utilization of jacket water and hot water or live steam in combination with a hot water loop system
- Utilization of vacuum steam and condensate cooling
- Maximum salinity: 2 ppm
- Capacity range:
  - DPU Series (single and two-stage): 20-75 m<sup>3</sup>/24 h
  - JWP Series (single stage): 0.5-100 m<sup>3</sup>/24 h

### Green advantages

*Alfa Laval's freshwater generators offer environmental benefits on several levels. In addition to utilizing waste heat already found on site, they use condensate for cooling, which improves heat recovery and thereby reduces fuel consumption. Only a small quantity of condensate is required for this process.*



DPU



JWP



# Water heating and circulation

## Hot Water Loop

A complement to freshwater generator systems, the Hot Water Loop provides the correct amount of heating water at the correct temperature – even when the engine is not running. This facilitates the distillation process and makes maximum use of the freshwater generator's capabilities. Reliable and automatic, the Hot Water Loop can even be used for other heating applications, such as the pre-heating of the main engine during periods of standstill. Its compact, modular design requires little space and ensures a simple, low-cost installation.

- Reliable operation due to self-adjusting steam regulation equipment
- Possibility to use in pre-heating the main engine or other equipment
- Capacity: 7–100 m<sup>3</sup>/24 h

### Equipment:

- Stainless steel plate heat exchanger with bed frame and internal piping
- Hot water circulating pump, electric motor and starter
- Thermostatically controlled steam/thermal oil regulating valve
- Instruments and steam trap



Hot Water loop 35-60

## AQUA Hot Water System, HWS

For use with the AQUA freshwater generator, the AQUA HWS allows the production of fresh water with steam from the steam boiler as an alternative heat source. This means there can be a backup supply of high-quality technical water when the main engine is not in service. The steam injector system consists of a steam injector and an arrangement of pipes, instruments and internal valves.

## Feed Water Treatment, FWT

- pH adjustment filter
- Chlorination
- Dechlorination
- Advanced ultraviolet sterilizer
- Silver-ion water sterilizer

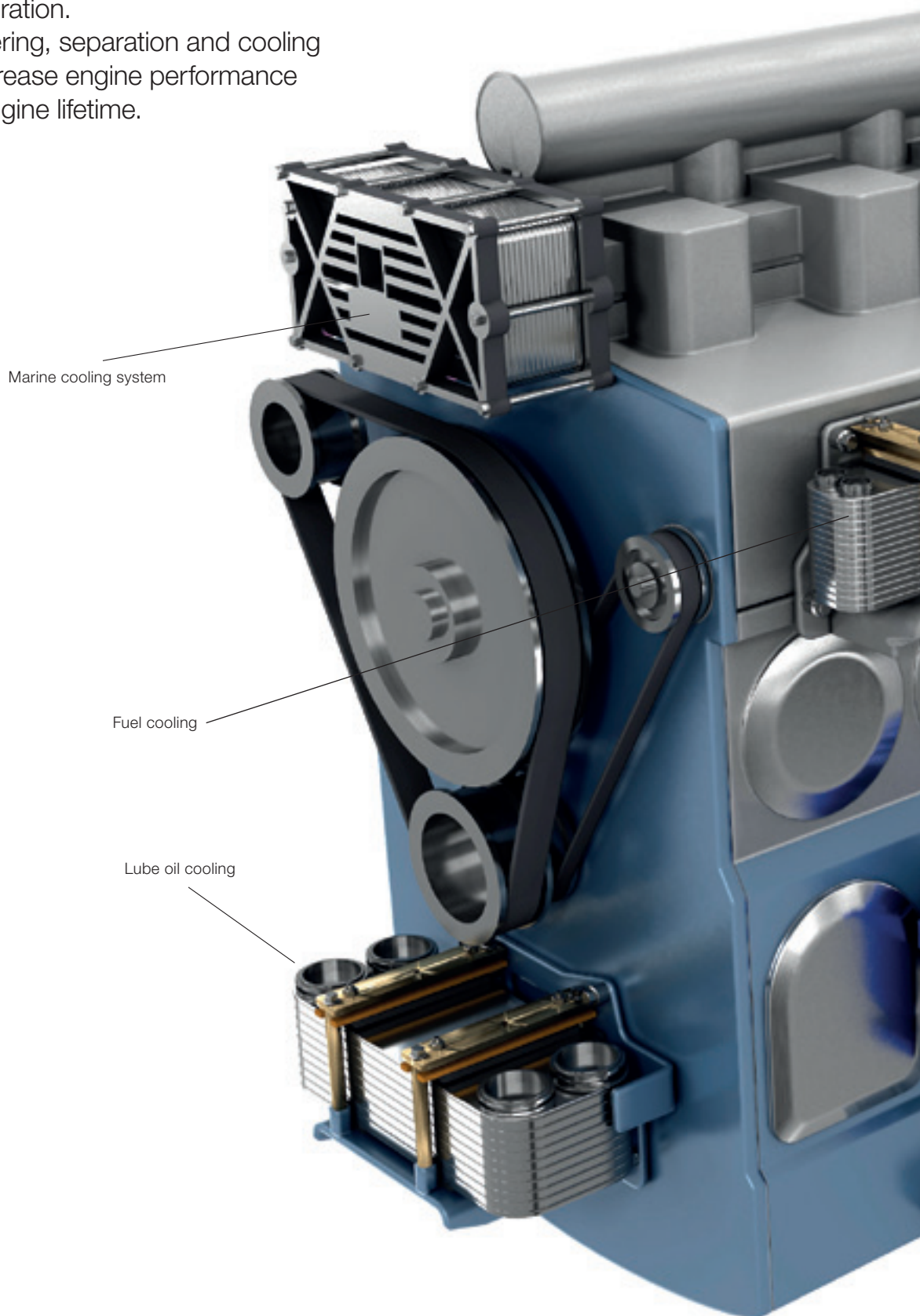


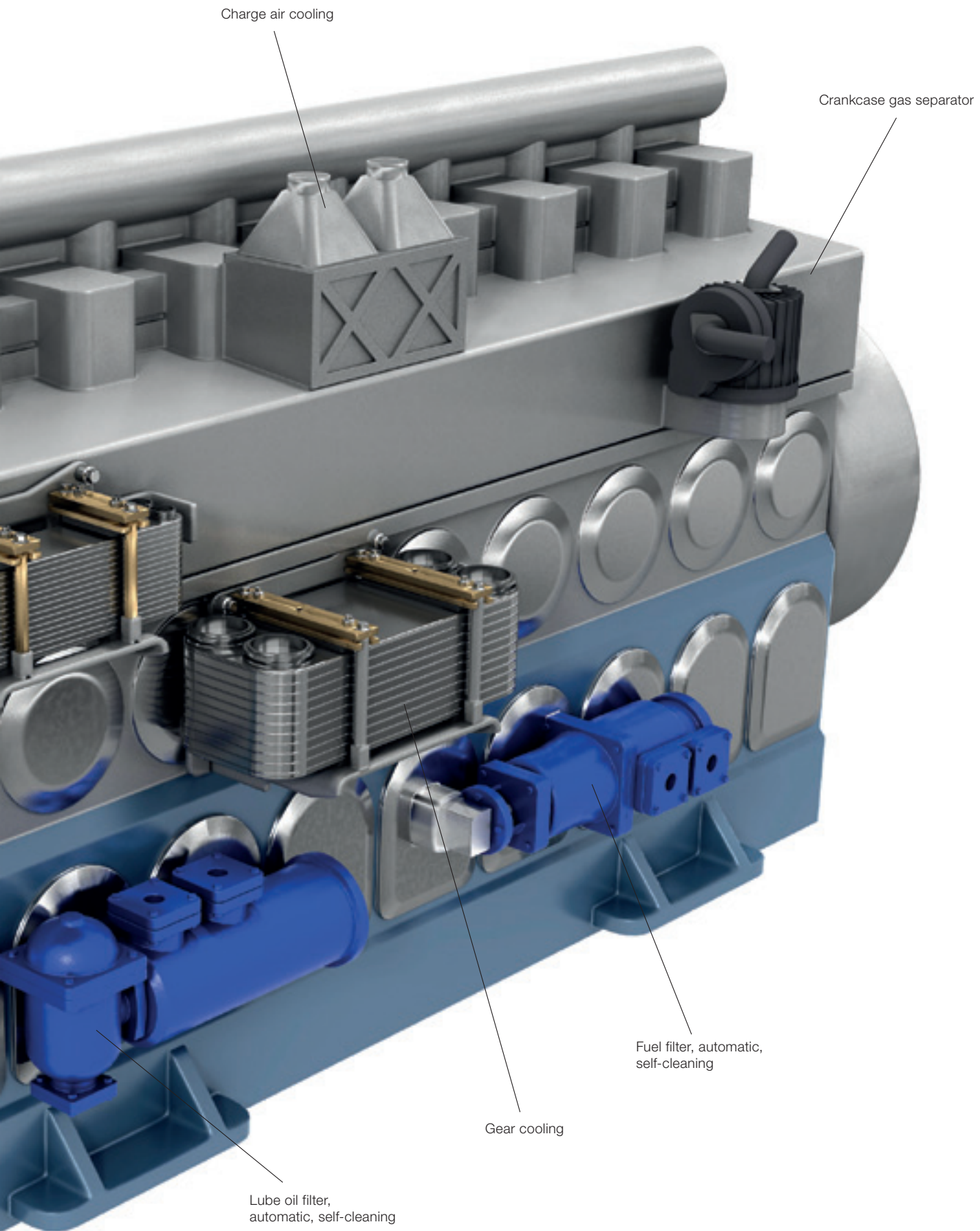
AQUA HWS

# Alfa Laval on engine

The high value that characterizes other Alfa Laval products can also be found in our OEM solutions for engine incorporation.

Our integrated filtering, separation and cooling products both increase engine performance and extend the engine lifetime.









# Peace of mind

Changing conditions mean changing requirements for capacity, energy efficiency and the use of consumable resources. By providing access to expertise and support, Alfa Laval Parts & Service delivers the benefits of maximum uptime, availability and optimization.



## Your link worldwide

All equipment needs proper attention to maximize its lifetime value, and Alfa Laval Parts & Service can support you in locations near and far. Even under the harshest conditions, we can help you increase your equipment's valuable uptime, maximize its service intervals and decrease its total cost of ownership.

Whether handling major overhauls and repairs, retro fitting, upgrading or simply fine-tuning, we see that you get the most out of your existing resources. This is best done through preventive maintenance, with regular plant inspections and subsequent maintenance recommendations.

Our focused innovative approach puts us at the forefront of solutions and development. Continuously meeting new challenges, we are dedicated to our search for improvement.

## On hand and on task

Always in easy reach, our experienced engineers are Alfa Laval's greatest asset. With their thorough understanding of power applications as a whole, they can assist you in planning maintenance tasks, or in looking for more efficient ways to work with alternative fuels.

In the field, our engineers are available personally for training, commissioning or in-depth troubleshooting. Their valuable input helps ensure long-term economy and the highest degree of optimization.

Whatever your needs and wherever you work, our skilled engineers assist you in achieving pure performance.



### 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.

EMD00222EN 1111

PureBlige, PureVent, Alpacon, CentriShoot, CentriLock, emmie UNEX and XLRator are trademarks owned by Alfa Laval Corporate AB. Alfa Laval is a trademark registered and owned by Alfa Laval Corporate AB.

