



A complete range for all needs

Cooling solutions for electrical power converters



Cooling solutions from the technology leader that save energy and money

Alfa Laval is a global brand with a long tradition. It dates back to 1883, when Gustaf de Laval began marketing his pioneering invention, the centrifugal separator.

Today, the company has nearly 12,000 employees in more than 50 countries, covering over 100 markets. Their mission is to assist industries to refine and improve their products and to optimize the performance of their processes.

Typical of our capability to help optimize process performance is our range of state-of-the-art cooling solutions for power conversion equipment.

The leader in three key technologies

Welcome to Alfa Laval, a truly dynamic company with the global resources to meet the needs of our customers in today's fiercely competitive business climate. Our reputation is based on our unique knowledge and experience of three key technologies – separation, heat transfer and fluid handling – which play major roles in most industrial sectors.

The Alfa Laval brand stands for technical know-how, highly engineered, reliable products, efficient service and

the finest process engineering skills. We are customer oriented, open, informal and flexible – and we dare to do things differently.

A wide range of air and liquid heat exchangers

Building power conversion equipment? When you consider cooling solutions, it is worth knowing that, as a market leading heat transfer specialist, Alfa Laval supplies a wide range of both air and liquid heat exchangers. Whether it is transformers, rectifiers or electrical drives, we have the state-of-the-art cooling solutions you need.

You and, in turn, your customers can achieve substantial savings with

Alfa Laval cooling solutions. With the smallest footprints and the highest performance, the products presented on the following pages offer the financial and operational benefits of several decades of intensive product development.

Our partners include global market leaders and other well-known companies in the power conversion business. Alfa Laval's cooling solutions help them to build smaller systems and save energy.

Alfa Laval's state-of-the-art cooling solutions are installed on transformers, rectifiers and drives throughout the world. Typical industries include: Power, chemicals, metal-working, offshore, pulp and paper and steel mills.





Transformer cooling

By maintaining the oil at a low temperature, a higher electro load is allowed in the transformer on a constant basis or during periods of peak demand.

Alfa Laval offers a complete range of high-quality solutions for cooling transformer oil by forced air (OFAF) or by forced water (OFWF).

For transformer cooling Alfa Laval offers:

- Air heat exchangers – AlfaBlue transformer oil coolers
- Gasketed plate heat exchangers – double wall.

Our new AlfaBlue transformer oil coolers are the absolute latest technology – light and compact, yet built to withstand tough conditions.

For OFWF applications, Alfa Laval double wall plate heat exchangers provide all the safety you need. We can also supply efficient, maintenance-free transformer oil pumps.

Rectifier cooling

Compact rectifiers are normally cooled directly by air while medium and high current rectifiers are more commonly cooled by pure water.

Rectifier systems are often manufactured to non-standard specifications and very specific end-customer demands. Alfa Laval has extensive experience in handling complex projects, so you can rely on us to find the right solution.

Since pure water is the cooling medium, material selection in the heat exchanger is vital. At Alfa Laval we know this, therefore high quality stainless steel components are standard.

For rectifier cooling Alfa Laval offers:

- AlfaBlue and AlfaBlue Power air heat exchangers
- Gasketed plate heat exchangers
- AlfaNova fusion bonded heat exchangers.

The compact fusion-bonded Alfa Nova in 100% stainless steel is particularly well suited for pure water when space is limited.

Drives cooling

Applying an electrical drive to an electrical motor offers major energy saving potential. Small drive systems are mostly air cooled while larger drives are increasingly liquid cooled. The cooling medium used is pure water or, on older drive systems, tap water.

When using direct air cooling on a drive system the heat dissipates into the surrounding air. Liquid cooling offers a major benefit – the heat will be dissipated in the water and the heat loss to the surroundings will be practically eliminated.

For drives cooling Alfa Laval offers:

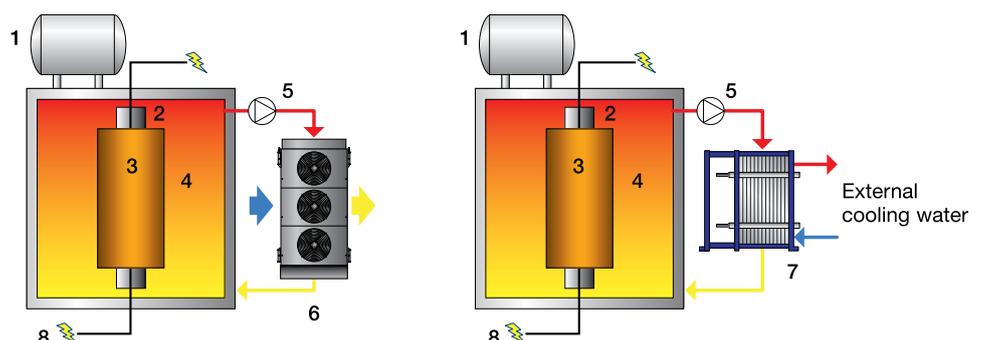
- Gasketed plate heat exchangers
- AlfaNova fusion bonded heat exchangers
- Copper brazed heat exchangers.

Here again, the compact fusion-bonded Alfa Nova in 100% stainless steel is particularly well suited for pure water when space is limited.

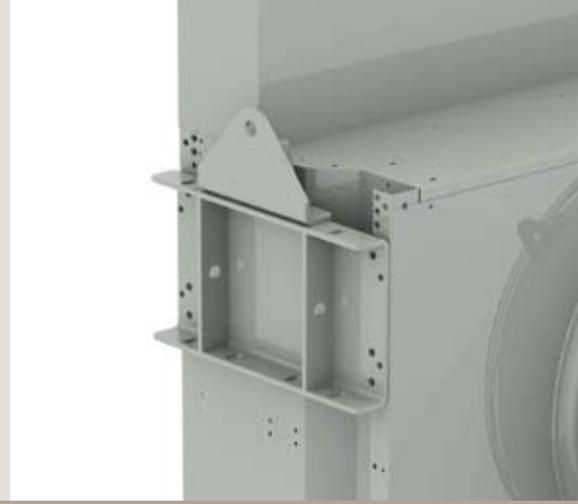
Transformer cooling

Schematic illustration of transformer oil cooling by air or water

1. Oil expansion tank
2. Transformer iron core
3. Transformer windings
4. Transformer oil
5. Oil pump
6. Dry cooler
7. Plate heat exchanger
8. Electricity in/out



Innovative coil construction, the latest fan motor technology and a rugged casing to withstand the toughest conditions. This is the new AlfaBlue transformer oil cooler.



AlfaBlue transformer oil cooler – advanced technology, rugged exterior

When we designed the AlfaBlue oil cooler, we asked transformer manufacturers to list their specific needs. At the top of the list was a rugged industrial design to withstand tough conditions. Based on their input, we designed the latest addition to our AlfaBlue air heat exchanger range, AlfaBlue oil coolers for transformer oil.

Rugged casing to withstand the toughest conditions

The frame design and construction of the AlfaBlue oil cooler provide high rigidity for protection against vibration and thermal shocks. The casing is made in hot dip galvanized steel and painted with primer and top coating. All parts are painted separately before assembly to avoid any form of corrosion. As a result, the casing is available in corrosion class C4 as standard, and C5 on demand.

latest fan motor technology with state-of-the-art, low-noise blade design. Several fan impeller profiles and



AlfaBlue transformer oil cooler



An AlfaBlue transformer oil cooler in the last stage of production at Alfa Laval's air heat exchanger factory in Italy.

Innovative coil construction

The AlfaBlue oil cooler offers high cooling efficiency thanks to optimized heat-transfer surfaces. The tube configuration comes in a variety of options. Give us the basic input data and we will calculate the optimal configuration according to your need.

We can supply the corrugated fins in various materials and treatments for longest lifetime in your application. Manufactured in aluminium as standard the fins can also be in Seaworthy aluminium (suitable for offshore installations), copper, epoxy coated aluminium, and with F-Coat or Blygold treatment.

Latest fan motor technology

The AlfaBlue oil cooler incorporates the



Whether it's a standard or non-standard rectifier system, there's an AlfaBlue dry cooler for efficient cooling. Choose from a range of capacities and noise levels.

Dry coolers for rectifier cooling

rotation speeds are available to meet the requested noise level. The fan and motor are a complete package that, if necessary, can be replaced simply and easily without dismantling.

The motor is equipped with an external rotor. Integrated thermo contacts provide reliable protection against thermal overload. Energy saving, variable-speed EC (Electrically Commutated) fans are available as an option.

AlfaBlue oil cooler – benefits

- Heavy duty design with high corrosion resistance
- Easily cleanable thanks to removable fan motors and industrial power fins
- Fully assembled: easy to connect to the transformer
- Reduced fan motor power consumption as a result of low static pressure
- Excellent sound characteristics
- Reliable performance
- Easy installation & maintenance
- Energy efficient – low total cost of ownership
- Two-year product guarantee.

AlfaBlue dry coolers

Suitable for standardized rectifier systems, AlfaBlue dry coolers are available in either single or dual coil execution. There is a range of capacities, four fan diameters and five noise levels.



AlfaBlue Power dry coolers

AlfaBlue Power is a range of heavy duty radiators with stainless steel tubes for rectifier cooling. They are normally chosen for rectifier systems with non-standard specifications and very specific end-customer demands.



Alfa Laval radiator platform

AlfaBlue air heat exchangers – benefits

- Optimized footprint with strong casing design
- Modular design – pay for what you need
- Corrosion resistant casing up to class C5
- Innovative fin corrugation design for increased heat transfer
- Over 300 standard models
- Noise levels to meet every demand
- EC fans option (Electrically Commutated)
 - Less power consumption during regulation
 - Best alternative for frequency converter control
- Optional coil treatment for aggressive environments
- Optional non-standard fin spacing for dusty environments.

Innovative offshore solution

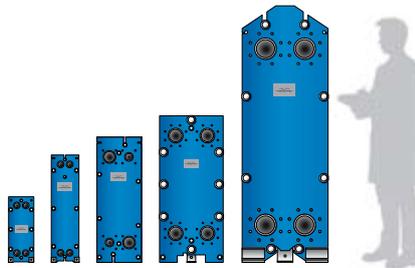
Electricity for the Goliat FPSO (Floating, Production, Storage and Offloading) platform is supplied by ABB transformers using tailor-made Alfa Laval double wall PHEs to cool the transformer liquid.



Double wall heat exchangers installed on a transformer.

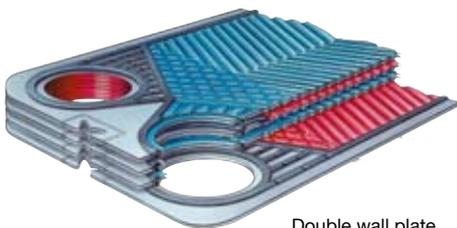
Plate heat exchangers – much more for your money

If you have used shell-and-tube coolers in the past, choose plate heat exchangers (PHEs) and you are in for a pleasant surprise. Why? Because PHEs are much more efficient, occupy only a fraction of the space, are much easier to maintain, and are usually less expensive.



With their compact designs, Alfa Laval plate heat exchangers occupy only a fraction of the space required by comparable shell-and-tube units.

- Highly corrosion resistant
- No interaction with other metals
- Most compact solution available for copper-free environments
- Superior mechanical and thermal fatigue resistance compared to conventional brazed units (nickel, copper)
- Long lifetime



Double wall plate pairs. Welded only in the port holes.

Double wall technology

In Alfa Laval double wall PHEs it is impossible for the fluids to intermix (essential for OFWF cooling of transformer oil). The design includes two identical plates that are laser-welded around the portholes. The channels are formed when the welded plate pairs are assembled together in a plate pack and sealed with gaskets in the conventional manner.

Eight good reasons to choose PHEs for transformer cooling instead of shell-and-tubes

- Maximum efficiency with high coefficients of heat transfer
- Continuous turbulent flow – no dead spots
- Reduced overall dimensions of the PHE and transformer
- Simple, easy maintenance
- Precise control of working conditions
- No vibrations
- PHE can be extended if needed
- Up to 30% lower cost and investment

Alfa Laval copper brazed heat exchangers

Alfa Laval copper brazed plate heat exchangers are suitable for transformer oil cooling and drives cooling (where the drive system has a built-in copper inhibitor). The brazed units offer efficient heat transfer with an extremely small footprint.



AlfaNova fusion-bonded heat exchangers

AlfaNova – a compact solution

When space is limited, the compact fusion-bonded Alfa Nova, in 100% stainless steel, is an excellent choice for rectifier and drives cooling.

Continuous product development ensures that we always have the state-of-the-art solutions you need. After installation, Alfa Laval's world-class service organization is there to support you.



Partners in performance

Alfa Laval invests heavily in product development. Hundreds of engineers and technicians develop a large number of products annually, with new capacities, materials and functions. There are currently hundreds of patents related to Alfa Laval products.

Today's advanced air and liquid heat exchangers, with their high performance and low space requirements, are excellent examples of these activities.

You talk, we listen

Alfa Laval became the technology leader by working closely with customers and partners and listening to their needs. You are our best source of information and inspiration.

Alfa Laval heat transfer solutions are designed using the latest techniques and testing methods, drawing on our huge reservoir of know-how and experience in the fields of thermal and mechanical engineering.

We have long experience, an impressive list of references, and a complete product portfolio. Our sales staff have advanced calculation tools, and we can recommend the best solution for your needs.



Alfa Laval's intensive product development activities generate a continuous flow of new heat transfer products.

After installation, we are there to support you

Install Alfa Laval cooling solutions and you and your customers gain access to a world-class customer service organization. We have a global team of highly experienced field service engineers to support you, and there are more than 50 service centres worldwide.

With Alfa Laval you can rely on genuine spare parts and knowledgeable service personnel dedicated to serving your heat transfer needs 24/7.

Installation and commissioning support

This ensures trouble-free start-up and helps you get the most from your Alfa Laval equipment in terms of performance and reliability.



Alfa Laval has more than 100 sales offices and more than 50 service centers worldwide. Shown here are national and regional headquarters.

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

