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 assisting customers in optimizing 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 website. Please visit www.alfalaval.com to access the information.
The Alfa Laval gasketed heat exchanger

The gasketed plate heat exchanger (PHE) range from Alfa Laval is the result of years of experience in heat transfer technology. At a quick glance the design may seem traditional, but when studying the plates, gaskets and frames in detail the superiority of the Alfa Laval PHE becomes obvious. As always, attention to detail is what gives Alfa Laval the winning edge.

- Flexible design
- Efficient heat transfer
- Compact design

High performance heat transfer
In Alfa Laval’s plate heat exchangers (PHEs), the two media are separated by a thin, corrugated plate. The rule is the thinner the plate, the more efficient and more uniform heat transfer, the better the process control. But it is equally important to achieve a turbulent flow and a uniform distribution across the entire surface of the plate. Alfa Laval has solved the distribution problem with a unique, efficient, distribution pattern. Turbulent flow is achieved by the plates’ herringbone pattern.

Alfa Laval plates are available in a wide range of designs and sizes. The pattern, pressing depth and material can be altered to accommodate different applications. The standard plate is pressed in stainless steel, but can be manufactured in other pressable materials as well, e.g. titanium. The modular design means that the PHE can easily be customized for different applications.

All Alfa Laval plates are produced in a single-step pressing process. This guarantees that all plates will be identical, featuring uniform corrugation forms and contact points. When Alfa Laval plates are assembled in a finished PHE, they utilize the plates’ contact points to create a flexible yet mechanically stable construction that can withstand great strain.

Quality sealing systems
For Alfa Laval’s PHE range there are gaskets available in many different materials and designs. The most common gasket materials used in HVAC applications are nitrile (NBR) and EPDM. Alfa Laval’s gaskets are always moulded in one piece. This guarantees exact gasket geometry and no weak links from vulcanisation. Also, the gasket groove on the plate and the gasket itself is designed together to ensure optimum sealing capabilities.

Alfa Laval offers three different gasket fastening solutions, all of which guarantee a perfect result: the revolutionary, quickly inserted Clip-on gasket; the Tape-on gasket for plates with small pressing depths, and glued gaskets with Alfa Laval’s specially developed gluing technique for unsurpassable adhesion.

Solid pressure vessel design
The frame is an important component in Alfa Laval’s plate heat exchanger (PHE) concept. Thanks to the precision-made and user-friendly frame, the gasketed PHEs can be quickly and easily opened for inspection and gasket replacement. And they are just as easily reassembled with a perfect fit. Time after time. Another advantage of the Alfa Laval frames is that they can easily be adapted for expansion or reconstruction of a PHE. Alfa Laval frames come in many different models, and they can also be customized for different applications.
Plate heat exchangers
in heating systems
Plate heat exchangers are commonly used in all types of heating applications with demands on comfort, reliability and safety. In addition to transferring heat from one circuit to another, the heat exchanger also efficiently handles the pressure differences that normally exist between the primary and secondary sides. The Alfa Laval range of gasketed plate heat exchanger models covers all comfort heating duties like tap water heating and swimming pool heating, from small to large capacities. Thanks to a flexible design, the PHE can be tailor-made to fit your specific needs exactly.

Tap water heating
The advantages of using a plate heat exchanger to produce hot tap water compared to traditional coil in tank systems are numerous. The PHE instantly heats the tap water to the required temperature when it passes through the heat exchanger. This means that hot water is available immediately and at any time. Another benefit with using plate heat exchangers for hot tap water production is that the system requires much less space than a traditional tank and coil system. If solar energy is used to produce hot tap water, a PHE makes it possible to separate the treated water in the solar panels from the tap water circuit. Also, scaling problems and corrosion risks in the solar panels are reduced when separating the circuits with a PHE.

Swimming pool heating
During the summer season when the building’s heating system is not used to full capacity, excess heat from the existing heat source can be used for heating outdoor pools. A heat exchanger installed between the swimming pool’s circulation system and the building’s ordinary heating system separates the circuits and provides pool heating. It’s important to remember that addition of chlorine should take place after the water has passed the heat exchanger in order to avoid a high concentration of chlorine flowing through the heat exchanger. It is recommended to use titanium plates when the chloride concentration is high.

Plate heat exchangers
in cooling systems
The requirement for thermal efficiency – close temperatures – is very high particularly in cooling applications like e.g. thermal storage and free cooling. Thanks to Alfa Laval’s superior competence in plate pressing, temperature approaches of down to 0.5°C (0.9°F) between the two circuits can be achieved. In addition, this can be accomplished in a single pass connection with all four connections on the front plate, making installation and maintenance very easy.

Central cooling
The main component of the central comfort cooling system is the cold source, commonly a chiller. While cold water or glycol solution is produced on the evaporator side, heat is generated and rejected on the condenser side of the chiller. There are several benefits using a plate heat exchanger in either the hot condenser circuit or the cold evaporator circuit.

Central cooling
The condenser can for example be cooled by an open cooling source like sea or river water. However, the often aggressive media in the open circuits can affect sensitive A/C equipment such as the chiller. A plate heat exchanger, installed as a divider between the two systems, eliminates these problems. On the cold evaporator side the plate heat exchanger is used to separate two clean cold circuits, and to protect other equipment from high pressures.

District cooling
District cooling is environment-friendly with better utilisation of cooling capacities and an environment-friendly cooling source. It gives the user convenience and comfort and a better level of equipment redundancy, less need for maintenance and space savings. It also gives the user economical benefits with lower investment costs and flexibility of operation. Using plate heat exchangers in indirect district cooling distribution creates a number of advantages, for example pressure interception between the different circuits. The wide range of Alfa Laval PHE models with different characteristics assures that optimum solutions can be found for virtually all comfort cooling duties.
Plate, gasket and connection materials

Plates can be obtained in all pressable materials. The most common materials are: stainless steel AISI 304, AISI 316, and titanium. Gaskets are available in a wide range of elastomers. The most common are: nitrile and EPDM. Threaded pipe connections are available in stainless steel and titanium, and for MS also in carbon steel. Flange connections are available unlined or with linings in rubber, stainless steel, titanium or other alloys depending on model.

Max pressure and temperature

All models are available with different frame designs and different plate thickness depending on the required design pressure. The maximum temperature depends on the gasket material used, and the working pressure.

Approvals

All models are approved according to all major pressure vessel codes, including marine classifications.
Insulation
Insulation, designed for HVAC applications, is available for most PHE models. There are two different types of insulation – heating and cooling insulation.

The reason for having two different types is that the mineral wool will be wet from condensing water if used when the heat exchanger temperature is lower than the surrounding temperature. Polyurethane is more expensive than mineral wool, but technically the cooling insulation can be used for heating duties as well.

Drip tray
The Alfa Laval drip tray insulates the heat exchanger from the floor, and it also collects any condensate formed on the outside of the heat exchanger. The drip tray also collects any remaining water (after drainage) in the PHE when the unit is opened for inspection or maintenance. The drip tray consists of 0.75 mm hot galvanized steel plates, 50 mm polyurethane foam, supports of waterproof wood, and a draining valve.

Protection sheet
A protection sheet is a device covering all sides of the plate pack except downwards. It is used to prevent persons from getting injured if a sudden leak of hot corrosive or toxic media should occur. The Alfa Laval protection sheet consists of one or more stainless steel (AISI 304) sheet(s) formed to fit the PHE. On most frames the sheet is fitted between the plate pack and the tightening bolts.

Heating insulation
Heating insulation consists of 65 mm of mineral wool, clad with a 1 mm aluminum sheet on the outside and aluminum foil on the inside. It covers all sides of the PHE including the frame and pressure plate, except downwards.

Cooling insulation
Cooling insulation consists of 60 mm of polyurethane, clad with a 1 mm aluminum sheet on the outside and aluminum foil on the inside. It covers all sides of the PHE including the frame and pressure plate, except downwards.

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Start up procedure
1. Before starting any pump, check whether instructions exist stating which pump should be started first.
2. Check that the valve between the pump and the heat exchanger is closed.
3. Check that the valve at the exit, if there is one, is fully open.
4. Open the ventilation.
5. Start the pump.
6. Open the valve slowly.
7. When all the air is out, close the ventilation.
8. Repeat the procedure for the other side.

Shut down procedure
1. First establish whether instructions exist as to which side should be stopped first.
2. Slowly close the valve controlling the flow rate of the pump you are about to stop.
3. When the valve is closed, stop the pump.
4. Repeat the procedure for the other side.
5. If the heat exchanger for any reason is shut down for a longer period, more than a few days, it should be drained.

Operation
Adjustments in flow rates to maintain correct temperatures or pressure drops should be made slowly in order to prevent pressure shocks to the system. Any problems in maintaining the performance of the heat exchanger may be caused by changing temperature conditions, changing flow rates or by fouling. As long as the PHE is operating satisfactorily, it should be left without any interference. After start-up, the PHE does not require continuous supervision.

Maintenance instructions
The heat transfer through the plates can be seriously reduced by the formation of deposits of various kinds on the plate surfaces. Even if the highly turbulent flow gives a strong resistance to the formation of deposits the turbulence can not completely eliminate fouling. Normal maintenance does not usually require the PHE to be opened (apart from occasional check of plates and gaskets). Thanks to CIP (Cleaning In Place) it is possible to remove calcium deposits and other forms of scaling from the plate surfaces in an easy and effective way without opening the heat exchanger. Different cleaning solutions can be used depending on the type of deposits. Alfa Laval has a worldwide service organisation. Service is available in 130 countries at 15 major service centres and a network of service stations around the globe.

Installation instructions
In HVAC applications, it is recommended, from a performance point of view, to install the heat exchanger so that a counter current flow is obtained. Alfa Laval recommends installing the PHE on a flat foundation giving the necessary support to the frame. It is important to leave free space around the PHE, to be able to carry out maintenance work if needed. Make sure that all foreign objects have been rinsed out of the system before connecting any piping to the heat exchanger. Also, no stress or strain is to be placed on the PHE by the piping system.
Using webcALc™

webcALc™ is an easy to use selection tool available on-line that can be used for sizing heat exchangers for applications like tap water heating, district heating, cooling, and district cooling.

• Available on www.alfalaval.com
• Easy to use
• Detailed results

How to calculate and select a heat exchanger with webcALc™

For duties that are not covered in the selection tables, and if you want to get a more tailor-made design, you can design your heat exchanger on-line on the internet site www.alfalaval.com, using a selection tool called webcALc™. It should be noted that webcALc™ is a simplified version of the software used by Alfa Laval, and therefore the result may differ slightly when comparing with the selection tables and/or quotations made by Alfa Laval representatives.

webcALc™ is quite easy to use, but if you need instructions just follow the step by step instructions below. You enter the data for your fluids into the different input fields in webcALc™. Move between the different input fields by using either the mouse or the tabulator.

How to use webcALc™’s control panel

Design pressure: select the required pressure resistance for the heat exchanger. (Default 10 bar)

Display: webcALc™ selects from the complete range of gasketed and brazed heat exchangers included in the software (default). You can specify if you want webcALc™ to suggest only solutions with a certain number of identical units, then select from one to nine units.

Each solution is presented with a standardised drawing and the specific technical parameters. Each solution also has a corresponding AutoCAD drawing, which can be downloaded to your computer. To print the technical parameters, use the printer-friendly page offered at the bottom of the result page. It is also possible to download specification texts for different types of heat exchangers.

Step by step guide

1. Start by selecting the hotter fluid, fluid 1, by clicking on the arrow in the pull down menu. Available fluids are: water (default value), seawater (containing approximately 3% NaCl), ethylene glycol and propylene glycol. When selecting glycol fill in the concentration, %, in the input field.

2. Enter the maximum allowed pressure drop over the heat exchanger in the next input field. (Default 100 kPa)

3. Enter the available flow rate of fluid 1. Omit this value if the heat load is specified either at the bottom of the page or if the heat load is specified through the full input on the cold side. There must always be heat balance in the heat exchanger, which means that the heat load on the hot side is always equal to the heat load on the cold side.

4. Enter the inlet temperature of fluid 1 in the input field temperature in, and if applicable the required outlet temperature in the input field temperature out.

5. Enter the data for the colder fluid, fluid 2, in the same way as for fluid 1 (point 1 to 4).

6. At the bottom of the page you select which material that should be used for the heat transfer plates. You can choose between stainless steel AISI 316 (default), stainless steel AISI 304 and titanium.

7. Heat load is an optional field to be used if the inlet and outlet temperatures as well as flow rate have not been specified on either the cold or the hot side.

8. The field units makes it possible to change between SI, American or metric units.
For a more tailor-made design, you can also use the on-line selection tool called some European countries where district heating is used. It is of course impossible.

The selection tables in this catalogue enable you to find a suitable heat exchanger without prior notice. Alfa Laval assumes no responsibility for

Heat exchanger selection tables

The selection tables in this catalogue enable you to find a suitable heat exchanger model and size in a quick and easy way for a number of pre-defined duties. The duties are based on radiator and tap water heating duties which are common in some European countries where district heating is used. It is of course impossible to cover all temperatures and capacities in tables like these, but hopefully they can provide you with some guidance when selecting a heat exchanger for your duty.

For a more tailored design, you can also use the on-line selection tool called weboCLC, which is presented in detail in this catalogue. Of course, you are also most welcome to contact any Alfa Laval representative who will be happy to assist you with a heat exchanger selection.

Disclaimers

While every precaution has been taken, Alfa Laval assumes no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein. We reserve the right to change our products and the specifications detailed in this brochure without prior notice.