Take the complication out of cooling

Data center cooling equipment and service from Alfa Laval

How to make cooling less complicated
As data grows, so does the demand for new data centers with increased capacity and better environmental performance. The pressure is on data center managers to deliver mission-critical solutions in the most cost effective way.

Alfa Laval, as a leading pioneer in cooling solutions for specialized applications, has many ways to help lighten that load. Our goal is to make your choice of cooling solution as simple as possible. Alfa Laval sales representatives are nearby you to support you in taking the complication out of cooling.

Please go to **www.alfalaval.com** to find an Alfa Laval office and contact in your region.

Make your choice an easy one

Choosing cooling for your data center doesn't have to be complicated. Alfa Laval has been a leader in industrial climate control for more than 100 years. We work with some of the most heat-sensitive applications imaginable, experience that lends itself well to the specialized needs of data centers. Alfa Laval's high-quality products meet the demands of all data center tier levels.

We understand the importance of zero-disruption availability. We know how to balance cost and environmental considerations. And we tailor our complete offer accordingly, employing top quality materials and engineering to deliver advanced solutions that save time, money and make life easier for you.

Alfa Laval offers a comprehensive portfolio of services to keep your equipment in top working condition, extending their performance and contributing to optimal operation of your data center.

Trust your data center cooling to the original experts in cooling—it doesn't have to be any more complicated than that.

Environmentally sustainable cooling—green IT made simpler

District heating and cooling (campus energy) is one of the original "green" concepts, and Alfa Laval pioneered it as far back as 1940. That is why energy saving is always a core feature of Alfa Laval's equipment, and it underpins our data center cooling offer as well.

We specialize in ways to take advantage of free cooling. Supply efficiency-optimized components for all types of cooling systems. And offer an innovative technology for server cooling that can lower energy use by up to 80% compared to the current technology standard.

Data center cooling equipment from Alfa Laval gives you

Lowest energy use possible—engineered into every solution

Wide range of solutions to take advantage of free cooling

Worry-free performance and service 24/7/365

Cooling adapted to you

Alfa Laval's offer to the data center cooling business is both broad, innovative and available for the following applications:

- Unique server cooling technology with the lowest possible PUE on the market
- Free cooling solutions utilizing either air or water as cooling media for greater savings compared to chiller cooling
- Mission – critical service and maintenance

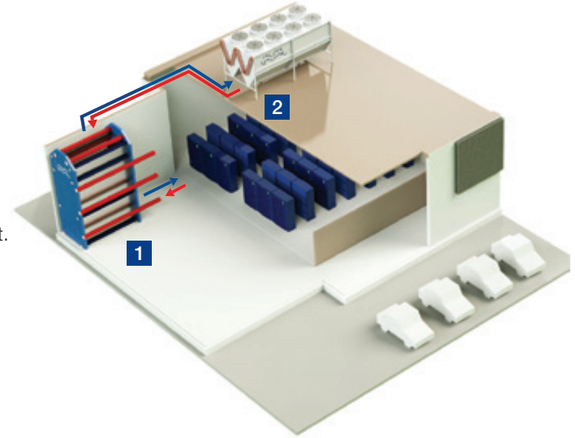
	Air heat exchanger	Liquid heat exchanger	Water filter
Server cooling	✔		
Free cooling with air	✔	✔	
Free cooling with water		✔	✔
Service	✔	✔	✔

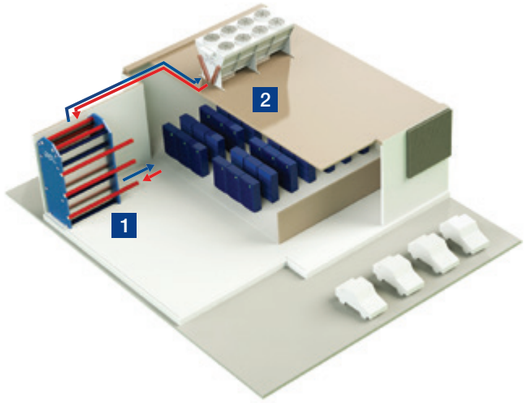
Free cooling applications

Free cooling with air (adiabatic)

Alfa Laval's adiabatic cooler, Abatigo, in combination with gasketed plate heat exchangers takes free cooling to a new level. It offers significant savings on water and energy bills, eliminates the need for water towers and has a small footprint.

1 Gasketed plate heat exchanger
2 Adiabatic cooler





Free cooling with air (dry cooler)

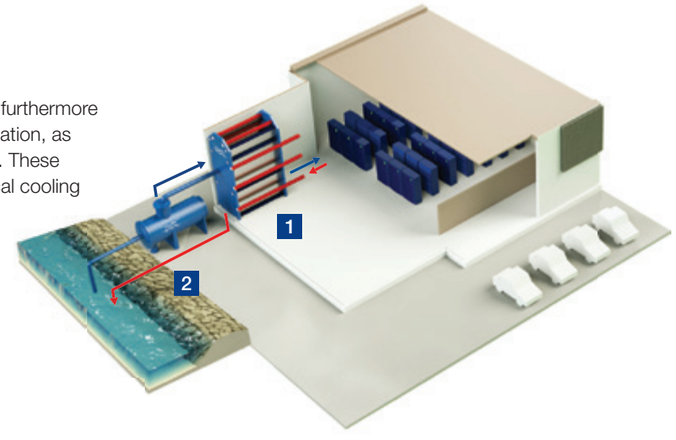
For colder periods of the year, a combination of Alfa Laval dry coolers and gasketed plate heat exchangers offers an effective and clean closed loop system with a minimum of disturbance.

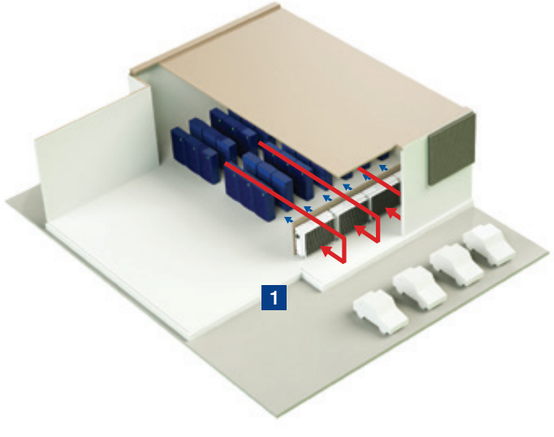
1 Gasketed plate heat exchanger
2 Dry cooler

Free cooling with water

Using water from rivers, lakes or sea/ocean can furthermore decrease operational costs for the cooling installation, as water as cooling media is more effective than air. These installations can often operate without mechanical cooling year round.

1 Gasketed plate heat exchanger
2 Water filter





Server cooling application

Server cooling with Low Speed Ventilation

A unique patented concept allows data centers to be designed and operated in a non pressurized server environment. Alfa Laval low speed ventilation coolers achieve more effective server cooling compared to conventional technologies.

1 Low Speed Ventilation heat exchanger

Note: Applications are not made to scale.

Product overview – free cooling

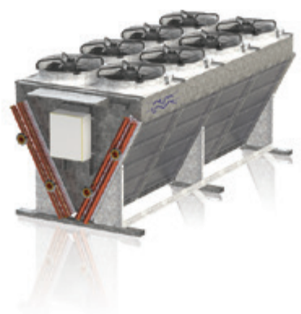
Free cooling plays a vital role in the running costs of data centers. When it comes to energy savings, the ratio between mechanical cooling and free cooling is approximately 5 to 1. Our free cooling equipment utilizes the inexpensive cold medias from either air or water. Central in our free cooling systems are AHRI certified gasketed plate heat exchangers.

Alfa Laval is the only supplier offering both filters and heat exchangers (air and gasketed plate heat exchangers) for data center cooling.

Dry coolers

Alfa Laval dry coolers are a smart way to take advantage of free cooling when the surrounding temperature allows for it. They are made with cross-fin copper tubes and advanced corrugated aluminum fins resulting in a combination of compact dimensions and high capacity. All Alfa Laval dry coolers are easily integrated with our liquid cooled gasketed plate heat exchangers.

- Broadest range of industrial dry coolers available
- Cooling range 16–1800 kW (55–6100 kBtu/h)
- Robust and corrosion resistant design
- Easy to install and service
- Compact dimensions giving high capacity per sqm. foot print
- EC fan technology reducing noise levels and energy consumption
- Euro vent certified



Adiabatic coolers

Alfa Laval's adiabatic cooler, Abatigo, is a highly engineered product featuring three different types of operational mode: In cold conditions it works as a pure closed loop dry cooler. When the ambient temperature goes up the unique adiabatic chamber is activated spraying a fine mist of water to pre-cool the air before it enters the heat exchanger coil. In even tougher temperatures a third mode is activated – the booster function – where water is sprayed directly to the cooling coil. The smart design and patent gives no stagnant water and drops the risk of dangerous legionella to a minimum.

- Up to 95% reduction in water consumption vs. cooling tower
- No water treatment system needed
- Perfect water temperature through precise controls that continuously adjust fans and adiabatic chamber activation as needed
- Maximized uptime thanks to scale-free operation, durable construction, and acrylic-coated heat exchanger
- Up to 95% lower energy consumption vs. air-cooled central chiller
- Higher capacity and more compact compared to dry coolers

Gasketed plate heat exchangers

In each free cooling installation, independent of the technology chosen, the gasketed plate heat exchanger (GPHE) is crucial for the total performance of the system. Alfa Laval heat exchangers are industry standard for general cooling duties. Each is engineered for optimal and complete counter-current flow principle that creates the highest possible transfer efficiency. Alfa Laval heat exchangers are designed to stretch the limits of what is possible in heat transfer. The effectiveness of our plates eliminate stagnant zones and reduce fouling to ensure maximum performance with minimum operating costs.

- AHRI certified range
- Broadest range of GPHE
- Water flow 14–3800 m³/h (62–16700 gpm)
- Best quality and performance securing maximum uptime
- compared to other manufacturers
- Simple expansion for increasing cooling duty
- Minimum footprint compared to tubular heat exchangers

Water filters

Alfa Laval filters (ALF) are automatic self-cleaning filters sized on the basis of the type of fouling and the type of gasketed plate heat exchanger installed downstream to the free cooling user. ALF filters make it easy and safe to take advantage of available secondary cooling water from sea, lakes or rivers. They effectively remove mussels, seaweed and other form of marine life that can foul and clog the gasketed plate heat exchanger, preventing it from less heat transfer performance. As a result, you can benefit from low cost free cooling regardless of the season or the purity of your water source.

- Automatic self-cleaning filters
- Trouble-free operations
- Water flow 45–8800 m³/h (197–38700 gpm)
- Particle filtration 0.1–2.5 mm
- Available in plastic, carbon or stainless steel housing

Product overview – server cooling

Take the pressure off with Low Speed Ventilation from Alfa Laval

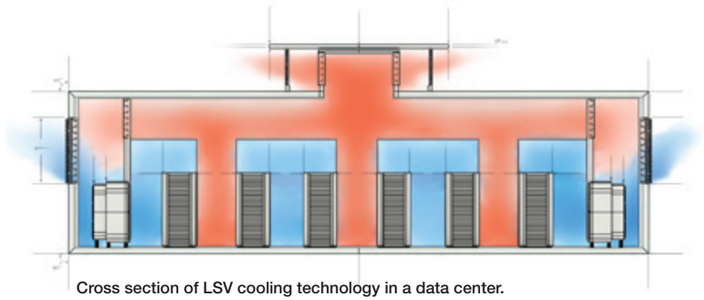
LSV (Low Speed Ventilation) is a unique and patented server cooling technology that uses lower air speed resulting in a non-pressurized server room and lower energy consumption. The servers are fully saturated with temperature controlled air at all times.

Working with nature

Significant amounts of air are necessary to cool the servers. Compared to these amounts traditional server coolers are relatively small, resulting in high air speeds with negative issues related to it (Venturi effect/hot spots).

Keeping air speed low

The LSV cooling technology uses air coolers with a large cross-sectional area in order to keep the air speed low and avoid the related issues (Venturi, hot spots, pressure, energy consumption). The LSV principle uses coolers installed outside of the sensitive server room that draw return air from the upper plenum and quietly distribute enough cool air across the server room, see illustration. The system makes sure sufficient air is being supplied. And it works with hot and cold containments, with or without raised floors, in closed loop systems or with the use of outside air. As LSV is a normal pressure technology data center operators only need to control the air availability and not the air pressure — and that's a big difference.



Cross section of LSV cooling technology in a data center.

Scan this code to find out more about LSV

Alfa Laval Arctigo LSV

Arctigo LSV air coolers are specially designed for data centers built on the low speed ventilation concept. They work with the design of the building itself to deliver low fan speed, low air velocity and minimal pressure differences on the air flow route—ensuring a constant cool throughout the white space at much lower power consumption.

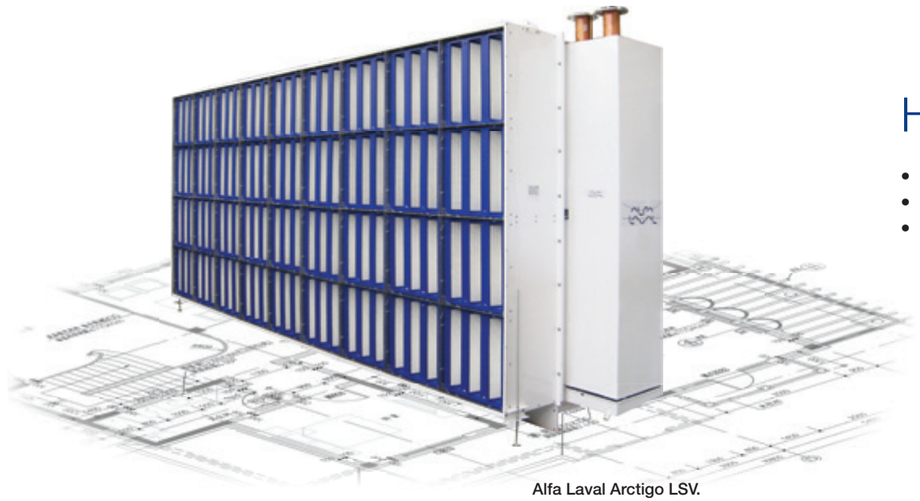
- Effective server cooling with Low Speed Ventilation
- Superior operational cost and performance
- Industrial design
- Trouble free operations
- Eurovent certified

Maintenance and service

- Simple and easy components to service
- Customized service programs ensure trouble free operations
- LSV coolers are situated outside of the white space providing easier access

High quality

- World class material and supplier choice
- Combined technology and experience from thousands of installations



Alfa Laval Arctigo LSV.

Heavy duty

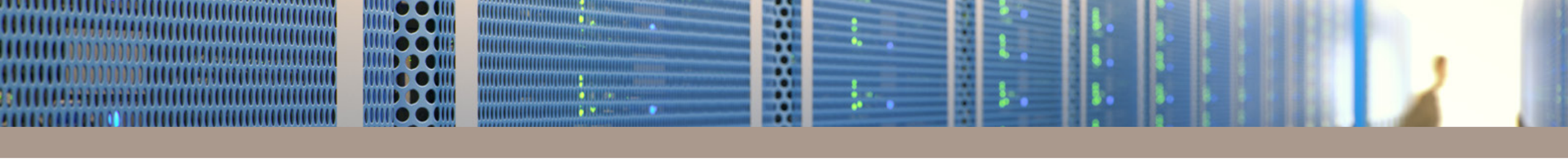
- Corrosion resistant materials
- Robust design
- Industrial components

Energy efficient

- More 'lean' cooling as air speed is lower compared to conventional server cooling technology
- Low energy consumption thanks to EC fans distributing air to the servers with low speed
- No need to compensate for pressure drops
- High delta T on water side ensures possible use of heat pumps

Lowest PUE value on the market

- 1.07 with use of outside air cooling
- 1.12 with use of mechanical cooling

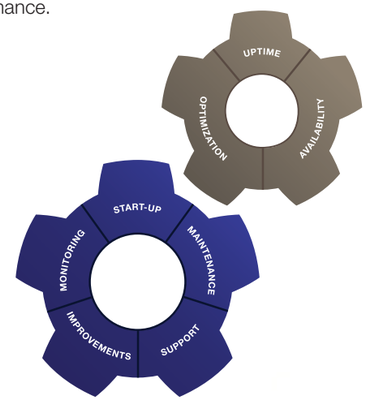


Back your data center cooling with confidence

Extending performance to a higher level

Quality cooling equipment is only as good as its maintenance program. Proactive cleaning and maintenance safeguard uptime and efficiency, and contribute to lower environmental impact.

With Alfa Laval reconditioning and repair services, you can ensure your heat exchangers and other equipment delivered by Alfa Laval continue to deliver high efficiency and optimal performance.

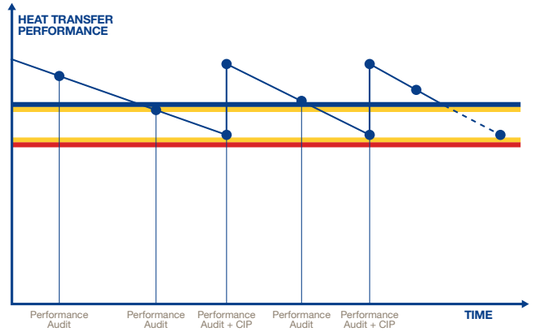


Alfa Laval near your data center– worldwide support for total peace of mind

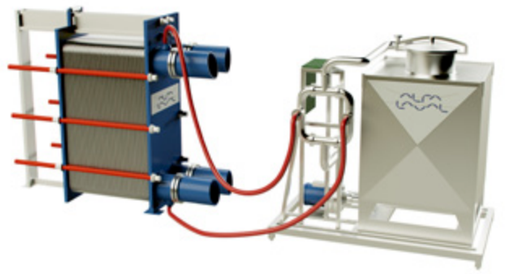
- 103 sales offices in 53 countries
- Service centers and partners ready to assist you in more than 100 countries
- Local expertise and global support from cooling specialists

Performance audit

With performance audits, you will always be able to utilize the full potential of your data center cooling installation. Alfa Laval experts review and analyze the performance of your equipment and secure the right service intervals, performance and uptime.



Performance audit compares optimal heat load vs actual heat load to determine the heat exchanger's performance level.



Cleaning in place

When fouling occurs, an Alfa Laval CIP (cleaning-in-place) system enables quick and easy in-line cleaning of heat exchangers without dismantling the equipment. To ensure safe removal of unwanted contaminants from the equipment surfaces, Alfa Laval recommends environmentally friendly and easily biodegradable cleaning agents. By eliminating the repeated and unnecessary opening of your equipment, you drastically reduce both spare parts consumption and the number of man-hours required for cleaning.

Back flush equipment

Alfa Laval recommends a back flushing sequence on the incoming flow of cooling water at frequent short periods of time. In this sequence the reversed water direction scrapes off and flushes out accumulated debris from the plate heat exchanger surface. Using back flush equipment saves time and money and minimizes downtime.

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, 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.com/datacenter

Want more? Please scan this code to learn more about Alfa Laval data center cooling.

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