

# In good hands

Safeguarding hygienic applications





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# A matter of trust

In more ways than one, working with hygienic demands is a question of care. Safeguarding the well-being of those who consume food or drink, rely on medicine or use cosmetics and personal care products requires deep understanding – and the greatest attention to cleanliness and detail.

As the leading producer of components and solutions for hygienic applications, Alfa Laval has a proven record of meeting this need. Customers worldwide, served by our comprehensive network of sales channels, have come to rely on us for the widest range of hygienic components and accessories.

Above all, these customers turn to us for innovation in meeting the challenges of hygienic production. With their superior safety, gentle efficiency and uncompromising cleanliness, our components protect not only the businesses that work with hygienic applications, but also the people who benefit from them.







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# A question of balance

Just as there is no single definition of hygiene, there is no one aspect that defines value. Rather, value is a balance of performance, reliability, service and more. Alfa Laval combines the many aspects of value into a total concept, delivered through the capable hands of our sales channel partners.

## **A company of breadth**

Drawing on decades of separation, heat transfer and fluid handling experience, Alfa Laval provides a complete range of components for essential hygienic processes. Our well-documented offering is supplied and supported through a comprehensive network of distributors, system builders and contractors.

In many ways, our breadth reflects our worldwide cooperation with these diverse partners. By coupling their insights with our own process experience, we engineer groundbreaking equipment that addresses a wide range of specific market and customer needs.

## **... and detail**

A broad offering, of course, is not a strength in itself. While diversity has its advantages, it takes specific expertise to meet hygienic demands.

This is why Alfa Laval's global organization has a dedicated research and development staff with hygienic requirements in focus. Among our specialists are the experts in metals and elastomers at our Material and Chemistry Center, the fluid handling experts at our rheology laboratory, and our experts in the design of plate heat exchangers and tank cleaning systems.

Together, these specialists stand for wide-reaching innovations – optimized in every detail.

## **Simply innovative**

Innovating for hygienic applications is complex, as it involves not only hygienic factors, but also factors like energy efficiency, ease of maintenance and the relationship between cost and quality.

Yet Alfa Laval strives to keep things simple.

Our emphasis is on modular, traceable components that can easily be adapted to individual needs. These are backed by exceptional tools and resources, which allow our partners to size, configure and support them.

Moreover, we do our best to simplify cleaning and service. With few parts, rugged construction and flow-optimized design that ensures effective Cleaning In Place (CIP), Alfa Laval components spend more time in operation and less time being maintained.

## **... and careful**

Ironically, much of our innovation stems from a conservative approach. In all that we do, our goal is to minimize risk.

By designing effectively, with good margins of capacity and protection against wear and contamination, we make certain that unexpected stops are avoided.

After all, it takes not only effective components – but also the uninterrupted operation of the production line – to reduce lifecycle cost.





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# Channeling strengths

Alfa Laval's approach combines the offering and advantages of a global brand with the individual attention of local sales channels. It places over 100 years of experience in the hands of representatives in more than 100 countries – creating a one-stop shop with the world's largest accumulation of process expertise.

## **A circle of knowledge**

Alfa Laval components reach the market through an expansive network of distributors, system builders and contractors. Carefully selected and highly skilled, these partners receive dedicated Alfa Laval training and close support from our central and local experts.

In addition, our partners possess their own specialist competence. As experts on the industries and applications in the regions they serve, they work closely with customers and have firsthand insights into real-life hygienic challenges.

By working with us, they contribute those insights to an already vast pool of knowledge. In this way, local businesses serving local needs are supported by global experience – from Alfa Laval and from similar businesses around the world.

## **All the right tools**

At our partners' fingertips are advanced resources and documentation, built on Alfa Laval's unique understanding of hygienic components and processes. These reflect not only a century of component development, but also countless hours of research into media behavior under specific conditions.

Using our sizing, design and optimization tools, our partners can select optimal components for customer-specific needs, taking into account such factors as product composition, viscosity and thermal conductivity. Working locally, they can provide direct solutions from a trusted global supplier – regardless whether the components are off-the-shelf or specially configured.

## **Strength and security**

Our partners' ability to act independently, combined with Alfa Laval's broad portfolio and organizational resources, creates a one-stop shop with world-class distribution strengths. Alfa Laval logistics ensure reliable and accurate deliveries, not only of finished components, but also of spare parts.

Moreover, the combination allows for true peace of mind. With the troubleshooting guidance of Alfa Laval's competence centers as a complement to our partners' own skills, even the most stubborn issues can easily be resolved.





# Biopharm



Applied, ingested or injected directly into the bloodstream, medicines and other therapeutic products are often used when our bodies are at their weakest. Understandably, the companies that produce them are under exceptional scrutiny.

Alfa Laval works tirelessly to ensure consistent biopharm manufacturing and to prevent the contamination of sensitive products – whether by equipment, by associated media, or by residue from a previous batch. Our components are engineered for optimized flow and maximum cleanability, with a small number of product contact parts and smooth, well-constructed internal surfaces.

We have thus earned a trusted place in the biopharm industry, where we are recognized for our leadership in high-speed separation, our Tri-Clover® and Toftejorg brands, and the way our components' gentle treatment protects cell cultures and other delicate products.

Our components also ensure problem-free operation in accordance with current Good Manufacturing Practice and the latest industry praxis. Alfa Laval Q-doc, our cutting-edge documentation package for the biopharm industry, provides proof that our components meet the strictest standards and support a hassle-free qualification and validation process.

Q-doc encompasses every aspect of production, from raw material sourcing to the delivery of finished equipment. As such, it creates full transparency and allows the slightest change in material or manufacture to be traced – even when it comes to spare parts.



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# Personal care



Since we use them to maintain our own hygiene, it is little surprise that there are strict hygienic standards for shampoos, soaps, deodorants, toothpastes and more. No less demanding are the countless lotions, creams and cosmetics, which we trust to make ourselves look and feel our best.

While Alfa Laval components provide the stringent hygiene associated with personal care, they also deliver much more. As well as ensuring the quality and uniformity of personal care products – which must have the same feel and effect each time they are applied – they help to conserve resources and reduce environmental impact.

For a start, our components ensure repeatability and economy in key production processes. This can be seen in the consistent operation of our valves and the advanced automation that accompanies them, or in the way that our dynamic tank cleaning devices prevent batch-to-batch contamination while minimizing fluid and energy consumption.

Likewise, our components are engineered for careful treatment that optimizes efficiency and the effect of active ingredients. This is evident in the smooth, economical transfer of heat from our plate heat exchangers, or in the ability of our pumps to handle viscous products like lipstick without affecting their character or consistency.

By ensuring total process reliability, our components safeguard the products so many rely on in turn.



# Food

Today's consumers exhibit a growing demand for wholesome and natural foods, yet their appetite for economy and convenience remains unchanged. More than ever, food processing is as much a question of preserving natural flavors, textures and nutritional value as it is of optimizing price and shelf life.

This is a balance Alfa Laval is well equipped to achieve. Having ensured the quality and safety of food products for over a century, we are well acquainted with the characteristics of soups, sauces, tomato products, jams, confections, baby foods and more. Moreover, we have taken an active role in the development of standards for working with food.

The processes we support are as diverse as the raw materials they involve, which vary from dry powders and solids to sticky sugars and viscous liquids – to say nothing of sensitive flavor enhancers and essences. To bring out the best in all of these ingredients, we supply components that are truly optimized for the processes they handle.

Our fluid handling components, for example, transport ingredients with a combination of gentle movement and high

precision. Yeasts, purées and even delicate egg yolks pass through our pumps undamaged, while the dosing of ingredients such as milk and sweeteners is flawlessly controlled by our valves and automation. Once combined, these ingredients can be perfectly blended with the help of our purpose-built mixers and agitators.

For the all-important cooking and refrigeration processes, we offer thermal components whose control of temperature and pressure ensures the integrity of finished products. Our plate heat exchangers can also be used for pasteurization, or to balance the concentration of sugars and starches by means of evaporation or condensation.

In addition, we offer solutions for creating useful products from what would otherwise be spillage and waste. Among the most advanced of these are our specialized hygienic membranes, which can be used for filtration and clarification, or for the recovery of valuable proteins.

Whatever the product – and whatever the process – Alfa Laval components are an ideal recipe for food safety, performance and economy.





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# Beverage



The production of soft drinks, fruit juices and even alcoholic beverages is a balance of aesthetics and economy. Alfa Laval components protect flavor, texture and appearance, but also the ability to clean process lines quickly and to shift between different types of production.

In addition, our components make effective use of resources, for example through consistent dosing in the production of soft drinks and fruit juices. Our precision valves and automation ensure there are no variations in the finished product, and that none of the precious concentrate or sweetener is wasted.

A wide range of beverages – especially pasteurized ones – also demand sensitive temperature control. The combination of

Alfa Laval plate heat exchangers and pumps allows exact heating and cooling under a steady flow, which preserves taste and color in addition to shelf life.

Our pumps, moreover, are optimized for low-shear transport of high-viscosity ingredients, such as the syrups used in soft drinks or the yeasts used in brewing.

Alcoholic beverages, in fact, are an area of particular Alfa Laval expertise. Beyond supporting the fermentation and pasteurization processes, we provide membrane technology that is truly groundbreaking. Alfa Laval membranes can be used to clarify beer without Kieselguhr waste or to create flavorful, low-alcohol beverages – or even to turn red wine into white.



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ALFA LAVAL PRODU



# Dairy

Because milk products are active in nature, hygiene is of crucial importance in their production. Alfa Laval has safeguarded hygiene since 1883, when our continuous milk separator laid the foundation for the dairy industry itself.

Our milk separators today, supplied globally through a comprehensive partnership with Tetra Pak, are the dairy industry standard. Delivered as part of complete processing solutions, they are joined by many other components, available through Tetra Pak and our other sales channels.

Central to our offering – given the role of pasteurization and refrigeration – are our thermally efficient, purpose-built plate heat exchangers. Alfa Laval plate heat exchangers offer superior hygiene and reliability, whether used for milk cooling or for tempering prior to curd setting.

In addition, we provide a vast range of options for fluid handling, including valves, automation and all the necessary fittings and tubes. Notable among these are our pumps, which allow gentle, low-shear treatment of even viscous fluids, such as yoghurts containing sensitive fruit.

Beyond these components, we provide modern ways of optimizing dairy processes, including dynamic tank cleaning devices and various filtration membranes. Using the latter, for example, considerable water can be recovered from whey – at times enough to cover a substantial portion of process or cleaning needs.



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# Pumps

## **Knowledge in motion**

Pumps in hygienic processes are in constant motion, providing the driving force for fluids that can be sensitive or challenging to the pumps themselves. In order to minimize risk, they must be carefully engineered to handle a complex variety of issues.

This is why Alfa Laval devotes so much effort to matching pumps with their intended applications.

Alfa Laval is one of the world's largest pump suppliers, offering a flexible portfolio of centrifugal pumps, liquid ring pumps and rotary lobe pumps. But more importantly, we are pumping specialists with a comprehensive knowledge of pump engineering, pump seals and potential pumping challenges.

Our portfolio combines the highest standards of hygiene with trouble-free operation and a truly low cost of ownership.

## **Performance analyzed**

Alfa Laval's pumping expertise has research as its cornerstone. In addition to exploring fluid characteristics in our state-of-the-art rheology lab, we make extensive use of Computational Fluid Dynamics (CFD), an advanced flow-modelling technology.

By examining factors such as yield stress, shear rate and product behavior at various temperatures and pressures, our specialists determine how a particular pump will function with a specific liquid in a given system. And by performing chemical analyses of elastomers and other materials, they identify the correct choices for use with a given media.

This information is combined with advanced CFD flow simulations, as well as a database containing 25 years of accumulated knowledge. The result is not only a comprehensive development program, but also pumps that are fully optimized for efficiency, cleanability and reduced shear.



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Alfa Laval is a unique combination of pump specialist and full-range supplier. While we offer a complete and respected portfolio of pumps, our true strength is an in-depth understanding of fluid movement and an ability to relate it to the bigger picture.

#### From form to features

The Alfa Laval difference is a blend of many factors. Our pumps' superior performance and high energy efficiency is partly a result of their internal geometry, which ensures excellent flow characteristics and easy CIP. Combined with the pumps' robust construction, this results in trouble-free operation and low maintenance requirements.

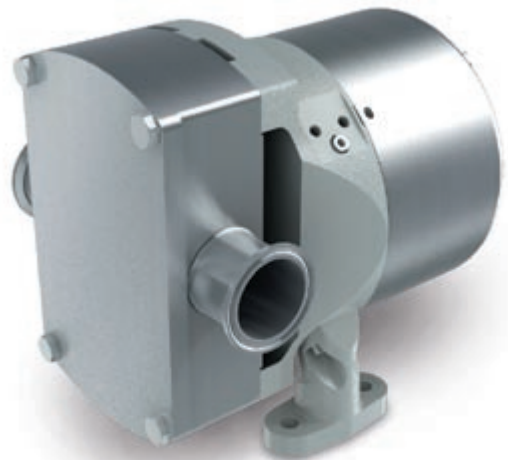
On the other hand, Alfa Laval pumps offer no shortage of individual features. These range from the precisely balanced design and placement of our impellers to the use of external rather than internal springs on the shaft seals of our centrifugal pumps.

Most of our centrifugal pumps actually share the same mechanical shaft seal, which simplifies part replacement and inventory. Such modular features can be found throughout our pump portfolio, which emphasizes ease of maintenance, retrofitting and seal conversion.

#### Ongoing development

With our strong pumping focus, we continue making strides in otherwise well-established technologies. Alfa Laval's core pumping components, the LKH centrifugal pump and the SRU rotary lobe pump, have been on the market for over a decade and are well recognized for their reliability and ease of maintenance. Yet we regularly introduce refinements that enhance their performance and lifetime economy.

In addition, we continue to expand our portfolio with new components. On the one hand, we have broadened our UltraPure line to create a full range of pumps specifically for biopharm use. And on the other, we have introduced the more standardized SolidC centrifugal pump and OptiLobe rotary lobe pump, which meet the needs of a changing market by combining Alfa Laval reliability with greater affordability.



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# Valves

## **A seal of quality**

In their role as flow directors and necessary safeguards, valves are of critical importance to any hygienic process. Even small differences in their operation make a major difference, especially when they are used together in large numbers.

As the market leader in valves and valve clusters for hygienic industries, Alfa Laval has an uncompromising commitment to valve quality. Over the years, our dedicated research and development team has not only optimized valve function, but also improved valve economy by simplifying construction, cleaning and maintenance.

In addition to seat valves in single-seat and double-seat models, our broad valve portfolio comprises, butterfly valves, ball valves, check valves, regulating valves and sampling valves. Furthermore, we offer special valves intended for specific purposes, including a growing portfolio of valves for biopharm use. Because each aspect of these valves has been carefully thought through, each valve is assured to deliver optimal performance – and a maximum amount of uptime.

## **Simply superior**

Perhaps the clearest hallmark of Alfa Laval valves is their astonishing simplicity. The valve bodies in our Tri-Clover Unique 7000 series, for instance, are created from a single disc of stainless steel and possess no welds where bacteria can accumulate.

In fact, all valves from Alfa Laval are constructed with a minimal number of elements. This means fewer moving parts to break or malfunction, but it also means far easier maintenance. In contrast to 30 or 40 steps, a valve from Alfa Laval can be disassembled in as few as 10.

Furthermore, our valves are designed without loose springs, which means they pose no safety risk when the valve body is opened.



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From revolutionary advances like weld-free construction to fine enhancements that reduce fluid and energy consumption, Alfa Laval has led the way in hygienic valve development. Our valve portfolio today offers a strong mix of security and simplicity.

### Built to adapt

Additional simplicity is created by modular valve design, which is specific to Alfa Laval and can be found throughout most of our valve portfolio.

Our Unique 7000 single-seat valves, for example, are constructed from a series of base parts that allow valves to be configured for different application requirements. This enables quick changeovers between standard and aseptic milk production, for example, or a move from juice to juice concentrate. By keeping the valve body but exchanging stems, actuators and other elements, conversions can be made in just a few minutes per valve – without removing the valve body from the system.

In the case of the mixproof valves, our Unique PMO Series provides ease of interchangeability where standard PMO valves can be upgraded to the continuous processing benefits of the Unique PMO Plus – CP valve – a benefit exclusive to Alfa Laval PMO valves!

Of course, modularity has advantages beyond construction and conversion. Because modular thinking allows features to be chosen as needed, it also does away with unnecessary frills and provides a quicker return on investment.

### Strengths great and small

While creating modular systems requires a good deal of overview, Alfa Laval also puts considerable effort into valve details. This includes the development of gasket compounds for greater strength and resilience, as well as the use of surface finishes that combine good appearance with maximum hygiene and cleanability.

In addition, we look for every way possible to limit the consumption of resources and energy. By reducing the fluid required for CIP, for example, we decrease the associated needs for both heating and pumping.

While the results may seem negligible when looking at a single valve, the combined effect of all valves in an installation can amount to significant savings and reduced environmental impact.



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# Automation and monitoring

## **In full control**

Automation constitutes a huge field, and the ways of applying it in hygienic processes are both complex and changing. Nevertheless, Alfa Laval has held a position as an innovator in hygienic valve automation for a decade.

Having sold 300 000 ThinkTop® valve control units during that time, we possess a proven track record of reliability and low cost of ownership.

This success derives in part from a dedication to automation itself. Whereas other suppliers see automation as a small part of much larger turnkey products, we approach automation on a component level and allow it to come into full focus.

With a concept department that explores automation advances and industry needs, as well as a committed research and development staff, we are able to stay at the forefront of automation work.

## **Thinking differently**

Alfa Laval's leadership in valve automation can be summarized in a single word: ThinkTop. Since its introduction, the ThinkTop valve control unit has redefined the way industries look at valve actuation and monitoring.

Unlike traditional control units with manually adjusted proximity switches – which are still used by many of our competitors – ThinkTop is able to store parameters for valve operation. Using a state-of-the-art “no-touch” sensor system, preconfigured with a tolerance band, ThinkTop detects valve stem movement with previously unthinkable accuracy.

Since ThinkTop recognizes the slightest deviation in the opening or closing of a valve plug, it prevents even the risk of minor leakage. Moreover, the information obtained from the valve controls can be used to track operation from batch to batch. This is important for safety, especially in sensitive applications where detection of the tiniest contamination is critical.



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Alfa Laval's leading hygienic valves are supported by a noteworthy offering in valve automation. Equipped with a "no-touch" sensor that provides set-and-forget ease, our control and indicator units combine unparalleled accuracy with total reliability.

### Divided assets

Naturally, there are countless ways to make use of automation. While access to comprehensive data for batch reports and trending is essential in some applications, simple real-time monitoring is often sufficient in others.

To meet these diverse needs, we have divided our ThinkTop technology into a range of different valve control units: GreenTop, ThinkTop, the mid-level ThinkTop Basic and the relatively simple IndiTop monitor.

With these three units, Alfa Laval covers the whole spectrum, from true automation and a full range of electronic interfaces to cost-effective indication of valve position. Since all units can be fitted onto Alfa Laval valves without special expertise or costly adaptors, they make it easy to upgrade with changing requirements.

### Sturdy and stable

Because their "no-touch" sensor is impervious to temperature and vibrations, Alfa Laval control and indicator units offer a high degree of durability. Our ThinkTop Basic unit has even been ATEX certified, which means it can be used in potentially explosive environments.

In addition, our automation is unique in having both Nema 4 and 4X as well as IP66 and IP67 classifications. Since they prevent the ingress of particles and liquid, the units can be hosed down with water or even drenched in cleaning fluid – without putting important settings at risk.

Put simply, our valve automation offers not only accuracy, but security and ease as well.



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# Tri-Clover fittings and tubing

## **The sum of all parts**

Fittings and tubes comprise the numerous passageways in almost any hygienic system. Alfa Laval has a strong position when it comes to these components, which we market under the Alfa Laval and Tri-Clover brand names.

As one of the most experienced suppliers of hygienic installation material, we have a reputation for consistency, structural integrity, and hassle-free welding and assembly. Our tubes, unions, clamps, flanges, bends, tees, reducers and basic valves are all readily available in hygienic and ultra-hygienic executions.

In fact, Alfa Laval can comply with the vast majority of standards, not only of quality but also of size. As the only truly global supplier when it comes to fittings and tubes, we offer a full range of surface finishes in nearly all recognized dimensions.

We can provide the right part and quality for any hygienic application, anywhere in the world.

## **Delivering advantages**

Given that fittings and tubes are regulated by norms and standards, they are most often viewed as a commodity. But while little has changed in their form over the past 50 years, Alfa Laval has transformed their delivery through a truly optimized supply concept.

Though individual fittings are available at individual prices, we provide a discount when items are ordered in boxes of ten. Our most popular items can also be ordered in bulk, which means they arrive on pallets at an even greater discount.

For companies with a more extensive need of installation material, we can even supply a shipping container filled with a customized mix of fittings. This manner of delivery, which is customer-specific and highly discounted, is a unique way of distributing such a high-volume product.



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Alfa Laval's vast assortment of installation material encompasses all necessary shapes, dimensions and surface finishes. Supplied through a range of cost-efficient delivery options, our fittings and tubes are individually inspected to ensure perfect hygiene.

### An eye for detail

Commodity or not, installation material must meet the same high criteria as other hygienic components. To safeguard hygiene system-wide, Alfa Laval devotes exceptional attention to the quality of fittings, tubes and basic valves.

Whereas many suppliers find even random checks of tolerances and finishes to be too demanding, we inspect every item that leaves our production facilities. Each fitting is marked with a Tri-Clover brand mark, which certifies that it has undergone well-integrated quality assurance procedures.

Moreover, our fitting packages are labelled with a bar code and manufacturing date, which contributes to effective logistics and traceability. Shipped in robust packaging with the Tri-Clover brand mark, they can be counted on to arrive in pristine condition.

### Biopharm assurance

For the biopharm industry, where there are strict demands on installation material, Alfa Laval takes quality even further. Our Tri-Clover BioPharm fittings and tubes, which are manufactured to exact tolerances, have thus become a symbol of excellence all over the world.

In addition to using material from prime mills, we use rigorous procedures and inspections to secure the consistency and traceability of our manufacturing. The even quality of our fittings and tubes ensures ease of assembly and welding, and our ASME BPE fittings feature laser welding, which minimizes the risk of roughing and corrosion.

By doing everything in our power to ensure uniformity, we help ensure compliance with current Good Manufacturing Practice.



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# Heat exchangers

## A degree of difference

Today's hygienic production places growing demands on heating and cooling components, which must deliver shorter processing times while maximizing uptime and energy efficiency.

Achieving this requires a complex mix of thermal capability, precision and control.

Alfa Laval heat exchangers provide exactly these characteristics, combining exceptional heat transfer with gentle handling that protects product quality. By evenly distributing fluids and maintaining a consistent media flow, they not only allow for the most effective transfer of heat or cold, but also prevent irregularities that can cause fouling, burning or changes in the end product.

These features make Alfa Laval heat exchangers easy to work with as well, not least because the reduction of dead zones minimizes product build-up and enables more effective CIP. Combined with a compact design that simplifies access and claims less space in the process line, they make Alfa Laval heat exchangers an ideal choice for installation, operation and maintenance.

## Original innovation

Alfa Laval has a long history of leadership in heat transfer, the results of which are readily seen in our plate heat exchangers.

Our plates, for example, were the first with a distribution area for optimizing product flow. While this feature is frequently copied today, our precision-engineered plates are still unmatched when it comes to directing the movement of fluid. This gives them not only superior heat transfer characteristics, but also exceptional cleanability even at the plate corners.

Similarly imitated – and also unsurpassed – are our glueless clip-on gaskets, which allow gasket replacement with the plate still on the frame. Whereas imitators rely on various snap-in solutions, our unique clip-on gaskets are easy to work with and can also be seen when the heat exchanger is closed, making it simple to verify alignment.



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With their thermal efficiency and superior cleanability, Alfa Laval's heat transfer components excel in critical heating and cooling processes. Our leading gasketed plate heat exchangers are joined by innovative non-gasketed models and specialty heat exchangers for biopharm use.

### Suitably framed

Unlike industrial applications, hygienic applications place as many demands on heat exchanger frames as they do on plates and gaskets. For this reason, Alfa Laval has dedicated specialists who develop frames for hygienic needs.

The latest frame development is the FrontLine 10 and 15 Automatic Series. Each frame automatically opens and closes for quick and easy access to plate inspection, cleaning or service.

On the one hand, these specialists ensure the use of standard-compliant materials and surface finishes, designed to safeguard hygienic processes. But they are also responsible for advantageous features, such as smaller ports for CIP without specialized pumps, or the five-point alignment system in our best-selling FrontLine series.

### Advanced developments

While gasketed plate heat exchangers like FrontLine handle most food and dairy duties, we also offer heat exchangers for specialized demands, such as those in the biopharm and personal care industries.

Specifically developed and documented for biopharm, for example, are our Pharma-line and Pharma-X heat exchangers. Pharma-line is a double-tubesheet shell-and-tube heat exchanger that offers many options, while Pharma-X is a ready-built module for point-of-use cooling in Water For Injection (WFI) or Purified Water (PW) systems. Also used in clean-water applications are our Gemini plate heat exchangers, which have crevice-free double-wall plates and provide a higher turbulence that minimizes biofilm build-up.

Two other innovative plate solutions are our Compabloc and AlfaNova heat exchangers. The laser-welded Compabloc, available in many different constructions and materials, is ideal for condensing duties, where it saves cost and space over other types of condensers. And our unique AlfaNova models are manufactured through a revolutionary bonding process known as AlfaFusion, which enables a construction of 100% stainless steel.



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# Filtration and separation

## **A separate agenda**

Separation, a key process in the vast majority of hygienic processes, has been a specialty of Alfa Laval for well over 100 years. But while separation has traditionally been handled by mechanical means, today it is increasingly being performed through membrane filtration.

As well as providing mechanical separators, Alfa Laval is one of only a handful of companies that manufacture sanitary membranes for hygienic use. And as the only membrane producer with a total focus on hygienic applications, we are the one that can best meet the needs of hygienic industries.

Likewise, since we are not limited by the quantities of industrial membrane production, we are the producer that can most easily adapt to individual requirements. While our membrane chemistry is standardized, the form of our membranes can be tailored to the needs of any hygienic application.

## **Dual technologies**

Alfa Laval's membrane offering comprises organic membranes for ultrafiltration, nanofiltration, reverse filtration and microfiltration. These can be delivered in two types, depending on the viscosity of the product to be separated.

For most viscosities we provide spiral-wound membranes, which are also the industry standard. Whereas competitor membranes are machine-wound, we wind our spirals by hand, producing a tighter and more hygienic roll with a longer service life.

In addition, we offer plate-and-frame membranes, an Alfa Laval solution that can handle higher viscosities. Plate-and-frame membranes feature open channels across the membrane surface and are supported by hollow plates from which the permeate is collected.

For membrane system builders, we can also provide the standard and high-pressure pumps, valves and other accessories needed to create a complete and efficient membrane system.



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Since the introduction of Gustaf de Laval's first cream separator in 1883, Alfa Laval has led the development of separation technology. Modern hygienic industries can look to us for advanced membrane filtration solutions – as well as traditional high-speed separators and decanters.

#### Continuous advances

Alfa Laval membranes can be used in an extensive range of processes, especially in the food, beverage and dairy industries. Many dairy products, in fact, could not be produced as they are today if our membrane technology did not exist.

Because we supply hygienic industries with other components as well as membranes, these solutions are backed by complete process knowledge. Moreover, because our membrane technology is under constant development, its users can count on regular enhancements that increase membrane performance.



#### Traditional strengths

Membrane advances aside, it goes without saying that mechanical means account for most hygienic separation. This will continue to be the case, as will Alfa Laval's leadership in traditional separation methods.

Alfa Laval has a full range of centrifugal separators and decanters for hygienic use, generally available as part of larger process deliveries. In biopharm, for example, our high-speed separators lead the industry, providing gentle acceleration and low-shear treatment that protect even sensitive cell cultures. And our decanters, available in different designs, lengths and cone geometries, enable two-phase and three-phase separation of liquids and solids in countless food and beverage applications.

With our full portfolio of options – membrane and mechanical – we provide comprehensive answers to all separation needs.



# Tank cleaning equipment

## **All but the tank itself**

Tanks are often at the heart of hygienic processes, where they are used not only for mixing and storage, but also for settling, fermentation and a wide variety of other applications.

While Alfa Laval is not a supplier of tanks themselves, we do provide a range of components that support and enhance their function. Our tank equipment represents a total package, combining the market's widest range of options with an in-depth knowledge of mixing, agitation and cleaning.

Quite simply, we provide everything to make a tank better – inside and out. So whatever the tank or the task it performs, time and money can be saved by using Alfa Laval as a single supplier.

## **A clean revolution**

Prominent in Alfa Laval's tank equipment offering is our Toftejorg range of tank cleaning devices. Firmly associated with leading innovation, the Toftejorg name signifies a fifty-year track record of ease and efficiency.

In any cleaning process, the aim is to clean quickly and thoroughly while using the least possible amount of cleaning fluid. This is most effectively achieved with our Toftejorg rotary spray heads and jet heads, which project cleaning media onto tank walls in an economical, three-dimensional pattern.

By combining impact with rotary motion, these dynamic cleaning heads remove residual material far more effectively than conventional static spray balls. As a result, they save time, water, detergent and energy in the cleaning process – and ultimately money as well.



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Through decades of work both in and around hygienic tanks, Alfa Laval has developed a thorough understanding of tank processes and dynamics. Although not a tank supplier, we provide leading cleaning solutions and all manner of tank-related equipment.

### **Making a match**

For optimal cleaning and the greatest reduction of cleaning waste, it is essential to pair a tank cleaning device with the tank and the products it handles. Alfa Laval's range of Toftejorg spray heads and jet heads provides many possible options, including 3A-compliant devices and the first rotary jet head with EHEDG approval.

Choosing a device is easy, not least because of the sizing and selection tools available to Alfa Laval's sales channel partners. Based on our years of experience and the comprehensive data from thousands of software calculations, our tools present not only the cleaning results for a given Toftejorg device, but also the potential return on investment.

### **The ideal complement**

Of course, tank cleaning is only one aspect of a much broader offering. In addition to tank cleaning devices, Alfa Laval can provide a full assortment of tank equipment and accessories, from tank outlets and sampling valves to flow meters and other instrumentation.

Our mixers and agitators, for example, are based on our thorough understanding of tank and fluid dynamics. Designed for optimal hygiene and low energy consumption, they can be constructed from standardized modules or custom-built to handle a particular process.

For the tank exterior, we can supply tank legs and a full range of Access tank covers, as well as a wide selection of sight glasses. Tank covers in standard and pressure models are available in all shapes and sizes, and sight glasses can be provided either with or without halogen light fittings.



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# The test of time

While there are convincing benefits already at the time of purchase, the advantages of choosing Alfa Laval may be clearest down the road. Alfa Laval components prove their worth as time goes on, thanks to strong design, trouble-free operation and expert support that contribute to a low lifecycle cost

## **Right from the start**

One of the reasons Alfa Laval components perform so well is that they are designed and sized correctly from the beginning. Alfa Laval components are engineered for efficiency and good margins of capacity, and their selection is made with the help of advanced sizing and design tools.

Such tools allow the distributors, system builders and contractors we work with to ensure that each component is fully optimized for the situation in which it is used. When this is the case, components not only operate longer, but also with less energy, water consumption and waste.

## **With ease in focus**

Other contributors to long-term hygienic performance are cleanability and ease of maintenance. Alfa Laval components minimize dead zones and product build-up, which paves the way for effective Cleaning In Place (CIP) and Sterilization In Place (SIP). Moreover, their design helps minimize wear and tear, which in turn cuts back on maintenance needs.

When maintenance is required, it is simplified by our components' small number of parts and their ease of disassembly and reassembly. Alfa Laval Genuine Spare Parts are available globally through our network of channel partners, which in turn are supported by our effective Distribution Centers.

Parts for standard maintenance are incorporated into Service Kits – at a price lower than that of the individual items.

## **Informed and effective**

Naturally, our components are supported by a full range of documentation. Beyond installation instructions, manuals, animations and service videos, Alfa Laval offers maintenance guidelines, which provide expert advice and an inspection schedule for maximizing uptime.

Further advice is available from our central experts in optimization and troubleshooting. Drawing on solutions from around the world, as well as resources like our Material and Chemistry Center, these specialists support our channel partners with cutting-edge answers based on documented experience.

In fact, this central expertise can also be applied locally. In cooperation with our channel partners, we frequently conduct seminars and workshops, led by a dedicated organization that trains up to 1000 people per year. Thousands of others receive training from our Alfa Laval sales companies, who assist our channel partners and their customers directly on site.

Together, the right components and information are the best assurance of long-term performance.







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## Pumps

### Centrifugal pumps



**LKH:** Premium pump that combines energy efficiency with extremely gentle product treatment



**LKH UltraPure:** High-purity-water pump for water-for-injection (WFI) and other biotechnology and pharmaceutical applications



**SolidC:** Reliable and cost-effective standard duty pump



### Liquid ring

## Valves and Automation

### Mixproof valves



**Unique Mixproof valve:** Allows product to flow in one housing and CIP solution in the other, without risk of co-mingling – reduces the number of single-seat valves needed while increasing automation capabilities



**Unique Mixproof – tank valve:** For Mixproof operation when draining is required up to the tank port



**Unique PMO valves:** Complies with the FDA's Pasteurized Milk Ordinance (PMO) and covers all Mixproof dairy applications including viscous and large particulate products

### Tri-Clover® Single-seat valves



**Unique 7000 – Standard valve:** Interchangeable one-piece valve body has no welds which ensures corrosion resistance and minimizes the potential of stress related valve port and body irregularities



**Unique 7000 – Aseptic valve:** Innovative one-piece diaphragm eliminates the need for a steam barrier – resulting in improved cleanliness and fewer spare parts



**Unique 7000 – Long stroke valve:** For processing suspended solids or viscous products



### Specialty valves



**LKB – Butterfly valve:** An economical on/off routing valve for either automatic or manually operated systems



**Tri-Clover Ball valve:** The full-flow design minimizes line turbulence and pressure drops



**CPM 2:** Designed to maintain either constant inlet or outlet pressure



**LKC-2:** A non-return valve designed to prevent reverse product flow

### Valve automation



**ThinkTop®:** The most advanced automated control unit for all air-operated Alfa Laval and Tri-Clover valves



**ThinkTop® Basic®:** Has a “no touch” sensor system and “set and forget” programming feature



**IndiTop:** A simple, easy to install and use electrical feedback unit



## Tank Cleaning Equipment

### Rotary Jet Heads



**Toftejorg SaniJet 20:** A versatile self-cleaning, self-draining device ideal for tanks between 130 and 8,000 gallons – cleans in a 360° 3D indexed pattern



**Toftejorg SaniJet 25:** The first EHEDG (European Hygienic Engineering and Design Group) compliant device built to clean the largest size tanks/vats



**Toftejorg TJ20G:** Our most popular jet head provides 360° high impact cleaning for a wide variety of applications including brewery, food and dairy



**Toftejorg TZ-74:** A proven solution for the brewery industry designed for tanks/vessels between 13,000 to 130,000 gallons



**Toftejorg TZ-82:** Provides the same 360° high impact cleaning for the largest storage tanks in petro-chemical and chemical processing industries



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# pumps

# Positive displacement pumps

**MR:** Used for CIP return applications where pumping liquids containing air or gas is needed



**SX:** Premium pump for sensitive and ultra-clean products that require the lowest shear possible



**SRU:** Our most versatile pump designed to handle the widest temperature and pressure ranges in virtually all applications



**OptiLobe:** A cost-effective rotary lobe pump for general applications



**Unique PMO Plus®:** Allows seat lift cleaning in one chamber while product is in the other to reduce downtime



**Unique PMO – F:** Has an O.D. balancer cleaning element so product build-up can be cleaned or “flushed” without having to shut down



**Unique PMO Plus – CP:** Utilizes features from the Unique PMO – F and Unique PMO Plus to allow for continuous processing

**Unique 7000 – Y-body valve:**  
When unobstructed flow is required for the most demanding viscous products



**Unique 7000 – Tank valve:**  
A single-seat valve solution for a variety of tank/vat sizes and configurations



**Unique 7000 – Tangential/Tank valve:** A horizontal valve with enhanced body drain-ability



**700 Series valves:**  
Designed to deliver years of reliable performance and available in a variety of configurations including throttling and tank versions.



**Unique 7000 vacuum breaker:**  
Eliminates vacuum on the downstream side of a pasteurizer in an HTST system



**45 BYMP ball check valve:**  
The body design allows full flow to prevent reverse product flow



**Air blow check valve:**  
Evacuates lines of product or CIP solution for air agitation of product in tanks/ vessels



**AH shutter valve:** A self-draining valve that allows for multi-directional product flow

**GreenTop:** A durable unit that guards against leakage and breakdown, so the housing can be installed in any position

## Rotary Spray Heads



**Toftejorg SaniMidget:** With a 3A dairy version available, it uses low CIP fluid volumes at low pressures for tanks up to 2,700 gallons in size

## Static Spray Balls



**8000 Series Spray Balls:**  
Designed to meet all 3A standards, and provide a low cost, manual way of distributing CIP fluid

## Tank Covers



**3A LKD Manway (oval):** Installed on the side of tanks and used when access to the vessel interior is required below the liquid level



**3A LKDC Manway (circular):** Installed on the top of tanks and used when access to the vessel interior is required above the liquid level



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## Heat Exchangers

### Plate Heat Exchangers



**FrontLine 10 and 15 Automatic:** A one-of-a-kind oil-free, electric powered automatic opening and closing frame with clean, quiet and reliable operation



**FrontLine:** Offers more heat transfer area per plate for increased throughput, higher heat recovery and lower pressure drops



**BaseLine:** A versatile PHE for both process and utility duties from heating/cooling to pasteurization at low flow rates



### Tubular Heat Exchangers



**Pharma-X:** A tube-in-tube-in-tube heat exchanger for point of use heat transfer in purified water applications



**PharmaLine:** A shell-and-tube heat exchanger for heating and cooling of purified water in utility applications



**ViscoLine:** A corrugated tubular heat exchanger engineered to handle medium viscosity food products or food/beverage products containing small particulates

### Scraped-Surface Heat Exchanger



**Contherm:** An Ideal continuous or semi-continuous heat exchanger solution for highly viscous and sticky foods or foods with particulates, and personal care products



**Contherm Core:** Designed to process low to medium viscosity products and provides exceptional thermal efficiency, higher throughput and uniform heat transfer

## Separation

### Disc-Stack Centrifuges



**Self Cleaning Design:** Intermittent solids discharge, with hermetic design eliminating oxygen pick-up, and gentle acceleration with low shear flow. Configurable for 2phase or 3phase applications



**Nozzle Bowl Design:** Continuous solids discharge used to separate, wash and concentrate micro-organisms, widely used in yeast production



**Skid-Mounted System:** Centrifuges can be supplied as stand-alone machines or integrated into a skid mounted system with auxiliaries



**Solid Wall Bowl Design:** Manual solids removal, in which the machine is stopped and bowl is opened. Used in high fouling applications such as blood and natural latex processing

## Filtration

### Membranes and Filters



**Plate and frame:** Specifically designed for ultra and microfiltration of highly viscous products and fermentation broths in the food, beverage, biotechnology and pharmaceutical industries



**Spiral membranes:** Used to supplement centrifugal separation processes – micro, nano, ultra and reverse osmosis versions are available depending on the level of filtration needed



**Safety filters:** Installed directly in the feed line, they serve as particulate-retaining slot tube filters to comply with sanitary requirements



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## Utility Heat Exchangers

### TS Steam heaters:

Designed for steam to water heating, the unique plate geometry and heavy duty gaskets make it ideal for use in hot water sets



**Braze:** A compact BHE with high heat transfer coefficients and small hold-up volumes for water heating/cooling



**AlfaNova:** Constructed with 100% stainless steel for demanding water, steam and CIP heating duties



**M-line:** A reliable and efficient general heating and cooling solution

## All-Welded Heat Exchangers



**Compabloc:** A durable heat exchanger used as a main or overhead condenser on BioPharm reactors and vent condensers



**Spiral:** A versatile heat transfer solution with a compact, self-cleaning design to process everything from dirty fluids to high vacuum condensation

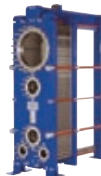
## Evaporation and Condensing



**AlfaVap:** Uses a rising-film operation for gentle and complete flow control and is especially efficient at high concentrations and viscosities



**ViscoVap:** Tubular evaporator systems for concentration of products such as tomato and fruit purees



**AlfaCond:** Condenses vapors under low pressure/vacuum conditions in evaporation and distillation systems

## Decanter Centrifuges



**Stand alone decanter:** For clarification during food and beverage processing with design features focusing on hygiene, better clarification and higher yield performance



**ALDEC:** For dewatering of wastewater and process waste streams, ALDEC consistently applies high torque and effective control for large volumes of sludge to provide the best optimized performance



**Decanter modules:** A wide range of configurations to optimize your process requirements – from clarifying process streams to dewatering your wastewater

## Tri-Clover Fittings and Tubing



**Bio-Pharmaceutical Fittings:** Constructed with 316L stainless steel to BPE standards, each fitting is individually capped and bagged with material test reports



**Food and Beverage Fittings:** Manufactured to 3A standards, all product surfaces are polished to 32 micro inch Ra or better



**Tubing:** Available in a full line of sizes and finishes to ensure a perfect fit with all Tri-Clover fittings



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