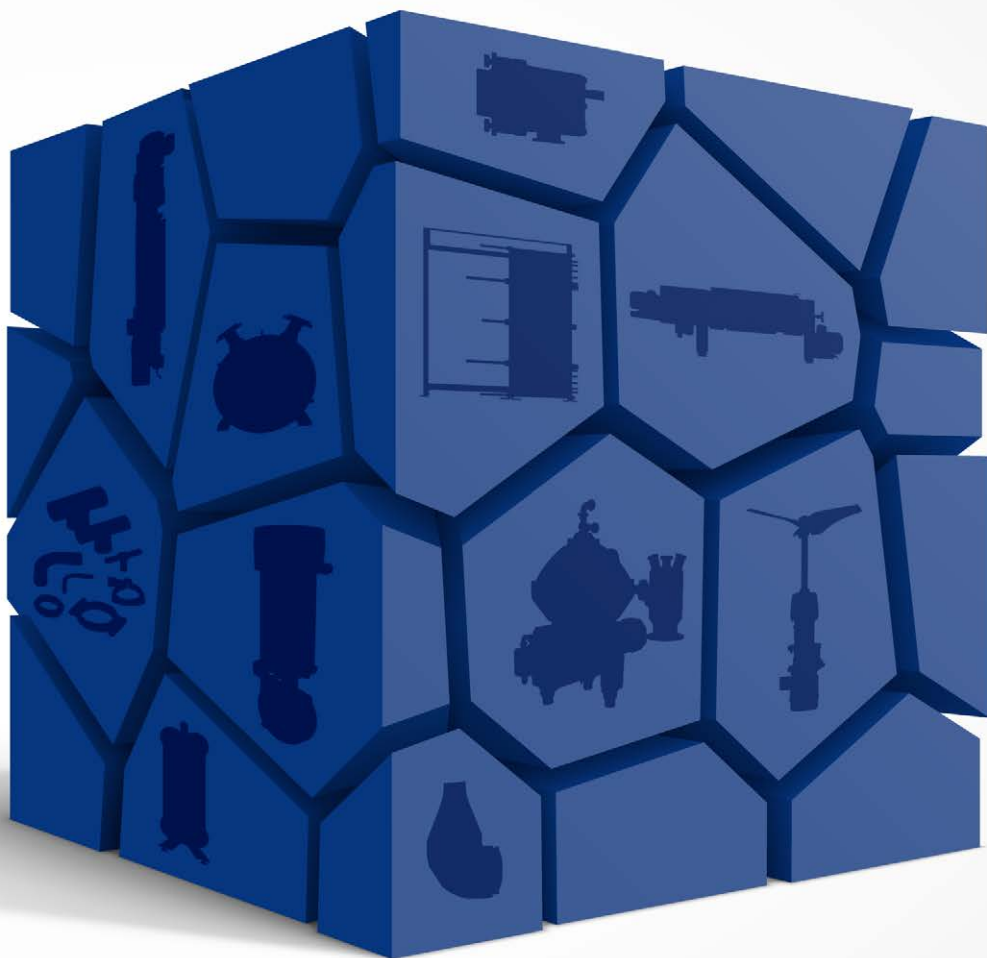




## The building blocks of profitability

Maximize reliability and yield with Alfa Laval protein, fat and oil recovery systems





# Step up your game

Alfa Laval is one of the world's leading suppliers of equipment and complete production lines for clarification, extraction, dewatering and fat recovery in fish, meat, vegetable protein and dairy processing. Companies across the globe rely on our products and solutions to recover high-quality proteins, oils and fats in a cost-efficient way.

The protein business is highly competitive, and to be profitable you need to maximize quality and yield while keeping operating costs low. At Alfa Laval we have more than 30 years' experience from designing rendering, fat melting and protein recovery systems. We know how you can reduce your environmental impact and get the extra percent of product out of your raw material that make all the difference to your bottom line.

Please contact us at [protein@alfalaval.com](mailto:protein@alfalaval.com) or visit [www.alfalaval.com](http://www.alfalaval.com) to learn more.



# Innovating processing technology since 1883

Ever since Gustav de Laval founded Alfa Laval in 1883 and started manufacturing separators, we have been at the forefront of the development of processing technology. Over the years the company has grown and we have expanded our scope of applications, but one thing remains unchanged – our focus on performance, reliability and customer satisfaction.

## Providing state-of-the-art solutions

Alfa Laval is active in many different industries and you can find our equipment in all sorts of processes – from breweries to power plants.

We are the world's leading supplier of complete process lines for recovery of edible protein from fish, meat and vegetable sources. We supply components, complete skid-mounted modules and process lines for clarification, extraction, dewatering and fat recovery.



## Optimizing our customers processes. Time and time again.

We help customers around the world optimize their operations and continuously improve their processes. Our long experience, deep process knowledge and wide product range means we can help you get the most out of your raw material.

### Core technologies

All our solutions are based on Alfa Laval's three core technologies:

**Heat transfer** – We offer a wide range of highly efficient heat exchangers that help you cut energy costs and improve production in all types of heat transfer duties, including heating, cooling, evaporation, condensation and even steam generator systems.

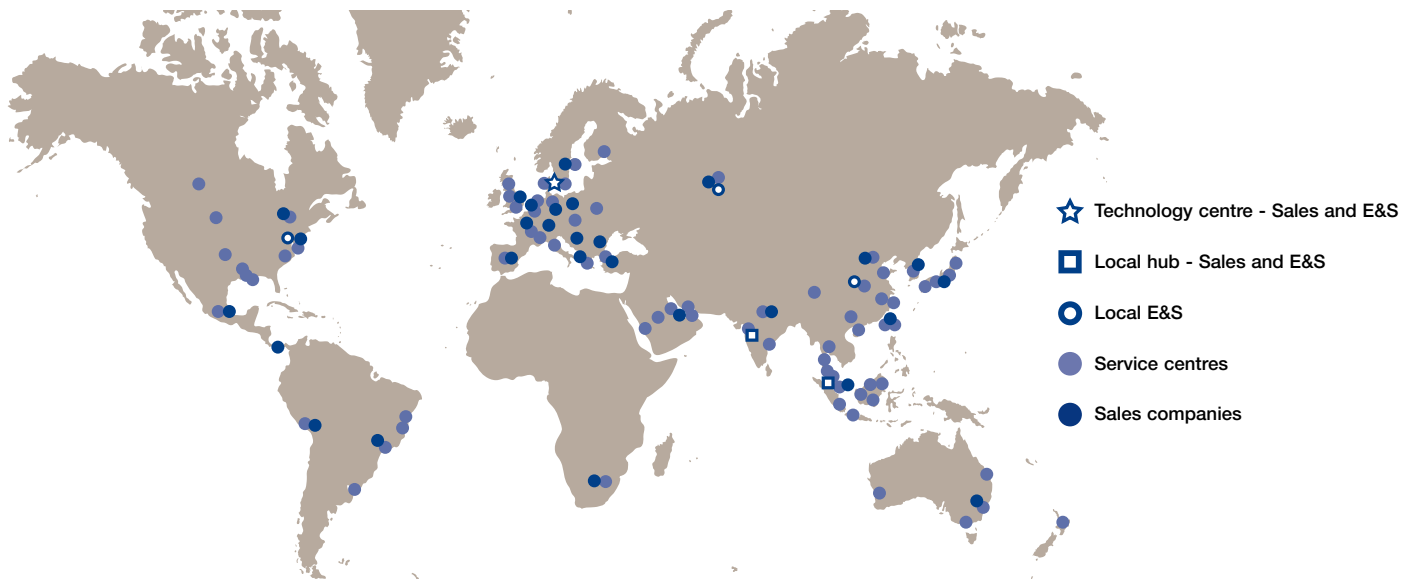
**Separation** – Alfa Laval high-speed disc stack separators and decanter centrifuges are perfect for separating two liquids from each other, or solids from one or two liquids.



Decanter centrifuge system for protein processing

Separators are mainly used for purifying liquids, and decanter centrifuges are commonly used for defatting and/or dewatering solids. Alfa Laval decanter centrifuges are available in two or three phase designs. In the separation category we also offer membrane filtration systems and strainers.

**Fluid handling** – Our range of valves, pumps, pipes, fittings, tank cleaning equipment and agitators have been specifically developed for industries with stringent hygiene requirements.



## A global partner to the industry

We are here to support you from the first idea stage and throughout the entire lifetime of your plant. We supply complete process lines, modules or individual components, and our global team of process experts are glad to assist you with good advice and inspiration. Our service organization helps you secure top-level performance that keeps you competitive throughout your equipment's lifecycle.

### Supporting you all the way

Partnering with Alfa Laval gives you access to all the resources you need to succeed in the protein recovery industry.

We can help you in all development phases, from design to testing. Our global team of process experts helps you get the right equipment to match your specific needs and operating conditions.

Once you have decided which equipment to use we can supply you with individual components, skid-mounted modules or complete process lines. We are also happy to assist with start-up and commissioning, training and service.

### Global centre and regional hubs

Being close to our customers is important for us and this is reflected in the way we are organized. Our central and regional process experts support your

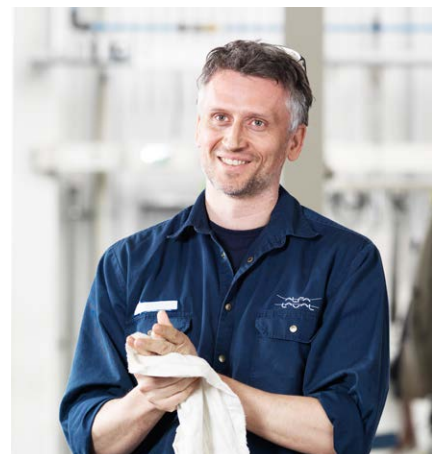
local sales representatives. This decentralised way of working ensures you get the best possible local support and have access to world-class process knowhow.

### Extending performance

Alfa Laval Service provides all the services you need to ensure top performance over the whole lifecycle of your equipment and maximize your return on investment.

With Alfa Laval as your service partner you get the peace of mind that comes from knowing your machinery is in the hands of dedicated professionals. We make sure your equipment and processes are optimized so that you keep your competitive edge and benefit from maximum uptime.

Our Performance Agreements are tailor-made service solutions that can include any combination of our



services. A Performance Agreement gives you true security and advance knowledge of your service costs.

With service centres, field service engineers and service partners in nearly 100 countries, Alfa Laval is in easy reach of your operations. Dedicated specialists are ready to assist you whenever you need help.

# A wide range of advanced process solutions

System	Grade			Raw material			
	Food	Feed	Technical	Fish	Poultry	Red meat	Vegetables
<b>CentriFlow</b> Wet rendering - commonly known as "fat melting line" or "whole fish decanting"				●	●	●	
<b>Fish Liver Oil Plant</b> Oil recovery from fish liver, usually from whitefish				●			
<b>CentriBone</b> Production of primarily food-grade bone chips or gel bones						●	
<b>CentriBlood</b> Blood meal production from raw whole blood or haemoglobin					●	●	
<b>CentriSkim</b> Recovery of oil and fats from industrial waste water streams. DAF followed by a 3-phase decanter				●	●	●	
<b>Surimi Plant</b> Surimi production, primarily from filleted whitefish				●			
<b>Fat Reduced Meat Plant</b> Low-temperature, mechanical meat defatting for reduction of excess fat and/or recovery of high-grade oils/fats				●	●	●	
<b>AlfaBlood</b> Plasma recovery from whole blood using a high-speed separator					●	●	
<b>CentriFine</b> Final purification of recovered oil or fat using a high-speed separator				●	●	●	
<b>VegPro80</b> Recovery of protein concentrates, fibres and carbohydrates from vegetable protein sources							●
<b>VegPro90</b> Recovery of protein isolates, fibres and carbohydrates from vegetable protein sources							●
<b>HyPro Plant</b> Protein concentrate recovery from soft and/or bone material or feathers through thermal/enzymatic hydrolysis with water and/or enzymes				●	●	●	
<b>Silage Plant</b> Conversion of by-products, e.g. from fish, to animal feed using acid hydrolysis				●	●		
<b>CentriMeal</b> Conventional dry rendering using press technology					●	●	
<b>CentriMealEco</b> Upgrade for dry rendering plants. Production is optimized by connecting a CentriFlow upstream of the existing process.					●	●	

End product	Components								
	Grinding	Direct heating	Indirect heating	Decanter	Separator	Cooling	Membranes	Evaporation / fat/oil vacuum drying	Dryer
Oil/fat, meal or greaves	Grinder	Melting tube	Contherm Cooker – Fish			Fat/oil Greaves	Desalination	Evaporator and/or vacuum dryer	
Oil	Macerator		Contherm			Oli		Vacuum dryer	
Gel bones and fat or bone meal	Pre-breaker and grinder	Raw material heater with conveyor						Evaporator and/or vacuum dryer	
Blood meal	Macerator	SK heater						Evaporator for reduction of BOD/COD, nitrogen or e.g. phosphor	
Oil/fat and meal		SK heater						Evaporator for reduction of BOD/COD, nitrogen or e.g. phosphor	
Surimi	Mincer / refiner								
Texturized fat-reduced meat; high-grade virgin oil/fat	Grinder /deboner	RotaTherm (Gold Peg)	Contherm			Fat/oil		Vacuum dryer	
Plasma and haemoglobin fraction						Liquids Ice flakes		Evaporator for plasma concentration	
Purified fat								Vacuum dryer	
Protein concentrate, fibres and carbohydrates			Hydrolyser					Evaporator	
Protein isolate, fibres and carbohydrates			Hydrolyser					Evaporator	
Soup/broth or extract/ protein concentrate/digest and oil/fat	(Pre-breaker and) grinder (and refiner)		Sterilizer – broth/soup Cooker – Feather (Pressure) hydrolyser					Evaporator	
Silage and oil	Grinder	Melting tube						Evaporator and/or vacuum dryer	
Oil/fat and meal	(Pre-breaker and) grinder		Dryer/sterilizer					Vacuum dryer	
Oil/fat and meal	(Pre-breaker and) grinder	Melting tube	Dryer/sterilizer Cooker					Vacuum dryer Evaporator	

 Alfa Laval equipment, required    
  Alfa Laval equipment, optional    
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# Components and modules

## Separation



Decanter centrifuges

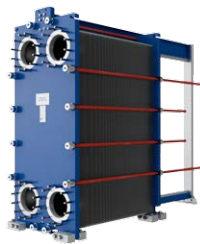


High-speed separators



Membranes

## Heat transfer



Gasketed plate heat exchangers



Brazed and fusion-bonded plate heat exchangers



Scraped surface heat exchangers

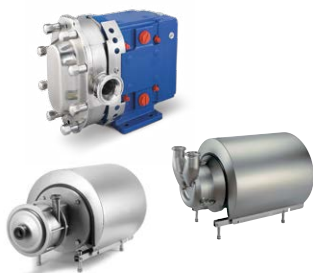


Tubular heat exchangers



Dry Cooler VDD

## Fluid handling



Pumps



Valves and actuators



Tubes, fittings, instruments and tank cleaning equipment



Mixers and agitators

## Standard and customized modules



CentriFlow – wet rendering module



SteriTherm – sterilizer module



Skid-mounted membrane filtration module



AlfaVap – evaporation module

### **Alfa Laval in brief**

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

### **How to contact Alfa Laval**

Contact Alfa Laval's global protein specialists at [protein@alfalaval.com](mailto:protein@alfalaval.com). We are happy to discuss the possibilities in your plant and explain how we can help you improve your profitability.

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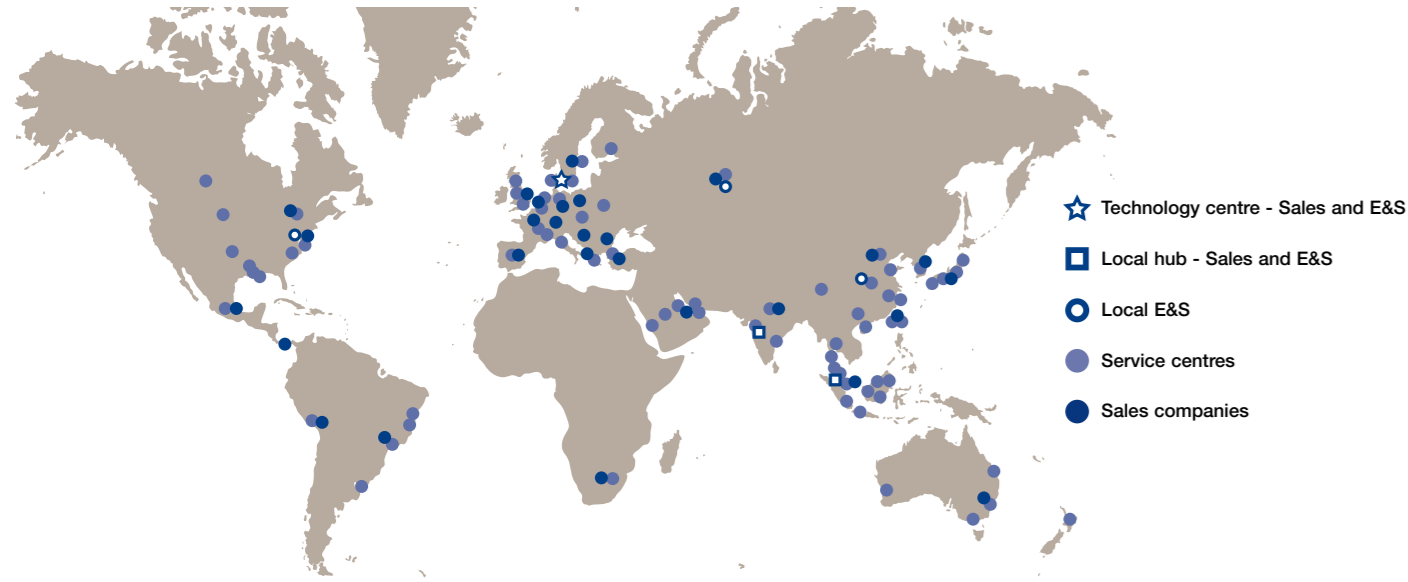


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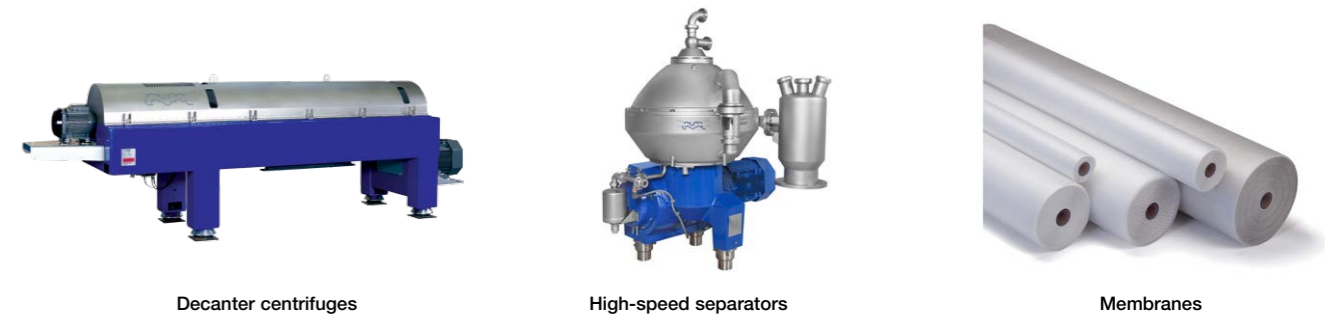
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System	Grade			Raw material			End product	Components									
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<b>CentriFlow</b> Wet rendering - commonly known as "fat melting line" or "whole fish decanting"	✔	✔	✔	●	●	●		Grinder	Melting tube	Contherm Cooker - Fish	●	●	Fat/oil Greaves	Desalination	Evaporator and/or vacuum dryer		
<b>Fish Liver Oil Plant</b> Oil recovery from fish liver, usually from whitefish	✔			●				Macerator		Contherm	●		Oil		Vacuum dryer		
<b>CentriBone</b> Production of primarily food-grade bone chips or gel bones	✔	✔				●		Pre-breaker and grinder	Raw material heater with conveyor		●	●			Evaporator and/or vacuum dryer		
<b>CentriBlood</b> Blood meal production from raw whole blood or haemoglobin	✔	✔			●	●		Macerator	SK heater		●			●	Evaporator for reduction of BOD/COD, nitrogen or e.g. phosphor		
<b>CentriSkim</b> Recovery of oil and fats from industrial waste water streams. DAF followed by a 3-phase decanter	✔	✔		●	●	●			SK heater		●	●			Evaporator for reduction of BOD/COD, nitrogen or e.g. phosphor		
<b>Surimi Plant</b> Surimi production, primarily from filleted whitefish	✔			●				Mincer / refiner			●	●					
<b>Fat Reduced Meat Plant</b> Low-temperature, mechanical meat defatting for reduction of excess fat and/or recovery of high-grade oils/fats	✔			●	●	●		Grinder / deboner	RollTherm (Gold Pig)	Contherm	●	●	Fat/oil		Vacuum dryer		
<b>AlfaBlood</b> Plasma recovery from whole blood using a high-speed separator	✔	✔			●	●					●		Liquids Ice flakes		Evaporator for plasma concentration		
<b>CentriFine</b> Final purification of recovered oil or fat using a high-speed separator	✔	✔	✔	●	●	●						●			Vacuum dryer		
<b>VegPro80</b> Recovery of protein concentrates, fibres and carbohydrates from vegetable protein sources	✔	✔					●				●	●			Evaporator		
<b>VegPro90</b> Recovery of protein isolates, fibres and carbohydrates from vegetable protein sources	✔	✔					●				●	●			Evaporator		
<b>HyPro Plant</b> Protein concentrate recovery from soft and/or bone material or feathers through thermal/enzymatic hydrolysis with water and/or enzymes	✔	✔		●	●	●		(Pre-breaker and) grinder (and refiner)		●	●	●			Evaporator		
<b>Silage Plant</b> Conversion of by-products, e.g. from fish, to animal feed using acid hydrolysis		✔		●	●			Grinder	Melting tube		●	●			Evaporator and/or vacuum dryer		
<b>CentriMeal</b> Conventional dry rendering using press technology	✔	✔	✔		●	●		(Pre-breaker and) grinder		Dryer/sterilizer	●	●			Vacuum dryer		
<b>CentriMealEco</b> Upgrade for dry rendering plants. Production is optimized by connecting a CentriFlow upstream of the existing process.	✔	✔	✔		●	●		(Pre-breaker and) grinder	Melting tube	Dryer/sterilizer Cooker	●	●			Vacuum dryer Evaporator		

● Alfa Laval equipment, required ○ Alfa Laval equipment, optional ● Sub-supplied equipment, required ○ Sub-supplied equipment, optional

## Components and modules

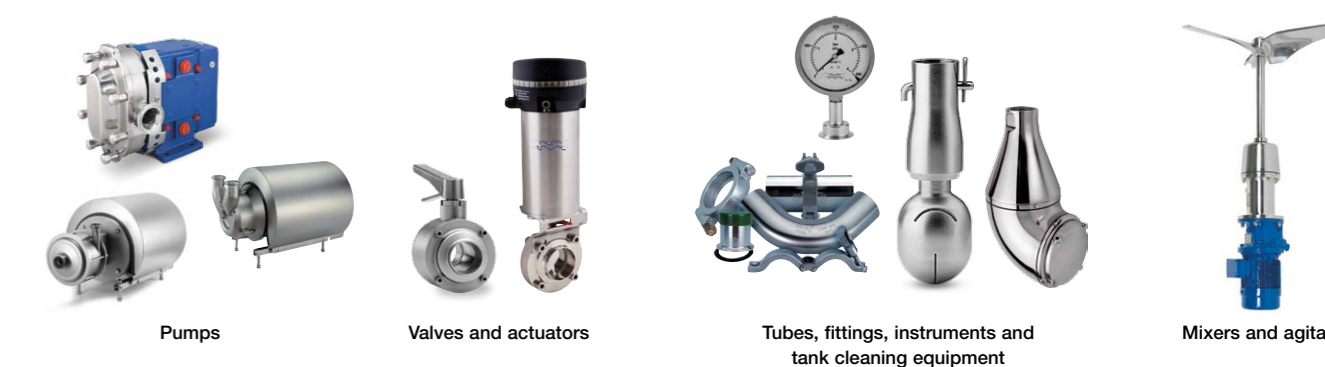
### Separation



### Heat transfer



### Fluid handling



### Standard and customized modules

