



Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions. Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

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

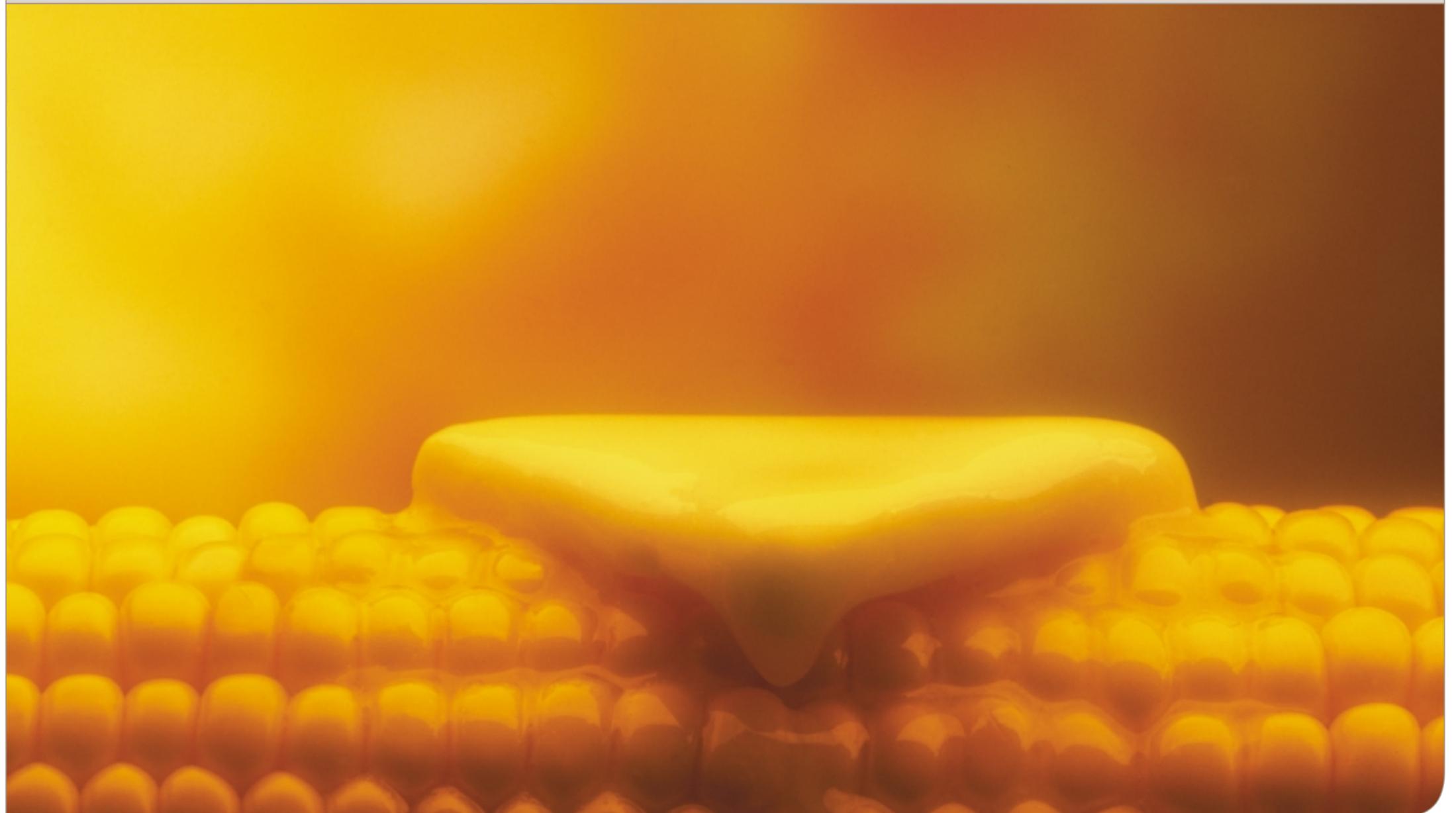
Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

The efficiency ingredient for yellow fats

Processing yellow fats with Alfa Laval technology



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Producing yellow fats is a delicate mix of blending and processing. It involves achieving a delicate balance of properties, allowing for subtle shifts in local market preferences and consumer requirements, while meeting stringent international standards.

Alfa Laval is the supplier of equipment and processes that make this possible.

Addressing tomorrow's needs for processing yellow fats

Yellow fats production is increasingly linked with convenience foods and functional foods, and growing health awareness among consumers

Over the years, margarine has been developed into a wide range of products for domestic use as well as for the baking, catering and prepared meals industries. As a result of this diversification, the generic term "yellow fats" is now often used as a more accurate name for margarine, spreads and related products.

Raw materials

The fats and oils in a fat blend are to a great extent interchangeable. Virtually every available edible fat or oil is now used in a yellow fat product somewhere in the world. Widely different fat compositions can therefore be found in products for the same basic application. Raw material prices on the world market fluctuate considerably. Yellow fats manufacturers carefully monitor the worldwide fluctuations in raw material prices, and adapt the fat compositions in their manufacturing processes accordingly.

In flexible process lines, fat blends can easily be modified to follow market trends. This keeps the cost of raw materials down without affecting the quality of the end product.

Consumer products

In the consumer market, the most important properties relate to taste, convenience and health. The standard product, traditionally containing 80% fat, is mainly used for cooking and baking. A wide range of soft products is available, spreadable direct from the fridge. These table margarines and diet margarines vary in fat content from 80% down to 40% or lower, which is currently an attractive figure for low fat products. This makes the formula and water phase preparation even more important factors in providing the right structure and taste.

Liquid oils increase the unsaturated fat content, and butter fat or butter can be added to the vegetable fat blend to

improve flavour. Dairy blends, on the other hand, are made from butter or butter fat, with vegetable oils added to improve spreadability and make the product more appealing to consumers who focus on the unsaturated fat content.

With the right equipment and a flexible design, traditional process lines can easily be used for all these products. In low fat products, the balance between formulation and detailed process design is especially important, as the key issue is preparation of a stable emulsion. For dairy blends, minor allowances in process conditions have to be made to take into account the special crystallization properties of butter fat. Flexibility gives clear advantages as such blended products have now won widespread consumer acceptance in many consumer markets, and offer the best overall prospects for product development and market growth.

Recent developments

Among the more important developments in the yellow fats industry is an increasing tendency to supplement yellow fats with plant sterols, which are based on unsaturated fatty acids. It is claimed that the combined effect of using products where plant sterols have been added to yellow fat products and ensuring a nourishing diet reduces cholesterol levels by 10–15% within a few weeks.



Yellow fats have always played an important role in the food industry. Their use is now expanding rapidly, and the role they play is changing and developing.



grainy ghee where the crystals are formed during well-controlled, slow crystallization, giving a grainy consistency and appearance. The pre-cooled fat blend, with additives if required, is poured into cans while still liquid, with final crystallization taking place inside the cans during cold storage.

Industry distinctions melting away

In order to deal successfully with modern consumer preferences, the margarine and dairy industries are developing hand in hand, as reflected by increasing use of the term "yellow fats". What were once separate technologies, each with its own products, processes and plants, now have much in common. At the same time, more traditional market segments have to adopt modern processing techniques and standards of industrial hygiene, often resulting in a merger between techniques used in the margarine and dairy industries.

As one of the world's largest suppliers of process equipment for edible fats, Alfa Laval is equally familiar with the technologies used in both these industries. Alfa Laval has a unique know-how concerning refining processes, milk treatment and vegetable fat crystallization. Full, practical insight into process technology and thorough familiarity with both raw materials and formulations are essential to ensuring top quality in all yellow fats products and processes.

Puff pastry margarine, on the other hand, requires special combinations of fat compositions and process conditions to produce the right plasticity. Shortening normally contains no water and is basically margarine without the aqueous phase. This means there is no need to form an emulsion, because the shortening consists solely of fats, possibly with oil-soluble ingredients. To improve appearance and texture, a gas (preferably nitrogen) is often dispersed through the product during manufacture.

Another fat blend with no aqueous phase is vegetable ghee (vanaspati). This is normally found in two types – a smooth ghee with a consistency similar to shortening, produced in the same way as margarine or shortening, and a

Bakery products

With products for the baking and catering industries, the most important properties often vary according to the needs of specific applications. Most such products, including cream and cake margarines, and shortening, can easily be made in a process line with a flexible design.



Hygiene, process optimization and traceability

As part of the increasing focus on food safety, the demands as regards cleaner production conditions and more hygienic processes are constantly being tightened. Attention from both consumer organizations and politicians will inevitably affect both national and international yellow fats producers.

This will result in greater demands regarding traceability, and will even apply to the components used for a particular process installation, such as pipes, fittings and unions. A supplier who ensures that each single component is fully traceable can save considerable time and money when the time comes to validate the process line to the relevant authorities.

Every single link is important

Two of the most critical points in yellow fats production – both current and future – are improved hygiene and full traceability within the processing lines. Manufacturers of process equipment and components must live up to these demands in full if food producers are to make sure their goods reach the most attractive shelves in the supermarket.

Alfa Laval can deliver complete equipment packages that include all the necessary components, including pipes and fittings, valves, pumps, heat exchangers, tank cleaning equipment and control system interfaces. The entire package features the same top-quality workmanship. Certain key components, such as heat exchangers, are also available as fully traceable parts to ensure easier validation, if required.

This gives yellow fats producers the additional advantage of saving time and money. It brings down the cost without compromising quality because one single supplier can deliver all the components and process knowledge needed. This brings down the cost without compromising quality.



Preparing yellow fats



Unilever Hungary is already familiar with Alfa Laval know-how in this special field, where each installation is custom-built to meet specific customer requirements and give the best possible results. In 2002, Unilever Hungary placed an order with Alfa Laval for a premix installation. The result of the two

companies working together on the specifications is that Unilever Hungary now runs a complete, fully automatic premix process.

Mr Tibor Garai, Technical Director of Unilever Hungary, states: "We are extremely happy with the process equipment that Alfa Laval delivered."

Yellow fats is basically a question of mixing water and oil together. Doing it in an accurately controlled and efficient manner is the trick of the trade. All fats have specific temperatures at which crystallization takes place when they are cooled from the liquid to the solid state.

Emulsion preparation

The emulsion is normally prepared in batches, using special weighing systems to deal with the many different components used and the fat content desired. Continuous in-line proportioning of both phases and other components saves space, and either proportioning pumps or flow meters can be used.

Re-melting and emulsion pasteurization

Products with reduced fat content are sensitive to bacteria. Conventional open re-melting systems therefore suffer from infection risks and other drawbacks.

A closed rework system utilizing a plate heat exchanger, on the other hand, has the important advantage of eliminating virtually all risk of contamination, as well as saving energy, allowing easy CIP (Cleaning-In-Place) procedures and minimizing product waste.

The prepared emulsion, which includes the melted rework, is often pasteurized immediately before the margarine is cooled and crystallized. To save energy and treat the delicate emulsion gently, a plate heat exchanger with a regenerative section is often used.

Controlled pre-cooling

To ensure that the end product is of a consistently high quality, it is essential to keep the inlet temperature to the tube cooler constant, no matter how much rework there is. This is easily



done by adding a cooling section specially designed to avoid uncontrolled pre-crystallization.

However, part of the cooling that would otherwise have to be done in the tube cooler can in fact be done in the plate heat exchangers. Keeping the temperature constant at ± 1 to 2°C (± 33.8 to 35.6°F) ensures that both the tube cooler and the packaging machines further down the production line operate more smoothly, thus avoiding any untoward production disturbances and stoppages.

Cooling and crystallization

The pre-cooled emulsion is then cooled further and worked in a tube cooler, where part of the fat crystallizes, giving the desired texture. The cooler unit is designed to transfer heat efficiently and disperse water evenly in the end product.

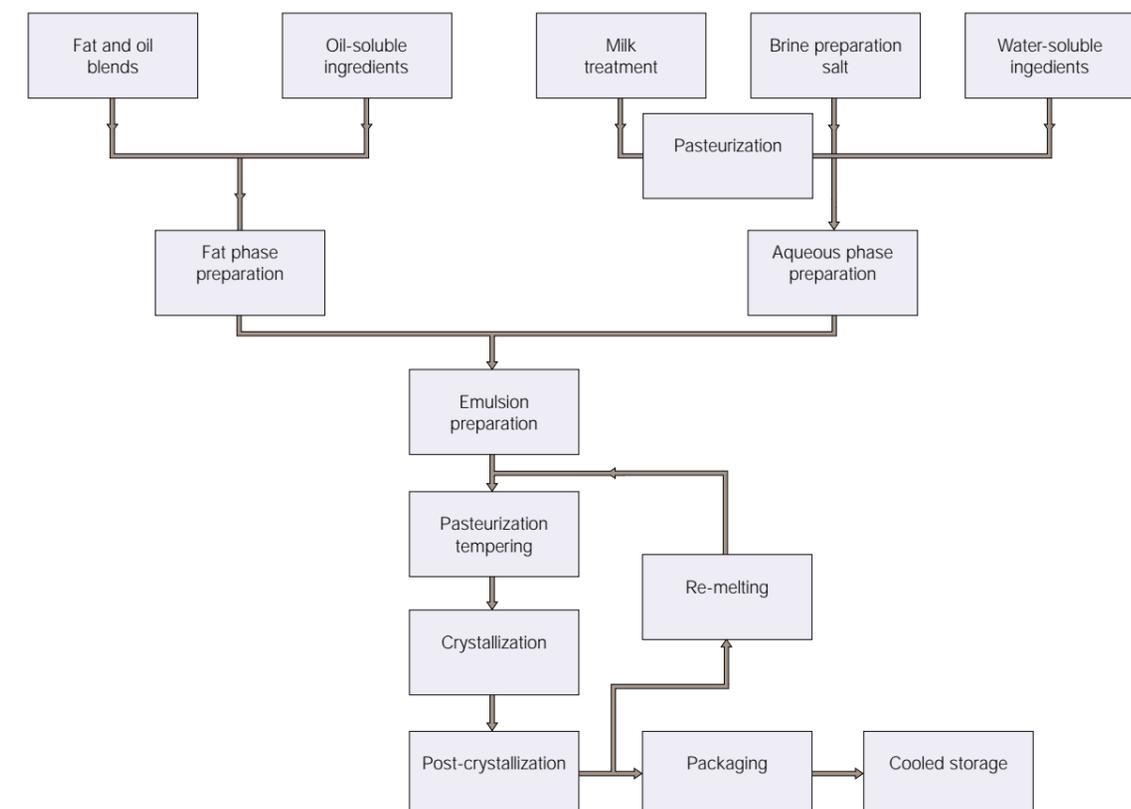
Accurate and easily adjustable cooling keeps crystallization under strict control. Cooling times and retention (holding) times can be independently varied. This flexibility provides the key to producing a wide variety of high-quality yellow fats that can be rapidly and easily adapted to meet changing consumer demands and other market developments.

Packaging and storage

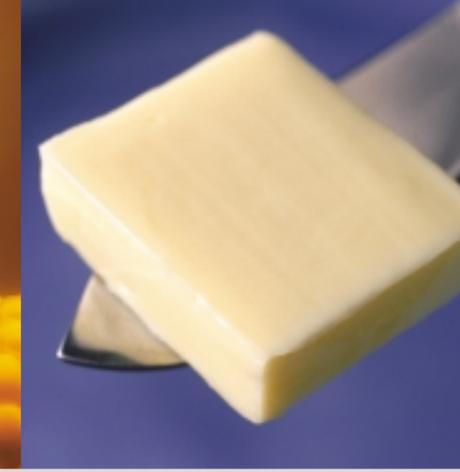
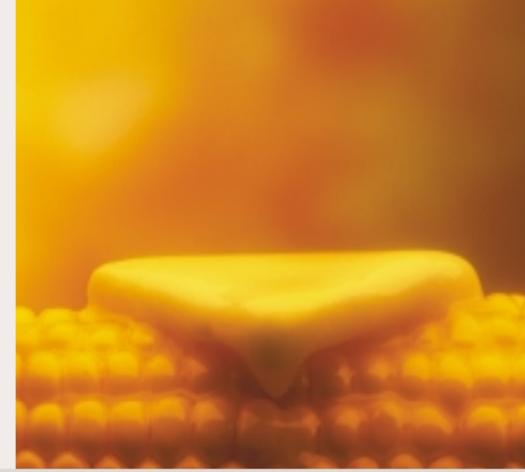
Modern packaging equipment must cope with the wide variety of package types and sizes in demand. Both the machines and the control system involved have to be selected and designed to fit in smoothly with the process line as a whole. After packaging, the products are normally transferred to a cold store to mature overnight – or longer – before distribution. This enhances product quality.



The basic principle behind margarine processing



Alfa Laval supplies many of the key modules used within the production of yellow fats. These provide customers with the assurance of many years of trouble-free production with the highest standards of reliability, durability and hygiene.



Contherm® scraped surface heat exchanger

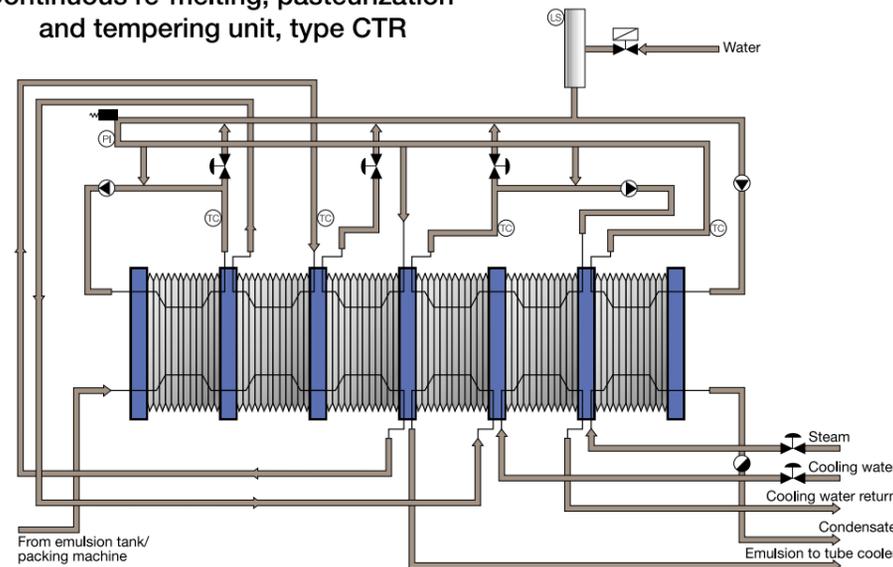
Contherm scraped surface heat exchangers are particularly suited for both crystallization and re-melting duties for yellow fats and shortening mixtures. The special rotor and blade descraping action results in a surface free from fouling and provides correspondingly high heat transfer rates.



CTR unit

The Alfa Laval continuous tempering and re-melting (CTR) unit is a specially designed plate heat exchanger in several sections, where the flow of rework margarine is continually melted and mixed with fresh emulsion for reprocessing.

Continuous re-melting, pasteurization and tempering unit, type CTR



Melting, heating and cooling are strictly controlled by built-in PID regulators to prevent any overheating or uncontrolled pre-crystallization, and to ensure a constant feed temperature to the

crystallizer. A pasteurization stage can be included for products that are sensitive to bacteriological contamination. For processing salted margarines, titanium plates are fitted.



CIP station

All Alfa Laval food plant equipment is designed to use industrial CIP (Cleaning-In-Place) procedures. Special control systems ensure that times, temperatures, flow rates and detergent volumes are exactly the same every time – which also ensures the same perfect, hygienic results every time.



Both manual and fully automatic CIP installations are available. To reduce energy consumption, the cleaning fluids are heated in regenerative plate heat exchangers. Alfa Laval CIP stations usually include a special tank for collecting emulsions, so as to recover the fat from flushing the process line.



Automated control systems

Correctly designed control systems make a crucial difference to the efficiency and profitability of yellow fats processes. It is often the control system that transforms a series of individual machines into a smoothly functioning process line.

Control systems make it possible to store all the data associated with a wide range of different combinations of products, raw materials, ingredient formulations and processes. This helps ensure that each process can be run identically every time, with immediate implementation as and when required.

Alfa Laval provides the optimal combination of custom-designed application programs and standard software packages. These are designed for ease of use as well as maximum flexibility and scalability. This makes it easy to deal with subsequent expansion or modification of the production line, in addition to future requirements for collecting and presenting data.



Nonstop Performance

A lifetime commitment



Engineering & Supply

Alfa Laval provides professional project management and execution before, during and after you order a process system or component. We are dedicated to finding the best solutions, which will maximize customer performance.

Our focus is on innovation in order to continually upgrade and improve our products and systems. Boosting performance is an important driving force behind everything we do in our business.



Parts & Service

For us at Alfa Laval, our obligation to you as a customer does not stop short at delivery. Our Parts & Service organization is there to ensure that your process always runs at peak performance. This is a commitment that extends throughout the lifetime of the system. We call it Nonstop Performance.

Nonstop Performance is based on our global network of experts, who are always on standby to provide you with genuine spare parts on site, in more than 50 countries, 365 days a year, right around the clock.

In terms of service, we speak your language. Alfa Laval service is based on a profound insight into the needs of the process industry. We see every product as part of a process and understand the role it plays within that process. We can therefore work in close collaboration with you to tailor an individual service package that matches your requirements perfectly. Service must result in bottom-line benefits. We therefore help you to calculate the savings that will result from any proposed service package, and the real-term benefits it will provide.

Challenge us to show you!

