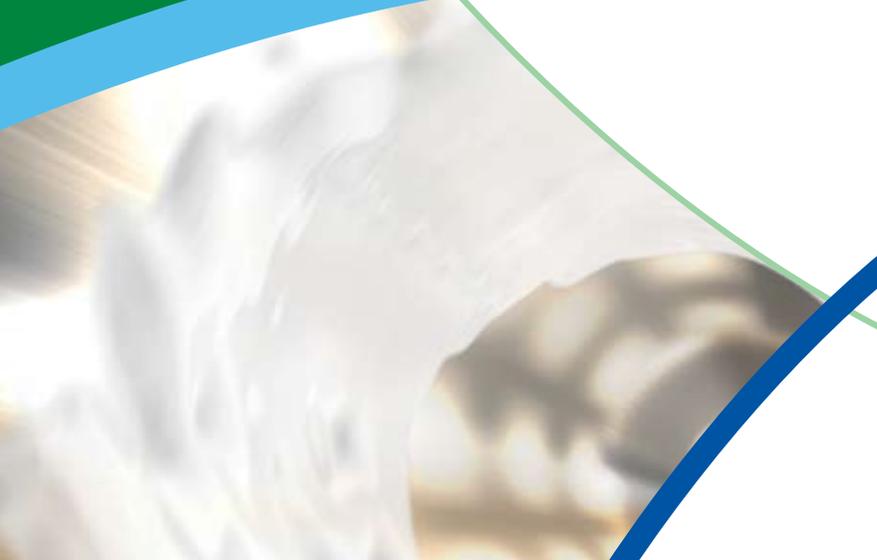


Tetra Lactenso™ Aseptic

The right UHT processing for every dairy product

- Tetra Therm® Aseptic Flex
- Tetra Therm® Aseptic VTIS



The new UHT equation

UHT processing must quickly destroy microorganisms without adversely affecting product quality. But different products may need different UHT technologies. Tetra Pak has them all, so we can offer you objective advice – and the production solution that will give you more output from less input.

Safety first

Tetra Lactenso Aseptic production solutions give you uncompromising food safety together with consistent product quality. Our UHT technology enables making tasty, nutritional dairy products safe and available everywhere, even without refrigeration. Apart from destroying microorganisms, our solutions are also about the hygienic design of equipment and consistent, controlled operation, factors that affect product quality and efficiency as well.

Adding value

To be competitive in today's dairy industry, you often need a combination of innovation and quality – and the right UHT technology. Many products involve adding value – forti-

fying with vitamins and minerals, adding fibre, omega-3 etc. By targeting specific needs, manufacturers can add more value and achieve higher margins. But such products require extreme care in production in order to achieve the right quality. Tetra Pak has the aseptic solutions that not only add value to your products, but to your production – and your bottom line.

Realizing potential

The potential profitability of ambient dairy products is great – provided you have a production solution that meets the requirements. With our new solutions, you get it all. Product quality and safety. Efficient production. Long-term sustainability. And thanks to minimized consumption of energy and other

resources, as well as minimal product losses, you not only achieve sustainability in terms of the environment, but also in terms of the long-term competitiveness of your dairy business.

Tetra Therm Aseptic VTIS and Tetra Therm Aseptic Flex systems can be included in existing production lines or as part of our complete new Tetra Lactenso Aseptic production solutions. Whatever your choice, what we deliver is backed by specified performance guarantees. And our guarantees are validated. It's part of a new equation for success.





**By targeting specific needs
manufacturers can add more value
and achieve higher margins.**



Bozena Malmgren
– part of the Tetra Pak team



Finding the right technology

There is no “right” or “wrong” UHT technology in absolute terms. Each has its merits, and each – or a combination – may be best for a specific solution, once all of the parameters are taken into consideration. It all depends on what products you make as well as how you want to operate your plant. There are four different UHT technologies for ambient dairy production on the market today:

- Direct heating via injection
- Direct heating via infusion
- Indirect heating via tube heat exchangers
- Indirect heating via plate heat exchangers

In addition, there can be certain combinations of these.

High-quality ambient dairy products depend on precise heat treatment that ensures commercial sterility without impairing flavour or nutritional value. Smooth production requires high reliability and availability. For many dairy producers, commercial success also depends on the ability to switch quickly from one product to another and offer what the market needs.

What is important, however, is that your choice is not limited by what your equipment supplier wants to deliver. That’s why Tetra Pak offers all technologies – so we can give you objective advice on which solution will work best for you.

The effects of heat

UHT treatment – the rapid heating and cooling of a dairy product – involves two crucial factors. One is that higher temperatures destroy microorganisms more quickly. The other is that the shorter the time a product is held at a high temperature, the less chemical change there will be to affect flavour, appearance and nutrition.

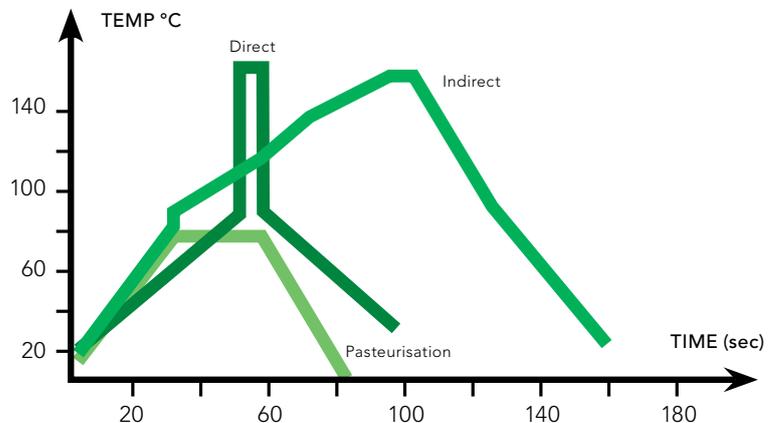
The graph here shows the temperature curves for three different processes: pasteurization, direct heating (e.g. Tetra Therm Aseptic VTIS) and indirect heating (e.g. Tetra Therm Aseptic Flex). The narrow “plateau” at the top of the latter two curves is the holding time needed to destroy the microorganisms.

Customized solutions

Tetra Pak works together with you to define your process needs and to identify the technology, the capacity and the configuration that best suits your applications and production requirements. We then offer you objective advice on a customized production solution – anything from a free-standing UHT unit to an entire new production line.

Both Tetra Therm Aseptic VTIS and Tetra Therm Aseptic Flex build on the same technical platform and both are of modular design. This assures easy upgrades and expansion, i.e. a future-proof solution.

Whatever we deliver is designed to give you more output from less input. We don’t just say this. We guarantee it. And the performance of our equipment is validated. After testing at our plant and implementation at your site, we are always available to provide support and advice during years of operation.



The right technology for your products & production

Tetra Lactenso Aseptic production solutions are customized to meet your UHT dairy product and production needs. Here is an outline of the different UHT technologies. It's your needs that determine what's right for you!

Tetra Therm Aseptic Flex indirect heating solutions

The most cost-effective method of UHT processing is by indirect heating based on plate or tubular heat exchangers. Tetra Therm Aseptic Flex systems combine efficiency with versatility, and are the preferred choice of many dairies for UHT processing of milk, flavoured milk products, cream and yoghurt drinks. Also suitable for other applications such as juice, nectar and tea.

The benefits include:

- Low energy and water consumption
- High availability (up to 40 hours' running time)
- Highest operational efficiency of any indirect UHT system on the market
- Optimized product quality
- Low environmental impact
- Uncompromising food safety

How it works

After pre-sterilization, the product is pre-heated with regenerated heat produced from cooling the downstream product. Normally, homogenization takes place prior to final heating. Final UHT heating is done in a heat exchanger and the product is held in a holding tube for the required period of time. The product is then cooled to the filling temperature, and the energy efficiency is optimized by heat regeneration. The high heat recovery and heat transfer efficiency assure the lowest possible running cost.



Tetra Therm Aseptic VTIS direct heating solutions

Tetra Therm Aseptic VTIS processes are based on direct contact with culinary steam, via either injection or infusion. They offer state-of-the-art continuous, aseptic processing for heat-sensitive products such as milk, enriched milk, cream, formulated dairy products. They can even be used for soy milk, ice cream mix and dairy desserts as well as extended shelf life (ESL) products.

The benefits include:

- Superior product quality
- High availability (running time 40 hours or more)
- Highest operational efficiency of any direct UHT system on the market
- Low environmental impact
- Uncompromising food safety

How it works

After pre-sterilization, product is preheated in a plate or tubular heat exchanger. By limiting indirect heating to below 80°C, the risk of high-temperature fouling is eliminated. The product is then instantaneously heated to the required UHT temperature by culinary steam in direct contact with the product via the ring nozzle steam injector or in the steam infusion vessel. After an ultra-short heating time, followed by a few seconds of holding time, the steam is flashed off in a vacuum vessel, causing the product to cool rapidly. Aseptic homogenization optimizes product stability and texture. The product is then cooled to the filling temperature, and the energy efficiency is optimized by heat regeneration.

This process ensures minimal impact on the taste, colour and nutritional value of the product. The system is designed for variable capacity to ensure production flexibility.



Features that deliver

Tetra Therm Aseptic Flex and Tetra Therm Aseptic VTIS share certain features, but obviously also have some differences.

Shared features

Total control and efficiency

Tetra Therm Aseptic Flex includes a user-friendly, PLC-based control system providing a complete overview and automation of the entire process. Temperature and pressure can be set at all points in the process, providing complete process control at every stage. Automation of the entire process reduces the risk of operator error. For a control room solution, the optional Tetra PlantMaster provides user-friendly automation for production reports, data logging and full traceability. It also facilitates preventive maintenance.

Total safety

To assure food safety, there is always overpressure on the aseptic side. Additionally, the new Cold Spot design (scientific calculation of when the coldest spot of each

component to sterilize is reached) enables safe reduction of pre-sterilization times. The highly effective CIP can be complemented with Aseptic Intermediate Cleaning to minimize fouling and IntelliCIP (see separate section). Moreover, with the optional Tetra PlantMaster, you get full traceability.

Optimized design

Tetra Therm Aseptic Flex can be optimized to any dairy product and production requirements, including fast and safe product changeovers. This enables solutions that are ideal for production of different products and capacities.

Aseptic Energy Hibernation mode

When the Tetra Therm Aseptic Flex unit is in sterile water circulation for more than a set

time, it automatically enters the Aseptic Energy Hibernation mode. This cuts the amount of energy and cooling water during sterile water circulation by up to 75%.

IntelliCIP

– the product-adapted CIP program

This feature adjusts the cleaning sequence to what is required, not more, not less. Production parameters are continuously monitored and the adequate CIP program is calculated. This enables you to maximize uptime and safeguard the CIP result, as the CIP sequence is based on parameters from the previous production run.

Tetra Therm Aseptic Flex features, indirect heating

Flavour protection

Gentle UHT treatment is achieved by a minimum temperature difference between the heating medium and the product, protecting delicate aromas and flavours. Rapid cooling to package temperature is achieved by returning downstream heat to unprocessed product.

Efficient heat transfer

The Tetra Therm Aseptic Flex offers several types of Tetra Spiraflo multi-tube heat exchangers all with the floating shell and tube design that eliminates cracking due to thermal expansion, thus increasing product safety and production reliability. The Tetra Spiraflo

CMR model is specially designed for cost-effective production with direct product-to-product heat regeneration while the Tetra Spiraflo CM gives optimal flexibility and extended run times. The unique “turbo” tubes give a higher flow velocity, greater heat transfer area, and faster heating and cooling with improved product quality as a result. Configurations can be easily upgraded or changed to accommodate new applications and/or capacities. The Tetra Therm Aseptic Flex can be equipped with a Tetra Plex plate heat exchanger as an alternative for certain products and where long production times are not required.

Homogenization

Tetra Alex homogenizers are designed to deliver smooth products of consistently high quality throughout a long service life with low maintenance, high energy efficiency at low noise levels, minimum power consumption, and easy maintenance access.

Tetra Therm Aseptic VTIS features, direct heating

Steam injection

The ring nozzle steam injector heats the product in about 0.10 seconds. The combination of a high sterilization temperature and a short heating time ensures that microorganisms and spores are killed or deactivated with minimal impact on the taste and colour of the product.

Combining with steam infusion

Whipping cream and products containing stabilizers can benefit from Tetra Pak's infusion technology. The system includes several unique and patented features:

- An air layer insulates and protects the distribution plate at the product inlet to maximize running time.
- A unique steam distribution for reduction of fouling and optimization of running times.
- Variable holding cell enabling 1:2 capacity adjustment during production.

Flash cooling

The steam is flashed off in a vacuum vessel, enabling rapid cooling of the product. In addition to requiring less floor space, the unique and compact vacuum vessel design with a built-in condenser means quick and efficient pre-sterilization and cleaning. De-aeration in the vacuum vessel improves taste with no off-flavours.

Efficient pre-heating

The type of indirect pre-heating that is best for a particular application is determined by several factors, e.g. product viscosity, running times and maintenance costs. Tetra Therm Aseptic VTIS systems offer tubular or plate heat exchangers to ensure the best possible pre-heating for each product.

Aseptic homogenization

The Tetra Alex Aseptic homogenizer – vital for a direct UHT system – is designed to deliver smooth products of consistently high quality throughout a long service life with low maintenance, high energy efficiency at low noise levels, all hygienically designed with aseptic safety as the top priority.



Enabling you to get more

Tetra Lactenso Aseptic – of which Tetra Therm Aseptic UHT systems are one part – represents the new generation of UHT production solutions. The idea is to enable you to achieve greater production availability, efficiency and flexibility. With consistent product quality and uncompromising food safety and in a way that is sustainable both for the environment and for your business. In short, Tetra Lactenso Aseptic means a new equation – one that helps you to get more dairy output from less input.

Guaranteed and validated

Tetra Lactenso Aseptic solutions are the result of close, long-term relations with dairy customers worldwide, combined with our own extensive knowledge and experience of dairy products and processes. All this has given us a real, in-depth understanding of your needs and wishes. Regardless of the solution that turns out to best suit your product and production needs, we feel certain that we can enable you to grow your business.

And we do more than talk. We guarantee performance on the parameters that make a difference in your operation, because we believe in keeping our promises. What's more, our guarantees are validated.

Down to reality

Since our solutions are customized, no two are alike. But these two actual customer cases are good examples of what we might be able to do for you.

Case 1: The problem

A dairy in Northern Europe produces 50,000 litres of UHT milk and 50,000 litres of 40% whipping cream a day, but product losses were eating away profits.

Case 1: The solution

Tetra Therm Aseptic Flex cut product losses drastically, thanks to a double balance-tank system together with a reduced bottom tank diameter that gave a sharp interface during change-overs. The flow control during filling and emptying counts and traces every litre

through the system. As a result the product loss was reduced by 40% and the total UHT operating cost was cut by 9%.

Case 2: The problem

A customer in Southern Europe was experiencing uneven product quality of their UHT milk caused by the variable capacity of their Tetra Therm Aseptic VTIS. (The holding time for a UHT unit with variable capacity will increase as the capacity is reduced.) Yet the variable capacity was needed to supply different filling machines in operation.

Case 2: The solution

The Tetra Therm Aseptic VTIS was equipped with automatic control of the F0 value (effect of time/temperature combination). The longer holding time at reduced capacity was compensated by an automatic reduction in temperature, a constant F0 value and a 25% reduction in the lactulose value. In addition to the high product quality consistency, the savings from reduced steam consumption was € 4,000 per year.



We make it our motto

The Tetra Pak motto – PROTECTS WHAT'S GOOD – is about ensuring the solutions we deliver will enable our customers to protect product quality and safety, to protect production efficiency and profitability, and to do so in a way that helps to protect the environment. It's all part of the equation that can help to protect the long-term profitability of your dairy business.

Local presence worldwide

With an installed base of over 2,500 Tetra Therm Aseptic units worldwide, Tetra Pak works locally with dairy producers, providing solid, long-term technical support.

We reserve the right to introduce design modifications.
Tetra Pak, , PROTECTS WHAT'S GOOD, Tetra Lactenso, Tetra Spiraflo, Tetra Therm, Tetra Plex,
Tetra PlantMaster, Tetra Alex and Tetra Alsafe are trademarks belonging to the Tetra Pak Group.

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 **Tetra Pak**