Tetra Pak® Indirect UHT unit PFF with coiled heat exchanger

Unique coiled heat exchanger solution gives outstanding product quality and flexibility.

Highlights

- High and consistent product quality
- Unmatched pressure rating up to 300 bar
- Pipe through-connection of product pipe to avoid cracks due to thermal expansion
- Maximum flexibility from a wide variety of product- and processing-specific options
- Low-loss balance tank function for minimized mix phases
- Ensures uncompromising food safety, due to high hygienic design and adaptable cleaning program
- Optimizes operational efficiency through long running time and minimized energy consumption

Application

Tetra Pak® Indirect UHT unit PFF with Tetra Pak® Coiled Heat Exchanger is a processing unit for highly efficient, continuous ultra-high temperature treatment of prepared food products. The unit is of aseptic design and uses a Tetra Pak Coiled Heat Exchanger for indirect heating to obtain a product that can be stored at ambient temperatures. The unit is suitable for high viscous prepared food products with or without particles such as desserts, fruit preparations, soups, sauces, tomato preparations and baby food, as well as other low- or high-acid viscous products. And is available as a standalone unit or as part of a complete line solution.

Maximizing versatility and efficiency

Tetra Pak® Indirect UHT unit PFF makes it possible to produce high-quality products with low operating costs. The unit optimizes energy consumption by using water-loop heat regeneration design on the water side, when applicable.

Tetra Pak® Coiled Heat Exchanger is a unique heat exchanger with a patented design that minimizes service and maintenance costs. It comes in a number of sizes, depending on product and capacities, each thoroughly calculated for optimized results.

The unit offers optimal versatility and the possibility to produce a wide range of products that can be either smooth or contain particles of up to 25 mm in diameter. Advanced automation reduces human error and maintains product quality. Process parameter logging enables traceability for food safety.

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Working principle

The module is fully automated using PLC control for safe operation and production.

The operation can be divided into four steps:

- Pre-sterilization
- Production
- Intermediate cleaning
- Cleaning-in-place (CIP)

Before production can start, it is necessary to sterilize the unit's aseptic area by circulating pressurized hot water. An internal sterilizing loop minimizes energy consumption and start-up time. After sterilization, the unit is cooled step by step to production temperature. Lastly, sterile water is circulated through the unit.

When the receiving equipment is ready, production starts by filling the unit with product, displacing the water to drain. The water/product mix phase can be sent to drain or a reject tank. Thereafter, production is continuous.

If product supply or receiving equipment fails, sterile water displaces the product and the UHT unit goes into sterile circulation. The product is heated in a coiled heat exchanger by an indirect hot water circuit and passes through a holding tube for the required period of time.

A temperature guard automatically monitors product temperature after the holding tube. If the temperature drops below the preset level, an alarm is activated, production automatically ceases and the receiving equipment closes. Cooling to filling temperature takes place in a coiled heat exchanger.

To prolong the production period between CIP, intermediate cleaning can be performed. When intermediate cleaning is selected, sterile water displaces the product before cleaning starts. During the intermediate cleaning sequences, the holding tube is kept at the sterilization temperature, meaning that aseptic parts of the UHT unit remain sterile. Intermediate cleaning can be performed either with lye only or lye and acid flush. This enables longer available production time in the UHT unit before full CIP is required. After each production run, the UHT unit undergoes CIP with both lye and acid. The CIP sequences can be configured for optimal cleaning results.

Processing parameters

Temperature program and capacities are specific for each application.

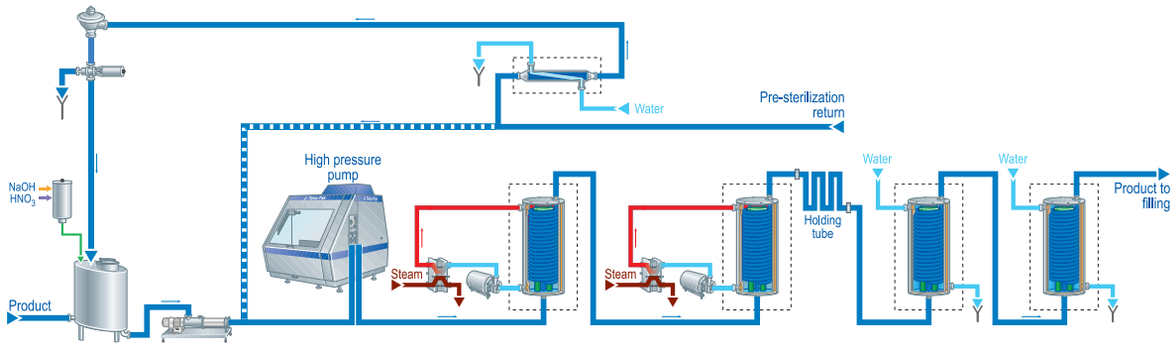
Capacity

The capacity range depends on the application. Typical capacities range from 2 000 l/h to 15 000 l/h. For detailed information, please contact your Tetra Pak representative.

Scope of supply

- Product balance tank with level control
- Frequency controlled positive product pump
- Centrifugal water pump
- Product flow meter
- Water flow meter
- Centrifugal CIP booster pump
- Free-standing Tetra Pak® Coiled Heat Exchanger (CHE) with floating connections, coils made of Duplex 2205 material
- Hot water circuit, including brazed PHE, pump, steam valve and trap, expansion vessel, shut-off valves, etc.
- Control panel in stainless steel including process controller (PLC), solenoid valves and motor starters
- Automated PLC operated sequences
- Automated process interaction with downstream equipment
- Automated fault supervision and action for pumps, temperatures and diversion valve
- Frequency converters, mounted on the frame
- Pre-wired signal/power cables
- Pneumatic, remote-controlled sanitary valves
- Product piping in AISI 316
- Set of pipes, bends, valves, internal signal wiring, pipes for signal wiring and fittings required for pre-erection of the system
- Factory pre-assembled and tested before delivery
- Engineering, programming
- Technical documentation in European Economic Area (EEA) official languages

Example flowchart



Optional features

Automation and control

- PLC control system: Siemens
- 21" industrial PC operator panel mounted in control cabinet
- Free-standing PC as operator interface (GUI)
- Tetra Pak® PlantMaster integration
- Uninterrupted power supply (UPS)
- Control panel air cooling
- Digital paperless recorder

Production

- Automatic CIP of balance tank
- Energy hibernation (EH) for reduced energy consumption
- Temperature control to various heating section
- Insulation of heat exchangers
- Heat recovery

Special food treatment

- Alternative product feed for particulated products
- Hibernation mode
- Deaerator for product quality and long running time
- Multiple holding tubes
- TetraPak® Homogenizer for product quality

Food safety

- Integrated leakage test
- Positive product pressure and pressure supervision

Deaerator

- Deaerator on separate skid
- Closed water loop for cooling of deaerator condenser
- Closed water loop on deaerator vacuum pump

Homogenizer

- Aseptic homogenization
- Aseptic or non-aseptic, changeable by swing-bends
- Split homogenization

Cleaning-in-place (CIP)

- CIP from CIP station or from internal CIP system
- Internal CIP system with automated addition of CIP detergent into the balance tank via ratio dosing or header batch system
- CIP recipe editor with possibility to design unique cleaning recipes
- Ratio dosing of CIP detergents
- Conductivity switch for supervision of CIP media change
- Back-flush cleaning of heat exchanger for products containing fibres

Technical documentation

- Non-EEA languages
- CE marking for countries outside the EEA

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Example of production parameters for typical prepared food products

	Soup w particles	Apple puree w apple
Product inlet temperature:	70°C	4°C
Sterilization temperature:	143°C	143°C
Holding time (Volumetric):	240 s	150 s
Product outlet temperature:	20°C	25°C
Pre-sterilization temperature:	140°C	140°C
Pre-sterilization time:	30 minutes	30 minutes

Consumption data for processing of soups with particles*

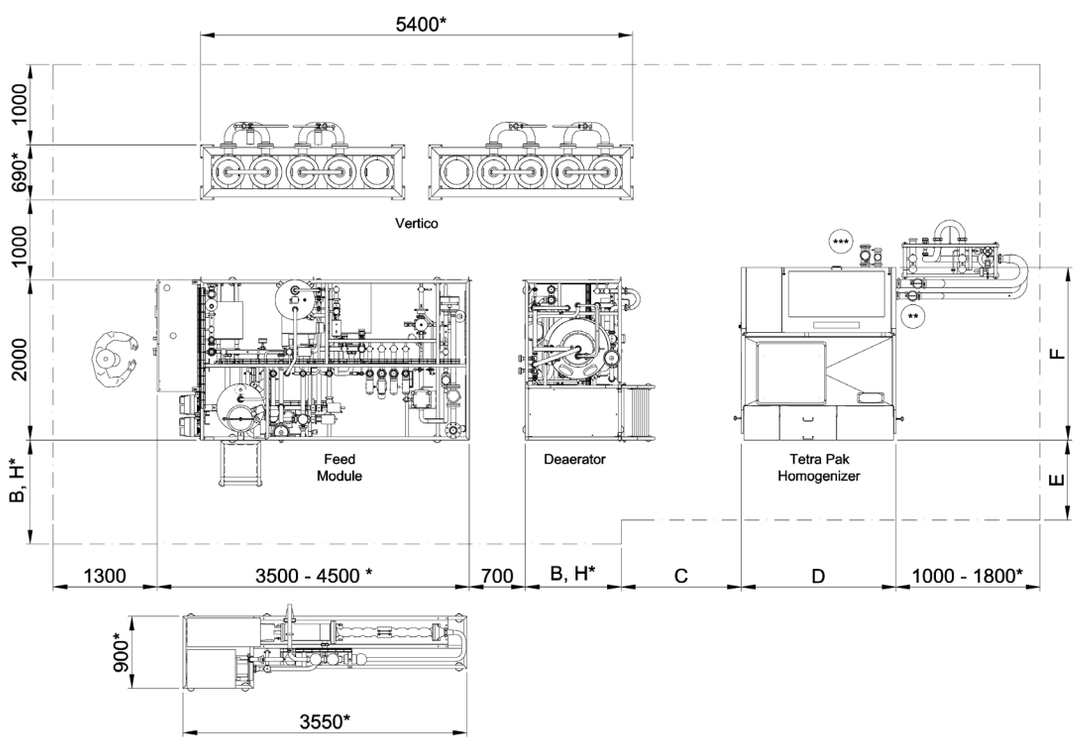
		2 000 l/h
Steam 600 kPa	kg/h	290
Heater	kW	180
Tower water	l/h	25 000
Pre-cooler 1	kW	210
Tower water	l/h	7 200
Pre-sterilization cooler	kW	140
Ice water	l/h	10 000
Final cooler	kW	90
Potable water	l/h	15,000
Production/CIP	l/h	2 000 / 13 000
Installed power	kW	50

*Consumption data are indicative.

Steam consumption is given at the nominal flow in the product production phase. Steam consumption can be increased during start-up, pre-sterilization and cleaning. Steam supply lines should be dimensioned for twice the normal consumption.

Cooling water is used to cool the product in the production phase as well as for cooling in the pre-sterilization of the module during start-up These two consumptions do not occur simultaneously and the figure indicated corresponds to the higher of these loads.

The potable water specified indicates the consumption during the cleaning phase as well as water used for water-flushed seals, etc. Potable water used for product mixing and preparation is not included in the figure stated.



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