

# Géminia<sup>®</sup>

## TUBULAR PASTEURISING UNITS



Géminia<sup>®</sup>  
Procesos Alimentarios, S.L.

At Gémina we are aware of the importance of developing pasteurisation methods and techniques that are aligned with the food industry's constant innovations and modern day needs.

For this reason, one of our main professional specialisations consists of assisting the work of our clients through the development of plans for and the construction of sterilising plants adapted to each particular product requirement.

We manufacture different types of pasteurisers, adapted to product requirement and needs. In this way, we distinguish among four main unit types: single tube, pyrotubular (shell) or multi-tube, annular and high pressure annular pasteurisers. The

choice depends on the type of process and product. Rheological data such as viscosity, thermal transfer, density and heat capacity provide the essential information for the selection of the type of heat exchanger. For example, a high pressure annular pasteuriser would be needed in cases where viscosity levels are greater than 2,000 centipoise.



## Operating principles

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Basically, the pasteurization process consists of putting the product (milk and by-products, creams, juices, concentrates, soups, eggs and by-products, or any other type of fluid food product) through a controlled treatment of temperature increase followed by a cooling phase, so as to obtain an optimal sterilization of the product without losing its sensory characteristics, nor its richness in vitamins, proteins and nutrients.



## WORKING PRINCIPLE

### A.1 SINGLE TUBE PASTEURISERS

- Sterilisation of products with low pH (<5).
- Sterilisation of products with high grade of particles, fibres, and large pieces.
- Fruit pulp.
- Cubed fruit and vegetables.

### A.2 PYROTUBULAR PASTEURISERS

- Liquids.
- Fruit juices with high fibre content and pulps (orange with bits, peach juice, tropical fruit juices, pineapple with bits, etc.).
- Gazpachos.
- Soups (squash, vegetables, meat, etc.).

### A.3 ANNULAR PASTEURISERS

- High viscosity creams.
- Cubed tomatoes or tomato cubes.
- Fruit and vegetable concentrate/paste.
- Any product applicable to single tube uses in cases with large processing quantities requirements.

### A.4 HIGH PRESSURE ANNULAR PASTEURISERS

- Tomato concentrate.
- Orange bits.

\*With high viscosity products static stirrers are installed which generate high turbulence and prevent the product from adhering to the walls of the exchanger, preventing the product from burning and keeping intact its flavour properties.

## ADVANTAGES

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### B.1. SINGLE TUBE PASTEURISERS

- Low cost sterilising system.
- It allows for the sterilisation of large products (fruit slices, vegetables, ratatouille, cubes, strawberry, formula products, thick cut bitter orange marmalade, etc.).

### B.2. PYROTUBULAR UNITS

- Possible integration of a circuit for indirect recovery which eliminates 'dead' areas without cleaning, and energy recovery of up to 80%.
- High thermal performance: a single tube allows for large surfaces.
- Flash pasteurisation.

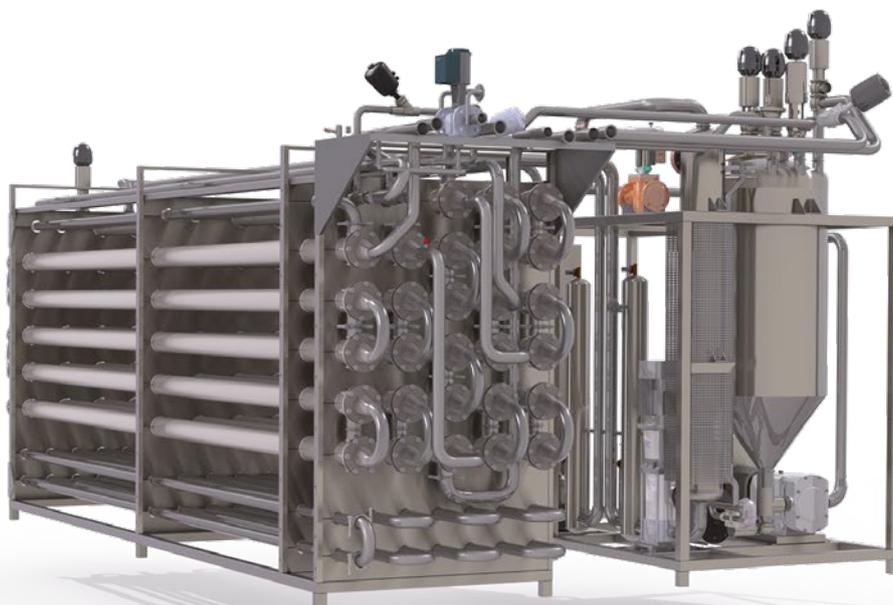
### A.3. ANNULAR PASTEURISERS

- Single flow, which avoids the creation of preferential flow with associated increases in heat transfer, low fouling coefficient, and high efficiency.
- Pump types adaptable to the type of work:
  - Up to 30 bar positive transfer pumps.
  - Piston pumps over 30 bar and up to 300 bars (high pressure).

## FEATURES AND ADVANTAGE

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- Design adapted to client requirements: in all Gémina projects we strive to achieve the integration of the new equipment in a way that perfectly suits customers' production facilities.
- Mounted on a modular chassis, a module comprises of a heat exchanger and another one comprises the tanks, pumps and the electrical box with control circuit. This design enables future expansions.
- Rejection recovery system: optimised whole use of the product, without losses.
- Simplicity and ease of learning and handling of the automated system: our aim is to facilitate workers' tasks. Due to this, we apply the principles of rationality, ergonomics and functionality which to all our manufacturing methods.
- Designed and manufactured complying with the high hygiene standards recommended by EHEDG (European Hygienic Design Group), and 3A (USA norms).
- Technical assistance via internet: Focused at effectively solving all of our clients' technical difficulties.
- Efficiency: total control of pasteurising processes with double testing of the process' temperatures.



# TECHNICAL MANUFACTURE DETAILS

**Automation:** wide range of processes; from HMI (Human Machine Interface) to SCADA.

Optimal integration of IT solutions, for example with applications of MES levels (Manufacturing Executing Systems) and ERP (Enterprise Resource Planning).

Integration to other systems, fieldbus, ASI- Bus, Profi-Bus and Ethernet.

We offer the greatest ease of connectivity and implementation of IT systems for process control.

On-line supervision and control of all the automated process.

**Soldering:** heat exchangers are soldered inside inert environments and with automated soldering processes.

**Components:** made with the highest quality components on

the market.

**Materials:** AISI 316 materials are used in all areas of contact with the product, and AISI 304 on remaining areas. All components used are FDA approved.

**Treatments:** passivation treatment which reduces surface corrosion.

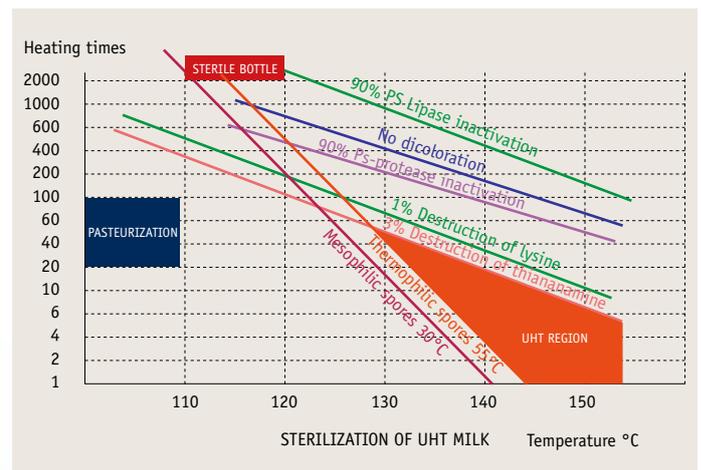
**Assembly:** pre-mounted on chassis, reducing start-up times at factory.

**Excellent surface finishes:** with roughness of interior finishes of less than  $Ra < 0.8$  mm.

**Cleanness:** Design without 'dead' zones (internal screws, joints, etc.). All elements designed for reliable and safe production.

## WHAT MAKES US UNIQUE?

The calculation and recording of sterilisation factor  $f_0$ . This factor is determined by the exposure time and the sterilisation temperature at which the product is treated. Based on both parameters the intensity of heat treatment is determined. The curves represent the lethal effect for varying types of pathogenic bacteria.



## ADVANTAGES

- Real time control of pasteurisation or sterilisation processes.
- Real time graphical display of the above diagram, which indicates the current stage of sterilisation of the product being processed.
- Audit solutions: f0 factors reports can be stored or printed out.

## OPTIONAL KIT: DEAREATOR

### Design

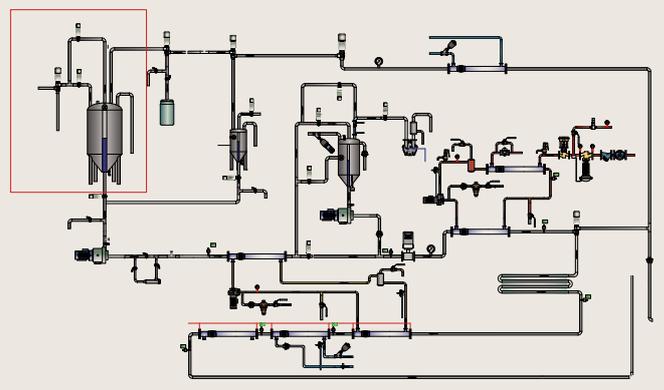
Fittings for removing dissolved air in products.

Depending on the phase previous to pasteurisation, the product could enter the pasteuriser with a high level of dissolved air content. For example, the extraction phase triggers high air dissolution in the product.

Not all products have the same oxidation resistance index produced by diluted air. Some products are very sensitive which in turn alters the organoleptic properties which influence their quality.

DIAGRAM. Pasteurizer with deaeration

Capacity 16.000 L/H. Temperature at full-load 25°C



## MODELS

### Tubular pasteurisers: Creams and smoothies

MODEL	CAPACITY LITRES / HOUR	PRODUCT	SYSTEM	IMPULSION	MAX PROCESS TEMPERATURE	ENTRY TEMPERATURE OF PRODUCT	HEATING MEDIUM	CONTROL	HOLDING	VISCOSITY
JC-T-/250-B	250	juices, fibres<15%	Multi tubular	Centrifuge	95°C	>5°C <30°C	Hot water	Semi-automatic	30s-60s	Less than 600 cps
JC-T-/500_B	500	juices, fibres<15%	Multi tubular	Centrifuge	95°C	>5°C <30°C	Hot water	Semi-automatic	30s-60s	Less than 600 cps
JC-T-/1000-B	1000	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Semi-automatic	30s-60s	Less than 600 cps
JC-T-/1500-B	1500	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Semi-automatic	30s-60s	Less than 600 cps
JC-T-/2500-B	2500	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Semi-automatic	30s-60s	Less than 600 cps
JC-T-/4500-B	4500	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T-/6500-B	6500	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T-/8500-B	8500	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T-/1200-B	12000	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T-/15000-B	15000	juices, fibres<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T-/xxxx-B	xxxx	juices, fibres<15%	Multi tubular	Positive	xxxxx	xxxx	Steam	Automatic.	xxxx	

# Tubular pasteurisers: Creams, fibres and high viscosity products

MODEL	CAPACITY LITRES / HOUR	PRODUCT	SYSTEM	IMPULSION	MAXIUM PROCESS TEMPERATURE	ENTRY TEMPERATURE OF PRODUCT	HEATING MEDIUM	CONTROL	HOLDING	VISCOSITY
JC-P- /1000-A	1000	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Semi-automatic	30s	Less than 600 cps
JC-P- /1500-A	1500	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Semi-automatic	30s	Less than 600 cps
JC-P- /2500-A	2500	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Semi-automatic	30s	Less than 600 cps
JC-P- /4500-A	4500	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 600 cps
JC-P- /6500-A	6500	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 600 cps
JC-P- /8500-A	8500	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 600 cps
JC-P- /1200-A	12000	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 600 cps
JC-P- /15000-A	15000	juices, fibre<15%	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 600 cps
JC-P- /xxxx-A	xxxx	juices, fibre<xx%	Multi tubular	Positive	xxxxx	xxxx	Steam	Automatic.	xxxx	
JC-T- /15000-B	15000	juices, fibre<15%	Multi tubular	Positive	120°C	>5°C <30°C	Steam	Automatic.	30s-60s	Less than 600 cps
JC-T- /xxxx-B	xxxx	juices, fibre<15%	Multi tubular	Positive	xxxxx	xxxx	Steam	Automatic.	xxxx	



## Tubular pasteurisers: Low fibre content concentrates

MODEL	CAPACITY LITRES/HOUR	PRODUCT	SYSTEM	IMPULSION	MAXIUM PROCESS TEMPERATURE	ENTRY TEMPERATURE OF PRODUCT	HEATING MEDIUM	CONTROL	HOLDING	VISCOSITY
JC-P-/2500-C	2500	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Semi-automatic	30s	Less than 1500 cps
JC-P-/4500-C	4500	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 1500 cps
JC-P-/6500-C	6500	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 1500 cps
JC-P-/8500-C	8500	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 1500 cps
JC-P-/1200-C	12000	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 1500 cps
JC-P-/15000-c	15000	Concentrated, low in fiber	Multi tubular	Positive	110°C	>5°C <30°C	Steam	Automatic.	30s	Less than 1500 cps
JC-P-/xxxx-C	xxxx	xxxx	Multi tubular	Positive	xxxxx	xxxx	Steam	Automatic.	xxxx	Less than xxxxcps

## Tubular pasteurisers: Orange bits

MODEL	CAPACITY LITRES/HOUR	PRODUCT	SYSTEM	IMPULSION	MAXIUM PROCESS TEMPERATURE	ENTRY TEMPERATURE OF PRODUCT	HEATING MEDIUM	CONTROL	HOLDING	VISCOSITY
JC-P-/2000-CL	2000	Orange bits	Annular	Positive + piston	105°C	>5°C	Steam	Automatic.	30s-60 sg	120 bar
JC-P-/5000-CL	5000	Orange bits	Annular	Positive + piston	105°C	>5°C	Steam	Automatic.	30s-60 sg	120 bar
JC-P-/8000-CL	8000	Orange bits	Annular	Positive + piston	105°C	>5°C	Steam	Automatic.	30s-60 sg	120 bar
JC-P-/xxxx-CL	xxxx	xxxx	Annular	Positive + piston	xxxxx	xxxx	Steam	Automatic.	xxxx	120 bar

## Tubular pasteurisers: High fibre content concentrates

MODEL	CAPACITY LITRES/HOUR	PRODUCT	SYSTEM	IMPULSION	MAXIUM PROCESS TEMPERATURE	ENTRY TEMPERATURE OF PRODUCT	HEATING MEDIUM	CONTROL	HOLDING	VISCOSITY	WORKING PRESSURE
JC-P-/5000-AP	5000	Tomato concentrate 38 brix	Annular	Positive + piston	120°C	>45°C	Steam	Automatic.	30s-60 sg	Less than 3000 cps	300 bar
JC-P-/8000-AP	8000	Tomato concentrate 38 brix	Annular	Positive + piston	120°C	>45°C	Steam	Automatic.	30s-60 sg	Less than 3000 cps	300 bar
JC-P-/xxxx-AP	xxxx	xxxx	Annular	Positive + piston	xxxxx	xxxx	Steam	Automatic.	xxxx	Less than xxxxcps	300 bar

# Our company



GÉMINA Procesos Alimentarios, S.L. is located in Jumilla, Murcia, a Spanish autonomous region which is a model in food production.

GÉMINA has 25 years of experience in designing, making and integration of systems which offer innovative solutions for the food sector industry.

*You imagine and,*  
**we do it.**



## BUSINESS LINES

### Design and manufacture of machinery

- Design, manufacturing and integration of process equipment and food aseptic packing.
- The Manufacture is completely carried out in our installations.
- All our machinery has CE safety certificate and complies with the most exigent standards.
- I+D+i: We bet on technology innovation.

### Engineering and design of processes: Projects management

In Gémima, we love our work and, therefore, our engineering department includes from the design, the calculation, the manufacture, the assembly, the automation and the start up of machines and installations. Therefore, we include a global and integral management of all our projects.

We care of every detail of the process and we advise our clients to optimize their product elaboration procedure. Gémima designs every process adapting it to the customers' requirements and standing out our customers' products among their competitors.

- Versatility and flexibility: we can plan from a plant, a simple line expansion to the installation of an equipment in a process.
- Ability of adaptation to different places and circumstances.
- Our engineering department has a big technical capacity and a long experience in this area.
- Gémima guarantees your success because we manage the whole project, reducing risks, costs and deadlines

# Services Provided

## 1 - Technical assistance service: Alfa-Laval official technical and distributor service

- Maintenance service.
- Installation service.
- Calibrations.
- Replacement parts services.
- "Training" service.
- Online monitoring of production process and breakdown resolution.

## 2 - Automation and Robotics

- Automation of custom-made processes: integral solutions.
- Total Control of the process: SCADA systems, record and control of data.
- Custom-made robotics applications: different solutions for different necessities.

## 3 - Food Quality

- Optimization, development and validation of processing and packing equipment, besides of food elaboration processes.
- Consultancy for implantation of standards such as: BRC, IFS: ISO 22.000, FSSC...
- Product development [process + formula].

# Customer Service

Gémina is characterized by its exclusive and permanent customer service. Our vocation is to become part in an operational way of the companies which we work.

Our closeness, technical competence, wide experience and self-confident are some of the main features why our costumers place their trust into our equipments and services.



# Industries

Industrial sectors where GEMINA develops its projects:

- Dairy industry
- Tomato industry
- Juice and drink industry
- Vegetables and fruits industry
- Citrus fruits industry

# Products catalogue

## Aseptic fillings

Aseptic machine which fills metal drums with pre-sterilised bags which have pressurised cap. Besides, it also fills carton containers

## Bag in box

Aseptic filling automatic feeding of pre-sterilized bags which have pressurized cap and a low volume (1-20 liters)

## Extractors

Processing of a wide variety of products to get a puree free of seeds and peels.

Different methods of using: extractor or refiner

## Heat exchanger

We offer all kind of models and designs, from single-tube to partial ones or rough surface exchangers.

## Forced circulation evaporators

Concentrators which have great capacity and performance for products having great viscosity and a high content in solid matter. Multiple stages which are adapted to the process and needs.

## Hot/cold break units

These units process tomato puree and tomato paste guaranteeing the total or partial deactivation of the pectolytic enzymes and allowing the preservation of the pectine.

## Laboratory pilot plants

Pasteurization and aseptic packing in the laboratory of small product samples, such as juices, soda drinks, vegetable creams, soups, etc.

## Tubular pasteurizer

Project and constructive development of pasteurization plants adapted to different needs.

## UHT

Low-acid liquid products (pH>4.5 for milk pH>6.5) are treated at 135-150°C for a few seconds with indirect heating or direct steam injection.

## Heaters and coolers

Heating of products before getting through treatments such as refining or mixing. Cooling previous pasteurization treatments.

## Cream extraction plants

Cream extractions of all types of fruits and vegetables, in both cold and hot extraction processes.

## Aseptic Monoblock

Integration of an aseptic filling in a pasteurization plant, creating a compact, functional and versatile machine which is adaptable to a wide range of products.

## Crusher

Defrosting of stored products such as fruit juices, fruit and vegetables pastes, creams, sauces and so on.

## Piston Pump

It is conceived to pump viscous products, big particles of products (fruit in cubes or in pieces) or product which are sensible to shear stress.

## Inverse osmosis equipment

Reduction of salinity of salty waters and sea waters.

## Blending room / blending

Blending by recipes from database and transference of process parameters to pasteurizers.

## Emptying of cans by aspiration

Unloading of metal cans and aseptic bags in blending rooms through emptying techniques in very few seconds.

## CIP systems

Cip systems are used to carry out the chemical cleaning of food installations in a completely automatic way.

## Processing tanks

Storage in aseptic packing tanks for high and low ph products, in liquid or viscous products.

## Blending tanks

We have a wide range of vertical and horizontal tanks with different types of shaking and volumes. They are adapted to process needs.

## Storage tanks

Storage rooms in stainless steel tanks having standard volumes or custom-made volumes.

## Finisher or pulping machine

It refines crushed product to remove peels, stems and seeds.

## Hammer mill

It is a grinder of pitted food (vegetables among others) for processing raw material.

## Robotics

Robotic applications in proportion to palletized/ depalletized for the start and the end of processing and packing lines.



Gémina® at your service

**Gémina**®

Procesos Alimentarios, S.L.

**GÉMINA Procesos Alimentarios S.L.**

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Collaboration projects:



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