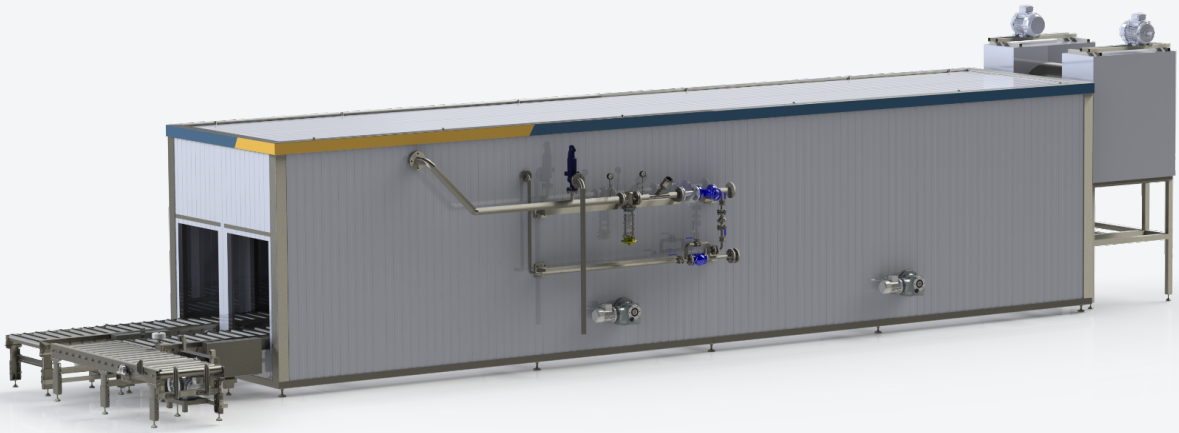
THAWING TUNNEL



Procesos Alimentarios, S.L.

Preparing frozen products in drums

Recovering frozen juices, pulps and purées starts with a crucial operation: releasing the block from its container so it can enter the process. The surface-thawing tunnel is positioned before drum emptying and prepares the product for subsequent processing.



Gémina tunnel installed at a production plant. General view.

SURFACE THAWING

The aim is to act on the interface between the frozen product and its container, facilitating release of the block. This stage prepares the drum for emptying without seeking to thaw its entire contents.

FRUIT JUICES, PULPS AND PURÉES

An application for frozen raw materials that need to be reintroduced into a processing line. The cycle is assessed according to the product, its initial temperature and the characteristics of the drum and inner packaging.

OPERATING PRINCIPLE

Thermal conditioning before emptying

The thawing tunnel is designed to pre-thaw the outer layer of the frozen block, facilitating the tipping of 200-litre drums containing deep-frozen fruit juices, pulps and purées. This conditioning helps release the product from the drum as it is discharged into the drum tipper and frozen-block crusher assembly.

Frequency-controlled transfer shuttles move drums into and out of the tunnel in pairs or individually, depending on the configuration. Inside the tunnel, drums are conveyed on two driven chain tracks or a set of roller conveyors.

At the top of the tunnel, air is heated as it circulates through a steam/air heat exchanger. A fan forces the hot air through a duct that directs it along the drums.

The process thaws only a layer approximately 2 to 3 cm thick around the outside and across the top of the block, while the remaining product stays deep-frozen to preserve its quality. Capacity is adjusted through drum residence time and tunnel temperature. These parameters allow small batches of different products to be processed with specific conditioning times.

STEAM SUPPLY

The equipment includes the complete steam line required for operation: an isolation valve, strainer, pressure-reducing valve, automatic shut-off valve, condensate trap system, safety valve and steam/air plate heat exchanger. Connecting pipework is insulated and protected.



PROCESS INTEGRATION

From frozen drums to the processing line

The solution is designed as part of the complete line: drum reception and conveying, surface conditioning, emptying and subsequent product processing. Coordination between stages matches the feed rate to production requirements.



Drum infeed and tunnel entrance.



Side and rear view of the equipment.

INTEGRATION OPTIONS

The tunnel can be combined with the following equipment and systems, depending on the project scope:

• Drum tipper with frozen-block crusher.

• Conveyor system with a drum opening station, empty drum compactor, weighing system, full-drum infeed conveyors and a washing station for full or empty drums.

Equipment specifications available on request.

DRUM SPECIFICATIONS

DIAMETER	HEIGHT	MAXIMUM WEIGHT
Ø 480-630 mm	**810-1,000 mm**	**300 kg**

Gémina provides process engineering and integration, installation, commissioning and technical support.

Reference configuration data

30

DRUMS/H · 3 CM LAYER

40

DRUMS/H · 1.5 CM LAYER

Minimum capacities for the stated surface-thawing thicknesses. Reference conditions: drum inlet temperature of -20°C and internal tunnel temperature of 120°C.

PARAMETER	VALUE
Overall dimensions (length × width × height)	13,515 × 4,658 × 3,185 mm
Maximum weight, including all drums	18,000 kg
Number of supports / load per support	15 / 1,200 kg
Electrical power	15 kW
Power supply	400 V · three-phase · 50 Hz
Control system	Siemens
Drum inlet temperature	-20°C
Internal tunnel temperature	120°C
Steam consumption	600 kg/h at 3.5 bar

Reference configuration data, updated for this catalogue edition. Throughput must be considered together with the stated thawing thickness and operating conditions.

Our company

Gémina©
Procesos Alimentarios, S.L.

GÉMINA Procesos Alimentarios, S.L., based in Jumilla, Murcia, a leading Spanish food-producing region, is a leading Spanish company with 25 years of experience in the design, manufacture and integration of systems delivering innovative solutions for the food industry.

You imagine,
we make it happen.



BUSINESS AREAS

Machinery design and manufacture

- Design, manufacture and integration of food processing and aseptic filling equipment.
- All manufacturing is carried out entirely at our facilities.
- All our machinery is CE safety certified and meets the most demanding standards.
- R&D and innovation: committed to technological progress.

Process engineering and design: project management

At Gémina, we enjoy what we do. Our engineering department covers design and calculations, manufacture, assembly, automation and commissioning of equipment and plants, providing comprehensive management of every project we undertake.

We give every project the care it deserves, attending to each process detail and advising you on how to optimise production. Gémina designs each process around your needs, helping your product stand out from the competition.

- Versatility and flexibility: from a turnkey plant to a line extension or the installation of a single unit in a process.
- Adaptability to different environments and circumstances.
- Extensive technical capabilities and experience within our engineering team.
- Comprehensive project management ensures success by reducing risks, costs and lead times.

Our services

1 - Technical support: official Alfa-Laval service provider and distributor

- Maintenance services.
- Installation services.
- Calibration.
- Spare parts services.
- Training services.
- Online production monitoring and troubleshooting.

2 - Automation and robotics

- Tailored process automation: comprehensive solutions.
- Complete process control: SCADA systems, data logging and monitoring.
- Custom robotic applications: a solution for every need.

3 - Comprehensive food quality services

- Optimisation, development and validation of processing and filling equipment and food production processes.
- Consultancy for implementing BRC, IFS, ISO 22000, FSSC and other standards.
- Product development [process + formulation].

Customer service

Gémina's professional services are defined by dedicated, ongoing attention to every customer. Our vocation is to become an operational partner to the companies we work with, placing all our skills and capabilities at their disposal.

Our close customer relationships, technical expertise, accumulated experience and know-how are key reasons why customers choose us and trust our equipment and services.



Industries

The main industrial sectors in which GÉMINA develops projects are:

- Dairy industry
- Tomato industry
- Juice and beverage industry
- Fruit and vegetable industry
- Citrus industry

Product catalogue

Aseptic fillers
Aseptic machines for filling metal drums with pre-sterilised bags with press-fit closures, or for filling cardboard containers.

Bag-in-box
Aseptic filler with automatic feed of small pre-sterilised bags, from 1 to 20 litres, with press-fit closures.

Extractors
Processing a wide range of products to obtain purée free from seeds and skins. Available for pulping or refining.

Heat exchangers
A full range of models and designs, including single-tube, annular, multitubular and scraped-surface units.

Forced-circulation evaporators
High-capacity, high-performance concentrators for products with high solids content and/or viscosity. Multiple stages tailored to process requirements.

Hot/cold break units
Process tomato purée or concentrate, ensuring full or partial inactivation of pectolytic enzymes to preserve pectin.

Laboratory pilot plants
Laboratory pasteurisation and aseptic filling of small samples, including juices, soft drinks, vegetable purées and soups.

Tubular pasteurisers
Design and construction of pasteurisation plants tailored to each specific requirement.

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

Heaters and coolers
Heating products before treatments such as refining or mixing. Cooling before pasteurisation treatments.

Purée extraction plants
Purée extraction from all types of fruit and vegetables, using either cold or hot extraction processes.

Aseptic monoblocs
An aseptic filler integrated into a pasteurisation plant to form a single compact, functional and versatile machine, adaptable to a wide range of products.

Crusher
Thawing stored products such as fruit juices, fruit concentrates, vegetables, purées and sauces.

Piston pumps
Designed to pump viscous products, products with large particles (diced or chopped fruit), or products sensitive to shear stress.

Reverse osmosis units
Reduction of salinity in brackish water and seawater.

Mixing / blending rooms
Recipe-based mixing from a database and transfer of process parameters to pasteurisers.

Vacuum drum emptying
Vacuum unloading of metal drums and aseptic bags in blending rooms in just a few seconds.

CIP systems
Fully automatic chemical cleaning of food processing installations.

Process tanks
Aseptic filling storage tanks for high- and low-pH products, whether liquid or viscous.

Mixing tanks
A wide range of vertical and horizontal tanks, with different agitators and capacities, tailored to process requirements.

Storage tanks
Stainless steel storage tanks with standard or custom capacities to meet customer needs.

Finishers / pulpers
Refining pre-crushed products to remove skins, stems and seeds.

Hammer mills
Crushing of pit-free foods, including vegetables, for raw material processing.

Robotics
Custom robotic depalletising and palletising applications for the start and end of processing and filling lines.



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