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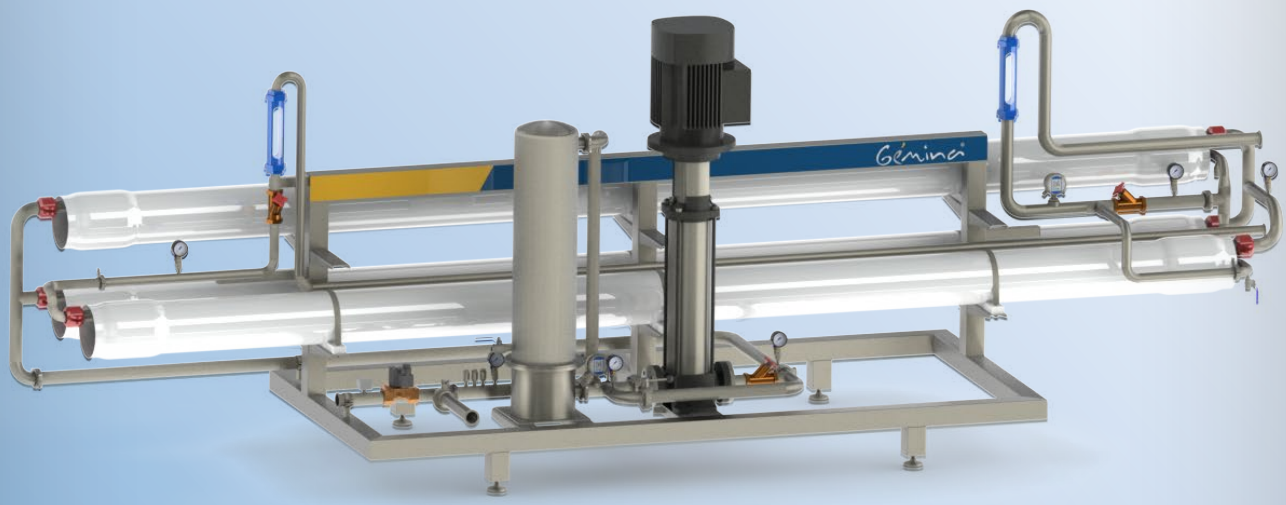
REVERSE OSMOSIS EQUIPMENT



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Procesos Alimentarios, S.L.

HOW IT WORKS

Natural or direct osmosis consists in the dissolution of a solvent (usually water) and a solute formed by one or more chemical components (salts) in dissolution.

If we place pure water on one side of a membrane and on the other water that contains mineral salts, the water will flow from the less dense solution (pure water) towards the denser solution (water with minerals) until there is no difference in pressure between the two sides. The difference in manometric head between the two levels is known as osmotic pressure of the solution.

Technology has allowed for the inversion of this natural process, so that if a pressure higher the natural osmotic pressure is applied to the solute (salty water), a reversal of the water flow is triggered: clean water passes from the salty solution towards the pure water solution medium.

The osmotic pressure that needs to be exceeded depends largely on the type of solute and its density, although an approximate range for osmotic pressure can normally be placed between 5 and 60 bar.

With reversal osmosis systems it is possible to execute concentration processes as well as separation processes. When applying this system to water, separation rates of 95% of dissolved salts can be achieved, thus accomplishing in a decrease in salinity of sea water.

TERM DEFINITIONS

Filtering:

Water that has undergone osmosis, which has a lower salt level than the water supplying the system.

Concentrate:

Water that does not pass through the membrane, and remains in the denser solution medium. Hence this concentration ends up being higher than that of water supplying the system.

Recovery (Z):

Relación en el porcentaje entre el volumen de agua filtrada y el volumen de agua de alimentación. Por ejemplo, una instalación trabajando al 80% producirá por cada 100 partes de agua de alimentación, 80 partes de agua filtrada y 20 partes de concentrado.

Concentration factor:

Number of times that rejected water is concentrated or the level of concentrate with respect to supply.

FC = 11-Z = 11-0,8 = 5

Therefore, for a recovery of 80%, the concentration factor is 5.

STC (Saltiness Total Coefficient):

Total amount of salts.

Salt or Ionic Escape:

Percentage index between filter salts and the supply water STC.

% IONIC ESCAPE = ppm Filtered wate / ppm Supply

Salt or Ionic Escape:

Percentage index of discarded salt content.

% SALT REJECTION = 100 - % Ionic Escape

APPLICATIONS

Water that has undergone osmosis has many applications within the food industry, such as:

- Food manufacture.
- Cooling tower units.
- Boiler units.
- Heat exchangers: prevents lime scale deposits.

ADVANTAGES

- Eliminates floating materials and microorganism.
- It allows for the elimination of solids diluted in water.
- It does the purification process continuously and in a single phase.
- Simple technology.
- Low-cost system compared with alternatives, such as evaporation.
- Modular and expandable design.
- Reduces the need for boiler purges.
- Manufacture of sodium-free products.
- Increase in agricultural production.

FEATURES

Large variety of membranes for every type of application

Totally automated equipment. Estimation of parameters such as conductivity, flow speed, temperature, etc.

We provide for all the pre-treatments, such as sand filtering, iron removal systems, deodorizing with activated carbon; and the post-treatments such as chlorination, UV sterilisation, remineralisation, etc.

Osmosis Plants, entry conductivity <1500 ms

PUMP TYPE	CAPACITY LITRE / HOUR	PHASES	SYSTEM	IMPULSION	CONTROL
RO-A-1000-A	1000	1	Membrane	Multi-cellular	Semi-automatic
RO-A-2000-A	2000	1	Membrane	Multi-cellular	Semi-automatic
RO-A-4000-A	3000	1	Membrane	Multi-cellular	Semi-automatic
RO-A-8000-A	8000	2	Membrane	Multi-cellular	Semi-automatic
RO-A-12000-A	12000	2	Membrane	Multi-cellular	Semi-automatic
RO-A-16000-A	16000	2	Membrane	Multi-cellular	Semi-automatic
RO-A-22000-A	22000	2	Membrane	Multi-cellular	Semi-automatic

Our company

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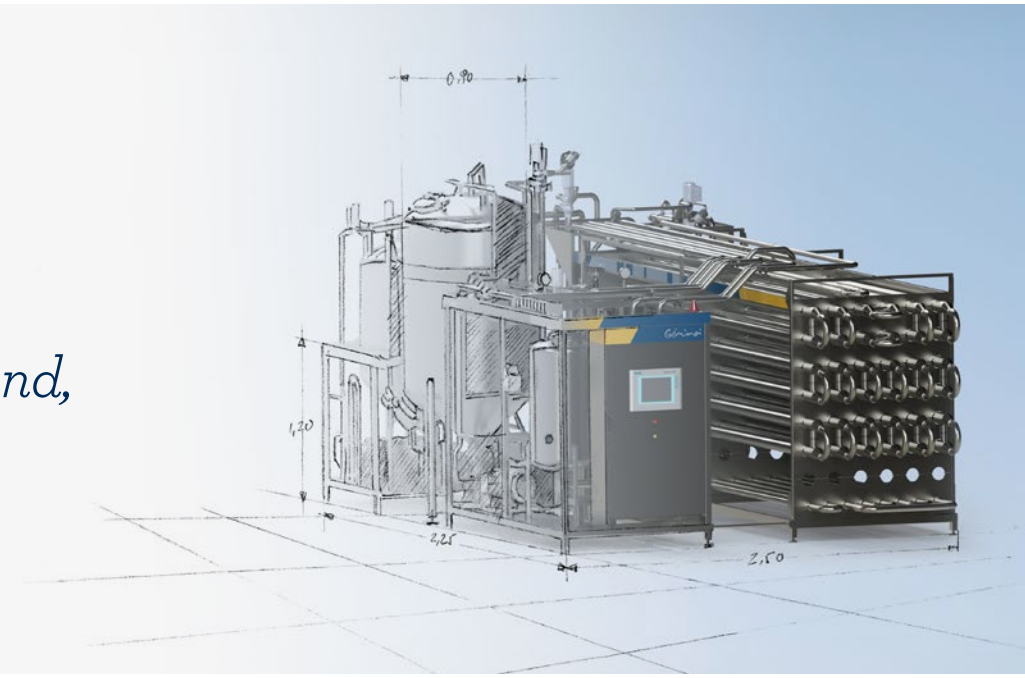
Procesos Alimentarios, S.L.

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 Gémina, 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. Gémina 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.
- Gémina 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 pectolitic 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 proccesing and packing lines.

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