PIGNAT

Process Engineering for Education

Fragrance & Beverage

Chemistry

Water treatement

An ISO Certified company

LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001 · FRANCE

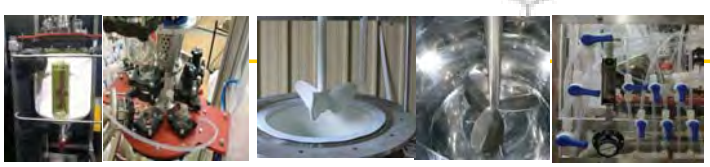
Reactors

RPI 4000
Multi purpose 40L SS
& glass reactor
Also in explosion
proof version

UPR 1000 :
10 liters manual reactor
for
educationnal purpose

Filters

SS or PVC Closed
Filter
Buchner type
Capacity
5 l. up to 50 liters



Core competencies

Measure, Eex Protection, Safety studies




Sensors & Probes
Control valves
Equipotential wiring,
Eex proof componant...
Hazop & SIL Analysis

Control, data recording, PLC, DCS, SNCC

Video recorder

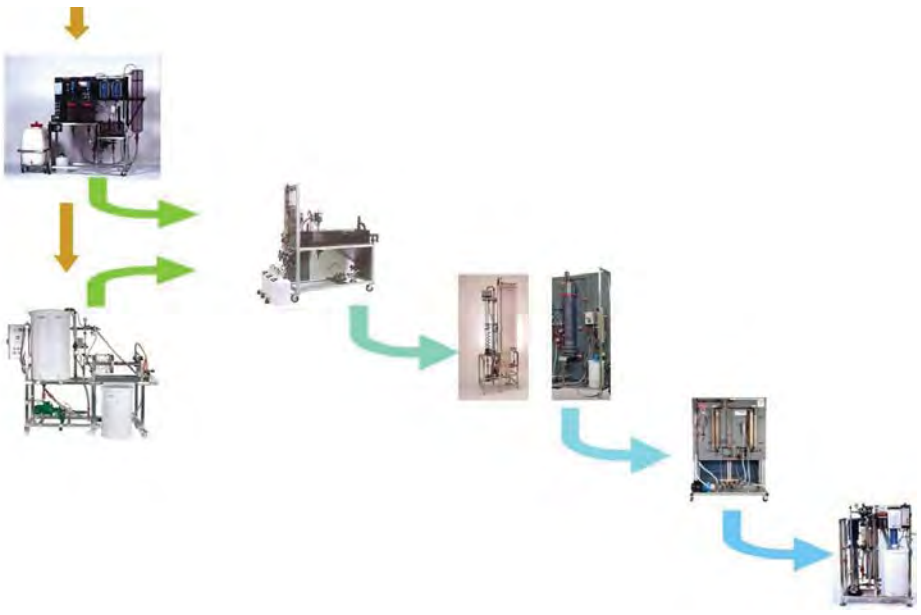
Industrial spervisors

On line Data acquisition

Complete Process line i.e. Watertreatment line

From wastewater
to ultra-pure water

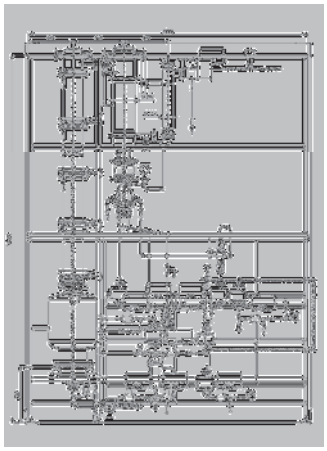
Ask for detailled specs



Added Values

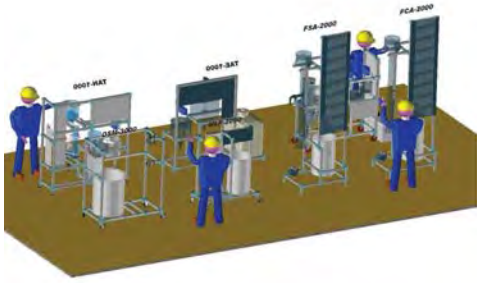
Complete engineering

From hand drawing to prototypes



Educationnal Engineering

Virtual 3D installation Complete workshop conception Educationnal Manual



On site comissioning :

Technicians & Engineers

Installating, comissionning

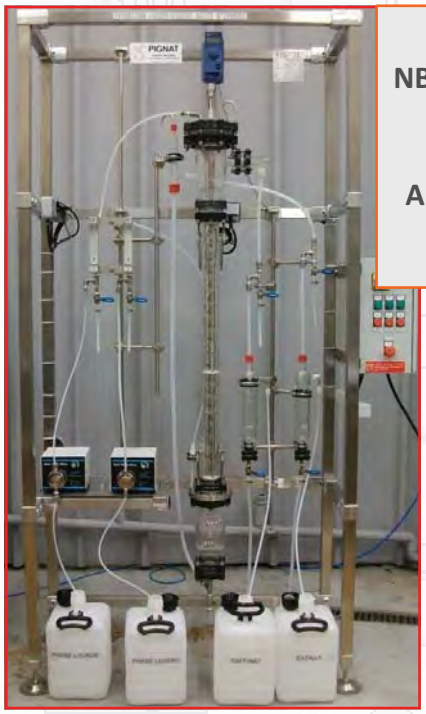
Courses for teachers

Distillation

DVI1000
Continuous distillation NB25
Table top material

DVI6000
Continuous coupled distillation NB50
Also one column unit

Extraction & Absorption



ELA2000
NB50 Stirred Liquid liquid Extraction unit

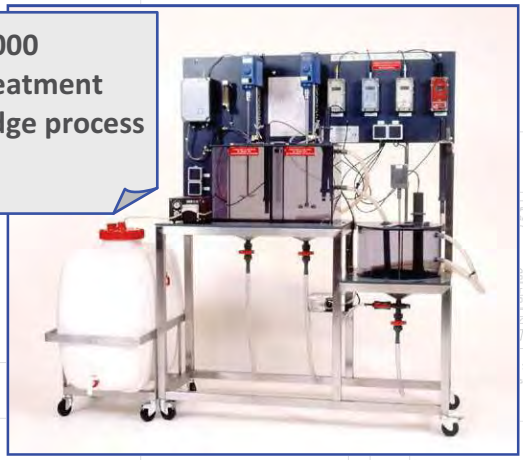
Also available as pulsed unit

ABS2000
Absorption column NB50
Packed with Raschig ring

Water Treatment

TPC1000
Lamellar decanter
Coagulation & floculation process

TAE1000
Aerobic treatment
Activated sludge process



EAC1000
Ion Exchange

Fragrance & Beverage

UPA 1000
Pasteurization unit
3 staged heat exchanger

ESA1000
Fragance and flavour extraction unit

Sensors, Regulation, Automatism

CEB1000
Multiloop regulation control
Temperature , level, pressure

BCN2000
Level sensors

BRP2000
Pressure regulation

ADP1000
Automated weight batching

Heat & Fluids

BEP2000
2 Centrifugal pumps study

BME4000
4 Heat exchangers studies

PIGNAT

PIGNAT

55 years of innovation and exprience

America	Europe & Africa	Middle East	Asia
USA, Canada, Mexico, Colombia, Peru, Brasil, Chile	France, E.C., Russia, Tunisia, Algeria, Marocco,	UAE, Saoudi arabia, Libanon, Jordania, Iran, Pakistan, India	Singapore,Malaysia, Indonesia, Vietnam

Our Plant

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PIGNAT

Process Engineering for Education

Fruit processing

Food & Beverage

PIGNAT

50 years of innovation and experience for your satisfaction

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In 1983, this expertise has been dedicated to teaching technologies and pilot units have been created to represent the main unit operations.
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- Food & Beverage Engineering
- Chemical Engineering
- Environment
- Fluid Mechanics
- Automation & Control
- Thermodynamics

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Services

A complete line of products dedicated to
Food & Beverage Engineering

Coaching in the definition of your project :

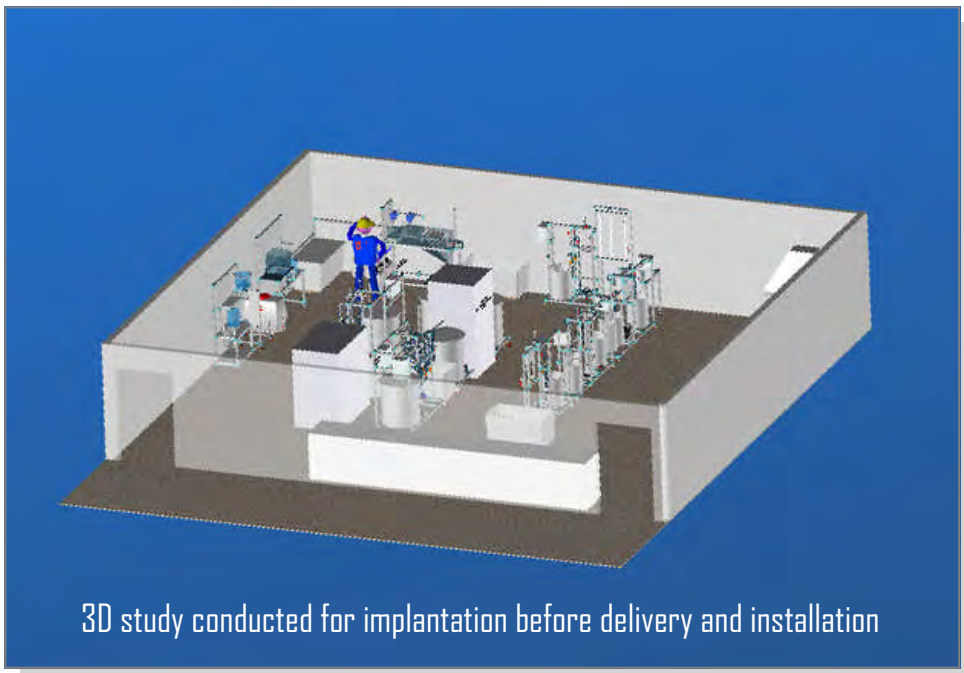
- Proposal to implement in your room
- Definition of plans for a new hall
- 3D design
- Definition of utilities: water, steam, compressed air, vacuum, electricity

Teaching tools :

- Theoretical lessons
- Instructions for use
- Practical exercises
- Results

Continuous improvement approach
CE manufacturing
ISO9001 certification

SUMMARY



3D study conducted for implantation before delivery and installation

BREAKING

BRO/2000

CUTTING MILL
600 kg/h

PRESSING

PHY/2000

WATER PRESS
40 L–100 kg/h

ENZYMING

CVT/1000

ENZYMING TANK
50 L–85°C–6kW

FILTRATIO

FIA/2000

PLATE FILTE
600 L/h–0,8 m

REFINING-STONING

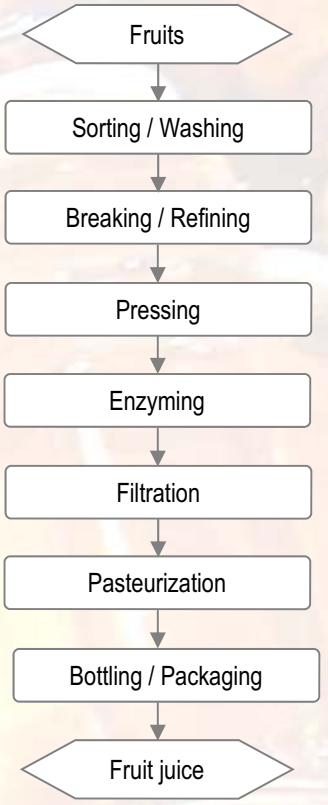
DRP/2000

AUTOMATIC SIEVE
120 kg/h

Fruit juice is the unfermented liquid extracted from the edible part of sound, ripe, fresh fruits or preserved in sound conditions. The juice should have the colour, aroma and flavour of the fruit from which it is extracted. The addition of sugar, syrup, water, acid ... is subject to Codex Alimentarius regulations.

The fruits are washed and sorted prior crushed and pressed to extract the juice. To clarify the juice, a pectinolytic enzyme addition is made to dissolve some of these pectins, which causes a decrease in viscosity and sedimentation of particles which can then be removed from the juice.
Filtration on media (such as kieselguhr or plates) can remove the last particles (pectin, pulp) in suspension before pasteurization and hot filling.
The pasteurized juice should be stored at 4-5 ° C and be drunk quickly, within a few weeks.

FRUIT JUICES



ON

R

m^2 max

PASTEURIZATION

UPA/2000

PLATE PASTEURIZER
50 L/h–85°C–6 kW

BOTTLING

UEM/2000

CCO/2000

4 SPOUTS FILLER–BOTTLE CAPPER
400 L/h

BLANCHING

CVT/2000

Blanching Tank
50 L–100°C–6kW

REFINING-STONING

DRP/2000

Automatic Sieve
120 kg/h

BREAKING

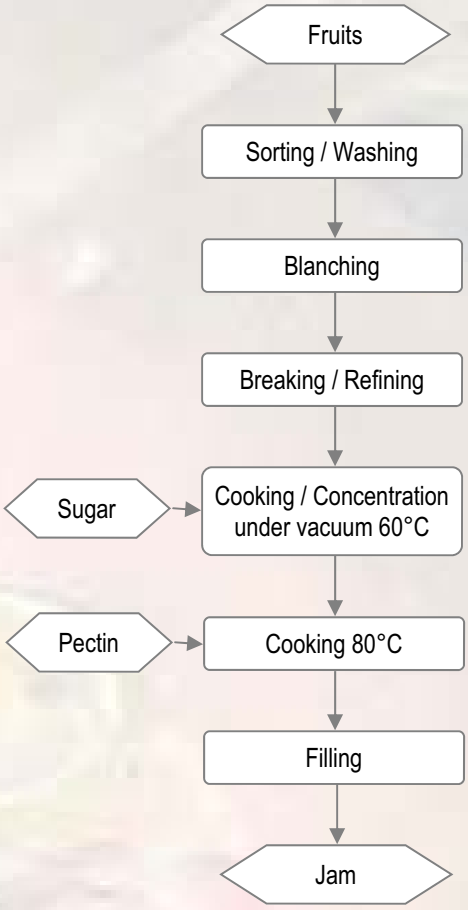
BRO/2000

Cutting Mill
600 kg/h

The jam is made from whole fruit or chunks or flesh and / or concentrated puree, mixed with sweeteners giving it a sweet taste. The respective proportions of fruit and sugar are subject to regulation. Generally, the fruit content shall not be less than 45% of the finished product.

Pre-sorted, washed or peeled fruits can be softened by blanching before being crushed or refined. The pulp is introduced in a concentration sphere with sugar. The mixture is cooked and concentrated at 60°C under reduced pressure until the desired content of sugar is obtained. Pectin can then be added to give suitable texture to the jam before baking at 80°C. The jam is then packaged in jars pre-sterilized at 85°C and sealed. After evaporation, the jam has a rate of sugar of 63 to 65% which gives it its texture, taste and ensures its conservation over a year.

Jams



COOKING–CONCENTRATION

UCC/3000

CONCENTRATION SPHERE
20 L–6 kW

FILLING

UPO/1000

PNEUMATIC PROPORTIONING PUMP
50 to 500 ml

COMPOTES, SAUCES, ...

BREAKING

BRO/2000

CUTTING MILL
600 kg/h

COOKING

REFINING-STONING

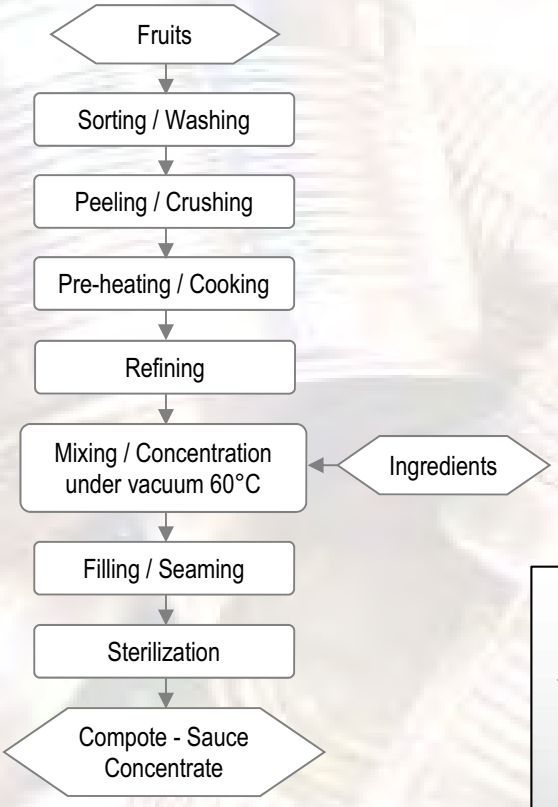
DRP/2000

AUTOMATIC SIEVE
120 kg/h

COOKING–CONCENTRATION

UCC/3000

CONCENTRATION SPHERE
20 L–6 kW



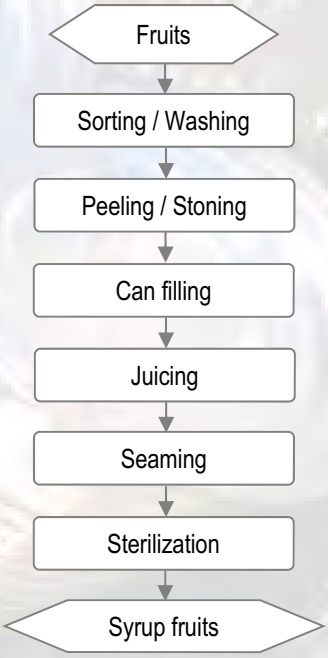
The sauces and purees are prepared using pulp from fruits, reduced more or less finely, mixed with other ingredients (salt, sugar, water, spices, lemon juice, ...) and are packaged in airtight containers then sterilized. A sugar-free apple puree presents a minimum of 9% solids and 16.5% with sugar. A tomato paste contains 7-24% solids, while a concentrated paste will have a concentration greater than 24%.

The fruits are washed and sorted prior coarsely crushed before being heated a few minutes at 85°C to soften the tissues. They will then be refined to separate the puree of the skins, pips and stalks. To this flesh will be mixed ingredients before concentration under reduced pressure if necessary. The product will then be placed in cans or jars that will be seamed and sterilized. The packaging in sealed containers and heat processed will preserve the product during 2 to 5 years.

CANNED FRUITS

Fruits may be packed, in cans, whole, sliced, chopped, alone or mixed with others. The fruit must be sound, ripe and can be peeled and stoned. They will be presented with a packing medium such as water, juice of the fruit, a dry sweetener or a sugar syrup. The product should have the flavor, color and texture of fresh product.

The fruits can be sorted and washed, peeled, seeded, chopped (depending on the product) before canning. The fruits are then covered with a suitable coverage medium. The boxes will be seamed and then sterilized. The packaging in sealed containers and heat processed will preserve the product for 2-5 years.



FILLING

UPO/1000

Pneumatic Proportioning Pump
50 to 500 ml

SEAMING

SER/2000

Seamer
55 to 100 mm

STERILIZATION

ATV/3000

Autoclave
50 L—steel or stainless steel

Related disciplines, called Industrial Engineering, are also essential to understand the overall operation of equipments used in food industry and to be able to ensure control and maintenance.

- Pumping : a study of different types of pumps, their operation and their use.
- Heat exchanges : a study of different types of exchangers and their use.
- Control / Sensors : process control study.
- The principles of evaporation and crystallization.

INDUSTRIAL ENGINEERING

BSP/2000

BEP/2000

PUMPING

Pump features
Series / Parallel connection
Measuring motor torque
Visualization of cavitations
Breakdown simulation

BME/4000

BRET/2000

HEAT EXCHANGES

Exchangers features
Study at co-and counter-current
Transfer characterization
Influence of flow regimes
Study of the control

CONTROL & SENSORS

Control units (pressure, temperature, ...) :

Study of sensors and actuators

Study of control loops

Sensors study units :

Study of different technologies

Setting sensors

Flow Sensors

BCD/1000

Pressure Sensors

BCD/1000

Pressure Control

BRP/1000

Temperature Control

BRT/1000

EVAPORATION–CRYSTALLIZATION

Processes of evaporation and concentration

Cooling crystallization

EVV/1000

CRV/2000

YOUR PROJECT

Line	Unit operations	Range	Price (from)
Pre-treatment	Breaking, Refining, Stoning	BRO, DRP	
	Pressing	PAP, PHY	
	Filtration	FIA	
Heat Treatment	Enzyming, Blanching	CVT	
	Pasteurization	UPA	
	Cooking Concentration	UCC	
	Sterilization	ATV	
Packaging	Bottling, Filling	UEM, UPO	
	Seaming, Capping	SER, CCO, CPP	
Industrial Engineering	Pump study	BEP, BSP	
	Control	BRP, BRT, ...	
	Sensors	BCD, BCP, ...	
	Heat exchanges	BME, BRET	
	Evaporation, Crystallization	EVV, CRV	

PRODUCTION LINES

Production Line for Fruit Juice	LJF/2000
Production Line for Appertized Products	LPA/2000

CONTACT

Our plant

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69741 Genas Cedex
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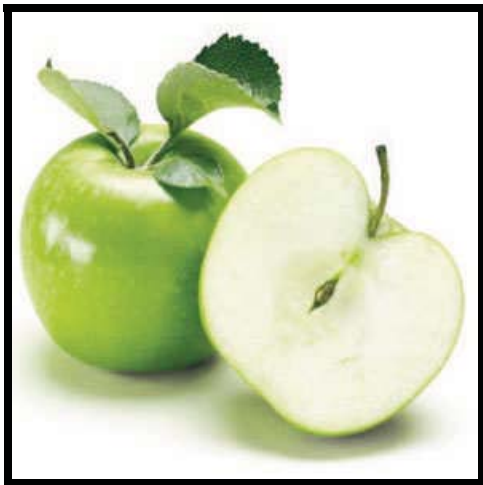
Process Engineering for Education



Fruit processing

Fruit juices

Food & Beverage

GRINDING

Crushed apples

The grinding is designed to prepare fruit for pressing. The fruits are introduced after washing in the cutting mill without pretreatment.

PRESSING

PAP/2000

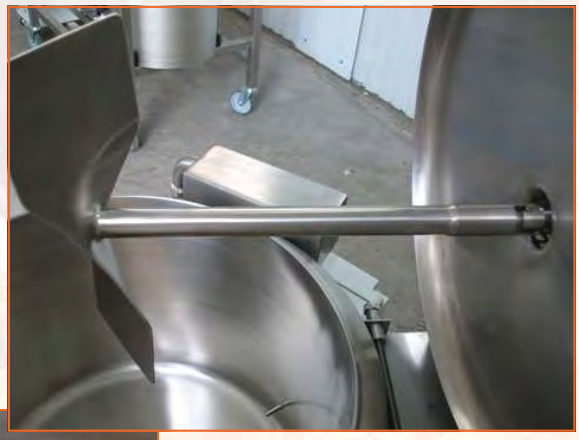
Packing press
PAP/2000

Pressing allows to extract juice from fruits and separate the residue (skins, stems, fibers). The pressing can be done on different types of equipment: packing presses or hydraulic presses.

Hydraulic press
PHY/2000

Photos not contractually binding

ENZYMING



Removal of pectines : enzyming and settling

The addition of enzymes helps to clarify the juice to prevent deposits and turbidity. The enzyming takes place at 45-50 °C with pectinolytic enzymes in a thermostated tank.

FILTRATION

Filtration is performed on filter plates with cardboard filters of suitable porosity for the desired type of filtration : coarse, fine, sterile ...

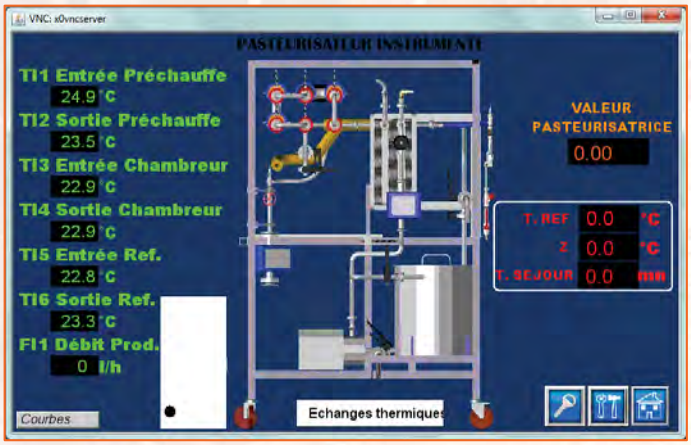
FIA/2000

Filtration residues

Insolubles filtration

Photos not contractually binding

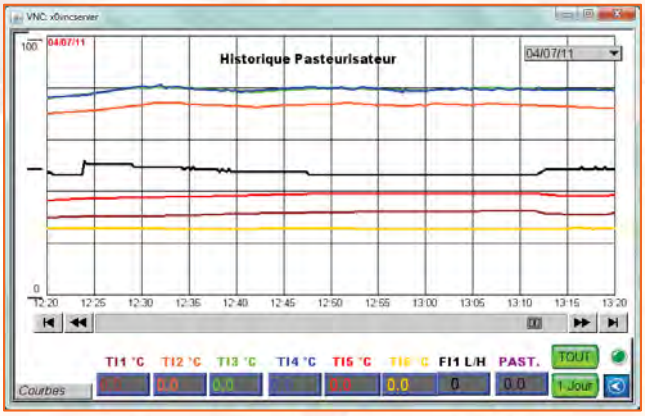
PASTEURIZATION



Pasteurization monitoring :
temperatures,
holding time,
pasteurization value

$$VP = t \times 10^{\frac{\theta - \theta_{ref}}{z}}$$

UPA/2000



BOTTLING

Pasteurization (heat treatment) followed by hot bottling and capping in clean bottles, allows the preservation of fruit juices for a few weeks in positive cold (0-4 ° C).
Manual or semi-automatic equipments can make small productions.

CAPPING

UEM/2000

CCO/2000 CPP/1000

PilferProof caps

4 spouts filler

Crown caps

Photos not contractually binding

YOUR PROJECT

LJF/2000

Unit operations	Range	Prices (from)
Grinding, Refining, Stoning	BRO, DRP	
Pressing	PAP, PHY	
Enzyming	CVT	
Filtration	FIA	
Pasteurization	UPA	
Bottling	UEM	
Capping	CCO, CPP	

Production line of fruit juices LJF/2000

CONTACT

Our plant

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PIGNAT

Process Engineering for Education

Environment & Water Treatment

Industrial Engineering & Hydraulic Networks

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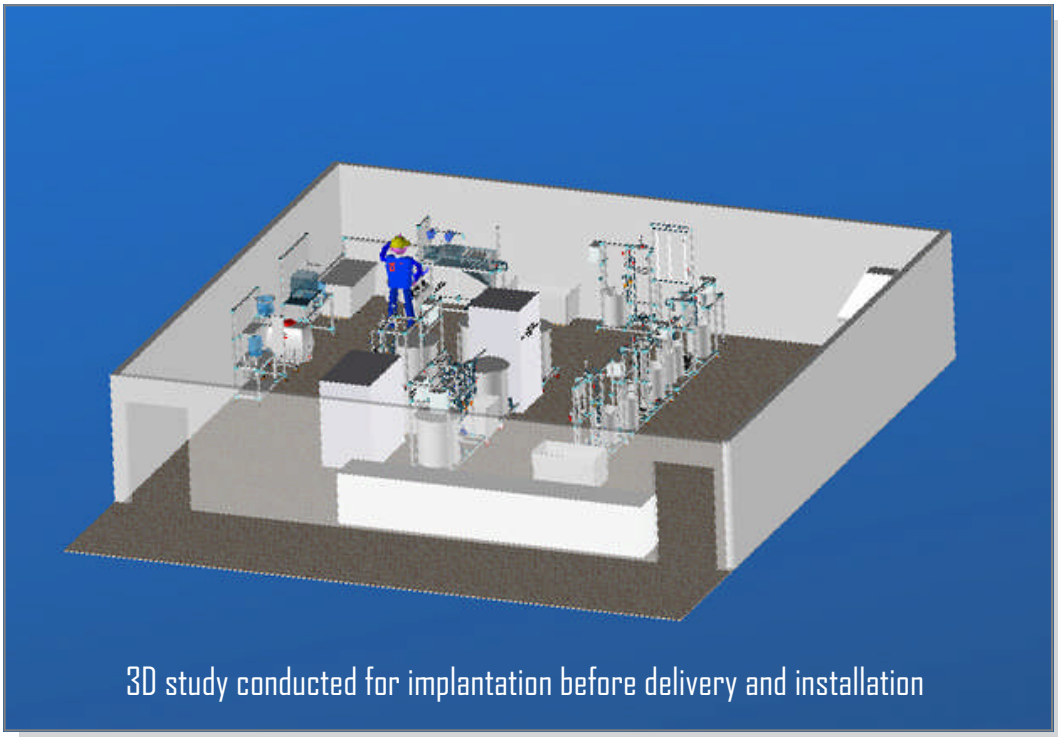
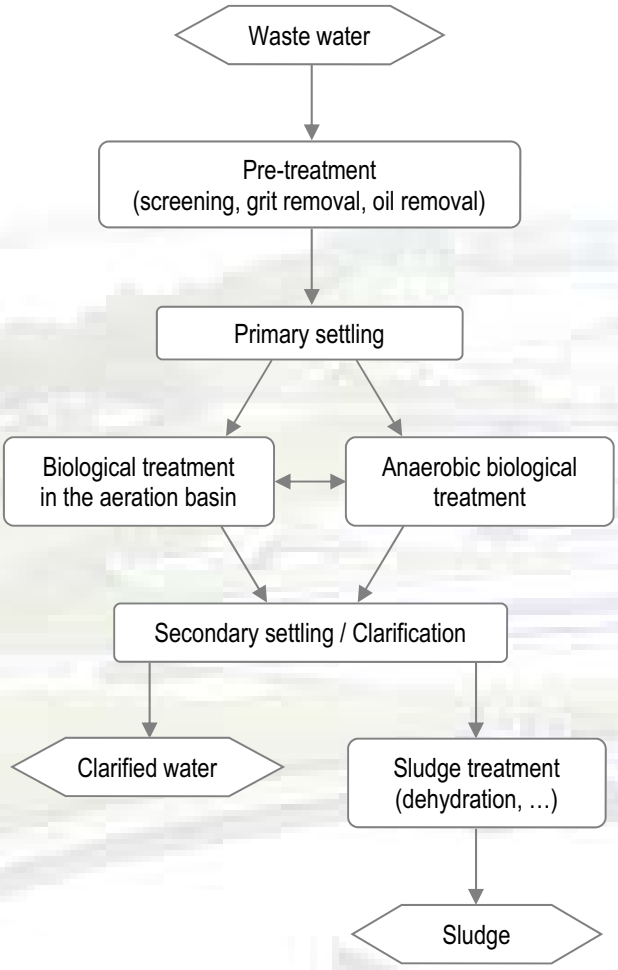
Continuous improvement approach
CE manufacturing
ISO9001 certification

SUMMARY



3D study conducted for implantation before delivery and installation



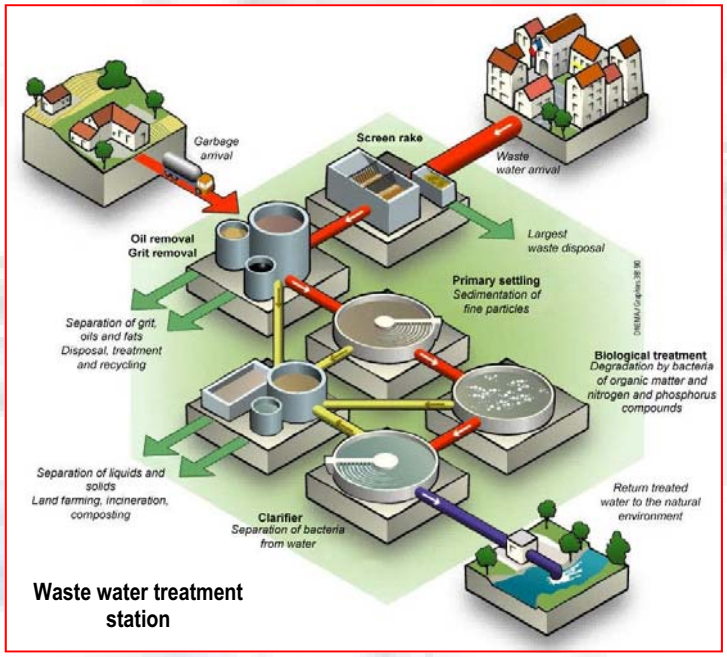
Biological Treatment

Aerobic and anaerobic treatment

Study of hydraulic and mass charges of the process

Determination of environment specificities

Acquisition / Monitoring / Automation



Waste water treatment station

SANITATION

Waste water treatment

Anaerobic Treatment

TAN/1000

Digestion and denitrification processes

Operating in a fixed bed

Effluent recycling

Sludge Filtration

FIL/2000

Defining the parameters of filtration media

Economical and technical validation of the process

The sanitation or wastewater treatment is a set of techniques designed to purify the water before returning to the natural environment.

First, pre-treatment equipments remove large solids present. A primary settling is then used to eliminate some of the particles in suspension.

The water is then sent to aeration tank where bacteria break down organic compounds and nitrogen. Anaerobic treatment is generally used in addition to aerobic or to treat nitrogen pollution.

After settling, the clarified water is separated from the sludge, which follow then their own processing circuit (concentration, dehydration, packaging, ...).

DRINKING WATER

Coagulation, Flocculation, Sedimentation

TPC/3000

Implementation of
a physico chemical treatment

Adjustment of operating parameters

Monitoring water quality at the output

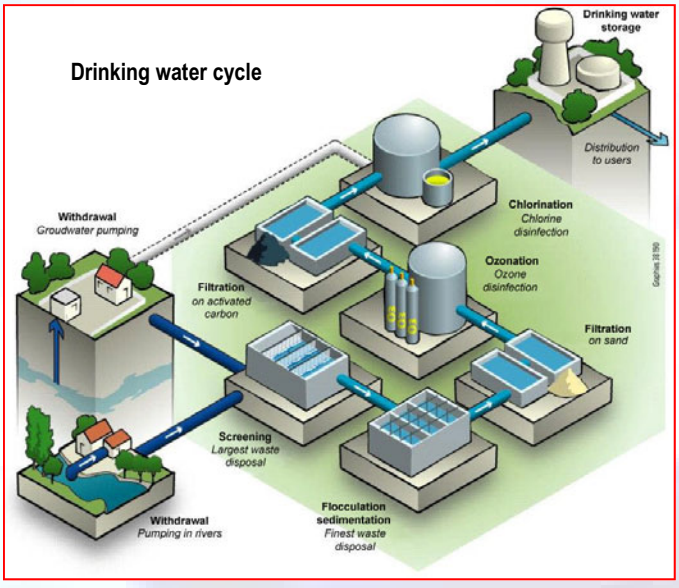
Sand Filtration

FSA/3000

Deep-bed filtration of water loaded with suspended solids

Visualization of clogging

Backwashing of the bed



The water pumped from underground aquifers and rivers does not generally respond to drinking water standards. It may contain suspended particles, dissolved salts and bacteria.
The purification consists in removing these substances and adding reagents to the water which becomes qualified and meets the standards.

After an initial mechanical pre-treatment (coarse and fine screening), the water undergoes a physico-chemical coagulation-flocculation-sedimentation to remove residual finest particles.
The water is then passed through a sand filter and an activated carbon filter to remove particles larger than 20 µm and pollutants such as heavy metals, chlorine and some organic compounds.
After filtration, the water undergoes disinfection step (ozonation, UV, chlorine) which aims to eliminate residual bacterial germs before drinking water storage and distribution.

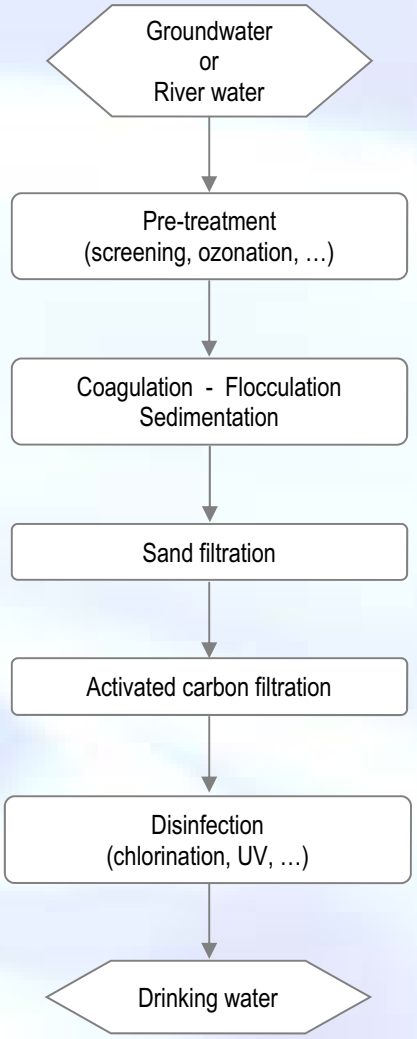
Activated Carbon Filtration
Disinfection : Chlorination, UV

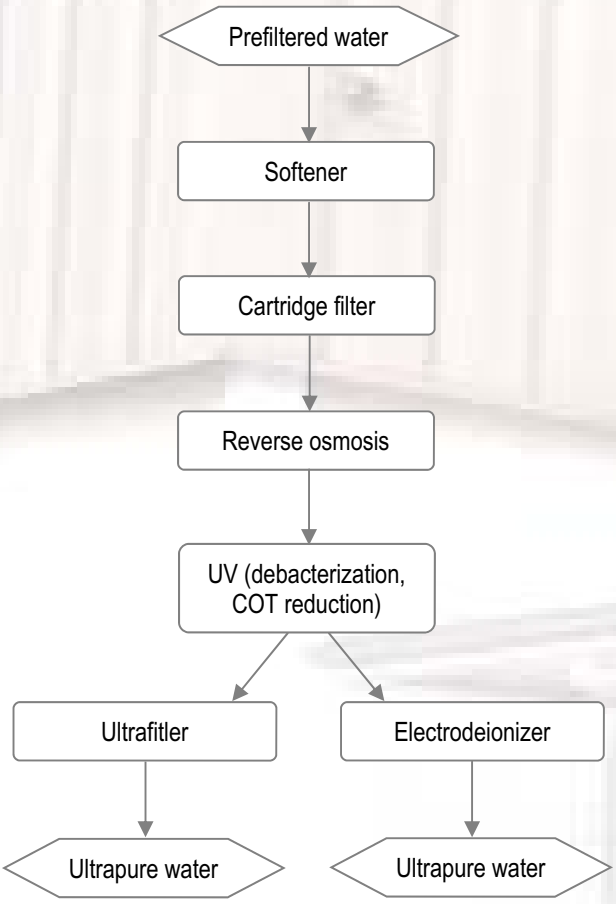
FSC/2000

Purification of water by activated carbon filtration

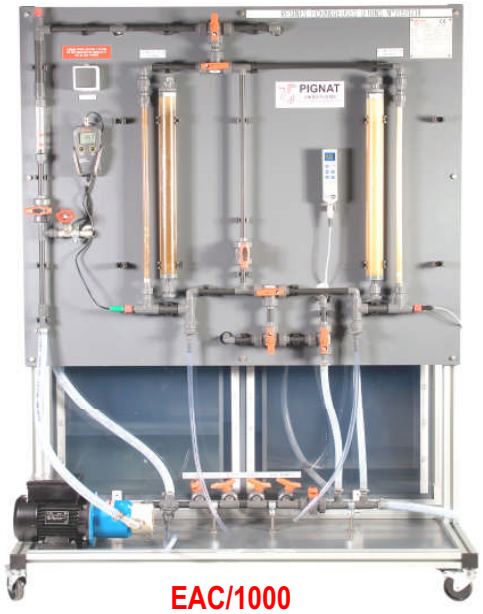
Disinfection passing through UV light

Disinfection by chlorination





Ion Exchange Resins



EAC/1000

Production of soft water or demineralised water by polymeric resins

Elimination : ions, activated silica, CO_2

Resins regeneration

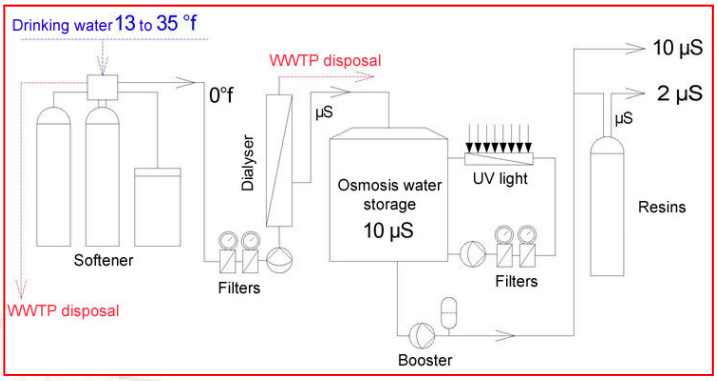
The industry requires no drinking water but process water. This term refers to all types of water entering in manufacturing processes : cooling water, cleaning water, component manufacturing (pharmaceutical, food, cosmetics), cutting water, …

The purity of water is defined by its gradient in ° French or mS. Hard water is about 15 to 35 °f, softened water 0 °f, reverse osmosis water shows less than 10 mS while electrodeionized water will be called ultra pure with a conductivity below 1 mS.

Depending on the use, the treatment modes will be adjusted and the chain will be formed. As a general rule, the water undergoes:

- A pre-treatment (sand/activated carbon filter, softener, cartridge filter, …)
- A main treatment (reverse osmosis, nanofiltration, UV, …)
- A finish treatment (mixed-bed ion exchanger, ultrafiltration, electrodeionization, …)

PURIFIED WATER



Reverse Osmosis

OSM/2000

Tangential filtration on reverse osmosis membrane

Desalination

Elimination : bacteria, pyrogens, Organic compounds, ions

Ultrafiltration

ULF/2000

Tangential filtration on organic ultrafiltration membrane

Purification / concentration of solutions

Elimination : bacteria, pyrogens, colloids

INDUSTRIAL & ENGINEERING

Related disciplines, called Industrial Engineering, are also essential to understand the overall operation of equipments used in water treatment and to be able to ensure control and maintenance.

- Pumping : a study of different types of pumps, their operation and their use.
- Fluid mechanics : the study of pressure losses in pipes, valves, orifices, ...
- The free surface flows : the study of flow in open channel, the study of flow depending on the obstacles.
- Control / Automation : process control study.

BSP/2000

BEP/2000

PUMPING

Pump features
Series / Parallel connection
Measuring motor torque
Visualization of cavitations
Breakdown simulation

FLUID MECHANICS

Measurement of pressure losses
Flow measurement
Study of orifices
Visualization of flow characteristics

BDF/1000

BDF/3000

HYDRAULIC NETWORKS

FREE SURFACE FLOWS

Study of an open channel
Flow measurement
Flow visualization

MCO/2000

CONTROL & AUTOMATION

Control unit (level, flow, pH, ...) :
Study of sensors and actuators
Study of control loops
Automated pumping station :
Simulation of a water distribution network
Manual or automated process control

Pumping Station

ASP/2000

Flow Control

BRD/1000

Level Control

BRN/2000

pH Control

BRpH/1000

YOUR PROJECT

Line	Unit operations	Range	Price (from)
Sanitation	Biological treatment	TAE	
LAE/2000	Anaerobic treatment	TAN	
	Filter press	FIL	
Drinking water	Coagulation, Flocculation, Sedimentation	TPC	
LPE/2000	Sand filter	FSA	
	Activated carbon filter	FSC	
Purified water	Ion exchange resins	EAC	
LFE/2000	Reverse osmosis	OSM	
	Ultrafiltration	ULF	
	Cartridge filter		
	UV disinfection		
	Electrodeionization		
Industrial engineering	Pump study	BEP, BSP	
& Hydraulic networks	Fluid mechanics	BDF	
	Free surface flows	MCO	
	Control	BRN, BRD,...	
	Pumping station	ASP	

CONTACT

Our plant

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