PIGNAT

Process Engineering for Education

Environment & Water Treatment

Industrial Engineering & Hydraulic Networks

PIGNAT

50 years of innovation and experience for your satisfaction

Since 1963, PIGNAT has built and developed pilot plants in Process Engineering.

In 1983, this expertise has been dedicated to teaching technologies and pilot units have been created to represent the main unit operations.
Today, PIGNAT has extended its range to all activities of Process Engineering :

- Food & Beverage Engineering
- Chemical Engineering
- Environment
- Fluid Mechanics
- Automation & Control
- Thermodynamics

The pilot units presented here are the result of our experience. They will become essential to your teachings.

Services

A complete line of products dedicated to
Water Treatment and Hydraulic Networks

Coaching in the definition of your project :

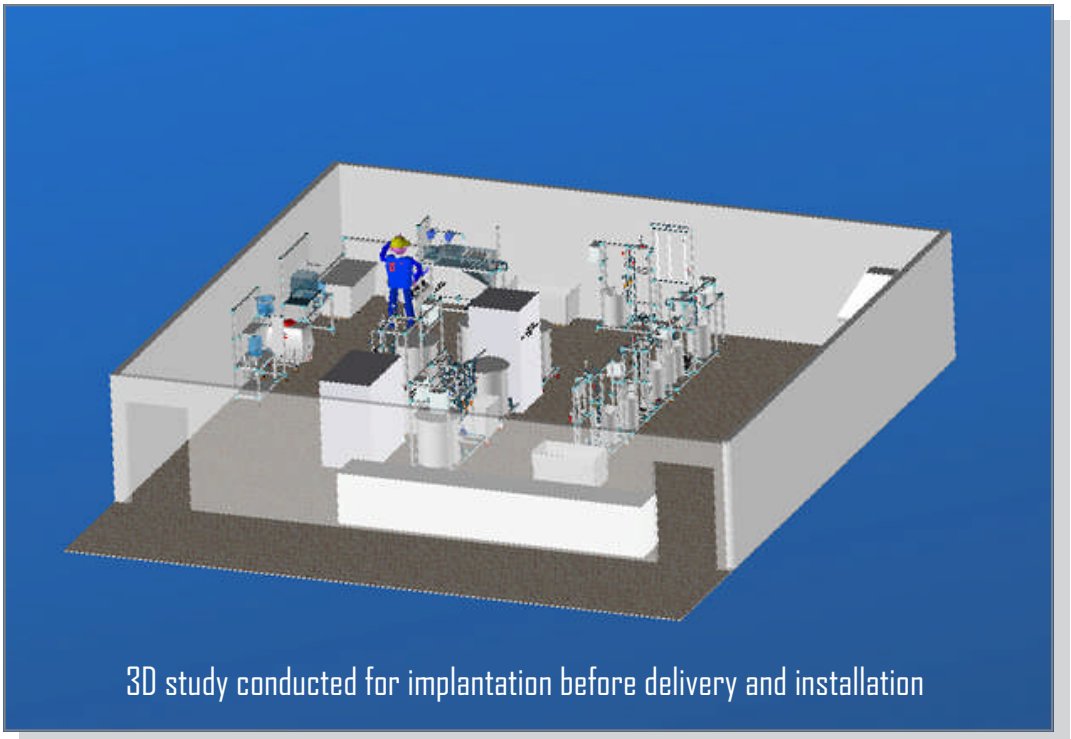
- Proposal to implement in your room
- Definition of plans for a new hall
- 3D design
- Definition of utilities: water, steam, compressed air, vacuum, electricity

Teaching tools :

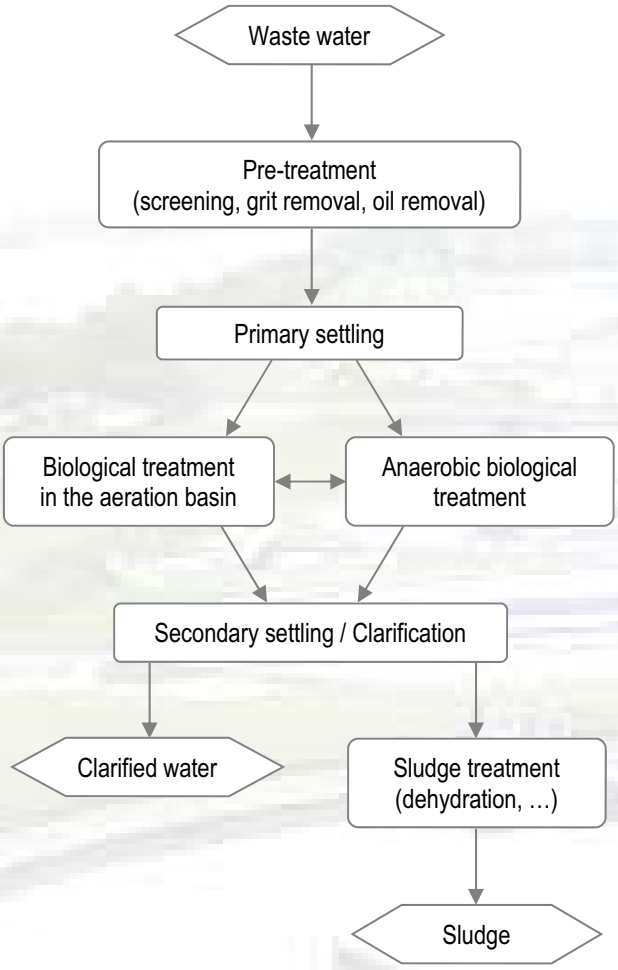
- Theoretical lessons
- Instructions for use
- Practical exercises
- Results

Continuous improvement approach
CE manufacturing
ISO9001 certification

SUMMARY



3D study conducted for implantation before delivery and installation



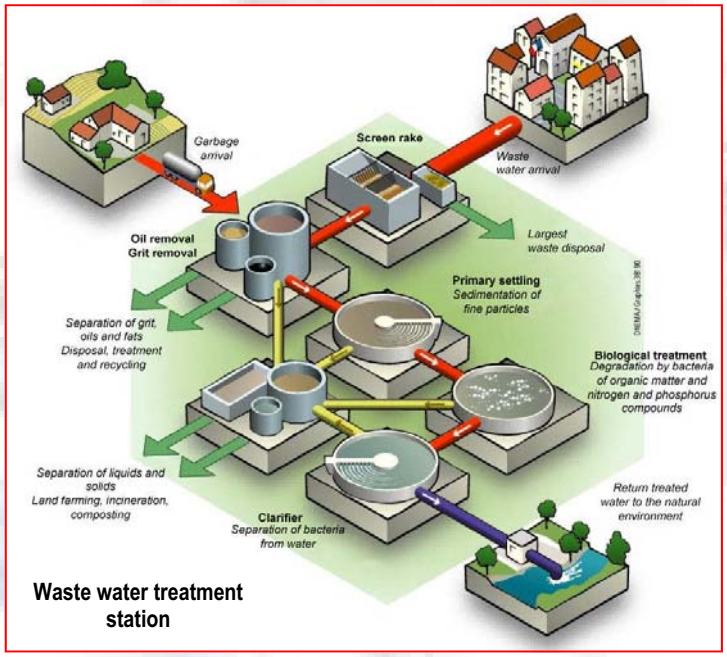
Biological Treatment

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

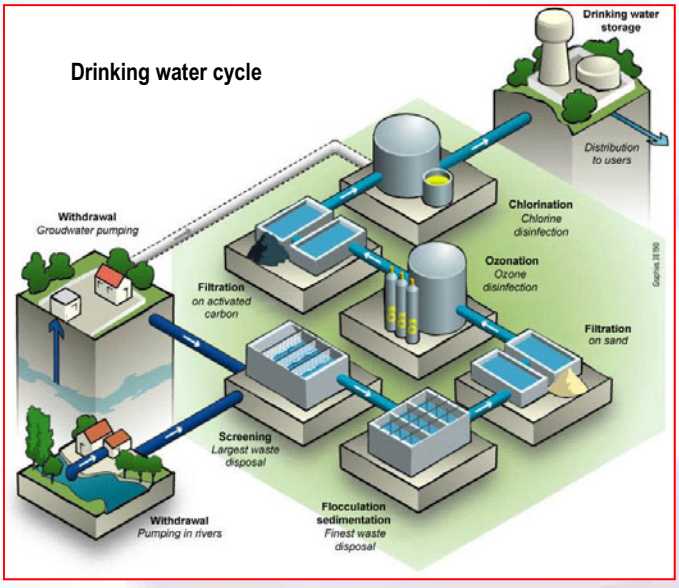
Sand Filtration

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.

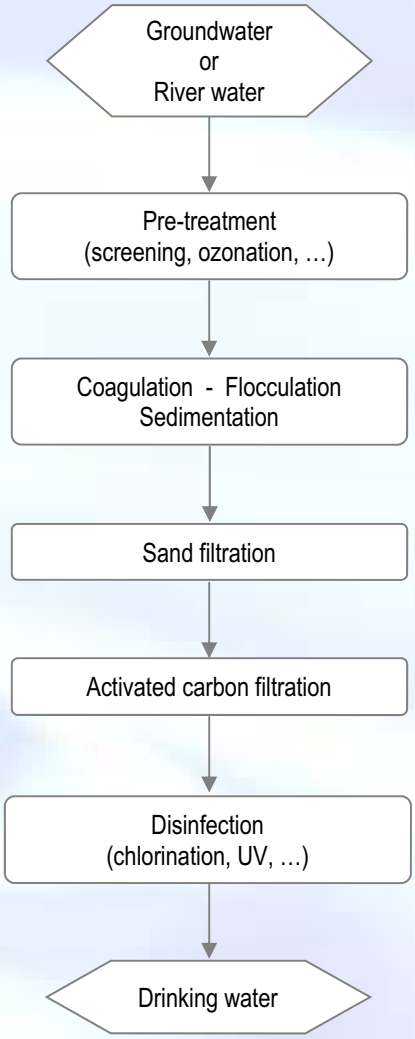
Activated Carbon Filtration
Disinfection : Chlorination, UV

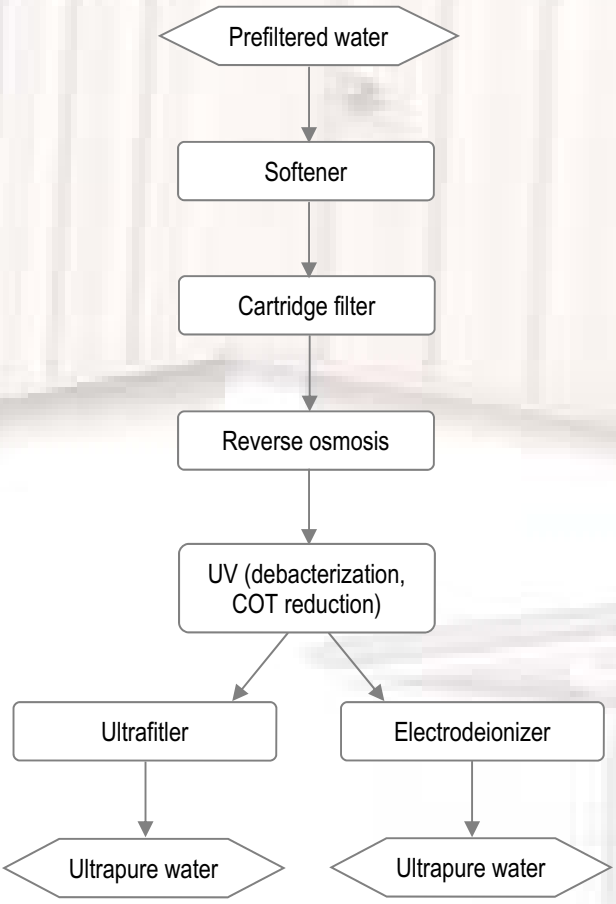
FSC/2000

Purification of water by activated carbon filtration

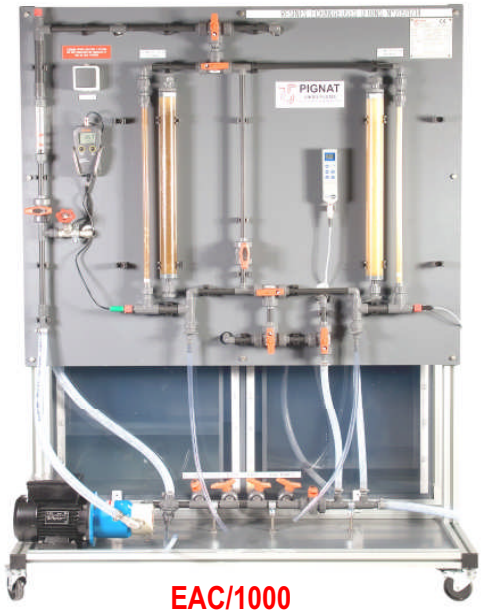
Disinfection passing through UV light

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

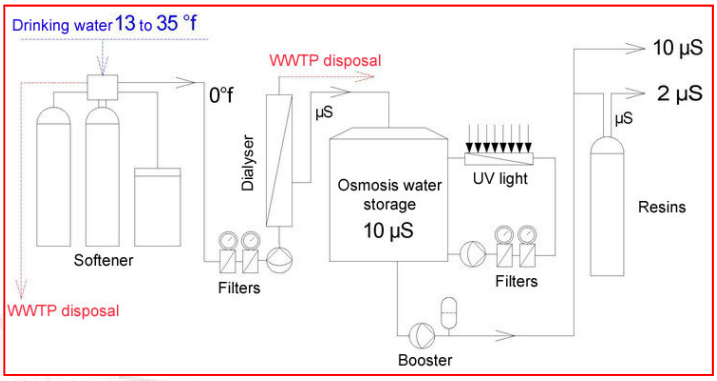
The industry requires no drinking water but process water. This term refers to all types of water entering in manufacturing processes : cooling water, cleaning water, component manufacturing (pharmaceutical, food, cosmetics), cutting water, …

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

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