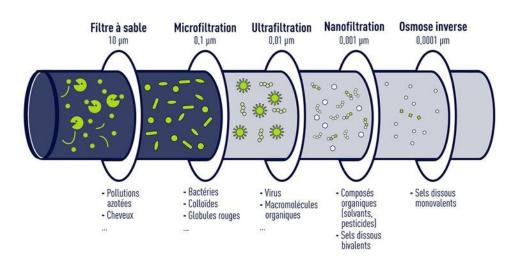




Industrial water treatment innovations

- Membrane separation?
 - An innovative method which consists of filtering the water using increasingly fine membranes.
 - With Ultra-Filtration and at pressures close to those of the city water pipe, macromolecules and heavy metals can be retained



"Why transport water and pollutants to treat them if we can separate them on site and return the purified water to nature?"



Who are we?



Our values

Our orientations and actions are in favor of responsible development and sustainable



Solution integrator innovative techniques

in the fields of green technologies developed by construction technologists (H20 Vortex, TFTFluid, Water Insight)



Expertise

Water treatment - Cooling towers
Waste management
Experiences in large groups
(Engie, Veolia, Suez Environment)
Associated design and engineering office
with Vox Environment



Clients

Tailor-made solutions adapted to the specific needs of each



OSEIDO offers solutionsthat meet environmental and financial challenges manufacturers for the treatment of polluted water



Responding to current and future challenges and better managing its production facilities



Save water

Natural resources are dwindling Membrane solutions are the keys to water recycling and reuse



Anticipate the increase the cost of water

The use of water in the processes represents an important item of expenditure which tends to increase

Reusing wastewater reduces treatment costs



Reduce effluent management costs

The increasing cost of treatment in external treatment unit is a constant challenge to cost control



Comply with regulations

Comply with increasingly stringent environmental regulations



Reduce the use of chemicals

Reduce the use of treatment products by avoiding coagulants and flocculants

Reduce the quantities of sludge produced

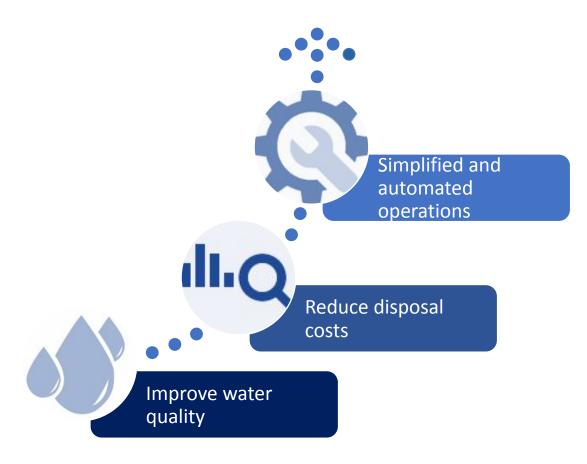


Optimize maintenance

The membranes are self-washing and very easy to maintain with chemical rinses with strong acids



By means of our membrane technologies we want to allow you and economic performance of your company







Treatment of polluted water



Environmental challenge: the new RSDE directives are very demanding on heavy metals and micro-pollutants

- Industries and other producing sectors emit pollutants for which the emission thresholds have become extremely low,
- These heavy metals and oils must be removed from wastewater to a very low level prior to disposal or water reuse,
- Conventional methods are based on physico-chemical principles, the precipitation of the pollutants evacuated in sludge at the same time as the chemicals which require constant adjustments of the dosages,
- Traditional separation methods cannot achieve the removal efficiency required for very low discharge limits or water reuse,
- In order to succeed in the elimination of micro-pollutants, the implementation of membrane technology is very often necessary and it is also not very compatible with the physico-chemicals whose coagulants can obstruct the membranes

OBJECTIF de réduction	FAMILLE	SUBSTANCE	CLASSEMENT	N°CAS	CODE SANDRE
	BTEX	Benzène	SP	71-43-2	1114
	COHV	Trichlorométhane	SP	67-66-3	1135
	COHV	1,2-Dichloroéthane	SP	107-06-2	1161
	COHV	Dichlorométhane	SP	75-09-2	1168
	HAP	Anthracène	SDP	120-12-7	1458
	HAP	Naphtalène	SP	91-20-3	1517
	Métaux	Arsenic	PSEE	7440-38-2	1369
	Métaux	Plomb et ses composés	SP	7439-92-1	1382
-30 % en 2021	Métaux	Nickel et ses composés	SP	7440-02-0	1386
	Métaux	Chrome	PSEE	7440-47-3	1389
	Pesticides	Chlorpyrifos	SP	2921-88-2	1083
	Pesticides	Chlortoluron	PSEE	15545-48-9	1136
	Pesticides	2,4D	PSEE	94-75-7	1141
	Pesticides	Isoproturon	SP	34123-59-6	1208
	Pesticides	Linuron (pour les DOM)	PSEE	330-55-2	1209
	Pesticides	2,4-MCPA	PSEE	94-74-6	1212
	Pesticides	Oxadiazon	PSEE	19666-30-9	1667



Our skills

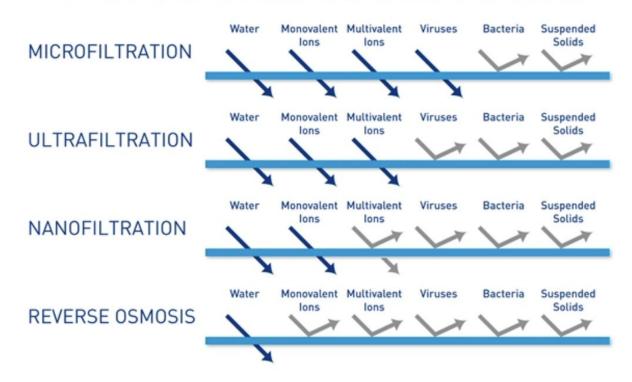
- Our solutions are centered on membrane solutions to first eliminate particulate and hydrocarbon pollution and, in a second stage, dissolved pollution on more advanced membrane solutions.
- We cooperate with leading manufacturers in the market.
- Water treatment
 - Membrane technology (replacing Physico-chemical)
 - Ultrafiltration, microfiltration, finishing treatment: nano-filtration, reverse osmosis
- Mechanical and hydraulic engineering
 - Implementation and installation of auxiliary equipment such as the separator, pre-filtration system and sludge dewatering
- Electrical engineering, automation
 - Interconnection with existing systems or development of custom PLCs



Water treatment: applications examples

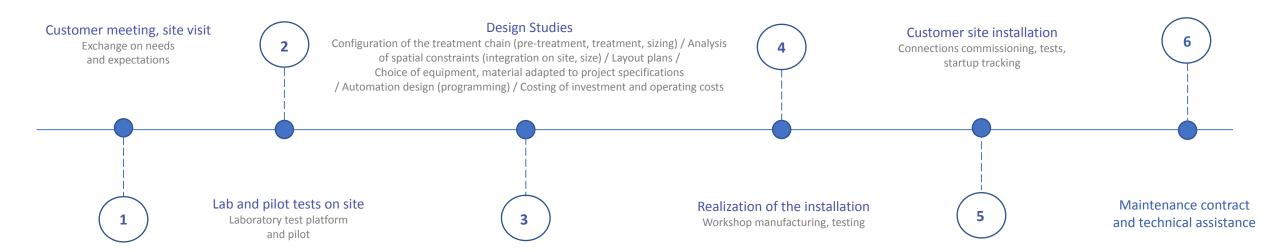
- Removal of hydrocarbons
 - Recycling of degreasing baths
 - Recycling of washing baths
 - Treatment of oily and emulsified water
- Reduction of Hard COD, surfactants, etc.
 - Treatment of water loaded with surfactants
 - Fire drill water treatment
 - Forming oil recycling
 - Landfill leachate treatment
- Removal of heavy metals
 - Dechroming, de-leading, dezincification
 - Alternative to physico-chemical treatment
- Finishing treatment for recycling and regulatory compliance

TYPE OF MEMBRANES AND CHARACTERISTICS





Key stages of a water treatment installation project





Water treatment by tangential filtration



Principle

Based on the sieving effect of the membrane pore size and the built-in membrane separation technology, the emulsion wastewater is treated by rejecting the emulsion particles with a ceramic membrane to recover oil

• Solves the complicated problem of demulsification, flotation and coagulation used in the traditional method, the following NF/RO solutions can be used to further process the ceramic membrane filtrate for reuse of the treated water.

Advantages of the process

- Excellent chemical stability,
- Thermal resistance and very wide pH gradient
- Valuable oil can be recycled,
- Easy to regenerate,
- High flow and adjustable as needed (modular construction),
- The highly automatic operation system makes the process both simple and convenient, and greatly reduces operation costs,
- A compact design for a reduced occupied space.

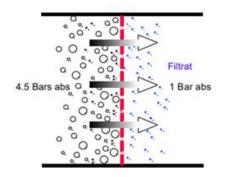


Focus on the principle of tangential filtration

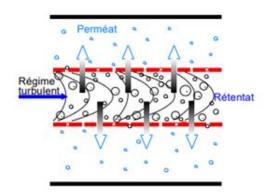
We can locate by the following diagram the tangential filtration compared to the traditional filtration, also called frontal filtration:

- Frontal filtration
 - The filter medium is a wall perpendicular to the direction of circulation, we obtain more or less quickly a clogging and therefore a stoppage of the filtration.
- Tangential filtration
 - The filter medium is a membrane placed inside a porous tube. The circulation of the fluid to be treated in the tube in turbulent mode (several m/s) prevents the installation of a clogging film.
- To the phenomenon of pure mechanical separation (segregation by the size of the molecules) are added phenomena of segregation by the degree of hydrophobicity
- The molecules are indeed more or less repelled from the membrane depending on whether they are hydrophilic or hydrophobic.
- The permanent recirculation on the membrane of the liquid to be treated, known as "retentate", makes it possible to obtain at the end of filtration:
 - a concentrate of pollutants
 - a permeate stripped of its pollutants

FILTRATION FRONTALE

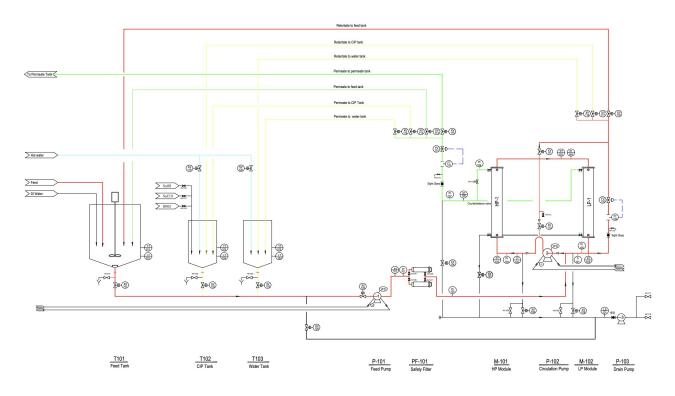


FILTRATION TANGENTIELLE





Reference PID of an Ultra Filtration unit



By choosing between different membranes and different degrees of porosity, we can:

- Eliminate hydrocarbons even in emulsion,
- Eliminate suspended solids, clarification,
- Eliminate macro-molecules and in particular COD,
- Eliminate heavy metals and divalent ions,
- Completely demineralise water (e.g. desalination of seawater),
- Sterilize water.

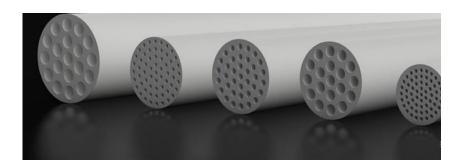


Membrane categories

There are two main families of tangential filtration membranes, classified by the material used:

- Organic membranes
 - Use media in organic material: polysulfone, cellulose acetate, polyamide...
 - The fragility of the media reserves them for "clean" applications, with low clogging
 - The regeneration conditions are limited in pH: 4 < pH
- Mineral membranes
 - Use media like graphite and ceramics
 - The nature of the support makes it possible to adopt regenerations under severe conditions based on acids and alkalis
 - Severe industrial applications (cutting fluids, greasy emulsions, etc.) favor mineral membranes, which are more expensive, but much more resistant to fouling and regeneration







Example of application in the surface treatment industry

- Combined removal of metals, oil and grease and suspended solids
 - Our partner has developed a specific complete treatment plant for the metals industry,
 - The process chosen is efficient and robust. It removes solids, metals, oils and greases from wastewater,
 - The process, using ceramic membrane technology, reliably produces high quality effluent that can be reused or disposed of,
 - The Ceramic membrane is extremely resistant to variations in water quality and to harsh chemicals, making it an ideal solution for the removal of metals and for the treatment of waste water from the metal industry.
- Main steps
 - Pre-treatment (e.g. for fluxes containing cyanide, chromium or nickel),
 - Precipitation of metals,
 - Ultrafiltration (UF)
 - includes a high-efficiency solids recycle step that reduces the amount of precipitation chemicals needed to achieve metal removal.
 - Sludge treatment



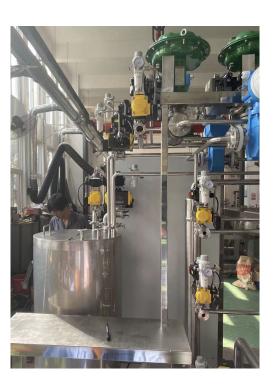


Key Benefits of Ceramic Membrane UF Technologies

- Constant and reliable impregnation quality, independent of disturbances,
- Compact,
- Compatibility with hazardous chemicals,
- Sustainability,
- Fully Automated Minimum Required Operation Staff
- Flexibility for the removal of a wide range of metals or pollutants: Cr6+, Cr3+, cyanides, Zn, Ni, Cd, Cu, Ag, Hg, Pb, Mo, etc









Main benefits observed: simplified operations and controlled abatement rates



Saving of reagents

The use of reagents is limited to pH control and the use of detergents for the regeneration of membranes

Performance monitoring

Automation of processes and continuous adjustment of performance

Possibility of joint reduction of heavy metals and hydrocarbons

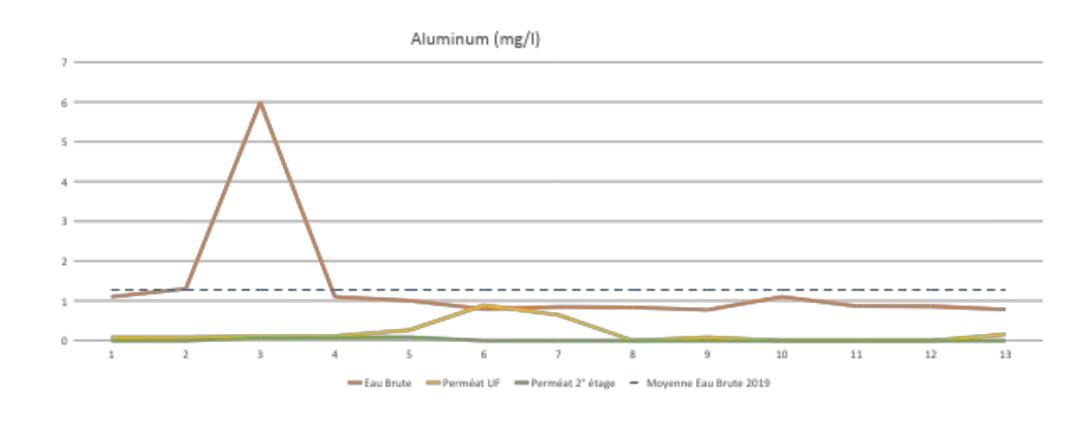
When conventional methods require the implementation of a physico-chemical and a float

Reduced operational costs

Less technical maintenance and human intervention

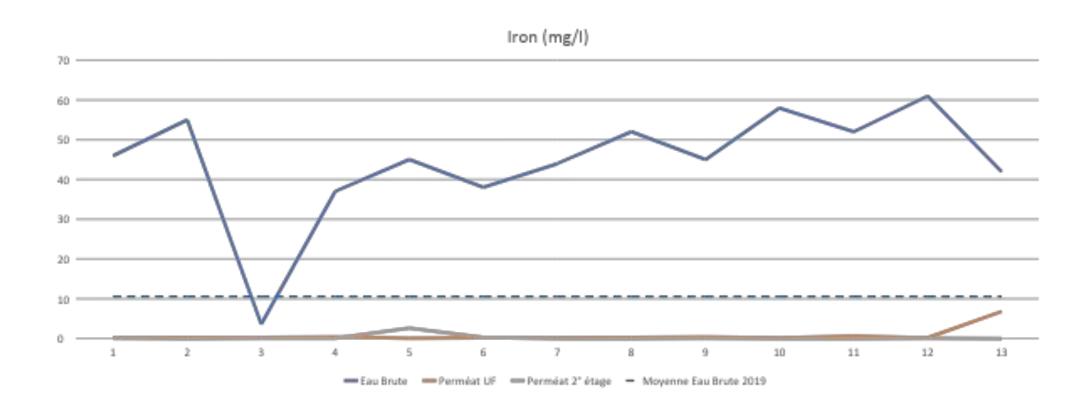


Feedback and benefits observed: aluminum reduction on a slag heap of a former aluminum production plant





Feedback and benefits observed: iron reduction on a slag heap of a former aluminum production plant





Cleaning waste water recovery in a pesticide production site: from raw water to treated product



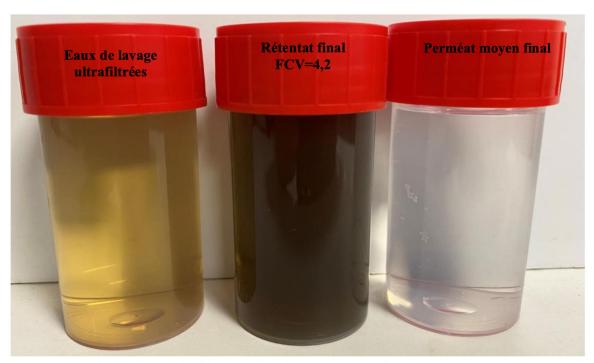
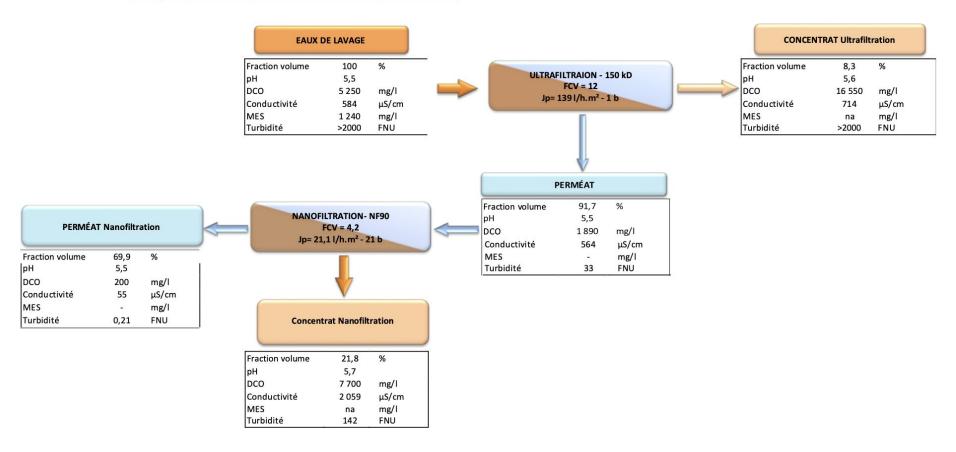


Figure 7: Différentes fractions obtenues - Osmose inverse



UF/ NF treatment combination: from raw cleaning waste water to clean water => 64% water recovery @ 55 micro siemens/cm

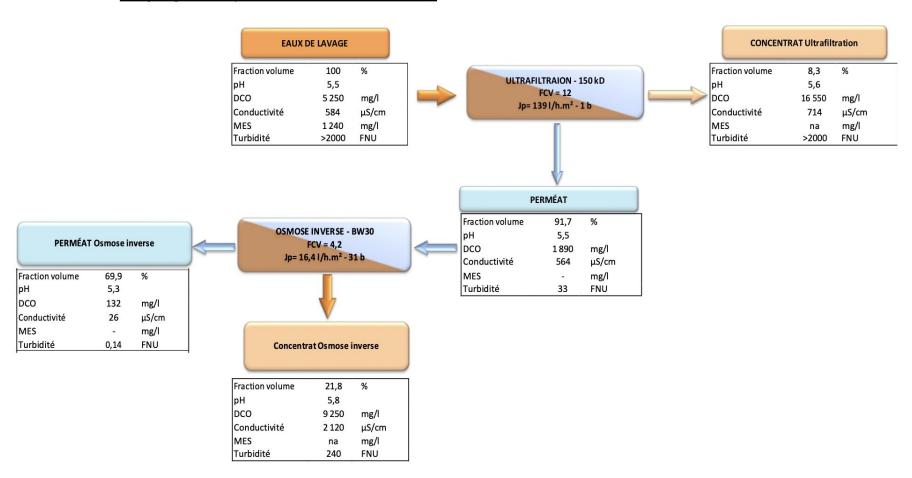
Couplage Ultrafiltration - Nanofiltration





UF/ RO treatment combination: From raw cleaning waste water to clean water => 64% water recovery @ 26 micro siemens/cm and 0,88 microgramme/l on pesticide

Couplage Ultrafiltration -Osmose inverse





Cost comparison between on site treatement to external treatment: Initial situation vs on site solution

Initial situation

Item	Quantity	Value
Destruction	Ton	136 Euros
Transportation	Truck	1300 Euros
Total per ton		180 Euros/T
Total per year	600 T	108.000 Euros
Direct Opex savings for on site treatment	64% of 600 T= 384 T	-69.120 Euros
Indirect Opex savings	-25% man power work load, water and energy	-12.500 Euros
Total savings per year		81 620 Euros

<u>Conclusion:</u> Return on investment for this project 2,25 years considering a saving of 80.000 Euros per year compared to 180.000 Euros for CAPEX

On site treatement (based on one treatment line and excluding interconnexions and intermediate tanks if any)

	**	
Items for CAPEX	Quantity	Value
1 preteatement unit @ 1 m3/h	1	80.000 Euros
1 polishing unit @ 1 m3/h	1	100.000 Euros
Total CAPEX		180.000 Euros
Items for OPEX	Quantity	Value
Waste water concentrate@180 Euros/T	216 T	38.880 Euros
Energy consumption	6 kw/h @ 200 days a year	4.000 Euros
Chemical consumption	500 l/ year	5.000 Euros
Maintenance	2 X year	3.000 Euros
Membrane replacement budget	0,5 x year	1.500 Euros
Total Opex	Per year	52.380 Euros



Other non economic direct benefits

- Cost controling by direct operation on site,
- Reduce significantly carbon footprint (truck transportation, water incineration),
- Reduce risk of accident by waste pumping, discharging, truck collection etc...
- Limitation of external waste disposal,
- Possibility of reuse of the waste water in cleaning or non process operation,
- Reduced environnemental impact,
- Overall better image!



Some of our references



They trust us

















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