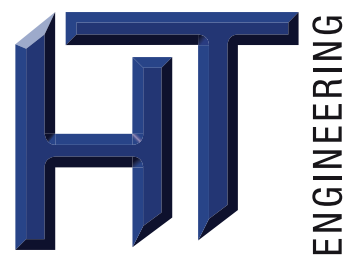


PROCESS WATER TREATMENT PLANTS

FOOD & BEVERAGE INDUSTRY

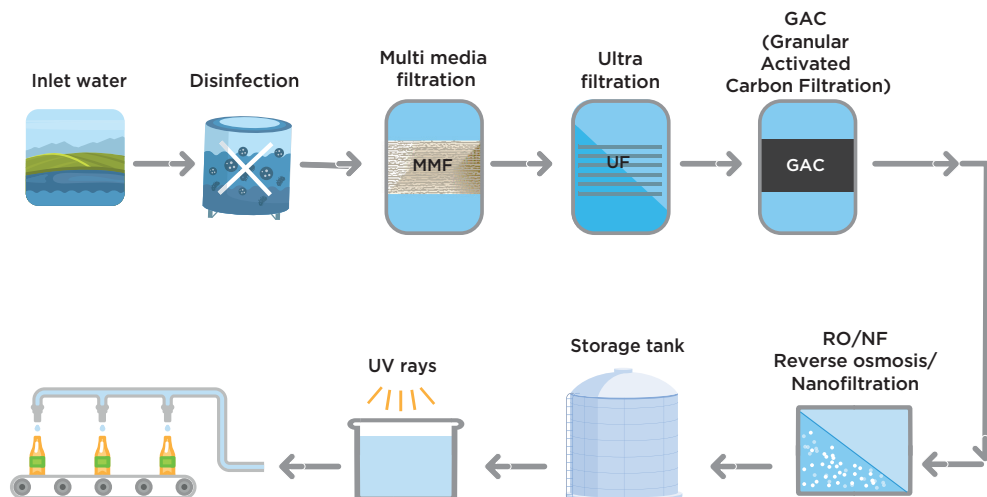
Image By maniacvector



HYDROTECH
a gradiant company

STATE-OF-THE-ART TURNKEY SOLUTIONS FOR WATER TREATMENT

To ensure highly efficient water treatment, Hydrotech Engineering follows a three-step process: pre-treatment, main treatment and post-treatment. These steps are carefully selected and adapted according to the initial quality of the water and the specific goals of each customer, thus ensuring the highest quality of the final result.



DISINFECTION, MULTI-MEDIA FILTRATION AND ULTRAFILTRATION PRE-TREATMENT

The water to be treated, whether it comes from the subsoil or from a surface supply source, is first of all subjected to an analysis at the chemical laboratory of Hydrotech Engineering. Once the chemical-bacteriological composition of the water has been identified, our technical department designs the most effective treatment to achieve the required standards. When necessary, a first phase may include disinfection through the dosage of an oxidant, such as sodium hypochlorite, to reduce the microbiological

load, followed by filtration on a multi-media granular layer under pressure to remove the suspended material or

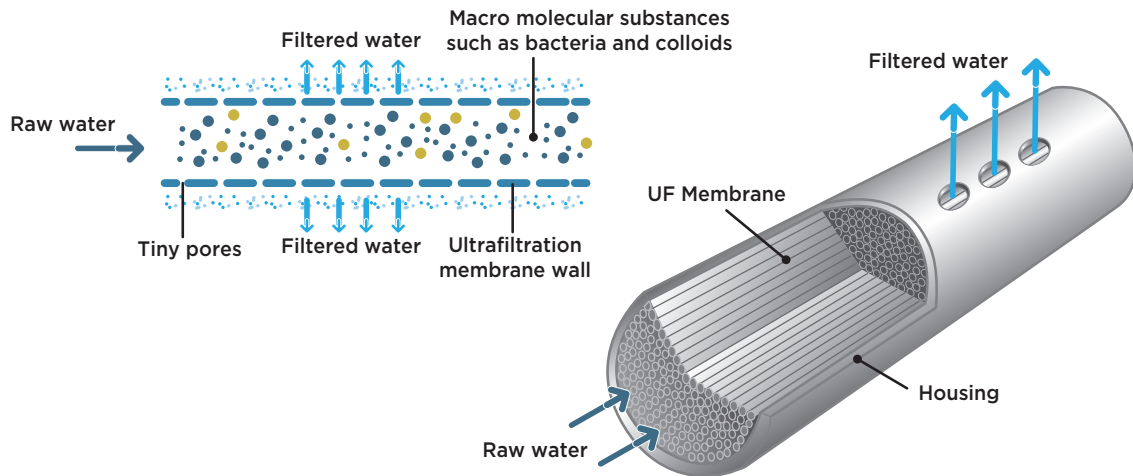
possibly the presence of some metals present in solution such as iron.



ULTRAFILTRATION (UF)

PRE-TREATMENT

Hydrotech Engineering uses ultrafiltration prior to activated carbon and reverse osmosis/nanofiltration stages for effective water pre-treatment that provides superior performance compared to conventional filtration technologies, making the use of subsequent refining stages easier to manage and effective. Ultrafiltration technology is based on the use of semi-permeable membranes, generally tolerant to residual active chlorine, of the spiral wound or hollow fibre type.



If you are using an ultrafiltration system, the best practice is to also implement a system that provides for the integrity of the membranes, in order to be able to constantly check the quality of the filtered water.

CHARACTERISTICS OF ULTRAFILTRATION

Degree of filtration	20-30 nm
Pressure	< 1 bar
% Recovery	90/97%
Output Turbidity (NTU - Nephelometric Turbidity Units)	< 0,1
Backwash	✓
Tolerance to residual active chlorine	✓
Removed Components	Viruses, giardia, cryptosporidium, bacteria, colloids, algae and suspended solids

THE BENEFITS OF ULTRAFILTRATION

- **Reduction of overall running costs,** ease of maintenance and greater simplicity in membrane cleaning.

- **Reduction of residual chemicals,** thanks to the minimal use of chemicals for pre-treatment and cleaning.

- **High and consistent product quality, measured by:** water turbidity (NTU) or silt density index (SDI).

- **High level of tolerance of the UF membrane** to feed water alterations.

GRANULAR ACTIVATED CARBON FILTRATION (GAC) AND REVERSE OSMOSIS (RO)/NANOFILTRATION (NF)

MAIN TREATMENT

GRANULAR ACTIVATED CARBON FILTRATION

GAC (Granular Activated Carbon filtration) is a filter with activated granular carbon, loaded onto pressure filters, which removes organic chemicals and also by-products of chemical reactions that

occurred in pre-treatment. These substances can cause detectable odours and tastes even at very low concentrations. Activated carbon, obtained from carbonaceous raw materials such as charcoal, coconut

shells or wood, is a black substance, without taste or odour, porous and insoluble in water and with a high specific surface area (500-1500m²/g).

CHARACTERISTICS OF THE GAC (GRANULAR ACTIVATED CARBON FILTRATION)

Removed Components

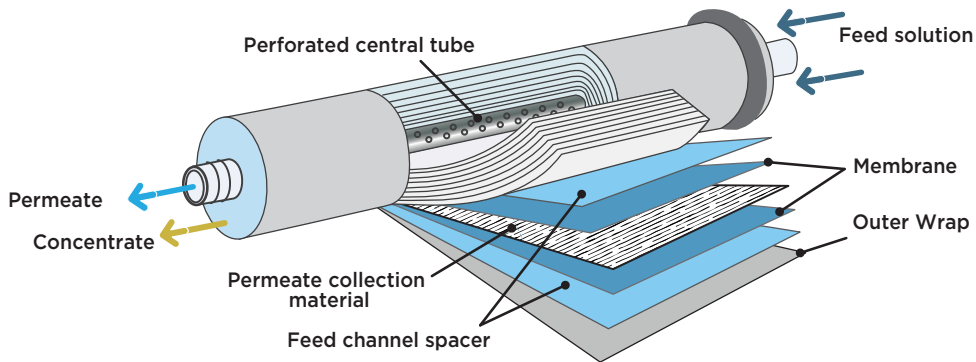
By products, chlorine, organic elements and pesticides



REVERSE OSMOSIS (RO)

MAIN TREATMENT

Reverse osmosis (RO) is one of the most widely used technologies in water treatment and consists of a real barrier capable of removing microbiological components, inorganic and dissolved organic substances when associated with GAC and ultrafiltration processes. It's a type of membrane that operates according to the osmotic principle, i.e. the water is separated by applying pressure on the membrane in the opposite direction to the natural direction of the osmotic flow.



The RO membrane is normally installed with a wound spiral configuration that follows the principles of tangential flow filtration. More precisely, by applying pressure, the water is forced to pass through the membrane: the filtered water (permeate) collects in the inner part of the filter, while all the dissolved components remain concentrated in the outer part.

CHARACTERISTICS OF REVERSE OSMOSIS

Degree of filtration	1-10 nm
Pressure	10 - 80 bar
% Recovery	60/90%
Water quality	Maximum
Heat sanitization	✓
Treats groundwater, surface water and brackish water	✓
Removed Components	Endotoxins/pyrogens, insecticides/pesticides, herbicides, antibiotics, nitrates, soluble salts, metal ions, heavy metals, arsenic, boron and fluorine

THE BENEFITS OF REVERSE OSMOSIS

- **Guarantee of the high quality of the water produced**, even if the source of supply should change.

- **Removal** of the elements is **organic and inorganic**.

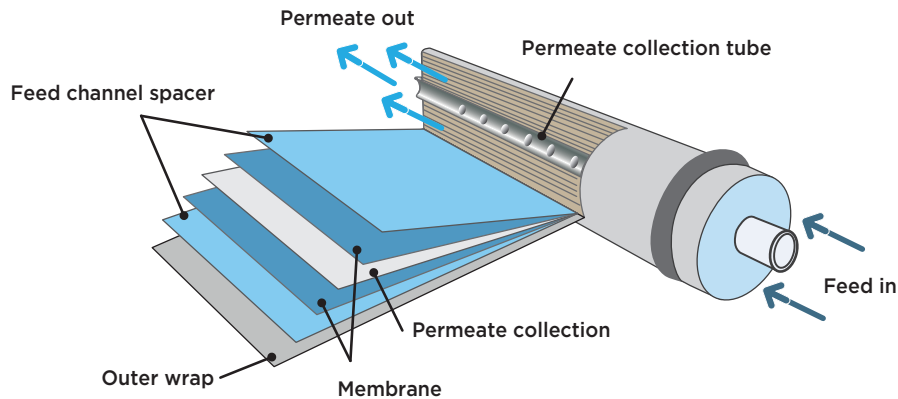
- **Particularly effective on micropollutants** (endoxins, antibiotics).

- The conformation of the membrane makes it possible to carry out **effective cycles of cleaning and sanitization**.

NANOFILTRATION (NF)

MAIN TREATMENT

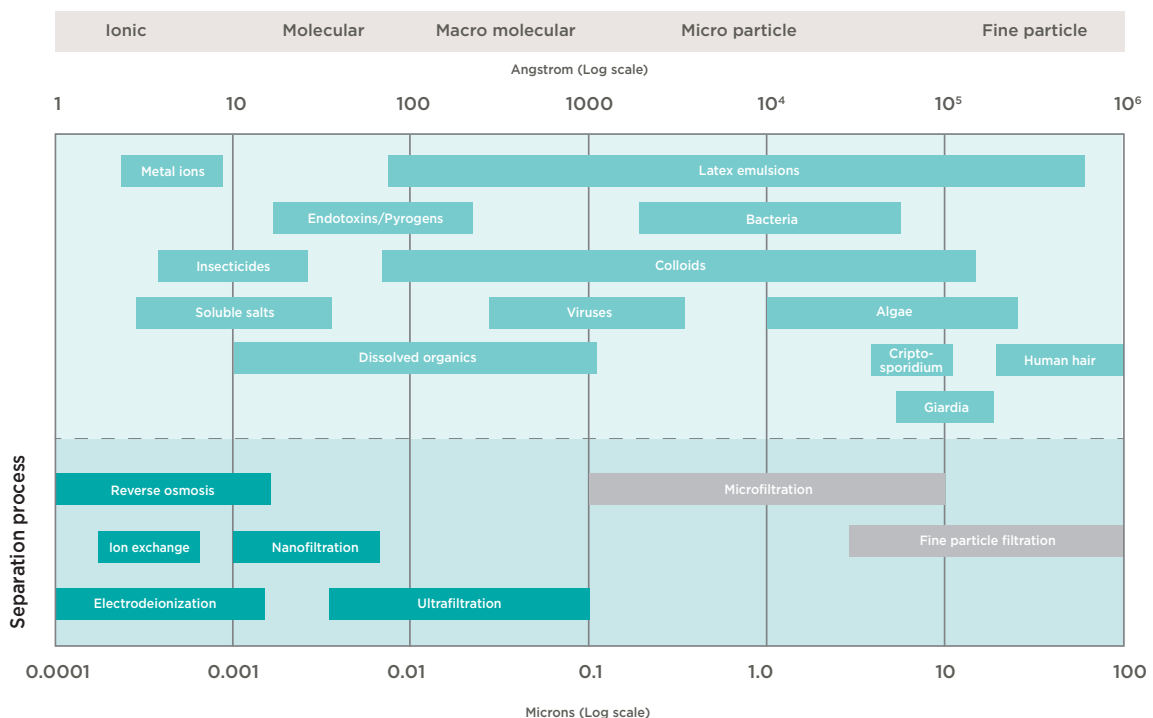
If you need a lower reduction in the concentration of dissolved solids than that achieved with reverse osmosis, but still maintaining a very effective level of reduction of hardness and content of organic substances and colour, nanofiltration can be used. The main difference between NF and RO is that the former is designed to remove multivalent ions such as calcium and magnesium and have a molecular shear of about 200 Daltons, reverse osmosis instead, it is designed to filter all substances in solution.



CHARACTERISTICS OF NANOFILTRATION

Pressure	3 - 20 bar
% Recovery	75/90%
Water softening and discoloration	✓
Disinfection of primary water	✓
Removed Components	Divalent ions, salt in slightly brackish waters

RANGE OF FILTRATION PROCESSES



UV RAYS

POST-TREATMENT

Ultraviolet (UV) light, a form of electromagnetic radiation with wavelengths from 210 to 370 nanometres not visible to the human eye, is employed in water treatment prior to bottling or intended use. This light inactivates microorganisms, such as bacteria, viruses, and fungi, altering their proteins and DNA, preventing them from replicating. UV systems, consisting of a stainless steel chamber with UV lamps and a control panel, allow water to pass through the treatment without altering

its taste, odour or colour. Different organisms are sensitive to slightly different wavelengths, but the design and sizing of the UV system for dose calculation is based on measuring ultraviolet light entering the system at 254 nm. Therefore, the sizing depends on how easily UV light can pass through the water to reach potential organisms.



CHARACTERISTICS OF UV RAYS

Wavelength	210 - 370 nm
Activation time	Minimum
Cluttered	Reduced and compact
Chemical dosing	None
Efficiency in reducing the microbiological load	Maximum
Does not alter taste, smell or colour	✓
Removed Components	Bacillus subtilis (spores), Escherichia coli, coliform bacteria, poliovirus, cryptosporidium, giardia, adenovirus, vibrio cholerae, MS2, hepatitis A and rotavirus - Wa and SA11.

UV doses (in mJ/cm²) required for the inactivation of reference pathogens in validation tests.

Microorganism	Log inactivation								
	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	
Cryptosporidium	1,6	2,5	3,9	5,8	8,5	12	-	-	
Giardia	1,5	2,1	3,0	5,2	7,7	11	-	-	
Virus	39	58	79	100	121	143	163	186	

EXCELLENCE IN INDUSTRIAL WATER TREATMENT PROCESSES

TURNKEY PLANTS

- Creation of state-of-the-art tailor-made systems
- Quality assurance, cost and project time reduction
- Complete management: design, development, in-house construction and after-sales service

AUTOMATION

- In-house software for universal plant management
- Plants designed to automate maintenance activities, reduce operating costs, maximize production and reduce downtime

REMOTE CONTROL

- Continuous monitoring of parameters and timely remote intervention by a specialized in-house team
- Preventive maintenance and optimization of plant performance

PILOT PROJECTS

- Risk reduction and prior assessment of the feasibility of the project through the construction of pilot plants
- Supply of the best technologies with the highest performance on the market

PRE-ASSEMBLY

- Construction and pre-assembly of the plant and all ancillary sections in Italy by a specialized team
- Reduction of plant footprint, costs and optimization of logistics

HYGIENIC DESIGN

- Systems with certified components and sanitizable materials, such as 316 steel
- Minimal maintenance and extended equipment life
- Highest system quality

INTERNATIONAL VENDORS

- Collaboration with the best international suppliers to ensure reliable and high-quality solutions
- Immediate service for spare parts that are quickly available

ZERO LIQUID DISCHARGE

- We specialize in the implementation of advanced solutions for wastewater treatment
- 100% recycling of wastewater with a reduction in environmental impact and water consumption

CERTIFICATIONS

- Increased plant quality and safety
- ISO 9001:2015 certification and systems compliant with the most stringent hygiene standards in the food and beverage sector, such as EHEDG and 1935:2004

REFERENCES

Hydrotech Engineering has established important collaborations with leading global companies in the Food & Beverage sector, building turnkey plants in different parts of the world, including Asia, Africa, Central America and Europe. These successes have solidified our partnerships with renowned players in the industry who have repeatedly confirmed the high standard of our services during various collaborations, reinforcing their trust in Hydrotech Engineering.

Discover the plants built by Hydrotech Engineering here:



For over 23 years, Hydrotech Engineering has been building state-of-the-art turnkey plants for the treatment of process water and wastewater using semipermeable membrane and biological process technologies. With more than 200 proven installations in over 25 countries, Hydrotech Engineering has supported over 100 companies in reducing water consumption and recovering as much as possible for more sustainable water use.

Our team coordinates projects, from design to after-sales service, all over the world between the headquarters in Italy and India.



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