

/// /// /// /// **ULfine**
Ultrafiltration



INNOVATOR
***Automatic cleaning
without auxiliary tank!***

Advantages and applications

- Filters contaminated water with colloids, impurities, microbiological and suspended solids
- Produces potable water from surface water, springs or holes, for use in public distribution, condominiums, hotels, leisure centers and industrial applications
- It's ideal to be incorporated in reverse osmosis systems pre-treatment, to guarantee optimum protection to RO membranes (water with SDI < 3)
- Applicable in tertiary wastewater treatment systems





Welcome to Enkrott's World!

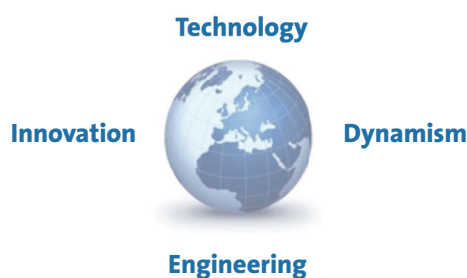
Water is essential to life. However, the water needs of the world are increasing. These rates cause a pressure increase in living conditions, especially in poor countries. It is estimated that two thirds of the world population could live in the future in conditions of stress caused by low water availability...

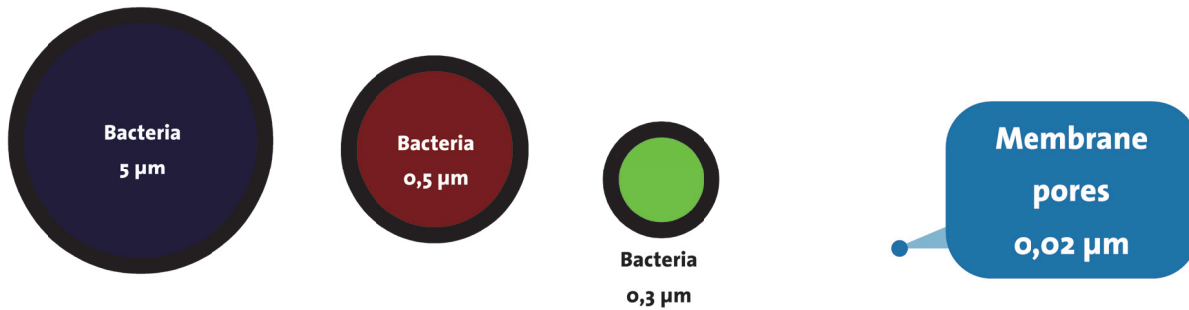
It is necessary that we all preserve the common element which is water for future generations, using the best practices and techniques of conservation, reuse and recycling.

In Enkrott we know well what that is. We develop and apply engineering and products solutions for over 50 years.

We have given users the ability to utilize various sources of less noble water to feed their processes, treat it with techniques that minimize environmental impact and supply people with an appropriate water for their health.

Water is everything for us! It is our raw material and our purpose. The impacts of water in various industrial processes, the equipment that use water in their usual operations and the well-being of populations are the goals of our knowledge.





Ultrafiltration fiber characteristics

- **Extremely small filtration pore diameter.** The use of membranes with a nominal pore diameter of 0.02 µm allows to remove pathogenic organisms and the majority of virus and bacteria. The high porosity of the membranes allows high flow with low pressure loss
- **Durability.** The structure and manufacturing process ensures high stability and durability of the membranes, even with frequent cycle of chemical cleaning
- **Configuration.** Membranes that function on pressure and with internal to external flow are applied. Each membrane has 7 longitudinal holes (with 0.9 mm or with 1.5 mm of diameter) through which passes the water that will be filtered. The pressure forces the passage through the wall of the membrane, filtering the water in an extremely effective way

Module details

- The systems ULfine are composed by low pressure ultrafiltration modules. The fibers are encapsulated in PVC modules, vertically assembled. The special design of the module includes an internal distributor that allows an almost constant radial velocity
- **Integrity guaranty.** The modules are sealed and don't require any seal to separate the water entrance area from the ultra-filtered water. During the cleaning process the fibers are not subject to great oscillations. This reduces the mechanical strain and maximizes the membranes lifetime

Innovation

- The MX series of ULfine have innovating design that avoids the necessity of a water tank for the membranes cleaning. Cleaning is done individually, by modules sections, with water produced by the remaining
- Greater efficiency. The MX unit continues the water production even during the cleaning. In the conventional systems this water must be produced before the cleaning, reducing the useful time of production
- Minor occupied space. The water tank absence reduces significantly the space occupied by the system
- Lower effluent flow. The cleaning by modules sections implies reduction of the effluent flow. The over sizing of the rejection pipes is not necessary



Configurations

- The ULfine systems are built in skids that include the modules and all the control equipment and automatic command
- The storage and reagents dosing is supplied in HDPE preassembled skids, corrosion inert. Includes contention vase, dosing pumps and level sensors
- MBW series includes a water tank for cleaning, with preassembled level sensors. The cleaning pump is included in the membrane skid
- Three series are available:
- MBW series: 1, 2 or 3 modules. These systems are designed to produce up to 15 m³/h
- MX series: 4, 6, 8 and 12 modules. These systems are designed to produce up to 60 m³/h
- MXL series: system with up to 48 modules, prepared to treat up to 240 m³/h. In these systems the modules are supplied in separate structures from the command valves structure
- The modules skid includes one or more modulating valves for automatic regulation of the treated flow. The system measures and monitors the production and cleaning flows, the entrance and exit pressures, and the membranes differential pressure
- The electrical board includes a SIEMENS PLC, a color touch panel and a Ethernet industrial switch



Backwash and CEB

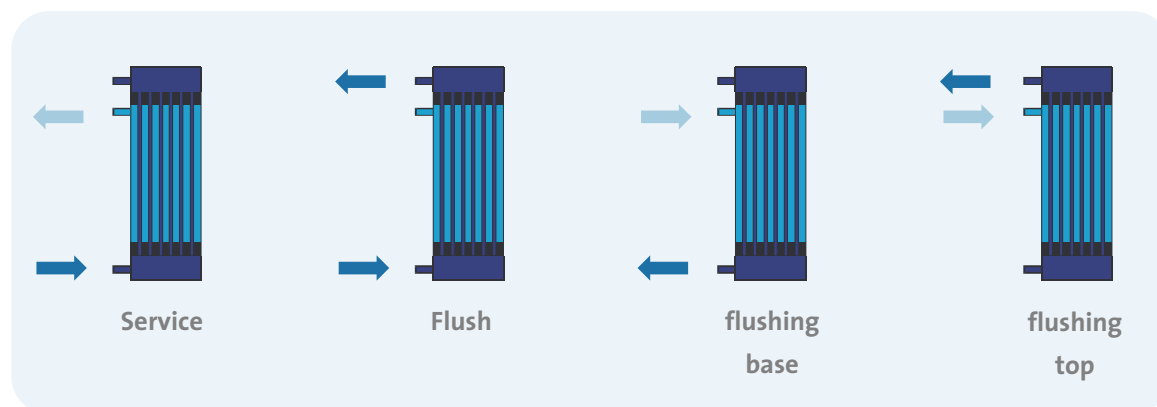
- The system executes very short automatic flushings (40 – 70 s), with typical intervals between 20 to 60 minutes
- CEB (“Chemical Enhanced Backwash”) flushings are performed periodically. The flushing frequency depends on the quality of the water and is adjustable on the touch panel of the operator. This process is essential to maintain the porosity of the membranes over the time
- The CEB flushing resort to Caustic Soda (removal of organic deposits), Acid (removal of mineral scale), and occasionally, Sodium Hypochlorite for disinfection

Raw water quality and limitations

Turbidity	Average <50 NTU, 100 NTU Maximum (fiber modules with 0.9 mm) Average <150 NTU, 250 NTU Maximum (fiber modules with 1.5 mm)
Particles size	<250 µm
pH	3 - 10 (in service)
Iron	<5 mg/l (oxidized form in suspension)
Manganese	<1 mg/l (oxidized form in suspension)
Oils and grease	<3 mg/l
TOC	<20 mg/l
Cationic polymers	Undetectable

In case any of the parameters do not meet specifications, please contact Enkrott to request assistance. It may be necessary to apply a pre-coagulation process in case of water with high levels of organic matter. It may be necessary to filter / sieve the water to be treated in order to remove coarse particles

Service sequence / flushing



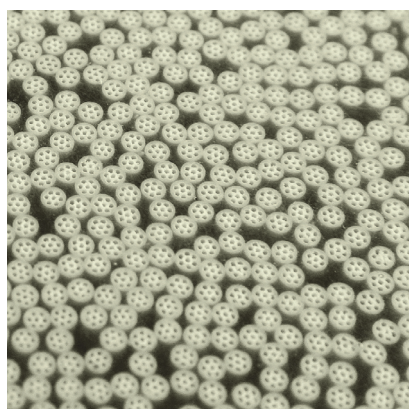
Design parameters

Input pressure	2 – 3 bar (membranes pressure loss < 1 bar)
Maximum pressure	6 bar
Recovery	85% – 95% (typical value)
Flushing flow	15 m ³ /h per module (60 m ³) simultaneously in flushing
Production flow	40 – 120 l/m.h
Reagents for CEB	NaOH, HCl, citric acid, NaOCl
Compressed air	6 – 8 bar, dry, without oil
Power supply	3 x 400 VAC, 50 Hz

The hydraulic connections are all made in the upper region of the system, vertically.

Consider the assembling of the pipes in order to prevent the ULfine unit from getting under vacuum





Membranes
0,9 mm channels
Encapsulated Top

Model	Number of modules	Nominal production (l/h)	Power (kW)	Connections	Dimensions (mm) L x D x H
ULF 1MBW	1	5.000	3	DN40 / DN40	1200 x 1140 x 1900
ULF 2MBW	2	10.000	3	DN40 / DN40	1200 x 1140 x 1900
ULF 3MBW	3	15.000	3	DN50 / DN50	1200 x 1600 x 1900
ULF 4MX	4	20.000	1	DN50 / DN65	1700 x 1200 x 1900
ULF 6MX	6	30.000	1	DN80 / DN65	1700 x 1900 x 1900
ULF 8MX	8	40.000	1	DN80 / DN80	1700 x 2600 x 1900
ULF 2x4MX	8	40.000	1	2 x DN50/DN65	1700 x 2200 x 1900
ULF 12MX	12	60.000	1	DN100 / DN100	1700 x 3800 x 1900
ULF MXL	project	project	project	project	project

In MBW models is provided a cleaning water tank with 1100 x 1100 x 1500 mm

All models include a reagents skid, in HDPE, with 1300 x 400 x 1500 mm



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Enkrott reserves the right to change all technical specifications and the design of the models presented in this brochure



ADDING VALUE TO YOUR WATER