

# Culligan®

## ULTRAFILTRATION



CULLIGAN: WORLD LEADER IN THE WATER TREATMENT

CE Equipment according to CE Directives in force

# Ultrafiltration

## RELIABLE, ECONOMIC AND ECOLOGICAL TO REMOVE SUSPENDED SOLIDS IN WATER

Access to water, in sufficient quantities and quality, is key for drinking water but also for commercial and industrial applications. It is important therefore not to waste water or cause water pollution. The Ultrafiltration has a low environmental impact and minimises the level of pollution compared to other treatment methods. Culligan offers Ultrafiltration, with hollow fibre membranes, as an alternative to multilayer filters and related chemical conditioning.

### Main applications and advantages of Ultrafiltration

- **Filtering water contaminated** by colloids, microbiological impurities and suspended solids.
- **Production of drinkable water** from surface, spring or well water for water mains, corporations, condominiums, hotels, recreational centres, residential areas, industries, etc.
- **Pretreatment for Reverse Osmosis systems** to guarantee always the ideal quality for the protection of the membranes (SDI<3).
- **Tertiary filtering in waste treatment systems** to obtain water of suitable quality for reuse in non-drinkable uses.

### Characteristics of the membranes



#### Low level of clogging

The UF modules are made of PVDF-H, with excellent properties of resistance to pH and high levels of oxidising agents such as peroxides and hypochlorites, permitting sufficient removal of the bacterial contamination and thorough cleansing during washing.

#### Minimum diameter of the filtering pores

With a nominal pore diameter of 0.03  $\mu\text{m}$  the UF technology efficiently removes pathogenic agents, most viruses and bacteria. Additionally the high porosity membranes, compared to the standard capillary ones, allow a high flow rate at the same supply pressure of the membrane.

#### Long lasting

The special structure with a double wall of fibres allows an excellent duration and resistance to breaking, even with frequent cycles of chemical washing for cleaning the membranes.

#### Configuration

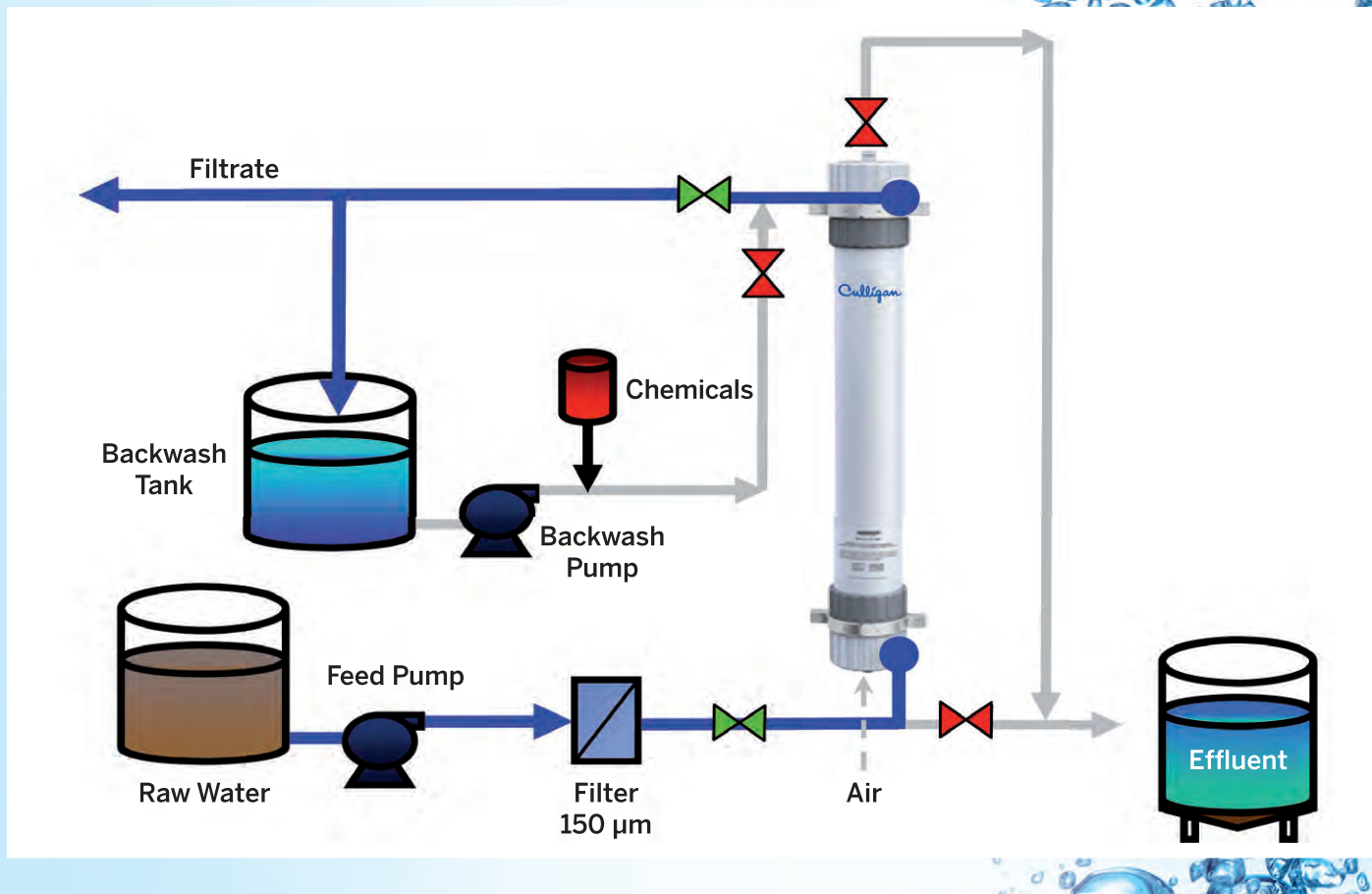
The system has been designed to have a filtering flow from the outside toward the inside of the membrane, thus allowing a low level of clogging and a high load capacity of solids, high filtering surface and easy washing.

#### Simple and modular design

The UF modules can easily be installed, and have a small footprint.



## Standard flow chart



## The process of Ultrafiltration

**Ultrafiltration is a process of separation under pressure, able to separate insoluble particles from water.**

It is a hugely successful application, extremely reliable and able to **totally remove suspended solids in water, with low running costs**. During the phase of operation there is no consumption of chemical products and, in addition, the waste eluates, that are continuously produced, do not have an excessive concentration of pollutants.

It is used for a large range of applications: treatment of surface waters, seawater, industrial technological waste and clarified waste of the processes of waste purification. The heart of the Ultrafiltration system is formed by the modules that carry out the real process of separation: they have a high capacity to withhold colloids, silt, bacteria and most viruses.

The Ultrafiltration modules are made to attain high resistance to mechanical stress from rubbing and are composed of a double layer of

hollow fibres (capillaries) made of PVDF. The completely automated system performs scheduled washes during the production cycle. In addition it is equipped with a pressure differential, able to detect too high a loss of head (caused by the membranes clogging) and to begin the washing cycle. The system is fully automated with an electric panel complete with a PLC, controlling all pumps (metering, washing, etc.) and taking information from pressure and flow measuring instruments.



## Main references

Customer		Market/Equipment	Flow Rate (m <sup>3</sup> /h)
BEBA	Angola	Food Industry	23
COINDA Presidency Palace	Angola	Plant on skids	15
DANIELI Officine Meccaniche	Egypt	Iron and Steel	90
EUROMECC for the Ministry of the Defence	Mobile Units	4 potabilising machines	10
GULF STEEL & STRANDS	Arab Emirates	Industrial Services	8
HERA S.p.A.	Coriano, Italy	Incineration	6
ITALIAN DEFENCE Ministry	Mobile Units	3 field mobile potabilising machines	44
NOVOTEL	Arab Emirates	Plant on skids	15
REFRIANGO	Angola	Soft drinks	50
SFIR	Brindisi, Italy	Potabilisation	100

## Technical characteristics

Operating conditions		
Maximum feed pressure	6.0 bar	87 psi
Maximum loss of head	2.1 bar	30 psi
Maximum backwash pressure	2.5 bar	36 psi
Filtering flow at 25°C	40-120 l/m <sup>2</sup> ·h	24-70 gfd
Backwash flow	100-150 l/m <sup>2</sup> ·h	59-88 gfd
Operational temperature	1-40 °C	34-104 °f
Operational pH	2-11	
Maximum concentration of NaOCl (in washing)	2000 mg/l	

Characteristics of raw water	Typical	Maximum
Cloudiness, NTU	< 50	300
TSS, mg/l	< 50	100
Diameter of particles, µm	< 150	300
TOC, mg/l	< 10	40
COD <sub>Mn</sub> , mg/l		60
Oils, greases, mg/l	0	< 2
pH, in service	6-9	2-11
pH, in washing	1-12	1-12
Operational temperature	25 °C	40 °C
Cl <sub>2</sub> in service, mg/l	0.5	200
Cl <sub>2</sub> in washing, mg/l	2000	5000
Backwash frequency	1 every 20-60 minutes	
Backwash duration	40-120 seconds	
Frequency of typical chemical washing	depending on the raw water	
Chemical products for washing	NaOCl, NaOH, HCl, Citric Acid	
Backwash with air	1 time a day	

Model	Modules	Max flow rate	Power	Hydraulic connections		Dimensions (mm)
	no.	m <sup>3</sup> /h	kW	H <sub>2</sub> O inlet	Permeate	length x width x height
ULF 10	1	6	2,2	DN40	DN40	1800x2150x2350
ULF 20	2	12	2,2	DN40	DN40	1800x2150x2350
ULF 40	4	24	3	DN50	DN50	1800x2150x2350
ULF 60	6	38	4	DN65	DN65	2300x2150x2350
ULF 80	8	50	4	DN80	DN80	2300x2150x2350
ULF 100	10	62	5,5	DN80	DN80	2750x2150x2350
ULF 120	12	75	7,5	DN80	DN80	2750x2150x2350
ULF 140	14	87	7,5	DN80	DN80	3200x2150x2150
ULF 160	16	100	11	DN100	DN100	3200x2150x2150
ULF 180	18	112	15	DN100	DN100	3400x2150x2350

Power supply: 380V~50Hz three-phase + earth

QUALITY SYSTEM CERTIFIED ACCORDING TO UNI EN ISO 9001 NORM

Culligan reserves the right to change any technical or design specifications for the models shown in this brochure.

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