

Membranes for Water Purification

Main types

Membrane materials

- Aluminium Oxide membranes
- Polymeric membranes
- Silicium Carbide

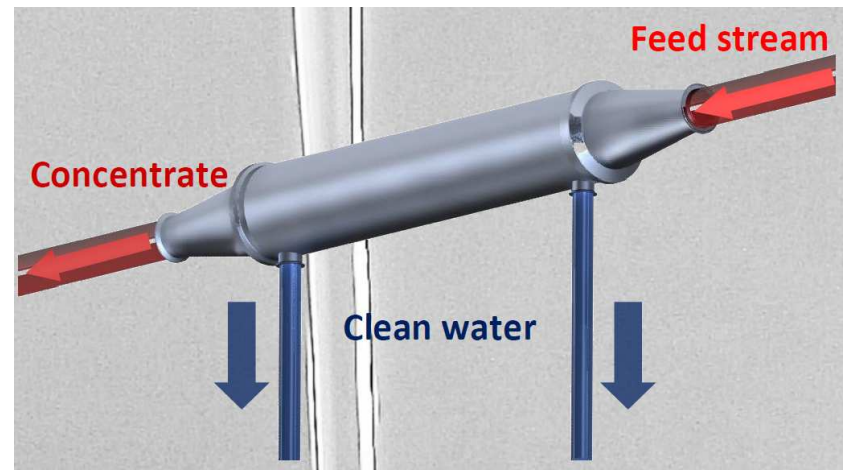
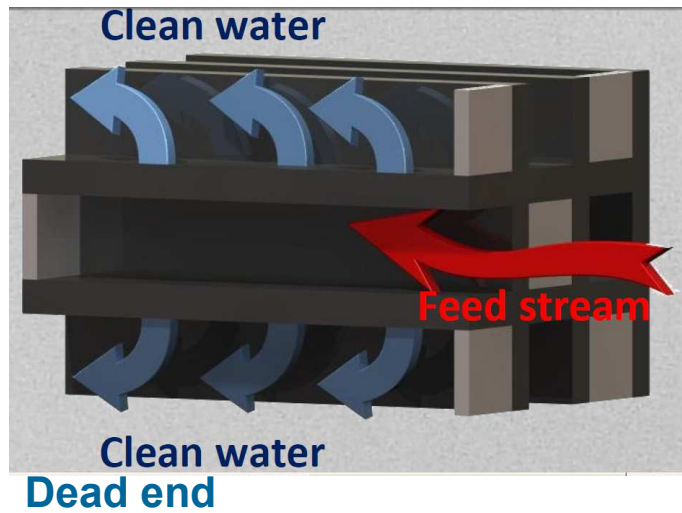
Filtration modes:

- Dead end filtration
- Cross Flow Filtration
- Semi dead-end filtration

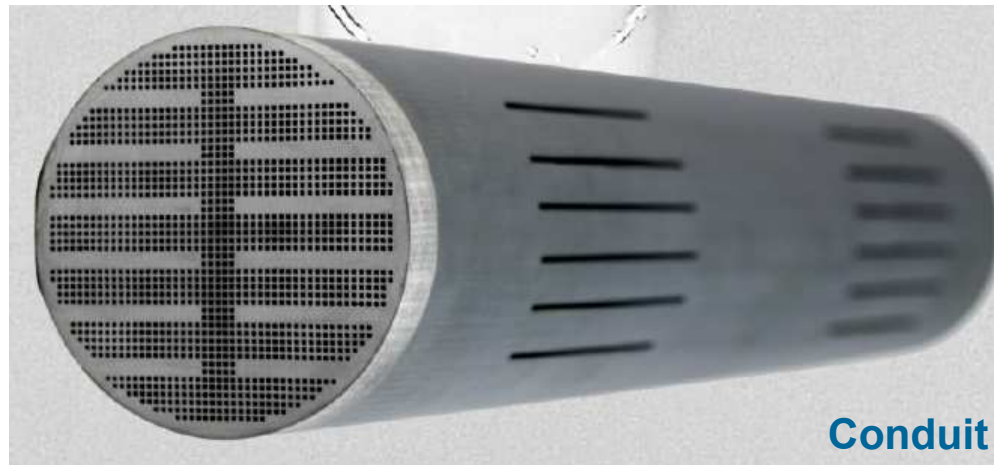
Membrane configuration

- Hollow Fibres
 - Tubular
 - Tubular / conduits
 - Plate & Frame
 - Spiral Wound
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Silicon Carbide



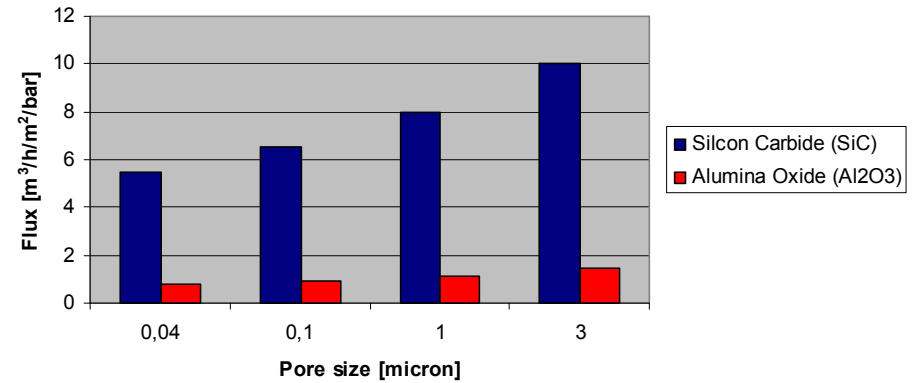
Cross Flow



SiC Advantages

- Highest flux compared with other materials
- Total chemical resistance
- High temperature resistance
- Material of 100 % silicon carbide
- Low affinity angle to water (0.3 deg.)

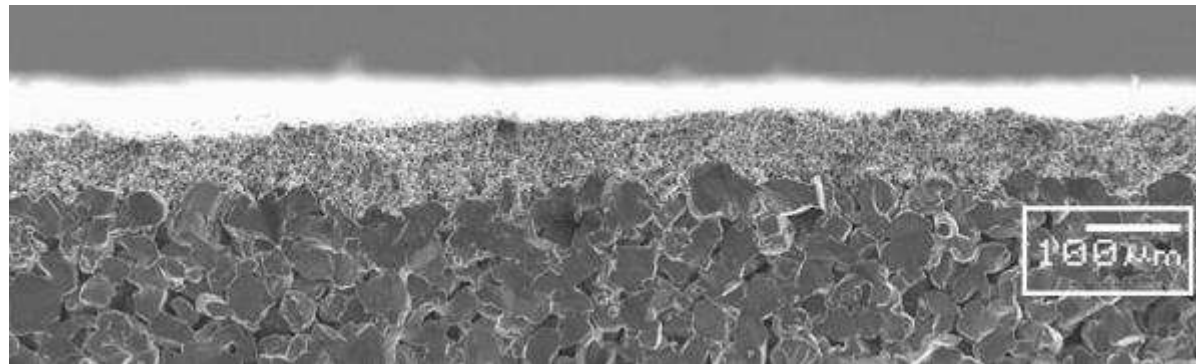
Flux comparison between SiC and Alumina Oxide membranes



Uniform pore size

Remove bacterias & most vira

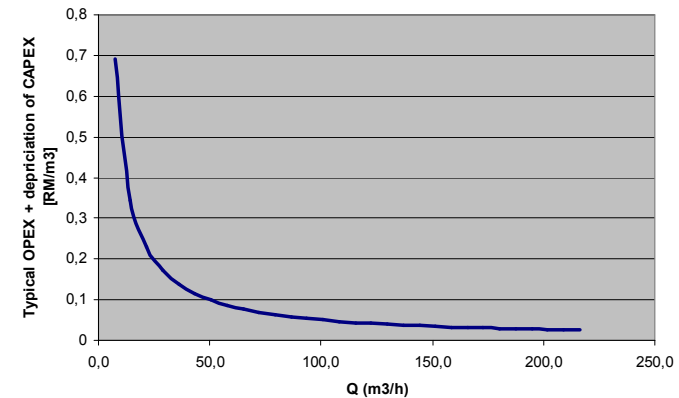
Pore size - micron	Water flux - at 0.2 bar TMP	LMH - (L/(m ² *h*bar))
0.04	6 m ³ /h	3,000
0.1	8 m ³ /h	4,000
1	20 m ³ /h	10,000
3	> 25 m ³ /h	> 12,000
30	> 35 m ³ /h	>17,000



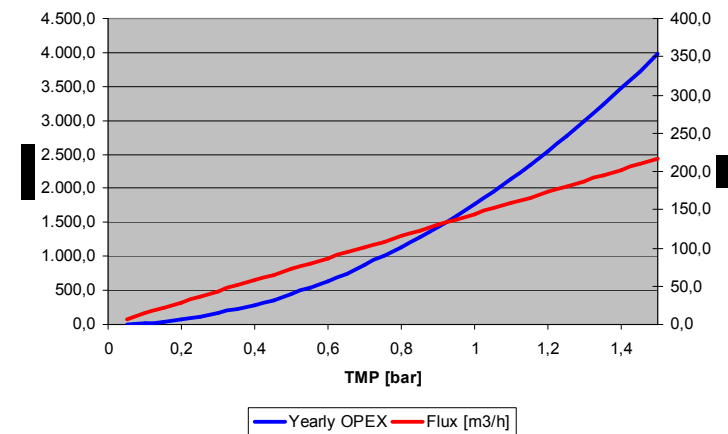
Low operation Cost

- TMP (Trans Membrane Pressure) to be designed according to OPEC/CAPEX ratio
- Typical most economic TMP = 0.2-1 bar, depending of system size & water quality
- Backflush water required is <10% of volume required for sand filters
- Recovery rate up to 97%
- Compact design: 1 kg of membrane replaces 1 ton of sand in traditional filter design
- Does not normally require post treatment
- Long life expectancy

C/B for membrane system



OPEX



Backwashing

- Principle depends of water quality and filtration mode
 - Require water/air – no backwash tank required
 - Recovery of up to 97%
 - Water hammer unit for difficult water
 - No degradation of TMP over time if well designed
 - Regeneration of membranes is simple
 - Large clearance of 2x2 or 5x5 mm
 - Chemical Enhanced Backwashing (CEB) seldom required but can be performed with inexpensive chemicals PH 0-14
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Applications

Possible to integrate in bore well stations

Excellent for re-use of backwash water

Suitable for surface water with high content of solids

Very efficient for oil/water separation down to 10 PPM



Bore well station



MWTP (Micro WTP 5 m³/h)
