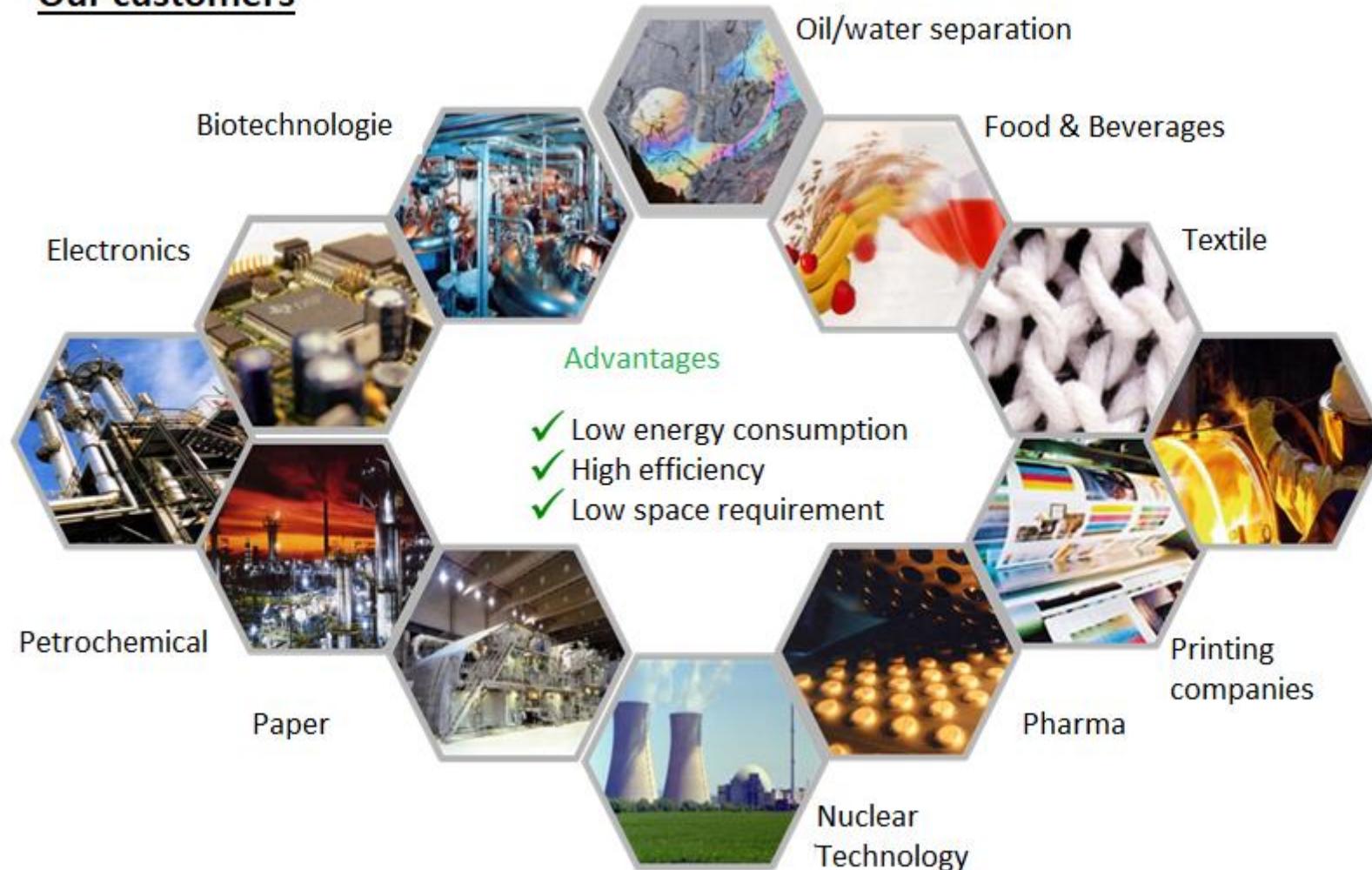


Water Treatment Technology

Water Purification



Our customers



Water Treatment Technology

Water Purification



Our know-how

Technologies for water, wastewater and process water treatment



Softening plants



Nanofiltration / reverse osmosis plants



Gravel/active carbon filter plants



UV disinfection



Electrodeionization



Ultrafiltration plants



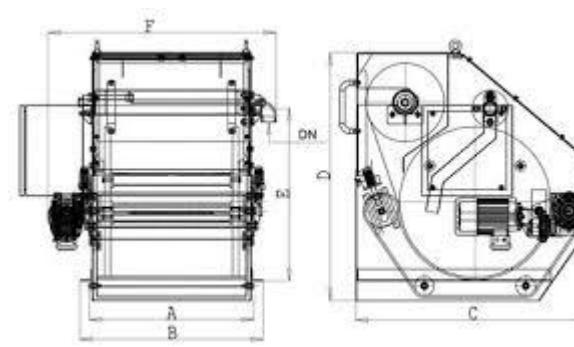
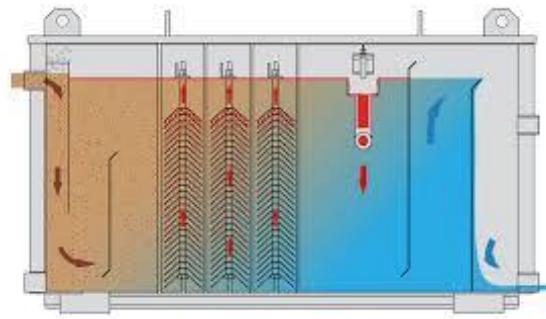
Ion exchange systems

Water Treatment Technology

Water purification

Pretreatment measures

- Light and heavy liquid separators
- Classical oil separators
- Coalescence separator
- Solids elimination
- Dosing systems for destabilization of emulsions
i.e. splitting of the emulsion into its components
- Emulsion splitting by acid treatment



Water Treatment Technology

Water Purification

- Gravel filter
 - Softening plants
 - Activated carbon filters
 - Deferrization
 - Demanganization
 - Zeolite filters
-
- Standard plants with capacities from 100 l/h to 25 m³/h



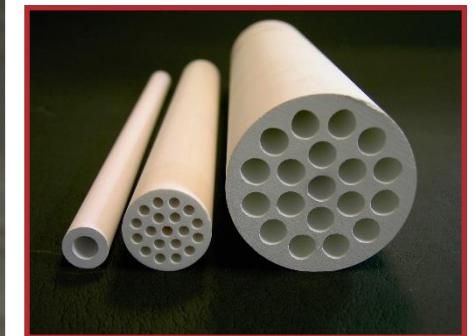
Water Treatment Technology

Water Purification



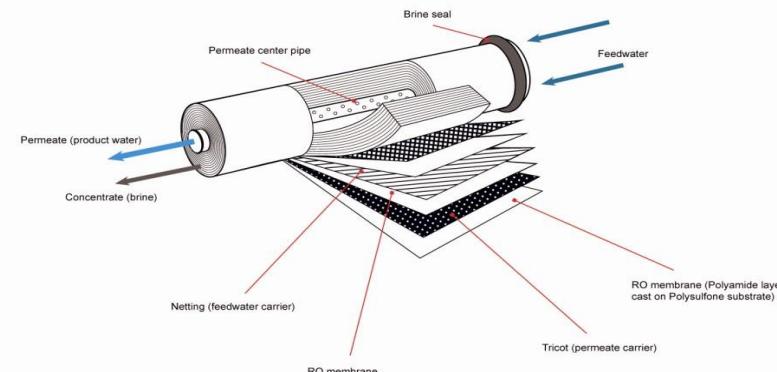
Microfiltration, ultrafiltration and nanofiltration

for drinking water/surface water treatment
for dye separation
for separation
for concentration
for biomass separation
for emulsion treatment



Module systems:

Ceramic MF and UF
- polymer membrane UF and NF
- Wound module NF and RO



Water Treatment Technology

Water Purifikation

Polymer – Membranfiltration Bsp. Tubularmembrane

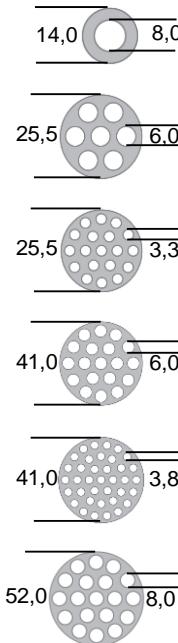
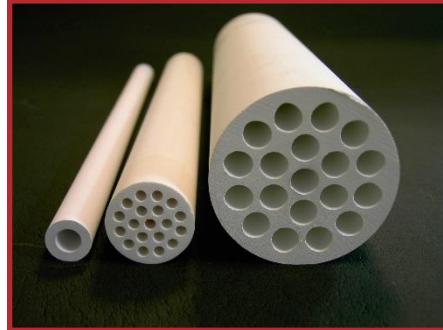
Parameter	Unit	Membrane diameter			
Membrane diameter	mm	8.0			
Membrane area	m ²	6.4	15	27.2	39,0
Module diameter	mm	110 (4")	160 (6")	210 (8")	260 (10")
Module length	m	3			
Module material		GFK			
Concentrate connection	Victaulic clamp	4"	6"	8"	10"
Permeate connection	Victaulic clamp	1.5"	2"	2.5"	3.0"



Water Treatment Technology

Water Purifikation

Ceramic - Membranfiltration



Substrat	$\alpha\text{-Al}_2\text{O}_3$
Active interface (coating)	$\text{ZrO}_2 / \text{TiO}_2 / \alpha\text{-Al}_2\text{O}_3$
Pore size [nm]	10 ... 1200
Length [mm]	200 - 1200
Outside Diameter [mm]	14,0 ... 52,0
Inside Diameter [mm]	3,3 ... 8,0
Number of filter channels	1 ... 37
Filter area per element [m^2]	0,025 ... 0,574
Max. operating pressure [bar]	10
pH-value	1 bis 14
Resistance at high temperatures	Steam sterilizable
Stable with temperature fluctuations	yes
Permeability [$\text{l/m}^2 \cdot \text{h} \cdot \text{bar}$] (deionized water)	7150 - 250

Water Treatment Technology Water Purifikation



Nanofiltration / Reverse Osmosis and Combination Methods – Applications

- Seawater desalination
- Brackish water desalination
- Boiler feed water treatment, cooling water
- concentration of saline solutions, e.g. sodium nitrate, Sodium sulphate solutions, brine
- concentration of organic ingredients, e.g. isopropanol, Glycol, sugar solutions
- Purification of process condensates, e.g. in caprolactam production
- Recovery of metals
- Cleaning and concentration of landfill leachate

Water Treatment Technology

Water Purification



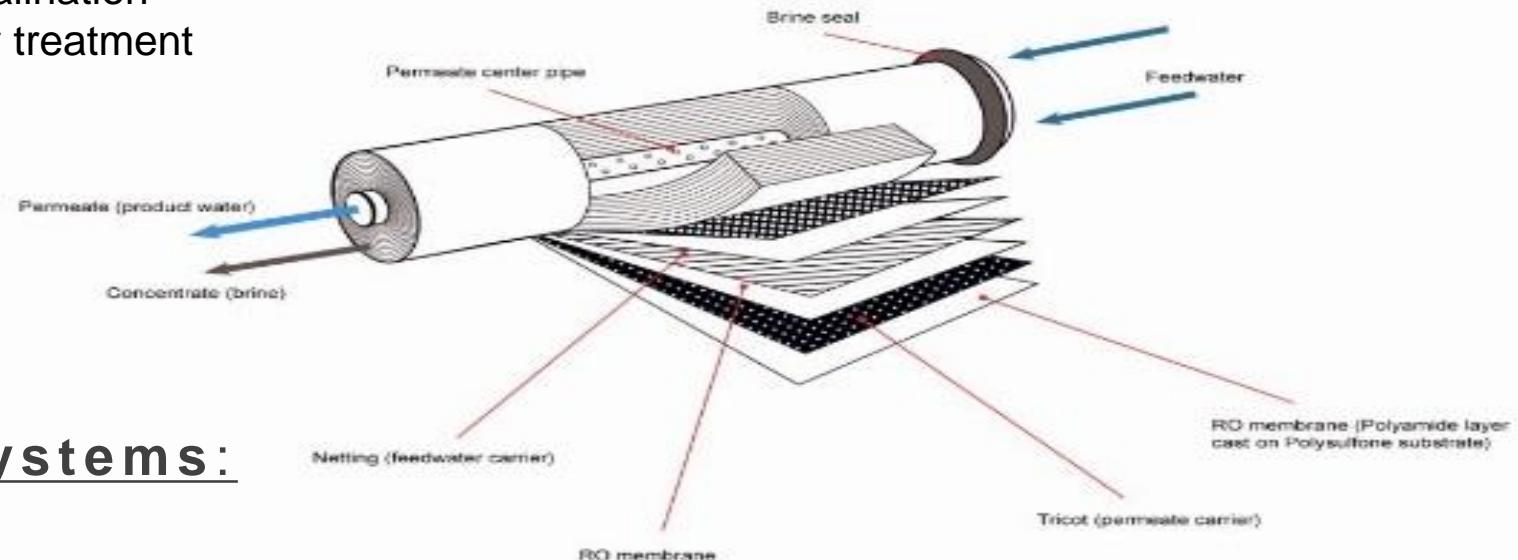
Nanofiltration / Reverse Osmosis

For drinking water/surface water treatment

For brackish water desalination

For seawater desalination

For process water treatment



Modular systems:

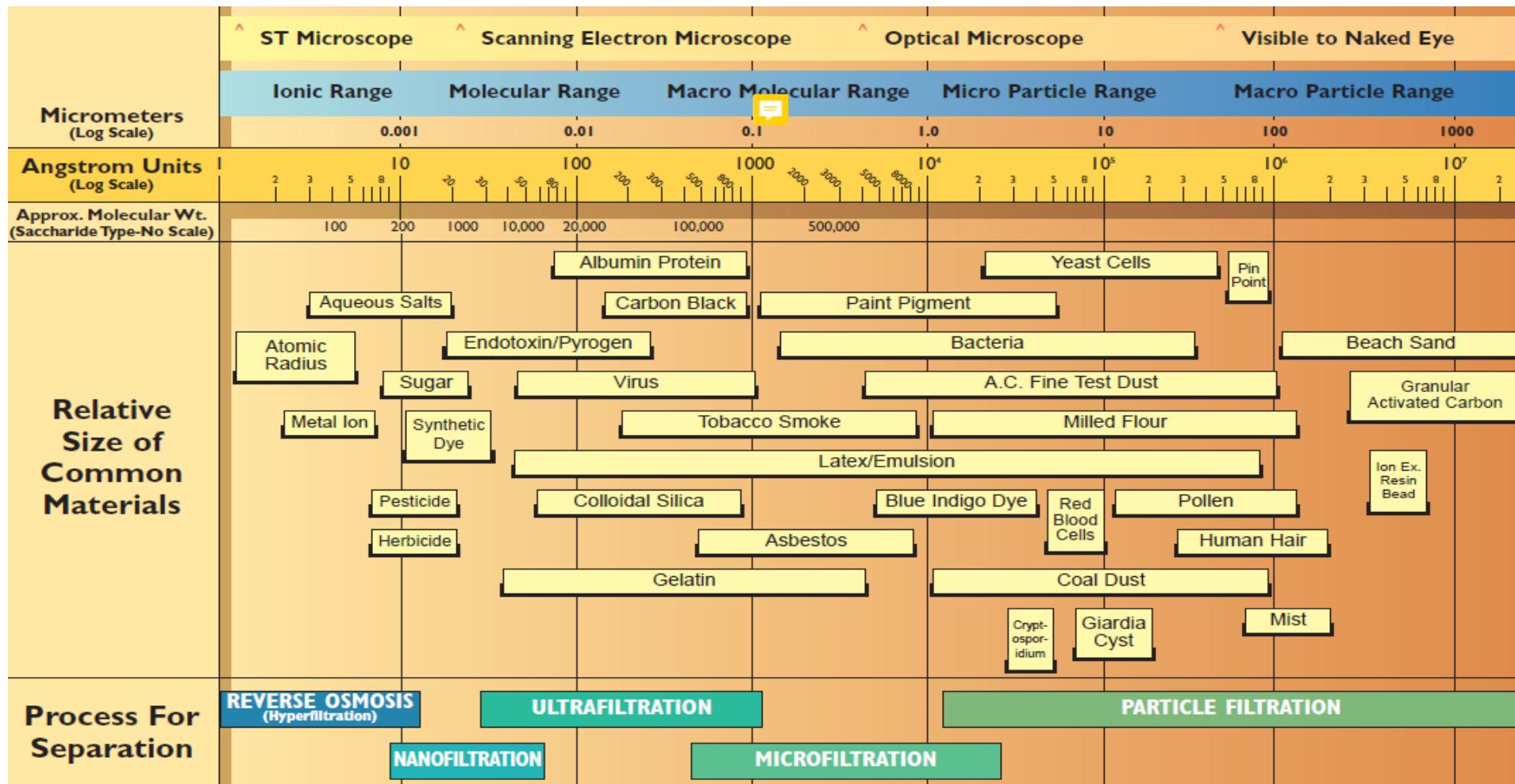
Winding modules

Variable spacer geometries

Nanofiltration / Umkehrosmose

Water Treatment Technology

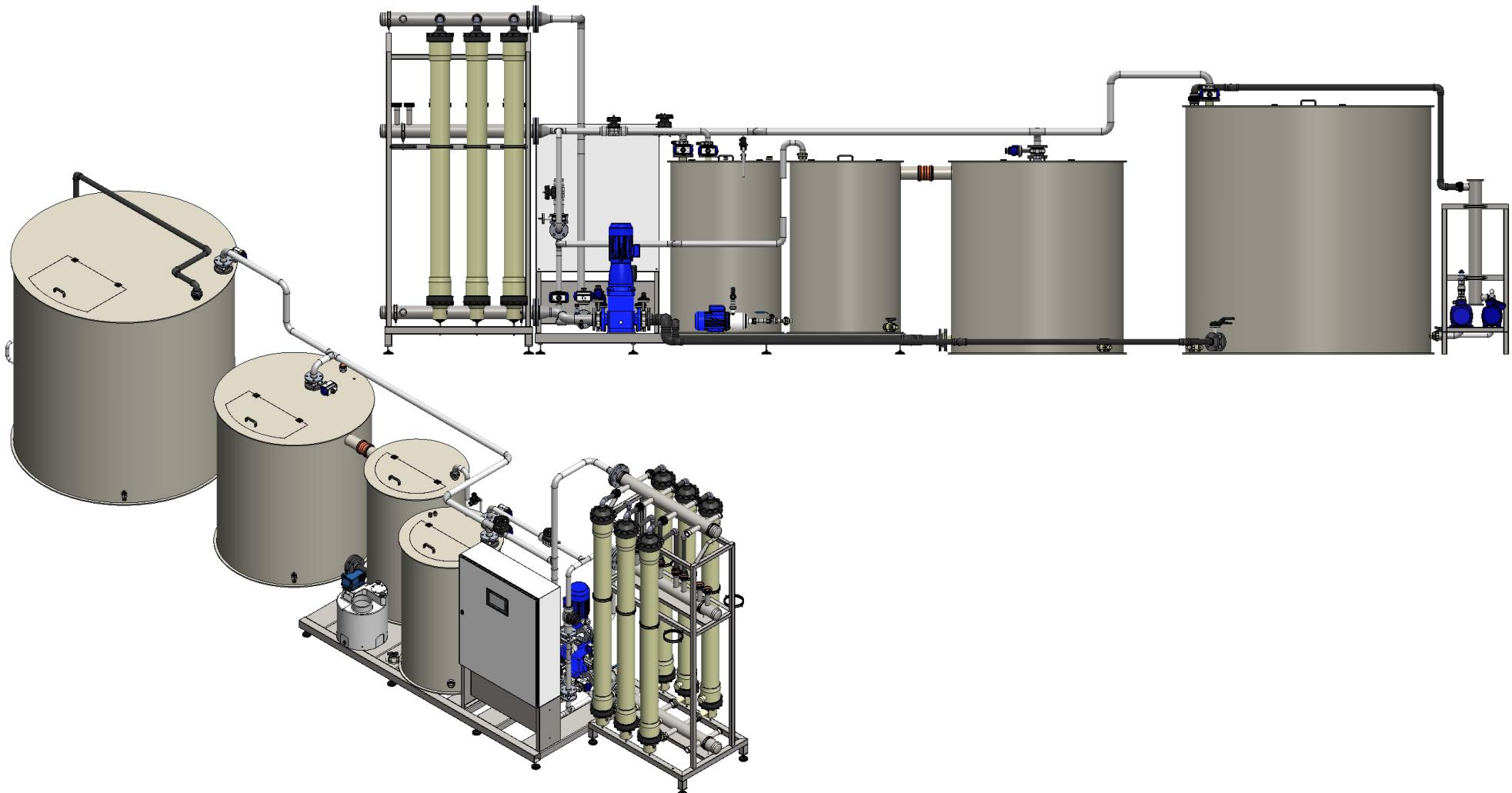
Water Purification



Water Treatment Technology

Water Purifikation

Mikrofiltration - Ultrafiltration



Water Treatment Technology

Water Purifikation

Wastewater treatment system for a bottle washer

Capacity	10 m3/h
UF Design	1 skid
Number of modules	6 pcs
Membrane type	capillary membrane
Membrane material	PVDF
Membrane area	300 m ²
Diaphragm diameter	0.7 mm
Flux	34 l/m ²
Cut-Off	100 kD
Operating pressure	2.5 bar



Water Treatment Technology

Water Purifikation

Distillate preparation from an evaporator plant

Capacity	4 m3/h
UF Design	1 skid
Number of modules	3 pcs
Membrane type	capillar
Membrane material	PVDF
Membrane area	150 m ²
Diaphragm diameter	0.7 mm
Flux	27 l/h/m ²
Cut-Off	100 kD
Operating pressure	2.0 bar



Water Treatment Technology

Water Purifikation

Emulsion treatment at a waste disposal company

capacity
UF Design
Number of modules
Membrane type
Membrane material
Membrane
membrane diameter
Cut-off
Operating pressure

3 m3/h
1 skid
6 pcs
capillary membrane
PVDF
area 300 m²
0,7 mm
100 kD
< 2.00 bar

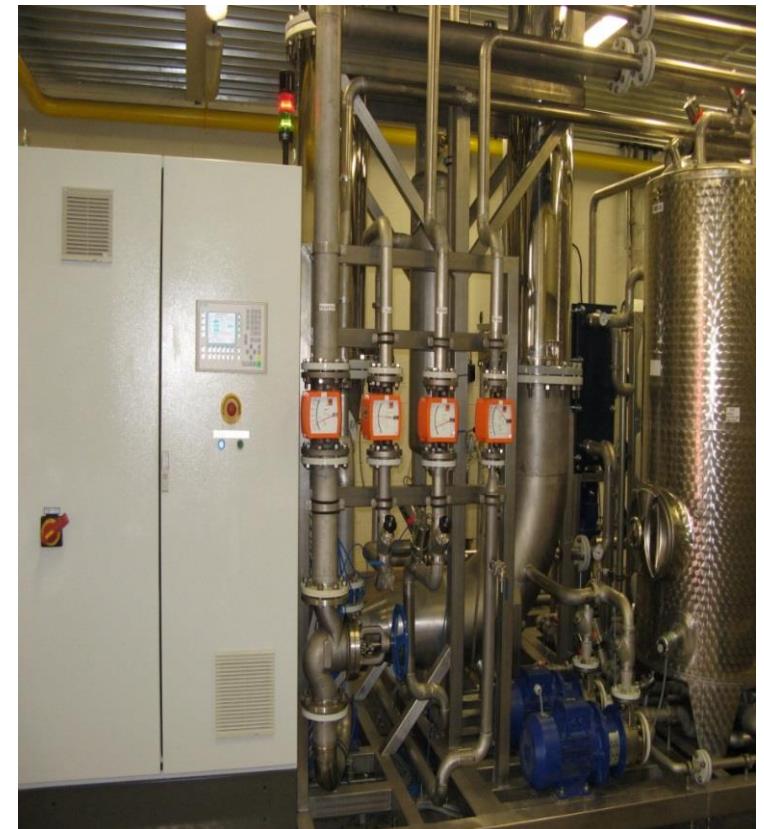


Water Treatment Technology

Water Purifikation

Separation of crack test oils Water-based fluorescent penetrant testers Dye yellow-green fluorescent

Approach	0.1 %
Molecular weight	1,220 g/mol
Batch mode of operation	
Working tank	20 m ³
Capacity	3,000 l/h
UF Design	1 skid
Number of modules	6 pcs
Membrane type	31M33/255/900
Membrane material	ZrO ₂ /TiO ₂
Membrane area	32.9 m ²
Diaphragm diameter	3.3 mm
Flux	95 l/hm ²
Cut-Off	50 nm
Operating temp.	25-65°C
Operating pressure	6.5 bar



Water Treatment Technology

Water Purifikation

Separation oil/water - emulsion treatment

Batch mode of operation

Working tank

5 m³

Capacity

1,500 l/h

UF Design

1 skid

Number of modules

2 pcs

Membrane type

T19/33/255/1000

Membrane area

12 m²

Diaphragm diameter

3.3 mm

Flux

123 l/hm²

Cut-off

80 nm

Operating temp.

25-65°C

Operating pressure

2.5 bar

UF Design

1 skid



Water Treatment Technology

Water Purifikation

Cleaning and concentration of azo dyes

Leaching neutral salts

Membrane type

Operation Diafiltration

Step

Driving style

Retention

Batch mode of operation

Capacity

Number of modules

Membrane type

Membrane material

Membrane area

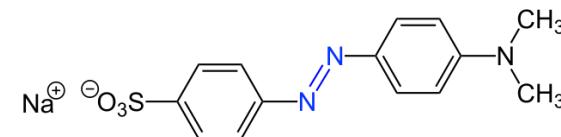
Diameter

Flux

Cut-Off

Operating pressure

UF Design



NF

with demineralized water

2

dye concentration

> 99 %

4,500 / 2,200 l/h

32 pieces

NF pipe membrane

PA

83.2 m²

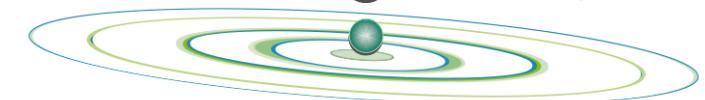
6 mm

54 / 26 l/h·m²

50 nm

18 bar

1 skid

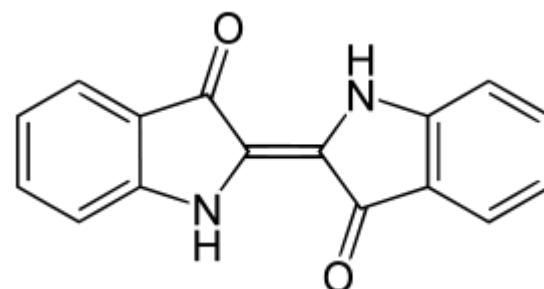


Water Treatment Technology

Water Purifikation

Textile laundry Separation of Indigo

Pretreatment vibrating sieve	50 µm
Module type	MO 83G 66.03 I8
Diaphragm	8 mm PVDF UF Design
Separation limit	14 kD
Capacity	10 m ³ /h
Number of loops	2
Number of modules	2 x 6
Membrane area	326 m ²
Water recycling	approx. 80 %



Water Treatment Technology

Water Purifikation



Biomass separation Molding plant

Ultrafiltration UF pipe module

Diaphragm	10 mm PES
Separation limit	30 nm
Capacity	34 m ³ /h
Number of loops	4 pcs.
Number of modules	16
Membrane area	314 m ²
Flux	108 l/hm ²
MLSS	18 g/l



Water Treatment Technology

Water Purifikation



Treatment of wastewater treatment plant wastewater from a food company

Combination UF and RO

Capacity	15 m3/h
UF Design	1 skid
Number of modules	6 pcs
Membrane type	capillary membrane
Membrane material	PVDF
Membrane area	300 m ²
Diaphragm diameter	0.7 mm
Flux	50 l/m ²
Cut-Off	100 kD
Operating pressure	2.3 bar
UO Design	10 m3/h
Operating pressure	12 bar
Reuse Irrigation Green areas, Cooling systems	



Water Treatment Technology

Water Purifikation



Nanofiltration / Reverse Osmosis Applications

- Seawater desalination
- Brackish water desalination
- Boiler feed water treatment, cooling water
- concentration of saline solutions, e.g. sodium nitrate, Sodium sulphate solutions, brine
- concentration of organic ingredients, e.g. isopropanol, Glycol, sugar solutions
- Purification of process condensates, e.g. in caprolactam production
- Recovery of metals
- Cleaning and concentration of landfill leachateov

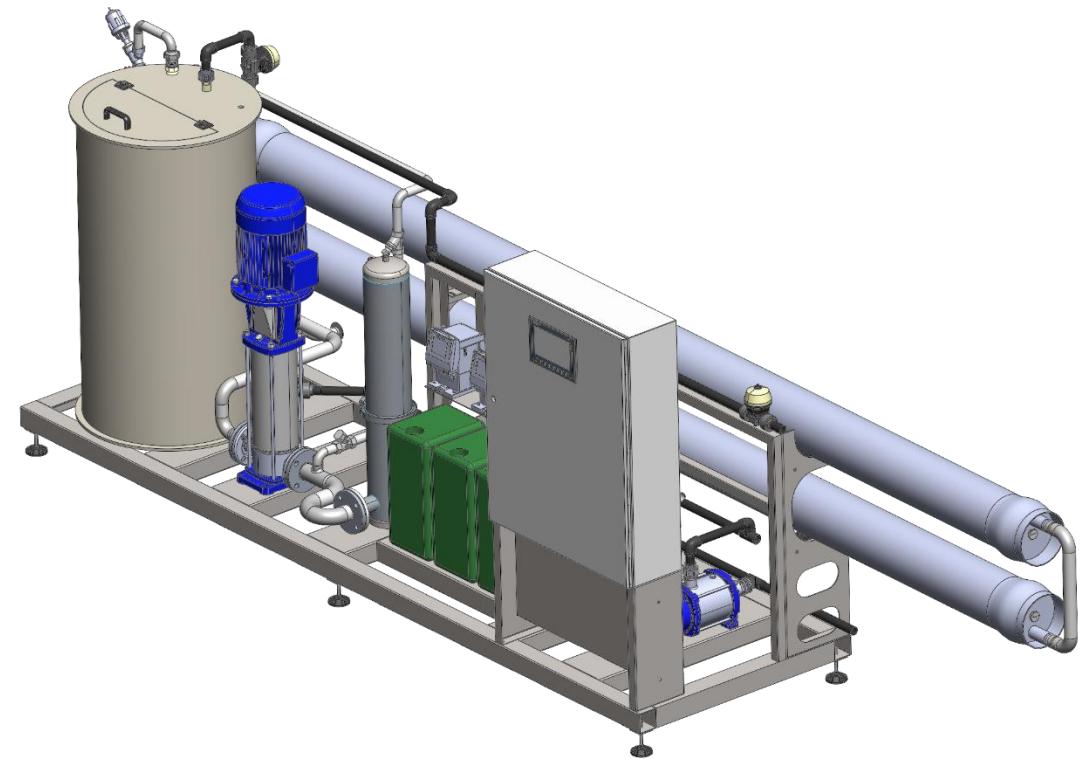
Water Treatment Technology

Water Technology

Nanofiltration / Reverse Osmosis

with softening

with antiscalant dosage



Water Treatment Technology

Water Purifikation

Nanofiltration for heavy metal separation and COD reduction in the pharmaceutical industry

Pre-cleaning

Ultrafiltration

For the removal of

Nanofiltration plant

Capacity

Recovery

Separation

Retention

Heavy metals

COD

6 m3/h

biomass after biology via a tubular UF membrane

5 m3/h

83 %

of zinc and COD

Inlet Permeat

8.5 0.1 mg/l

2,300 390 mg/l



Water Treatment Technology

Water Purifikation

Water recycling – leak testing in the automotive industry

Pre-cleaning

Activated carbon filtration

For the removal of

30 m³/h

oil and fat components

Water recycling plant Nanofiltration system for softening

Capacity 20 m³/h

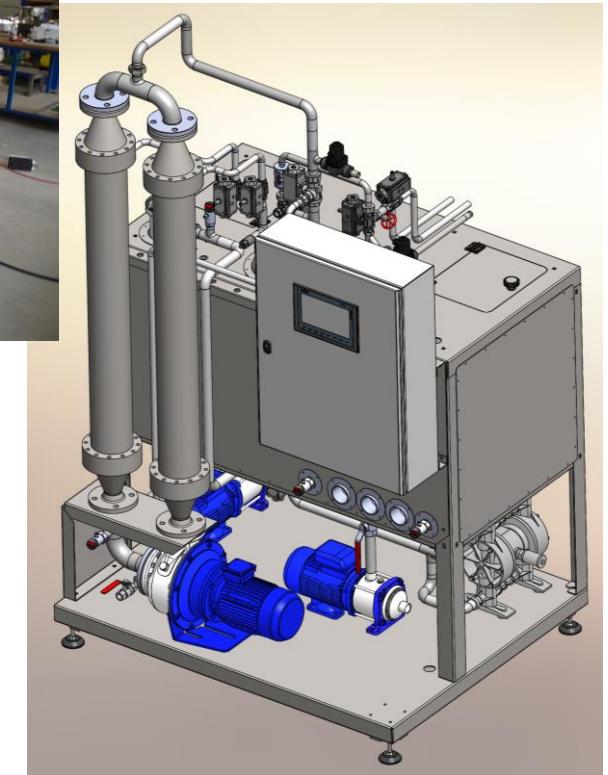
Recovery 85 %

Circulation system with freshwater supplement



Water Treatment Technology Water Purifikation

Ceramic Filtration Systems / Micro-Ultrafiltration



Water Treatment Technology

Water Purifikation

Reverse Osmosis



Water Treatment Technology Water Purifikation

Membrane plants for brackish and seawater desalination

