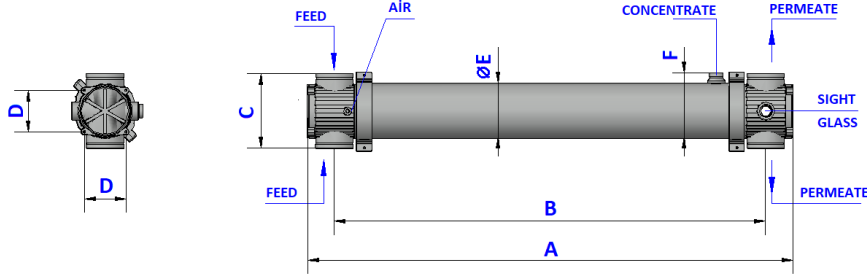


AKUALYS APM80 T



TECHNICAL DATA SHEET



| MODEL | Surface Area (m ²) | Dimensions (mm) | | | | | | Weight (kg) |
|---------|--------------------------------|-----------------|--------|-------|-------|-------|-------|-------------|
| | | A | B | C | D | ØE | F | |
| APM80 T | 80 | 2216±1 | 1968±1 | 344±1 | 190±1 | 250±1 | 289±1 | 58 |

A. SPECIFICATION

- Due to their high mechanical strength and chemical resistance, PVDF based hollow fiber membranes have long lifetime.
- Modified hollow fiber membranes have high permeability and 30nm nominal pore diameter.
- Hollow fiber membranes remove viruses, bacteria and particles including colloids.
- The produced water quality is <0,2 NTU.

Module Specifications

| PARAMETER | UNIT | SPECIFICATION |
|-----------------------------|------|------------------------------------|
| Model | - | APM80-T |
| Diameter | mm | 250 |
| Body and Cap Material | - | U-PVC |
| Nozzle(Concentrate) | mm | DN50 - Victaulic |
| Nozzles(Feed and Permeate) | mm | DN150(168.3)- Victaulic |
| Nozzle (Air Inlet Nozzle) | Inc | NPT 3/8" straight union connection |

• Membrane Specifications

| PARAMETER | UNIT | SPECIFICATION |
|-------------------------------|----------------|-------------------|
| Material | - | Modified PVDF |
| Membrane Type | - | Hollow Fiber UF |
| Flow Direction | - | Outside to inside |
| Fiber Outside/Inside Diameter | mm | 1,4 / 0,8 |
| Active Surface Area | m ² | 80 |
| Nominal MWCO, Dextrane | Dalton | ≤ 150.000 |



•Feed Water Specifications

| PARAMETER | UNIT | SPECIFICATION |
|-----------------------------|------|------------------------|
| Temperature | °C | 25 (Max 40) |
| Particle Dimension | μ | < 300 |
| Turbidity | NTU | 50 (Max 250) |
| Oil and Grease | mg/l | 0 (Max 1) |
| pH | - | 6-9 |
| Total Organic Carbon (TOC) | mg/l | < 10 (Max 30) |
| Total Suspended Solid (TSS) | mg/l | 50 (Max 80) |
| Chlorine | mg/l | 0,4 (Instant Max. 150) |

B. OPERATION

| PARAMETER | UNIT | SPECIFICATION |
|----------------------------------|--------------------|---------------------|
| Operation Modes | - | Dead End/Crossflow |
| Temperature | °C | 1-40 |
| pH | - | 2 - 11 |
| Filtrate Flux @25°C * | L/m ² h | 45-180 |
| Flow Capacity** | m ³ /h | 3,60-14,40 |
| Feed Water Inlet Pressure @ 25°C | bar | 2-3 (Instant Max.5) |
| TMP | bar | 0,4 - 2 |
| Filtrate Water SDI | - | ≤ 2,5 |
| Filtrate Water Turbidity* | NTU | ≤ 0,2 |

(*), (**): Depend on feed water quality

C. CLEANING, DISINFECTION & PRESERVATIVE SOLUTION

| PARAMETER | UNIT | SPECIFICATION |
|---|--|---------------|
| CLEANING | | |
| Backwash Pressure | bar | Max. 2,5 |
| Air Flowrate | Nm ³ /h | Max. 20 |
| Air Pressure | mbar | 600 - 800 |
| Chemically Enhanced Backwash (CEB) | | |
| Sodium Hypochlorite (NaOCl) | mg/l | 1000 |
| Sodium Hydroxide (NaOH) | mg/l | 500 |
| Hydrochloric Acid (HCl) | mg/l | 1000 |
| Citric Acid | % | 1 - 2 |
| Clean-in-Place (CIP) | | |
| Frequency | Current Process TMP(bar) ≥ Initial TMP(bar) + 0,9bar | |
| Operation Duration | 2 hours | |
| Chemical Cleaning Solutions (depend on pollutant) | 1.% 0,1 NaOH + 0,2% NaOCl 2.% 0,2 HCl, 2% Citric Acid | |
| Cleaning Flowrate per Module | 1-2 m ³ /h | |

GUIDELINES

- Follow the guidelines to avoid membrane deformation and to preserve membrane performance.
- It is mandatory; in initial production, the permeate water and preservative solution must be operated at half capacity until completely drained.
- Do not operate the module above the pressure limits to avoid membrane deformation.
- To obtain designed production capacity and designed water quality the operation parameters must be kept.
- Cleaning of preservative solution and cleaning-disinfection must be done according to below given instructions.
- The module must be filled with storage/ preservative solution during shut-down.

Cleaning of Preservative Solution

- Preservative solution is composed of water / glycerol/ sodium metabisulfite.
- For the cleaning the module is drained with feed water and the cleaning duration is minimum 4 hours.
- The feed water specifications must be kept and the used feed water volume must be at least 14 m³.

Cleaning - Disinfection

- The module should be chemically disinfected against biological contamination.
- 100 ppm sodium hypochlorite solution is circulated for 10 minutes.
- The solution should wait for 1 hour inside the module.
- After disinfection the module must be drained until the filtrate line is free from chlorine.

NOTE: Backwash procedure with treated/clean water at start-up process is advised.

D. PROCESS STEPS

- Valve positions and specifications must be kept.
- CEB frequency must be defined according to feed water quality.
- Chemical solution is either filled in the module or is circulated by using a vessel and a pump up to 2 hours.

Valve Position:

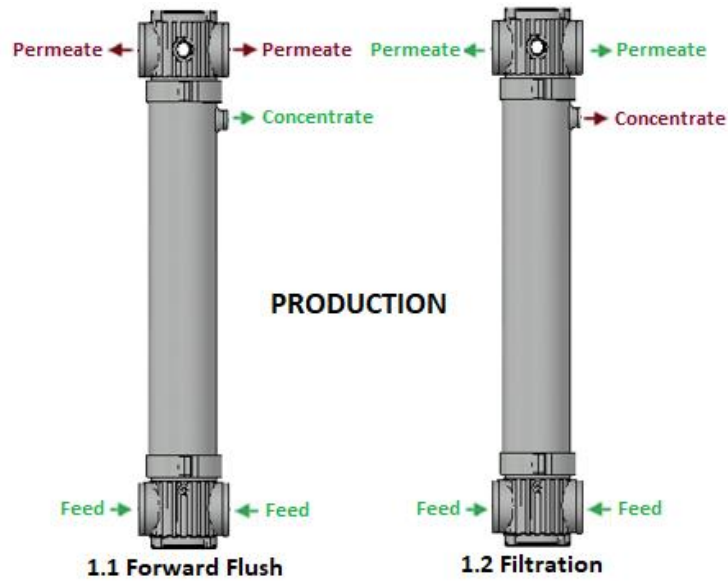
Open

Closed

1. PRODUCTION

1.1.Forward Flush: The module is rinsed with feed water.

1.2.Filtration: The production is done.



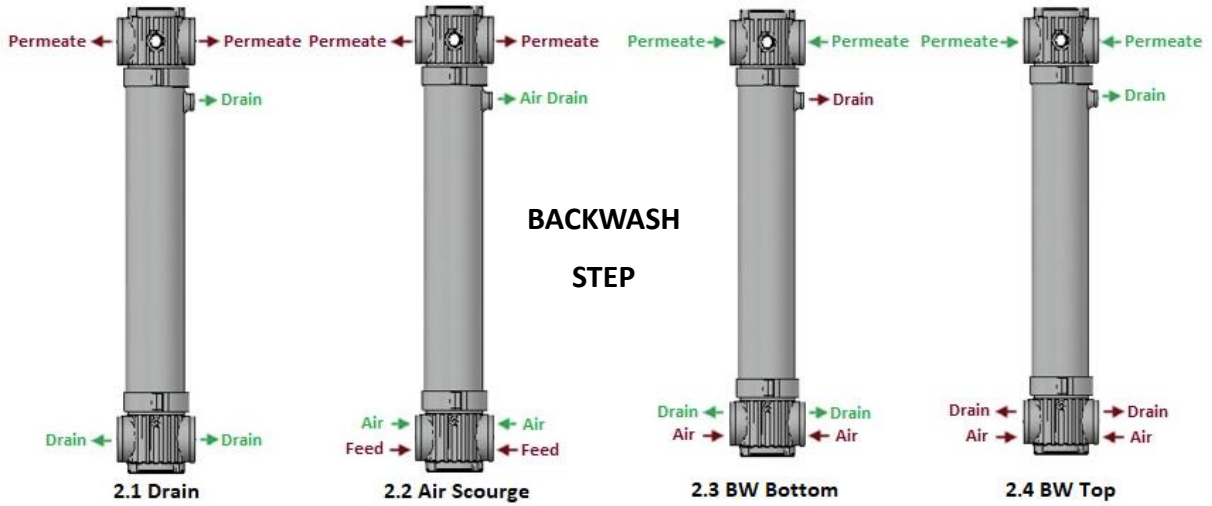
2.BACKWASH

2.1.Drain: The module is drained.

2.2.Air Scourge: The membranes are scoured by air.

2.3.Backwash-Bottom: The module is rinsed with permeate water. Flow direction is from top to bottom.

2.4.Backwash-Top: The module is rinsed with permeate water.



3.CEB (CAUSTIC/CHLOR/ACID)

3.1.Drain: The module is drained.

3.2.Air Scourge: The membranes are scoured by air.

3.3.Backwash-Bottom: The module is rinsed with permeate water and chemical.

Flow direction is from top to bottom.

3.4.Backwash-Top: The module is rinsed with permeate water and chemical.

3.5.Soak: All valves are in closed position. The membranes are soaked.

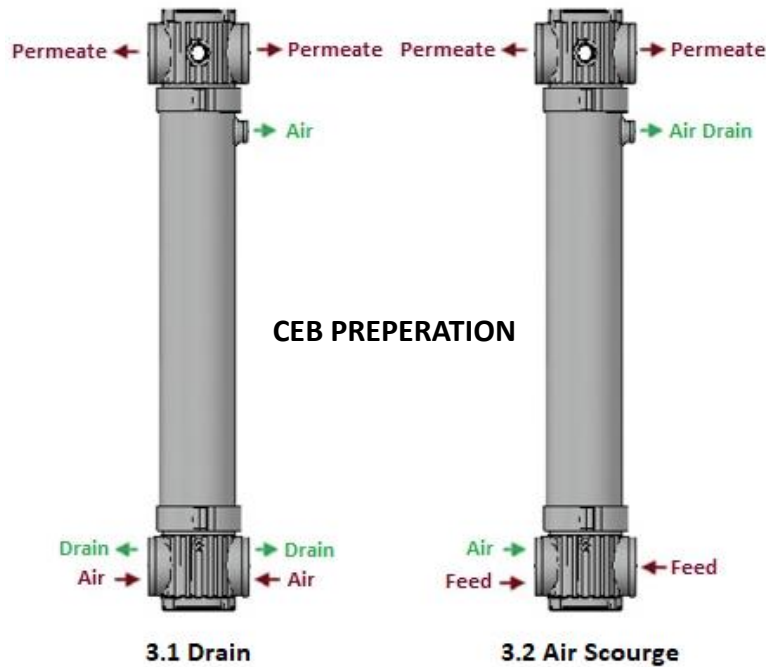
3.6.Drain: The module is drained.

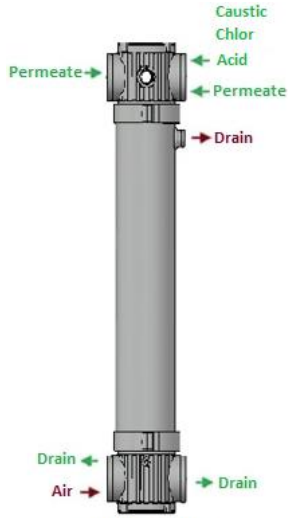
3.7.Air Scourge: The membranes are scoured by air.

3.8.Backwash-Bottom: The module is rinsed with permeate water. Flow direction is from top to bottom.

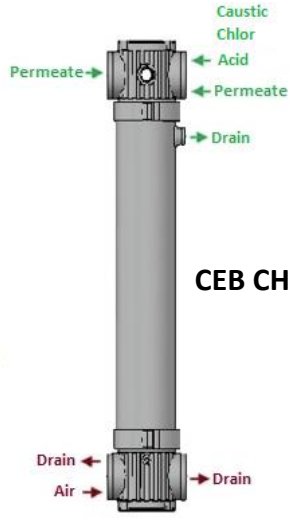
3.9.Backwash-Top: The module is rinsed with permeate water.

3.10.Forward Flush: The module is rinsed with feed water.





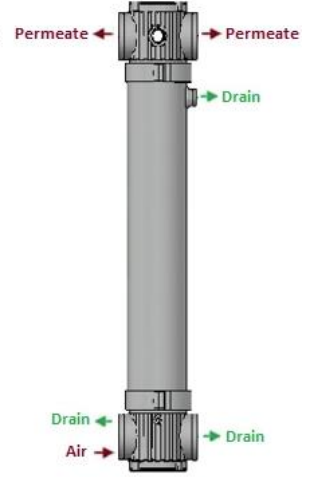
3.3 BW Bottom



3.4 BW Top

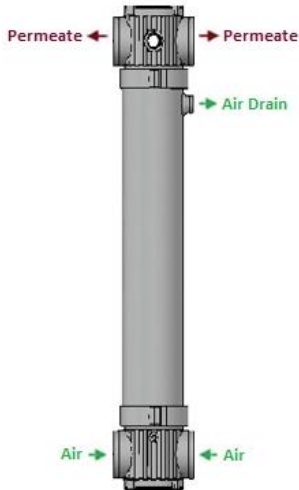


3.5 Soak

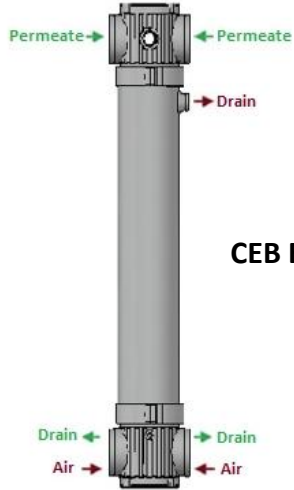


3.6 Drain

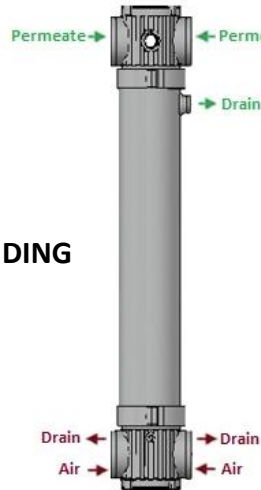
CEB CHEMICAL



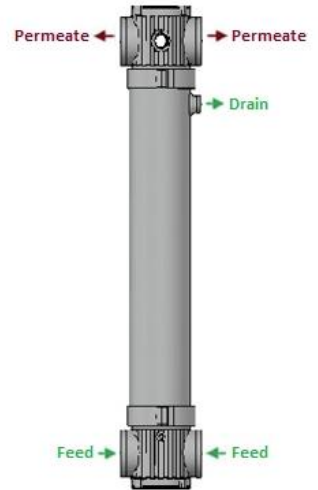
3.7 Air Scourge



3.8 BW Bottom



3.9 BW Top



3.10 Forward Flush

CEB ENDING