AL-MEM

AQUALOOP Membrane

Installation and operating manual

WATER, WE’RE IN OUR ELEMENT

www.intewa.com

Index

1. General information

Updated technical data, scope of application and basic dimensioning principles are available at:

https://www.intewa.com

General background information for water treatment and grey water utilization can be found at:

https://wiki.intewa.net/index.php/Wasseraufbereitung_und_Grauwassernutzung/en

2. Scope of delivery

1. *Membrane cartridge*
2. *1 piece ball for regulating aeration*
3. *2 pieces O-Ring (Ø 26mm x 3.5 mm)*
4. *2 pieces PVC connection elbow 90°, (connections 1¼ / 1" union nut)*

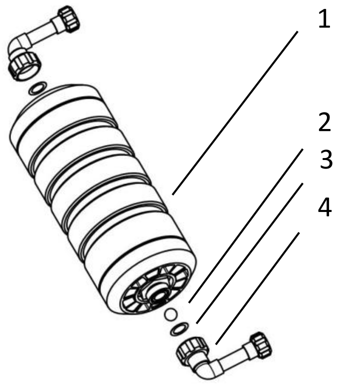

Fig 1 Scope of delivery

3. Notes on quality of untreated water and use

The membrane serves the purpose of filtering water of all types with the following restrictions and framework of conditions:

- The water may not be oxidative, reactive or corrosive in chemical terms.
- The water must be free from solvents and oils.
- The water may contain only degradable shampoos, washing and cleaning products
- The water must be free from facials sewage and the following maximal values of all parameters are permissible:
  - BOD5 < 180 mg/l for MBR filtration (with previous biological cleaning)
  - BOD5 < 0,5 mg/l for direct filtration
- The water must be free from color pigments (e.g. hair dyes) because this may lead to coloring of permeates.
- The membranes function via a suction/back flushing operation and are chemically cleaned as required to achieve a trans membrane pressure of <0.3 bar in suction and <0,5bar (max. 40°C) or <1.0bar (max. 30°C) in pressure mode.
- In MBR filtration, the membrane fibers are cleaned from the outside by air. For this purpose, the membrane cartridge has an aeration connection that directs the air into the cartridge. A maximum of 100 l/min per cartridge is permitted with a maximum aeration time of 3 h/day.

4. Technical Data

	AL-MEM
Cartridge dimensions (Ø x H):	Ø 164 x 410 mm
Dimension with elbow connector:	Ø 164 x 488 mm
Weight:	1.6 kg
Membrane filter area:	6 m²
Membrane fiber material / type:	PE / Hollow fiber
Fiber diameter / number / length:	0.41 – 0.44 mm / 1600-2000 / 740 mm ± 15 mm
Medium pore size:	0.02 µm
Anti-fouling:	yes
Pre-wetting:	yes
Flow range:	30 -600 l/h (depending on application and pressure range)
Temperature range:	0 - 40 °C
Max. Suction Transmembrane pressure:	0,7 bar
Max. Backflush pressure:	1.0 bar, at a water temperature of max. 30 °C
	0.5 bar, at a water temperature of max. 40 °C
Max. Membrane aeration:	30 l/min (with max. 8h Aeration duration/day)
	100 l/min (with max. 3h Aeration duration/day)
Max. free chlorine at 25°C or lower:	5000 ppm 9.5 pH during chemical cleaning
Max. cleaning load (free chlorine):	1.0 Mio ppmh (Cumulative hours)
Cartridge protection material and connectors:	PE / PPH / U-PVC / ABS / Epoxy resin
Aeration / permeate connection:	1 ¼“ / 1 ¼“ male
O-Ring seal:	Ø 26mm x 3,5 mm, NBR
Patented design:	yes
Lifetime:	Up to 10 years
Retention Bacteria:	LOG 6, SGS Institute, Report BS_20240129_RW_1
Retention Viruses:	LOG 5, SGS Institute, Report BS_20240318_RW_1

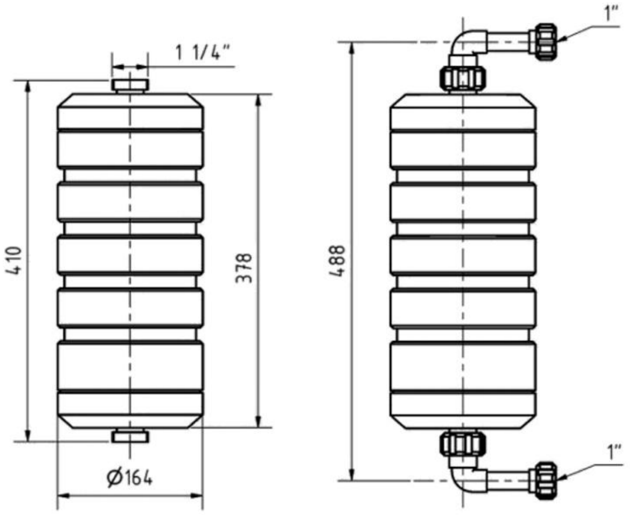

Fig 2: Membrane dimensions

5. Storage conditions and start-up process

Storage conditions:
New cartridges should be kept in their original shipping containers and crates until ready for installation. Cartridges should be stored as follows:

- Store the cartridges indoors and out of direct sunlight
- Store the cartridges with temperatures between 10 – 30°C
- Store the cartridges at relative humidity below 70%
- Store the cartridges in a horizontal position

Start-up process:
C-MEM cartridges will be supplied integrity tested and are manufactured pre-wetted. They can be used for filtration without any pre-treatment. There may be some foam production immediately after starting filtration which shall disappear shortly.

6. Instructions for installation

The membrane cartridge has a blower connection and a permeate connection. The membrane cartridge is always operated in a vertical position, whereby the blower connection is situated at the bottom. (The air should rise upwards in the cartridge through the fiber bundles.)

The top side of membrane with the permeate connection is distinguished by 18 slotted slits (s. Fig. 2) and the external interlocking ring. The blue cover of the cartridge is fixed with this.

Fig 3: Top side of membrane with sliding LOCK (Permeate connection)

The lower side of membrane used with the blower connection can be distinguished by the larger holes (s. Fig. 3).

The membrane connection is equipped with an O-ring nut into which an O-ring is inserted.

Fig 4: Lower side of membrane (Blower connection)

The ball inserted in the aeration connection ensures that the air is distributed evenly to the membranes when membranes are connected in parallel (such as in the membrane station with 2-6 membranes).

Note: If the ball is not used with a membrane, this membrane gets significantly more air. This can significantly reduce the service life of this membrane due to the higher mechanical stress.

Caution:
The ball was not a part of the membrane cartridges until 12'2021. When replacing a membrane with a ball, the other membranes on the same stations must be equipped with balls!

Fig 5: Ball for regulating aeration (blower connection side)

7. Maintenance and cleaning

The membranes performance (flow) should be checked four times a year.

Chemical cleaning is done only if the flow is extremely reduced. (Kindly note that the filtration performance is linearly dependent on the water temperature.) Under normal operating conditions these maintenance applications illustrated by us will be required every two years to maintain recommended filtration performance.

Reference value for flow rate per cartridge, with which a chemical cleaning is required:

- MBR Filtration, greywater (BOD <180 mg/l): 0.22 l/min (at 15°C)
- Direct filtration, rainwater (BOD < 5 mg/l): 1.12 l/min (at 15°C)

The chemical cleaning dissolves biological clogging (fouling) and mineral deposits (such as lime) within the hollow fibers.

Sludge that has accumulated on the outside of the fibers can be mechanically washed with a jet of water (see Section 7.1).

7.1 Mechanical cleaning

The outer ring is rotated from the LOCK position to the OPEN position (counter clockwise) to open the cartridge. The gray underside of the membrane must be held secure.

Fig 6: External ring with arrow marking on OPEN position

The outer ring can be removed in the OPEN position. Then the blue external cover can be removed from top.

Fig 7: Opened membrane

The hollow fibers are now exposed and can be washed with a strong water jet.

Fig 8: Washing the membrane

<u>Attention:</u>
Do <u>not</u> loosen the counter nuts located at the top to open the membrane since the assembling of cartridge is very difficult without tools.

Note:
Damaged or cracked fibers are simply knotted by the client to pass the leakage test of quality assurance. A tear in a fiber during use undergoes a kind of self-repair as the fiber is blocking and thus seals itself.

7.2 Chemical cleaning

Intensive chemical cleaning of the membrane cartridge may be done in two ways:

- INTENSIV: In a cleaning solution in a separate cleaning container
- IN-SITU: Directly in the tank (see manual of AL-MS and the system, AL-GWxxx) https://www.intewa.com/en/weiteres/downloads/downloads/instructions-and-data-sheets/

Intensive cleaning in a separate cleaning container

Caustic Wash

- Use clean water (< 60 mg/liter CaCo3 hardness) between 15 and 25 °C
- Circulate water through the system under standard pressure and flow conditions
- Add caustic (NaOH) slowly to achieve a pH of 12.0 (~ 0.5 wt.% NaOH addition)
- Circulate caustic solution through the system for 20 to 30 minutes
- Drain and completely flush system with clean water at a water temperature between 10 and 30 °C

Caustic / Chlorine Wash

- Use clean water (< 60 mg/liter CaCo3 hardness) between 15 and 25 °C
- Circulate water through the system under standard pressure and flow conditions
- Add caustic (NaOH) slowly to achieve a pH of 12.0 (~ 0.5 wt.% NaOH addition)
- Add liquid sodium hypochlorite (NaOCl) to achieve a total chlorine concentration of 5000 mg/liter total chlorine (max.)
- Circulate caustic/chlorine solution for 20 to 30 minutes
- Check caustic/chlorine solution and add NaOCl as required to maintain total chlorine concentration
- Drain and completely flush system with clean water at a water temperature between 10 and 30 °C

Acid Wash

- Use clean water (< 60 mg/liter CaCo3 hardness) between 15 and 25 °C
- Circulate water through the system under standard pressure and flow conditions
- Add citric acid (solid) slowly to achieve a pH of 2.5 (~ 0.5 wt.% citric acid addition)
- Circulate acid solution through the system for 20 to 30 minutes
- Drain and completely flush system with clean water at a water temperature between 10 and 30 °C

Combinations with other chemicals, flows, residence times and flushes are adjusted as required for an optimum cleaning success.

ATTENTION!

Always add caustic before chlorine.
Never mix acid and bleach!
All pipes and connections must be thoroughly washed with water before acid or beach is added!
Follow the warning and safety instructions of the chemicals used!

8. Accessories

Article description	Drawing number (Chap. 2)	Article Code	Article Number
Membrane incl. PVC connection bends	[1] - [4]	AL-MEM	230010
Elbow fitting set incl. gasket set (2 pcs. Elbow fitting, 2 pcs. O-ring, 2 pcs. flat gaskets, ball Ø19mm)	[2]- [3]	AL-MEM-CON-Set	230012
Ball Ø19mm, POM	[2]	AL-MEM-Ball	230198
Seal set (2 pcs. O-ring, 2 pcs. flat seal)	[3]	ALMEM-SEAL	600715

9. Warranty / Contact

The warranty provisions are included in our sales conditions, and can be viewed at:

https://www.intewa.com/en/terms/

For any queries, orders for spare parts or service enquiries please get in touch with your local dealer or visit the service domain at the INTEWA website of your country.
Always keep your purchase invoice handy.

https://www.intewa.com