

# INTEΨA



## AL-MEM

## AQUALOOP Membrane

Installation and operating manual

WATER, WE'RE IN OUR ELEMENT

## 1. Note

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

<http://www.intewa.de/wasser/wasseraufbereitung/>

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

[http://wiki.intewa.net/index.php/Wasseraufbereitung\\_und\\_GrauwassernutzungTechnische\\_Daten](http://wiki.intewa.net/index.php/Wasseraufbereitung_und_GrauwassernutzungTechnische_Daten),

## 2. Scope of delivery

1. Membrane cartridge
2. 1 piece ball for regulating aeration
3. 2 piece O-Ring (  $\varnothing$  26mm x 3.5 mm)
4. 2 piece PVC connection bends 90°,
5. (Connections 1¼ / 1" union nut)

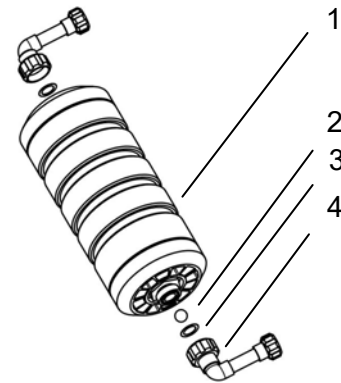


Fig.1: Scope of delivery

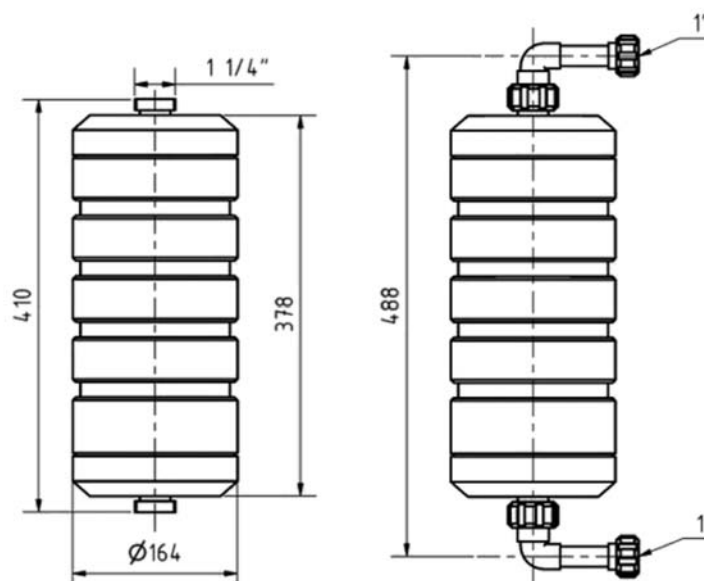
## 3. Notes on quality of untreated water and use

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 faecal 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 colour pigments (e.g. hair dyes) because this may lead to colouring 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 <1.0bar in pressure mode.
- During back flush operation, the membranes are flushed with compressed air (at least 30 l/min per cartridge).
- With MBR filtration, the bioreactor can be supplied to a maximum of up to 8h/day via membrane ventilation. If a greater air quantity is required, then external ventilation must be provided.

#### 4. Technical Data

Cartridge dimensions (Ø x H):	Ø 164 x 410 mm
Dimension with elbow connector:	Ø 164 x 486 mm
Weight:	1,6 kg
Membrane filter area:	6 m <sup>2</sup>
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:	0,2 µm
Anti-fouling:	yes
Pre-wetting:	yes
Flow range:	30 -600 l/h
Temperature range:	0 - 55 °C
Max. Transmembrane pressure:	0,7 bar
Max. Backflush pressure:	2,5 bar
Max. Membrane aeration:	30- 100 l/min (with max. 8 - 3h Aeration duration/day)
Max. free chlorine at 25°C or lower:	5000 ppm bei 9.5 pH during chemical cleaning
Max. cleaning load (free chlorine):	1.0 Mio ppmh (Cumulative hours)
Cartridge protection material and connectors:	PE / PP / U-PVC / ABS
Aeration / permeate connection:	1 ¼" AG / 1 ¼" OT
O-Ring seal:	Ø 26mm x 3,5 mm, NBR
Patented design:	yes
Lifetime:	Up to 10 years
Bacteriology test certificate:	Accredited testing laboratory HUS Salzburg
Testing standard:	ÖNORM EN ISO 9308-1
Removal of bacteria/viruses	Log 4-7



## 5. Storage conditions and start-up process

### Storage conditions:

New membrane cartridges must be stored in their original packaging until final installation. The following storage conditions apply:

- Membrane cartridges are to be protected from direct sunlight
- Storage temperature must be between 10 - 30 °C with a relative humidity below 70%

Used cartridges are chemically cleaned and flushed. Then they are stored as per storage conditions to dry.

### Start-up process:

The membrane cartridges are delivered as tested and bathed. They can be used for filtration without pre-treatment. Quickly dry if there is a slight build up of foam during operation.

The hollow fibre membranes have hydrophilic properties, i.e. the fibres can also be reused after cleaning and even drying.

## 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 fibre 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.

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. 2: Top side of membrane with sliding LOCK (Permeate connection)*



*Fig. 3: 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 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. 4: 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 (BOD <180 mg/l): < 0.22 l/min (at 15°C)
- Direct filtration (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 fibres.

Sludge that has accumulated on the outside of the fibres 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. 5: 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. 6: Opened membrane*

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



*Fig. 7: Washing the membrane*

### **Attention:**

Do not loosen the counternuts located at the top to open the membrane since the assembling of cartridge is very difficult without tools.

### **Note:**

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

## 7.2 Chemical cleaning

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

- In a cleaning solution in a separate cleaning container
- Directly in the tank (see manual of AQUALOOP membrane station, Chapt. 10)

Both cleaning procedures are explained in the AQUALOOP Membrane Station manual.

### Cleaning in a separate cleaning container

#### **Acid cleaning (e.g. with a blockage caused by calcium deposits):**

- Use clean water (< 60 mg/l CaCo<sub>3</sub> hard) between 15 and 25 °C . Slowly add acid (citric acid) until a pH of 2.5 (~ 0.5% citric acid added) is achieved
- Submerge the membrane cartridge(s) in the cleaning solution and circulate / filter the cleaning solution with normal filtration pressure of -0.2 bar for 12 - 24 hours.
- Empty the solution and rinse with clean water (10 and 30 °C ). Flushing with clean water for 20 minutes.

#### Note:

With a water hardness degree >8 pH, an acid cleaning is always performed before commencing basic cleaning.

#### **Basic chlorine cleaning (e.g. where there is blockage by biomass):**

- Use clean water (< 60 mg/l CaCo<sub>3</sub> hard) between 15 and 25 °C
- Circulate the water under normal pressure and flow ratio
- Slowly add base (NaOH), until a pH of 12.0 (~ 0.5 % NaOH added) is achieved
- Slowly add chlorine bleach (NaOCl) - for instance, DANKLORIX until a concentration of 5,000 mg/l max. is achieved
- Circulate the solution under normal pressure and flow rate for 20 to 30 mins
- Check the concentration and add (NaOCl) as required
- Empty the solution and rinse with clean water between 10 and 30 °C for 20 min.

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



#### **ATTENTION!**

**Never mix acid and beach!**

**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. Spare parts

Article description	Drawing no. (s. Chap. 2)	Order name	Order No.
Membrane incl. PVC connection bends	[1]-[3]	AL-MEM	230 010
Ball Ø19mm, POM	[2]	AL-MEM-Ball	230 198
Seal set (2 pcs. O-ring, 2 pcs. flat seal)	[3]	ALMEM-DS	600 715

## 9. Warranty / Contact

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

<http://www.intewa.de/1/cs/dialog/rechtliches/verkaufsbedingungen/>

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.

[www.intewa.com](http://www.intewa.com)