



MEMBRALOOP™

OPERATING AND ASSEMBLY INSTRUCTIONS

INNOVATIVE AND FLEXIBLE MEMBRANE FILTRATION

DESIGNED AND MADE IN EUROPE

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1 DETAILED DESCRIPTION

The MEMBRALOOP™ was developed to provide customers with a lightweight, mobile water treatment system that is ready for use at any time. The system has a filter capacity of up to 15 l/min (depending on pressure and temperature, proper manual and chemical cleaning provided). For higher flow rates, the units can also be connected in parallel.

The MEMBRALOOP™ process comprises the following process sections:

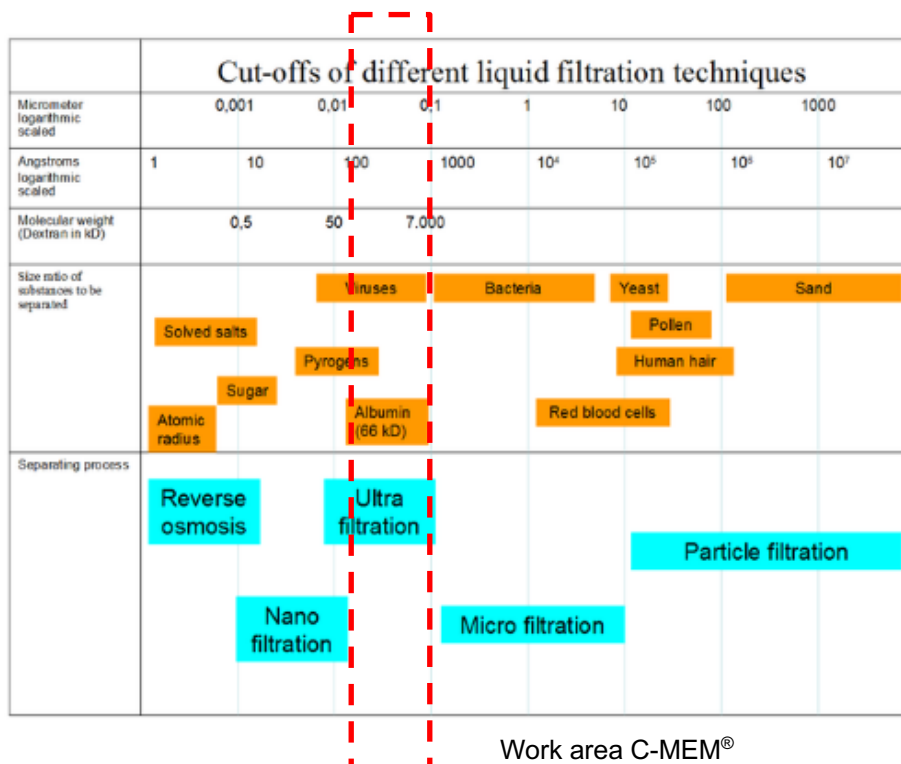
1. Raw water supply from suitable raw water sources
(described in chapter 3)
2. Supply line from reservoir with sufficient inlet pressure for the MEMBRALOOP™ system (min. 10 m / 1.0 bar, max. 50 m / 5 bar)
3. The MEMBRALOOP™ unit in flexible hose with 1/2" connection thread
4. Provision of pure water from the MEMBRALOOP™ unit for immediate use. The remaining pressure depends on the pressure loss of the diaphragm and the respective inlet pressure.

2 PROCESS DESCRIPTION

MEMBRALOOP™ is equipped with C-MEM® membranes. C-MEM® from SFC Umwelttechnik GmbH is a unique filtration unit based on hollow fiber membranes in the field of ultrafiltration. The scope of application of the C-MEM® unit ranges from drinking water treatment to the additional treatment of wastewater to general wastewater treatment. Depending on the water to be filtered and the nature of the membranes (organic, inorganic), the C-MEM® system can be classified as "outside-inside" with so-called "dead-end" operation.

A distinction is made between microfiltration, ultrafiltration and nanofiltration by the degree of separation. If the cut-off limit is 100 nm or higher, this is called microfiltration. If the exclusion limit is in the range between 2 and 100 nm, this is called ultrafiltration. In nanofiltration, the exclusion limit is below 2 nm.

Further qualitative statements about filtration can be made based on the flux or water value (transmembrane flow or penetration rate). Ideally, this is proportional to the transmembrane pressure and reciprocal to the membrane resistance. These quantities are determined both by the properties of the membrane used and by concentration polarization and any fouling that may occur. The penetration rate is based on 1 m² membrane area. Their unit is l/(m²h).



3 APPLICATION OF MEMBRALOOP™

3.1 Microbiological separation efficiency

The WHO classifies health-related separation targets according to the 2011 WHO report "Evaluation of household water treatment: health-related objectives and microbiological performance specifications" by applying the GDWQ concept of tolerable exposure.

GOAL	Log ₁₀ reduction necessary: Bacteria	Log ₁₀ reduction necessary: Virus	Log ₁₀ reduction necessary: Protozoa
Highly protective <input checked="" type="checkbox"/>	≥ 4	≥ 5	≥ 4
Protective	≥ 2	≥ 3	≥ 2
Interim	Achieves "protection" goal for two classes of pathogens, leading to better health		

The MEMBRALOOP™ ultrafiltration system reduces bacterial, viral and protozoa. The classifications of the WHO reduction targets are shown in the table.

MEMBRALOOP™ achieves the goal of **"highly protective"** in the categories:

Cholera	Cryptosporidium	Cyclosporiasis
	Intestinal inflammation	
Diarrhea	Dysentery	Gastroenteritis
Giardia	Hepatitis E	Typhus

3.2 Physical and chemical separation efficiency

The pore size of MEMBRALOOP™ of an average of 20 nm (0.02 µm) safely removes suspended substances (sediments, colloids, clay, dust, particulate metals, etc...) from the raw water in addition to microbiological impurities. The membrane serves as a

physical barrier. The solutes (e.g. Na⁺, K⁺, Ca²⁺, Cl⁻) however are not removed.

Parameter	Filtration rate
Filterable substances	≥ 99.999%
Turbidity	≥ 99.999%

3.3 Examples of raw water sources

Raw water (filterable substances < 10 mg/l, dissolved substances < 1 000 mg/l) can be obtained from the following sources:

- Storage tanks
 - City water
 - Rivers and lakes
 - Rainwater
 - Well
 - Spring water
- and
- any other source suitable for drinking water treatment.

3.4 Limits of the scope of application

Salt water or brackish water must not be used. The raw water contains soluble, organic or inorganic substances that exceed the specified limit range of the WHO drinking water guidelines or local limits, e.g. wastewater from industrial plants or urban sewage treatment plants.

In case of ambiguities and questions, please contact us either directly or our local partners.

4 DATA MEMBRALOOP™

The capacity of the MEMBRALOOP™ unit depends on the inlet pressure and is up to 350 litres of water per hour at 1.5 bar and up to 750 litres of water per hour at 3.0 bar. The membrane filter area is approx. 3 m² per unit.

The device does not require a power supply. The unit is operated exclusively by the inlet pressure, which is generated either by the level difference between the raw water tank / consumer or by a pump.

The complete MEMBRALOOP™ unit consists of the following components:

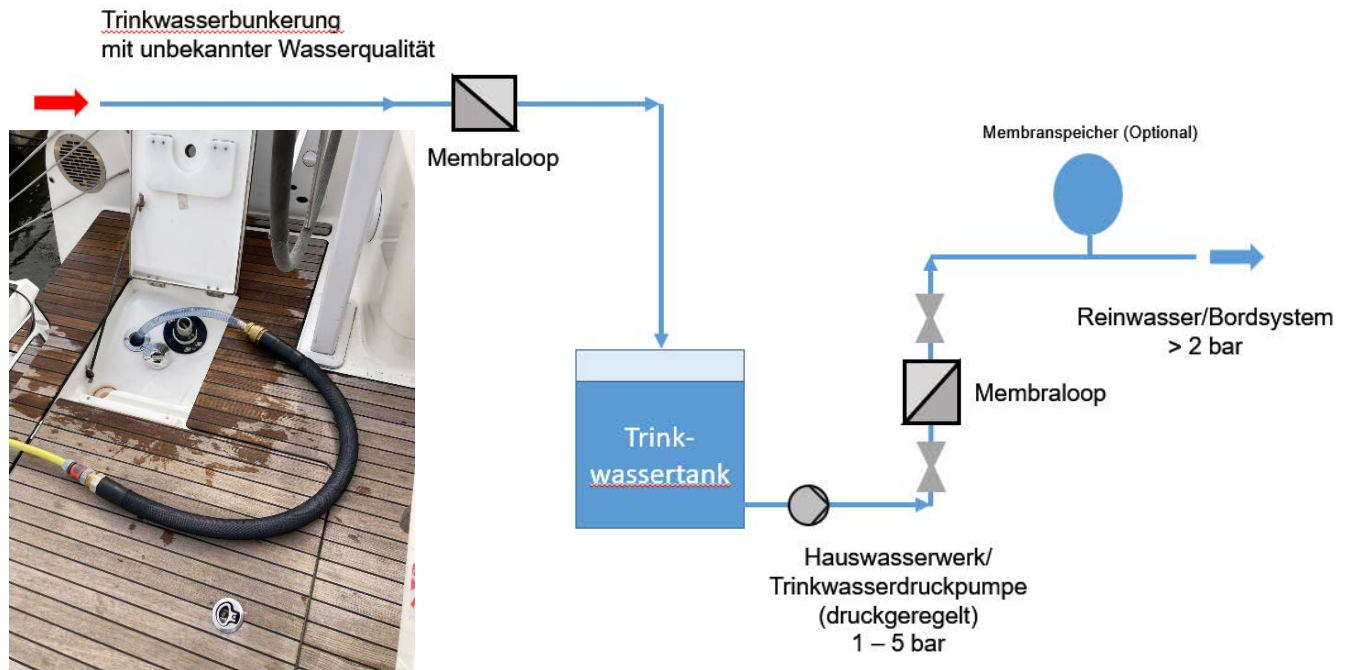
- 1 MEMBRALOOP™ unit in flexible hose suitable for max. 50 m / 5 bar inlet pressure / water column
- 1 connection adapter set - optional
- 1 mounting material set – optional
- 1 cleaning agent – optional

Not included:

- Raw water tanks
- Pre-pressure pump
- Pipe system raw water and pure water

5 EXAMPLES OF INSTALLATION AND USE

Installation diagram MEMBRALOOP™ for the germ-free bunkering of drinking water and for continuous operation prior to the use of drinking water



MEMBRALOOP™ - Bunker filter



Parallel installation 2 MEMBRALOOP™



Installation on a Vision 46



6 COMMISSIONING

Before putting into operation, all closures must be checked and, if necessary, tightened.

Step 1: Before the first application, please clean all pre- and post-held parts, such as raw water tanks, connecting pipes/hoses, branches and tapping points with clear drinking water and ideally carry out disinfection. Commercially available products can be used for disinfection. Membrane compatibility must be ensured.

Step 2: Start the pre-pressure pump and open a tapping point.

Step 3: Let the water run until the flow has stabilized. There may be a slight foaming, which subsides after a short time.

→ **The MEMBRALOOP™ filter is ready for use!**

7 CLEANING

7.1 Emptying MEMBRALOOP™

Switch off the back pressure pump and dismantle and drain the MEMBRALOOP™ at regular intervals depending on the degree of contamination of the water. Remove the sediment residue inside the hose.

7.2 Cleaning MEMBRALOOP™

At a flow rate of less than 250 litres per hour, MEMBRALOOP™ should be cleaned manually. You can get the right cleaning agent from the manufacturer.

In general, MEMBRALOOP™ should be dry-cleaned once a year to ensure an optimal level of cleanliness and an appropriate flow rate.

ATTENTION: NEVER mix different cleaning agents such as NaOCl and citric acid! During dry cleaning, use professional protective clothing (gloves, body, eye and face protection).

- 1) De-energize the back pressure pump and equalize the pressure.
- 2) Dismantle and drain MEMBRALOOP™.
- 3) Close the pure water side with a cap.
- 4) Pour 300 ml of detergent into the MEMBRALOOP™. Close the cap on the raw water side.
- 5) Toss and shake MEMBRALOOP™ back and forth for 30 seconds and then leave horizontally for 1 hour.
- 6) Swirl MEMBRALOOP™ back and forth for 30 seconds and swirl and shake MEMBRALOOP™ back and forth, open the raw water side and empty the MEMBRALOOP™ and rinse with clean water at least 3 times and empty all leftovers well.
- 7) Open the pure water side and reinstall MEMBRALOOP™ in the piping system.
- 8) Tighten the fasteners and check for leaks.

9) Putting the back pressure pump back into operation

If you do not want to do the cleaning yourself, there is the possibility of cleaning at the manufacturer. To do so, please contact us.

7.3 Estimated flow rate*

Betrieb mit regeler Reinigung / Operation with regular cleaning					
Differential pressure	1.0	1.5	2.0	3.0	bar
				≈	
Durchfluss / Flow	5	7.5	10	15	l/min

* Flow rate and flow rate depend on the temperature, pressure and the nature of the raw water (solids content)!

7.4 Disinfection of the entire system

The MEMBRALOOP™ filter safely removes particulate solids and germs from the raw water. However, we recommend regular additional disinfection of the entire system (raw water tanks, pipelines and tapping points) once a year with commercially available products. Please observe the operating and application instructions for the products used. The MEMBRALOOP™ filter can remain installed during disinfection. The membrane compatibility of the disinfectants must be clarified.

8 PROBLEM SOLVING

- MEMBRALOOP™ unit is leaking: The connectors may not have been fastened tightly enough. Screw the connectors tight again with the help of a suitable tool.
- The turbidity in the purified water is above 3 NTU, and particles are still visible: there are probably leaks in the system. Check the connections. Replace the damaged parts as needed.
- No flow / too low flow / flow changes:
 - Check the back pressure pump to see if there is sufficient pressure.
 - Check if there is enough water in the raw water tank.
 - There may be air pockets in the hose system. The system usually bleeds itself after a short time during operation. Check whether air is sucked in from the raw water tank.
 - Perform a cleaning of MEMBRALOOP™

9 SAFETY

- Read the instruction manual carefully!
- Make sure you have understood the instruction manual correctly!
- Use the unit exclusively for the purpose described!
- Do not connect pumps or inlet lines with a pressure higher than 5 bar to the unit.
Check the pressure with a pressure gauge before and after the unit.
- Do not use raw water with a temperature above 40°C!
- Only open MEMBRALOOP™ if it is depressurized!
- Fix the unit!
- Wear protective clothing, gloves and goggles during cleaning!
- NEVER mix different detergents such as NaOCl and citric acid during the cleaning process!
- Do not leave children unattended with the MEMBRALOOP™ unit!
- Use only raw water without algae, plant residues or other coarse particles!
- Carefully open and close the MEMBRALOOP™ connectors to prevent injuries to your fingers!
- MEMBRALOOP™ is a "point-of-use" (POI) treatment system – treated water must either be used immediately or stored in clean (preferably disinfected) containers and consumed within half a day (reinfection possible)!



10 CONTACT

If you have any questions, please do not hesitate to contact us:

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