Aquaporin Inside® Membranes

Hollow fiber forward osmosis element

High rejection of difficult compounds

Low specific reverse salt flux

High recovery of water

Low footprint due to high packing density

Product type

The Aquaporin Inside® HFFO 06 element is designed for Forward Osmosis (FO) applications.

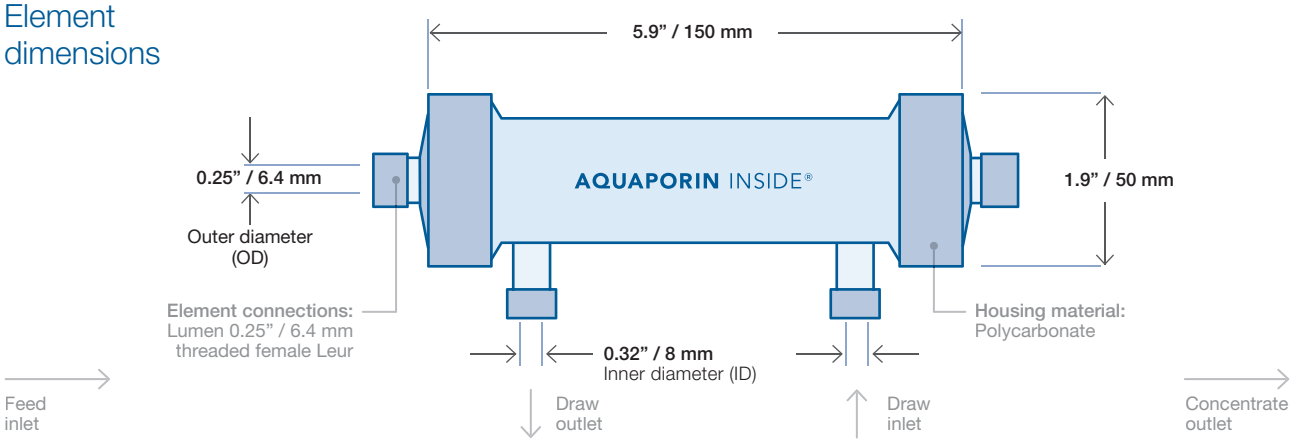
Biomimetic hollow fiber element comprising an active layer of polyamide thin film composite (TFC) with integrated aquaporin proteins. The addition of aquaporin water channels into the rejection layer makes the Aquaporin Inside® FO membrane capable of rejecting difficult contaminants and preserving valuable components. The use of hollow fibers allows for a very high packing density.

Product specifications

	Membrane area	Fiber ID	Permeate flow rate		Water flux	Specific reverse salt flux
	m^2	mm	GPD	L/h	LMH	g/L
HFFO 06	0.6	0.2	57	> 9	> 15	< 0.20

The stated product performance is based on 1 M NaCl (5.8 wt %) draw vs. DI water (FO mode) at 25° C / 77° F in a single-pass operation.

Element dimensions



Operating specifications

Recommended operating conditions	
Counter-current flow	
Feed flow inside lumen	**24 L/h (400 mL/min)**
Draw flow on shell side	**25 L/h (420 mL/min)**
Transmembrane pressure lumen to shell (TMP)	**0.2 bar / 2.9 psig**
Temperature range	**10-30°C / 50-86°F**
pH range	**2-11** (short term exposure)

Maximum operating conditions	
Transmembrane pressure lumen to shell (TMP)	**4 bar / 58 psig**
Temperature range	**5-50°C (41-122°F)**
Free chlorine tolerance [a]	**< 0.1 mg/L**

Guidelines for feed and concentrate quality

Component	**Feed**	**Concentrate**
Particle size	**≤ 50 µm**	**-**
TSS	**≤ 200 ppm**	**≤ 500 ppm**
Viscosity	**≤ 40 cP**	**≤ 90 cP**
TOC (dye solution)	**≤ 50,000 ppm**	**≤ 100,000 ppm**
TOC (pharmaceutical effluent)	**≤ 8,000 ppm**	**≤ 20,000 ppm**
TOC (alginate, organic foulant)	**≤ 300 ppm**	**≤ 1,000 ppm**
COD (pharmaceutical effluent)	**≤ 50,000 ppm**	**≤ 90,000 ppm**
Silica (soluble)	**≤ 500 ppm**	**≤ 1,000 ppm**
Oil & grease	**≤ 20 ppm**	**≤ 100 ppm**

[a] Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Aquaporin A/S recommends removing residual free chlorine by pre-treatment prior to membrane exposure.

Additional information

- ✓ It is recommended to rinse the elements for 1 hour, prior to first use.
- ✓ It is advisable to pre-treat the feed solution to remove suspended solids. Particles might damage the fibers and possibly cause a decrease in performance.
- ✓ Run feed solution prior to draw solution to avoid osmotic drying of the membrane.
- ✓ Do not allow element to run dry as this will compromise membrane performance.
- ✓ Immediately flush the element on lumen side with clean water for ≥ 30 min after use (shell side connections open).
- ✓ The element can be stored at room temperature, but preferred storage is at 4°C.
- ✓ Keep out of direct sunlight
- ✓ To prevent biological growth during prolonged system shutdowns, membrane elements should be immersed in a preservative solution. Rinse thoroughly before re-use.
- ✓ Keep elements moist at all times after initial wetting.
- ✓ The information provided in this document is for informative purposes only. It is the responsibility of the user to ensure appropriate usage of this product. Aquaporin A/S assumes no obligation, liability, or damages incurred for the misuse of the product or for the information provided in this document. This document does not express or implies any warranty as to the merchantability or fitness of the products.
- ✓ Not yet approved as food contact material (FCM).

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