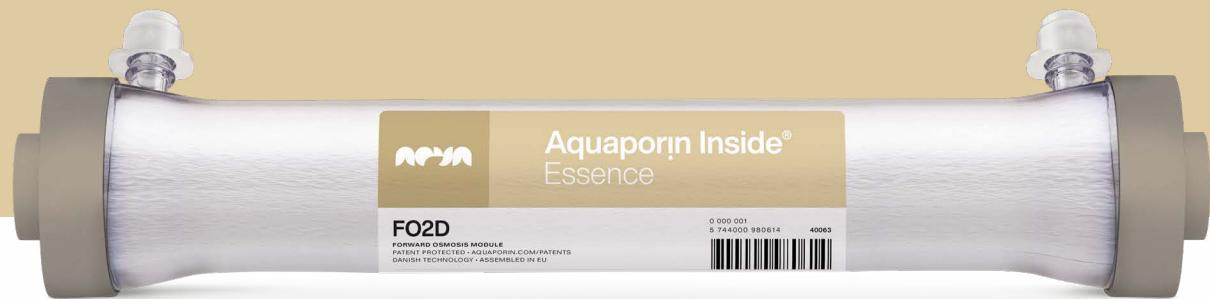


Aquaporin Inside® Essence FO2D

Hollow Fiber Forward Osmosis module



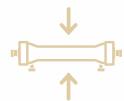
**High retention
and yield**



**Low specific
reverse salt flux**



**High concentration
factor**



**Compact and small
footprint**

PRODUCT TYPE

The Aquaporin Inside® Essence FO2D module is designed for Forward Osmosis (FO) applications. Biomimetic hollow fiber module comprising an active layer of polyamide thin film composite (TFC) with integrated aquaporin proteins.

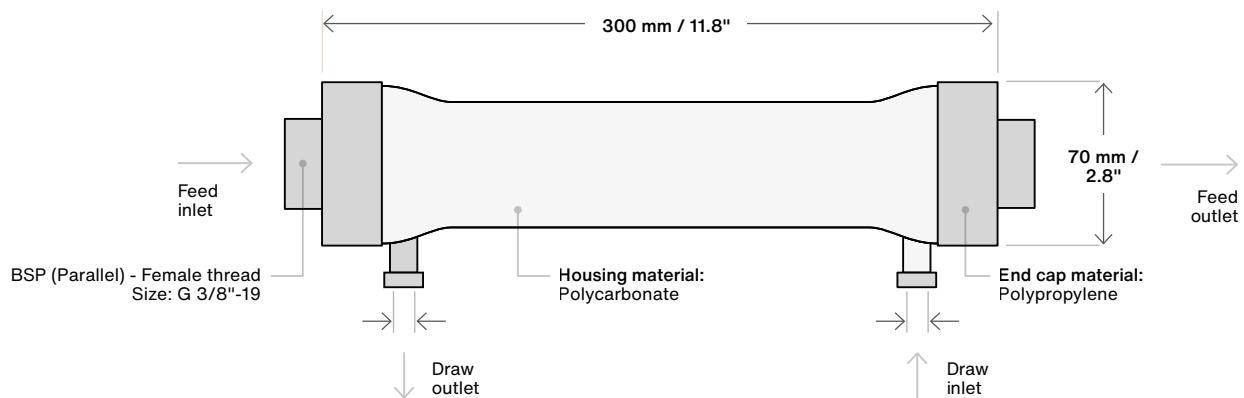
The addition of aquaporin water channels into the rejection layer makes the Aquaporin Inside® FO membrane capable of rejecting difficult contaminants and preserving valuable components. The use of hollow fibers allows for a very high packing density.

PRODUCT SPECIFICATIONS

Product name	Fiber ID	Membrane area	Water flux	Specific reverse salt flux
Aquaporin Inside® Essence FO2D module	0.20 mm	2.3 m ² 24.7 ft ²	11 ± 1.5 LMH	0.15 ± 0.05 g/L

The stated product performance is based on following testing conditions: 0.5 M NaCl (2.9 %) draw vs DI water (FO mode), temperature: 25°C (77°F), single pass mode, counter-current flow, feed flow rate: 60 LPH, draw flow rate: 25 LPH, transmembrane pressure (TMP) feed to draw: 0.2 bar (2.9 psi).

ELEMENT DIMENSIONS



RECOMMENDED OPERATING CONDITIONS

Operating mode	Counter-current flow, inside-out
Transmembrane pressure (TMP) feed to draw	0.2 bar / 2.9 psi
Temperature range	5–20°C / 41–68°F
pH range	4.5–8
Pre-filtration ^a	≤ 50 µm

^a The optimal pre-filtration is application dependent.

^b 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.

^c Refer to cleaning guidelines in the User Manual.

ADDITIONAL INFORMATION

- ✓ Module should be operated in vertical position with feed inlet in the top and draw inlet in the bottom.
- ✓ It is recommended to rinse the module for 30 min, 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 the module to run dry as this will compromise the membrane performance.
- ✓ Immediately flush the module on feed side with clean water for ≥ 30 min after use (draw side connections open).
- ✓ The module 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, the module should be immersed in a preservative solution. Rinse thoroughly before re-use.
- ✓ Keep the module moist at all times after initial wetting.
- ✓ The information provided in this document is for informative purposes only. It is the users own responsibility 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 imply any warranty as to the merchantability or fitness of the products.

MAXIMUM OPERATING CONDITIONS

Transmembrane pressure (TMP) feed to draw	≤ 4 bar / 58.0 psi
Feed inlet pressure	≤ 4 bar / 58.0 psi
Draw inlet pressure	≤ 2 bar / 29.0 psi
Max. particle size	≤ 50 µm
Free chlorine tolerance ^b	< 0.1 mg/L

CLEAN-IN-PLACE (CIP)^c

Temperature	≤ 40°C / 122°F
pH range	2–11
Pressure	≤ 0.5 bar / 7.3 psi
Duration	20 min

REGULATORY

This product is 'safe for use' as per the requirements according to the **21 CFR 177.2550 US FDA** regulations for concentration of coffee, tea, juices and low alcoholic solutions of maximum 20% in concentrate.

WARNING!

- This product can expose you to chemicals, including Bisphenol – A (BPA), which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
- This product is not intended for use in contact with infant formula and human milk.

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