Duratherm* STD Series

FACT SHEET

High Temperature Operation and Hot Water Sanitizable Spiral Wound Membranes



The Duratherm STD Series spiral wound membranes are specifically designed to maximize the benefits of continuous high temperature operation as well as being designed to withstand the high temperatures utilized in hot water sanitization in industries seeking to maximize energy recovery and use hot purified water.

The Duratherm STD Series are suitable for separation systems purifying water at operating temperatures up to 70°C (158°F) in a low crossflow environment and with no suspended solids.

Further, the Duratherm STD Series is able to be used in a separation system where the sanitization protocol is performed via periodic exposure to temperature as high as 90°C (194°F) at minimum feed pressure. The high temperature during the sanitization protocol kills microorganisms by denaturation and coagulation of the proteins chains. This sanitization protocol reduces site chemical costs as well as allows sanitization on the permeate side of the spiral wound membrane while not damaging the spiral wound membrane.

All models are designed for durability and include a cage outer wrap, polysulfone anti-telescoping devices (ATDs), and a polysulfone central tube.

Typical Applications

- Food & Beverage
- Biopharmaceuticals
- Electronics
- Chemical

Table 1: Specification

Membrane	A-Series, thin-film membrane (TFM), polyamide

Model	Average Permeate Flow gpd (m^3/day) (1,3)	Average NaCl Rejection (2,3)
Duratherm STD RO4040	2,300 (8.7)	99.5%
Duratherm STD RO8040	9,000 (34.1)	99.5%

(1) Individual flow rate may vary +/-20%. Final permeate flow rate is subject to variations in the heat treatments. In most cases, the permeate flow rate after heat treatments will stabilize at 25% below nominal flow rate before heat treatment for the Duratherm STD RO. This is taken into consideration in Winflows Database 3.07 and later.

(2) Stabilized salt rejection after 24 hours of operation

(3) Testing conditions: 2,000 ppm NaCl solution at 225 psig (1,550 kPa) operating pressure, (25°C) 77°F, pH 7.5 and 15% recovery before any hot water sanitization.

Consultas y ventas: AQUAREP · www.aquarep.com.ar · info@aquarep.com.ar · WhatsApp +54 9 11 6091-0087

Table 2: Properties (4)

Model	Active Area ft² (m²)	Outer Wrap	Part Number
Duratherm STD RO4040	90 (8.4)	Cage	1228197
Duratherm STD RO8040	374 (34.9)	Cage	1228225

(4) Spiral wound membrane properties and parameters are indicative numbers. Specific values by spiral wound membrane may vary within normal manufacturing tolerances.

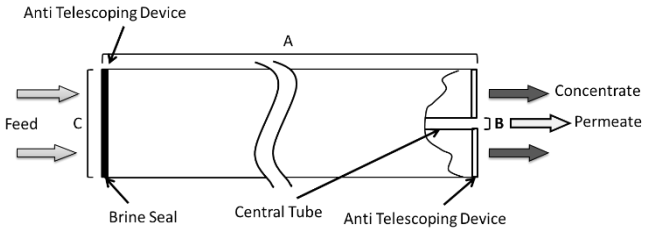

Figure 1: Dimensions Diagram for All Duratherm STD Series Models

Table 3: Dimensions and Weight (4)

Model	Dimensions, inches (cm)			Boxed Weight lbs (kg)
	A	B(6)	C	
Duratherm STD RO4040 (5)	40.0 (101.6)	0.625 (1.59)	3.9 (9.9)	9 (4.1)
Duratherm STD RO8040	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)

(5) "A" dimension includes the interconnector. Refer to TB1206 for further information.
(6) Internal diameter unless specified OD (outside diameter).

Table 4: Temperature Maximums

Do not exceed 20 GFD (34 LMH) permeate flux for any spiral wound membrane in any circumstances

Model	Maximum Operating Temperature	Maximum Cleaning Temperature	Maximum Sanitization Temperature
Duratherm STD RO	158°F (70°C)	122°F (50°C)	194°F (90°C)

Table 5: Operating Parameters (4)

Operating Temperature	41–122°F (5–50°C)	122–158°F (50–70°C)
Typical Operating Flux	10-18 GFD (17-31 LMH)	10-18 GFD (17-31 LMH)
Maximum Operating Pressure	600 psi (4,137 kPa)	400 psi (2,758 kPa)
Maximum Crossflow	STD 4040 Models: 20 GPM (4.5 m³/hr) STD 8040 Models: 65 GPM (14.8 m³/hr)	
Maximum Pressure Drop: Over an element	15 psig (103 kPa)	7.5 psig (51 kPa)
Maximum Pressure Drop: Per Housing	60 psig (414 kPa)	30 psig (207 kPa)
pH Range: Continuous Operation Clean-In-Place (CIP)	4.0-11.0 2 – 11.5	4.0-11.0 Not Allowed
Chlorine Tolerance	500 ppm-hours, dechlorination recommended	
Feedwater	NTU < 1 SDI_{15} < 5	

Table 6: Clean-In-Place Temperature and pH Range

Maximum Clean-In-Place Temperature	pH Minimum	pH Maximum
122°F (50°C)	2.0	11.5
113°F (45°C)	1.5	11.5
95°F (35°C)	1.5	11.5
77°F (25°C)	1.0	12.0

Hot Water Sanitization Recommendations

Prior to first use, new spiral wound membranes must be flushed with clean water[1] to remove any residual chemicals for at least an hour, at a transmembrane pressure of not more than 45 psi (3 bar). The system must be started and in operation for minimum 24 hours prior to hot water sanitization.

If the new spiral wound membranes are to be hot water sanitized before first use, the system must be flushed at low transmembrane pressure (up to 45 psi (3 bar)), for minimum 24 hours prior to sanitization.

Transmembrane pressure during hot water sanitization should also be maintained as low as possible, not exceeding 45 psi (3 bar), while ensuring some permeate flow for effective sanitization on the permeate side.

The cross flow to the system should be monitored and adjusted so that the pressure drop is not more than 2 psi per element or 10 psi per housing.

The following procedure should be followed step by step for the hot water sanitization of Duratherm STD spiral wound membranes.

1. The spiral wound membranes that have been in operation should be cleaned with approved Clean In Place (CIP) procedure to remove any mineral scales or organic foulants, and then be thoroughly flushed for at least an hour before sanitization.
2. Increase the temperature in the system from room temperature to target sanitization temperature[2] (up to 90°C/194°F) at a rate not higher than 5°C/9°F per minute. Maintain the target temperature for 30 to 60 minutes.
3. Cool the system to room temperature at a rate not higher than 5°C/9°F per minute.

[1]RO permeate is strongly preferred when available. Feedwater which does not foul or form scale on membrane can also be used but only after appropriate filtration. Note that the solubility of some inorganics, for example calcium carbonate and at least above 45°C calcium sulfate, decreases with increasing temperature.

[2]The effectiveness of heat sanitization is a function of temperature and time. Duratherm STD spiral wound membranes can withstand 90°C hot water sustained for over 60 minutes, but there is no gain by maintaining the high temperature for longer time than needed to deactivate the microbes that will be deactivated at the chosen temperature.

Salt Rejection

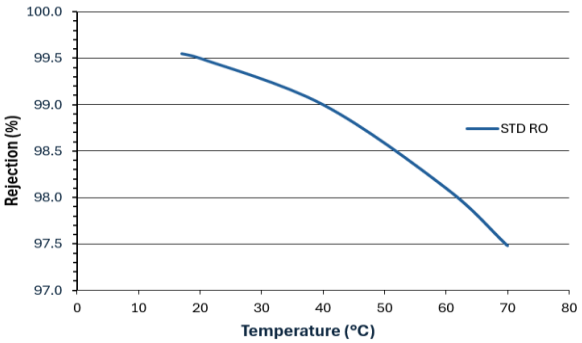

Figure 2: Simulated NaCl rejection for Duratherm STD spiral wound membranes with 2,000 ppm NaCl at 15% recovery and 33 LMH

Pressure Drop

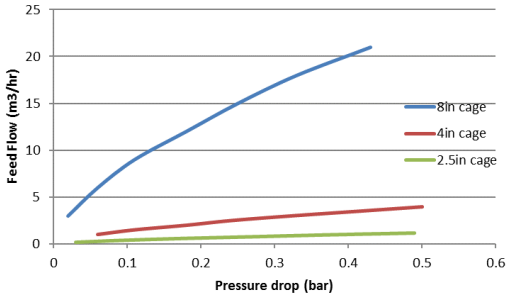

Figure 3: Simulated pressure drop

Net Driving Pressure

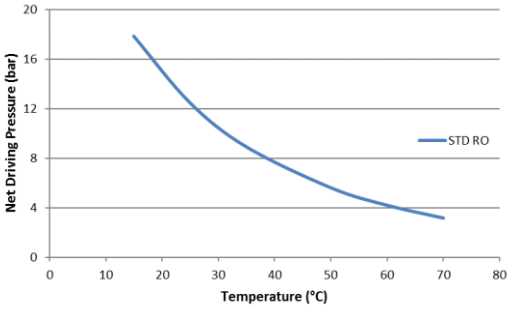

Figure 4: simulated net driving pressure for Duratherm STD spiral wound membranes with 2,000 ppm NaCl at 15% recovery and 33 LMH

*Trademark of Veolia; may be registered in one or more countries. ©2025 Veolia. All rights reserved. FS1271EN.docx Jul-25

Consultas y ventas: AQUAREP · www.aquarep.com.ar · info@aquarep.com.ar · WhatsApp +54 9 11 6091-0087