Sanitary Spiral Wound Elements

Alfa Laval Reverse Osmosis - RO98pHt Series

The Alfa Laval RO98pHt spiral elements for reverse osmosis are tailor-made for processes requiring high temperatures and a wide pH range in dairy, food and beverage applications

The elements are based on a thin film composite polyamide type membrane with polypropylene (PP) support material

The sanitary full fit design offers optimum cleaning conditions and minimizes stagnant spaces.

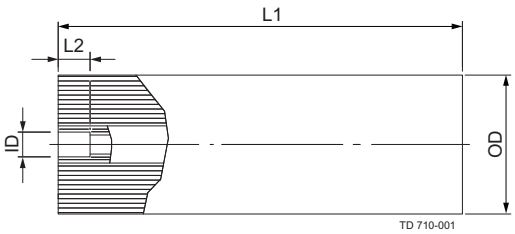
All the materials used for the production of these spiral elements comply with EU Regulations (EC) 1935/2004 and FDA regulations (CFR) Title 21. The elements are USDA approved.

Designation	Process	Characteristics	NaCl rejection
RO98pHt	RO	Thin film composite	≥98%*

*Measured on 2000 ppm NaCl, pH 8, 16 bar, 25ºC, 15% recovery

Spiral membrane designation

Alfa Laval RO98pHt-8038/30		
Alfa LavalRO98pHt	=	Membrane type
80	=	Outer diameter of element (8.0")
38	=	Element length (38")
30	=	Feed spacer thickness



Dimensions

OD = outer diameter of element
HD = nominal inner diameter of housing*
L1 = total length of element without ATD
ID = diameter of ATD socket
L2 = depth of ATD socket

For specific measurements of AL housings, please consult the product specification

Standard Element sizes (without ATD system)

Element size	Outer diameter (OD)		Housing diameter (HD)		Element length (L1)		ATD socket diameter (ID)		ATD socket depth (L2)	
	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
2517	64.0-65.0	2.52-2.56	66	2.6	432	17.01	21.1	0.831	50	1.97
3838	95.0-96.5	3.74-3.80	97.55	3.84	965	37.99	21.1	0.831	50	1.97
8038	198.5-201.5	7.82-7.93	204.14	8.04	965	37.99	28.58	1.125	76	2.99
8038	198.5-201.5	7.82-7.93	204.14	8.04	965	37.99	28.9	1.138	76	2.99

For other element sizes, please contact Alfa Laval.

Standard element configurations with code numbers - please specify code number when ordering

Size	Spacer	RO98pHt
2517/	30 mil	517037
	48 mil	517592
3838/	30 mil	516645
	48 mil	516646
	65 mil	522333
8038/ id 28.58 mm	30 mil	525469
	48 mil	525470
	65 mil	529633
8038/ id 28.9 mm	30 mil	517314
	48 mil	518424
	65 mil	522332

Typical cross-flow (m^3/h) and max. pressure drop (bar) at cP 1

Outer diameter	2.5”		3.8”		8.0”	
Spacer size	m3/h	bar	m3/h	bar	m3/h	bar
30 mil	1	0.5	6	1.1	18	0.9
48 mil	1.5	0.6	8	1.1	29	0.9
65 mil	-	-	10	1.1	32	0.9

Note: Calculated at tight fit of spiral element and housing and by use of standard ATD system.

Recommended operation limits

Production	
pH range (reference temperature 25°C)	2-10
Typical operating pressure, bar	15-40
Max. operating pressure at 30°C, bar	55
Max. operating pressure at 60°C, bar	27
Temperature, °C	5-60
Free chlorine concentration, ppm	<0.1
Hydrogen peroxide, continuous operation at 25°C	<20

Cleaning (2 hours per day)*	
pH range (reference temperature 25°C)	1-12.5
Typical cleaning pressure, bar	1-5
Temperature, °C	25-60

* Please consult Alfa Laval’s cleaning instructions and water quality specifications.

Hydrogen peroxide sanitation (1 hour per week)	
Hydrogen peroxide short time sanitation 2 x ½ hour per week at 25°C, ppm	<1000

Hot water sanitation**	
Max. sanitation temperature (<1.7 bar), °C	80

** Please see guidelines overleaf.

Note: The use of oxidation agents and similar chemicals might influence the membrane performance over time. Any contamination with chlorine must be avoided.

Important Information

- New spiral elements must be cleaned prior to first use. The cleaning procedure should be in accordance with the instructions provided in Alfa Laval's cleaning description for the spiral element type concerned.
- The customer is fully responsible for the effects that any incompatible chemicals may have on the spiral elements.
- After initial wetting, the spiral elements must be kept moist at all times.
- If the operating specifications given in this product description are not strictly followed, the limited warranty will be null and void.
- To prevent biological growth during system shutdowns, Alfa Laval recommends that spiral elements should be immersed in a protective solution.
- Avoid permeate-side back pressure at all times.
- Alfa Laval recommends using a rigid stainless steel ATD end device at the housing outlet end.
- Alfa Laval recommends that the inner diameter of the housing should be approx. 2 mm (0.08 inches) bigger than the outer diameter of the spiral element in question.
- For storage conditions please see Shelf Life and Storage document.
- For warranties, please see Spiral Element Warranty document.

Hot water sanitization guidelines

New hot water sanitizable spiral elements must be pre-sanitized with hot water before taken into production. After the first hot water sanitation, both permeate flow and rejection becomes stabilized. It should be noted that flux levels before pre-sanitization might appear high.

The water used for sanitizing must be clean, softened and of fouling and scaling free quality, and free from any oxidizing component. Please consult the Alfa Laval "Water quality" PD leaflet, 1603.

A safe sanitizing procedure comprises of:

1. Flush the plant to drain using above type water quality.
2. Start recycling and heating the water to max. 80°C (176°F) while maintaining a very low trans¬membrane pressure of <1.7 bar (<25 psi) with max. 3 bar (45 psi) feed pressure. Temperature changes should be gradual with not more than 5°C (9°F) change per minute.
3. Maintain the max. temperature for 60 – 90 minutes. Maintain the very low transmembrane pressure <1.7 bar (<25 psi) with max. 3 bar (45 psi) feed pressure.
4. Cool down the water / the plant gradually (not more than 5°C (9°F) change per minute) until 40°C (104°F).
5. Flush to drain with new suitable good water quality using the same very low transmembrane pressure <1.7 bar (<25 psi) with max. 3 bar (45 psi) feed pressure.

Operation guidelines

Avoid any abrupt pressure or cross - flow changes on the spiral elements during start - up, shutdown, cleaning or other sequences, in order to prevent possible damage. Alfa Laval recommends the following start - up procedure from stand still to operating condition:

- The unpressurized plant should be refilled with water.
- Feed pressure should be gradually increased over a 30 - 60 second time scale.
- Before initiating cross - flow at high permeate flux conditions (e.g. start - up with high temperature water), the set feed pressure should be maintained for 5 - 10 minutes.
- Cross-flow velocity at the set operating point should be gradually achieved over a period of 15 - 20 seconds
- Temperature changes should be implemented gradually over a period of 3 - 5 minutes.