

# Alfa Laval HSRO spiral membranes

## Hot water sanitizable membranes for reverse osmosis

### Spiral membrane data

The Alfa Laval HSRO spiral membrane is based on a unique construction of a thinfilm composite polyamide membrane with polyester (PET) support material in a sanitary and compact full-fit design that provides optimum cleaning conditions.

The HSRO spiral membrane is available in different combinations of length, diameter and feed spacer size.

All materials used for the production of the HSRO spiral membrane comply with EU Regulation (EC) 1935/2004, EU Regulation 10/2011, EU Regulation (EC) 2023/2006 and FDA regulations (CFR) Title 21.

The Alfa Laval HSRO spiral membrane is Halal certified.



Membrane type	Support material	Characteristics	Rejection
HSRO	Polyester	Thinfilm composite	≥ 98% <sup>1</sup>

<sup>1</sup> measured on 2000 ppm NaCl, 9 bar, 25°C, 15% recovery

### Spiral membrane designation

Example: **Alfa Laval HSRO-8038/30**

Alfa Laval HSRO	=	Membrane type
80	=	Outer diameter of spiral (8.0")
38	=	Length of spiral (38") without ATD system
30	=	Thickness of feed spacer (30 mil)

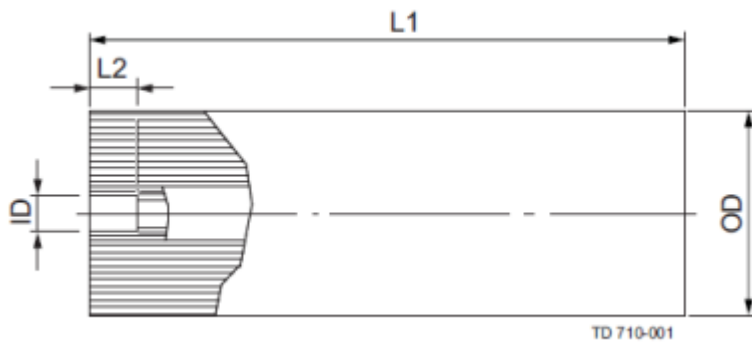
### Standard configurations

Spiral	Size <sup>1</sup>		Membrane type and code number <sup>2</sup>
		Spacer	HSRO
3838		30	X542864
3840		30	X534790
		48	X534791
		30	X536099
8038		65	X526924

<sup>1</sup> For other sizes, please contact Alfa Laval

<sup>2</sup> Please specify code number when ordering

## Dimensions



OD = outer diameter of spiral membrane  
 HD = nominal inner diameter of housing<sup>1</sup>  
 L1 = total length of spiral membrane without ATD  
 ID = diameter of ATD socket  
 L2 = depth of ATD socket

<sup>1</sup> For specific measurements of Alfa Laval housings please see the product specification

## Standard sizes

Size <sup>1</sup>	Outer diameter (OD)		Housing diameter (HD)		Spiral length (L1) <sup>2</sup>		ATD socket diameter (ID)		ATD socket depth (L2)	
	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
3838	95.0–96.5	3.74–3.80	97.55	3.84	965	37.99	21.1	0.831	50	1.97
3840	95.0–96.5	3.74–3.80	97.55	3.84	984	38.74	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

<sup>1</sup> For other sizes, please contact Alfa Laval

<sup>2</sup> Without ATD system

## Cross-flow and pressure drop

Typical cross-flow (m<sup>3</sup>/h) and max. pressure drop (bar) at cP 1:

Outer diameter:	3.8"		8.0"	
Spacer thickness:	m <sup>3</sup> /h	bar	m <sup>3</sup> /h	bar
30 mil	7	1.0	23	0.9
48 mil	8	1.0	—	—
65 mil	—	—	32	0.9

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

Maximum pressure drop across the entire housing not to exceed 4.1 bar

## Recommended operating limits

Production	
pH range (reference temperature 25°C)	3 – 10
Typical operating pressure, bar	15 – 42
Maximum operating pressure, bar	55
Temperature, °C	5 – 50

Cleaning <sup>1</sup> (3 hours per day)	
pH range (reference temperature 25°C)	1.5 – 11
Typical operating pressure, bar	1 – 3
Maximum operating pressure, bar	3
Temperature, °C	30 – 50

<sup>1</sup> Please consult the Alfa Laval cleaning instructions and water quality specifications

Sanitization (1 hour per week)	
Hydrogen peroxide at 25°C, ppm	<1000

OPTION: Hot water sanitization <sup>1</sup>	
Max. sanitization temperature (<1.7 bar), °C	80

<sup>1</sup> Please see guidelines overleaf

**Note:**

- Washing procedure indicated on the cover of each spiral membrane package must be strictly followed. Please consult the Alfa Laval cleaning instructions and water quality specifications.
- The use of oxidation agents and similar chemicals might influence the membrane performance over time. Agents such as chlorine are not allowed. Any contamination with chlorine must be avoided!

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**Important information**

- New spiral membranes must be cleaned prior to first use. Please see detailed instructions on the packaging of the product.
- The customer is fully responsible for the effects that any incompatible chemicals may have on the spiral membranes.
- After initial wetting, the spiral membranes must be kept moist at all times.
- If the operating specifications provided 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 membranes 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") bigger than the outer diameter of the spiral membrane.
- For storage conditions, please see Shelf Life and Storage document.
- For warranties, please see spiral membrane warranty document.

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**Operating guidelines**

Alfa Laval recommends the following start-up procedure from standstill 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 condition (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 variations should be implemented gradually over a period of 3–5 minutes.
- Avoid any abrupt pressure or cross-flow variations on the membranes during start-up, shutdown, cleaning or other sequences in order to prevent possible damage.

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**OPTION: Hot water sanitization guidelines**

Cleaning (CIP) of the plant to be performed prior to sanitization for optimum result. The cleaning procedure should be in accordance with the instructions provided in the Alfa Laval product leaflet for the spiral membrane concerned and available on [alfalaval.com](http://alfalaval.com).

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 transmembrane 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.



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