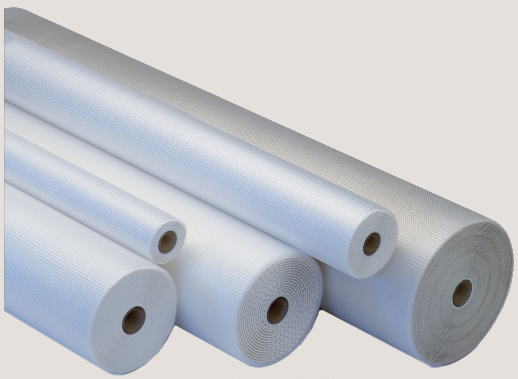
Alfa Laval UF spiral membranes — DAIRY

Sanitary spiral membranes for ultrafiltration (Dairy UF-PET and Dairy UF-pHt™)



Introduction

Cross-flow membrane filtration by Alfa Laval separates out the different components in a feed stream on the basis of the size and the shape of the micro-particles within it.

Alfa Laval spiral membranes for dairy applications have a sanitary and full-fit design which offers optimum cleaning conditions and minimized stagnant spaces.

The Dairy UF-pHt™ spiral membranes are based on polypropylene (PP) support material permitting an extended pH and temperature range.

Applications

Alfa Laval spiral membranes for dairy applications are tailor-made and used for the processing of:

- acid dairy products (GR60 membranes)
- milk and sweet whey (GR61 membranes)
- milk and whey (GR70, GR73 and GR82 membranes)

Benefits

- sanitary and compact full-fit design
- low initial investment and replacement costs
- cost-effective operation thanks to low energy consumption
- tolerance to high pH and temperature (Dairy UF-pHt™)
- operation at low temperature possible
- different types and sizes available
- the same basic membranes available in spiral and flat sheet configurations (Dairy UF-pHt™)
- developed and manufactured by Alfa Laval
- all materials in compliance with EU Regulation (EC) 1935/2004, EU Regulation 10/2011, EU Regulation (EC) 2023/2006 and FDA regulations (CFR) Title 21
- USDA approved and Halal certified
- all spiral membranes are shipped dry

Spiral membrane data

Alfa Laval spiral membranes for dairy applications are based on a unique construction of a polymeric membrane of either polysulphone or polyethersulphone with polyester (PET) or polypropylene (PP) support material that provides optimum cleaning conditions.

Membrane type, Dairy UF-PET	Support material	Characteristics	MWCO[1] value
GR61PE	Polyester	Polysulphone	10,000
GR70PE	Polyester	Polysulphone	10,000
GR73PE	Polyester	Polyethersulphone	10,000
GR82PE	Polyester	Polyethersulphone	5,000

[1] measured MWCO on typical dairy products

Membrane type, Dairy UF-pHt™	Support material	Characteristics	MWCO[1] value
GR60PP	Polypropylene	Polysulphone	20,000
GR61PP	Polypropylene	Polysulphone	10,000
GR70PP	Polypropylene	Polysulphone	10,000
GR73PP	Polypropylene	Polyethersulphone	10,000
GR82PP	Polypropylene	Polyethersulphone	5,000

[1] measured MWCO on typical dairy products

Spiral membrane designation

Example: **Alfa Laval GR73PE-6338/48**		
Alfa Laval GR73PE	=	Membrane type
63	=	Outer diameter of spiral (6.3")
38	=	Length of spiral (38") without ATD system
48	=	Thickness of feed spacer (48 mil)

Standard configurations

Size[1]		Dairy UF-PET membrane type and code number[2]			
Spiral	**Spacer**	**GR61PE**	**GR70PE**	**GR73PE**	**GR82PE**
2517	48	—	—	533663	533685
3838	48	—	—	533664	533687
	80	—	—	533666	533688
6338	30	—	517824	528943	529671
	48	516697	517829	528944	528912
	65	518475	—	531645	533689
	80	516742	517831	528945	529667
8038 (id 28.9)	30	533293	533299	529636	533690
	48	533294	533300	529972	533691
	65	533643	529937	529939	533692
	80	533295	533301	533667	533693
8338 (id 28.9)	30	533296	533302	533668	533694
	48	533297	533303	533669	—
	65	533644	533649	533670	533696
	80	533298	533304	533671	533697

[1] For other sizes, please contact Alfa Laval

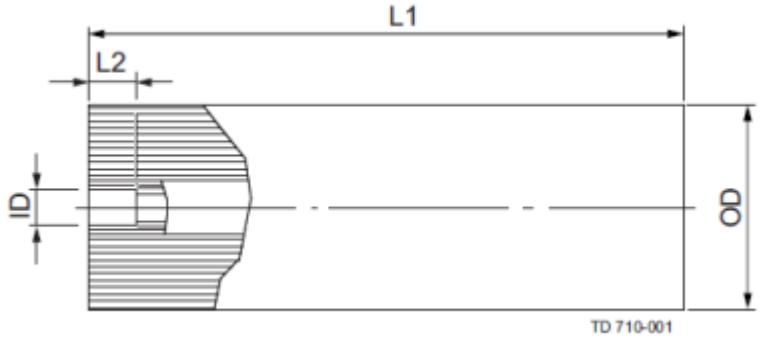
[2] Please specify code number when ordering

Size[1]		Dairy UF-pHt™ membrane type and code number[2]				
Spiral	**Spacer**	**GR60PP**	**GR61PP**	**GR70PP**	**GR73PP**	**GR82PP**
2517	48	517584	547585	—	533650	533672
2538	48	540985	528041	—	541048	541049
3838	30	—	516495	—	—	—
	48	516544	516496	—	530984	529872
	80	516545	516497	—	533652	533356
6338	30	516540	516435	519398	529017	533675
	48	516541	516436	519399	529018	533676
	65	519892	522547	524292	533653	533677
	80	516542	516437	—	529960	533678
8038 (id 28.9)	30	—	532021	—	533654	531934
	48	532015	—	—	533655	531628
	65	533633	—	—	533656	533679
	80	532016	—	533350	533657	531626
8338 (id 28.9)	30	532017	532024	533351	533658	533680
	48	532018	531981	533352	536559	533681
	65	533634	533641	533647	533660	533682
	80	532019	531982	533353	533661	533683

[1] For other sizes, please contact Alfa Laval

[2] Please specify code number when ordering

Dimensions



OD = outer diameter of spiral membrane
HD = nominal inner diameter of housing[1]
L1 = total length of spiral membrane without ATD
ID = diameter of ATD socket
L2 = depth of ATD socket

[1] For specific measurements of Alfa Laval housings please see the product specification

Standard sizes

Size[1]	Outer diameter (OD)		Housing diameter (HD)		Spiral length (L1)[2]		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	66.0	2.60	432	17.01	21.10	0.83	50.0	1.97
2538	64.0– 65.0	2.52– 2.56	66.0	2.60	965	37.99	21.10	0.83	50.0	1.97
3838	95.0– 96.5	3.74– 3.80	97.55	3.84	965	37.99	21.10	0.83	50.0	1.97
6338	160.0–162.0	6.30–6.38	163.10	6.42	965	37.99	28.90	1.14	76.0	2.99
8038	198.5–201.5	7.82– 7.93	204.14	8.04	965	37.99	28.90	1.14	76.0	2.99
8338	208.5–210.5	8.21–8.29	213.10	8.34	965	37.99	28.90	1.14	76.0	2.99

[1] For other sizes, please contact Alfa Laval

[2] Without ATD system

Cross-flow and pressure drop

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

Outer diameter:	2.5”		3.8”		6.3”		8.0”		8.3”	
Spacer thickness:	m^3/h	bar	m^3/h	bar	m^3/h	bar[1]	m^3/h	bar[2]	m^3/h	bar[2]
30 mil	—	—	7	1.1	17	1.1	19	0.9	21	0.9
48 mil	1.5	0.5	9	1.1	21	1.1	23	0.9	26	0.9
65 mil	—	—	—	—	25	1.1	27	0.9	31	0.9
80 mil	—	—	13	1.1	29	1.1	32	0.9	36	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

[1] During production at <50°C, 1.3 bar

[2] During production at <50°C, 1.1 bar

Recommended operating limits

Production	Dairy UF-PET	Dairy UF-pHt™
pH range (reference temperature 25°C)	2 — 9	2 — 10
Typical operating pressure, bar	<10	<10
Temperature, °C	5 — 50	5 — 75

Cleaning[1]	Dairy UF-PET (2 hours per day)	Dairy UF-pHt™ (3 hours per day)
pH range (reference temperature 25°C)	2 — 11.5	1 — 13
Typical pressure, bar	<4	<4
Temperature, °C	5 — 55	5 —70

[1] Please consult the Alfa Laval cleaning instructions and water quality specifications

Cleaning and sanitization limitations — caustic / chlorine	
GR61PP, GR61PE:	<200 ppm at 50°C, pH 10.5–11.0, max. ½ hour per day
GR60PP, GR70PP, GR70PE, GR73PP, GR73PE, GR82PP, GR82PE:	<200 ppm at 50°C, pH 10.5–11.0, max exposure: ppm x hours <25000 ppm hours

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.

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.

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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How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com