



Dairy RO FilmTec™ Hypershell™ Elements

Reverse Osmosis Elements for Dairy Processing Applications

Key Features

- Cost-effective milk, lactose and whey processing concentration solutions.
- Full-fit element configuration that minimizes stagnant areas for a sanitary design.
- A machined polypropylene rigid outer-shell, FilmTec™ Hypershell™ elements:
 - Do not deform and minimize channeling, which can lead to a reduction in premature element failure.
 - Have reduced bypass compared to conventional full-fit mesh wrapped elements, which may result in energy savings (see figure 1), improved product processing and efficient Clean In Place (CIP).
 - Enable safer and faster loading and removal from a system as the outer shell does not expand and preserves its shape during use.
 - Are identified with permanent laser etched model names and serial number.
- All components comply with FDA and EU food contact regulations, as well as halal and kosher certifications.

FilmTec™ Hypershell™ RO-390-FF

- FilmTec™ Hypershell™ RO-390-FF product is the industry's premier membrane for permeate polishing with more active area to maximize performance and reduce capital cost by requiring fewer elements for polishing applications.

Key Applications

- Dewatering and concentration of milk, whey protein and lactose to reduce product volume and enable savings on transportation and storage cost.
- Concentration of process streams to reduce evaporators loads and energy cost for powdered product production.
- Polishing of RO/NF permeate and/or evaporator condensate.

Feed Flow vs Pressure Drop

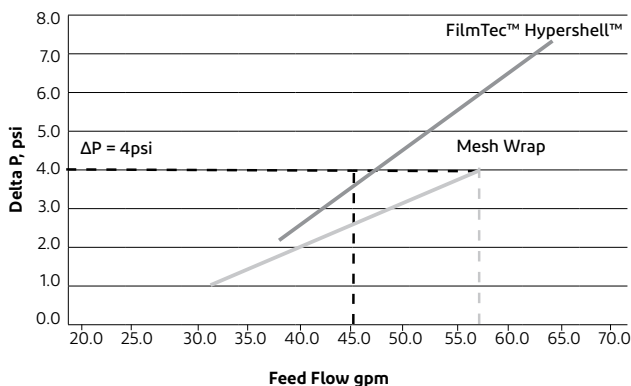


Figure 1: Feed Flow vs Pressure Drop for Mesh Wrap and FilmTec™ Hypershell™ Elements.

FilmTec™ Hypershell™ elements have less exterior fluid bypass and require approximately 30% less flow than conventional full-fit mesh wrapped elements for an equivalent pressure drop. This means more feed flows through the element for processing instead of around the element and through the mesh. This can result in up to 30% energy savings and up to 10% greater productivity, with higher crossflow velocity at the membrane surface.

The graph indicates the flow comparison at 4psi ΔP . Energy savings can be achieved by flow reduction.

Typical Properties

Element Name	Part Number	Active Area		Feed Spacer (mil)	Design Features
		(ft ²)	(m ²)		
FilmTec™ Hypershell™ RO-8038	302218	370	34.4	33	Outer shell Full Fit
FilmTec™ Hypershell™ RO-8038/48	360400	290	27.0	48	Outer shell Full Fit
FilmTec™ Hypershell™ RO-390-FF	346364	390	36.2	27	Outer shell Full Fit
FilmTec™ RO-3838/30-FF	80589	81	7.5	30	Mesh Wrap Full Fit
FilmTec™ RO-3840/30-FF	108664	85	7.8	30	Mesh Wrap Full Fit

Element Dimensions

Element Name	A		B		C	
	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
FilmTec™ Hypershell™ RO-8038 ¹	38.00	965	1.125	28.58	7.9	200
FilmTec™ Hypershell™ RO-8038/48 ¹	38.00	965	1.125	28.58	7.9	200
FilmTec™ Hypershell™ RO-390-FF ^{1,2}	40.00	1,016	1.125	28.58	7.9	200
FilmTec™ RO-3838/30-FF	38.00	965	0.831	21.10	3.8	96
FilmTec™ RO-3840/30-FF	38.75	984	0.831	21.10	3.8	96

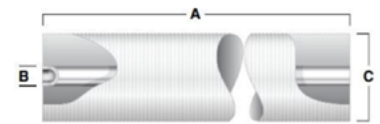
¹ FilmTec™ Hypershell™ Elements are designed to fit schedule 40, 8-inch stainless pipe (nominal 7.98-inch ID)

² FilmTec™ Hypershell™ 390 Elements are designed in an 8040 style with 1-inch exposed product water tube instead of a flush cut end on each side. Model 390 is not full sanitary design and should only be used when permeate is the product.

Suggested Operating Conditions

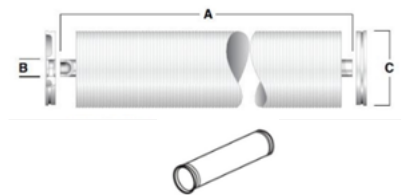
Maximum Operating Pressure	800 psig (54.8 bar)
Maximum Operating Temperature ^a	
pH 2 – 10	122°F (50°C)
Above pH 10	95°F (35°C)
pH Range	2 – 11
Free Chlorine Tolerance ^b	Non-detectable
Hydrogen peroxide usage limit ^b	
Continuous operation	20 ppm

Model 8038 / 3838 / 3840



For these models end caps, coupler, and O-rings are not included.

Model 390



For model 390 DuPont supplies two end caps (part number 113199) and one coupler (part number 255289) with each RO-390 element. Each coupler includes two 3-912 EPR O-rings (part number 151705)

Suggested Clean in Place (CIP) Limits

Maximum CIP Pressure	15 – 75 psig (1 - 5 bar)
Maximum CIP pH and Temperature ^a	
pH range 1.8 – 11 (reference temperature 25°C) ^c	122°F (50°C)
pH range 1.8 – 11.2 (reference temperature 25°C) ^c	113°F (45°C)
Hydrogen peroxide usage limit ^b	
Short-term cleaning (@77°F/25°C maximum) ^d	1,000 ppm

- Please consult DuPont's representative for operating and cleaning at different pH and temperature conditions. NF245XD elements could offer an eXtra Durability for extreme pH cleaning (case by case review).
- Under certain conditions, the presence of free chlorine and other oxidizers agents will cause premature membrane failure. DuPont recommends removing residual free chlorine using pretreatment, prior to membrane exposure.
- Refer to [Food Processing and Sanitary Elements Cleaning Guide](#) (Form No. 45 D01686 en).
And to [Temperature and pH best practices in preparation of Cleaning Solutions](#) (Form No. 45-D04358-en).
- Refer to [Sanitizing Membrane System](#) (Form No. 45-D01630-en)

Design Guidelines

Element Name	Max.recirculation cross-flow gpm (m ³ /h)	Max. element ΔP* Psi (bar)
FilmTec™ Hypershell™ RO-8038	80 (18.2)	13 (0.9)
FilmTec™ Hypershell™ RO-8038/48	80 (18.2)	13 (0.9)
FilmTec™ Hypershell™ RO-390-FF	80 (18.2)	13 (0.9)
FilmTec™ RO-3838/30-FF	30 (6.8)	15 (1.0)
FilmTec™ RO-3840/30-FF	30 (6.8)	15 (1.0)

*Maximum pressure drop across entire vessel is 60 psi (4.1 bar).

General Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Avoid static permeate-backpressure at all times.
- Any concentrate or permeate obtained from the first hour of operation should be discarded.
- The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.
- Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage.
- During start-up, a gradual change from a standstill to operating state is recommended as follows:
 - Feed pressure should be increased gradually over a 30-60 second time frame.
 - Cross-flow velocity at set operating points should be achieved gradually over 15-20 seconds.

Additional Important Information

Before use or storage, review these additional resources for important information:

- [Usage Guidelines for FilmTec™ 8" Elements](#) (Form No. 45-D01706-en)
- [Start-Up Sequence](#) (Form No. 45-D01609-en)
- [Storage and Shipping of New FilmTec™ Elements](#) (Form No. 45-D01633-en)

Product Stewardship

DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

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