



## FilmTec™ Hypershell™ Reverse Osmosis and Nanofiltration Elements

Sanitary Elements for Food and Dairy Applications

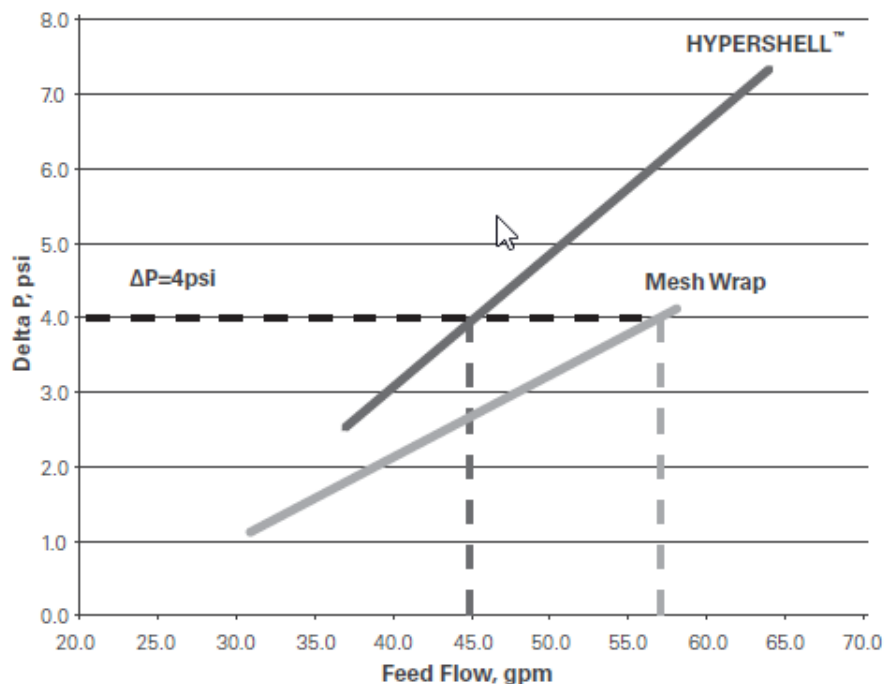


### Description

DuPont Water Solutions has combined three technologies into an advanced sanitary construction design for Food and Dairy processing applications: robust reverse osmosis (RO) and nanofiltration (NF) membrane sheet, precision automated element rolling, and a machined polypropylene hard outer shell.



- State-of-the-art design that minimizes channeling and prevents premature element failures throughout product lifetime.
- A rugged easy-to-handle outer shell for safer and faster loading and removal of elements from a system.
- Improved hydrodynamics through the element, compared to mesh wrapped, which results in energy savings (see figure 1) and more efficient processing and Clean In Place (CIP).

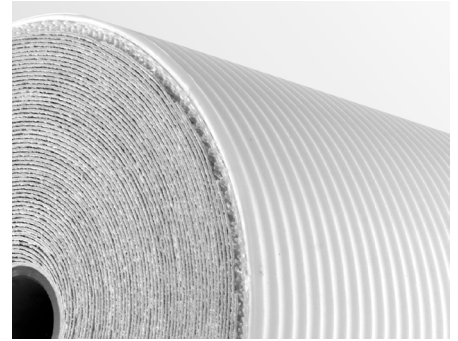


**Figure 1: Feed Flow vs Pressure Drop**

Pressure Drop versus Feed Flow for Mesh wrap and FilmTec™ Hypershell™ 8038 Elements. FilmTec™ Hypershell™ has less exterior bypassing and requires approximately 30% less flow than mesh wrap for an equivalent pressure drop. The graph indicates the flow comparison at 4psi delta P. Energy can be saved by reducing flow.

## Features

- FilmTec™ robust reverse osmosis (RO) and nanofiltration (NF) membrane sheet
- Precision automated rolling
- Machined polypropylene rigid outer shell with laser etched model names and serial numbers for easy, permanent identification.
- All materials of construction are compliant with U.S. Food and Drug Administration regulations for indirect contact with food. It is the responsibility of the user to meet any if there are additional regulatory requirements required for specific applications.
- All NF245 Elements contain an improved nanofiltration membrane sheet designed to reject organics with a molecular weight above 300 amu while passing monovalent salts.
- The FilmTec™ Hypershell™ RO-390 has more active area than competitive polishing elements to maximize performance and reduce capital cost by requiring fewer elements.



## Applications

- FilmTec™ Hypershell™ Reverse Osmosis (RO) Membrane Elements contain high-rejection FT30 membrane that has been successfully used to process a wide range of food, beverage, and dairy streams. These elements are especially effective in dewatering and product concentration.
- DuPont nanofiltration (NF) membrane elements are used by food and dairy processors for a variety of desalting, purification and other separations.
- FilmTec™ Hypershell™ 8038 Model Elements have trimmed leaves (tails) and are suitable for applications where concentrate and/or permeate is the desired product.
- FilmTec™ Hypershell™ 390 model is suitable for applications where the permeate is the desired product.
- FilmTec™ Hypershell™ RO-390 product is used in the industry for evaporator condensate polishing.

## Typical Properties

Product	Part Number	Design Active Area-ft2(m2)	Feed Spacer Thickness	Minimum ATD OD	ATD included
<b>Model 8038</b>					
FilmTec™ Hypershell™ RO-8038	302218	370 (34.4)	33	7.83"	No
FilmTec™ Hypershell™ RO-8038 (dry)	302219	370 (34.4)	33	7.83"	No
FilmTec™ Hypershell™ RO-8038/48	360400	290 (26.9)	48	7.83"	No
FilmTec™ Hypershell™ NF-8038	365935	370 (34.4)	33	7.83"	No
FilmTec™ Hypershell™ NF245-8038	336673	370 (34.4)	33	7.83"	No
<b>Model 390</b>					
FilmTec™ Hypershell™ RO-390	346364	395	27	7.83"	Yes
FilmTec™ Hypershell™ NF-390	371974	395	27	7.83"	Yes
FilmTec™ Hypershell™ NF245-390	371971	395	27	7.83"	Yes

## Dimensions

Model / Dimensions – inches (mm)	A	B	C
FilmTec™ Hypershell™ 8038 <sup>1</sup>	38.00 (965.0)	1.125 (28.58)	7.9 (200)
FilmTec™ Hypershell™ 390 <sup>1,2</sup>	40.00 (1,016)	1.125 (28.58)	7.9 (200)

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.

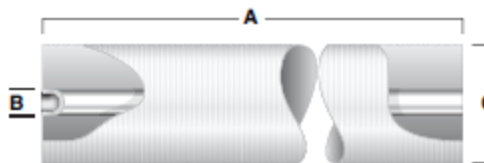


Figure 2: Model 8038

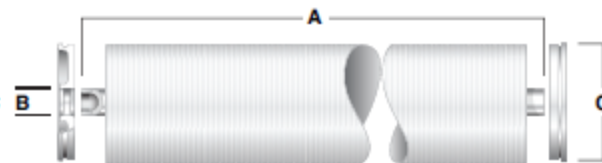


Figure 3: Model 390

## Operating and Cleaning Limits

Maximum Operating Pressure	800 psi (54.8 bar)
Maximum Operating Temperature	
pH 2-10	122oF (50oC)
above pH10	95oF (35oC)
pH Range	2 to 11
Free Chlorine Tolerance	Below detectable limits
Hydrogen Peroxide limit, continuous operation <sup>a,b</sup>	20ppm

## Clean-in-place (CIP) Parameters

Maximum CIP Pressure	15-75 psi (1-5 bar)
Maximum CIP Temperature	
pH 1.8 -11	122°F (50oC)
pH 1.8 -11.2	113oF (45oC)
pH Range	1.8 to 11.2
Free Chlorine Tolerance	Below detectable limits
Hydrogen Peroxide limit <sup>a,b</sup>	
Continuous operation	20ppm
Short-term cleaning	1,000ppm

- Please refer to [DuPont Food Processing and Sanitary Element Cleaning Guide](#) (Form No. 45-D01865-en) for more information.
- Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. DuPont Water Solutions recommends removing residual free chlorine using pretreatment, prior to membrane exposure. Please refer to [FilmTec™ Design Guidelines for multiple-element systems of 8-inch elements](#) (Form No. 45-D01695-en) for more information.

## Design Guidelines

Maximum Pressure Drop ( $\Delta P$ ) per Element	13 psi (0.9 bar)
Maximum Pressure Drop ( $\Delta P$ ) per Vessel	60 psi (4.1 bar)
Maximum cross-flow	80 gpm (18.2 m <sup>3</sup> /h)

## Important Start-up Information

New elements normally are cleaned prior to initial use. The cleaning procedure should be based on the application for which the elements are to be used. If cleaning with formulated agents is not available, an alkaline wash with a wetting agent is recommended prior to initial use. Please refer to [DuPont Food Processing and Sanitary Element Cleaning Guide](#) (Form No. 45-D01865-en) for more information.

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.
- Before initiating cross-flow at high permeate flux conditions (e.g., start-up with high-temperature water), the set operating pressure should be maintained for 5-10 minutes.
- Cross-flow velocity at set operating point should be achieved gradually over 15 - 20 seconds.

Avoid permeate-side backpressure at all times.

## General Information

Keep elements moist at all times after initial wetting.

To prevent biological growth during system shutdowns, it is recommended that elements be immersed in a preservative solution.

For successful operation of Reverse Osmosis (RO) and Nanofiltration (NF) membrane systems, the operation must follow the guidelines provided in the [FilmTec™ Reverse Osmosis / Nanofiltration Elements Operation Excellence and Limiting Conditions Tech Fact](#) (Form No. 45-D04388-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.

## Customer Notice

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont personnel are available to answer your questions and to provide reasonable technical support. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont.

Please be aware of the following:

- 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.
- Any concentrate or permeate obtained from the first hour of operation should be discarded.

**Have a question? Contact us at:**

[www.dupont.com/water/contact-us](http://www.dupont.com/water/contact-us)

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