



DOW HYPER SHELL™ Reverse Osmosis and Nanofiltration Elements



DOW HYPER SHELL™
Reverse Osmosis and
Nanofiltration Elements

Sanitary Elements for Food and Dairy Applications

Dow Water & Process 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).

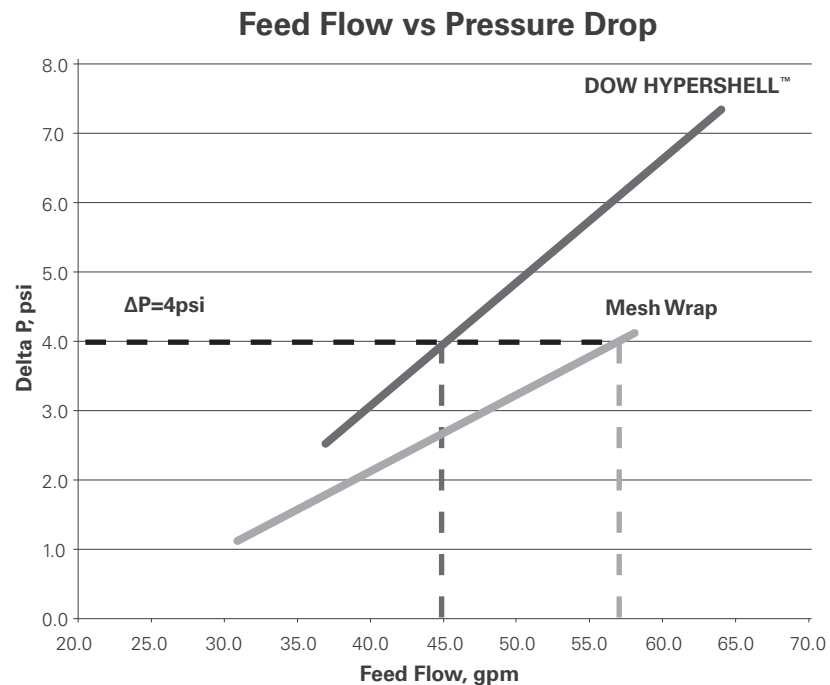


Figure 1. Pressure Drop versus Feed Flow for Mesh wrap and HYPER SHELL 8038 elements. HYPER SHELL™ has less exterior bypassing and requires approximately 30% less flow than mesh wrap for an equivalent pressure drop. The graph indicates the flow comparison at 4psi delta P. Energy can be saved by reducing flow.



Features

- DOW 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 DOW HYPER SHELL™ RO-390 has more active area than competitive polishing elements to maximize performance and reduce capital cost by requiring fewer elements.



Applications

- DOW HYPER SHELL™ 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.
- DOW nanofiltration (NF) membrane elements are used by food and dairy processors for a variety of desalting, purification and other separations.
- DOW HYPER SHELL™ 8038 model elements have trimmed leaves (tails) and are suitable for applications where concentrate and/or permeate is the desired product.
- DOW HYPER SHELL™ 390 model is suitable for applications where the permeate is the desired product.
- DOW HYPER SHELL™ RO-390 product is used in the industry for evaporator condensate polishing.

Product Specifications

Product	Part Number	Design Active Area-ft ² (m ²)	Feed Spacer Thickness	Minimum ATD OD	ATD included
Model 8038					
DOW HYPER SHELL™ RO-8038	302218	370 (34.4)	33	7.83"	No
DOW HYPER SHELL™ RO-8038 (dry)	302219	370 (34.4)	33	7.83"	No
DOW HYPER SHELL™ RO-8038/48	360400	290 (26.9)	48	7.83"	No
DOW HYPER SHELL™ NF-8038	365935	370 (34.4)	33	7.83"	No
DOW HYPER SHELL™ NF245-8038	336673	370 (34.4)	33	7.83"	No
Model 390					
DOW HYPER SHELL™ RO-390	346364	395	27	7.83"	Yes
DOW HYPER SHELL™ NF-390	371974	395	27	7.83"	Yes
DOW HYPER SHELL™ NF245-390	371971	395	27	7.83"	Yes

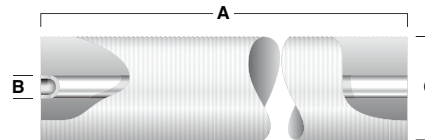
Sanitary Elements for Food and Dairy Applications

Dimensions

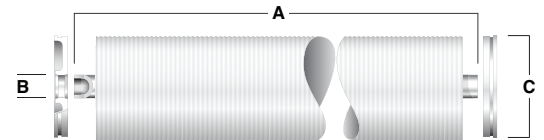
Model / Dimensions – inches (mm)	A	B	C
DOW HYPER SHELL™ 8038 ¹	38.00 (965.0)	1.125 (28.58)	7.9 (200)
DOW HYPER SHELL™ 390 ^{1,2}	40.00 (1,016)	1.125 (28.58)	7.9 (200)

1. DOW HYPER SHELL™ elements are designed to fit Schedule 40, 8 inch stainless pipe (nominal 7.98 inch ID).

2. DOW HYPER SHELL™ 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 8038



Model 390

Operating Parameters

Maximum Operating Pressure	800 psi (54.8 bar)
Maximum Operating Temperature	
pH 2-10	122°F (50°C)
above pH10	95°F (35°C)
pH Range	2 to 11
Free Chlorine Tolerance	Below detectable limits
Hydrogen Peroxide limit, continuous operation ^{a,b}	20ppm

Clean-in-place (CIP) Parameters

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

^aPlease refer to Dow Food & Dairy Cleaning Guide form 609-00077-0910 for more information.

^bUnder certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Dow Water & Process Solutions recommends removing residual free chlorine using pretreatment, prior to membrane exposure. Please refer to Technical Bulletin form 609-22010 for more information.

Design Guidelines

Maximum Pressure Drop (ΔP) per Element	13 psi (0.9 bar)
Maximum Pressure Drop (ΔP) per Vessel	60 psi (4.1 bar)
Maximum cross-flow	80 gpm (18.2 m ³ /h)

Sanitary Elements for Food and Dairy Applications

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 Dow Food & Dairy Cleaning Guide form 609-00077 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.

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

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.

Warranty Information

Reference warranty document 609-35010.

For more information about DOW HYPERSELL™ Reverse Osmosis and Nanofiltration Elements, including all scientific data and supporting reference materials, call the Dow Water & Process Solutions business:

North America: 1-800-447-4369
Latin America: (+55) 11-5188-9222
Europe: (+32) 3-450-2240

Pacific: +60 3 7958 3392
Japan: +813 5460 2100
China: +86 21 2301 1000

Or visit our website at dowwaterandprocess.com.

NOTICE: No freedom from any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. Dow assumes no obligation or liability for the information in this document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

