KOCH MEMBRANE SYSTEMS

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KMS HR™ FOOD & DAIRY RO ELEMENTS

Reverse Osmosis 4" and 8" Spiral Element Series

PRODUCT DESCRIPTION

Membrane Chemistry:	Proprietary TFC® polyamide
Membrane Type:	HR™ - High rejection reverse osmosis
Construction:	Sanitary spiral wound with net outerwrap
Regulatory Status:	Conform to USDA 3-A standards and FDA regulations (CFR Title 21)
Applications:	Concentration of whey, skim or whole milk, UF permeate/lactose, juices. Polishing of RO permeate and evaporator condensate. Polishing of water for reuse.
Options:	Diameter: 3.8 or 7.9"
	Length: 38" or 39"
	Feed Spacer: N (31 mil) or V (46 mil)
	Outerwrap: Controlled (e.g. NYV) or trimmable (e.g. NYT)

NOMINAL PERFORMANCE

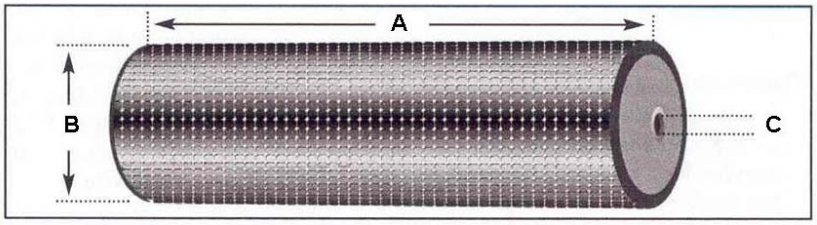
Part Numbers	Model	Active Membrane Area ft²	Active Membrane Area (m²)	Feed Spacer mil	Feed Spacer (mm)
8383800	3838 HR-NYV	76	(7.1)	31	(0.8)
8383900	3839 HR-NYV	76	(7.1)	31	(0.8)
8383802	3838 HR-VYV	61	(5.7)	46	(1.1)
8383903	3839 HR-VYV	61	(5.7)	46	(1.1)
8803805	8038 HR-NYV	371	(34.5)	31	(0.8)
8803811	8038 HR-NYT	371	(34.5)	31	(0.8)
8803806	8038 HR-VYV	291	(27.0)	46	(1.1)

OPERATING AND DESIGN INFORMATION*

Typical Operating Pressure:	300 - 600 psi (20.7 – 41.4 bar)
Maximum Operating Pressure:	650 psi (44.8 bar)
Operating Temperature Range:	40 - 122°F (5 - 50°C)
Cleaning Temperature Range:	95 - 122°F (35 - 50°C)
Allowable pH - Continuous Operation:	4.0 - 10.0
Allowable pH - Clean-In-Place (CIP):	1.8 - 11.0
Design Pressure Drop Per Element:	6 - 10 psi (0.4 - 0.7 bar)
Design Pressure Drop Per Vessel:	30 - 50 psi (2.1 - 3.4 bar)

* Consult KMS Process Technology Group for specific applications.

NOMINAL DIMENSIONS



Part Numbers	Model	A inches (mm)	B inches (mm)	C inches (mm)
8383800	3838 HR-NYV	38.0 (965)	3.8 (96.0)	0.831 (21.1)
8383900	3839 HR-NYV	38.8 (984)	3.8 (96.0)	0.831 (21.1)
8383802	3838 HR-VYV	38.0 (965)	3.8 (96.0)	0.831 (21.1)
8383903	3839 HR-VYV	38.8 (984)	3.8 (96.0)	0.831 (21.1)
8803805	8038 HR-NYV	38.0 (965)	7.9 (201.0)	1.125 (28.6)
8803811	8038 HR-NYT	38.0 (965)	7.9 (201.0)	1.125 (28.6)
8803806	8038 HR-VYV	38.0 (965)	7.9 (201.0)	1.125 (28.6)

Membrane Characteristics:

- HR High Rejection elements provide high flux and high rejections (typically >99.95% protein and lactose rejection).

Operating Limits:

- **Operating Pressure:** Maximum operating pressure for HR membranes is 650 psi (44.8 bar). Actual operating pressure is dependent upon system flux rate (appropriate for feed source) as well as feed, recovery and temperature conditions.
- **Permeate Pressure:** Permeate pressure should not exceed baseline (concentrate) pressure at any time (including online, off-line and during transition). Reverse pressure will damage the element.
- **Differential Pressure:** Maximum differential pressure limit is 10 psi (0.7 bar) per element and 50 psi (3.4 bar) for any length vessel.
- **Temperature:** Maximum operating and cleaning temperature is 122°F (50°C).
- **pH:** Allowable range for continuous operation is 4.0 to 10.0. Allowable range for cleaning is 1.8 to 11.0.

Water Quality for Cleaning & Diafiltration:

- **Turbidity and SDI:** Maximum feed turbidity is 1 NTU. Maximum feed Silt Density Index (SDI) is 5.0 (15-minute test).
- **Guidelines:** Please refer to the KMS "Water Quality Guidelines for CIP and Diafiltration" for more detailed information.

Chlorine and Chemical Exposure:

- Maximum continuous chlorine exposure limit is 0.1 ppm.
- Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or similar oxidizers in the feed.
- Chlorine tolerance for HR membranes may be significantly reduced if catalyzing metals such as iron are present or if the feed pH and/or temperature conditions are different than stated.
- KMS recommends removing residual free chlorine prior to membrane exposure to prevent premature membrane failure.

Cationic Polymers and Surfactants:

HR membranes may be irreversibly fouled if exposed to cationic (positively charged) polymers or surfactants. Exposure to these chemicals during operation or cleaning is not recommended and will void the warranty.

Lubricants:

For element installation, use only water or glycerin to lubricate seals. The use of petroleum or vegetable-based oils or solvents may damage the element and will void the warranty.

Supplemental Technical Bulletins:

- RO/NF Element Cleaning Procedures
- Water Quality Guidelines for CIP and Diafiltration

Service and Ongoing Technical Support:

Koch Membrane Systems (KMS) has an experienced staff of professionals available to assist end-users and OEMs for optimization of existing systems and support with the development of new applications. Along with the availability of supplemental technical bulletins, KMS also offers a complete line of KOCHKLEEN® cleaning and maintenance chemicals.

KMS Capability

KMS is the leader in crossflow membrane technology, manufacturing reverse osmosis, nanofiltration, microfiltration, and ultrafiltration membranes and membrane systems. The industries we serve include food, dairy and beverage, semiconductors, automotive, water and wastewater, chemical and general manufacturing. KMS adds value by providing top quality membrane products and by sharing our experience in the design and supply of thousands of crossflow membrane systems worldwide.