KOCH MEMBRANE SYSTEMS

KMS HFM™-180 FOOD & DAIRY UF ELEMENTS

Sanitary Ultrafiltration Spiral Elements

PRODUCT DESCRIPTION

Membrane Chemistry:	Proprietary semi-permeable polyvinylidene difluoride (PVDF)
Membrane Type:	HFM™-180 with observed separation range of 100,000 daltons
Construction:	Sanitary spiral wound element with polysulfone permeate tube and net outer wrap
Regulatory Status:	Conform to USDA 3-A standards and FDA regulations (CFR Title 21)
Options:	Diameter: 3.8", 4.3", 6.3", 8.0", or 8.3"
	Length: 33" or 38"
	Feed Spacer: N (31 mil) or V (46 mil)
	Outer wrap: Controlled (e.g. NYV) or trimmable (e.g. NYT)

SPECIFICATIONS

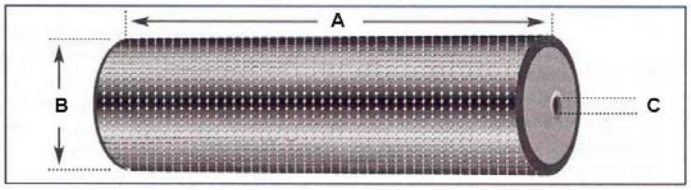
Model	Active Membrane Area NYV/T Spacer (31 mil) ft^2	(m^2)	VYV/T Spacer (46 mil) ft^2	(m^2)
3838 HFM-180	-	-	49	(4.6)
4333 HFM-180	-	-	66	(6.1)
6338 HFM-180	208	(19.4)	169	(15.7)
8338 HFM-180	-	-	290	(26.9)

OPERATING AND DESIGN INFORMATION*

Typical Operating Pressure:	30 - 120 psi (2.1 - 8.3 bar)
Maximum Operating Pressure:	140 psi (9.7 bar)
Recommended Operating Temperature Range:	41 - 130°F (5 - 54°C)
Maximum Operating Temperature:	
At pH 6.0 - 7.5:	150°F (65.5°C)
At pH 3.5 - 6.0:	140°F (60°C)
At pH 2.0 - 3.5 and 7.5 – 10.0:	130°F (54°C)
Cleaning Temperature Range:	105 - 130°F (40 - 54°C)
Allowable pH - Continuous Operation:	2.5 - 10.5
Allowable pH - Clean-In-Place (CIP):	1.5 - 11.0
Design Pressure Drop Per Element:	N spacer: 12-15 psi (0.8-1.0 bar) V spacer: 15-20 psi (1.0-1.4 bar)
Design Pressure Drop Per Vessel (3 in series):	N spacer: 36-45 psi (2.5-3.1 bar) V spacer: 45-60 psi (3.1-4.1 bar)
Design Pressure Drop Per Vessel (4 in series):	N spacer: 48-60 psi (3.3-4.1 bar) V spacer: 60-75 psi (4.1-5.2 bar)

* Consult KMS Process Technology Group for specific applications.

NOMINAL DIMENSIONS



Model	A inches (mm)		B inches (mm)		C inches (mm)	
3838 HFM-180	38.0	(965)	3.8	(96)	0.831	(21.1)
4333 HFM-180	33.0	(838)	4.3	(109)	0.831	(21.1)
6338 HFM-180	38.0	(965)	6.3	(160)	1.138	(28.9)
8338 HFM-180	38.0	(965)	8.3	(211)	1.138	(28.9)

Notes: Dimensions are provided for reference only and should not be interpreted as accurate specifications.

Membrane Characteristics:

- The membrane used in these modules consists of a semipermeable polyvinylidene difluoride (PVDF) layer cast on backing material.
- Pure water flux of these HFM-180 membranes is 2.0-4.0 gfd/psi (50-100 l/m^2/h/bar) at 77°F (25°C).

Operating Limits:

- Operating Pressure: Maximum operating pressure is 140 psi (9.7 bar).
- Permeate Pressure: Permeate pressure should not exceed baseline (concentrate) pressure at any time (including on-line, off-line and during transition). Reverse pressure will damage the membrane.
- Differential Pressure: The maximum differential pressures per element are listed on the front of this document, including design values for multi-element housings.
- Temperature: Maximum operating temperature is 150°F (65.5°C). Refer to the "Operating and Design Information" section on the front of this document for detailed information. Maximum cleaning temperature is 130°F (54°C).
- pH: Allowable range for continuous operation is 2.5 to 10.5. Allowable pH range for cleaning is 1.5 to 11.0.

Water Quality for Cleaning & Diafiltration:

- Guidelines: Please refer to the KMS "Water Quality Guidelines for CIP and Diafiltration" for more detailed information.

Chlorine and Chemical Exposure:

- Adherence to cleaning and sanitizing procedures including chemical concentrations, pH, temperature, and exposure time is necessary to achieve maximum useful element life. Accurate records should be maintained.
- KMS standard cleaning procedures for dairy applications should be followed. Recommended chlorine exposure time at the defined conditions is 30 minutes per day.
- Residual chlorine concentration during cleaning cycle (CIP) should be 150 ppm @ pH 10.5 or higher. Chlorine concentration should never exceed 200 ppm.
- Chlorine should only be added to the cleaning solution after the pH has been adjusted to 10.5 or higher.
- Iron or other catalyzing metals in the presence of free chlorine or hydrogen peroxide will accelerate membrane degradation.
- Sanitizing should be done only after a complete cleaning cycle and with water of acceptable quality. Refer to cleaning instructions and feedwater quality technical bulletins.

Cationic Polymers and Surfactants:

HFM-180 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:

- UF Element Cleaning Procedures
- Water Quality Guidelines for CIP and Diafiltration

Service and Ongoing Technical Support:

KMS has an experienced staff available to assist end-users and OEM's for optimization of existing systems and development of new applications. KMS also offers a complete line of KOCHKLEEN® membrane pretreatment, 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, semiconductor, automotive, water and wastewater, chemical and general manufacturing. KMS adds value by providing top quality membrane products and sharing our experience in the design and supply of thousands of crossflow membrane systems worldwide.

Koch Membrane Systems, Inc., www.kochmembrane.com

Corporate Headquarters: 850 Main Street, Wilmington, Massachusetts 01887-3388, US, Tel. Toll Free: 1-888-677-5624, Telephone: 1-978-694-7000, Fax: 1-978-657-5208
European Headquarters: Koch Chemical Technology Group Ltd., Units 3-6, Frank Foley Way, Stafford ST16 2ST, GB, Telephone: +44-178-527-2500, Fax: +44-178-522-3149

• Aachen DE • Lyon FR • Madrid ES • Milan IT • Wijnegem BE • Beijing & Shanghai CN • Mumbai & Chennai IN • Melbourne & Sydney AU • Singapore • Sao Paulo BR • Manama BH •