



# FOOD & DAIRY UF ELEMENTS

## Ultrafiltration 4" and 8" Spiral Elements with Stainless Steel Permeate Tube

<b>PRODUCT DESCRIPTION</b>	<b>Membrane Chemistry:</b>	HFK™-131 and HFK™-328: Proprietary polyethersulfone (PES) HFM™-180: Proprietary polyvinylidene fluoride (PVDF)
	<b>Membrane Type:</b>	HFK-131 with observed separation range of 10,000 Daltons HFK-328 with observed separation range of 5,000 Daltons HFM-180 with observed separation range of 100,000 Daltons
	<b>Construction:</b>	Sanitary spiral wound with stainless steel permeate tube
	<b>Regulatory Status:</b>	HFK-131, HFK-328 spirals are compliant with US FDA CFR Title 21, EC Reg. No. 1935/2004, EU Reg. No 10/1011 and are Halal-certified by the Islamic Food and Nutrition Council of America (IFANCA). HFM-180 spirals are compliant with US FDA CFR Title 21
	<b>Options:</b>	Fold Protection: XL-1000™ fused fold protection (e.g. XL) or standard Outer wrap: Controlled (e.g. VSV) or trimmable (e.g. VST) Element diameter: 4.3 inch or 8.3 inch Feed Spacer: N (31 mil), V (43 mil) or F (80 mil)

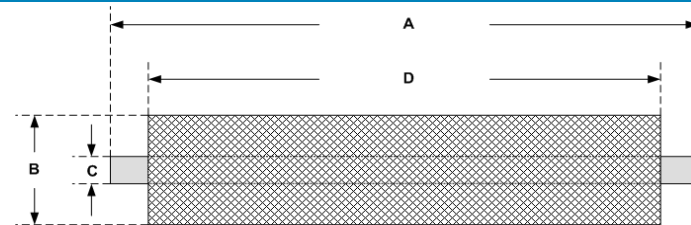
SPECIFICATIONS	KPN	Model	Active Membrane Area		Feed Spacer
			ft <sup>2</sup>	(m <sup>2</sup> )	mil (mm)
	0700290	4333 K131-VSV	76	(7.1)	43 (1.1)
	0700291	4333 K131-FSV	47	(4.4)	80 (2.0)
	0701324	XL 4333 K131-NSV	90	(8.4)	31 (0.8)
	0701290	XL 4333 K131-VSV	75	(7.0)	43 (1.1)
	0701291	XL 4333 K131-FSV	46	(4.3)	80 (2.0)
	0700755	4333 K328-VSV	78	(7.3)	43 (1.1)
	0700319	4333 M180-VSV	72	(6.7)	43 (1.1)
	0701746	XL 8333 K131-VST	263	(24.4)	43 (1.1)

### OPERATING AND DESIGN INFORMATION\*

Typical Operating Pressure:	30 - 120 psi (2.1 - 8.3 bar)
Maximum Operating Pressure:	140 psi (9.7 bar)
General Operating Temperature Range:	41 - 131°F (5 - 55°C)
For the M100 and M180, 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 - 122°F (40 - 50°C)
Allowable pH - Continuous Operation:	2.5 - 10.0
Allowable pH - Clean-In-Place (CIP):	1.8 - 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) F spacer: 15-25 psi (1.0-1.7 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) F spacer: 45-75 psi (3.1-5.2 bar)
Design Pressure Drop Per Vessel (4 in series):	N spacer: 48-60 psi (3.3-4.1 bar) V spacer: 60-68 psi (4.1-4.7 bar)

\* Consult KMS Process Technology Group for specific applications.

### NOMINAL DIMENSIONS\*



\* Dimensions are provided for reference only and should not be interpreted as accurate specifications.

Model	A	B	C	D
	inches (mm)	inches (mm)	inches (mm)	inches (mm)
4333 models	37.0 (940)	4.3 (109)	0.811 (20.6)	33.0 (838)
8333 models	36.7 (933)	8.3 (211)	1.632 (41.5)	33.0 (838)

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### Membrane Characteristics:

- The membrane used in these elements consists of a semipermeable polymer layer (PES or PVDF) on a polyester backing material.
- Pure water flux of these PES HFK membranes is 1.0-2.2 gfd/psi (24-53 l/m<sup>2</sup>/h/bar) at 77°F (25°C).
- Pure water flux of these HFM-180™ membranes is 2.0-4.0 gfd/psi (50-100 l/m<sup>2</sup>/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 online, off-line and during transition). Reverse pressure will damage the membrane.
- **Differential Pressure:** The maximum differential pressure per element is listed on the front of this document, including design values for multi-element housings.
- **Temperature:** Maximum operating temperature is 131°F (55°C), maximum cleaning temperature is 122°F (50°C). Higher operating temperature may be allowed for the M100 and M180 spirals at specific pH ranges.
- **pH:** Allowable range for continuous operation is 2.5 to 10.0. Allowable pH 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 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:

- 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 (Positively Charged) Polymers and Surfactants:

HFK 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:

Koch Membrane Systems (KMS) has an experienced staff of professionals available to assist end-users and OEM's 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™ 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, 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.

*The information contained in this publication is believed to be accurate and reliable, but is not to be construed as implying any warranty or guarantee of performance. We assume no responsibility, obligation or liability for results obtained or damages incurred through the application of the information contained herein. Refer to Standard Terms and Conditions of Sale and Performance Warranty documentation for additional information.*

**LENNTECH**

info@lenntech.com Tel. +31-152-610-900

www.lenntech.com Fax. +31-152-616-289

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