DATASHEET

KOVALUS Separation Solutions™

Sani-Pro® HRX™ High Temperature RO Elements

Reverse Osmosis Sanitary Spiral Elements for High Pressure and High Temperature Operation

PRODUCT DESCRIPTION

Membrane Chemistry:	Proprietary TFC® polyamide
Membrane Type:	HRX high rejection reverse osmosis for high pressure and high temperature operation
Construction:	Sanitary spiral wound elements with controlled OD net Outerwrap with two BAND-TITE® reinforcement straps
Regulatory Status:	Compliant with US FDA CFR Title 21, EC Reg. No. 1935/2004, and EU Reg. No. 10/2011. Halal-certified by the Islamic Food and Nutrition Council of America (IFANCA).
Applications:	Concentration of whey, skim or whole milk, UF permeate/lactose; Polishing of RO permeate and evaporator condensate; Polishing of water for reuse; Fruit juice concentration.

NOMINAL SPECIFICATIONS

	Membrane Area*		
Model	**30-mil Spacer ft² (m²)**	**45-mil Spacer ft² (m²)**	**62-mil Spacer ft² (m²)**
HP 3838 HRX HT	76 (7.1)	61 (5.7)	49 (4.6)
HP 8038 HRX HT	380 (35.3)	300 (27.9)	213 (19.8)

OPERATING AND DESIGN INFORMATION*

Typical Operating Pressure:	300 - 800 psi (20.7 – 55 bar)
Maximum Operating Pressure:	1000 psi (69 bar)
Operating Temperature Range:	40-158°F (5-70°C)
Design Pressure Drop:	6 - 10 psi (0.4 - 0.7 bar) per element
Design Pressure Drop:	30 - 50 psi (2.1 - 3.4 bar) per vessel
Allowable pH – Continuous Operation:	4.0 - 10.0

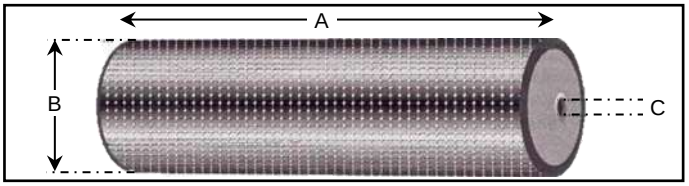
* Follow the Operating Envelope for HP RO-HT Sanitary Elements guidelines in the second page of this document

CLEANING AND HOT WATER SANITIZATION INFORMATION*

Typical Cleaning Pressure:	75 - 100 psi (5.2 – 6.9 bar)
Maximum Cleaning Pressure:	150 psi (10.3 bar) at 140°F (60°C) or below
Maximum Cleaning Temperature:	140°F (60°C)
Design Pressure Drop During Cleaning:	6 - 10 psi (0.4 - 0.7 bar) per element
Design Pressure Drop During Cleaning:	30 - 50 psi (2.1 - 3.4 bar) per vessel
Allowable pH - Clean-In-Place (CIP):	1.8 - 11.0
Maximum Temperature - Hot Water Sanitization:	185°F (85°C)
Allowable pH - Hot Water Sanitization:	4.0 - 8.0 above 140°F (60°C)
Maximum Pressure - Hot Water Sanitization:	30 psi (2.1 bar)
Maximum Pressure Drop Per Element - Hot Water Sanitization:	2 psi (0.15 bar)
Maximum Pressure Drop Per Vessel - Hot Water Sanitization:	10 psi (0.7 bar)
Hot Water Sanitization Cycles - Maximum Frequency and Duration:	One cycle per day, 30 minutes per cycle

* Consult KSS Process Technology Group for specific applications

NOMINAL DIMENSIONS



	A		B		C	
Model	**inches**	**mm**	**inches**	**mm**	**inches**	**mm**
3838	38.0	965	3.8	96	0.831	21.1
8038	38.0	965	7.9	201	1.125	28.6

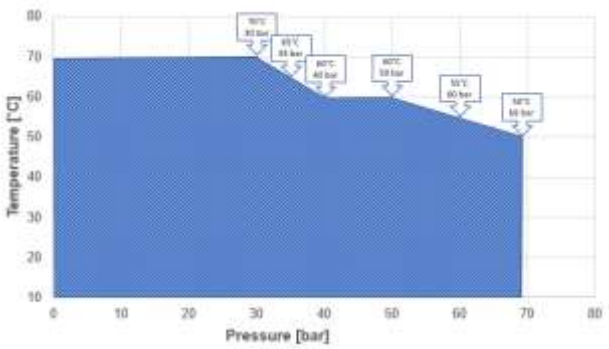
OPERATING GUIDELINES

Membrane Characteristics:

Sanitary High Temperature RO Elements (HP RO-HT) are selected when high rejection to organic and inorganic material is the objective and operating at high pressure and hot water sanitization are required.

Operating Limits:

- **Operating Pressure:** The maximum operating pressure for the HP RO-HT elements is listed in the first page of this document. When operating above 435 psi (30 bar) temperature should be limited as shown in the Operating Envelope for HP RO-HT Sanitary Elements chart. Actual operating pressure is dependent upon system flux rate, as well as feed, concentration and temperature conditions.
- **Operating Envelope for HP RO-HT Sanitary Elements**



- **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 listed in the first page of this document. Please follow the specified limits for each operating mode (Process, Cleaning or Hot water sanitization).

  Temperature: Maximum operating temperature is 158°F (70°C). Maximum cleaning temperature is 140°F (60°C). Maximum temperature for hot water sanitization is 185°F (85°C).
  Do not exceed 5°C (9°F) per minute above 131°F (55°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:** Refer to the KSS "Water Quality Guidelines for CIP and Diafiltration" for 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 must be maintained.
- KSS recommends removing residual free chlorine prior to membrane exposure to prevent premature membrane failure.
- Sodium metabisulfite (without catalysts such as cobalt) is the preferred chemical to eliminate free chlorine or similar oxidizers in the feed.
- Iron or other catalyzing metals in the presence of oxidizers such as hydrogen peroxide or peracetic acid are known to accelerate membrane degradation.

Cationic Polymers and Surfactants:

Sanitary HP RO-HT 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

KSS-Assist® Service and Ongoing Technical Support:

KSS 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, KSS also offers a complete line of cleaning and maintenance chemicals.

KSS Capability:

KSS 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. KSS 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.

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