KOCH MEMBRANE SYSTEMS

FLUID SYSTEMS® TFC® - HF 4" ELEMENT

High Rejection, High Flow Seawater RO Element

PRODUCT DESCRIPTION

Membrane Chemistry:	Proprietary TFC® polyamide
Membrane Type:	TFC®-HF membrane
Construction:	Spiral wound with fiberglass outerwrap
Applications:	Seawater desalination

SPECIFICATIONS

Part Number	Model	Permeate Flow gpd	Permeate Flow (m^3/d)	Chloride Rejection percent	Active Membrane Area ft^2	Active Membrane Area (m^2)	Feed Spacer mil	Feed Spacer (mm)
8182002	4040-HF	1,760	(6.6)	99.7	74	(6.9)	31	(0.8)

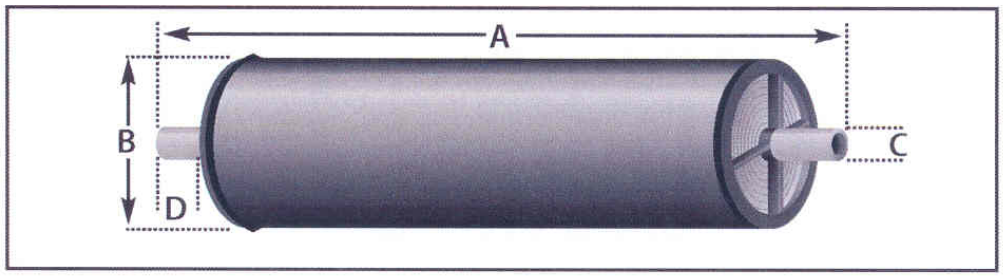
Test Conditions: 32,800 mg/l NaCl solution (isosmotic to ASTM standard seawater) at 800 psi (5,520 kPa) applied pressure, 7% recovery, 77°F (25°C) and pH 7.5

OPERATING AND DESIGN INFORMATION*

Typical Operating Pressure:	750 - 950 psi (5,175 - 6,555 kPa)
Maximum Operating Pressure:	1,000 psi (6,896 kPa)
Maximum Operating Temperature:	113°F (45°C)
Maximum Cleaning Temperature:	113°F (45°C)
Maximum Continuous Free Chlorine:	<0.1 mg/l
Allowable pH – Continuous Operation:	4 - 11
Allowable pH – Short Term Cleaning:	2.5 - 11
Maximum Differential Pressure Per Element:	10 psi (69 kPa)
Maximum Differential Pressure Per Vessel:	60 psi (414 kPa)
Maximum Feed Turbidity:	1 NTU
Maximum Feed SDI (15 minute test):	5

* Consult Process Technology Group for specific information.

NOMINAL DIMENSIONS AND WEIGHT*



Model	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	Weight lbs (kg)	Part Numbers Interconnector	O-ring	Brine Seal
4040-HF	40 (1,016)	4 (101.6)	0.75 (19.0)	1.0 (25.4)	10 (4.5)	0035267	0035458	0035702

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

Performance:

Performance specifications shown on the front side of this document are nominal values. Individual element permeate flows may vary ±15% from the values shown. Minimum rejection is 99.3% at the conditions shown.

System performance should be predicted using KMS ROPRO® software. Element performance is based on the nominal values shown.

System operating data should be normalized and key performance parameters tracked using KMS NORMPRO® software.

Operating Limits:

- Operating Pressure: Maximum operating pressure is 1,000 psi (6,896 kPa). Typical operating pressure for TFC®-HF systems is in the range of 750 psi (5,175 kPa) to 950 psi (6,555 kPa). Actual operating pressure is dependent upon system flux rate (appropriate for feed source) as well as feed salinity, recovery and temperature conditions.
- Permeate Pressure: Permeate pressure should not exceed feed-concentrate pressure by more than 5 psi (34 kPa) at any time (on-line, off-line and during transition).
- Differential Pressure: Maximum differential pressure limits are 10 psi (69 kPa) per element. Maximum differential pressure for pressure vessel is 60 psi (414 kPa).
- Temperature: Maximum operating temperature is 113°F (45°C). Maximum cleaning temperature is 113°F (45°C).
- pH: Allowable range for continuous operation is pH 4-11. Allowable range for short term cleaning is pH 2.5-11. It is recommended to limit the exposure of the TFC-HF membrane to the extended pH range to 4 hours, once per month.
- Turbidity and SDI: Maximum feed turbidity is 1 NTU. Maximum feed Silt Density Index (SDI) is 5.0 (15 minute test). Experience has shown that feedwater with turbidity greater than 0.2 NTU generally results in frequent cleanings.
- Recovery: Maximum recovery is site and application specific. In general, single element recovery is approximately 7% per element. Recovery limits should be determined using KMS ROPRO program.

Chemical Tolerance:

- Chlorine:
  Exposure of TFC-HF membrane to free chlorine or other oxidizing agents such as permanganate, ozone, bromine and iodine is not recommended. TFC-HF membrane has a free chlorine tolerance of approximately 1,000 ppm-hours based on testing at 77°F (25°C), pH 8. This tolerance may be significantly reduced if catalyzing metals such as iron are present or if the pH and/or temperature are different. Sodium metabisulfite (without catalysts such as cobalt) is the preferred reducing agent. TFC-HF membrane has a chloramine tolerance of approximately 60,000 ppm-hours in the absence of free chlorine based on testing at 77°F (25°C), pH 8.
- Cationic Polymers and Surfactants:
  TFC-HF membrane may be irreversibly fouled if exposed to cationic (positively charged) polymers or surfactants. Exposure to these chemicals during operation or cleaning is not recommended.

Lubricants:

For element loading, use only approved silicone lubricant, water, or glycerin to lubricate O-rings and brine seals. The use of petroleum based lubricants or vegetable based oils may damage the element and void the warranty.

Service and Ongoing Technical Support:

KMS has an experienced staff of professionals available to assist endusers, 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 KOCHTREAT® and KOCHKLEEN® RO pretreatment and maintenance chemicals.

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