

# FLUID SYSTEMS® TFC™ ULP™ 8" Elements

High Rejection, Ultra Low-Pressure RO Elements for Brackish Water

## PRODUCT DESCRIPTION

<b>Membrane Chemistry:</b>	Proprietary TFC polyamide
<b>Membrane Type:</b>	TFC ULP ultra low pressure membrane TFC ULP-HF ultra low pressure, high flow membrane
<b>Construction:</b>	Spiral wound with fiberglass outerwrap
<b>Applications:</b>	High rejection low energy reverse osmosis brackish water treatment
<b>Regulatory Status:</b>	KPN 8882304: Certified to NSF/ANSI/CAN 61

## SPECIFICATIONS

KSS Part Number	Model	Permeate Flow gpd (m³/d)	Chloride Rejection percent	Feed Spacer mil (mm)	Active Membrane Area ft² (m²)
8882304	8040-ULP-400	11,095 (42.0)	99.2	28 (0.7)	400 (37.2)
8882307	8040-ULP-400-34	11,095 (42.0)	99.2	34 (0.9)	400 (37.2)
8882305	8040-ULP-440-28	12,300 (46.5)	99.2	28 (0.7)	440 (40.9)
8882306	8040-ULP-HF-400	14,050 (53.2)*	99.0	28 (0.7)	400 (37.2)

Test Conditions: 2,000 mg/l NaCl solution at 150 psi (1,034 kPa) applied pressure, 15% recovery, 77°F (25°C) and pH 7.5

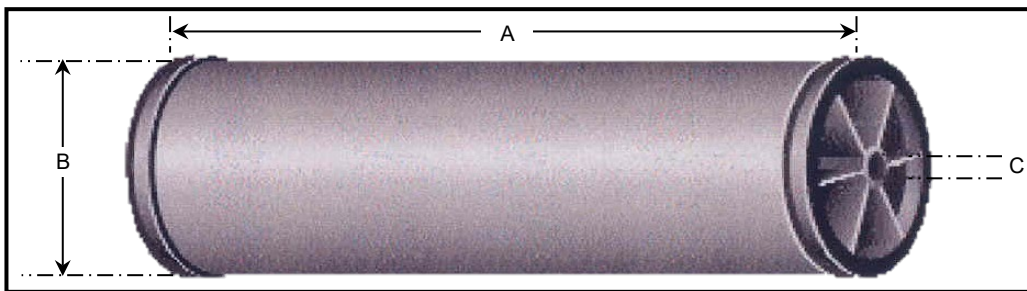
\*10,570 gpd (40.0 m³/d) if tested at 500 mg/l NaCl solution at 100 psi (689 kPa) applied pressure, 15% recovery, 77°F (25°C) and pH 7.5

## OPERATING AND DESIGN INFORMATION\*

<b>Typical Operating Pressure:</b>	100 - 175 psi (690 - 1,210 kPa)
<b>Maximum Operating Pressure:</b>	350 psi (2,400 kPa)
<b>Maximum Operating Temperature:</b>	113°F (45°C)
<b>Maximum Cleaning Temperature:</b>	113°F (45°C)
<b>Maximum Continuous Free Chlorine:</b>	<0.1 mg/l
<b>Allowable pH – Continuous Operation:</b>	4 - 11
<b>Allowable pH – Short Term Cleaning:</b>	2.5 - 11
<b>Maximum Differential Pressure per Element:</b>	10 psi (69 kPa)
<b>Maximum Differential Pressure per Vessel:</b>	60 psi (414 kPa)
<b>Maximum Feed Turbidity:</b>	1 NTU
<b>Maximum Feed SDI (15 minute test):</b>	5

\*Consult KSS Process Technology Group for specific information

## NOMINAL DIMENSIONS



Model	A		B		C		Part Numbers		
	inches	mm	inches	mm	inches	mm	Interconnector	O-ring	Brine Seal
All models	40	1,016	8	203	1.125	29	0035260	0035464	0030584

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

## OPERATING GUIDELINES

**Performance:**

Performance specifications shown on the front side of this document are nominal values. Individual element permeate flows may vary +20/-15% from the values shown. Minimum chloride ion rejection is 99.0% at the conditions shown.

**Operating Limits:**

- **Operating Pressure:** Maximum operating pressure is 350 psi (2,400 kPa). Typical operating pressure for TFC ULP systems is in the range of 100 psi (690 kPa) to 175 psi (1,210 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) for a 40" (1,016 mm) long 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 ULP 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 15%.

**Chemical Tolerance:**

- **Chlorine:** Exposure of TFC ULP membrane to free chlorine or other oxidizing agents such as permanganate, ozone, bromine and iodine is not recommended. TFC ULP 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 ULP 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 (Positively Charged) Polymers and Surfactants:** TFC ULP 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 the recommended silicone lubricant (or approved equivalent), 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:**

KSS 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, KSS also offers a complete line of KOCHKLEEN® RO cleaning chemicals.

*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*

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