

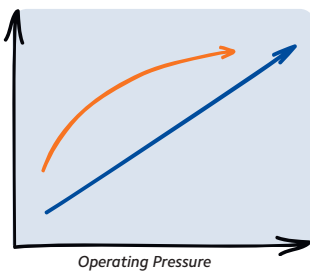
# Introducing SPECTRUM Membranes

SPECTRUM uses state-of-the-art technology to manufacture a range of high-performance membrane products.

## Factors that affect membrane performance

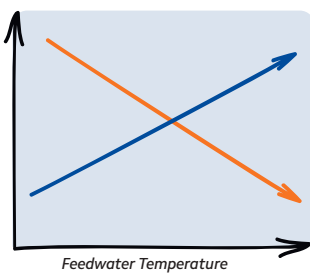
 **Permeate Production**  
 **Rejection Rate**

### Operating Pressure



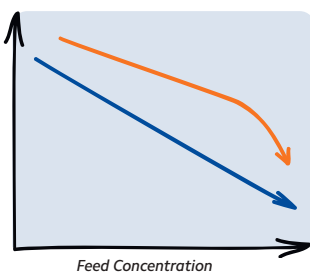
*The amount of permeate water that an RO membrane will produce is directly affected by the operating pressure. As pressure increases the amount of permeate produced also increases along with the rejection rate to a certain point.*

### Feedwater Temperature



*Feedwater temperature will have a dramatic effect on RO membrane permeate production and rejection rate. The higher the feedwater temperature the higher the permeate production and the lower rejection rate.*

### Feed Concentration



*The higher the feedwater concentration the lower the permeate flow and % rejection rate of the RO membrane. Increasing the operating pressure can counter this effect.*

## ERO vs SRO

When it comes to choosing a membrane, it is important to consider the application requirements and the membrane's operating specifications. SPECTRUM's offering of commercial and industrial RO membranes has two ranges to provide a solution for a variety of application conditions.

### ERO (High Production, Lower Pressure)

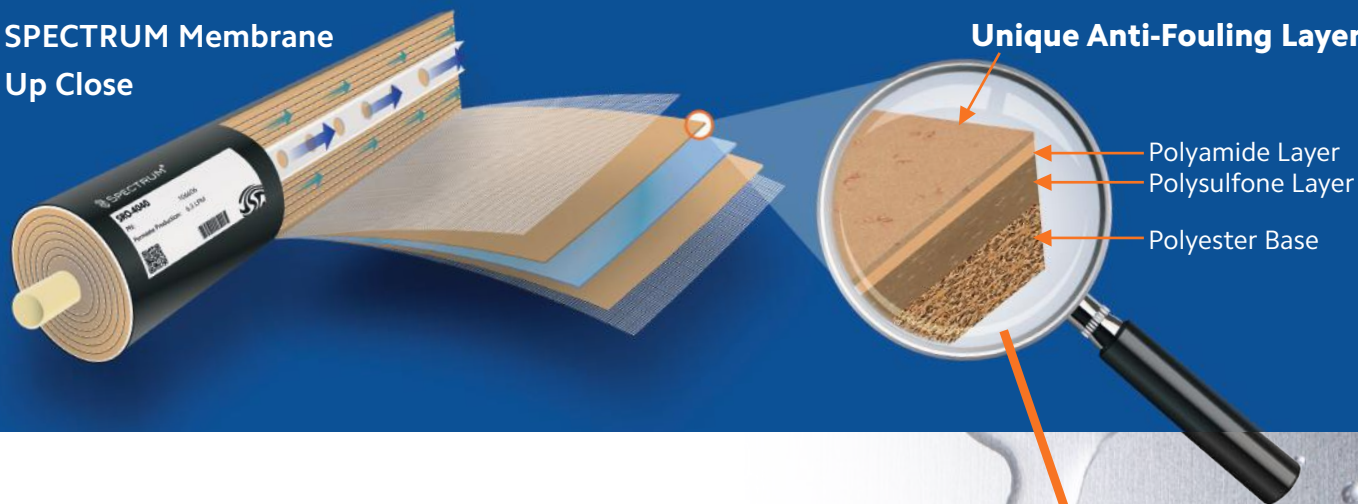
With an average rejection rate of 99%, the ERO range of membranes has been designed to deliver higher permeate flow rates in lower pressure applications. Whilst an optimum balance of performance is achieved at 10.3 bar, the ERO delivers exceptional performance at pressure as low as 6.9 bar, which is perfectly suited to tap water applications with a feed water concentration typically of 500 mg/l or less.

### SRO (High Rejection)

For applications that demand higher permeate quality, the SRO range has been manufactured to deliver consistent permeate quality from higher concentration feed water sources up to 10,000 mg/l. Operating at 15.5 bar and with an average rejection rate of 99.5%, the SRO range is perfectly suited to industrial processes, such as boiler feed and microelectronics.

## SPECTRUM Membrane Up Close

### Unique Anti-Fouling Layer



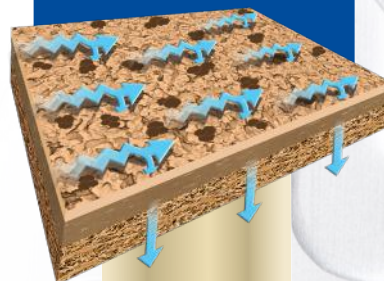
## Media Innovation For a long life membrane

Reverse osmosis membranes are renowned for being extremely susceptible to both physical damage and plugging. The complex structure of a normal RO membrane can be prone to premature organic fouling, reducing permeate production, resulting in early changeout.

To lower energy consumption and extend element life, SPECTRUM RO membrane is cast uniquely with an additional anti-fouling layer applied to the surface of the flatsheet. This additional anti-fouling layer makes the external surface of the flatsheet smoother, reducing the binding sites of potential membrane foulants whilst creating a more neutral membrane surface to reduce interaction with charged ions.

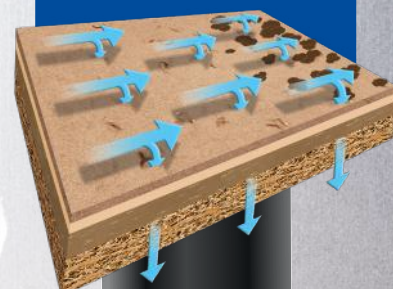
### Traditional membranes since 1960's (Untreated Surface)

Complex structure, prone to premature organic fouling, reducing permeate production



### SPECTRUM RO Membranes (Smooth anti-fouling layer)

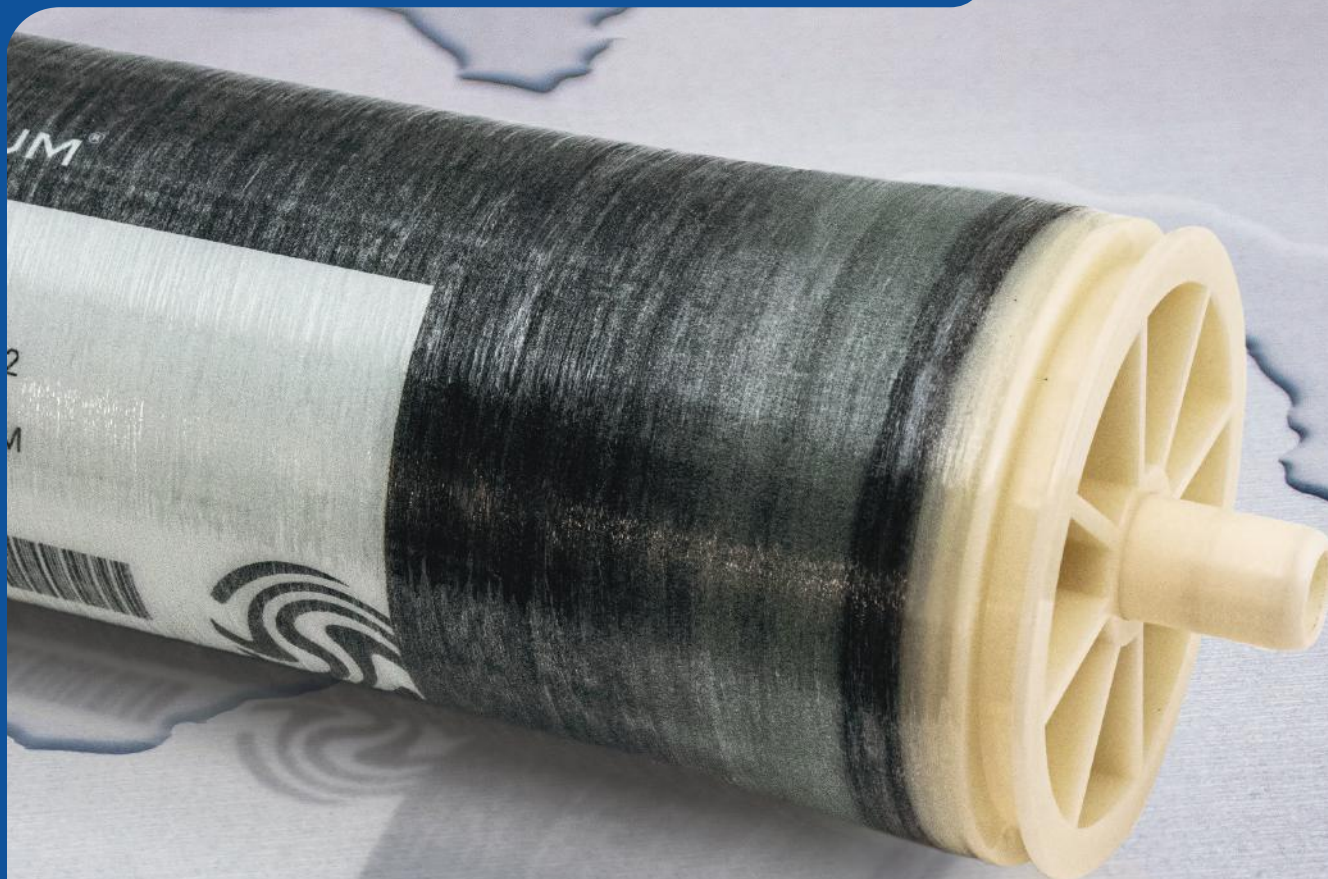
With an added anti-fouling layer, foulants are less attracted to membrane surface



### Membrane Cross-Reference Guide *SPECTRUM RO membrane compared to other industry manufacturers.*

	SPECTRUM	AXEON	Hydranautics	SUEZ	Toray	Dupont	Oltremare
2.5" Membranes	ERO-2521	HF4-2521	ESPA-2521	AK2521TM	-	XLE-2521	LOW2-2521
	ERO-2540	HF4-2540	ESPA-2540	AK2540TM	-	XLE-2540	LOW2-2540
	SRO-2521	HR3-2521	-	AG2521TM	-	TW30-2521	BR2-2521
	SRO-2540	HR3-2540	-	AG2540TM	-	TW30-2540	BR2-2540
4" Membranes	ERO-4021	HF4-4021	ESPA-4021	AK4021TM	-	XLE-4021	LOW2-4021
	ERO-4040	HF4-4040	ESPA2-LD-4040	AK90	TM10A	XLE-4040	LOW2-4040
	SRO-4021	HR3-4021	-	AG4021TM	-	TW30-4021	BR2-4021
	SRO-4040	HR3-4040	CPA7-LD-4040	AG90	TM710D	TW30-4040	BR2-4040
8" Membranes	ERO-8040	-	ESPA2-LD	AK-365	TMG20-370C	-	LOW2-HR-8040
	ERO-8040-HF	-	ESPA4-LD	AK-400	TMG20-400	LE-400	LOW24-8040
	SRO-8040	-	CPA2	AG-365	TM720-370	BW30-365	BR2-8040
	SRO-8040-HF	-	CPA3	AG-400	TM720-400	BW30-400	BR3-8040

## Fastest Rinse up RO Membrane



**Commercial & Industrial  
Applications**

## 4" Membranes

### Higher Flow, Lower Energy

Advancing every area of the user experience, making the SPECTRUM 4" not just a retrofit but a system upgrade. Starting with logistics, where the fibreglass outer finish adds security, as does the strengthened packaging. Storage is improved with extended shelf life, installation rinse-up time is dramatically reduced, higher flow at lower energy consumption is achieved during operation, whilst increasing permeate quality, and membrane life is extended due to the anti-fouling media.

## Specification

Maximum Operating Temperature		4 - 45°C
Maximum Operating Pressure		41 bar
Minimum Operating Pressure	- ERO - SRO	6 bar 10 bar
Maximum Feed Flow Rate		60 LPM
Minimum Feed Flow Rate		15 LPM
Maximum Recommended Recovery		35 %
pH Range, Continuous Operation		3-10
pH Range, Short Term Cleaning		2-12
Maximum Feed Silt Density Index		5.5 SDI
Chlorine Tolerance (Total Exposure 2000 mg/l - hours) (mg/l)		<0.1
Maximum Feedwater Turbidity		<1 NTU
Maximum Feedwater Quality (TDS)	- ERO - SRO	<2,000 mg/l <10,000 mg/l
Recommended Shelf Life		2 Years

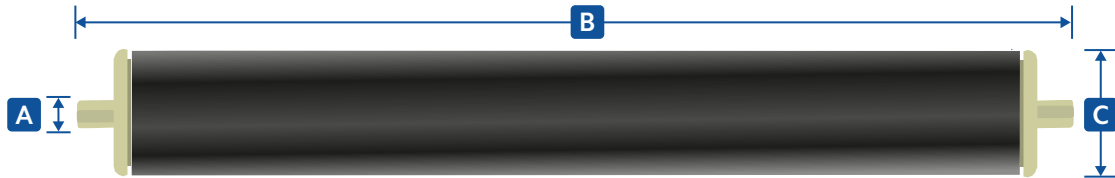
## Materials of Construction

Permeate Tube ABS	Anti-Telescoping Device ABS
Feed Channel Spacer Polypropylene	Outer Wrap Fibreglass
Membrane Polyamide Thin-Film Composite	Brine Seal Buna-N
Permeate Collection Material Polyethylene Terephthalate (PET)	

## Configurations

Diameter (")	Length (")	
4.0 (nominal)	21 (nominal)	40 (nominal)

## Dimensions



Product	Dimensions (")			Active Area ft <sup>2</sup> (m <sup>2</sup> )
	A	B	C	
ERO-4021	0.75	21	3.9	36 (3.3)
ERO-4040	0.75	40	3.9	90 (8.3)
SRO-4021	0.75	21	3.9	39 (3.6)
SRO-4040	0.75	40	3.9	87 (8.1)

## Part Number

## Flow Rate

Product Code	LPH (m <sup>3</sup> /day)	Operating Pressure bar (psi)	Avg Rejection %
ERO-4021	189 (4.5)	@ 10.3 (150)	99
ERO-4040	410 (9.8)	@ 10.3 (150)	99
SRO-4021	173 (4.2)	@ 15.5 (225)	99.5
SRO-4040	379 (9.1)	@ 15.5 (225)	99.5

## Reliable and Secure RO Housing



**PED**  
Compliant  
Article 4, Paragraph 3  
Group 2 Liquids

 **SPECTRUM**

### Standard vs Economic

Extending the performance capabilities of the Economic range, the SMH is ideal for use with SPECTRUM SRO membranes in higher TDS feed waters (>500 mg/L). Designed for more demanding applications, the Standard range provides superior performance.



### Corrosion Resistant

Constructed from 316L stainless steel, the SMH provides extra corrosion protection, such as pitting from high chloride solutions.

### Durability

With a 30% thicker body, the Standard range has increased strength and durability, suitable for harsh industrial environments.

### Seamless

Manufactured from a seamless stainless tube, the SMH avoids the potential of long term weld corrosion for extended service life.

## 4" Membrane Housings

### The Go-to For Commercial Pure Water Production

The preferred choice for commercial reverse osmosis systems, the SPECTRUM 4" stainless steel membrane housings are constructed with a highly polished stainless steel body to ensure membrane seal integrity. Typically lighter than comparable PVC or FRP alternatives, these housings feature two twin-port single piece ABS end-caps offering flexibility in both housing orientation and membrane flow pattern, whereby pure water can be collected at either end of the housing.

## Specification

Operating Temperature	SMH 50 °C / EMH 40 °C
Maximum Operating Pressure	SMH 17 bar / EMH 10 bar

## Materials of Construction

<b>Housing Body</b>	
- EMH	304 Stainless Steel - Seamed
- SMH	316L Stainless Steel - Seamless

<b>Clamps</b>	304 Stainless Steel
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<b>O-rings</b>	Silicone
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<b>Plug</b>	1/2" BSPT PVC
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<b>Endcaps</b>	ABS
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<b>Clamp Screws</b>	304 Stainless Steel
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<b>Mounting Strap</b>	304 Stainless Steel
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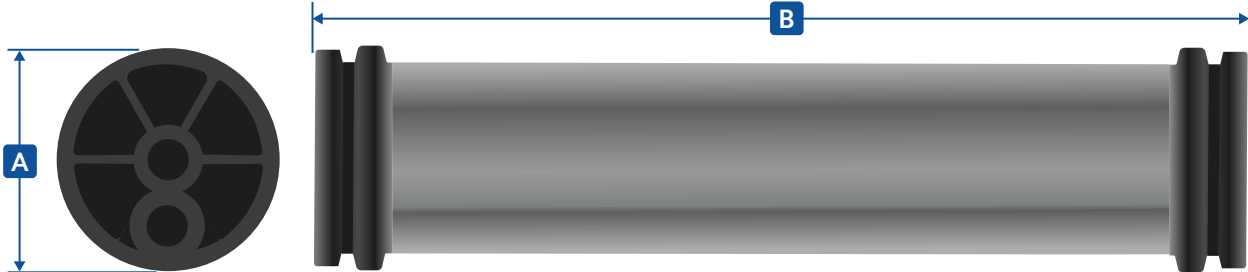


## Configurations

<b>Diameter (")</b>	<b>Length (")</b>	<b>Port Size (")</b>		
4.0 (nominal)	21 (nominal)	3/4	1/2	3/4
	40 (nominal)	Feed	Permeate	Concentrate

- Increased resistance to UV (compared to PVC & FRP)
- Secure integrated clamping system
- Complete with mounting straps

## Dimensions



Product	Dimensions (")	
	A	B
EMH-SP-4021	4.6	23.3
EMH-SP-4040	4.6	42.3
SMH-SP-4021	4.6	23.3
SMH-SP-4040	4.6	42.3

## Part Number

Product Code	Material	Size	Port Size (Feed & Concentrate)	Port Size (Permeate)
EMH	SP	4021	3/4	1/2
SMH		4040		

e.g. EMH-SP-4021-3/4-1/2