

# ESPA1

## Specified Performance\*

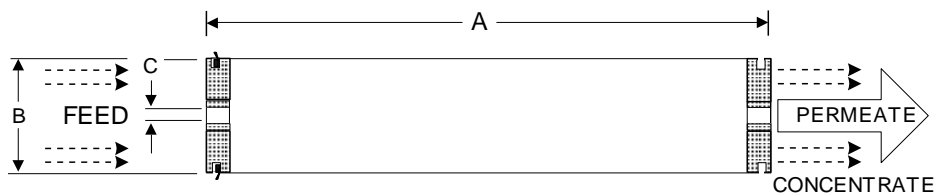
Permeate Flow:	12,000 gpd (45.4 m <sup>3</sup> /d)
Salt Rejection:	99.4% (99.2% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary +25 / -15 percent from the value specified.

## General Product Description\*\*

Configuration:	Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	400 ft <sup>2</sup> (37.2 m <sup>2</sup> )

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	27.6 ± 2 (12.5 ± 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	75 gpm (17.0 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

^ The limitations shown here are for general use. For specified projects, operation at more conservative values may ensure the best performance and longest life of the membrane. See Hydranautics Technical Bulletins for more details.

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## Membrane Element

## ESPA1-LD-4040 (Low Fouling Technology)

<b>Performance:</b>	Permeate Flow:	2,450 gpd (9.27 m <sup>3</sup> /d)
	Salt Rejection:	99.4% (99.2% Minimum)

<b>Type</b>	Configuration:	Spiral Wound
	Membrane Polymer:	Composite Polyamide
	Membrane Active Area:	80 ft <sup>2</sup> (7.4 m <sup>2</sup> )
	Feed Spacer:	34 mil (0.864 mm)

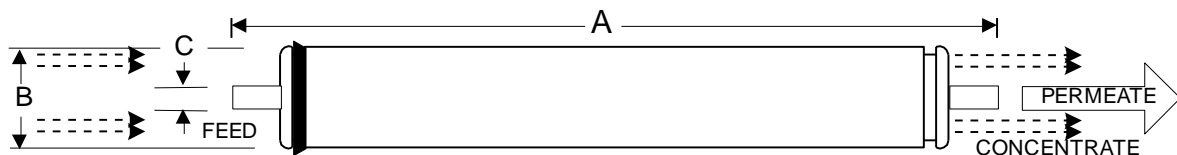
<b>Application Data*</b>	Maximum Applied Pressure:	600 psig (4.14 MPa)
	Maximum Chlorine Concentration:	< 0.1 PPM
	Maximum Operating Temperature:	113 °F (45 °C)
	pH Range, Continuous (Cleaning):	2-10 (1-12)*
	Maximum Feedwater Turbidity:	1.0 NTU
	Maximum Feedwater SDI (15 mins):	5.0
	Maximum Feed Flow:	16 GPM (3.6 m <sup>3</sup> /h)
	Maximum Pressure Drop for Each Element:	15 psi

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### Test Conditions

The stated performance is initial (data taken after 30 minutes of operation), based on the following conditions:

- 1500 ppm NaCl solution
- 150 psi (1.05 MPa) Applied Pressure
- 77 °F (25 °C) Operating Temperature
- 15% Permeate Recovery
- 6.5 - 7.0 pH Range
- (Data taken after 30 minutes of operation)



A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	3.95 (100.3)	0.75 (19.1)	8 (3.6)

Core tube extension = 1.05" (26.7 mm)

**Notice:** Permeate flow for individual elements may vary + or - 15 percent. All membrane elements are supplied with a brine seal, interconnector, and o-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1% sodium meta-bisulfite solution and then packaged in a cardboard box.

Hydranautics believes the information and data contained herein to be accurate and useful. The information and data are offered in good faith, but without guarantee, as conditions and methods of use of our products are beyond our control. Hydranautics assumes no liability for results obtained or damages incurred through the application of the presented information and data. It is the user's responsibility to determine the appropriateness of Hydranautics' products for the user's specific end uses.

2/16/17

# ESPA2-LD

## Specified Performance\*

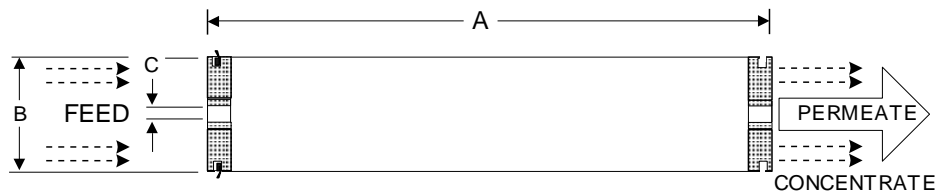
Permeate Flow:	10,000 gpd (37.9 m <sup>3</sup> /d)
Salt Rejection:	99.6% (99.5% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary  $\pm 15$  percent from the value specified.

## General Product Description\*\*

Configuration:	Low Fouling Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	400 ft <sup>2</sup> (37.2 m <sup>2</sup> )
Feed Spacer:	34 mil (0.864 mm)

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	27.6 $\pm$ 2 (12.5 $\pm$ 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10.6 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	85 gpm (19.3 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

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# ESPA2-LD-4040

## Specified Performance\*

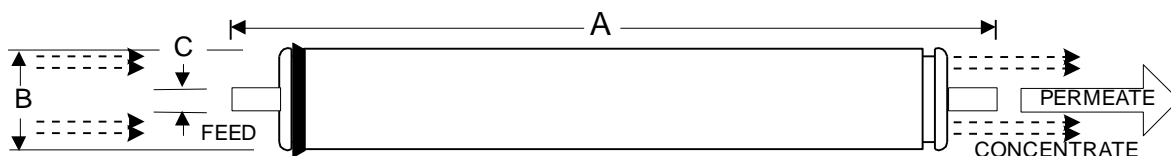
Permeate Flow:	2,000 gpd (7.57 m <sup>3</sup> /d)
Salt Rejection:	99.6% (99.4% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary + or -20 percent from the value specified.

## General Product Description\*\*

Configuration:	Low Fouling Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	80 ft <sup>2</sup> (7.43 m <sup>2</sup> )
Feed Spacer:	34 mil (0.864 mm)

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	3.95 (100.3)	0.75 (19.1)	8 (3.6)

Core tube extension = 1.05" (26.7 mm)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs. (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10.6 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	16 gpm (3.6 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

^ The limitations shown here are for general use. For specified projects, operation at more conservative values may ensure the best performance and longest life of the membrane. See Hydranautics Technical Bulletins for more details.

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### Hydranautics Corporate office

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 Web: www.membranes.com Email: hy-info@nitto.com

# ESPA2-LD MAX

## Specified Performance\*

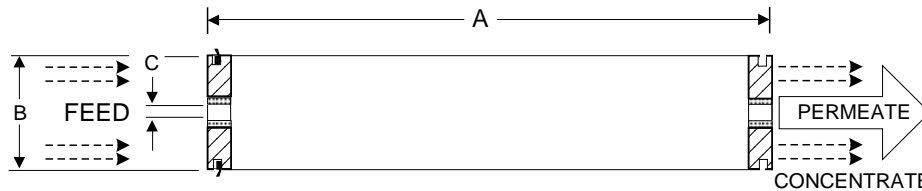
Permeate Flow:	12,000 gpd (45.4 m <sup>3</sup> /d)
Salt Rejection:	99.6% (99.5% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary ±15 percent from the value specified.

## General Product Description\*\*

Configuration:	Low Fouling Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	440 ft <sup>2</sup> (40.9 m <sup>2</sup> )
Feed Spacer:	34 mil (0.864 mm)

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	29.8 ± 2 (13.5 ± 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10.6 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	85 gpm (19.3 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

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# ESPA2 MAX

## Specified Performance\*

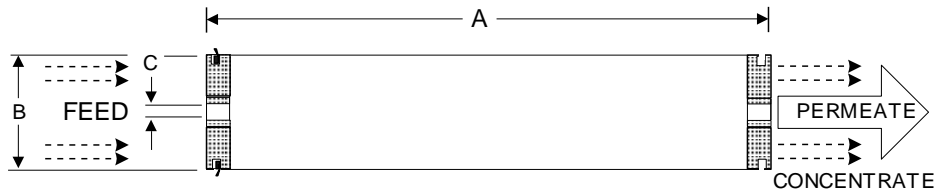
Permeate Flow:	12,000 gpd (45.4 m <sup>3</sup> /d)
Salt Rejection:	99.6% (99.5% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary ±15 percent from the value specified.

## General Product Description\*\*

Configuration:	Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	440 ft <sup>2</sup> (40.9 m <sup>2</sup> )

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	29.8 ± 2 (13.5 ± 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10.6 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	75 gpm (17.0 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

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# ESPA4-LD

## Specified Performance\*

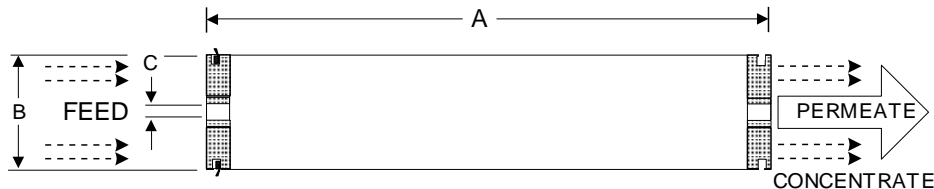
Permeate Flow:	12,000 gpd (45.4 m <sup>3</sup> /d)
Salt Rejection:	99.2% (99.0% minimum)
Test Conditions:	500 ppm NaCl solution
	100 psi (0.7 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary  $\pm 15$  percent from the value specified.

## General Product Description\*\*

Configuration:	Low Fouling Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	400 ft <sup>2</sup> (37.2 m <sup>2</sup> )
Feed Spacer:	34 mil (0.864 mm)

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	27.6 $\pm$ 2 (12.5 $\pm$ 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	85 gpm (19.3 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

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## Membrane Element

## ESPA4-LD-4040 (Low Fouling Technology)

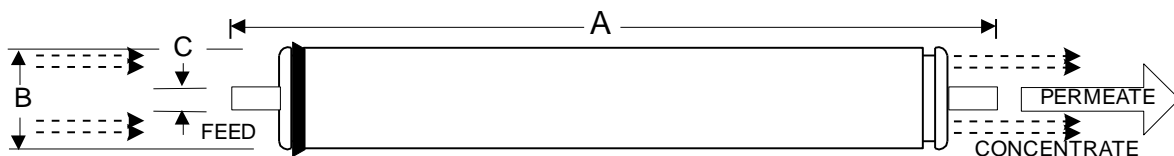
<b>Performance:</b>	Permeate Flow:	2,350 gpd (8.90 m <sup>3</sup> /d)
	Salt Rejection:	99.2% (99.0% minimum)
<b>Type</b>	Configuration:	Spiral Wound
	Membrane Polymer:	Composite Polyamide
	Membrane Active Area:	80 ft <sup>2</sup> (7.4 m <sup>2</sup> )
	Feed Spacer:	34 mil (0.864 mm)
<b>Application Data*</b>	Maximum Applied Pressure:	600 psig (4.14 MPa)
	Maximum Chlorine Concentration:	< 0.1 PPM
	Maximum Operating Temperature:	113 °F (45 °C)
	pH Range, Continuous (Cleaning):	2-10 (1-12)*
	Maximum Feedwater Turbidity:	1.0 NTU
	Maximum Feedwater SDI (15 mins):	5.0
	Maximum Feed Flow:	16 GPM (3.6 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi	

\* The limitations shown here are for general use. For specific projects, operating at more conservative values may ensure the best performance and longest life of the membrane. See Hydranautics Technical Bulletins for more detail on operation limits, cleaning pH, and cleaning temperatures.

### Test Conditions

The stated performance is initial (data taken after 30 minutes of operation), based on the following conditions:

500 ppm NaCl solution  
 100 psi (0.7 MPa) Applied Pressure  
 77 °F (25 °C) Operating Temperature  
 15% Permeate Recovery  
 6.5 - 7.0 pH Range  
 (Data taken after 30 minutes of operation)



A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	3.95 (100.3)	0.75 (19.1)	8 (3.6)

**Core tube extension = 1.05" (26.7 mm)**

**Notice:** Permeate flow for individual elements may vary + or - 15 percent. All membrane elements are supplied with a brine seal, interconnector, and o-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution and then packaged in a cardboard box.

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# ESPA4 MAX

## Specified Performance\*

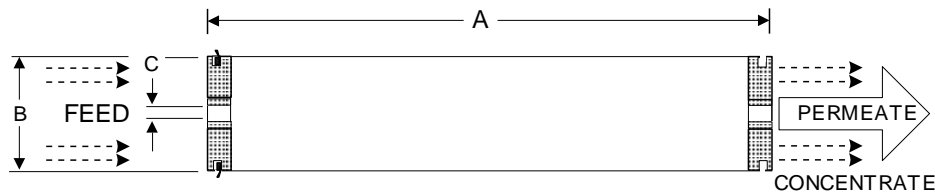
Permeate Flow:	13,200 gpd (50 m <sup>3</sup> /d)
Salt Rejection:	99.2% (99.0% minimum)
Test Conditions:	500 ppm NaCl solution
	100 psi (0.7 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary ±15 percent from the value specified.

## General Product Description\*\*

Configuration:	Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	440 ft <sup>2</sup> (40.9 m <sup>2</sup> )

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	29.8 ± 2 (13.5 ± 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-10 (1-12)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	75 gpm (17.0 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

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# ESPAB MAX

## Specified Performance\*

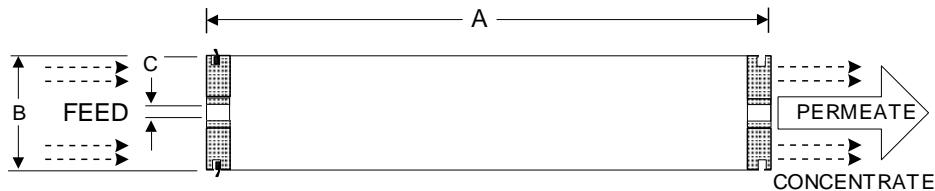
Permeate Flow:	9,000 gpd (34.1 m <sup>3</sup> /d)
Salt Rejection:	99.3% (99.0% minimum)
Test Conditions:	1500 ppm NaCl solution
	150 psi (1.03 MPa) Applied Pressure
	77 °F (25 °C) Operating Temperature
	15% Permeate Recovery
	6.5 - 7.0 pH Range

\*The Specified Performance is based on data taken after approximately 30 minutes of operation. Actual testing of elements may be done at conditions which vary from these exact values; in which case, the performance is normalized back to these standard conditions. Permeate flow for individual elements may vary ±15 percent from the value specified.

## General Product Description\*\*

Configuration:	Spiral Wound
Membrane Polymer:	Composite Polyamide
Membrane Active Area**:	440 ft <sup>2</sup> (40.9 m <sup>2</sup> )

Packaging: All membrane elements are supplied with a brine seal, interconnector, and O-rings. Elements are enclosed in a sealed polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box.



Element Details\*\*

A, inches (mm)	B, inches (mm)	C, inches (mm)	Weight, lbs. (kg)
40.0 (1016)	7.89 (200)	1.125 (28.6)	29.8 ± 2 (13.5 ± 1)

\*\*Values listed are indicative, not specified. For more detailed specifications, see our Technical Service Bulletin documents or contact Hydranautics Technical Department. Element weight values are as shipped from factory. Elements that are used and then gravity drained may still contain at least an additional 2 lbs (1 kg) of liquid.

## Product Use and Restrictions^

Maximum Applied Pressure:	600 psig (4.14 MPa)
Maximum Chlorine Concentration:	< 0.1 ppm
Maximum Operating Temperature:	113 °F (45 °C)
pH Range, Continuous (Cleaning):	2-11 (1-12.5)
Maximum Feedwater Turbidity:	1.0 NTU
Maximum Feedwater SDI (15 mins):	5.0
Maximum Feed Flow:	75 gpm (17.0 m <sup>3</sup> /h)
Maximum Pressure Drop for Each Element:	15 psi (0.10 MPa)

^ The limitations shown here are for general use. For specified projects, operation at more conservative values may ensure the best performance and longest life of the membrane. See Hydranautics Technical Bulletins for more details.

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