

## ESPA

### Ultra-Low Pressure Energy Saving Brackish Water Membranes

Hydranautics offers a complete line of energy saving polyamide ESPA reverse osmosis membrane elements for a wide range of water treatment applications. ESPA's unparalleled performance characteristics can provide significant cost savings due to the lower operating pressures required while still providing optimal flow as well as high salt and boron rejection.

Hydranautics also offers Integrated Membrane Solutions (IMS) combining a range of RO, NF, UF and MF membrane technologies to achieve the most comprehensive, effective, low-cost solutions for the industry.

#### ESPA Applications:

- Treatment of well, surface and wastewater with high salt rejection requirements
- High purity industrial applications
- Best boron rejecting low pressure RO membrane in seawater desalination
- Lowest fouling membrane available for reclaimed municipal waste water plant applications

#### ESPA Product Offerings:

- **ESPA1:** ESPA1 is popularly used in the treatment of low TDS waters to produce potable water. This membrane is available in 4-inch and 8-inch diameters.
- **ESPA2:** ESPA2 membranes are low pressure brackish water membranes designed to minimize colloidal fouling. This membrane is available in 4-inch, 8-inch and 16-inch diameters.
- **ESPAB:** ESPAB are low pressure brackish water membranes having a high rejection for boron. This membrane is available in 8-inch and 16-inch diameters.
- **ESPA4:** ESPA4 membranes require ultra-low pressures without compromising standards for high flux and high salt rejection. ESPA4 membrane has been commonly used in drinking water production from well and surface waters in the water treatment industry. It is widely accepted due to significant operational cost savings associated with their use. Due to their ultra-low feed pressure requirement, ESPA4 membranes have been accepted as a standard in the second pass of two-pass reverse osmosis systems.

The ESPA2 and ESPA4 membranes are available in the LD variant wherein low differential LD Technology® is used to minimize colloidal fouling when used with conventional pre-treatment equipment. These membranes offer consistently low feed pressures and longer intervals between cleanings.

Additionally, the ESPA2, ESPAB and ESPA4 membranes are available in the MAX variant which have a 440 ft<sup>2</sup> (40.9 m<sup>2</sup>) active membrane surface area. The increased membrane area can reduce capital costs by requiring fewer pressure vessels and less floor space.





## ESPA Product Performance:

Membrane Product	Model	Permeate flow gpd (m <sup>3</sup> /d)	Norm. Salt Rejection	Min. Salt Rejection	Membrane Active Area ft <sup>2</sup> (m <sup>2</sup> )
ESPA1	ESPA1	12000 (45.4)	99.4%	99.2%	400 (37.1)
ESPA2	ESPA2-4040	1900 (7.2)	99.6%	99.4%	85 (7.9)
	ESPA2-LD-4040	2000 (7.57)	99.6%	99.4%	80 (7.4)
	ESPA2-LD	10000 (37.9)	99.6%	99.5%	400 (37.1)
	ESPA2 MAX	12000 (45.4)	99.6%	99.5%	440 (40.9)
	ESPA2 1640	41000 (155.2)	99.6%	99.4%	1700 (158)
ESPAB	ESPAB MAX	9000 (34.1)	99.3%	99.0%	440 (40.9)
	ESPAB 1640	34000 (128.7)	99.3%	99.1%	1700 (158)
ESPA4	ESPA4-LD-4040	2350 (8.9)	99.2%	99.0%	80 (7.4)
	ESPA4-LD	12000 (45.4)	99.2%	99.0%	400 (37.1)
	ESPA4 MAX	13200 (50)	99.2%	99.0%	440 (40.9)



Hydranautics – A Nitto Group Company is a global leader in research, including reverse osmosis, nanofiltration, ultrafiltration, and microfiltration. Our membrane products (CPA, ESPA, LFC, SWC, ESNA, HYDRAcapMAX and HYDRAsub) are used extensively in municipal & industrial water and wastewater treatment.

Hydranautics has over 40 years experience in the membrane technology arena and are committed to creating innovative membrane technologies which provide clean water to a thirsty world.

Our Global Membrane Division is headquartered in Oceanside, CA, USA. With three state-of-the-art manufacturing sites located in Oceanside – CA – USA, Shiga – Japan and Shanghai – China, Hydranautics has a combined manufacturing area in excess of 1,400,000 ft<sup>2</sup> (130,064 m<sup>2</sup>). Our world-wide sales and customer service offices are located throughout Europe, Asia, the Middle East, North America and South America.

## Ordering

Hydranautics Model	Culligan PN	Std Lead Time	Hydranautics Model	Culligan PN	Std Lead Time
ESPA1-4040	D1032557	10 business days	ESPA3	D1032570	10 business days
ESPA1-LD-4040	D1032558	10 business days	ESPA4	D1032571	10 business days
ESPA2-4040	D1032559	10 business days	ESPA4-LD	D1032572	10 business days
ESPA2-LD-4040	D1032560	10 business days	ESPA4 MAX	D1032573	10 business days
ESPA3-4040	D1032561	10 business days	ESPAB	D1032574	10 business days
ESPA4-4040	D1032562	10 business days	ESPAB MAX	D1032575	10 business days
ESPA4-LD-4040	D1032563	10 business days	ESPA-2514	D1032602	10 business days
ESPA1	D1032564	10 business days	ESPA-2521	D1032603	10 business days
ESPA2	D1032565	10 business days	ESPA-2540	D1032604	10 business days
ESPA2-LD	D1032566	10 business days	ESPA-4014	D1032605	10 business days
ESPA2-LD MAX	D1032567	10 business days	ESPA-4021	D1032606	10 business days
ESPA2-XLD	D1032568	10 business days	ESPA-4611	D1032607	10 business days
ESPA2 MAX	D1032569	10 business days	ESPA-4641	D1032608	10 business days