

# ESNA®



## A New Generation of ESNA Performance

### ESNA - Energy Saving Nanofiltration Membrane Element

High performance energy savings ESNA nanofiltration membrane elements are ideal for softening applications and the removal of pesticides, bacteria or viruses. They provide 50%-90% salt rejection with ultra-low-pressure operations, increased energy savings, and significantly lower installation and operating costs. They can effectively remove organics which can form disinfection by-products in municipal water distribution lines. At the Boca Raton plant THM formation potential was reduced from 0.60 mg/L to less than 0.020 mg/L, well below the 0.042 mg/L limit.

ESNA elements are available from Hydranautics in both 4-inch and 8-inch diameters by 40-inch long spiral wound configurations for many applications. Smaller diameter elements are also available from Hydranautics' licensed manufacturer Oltremare, located in Fano, Italy.

Our ESNA elements can be used as either a stand alone product or part of our Integrated Membrane Solution® (IMS) which combines a range of RO, NF, UF and MF membrane technologies to achieve the most comprehensive, effective, low-cost results in the industry.

### Product Offering:

#### ESNA1-LF-8040 / ESNA1-LF-4040

Ideal for low salinity brackish feed water sources for municipal potable applications, especially those with high organic loading. Significantly reduces operating costs and provides optimum hardness rejection for softening applications, available in 4-inch and 8-inch diameter configurations

#### ESNA1-LF2

Designed to provide high rejection of natural organic materials and moderate rejection of total hardness, while running below 100 psi, offering energy and cost savings.



## ESNA®

### Performance for Low Fouling Membranes

Element Type	Min. Salt Rej.,%	Nom. Salt Rej.,%	Ca Rej. Brackish Water, %	Permeate Flow GPD (m3/d)
ESNA1-LF-4040	84-95.7	89	96.0	1,742 (6.59)
ESNA1-LF	84-95.7	89	96.0	8,200 (31.04)
ESNA1-LF2	73-92	87	92	10,500 (39.7)

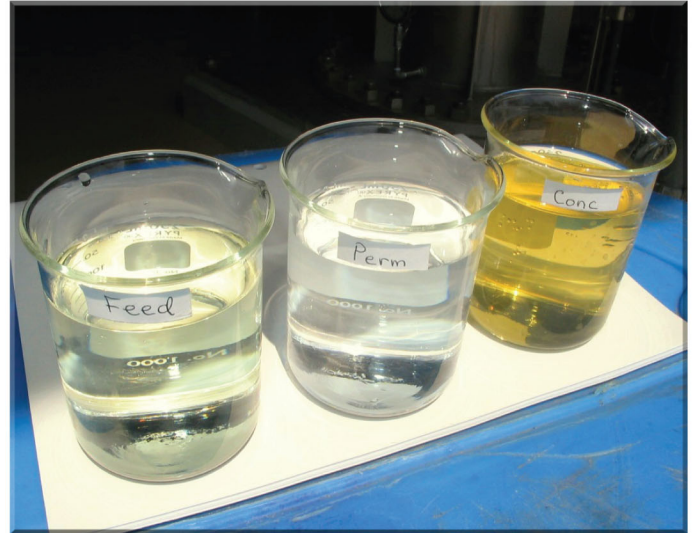
#### Test Conditions

Ca Cl <sub>2</sub> Solution, PPM	500
Applied Pressure, psig (MPa)	75 (0.52)
Operating Temperature, °F(°C)	77° (25°)
Permeate Recovery	15%
pH Range	6.5-7.0

#### Application Data †

Maximum Applied Pressure, psig (MPa)	600 (4.16)
Maximum Chlorine Concentration, PPM	<0.1
Maximum Operating Temperature, °F(°C)	113° (45°)
Feedwater pH Range	3.0-10.0
Maximum Feedwater Turbidity, NTU	1.0
Maximum Feedwater SDI (15 mins)	5.0
Maximum Feed Flow, GPM (m <sup>3</sup> /h)	75 (17)
Minimum Ratio of Concentrate to Permeate Flow for any Element	5:1
Maximum Pressure Drop for Each Element, psi	10

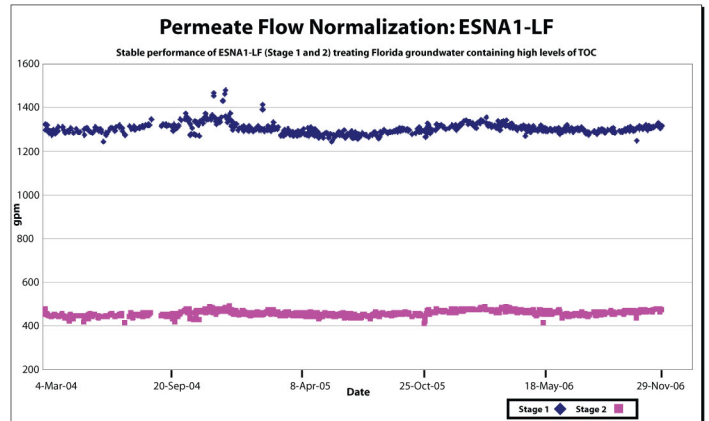
†The limitations shown in the Application Data are for general use. The values may be more conservative for specific projects to ensure the best performance and the longest life of the membrane.



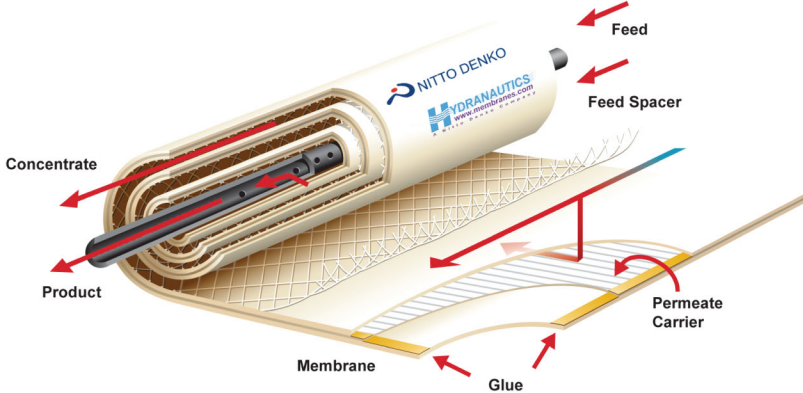
Water samples taken from the feed, permeate and concentrate of an ESNA1-LF2 system

### Selected ESNA Project References:

Boca Raton, Florida	40 MGD (151,500 m3/d) of potable water from a well water source
Hollywood, Florida	18 MGD (68,000 m3/d) of potable water from a well water source
Deerfield Bch., Florida	12 MGD (45,500 m3/d) of potable water from a well water source
Pompano Bch., Florida	10 MGD (37,800 m3/d) of potable water from a well water source
Fort Myers, Florida	12 MGD (45,400 m3/d) of potable water from a well water source



Over 2 years of stable performance treating Florida groundwater containing high levels of TOC



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