HYDRANAUTICS MEMBRANES

Pollet Water Group



Nitto
HYDRANAUTICS
Nitto Group Company

Hydranautics' & Nitto's experience in membrane technology spans five decades.

Hydranautics remains committed to delivering innovative membrane technologies to meet the growing demand of the separation industry.

As a result, they design and manufacture a broad spectrum of reverse osmosis, nanofiltration, ultrafiltration and microfiltration membranes in various configurations and chemistries.



Industrial process water



Boiler feedwater



Surface water treatment



Wastewater treatment



Pharmaceuticals



Potable water



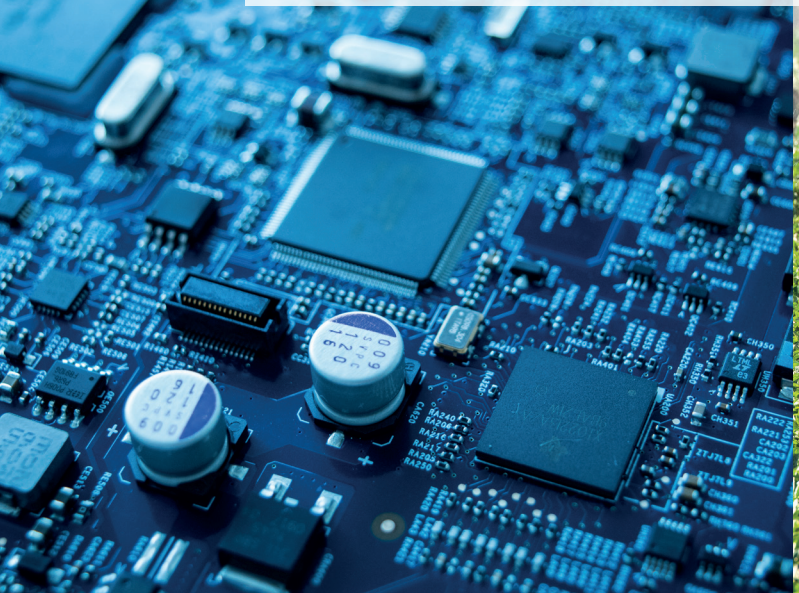
Food and Beverage



Seawater desalination

Electronic rinse water

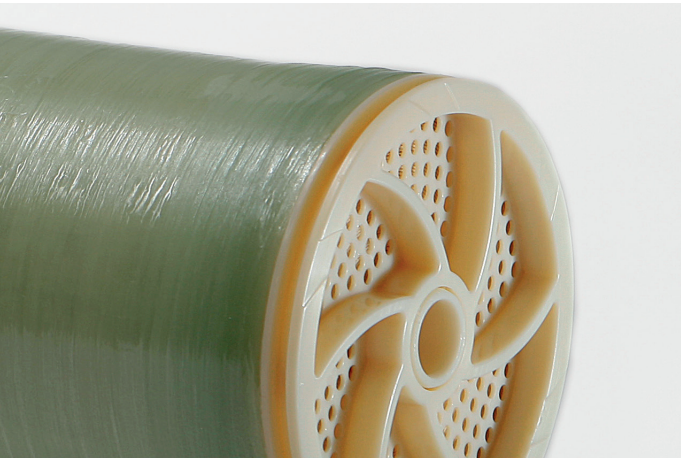
Agricultural irrigation





Research and Development

Utilizing two R & D centers in the USA and Japan, Hydranautics' consistent focus on technology continues to produce the most innovative and effective membrane products for the water treatment industry.



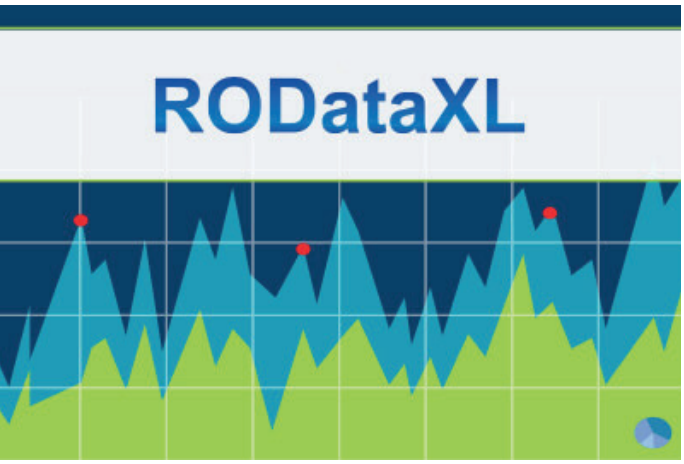
Anti-Telescoping Device (ATD) -

An anti-telescoping device or ATD is a plastic device located on the ends of a reverse osmosis membrane element. This device helps to provide structural support to the RO membrane envelopes preventing unraveling and extension.



Integrated Membrane Solutions Design

Hydranautics offers the largest line of membrane products and services in the industry. In addition to our full range of RO, NF, UF and MF products, Hydranautics also offers unique custom technology solutions – Integrated Membrane Solutions (IMS) – for every water treatment requirement. Hydranautics' IMS combines a range of membrane technologies to achieve the most comprehensive, effective and low-cost ownership.



RODataXL

Track your RO system performance
RODataXL is a powerful RO normalization program which will help you interpret data collected from a water treatment plant using Hydranautics RO membranes. The program produces operational graphs, normalization charts that make reliability, performance and efficiency goals more achievable by allowing you to address issues before they become problems that significantly impact operations.

Quality assurance

Certification

Hydranautics membranes are NSF & ISO 9001 certified. A number of elements have achieved more certifications.

General

- ISO 9001
- NSF International – Hydranautics has been certified to be in conformance with ANSI/NSF Standard 61 requirements for reverse osmosis drinking

Certain sanitary full-fit spiral wound membrane elements manufactured by Hydranautics have achieved the the following certification:

- Compliance with FDA Code of Federal Regulations Title 21, Part 177
- USDA 3-A Sanitary Standard 45-03 certification
- Compliance with EU Commission Regulation No. 10/2011
  Framework Regulation (EC) No. 1935/2004
  Good Manufacturing Practice Regulation Commission Regulation (EC) No. 2023/2006.
- Kosher certification by EarthKosher
- Halal certification by Islamic Food and Nutrition Council of America

100% tested

All membranes are 100% wet tested during production and vacuum sealed in a polyethylene bag with special solution to ensure their preservation.

ISO 9001 quality system

Product certification

Membrane Selection

Different industries have different needs. However they all have one thing in common, the need to efficiently run their processes & applications with minimum costs and maximum output. Selecting the correct type of membrane is the first step towards achieving energy, cost and process efficiency. Hydranautics helps you achieve all of these with its comprehensive membrane portfolio & Product Selection Tools.



MARKETS & PRODUCTS

Enabling you to select effective membrane solutions based on your specific industry requirements.

Membranes for a wide range of industry applications



CROSS REFERENCE

Empowering you to choose the best suited Hydranautics membranes in comparison to other manufacturer's membranes.

Membrane compatibility check at your fingertips !

Our range

REVERSE OSMOSIS & NANOFILTRATION



ESPA
Energy Saving RO Elements

CPA
High rejection RO membranes

LFC
Low Fouling RO Elements

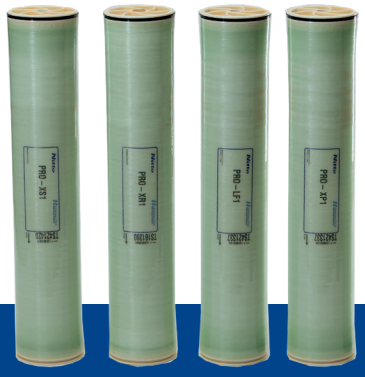
SWC
Seawater RO Elements

ESNA
Nanofiltration

HYDRACORE
Salt Passing, Organic Rejecting

PRO SERIES

Specialty Membrane Products for Challenging Industrial Wastewaters



PRO-XR
Durable Xtreme High Rejection BWRO

PRO-LF
Low Fouling high pressure RO membrane

PRO-XS
Xtreme Separation of Salt species

PRO-XP
Desalination at Xtreme Pressures

Reverse Osmosis & Nanofiltration

Nitto
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Reverse Osmosis & Nanofiltration

ESPA RANGE

Energy Saving RO Elements

ESPA (Energy Saving Polyamide) membranes achieve high flux / lower pressure without compromising standards for high rejection. They gained wide acceptance in the water treatment industry due to the significant operational cost savings associated with their use. ESPA membranes are available in 4” and 8” diameters.



- Ultra low pressure (energy saving)
- Applications :
    - Municipal drinking water treatment
    - Water treatment for irrigation
    - Drinking water and beverages bottling operations

Item Name	Permeate Flow gpd	(m^3/d)	Salt Rejection (nominal)	Feed Spacer mm	Membrane Active Area Ft2 (m2)
ESPA1-LD-4040	2,450	9.3	99.4%	34	80 (7.4)
ESPA1	12,000	45.4	99.4%	26-28	400 (37.2)
ESPA2-4040	1,900	7.2	99.6%	26-28	85 (7.9)
ESPA2-LD-4040	2,000	7.6	99.6%	34	80 (7.4)
ESPA2-LD	10,000	37.9	99.6%	34	400 (37.2)
ESPA2 MAX	12,000	45.4	99.6%	26-28	440 (40.9)
ESPA2-LD MAX	12,000	45.4	99.6%	34	440 (40.9)
ESPAB MAX	9,000	34.1	99.3%	26-28	440 (40.9)
ESPA4-LD-4040	2,350	8.9	99.2%	34	80 (7.4)
ESPA4-LD	12,000	45.4	99.2%	34	400 (37.2)
ESPA4 MAX	13,200	50	99.2%	26-28	440 (40.9)



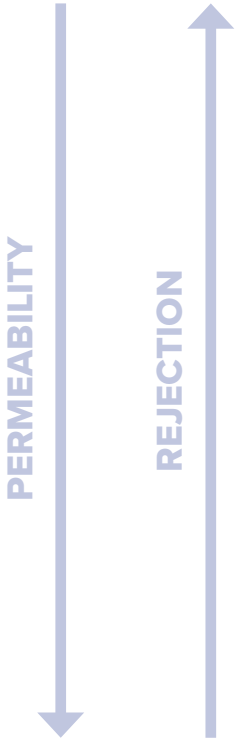


LD

LD represents a patented 34 mil thickness feed spacer that represents low differential pressure (ΔP), prevents colloidal fouling and increases effectiveness of membrane cleaning.

MAX

MAX represents the technology of maximized membrane area of 440 ft2 to reduce the number of elements, thereby saving the cost.



ESPA elements Classification

ESPA2

- Provide optimum salt rejection and permeate flows
- Offer highest energy efficiency at lowest costs
- Used in large municipal wastewater reclamation plants

ESPA1

- Best balance rejection/pressure
- Commonly used to produce potable water from low TDS feed waters

ESPA4

- Lowest feed pressure offering, low energy consumption
- Require ultra-low pressures without compromising high salt rejection
- Commonly used in the second pass of a reverse osmosis system





Reverse Osmosis & Nanofiltration

CPA RANGE

High rejection RO membranes

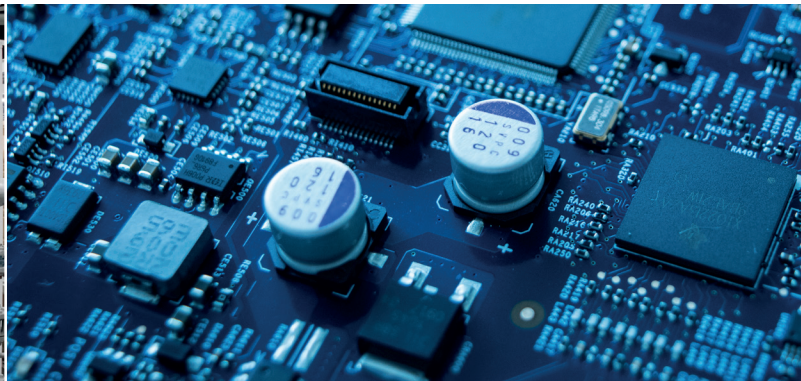
CPA (Composite Polyamide) membranes set the standard for RO membranes – over 600 million gallons per day of pure water are produced by CPA elements for global municipalities and industries. CPA membranes are available in 4” and 8” diameters.PA membranes are available in 4” and 8” diameters.



- Ideal for producing high purity water
- Applications
    - Boiler makeup water for power generation
    - Industrial waste water recovery
    - Ultrapure water for semiconductor

Item Name	Permeate Flow gpd	(m^3/d)	Salt Rejection (nominal)	Feed Spacer mm	Membrane Active Area Ft2 (m2)
CPA2-4040	2250	8.5	99.5%	26-28	85 (7.9)
CPA2	10,000	37.9	99.7%	32	365 (33.9)
CPA3	11,000	41.6	99.7%	31	400 (37.2)
CPA5-LD-4040	2,100	7.95	99.7%	34	80 (7.4)
CPA5-LD	11,000	41.6	99.7%	34	400 (37.2)
CPA5 MAX	12,000	45.5	99.7%	26-28	440 (40.9)
CPA6-LD	8,000	30.3	99.75%	34	400 (37.2)
CPA6 MAX	8,000	33.3	99.75%	26-28	440 (40.9)
CPA-7-LD-4040	2,300	8.7	99.8%	34	80 (7.4)
CPA7-LD	11,500	43.5	99.8%	34	400 (37.2)
CPA7 MAX	12,600	47.7	99.8%	26-28	440 (40.9)





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MAX

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CPA elements Classification

CPA2

- High rejection brackish water RO membrane that continues to remain popular as the robust workhorse product in the treatment of brackish waters to produce low TDS permeate

CPA3

- High rejection brackish water membrane exhibit high tolerance to feed water suspended solids

CPA5

- Provide optimum salt rejection and permeate flows
- Provide high salt rejection including silica and nitrates

CPA6

Is the fifth generation membrane that is used for treating highly brackish waters demanding very low permeate TDS.

CPA7

Is the sixth generation CPA high rejection brackish water RO membrane offering the highest salt rejection in the industry.





Reverse Osmosis & Nanofiltration

LFC RANGE

Low Fouling RO Elements

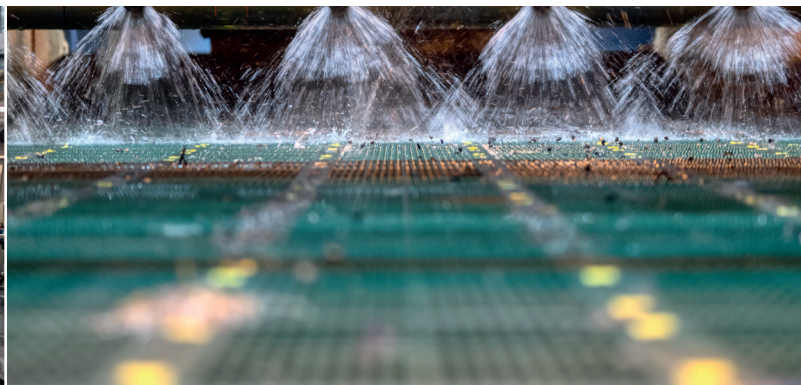
LFC (Low Fouling Composite) membranes combine neutral surface charge and hydrophilicity, providing significant reduction in fouling rates and increasing membrane efficiency by restoring nominal performance after cleaning. LFC membranes are available in 4” and 8” diameters.



- Combining the attributes of a neutral surface charge & hydrophilicity
  - Enhanced membrane chemistry for increased chemical resistance
  - Innovative feed spacer design to minimize trapping of small colloidal particles
  - Proprietary vented seal carrier to eliminate pressure-shock damage during system startup
- Applications :
  - Municipal wastewater treatment
  - Industrial wastewater treatment
  - Wastewater with organic fouling potential

Item Name	Permeate Flow gpd	(m^3/d)	Salt Rejection (nominal)	Feed Spacer mm	Membrane Active Area Ft2 (m2)
LFC3-LD-4040	2100	7.95	99.7%	34	80
LFC3-LD	11,000	41.60	99.7%	34	400





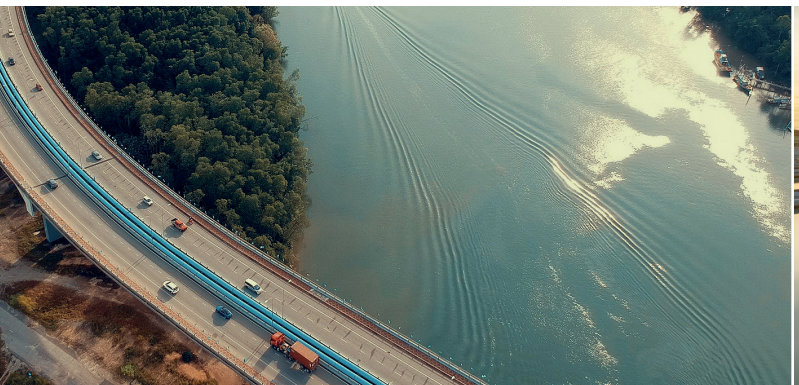
LD

LD represents a patented 34 mil thickness feed spacer that represents low differential pressure (ΔP), prevents colloidal fouling and increases effectiveness of membrane cleaning.

LFC elements Classification

LFC3-LD

- High permeate flow – 11,000 gpd (41.6 m3/d)
- High salt rejection – 99.7% (99.5% minimum)
- Increased membrane durability
- Lower dP (differential pressure)
- Greater tolerance to high pH cleanings
- Improved flux distribution



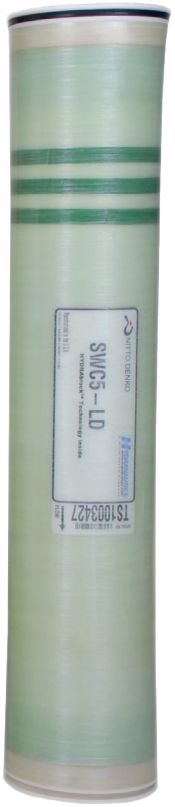


Reverse Osmosis & Nanofiltration

SWC RANGE

Seawater RO Elements

SWC (Seawater Composite) membranes offer a consistently pure end-product with lowest energy consumption at varying levels of seawater salinities. SWC membranes are available in 4” and 8” diameters.



- Seawater RO Elements
- Applications
  - Conventional & hybrid seawater desalination plants
  - Boron reduction for potable & agricultural application

Item Name	Permeate Flow gpd	(m^3/d)	Salt Rejection (nominal)	Feed Spacer mm	Membrane Active Area Ft2 (m2)
SWC4-LD	6500	24.6	99.8%	34	400 (37.2)
SWC4 MAX	7200	27.3	99.8%	26-28	440 (40.9)
SWC5-LD-4040	1750	6.62	99.7%	34	80 (7.4)
SWC5-LD	9000	34.1	99.8%	34	400 (37.2)
SWC5 MAX	9900	37.5	99.8%	26-28	440 (40.9)
SWC6-LD	12000	45.5	99.6%	34	400 (37.2)
SWC6 MAX	13200	50	99.6%	26-28	440 (40.9)



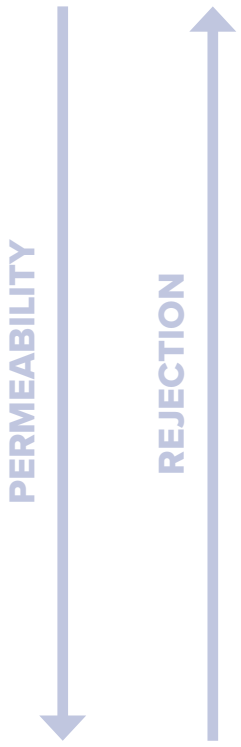


LD

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MAX

MAX represents the technology of maximized membrane area of 440 ft2 to reduce the number of elements, thereby saving the cost.



SWC elements Classification

SWC4

- The highest salt rejecting membranes, treat varying levels of seawater salinities and produce low TDS permeate.
- SWC4 is popularly used in the treatment of sea and highly brackish waters.

SWC5

- Provide optimum salt rejection and permeate flows.
- Offer highest energy efficiency at lowest costs and are used in mega desalination plants.

SWC6

- Lowest feed pressure membranes offering low energy consumption.
- Preferred when the seawater feed temperature is lower which requires high feed pressures.
- Result in low energy consumption and lower treatment costs.

Available in “LD” for optimized fouling resistance
Available in “MAX” for highest membrane active area





Reverse Osmosis & Nanofiltration

ESNA RANGE

Nanofiltration

ESNA (Energy Saving Nanofiltration) nanofiltration membrane elements are designed using the latest technology and exhibit unparalleled performance at ultra-low pressures. Ideal for softening applications and removal of pesticides and pathogens, ESNA membranes provide 91%-99% salt rejection.



- Applications
  - Softening applications
  - Removal of pesticides & pathogens

LD

LD represents a patented 34 mil thickness feed spacer that represents low differential pressure (ΔP), prevents colloidal fouling and increases effectiveness of membrane cleaning.

Item Name	Permeate Flow gpd	(m^3/d)	Salt Rejection (nominal)	Feed Spacer mm	Membrane Active Area Ft2 (m2)
ESNA1-LF-LD	9500	36.0	93%	34	400 (37.2)
ESNA1-LF2-LD-4040	2400	9.1	91%	34	80 (7.4)
ESNA1-LF2-LD	12000	45.4	91%	34	400 (37.2)





Reverse Osmosis & Nanofiltration

HYDRACORE RANGE

HydraCoRe - Salt Passing, Organic Rejecting

Hydranautics' HYDRACoRe® (Hydranautics Color Removal) membranes are sulfonated polyethersulfone-based spiral-wound, crossflow elements that can be used for potable water as well as industrial applications in which color reduction with minimal removal of dissolved salts is desired.



- For color reduction with minimal removal of dissolved salts
  - Removes and adjusts color
  - Tolerates pH variation well
  - High temperature compatibility up to 70 ˚C (for HYDRACoRe70pHT)
  - Rejects low molecular weight organics while passing salts, sugars, alcohol and water
  - High and stable permeate flux
  - Prevents scaling due to low salt rejection
  - Reduces anti-scalant costs
  - Eliminates permeate remineralization costs
  - Tolerates chlorine well for increased cleaning efficiency
  - Green technology
- Applications
  - Potable water
  - Industrial applications

Item Name	Salt Rejection (nominal)	
HYDRACoRe10	10-20%	~ 3000 Daltons
HYDRACoRe50	50-60%	~ 1000 Daltons
HYDRACoRe70pHT	70-80%	~ 700 Daltons

Notice: Rejection efficiencies are dependent upon feed pressures; greater feed pressures typically yielding higher rejections. In addition to the studies done on coffee, grapejuice, soy sauce, red wine and tea, additional studies have been completed on the rejection efficiencies of propylene glycol, glucose, sucrose and dyes.

Available Sizes and configurations :

Fiberglass-wrapped elements : 4040, 8040 with 30 or 46 mil feed spacer
Full-fit, net-wrapped elements : 3838, 4040, 8038, 8040 with 30 or 46 mil feed spacer





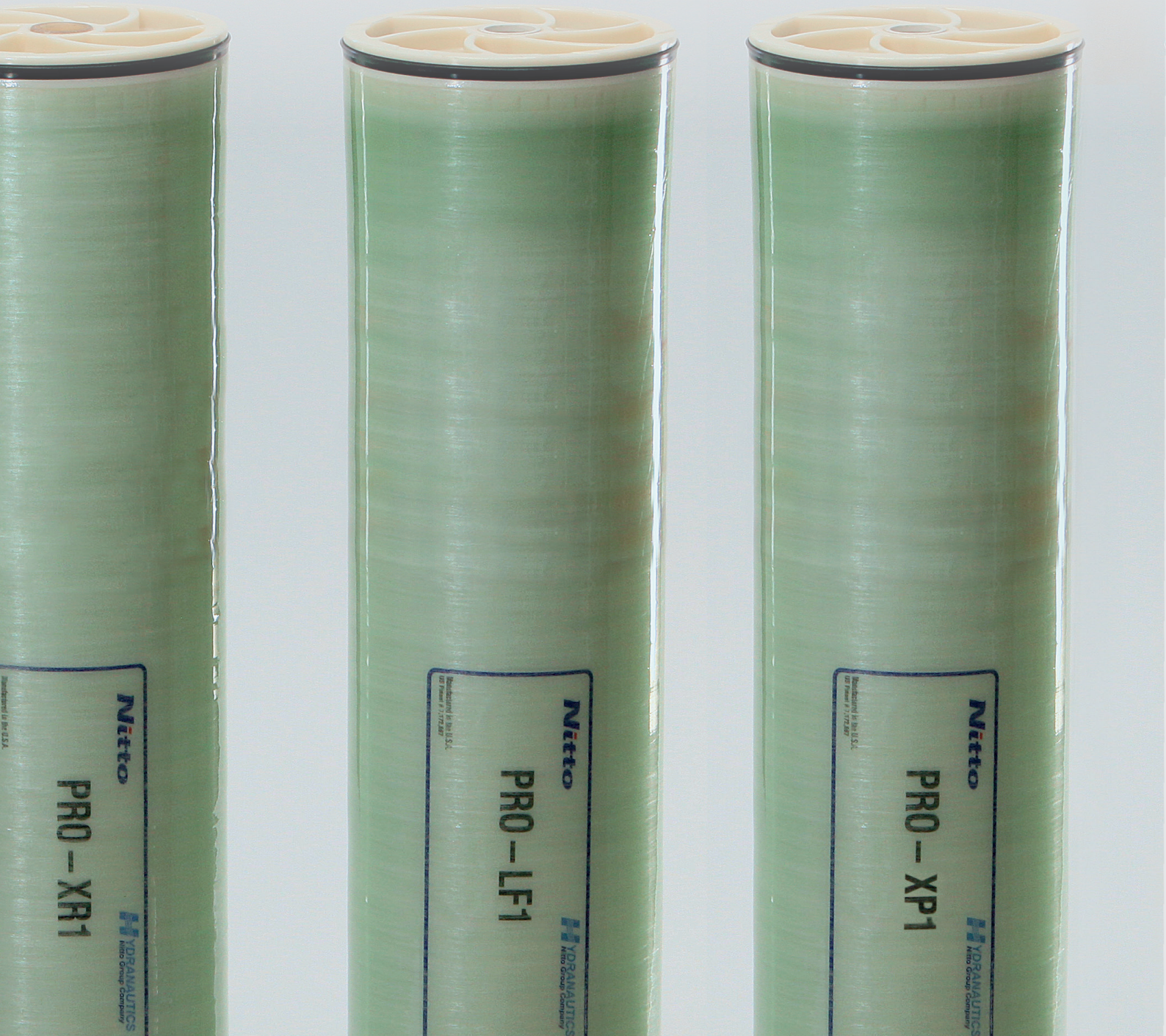
PRO series

Specialty Membrane Products for Challenging Industrial Wastewaters

Nitto
HYDRANAUTICS
Nitto Group Company

What ?

The PRO series from Hydranautics comprises elements that offer effective, integrated, site-specific Zero Liquid Discharge (ZLD) / Minimum Liquid Discharge (MLD) solutions that are cost-effective, innovative, and sustainable.



Features

- Robust RO-NF membranes with high chemical tolerance and fouling resistance under high pH operation and lower cleaning requirement; thus achieving longer membrane life
- Membranes with extra-selectivity and ability to operate at ultra-high pressures of upto 1800 psi
- Innovative membrane chemistry and 34 mil thicker spacer design prevents colloidal and particulate fouling; thus reducing cleaning frequency and costs
- Proprietary vented seal carrier eliminates pressure shocks during startups.



PRO series

PRO-XR

Durable **X**treme High **R**ejection BWRO

PRO-XR supplies the best combination of high rejection and high flow capability at low pressures, compared to all commercial low pressure type RO elements.



- Low fouling, high rejection RO membrane
- Key benefits :
    - Brackish water membrane with the highest salt rejection
    - Surface coating to minimize organic fouling
    - High tolerance to caustic cleaning
    - Specially designed elements for rugged applications

Parameter	PRO-XR1
Standard Test Condition	225 psi (1.55 MPa) 2000 ppm NaCl
Nominal NaCl rejection	99,7%
Permeate flow	11,500 gpd (43.5 m^3/d)
Active Membrane area	400 ft^2 (37 m^2)
Feed spacer thickness	34 mil (0.86 mm)
Maximum Pressure	600 psi (41.4 bar)





PRO series

PRO-LF

Low **F**ouling high pressure RO membrane

PRO-LF are spiral wound RO membranes which are neutrally charged and have a hydrophilic coating to minimize fouling while treating high salinity wastewaters. PRO-LF is ideal for treating high-fouling brine streams generated from the first step of a ZLD system.



- Low fouling, high pressure RO membrane
- Key benefits :
    - Operates at high feed pressure
    - Hydrophilic coating more resistant to organic fouling
    - Superior salt rejection
    - Thicker feed spacer to reduce foulant blocage
    - Robus chemistry is highly resistant to aggressive cleaning

Parameter	PRO-LF1
Standard Test Condition	800 psi (5.5 MPa) 32,000 ppm NaCl
Nominal NaCl rejection	99,8%
Permeate flow	7,700 gpd (29.1 m^3/d)
Active Membrane area	400 ft^2 (37 m^2)
Feed spacer thickness	34 mil (0.86 mm)
Maximum Pressure	1200 psi (82.8 bar)





PRO series

PRO-XS

Xtreme Separation of Salt species

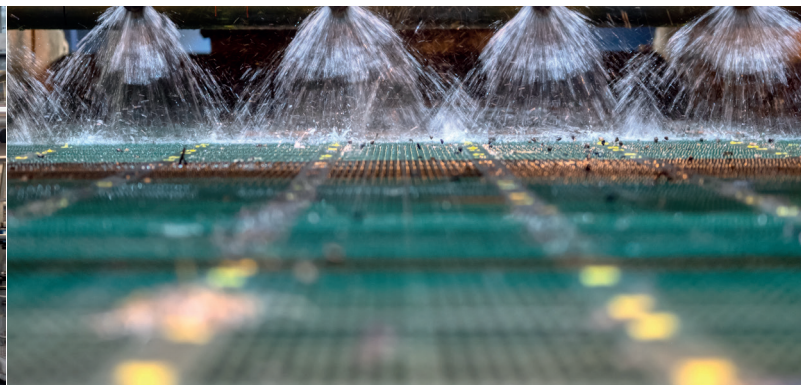
PRO-XS is a series of spiral wound NF membranes with high ion selectivity designed for salt separation in the liquid stream to achieve more purified salt streams for either salt extraction or recycle.



- Extra selective NF membrane
- Key benefits :
    - Salt Splitting Membrane SO_4 - Cl, Mg,Ca - Na
    - Element configuration to handle high brine concentrations
    - Low fouling membrane sheet to reduce organic adsorption
    - Thicker feed spacer to reduce foulant blockage

Parameter	PRO-XS1	PRO-XS2	PRO-XS3
Standard Test 110 psi (0.76 MPa) 2000 ppm MgSO4	Higher Salt separation at up to 1200 psi	High Salt Separation at up to 600 psi	High Salt Separation at up to 1200 psi
Nominal NaCl rejection	99,8%	99,7%	99,7%
Permeate flow	8,500 gpd (32.3 m^3/d)	11,000 gpd (41.6 m^3/d)	9,650 gpd (36.5 m^3/d)
Active Membrane area	400 ft^2 (37 m^2)	400 ft^2 (37 m^2)	400 ft^2 (37 m^2)
Feed spacer thickness	34 mil (0.86 mm)	34 mil (0.86 mm)	34 mil (0.86 mm)
Maximum Pressure	1200 psi (82.7 bar)	600 psi (41.4 bar)	1200 psi (82.7 bar)





PRO series

PRO-XP

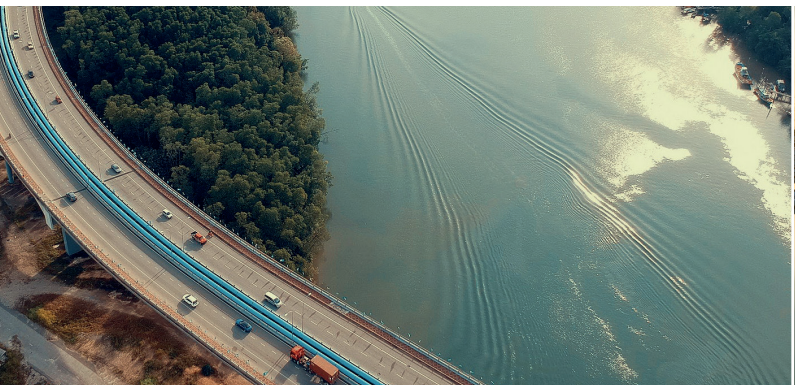
Desalination at **X**treme **P**ressures

PRO-XP are ultra-high pressure RO membranes which can operate at pressures up to 1,800 psi (12.4 MPa), exceeding normal RO pressure limits of 1,200 psi (8.27 MPa).



- Ultra-High Pressure RO membrane
- Key benefits :
    - Operates as highest feed pressure
    - Excellent rejection over long-term operation
    - Extra robust construction to handle difficult wastewater applications
    - Thicker feed spacer to reduce foulant blockage

Parameter	PRO-XP1
Standard Test Condition	800 psi (5.5 MPa) 32,000 ppm NaCl
Nominal NaCl rejection	99,8%
Permeate flow	8,000 gpd (30.3 m^3/d)
Active Membrane area	365 ft^2 (33.9 m^2)
Feed spacer thickness	34 mil (0.86 mm)
Maximum Pressure	1800 psi (124 bar)





Pollet Water Group

Make water count.
www.polletwatergroup.com

