Reverse Osmosis and Nanofiltration Water Spirals Portfolio



Leadership in Filtration

MANN+HUMMEL

Overview

REVERSE OSMOSIS

Reverse osmosis (RO) is a membrane filtration technology that effectively **removes ions such as sodium and chloride**, as well as organic molecules, including pesticides and herbicides. RO is widely used in various applications, including **water and wastewater treatment, food and beverage processing, and pharmaceutical manufacturing**.

NANOFILTRATION

Nanofiltration (NF) membranes are designed to selectively **remove large organic molecules and multivalent ions such as calcium and magnesium.** The combination of selective removal capabilities and low energy requirements makes NF membranes ideal for numerous **drinking water applications**, including water softening, decolorization, and micropollutant removal. In **industrial applications**, nanofiltration is particularly effective at removing specific components such as coloring agents in the textile industry.

RO and NF membranes are commonly made from **thin-film composite (TFC) materials**, featuring a thin polyamide layer supported by a polysulfone (PSU) or polyethersulfone (PES) base. These membranes are arranged into modules that typically run in crossflow mode, where the feed liquid moves across the membrane surface. This flow helps create shear forces that limit fouling and scaling, supporting consistent performance and longer membrane life.







STANDARD AND CUSTOM SOLUTIONS

MANN+HUMMEL Water & Membrane Solutions (WMS) offers a comprehensive portfolio of RO and NF membranes to suit a wide range of applications. All elements mentioned in this brochure are **available in 2.5”, 4”, and 8” sizes** as well as various other configurations and customizations to meet diverse project requirements.

KEY ADVANTAGES

- Effective removal of dissolved solids
- High-quality water production
- Cost-effective technology compared to thermal processes
- Suitable for diverse applications

Brackish water reverse osmosis elements

HIGH-REJECTION BRACKISH WATER REVERSE OSMOSIS ELEMENTS

High-rejection brackish water reverse osmosis (BWRO) elements from MANN+HUMMEL WMS are manufactured using TFC polyamide technology. The elements are **NSF/ANSI Standard 61 and Halal certified**, making them suitable for both industrial and drinking water applications.

APPLICATIONS

- Municipal drinking water
- Semiconductor industry
- Pharma
- Food and beverage
- Boiler feed water

Product	Identical to	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
MICRODYN 8040-BW-365	Oltremare BR2-8040	99.6%	99.4%	34 (365)	37.9 (10000)
MICRODYN 8040-BW-400	Oltremare BR3-8040	99.6%	99.4%	37.2 (400)	41.6 (11000)
MICRODYN 8040-BW-400/34	Oltremare BR3G-8040	99.6%	99.4%	37.2 (400)	41.6 (11000)
MICRODYN 8040-BW-440	Oltremare BR34-8040	99.6%	99.4%	40.9 (440)	45.6 (12000)

APPLICATIONS

- Tertiary effluent and water reuse
- Industrial wastewater treatment
- Surface water with high fouling potential

FOULING-RESISTANT MEMBRANES

Fouling-resistant membranes from MANN+HUMMEL WMS are specifically designed for **water reuse applications with high fouling potential, such as tertiary effluent treatment**. These membranes are also ideal for treating surface water with high organic content as well as industrial wastewater.

Product	Identical to	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
Oltremare FOUL1-4040		99.4%	99.0%	7.9 (85)	7.6 (2000)
MICRODYN 8040-FR-400	Oltremare FOUL1-8040	99.5%	99.0%	37.2 (400)	40 (10500)
MICRODYN 8040-FR-400/34	Oltremare FOUL2G-8040	99.5%	99.0%	37.2 (400)	40 (10500)

LOW-ENERGY BRACKISH WATER REVERSE OSMOSIS ELEMENTS

With the perfect balance of **low energy consumption and high rejection rates**, low-energy BWRO elements from MANN+HUMMEL WMS are ideal for applications that do not require very high purity water, providing significant energy and cost savings. These elements are suited to both newly designed systems and retrofitted installations.

APPLICATIONS

- Ground and surface water treatment
- High-purity industrial applications
- Municipal water reclamation

Product	Identical to	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
MICRODYN 4040-ULE	Oltremare LOW3-4040	98.8%	98.0%	7.9 (85)	11.4 (3000)
MICRODYN 8040-ULE-400		98.8%	98.0%	37.2 (400)	53 (14000)
MICRODYN 8040-ULE-440		98.8%	98.0%	40.9 (440)	57 (15000)
MICRODYN 4040-XLE		99.2%	99.0%	7.9 (85)	9.8 (2600)
MICRODYN 8040-XLE-400		99.2%	99.0%	37.2 (400)	45.4 (12000)
MICRODYN 8040-XLE-440		99.2%	99.0%	40.9 (440)	50 (13200)
MICRODYN 4040-XRLE	Oltremare LOW2-HR-4040	99.65%	99.40%	7.9 (85)	7.2 (1900)
MICRODYN 8040-XRLE-400	Oltremare LOW2-HR-8040	99.65%	99.40%	37.2 (400)	35.9 (9500)
MICRODYN 8040-XRLE-400/34	Oltremare LOW2G-HR-8040	99.65%	99.40%	37.2 (400)	35.9 (9500)
MICRODYN 8040-XRLE-440	Oltremare LOW24-HR-8040	99.65%	99.40%	40.9 (440)	39.7 (10500)
MICRODYN 4040-LE		99.3%	98.8%	7.9 (85)	8.3 (2200)
MICRODYN 8040-LE-400		99.3%	98.8%	37.2 (400)	40 (10550)
MICRODYN 8040-LE-400/34		99.3%	98.8%	37.2 (400)	40 (10550)
MICRODYN 8040-LE-440		99.3%	98.8%	40.9 (440)	43.9 (11550)
Oltremare LOW1-4040		99.5%	99.2%	7.9 (85)	9.8 (2600)
Oltremare LOW1-8040		99.3%	99.0%	37.2 (400)	45.4 (12000)
Oltremare LOW1G-8040		99.3%	99.0%	37.2 (400)	45.4 (12000)
Oltremare LOW14-8040		99.3%	99.0%	40.9 (440)	50 (13200)
MICRODYN 4040-HRLE	Oltremare LOW2-4040	99.5%	99.3%	7.9 (85)	7.9 (2100)
MICRODYN 8040-HRLE-400	Oltremare LOW2-8040	99.5%	99.3%	37.2 (400)	39.7 (10500)
MICRODYN 8040-HRLE-400/34	Oltremare LOW2G-8040	99.5%	99.3%	37.2 (400)	39.7 (10500)
MICRODYN 8040-HRLE-440	Oltremare LOW24-8040	99.5%	99.3%	40.9 (440)	43.5 (11500)
MICRODYN 4040-XLE	Oltremare LOW4-4040	99.2%	99.0%	7.9 (85)	9.8 (2600)

Product	Identical to	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
MICRODYN 8040-XLE-400	Oltremare LOW4-8040	99.2%	99.0%	37.2 (400)	45.4 (12000)
MICRODYN 8040-XLE-440	Oltremare LOW44-8040	99.2%	99.0%	40.9 (440)	50.0 (13200)
Oltremare LOW7 4040		99.2%	99.0%	7.9 (85)	9.5 (2500)
Oltremare LOW7 4040XL		99.2%	99.0%	9.8 (105)	11.7 (3100)

Seawater reverse osmosis elements

HIGH-REJECTION/HIGH-PRODUCTIVITY SEAWATER REVERSE OSMOSIS ELEMENTS

The high-rejection series seawater reverse osmosis (SWRO) membranes is designed for **seawater desalination and other high-salinity water purification applications**, such as in industrial processes that require exceptional permeate water purity. The high-productivity series is ideal for applications demanding low energy consumption while maintaining reliable performance.

APPLICATIONS

- Conventional and hybrid seawater desalination plants
- Industrial water with high salinity

Product	Identical to	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
MICRODYN 4040-SWL	Oltremare SEA2-4040	99.4%	99.2%	7.9 (85)	7.4 (1950)
MICRODYN 8040-SWL-400/34	Oltremare SEA5G-8040	99.75%	99.65%	37.2 (400)	34.1 (9000)
MICRODYN 8040-SWL-440	Oltremare SEA54-8040	99.75%	99.65%	40.9 (440)	37.5 (9900)
MICRODYN 8040-SWM-400/34	Oltremare SEA1G-8040	99.75%	99.65%	37.2 (400)	28 (7500)
MICRODYN 8040-SWM-440	Oltremare SEA14-8040	99.75%	99.65%	40.9 (440)	30.2 (8000)
MICRODYN 4040-SWH	Oltremare SEA5-4040	99.6%	99.4%	7.9 (85)	6.4 (1700)
MICRODYN 8040-SWH-400/34	Oltremare SEA4G	99.8%	99.7%	37.2 (400)	22.7 (6000)
MICRODYN 8040-SWH-440	Oltremare SEA44	99.8%	99.7%	40.9 (440)	25.0 (6600)

MANN+HUMMEL Water & Membrane Solutions SWRO elements are available in various sizes, configurations, and operational capabilities.

Scan for **test conditions** and **technical data sheets** for each module.



Nanofiltration elements

The less dense NF7 membranes from MANN+HUMMEL WMS **selectively reject divalent and polyvalent ions as well as organics like natural organic matter (NOM)**, per- and polyfluoroalkyl substances (PFAS), and pharmaceuticals while allowing monovalent ions like Na+ or Cl- to pass through. In contrast, the dense NF9 membranes provide very high rejection (including NaCl) even at low pressures.

APPLICATIONS

- Removal of total organic carbon (TOC), NOM and many other organics
- Water softening
- Industrial water reuse
- Magnesium recovery from seawater

Product	Identical to	Nominal rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
MICRODYN NF7-4040	Oltremare NANO7-4040	97.0%	7.9 (85)	9.5 (2500)
MICRODYN NF7-8040	Oltremare NANO7-8040	97.0%	37.2 (400)	47.3 (12500)
MICRODYN NF9-4040	Oltremare NANO9-4040	97.0%	7.9 (85)	7.6 (2000)
MICRODYN NF9-8040	Oltremare NANO9-8040	97.0%	37.2 (400)	40 (9500)

The MANN+HUMMEL Water & Membrane Solutions NF portfolio offers a unique combination of selective rejection and high flow.



Cellulose acetate membranes

The TRISEP SB series features a **cellulose acetate/triacetate blend** that offers an excellent combination of **chlorine tolerance (0.5 ppm nominal/1 ppm max.), solute rejection, and fouling resistance**, making the series a perfect fit for applications with high biofouling potential. The SB20 model delivers high rejection while the SB50 model is designed for higher flow.

APPLICATIONS

- Demineralization of feed water with high biofouling potential
- Removal of total organic carbon (TOC), NOM and many other organics

BRACKISH WATER

Product	Nominal rejection	Minimum rejection	Area m^2 (ft^2)	Flow m^3/d (gpd)
TRISEP PLT 4040-SB20-31	98.0%	97.0%	7.4 (80)	6.1 (1600)
TRISEP 4040-SB20-TSA	98.0%	97.0%	7.4 (80)	6.1 (1600)
TRISEP 8040-SB20-TPA	98.0%	97.0%	30.2 (325)	24.6 (6500)
TRISEP 8040-SB20-TSA	98.0%	97.0%	32.5 (350)	26.5 (7000)
TRISEP 8040-SB20-TSFA	98.0%	97.0%	32.5 (350)	26.5 (7000)
TRISEP PLT 4040-SB50-31	96.0%	92.5%	7.4 (80)	7.6 (2000)
TRISEP 4040-SB50-TSA	96.0%	92.5%	7.4 (80)	7.6 (2000)
TRISEP 8040-SB50-TSA	96.0%	92.5%	32.5 (350)	32.2 (8500)
TRISEP 8040-SB90-TSA	85.0%	80.0%	32.5 (350)	32.6 (8,600)
TRISEP PLT 4040-SB90-31	85.0%	80.0%	7.4 (80)	7.4 (1,950)

- TSA: 1.5" ID permeate water tube, 31 mil feed spacer
- TPA: 1.5" ID permeate water tube, 34 mil feed spacer
- TSFA: 1.125" ID permeate water tube

NANOFILTRATION

Product	MWCO (Molecular Weight Cut Off)	Area m^2 (ft^2)	Flow m^3/d (gpd)
TRISEP PLT 4040-SBNF-31	2,000 (Da)	7.4 (80)	17.0 (4,500)
TRISEP 8040-SBNF-TSA	2,000 (Da)	32.5 (350)	72.0 (19,000)

- TSA: 1.5" ID permeate water tube, 31 mil feed spacer

Oltremare custom elements

Oltremare elements are designed to **purify every water type**, making them suitable for **diverse industrial and commercial applications**. Whether your project requires a non-standard size or a specialized commercial element, Oltremare offers perfect RO and NF solutions.

These **compact elements** are simple to install and replace, and they are available as either an all-in-one vessel solution or an element-only option to fit your system requirements.

For private-label needs, Oltremare offers unparalleled **customization capabilities**. From standard and non-standard elements to commercial products designed for typical operating conditions, Oltremare delivers private-label spiral elements with fully customized labels approved by you.

APPLICATIONS

- Spot-free rinse water and wash water recycling at car washes
- Drinking water treatment in self-service vending machines
- RO drinking water production for residential use
- Ultra-high-pressure membranes for zero- and minimal-liquid discharge (ZLD and MLD) applications
- Potable water production



The MANN+HUMMEL Water & Membrane Solutions manufacturing plant is ISO 9001:2015 certified. Custom-made designs with private labels meet specific technical and brand requirements.

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