

MEMBRANE PROJECTS

2024

EDITION FOR
SNOWATE CATALOG

Sn^owate

Hengshui Snowate Environmental
Technology Co., Ltd.



HENGSHUI SNOWATE ENVIRONMENTAL TECHNOLOGY CO., LTD.

A TRUSTWORTHY SOURCING EXPERT ON WATER TREATMENT FACILITIES

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As a senior sourcing expert on water treatment facilities and accessories, Hengshui Snowate Environmental Technology Co., Ltd. has extensive water treatment expertise, profound water treatment industry experience and a deep understanding of the water treatment industry purchasing demands. As a consequence, we are capable of providing one-stop purchase and technical support on water treatment facilities and accessories according to our customers' applications, thereby helping our customers to shorten the procurement cycle, reduce procurement costs and maximize economic benefits.

We integrate upstream supply chain products of the water treatment industry. In addition, we work with renowned suppliers and manufacturers. As a result, we can continuously supply high-quality water treatment components and systems for customers across the world to meet the needs of a wide range of applications. Thereby optimize water resources and promote the sustainable development of the global environment.



SEAWATER DESALINATION MEMBRANES

Seawater Desalination, Brine Water Treatment, Zero Discharge, Wastewater Resource Utilization

Proprietary membrane formulation, process and element rolling technology ensures high salt rejection, reliability, long-term stability, energy saving, and lower system investment and operating costs.

Core Advantages

- High salt rejection
- Resistant to cleaning with good performance recovery
- High boron rejection
- Reliable with long-term stable operation

Applications

- Seawater and sub-seawater desalination
- Concentration of medium to high salt brine water
- High concentration ratio / high salt separation
- Zero discharge & utilization of wastewater resources

Seawater Desalination RO Membrane Performance Specifications

Type	Membrane Model	Active Area ft ² (m ²)	Flux gpd (m ³ /d)	Min. Rejection Rate (%)	Stablized Rejection Rate (%)	Stabilized Boron Rejection Rate (%)	Test Conditions		
							Pressure psi (MPa)	Solution NaCl (ppm)	Recovery (%)
HR	SM SW-8040-400HR	400 (37.2)	6,500 (24.5)	99.65	99.80	92.0	800 (5.5)	32,000	8
	SM SW-4040-82HR	82 (7.6)	1,320 (5)	99.60	99.75	/			
XLE	SM SW-8040-400XLE	400 (37.2)	9,000 (34)	99.60	99.80	92.0			
	SM SW-8040-440XLE	440 (41)	9,750 (37)	99.60	99.80	92.0			
	SM SW-4040-82XLE	82 (7.6)	1,660 (6.3)	99.60	99.65	/			
HRLE	SM SW-8040-400HRLE	400 (37.2)	7,400 (28)	99.65	99.80	92.0			
	SM SW-8040-440HRLE	440 (41)	7,900 (30)	99.65	99.80	92.0			
	SM SW-4040-82HRLE	82 (7.6)	1,600 (6.1)	99.60	99.70	/			
HRFR	SM SW-8040-400HRFR/34	400 (37.2)	7,400 (28)	99.65	99.80	92.0			
XHR	SM SW-8040-400XHR	400 (37.2)	6,100 (23)	99.70	99.82	92.0			
	SM SW-8040-440XHR	440 (41)	6,600 (25)	99.70	99.82	92.0			
	SM SW-4040-82XHR	82 (7.6)	1,180 (4.5)	99.60	99.75	/			

Commercial Membrane Performance Specification

Type	Membrane Model	Active Area ft ² (m ²)	Flux gpd (m ³ /d)	Min. Rejection Rate (%)	Stablized Rejection Rate (%)	Test Conditions		
						Pressure psi (MPa)	Solution NaCl (ppm)	Recovery (%)
Commercial Seawater Desalination	SM SW-2540-28HR	28 (2.6)	580 (2.2)	99.55	99.7	800 (5.5)	32,000	8
	SM SW-4021-33HR	33 (3.1)	660 (2.5)	99.55	99.65			5
	SM SW-2521-12HR	12 (1.1)	240 (0.9)	99.5	99.6			5
	SM SW-2540-28HRLE	28 (2.6)	680 (2.6)	99.5	99.65			8
	SM SW-4021-33HRLE	33 (3.1)	790 (3)	99.5	99.6			5
	SM SW-2521-12HRLE	12 (1.1)	290 (1.1)	99.4	99.55			5

REVERSE OSMOSIS MEMBRANES INDUSTRIAL GRADE BRACKISH WATER RO MEMBRANE

Core Advantages

- Resistance to cleaning with good performance recovery
- Reliable with longer-term stable operation
- Superior anti-fouling
- Adaptable to feed water quality & temperature change

Applications

- Industrial water purification
- Reclaimed water reuse
- Near-zero discharge



Industrial Brackish Water RO Membrane Performance Specification

Type	Membrane Model	Active Area ft ² (m ²)	Flux gpd (m ³ /d)	Min. Rejection Rate (%)	Stablized Rejection Rate (%)	Test Conditions		
						Pressure psi (MPa)	Solution NaCl (ppm)	Recovery (%)
HR	SM BW-8040-400HR	400 (37.2)	11,350 (43)	99.4	99.7	225 (1.55)	2,000	15
	SM BW-8040-440HR	440 (41)	12,560 (48)	99.4	99.7			
	SM BW-4040-82HR	82 (7.6)	2,250 (8.6)	99.3	99.5			
FR	SM BW-8040-400FR/34	400 (37.2)	11,100 (42)	99.35	99.5			
	SM BW-4040-82FR/34	82 (7.6)	2,000 (7.6)	99.3	99.5			
XFR	SM BW-8040-400XFR/34	400 (37.2)	11,350 (43)	99.4	99.6			
	SM BW-4040-82XFR/34	82 (7.6)	2,050 (7.8)	99.4	99.6			
XLE	SM BW-8040-400XLE	400 (37.2)	12,550 (47.5)	98.0	99.0	125 (0.86)	500	
	SM BW-8040-440XLE	440 (41)	14,000 (53)	98.0	99.0			
	SM BW-4040-82XLE	82 (7.6)	2,400 (9.1)	98.0	99.0			
FRLE	SM BW-8040-400FRLE/34	400 (37.2)	10,500 (40)	99.1	99.3	150 (1.03)	1500	
	SM BW-4040-82FRLE/34	82 (7.6)	1,900 (7.2)	99.0	99.3			
HRLE	SM BW-8040-400HRLE	400 (37.2)	11,350 (43)	99.1	99.3			
	SM BW-8040-440HRLE	440 (41)	12,560 (48)	99.1	99.3			
	SM BW-4040-82HRLE	82 (7.6)	2,250 (8.5)	99.0	99.3			

REVERSE OSMOSIS MEMBRANES
GENERAL BRACKISH WATER RO MEMBRANE

Core Advantages

- High salt rejection
- Low energy consumption
- High anti-fouling
- Adaptable to feed water quality & temperature change

Applications

Purification of surface water, ground water, municipal water



Brackish Water Membrane Performance Specification

Type	Membrane Model	Active Area ft ² (m ²)	Flux gpd (m ³ /d)	Min. Rejection Rate (%)	Stablized Rejection Rate (%)	Test Conditions		
						Pressure psi (MPa)	Solution NaCl (ppm)	Recovery (%)
LP	SM LP-4040-82	82 (7.6)	2,250 (8.6)	99.3	99.6	225 (1.55)	2,000	15
	SM LP-8040-400	400 (37.2)	11,100 (42)	99.3	99.6			
ULP	SM ULP-4040-82	82 (7.6)	2,250 (8.6)	99.0	99.5	150 (1.03)	1,500	15
	SM ULP-8040-400	400 (37.2)	11,350 (43)	99.0	99.5			
	SM ULP-8040-440	440 (41)	12,650 (48)	99.0	99.5			
XLP	SM XLP-4040-82	82 (7.6)	2,220 (8.4)	98.0	99.0	100 (0.69)	500	15
	SM XLP-8040-400	400 (37.2)	11,900 (45)	98.0	99.0			
	SM XLP-8040-440	440 (41)	13,200 (50)	98.0	99.0			

NANOFILTRATION MEMBRANES

Water softening, Organics Removal, Material Separation/Purification/Concentration, Wastewater Resourization.
NF90/NF150/NF280/NF500 can meet the processing needs for different selective material separations, removal of salts or organics from water at lower operating pressures.

Core Advantages

- High Accuracy of Separation
- Low Energy Consumption
- Variable Cut-off MW

Applications

- Removal of Hardness and Organic Matter from Water
- Material Separation, Purification and Concentration
- Salt Separation for Wastewater Resourization



Nano Filtration Membrane Performance Specifications

Type	Membrane Model	Active Area ft ² (m ²)	Flux gpd (m ³ /d)	Stablized Rejection Rate (%)	Test Conditions		
					Pressure psi (MPa)	Solution NaCl (ppm)	Recovery (%)
90 Series	SM NF-90-8040-400	400 (37.2)	8,200 (31)	> 98.5	70 (0.48)	2,000 ppm MgSO ₄	15
	SM NF-90-4040-82	82 (7.6)	1,580 (6)	> 98.5			
150 Series	SM NF-150-8040-400/34	400 (37.2)	8,950 (34)	> 98			
	SM NF-150-4040-82	82 (7.6)	1,850 (7)	> 98			
280 Series	SM NF-280-8040-400	400 (37.2)	12,410 (47)	> 97			
	SM NF-280-4040-82	82 (7.6)	2,430 (9.2)	> 97			
500 Series	SM NF-500-8040-400	400 (37.2)	13,200 (50.0)	> 90			
	SM NF-500-4040-82	82 (7.6)	2,900 (11)	> 90			



20,000 m³/d 1 November 2020

Desalination plant case in Middle East

Dow Reverse Osmosis Membrane Replacement Projects

The salt rejection rate of product was 99.02% in the first week of operation, and after 24 months of operation, the salt rejection rate of the system was stabilized at 98.15% – 98.22%.

Up to now, the salt rejection rate and flux of the system are stable.

In March 2023, 4,000 seawater desalination membrane elements were purchased and all have been replaced.

In November 2023, 4,100 seawater desalination membranes were purchased again.

Membrane Models – SM SW-8040-400HRLE

Snowate SW-8040-400HRLE/34 is a high-end seawater membrane featuring a supporting layer with high compression resistance, thick and dense flawless thin film layer. It has good wear resistance and chemical cleaning resistance. The membrane element does not require post-processing during manufacturing. It tolerates a wide range of pH, which allows more efficient and rougher cleaning using regular acid and base, so it has a high cleaning efficiency. The membrane system can operate in the long term under lower pressure due to thorough cleaning, so the membrane performs better during its service life. It can significantly reduce operation costs and provide the best long-term economy for the seawater desalination system.

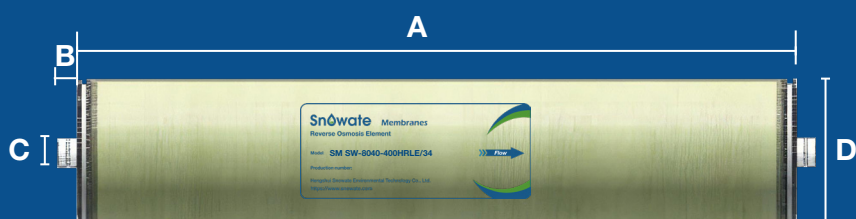


Product Highlights

- Superior high fouling resistance and suitable for poor feed water quality
- Stable and high rejection rate of salts
- High compression and fouling resistance and high cleaning efficiency
- Low power consumption and reduced costs of the membrane system



Product Dimensions



SM SW-8040-400HRLE/34

A	B	C	D
inch (mm)	inch (mm)	inch (mm)	inch (mm)
40 (1,016)	/	1.125 (29)	7.9 (201)



Product Specifications

Type	Membrane Model	Performance Specification			Structural Specification			Test Conditions
		Stabilized Salt Rejection Rate (%)	Boron Rejection Rate (%)	Flux gpd (m³/d)	Active Area ft² (m²)	Feed Spacer Thickness (mil)	Central Tube Inner Diameter (mm)	
SW	SM SW-8040-400HRLE/34	99.8	95.0	8500 (33)	400 (37)	34	29	32,000 mg/L NaCl 800 psi, 25 °C PH 7.8–8.2, Recovery 8%



Operating and cleaning limits

- Maximum Operating Pressure: 83 bar (1200 psi)
- pH Range Short-Term Cleaning: 1–13
- Maximum Operating Temperature: 45 °C (113 °F)
- Maximum Feed SDI (SDI 15): 5.0
- Maximum Element Pressure Drop: 1.0 bar (15 psi)
- Free Chlorine Tolerance: <0.1 ppm
- pH Range Continuous Operation: 2–11

Notes

- Permeate flow for individual elements may vary $\pm 15\%$ from the value specified.
- Active membrane area guaranteed $\pm 4\%$.
- Stabilized salt rejection is generally achieved within 24–48 hours of continuous use; depending upon feedwater characteristics and operating conditions.

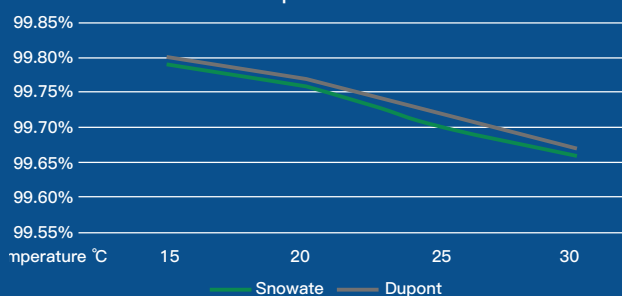
Snowate SW-8040-400HRLE VS DuPont SW30HRLE-400

Performance Comparison Between Snowate & DuPont at Different Temperature			
Test Solution	NaCl	Pressure, MPa	5.5
Concentrate	32,000 ppm	pH	7.82

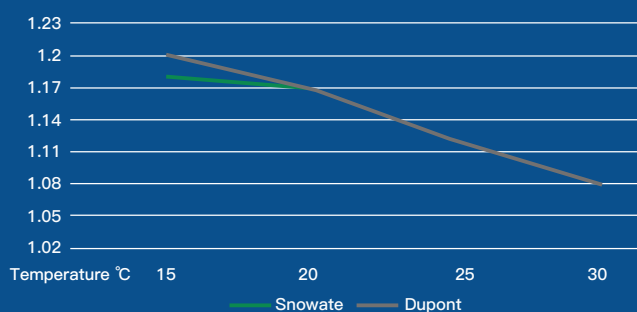
Test Data of Membrane Element					
Temperature, °C	15	20	25	30	
Salt Rejection Rate, %	99.79%	99.76%	99.70%	99.66%	Snowate
	99.80%	99.77%	99.72%	99.67%	DuPont
Flux, m³/h	1.18	1.17	1.12	1.08	Snowate
	1.20	1.17	1.12	1.08	DuPont

Under the same test conditions, the salt rejection rate and flux are close to each other.

Salt Rejection Rate Comparison at Different Temperature



Flux Comparison at Different Temperatures



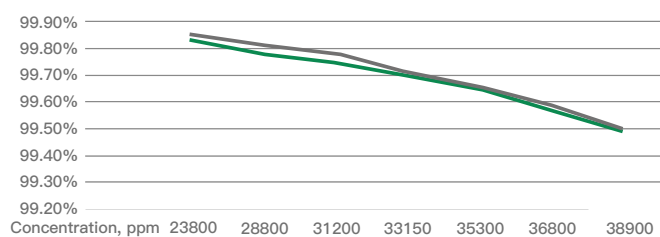
Snowate SW-8040-400HRLE VS DuPont SW30HRLE-400

Performance Comparison Between Snowate & DuPont at Different Concentration			
Test Solution	NaCl	Pressure, MPa	5.5
Temperature, °C	25	pH	7.82

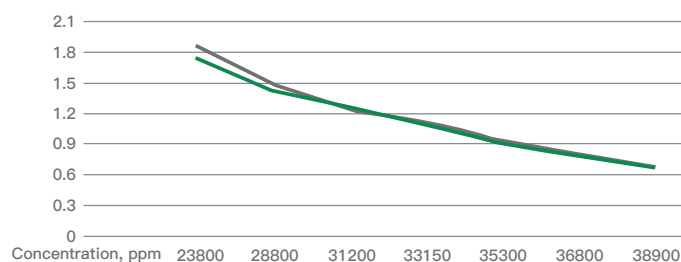
Test Data of Membrane Element								
Concentration, ppm	23,800	28,800	31,200	33,150	35,300	36,800	38,900	
Salt Rejection Rate %	99.83%	99.79%	99.75%	99.70%	99.64%	99.57%	99.49%	Snøwater
	99.86%	99.81%	99.77%	99.71%	99.65%	99.59%	99.50%	DuPont
Flux, m³/h	1.74	1.42	1.26	1.1	0.91	0.78	0.67	Snøwater
	1.86	1.49	1.24	1.11	0.93	0.8	0.68	DuPont

Under the same test conditions, the rejection and flux are close to each other at different concentrations.

Salt Rejection Rate Comparison at Different Concentration

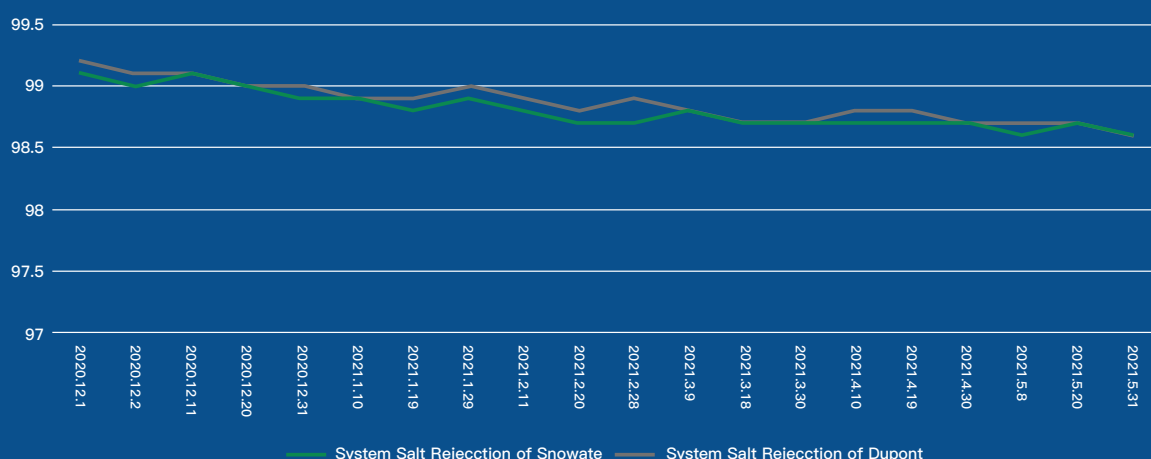


Flux Comparison at Different Concentration



— Snowate — DuPont

— Snowate — DuPont



It can be clearly seen from the data that the system salt rejection rate of the Snowate's Seawater Membrane is close to DuPont's at the same operating conditions.

SM 8040-400HRLE Run Data Report from Customer in Middle East

Snowate



First Month Run Data

Reverse Osmosis Logsheet

Project:	RO Element Field Test	Client:	
Plant:		Skid: 1	Pressure vessel:
Test start-up date:	1/8/2022	Sheet No.	1

Date	Time	Permeate flow (Vessel)	Feed pressure	Concentrate pressure	Feed temperature	Feed salinity	Permeate salinity (Total skid)	Permeate salinity (Vessel)	SR
		[m3/h]	[bar]	[bar]	[°C]	[ppm]	[ppm]	[ppm]	[%]
1/8/2022	21:30	6.45	63.5	56.5	23.6	36400	557	247	99.4
1/9/2022	1:00	6.5	63.5	57	24	36300	566	216	99.5
1/9/2022	5:00	6.4	64	57	23	36400	566	210	99.5
1/9/2022	9:00	6.3	64	57.5	22.6	36100	533	202	99.5
1/9/2022	13:00	6.4	63.5	57.5	24	36200	559	212	99.5
1/9/2022	17:00	6.3	63.9	57.9	23.5	36400	543	208	99.5
1/9/2022	21:00	6.3	63.9	57.5	23.5	36600	525	185	99.6
1/10/2022	1:00	6.3	63.9	57	23.9	36600	542	193	99.6
1/10/2022	5:00	6.3	63.5	57	23.5	36200	532	191	99.6
1/10/2022	9:00	6.3	63.5	57	23	36300	527	182	99.6
1/10/2022	13:00	6.3	63.5	57	23.5	36700	580	203	99.6
1/10/2022	17:00	6.2	63.5	57	24.5	37000	564	196	99.6
1/10/2022	21:00	6.1	63.5	57	24	36700	541	188	99.6
1/11/2022	1:00	6.2	63	56.5	23.8	36400	547	196	99.6
1/11/2022	5:00	6.1	63.5	57	23.5	36100	542	192	99.6
1/11/2022	9:00	6.1	63.5	56.5	23.5	36800	531	185	99.6
1/11/2022	13:00	6.1	63.5	56.5	24	36400	564	193	99.6
1/11/2022	17:00	OFF							
1/11/2022	21:00	6.3	64.5	58	24	36600	550	182	99.6
1/12/2022	1:00	6.3	64.5	58	23.6	36100	548	177	99.6
1/12/2022	5:00	6.2	65	58	23.7	36300	560	186	99.6
1/12/2022	9:00	6.25	64.5	58	23.5	36100	546	230	99.5
1/12/2022	13:00	6.25	64.5	58	23.8	36300	538	127	99.7
1/12/2022	17:00	6.4	64.5	57.9	25	36200	581	133	99.7
1/12/2022	21:00	6.3	65	57.9	24.5	36600	552	176	99.6
1/13/2022	1:00	6.3	65	58	24	36500	540	127	99.7

Approved: Dr. M.

Note: The run data is recorded on one vessel with 7 elements

SM 8040-400HRLE Run Data Report from Customer in Middle East



Run Data after 2 Months

Reverse Osmosis Logsheets

Project:	RO Element Field Test	Client:	
Plant:		Skid: 1	Pressure vessel:
Test start-up date:	1/8/2022	Sheet No.	2

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Approved: Dr. M

Note: The run data is recorded on one vessel with 7 elements

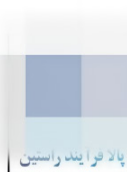
SM 8040-400HRLE Run Data Report from Customer in Middle East



Run Data after 5 Months

Reverse Osmosis Logsheet

Project:	RO Element Field Test	Client:	
Plant:		Skid: 1	Pressure vessel: D2
Test start-up date:	1/8/2022	Sheet No.	4



Date	Time	Permeate flow (Vessel)	Feed pressure	Concentrate pressure	Feed temperature	Feed salinity	Permeate salinity (Total skid)	Permeate salinity (Vessel)	SR
		[m3/h]	[bar]	[bar]	[°C]	[ppm]	[ppm]	[ppm]	[%]
9/25/2022	9:00	5.8	65	58	21	34400	465	113	99.7
9/25/2022	13:00	OFF							
9/25/2022	17:00	5.9	64.9	57.9	22	34300	471	112	99.7
9/25/2022	21:00	5.9	65	57.9	22	34700	464	110	99.7
9/26/2022	1:00	5.9	65	57.9	22	34700	472	113	99.7
9/26/2022	5:00	5.9	65	58	21.5	34600	464	109	99.7
9/26/2022	9:00	5.9	65	58	21.7	34200	456	109	99.7
9/26/2022	13:00	5.9	65	58	23.4	34800	490	145	99.7
9/26/2022	17:00	5.95	64.9	58	23.6	34900	490	164	99.6
9/26/2022	21:00	5.95	64.9	57.9	22	34900	466	112	99.7
9/27/2022	1:00	6	65	57.9	21	34800	475	114	99.7
9/27/2022	5:00	5.95	65	57.9	22	34500	467	113	99.7
9/27/2022	9:00	5.95	65	57.9	22	33800	456	150	99.6
9/27/2022	13:00	5.95	64.5	57.5	23.6	34200	478	119	99.7
9/27/2022	17:00	5.95	64.9	58	23.8	34900	499	126	99.7
9/27/2022	21:00	5.95	64.9	57.5	23	34700	468	111	99.7
9/28/2022	1:00	5.95	65	57.9	22	34700	466	112	99.7
9/28/2022	5:00	5.95	64.9	57.9	22	34600	465	112	99.7
9/28/2022	9:00	5.95	64.9	57.9	23.5	34700	464	114	99.7
9/28/2022	13:00	5.9	64.5	57.5	23.8	34800	528	119	99.7
9/28/2022	17:00	OFF							
9/28/2022	21:00	OFF							
9/29/2022	1:00	5.8	64	57.5	22.5	34600	499	119	99.7
9/29/2022	5:00	5.85	64	57.5	22.8	34400	504	121	99.7
9/29/2022	9:00	5.8	64	57	22.7	34700	485	117	99.7
9/29/2022	13:00	5.8	64.5	57.5	23	35200	462	114	99.7

Approved: Dr. M

Note: The run data is recorded on one vessel with 7 elements

SM 8040-400HRLE Run Data Report from Customer in Middle East

Run Data after 1 Year

Reverse Osmosis Logsheet



Project:	RO Element Field Test	Client:	
Plant:		Skid: 1	Pressure vessel: D2
Test start-up date:	1/8/2022	Sheet No.	5

Date	Time	Permeate flow (Vessel)	Feed pressure	Concentrate pressure	Feed temperature	Feed salinity	Permeate salinity (Total skid)	Permeate salinity (Vessel)	SR
		[m3/h]	[bar]	[bar]	[°C]	[ppm]	[ppm]	[ppm]	[%]
1/26/2023	17:00	5.8	64.5	57	23.7	35100	490	121	99.7
1/26/2023	21:00	5.8	64	57.5	23.3	34900	485	120	99.7
1/27/2023	1:00	5.8	64	57.5	23	34800	475	118	99.7
1/27/2023	5:00	5.8	64	57.5	22.5	34600	479	120	99.7
1/27/2023	9:00	5.8	64.5	57.5	23	34700	473	116	99.7
1/27/2023	13:00	5.8	64.5	57	22	34700	477	116	99.7
1/27/2023	17:00	5.8	64.5	57.5	23	35400	518	124	99.7
1/27/2023	21:00	5.8	64.5	57.5	22.5	35200	497	119	99.7
1/28/2023	1:00	5.8	64.5	57	24.5	35000	482	117	99.7
1/28/2023	5:00	5.8	64.5	57.5	23	35200	494	119	99.7
1/28/2023	9:00	5.8	64.5	57	23	34800	487	118	99.7
1/28/2023	13:00	5.8	64.5	57	23	34900	480	115	99.7
1/28/2023	17:00	5.8	64.5	57	23	35200	485	117	99.7
1/28/2023	21:00	5.8	64.5	57	24	35200	490	119	99.7
1/29/2023	1:00	5.8	64.5	57	23.5	35200	485	117	99.7
1/29/2023	5:00	5.75	64.9	57.5	23.5	35700	483	118	99.7
1/29/2023	9:00	5.75	64.5	57	23.4	35100	495	121	99.7
1/29/2023	13:00	5.7	64.9	57.5	23.6	35300	499	123	99.7
1/29/2023	17:00	5.7	64.5	57.5	23.8	35400	490	119	99.7
1/29/2023	21:00	5.8	64.5	57.5	23.8	35400	499	121	99.7
1/30/2023	1:00	5.8	64.5	57.5	23	35000	479	118	99.7
1/30/2023	5:00	5.7	64.5	57	23	34900	473	115	99.7
1/30/2023	9:00	OFF							
1/30/2023	13:00	OFF							
1/30/2023	17:00	5.8	64.5	57.5	23.9	34300	488	122	99.7
1/30/2023	21:00	5.8	64	57	24	35200	498	125	99.7

Approved: Dr. _____

Note: The run data is recorded on one vessel with 7 elements



200 membrane elements

A Seawater Desalination Project in Qingdao, China

Qingdao BCTA Desalination Co., Ltd. was established in October 2008 with a joint investment of 109 million euros (about 151 million US dollars) by Befesa CTA Qingdao S.L. of Spain, Qingdao Citymedia Co., Ltd. and Qingdao Hairun Water Supply Group Co., Ltd., to supply water to island cities with advanced seawater desalination technology.

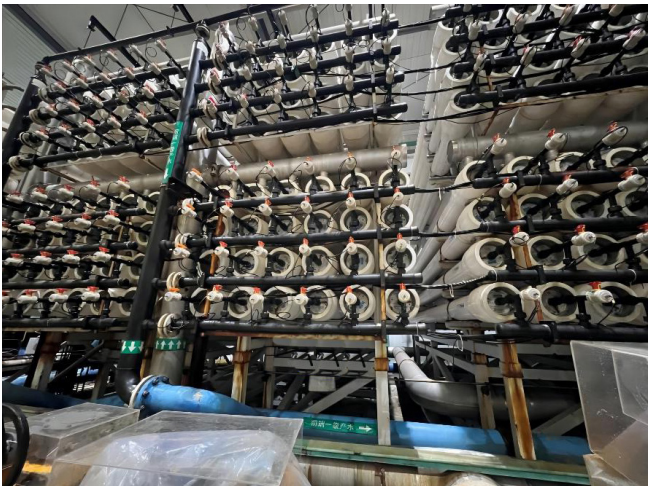
The total investment of the expansion project of the Baifa Seawater Desalination Plant is 744.36 million CNY, covering an area of about 53 acres, with a designed production capacity of 100,000 cubic meters per day.

Our company supplied 200 membrane elements for this project and the current data is running stably.

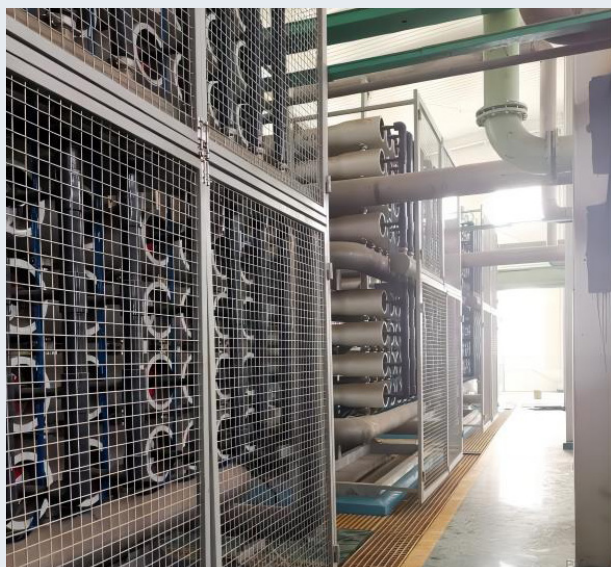


Snowate VS Toray SW Membrane Comparison in Qingdao BCTA Desalination

Operation Data Record						
Date	RO membranes	Boron in Permeate(mg/L)	Permeate Conductivity(μs/cm)	Date	Boron in Permeate(mg/L)	Permeate Conductivity (μs/cm)
20230906	Snowate SW	0.88	356	20230916	1	412.5
	Toray SW	0.7	244		1.02	421.7
20230907	Snowate SW	0.9	300	20230917	0.84	347.3
	Toray SW	0.81	256		0.89	358.4
20230908	Snowate SW	0.92	412	20230918	0.86	387.2
	Toray SW	0.89	304		0.84	379.5
20230909	Snowate SW	0.95	423	20230919	0.72	278.4
	Toray SW	0.76	237		0.78	290.5
20230910	Snowate SW	0.75	357	20230920	1.04	424.6
	Toray SW	0.71	286		1.08	436.2
20230911	Snowate SW	0.89	356	20230921	1.04	398.5
	Toray SW	0.89	305		0.98	344.6
20230912	Snowate SW	1.2		20230922	0.84	321.6
	Toray SW	0.8	269		0.78	256.8
20230913	Snowate SW	0.96	342	20230923	0.97	325.6
	Toray SW	0.98	340		0.92	302.3
20230914	Snowate SW	1.08	420.3	20230924	0.86	331.6
	Toray SW	1.04	430		0.89	358.6
20230915	Snowate SW	1.02	390	20230925	0.87	324.8
	Toray SW	0.96	393.1		0.85	325.3



Other seawater desalination projects



A Seawater Desalination Project in Guangdong, China

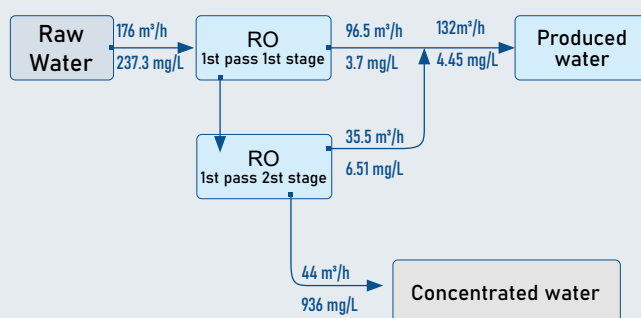
Our SWLE desalination membrane modules run simultaneously with a well-known international brand membrane.

After 12 months of operation, the salt rejection rate of system is stable at 98.52%-98.65%, which is synchronized and stable with the system salt rejection rate of a well-known international brand membrane; So far, the salt rejection rate and flux of the system are stable.

Other Membrane Series Projects



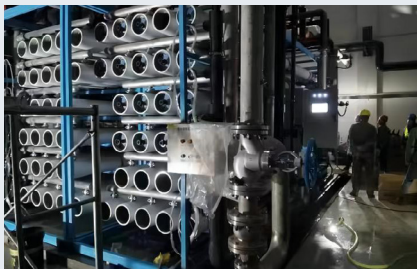
CHALIECO 1000 kt/a alumina overseas project, INDONESIA



For the CHALIECO 1000 kt/a alumina overseas project, the influent water is surface water (SDI <3) with a salt content of 237.3 mg/L.

- The system is designed as one-pass two-stage, total in 2 sets.
- Membrane quantity per membrane rack: 156
- System membrane quantity: 312
- System membrane model: SM BW-8040-400HR

At present, the stabilized salt rejection rate is 98.37%, and the produced water meets project requirements.



Suyin Industrial Park Water Reclamation Plant Project, China

In 2021, Suyin Industrial Park Reclaimed Water Plant Project purchased a total of 396 anti-pollution series membrane elements and 66 sets of 6-elements membrane housings from our company.

The system recovery rate is 73.8%, the system is stable, and the initial salt rejection rate is 98.6%. So far, the project has been stable and gains highly evaluate from customers.

A Replacement Project of Thermal Power Plant in Ningxia, China

Water treatment capacity 100 m³/h

The project purchased 120 pcs of our BW anti-pollution series products. At the initial stage, the stabilized salt rejection rate of the system was 98.73%. After 12 months of operation, the salt rejection rate of the system is stable at about 98.55%, with no obvious change and no decrease in water production.



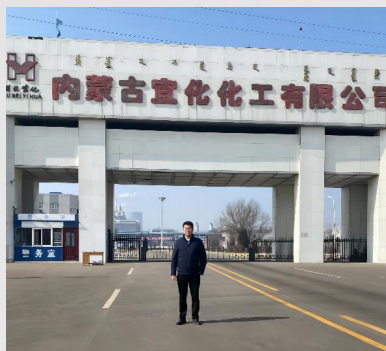


312 1 2022

A Replacement Project in Yihua Chemical Co.,Ltd, China

Inner Mongolia Yihua Chemical Co., Ltd. is a wholly-owned subsidiary invested and established by Hubei Yihua Chemical Co., Ltd. and has an annual production capacity of 510,000 tons of calcium carbide, 300,000 tons of caustic soda, 300,000 tons of PVC and 30,000 tons of pentaerythritol. A set of public works desalted water unit has been built. The designed three-pass desalted water unit production capacity is 330 m³/h. Water is produced by adopting a reverse osmosis system after multi-media filtration, then passes through the anion and cation bed and the mixed bed to produce desalted water.

In 2022, 312 anti-pollution series membrane elements of our company were purchased in batches for multiple sets of reclaimed water reuse systems. After replacing membranes, the stabilized salt rejection reaches 98.7%. The water yield of the system is 260–280 m³/h. And we have won 5 tenders of customer.





- RO1 reverse osmosis unit is set as 3+2 static standby, 3 sets of RO1 can meet 100% operation condition, RO2 reverse osmosis unit is set as 2+1 static standby, 2 sets of RO2 can meet 100% operation condition, RO3 reverse osmosis unit is set as 1+1 static standby, and one set of RO3 can meet 100% operation condition.
- The reverse osmosis membranes are required to achieve a 97% salt rejection rate (within three years), recovery rate of RO1 reverse osmosis unit is not less than 80% (within three years), recovery rate of RO2 reverse osmosis unit is not less than 60% (within three years), and recovery rate of RO3 reverse osmosis unit shall not be less than 80% (within three years).

Lanzhou Petrochemical Project to treat water with high salt content.

The treatment scale of units for separating salt from high salt water by crystallization is 400 m³/h, and the annual operation time of the unit is 8,400 hours. This system includes pretreatment, membrane treatment, silicon removal treatment, ozone catalytic oxidation, salts separation by NF, fractional crystallization, sludge treatment system, wastewater temporary storage system, etc. Supporting utilities and auxiliary facilities include circulating water station, device substation and cabinet room.

The reverse osmosis membrane elements of this project are respectively applied to three reverse osmosis treatment units, i.e. reverse osmosis unit (RO1) in membrane treatment section, reverse osmosis unit (RO2) for treatment of produced water from salts separation by NF and reverse osmosis unit (RO3) in the salt separation and refining section of NF, where RO2 and RO3 are connected in series in two passes, and the water produced by RO2 is the influent water of RO3.

Item	Analysis item	unit	RO1 water quality requirement	RO2 water quality requirement	RO3 water quality requirement
1	pH	-	6.5–8.5	6.5–8.5	6.5–8.5
2	Conductivity	μS/cm	≤300	≤600	≤100
3	Total Dissolved Solids (TDS)	mg/L	≤150	≤400	≤50
4	Chloride (as Cl ⁻)	mg/L	≤40	≤80	≤10
5	Sulfate (as SO ₄ ²⁻)	mg/L	≤50	≤100	≤1
6	Turbidity	NTU	≤1	≤1	≤1
7	COD _{Mn}	mg/L	≤1	≤5	≤1
8	Total Organic Carbon	mg/L	≤1	≤2	≤1
9	Ammonia Nitrogen (as NH ₃ -N)	mg/L	≤1	≤2	≤1

Shaoguan Printing and Dyeing Factory New Project, China

The newly-built printing and dyeing wastewater project is divided into two phases. The project has passed strict test.

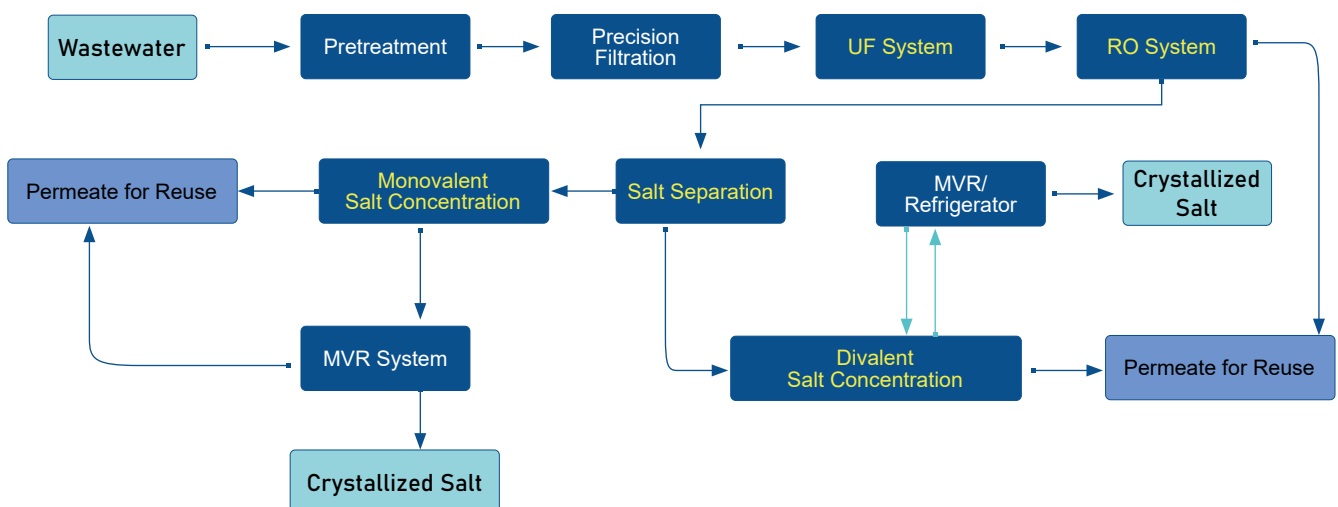
Phase I: Reclaimed water reuse 150 Tons/H

- According to the requirements of customers, we customized and manufactured roll type UF membranes (240 pcs) and roll type RO membranes (480 pcs) according to the inlet water quality, treatment processes and equipment.
- Processes: 2-pass RO system,
- Processing effect: The feed water TDS is 4780ppm, permeate TDS 50 ppm. System rejection: 98.95%, system recovery: 65%. RO system concentration TDS is 13657 ppm(90% Na_2SO_4 + 10% NaCl)



Phase II: Pilot Project for zero discharge and resource recovery

- Processes: 2 Tons/H high concentration system
- Processing effect: Concentrate TDS is 54600 ppm, we customized and manufactured 2pcs high-salt separation membrane, obtained >98.5% purity Na_2SO_4
- The Snowate High Concentration and High-salt Separation membrane is combined with the energy recovery system can significantly improve the concentration, purity of separation, energy saving and shorten the process.



New Project of Xinjiang Waterworks, China

The project is a new project of 1000 m³ drinking water treatment system of Xinjiang Waterworks. 216 pieces anti-pollution reverse osmosis membrane elements of our company are used in this project. The influent is surface water. The initial system stabilized salt rejection is 98.85%.



Ningxia Qiyuan Pharmaceutical Co.,Ltd. Replacement Project, China

Qiyuan Pharmaceutical purchased a total of 144 pieces membrane elements for membrane replacement projects, which were mixed used with first-line imported membrane elements.

The salt rejection rate of a single system before membrane change was 94.72%, and the stabilized salt rejection rate of a single system rose to 98.44% after membrane change.



Desalted Water System in Power Workshop of a Coal Chemical Plant in Ningxia, China

- Water treatment capacity is 500 m³/h.
- The initial system stabilized salt rejection rate was 98.5%. After 4 months of operation, the system continues to stabilize at 98.4%.
- At present, the salt rejection rate and flux of the system is stable.



Sewage Treatment Project of a Textile Printing and Dyeing Factory in Xiaoshan, Hangzhou, China

- Water treatment capacity is 200 m³/h, and the treated water is reused in the workshop.
- Initial system stabilized salt rejection rate of 98.4% and system salt rejection rate of 98.2% after 8 months of operation.
- At present, the salt rejection rate and flux of the system is stable.

Shaoyang Aquaculture Wastewater Project in Hunan Province, China

Membrane test equipment was composed of submerged MBR flat membrane system + nanofiltration membrane system.

I. Main performance parameters of MBR membrane

- a) Model: CPFC2020-80
- b) Filtration pore size: 0.2 μm (200 nm)
- c) Total effective membrane area: 160 m^2

II. NF membrane Model: NF150 series

III. Running Conditions

- a) MBR system: the effluent of MBR system is clear and yellow with stable water yield.
- b) NF system: the effluent of NF system is clear and transparent.

	MBR Membrane Output	NF Output	Removal Rate
COD (mg/L)	829	8.5	99%
Conductivity (mS/cm)	7.5	3.6	52%



Item	Project	Operating System	Treatment capacity	Raw water source	Time	New/Replace	Model	Remark
1	Shaoguan Nonferrous Metals Co., Ltd., China	Separating salt from melting wastewater water by crystallization, achieving resource utilization.	100 m ³ /h	Waste water	2019	New	BW FR Antifouling Membranes	
2	Zhejiang Shenshui Environmental Protection Engineering Co., Ltd., China	Reclaimed water reuse	100 m ³ /h	Reclaimed water	2019	Replace Dow	BW FR Antifouling Membranes	
3	Surface Water Treatment in Honduras, South America	Demineralized water	156 m ³ /h	Surface water	2019	Replace Dow	BW Industrial Brackish Water Membranes	Export
4	Guangdong Mining Co., Ltd., China	Tailings wastewater treatment	500 m ³ /h	Waste water	2020	New	BW FR Antifouling Membranes	
5	Zhejiang Printing and Dyeing Co., Ltd., China	Reclaimed water reuse	120 m ³ /h	Dyeing wastewater	2020	Replace Dow	BW FR Antifouling Membranes	
6	Civil water production in Jiangmen, Guangdong, China	Sea island civil desalination equipment	/	Seawater	2021	Replace Dow	SW Seawater Desalination Membrane	
7	A zero emission membrane change project, China	Zero emission	1900 m ³ /d	Concentrated salt water	2021	New	SW Seawater Desalination Membrane	
8	Seawater Desalination Project in Shantou, China	Desalination	/	/	2021	Replace Dow	SW Seawater Desalination Membrane	
9	Guangxi Guilin Natural Mineral Water Production Factory, China	Mineral water equipment	144 m ³ /d	Spring water	2021	Replace Dow	NF Nanofiltration Membrane	
10	Hunan Environmental Biotechnology Co., Ltd., China	Breeding wastewater decolorization and COD removal	48 m ³ /d	Waste water	2021	New	NF Nanofiltration Membrane	
11	A landfill in Huangshan City, Anhui Province, China	Landfill Leachate Equipment	360 m ³ /d	Landfill leachate	2021	Replace Dow	NF Nanofiltration Membrane	
12	Guangdong Yunfu City Solid Waste Treatment Center, China	Landfill Leachate Equipment	480 m ³ /d	Landfill leachate	2021	Replace Dow	NF Nanofiltration Membrane	
13	Landfill in Hechi City, Guangxi, China	Landfill Leachate Equipment	300 m ³ /d	Landfill leachate	2021	Replace Dow	NF Nanofiltration Membrane	
14	Ningdong Chemical Wastewater Treatment Plant, Ningxia, China	Zero emission	240 m ³ /h	Chemical wastewater	2021	Replace Dow	BW FR Antifouling Membranes	
15	Yinchuan Industrial Park Sewage Treatment Plant, China	Reclaimed water reuse	520 m ³ /h	Waste water	2021	New	BW FR Antifouling Membranes	
16	Shandong Gaomi Printing and Dyeing Factory, China	Reclaimed water reuse	80 m ³ /h	Dyeing wastewater	2021	Replace Dow	BW FR Antifouling Membranes	
17	Membrane replacement project of Guangzhou Runhua Chemical Plant, China	Reclaimed water reuse	72 m ³ /d	Waste water	2021	Replace LG	BW FR Antifouling Membranes	
18	Condensate water treatment in Changchun, Jilin, China	Condensate Refining	200 m ³ /d	Condensate	2021	Replace Dow	BW FR Antifouling Membranes	
19	Shaanxi Optoelectronics Technology Co., Ltd., China	Pure water system	144 m ³ /d	Tap water	2021	Replace Dow	BW FR Antifouling Membranes	
20	A landfill in Huangshan City, Anhui Province, China	Landfill Leachate Equipment	360 m ³ /d	Landfill leachate	2021	Replace Dow	BW FR Antifouling Membranes	

Item	Project	Operating System	Treatment capacity	Raw water source	Time	New/Replace	Model	Remark
21	Guangdong Yunfu City Solid Waste Treatment Center, China	Landfill Leachate Equipment	480 m ³ /d	Landfill leachate	2021	Replace Dow	BW FR Antifouling Membranes	
22	Landfill in Hechi City, Guangxi, China	Landfill Leachate Equipment	300 m ³ /d	Landfill leachate	2021	Replace Dow	BW FR Antifouling Membranes	
23	Ningxia Thermal Power Plant, China	Demineralized water	250 m ³ /h	High hardness groundwater	2021	Replace Dow	BW FR Antifouling Membranes	
24	Ultrapure water for screen washing in Jiangsu Taizhou LCD screen factory, China	Ultrapure water equipment	60 m ³ /h	Surface water	2021	Replace Dow	BW Industrial Brackish Water Membranes	
25	Membrane replacement project of Northwest Cigarette Factory, China	Groundwater treatment	500 m ³ /d	Groundwater	2021	Replace Vontron	ULP Ordinary Brackish Water Membrane	
26	Wuhu Vehicle Urea Company Membrane Replacing Project, China	Vehicle urea equipment	24 m ³ /d	Tap water	2021	Replace Aowei	ULP Ordinary Brackish Water Membrane	
27	Rongcheng small desalination equipment, China	Sea island civil desalination equipment	/	Seawater	2022	Replace Dow	SW Seawater Desalination Membrane	
28	Guangdong small seawater desalination equipment	Sea island civil desalination equipment	/	Seawater	2022	Replace Dow	SW Seawater Desalination Membrane	
29	A Filtration Technology Co., Ltd. in Shandong, China	Internal circulation greening system	80 m ³ /h	Beijing surface water	2022	Replace	SW Seawater Desalination Membrane	
30	Qingdao Seawater Desalination Co., Ltd., China	Desalination	150 m ³ /h	Seawater	2022	Replace TORAY	SW Seawater Desalination Membrane	
31	An Environmental Protection Company in Zibo, Shandong, China	Desalination	150 m ³ /h	Seawater	2022	Replace Dow	SW Seawater Desalination Membrane	
32	Guangdong Jieyang Ecological City Sewage Treatment Project, China	Demineralized water	100 m ³ /h	Sewage	2022	Replace Dow	SW Seawater Desalination Membrane	
33	An Environmental Technology Co., Ltd. in Shanghai, China	Desalination	20 m ³ /h	Seawater	2022	New	SW Seawater Desalination Membrane	
34	An Environmental Technology Co., Ltd. in Shanghai, China	Desalination	20 m ³ /h	Seawater	2022	New	NF Nanofiltration Membrane	
35	A Technology Company in Shaanxi, China	Pure water system	400 m ³ /d	Tap water	2022	Replace HYDRANAUTICS	BW FR Antifouling Membranes	
36	Zhonglian Cement Plant, China	Demineralized water	60 m ³ /h	High hardness surface water	2022	Replace Vontron	BW FR Antifouling Membranes	
37	Yihua Chemical Co.,Ltd in Inner Mongolia, China	Demineralized water	120 m ³ /h	High hardness surface water	2022	Replace Dow	BW FR Antifouling Membranes	
38	Yihua Chemical Co.,Ltd in Inner Mongolia, China	Demineralized water	120 m ³ /h	High hardness surface water	2022	Replace Dow	BW FR Antifouling Membranes	
39	Tap Water Capacity Expansion Project in Xinjiang, China	Demineralized water	240 m ³ /h	High hardness surface water	2022	New	BW FR Antifouling Membranes	
40	Yihua Chemical Co.,Ltd in Inner Mongolia, China	Demineralized water	150 m ³ /h	High hardness surface water	2022	Replace Dow	BW FR Antifouling Membranes	

Item	Project	Operating System	Treatment capacity	Raw water source	Time	New/Replace	Model	Remark
41	Ecological City Sewage Treatment Project in Jieyang, Guangdong, China	Demineralized water	180 m ³ /h	Sewage	2022	Replace Dow	BW FR Antifouling Membranes	
42	Guangdong Industrial Park, China	Reclaimed water reuse	300 m ³ /h	Chip wastewater	2022	New	BW FR Antifouling Membranes	
43	Wastewater Treatment Project of Shaoguan Printing and Dyeing Factory, China	Reclaimed water reuse	600 m ³ /h	Reclaimed water	2022	New	BW FR Antifouling Membranes	
44	Yihua Chemical Co.,Ltd in Inner Mongolia, China	Demineralized water	200 m ³ /h	High hardness surface water	2022	Replace Dow	BW FR Antifouling Membranes	
45	Surface Water Treatment in India	Demineralized water	600 m ³ /h	Surface water	2022	Replace HYDRANAUTICS	BW Industrial Brackish Water Membranes	Export
46	Surface Water Treatment in India	Demineralized water	2000 m ³ /h	Surface water	2022	Replace HYDRANAUTICS	BW Industrial Brackish Water Membranes	Export
47	Yushan Cement Plant Reverse Osmosis Membrane Procurement Project, China	Waste heat power generation	50 m ³ /h	Surface water	2022	Replace Aowei	BW Industrial Brackish Water Membranes	
48	Wastewater Treatment Project of Shaoguan Printing and Dyeing Factory, China	Reclaimed water reuse	600 m ³ /h	Reclaimed water	2022	New	UF Roll Ultrafiltration Membrane	
49	Seawater desalination membrane replacement project in Spanish	Desalination	145 m ³ /h	Seawater	2023	Replace Dow	SW Seawater Desalination Membrane	Export
50	Seawater desalination membrane replacement project in the Middle East	Desalination	/	Seawater	2023	Replace Dow	SW Seawater Desalination Membrane	Export 4000 pieces
51	Yihua Chemical Co.,Ltd in Inner Mongolia, China	Demineralized water	120 m ³ /h	High hardness surface water	2023	Replace Dow	BW FR Antifouling Membranes	
52	A Coal Chemical Group Membrane Replacement Project, Liaoning, China	Reclaimed water reuse	120 m ³ /h	Reclaimed water	2023	Replace Dow	BW FR Antifouling Membranes	
53	CHALIECO Indonesia Manpawa 1000kt/a Alumina Project	Demineralized water	352 m ³ /h	Surface water	2023	New	BW Industrial Brackish Water Membranes	Export
54	Surface Water Treatment in India	Demineralized water	2500 m ³ /h	Surface water	2023	Replace HYDRANAUTICS	BW Industrial Brackish Water Membranes	Export
55	Photovoltaic Power Plant reverse osmosis membrane replacement project in Shaanxi, China	Demineralized water	240 m ³ /d	Tap water	2023	Replace Dow	BW Industrial Brackish Water Membranes	
56	Printing and Dyeing Plant Wastewater Treatment Project Expansion in Shaoguan, China	Printing and dyeing wastewater treatment	600 m ³ /h	Dyeing wastewater	2023	New	UF Roll Ultrafiltration Membrane	
57	Direct drinking water roll type ultrafiltration membrane new project	Drinking water filtration	256 m ³ /h	Surface water	2023	New	UF Roll Ultrafiltration Membrane	
58	New material membrane replacement project, Liaoning, China	Demineralized water	105 m ³ /h	Surface water	2023	Replace Vontron	LP Ordinary Brackish Water Membrane	
59	New Material Company Purchasing project, Guangxi, China	Demineralized water	150 m ³ /h	Tap water	2023	New	ULP Ordinary Brackish Water Membrane	

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