

SAMYANG

TRILITE
삼양 트리라이트
Reverse Osmosis

TRILITE Reverse Osmosis Membrane



Samyang Corporation

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Samyang Group Overview



Established in
1924



Employees
3,500



Sales (2023)
4.1 Bn.



Food Businesses

- › Sugar
- › Starch sugar
- › Sweeteners
- › Flour
- › Cooking oil
- › Modified fats
- › Pre-mixes
- › Nutritional supplements



Pharmaceutical Business

- › Surgical sutures
- › Antibiotics
- › Patches



Packaging

- › Pet bottles
- › Aseptic Business



Other Business

- › Data system
- › Beauty business

Chemical Business

- › Polycarbonate Engineering plastics
- › Ion exchange resins, EDI & Reverse Osmosis Membrane
- › Bisphenol A
- › Terephthalic acid
- › Electronic Materials
- › Cosmetic ingredients

- ☰ Samyang Corp.
- ☰ Samnam Petrochem
- ☰ Samyang Kasei
- ☰ Samyang Innochem
- ☰ Samyang Fine Technology

TRILITE Water Solutions

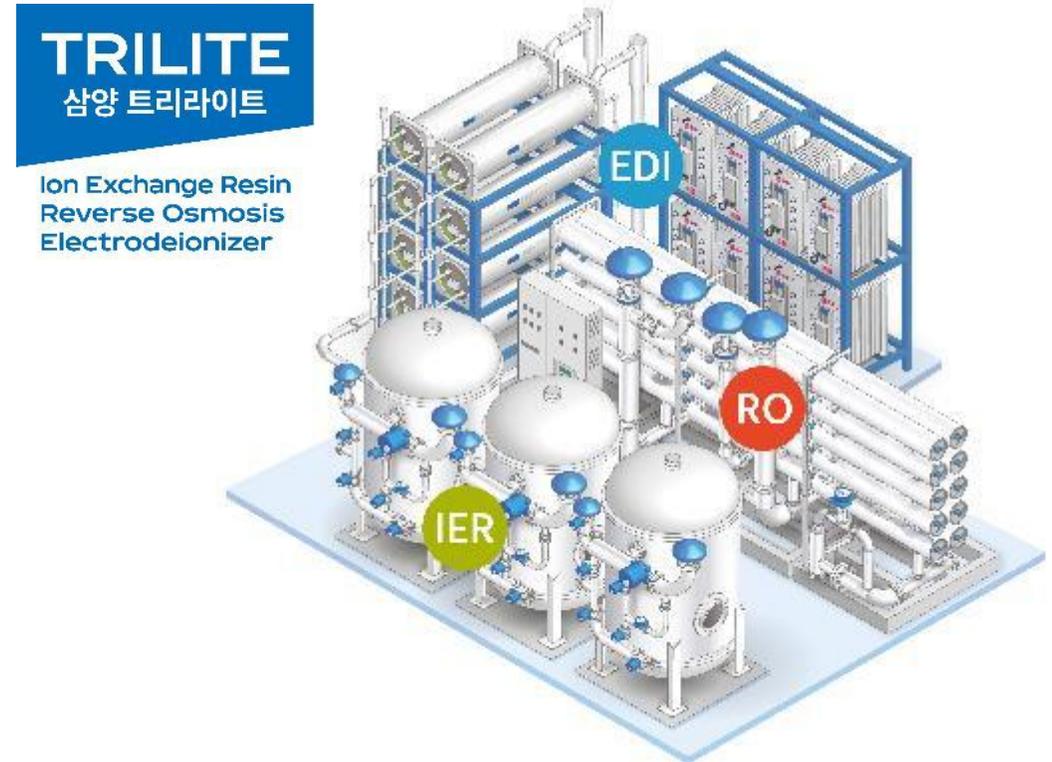
Samyang represents the history of ion exchange resins in Korea.

Samyang has been producing ion exchange resins since 1976 and, since 2011, has developed ultrapure water grade ion exchange resins, contributing to the competitiveness of the semiconductor/display industries.

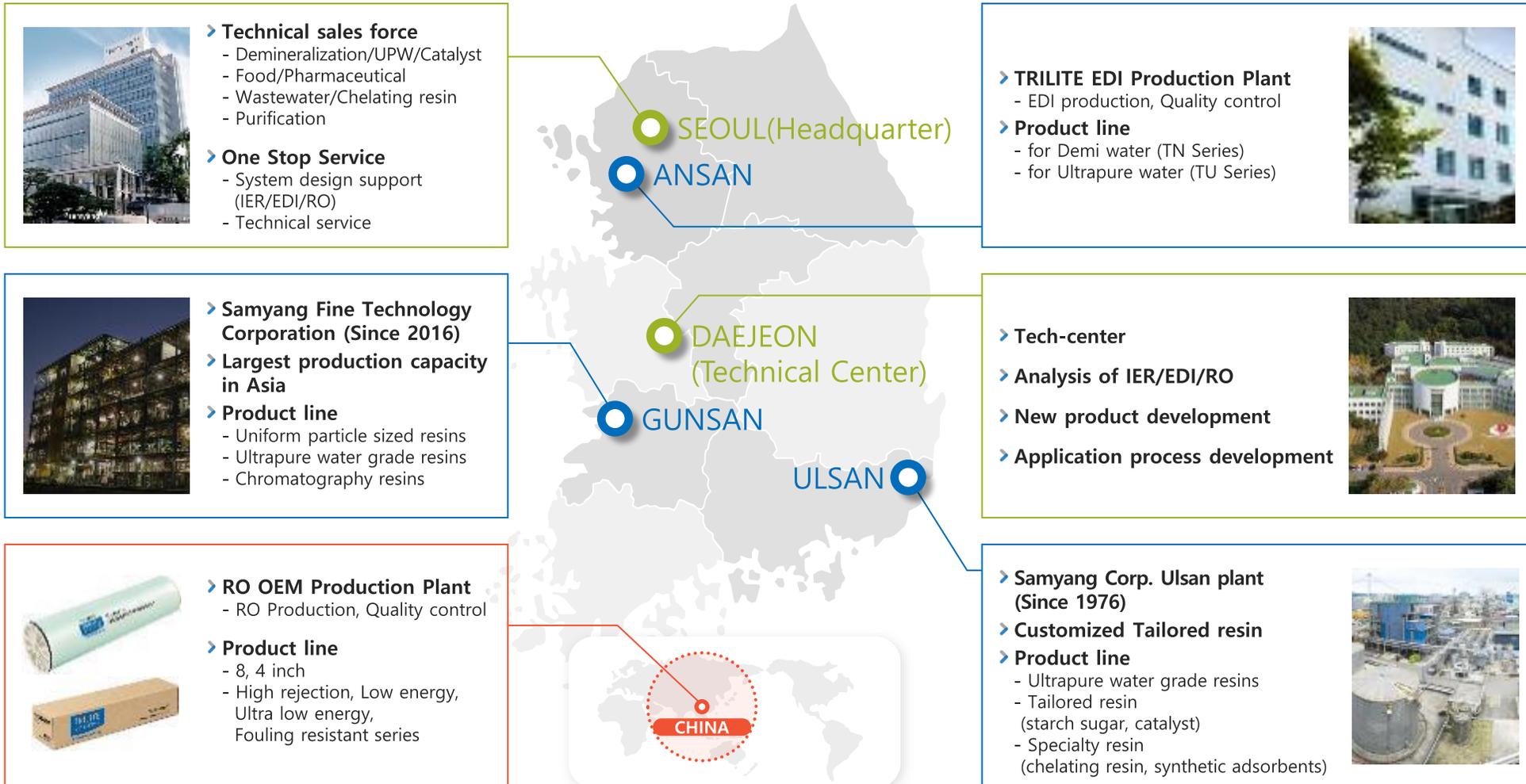
In 2016, Samyang has established Asia's largest plant dedicated to uniform particle-sized ion exchange resins in Gunsan, leading the global premium ion exchange resin market for applications such as nuclear power plants, semiconductors, and chromatography.

To meet various water treatment needs, we entered the eco-friendly water treatment system EDI (Electrodeionizer) business in 2021 and added the Reverse Osmosis Membrane business in 2023, providing a total water treatment solution.

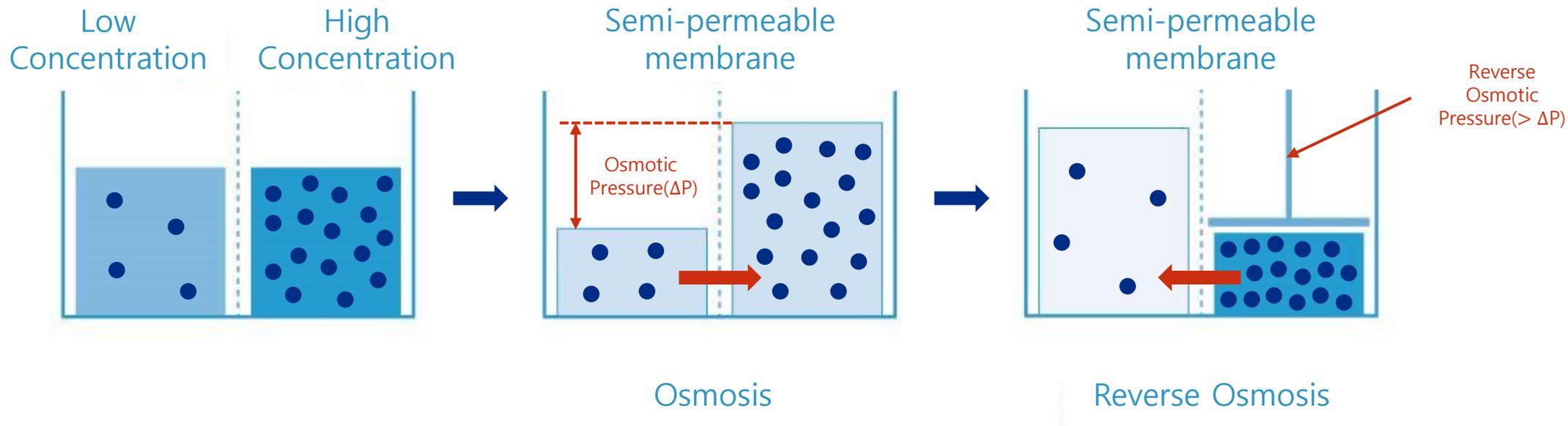
Samyang Trilite Reverse Osmosis Membrane is produced under Samyang's strict quality control, accumulated through ion exchange resins and EDI, and you can receive various technical services (such as system design and troubleshooting).



Key Facilities (Headquarters, Factory, Tech Center)



Reverse Osmosis

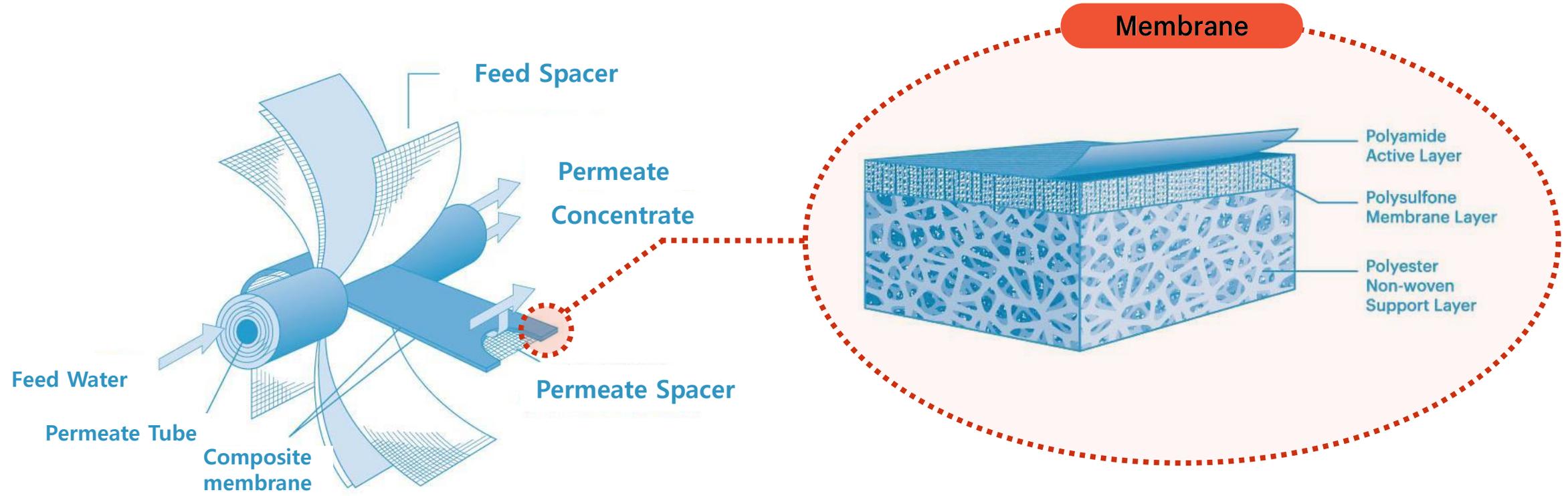


A solution with a concentration difference is separated by a semi-permeable membrane that allows only solvent (water) molecules to pass through

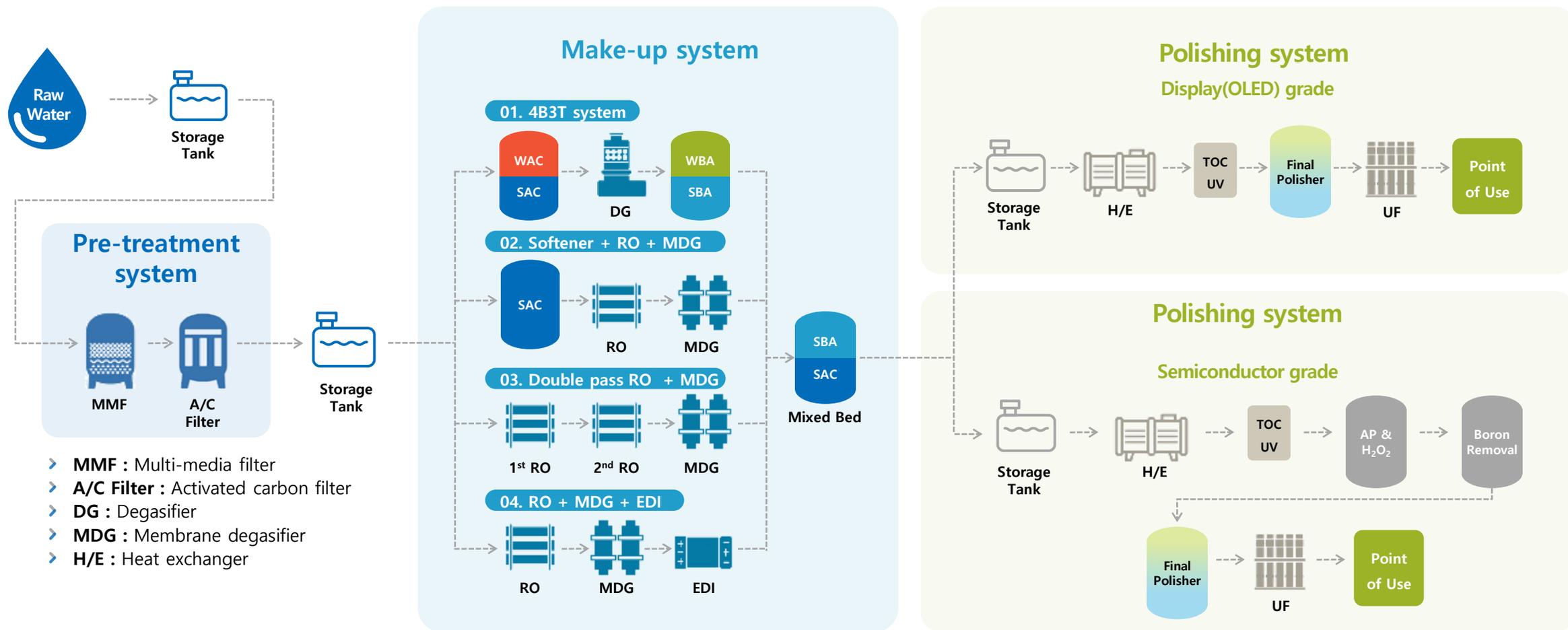
Water from the low-concentration solution moves toward the high-concentration solution, creating a difference in water level (osmotic pressure)

When a pressure greater than the osmotic pressure (reverse osmosis) is applied to a high-concentration solution, only water molecules pass through to the low-concentration side

Reverse Osmosis Membrane Structure



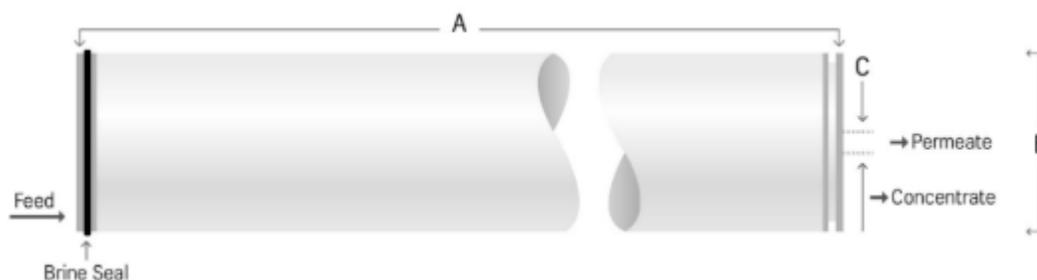
Reverse osmosis (RO) membranes are a key component in various water treatment processes



- › **MMF** : Multi-media filter
- › **A/C Filter** : Activated carbon filter
- › **DG** : Degasifier
- › **MDG** : Membrane degasifier
- › **H/E** : Heat exchanger

RO Element

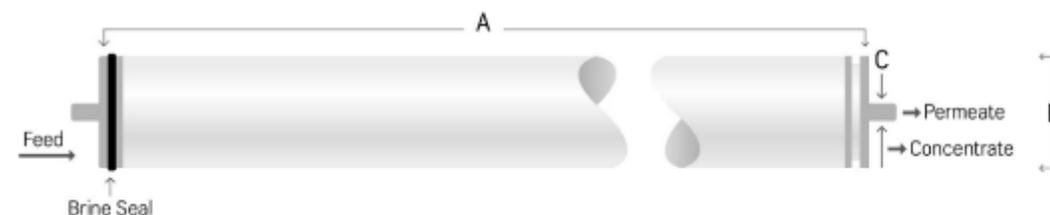
"8in. , 8040"



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

**"8040" = Diameter: 8 inch
Length 40 inch**

"4in. , 4040"



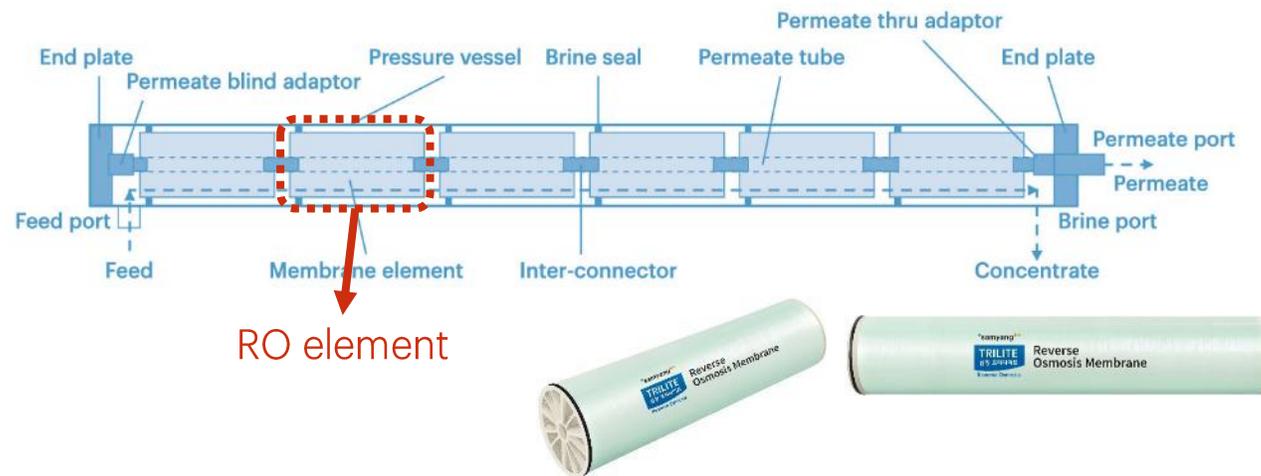
A / inch (mm)	B / inch (mm)	C / inch (mm)
40 (1,016)	3.9 (99.7)	0.75 (19.1)

**"4040" = Diameter: 4 inch
Length 40 inch**

RO Pressure Vessel

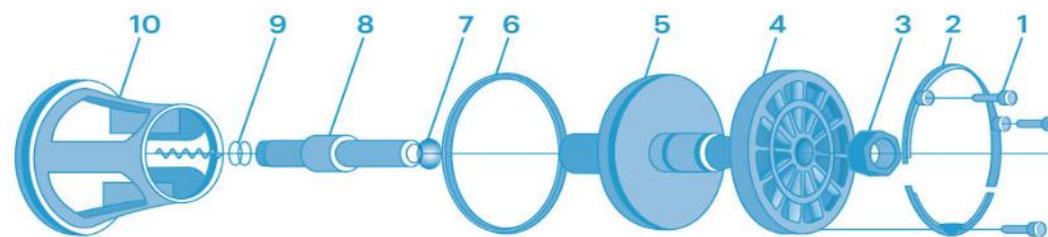


Side-Port type RO Pressure Vessel



RO element

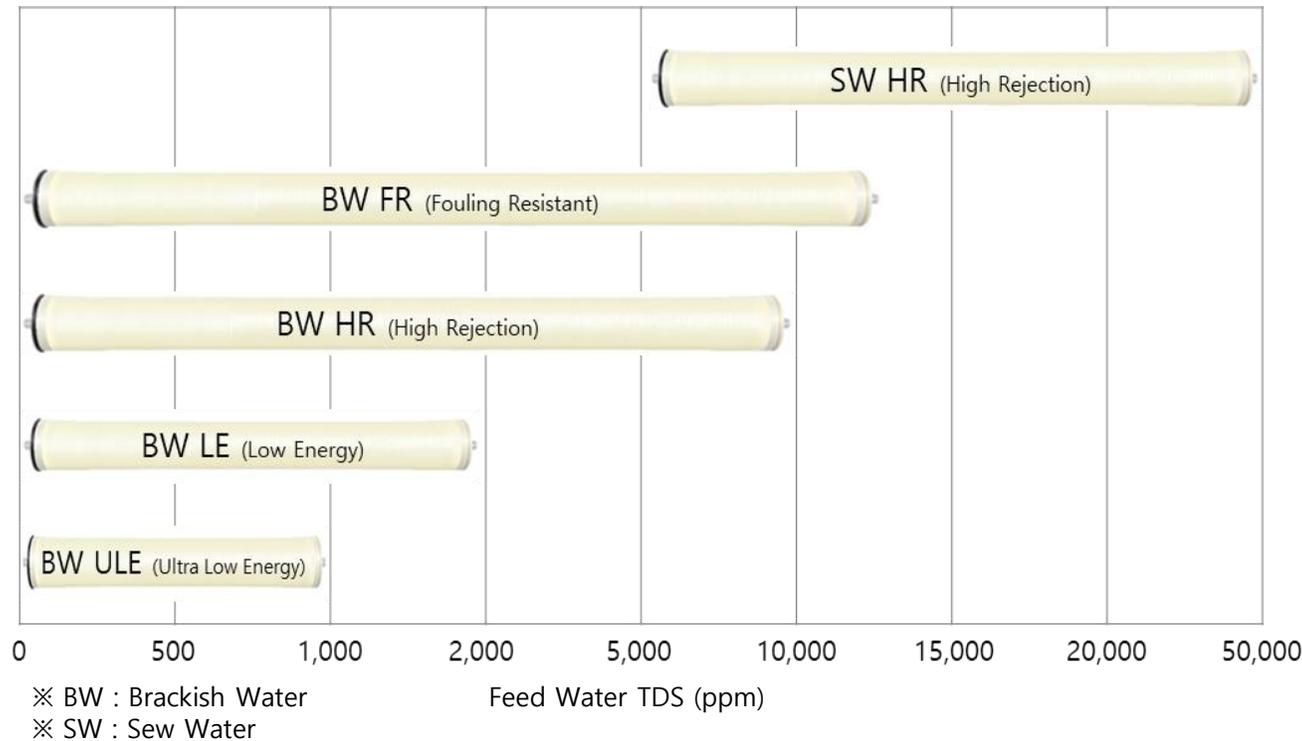
Head Assembly



1. Retaining bolt 2. 3-piece retaining ring 3. Head nut 4. End cap 5. Supporting end cap plate 6. O.D. O-ring 7. I.D. O-Ring 8. Membrane adapter 9. Adapter O-rings 10. Thrust Cone

- Select pressure vessel suitable for the size and number of elements
- Element mounting capacity: 4-inch : 1 to 6 / 8-inch: 1 to 8
- Choose pressure rating that can withstand design supply pressure
- Material : Case = FRP / Inlet & outlet port: Stainless Steel

Key Features and Applications of Reverse Osmosis(RO) Membrane by Type



SW HR (High Rejection)

- Capable of treating ultra-high concentration feed water such as seawater (TDS 35,000 ppm), ensuring high rejection rate and stable operation.
- Recommended feed water TDS concentration: 5,000 ppm to 50,000 ppm.
- Applications: Seawater desalination

BW HR (High Rejection)

- Low operating pressure, high rejection rate, and high permeate flow
- Excellent performance in removing TDS, TOC, and SiO₂.
- Recommended feed water TDS concentration: Up to 10,000 ppm.
- Applications: general water treatment, high-purity requirements

BW FR (Fouling Resistant)

- Anti-fouling product with a specially treated surface to minimize the adhesion of contaminants and microbial growth on the membrane surface
- Low initial differential pressure and long durability.
- Recommended feed water TDS concentration: Up to 12,000 ppm.
- Applications: Municipal wastewater reuse, industrial wastewater reuse

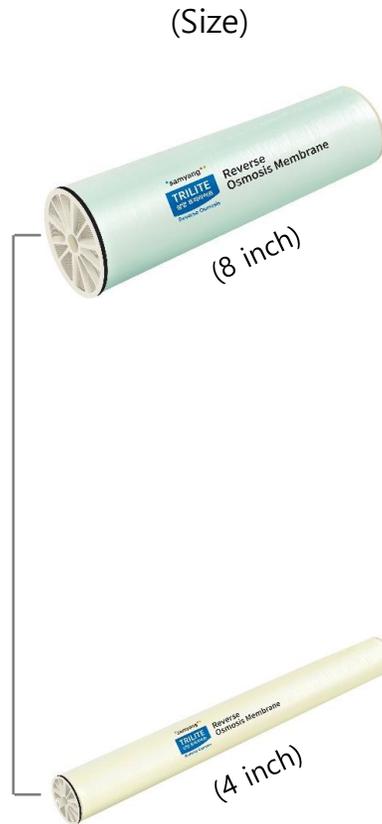
BW LE (Low Energy)

- Low pressure (70% of HR series) operation, stable rejection rate
- Low energy consumption → Reduces initial investment and maintenance costs
- Recommended feed water TDS concentration: Less than 2,000 ppm
- Areas of application: Low TDS Water treatment with, 2nd-pass RO

BW ULE (Ultra Low Energy)

- Ultra low pressure operation (50% of HR series), stable rejection rate
- Very low energy consumption → Reduces initial investment and maintenance costs
- Recommended feed water TDS concentration: Less than 1,000 ppm
- Areas of application: Drinking water facilities, etc

RO membrane Line-Up



			(Rejection rate)	(Permeate flow)	(Operating Pressure)		
BW (Brackish Water)	HR (High Rejection)	BWHR-8040PRO	Special	99.8%	11,500 GPD	225 psi	
		BWHR-8040-440	Special	99.7%	12,650 GPD	225 psi	
		BWHR-8040	Standard	99.7%	10,500 GPD	225 psi	
	LE (Low Energy)	BWLE-8040-440	Special	99.7%	12,000 GPD	150 psi	
		BWLE-8040	Standard	99.7%	10,500 GPD	150 psi	
	ULE (Ultra Low Energy)	BWULE-8040	Standard	99.2%	12,000 GPD	100 GPD	
	FR (Fouling Resistant)	BWXFR-8040	Special	99.7%	11,000 GPD	225 psi	
		BWFRLE-8040	Special	99.4%	12,500 GPD	225 psi	
		BWFR-8040	Standard	99.7%	10,500 GPD	225 psi	
	SW (Sea Water)	HR (High Rejection)	SWXHR-8040	Special	99.85%	7,000 GPD	800 psi
			SWHR-8040-440	Special	99.8%	8,200 GPD	800 psi
			SWHR-8040	Standard	99.8%	7,500 GPD	800 psi
LE (Low Energy)		SWXLE-8040	Special	99.7%	9,500 GPD	800 psi	
		SWLE-8040-440	Special	99.8%	9,900 GPD	800 psi	
SWLE-8040		Standard	99.8%	9,000 GPD	800 psi		
FR (Fouling Resistant)	SWFR-8040	Standard	99.8%	7,500 GPD	800 psi		
BW (Brackish Water)	HR (High Rejection)	BWHR-4040	Standard	99.7%	2,400 GPD	225 psi	
	LE (Low Energy)	BWLE-4040	Standard	99.8%	2,200 GPD	150 psi	
	ULE (Ultra Low Energy)	BWULE-4040	Standard	99.2%	2,600 GPD	100 psi	
	FR (Fouling Resistant)	BWFR-4040	Standard	99.7%	2,200 GPD	225 psi	
	SW (Sea Water)	HR (High Rejection)	SWHR-4040	Standard	99.8%	1,600 GPD	800 psi

RO Product Specification – Brackish Water

Type	Model	Rejection rate (%)	Permeate flow GPD (m ³ /d)	Activate Membrane Area ft ² (m ²)	Spacer Thickness (mil)	Test Condition		
						Pressure psi (MPa)	Conc. Of NaCl (ppm)	Recovery rate (%)
HR (High Rejection)	BWHR-8040PRO	99.8	11,500 (43.5)	400 (37.2)	34-LD	225 (1.55)	2,000	15
	BWHR-8040-440	99.7	12650 (47.8)	440 (41)	28			
	BWHR-8040LD	99.7	10,500 (39.7)	400 (37.2)	34-LD			
	BWHR-8040	99.7	10,500 (39.7)	400 (37.2)	28			
	BWHR-4040	99.6	2,800 (10.6)	400 (37.2)	28			
FR (Fouling Resistant)	BWXFR-8040	99.7	11,000 (39.7)	400 (37.2)	28	225 (1.55)	2,000	15
	BWFRLE-8040	99.4	12500 (47.2)	400 (37.2)	28			
	BWFR-8040LD	99.6	10,500 (39.7)	400 (37.2)	34-LD			
	BWFR-8040	99.5	10,500 (39.7)	400 (37.2)	34			
	BWFR-4040	99.5	2,200 (8.3)	90 (8.4)	34			
LE (Low Energy)	BWLE-8040	99.5	10,500 (39.7)	400 (37.2)	28	150 (1.03)	1,500	15
	BWLE-8040-440	99.7	12,000(45.4)	440(41)	28			
	BWLE-4040	99.5	2,600 (9.8)	100 (9.3)	28			
ULE (Ultra Low Energy)	BWULE-8040	99.2	12,800 (48.4)	400 (37.2)	28	100 (0.69)	500	15
	BWULE-4040	99.2	2,600 (9.8)	100 (9.3)	28			

RO Product Specification – Sea Water

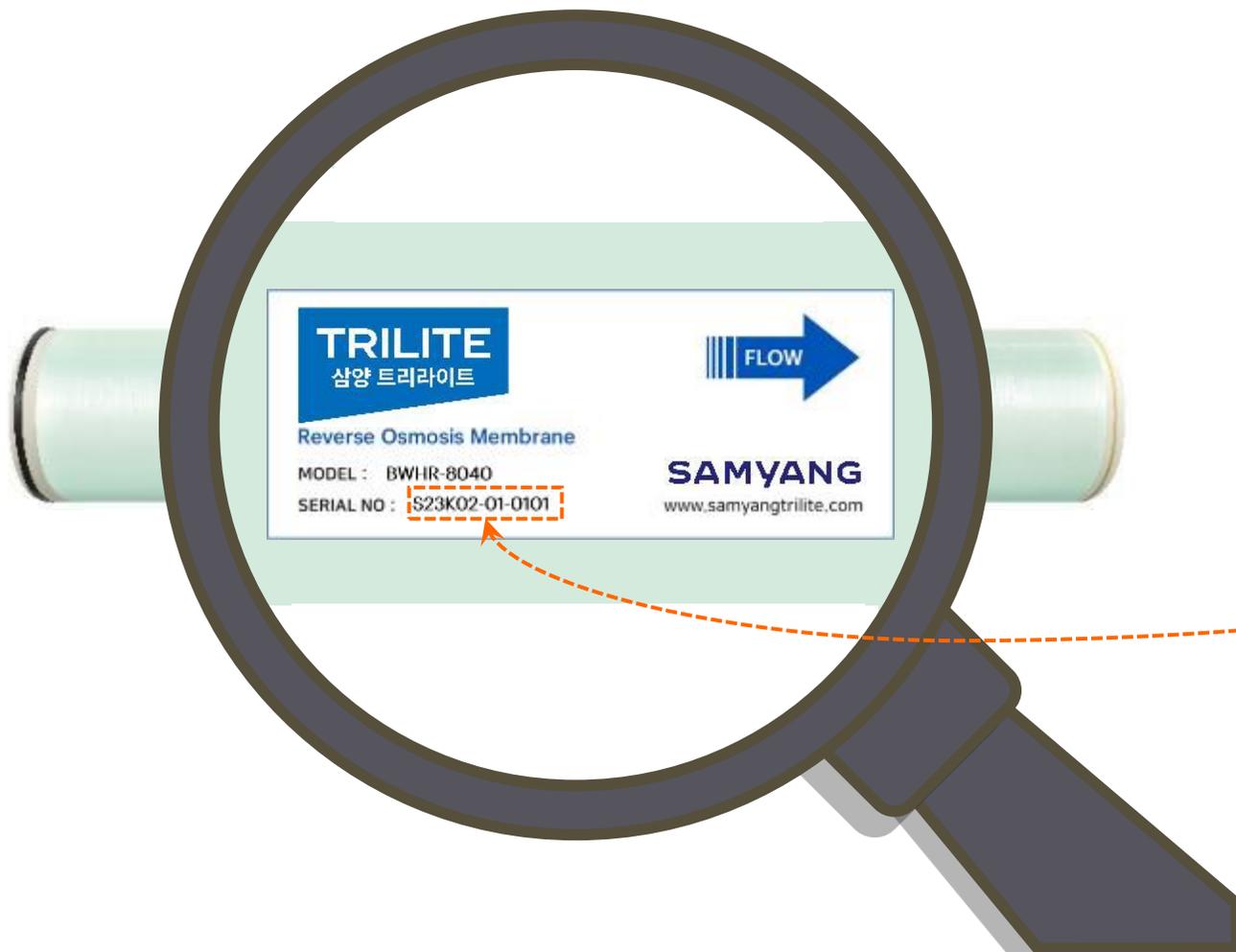
Type	Model	Rejection rate (%)	Permeate flow GPD (m ³ /d)	Activate Membrane Area ft ² (m ²)	Spacer Thickness (mil)	Test Condition		
						Pressure psi (MPa)	Conc. Of NaCl (ppm)	Recovery rate (%)
HR (High Rejection)	SWXHR-8040	99.85	7,000 (26.5)	400 (37.2)	28	800 (5.5)	32,000	8
	SWHR-8040-440	99.8	8,200(31)	440 (41.0)	28			
	SWHR-8040	99.7	7,500 (39.7)	400 (37.2)	28			
	SWHR-4040	99.8	1,600 (6.1)	90 (8.4)	28			
FR (Fouling Resistant)	SWFR-8040LD	99.8	7,500 (39.7)	400 (37.2)	28	800 (5.5)	32,000	8
LE (Low Energy)	SWLE-8040-440	99.8	9,900 (37.4)	440 (41.0)	28	800 (5.5)	32,000	8
	SWXLE-8040	99.7	9,500 (36.)	400(37.2)	28			
	SWLE-8040	99.8	9000 (34.0)	400 (37.2)	28			

Packaging & Pallet



Type	Material	Dimension(cm) (L x W x H)	Net Weight (kg)	Gross Weight (kg)	Standard palletization			
					Quantity (EA)	Dimension (W x L x H, cm)	Net Weight (kg)	Gross Weight (kg)
8040	Carton Box	110 x 23 x 26	14	15	30	108 x 112 x 112	330	410
4040	Carton Box	110 x 13 x 12	3.6	4	63	153 x 112 x 112	189	236

RO Product Label and Test Report






INSPECTION AND TEST REPORT

ISSUE DATE : 2023-10-11

We hereby certify that undermentioned products were duly inspected by us and were found to conform to our specifications.

Customer		Model Name	TRILITE BWHR-8040
End User		Quantity (EA)	120

	Item	Unit	Specification
Testing Conditions	Testing Pressure	psi	224~226
	Temperature of testing solution	°C	23±3
	Concentration of testing solution (NaCl)	µs/cm	3,900~4,150
	pH value of testing solution	-	6.5~7.0
	Recovery rate	%	15~18
Performance Standard Requirements	Typical rejection rate	%	99.7
	Minimum rejection rate	%	99.4
	Permeate flow rate	GPD	8,800~13,200

Item No.	Rejection Rate (%)	Permeate Flow (GPD)	Result
1	99.72	12,778	PASSED
Serial No. :			
S23K02-01-0101	S23K02-01-0102	S23K02-01-0103	S23K02-01-0104
S23K02-01-0105	S23K02-01-0106	S23K02-01-0107	S23K02-01-0108
S23K02-01-0109	S23K02-01-0110	S23K02-01-0111	S23K02-01-0112

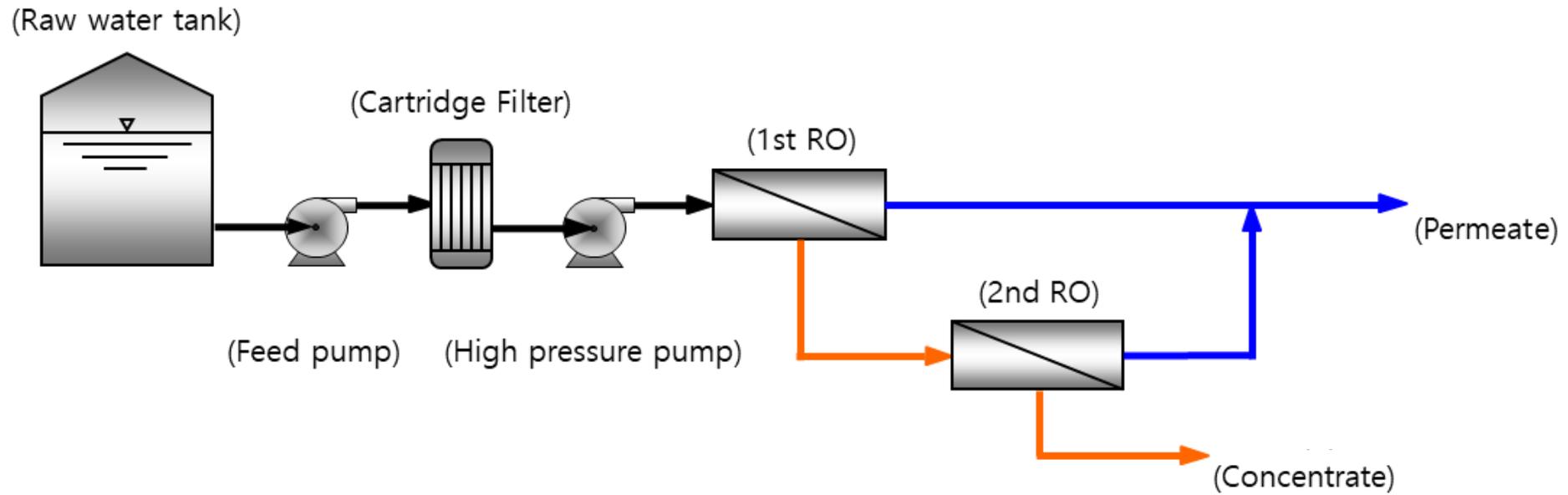
We certify the above statement of quality to be true and correct.

Manager Seong-Min Kim
Production Team

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31 Jong-ro 33-gil, jongno-gu, Seoul, Korea / TEL : 02-740-7732~7

Plant : SAMYANG CORPORATION ULSAN 1 PLANT
285 Jansaengpo-ro, Nam-gu, Ulsan, 44778, Korea / TEL : 052-279-4782

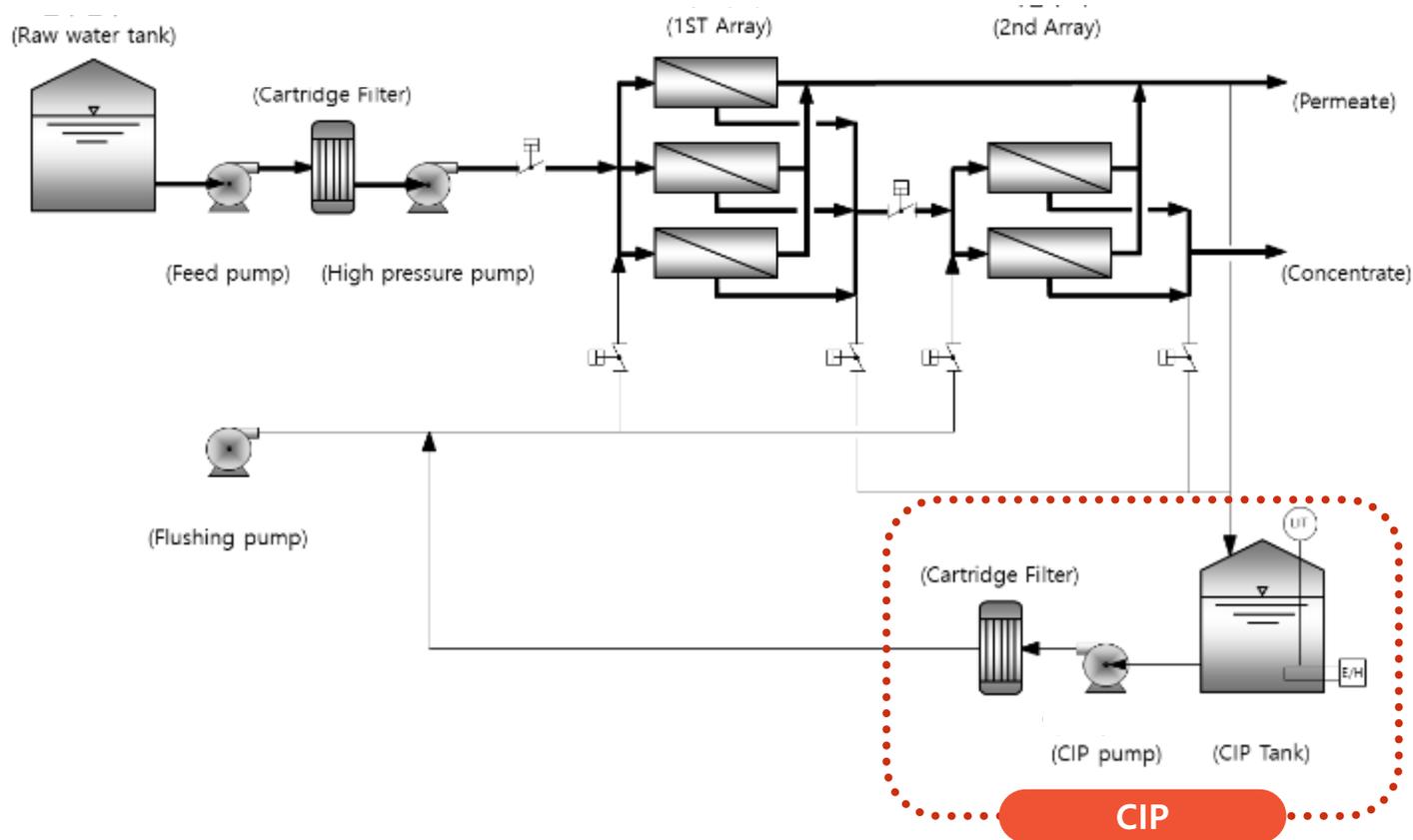
RO System (1)



$$(Rejection\ Rate) = \frac{(Feed\ TDS) - (Permeate\ TDS)}{(Feed\ TDS)} \times 100$$

$$(Recovery\ Rate) = \frac{(Permeate\ water)}{(Feed\ Water)} \times 100$$

RO System (2)



① Determine need for CIP

- Decrease in treated water output by 10% or more
- Increase in salt passage by 10% or more
- Increase in differential pressure between feed water and concentrate by 15% or more

② Analyze Contamination and Identify Causes

③ Select Cleaning Chemicals

④ Calculate Required Amount of Chemicals

⑤ Perform CIP

- Low-pressure cleaning → Chemical injection → Soaking & circulation → High-flow cleaning → Draining → Final rinse

- **CIP (Cleaning In Place) : automated cleaning process used to sanitize the interior surfaces of equipment, pipelines, and vessels without disassembling them**

Reference (Samyang Kasei)



NO.	Category	Spec.
1	Capacity	105m ³ /hr as product (Recovery : 80%)
2	RO Arrangement	14 : 7 : 3
3	Membrane Quantity	144 (84 + 42 + 18)
4	Inlet water	Conductivity : 300μS/cm ↓
5	Outlet water	Conductivity : 15μS/cm ↓

Reference (Samyang Fine Technology)



NO.	Category	Spec.
1	Capacity	40m ³ /hr as product (Recovery : 80%)
2	RO Arrangement	4 : 2
3	Membrane Quantity	36 (24 + 12)
4	Inlet water	Conductivity : 1.5μS/cm ↓ (2B3T 처리수)
5	Outlet water	Conductivity : 1.0μS/cm ↓

Cross-Reference Guide

유형								
8인치	HR	BWHR-8040PRO	BW30XHR PRO-400/34	CPA7-LD		TM720D	BW 400R G2	PURO-II
		BWHR-8040LD	BW30 PRO-400/34	CPA5-LD	RE8040-BE34		BW 400 R Dura	LP400-LD
		BWHR-8040	BW30 PRO-400	CPA3	RE8040-BE		BW 400 R	LP22-8040
	FR	BWFR-8040LD		LFC3-LD	RE8040-FEN34	TML20D-400	BW 400 AFR G2	FR400-LD
		BWFR-8040					BW 400 AFR	FR12-8040
	LE	BWLE-8040	ECO PRO-400	ESPA2-LD	RE8040-BLR	TMG20D-400	BW 400 ES(L)	ULP32-8040
	ULE	BWULE-8040	XLE-440	ESPA4-LD	RE8040-BLF	TMH20A-400C	BW 400 UES	XLP12-8040
4인치	HR	BWHR-4040	BW30 PRO-4040	CPA2-4040	RE4040-BE	TM710D	BW 4040 R	LP21-4040
	FR	BWFR-4040		LFC3-LD-4040	RE4040-FEN	TML10D		FR11-4040
	LE	BWLE-4040	LC LE PRO-4040	ESPA2-LD-4040	RE4040-BLN	TMG10D	BW 4040 ES	ULP21-4040
	ULE	BWULE-4040	XLE PRO-4040	ESPA4-LD-4040	RE4040-BLF	TMH10A	BW 4040 UES	XLP11-4040

SAMYANG



Samyang Water Solution's 50 years of accumulated expertise is now encapsulated through AI-powered ChatGPT. Experience 'Trigent' on the Samyang Trilite website!