



# IonClear<sup>TM</sup>

Redefining the Future of RO Membrane Technology





2

## Who We Are

IonClear is a leading technology company based in Silicon Valley, focused on delivering high-performance reverse osmosis (RO) and nanofiltration (NF) membranes for the growing water treatment industry. Backed by a global team of membrane experts, we deliver reliable, customized solutions that drive performance, efficiency, and sustainability.

- Founded in Silicon Valley, part of Transfilm Tech Inc., leveraging decades of filtration expertise
- Serving 30+ countries across industrial, municipal, and desalination markets
- 10,000 sq. m manufacturing facility





3

# Our Mission

IonClear is committed to revolutionizing water purification and selective resource recovery through high-efficiency membranes that lower energy use, improve system longevity, and optimize sustainability for industries worldwide.

- Millions invested in R&D to develop cutting-edge membrane technology
- Customizable membrane engineering to meet specific industry challenges
- Sustainability-driven solutions reducing energy consumption and operational costs





4

# Proven Global Performance

IonClear membranes are trusted around the world for critical water treatment challenges—  
**delivering reliable performance backed by global expertise.**





5

## Manufacturing & R&D Headquarters

- 14,000 m<sup>2</sup> facility in Ankang, Shaanxi Province, China
- Proprietary RO and NF membrane production lines
- Continuous R&D driven by international engineering team (U.S., Japan, China)

## Worldwide Reach

- Operating in 30+ countries across six continents
- Proven results in diverse water treatment environments
- Backed by technical support across global time zones





6

## Industries Served

From high-purity manufacturing to complex wastewater and desalination projects, IonClear membranes are trusted by industries that demand performance, reliability, and long-term value.



### Seawater Desalination

High-rejection membranes for reliable freshwater conversion.



### Municipal Water Treatment

Safe, cost-effective purification at scale.



### Industrial Wastewater & ZLD

Near-zero liquid discharge solutions for sustainability



### Mining & Lithium Extraction

High-efficiency recovery of critical materials.



### Power Generation & Petrochemicals

Customized solutions for high-contaminant environments.



### Food & Beverage Processing

Ensuring water purity for production standards.



## **What Sets Us Apart**



8

# Innovating Water & Resource Recovery at Scale

## **Higher Performance at Lower Cost**

Outperforms major brands—with competitive pricing.

## **Manufacture Dry Membranes**

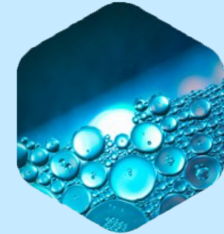
IonClear and Dupont are the only 2 dry membrane manufacturers in the world

## **Proprietary, Sustainable Technology**

Reuses 60–70% of energy and materials—cutting costs and waste

## **Agile & Innovative**

Customizable Solutions  
24/7 Support







9

# State-of-the-Art-Manufacturing

**Precision, performance, and scalability —  
built into every membrane we produce.**

- 100,000+ membrane elements/year production capacity
- Fully dry membrane delivery ensures easier handling, longer shelf life, and reduced shipping complexity
- Highly automated manufacturing for consistent, repeatable quality and performance
- Proprietary production lines designed and optimized by global membrane experts
- In-house quality control and testing ensure each element meets exacting standards





10

# Advanced Technology

## Precise Tension Control

Smooths production, compensates for material/process flaws.

## Precision Coating

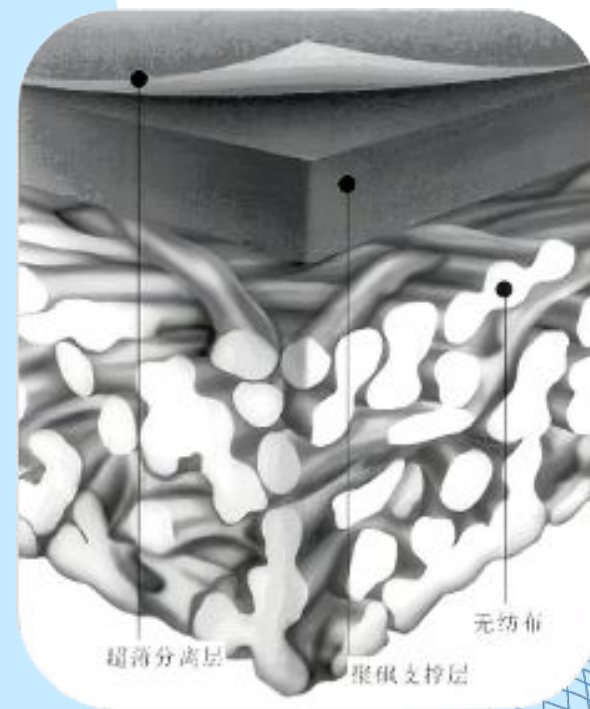
Boosts membrane uniformity, consistency & reduces defects.

## Nano-scale Composite Membranes

Creates smoother, hydrophilic surfaces with enhanced anti-pollution.

## Ultra-thin Flat Sheets

Achieves minimum material thickness (desalination layer 0.2 $\mu$ m) for advanced filtration.





11

# Tailored Performance Through Custom Membrane Engineering

At IonClear, we understand that no two water sources are the same. That's why we offer customized membrane solutions to meet the specific challenges of your environment.

Our Membranes are engineered to handle:

**High Turbidity**

**Elevated boron concentrations**

**Temperature fluctuations**

**Unique fouling profiles**

Through custom flow path design and material formulation adjustments, we optimize for your specific feed water characteristics.







## **The Challenge**



13

# Operating at Scale in Harsh Conditions

**Desalination plants face complex and costly demands**

## **High Energy Use**

Significant pressure and energy needed for seawater RO processes.

## **Fouling & Scaling**

Biofouling and mineral buildup reduce membrane performance and lifespan.

## **Brine Management**

Environmental concerns and regulations around concentrate discharge.

## **Ongoing O&M Costs**

Frequent cleaning cycles, chemical use, and membrane replacements.

## **System Downtime**

Clogs, breakdowns, and membrane failures interrupt water production.

## **Membrane Lifespan Limits**

Membranes often degrade in 3–5 years under aggressive operating conditions.



## **Our Solution Portfolio**

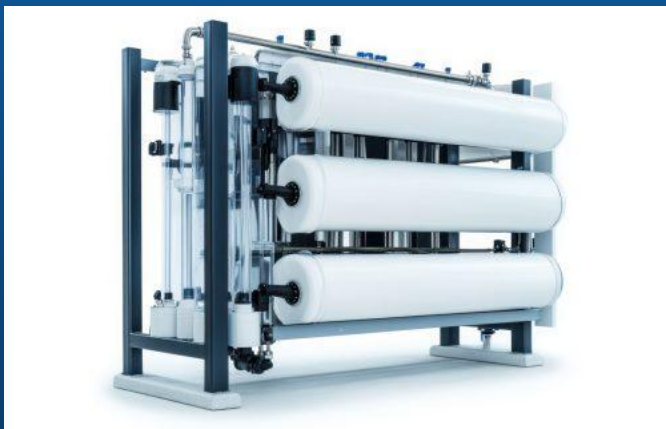




15

# Precision-Engineered Filtration for Industrial Applications

**Reverse Osmosis  
(RO) Membranes**



**Nanofiltration  
Membranes**



**Specialty  
Solutions**





# Reverse Osmosis Membranes

**IonClear's RO membranes are engineered for high performance across seawater, brackish, and industrial water treatment systems, delivering high salt rejection, low energy consumption, and long-term durability.**

- 100,000+ membrane elements/year production capacity
- Fully dry membrane delivery ensures easier handling, longer shelf life, and reduced shipping complexity
- Highly automated manufacturing for consistent, repeatable quality and performance
- Proprietary production lines designed and optimized by global membrane experts
- In-house quality control and testing ensure each element meets exacting standards





17

# Seawater Desalination Series (SW)

## Proprietary Membrane Technology

- High salt rejection
- Reliable, long-term stable performance
- Energy-saving
- Low system investment and operating costs

## Core Advantages

- Excellent salt rejection
- High boron rejection
- Reliable and stable operation

## Applications

- Seawater and sub-seawater desalination
- Concentration of medium to high salt brine water
- Zero discharge and wastewater resource recovery

**Seawater Desalinationn RO Membrane Performance Specifications**

Type	Membrane Model	Active Area ft(m <sup>2</sup> )	Flux, gpd(m <sup>2</sup> /d)	Minimum Rejection	Stablized Rejection Rate(%)	Stablized Boron Rate(%)	Test Conditions		
							Pressure psi(MPa)	Solution NaCl(ppm)	recovery (%)
HR	IC SW-8040-400HR	400(37.2)	6500(24.5)	99.65	99.80	92.0	800(5.5)	32,000	8
	IC SW-4040-82HR	82(7.6)	1320(5)	99.60	99.75	/			
HRLE	IC SW-8040-400HRLE	400(37.2)	7400(28)	99.65	99.80	92.0			
	IC SW-8040-440HRLE	440(41)	7900(30)	99.65	99.80	92.0			
	IC SW-4040-82HRLE	82(7.6)	1600(6.1)	99.60	99.70	/			
XHR	IC SW-8040-400XHR	400(37.2)	6100(23)	99.70	99.82	92.0			
	IC SW-8040-440XHR	440(41)	6600(25)	99.70	99.82	92.0			
XLE	IC SW-8040-400XLE	400(37.2)	9000(34)	99.60	99.80	92.0			
	IC SW-8040-440XLE	440(41)	9750(37)	99.60	99.80	92.0			
	IC SW-4040-82XLE	82(7.6)	1660(6.3)	99.60	99.65	/			
HRFR	IC SW-8040-400HRFR/34	400(37)	7400(28)	99.65	99.80	92.0			

**Commercial Membrane Performance Specifications**

Type	Membrane Model	Active Area ft(m <sup>2</sup> )	Flux, gpd(m <sup>2</sup> /d)	Minimum Rejection Rate(%)	Stablized Rejection Rate(%)	Test Conditions		
						Pressure psi(MPa)	Solution NaCl(ppm)	recovery (%)
Commercial Seawater Desalination	IC SW-2540-28HR	28(2.6)	580(2.2)	99.55	99.7	800(5.5)	32000	8
	IC SW-4021-33HR	33(3.1)	660(2.5)	99.55	99.65			5
	IC SW-2521-12HR	12(1.1)	240(0.9)	99.5	99.6			8
	IC SW-2540-28HRLE	28(2.6)	680(2.6)	99.5	99.65			5
	IC SW-4021-33HRLE	33(3.1)	790(3)	99.5	99.6			8
	IC SW-2521-12HRLE	12(1.1)	290(1.1)	99.4	99.55			5





18

# SW-8040-400HR

## Product Highlights

Increased sheet thickness  
**GREATER SERVICE LIFE**

Short membrane sheet length  
**REDUCED FOULING**

Low power consumption  
**REDUCED OPERATIONAL COST**



## Product Description

IC SW-HR Series are membrane elements with high rejection rate developed for seawater desalination, which can ensure long-term stable high rejection rate while reaching the standard flux.



19

# SW-8040-400 XHR

## Product Highlights

Increased sheet density  
**HIGHER REJECTION RATE**

Non-oxidation post-treatment  
**CHEMICAL STABILITY**

Extra high rejection rate  
**LONG-TERM PERFORMANCE**



## Product Description

IC SW-XHR series are based on the production process of IC SW-HR series, which increases the density of the sheet and further upgrades the rejection rate. The membrane elements have extra high rejection rate and can maintain high stability in long-term operation.



20

# SW-8040-400HRLE

## Product Highlights

Enables the system to operate at  
**LOWER ENERGY CONSUMPTION**

Lower energy consumption  
**COST SAVINGS FOR USERS**

High rejection rate, high flux  
& high boron removal at a  
**FRACTION OF THE ENERGY USE**



## Product Description

IC SW-HRLE series are aimed at the problem of high energy consumption of conventional seawater desalination membranes. The membrane performance has been upgraded again to achieve high rejection rate while reducing operating energy consumption and savings costs for users.





21

# SW-8040400HRFR/34

## Product Highlights

Patented anti-pollutant rolling design  
**REDUCED FREQUENCY OF  
CHEMICAL CLEANING**

Anti-pollutant coating  
**IMPROVED RECOVERY POST  
CHEMICAL CLEANING**

Designed for challenging seawater  
**AND HIGH-HARDNESS BRINE**



## Product Description

IC SW-HRFR series are developed for seawater with complex water quality or concentrated brine with high hardness and organic matter. The membrane has been specially treated to effectively reduce the adhesion of organic matter and inorganic salts on the membrane surface, reducing the frequency of chemical cleaning.



22

# SW-8040-400XLE

## Product Highlights

Extra low-energy and high-flux  
**REDUCED ENERGY USE**

Higher flux under the same  
**OPERATING PRESSURE  
AS OTHER SWRO MODELS**

Improved water  
**PRODUCTION ECONOMY**



## Product Description

IC SW-XLE series are low-energy and high-flux membrane elements developed to reduce the energy consumption of the system. It can effectively reduce the energy consumption of the pump, or achieve higher flux than other SWRO models under the same operating pressure, suitable for users who pursue higher flux.



## Case Studies





## From a Middle East User

## Month 2

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

Approved: Dr. M.

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

Approved: Dr. M



25

# Replacement of 504 SW Elements in a 35000 M<sup>3</sup>/D Seawater Desalination Plant in Middle East

## »» System Configuration & Run Data with 504 UC SW-8040-440-HRLE Seawater Membrane

System Information		Run Data		
Plant Name	A plant in Middle East	Rack # Replaced	#21	#22
Plant Capacity	35000 m3/day	Feed temperature, °C	35	35
Desalination Process	SW + BW	Feed pressure(Bar)	62.8	62.8
Pretreatment System	UF	Feed conductivity, µs/cm	62000	62000
Total Racks of SW System	12	Feed TDS, mg/L	34100	34100
Elements in Each Vessel	7	Permeate conductivity, µs/cm	1351	1134
Vessels on Each Rack	36	Permeate TDS, mg/L	643	623
Total QTY of Membranes	3024	System Rejection, %	98.1	98.2
System design recovery	45%	Permeate flow/Rack, m <sup>3</sup> /h	120	119
Membranes on Each Rack	252			

## »» Conclusions

1. Higher than **98%** rejection rate is achieved with **620000 µs/cm feed under 62.8 Bar pressure at 35°C**
2. The flux meets the design target
3. **7060 SW elements** have been sold since 2023 and **NO complaint** was received
4. Significantly **saved the cost** on membrane for the customer



26

# Qingdao Baifa Desalination Plant

**Exclusive partner to China's  
largest seawater desalination plant**

- Maintained a desalination rate of 99.65%+ throughout operation
- Stable water yield per membrane, significantly lowering cost per ton
- Improved boron removal from 80% to 89.5% at pH 7
- Achieved through custom membrane formulation and cross-linking optimization

**- producing  
200,000 tons of  
water per day.**

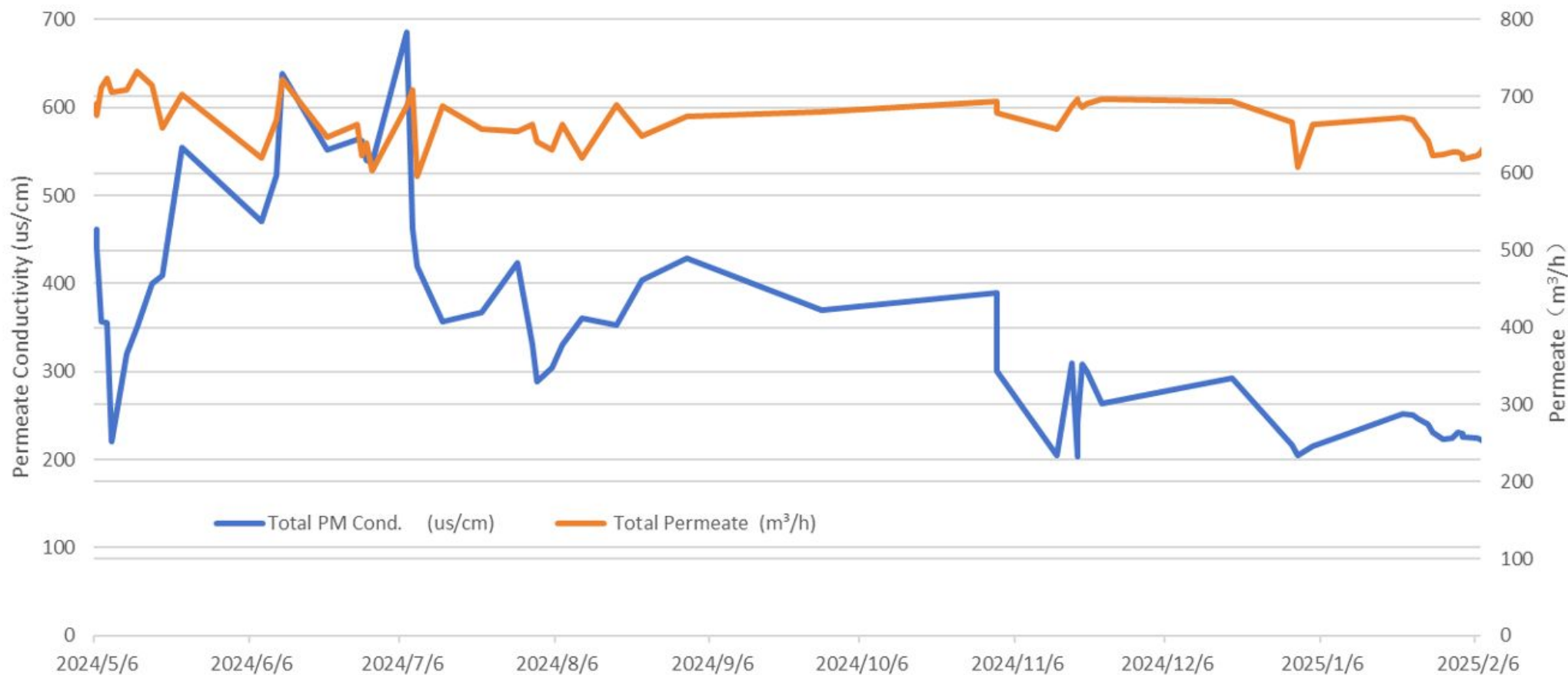




27

# Replacement of 1344 SW Elements in the Largest Seawater Desalination Plant in China

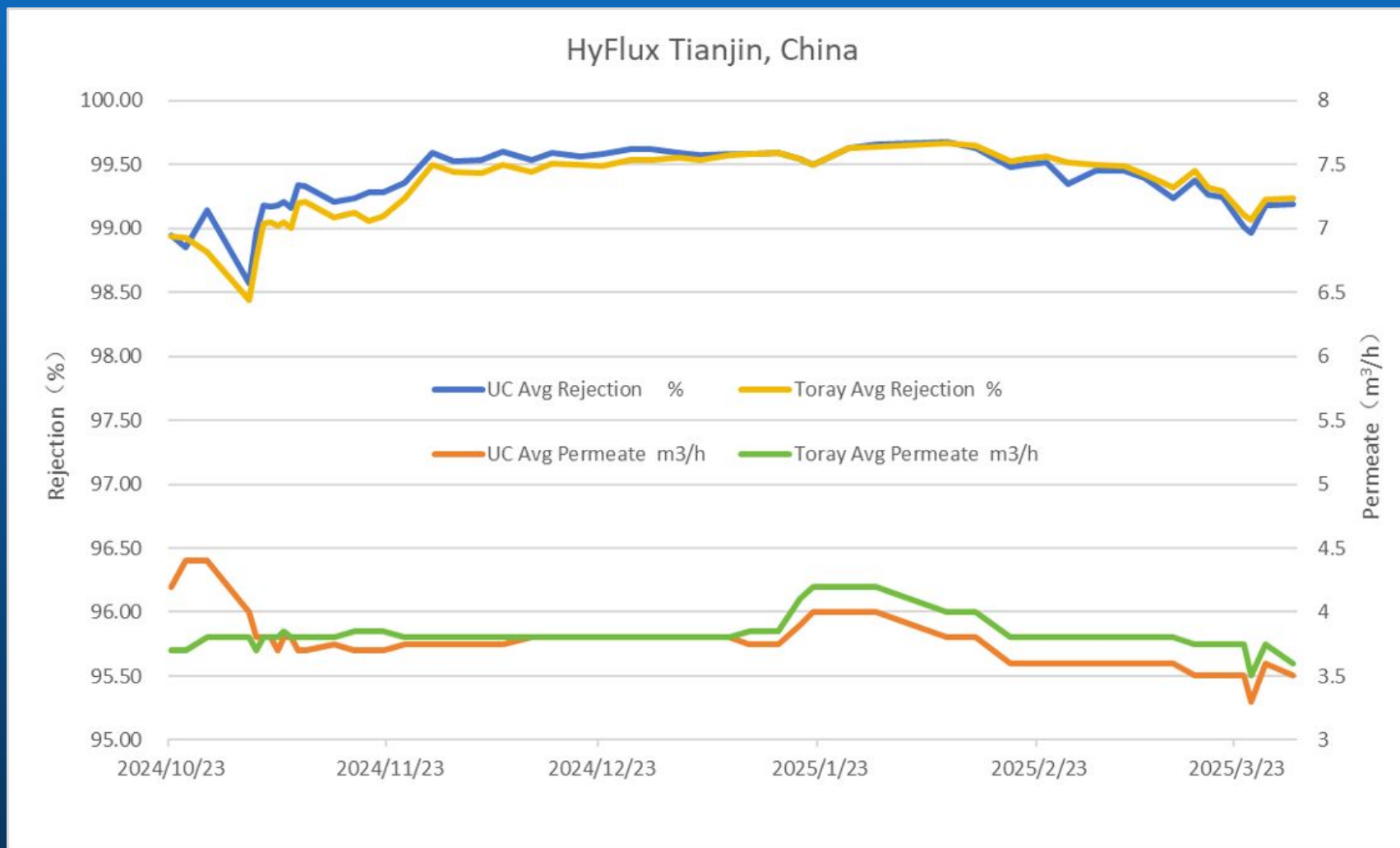
9 Months Continuous Run Data from Baifa Replacement Project, Qingdao China





28

# Trial Run Data on Hyflux Tianjin Seawater Desalination Plant in China (IonClear vs Toray)



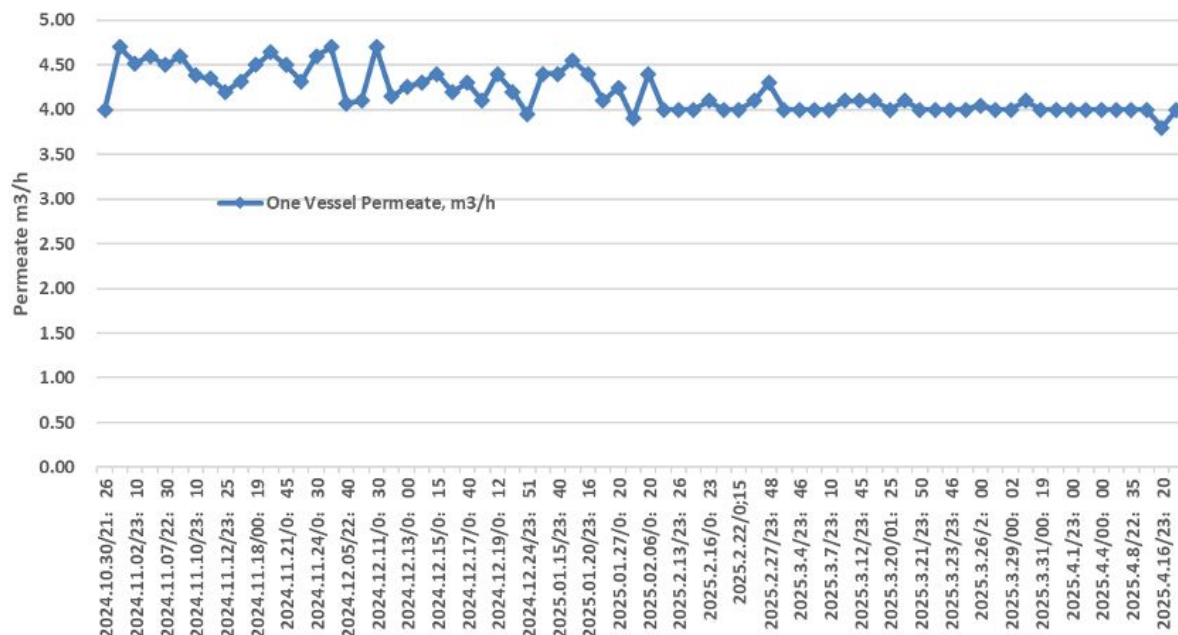


29

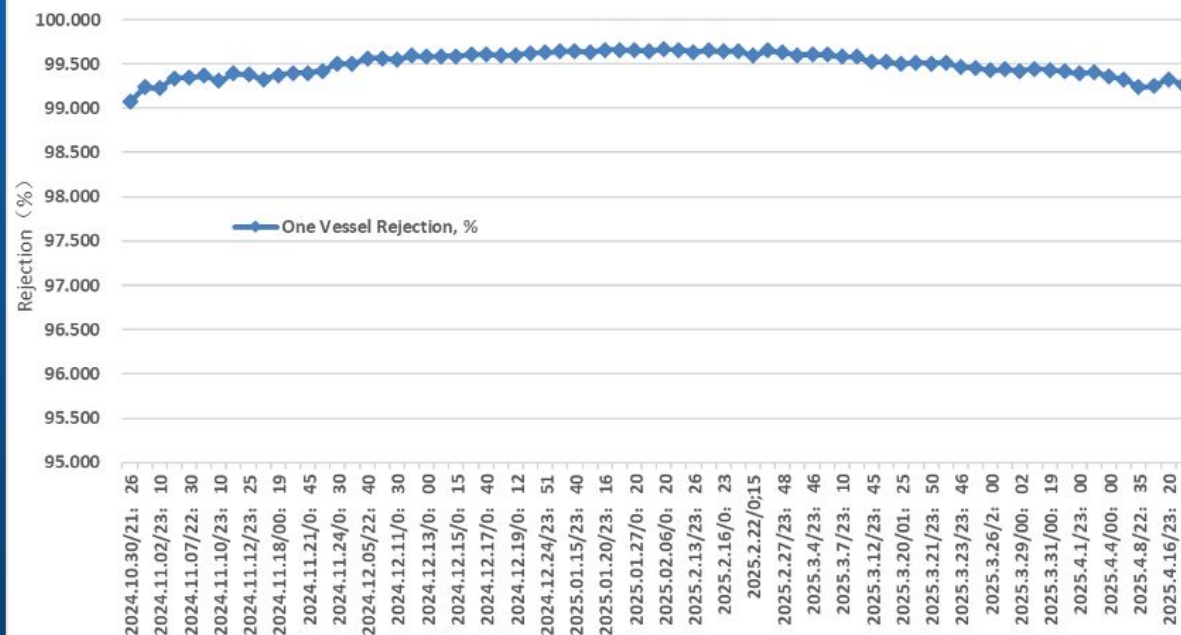
# Run Data on Xianda(Tianjin) Oct 24-April 25

## 150,000 m<sup>3</sup>/day Seawater Desalination Plant in China

UC Seawater Membrane Permeate (one vessel) at Xianda (Tianjin)  
150,000 m<sup>3</sup>/day Seawater Desalination Plant



UC Seawater Membrane Rejection (one vessel) at Xianda(Tianjin)  
150,000 m<sup>3</sup>/day Seawater Desalination Plant

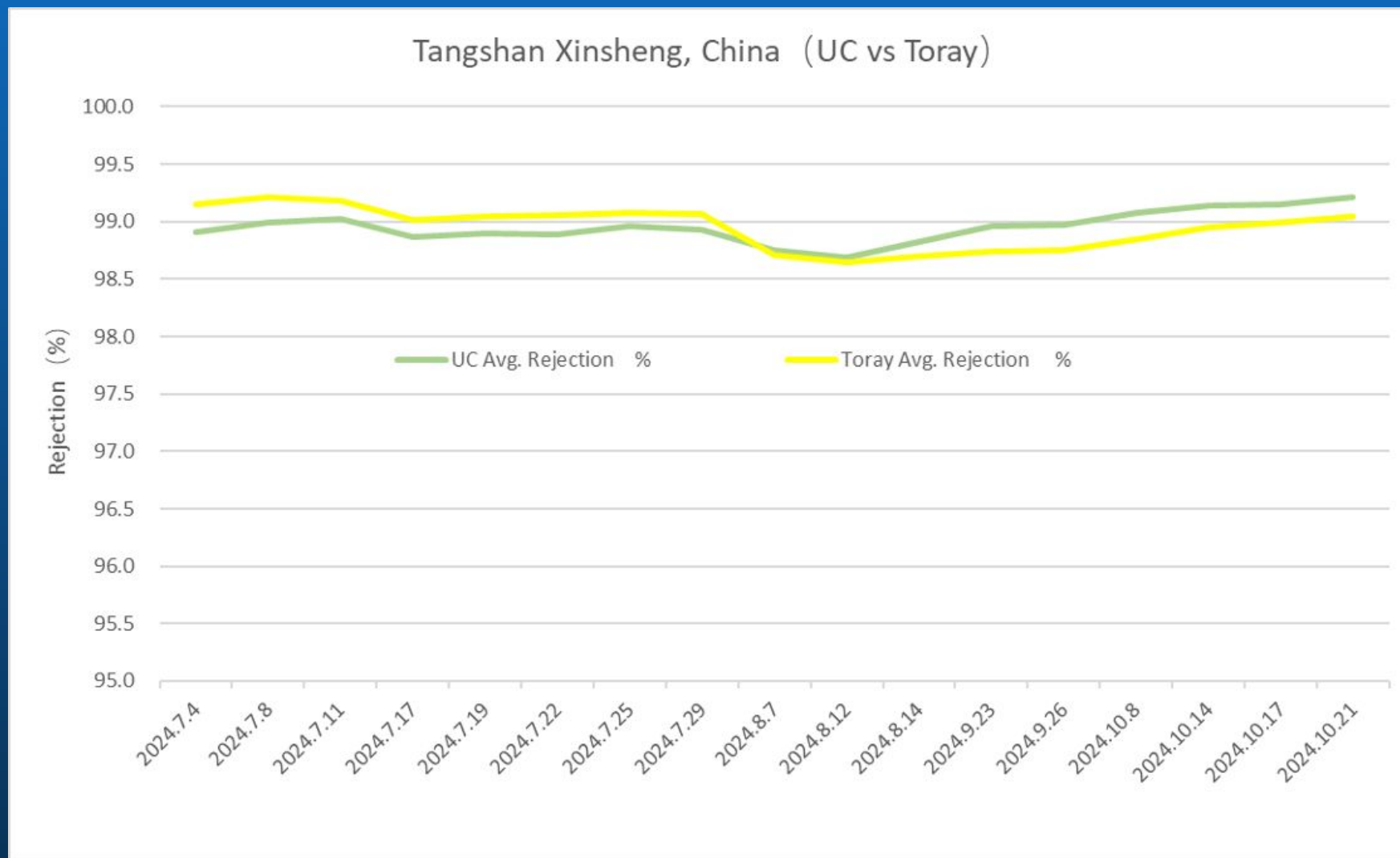






30

# Trial Run Data on Tangshan Xinsheng Seawater Desalination Plant in China (IC vs Toray)





# IonClear vs DuPont (FilmTec):

Performance Comparison at Varying Temperatures

**IonClear SW-8040-400HRLE**  
VS  
**DuPont SW30HRLE-400**

Test Solution		NaCl	Pressure, Mpa		5.5
Concentrate		32000ppm	PH		7.82
Test Data of Membrane Element					
Project	Temperature℃	15	20	v25	30
Salt Rejection Rate,%	IonClear	99.79%	99.76%	99.70%	99.66%
	DuPont	99.80%	99.77%	99.72%	99.67%
Flux, m³/H	IonClear	1.18	1.17	1.12	1.08
	DuPont	1.20	1.17	1.12	1.08



# IonClear vs DuPont (FilmTec):

Performance Comparison at Different Concentration

**IonClear SW-8040-400HRLE**  
VS  
**DuPont SW30HRLE-400**

With the same test conditions, the rejection and flux are close to each other at different concentration

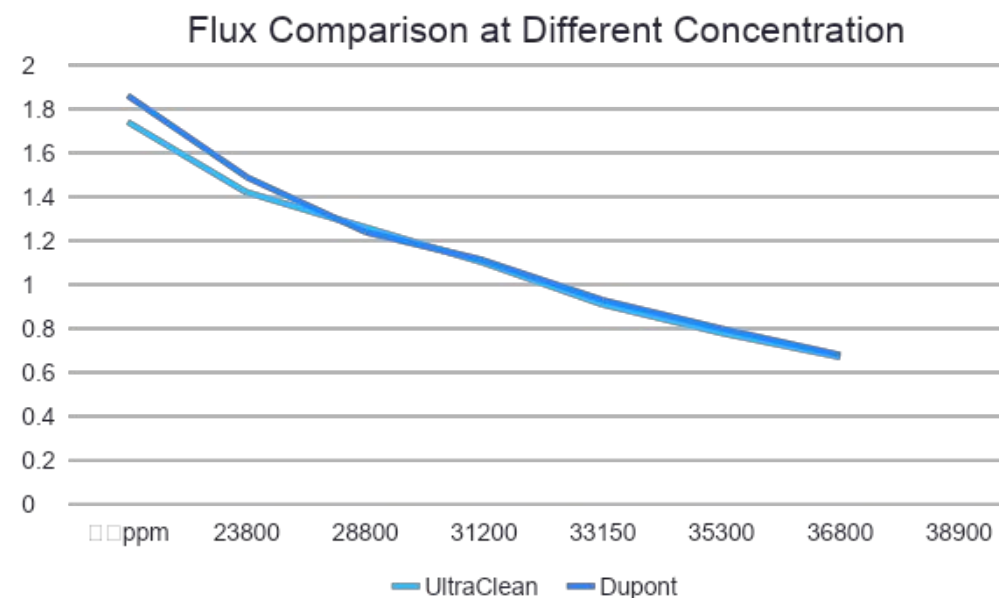
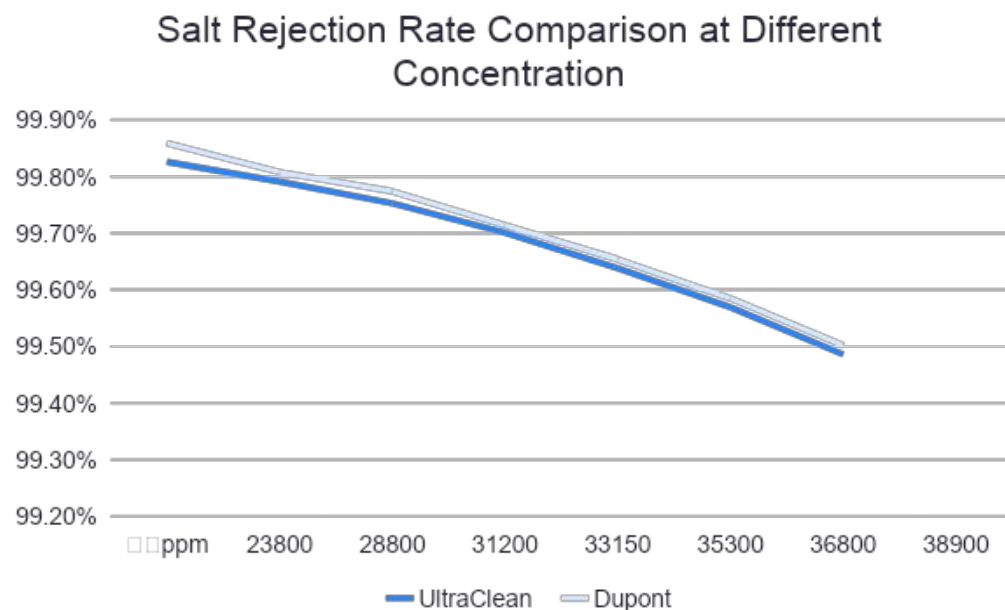
Test Solution	NaCl	Temperature °C	25	Pressure MPa	5.5	PH	7.82	
Test Data of Membrane Element								
Project	Concentrate ppm	23800	28800	31200	33150	35300	36800	38900
Salt Rejection Rate %	IonClear	99.83%	99.79%	99.75%	99.70%	99.64%	99.57%	99.49%
	DuPont	99.86%	99.81%	99.77%	99.71%	99.65%	99.59%	99.50%
Flux m³/H	IonClear	1.74	1.42	1.26	1.1	0.91	0.78	0.67
	DuPont	1.86	1.49	1.24	1.11	0.93	0.8	0.68





# IonClear vs DuPont (FilmTec):

## Performance Comparison at Different Concentration

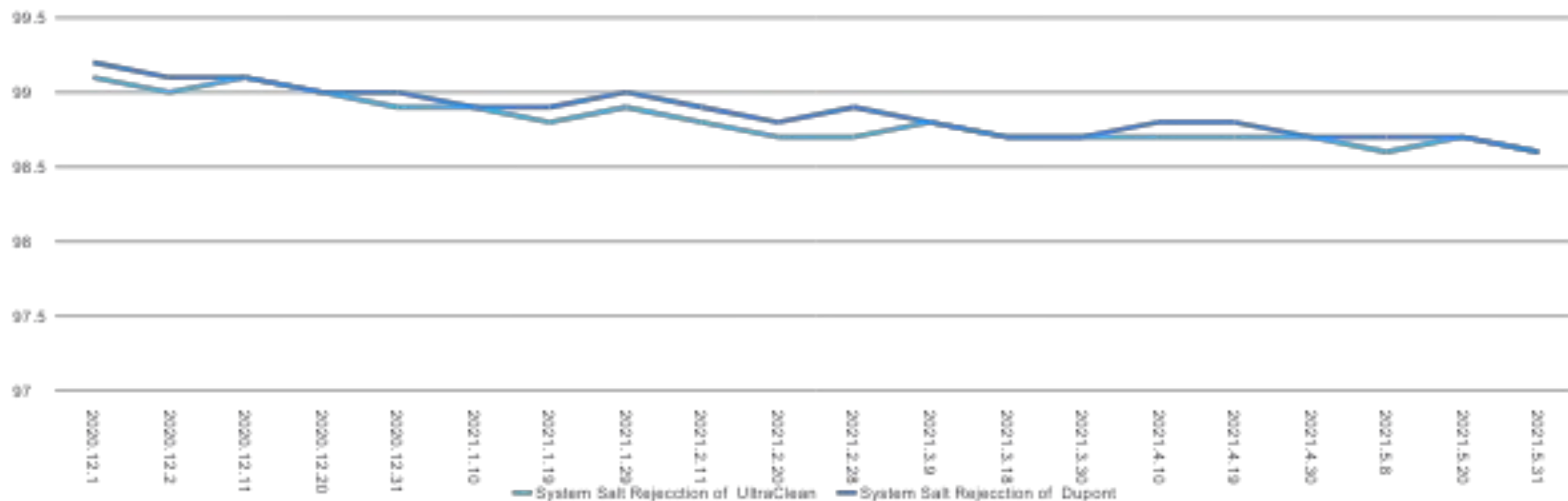


With the same test conditions, the rejection and flux are close to each other at different concentration



# IonClear vs DuPont (FilmTec):

## System Salt Rejection Comparison



It can be clearly seen from the data that the system salt rejection rate of the IonClear's Seawater Membrane is close to and follows the same trend with Dupont's at the same operating conditions.



35

# Total Life Cycle Cost Optimization

On average, replacement and maintenance cost of seawater desalination membranes accounts for more than 30% of the total project cost.

Using patented nanopollution-resistant coating technology, our membranes reduce these operational costs by:

**Extending the cleaning cycle by 30%**

**Providing a service life of more than 5 years**

**Reducing the average annual maintenance cost by 25%**





36

# Client Testimonial

## Efficiency & Performance

“The membrane technology provided has significantly enhanced our water treatment process, with notable improvements in the membranes’ permeability and selectivity, resulting in improved water quality, increased productivity, and reduced operational costs.”

## Customer Support

“The technical support and guidance provided by their team have been invaluable. Their responsiveness and expertise have greatly assisted us in optimizing our systems for maximum efficiency and effectiveness.”

**Michael Spanos, CEO**

SeaWater Pro Watermakers







37

# How We Support You

## 24/7 Service Hotline

- Expert engineers available around the clock
- Real-time troubleshooting, optimization, and maintenance
- Fast response to minimize downtime

## Membrane Performance Assurance

- Complimentary small-batch trial to benchmark against existing brands
- 3-year warranty—one of the best in the industry
- Free replacement if performance falls below guaranteed threshold

**A Partnership, Not Just a Product**  
**Ongoing support from a dedicated team**





38

# A Strong Partnership for a Sustainable Future

IonClear delivers cutting-edge reverse osmosis membrane technology and custom-engineered solutions, designed to meet the evolving needs of high-demand facilities like the Carlsbad Desalination Plant.

With the Carlsbad facility providing drought-proof, locally controlled water for 400,000 people, IonClear's precision membranes will support this mission with stable, high-quality output—even under fluctuating seawater conditions.





**IonClear**<sup>TM</sup>  
ENGINEERED FOR MAXIMUM PERFORMANCE

# Let's Unlock the Future of Water Together

**CONTACT US:**

**Charles Huang - CEO**

**[charles@ionclear.com](mailto:charles@ionclear.com)**

**Website: [ionclear.com](http://ionclear.com)**