

VONTRON

2023

**RO/NF/UF**  
**Product Manual**



VONTRON TECHNOLOGY CO., LTD.  
[www.vontron.com](http://www.vontron.com)

# VONTRON

## VONTRON

Present inexhaustible supply of water essential for life

## VISION

To be an excellent enterprise beneficial to human being and environmental health

## MISSION

Improving the environment and sharing the health

## VALUE

Responsibility, integrity, expertise and outstanding results

## Company Profile

**VONTRON TECHNOLOGY CO., LTD.** is a listed company of CRRC Group (stock referred to as "VONTRON", code 000920). The company is registered in Southwest China's Guiyang High-tech Industrial Zone, a large-scale enterprise of the central government in Guizhou, and the company's largest shareholder is CRRC Industrial Investment Co., Ltd.. The company is a publicly traded company that specializes in the research and development, manufacturing, and sale of separation membranes and related materials, supplemented by comprehensive utilization of plant fibers and membrane separation industry.

VONTRON's core business is membranes, With over 20 years of experience in the manufacture of spiral-wound membrane elements. VONTRON specialized in R&D and manufacturing of reverse osmosis (RO), nanofiltration (NF), and ultrafiltration (UF) membrane elements as a national standard-setting unit of reverse osmosis membrane and a national high-tech enterprise. The company owns the core technologies in membrane manufacturing and system design, aiming at providing quality services to its clients. VONTRON's products are widely sold in over 130 countries and regions.

VONTRON has developed over 20 Series and over 200 specifications of membrane products, including desalination membrane, fouling resistant membrane, oxidation resistant membrane, nanofiltration membrane, special separation membrane and residential membranes, which are applicable to bottled water, municipal drinking water, industrial pure water, electric high-purity water, seawater desalination, brackish water desalination, wastewater reuse, separation of high-salinity water and near-zero emission, food and beverage production, pharmaceutical manufacturing, material separation and purification as well as other applications. VONTRON is currently China's largest manufacturer and service provider of dry-type reverse osmosis membrane elements.

As the R&D and application platform of the National and Local Joint Engineering Center for Separation Membrane Materials and Application Technology, Since the year of 2004, VONTRON has been undertaking 8 major scientific programs such as the national high-tech and R&D program (863 program), National Sci. &Tech Support Program and National Key R&D Program, etc. The company has been granted 143 patents, including 65 invention patents. VONTRON has been involved in preparing 12 national and industrial standards, among which VONTRON has played a leading role in preparing 3 national standards that have been put into effect. The talent pool and top-notch equipment the company owns has been enabling its steady and sustainable growth. Adhering to the idea of "Highly-automatic Equipment, High-standard

Production Environment and Strict Quality Control”, VONTRON has set up a fully-automatic dry-type membrane sheet producing line and a fully-automatic spiral- wound line with core technologies. VONTRON focuses on extending and developing the spiral-wound separation membrane industry into the world's advanced membrane technology industry chain and the core industrial cluster of all categories, relying on R&D and manufacturing advantages.

VONTRON's development strategy of "Focus on environment & health, Integrated synergy & innovation", in which environmental protection and health are the core, high-end materials are the fulcrum, focusing on the market with technology and investing in the technology with market. Relying on the advantages of listed companies' platform financing and existing industrial technology, VONTRON gives full play to the synergy among various business units. This can realize the company's corporate mission of "Improving the environment and sharing the health" and its development vision of "To be an excellent enterprise beneficial to human being and environmental health".

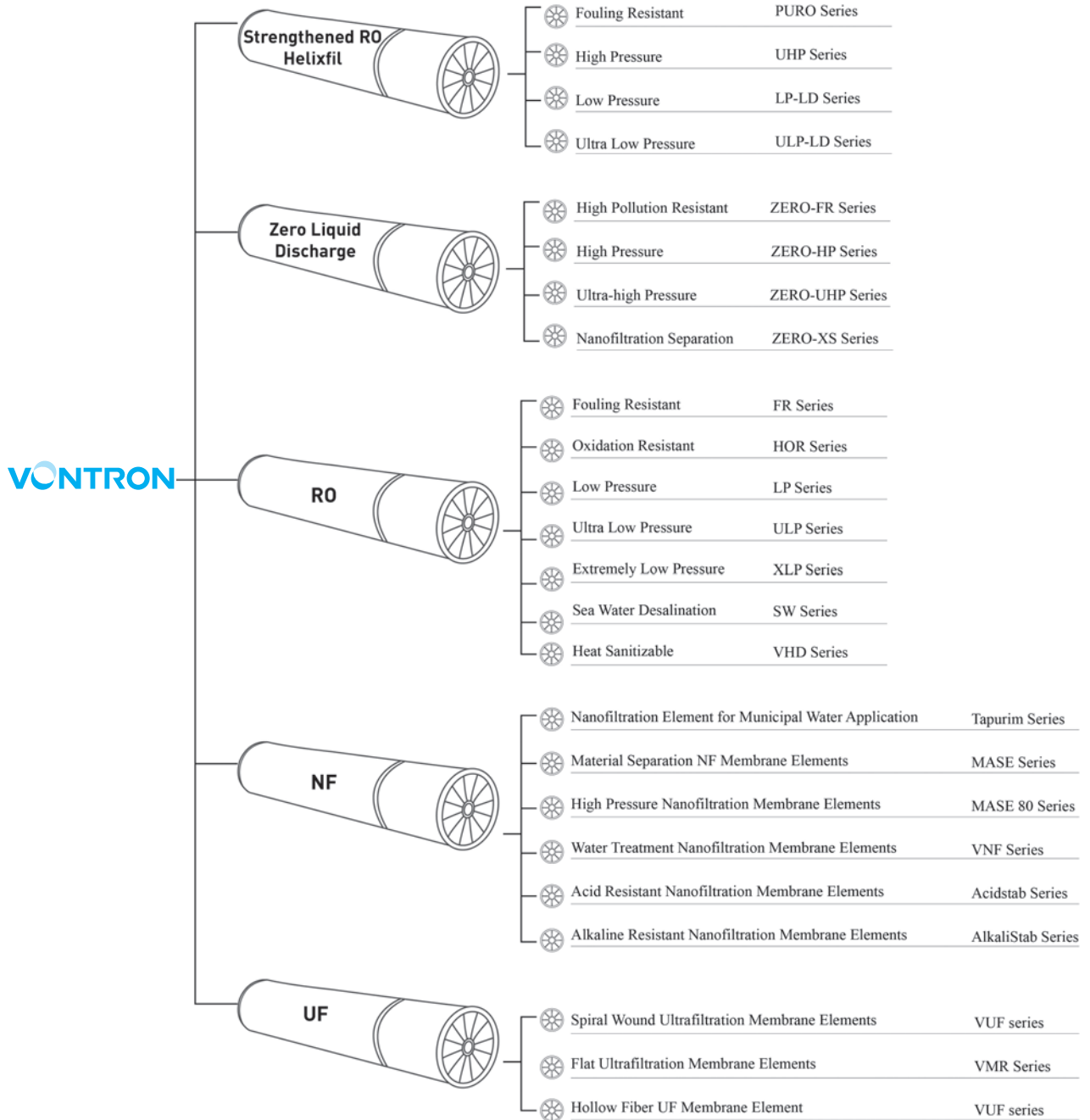
# Content

Chapter I Product Profile .....	1
1-1 Product Classification .....	1
1-2 Product Size .....	6
1-3 Guideline for RO Membrane Selection .....	7
Chapter II Product Selection Guidelines .....	8
2-1 RO Membrane Elements .....	8
◇ Strengthened RO Membrane Elements – Helixfil Series .....	8
◇ Zero Liquid Discharge (ZLD) – ZERO series .....	10
◇ Fouling Resistant RO Membrane Elements – FR Series .....	12
◇ Low Pressure RO Membrane Elements – LP Series .....	13
◇ Ultra Low Pressure Membrane Elements – ULP Series .....	14
◇ Extremely Low Pressure Series Membrane Elements – XLP Series .....	15
◇ Oxidation-resistant RO Membrane Elements – HOR Series .....	16
◇ Sea Water Desalination RO Membrane Elements – SW Series .....	18
◇ Heat Sanitizable RO Elements – VHD Series .....	19
2-2 Nanofiltration Elements .....	20
◇ Nanofiltration Elements for Municipal Water Application – Tapurim Series .....	20
◇ Material Separation NF Membrane Elements – MASE Series .....	21
◇ High Pressure Nanofiltration Membrane Elements – MASE 80 Series .....	22
◇ Water Treatment Nanofiltration Membrane Elements – VNF Series .....	23
◇ Acid-resistant Nanofiltration Membrane Elements – Acidstab Series .....	24
◇ Alkaline Resistant Nanofiltration Membrane Elements – AlkaliStab Series .....	25
2-3 Ultrafiltration Membrane Elements .....	26
◇ Spiral Wound Ultrafiltration Membrane Elements – VUF Series .....	26
◇ Flat Ultrafiltration Membrane Elements – VMR Series .....	27
◇ Hollow fiber UF Membrane Element VUF Series .....	28

Chapter III Preservation of Membrane Elements .....	29
3-1 Dry-type Membrane Elements .....	29
3-2 Precautions for Dry-type Elements.....	29
Chapter IV Quality Assurance of Membrane Elements .....	31
4-1 Three-year Warranty for RO Membrane Elements .....	31
4-2 Repair and Replacement Procedures .....	34
4-3 Product Traceability and Anti-fake Measures .....	37
4-4 Qualifications and Certifications .....	38

# Chapter I Product Profile

## 1-1 Product Classification



## Performance of Industrial RO Element

### 1. Major Properties of Industrial RO Element

Type	Model	Rejection Rate (%)	Permeate Flow GPD (m <sup>3</sup> /d)	Active Membrane Area ft <sup>2</sup> (m <sup>2</sup> )	Spacer Thickness (mil)	Test Conditions		
						Test Pressure psi(MPa)	Solution Concentration of NaCl (ppm)	Recovery Rate (%)
Helixfil Series	LP400-LD	99.7	10500(39.7)	400(37.2)	34-LD	225(1.55)	2000	15
	LP440-MAX	99.7	12500(47.3)	440(40.9)	28			
	ULP400-LD	99.5	10500(39.7)	400(37.2)	34-LD	150(1.03)	1500	15
	ULP440-MAX	99.5	12000(45.4)	440(40.9)	28			
	PURO-FRLE	99.6	10500(39.7)	400(37.2)	34-LD	150(1.03)	2000	15
	PURO-I	99.75	10500(39.7)	400(37.2)	34	225(1.55)	2000	15
	PURO-II	99.8	11500(43.5)	400(37.2)	34-LD			
Zero Liquid Discharge Series	ZERO-FR10	99.7	11500(43.5)	400(37.2)	34	225(1.55)	2000	15
	ZERO-HP70	99.75	8800(33.3)	400(37.2)	34	800(5.52)	32000	8
	ZERO-UHP120	99.7	7400(28.0)	330(30.7)	28			
	ZERO-XS90	99.0	8300(31.4)	400(37.2)	34	100(0.69)	2000 MgSO <sub>4</sub>	15
Extra Low Pressure Element	XLP12-8040	99.2	12800(48.4)	400(37.2)	28	100(0.69)	500	15
	XLP11-4040	99.2	2600(9.8)	100(9.3)	28			
Ultra Low Pressure Element	ULP22-8040	99.0	12100(45.8)	400(37.2)	28	150(1.03)	1500	15
	ULP32-8040	99.5	10500(39.7)	400(37.2)	28			
	ULP32-8040/31	99.5	10500(39.7)	400(37.2)	31			
	ULP32-8040-440	99.3	12650(47.9)	440(40.9)	28			
	ULP21-4040	99.5	2600(9.8)	100(9.3)	28			
	ULP31-4040	99.6	2000(7.6)	100(9.3)	28			
	ULP21-4021	99.0	950(3.6)	36(3.3)	28			8
	ULP21-2521	99.0	300(1.1)	14(1.3)	28			
	ULP21-2540	99.0	750(2.8)	30(2.8)	28			



Type	Model	Rejection Rate (%)	Permeate Flow GPD (m <sup>3</sup> /d)	Active Membrane Area ft <sup>2</sup> (m <sup>2</sup> )	Spacer Thickness (mil)	Test Conditions		
						Test Pressure psi(MPa)	Solution Concentration of NaCl (ppm)	Recovery Rate (%)
Low Pressure Element	LP22-8040	99.7	10500(39.7)	400(37.2)	28	225(1.55)	2000	15
	LP22-8040/31	99.7	10500(39.7)	400(37.2)	31			
	LP22-8040-440	99.7	11500(43.5)	440(40.9)	28			
	LP22-8040PRO	99.7	11000(41.6)	400(37.2)	28			
	LP21-4040	99.6	2800(10.6)	100(9.3)	28			
Fouling Resistant Element	FR12-8040	99.5	10500(39.7)	400(37.2)	34	225(1.55)	2000	15
	FR400-LD	99.6	10500(39.7)	400(37.2)	34			
	FR22-8040PRO	99.7	11000(41.6)	400(37.2)	34			
	FR11-4040	99.5	2200(8.3)	90(8.4)	34			
High Oxidation Resistant Element	HOR22-8040	99.5	9000(34.0)	400(37.2)	28	225(1.55)	2000	15
	HOR21-4040	99.5	2200(8.3)	90(8.4)	28			
Sea Water Desalination Element	SW8040XHR-400	99.85	6000(22.7)	400(37.2)	28	800(5.52)	32000	8
	SW8040XHR-440	99.85	6600(25.0)	440(40.9)	28			
	SW8040FR-400	99.8	8200(31.0)	400(37.2)	34			
	SW8040HR-400	99.8	7500(28.4)	400(37.2)	28			
	SW8040HR-440	99.8	8250(31.2)	440(40.9)	28			
	SW8040LE-400	99.8	9000(34.0)	400(37.2)	28			
	SW8040LE-440	99.8	9500(35.9)	440(40.9)	28			
	SW8040XLE-400	99.7	11000(41.6)	400(37.2)	28			
	SW8040XLE-440	99.7	12100(45.8)	440(40.9)	28			
	SW4040HR	99.8	1600(6.1)	90(8.4)	28			
	SW4040LE	99.7	1900(7.2)	90(8.4)	28			
	SW11-4021	99.5	750(2.8)	33(3.1)	28			
	SW11-2521	99.5	270(1.0)	12(1.1)	28			
	SW11-2540	99.5	600(2.3)	28(2.6)	28			8
Heat Sanitizable RO Element	VHD-8040/34G	98.0	9000(34.0)	400(37.2)	34	150(1.03)	2000	15
	VHD-4038G	98.0	2100(7.9)	90(8.4)	28			

## 2. Major Properties of Nanofiltration Membrane Element

Type	Model	Rejection Rate (%)	Permeate Flow GPD (m <sup>3</sup> /d)	Spacer Thickness (mil)	Test Conditions		
					Test Pressure psi(MPa)	Solution Concentration (ppm)	Recovery Rate (%)
Water Treatment Nanofiltration Membrane Element	VNF1-8040	98	10000(37.9)	28	100(0.69)	2000 MgSO <sub>4</sub>	15
	VNF2-8040	97	10500(39.7)	28			
	VNF1-4040	98	2000(7.5)	28			
	VNF2-4040	97	2400(9.1)	28			
	VNF1-2540	98	650(2.46)	28			
	VNF2-2540	97	750(2.84)	28			
Municipal Water Nanofiltration Membrane Element	TAPU-LS	95	12000(45.4)	34-LD	70(0.48)	Tested in mixed solution of NaCl, MgSO <sub>4</sub> and CaCl <sub>2</sub>	15
	TAPU-MS	95	9000(34.1)	34-LD			
	TAPU-HS	95	8000(30.3)	34-LD			
Material Separation NF Membrane Element	MASE-SP	90	12000(45.4)	34-LD	100(0.69)	2000 MgSO <sub>4</sub>	15
	MASE-SL	98	12000(45.4)	34-LD			
	MASE-PS	98	12000(45.4)	34-LD			
	MASE-CR	95	12000(45.4)	34-LD			
High Pressure Nanofiltration Membrane Element	MASE-SL 80	98	8200(31.0)	28	100(0.69)	2000 MgSO <sub>4</sub>	15
	MASE-CR 80	95	9500(35.9)	28			
Acid-resistant Nanofiltration Membrane Element	Acidstab NF-8040	96	5500(20.8)	28	110(0.76)	2000 MgSO <sub>4</sub>	15
	Acidstab NF-4040	96	1200(4.5)	28			
	Acidstab NF-2540	96	350(13.0)	28			
Alkali-resistant Nanofiltration Membrane Element	Alkalistab NF-8040	96	5500(20.8)	28	110(0.76)	2000 MgSO <sub>4</sub>	15
	Alkalistab NF-4040	96	750(2.8)	28			
	Alkalistab NF-2540	96	220(0.82)	28			

### 3. Major Properties of UF Membrane Element

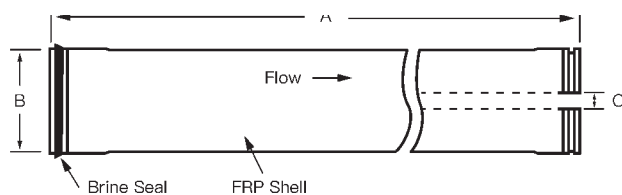
Type	Model	Permeate Flow GPD (m <sup>3</sup> /d)	Test Conditions			
			Testing Pressure psi(MPa)	Test Solution	Solution Concentration (ppm)	Recovery Rate (%)
Spiral Wound Ultrafiltration Membrane Element	VUF8040-4K/31F	8700(32.9)	60(0.41)	PEG 4000	1000	15
	VUF8040-6K/31F	6500(24.6)		PEG 6000		
	VUF8040-8K/31F	9500(35.9)		PEG 8000		
	VUF8040-10K/31F	7000(26.5)	40(0.28)	PEG 10000	1000	15
	VUF8040-20K/31F	10500(39.7)		PEG 20000		
	VUF8040-67K/31F	25000(94.6)	40(0.28)	BSA	300	15

Type	Model	Active Membrane Area (m <sup>2</sup> )	Weight (Kg)	W×H×T (mm)	Average Membrane Pore Size (μm)
Flat Ultrafiltration Membrane Element	VMR 88	0.88	2.34	490×1000×7	0.1
	VMR 160	1.6	3.73	515×1750×7	0.1

Type	Model	Active Membrane Area (m <sup>2</sup> )	System flux LMH	MWCO Da	Membrane filament material	Sealant
Hollow Fiber UF Membrane Element	VUF-2860	50	30-120	150000	PVDF	Epoxy Resins
	VUF-2880	75	30-120	150000	PVDF	Epoxy Resins

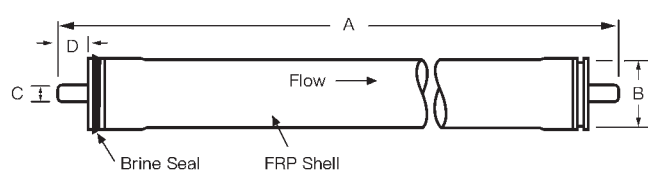
## 1-2 Product Size (1 inch=25.4 mm )

### 8040 Membrane Element



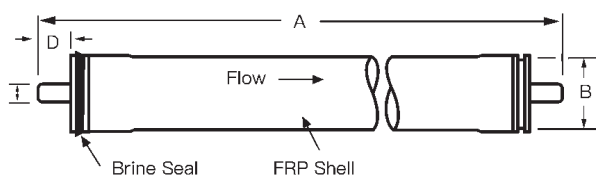
A/mm(inch)	B/mm(inch)	C/mm(inch)
1016 (40)	201 (7.9)	29 (1.125)

### 4040、2540 Membrane Element



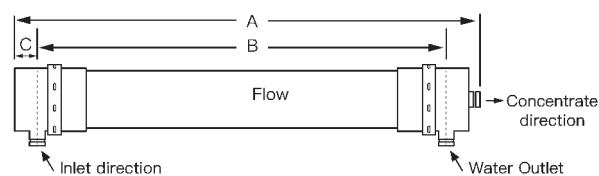
Specification	A/mm(inch)	B/mm(inch)	C/mm(inch)	D/mm(inch)
4040	1016 (40)	99.7 (3.9)	19.1 (0.75)	26.7 (1.05)
2540	1016 (40)	61 (2.4)	19.1 (0.75)	30.2 (1.19)

### 4021、2521 Membrane Element



Specification	A/mm(inch)	B/mm(inch)	C/mm(inch)	D/mm(inch)
4021	533.4 (21)	99.7 (3.9)	19.1 (0.75)	26.7 (1.05)
2521	533.4 (21)	61 (2.4)	19.1 (0.75)	30.2 (1.19)

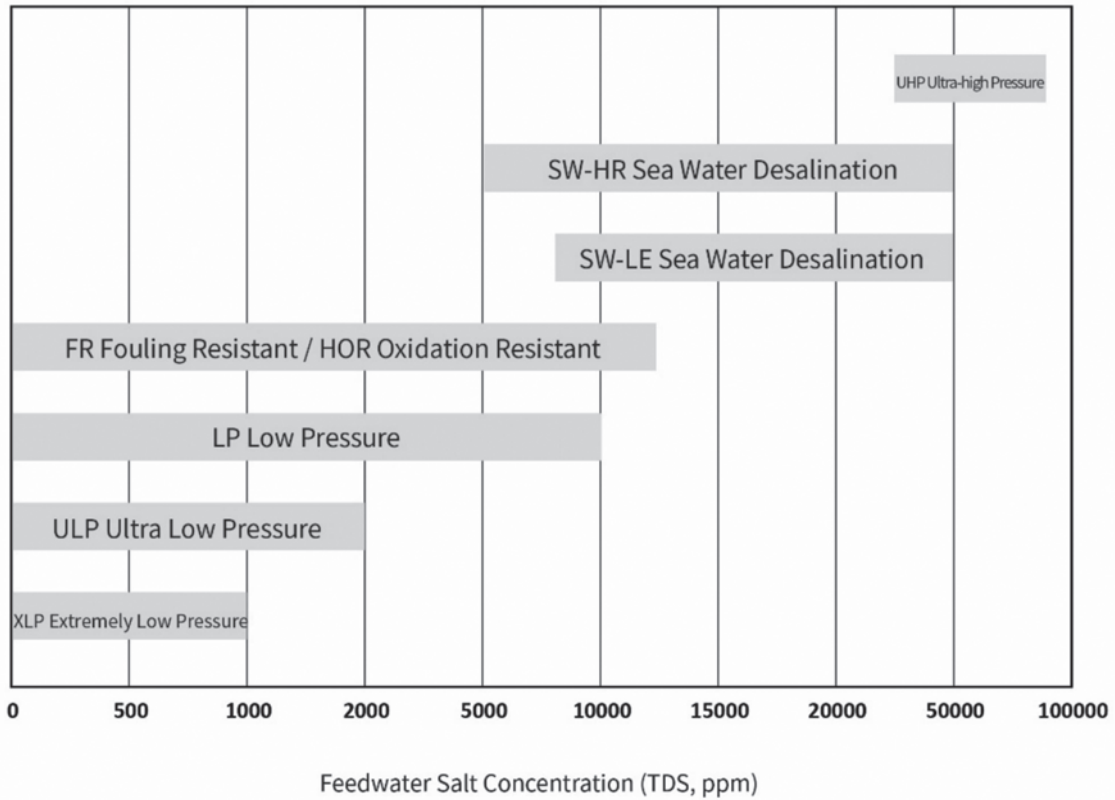
### 2860、2880 Membrane Element



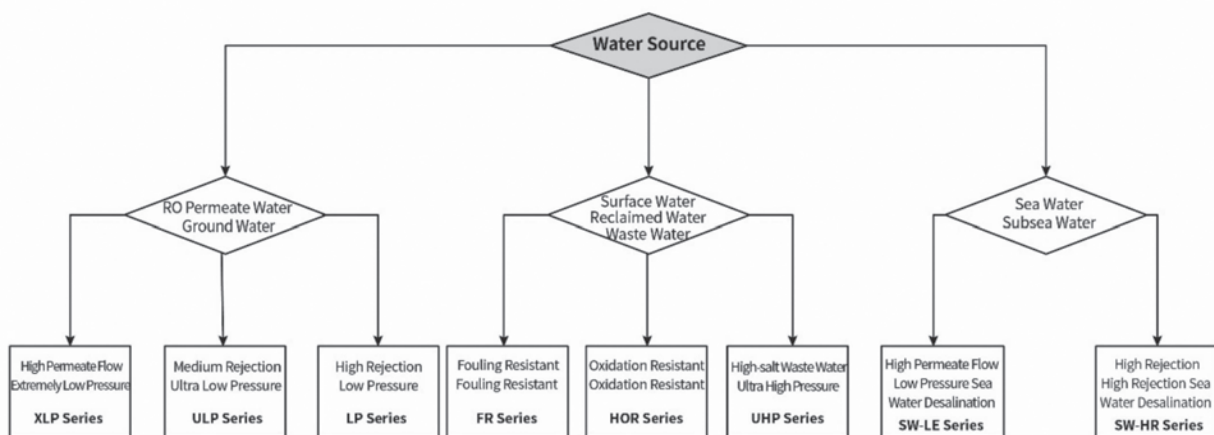
Specification	A/mm(inch)	B/mm(inch)	C/mm(inch)
2880	2360 (92.91)	2130 (83.85)	95 (3.74)
2860	1860 (73.23)	1630 (64.17)	95 (3.74)

### 1-3 Guideline for RO Membrane Selection

(A) Selection of element according to Feedwater Salt Concentration



(B) Selection of element according to water source quality



## Chapter II Product Selection Guidelines

### 2-1 RO Membrane Elements

#### ◇ Strengthened RO Membrane Elements - Helixfil Series

ULP400-LD and LP400-LD membrane elements adopt LD 34mil feed channel spacer to improve the liquid turbulence on the surface of membrane, thus reducing the risk of colloid congestion and the frequency of cleaning.

ULP440-MAX and LP440-MAX membrane elements can increase permeate flow by 15% and 20% respectively, while maintaining the required rejection rate.

PURO-I membrane elements are more fouling-resistant and more resilient to a wide range of chemical cleaning thanks to its improved cross-link strength of Polyamide desalination layer.

PURO- II membrane elements have higher endurance to chemical cleaning and obviously higher fouling resistance owing to the brand-new design of feed channel spacer with low pressure differentials.

PURO-FRLE, an ultra-low pressure RO Membrane, has the features of fouling resistance and low energy consumption, and is applicable to the treatment of industrial sewage with low salinity, such as electronic sewage and surface water.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area		Feed Spacer Thickness mil
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
LP440-MAX	12500	47.3	99.7	440	40.9	28
LP400-LD	10500	39.7	99.7	400	37.2	34-LD
ULP440-MAX <sup>1</sup>	12000	45.4	99.5	440	40.9	28
ULP400-LD <sup>1</sup>	10500	39.7	99.5	400	37.2	34-LD
PURO-I	10500	39.7	99.75	400	37.2	34
PURO-II	11500	43.5	99.8	400	37.2	34-LD
PURO-FRLE <sup>2</sup>	10500	39.7	99.6	400	37.2	34-LD

	Operating pressure at 225 psi (1.55 MPa)	2000 mg/L NaCl solution	Temperature at 25°C
	pH 7.0 ± 0.5	Recovery rate at 15%	
<b>Testing</b>	<sup>1</sup> Operating pressure at 150 psi (1.03 MPa)	1500 mg/L NaCl solution	Temperature at 25°C
<b>Conditions</b>	pH 7.0 ± 0.5	Recovery rate at 15%	
	<sup>2</sup> Operating pressure at 150 psi (1.03 MPa)	2000 mg/L NaCl solution	Temperature at 25°C
	pH 7.0 ± 0.5	Recovery rate at 15%	

---

	Maximum operating pressure:	600 psi (4.14 MPa);
	Maximum feedwater temperature:	45°C
	Maximum feedwater flow SDI <sub>15</sub> :	5
<b>Operating</b>	Maximum concentration of free chlorine:	<0.1 mg/L
<b>Conditions</b>	Maximum pressure drop per element:	15 psi (0.1MPa)
<b>&amp; Limits</b>	Allowed pH range for chemical cleaning:	1-13
	Allowed pH range for feedwater in operation:	2-11
	<sup>1</sup> Allowed pH range for chemical cleaning:	2-12
	<sup>1</sup> Allowed pH range for feedwater in operation:	3-10

---

**Note:** Each membrane element may have ±15% variation of permeate flow.

<sup>1</sup>Each membrane element may have ±20% variation of permeate flow.

### ◇ ZERO Liquid Discharge (ZLD) - ZERO Series

ZERO-FR10 element is one of the industry's most advanced fouling resistant element technology special designed for high TDS level 5000-15000 ppm, and high COD wastewater reclaiming in zero liquid discharge process. Base on the new generation of membrane separation layer technology and unique component structure, It is a low pressure drop, long cleaning cycle, high chemical cleaning resistance membrane element product.

ZERO-HP 70 is a series of high pressure reverse osmosis membrane element. The highly desalinated membrane product is developed for TDS 15000-35000 ppm brine concentration. Based on the SW serial element to improve the performance of the bearing higher pressure, and the Zeta potential and hydrophilicity of the membrane are also improved.

ZERO-UHP 120 is a series of ultra-high pressure reverse osmosis membrane element. The membrane product is developed for TDS 35000-70000 ppm brine concentration with a maximum operating pressure up to 120 bar, suitable for concentration and reduction of high salt waste water discharge.

ZERO-XS 90 is a series of nanofiltration separation membrane element. It is a highly selective fouling resistant nanofiltration membrane product developed for sodium chloride and sodium sulfate of Low energy consumption resource recycling. It is suitable for the selective separation of TDS 35000-70000 ppm high pollution concentrated brine in zero liquid discharge process of chlor-alkali, desulfurization wastewater, remove sodium sulfate from dyeing wastewater.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area		Feed Spacer Thickness mil
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
ZERO-FR10	11500	43.5	99.7	400	37.2	34
ZERO-HP70 <sup>1</sup>	8800	33.3	99.75	400	37.2	34
ZERO-UHP120 <sup>2</sup>	7400	28.0	99.7	330	30.7	28
ZERO-XS90 <sup>3</sup>	8300	31.4	99.0	400	37.2	34

**Testing Conditions**

Operating pressure at 225 psi (1.55 MPa) 2000 mg/L NaCl solution  
 Temperature at 25°C pH 7.0 ± 0.5 Recovery rate at 15%

<sup>1,2</sup> Operating pressure at 800 psi (5.52 MPa) 32000 mg/L NaCl solution  
 Temperature at 25°C pH 8 Recovery rate at 8%

<sup>3</sup> Operating pressure at 100 psi (0.69 MPa) 2000 mg/L MgSO<sub>4</sub> solution  
 Temperature at 25°C pH7.0 ± 0.5 Recovery rate at 15%



<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure:	600 psi (4.14 MPa)
		<sup>1</sup> 1200 psi (8.28 MPa)
		<sup>2</sup> 1740psi (12.0MPa)
	Maximum temperature:	45 °C
	Maximum feedwater flow SDI <sub>15</sub> :	5
	Maximum concentration of free chlorine:	<0.1 mg/L
	Maximum pressure drop per element:	15 psi (0.1MPa)
	Allowed pH range for feedwater in operatio:	2-11
	Allowed pH range for chemical cleaning:	1-13
	<sup>3</sup> Allowed pH range for feedwater in operation:	3-10
<sup>3</sup> Allowed pH range for chemical cleaning:	2-11	

---

**Note:** Each membrane element may have ±20% variation of permeate flow.

### ◇ Fouling Resistant RO Membrane Elements - FR Series

FR Series RO Membrane Element utilizes specialized manufacture technique that can improve the hydrophilicity, electric charge and roughness of its surface, thus reducing the breeding and adsorption of pollutants and microbes on membrane surface.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area		Feed Spacer Thickness mil
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
FR12-8040	10500	39.7	99.5	400	37.2	34
FR22-8040PRO	11000	41.6	99.7	400	37.2	34
FR400-LD	10500	39.7	99.6	400	37.2	34
FR11-4040	2200	8.3	99.5	90	8.4	34

**Testing Conditions**

Operating pressure 225 psi (1.55 MPa)  
 Tested at 2000mg/L NaCl solution  
 Temperature at 25°C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**

Maximum operating pressure: 600 psi (4.14 MPa)  
 Maximum temperature: 45°C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.1 mg/L  
 Maximum pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 1-13  
 Allowed pH range for feedwater in operation: 2-11

**Note:** Each membrane element may have ±15% variation of permeate flow.

◇ Low Pressure RO Membrane Elements- LP Series

Low Pressure Series is primarily used in desalination of brackish water. This series features low operating pressure, high permeate flow and rejection. It has high performance in rejecting soluble salt, TOC and SiO<sub>2</sub>, and can be widely applied in pure water production in electricity and electronic industries.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area		Feed spacer Thickness mil
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
LP22-8040-440	11500	43.5	99.7	440	40.9	28
LP22-8040	10500	39.7	99.7	400	37.2	28
LP22-8040PRO	11000	41.6	99.7	400	37.2	28
LP22-8040/31	10500	39.7	99.7	400	37.2	31
LP21-4040	2800	10.6	99.6	100	9.3	28

**Testing Conditions**  
 Operating pressure 225 psi (1.55 MPa)  
 Tested at 2000 mg/L NaCl solution  
 Temperature at 25°C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**  
 Maximum operating pressure: 600 psi (4.14 MPa)  
 Maximum feedwater flow: 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040-16 gpm (3.6 m<sup>3</sup>/h)  
 Maximum feedwater temperature: 45°C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.1 mg/L  
 Maximum pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 1-13  
 Allowed pH range for feedwater in operation: 2-11

**Note:** Each membrane element may have ±15% variation of permeate flow.

## ◇ Ultra Low Pressure Membrane Elements - ULP Series

ULP Series Membrane Element can work with ultra-low pressure to reach a water flux and rejection rate that can rival its common low-pressure counterpart. It can operate with 2/3 pressure of LP Series while reaching a rejection rate of 99.5%.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area		Feed spacer Thickness mil
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
ULP32-8040-440	12650	47.9	99.3	440	40.9	28
ULP22-8040	12100	45.8	99.0	400	37.2	28
ULP32-8040	10500	39.7	99.5	400	37.2	28
ULP32-8040/31	10500	39.7	99.5	400	37.2	31
ULP21-4040	2600	9.8	99.5	100	9.3	28
ULP31-4040	2000	7.6	99.6	100	9.3	28
ULP21-4021 <sup>1</sup>	950	3.6	99.0	36	3.3	28
ULP21-2540	750	2.84	99.0	30	2.8	28
ULP21-2521 <sup>1</sup>	300	1.13	99.0	14	1.3	28

**Testing Conditions** Operating pressure 150 psi (1.03 MPa) Tested in 1500 mg/L NaCl solution  
 Temperature at 25°C pH 7.0 ± 0.5 Recovery rate at 15%.  
<sup>1</sup>Operating pressure 150 psi (1.03 MPa) Tested in 1500 mg/L NaCl solution  
 Temperature at 25°C pH 7.0 ± 0.5 Recovery rate at 8%.

**Operating Conditions & Limits**

- Maximum operating pressure: 600 psi (4.14 MPa)
- Maximum feedwater flow: 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040, 4021-16 gpm (3.6 m<sup>3</sup>/h)  
 2521, 2540-6 gpm (1.4 m<sup>3</sup>/h)
- Maximum temperature: 45°C
- Maximum feedwater flow SDI<sub>15</sub>: 5
- Maximum concentration of free chlorine: <0.1 mg/L
- Maximum pressure drop per element: 15 psi (0.1MPa)
- Allowed pH range for chemical cleaning: 2-12
- Allowed pH range for feedwater in operation: 3-10

**Note:** Each membrane element may have ±20% variation of permeate flow.

◇ Extremely Low Pressure Membrane Elements -XLP Series

Extremely Low Pressure Series Membrane Element can reach a water flux and rejection rate that rivals its low pressure counterpart under extreme-low pressure, its operating pressure is 1/2 to that of the normal low-pressure element.

Model	Permeate Flow		Stable Rejection	Active Membrane Area		Feed spacer Thickness
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
XLP12-8040	12800	48.4	99.2	400	37.2	28
XLP11-4040	2600	9.8	99.2	100	9.3	28

<b>Testing Conditions</b>	Operating pressure 100 psi (0.69 MPa)	
	Tested in 500 mg/L NaCl solution	
	Temperature at 25 °C	
	pH 7.0 ± 0.5	
	Recovery rate at 15%	

<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure:	600 psi(4.14 MPa)
	Maximum feedwater flow:	8040-75 gpm(17 m <sup>3</sup> /h) 4040-16 gpm (3.6 m <sup>3</sup> /h)
	Maximum temperature:	45 °C
	Maximum feedwater flow SDI <sub>15</sub> :	5
	Maximum concentration of free chlorine:	<0.1 mg/L
	Maximum pressure drop per element:	15 psi (0.1MPa)
	Allowed pH range for chemical cleaning:	2-12
Allowed pH range for feedwater in operation:	3-10	

**Note:** Each membrane element may have ±20% variation of permeate flow.

## ◇ Oxidation-resistant RO Membrane Elements - HOR Series

HOR Series is the oxidation-resistant polyamide membrane element independently developed by VONTRON. Aiming to overcome the shortcoming of low oxidation resistance commonly existing in traditional polyamide RO membrane, it utilizes unique applies specialized synthesizing process to strengthen the oxidation resistance of membrane element, allowing the disinfectants to be directly added into the on-line elements, thus achieving the complete asepsis of RO mainbody.

Model	Permeate Flow		Stable Rejection	Active Membrane Area		Spacer Thickness
	GPD	m <sup>3</sup> /d	%	ft <sup>2</sup>	m <sup>2</sup>	mil
HOR22-8040	9000	34.0	99.5	400	37.2	28
HOR21-4040	2200	8.3	99.5	90	8.4	28

**Testing Conditions**

Operating pressure 225 psi (1.55 MPa)  
 Tested in 2000 mg/L NaCl solution  
 Temperature at 25°C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**

Maximum operating pressure: 600 psi (4.14 MPa)  
 Maximum feedwater flow: 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040-16 gpm (3.6 m<sup>3</sup>/h)  
 Maximum temperature: 45°C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.5 mg/L  
 Maximum pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 2-12  
 Allowed pH range for feedwater in operation: 3-10

**Note:** Each membrane element may have ±20% variation of permeate flow

## Important Information

1. Metal ions such as  $\text{Cu}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Fe}^{3+}$ , etc. that may cause oxidation and catalyzation shall be completely removed from feedwater before pyochloride is added.
2. The pH and temperature of feedwater shall be kept under control when pyochloride is added, and the feedwater temperature shall be no higher than  $30^{\circ}\text{C}$  and the pH range between 6~8 is preferred, otherwise the oxidation process will be accelerated.
3. Feedwater pipelines made of high-pressure PVC material or high corrosion-resistant stainless-steel material is preferred, and it would be best to use pressure vessels made of fiberglass reinforced plastic. Pumps and instruments made of high corrosion-resistant stainless steel are recommended, while those containing copper component shall be avoided.
4. Since residual chlorine may remain in the permeated water side of RO system, the customer shall decide whether to remove the residual chlorine from output water as it depends.
5. In case an impactive disinfection is required for the RO system, pyochloride solution with 2mg/L concentration is recommended.

## ◇ Sea Water Desalination RO Membrane Elements - SW Series

SW Series is used for sea water desalination. It can improve permeate flow by optimizing membrane element structure. It has the features of high rejection rate, stable performance, low operating cost and small equipment investment. It can be used to obtain qualified drinking water from seawater.

Model	Permeate Flow		Rejection Rate	Active Membrane Area		Spacer Thickness	Boron Rejection Rate
	GPD	m <sup>3</sup> /d		%	ft <sup>2</sup>		
SW8040XHR-400	6000	22.7	99.85	400	37.2	28	92.0
SW8040XHR-440	6600	25.0	99.85	440	40.9	28	92.0
SW8040FR-400	8200	31.0	99.8	400	37.2	34	92.0
SW8040HR-400	7500	28.4	99.8	400	37.2	28	92.0
SW8040HR-440	8250	31.2	99.8	440	40.9	28	92.0
SW8040LE-400	9000	34.0	99.8	400	37.2	28	92.0
SW8040LE-440	9500	35.9	99.8	440	40.9	28	92.0
SW8040XLE-400	11000	41.6	99.7	400	37.2	28	92.0
SW8040XLE-440	12100	45.8	99.7	440	40.9	28	92.0
SW4040HR	1600	6.1	99.8	90	8.4	28	91.0
SW4040LE	1900	7.2	99.7	90	8.4	28	91.0
SW11-4021 <sup>1</sup>	750	2.8	99.5	33	3.1	28	91.0
SW11-2521 <sup>1</sup>	270	1.0	99.5	12	1.1	28	91.0
SW11-2540	600	2.3	99.5	28	2.6	28	91.0

**Testing Conditions**  
 Operating pressure 800 psi (5.52 MPa)    Tested in 32000 mg/L NaCl solution  
 Temperature at 25 °C    pH 8    Recovery rate at 8%  
<sup>1</sup>Operating pressure 800 psi (5.52 MPa)    Tested in 32000 mg/L NaCl solution  
 Temperature at 25 °C    pH 8    Recovery rate at 4%

**Operating Conditions & Limits**  
 Maximum Operating pressure: 1200 psi (8.28 MPa)  
 Maximum feedwater flow: 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040, 4021-16 gpm (3.6 m<sup>3</sup>/h)  
 2521, 2540-6 gpm (1.4 m<sup>3</sup>/h)  
 Maximum temperature: 45 °C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.1 mg/L  
 Maximum pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 1-13  
 Allowed pH range for feedwater in operation: 2-11

**Note:** Each membrane element may have ±20% variation of permeate flow.



### ◇ Heat Sanitizable RO Elements -VHD Series

VHD heat sanitizable reverse osmosis membrane element is a product developed for pasteurization in food and pharmaceutical industries. The product uses hygienic pass, shell and accessories, which can minimize the stagnant areas between membrane element and pressure vessel. The product all components comply with FDA standards.

#### Features

- Satisfied with the requirement of pasteurization
- Sanitary structure design
- The product comply with USA FDA standards

Model	Permeate Flow		Stable Rejection	Active Membrane Area		Spacer Thickness
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>	
VHD-8040/34G	9000	34.0	98.0	400	37.2	34
VHD-4038G	2100	7.9	98.0	90	8.4	28

<b>Testing Conditions</b>	Operating pressure 150 psi (1.03 MPa)	
	Tested in 2000 mg/L NaCl solution	
	Temperature at 25 °C	
	pH 7.0 ± 0.5	
	Recovery rate at 15%	
<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure :	600 psi (4.14 MPa)
	Maximum feedwater flow :	8040-75 gpm (17 m <sup>3</sup> /h) 4038-16 gpm (3.6 m <sup>3</sup> /h)
	Feedwater Temperature :	< 45 °C
	Maximum feedwater flow SDI <sub>15</sub> :	5
	Maximum Temperature of Heat Sanitization :	85 °C (25psi 1.75bar)
	Maximum concentration of free chlorine :	< 0.1 mg/L
	Maximum pressure drop per element :	15 psi (0.1MPa)
	Allowed pH range for chemical cleaning :	2-12
Allowed pH range for feedwater in operation :	3-10	

**Note:** Each membrane element may have ±20% variation of permeate flow.

## 2-2 Nanofiltration Elements

### ◇ Nanofiltration membrane elements for municipal water application - Tapurim Series

Organics, microbes, viruses and most of metal ions with two or higher valence can be filtered by Tapurim Series NF element, while part of sodium, potassium, calcium, magnesium ions, etc. can be retained in the permeated water.

TAPU-LS Element is designed primarily for removal of organics while keeping most of the monovalent ions retained in the permeated water, and is applicable to removal of organics and inorganics from raw water with low salinity.

TAPU-MS Element has higher rejection rate of monovalent ions while maintaining a proper rejection rate of organics, which is applicable to the removal of organic and inorganic matters in mid-salinity raw water.

TAPU-HS Element has a rejection rate at 80-95% for chlorides, applicable to the rejection of organic and inorganic matters in mid and high-salinity raw water.

- This membrane element is developed by utilizing the technology of controllable porosity formation in separation layers, and is designed for waters with middle and high salinity to meet the requirements of healthy drinking water.

- The use of brand-new LD (low pressure difference) 34-mil feed channel spacer improves the fouling resistance while reducing the energy consumption.

- The entire series of elements have been officially authorized by “Hygiene Permit for Products Related to Drinking Water Hygiene Safety”, thus ensuring the safety of membrane element application.

Model	Permeate flow		Rejection rate of sulfate	Rejection rate of TOC	Active Membrane Area	
	GPD	m <sup>3</sup> /d	%	%	ft <sup>2</sup>	m <sup>2</sup>
TAPU-LS	12000	45.4	95	90	400	37.2
TAPU-MS	9000	34.1	95	90	400	37.2
TAPU-HS	8000	30.3	95	90	400	37.2

**Testing Conditions** Operating pressure 70 psi (0.48 MPa) Tested in mixed solution of NaCl, MgSO<sub>4</sub> and CaCl<sub>2</sub> Temperature at 25°C pH 7.0 ± 0.5 Recovery rate at 15%

**Operating Conditions & Limits**

- Maximum operating pressure: 600 psi (4.14 MPa)
- Maximum feedwater flow: 75 gpm (17 m<sup>3</sup>/h)
- Maximum temperature: 45°C
- Maximum feedwater flow SDI<sub>15</sub>: 5
- Maximum concentration of free chlorine: <0.1 mg/L
- Maximum pressure drop per element: 15 psi (0.1MPa)
- Allowed pH range for chemical cleaning: 2-12
- Allowed pH range for feedwater in operation: 3-10

**Note:** Each membrane element may have ±20% variation of permeate flow.

## ◇ Material Separation NF Membrane Elements - MASE Series

Material Separation NF Membrane is primarily used in the separation of monovalent salt and divalent salt, as well as in hardness removal, denitration separation and concentration of liquid, with the molecular weight cutoff covering 200-800 Dal.

MASE-SP is designed to reject part of the multivalent ions while allowing the permeation of monovalent ions, and is applicable to purification of high-concentrated saline water.

MASE-SL is designed to reject the multi-valent ions and organics while allowing the permeation of monovalent ions, and is applicable to purification, decolorization and organism rejection of high-concentrated saline water.

MASE-PS has a moderate rejection rate of monovalent ion, applicable to rejecting organics such as pesticide, herbicide, etc. in high-salt water.

MASE-CR has a high rejection rate of monovalent ion, which can be applied in the reuse of rejected water with 5000-10000mg/L salinity.

- The use of patented Uarc water distribution endcap ensures more even distribution of hydraulic load on the end surface, thus reducing the accumulation of pollutants.
- The use of brand-new LD (low pressure difference) 34-mil feed channel spacer improves the fouling resistance while reducing the energy consumption.
- The end cap adopts thermal-melt spin welding technology to enhance the structural strength of the membrane element and ensure stable operation of the membrane element under a high pressure difference environment.
- The use of hi-precision spiral-winding technology and low permeate resistance structure decrease the overall fouling rate of membrane element, thus maximizing the working efficiency of membrane element and effectively reducing the operational costs.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area	
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>
MASE-SP	12000	45.4	90	400	37.2
MASE-SL	12000	45.4	98	400	37.2
MASE-PS	12000	45.4	98	400	37.2
MASE-CR	12000	45.4	95	400	37.2
<b>Testing Conditions</b>	Operating pressure 100 psi (0.69 MPa) Temperature at 25°C		Tested in 2000 mg/L MgSO <sub>4</sub> solution pH 7.0 ± 0.5 Recovery rate at 15%		
<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure:		600 psi(4.14 MPa)		
	Maximum feedwater flow:		75 gpm (17 m <sup>3</sup> /h)		
	Maximum temperature:		45°C		
	Maximum feedwater flow SDI <sub>15</sub> :		5		
	Maximum concentration of free chlorine:		<0.1 mg/L		
	Maximum pressure drop per element:		15 psi (0.1MPa)		
	Allowed pH range for chemical cleaning:		2-12		
	Allowed pH range for feedwater in operation:		3-10		

**Note:** Each membrane element may have ±20% variation of permeate flow

### ◇ High Pressure Nanofiltration Membrane Elements - MASE 80 Series

High-pressure nanofiltration membrane element is applicable to the purification, separation and concentration of hi-concentrated brine, and can work within a maximum pressure of 80 bar.

Model	Permeate Flow		Stable Rejection	Active Membrane Area	
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>
MASE-SL 80	8200	31.0	98	370	34.5
MASE-CR 80	9500	35.9	95	370	34.5

**Testing Conditions**

Operating pressure 100 psi (0.69 MPa)  
 Tested in 2000 mg/L MgSO<sub>4</sub> solution  
 Temperature at 25°C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**

Maximum operating pressure: 1200 psi (8.28 MPa)  
 Maximum feedwater flow: 75 gpm (17 m<sup>3</sup>/h)  
 Maximum temperature: 45°C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.1 mg/L  
 Maximum pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 2-12  
 Allowed pH range for feedwater in operation : 3-10

**Note:** Each membrane element may have ±20% variation of permeate flow.

◇ Water Treatment Nanofiltration Membrane Elements - VNF Series

Water treatment nanofiltration membrane elements are mainly used for the purification of drinking water and industrial water, and treatment of waste water.

Model	Permeate Flow		Stable Rejection %	Active Membrane Area	
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>
VNF1-8040	10000	37.9	≥ 98	400	37.2
VNF2-8040	10500	39.7	≥ 97	400	37.2
VNF1-4040	2000	7.5	≥ 98	90	8.4
VNF2-4040	2400	9.1	≥ 97	90	8.4
VNF1-2540	650	2.46	≥98	28	2.6
VNF2-2540	750	2.84	≥97	28	2.6

**Testing Conditions**  
 Operating pressure 100 psi (0.69 MPa)  
 Tested in 2000 mg/L MgSO<sub>4</sub> solution  
 Temperature at 25 °C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**  
 Maximum operating pressure: 600 psi (4.14 MPa)  
 Maximum feedwater flow: 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040-16 gpm (3.6 m<sup>3</sup>/h)  
 2540-6 gpm (1.4 m<sup>3</sup>/h)  
 Maximum temperature: 45 °C  
 Maximum feedwater flow SDI<sub>15</sub>: 5  
 Maximum concentration of free chlorine: <0.1 mg/L  
 Maximum Pressure drop per element: 15 psi (0.1MPa)  
 Allowed pH range for chemical cleaning: 2-12  
 Allowed pH range for feedwater in operation: 3-10

**Note:** Each membrane element may have ±20% variation of permeate flow.

## ◇ Acid-resistant Nanofiltration Membrane Elements - Acidstab Series

Acidstab NF Series of acid-resistant nanofiltration membrane elements are mainly used to separate metal ions/inorganic salts from acid solutions to achieve permeation and recovery of acid solutions. It can be used in 20% (ω/%) hydrochloric acid, nitric acid and sulfuric acid, with molecular weight cutoff at about 200 Dal rejected.

Model	Permeate Flow		Stable Rejection	Active Membrane Area	
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>
Acidstab NF-8040	5500	20.8	96	350	32.5
Acidstab NF-4040	1200	4.5	96	83	7.7
Acidstab NF-2540	350	13	96	25	2.3

**Testing Conditions**  
 Operating pressure 110 psi (0.76 MPa)  
 Tested in 2000 mg/L MgSO<sub>4</sub> solution  
 Temperature at 25°C  
 pH 7.0 ± 0.5  
 Recovery rate at 15%

**Operating Conditions & Limits**  
 Maximum feedwater flow : 8040-75 gpm (17 m<sup>3</sup>/h)  
 4040-16 gpm (3.6 m<sup>3</sup>/h)  
 2540-6 gpm (1.4 m<sup>3</sup>/h)  
 Maximum temperature: 45°C  
 Maximum Pressure drop per element: 15 psi (0.1MPa)

**Note:** Each membrane element may have ±20% variation of permeate flow.

◇ Alkaline Resistant Nanofiltration Membrane Elements - Alkalistab Series

Alkalistab series nanofiltration membrane elements are suitable for the treatment of pH 5~14 and the extreme feed solution which is not suitable for been described by pH Value.

The membrane elements can keep stable separation performance in 20% (ω/%) NaOH, KOH and other strong alkaline solutions, with the unique patent membrane Combined process and high-permeate flow design, it will bring both economic and environmental benefits for the user.

Model	Permeate Flow		Stable Rejection	Active Membrane Area	
	GPD	m <sup>3</sup> /d		ft <sup>2</sup>	m <sup>2</sup>
Alkalistab NF-8040	5500	20.8	96	350	32.6
Alkalistab NF-4040	750	2.8	96	83	7.7
Alkalistab NF-2540	220	0.82	96	24	2.2

<b>Testing Conditions</b>	Operating pressure 110 psi (0.76 MPa)	
	Tested in 2000 mg/L MgSO <sub>4</sub> solution	
	Temperature at 25°C	
	pH 7.0 ± 0.5	
	Recovery rate at 15%	

<b>Operating Conditions &amp; Limits</b>	Maximum feedwater flow:	8040-75 gpm (17 m <sup>3</sup> /h)
		4040-16 gpm (3.6 m <sup>3</sup> /h)
		2540-6 gpm (1.4m <sup>3</sup> /h)
	Maximum temperature:	45°C
	Maximum Pressure drop per element:	15 psi (0.1 MPa)

**Note:** Each membrane element may have ±20% variation of permeate flow.

## 2-3 Ultrafiltration Membrane Elements

### ◇ Spiral Wound Ultrafiltration Membrane Elements - VUF Series

The VUF series is mainly used for separation and concentration of specific material with molecular weight cut off (MWCO) at 4k, 6k, 8k, 10k, 20k, 67k Da. VUF series applies the feed channel spacer of 31, 46 and 90mil, and is favorably equipped with the fiberglass housing or sanitary-grade housing.

Model	Permeate Flow		Active Membrane Area		Testing Solution
	GPD	m <sup>3</sup> /d	ft <sup>2</sup>	m <sup>2</sup>	
VUF8040-4K/31F	8700	32.9	400	37.2	PEG4000
VUF8040-6K/31F	6500	24.6	400	37.2	PEG6000
VUF8040-8K/31F	9500	35.9	400	37.2	PEG8000
VUF8040-10K/31F <sup>1</sup>	7000	26.5	400	37.2	PEG10000
VUF8040-20K/31F <sup>1</sup>	10500	39.7	400	37.2	PEG20000
VUF8040-67K/31F <sup>2</sup>	25000	94.6	400	37.2	Bovine Serum Albumin

<b>Testing Conditions</b>	Operating pressure 60 psi (0.41 MPa)    Tested in 1000 mg/L solution
	Temperature at 25°C    Recovery rate at 15%
	<sup>1</sup> Operating pressure 40 psi (0.28 MPa)    Tested in 1000 mg/L solution
	Temperature at 25°C    Recovery rate at 15%
	<sup>2</sup> Operating pressure 40 psi (0.28 MPa)    Tested in 300 mg/L solution
	Temperature at 25°C    Recovery rate at 15%

<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure:	300 psi (2.07 MPa)
	Maximum feedwater flow:	84 gpm (19 m <sup>3</sup> /h)
	Maximum temperature:	40°C
	Maximum feedwater flow SDI <sub>15</sub> :	5
	Maximum pressure drop per element:	15 psi (0.1MPa)
	Allowed pH range for chemical cleaning:	2-12
	Allowed pH range for feedwater in operation:	3-10

**Note:** Each membrane element may have ±20% variation of permeate flow.



◇ Flat Ultrafiltration Membrane Element- VMR Series

The VMR Series of flat membrane element is composed of membrane sheet, channel netting and spacer plate. A water outlet is designed on the top of the spacer plate. The porous filtering membrane sheet with 0.1 $\mu$ m pore size made of polyvinyl chloride is welded on both sides of the spacer plate. The permeated water is drawn from the water outlet.

Model	VMR 88	VMR 160
Active Membrane Area (m <sup>2</sup> )	0.88	1.6
W×H×T (mm)	490×1000×7	515×1750×7
Weight (Kg)	2.34	3.73
Average membrane pore size ( $\mu$ m)	0.1	
Permeate Flow / L (Sheet • Perday)	350~520	640~960
Aeration / L (Sheet • Perday)	$\geq 8$	
pH	3~12	
Turbidity of effluent (NTU)	<1.0	
Effluent suspended matter (SS)	$\leq 1$	

**Note:** This parameter refers to the initial permeate flux of a single membrane element in municipal sewage treatment with MBR at 25 $^{\circ}$ C temperature and less than -20KPa vacuumed condition.

### ◇ Hollow Fiber UF Membrane Element VUF Series

Hollow fiber UF membrane elements are mainly used for suspended solid, colloidal and bacteria in water solution, and are widely used in tap water purification, seawater desalination pretreatment and wastewater recycle purification.

Model	Active Membrane Area m <sup>2</sup>	System Flux LMH	MWCO Da	Membrane Filament Material	Sealant
VUF-2860	50	30-120	150000	PVDF	Epoxy Resins
VUF-2880	75	30-120	150000	PVDF	Epoxy Resins

<b>Operating Conditions &amp; Limits</b>	Maximum operating pressure:	0.60 MPa
	Maximum backwash TMP	0.25 MPa
	Maximum temperature:	45°C
	Maximum filtration TMP	0.20 MPa
	Allowed pH range for feedwater in operation	2-11

## Chapter III Preservation of Membrane Elements

### 3-1 All series dry membrane elements

VONTRON offers a full range of dry membrane elements. Compared with wet membrane elements, the advantages of dry membrane elements are easy to transport and install, and dry membrane elements have longer storage life than wet membrane elements. VONTRON can provide both dry and wet membrane elements.

**Table 3-1-1 Comparison Between Dry and Wet Membrane Elements**

Element Type/Factors	Dry Element	Wet Element
Protective Solution	Not required	1.0% ( $\omega$ ) of sodium bisulfite should be replaced regularly (90 days or less)
Temperature of Presevation	No higher than 45°C	0°C- 45°C
Breeding of microorganism	No Breeding	Easy to breed (If the protective fluid is not replaced in time)
Transportation and etc.	Light weight, easy transportation and low cost	Heavier, not easy to transport, cost high

### 3-2 Cautions for using of dry membrane elements

#### 3-2-1 Storage of dry membrane elements

1. Storage place must be cool and dry , avoid direct sunlight.
2. The temperature at the place of storage shall be lower than 45°C .

#### 3-2-2 Notice

1. Before sterilizing with formaldehyde, dry membrane elements should be washed for at least 6 hours.
2. Operating conditions and design guidelines for dry membrane elements are the same as those for the same type of wet membrane elements.
3. Keep elements moist constantly after initial wetting, the storage, protection and cleaning of the dry membrane element should be carried out according to the treatment method of the wet membrane element.
4. The initial operation procedures of the reverse osmosis system should carried out in accordance

with the Guide to Use and Maintenance of RO System of VONTRON Service Manual. Permeate and brackish water should be discharged in the first hour of operation.

5. For the recommended design parameters, please refer to the latest version of VONTRON Technical Manual and VONTRON Design Guide, or consult with experts. If the user does not strictly follow the operating guidelines, VONTRON takes no liability of the consequences arising therefrom.

6. No chemicals affecting membrane elements are allowed to be added during storage and operation. VONTRON take no liability of misuse of all such chemicals.

### 3-2-3 Important information

1. The data and information provided by VONTRON in this information have been obtained through long-term experiments. We are confident that these data and information are accurate and effective. VONTRON will not bear any consequence arising from the client's failure to use and maintain the product in accordance with the conditions provided in this book.

2. When the membrane element is used for the first time, it is recommended to rinse at low pressure for 15-25 minutes (long-time immersion not recommended), and then rinse at high pressure for 60 to 90 minutes (permeate flow shall not be less than 50% of the designed system water production). All the permeated water and concentrated water during the first hour of operation of the membrane element shall be discharged.

3. It is forbidden to add any chemical agents that have an impact on the membrane elements during storage and operation. If such chemical agents are used in violation of this provision, Vontron will not bear any of the consequences arising therefrom.

4. Along with technological progress and product upgrading, product specifications are subject to change at any time without prior notification. Please refer to the latest product information of Vontron.

## Chapter IV Quality Assurance of Membrane Elements

### 4-1 Three-year Warranty for RO Membrane Elements

VONTRON RO membrane elements shall be used according to the specifications and procedures set forth by VONTRON TECHNOLOGY CO., LTD. (hereinafter referred to “VONTRON”), and only on this condition will VONTRON ensure a three-year period of limited quality guarantee, with the terms specified as follows:

#### 4-1-1 Assurance on Manufacturing Technologies and Materials

VONTRON ensures that the RO elements manufactured and sold are intact in respect of production technologies and materials. VONTRON undertakes a 12-month guarantee from the arrival of the product at the buyer's designated place or port. When VONTRON examined a deflection on products in accordance with this clause, VONTRON will provide solutions after product testing.

#### 4-1-2 Performance Assurance

1. According to the test conditions specified in the product sample, the new membrane products have the initial performance specified in the brochure.

2. VONTRON warrants the performance of its elements for three years from the date when the RO system is put into operation or 6 months after the goods is shipped (whichever occurs first), during which period VONTRON warrants as follows:

##### Performance of element within a three-year period of limited warranty

(1) When used or tested under standard test conditions, and the pressure of initial average water production, the average salt passage should not exceed 2 times of the value specified in the Product Manual.

(2) When used or tested under test conditions, the average water permeate flow is no less than 70% of the minimum value specified in the Product Manual.

##### Initial Performance

VONTRON guarantees the initial minimum permeate flow and rejection rate as specified in the technical specifications. These parameters are obtained under standard testing conditions set forth by VONTRON. If these membrane elements fail to reach the minimum initial values as specified, VONTRON will, after confirming the performance failure, repair the membrane elements or refund to customers for those defective membrane elements, in which case VONTRON will bear the freight charges.

In case the buyer fails to satisfy any of the following requirements, VONTRON will bear no liability on the three-year quality warranty mentioned above:

(1) Feed water turbidity exceed 1.0NTU;  $SDI_{15}$  (15min, 30psi) exceed 5; feed water temperature higher than 45°C .

(2) Feed water shall not contain harmful substance that may cause physical and chemical damage to the membrane elements.

(3) Before being installed or put into operation, the membrane elements shall be stored in original packing box and preserved at the temperature not higher than 45°C for dry-type membranes and at the temperature within 0~45°C for wet-type membranes.

(4) The pH value of feed water shall be within the range of 2~11 during regular running(subject to the pH range specified in the latest version of VONTRON technical manual). When the system is cleaned, the pH value of feed water shall be within 2~13 (subject to the pH range specified in the latest version of VONTRON technical manual).

(5) The feed water shall not contain such oxidizing substances such as chlorine, potassium permanganate and hypochlorous acid radical, etc. (Notes: This clause is not applicable to HOR series)

(6) The maximum operating pressure for membrane element is as follows (except otherwise specified in the product instructions):

Membrane Series	Max Operating Pressure
XLP Series	600 psi
ULP Series	600 psi
LP Series	600 psi
SW Series	1200 psi
ZERO-HP Series	1200 psi
FR & PURO Series	600 psi
HOR Series	600 psi
ZERO-UHP Series	1740 psi

(7) In any case, the backpressure exerted on the membrane element should not exceed 5 psi, and the membrane element should be avoided from the impact of water hammer when the system is in operation.

(8) If under standard operating conditions, the performance of system decreases by 10% or the contamination or scaling occurs, the membrane elements should be cleaned immediately in accordance with specified procedures.

(9) Membrane assembly arrangement, instrument configuration, recovery rate and other system components and design parameters should be consistent with the engineering design; VONTRON renders no liability on the damage of membrane elements caused by improper operation during the installation process.

(10) It is required that user should frequently and systematically record the standardized performance data of the whole system and its subsystems, ensure that these data are genuine, complete

and consistent, and keep these data on file for future reference. When compensation is claimed, this information will be the evidence.

#### The Conditions of Forming a RO System

① Completed and effective pretreatment, arrangement of membrane elements, installation of instruments, design standards of equipment and components should comply with VONTRON Reverse Osmosis Membrane Design Guidelines and related technical standards. VONTRON has the right to check whether the design meets the design guidelines and related technical standards.

② The RO system shall be equipped with proper devices and applicable protective measures to prevent the breeding of microbial contamination and other kinds of contamination.

#### Conditions of Feed Water

① The feed water of RO system must ensure that the membrane surface will not suffer the adhesion by any of the colloidal matter, microorganism or other sediments

② The RO membrane should be free from the damage of those harmful chemicals, such as surfactant, organic solvent, grease, high-molecular polymer, etc.

③ The feed water should be free from any strong oxidative substance, such as ozone, chlorine or potassium permanganate, etc.

④ The feed water temperature shall be lower than 45℃ .

⑤ The SDI<sub>15</sub> of feed water shall be lower than 5 all the time, and the maximum turbidity of feed water shall be less than 1.0NTU, while the turbidity of feed water in continuous operation shall be controlled within 0.3-0.5NTU, and the SDI<sub>15</sub> shall be preferably lower than 3.

⑥ The feed water should not contained any colloidal sulfur.

#### Operating Conditions

① The most suitable system recovery rate should be determined according to the degree of precipitation of insoluble substances.

② During the operation, the RO system shall be surely free from scaling formed by calcium, magnesium, barium, strontium, and silicon, etc.

③ When the high-pressure pump is running, the RO system shall be equipped with special-purpose device to prevent RO elements from being affected by the water hammer.

④ The RO system shall use the chemicals as recommended or permitted by VONTRON.

#### Cleaning Conditions

Refer to VONTRON Membrane Element Cleaning Guidelines

#### Important notice during the use of RO elements

① For the recommended design scope, please refer to the latest version of VONTRON technical manual, design guide, or consult with technical experts. If the user does not strictly follow the operating conditions, VONTRON bears no consequences arising from the default. The storage of membrane elements should be in accordance with the stipulations indicated in the product manual. Keep elements

moist constantly after using. The wet-type elements have been treated with the preservative solution made of RO purified water and 1.0% sodium hydrogen sulfite (an antifreeze solution of 10% propanetriol is required in winter), then sealed with plastic bags in vacuum, and further packed in carton boxes.

② The RO water produced in the first hour of running shall be discarded.

③ During storage and run time, it is strictly prohibited to dose any chemical medicament that may be harmful to membrane elements. In case of any violation in using this kind of chemical medicament, VONTRON assumes no liability.

④ For initial flushing of membrane elements, it is recommended that the membrane elements shall be flushed with properly pretreated water for 15~25 minutes under low pressure (not suitable for soaking or overnight soaking), and then be flushed for 60~90 minutes under high pressure (water permeate flow not less than 50% of designed system capacity). Scale inhibitors are not allowed to be added in low pressure flushing. Scale inhibitors are added in high pressure operation flushing. All permeate water and brine water should be discharged in the process of flushing.

### **Warranty Statement:**

Any failure or refusal to provide complete information of VONTRON RO membrane products will invalidate the warranty.

This warranty statement excludes any indirect, punitive, implicative, special liability for damages.

## **4-2 Membrane Products Repair and Removal Procedure**

In case the customer requests to implement the procedures on repair and replacement of membrane elements, the following procedures set forth by VONTRON shall be implemented:

### **4-2-1 Membrane Element Repair Procedure**

It is necessary to contact VONTRON regional sales manager before obtaining the approval of repairing.

The repairing and replacement testing procedure can be two options: one is call for VONTRON technicians to come to the site for testing; the other is the customer send membrane element back to VONTRON for testing.

1. In case of on-the-spot inspection and testing:

(1) For the products within the quality guarantee period and the problems caused by the membrane materials or the production technologies, VONTRON shall, upon the completion of the inspection and testing, bear all the expenses for inspection, testing and the freight.

(2) For the products within the quality guarantee period but the problems which are not caused by the membrane materials or the production technologies, the customer shall, upon completion of the inspection and testing, bear all the expenses for inspection and the freight.

(3) As for the products beyond the quality guarantee period, the customer shall, upon completion of



the inspection and testing, bear all the expenses for inspection and testing and the freight charges.

2. In case of returning the elements to VONTRON for inspection and testing:

(1) The customer shall fill in “Registration Form for Return, Repair and Replacement of Membrane Element(s)”, and send it to the regional sales manager by e-mail, fax or other ways. Upon confirmation, the regional sales manager shall notify the customer to return the membrane elements.

(2) Beside returning the membrane element, the customer shall also provide the following information:

- Model and serial number of membrane element, and contract number.
- Detailed description of failures of product
- All data that can reflect the properties of membrane element(s) returned, such as rejection rate, temperature, pressure, salt concentration of feed water, and permeate flow, etc.

#### 4-2-2 Packaging and Transportation

① Before returning transportation, the customer shall take all necessary measures to protect and store the membrane elements as stipulated in the terms set forth in the technical announcement.

② The returned elements shall be packed in sealed plastic bags and then placed in the carton boxes to avoid mechanical damage in the course of transportation, and shall be surely kept away from moisture and exposure to sunlight.

③ After obtained the return notice from VONTRON, the customer shall send out the membrane element(s) as soon as possible in order to avoid the change in properties of membrane element(s).

#### 4-2-3 Inspection and Testing Procedure

① In case it is necessary to conduct destructive experiment on the returned membrane element(s) for the purpose of technical inspection, VONTRON shall, upon having its regional sales manager of VONTRON contacting the customer and obtaining authorization from the customer, carry out the destructive experiment.

② As for the membrane element(s) within the quality guarantee term, if the testing result proves that the problem of membrane element(s) is not caused by the membrane materials or the producing process, the customer shall bear all of the expenses for inspection and testing, and cannot get any compensation. VONTRON will, according to the instructions of customer, dispose of the membrane element(s) or, at the customer’s charges, send back the element(s) to the customer.

③ In case the testing result proves that there actually exists defect in the material or producing process of the membrane element(s), VONTRON will bear the expenses for inspection and testing; Besides, the customer can obtain the membrane element(s) compensated by VONTRON that are in conformity with the technical specifications, with the freight charges.

④ As for the membrane element(s) beyond the quality guarantee term, the customer shall bear all the expenses for inspection, testing and replacement of membrane element(s) as well as the freight charges.

#### 4-2-4 Additional Provisions

In case VONTRON doesn't receive the membrane element(s) within the specified time, it will notify the customer of ending the repair program. In general case, the specified time shall be within one month from the date when the customer receives the Registration Form for Repair and Replacement of Membrane Elements signed by the regional sales manager of VONTRON.

The quality warranty shall be invalidated upon the occurrence of any of the following:

- The membrane element no serial number on the label.
- It is obviously visible that the membrane element(s) has suffered the contamination in operation.
- The mechanical damage is obviously visible, which is caused in the course of service.
- The membrane element has been damaged due to improper storage or transportation.
- The membrane element(s) has/have been transformed without the permission of VONTRON.

#### Attachment 1-Registration Form for Repair and Replacement of Membrane Elements

VONTRON TECHNOLOGY CO., LTD. Registration Form for Repair and Replacement of Membrane Elements			
Name of Customer		Name of Seller	
Contact Person		Fax	
Telephone		E-mail	
Attached Information			
Model and S/N :			
Detailed Description of Failure (including the time of initial operation):			
Below is for VONTRON Technology Co. Ltd. only			
Comments of Regional Sales Manager			

### 4-3 Product Traceability and Anti-fake Measures

Inquiry by Website:

To input the 20-digits anti-fake code at <http://track.vontron.com>



9位追溯码查询入口 Click here to input 9 digits tracking number

请输入20位防伪码  

Please input the 20 digits Anti-fake Code

家用 Residential



工业 Industrial



## 4-4 Qualifications and Certifications

### ISO9001



### ISO14001



### ISO45001



NSF

# NSF International

789 N. Dixboro Road, Ann Arbor, MI 48105 USA

RECOGNIZES

## Vontron Technology Co., Ltd.

China

AS COMPLYING WITH NSF/ANSI/CAN 61 AND ALL APPLICABLE REQUIREMENTS.

PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE  
AUTHORIZED TO BEAR THE NSF MARK.



This certificate is the property of NSF International and must be returned upon request. This certificate remains valid as long as this client has products in NSF's Official Listings for the referenced standards. For the most current and complete Listing information, please access NSF's website ([www.nsf.org](http://www.nsf.org)).

October 4, 2021  
Certificate# 1H770 - 03

Theresa Bellish  
Senior Director Water Commercial

# NSF International

789 N. Dixboro Road, Ann Arbor, MI 48105 USA

RECOGNIZES

## Vontron Technology Co., Ltd.

China

AS COMPLYING WITH NSF/ANSI 58 AND ALL APPLICABLE REQUIREMENTS.

PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE  
AUTHORIZED TO BEAR THE NSF MARK.



This certificate is the property of NSF International and must be returned upon request. This certificate remains valid as long as this client has products in NSF's Official Listings for the referenced standards. For the most current and complete Listing information, please access NSF's website ([www.nsf.org](http://www.nsf.org)).

October 4, 2021  
Certificate# 3D180 - 06

David Purkiss  
Vice President, Global Water Division



📍 **Add.: 1518, Liyang Avenue, Shawen Eco-tech Park,  
Baiyun Dis., Guiyang, Guizhou 550014, CHINA**

📍 **Add.: F16, Building G, Yingkun Century, Auto  
mobile Museum East Road, Fengtai Dis., Beijing  
100071, CHINA**

☎ **Tel: +86 10-83619831**

✉ **E-mail: sales@vontron.com**

📘 **Facebook:**



👤 **Wechat:**



All data and information provided in this manual have been obtained from long-term experiment by Vontron. We confirm the effective and accuracy of the data. We assume no liability for any consequences of user's failure in abiding the conditions specified in this manual in use or maintenance of membrane products. It is strongly recommended that the user shall strictly abide the designed use and maintenance requirements and keep relevant records.

Vontron will not bear all consequences arising from the customer's failure to use and maintain the product in accordance with the conditions provided in this document. Since the end use conditions of users cannot be controlled, the information and data listed in the document shall not be taken as the guarantee of final performance. It is shall not to add any chemicals that affect the membrane elements during storage and operation, and Vontron will not bear any consequences arising from the using of such chemicals.

Along with technical development and product renovation, all information will be subject to modification without prior notification. Please keep notice of our website for any updates of the product.