# eko-trading co., limited Membrane Elements



Newly developed by Vontron Technology Co., Ltd. XLP series of extremely low pressure aromatic polyamide compound membrane element can work under ultra low pressure to reach as high permeate flow and salt rejection as regular low-pressure membrane element can, and is applicable to desalination of surface water and underground water. It operates under approximately half the operating pressure of regular low-pressure composite membrane, and achieves a salt rejection rate of up to 99.0%, which can decrease the investment costs for such relevant facilities as pump, piping, and container, etc. and the operating cost for the RO system, thus increasing the economic efficiency. Being suitable for the desalination treatment of those water sources with low salinity not requiring high salt rejection such as surface water, underground water, tap water and municipal water, which have a salt concentration lower than 1000 ppm, XLP series of membrane element is particularly applicable to the second-pass desalination with two-pass RO system, and is mainly applied to numerous applications of various scales, such as pure water production, boiler water replenishment, foodstuff processing and pharmaceutical production.

Model	Active Membrane Area ft (m²)	Average Permeate GPD (m³/d)	Stable Rejection Rate %	Min. Rejection Rate %	
XLP11-4040	<b>-4040</b> 90 (8.4) 2000 (7.6)		98.0	97.5	
XLP12-8040	400 (37.2)	9000 (34.0)	98.0	97.5	

		XLP11-4040	XLP12-8040
	Testing Pressure	100 psi (0.69 MPa)	100 psi (0.69 MPa)
	Testing Solution Temperature	25 °C	25 °C
Testing Conditions	Concentration of Testing Solution (NaCl)	500 ppm	500 ppm
	pH value of Testing Solution	7.5	7.5
	Recovery Rate of Single Element	15 %	15 %
	Max. Working Pressure	600 psi (4.14 MPa)	600 psi (4.14 MPa)
Testing Conditions	Max. volume of Feed water	16 gpm (3.6 m3/h)	75 gpm (17 m3/h)
	Max. Temperature of Feed water	45 °C	45 °C
Operation	Max. Feed water SDI15	5	5
Limits &	pH Range of Feed water during Continuous Operation	310	310
Conditions	pH Range of Feed Water during Chemical Cleaning	212	212
Testing Conditions	Residual Chlorine Concentration of Feed Water	< 0.1 ppm	< 0.1 ppm
	Max. Pressure Drop of Single Membrane Element	15 psi (0.1 MPa)	15 psi (0.1 MPa)
	Max. Pressure Drop of Single Pressure vessel with 6 RO Membranes	50 psi (0.34 MPa)	50 psi (0.34 MPa)







# **Ultra Low PressureElements**

ULP series of ultra-low pressure aromatic polyamide compound membrane element newly developed by vontron Membrane Technology Co., Ltd. can work under ultra low pressure to reach as high permeate flow and rejection same as regular low-pressure membrane element, and is applicable to desalination of surface water and underground water. It operates under approximately two thirds of the operating pressure of regular low-pressure composite membranes, which can decrease the investment costs for such relevant facilities as pumps, pipelines, and containers, etc. and the operating cost for the RO system, thus increasing the economic efficiency.

Applicable to desalination treatment of those water sources with NaCl lower than 2000 ppm, such as surface water, underground water, tap water and municipal water, ULP series membrane elements are mainly applicable to such as pure water, boiler water replenishment, foodstuff processing, and pharmaceutical production.

#### **TECHNICAL CHARACTERISTICS**

Model	Active Membrane Area ft2 (m²)	Average Permeate GPD (m³/d)	Stable Rejection Rate %	Min. Rejection Rate %
ULP11-4021	36 (3.3)	1000 (3.78)	98.0	97.5
ULP11-4040	90 (8.4)	2700 (10.2)	98.0	97.5
ULP12-8040	400 (37.2)	13200 (49.9)	98.0	97.5
ULP21-2521	14 (1.3)	300 (1.13)	99.0	98.5
ULP21-2540	30 (2.8)	750 (2.84)	99.0	98.5
ULP21-4021	36 (3.3)	950 (3.6)	99.0	98.5
ULP21-4040	90 (8.4)	2400 (9.1)	99.0	98.5
ULP21-8040	365 (33.9)	11000 (41.6)	99.0	98.5
ULP22-8040	400 (37.2)	12100 (45.7)	99.0	98.5
ULP31-4021	36 (3.3)	850 (3.2)	99.4	99.0

		ULP11- 4021	ULP11- 4040	ULP12- 8040	ULP21- 2521	ULP21- 2540	ULP21- 4021	ULP21- 4040	ULP21- 8040	ULP22- 8040	ULP31- 4021
	Testing Pressure	150 psi (1.03 MPa)									
	Testing Solution Temperature	25 °C									
Testing Conditions	Concentration of Testing Solution (NaCl)	1500 ppm									
	pH value of Testing Solution	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	Recovery Rate of Single Element	8 %	15 %	15 %	8 %	8 %	8 %	15%	15 %	15%	8 %
	Max. Working Pressure	600 psi (4.14 MPa)									
	Max. volume of Feed water	16 gpm (3.6 m³/h)	75 gpm (17 m³/h)	75 gpm (17 m³/h)	16 gpm (3.6 m³/h)						
	Max. Temperature of Feed water	45 °C									
	Max. Feed water SDI15	5	5	5	5	5	5	5	5	5	5
Operation Limits & Conditions	pH Range of Feed water during Continuous Operation	310	310	310	310	310	310	310	310	310	310
	pH Range of Feed Water during Chemical Cleaning	212	212	212	212	212	212	212	212	212	212
	Residual Chlorine Concentration of Feed Water	< 0.1 ppm									
	Max. Pressure Drop of Single Membrane Element	15 psi (0.1 MPa)									
	Max. Pressure Drop of Single Pressure vessel with 6 ROMembranes	50 psi (0.34 MPa)									

## **Brackish Water Elements**

LP (Low Pressure) series of aromatic polyamide RO membrane element developed by vontron Membrane TechnologyCo.,Ltd. is applicable to desalination of brackish water. It is characterized by low-pressure operation, higher water productivity and excellent desalting performance. Besides, it is particularly applicable to fabrication of high-purity water for electronic industry and electric power industry owing to its excellent performance in removing soluble salts, TOC, SiO2, etc.

Being suitable for desalting such water sources as surface water (NaCl ≤10000ppm), underground water, tap water and municipal water, etc., LP series is mainly applicable to treatment of various industrial water such as industrialpurpose pure water, boiler water replenishment in power plants, and can be also applied to such brackish water applications, such as treatment of high-concentration saline waste water and production of beverage-purpose water.

# **TECHNICAL CHARACTERISTICS**

Model	Active Membrane Area ft2 (m²)	Average Permeate GPD (m³/d)	Average Stable neate GPD Rejection Rate (m <sup>3</sup> /d) %	
LP11-4040	90 (8.4)	3000 (11.4)	99.3	99.0
LP21-4040	90 (8.4)	2400 (9.1)	99.5	99.3
LP21-8040	365 (33.9)	9600 (36.3)	99.5	99.3
LP22-8040	400 (37.2)	10500 (39.7)	99.5	99.3

		LP11-4040	LP21-4040	LP21-8040	LP22-8040
Testing Conditions	Testing Pressure	225 psi (1.55 MPa)	225 psi (1.55 MPa)	225 psi (1.55 MPa)	225 psi (1.55 MPa)
	Testing Solution Temperature	25°C	25 °C	25 °C	25 °C
	Concentration of Testing Solution (NaCl)	2000 ppm	2000 ppm	2000 ppm	2000 ppm
	pH value of Testing Solution	7.5	7.5	7.5	7.5
Testing Conditions	Recovery Rate of Single Element	15 %	15 %	15 %	15 %
Operation	Max. Working Pressure	600 psi (4.14 MPa)	600 psi (4.14 MPa)	600 psi (4.14 MPa)	600 psi (4.14 MPa)
	Max. volume of Feed water	16 gpm (3.6 m3/h)	16 gpm (3.6 m3/h)	16 gpm (3.6 m3/h)	16 gpm (3.6 m3/h)
	Max. Temperature of Feed water	45 °C	45 °C	45 °C	45 °C
	Max. Feed water SDI15	5	5	5	5
Operation Limits & Conditions	pH Range of Feed water during Continuous Operation	225 psi (1.55 MPa)   25°C 25°C 25°C 25°C 25°C 25°C   2000 ppm 2000 ppm 2000 ppm 2000 ppm 2000 ppm 2000 ppm   7.5 7.5 7.5 7.5 7.5 7.5   15% 15% 15% 15% 600 psi (4.14 MPa) 600 psi (			
Conditions	pH Range of Feed Water during Chemical Cleaning	113	113	113	113
	Residual Chlorine Concentration of Feed Water	< 0.1 ppm	< 0.1 ppm	< 0.1 ppm	< 0.1 ppm
	Max. Pressure Drop of Single Membrane Element	15 psi (0.1 MPa)	15 psi (0.1 MPa)	15 psi (0.1 MPa)	15 psi (0.1 MPa)
	Max. Pressure Drop of Single Pressure vessel with 6 RO Membranes	50 psi (0.34 MPa)	50 psi (0.34 MPa)	50 psi (0.34 MPa)	50 psi (0.34 MPa)

# **High Oxidation Resistant Elements**

HOR (high oxidation resistant) series of aromatic polyamide compound membrane element newly developed by vontron Membrane Technology Co., Ltd. has the properties of low operating pressure, high permeate flow and excellent rejection performance, etc. Besides, the use of special synthesizing process enhances the oxidation property of membrane element and enables the membrane element to withstand the impact of oxidative substance, thus simplifying and optimizing the pretreatment process of RO system, reducing the microbial contamination of membrane elements, saving the operating cost and elongating the service life.

Industrial HOR series is designed for the desalting treatment of those water sources with salinity lower than 10000 ppm such as surface water, underground water, tap water and municipal water, and is especially applicable to reuse treatment of those water sources that contain microbial contamination or oxidative substance, such as municipal-purpose or industrial-purpose reclaimed water, electroplating waste water.

#### **TECHNICAL CHARACTERISTICS**

Model	Active Membrane Area ft2 (m²)	Average Permeate GPD (m³/d)	Stable Rejection Rate %	Min. Rejection Rate %
HOR21-4040	90 (8.4)	2200 (8.3)	99.5	99.2
XLP12-8040	400 (37.2)	9000 (34.0)	98.0	97.5

		HOR21-4040	XLP12-8040
	Testing Pressure	225 psi (1.55 MPa)	100 psi (0.69 MPa)
	Testing Solution Temperature	25 °C	25 °C
Testing Conditions	Concentration of Testing Solution (NaCl)	2000 ppm	500 ppm
	HOR21-4040iting Pressure225 psi (1.55 MPa)iting Solution Temperature25 °Cincentration of Testing Solution (NaCl)2000 ppmvalue of Testing Solution7.5covery Rate of Single Element15 %x. Working Pressure600 psi (4.14 MPa)x. volume of Feed water16 gpm (3.6 m3/h)x. Temperature of Feed water45 °Cx. Feed water SDI155Range of Feed water during Continuous Operation310Range of Feed Water during Chemical Cleaning212sidual Chlorine Concentration of Feed Water< 0.1 ppmx. Pressure Drop of Single Pressure vessel with 6 RO Membranes50 psi (0.34 MPa)	7.5	
	Recovery Rate of Single Element	HOR21-4040 XLP12-8040   225 psi (1.55 MPa) 100 psi (0.69 MPa)   25 °C 25 °C   2000 ppm 500 ppm   7.5 7.5   15 % 15 %   600 psi (4.14 MPa) 600 psi (4.14 MPa)   16 gpm (3.6 m3/h) 75 gpm (17 m3/h)   45 °C 45 °C   5 5   00 310   212 212   < 0.1 ppm <0.1 ppm   15 psi (0.1 MPa) 15 psi (0.1 MPa)   6 RO Membranes 50 psi (0.34 MPa)	15 %
	Max. Working Pressure	600 psi (4.14 MPa)	600 psi (4.14 MPa)
	Max. volume of Feed water	16 gpm (3.6 m3/h)	75 gpm (17 m3/h)
	Max. Temperature of Feed water	45 °C	45 °C
Operation	Max. Feed water SDI15	5	5
Limits &	pH Range of Feed water during Continuous Operation	310	310
Conditions	pH Range of Feed Water during Chemical Cleaning	HOR21-4040 XLP12-8040   225 psi (1.55 MPa) 100 psi (0.69 MPa)   25 °C 25 °C   1 (NaCl) 2000 ppm 500 ppm   7.5 7.5   15 % 15 %   600 psi (4.14 MPa) 600 psi (4.14 MPa)   600 psi (4.14 MPa) 600 psi (4.14 MPa)   16 gpm (3.6 m3/h) 75 gpm (17 m3/h)   45 °C 45 °C   5 5   continuous Operation 310   212 212   of Feed Water < 0.1 ppm   15 psi (0.1 MPa) 15 psi (0.1 MPa)   sesure vessel with 6 RO Membranes 50 psi (0.34 MPa)	
	HOR21-40Testing onditionsTesting Solution Temperature225 psi (1.55Testing Solution Temperature25 °CConcentration of Testing Solution (NaCl)2000 pppH value of Testing Solution7.5Recovery Rate of Single Element15 %Max. Working Pressure600 psi (4.14Max. volume of Feed water16 gpm (3.6Max. Temperature of Feed water45 °CMax. Temperature of Feed water5pH Range of Feed water during Continuous Operation310pH Range of Feed Water during Chemical Cleaning212Residual Chlorine Concentration of Feed Water<0.1 ppiMax. Pressure Drop of Single Pressure vessel with 6 RO Membranes50 psi (0.34	< 0.1 ppm	< 0.1 ppm
		15 psi (0.1 MPa)	15 psi (0.1 MPa)
	Max. Pressure Drop of Single Pressure vessel with 6 RO Membranes	50 psi (0.34 MPa)	50 psi (0.34 MPa)

The industrial nanofiltration element is designed for removing from water various organics, microbes, viruses and most metallic ions with divalent or polyvalent while retaining part of the sodium, potassium, calcium and magnesium ions, etc. Nanofiltration, free of chemical reaction, heating and transformation, can keep the biological activity undamaged and maintain the primary flavor or fragrance of substance unchanged, and is increasingly applied in production of drinking water and in separation and concentration/purification processes for foodstuff, medicine, biological engineering and pollution treatment, etc.

VNF1: Relatively low rejection rate of monovalent salt; Moderate rejection rate of divalent salt; High removal rate of TOC. The membrane element has the advantages of large effective membrane area, low trans-membrane pressure difference and low pressure requirement.

Model	Active Membrane Area ft2 (m <sup>2</sup> )	Average Permeate GPD (m³/d)	Stable Rejection Rate %
		NaCl 800 (3.03)	3050
VINF 1-2540	28 (2.0)	MgSO4 650 (2.46)	≥96
	00 (9.4)	NaCl 2400 (9.1)	3050
VINF 1-4040	90 (8:4)	MgSO4 2000 (7.5)	≥98
	400 (27.2)	NaCl 12000 (45.4)	3050
VINF 1-8040	400 (37.2)	MgSO4 10000 (37.9)	≥98
	20 (2 6)	NaCl 700 (2.65)	9098
VINFZ-2340	28 (2.0)	MgSO4 700 (2.65)	≥96
	00 (9 4)	NaCl 2300 (8.7)	9098
VINFZ-4040	90 (8:4)	MgSO4 2400 (9.1)	≥97
	400 (27.2)	NaCl 10000 (37.9)	9098
VINFZ-8040	400 (37.2)	(m²) Average Permeate GPD (m³/d) Stable Rejection F   NaCl 800 (3.03) 3050   MgS04 650 (2.46) ≥96   NaCl 2400 (9.1) 3050   MgS04 2000 (7.5) ≥98   NaCl 12000 (45.4) 3050   MgS04 10000 (37.9) ≥98   NaCl 700 (2.65) 9098   MgS04 700 (2.65) ≥96   NaCl 2300 (8.7) 9098   MgS04 10000 (37.9) ≥97   NaCl 10000 (37.9) ≥97   MgS04 10500 (39.7) ≥97   MgS04 10000 (37.9) ≥97   MgS04 10000 (37.9) ≥98	≥97
VNF-8040K	400 (37.2)	MgSO4 10000 (37.9)	≥98

## **TECHNICAL CHARACTERISTICS**

		VNF1-2540	VNF1-4040	VNF1-8040	VNF2-2540	VNF2-4040	VNF2-8040	VNF-8040K
Testing Conditions	Testing Pressure	100 psi (0.69 MPa)						
	Testing Solution Temperature	25 °C	v					
	Concentration of Testing Solution (NaCl)	2000 ppm						
	pH value of Testing Solution	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	Recovery Rate of Single Element	15 %	15%	15%	15 %	15 %	15 %	15 %
	Max. Working Pressure	600 psi (4.14 MPa)						
	Max. volume of Feed water	6 gpm (1.4 m³/h)	16 gpm (3.6 m³/h)	75 gpm (17 m³/h)	6 gpm (1.4 m³/h)	16 gpm (3.6 m³/h)	75 gpm (17 m³/h)	75 gpm (17 m³/h)
	Max. Temperature of Feed water	45 °C						
	Max. Feed water SDI15	5	5	5	5	5	5	5
Operation Limits & Conditions	pH Range of Feed water during Continuous Operation	310	310	310	310	310	310	310
	pH Range of Feed Water during Chemical Cleaning	212	212	212	212	212	212	212
	Residual Chlorine Concentration of Feed Water	< 0.1 ppm						
	Max. Pressure Drop of Single Membrane Element	15 psi (0.1 MPa)						
	Max. Pressure Drop of Single Pressure vessel with 6 RO Membranes	50 psi (0.34 MPa)						