

Acid-resistant|Alkali-resistant|Solvent-resistant Spiral-wound Nanofiltration Membranes Hollow fiber Nanofiltration Membranes

Professional nanofiltration membrane research and development manufacturer

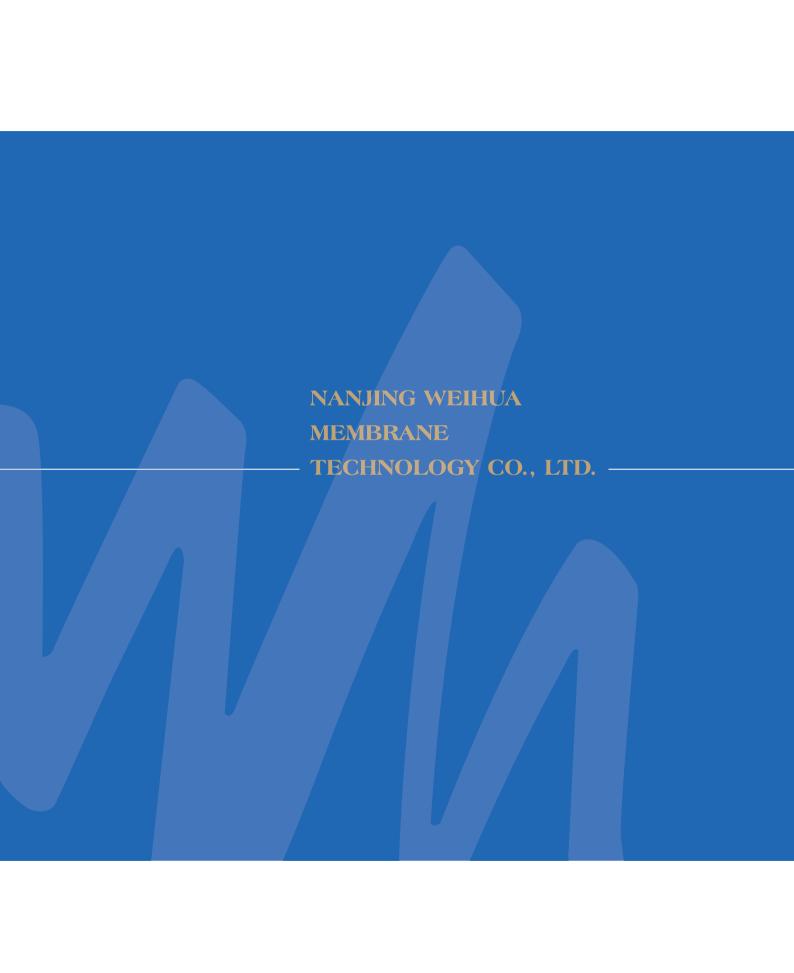
纳滤膜产品册 NANOFILTRATION MEMBRANE PRODUCT CATALOGUE











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#### 材料化学工程国家重点实验室

State Key Laboratory of Materials-Oriented Chemical Engineering





国家特种分离膜工程技术研究中心 National Engineering Research Center for Special Separation Membrane





南京膜材料产业技术研究院



# 构建低碳世界

Nanjing Weihua Membrane Technology Co., Ltd. was established in 2022, a high-tech enterprise specializing in the research, development and production of high-precision nanofiltration membrane separation materials.

Relying on the National Engineering Research Center for Special Separation Membranes of Nanjing Tech University, the State Key Laboratory of Materials-Oriented Chemical Engineering, and the Membrane Science and Technology Institute of Jiangsu Industrial Technology Research Institute, our company has a research and production site of approximately 2,000 square meters within the Jiangsu Membrane Science and Technology Industrial Park. It has established a full-process industrialization platform for the research, pilot testing, production, and testing of core products such as spiral-wound nanofiltration membranes and hollow fiber nanofiltration membranes.

Our company's research and development team has dedicated over a decade to advancing nanofiltration membrane technology. Leveraging its proprietary "Molecular Encapsulation" technology, the team has engineered precision nanofiltration membranes with finely controlled pore sizes and charges. Continuously innovating, our company has introduced a range of specialized nanofiltration membrane products, including acid-resistant, alkali-resistant, solvent-resistant, and high-temperature-resistant varieties, tailored for diverse applications. These membranes have found successful utilization in drinking water purification, biopharmaceutical processing, industrial wastewater treatment, and lithium extraction from salt lakes.

Guided by the mission to "Produce top-tier nanofiltration membranes, Reduce carbon emissions for industries, and Empower health", our company is dedicated to providing high-quality products that serve industrial environmental protection and promote well-being. Together with our partners, we strive to create a harmonious future of "Green mountains and clear waters, A flourishing land of China".



# 发展历程 | COMPANY MILESTONES



The First NF Membrane in Laboratory

<del>20</del>16



A 300 mm Width NF Membrane Production Line has been Built.

2017

# 2015



Professor Shi-Peng Sun Established Organic NF Membrane Research Group.

# 2018



A 1000 mm Width NF Membrane Production Line with an Annual Output of 500,000 m² has been Built.



The Science and Technology Award of Chemical Industry and **Engineering Society** of China-First Prize of Basic Research Achievements

2021



1.46 million t/y demonstration project of coal to ethylene glycol wastewater resource utilization



80 thousand t/y demonstration project of phosphorus containing wastewater standard discharge



220 thousand t/y demonstration project of landfill leachate treatment



A demonstration project of lithium extraction from salt lake with an annual output of 1000 t lithium carbonate



Nanjing Weihua Membrane Technology Co., Ltd. was Established.

2023

2024









Our company offers multiple types membrane products such as spiral-wound, disc tube module, and hollow fiber membranes. These products have been instrumental in projects ranging from lithium extraction from salt lakes to landfill leachate treatment, papermaking wastewater treatment, and pesticide wastewater treatment. Our company's efforts extend beyond conventional applications to encompass water treatment, material separation, pharmaceutical purification, and solvent recovery processes.



# 公司荣誉 | COMPANY HONORS





The Science and Technology Award of Chemical Industry and Engineering Society of China-First Prize of Basic Research Achievements























# 生产车间 | PRODUCTION WORKSHOPS







Flat Membrane Production Line

Flat Membrane Production Line

**Hollow Fiber Production Line** 







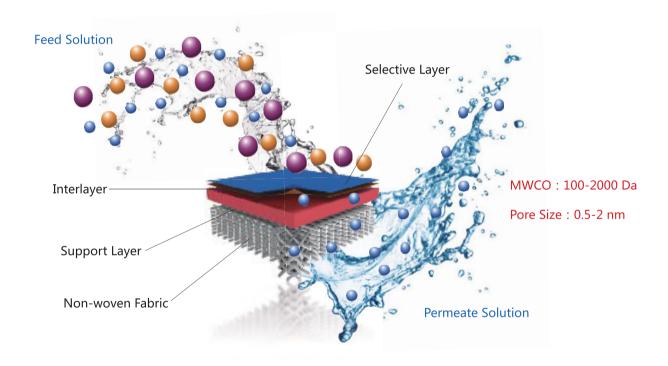
Membrane Testing Device

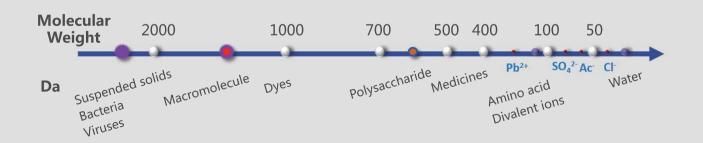
**Module Testing Device** 

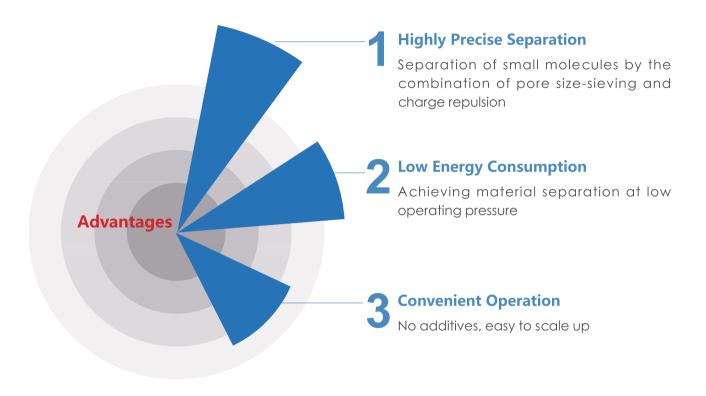
**Pilot Testing Device** 



# 纳滤膜 | NANOFILTRATION MEMBRANES







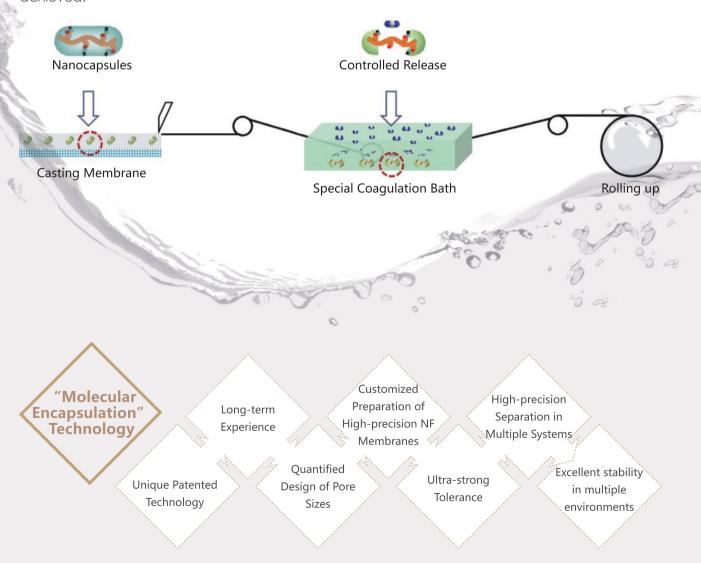


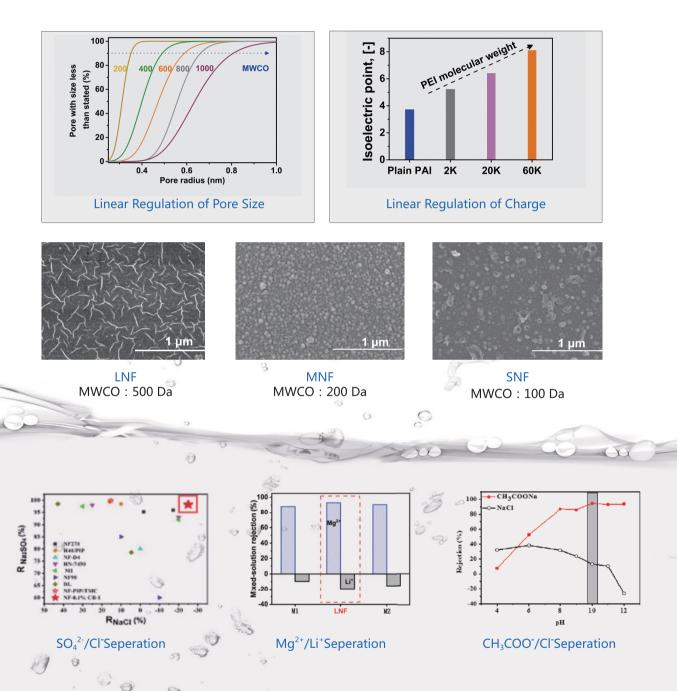


# TECHNICAL CHARACTERISTIC 1: Customized Preparation of High-precision NF Membranes

## "Molecular Encapsulation" Technology

Drawing inspiration from controlled-release mechanisms in pharmaceuticals, the company pioneered the concepts of "molecular encapsulation" and "nanocapsules" in membrane technology. By encapsulating functional modifiers and orchestrating their release at precise intervals, synchronized structural adjustments and functional enhancements in membranes can be achieved.





With "Molecular Encapsulation" Technology, NF membranes with precisely controlled pore sizes and charges can be obtained that allow for efficient ion separation in different systems.



# **TECHNICAL CHARACTERISTIC 2:** High-performance Hollow Fiber NF Membranes

## Synchronous Construction of Hierarchical Structure

Commencing with an exploration of polymer chemical structures, molecular simulations, and solubility parameter calculations were employed to quantify polymer compatibility. This approach theoretically overcomes the challenge of interface compatibility in bilayer membranes. Through co-extrusion and the integration of composite structures from two different materials, a significant reduction in membrane material costs and streamlined membrane preparation processes have been achieved.

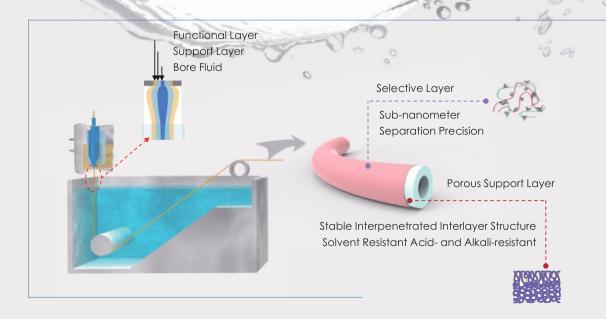
Intermolecular force induced interfacial adhesion mechanism

Theoretical breakthrough

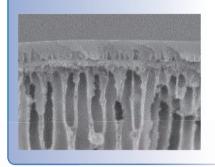
Synchronous Construction of Hierarchical Structure

**Technology leadership** 

## **Composite Structure Single-step Fabrication**



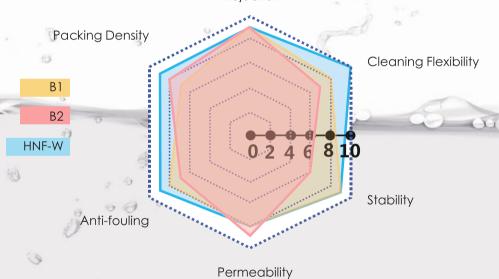
Solve interface compatibility issues and ensure stable operation under harsh conditions



Significantly simplify the membrane preparation process







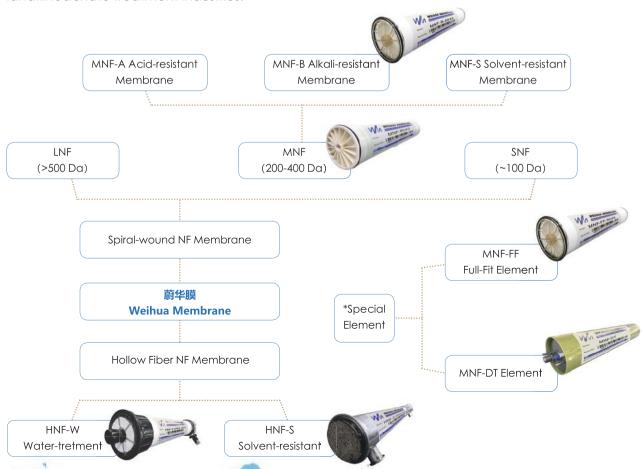
## **Advantages**

- ★ Larger Permeability and Smaller Covering Area due to the High Packing Density.
- ★ Lower Operation Cost and Pressure Drop due to the Open Fluid Channels.
- \$\frac{1}{2}\$ Shorter Pretreatment Steps and Lower Cleaning Agent Consumption due to the Flexible and Effective Cleaning Strategy.



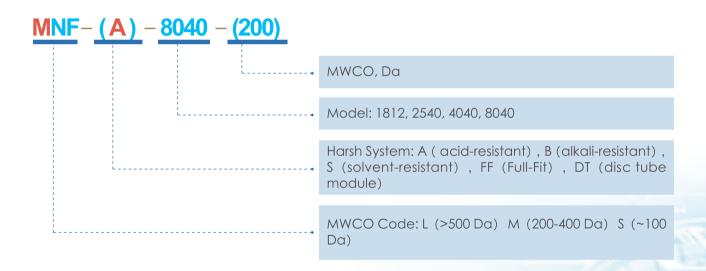
# 公司产品 | PRODUCTS

The products cover nanofiltration membrane elements and processes with various materials and MWCOs. We provide solutions based on nanofiltration membranes for wastewater recycling, material separation, etc. globally. Our service covers multiple fields such as chemical industry, biomedicine, environmental protection, and energy. Our products are applied in household water treatment, municipal water treatment, lithium extraction from salt lakes, zero discharge of high-salt wastewater, purification and concentration of high-value products, organic solvent recovery, and material separation under harsh acid systems. We undertake sewage treatment and zero discharge resource utilization projects in the pharmaceutical, electronics, food, textile, papermaking, and landfill leachate treatment industries.



# 命名与规格 | NOMENCLATURE OF MEMBRANES

### Spiral-wound NF Membrane



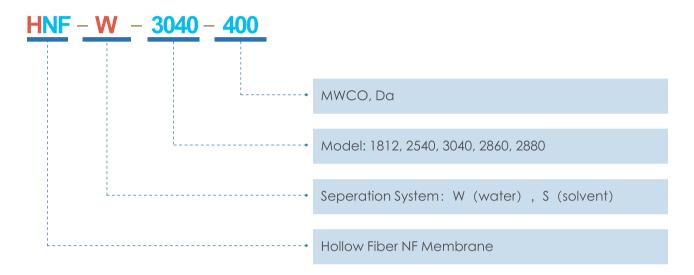


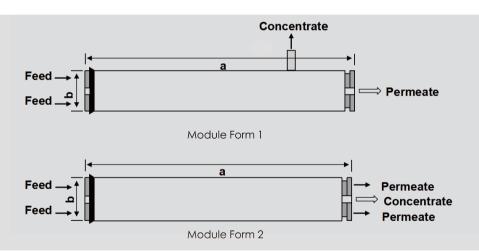
Model	a (inch) b (inch	
1812	12.0	1.8
2540	40.0	2.5
4040	40.0	4.0
8040	40.0	8.0

1 inch=25.4 mm



## Hollow Fiber NF Membrane





	Model	a (inch)	b (inch)
Module Form 1	1812	12.0	1.8
	2540	40.0	2.5
	3040	40.0	3.0
Module Form 2	2860	60.0	8.9
Module Form 2	2880	80.0	8.9

1 inch=25.4 mm



# 产品概述 | PRODUCT OVERVIEW

Product Category	Model	Effective Membrane Area ft² (m²)	PWP (LMH/bar)	Ave. Permeate GPD (m³/d)	Stable Rejection of 2000 ppm MgSO₄ (%)
	LNF-8040-500	400.0 (36.40)	8-10	10831 (41.00)	>97
	MNF-8040-200	400.0 (36.40)	5-6	8311 (31.46)	>98
	SNF-8040-100	400.0 (36.40)	2-3	2674 (10.12)	>99 >90 (2000 ppm NaCl)
Spiral- wound NF	MNF-A-8040 Acid-resistant Membrane	400.0 (36.40)	1-2	1744 (6.60)	>98
Membrane		400.0 (36.40)	1-2	1744 (6.60)	>98
MNF-S-8040 Solvent-resistant Membrane	400.0 (36.40)	2-3	3170 (12.57)	>96	
	MNF-FF-8040 Full- Fit Element	400.0 (36.40)	5-6	8311 (31.46)	>99
MNF-DT Elemen	MNF-DT Element	108 (10)	4-5	1847 (7.00)	>99
Hollow Fiber NF	HNF-W-2880-400 Water-treatment	970.9 (90.2)	7-8	~24043 (~91.0)	>90
Membrane	HNF-S-3040-200 Solvent-resistant	118.43 (11.0)	1-2	900 (3.37)	>90 (200 ppm PEG200)

<sup>\*</sup>Note: The permeate flow of single membrane element may vary within the range of  $\pm\,15\%$ 





#### Introduction

The LNF spiral-wound NF series features polyamide as its primary membrane material, with molecular weight cut-off (MWCO) exceeding 500 Da. This series effectively eliminates pollutants, suspended solids, high molecular weight impurities, bacteria, and more from water, while retaining essential minerals. Its separation performance surpasses that of imported products.

Characteristics | Large flux; Thermal stability; Excellent separation performance

#### **Applications**

The membrane is suitable for landfill leachate treatment, municipal water treatment, suspended solids/virus removal, dye desalination/concentration, household water purification, chemical industrial wastewater treatment, whey desalination, etc.

#### **Product Parameters**

Model	LNF-1812	LNF-2540	LNF-4040	LNF-8040
Effective Membrane Area ft² (m²)	4.20 (0.38)	23.68 (2.20)	92.40 (8.40)	400.0 (36.40)
Ave. Permeate GPD (m³/d)	114(0.43)	655(2.48)	2499(9.46)	10831(41.00)
Stable Rejection	>97% (2000 ppm Mg\$O₄)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

Testing Conditions: All data is collected under operating pressure of 0.69 MPa, 25°C and pH7.

Membrane Parameters: Pore diameter: 0.7 nm, MWCO>500 Da, PWP: 8-10 LMH/bar

**Usage Conditions:** Max. operating pressure: 600 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 3-11, Allowable concentration of free chlorine: < 100 ppm

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions.

<sup>\*</sup>Please note that the company's products undergo continual optimization, and actual performance data may vary from those presented in the product catalogue. Nanjing Weihua Membrane Technology Co., Ltd. reserves the final interpretation rights.



#### Introduction

The MNF spiral-wound NF series incorporates advanced support layer and selective layer collaborative regulation technology, along with a high-flux design. Primarily utilizing polyamide as the main membrane material, with quantitative regulation of molecular weight cut-off (MWCO) ranging from 200 to 400 Da. This series operates efficiently at low pressure, achieving a single module recovery rate of approximately 15%. It excels in removing diverse impurities from wastewater, including organic matter, microorganisms, viruses, turbidity, chromaticity, heavy metals, COD, and ammonia nitrogen. Even after fouling, its performance can be restored through cleaning, ensuring prolonged membrane service life and cost-effectiveness.

Characteristics | Operation at low pressure; High tolerance to fluctuations in raw water quality; Antifouling

#### **Applications**

The membrane is suitable for lithium extraction from salt lakes, zero discharge of wastewater, reuse of reclaimed water, protein and amino acid concentration in food/beverage industries, desalination of polysaccharides, etc.

#### **Product Parameters**

Model	MNF-1812	MNF-2540	MNF-4040	MNF-8040
Effective Membrane Area ft² (m²)	4.20 (0.38)	23.68 (2.2)	92.40 (8.40)	400.00 (36.40)
Ave. Permeate GPD (m³/d)	87(0.33)	502(1.90)	1918(7.26)	8311(31.46)
Stable Rejection	>98% (2000 ppm Mg\$O₄)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

**Testing Conditions**: All data is collected under operating pressure of 0.69 MPa, 25°C and pH7.

Membrane Parameters: Pore diameter: 0.5 nm, MWCO: 200 Da, PWP: 5-6 LMH/bar

Usage Conditions: Max. operating pressure: 600 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 3-11, Allowable concentration of free chlorine: < 100 ppm

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions.

<sup>\*</sup>Please note that the company's products undergo continual optimization, and actual performance data may vary from those presented in the product catalogue. Nanjing Weihua Membrane Technology Co., Ltd. reserves the final interpretation rights.





#### Introduction

The SNF spiral-wound NF series synergistics molecular encapsulation and interface polymerization technologies to precisely control the polymerization time and rate, resulting in a consistently dense surface layer with a narrow distribution of pore sizes. This membrane achieves high retention of monovalent ions while maintaining molecular weight cut-off (MWCO) around 100 Da. Moreover, it offers substantial cost advantages compared to RO membranes. It has significant advantages in reducing operating costs and improving water treatment efficiency.

Characteristics | Dense; Low MWCO

#### **Applications**

The membrane is suitable for laboratory pure water systems, high-purity water preparation in electronic chemical industries, water softening, desalination, precious metal recovery, COD / ammonia nitrogen removal, fermentation broth concentration, etc.

#### **Product Parameters**

Model	SNF-1812	SNF-2540	SNF-4040	SNF-8040
Effective Membrane Area ft² (m²)	4.20 (0.38)	23.68 (2.2)	92.40 (8.4)	400.00 (36.4)
Ave. Permeate GPD (m³/d)	29 (0.11)	169 (0.64)	618 (2.34)	2674 (10.12)
Stable Rejection	>90% (2000 ppm NaCl)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

**Testing Conditions**: All data is collected under operating pressure of 0.69 MPa, 25°C and pH7.

Membrane Parameters: Pore diameter: 0.3 nm, MWCO: 100 Da, PWP: 2-3 LMH/bar

Usage Conditions: Max. operating pressure: 600 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 2-13, Allowable concentration of free chlorine: < 100 ppm

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# **MNF-A Acid-resistant Membrane**

#### Introduction

The MNF-A Acid-resistant Membrane product boasts a unique formula and process tailored for separation under extremely harsh acid conditions (30 wt% H<sub>2</sub>SO<sub>4</sub>, 20 wt% HCl, 20 wt% HNO<sub>3</sub>, 20 wt%H<sub>3</sub>PO<sub>4</sub>), with molecular weight cut-off (MWCO) around 200 Da.

Characteristics | High rejection; Long membrane life in extreme acidic environments

#### **Applications**

The membrane is suitable for material separation and concentration in acidic solutions, recovery and purification of organic acid solutions, purification of inorganic acids, decolorization treatment of inorganic acids, electrolyte recovery, etc.

#### **Product Parameters**

Model	MNF-A-1812	MNF-A-2540	MNF-A-4040	MNF-A-8040
Effective Membrane Area ft² (m²)	4.20(0.38)	23.68(2.20)	92.40(8.40)	400.00(36.40)
Ave. Permeate GPD (m³/d)	16(0.06)	100(0.38)	396(1.5)	1744(6.6)
Stable Rejection	>98% (2000 ppm Mg\$O₄)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

**Testing Conditions**: All data is collected under operating pressure of 0.76 MPa, 25°C and pH7.

Membrane Parameters: Pore diameter: 0.5 nm, MWCO: 200 Da, PWP: 1-2 LMH/bar

**Usage Conditions**: Max. operating pressure: 600 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: <11, Allowable concentration of free chlorine: < 100 ppm

**Notes:** 1.The permeate flow of single membrane element may vary within the range of  $\pm 15\%$ ; 2. The daily cleaning of the membrane module is usually water flushing, and chemical cleaning (acid / alkali cleaning) is needed every 10 to 60 days.

#### **Acid-resistance**

System	Permeability	RMgSO <sub>4</sub>
	(LMH/bar)	
30 wt%H <sub>2</sub> SO <sub>4</sub>	$0.6 \pm 0.02$	$94.9 \pm 0.5$
5 wt%HCI	$2.7 \pm 0.35$	$97.9 \pm 0.2$
20 wt%HNO <sub>3</sub>	$2.2 \pm 0.18$	$98.0 \pm 0.1$
$20 \text{ wt}\%\text{H}_3\text{PO}_4$	$0.3 \pm 0.08$	$90.0 \pm 0.3$

Test conditions: 2000 ppmMgSO<sub>4</sub>, 0.76 MPa, 25℃

\*Note: Due to the limited resistance of the equipment used to hydrochloric acid, testing of the product hydrochloric acid system can only reach a concentration of 5 wt%.

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# **MNF-B Alkali-resistant Membrane**

#### Introduction

The MNF-B Alkali-resistant Membrane product, featuring advanced membrane materials and structural design, facilitates material separation under high concentration alkali conditions (30 wt% NaOH, 20 wt% KOH), with molecular weight cut-off (MWCO) about 200 Da. Operating at low pressure with extended durability, it assists businesses in reducing wastewater treatment expenses and enhancing material recovery efficiency.

#### Characteristics

Maintain high salt rejection in extremely alkaline environments; Low operating pressure; Long membrane life

#### **Applications**

The membrane is suitable for wastewater treatment and material separation under alkaline conditions, alkali recovery/concentration in leaching solution, metal ion recovery in alkaline solution, electrolyte recovery, etc.

#### **Product Parameters**

Model	MNF-B-1812	MNF-B-2540	MNF-B-4040	MNF-B-8040
Effective Membrane Area ft² (m²)	4.20(0.38)	23.68(2.20)	92.40(8.40)	400.00(36.40)
Ave. Permeate GPD (m³/d)	16(0.06)	100(0.38)	396(1.5)	1744(6.6)
Stable Rejection	>98% (2000 ppm MgSO₄)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

**Testing Conditions:** All data is collected under operating pressure of 0.76 MPa, 25°C and pH7.

**Membrane Parameters :** Pore diameter: 0.5 nm, MWCO: 200 Da, PWP: 1-2 LMH/bar

**Usage Conditions:** Max. operating pressure: 600 psi, Max. operating temperature: 65°C, pH value range of feed water during continuous operation: >3, Allowable concentration of free chlorine: < 100 ppm

**Notes:** 1. The permeate flow of single membrane element may vary within the range of  $\pm 15\%$ ; 2. The daily cleaning of the membrane module is usually water flushing, and chemical cleaning (acid / alkali cleaning) is needed every 10 to 60 days.

#### Alkali-resistance

System	Permeability	RNa <sub>2</sub> SO <sub>4</sub>
·	(LMH/bar)	
30 wt%NaOH	$1.23 \pm 0.02$	97.5±0.5
20 wt%KOH	$1.30 \pm 0.02$	$97.9 \pm 0.5$

Test conditions: 2000 ppmNa<sub>2</sub>SO<sub>4</sub> , 0.76 MPa, 25°C

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions.

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# **MNF-S Solvent-resistant Membrane**

#### Introduction

MNF-S Solvent-resistant Membrane product, with molecular weight cut-off (MWCO) around 300 Da, has resistance to various organic solvents, enabling organic solvent recovery, material separation, and high-value product concentration.

Characteristics | Maintain high permeability, high rejection, and anti-fouling ability in environments such as alcohols, ketones, esters, N, N-dimethylformamide (DMF), N-methylpyrrolidone (NMP), etc.

#### **Applications**

The membrane is suitable for material separation with solvent systems in the pharmaceutical, food, and chemical industries, organic solvent recovery/purification, drug concentration (antibiotics, peptides), dissolved chemicals recovery, production line cleaning waste liquid/hydrocarbon recovery and purification.

#### **Product Parameters**

Mo	del	MNF-S-1812	MNF-S-2540	MNF-S-4040	MNF-S-8040
Effective Membrane Areaft <sup>2</sup> (m <sup>2</sup> )		4.20(0.38)	23.68(2.20)	92.40(8.40)	400.00(36.40)
	Methanol	16 (0.06)	95 (0.36)	365 (1.38)	1580 (5.98)
Pure Solvent Flux GPD	Ethanol	21 (0.08)	127 (0.48)	486 (1.84)	2106 (7.97)
(m³/d)	Acetone	13 (0.05)	74 (0.28)	283 (1.07)	1229 (4.65)
	DMF	3 (0.01)	21 (0.08)	82 (0.31)	351 (1.33)
Ave. Permeate GPD (m³/d)		32(0.12)	201 (0.76)	793(3.0)	3170(12)
Stable Rejection		>96% (2000 ppm MgSO₄)			
Feed Spacer Thickness mil (mm)		31 (C	).79)		

Testing Conditions: All data is collected under operating pressure of 0.76 MPa, 25°C and pH7.

Membrane Parameters: Pore diameter: 0.7 nm, MWCO: 300 Da, PWP: 2-3 LMH/bar

Usage Conditions: Max. operating pressure: 600 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 3-11

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions. \*Please note that the company's products undergo continual optimization, and actual performance data may vary from those presented in the product catalogue. Nanjing Weihua Membrane Technology Co., Ltd. reserves the final interpretation rights.



# **MNF-FF Full-Fit Element**

#### Introduction

The MNF-FF Full-Fit Membrane is an innovative composite nanofiltration membrane product crafted from sanitary grade materials for safety and eco-friendliness. Capable of removing bacteria, organic matter, and sulfates from water while preserving essential minerals, it enhances product taste and quality in food processing applications like dairy products and beverages.

#### Characteristics

The components and auxiliary materials are all made of pharmaceutical and food grade materials, with no organic solvents; Thermal stability; Chemical corrosion resistance; Anti-fouling.

#### **Applications**

The membrane is suitable for water softening, drug desalination/concentration/refining in the biopharmaceutical industry, beverages decoloration/clarification/concentration in the food industry.

#### **Product Parameters**

Model	MNF-FF-1812	MNF-FF-2540	MNF-FF-4040	MNF-FF-8040
Effective Membrane Area ft² (m²)	4.20(0.38)	23.68(2.20)	92.40(8.40)	400.00 (36.4)
Ave. Permeate GPD (m³/d)	87(0.33)	502(1.90)	1918(7.26)	8311(31.46)
Stable Rejection	>99% (2000 ppm MgSO₄)			
Feed Spacer Thickness mil (mm)	31 (0.79)			

**Testing Conditions :** All data is collected under operating pressure of 0.69 MPa, 25℃ and pH7.

Membrane Parameters: Pore diameter: 0.5 nm, MWCO: 200-400 Da, PWP: 5-6 LMH/bar

**Usage Conditions:** Max. operating pressure: 600 psi, Max. operating temperature:  $45^{\circ}$ C, pH value range of feed water during continuous operation: 3-11, Allowable concentration of free chlorine: < 100 ppm

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions.

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## **HNF-W Water-tretment**

#### Introduction

The HNF-W Water-treatment series adopts hierarchical structure synchronous construction technology, greatly improving the bonding force between the selection layer and the support layer, enhancing the mechanical stability and service life of the membrane filament. With molecular weight cut-off (MWCO) around 400 Da, it can be widely used in household water purification and municipal water treatment.

#### Characteristics

High chlorine resistance; Excellent antibacterial properties; Fiber robustness; Backwashing feasibility; High filling density; High flux; Low operating costs; Low energy consumption

#### **Applications**

The membrane is suitable for desalination treatment of surface water, ground water, tap water, industrial water, and municipal water, as well as wastewater reuse, material concentration, and separation of divalent and divalent salts.

#### **Filament Parameters**

Inner and Outer Diameter (mm)	0.5 / 0.9
Pore Radius (nm)	0.4
MWCO (Da)	400
PWP (LMH/bar)	7-8

#### **Product Parameters**

Model	HNF-W- 1812-400	HNF-W- 3040-400	HNF-W- 2860-400	HNF-W- 2880-400
Effective Membrane Area ft² (m²)	9.7 (0.9)	118.0 (11.0)	715.8 (66.5)	970.9 (90.2)
Ave. Permeate GPD (m³/d)	~240 (~0.9)	~2932 (~11.1)	~17726 (~67.1)	~24043 (~91.0)
Stable Rejection	~ 90% (1000 ppm MgSO <sub>4</sub> ) ~ 90% (200 ppm PEG400)			
Feed Spacer Thickness mil (mm)	>300000			

**Testing Conditions:** All data is collected under operating pressure of 0.69 MPa, 20°C and pH7.

**Usage Conditions:** Max. operating pressure: 218 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 2-13, Allowable concentration of free chlorine: < 500 ppm

**Notes :** 1.The permeate flow of single membrane element may vary within the range of  $\pm$  15%; 2. Backwashing pressure  $\leq$  0.2 MPa.

<sup>\*</sup>The above parameters serve as reference values, and element parameters should be appropriately adjusted based on specific operational conditions.

\*Please note that the company's products undergo continual optimization, and actual performance data may vary from those presented in the product catalogue. Nanjing Weihua Membrane Technology Co., Ltd. reserves the final interpretation rights.



# **HNF-S Solvent-resistant**

#### Introduction

The HNF-S Solvent-resistant series membrane use polyimide as the membrane matrix material, with molecular weight cut-off (MWCO) around 200 Da. Solvent resistant materials are selected as sealing materials, and 304 steel materials are used as shell materials. They can operate stably in solvents of different polarities, with low dissolution and residue, and can be applied in fields such as biomedicine and food-processing industry.

#### Characteristics

Wide tolerance to organic solvents; Super strong mechanical stability; Backwashing feasibility

#### **Applications**

The membrane is suitable for material separation with solvent systems in the pharmaceutical, food, and chemical industries, organic solvent recovery/purification, drug concentration (antibiotics, peptides), dissolved chemicals recovery, production line cleaning waste liquid/hydrocarbon recovery and purification.

#### **Filament Parameters**

Inner and Outer Diameter (mm)	0.5 / 0.9
Pore Radius (nm)	0.2
MWCO (Da)	200
PWP (LMH/bar)	1-2

#### **Product Parameters**

Model		HNF-S- 1812-200	HNF-S- 2540-200	HNF-S- 3040-200	
Effective Membrane Areaft <sup>2</sup> (m <sup>2</sup> )		3.23 (0.3)	32.30 (3.0)	118.43 (11.0)	
	Methanol	12 (0.05)	123 (0.46)	450 (1.69)	
Pure Solvent Flux GPD(m³/d)	Ethanol	3 (0.01)	32 (0.12)	117 (0.44)	
	Acetone	8 (0.03)	77 (0.29)	284 (1.06)	
	DMF	2 (0.01)	21 (0.08)	78 (0.29)	
Ave. Permeate GPD (m³/d)		25 (0.09)	245 (0.92)	900 (3.37)	
Stable Rejection		>90% (200 ppm PEG 200)			

**Testing Conditions**: All data is collected under operating pressure of 0.76 MPa, 20°C and pH7.

**Usage Conditions:** Max. operating pressure: polar non proton solvents such as DMF and NMP: 218 psi, polar proton solvents such as methanol/ethanol: 290 psi, Max. operating temperature: 45°C, pH value range of feed water during continuous operation: 2-13.

**Notes :** 1.The permeate flow of single membrane element may vary within the range of  $\pm$  15%; 2. Backwashing pressure  $\leq$  0.2 MPa.



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# Industrial Environmental Protection Field

### **Lithium Extraction from Salt Lakes**

The extraction of lithium from salt lake brine is often hindered by a high magnesium-to-lithium ratio, which demands extremely high separation accuracy in NF membranes. Our company's high-precision NF membranes for lithium extraction have put into use in a reputable engineering company, demonstrating a similarly strong performance to that of internationally-renowned brand products, providing a competitive advantage.



MNF-8040-200

**Treatment Objective :** Separation of Mg<sup>2+</sup> and Li<sup>+</sup>, Li<sup>+</sup> enrichment

Product Model: MNF-8040-200

Feed Water Quality:  $C(Mg^{2+})=10 g/L$ ,  $C(Li^{+})=0.5 g/L$ ,

 $C(Mg^{2+}: Li^{+}) = 20: 1$ 

**Effluent Quality**:  $C(Mg^{2+}: Li^{+}) = 1: 1$ 

**Seperation Performance**:  $R(Mg^{2+}) > 98\% R(Li^+) - 20\% - -15\%$ 

**Operating Temperature**: 21 °C

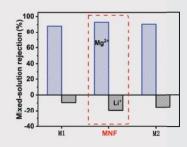
**Production:** 1000 t/y of lithium carbonate

#### Ingredients of original brine from a certain salt lake

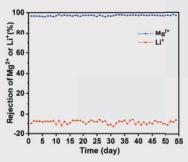
lons	В	K <sup>+</sup>	Li <sup>+</sup>	Mg <sup>2+</sup>	Na⁺	Cl <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>
Concentration	0.27 g/L	15.07 g/L	0.5 g/L	10 g/L	68.65 g/L	203.15 g/L	19.53 g/L



Salt Lake Lithium Extraction Project in Qinghai



Performance Comparison with Competitors



Stable Long-term Separation Performance



### **Coal Chemical Wastewater Treatment**

For coal chemical wastewater with high total salt content, primarily composed of  $Na_2SO_4$  and NaCl, an integrated process was devised. This process combines reverse osmosis membrane concentration, NF membrane salt separation, and freeze crystallization as core technologies to address the wastewater treatment challenges effectively.



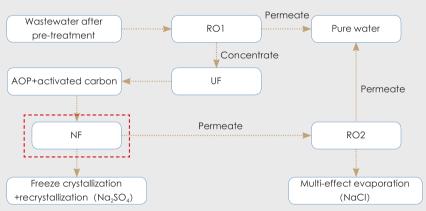
**Treatment Objective :** Separation of  $Na_2SO_4$  and NaCl **Separation Performance :** R  $(SO_4^{2-}) > 99.4\%$ 

**Treatment Cost:** The cost of wastewater treatment has decreased by 71%, and carbon emissions have decreased by 80% **Product Purity:** Na<sub>2</sub>SO<sub>4</sub> purity 98.4%, NaCl purity 98.9%

**Production :** The recovery rate of  $Na_2SO_4$  is 94 t/d, and the

recovery rate of NaCl is about 43 t/d **Processing Capacity:** 1.46 million t/y

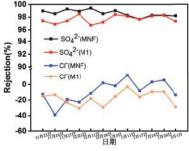
Operating Time: Stable operation for 8 months





Process Route for Coal Chemical Wastewater Treatment

Coal to Ethylene Glycol Wastewater Resource Utilization Project



Performance Comparison of Competitors

Freeze Crystallization+Recrystallization Multi-effect Evaporation





## **High-salinity Wastewater Resource Utilization**

Our company has developed a solution to tackle the challenging separation issue of similarlysized and similarly-valenced ions in chemical wastewater. We have created high-precision separation NF membranes and a nearly zero discharge process centered on NF membranes. Our solution minimizes wastewater emissions by 90% for enterprises and provides significant savings in environmental costs.

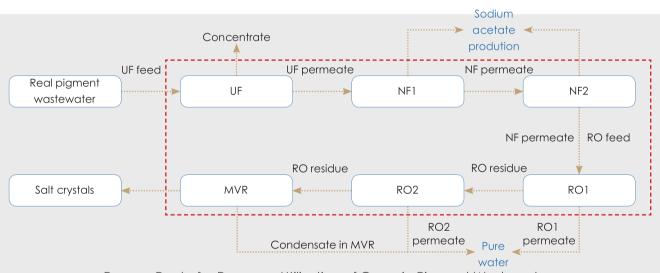


**Treatment Objective:** Separation of sodium acetate and NaCl

Product Model: SNF-8040

Feed Water Quality: High-salinity wastewater

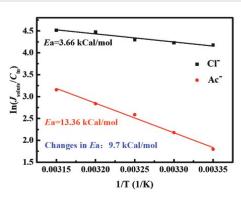
Effluent Quality: Salt concentrate **Processing Capacity:** 84000 t/y Processing Cost: 6.6 yuan/t



Process Route for Resource Utilization of Organic Pigment Wastewater



Demonstration Setup for Zero Discharge of Sodium Acetate Wastewater



The Separation Ratio of Sodium Acetate and NaCl is 15:1



#### **Treatment of Landfill Leachate**

To address the presence of complex pollutants in landfill leachate and the short lifespan of traditional membranes, our company has developed an anti-fouling NF membrane that has replaced well-known competitive brands in two waste treatment plants. Our membrane system has been operating stably for 2 years, surpassing all indicators of the competitive membranes.



MNF-8040-300

**Treatment Objective:** Reduction of COD and ammonia nitrogen content

Product Model: MNF-8040-300

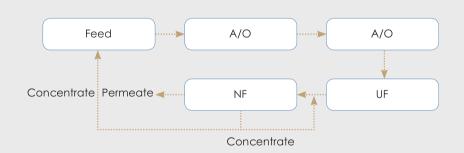
**Number of Membrane modules: 15** 

**Total membrane area:** 555 m<sup>2</sup> **Operating Pressure:** 0.5-1.1 MPa

Feed Water Quality: ammonia nitrogen100 mg/L; COD 1150 mg/L Effluent Quality: ammonia nitrogen<5 mg/L; COD<70 mg/L

**Processing Capacity:** 220 thousand t/y

**Operating Time:** 2 y



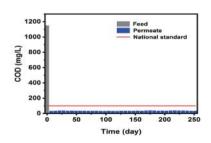
Process Route for Landfill Leachate Treatment



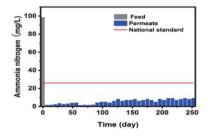
Landfill Leachate Treatment Project



Bleaching Rate > 99%



Long-term Stable Removal Rate of COD



Long-term Stable Removal Rate of Ammonia Nitrogen

### **Pesticide Wastewater Treatment**

In a specific case, A certain enterprise regularly discharges phosphorus-containing wastewater from pesticide production, leading to localized water body eutrophication. With stricter sewage discharge regulations threatening production shutdown, our company devised a secondary NF deep treatment process tailored to the unique qualities of the wastewater. The treated water now meets reuse standards, cutting wastewater treatment costs by 60% and reducing carbon emissions by 72%.



SNF-8040

**Treatment Objective:** The total phosphorus concentration drops below 1mg/L

**Effluent Quality:** The total phosphorus in the water produced by the first stage NF is below 8 mg/L, which can meet the discharge standard. The total phosphorus in the water produced by the second stage NF is below 1 mg/L, which can meet the reuse standard.

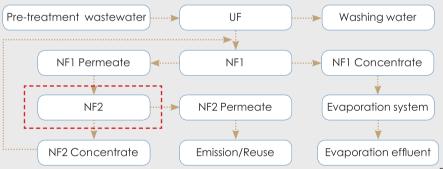
Power consumption of per ton water: 82 kWh/m<sup>3</sup>

**Processing Cost:** 60% reduction in wastewater treatment costs

and 72% reduction in carbon emissions

**Processing Capacity:** 80 thousand t/y

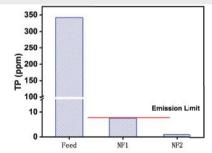
Operating Time: >1 y



Process Route flow for Pesticide Wastewater Treatment

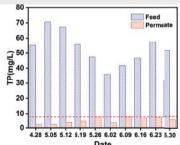


Phosphorus Containing Wastewater Standard Discharge Project



The total phosphorus in the water produced by the first stage NF is below 8 mg/L, which can meet the discharge standard;

The total phosphorus in the water produced by the second stage NF is below 1 mg/L, which can meet the reuse standard.



Continuous operation for two months, the total phosphorus in the water produced by the first stage NF is below the emission limit.



# Life and Health Field

## **Water Purification**

To address significant variations in surface water quality across regions, our company has designed a household water purification membrane product that customizes NF membrane based on water quality. Our product offers both flat spiral-wound membrane elements and hollow fiber membrane elements.



MNF-1812

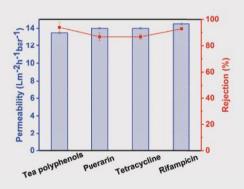


**Treatment Objective:** Removal of calcium ions, magnesium ions, and heavy metals from water

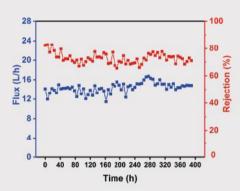
Product Model: MNF-1812 HNF-W-1812-400

Feed Water Quality: Surface water Rejection of Divalent Salt :>95%

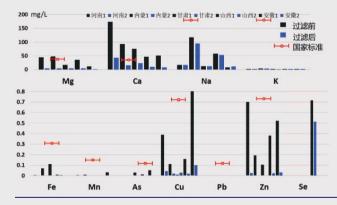
**Effluent Quality:** Better than national standards



Effective Removal of Antibiotics



Excellent Long-term Stability



Analysis of Filtration Performance for Surface Water Great performance for surface water in different regions

## **Municipal Water Treatment**

In response to the growing need for high-quality municipal drinking water supply, our company has developed advanced hollow fiber NF membranes for water treatment. Building on this innovation, a short process of "coagulation +hollow fiber NF" generates high quality drinking water with minimal pre-treatment requirements and high recovery rates.



HNF-W-3040-400

**Treatment Objective:** Removing organic matter and

heavy metal ions from water

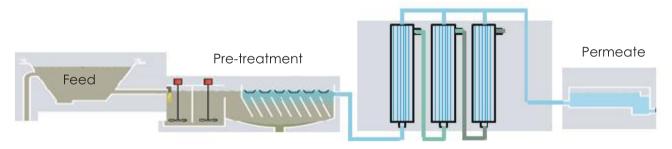
Product Model: HNF-W-3040-400

Feed Water Quality: Surface water

**TDS Salt Rejection (95% recovery rate):** ~20% **TOC Rejection (95% recovery rate):** ≥ 85%

**Effluent Quality:** Better than national standards

NF



"Coagulation + hollow fiber NF" Short Process Technology



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(%) eo -						
Rejection (%)						
20						
ıL	cro <sup>2</sup> L Heav Meto		CTC (-) Organic pollu		cio; fectio	

	Ion Concen		
Ions	Feed Solution	Permeate Solution	Rejection
Na⁺	12.91	10.00	22.6%
Ca <sup>2+</sup>	31.14	20.31	34.8%
Mg <sup>2+</sup>	4.42	3.91	11.6%
Cl <sup>-</sup>	29.71	33.47	-13.5%
SO <sub>4</sub> <sup>2-</sup>	25.76	9.06	64.8%
TDS	191	153	20.0%
TOC	8.0	1.2	85.0%

(Testing Conditions: 3 bar, 25°C; Water source: Yangtze River water)



## **Solvent Recovery**

To address inefficiencies and high costs associated with traditional methods used for separating small molecular drugs and solvents, our company has developed high-precision solvent resistant hollow fiber NF membrane products. Our products enable efficient separation and recovery of these substances, thereby reducing solvent and energy costs by 50%.



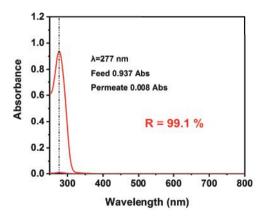
HNF-S-3040-200

**Treatment Objective:** Extraction of small molecule drug, recovery of methanol

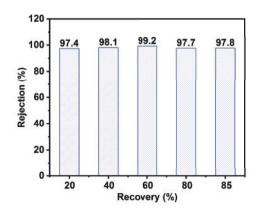
Product Model: HNF-S-3040-200 Treatment System: Methanol Drug Molecular Weight: ~280 Da

**Separation Performance (85% recovery rate):** R>97.5%

**Methanol permeability:** >5 L/ m<sup>2</sup> h



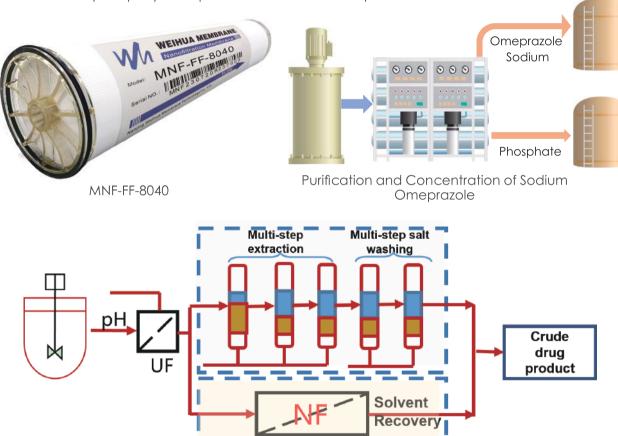
High Rejection of Small Molecular Drugs with MW of ~280 Da



Achieving Purification of Small Molecular Drugs and Recovery of Solvents at a High Recovery

## **Biopharmaceutical Purification**

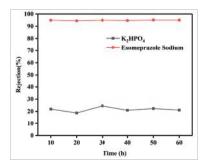
The biopharmaceutical industry has an enormous demand for drug separation and purification. Traditional purification processes such as extraction and salt washing are slow, expensive, and cause heavy pollution. In response to these problems, our company has developed a NF membrane purification process that significantly reduces the purification process, improves efficiency, and saves millions of yuan per year in purification costs for enterprises.



NF Integrated Process for Purification of Sodium Omeprazole Drug Purification



Integrated Set-up for Drug Purification



Efficient Drug Separation Performance

Produce top-tier nanofiltration membranes, Reduce carbon emissions for industries, and Empower health!

Add:南京市江北新区产业技术研创园园思路1号

Web: www.weihuamembrane.com

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南京蔚华膜科技有限公司 NANJING WEIHUA MEMBRANE TECHNOLOGY CO., LTD.



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