

# MS<sup>®</sup> Filtration Solutions

## For Industrial Water Treatment



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We are the worldwide leaders in separation and purification

Our Quality Membrane  
Your Best Solutions

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## Who we are?

Membrane Solutions is a global separation and purification company serving customers in water-intensive industries. We focus on municipal & industrial, pulp & paper, oil & gas, chemical & petrochemical, food & beverage, power generation, microelectronics, mining and water treatment to best improve our customers' water, energy and raw material efficiency. We drive to achieve above-the-market growth through our competent people, high-performing organization, product and service innovations, and a strengthened presence in selected emerging markets.



## Your Benefits

- Optimum water processing and value creation:
- In-house expertise in water treatment and project management
  - > Understanding the specific needs of water treatment
  - > Proven experience as a solutions integrator
  - > Guaranteed industrial processes and water quality
  - > Environmental compliance and high quality standards (ISO, FDA, NSF, Glass 100,000 clean fabrication room )
  - Tailor-made solutions to meet the specifications of every customer
  - Safe and reliable technologies
  - Optimum OPEX and asset preservation
  - Continuous improvement in both design and operation



ISO, FDA, NSF Certificates



Glass 100,000 clean fabrication room



Test and detection center



Design, commissioning & operation



## Expertise

As municipalities and local governments around the world have to cope with increasing populations and industrial growth, stricter regulations and an ever-decreasing supply of fresh water, thus the advanced membrane technology has been widely applied to treat industrial process water or wastewater.

MS is a global membrane filtration solution provider and also has decades of experience in wastewater treatment for different industries.

## Oil & Gas



Water quality is critical to improve the recovery and minimize the environmental impact of oil and gas production. We offer you advanced membrane filtration technologies to address the unique water resource needs of the oil & gas industry.

Our experience and science expertise enables us to develop better membrane system for water treatment that lower your costs and increase production of oil & gas resources.

## Chemical & Petrochemical

You know chemicals and we know water, and all the ways water can help your operation run at peak levels.

For decades, MS Water & Process Solutions has been the supplier of membrane filtration products and cartridge filters to the industry. Our products are used to produce, purify and recover some of the most commercially important products around the world according to the industry standard.

We support our customers in purification processes (chemical processing, cooling water, industrial boiler feedwater, industrial wastewater) and helping to develop new applications to make their processes more efficient and environmentally sustainable.

## Pulp & Paper

Due to the high fiber content of their water, pulp and paper mills face frequent plugging and backwashing issues—leading to higher maintenance costs and downtime. Our innovative technologies provide versatile solutions to water treatment challenges throughout the pulp and paper operation, including fibers removal.

From industrial cooling and boiler feedwater to solids removal of wastewater, we provide solutions that look good on paper and in your



## Municipal

Humans can go weeks without food, but only days without safe drinking water. Water sources vary from ground water, to lakes and rivers, to the sea itself. However, few water sources remain pristine enough to be consumed without some form of treatment. We've developed membrane technologies that enable wastewater reuse and the production of safe drinking water throughout the world. From contaminate removal, wastewater reuse to desalination we're dedicated to helping human beings stay healthy and hydrated.

## Mining



Metals are essential raw materials for nearly all of today's consumer and industrial products. And water management is becoming an increasingly important aspect of metal mining operations. Through the development of metal selective media and our ion exchange (IX) expertise, we're able to help the mining industry recover valuable metals and reuse water source in the most efficient and environmentally sustainable manner.

## Microelectronics

The microelectronics industry counts on water as a key raw material in the fabrication of devices such as semiconductors, photovoltaics and flat panel displays. Our knowledge of processes and requirements of microelectronic manufacturing make us the perfect partner for total water management solutions.



## Food & Beverage

Fact: water sources vary in their mineral profiles. This variability can pose a challenge for food and beverage manufacturers who seek to ensure the quality and consistency of their products. We help manage natural variability to ensure a more dependable set of food and beverage characteristics such as taste and color.

From refining high-fructose corn syrup and debittering juice to chromatographically separating sugars, we offer specialized solutions (separation & purification and process wastewater treatment) to fit a wide range of food & beverage needs.

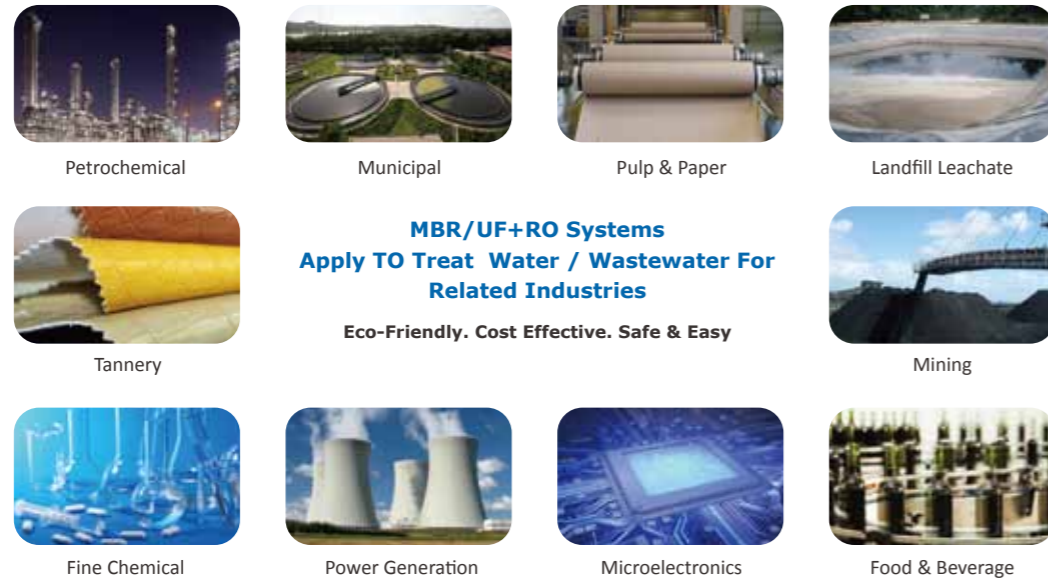
## Pharmaceutical

Ultrapure Water (UPW) System is widely applied to the production process (pharmaceutical preparation, injection water, pharmaceutical solvent, no pyrogen sterile water, etc.) of pharmaceutical industry in the world. MS Robinson UPW System is based on the key technology of RO membrane, and combines with UF/MF, EDI/IX, Activated Carbon Filter and UV device to effectively remove organic matter, heat source, virus, TOC, salt ions of raw water, and the production water quality meets the pharmacopoeia standards of purified water in Europe and US.

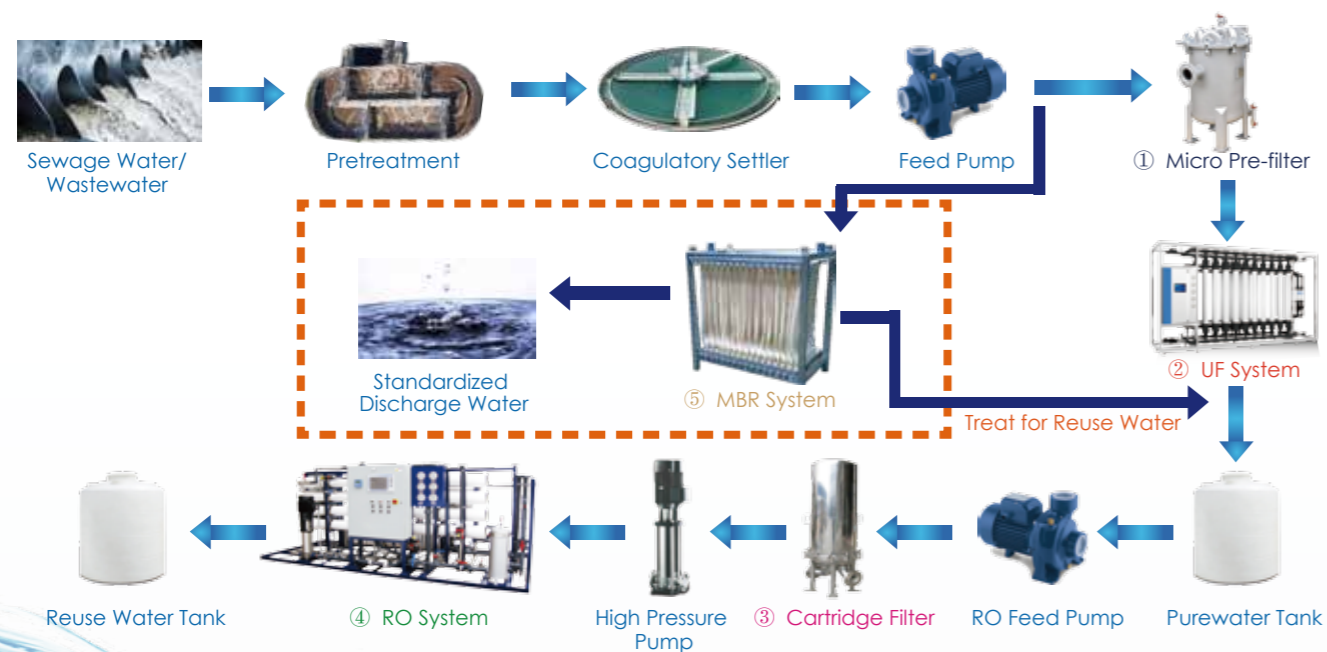


## Membrane System Applications

As known that Integrated Membrane System (IMS) such as MBR/UF+RO is now widely applied to industrial water depth treatment, and MS provides MBR/UF/NF/RO Modules & System and different Precision Filters for customers.



## Industrial Wastewater Depth Treatment Process



- ① 1-100 $\mu$ m, Cartridge Filters, Filter Bags, Multimedia Filters, Disc Filters, etc.
- ② 0.01-0.03 $\mu$ m, PVDF Hollow Fiber Membrane
- ③ 1-5 $\mu$ m, Cartridge Filters
- ④ RO—SWRO, BWRO, FRRO, LPRO
- ⑤ 0.1 $\mu$ m PVDF Hollow Fiber Membrane

## Application Products

Products Line	Available Configurations	Filter Ratings ( $\mu$ m)	Product Picture
MS <sup>®</sup> Petroplus MBR	Tailor-made	0.1	
MS <sup>®</sup> UF Series	Membrane shell 4040/8060/1060	0.03	
MS <sup>®</sup> RO Series	Membrane shell 4040/8040	0.0001	
MS <sup>®</sup> MicroPure Series Melt Blown Cartridge Filter	Cartridge	0.5/1.0/5.0/10/20/30 /50/100	
MS <sup>®</sup> PolyPure-Calssic PP Pleated Cartridge Filter	Cartridge	0.1 /0.22 /0.45 /1.0/3.0 /5.0 /10 /20	
MS <sup>®</sup> 600 FlowPure-HF Cartridge Filter	Cartridge	1.0 /4.5 /10 /20 /50	
MS <sup>®</sup> AquaPure String Wound Cartridge Filter	Cartridge	0.5 /1.0 /5.0/10 /20	
MS <sup>®</sup> AllPure-B Cartridge Filter	Cartridge	0.2/0.45/1.0/3.0/5.0/10.0	



—For HPI/CPI Waste Water Treatment In Industries

## MS<sup>®</sup> Petro Plus MBR System

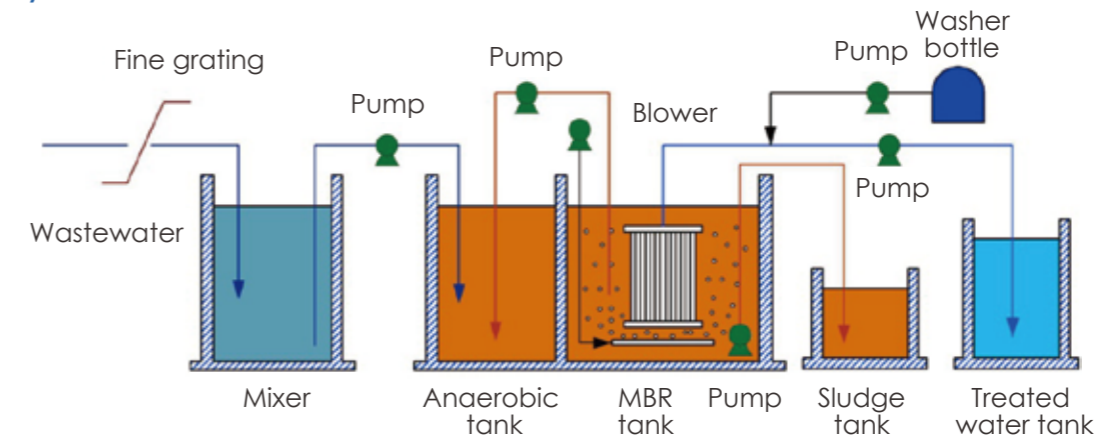
Petro Plus MBR systems combine proven ultrafiltration technology with biological treatment for municipal, landfill leachate, commercial and industrial wastewater treatment and water discharge/reuse applications. Replaced conventional complex treatment process, the MBR System incorporates MS Matrix II reinforced specifically designed to meet the requirements of PPC/IPPC regulations.



## Specifications

Module Type	MS-FSF-4010	MS-FSF-6015	MS-FSF-8020
Membrane Surface Areas (m2)	10	15	20
Material	PVDF	PVDF	PVDF
Pore Size (µm)	0.1	0.1	0.1
ID/OD(mm)	0.9/2.2	0.9/2.2	0.9/2.2
Filter Type	Suction	Suction	Suction
L (mm)	1000	1500	2000
W (mm)	380	380	380
H (mm)	30	30	30
Conduit	DN25	DN25	DN25
Air Intake	DN20	DN20	DN20
Module Weight (kg)	6	8	10
Seal Gum Material	PU	PU	PU
Conduit Material	ABS	ABS	ABS
<b>Operation Conditions</b>			
Operation Flux (L/H)	100-300	150-450	250-750
TMP (MPa)	-0.05	-0.05	-0.05
Temperature Range (°C)	5-40	5-40	5-40
pH Range	5-10	5-10	5-10
<b>Cleaning Conditions</b>			
Highest Temperature (°C)	40	40	40
pH Range	2-10	2-10	2-10
Most Active Chlorine (ppm)	1000	1000	1000

## MBR System Process



## Features

- > High standard and consistent effluent water quality
- > Efficient, effective and economic
- > Simplified system design, comprehensive cleaning box
- > High standard of biomass/solids control
- > Lower operation cost and less components



## Petro Plus MBR Effluent Water Quality

Available Matrix II UF Membrane Treatment Results	
SDI	<3
Turbidity (NTU)	<0.1
TSS (ppm)	<2
Sulfide (Removal rate)	non-detectable >96%
Oil (MBR) (ppm)	<1.5
TN (ppm)	<3
TP (ppm)	<0.5
Fecal Coliform (cfu/100mL)	0

## Application Fields



Petrochemical

Landfill Leachate

Municipal

Pulp & Paper

Food & Beverage

### MS® PVDF Ultrafiltration Hollow Fiber Membrane

Module Type	FUF-4040	FUF-8060	FUF-1060
Membrane Surface Areas (m2)	8	65	80
Membrane Material	PVDF	PVDF	PVDF
Pore Size (µm/inch)	0.03/0.0012	0.03/0.0012	0.03/0.0012
ID/OD (mm/inch)	0.7/1.3 (0.027/0.051)	0.7/1.3 (0.027/0.051)	0.7/1.3 (0.027/0.051)
Water Flux (LMH) at 1 Bar	>500	>500	>500
Temperature Range (°C/°F)	5-40/40-104	5-40/40-104	5-40/40-104
pH Range	1-12	1-12	1-12

### Features and Advantages

- > Hydrophilicity modified PVDF, smoother, less fouling
- > Intercept particle, bacteria and viruses
- > High chemical resistance
- > High intensity for membrane silk lining
- > Simple structure, reasonable design, easy to change-out
- > Low operating pressure, energy saving, stable effluent



UF Skid



UF Containerized Unit



Industrial UF System

### Application Fileds



Power Generation



Industrial Water Treatment



Oil & Gas



Drinking Water



Seawater Desalination

MS provides the 4040/8040 modules of SWRO/ BWRO/ FRRO/ LPRO series and also the system design schemes for customers in industrial wastewater treatment. They are characterized by low working pressure, excellent rejection rate, high flow and reliable performance.

### Specifications and Major Properties

Model of Element	Active Membrane Area ft2(m2)	Average Permeated Flow GPD (m3/d)	Stable Rejection Rate(%)	Minimum Rejection Rate(%)
SW4040	75(7.0)	1200 (4.6)	99.5	99.2
SW8040	350(32.6)	5000 (18.9)	99.6	99.3
BW4040	78(7.2)	2600 (9.8)	99.5	99.0
BW8040	400(37.2)	10500 (39.7)	99.5	99.0
FR4040	72(6.7)	2400 (9.0)	99.5	99.0
FR8040	365(34)	9500 (35.9)	99.5	99.0
LP4040	75(7.0)	2100 (7.96)	99.4	99.2
LP8040	350(32.6)	10000 (37.81)	99.4	99.2

### Applications

- Seawater desalination
- Power generation
- Microelectronics
- Water purification & reuse

### Notice

SWRO/BWRO or FRRO generally elected as the primary RO of wastewater desalination can reduce the total investment, remove over 99% salt and delete 100% pyrogen and bacteria.





MS® MicroPure series are pure polypropylene with obvious gradient structure depth filter, which welded by superfine fibers inside and cruder fibers at the surface. The raw material of filter media is polypropylene which is NSF certified. While it offers better protection of RO membrane system for seawater and brackish water.



### Features and Benefits

- > Up to 100% greater Dirt Holding Capacity
- > All PP construction provides wide variety of feed waters and good resistance to both organic
- > High contaminant removal efficiency
- > Provides lower total cost of filtration operations
- > Melt-bonded exterior and PP core ensures no media migration
- > Long service life
- > NSF compliant



PolyPure-Calssic PP pleated filters with greater surface area are 100% polypropylene construction offers low extractable, long service life and broad chemical compatibility, thermally bonded construction to ensure a cleaner filtrate. It is designed to reduce overall filtration costs when compared to spun bonded, string wound and nominally-rated pleated cartridges. It offers better protection of RO membrane system for seawater and brackish water.



### Typical Applications

- > Seawater RO pre-filtration
- > Wine clarification
- > Water filtration
- > Solvent filtration



### Special Applications

- > Seawater/brackish water RO re-filtration
- > Power Generation
- > Municipal/Industrial water re-filtration
- > Oil & Gas injection water re-filtration



### MS® Backwash PP Cartridge Filter

MS® AllPure-B pleated cartridge filters are design for high turbidity water filtration. All thermal bonded construction ensure filters no adhesives. The improved structural design have greatly improved the backwash performance. AllPure-B have the best cost-effective though multiple backwash.

### Applications

- > Seawater/Brackish/Lake/River Water
- > Pre-Filtration for RO
- > High Turbidity Water

### Features and Benefits

- > Controlled calendered polypropylene media
- > Balance life time, flow rate and cost
- > High capacity contaminant loading
- > Repeatable backwashing
- > Rigid construction – ensure efficiency after backwashing 45 cycles



MS® 600 FlowPure-HF cartridge filter is coreless, single open-ended. While large diameter and large filter area thus reduce use quantity and filter size. Certainly the inside to outside flow configuration allows for excellent dirt holding capacity, extending the time between filter change-outs. It offers better protection of RO membrane system for seawater desalination, oil fields or other industries.

### Unique Pleated Process

Unique high density of crescent pleated method provides optimized surface area for higher flux.



### Typical Applications

- > Seawater RO pre-filtration
- > Oil & Gas injection water
- > Petrochemical industry
- > Power generation
- > Industrial condensate water
- > Microelectronics process water
- > Pharmaceutical, Food & Beverage
- > Municipal water, etc.



MS® AquaPure string wound cartridge filter is a kind of deep filter cartridge, which is made from the textile fabric string (polypropylene, absorbent cotton and so on) precisely winding onto the multi-hole axes according to the specific technology. AquaPure Series string wound filter cartridge that design for SWRO can greatly reduce equipment operating costs and excellent protect your RO components.

### Features and Benefit

- Graded density structure
  - > Higher contaminant holding capacity
  - > Selective entrapment of contaminant throughout the filter to maximise lifetime
- Homogeneous and fluffy raw material
  - > Lower pressure drops for higher flow rates
  - > High product throughput for extraordinarily long service life
- Robust cartridge construction
  - > Better performance in harsh environments
  - > Wide range of sizes and precision
- Chemical inertia components
  - > Compatible with a wide range of solvents and cleaning solutions
- Components free of adhesives and surfactants
  - > Very low extractable levels
  - > Board chemical compatibility for most aggressive process applications



### Typical Applications

- > RO pre-filtration
- > UF pre-filtration
- > Chemical solvent filtration
- > Condensate polishing treatment filtration



Condensate polishing treatment filtration in Power Plant



### Brief Introduction

Increasing water demands are not accompanied by increasing water supplies, indeed fresh water resources are diminishing and suffered from quality decline over time. MS Filter responds to those challenges by various membrane-based solutions.

MS Ultrafiltration (UF) membrane is a pressure driven membrane separation process. Thanks to its nano-sized pores, UF membrane is widely known as powerful system for turbidity removal and disinfection in water treatment. Since it is operated in low pressure, which means low energy consumption, and yet relatively chemical-free, MS UF package system seems to be both economically and environmentally feasible.

### Key Features

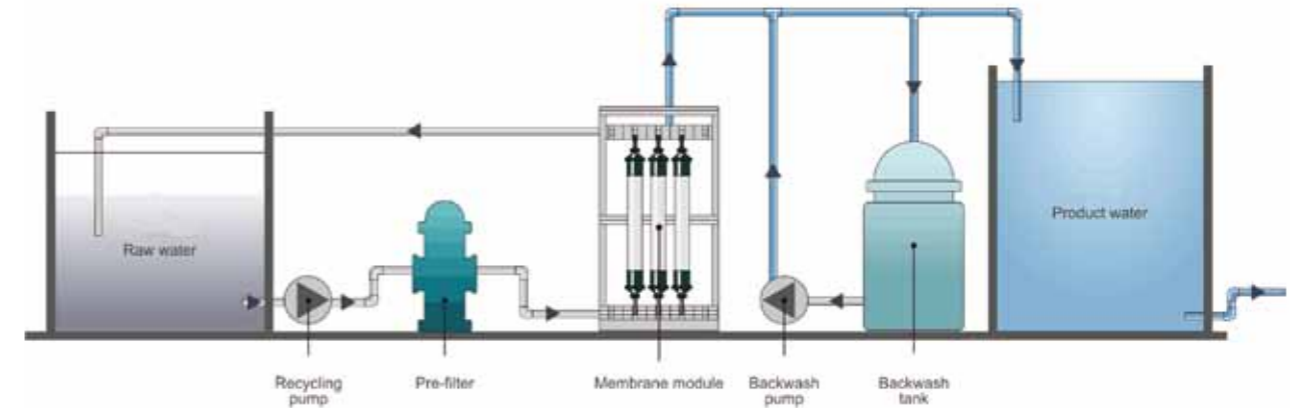
- > Compact design for small footprint, less instruments, simple piping & installation
- > Reduces water & energy usage
- > Removal of bacteria, viruses and pathogenic substances
- > Removal of TSS > 0.1 micron
- > Tangential flow along the membrane surface limits membrane fouling
- > Minimal pretreatment & chemicals needed
- > Automated design for easier operation
- > Only 1 pump for either feed circulation or backwash to minimize investment cost



### Specifications

Type	MS Ultrafiltration Package System (outside-in filtration)	
Material/ Pore Size	PVDF Hollow Fiber / 0.03µm	
Capacity	1-info(up to request) m³/hour	
Feed Turbidity	<300 NTU	
Product Turbidity	<1 NTU, SDI < 3	
Operating Pressure/ Temperature	0.5- 2.0 bar / 5-45 °C	
Features	Skid mounted	Filtration pump
	Cleaning in place	Automatic
	Pre-treatment (Additional)	Post-treatment (Additional)

### Process of UF Package System



### Applications

- > Waste and Effluent Treatment
- > Process Streams
- > Potable Water
- > Water Pre-Treatment
- > Wastewater Reuse
- > Machining & Grinding
- > Wash Water / Rinse Water Recycling
- > Milk and Dairy Processing
- > Replace Coagulation, Flocculation and Settling Process Media
- > Partial Dewatering
- > Landfill Leachate
- > Treatment of Dye Effluents
- > Surface & Ground Water Purification
- > Car Wash Effluent



MS provides reasonable water treatment scheme and service.

With specialist expertise, engineering, design and production in a modern operating environment, Membrane-Solutions supplies solutions for all your water-related challenges and basic needs.

From the production of drinking water till Microelectronics production .

Economically sound and environmentally sustainable with all necessary worldwide after sales service. Membrane-Solutions, your partner in high pure water and services.



## Available System Accessories

- > Polyethylene storage tanks
- > Float switches
- > Bladder tanks
- > Pressure/delivery pumps
- > Deionization (DI) post-filtration
- > Water softeners and carbon filters
- > Recirculation systems [includes germicidal lamp, cartridge or bag filter, and SS backpressure valve]

## Robinson High Purity Water System Details

S-Standard  
O-Optional

model	production(GPD@77°F feed water)	Membrane Qty	Motor HP	Inlet solenoid valve	Integral 5 micron sediment filter	Integral 1 micron sediment filter	Pre-treatment chemical injection pump	Pre-treatment chemical injection pump	voltage	Hertz	Pressure gauges (Qty)	Concentrate valve	Product/concentrate flow meters	Concentrate valve	Concentrate recycle w/flow meter	computer controller	TDS meter (single)	Stainless membrane housing(s)	Fiberglass membrane housing(s)	water-coated aluminum frame	Feed product/waste Connection sizes (inches)	Unit dimensions (inches)(L*W*H)	Unit weight(lbs)	Minimum feed pressure (psi)	Minimum feed(GPM)	Maximum TDS
Robinson-100	100	1	1/30 HP 25kw-h	S	S	S		O	110/220	50/60		S	S	O							1/4 1/4 1/4	4*15*20	33	35	1	500
Robinson-200	200	1	2/30 HP 50kw-h	S	S	S		O	110/220	50/60		S	S	O							1/4 1/4 1/4	5*15*25	40	35	1	500
Robinson-500	500	1	1/3 HP	S	S	S		O	110/220	50/60	4	S	S	O	O	O	S	O		O	3/8 3/8 3/8	8*15*25	45	35	1	1000
Robinson-1000	1000	2	1/2 HP	S	S	S		O	110/220	50/60	4	S	S	O	O	O	S	O		O	3/8 3/8 3/8	14*20*27	90	35	1.4	1000
Robinson-1500	1500	3	3/4 HP	S	S	S		O	110/220	50/60	5	S	S	O	O	O	S	O		O	3/8 3/8 3/8	15*20*27	100	35	2.5	1000
Robinson-2500	2500	4	3/4 HP	S	S	S		O	110/220/380	50/60	5	S	S	O	O	O	S	O		O	3/4 3/4 3/4	16*20*27	120	35	3.5	2000
Robinson-5000	5000	4	1.5 HP	S	S	S		O	110/220/380	50/60	6	S	S	O	O	O	S			O	3/4 3/4 3/4	27x33x54	250	35	6	2000
Robinson-10000	10000	6	3 HP	S	S	S	O	O	220/380	50/60	6	S	S	O	O	O	S			O	1 1 1	36x33x54	300	35	14	2000
Robinson-25000	25000	15	3-5 HP	S	S	S	O	O	220/380	50/60	6	S	S	O	O	O	S			O	1 1 1	50x33x54	420	35	30	2000

Nominal NaCl% rejection: 98.5% • Minimum NaCl% rejection: 96% • Maximum hardness: 5 GPG • pH range: 3-11 • Max. feed water temp: 105°F  
\*Details subject to change without notice  
\*\*Larger systems available up to 250,000 GPD  
Other Water production model are available upon request



## High Purity Water Applications

- > pharmaceutical
- > microelectronics
- > food and beverage
- > drinking
- > commercial
- > boat and ship
- > outsidess
- > laboratories

## To get started, please call or email us with the following information

- > Application (name, details)
- > Required water purity levels (TDS, conductivity, or resistivity)
- > Required delivery system peak flow rates (GPM) and pressure (psi)
- > Gallons per day (GPD) high purity water required (+ hours of usage per day)
- > Incoming (raw) water temperature (°F)
- > Incoming (raw) water quality (TDS level, GPG hardness, etc.)
- > Options required (packaged skid system, recirculation system, TDS/conductivity monitoring, computer controller, concentrate recycle, etc.)