ShenZhen Troy Intelligent Trading LTD.

[部分生产加工设备]

Some production processing equipment

我们在不断引进国内外先进设备及生产工艺的同时，更注重生产过程的科学管理。公司经常对员工进行严格的岗位培训，以保证员工能胜任各自的工作并满足不同生产工艺的要求，整个生产流程都接受实验室测试及质检部门的监控。

We are keeping introducing into the foreign advanced technology and emphasizing more on the scientific management of production process. Our staff get trained frequently to ensure that they can be competent for different requests of manufacturing techniques. The production process will be is monitored by our lab and the quality supervision department.











■ 公司援助雅安地震灾区的水处理设备

[工欲善其事　必先利其器]

If we want to do something well,we must use the good equipment.

我们拥有先进的生产设备及生产工艺，基本实现了企业生产的计算机化。计算机技术已广泛应用于产品设计、开发、生产及销售管理等领域，公司配备有国内最先进的手动、自动焊接机、施压机、折弯机、剪板机、卷板机、切割机及数控加工设备。先进的装备和工艺为产品质量提供了可靠保证，并可根据客户需求进行产品的设计、开发及制造。

We possess advanced equipments and manufacturing techniques, basically realize the computerization of producing. The advanced equipments and techniques has guaranteed qualities of our products.



02

检测完善　品质保证

IMORPVE THE QUALITY ASSURANCE TESTING.

公司引进大量先进的检测设备，并建立起完善的产品质量检测体系，为员工树立了一流的质量管理理念，并对员工进行定期的技术培训，以保证公司生产的每一件产品都具有优良品质。

The company has introduced into many advanced equipments, and has established perfect product supervision system. The quality management thought and cultivation for the staff has guaranteed product qualities.

[水质量检测实验室]

Water Qaulity Testing Lab



技术人员对客户提供水质进行检验



离子色谱仪



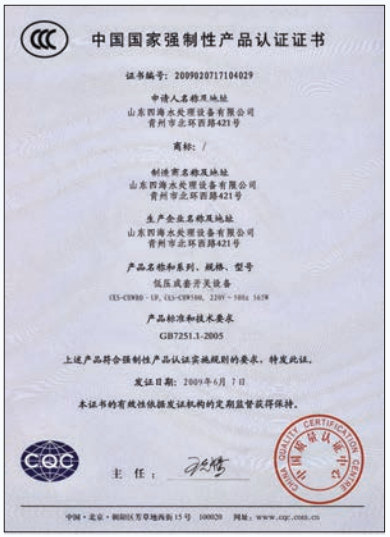
水质监测室一角



化验室操作台



原子吸收分光光度计



CCC产品认证证书



特种设备制造许可证



CE认证证书



中国资源综合利用发电协会理事单位



3A级信用企业



守合同重信用企业



中国膜工业协会理事证书



中国锅炉水处理协会证书



涉水批件(一)



涉水批件(二)

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[反渗透原理]
Principle of Reverse Osmosis

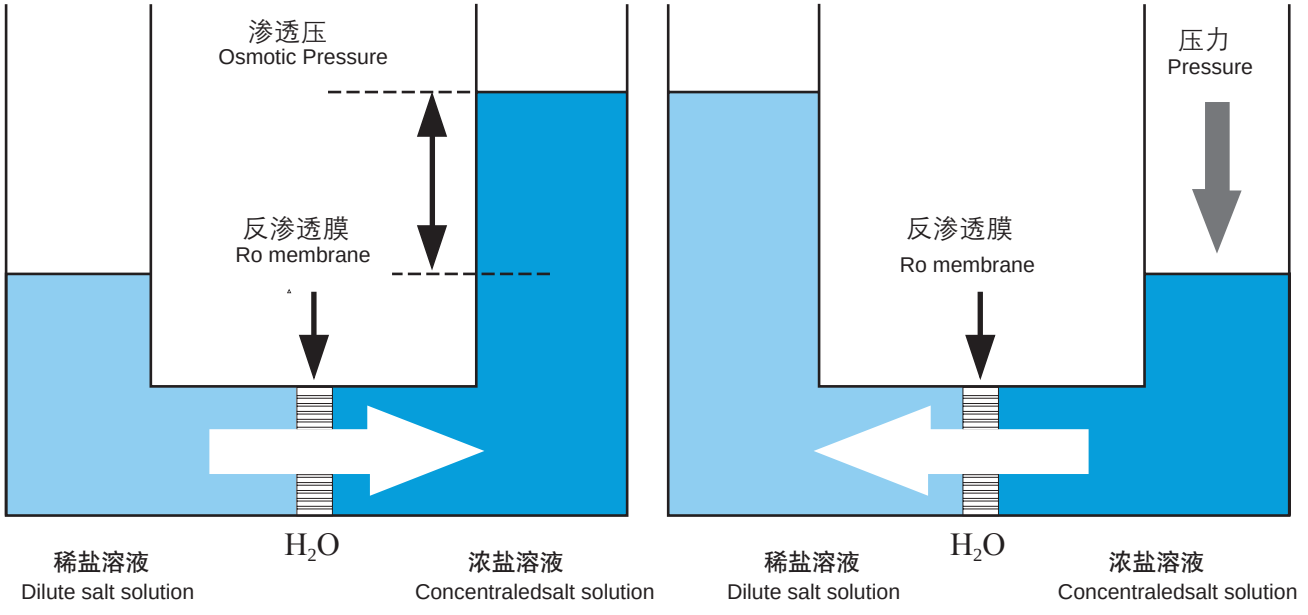
RO（Reverse Osmosis）反渗透技术是利用压力差为动力的膜分离过滤技术，源于美国二十世纪六十年代宇航科技的研究，后逐渐转化为民用，目前已广泛运用于科研、医药、食品、饮料、化工、电力、电子、造纸等领域。

RO反渗透膜孔径小至纳米级（1纳米=10^{-9}米），在一定的压力下，H_2O分子可以通过RO膜，而源水中的无机盐、重金属离子、有机物、胶体、细菌、病毒等杂质无法通过RO膜，从而使可以透过的纯水和无法透过的浓缩水严格区分开来。

RO technology is the use of differential pressure driven membrane filtration technology, which was first used on aerospace technology research in the United States in 1960S. Then it was gradually converted to civilian use, which has been widely used in scientific research, medical treatment, foods and beverages, chemical industry, electricity, electronics, paper industry and other fields.

The pore size of RO reverse osmosis membrane is only nano-scale (1 nanometer = 10^{-9} m). Under a certain pressure, H_2O molecules can go through the RO membrane, while the source of water, inorganic salts, heavy metal ions, organic matter, colloid, bacteria, viruses and other impurities can not pass RO membrane, thus we can separate from the water.

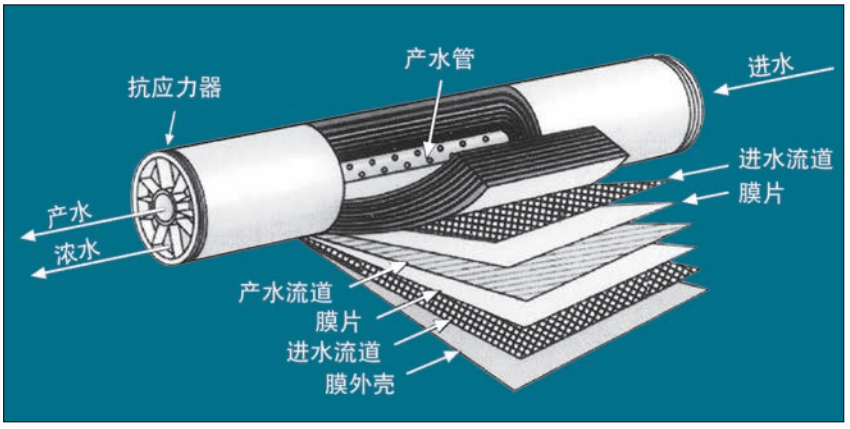
■ 反渗透原理图 Ro Principle



■ 反渗透膜元件



■ RO剖析图



■ 品牌反渗透膜元件的主要规格与性能

生产商 / 类别	技术内容			海德能	陶　氏	世　韩	汇通源泉
	操作压力 Psi(kg)	脱盐率%	产水量GPD (T/D)	相对应型号	相对应型号	相对应型号	相对应型号
极低压膜元件	100/7.0	99.2	11000(41.6)	LFC2-8040	XLE-440	RE8040-BLF	XLP12-8040
		99.2	2500(9.5)	LFC2-4040	XLE-4040	RE4040-BLF	XLP11-4040
超低压膜元件	150/10.5	99.3	12000(45.4)	ESPA1-8040	LE-440	RE8040-BLN	ULP22-8040
		99.6	9600(36.3)	ESPA2-8040	LE-365	RE8040-BLR	ULP21-8040
		99.2	10500(39.7)	ESPA4-8040	LE-400		ULP32-8040
		99.6	1900(7.2)	ESPA2-4040	LE-4040	RE4040-BLR	ULP31-4040
低压膜元件	225/15.5	99.7	10000(37.9)	CPA2-8040	BW30-400IG	RE8040-BN	LP21-8040
		99.7	11000(41.6)	CPA3-8040	BW30-400i	RE8040-BE	LP22-8040
		99.7	2400(9.1)	CPA2-4040	BW30-4040	RE4040-BE	LP21-4040
低污染膜元件	225/15.5	99.5	11000(41.6)	LFC1-8040	BW30-400-FR	RE8040-FE	FR12-8040
		99.5	10500(39.7)	LFC3-8040	BW30-365-FR	RE8040-FN	FR11-8040
		99.5	2200(8.3)	LFC3-4040		RE4040-FE	FR11-4040
海水淡化膜元件	800/55.2	99.7	5000(18.9)	SWC4+	SW30HRLE-400	RE8040-SH	SW21-8040
		99.7	6000(22.7)	SWC3+		RE8040-SR	SW22-8040
		99.5	1200(4.5)	SWC2-4040	SW30-4040	RE4040-SR	SW21-4040

反渗透膜元件对等型号的检测脱盐率和产水量基本相同、安装使用方法相同、外型及接口尺寸相同、内部结构、使用条件基本相同。因此，无论选择哪种品牌的膜元件，对新RO系统使用和已有RO系统膜元件的更换都非常方便。

[单级反渗透系统]
Single-pass reversae osmosis system

设备原理

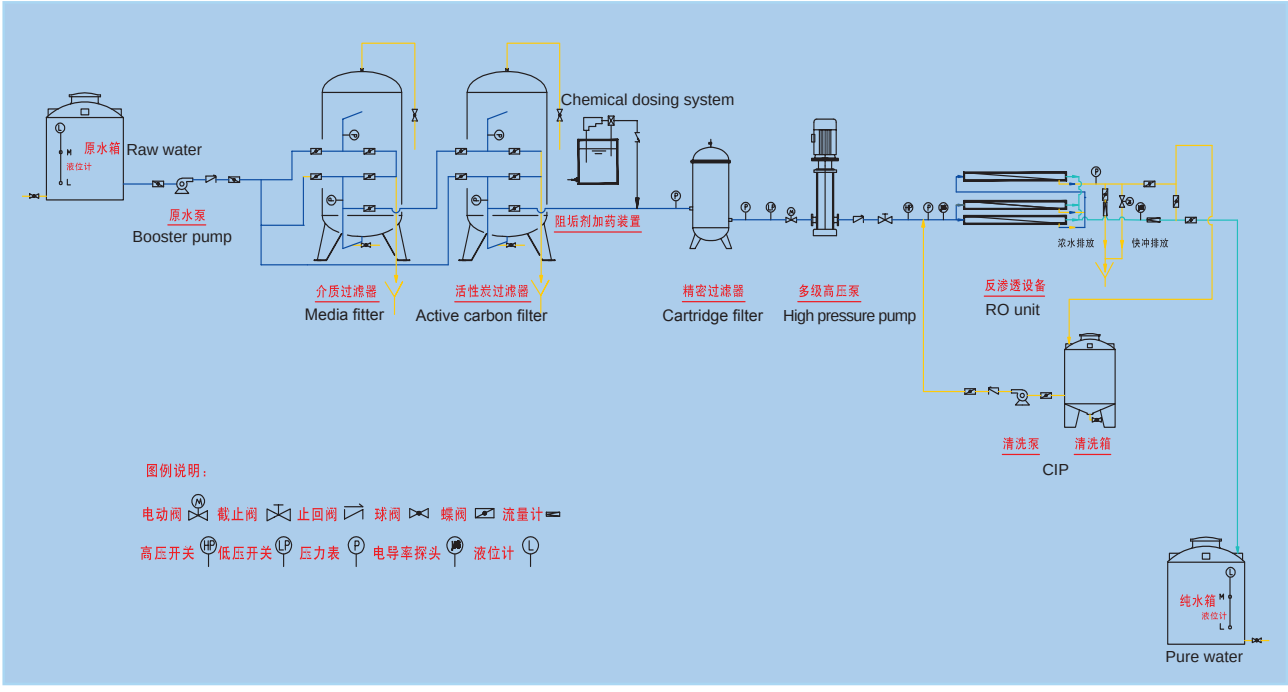
当纯水和盐水被理想半透膜隔开，理想半透膜只允许水通过而阻止盐通过，此时膜纯水侧的水会自发地通过半透膜流入盐水一侧，这种现象称为渗透，若在膜的盐水侧施加压力，那么水的自发流动将受到抑制而减慢，当施加的压力达到某一数值时，水通过膜的净流量等于零，这个压力称为渗透压力，当施加在膜盐水侧的压力大于渗透压力时，水的流向就会逆转，此时，盐水中的水将流入纯水侧，上述现象就是水的反渗透（RO）处理的基本原理。

Principles of Equipments

When the pure water and salt water are separated by the ideal semi-permeable membrane, the ideal semi-permeable membrane allows only water to pass but prevent the passage of salt. We call this phenomenon as penetration. If the salt water side of the membrane to exert pressure, then the spontaneous flow of water will be inhibited and slowed down, when the pressure reaches a certain value, the net flow of water through the membrane is equal to zero, the pressure is called osmotic pressure. When the exert pressure of saline side is greater than osmotic pressure, then the water flow will be reversed, thus saline water will flow to the water side. The above-mentioned phenomenon is the reverse osmosis basic principles.

工艺流程图 单级反渗透脱盐率为98%

Single-pass Ro system desalination rale≥98%



系统组成

一般包括预处理系统、反渗透装置、后处理系统、清洗系统和电气控制系统等。

预处理系统一般包括原水泵、加药装置、石英砂过滤器、活性炭过滤器、精密过滤器等。其主要作用是降低原水的污染指数和余氯等其他杂质，达到反渗透的进水要求。预处理系统的设备配置应该根据原水的具体情况而定。

反渗透装置主要包括多级高压泵、反渗透膜元件、膜壳（压力容器）、支架等组成。其主要作用是去除水中的杂质，使出水满足使用要求。



3×60T/H单级反渗透 3×60T/Hsingle stage RO unit

System components

Typically the whole system contains pretreatment systems, reverse osmosis devices, post-treatment systems, cleaning systems, and electrical control systems.

Pretreatment system generally contains pumps, chemical dosing devices, quartz sand filter, activated carbon filter, and precision filter and so on. Its main role is to reduce the raw water pollution index and residual chlorine in order to achieve the reverse osmosis input water requirements. Device configuration of the pretreatment system should be based on the specific circumstances of raw water.

Reverse osmosis unit includes multi-stage high-pressure pump, reverse osmosis membrane element, membrane shell (pressure vessel), frame etc. Its main role is to remove impurities in the water.



2×20T/H单级反渗透 2×20T/Hsingle stage RO unit



2×50T/H单级反渗透 2×50T/Hsingle stage RO unit



300T/H单级反渗透 300T/Hsingle stage RO unit

[双级反渗透系统]

Two-stage reverse osmosis system

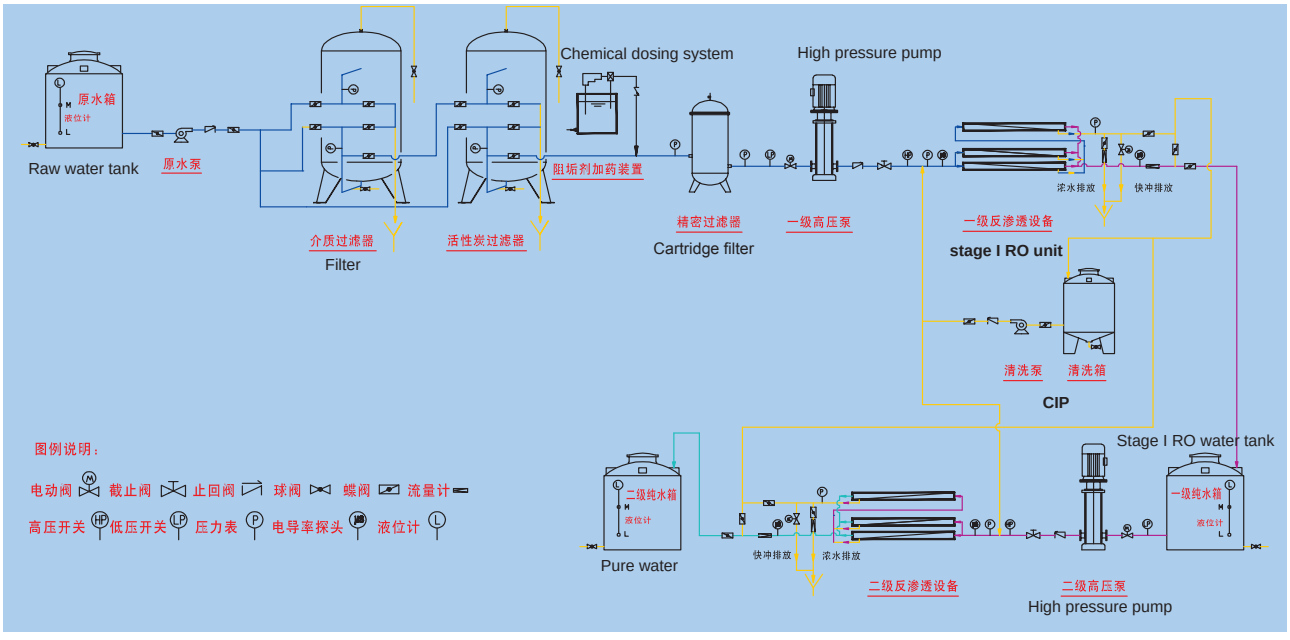
■ 应用范围

太空水、纯净水、蒸馏水等制备；酒水勾兑；医药、电子等行业用水的前期制备；化工工艺的浓缩、分离、提纯及配水制备；锅炉补给水的除盐；苦咸水淡化；造纸、电镀、印染等行业用水。

■ Applications

Production of space water, purified water, distilled water, etc.;wine blending; pre-preparation of water used in medical treatment, electronics and other industries; water brackish in chemical process of concentration, separation, purification and distribution ; boiler feed water, soft water desalination; bitter water desalination; electroplating, printing and dyeing industries.

■ 工艺流程图 双级反渗透出水水质为电导率≤10 μ s/cm





■ 12T/H双级反渗透 12T/Hdouble stage RO unit



■ 60T/H双级反渗透主机 60T/Hdouble stage RO unit

反渗透的优点

1、连续运行，产品水水质稳定

2、无须用酸碱再生

3、不会因再生而停机

4、节省了反冲和清洗用水

5、以高产率产生超纯水（产率可以高达95%）

6、无再生污水，不须污水处理设施

7、无须酸碱储备和酸碱稀释运送设施

8、减小车间建筑面积

9、使用安全可靠，避免工人接触酸碱

10、减低运行及维修成本

11、安装简单、安装费用低廉

The advantages of reverse osmosis

1. Operates continuously and the production water quality is stable.

2. No need to use acid-alkali to regenerate.

3. Stop operation because of regeneration.

4. Save the backwash and the clean water used.

5. High production rate (Production rate can reach 95%).

6. Non-regeneration sewage ,the sewage treatment facility.

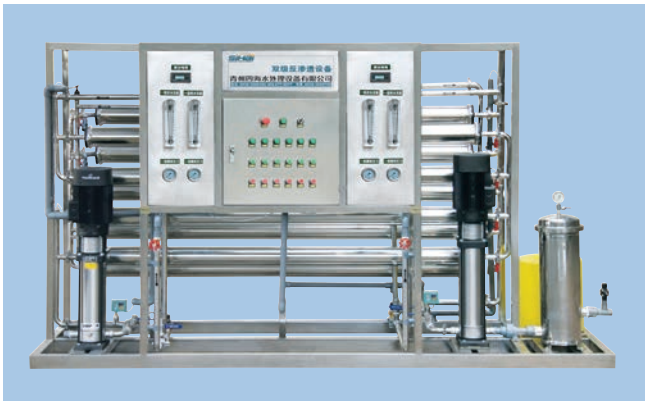
7. Not need the acid-alkali reserve and the acid-alkali dilution delivery equipments.

8. Reduce the building area of workshop.

9. Uses safely and reliably, avoids the worker contacting acid and alkali.

10. Decreases the running and maintenance cost.

11. Install simply low installation costs.



2T/H双级反渗透主机 2T/Hdouble stage RO unit



60T/H双级反渗透设备 60T/H double stage RO unit

[超滤系统]
Ultra-filtration system

■ 简介

超滤是以压力为推动力的膜分离技术之一。以大分子与小分子分离为目的，膜孔径在20－1000A°之间。中空纤维超滤器（膜）具有单位溶器内充填密度高，占地面积小等优点。

在超滤过程中，水溶液在压力推动下，流经膜表面，小于膜孔的溶剂（水）及小分子溶质透水膜，成为净化液（滤清液），比膜孔大的溶质及溶质集团被截留，随水流排出，成为溶缩液。超滤过程为动态过滤，分离是在流动状态下完成的。溶质仅在膜表面有限沉积，超滤速率衰减到一定程度而趋于平衡，且通过清洗可以恢复。

■ 原理

超滤是一种加压膜分离技术，即在一定的压力下，使小分子溶质和溶剂穿过一定孔径的特制的薄膜，而使大分子溶质不能透过，留在膜的一边，从而使大分子物质得到了部分的纯化。

■ 优缺点

超滤技术的优点是操作简便，成本低廉，不需增加任何化学试剂，尤其是超滤技术的实验条件温和，与蒸发、冷冻干燥相比没有相的变化，而且不引起温度、pH的变化，因而可以防止生物大分子的变性、失活和自溶。在生物大分子的制备技术中，超滤主要用于生物大分子的脱盐、脱水和浓缩等。超滤法也有一定的局限性，它不能直接得到干粉制剂。对于蛋白质溶液，一般只能得到10～50%的浓度。

■ Introduction

Ultra-filtration is a pressure-driven membrane separation technology. The aim of the technology is to separate macromolecules and small molecules whose membrane pore size is between 20-1000A°. Hollow Fiber Ultra-filter (membrane) has the advantages of high density and compact structure.

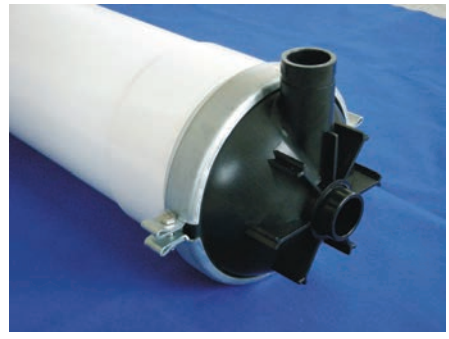
In the ultra-filtration process, the water is driven by hydraulic pressure and flows through the membrane surface. The ultra-filtration process is a dynamic filtration; separation is accomplished in the mobilization state. Solute in the membrane surface is only a limited deposition, the ultra-filtration rate to a certain degree of attenuation tends to balance, and can be restored by cleaning.

■ Principles

UF(Ultra-filtration) is a separation technology of lamination, that means a certain pressure will keep the solute molecules at one side of the lamination, so that purify the material.



■ 中空纤维超滤膜剖面图



■ 中空纤维超滤膜外形图

■ Advantages and disadvantages

Ultra-filtration technology is easily to be applied and the cost is low. Meanwhile, it doesn't need any chemical reagents. the temperature and PH value of water cannot be changed. In the preparation of biological macromolecules, the UF is mainly used for the desalination of biological macromolecules, dehydration and enrichment. Ultra filtration also has limitations. It can not directly get dry powder formulations. For the protein solution, generally we can only get 10 ~ 50% concentrations.



30T/H全自动超滤设备 30T/Hfull-automatic UF unit



90T/H全自动超滤设备 90T/Hfull-automatic UF unit



450T/H超滤系统 450T/H UF unit

[超纯水系统]
Ultra-pure water system

（一）混床系统 Mixed Bed System

■ 离子交换混床

混床是混合离子交换柱的简称，是针对离子交换技术所设计的设备。所谓混床，就是把一定比例的阳、阴离子交换树脂混合装填于同一交换装置中，对流体中的离子进行交换、脱除。由于阳树脂的比重比阴树脂大，所以在混床内阴树脂在上阳树脂在下。一般阳、阴树脂装填的比例为1:2，也有装填比例为1:1.5的，可按不同树脂酌情考虑选择。混床也分为体内同步再生式混床和体外再生式混床。同步再生式混床在运行及整个再生过程均在混床内进行，再生时树脂不移出设备以外，且阳、阴树脂同时再生，因此所需附属设备少，操作简便。具有以下优点：



■ 自动混床设备 mixed bed unit

(1) 出水水质优良，出水pH值接近中性。

(2) 出水水质稳定，短时间运行条件变化（如进水水质或成分、运行流速等）对混床出水水质影响不大。

(3) 间断运行对出水水质的影响小，恢复到停运前水质所需的时间比较短。

■ Mixed bed system

Mixed is short for ion exchange column, it mixes proportional cation resin and anion resin into exchange column, to exchange and remove the ions in flow. As cation resin's specific gravity is bigger than anion resin's, so inside column cation resin is under anion resin, capacity of cation and anion resin is 1:2 or 1:1.5. Mixed bed system includes inside regeneration and outside regeneration, inside generation mixed bed means generation process happening inside column, cation and anion resin regeneration at same time. So it needs less accessory equipments and operations easily.

Some other advantages are:

(1) Output water quality very good, PH almost neutral.

(2) Output water quality stable, change very little while running conditions change

(3)Only needs few time to get normal output water after a break



■ 10T/H混床 10T/H mixed bed unit

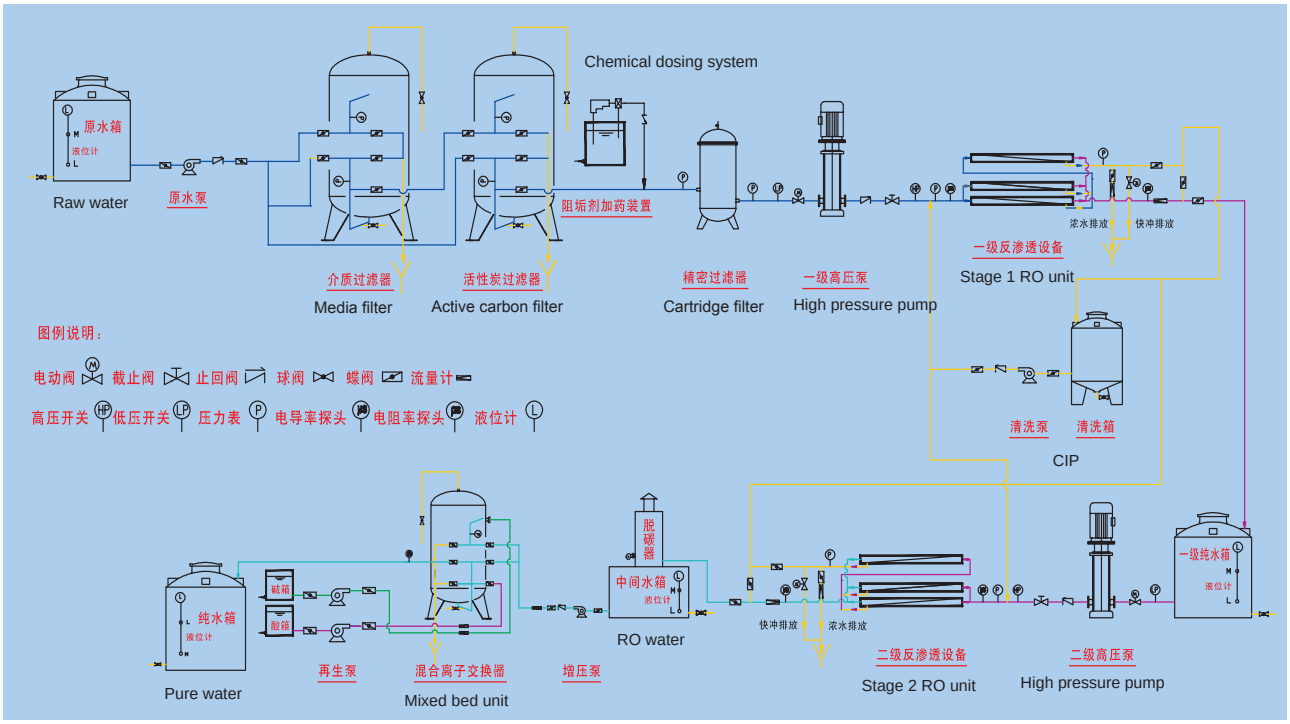


■ 80T/H混床 80T/H mixed bed unit

■ **双级RO＋混床**：出水水质电阻率达到15MΩ · cm

Double stage RO+ bed:output water resistirity reaches 15MΩ.com

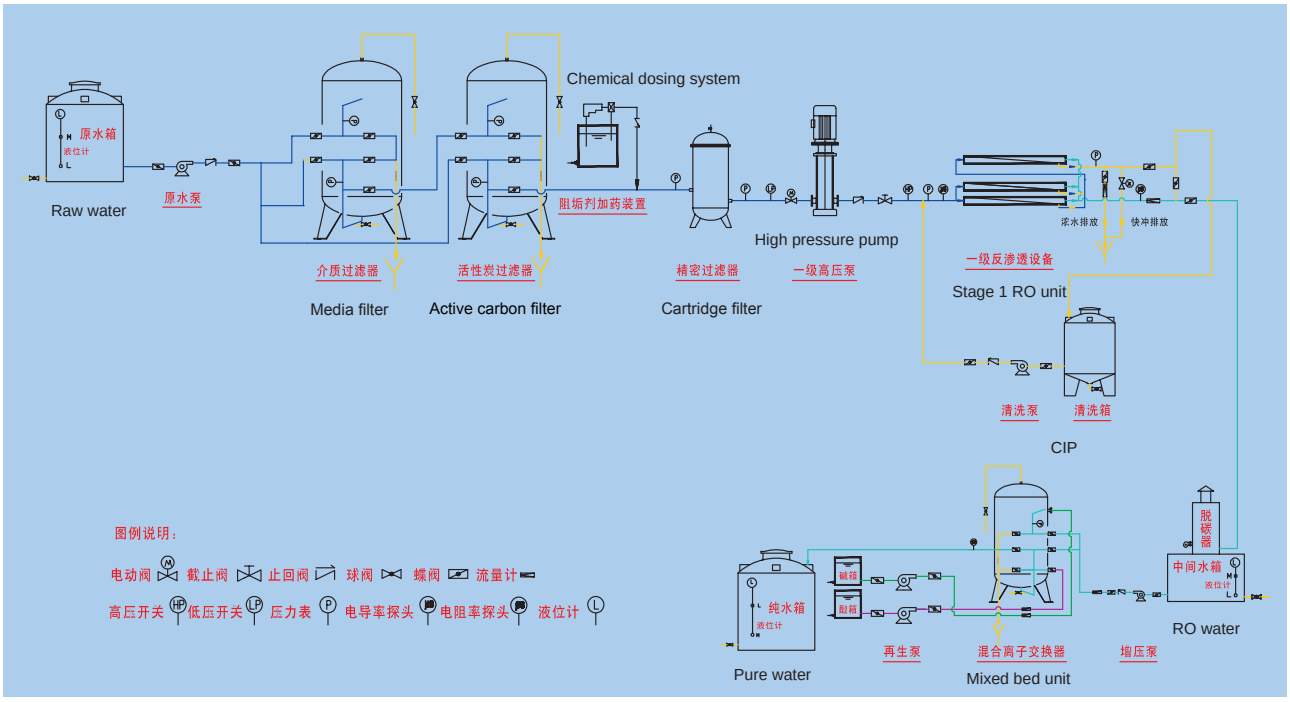
■ 工艺流程图



■ **单级RO＋混床**： 出水水质电阻率达到10MΩ · cm

Single stage RO+ bed:out put water resistirity reaches 10MΩ.com

■ 工艺流程图



[超纯水系统]
Ultra-pure water system

（二）EDI系统 EDI System

■ EDI技术 EDI（Electrodeionization）技术是将电渗析技术和离子交换技术相融合，通过阴、阳离子交换膜对阴、阳离子的选择性透过作用与离子交换树脂对离子的交换作用，在直流电场的作用下实现离子的定向迁移，从而完成水的深度除盐，同时水电离解产生的氢离子和氢氧根离子对离子交换树脂进行再生，因此不需酸碱化学再生而能连续制取超纯水。

■ EDI工作原理

1、RO产水进入EDI模块后被均匀地分配到淡水室中。

2、RO膜未脱除的微量离子被淡水室中的离子交换树脂吸附在膜表面。

3、直流电加在EDI模块的两端电极，驱动淡水室中的阴阳离子向相应电极迁移至浓水室，从而制取高纯水。

4、在电场作用下，水分子被大量电离成H^+和OH^-，从而连续地对离子交换树脂进行再生。

■ EDI Technology

With anion cation ionexchange membrane,ion exchange resin,and DC electric to implement ions directed migration.thus completing water desalination. meanwhile resion regenerate with H^+ and OH^- from electrolysed water,so no chemical is needed.

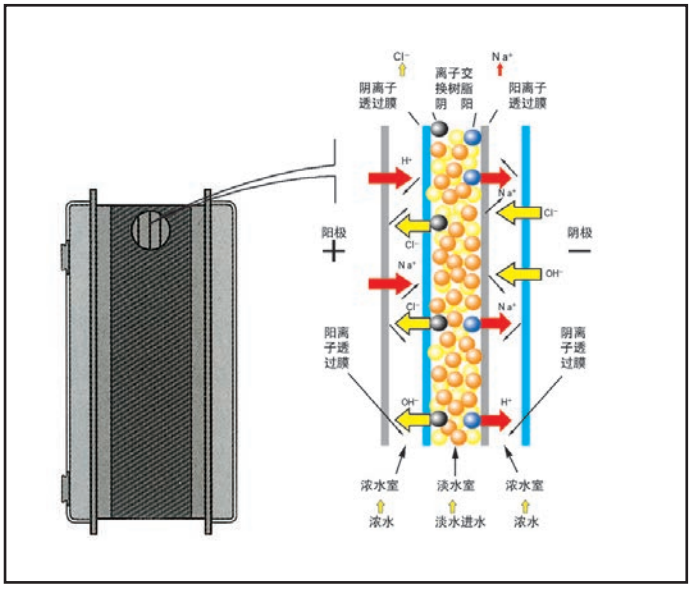
■ How EDI works

1. Evenly assignwater to the freshwater room, RO enters the EDI module.

2. The trace ions with RO membrane are adsorbed on the membrane surface.

3. DC is added to the EDI module at both ends of electrodes to drive the fresh water chamber of the cation-anion to the corresponding electrode moving to the dense water chamber.Then the water with high purity is obtained.

4. Driven by the effects of electric field, a large number of water molecules are ionized into H^+ and OH^-, thus regeneration can be continuously kept.



■ EDI进水条件

水　源：反渗透RO产水
电导率：≤20μS/cm
最佳电导率：2–10μS/cm
最大电导率：≤50μS/cm
PH值：6–8
温度：5℃–38℃
进水压力：0.2–0.6MPa
硬度：小于0.5ppm，（以$CaCO_3$计）
硅：小于0.5ppm，（以SiO_2计）

■ EDI water conditions

Water Source: RO water

Conductivity:≤20μS/cm
Best conductivity: 2-10μS/cm
Maximum Conductivity:≤50μS/cm
PH Value: 6-8
Temperature: 5 -38
Inlet Pressure: 0.2-0.6MPa
Hardness: less than 0.5ppm, (by $CaCO_3$)
Si: less than 0.5ppm, (by SiO_2)



■ EDI模块　EDI module



■ EDI实例　EDI unit

[抛光混床]
Polishing mixed bed

用于生产18.2MΩ·cm超纯水，一般与反渗透、离子交换器、EDI装置等配套使用，用水系统一般设计为循环管路，以使用水点保持新鲜、合格状态，避免死水出现，主要应用于电子、半导体、太阳能电池板等行业。

■ 双级RO+EDI：出水水质电阻率达到≥16MΩ·cm

■ 双级RO+EDI+抛光混床：出水水质电阻率达到18.2MΩ·cm

It produces ultra-pure water which resistivity is 18.2MΩ•cm. Usually works with RO, ion exchange column, EDI, circulation loop water system to keep water fresh and avoid dead water, widely used in electron, semiconductor and solar panel and other industry field.

■ Double pass RO + EDI: output water resistivity≥16MΩ•cm

■ Double pass RO+EDI+ polished mixed bed: output water quality resistivity reaches 18.2MΩ•cm

[软化水系统]
Soft water system

■ 软化水原理

离子交换树脂是一种聚合物，带有相应的功能基团。一般情况下，常规的钠离子交换树脂带有大量的钠离子。

当水中的钙镁离子含量高时，离子交换树脂可以释放出钠离子，功能基团与钙镁离子结合，这样水中的钙镁离子含量降低，水的硬度下降。硬水就变为软水，这是软化水设备的工作过程。

当树脂上的大量功能基团与钙镁离子结合后，树脂的软化能力下降，可以用氯化钠溶液流过树脂，此时溶液中的钠离子含量高，功能基团会释放出钙镁离子而与钠离子结合，这样树脂就恢复了交换能力，这个过程叫作“再生”。

由于实际工作的需要， 软化水设备的标准工作流程主要包括：

工作（有时叫做产水）、反洗、吸盐（再生）、慢冲洗（注水）、快冲洗五个过程。不同软化水设备的所有工序非常接近，只是由于实际工艺的不同或控制的需要，可能会有一些附加的流程。任何以钠离子交换为基础的软化水设备都是在这五个流程的基础上发展来的（其中，全自动软化水设备会增加盐水重注过程）。

■ Water softer system

Ion exchange resin is a polymer with relevant functional group. Plentiful Na ions will be released when Ca and Mg ions content in water is very high, functional groups combine with Ca and Mg ions, water hardness gets low while Ca and Mg ions content getting low. This is how softer system works.

Resin exchange ability gets down when functional groups combine with Ca and Mg ions, let NaCl solution flow through resins, function groups release Ca and Mg ions to combine with Na ions, resin exchange ability is recovered after this. This is called regeneration.

In practical use, water softer system working process are: Working(producing water), backwashing, regeneration, slow flushing, quick flushing.Additional process will be used according to need.



■ 单阀控制软水器 soft water unit

■ 软化水设备应用范围

工业锅炉补水及化工工艺用水。广泛应用于各种工业与民用软化水制备，如锅炉供水、供热空调系统补充水、纺织印染、造纸、洗衣、洗浴、食品加工、优质生活用水等各领域。

■ Water softer system application

Industrial boiler water and chemical industry water, aircondition system water, papermaking water, bathing water, etc.

■ 执行标准

GB1576-2001《工业锅炉水质》

GB/T18300-2001《自动控制钠离子交换器技术条件》

■ System standard

GB1576-2001《industrial boiler water quality》

GB/T18300-2001《automatic control Na-ion exchanger technical requirement》

（一）多阀软水器的介绍 Introduction of multi-valve water softener

SD多阀控制系统由一个信号分配器和一个时间／流量程序控制器构成，固定于防水控制器外壳内。信号分配器是一个旋转式导向阀，引导液体或气体信号源切换设备上各个隔膜阀的开闭，从而完成设备系统的自动控制。信号分配器阀芯由坚固耐腐，可自我润滑的材料制成，具有使用寿命长，无需维护的特点。

执行操作的阀门就选用国内外已经使用非常成熟的液动或气动隔膜阀，1.5″～6″均可，可配套使用ϕ600～ϕ3000罐体，这种阀门造价便宜，安装简便，维护方便，非专业人员即可完成检查、维修、更换等操作。



■ 多阀软水器 soft water system

SD valves control system is fixed in waterproof shell, consists a signal distributor and a time/flow controller. Signal distributor is a rotary type pilot valve, leads fluid or gas signal source to open and close diaphragm valves in equipments, thus automatic control system start.

Valves all are widely used surge or pneumatic diaphragm valve, 1.5″— 6″, match with φ600 — φ3000mm filter tanks. Low cost, easy installation and maintenance.

（二）弗莱克软水器的介绍 Introduction of FLECK water softener

由美国FLECK公司生产的控制阀，产品设计精巧，构造独特：

1、在工作状态时阀芯是唯一活动部件；

2、由活塞（Piston）、密封圈、分隔栅（Spacer）组成的核心部分水力力学性能优良，坚固且耐磨、耐腐蚀；

3、以黄铜为材料的阀芯表面牢固覆盖Teflon涂层；

4、阀体采用无铅黄铜或Noryl材料制造。



■ 美国弗莱克控制器

USA FLECK control valve, with elaborate design, is widely accepted.

1. Spool is the only moving parts while working.
2. Hard core with piston, seal ring, spacer,has good Hydraulic mechanical performance,solid, wearproof and corrosion-proof.
3. Brass spool covered with teflon coating
4. Unleaded brass or noryl valve body



■ 一用一备全自动软水器 1 use 1standbly



■ 美国弗莱克软水器 USA Fleck softener

■ 系统特点

1、自动化程度高，采用自动控制阀，自动完成软化及反洗等工作。

2、可靠性、耐用性强。罐体采用玻璃钢材质内衬耐腐蚀内胆，保证了设备的强度及耐腐蚀性。

3、可根据用户实际条件和要求，增设预处理设备和脱氧设备。

4、设备安装快捷，占地面积小，灵活方便

■ System advantage

1. High automaticity.full automatic control valve, autamaticlly complete soften and backwash process.
2. High reliability and durability. FRP filter body with corrosion proof liner, provide high strength and corrosion resistance.
3. Customized service.based on custumer needs, pre-treatment system and deoxygenation devices are supplied.
4. Easy installation and operation, less space cover.

[阴阳离子交换设备]
Anion and cation exchange equipment

■ 阴阳床介绍

所谓离子交换，就是水中的离子交换树脂上的离子，所进行的等电荷反应。离子交换的反应过程可以用 H 型阳离子交换树脂 HR 或 OH 型阴离子交换树脂 ROH 和水中的 Na^+ 或 Cl^- 交换反应过程为例：

$HR+Na^+ \longleftrightarrow NaR+H^+$

$ROH+ Cl^- \longleftrightarrow RCl+OH^-$

R 表示离子交换树脂的交换基团。从上式可知：在离子交换反应中，水中的阳离子（如 Na^+ 或 Cl^-）被转移到树脂上去了，而离子交换树脂上的一个可交换的 H^+ 或 OH^- 转入水中。Na^+ 或 Cl^- 从水中转移到树脂上的过程是离子的置换过程。而树脂上的 H^+ 或 OH^- 交换到水中的过程称为游离过程。因此，由于置换和游离过程的结果，使得 Na^+与H^+ 或Cl^-与OH^-互换位置，这一变化，就称为离子交换。



(1)



(2)

■ The introduction of the ion exchange column

Ion exchange is a kind of equal charge reaction which is the ion in the water to change the ion in the resin.the Ion exchange reaction process can be shown with the H type cation exchange resin HR or OH anion ion exchange resin ROH and Na + and Cl - exchange reaction process of the water, for example:

HR+Na+ ←→ NaR+H+

ROH+ Cl-←→ RCl+OH-

R said exchange groups of ion exchange resin. From above type shows: in the ion exchange reaction, the cationic (as Na + and Cl -) in the water were transferred to the resin, the commutative H + and OH - on the ion exchange resin is transferred into the water. Na + and Cl - transfer from water to the resin is the process of ion replacement . And the process which the H + and OH - on the resin transferred into the water named free process.Therefore, because the Replacement and free process,Na+ will change with H+ or Cl-will change with OH- this is the ion exchange.

阴、阳离子交换器是分别填装阴树脂和阳树脂的交换器。阳离子交换器用于去除正电荷离子（阳离子），阴树脂用于去除负电荷离子（阴离子）。

阳离子交换树脂是将H^+离子置换成阳离子，诸如钙、镁和钠离子；阴离子交换树脂是将OH^-离子置换成阴离子，诸如氯离子、硫酸根离子和重碳酸根离子，置换的H^+和OH^-合成形成水，去除水中的离子。

阴、阳离子交换器再生系统包括酸、碱储罐、酸碱溶解、酸碱计量和输送；酸碱储罐采用高位布置方式，利用卸酸碱泵将酸碱从运输车中卸入酸碱储罐中；由于采用高位布置方式，酸碱储罐中的酸碱利用自身重力流入酸碱计量箱中。



(3)



(4)

⑴ 脱碳器

⑵ 阴阳 离子交换设备

⑶ 酸碱储罐

⑷ 酸碱计量箱

(1) Decarburization device

(2) Anion and cation exchange column system

(3) Alkali and acid store tank

(4) Alkali and acid metering tank

The Anion and cation exchange column is a pressure vessel which inside filled with anion resin or cation resin separately. The cation exchange column is used for Removing positive charged ions (cation),and the anion resign is for removing the negatively charged ions (anion ion)

Anion and cation exchanger regeneration system include acid and alkali store tank, acid and alkali dissolving and acid and alkali measurement and transmission; Acid and alkali store tank adopts high layout method, which use the alkali pump unload the acid and alkali from the truck into the alkali and acid storage tank; since the high layout method ,acid and alkali will flow to the metering tank by itself because of it’s own gravity

[海水淡化技术及系统]
Sea water desalination technology

■ 海水淡化的定义

海水淡化即利用海水脱盐生产淡水。是实现水资源利用的开源增量技术，可以增加淡水总量，反渗透法且不受时空和气候影响，水质好、价格渐趋合理，可以保障沿海居民饮用水和工业锅炉补水等稳定供水。 从海水中取得淡水的过程谓海水淡化。 现在所用的海水淡化方法有海水冻结法、电渗析法、蒸馏法，目前应用反渗透膜的反渗透法以其设备简单、易于维护和设备模块化的优点迅速占领市场，逐步取代蒸馏法成为应用最广泛的方法。

■ Definition of sea water desalination

Sea water desalination is a technology and process to get pure water from sea water.Get fresh water or separate the salt from sea water ,could achieve the purpose of desalination . The method of getting fresh water from sea water including distillation way , freezing way ,reverse osmosis way , hydrate method and solvent extraction ; removing the salt from the sea water including electrodialysis method and ion exchange method .

■ 船用海水淡化设备

充分考虑客户的要求进行设计生产，根据船舶应用的特殊性而进行了专门的设计，其体积小、重量轻、占地省，安装方便、适应性强，可以在狭窄拥挤的船舱、甲板、船员舱、过道等空间安装。该设备操作简单维修方便，只要有海水、有电，启动后可立即提供淡水。设备脱盐率高，性能稳定、安全可靠，设计新颖巧妙，避免了频繁的清洗，无环境污染。其机架采用不锈钢制作，防锈耐腐蚀。电源适用范围广（220–380–415V／50HZ／60HZ／三相），能适应国内生产的大部分船舶。淡化水质符合国家生活饮用水水质标准。



■ 船舶用海水淡化设备 Marine seawater desalination unit

Marine seawater desalination equipment

We design according to the customer requirement and the special application of the shippings.Its small volume, light weight, save space, easy installation, strong adaptability, can be installed in the narrow crowded ship cabin and deck, the crew compartment, corridor space. The equipment operation is simple and convenient maintenance, as long as there is water, electricity, can provide fresh water immediately after start. The Equipment with a high desalination rate, stable performance,the design is novel and clever, it could avoid the frequent cleaning and no environmental pollution. The frame made of stainless steel which anti rust and corrosion. Power applicability is wide (220-380-415 - v / 50 hz or 60 hz/three-phase), this desalination system could be used for most of the shippings and its water production quality meet the national drinking water standards.



工业用海水淡化设备
Industrial seawater desalination unit

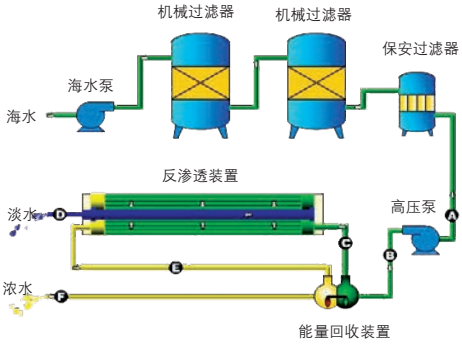
反渗透

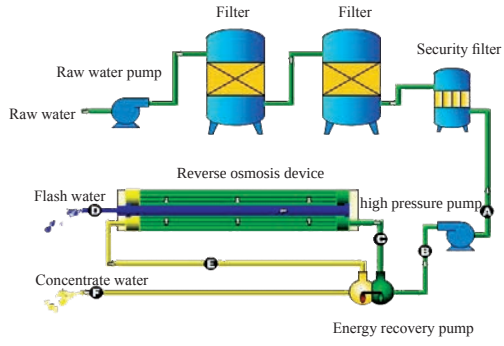
反渗透淡化工艺中，只能由水分子和少量离子能够穿过反渗透膜，而且其他离子和杂质将被截留下来，并随着水分的减少而被浓缩。这种方法由于没有相变而十分节能。反渗透膜的孔径 ＜ 10×10−10 m，它同时能滤除各种细菌、病毒和热源和其他污染物，获得高质量的纯水。盐分和其他杂质低的情况下生产成本低。

Reverse osmosis

In the reverse osmosis desalination process, reverse osmosis membrane only allowed water molecules and a small amount of ions could pass through and other ions and impurities will be intercept down, and is concentrated with the reduce of water. This method since no phase change and save energy. Reverse osmosis membrane aperture < 10 x 10-10 m, it can filter out all sorts of bacteria, viruses, and source of heat and other pollutants at the same time and get high quality pure water. The will save cost if the Salt and other impurities low.

反渗透流程演示





大型海水淡化

大中型海水淡化适用于海岛、驻地及沿海缺水城市。能够有效地去除海水中的无机盐、重金属离子、有机物细菌及病菌等有害成分，将海水淡化为符合国家生活饮用水标准的优质水。



Large-scale seawater desalination system

It's widely used in island and encampment in the sea, water shortage city near the sea. This system can remove inorganic salt, heavy metal ions, organic compound bacteria and germ etc, get qualified drinking water from sea water that meeting national drinking water standard.

集装箱式海水淡化设备系统

集装箱式海水淡化系统装配针对淡水缺乏的海岛居民生活用水或旅游业的季节性淡水供应，以及偏远地区或紧急情况下的淡水要求。在短时间内能够快速组织生产供货、投资少、见效快。系统组成主要有：配电控制柜、加药系统、预处理、反渗透膜组件、反洗系统等。

Containerized seawater desalination system

It's designed for island residents' domestic water, or seasonal fresh water supply for tourism, or remote area or emergence fresh water needs. It can be assembled and supplied in short time, little cost and much effective performance. It consists electric control cabinet, chemical dosing system, pre-treatment system and RO membrane module, backwashing system.



■ 能量回收装置

能量回收装置是反渗透海水淡化系统的关键装置之一，对大幅降低系统运行能耗和造水成本至关重要。我国已建成投产或正在兴建的反渗透海水淡化工程绝大部分都采用从国外进口的能量回收装置，价格十分昂贵，约占工程总投资的10～15%。能量回收装置是反渗透海水淡化产业链中的重要环节，也是我国目前发展反渗透海水淡化产业迫切需要攻克的关键部件之一，开发出具有自主知识产权的国产能量回收装置，逐步打破国外产品的垄断，形成完整的国产反渗透海水淡化产业链，已成为我国反渗透海水淡化产业发展的关键。

■ Energy Recovery Unit



Energy recovery unit is one of the key device of seawter desalination RO systems and significantly reduce the energy consumption of system operation and the cost of water production . Most of the Energy Recovery Unit of the RO desalination projects which China has put into operation and under construction are imported from abroad, the price is very expensive, and corers 10% to 15% of project total investment . Energy Recovery Unit is an important link in the chain of RO desalination industry, and also one of the key components which need to be conquered for developing RO desalination industry currently . To master domestic energy recovery unit with independent intellectual property rights , gradually breaking down the foreign products monopoly and form a complete domestic industrial chain of RO desalination has become the key to the development of our RO desalination industry.

■ 海水淡化常用工艺

Desalination process in common use

反渗透 Reverse osmosis

多效蒸馏 Multi-effect distillation

多级闪蒸 Multi-stage flash



■ 热法海水淡化设备 Thermal method seawater desalination unit

[无机碳膜设备]
Inorganic carbon membrane unit



■ 延长油矿工程现场 Oilfield project site



■ 恒天然牧场工程现场 Fonterra pasture project site

■ 设备介绍

无机炭膜技术已经在油田石化、钢铁、化工、食品加工等领域得到应用。它所拥有的高通量，强亲水性，高抗污染能力，高度集成性等优异性能，使其更加适合用于含油污水、中水回用等苛刻条件和环境下的应用，替代传统陶瓷膜、金属膜和有机膜，在油田回注水精细过滤处理、油田采出水资源化膜法回用处理、石化污水中水回用、废水回用、循环水精处理等领域，无机炭膜将具有广泛的应用前景。

■ Equipment introduction

The inorganic carbon membrane technology has been applied in the petrochemical oil field , iron and steel, chemicals, food processing, and other areas. The Excellent performance including high-throughput, highl hydrophilic, high contamination resistance, high integration level and so on, this has made it more suitable for oily wastewater, water reuse and other applications under harsh conditions It is an alternative to traditional ceramic membrane, the metal membrane and the organic membrane; inorganic carbon membrane will have broad application prospects in the oil field for injection water fine filtration treatment, reusing of oilfield produced water with membrane treatment, petrochemical sewage water reuse, wastewater reuse, circulating water fine treatment and other fields.

[陶瓷膜过滤器]
Inorganic ceramic membrane filter

■ 无机陶瓷膜

无机陶瓷膜是以氧化铝、氧化钛、氧化锆等经高压、高温烧结而成的具有多孔结构的精密陶瓷过滤材料，且有多孔支撑层、过渡层及微孔膜层呈非对称分布特点，过滤精度达到微滤、超滤甚至纳滤。



■ Inorganic ceramic membrane

Inorganic ceramic membrane is kind of precision ceramic filter materials which is formed from sintering with alumina, titania, zirconia, etc with high pressure, high temperature; having a porous structure and a porous support layer, the buffer layer and the microporous film with a non-symmetrical distribution characteristics. The filter accuracy could reach micro-filtration, ultrafiltration even nanofiltration.

■ 陶瓷膜具的优势

陶瓷膜具有分离效率高、效果稳定、化学稳定性好、耐酸碱、耐有机溶剂、耐菌、耐高温、抗污染、机械强度高、膜再生性能好、分离过程简单、能耗低、操作维护简便、膜使用寿命长等众多优势。

陶瓷膜设备已经成功应用于食品、饮料、植（药）物深加工、生物医药、发酵、精细化工等众多领域，可用于工艺过程中的分离、澄清、纯化、浓缩、除菌、除盐等。

■ The advantage of the Ceramic membrane

The advantages of Ceramic membrane : high separation efficiency, stable effectiveness , good chemical stability, acid and alkali resistance, organic solvent-resistant and bacteria-resistant , high temperature resistant, anti-pollution, high mechanical strength, good performance of membrane regeneration, the separation process is simple, low energy consumption, simple operation and maintain, ance membrane-long service life and many other advantages.



[盘式过滤器] Disc filter

■ 产品特点

1、精确过滤：可根据用水要求选择不同精度的过滤盘，有20μ、50μ、100μ、130μ、200μ多种规格。

2、高效反洗： 高速和彻底的反洗，只在20秒左右即可完成。全自动运行，连续出水：在过滤器组套内，反洗过程轮流交替进行，工作、反洗状态之间，自动切换，可确保连续出水。系统压损小。

3、标准：标准模块系统设计，用户可按需取舍，灵活可变，互换性强。

4、非标准：可灵活利用边角空间，因地制宜安装，占地很少。

5、运行可靠维护简单：几乎不需日常维护，部件100%经工厂检测和试运转，不需专用工具，备品备件少。

6、使用寿命长：高科技塑料过滤芯坚固、无磨损、无腐蚀，经多年工业实用验证，过滤和反洗效果不会随使用时间而变差。

■ Unit advantage

1. Filter precision: choose proper discs according to water application, 20μ, 50μ,100μ, and 200μ discs are provided.

2. Backwash: high efficient backwash, only needs 20seconds. Automatically change between backwash and filtration, output water continuously.

3. Standardization: standardize unit pods and system design, different precision discs are exchangeable.

4. Meanwhile, customized installation, cover minimum space.

5. Maintenance: all parts are 100% tested by factory, barely need daily maintenance and specialized tools, prepare very few spare parts.

6. Service life: stable, non-wear, non-corrosive plastic discs provide a long service life, filtration and backwash are not affected by time flies. Approved by long time use.

■ 应用范围

1、原水：地表水、地下水的机械杂质、藻类、菌类、有机物过滤。

2、市政：原水过滤；污水排放达标过滤；公园、绿化喷泉水过滤。

3、发电厂：汽轮机冷却水过滤，冷却水全滤和旁滤

4、农业：喷灌、滴灌水过滤。

5、反渗透/超纯水：预处理、膜保护、树脂捕捉器。

6、冶金/石化/矿业/医药/制浆/造纸/中央空调：循环水全滤、旁滤；工艺用水。

7、高含盐水过滤：苦咸水、海水、盐水过滤。



■ Unit application

1. Raw water filtration: filtrate mechanical impurities, algae, bacteria in surface and ground water

2. Municipal water : filtrate waste water to meet discharge standard; fountain water, etc.

3. Power station water: steam turbine cooling water filtration

4. Agriculture: spray and trickle water filtration

5. RO system: work as pre-treatment unit.Besides, it's also widely used to filtrate circulating water in metallurgy, petrochemical industry, mining, Papermaking and center air-condition system and other fields.

[移动式应急设备]
Mobile drinking water equipment

■ 移动式应急饮用水设备

移动式供水设备由设备及其运输工具所组成。车板上装有消毒设备和膜过滤设备。移动式供水设备可以在运输车所能到达的江河湖泊甚至水塘、地表水（包括在核、生物和化学武器作战下受污染的水源）进行水处理，还可淡化苦咸水和海水。

可将河水抽入饮水设备，片刻后就变得透明澄净，并且可以直接饮用。净水车载式应急饮水设备占地面积小，方便移动。利用自身配备柴油发电机发电便可从河中、湖水抽水、过滤、净化、杀菌，应急情况下，可以满足一个村落的饮水。



■ Mobile drinking water equipment

Mobile water supply system consists purifier units and transport device; Car board equipped with disinfection unit and membrane filtration equipment. Mobile water supply equipment can deal rivers and lakes or reservoirs, surface water (including contaminated water sources in the nuclear, biological and chemical warfare) , it can also be used for purifying brackish water and seawater.

已申请专利



The river water is pumped into the purifier, and for a moment pure drinking water is ready . This mobile purifier equipment covers small area and easy to move . Equiped with generator,it can work without electric suppiy, the Mobile purifier could meet the drinking water demands for a whole village in emergenly.

[工程实例]
Project cases



①山东奥隆炭黑100T／H反渗透

②潍坊特钢集团100T／H反渗透设备

①Shandong Aolong Tanhei Co.,Ltd 100T/H Reverse Osmosis Equipment

②Weifang Tegang 100T/ H Reverse Osmosis Equipment



[工程实例]
Project cases



①潍坊弘润石化100T／H单级设备一角

②山东香驰健源130T／H反渗透设备

③山东奥隆炭黑60T／H+混床脱碳器

④洛宁新华生物设备预处理

①Weifang Hongrun petrochemical industry Co.,Ltd ，100T/H single stage RO equipment

②Shandong xiangchi group 130T/h RO unit

③Shandong Aolong Tanhei Co.,Ltd ，60T/H RO plant + ion exchange decarburization device

④Luoning Xinhua Biology Co.,Ltd ，water pretreatment system







[工程实例]
Project cases











①山东香驰集团设备安装现场
②恒天然牧场60T/H双级反渗透
③山东海恒化学设备安装现场
④反渗透清水系统
⑤鞍山亚世抛光混床安装实景

① Equipment installation in shandong xiangchi group site
② Fonterra pasture 60T/h double stage RO unit
③ Equipment installation in shandong haiheng site
④ Reverse Osmosis Cleaning System
⑤ Anshan Yashi polishing mixed-bed installation







①
②
③
④

①鞍山亚世预处理加药系统

②反渗透设备泵房

③精密过滤器、高压泵安装实景

④山东恒联集团200T/H盘式过滤器



①Anshan Yashi pretreatment dosing system

②Reverse Osmosis Equipment Pumping Station

③Installation of precision filter、 high-pressure pump on-site

④Shandong Henglian group 200T/H Disc Filter