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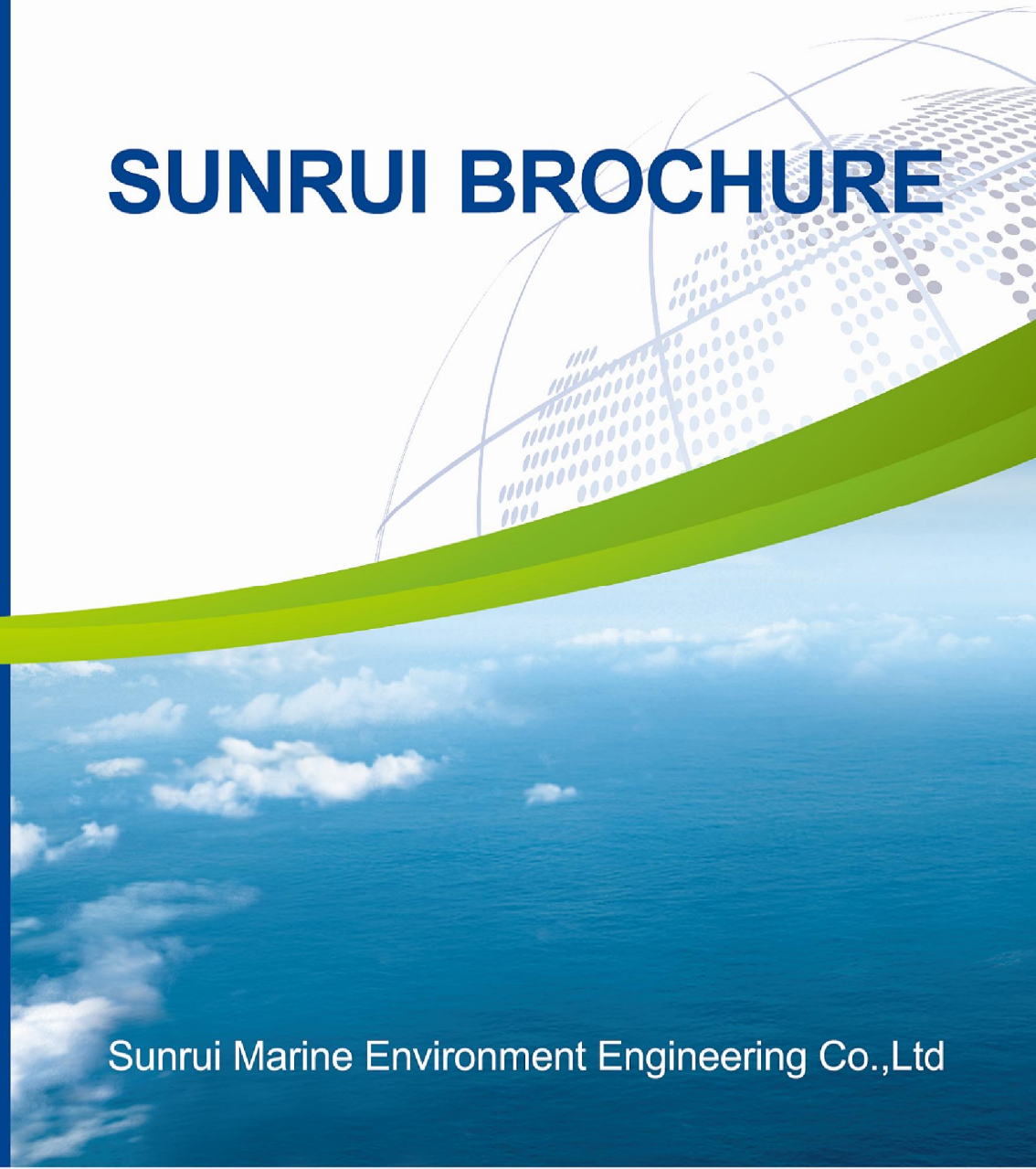
SUNRUI BROCHURE



Sunrui Marine Environment Engineering Co.,Ltd

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Company Introduction

Sunrui Marine Environment Engineering Co., Ltd is a subsidiary of China Shipbuilding Industry Company Limited. The company headquarter is located in Qingdao, with the branch in shanghai and the offices in Tokyo and in Singapore. It is a professional high-tech engineering company which is engaged in the research and development, design, manufacture, engineering and project contacting of corrosion control and water treatment technologies.

Sunrui has many years of experience in research and achievements popularization of anticorrosion and water treatment technologies and products. It has set up more than 40 state and military standards on corrosion control, anti-fouling and marine coating. The products of the company have been granted the certifications of DNV, CCS, LR, BV, NK, ABS and AMS of USCG. It has been granted highest contracting certification of conformity of quality, environment and occupational health and safety system certification management. It has mainly engaged in research, design, production, construction and engineering procurement construction (EPC) of cathodic protection, chlorine electrolysis, ballast water treatment, seawater desalination, electrolytic anti-fouling of ship and offshore platforms, sewage treatment, coating protection and so on.

The products of Sunrui are applied to protect ships, submarine lines, transportation, storage and transportation pipelines, electric power, petrochemical, municipal, environmental protection and other industries from corrosion and fouling. It has undertaken national infrastructure projects. The products are exported to more than thirty countries and regions such as American, Japan, Netherlands, Indonesia, Singapore, Pakistan, Sri Lanka Iran, Sudan, and Hong Kong ect.

There is a talent team in Sunrui, including 9 professors, 51 senior engineers, 10 project managers, 2 Qingdao outstanding technical personnel, 1 expert of IMO ballast water treatment evaluation committee, and 1 Taishan scholar.

Highest Contracting Certificate in Anti-corrosion Area

Certification of Safety Production

The 1th Prize of National Technology Progress

High Tech Enterprise Certification

National Important New Product

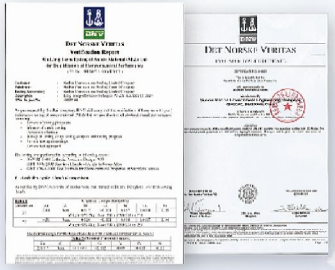
Contract and Trust Worthy Enterprise

A-class Tax Credit Enterprise

System Construction

Management System Certification of Quality, Envirnoment and Occupational Health and Safety

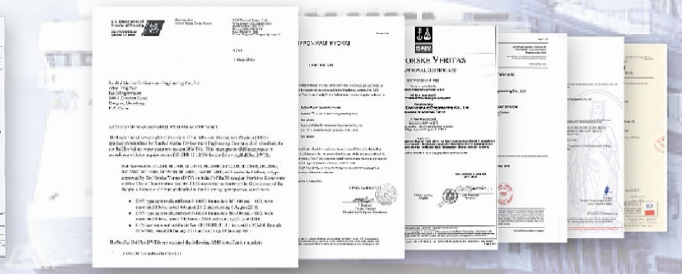
Product Certification



Sacrificial Anodes

DNV type approval certified

DNV electrochemical test certified of aluminum anode（one year）



Ballast Water Management System

DNV type approval certified

AMS certified of USCG

CCS type approval certified

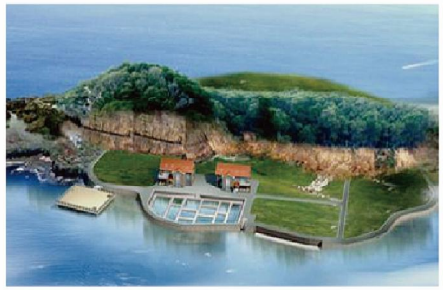
NK type approval certified

BV type approval certified

LR type approval certified

ABS type approval certified

R & D Capability



Xiamen Marine Experiment Station

Deep-Sea Experiment Station

Qingdao Marine Experiment Station

Sanya Marine Experiment Station

Sunrui has set up research and development department in charge of developing new products, new technologies and achievements. It also depends on State Key Laboratory for Marine Corrosion and Protection and marine experiment stations of Qingdao, Xiamen, Sanya and Deep-sea.

Sunrui has developed products and technologies research of ship sewage treatment technology, ship exhaust treatment technology, anticorrosion structures and technologies in marine environment, seawater desalinization equipment and so on. The company has marine environment simulating and accelerating corrosion lab, the chemical analysis lab, the electrochemistry lab, and the microstructure analysis and test instruments.

Water Quality Testing Laboratory

Electrochemical Experiment Laboratory

Water Treatment Laboratory

Ground-based Experiment Station of BalClor® ballast water management system (BWMS)

Sunrui has a research and development group which is highly educated and high-quality. The company has won the honorary title of Outstanding Innovation Team of Qingdao. With international advanced level of research and experimental conditions, the company has completed dozens of important research projects.

Sunrui is one of patent star enterprises of Shandong Province. Up to 2013, it has applied more than 80 patents, and has granted 44 patents. It also has established 16 national standards, 5 national military standards, 5 industry standards, and 1 navy standard.

Sunrui is one of key high-tech enterprises of China Torch Program, an enterprise technology center of Shandong Province, and a key laboratory of marine environmental and engineering electrochemical technology of Shandong Province. It also has a technology center and a research center of electrochemical protection & water treatment engineering of Qingdao. And it has been approved to build an expert workstation of Qingdao.

Sunrui has many independent research and development projects which won national and provincial progress prizes in science and technology field. One of the projects was honored with the first prize of science and technology by Chinese Society of Naval Architecture and Marine Engineering.

Production Capacity

Sacrificial anode workshop

BWMS workshop

Processing workshop

Assembling workshop

Sunrui has modern workshops of 26000 square meters, highly qualified and skilled workers, advanced production technology and equipment, standardized management system and first-class testing conditions. There are Sacrificial anode workshop, Processing workshop, Assembling workshop and Material warehouse in the 1th and 2th industry bases. There is ballast water management system (BWMS)workshop in the 3th industry base.

Sunrui has many melting furnace such as 1000kg consecutive melting furnace & 2000kg holding furnace, 500kg crucible furnace and so on. It has dozens of sets of advanced CNC equipment such as CNC machining center, CNC lathe and CNC shearing machine. All kinds of equipment are arranged reasonably and nattily in work shop for the workers to do their jobs in order and high-efficiency. It provides good conditions for production work.

Detection Capability

Fourier transform infrared spectrometer (FT-IR)

Environment scanning electron microscopy (ESEM)

Thermal analyzer (DSC-TG)

Electrochemical workstation

Field emission scanning electron microscope (FESEM)

Sunrui has more than 30 instruments such as foundry-master pro (FMP), environment scanning electron microscopy (ESEM), field emission scanning electron microscope (FESEM), thermal analyzer (DSC-TG), and Fourier transform infrared spectrometer (FT-IR) and so on.

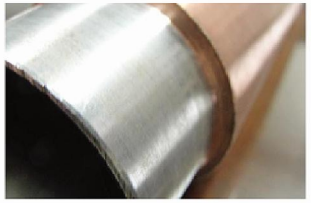
Sunrui has professional testing personnel, who can provide corrosion electrochemical testing, performance of coating testing, microscopic testing, element analysis, thickness testing and other precision testing service. This is to ensure that all kinds of products of the company have standard quality and reliable performance.

Main products

Bracelet-type aluminum sacrificial anodes

Jacket aluminum sacrificial anodes (the largest single anode in the world)

Magnesium alloy sacrificial anodes



Cold spray repair coating

Composite coating for fasteners

Transform-Rectifier

Reference electrodes

Sacrificial anodes（aluminum alloy, zinc alloy, magnesium alloy, iron alloy）
Annual production capacity is 15000 tons

Products of impressed current cathodic protection and the auxiliary
Annual production capacity is 400 sets

Coating products
Annual production capacity is 15000m²

Corrosion detection device
Annual production capacity is 50 sets

Auxiliary anodes

Main products

Seawater desalination equipment

Electrolysis chlorine system

Ballast water management system

Electrolytic sewage treatment system

Electrolytic chlorine system
Annual production capacity of chlorine is 8000kg/h

Seawater desalination equipment
Daily fresh water output is 20000 tons/day

Ballast water management system
Annual production capacity is 500 sets

Electrolytic sewage treatment system
Annual production capacity is 50 sets

Corrosion Control Industry

Cathodic protection project for Liaoning ship

Sunrui has been professionally engaged in corrosion control technology and product research, project design, product manufacturing, and EPC (engineering, procurement and construction). It represents the highest level in this field. It has rich experience in engineering performance and project management, and it has completed more than one thousand cathodic protection projects home and abroad ,in the fields of shipping, cross-sea bridge, oceaneering, chemical industry, petrochemical industry, underground pipe network, municipal works and so on. Corrosion control industry of the company keeps 30 percent share of anti-corrosion market and 70 percent share of marine engineering anti-corrosion market.

Coating and cathodic united protection project for Jiaozhou Bay cross-sea bridge

Application

- Ship
- Harbor installation
- Marine engineering
- Underground pipeline
- Oil storage tank
- Power plant
- Petrochemical enterprise
- Reinforced concrete structure and pile foundation of building

Service

- Studies and technology counseling of anti-corrosion program as well as the engineering, surveillance, and inspection of anti-corrosion projects of all kinds of metallic structures
- Design, engineering, debugging, quality surveillance, survey of protection performance and personnel training of various cathodic protection projects
- Investigation, inspection, life estimation, failure analysis and anti-corrosion design of metallic structure, and the supply of supplemental optimum cathodic protection scheme
- Various series of cathodic protection products and coating products
- Design, engineering, surveillance, and inspection of protection performance of coating and combining coating with cathodic protection
- Technical training, guidance and service

Cathodic protection project for Gaolan Harbor of Zhuhai

Cathodic protection project for Donghai Bridge

Cathodic protection project for container ship

Cathodic protection for steel pilings docks of Fulian Harbor

Cathodic protection project for UCH power plant of Pakistan

Cathodic protection project for Guangxi Petrochemical company

Cathodic protection project for Liwan 3-1 offshore platform

Cathodic protection project for nation oil storage tanks of Zhoushan

Electrolytic Chlorine Industry

Sunrui has been engaged in research and development of electrolytic chlorine industry for 30 years. It has established national standards such as "The Design and Installation of Ship Anti-fouling Equipment of Electrolyzing Seawater" and "The Technology of Sodium Hypochlorite Generator of Electrolyzing Seawater". Electrolytic chlorine technology and products of Sunrui has been exported more than 10 countries and regions such as India, Malaysia, Indonesia, Turkey, and Sudan.

Sunrui has successively undertaken electrolytic chlorine engineering dozens of nuclear power stations such as Ling'ao nuclear power plant, Tianwan nuclear power plant, and Hongyanhe nuclear power plant,and hundreds of thermal power station, chemical plants, ships, offshore platforms and LNG. In almost two years, Sunrui actively explores the international markets, and has got several important electrolytic chlorine projects from BV, Alstom and other international well-known contracting company.

Electrolytic cells of electrolysis seawater system

Electrolytic Chlorine Industry

Application

- Cooling water treatment
  - Nuclear power plant
  - Thermal power plant
  - Petrochemical enterprise
  - Chemical enterprise
  - Ship
  - Offshore installation
  - Air conditioning system
- Swimming pool sterilization
- Living sewage treatment
- Drinking water disposal
- Bleaching and dyeing wastewater treatment
- Wastewater treatment
- Killing the virus in recycle-water of oil field
- Hospital sewage treatment
- Food industry sterilization

Service

- Design and planning of electrolytic chlorine system
- Manufacturing and marketing of electrolytic chlorine system
- Installation and commissioning of electrolytic chlorine system
- Technical training, guidance and service

Electrolytic cells of electrolysis brine system

Machinery equipment of electrolytic chlorine system

Electrical equipment of electrolytic chlorine system

Operating device of electrolytic chlorine system

Electrolytic cell of electrolytic chlorine system

Technology Characteristics

Optimization Design

- One time electrolysis process, this can lower the complexity and investment of circling electrolytic equipment
- Product serialization, this can satisfy the various productions requirement of chlorine for customers
- Modularization design of the equipment, this can lower the workload of installation and maintenance for customers

High Efficiency and Energy Saving

- DSA anode is a kind of anodes applied in 95% of the chlorination in the world
- Special structure of electrolytic cell, this is convenient for customers to manage
- Hastelloy alloy cathode, this is hard to get embrittlement and can save power in comparison with Ti alloy cathode

High Safety and Reliability

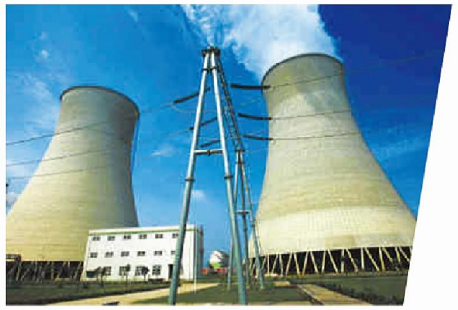
- No chlorine gas leaking
- PLC control, no staff on duty
- Various safe structures of hydrogen removal

Quality Assurance

- DSA anode, which has a continuously running life of over 5 years
- Hastelloy alloy cathode, which has a life assurance of over 40 years
- Stable electricity controller with special design

Electrolytic Chlorine Industry

Electrolytic seawater chlorine project for Fujian Nanpu power plant



Electrolyzing saline solution chlorination project for Linhuan Zhongli power plant

Electrolyzing saline solution chlorination project for India WPCPL power plant

Electrolytic seawater chlorine project for Huaneng Dalian power plant

Electrolytic Chlorine Industry

Electrolytic seawater chlorine project for Daya Bay nuclear power station

Electrolytic seawater chlorine project for Yisheng Petrochemical of Dalian

The 2th electrolytic seawater chlorine project for Fuqing nuclear power station

Electrolytic seawater chlorine project for Turkey BIGA power station

Electrolytic Anti-fouling Technology and Products

Cu-Al Anodes

Sunrui has mainly used the technology of electrolytic chlorine, electrolytic Cu-Al anodes, and combining the both for antifouling and anticorrosion. The latter was originated by Sunrui. This combining technology utilizes the available chlorine produced by DSA anodes to form a coordinating effect with Cu_2O and $Al(OH)_3$, which can control the adhesion and growth of marine life more effectively. The corresponding equipment has no pollution to the environment and the antifouling performance of it is remarkable. So it has been applied extensively in fields of ships and offshore platforms.

Application

- Ship
- Ocean vessel
- Naval ship
- FPSO ship
- Offshore platform

Electrolytic seawater chlorine antifouling equipment for offshore platform

Antifouling Products

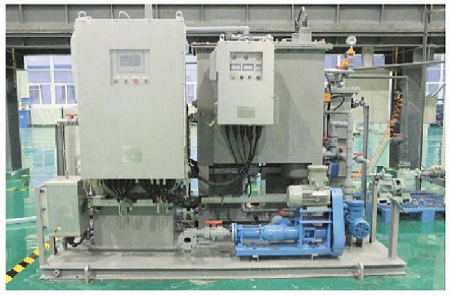
- Cu, Al, Cu-Al anodes of various specifications
- Anodes of various specifications
- Cl-Cu-Al antifouling equipment
- Electrolytic seawater chlorine antifouling equipment
- Other antifouling equipment in accordance with customer's requirements and different engineering conditions

Electrolytic Sewage Treatment Technology and Products

Electrolytic sewage treatment equipment of Sunrui is the second in the world, and the first in China, which uses electrolytic technology to purify sewage of ships and offshore platforms. The company has been committed to research and develop the new generation of electrolytic sewage treatment equipment after IMO new standard of sewage treatment implementation. The prototype has gained type approval of China classification society (CCS) on January 11, 2013.

The electrolytic sewage treatment equipment is officially approved to be applied in ship and on offshore platforms. Recently this technology and products has sufficient conditions for industrialization. The company has won the sewage treatment project contract of Oriental 1-1 gas field which belongs to CNOOC (China) Co., Ltd. This marks that the new generation products of electrolytic sewage treatment equipment of Sunrui officially have been put into market.

Sewage treatment project for the 1th phase of Oriental 1-1 gas field



The new generation sewage treatment equipment of Sunrui

Application

- Ship
- Offshore platform
- FPSO ship
- Ocean vessel
- Seashore facility

Service

- Design and manufacture of electrolytic sewage treatment equipment
- Installation and commissioning of electrolytic sewage treatment equipment
- Technical training, guidance and service

Ballast Water Management System Industry

Ballasting is necessary measure for ocean going vessel. The ballast water is unlimitedly discharged into the different place sea area, which could cause the invasion of harmful aquatic organisms and pathogens. The invasion of alien organisms had been listed by GEF (Global Environment Facility) as one of the four big hazards to the ocean.

In order to effectively control the invasion of harmful aquatic organisms and pathogens in ballast water, the International Maritime Organization (IMO) has developed the "International Convention and Management of Ship's Ballast Water and Sediments" in 2004. When the convention is implemented, all of the new ships will be required to install ballast water treatment system. This requirement is also suitable for the existing ships.

In this context, Sunrui has successfully developed the device of BalClor® ballast water management system (BWMS). This equipment has passed DNV, CCS, LR, NK, BV, ABS type approval certified and the AMS approval certificate of USCG. It also gained the independent innovation special fund of Shandong Province in 2012, and it was included in the national strategic innovation products in 2013.

BalClor® ballast water management system

Ballast Water Management System Industry

Bulk carrier

Tanker

Container vessel

Application

- Tanker（including VLCC）
- Bulk carrier
- Container vessel

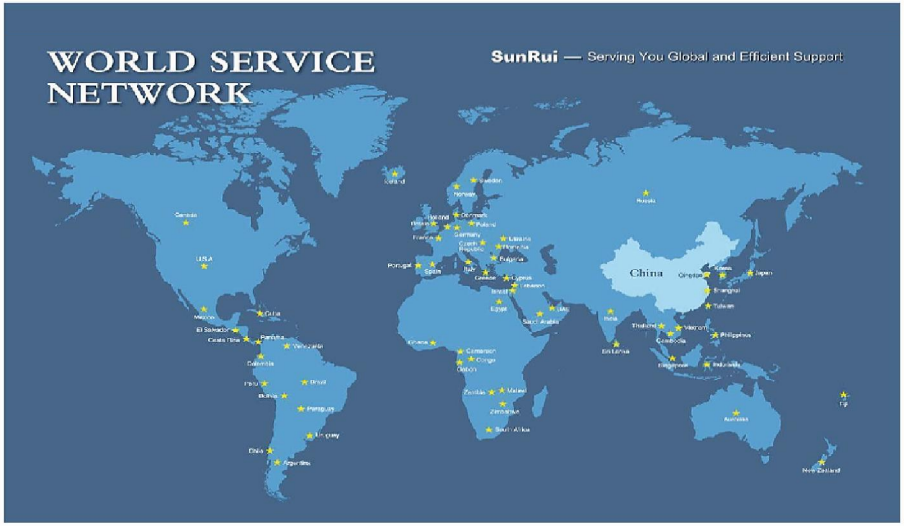
Service

- Provide total solution of ballast water management system for new ships
- Provide reform project of ballast water management system for used ships
- Design and manufacturing , sales of ballast water management system
- Installation and commissioning services of ballast water management system
- Technical training , guidance and service

Ballast Water Management System Industry

Technical features and Advantage

- Complying with IMO D-2 standard, products has type approval certified of six important classification society
- Electrolysis technology for disinfection : high efficiency with low power consumption, one-step disinfection effective and complete
- Side-stream technology : no pressure drop to main ballast pipeline, no big modification to main ballast pipeline, easy installation for new-buildings and retrofits
- Neutralization technology : applicable at different vessel voyages
- Modular design : simple design for new buildings & flexible installation on retrofits
- Treatment capacity： $100m^3/h \sim 7000m^3/h$, applicable for vessel types and sizes
- Applicable to muddy water & fresh water condition
- High performance with low operational cost & low maintenance cost
- World-wide service network provides efficient, convenient and high standard service



Parameter Selection Table of BalClor® BWMS

Model	Treatment Capacity (m^3/h)	Flow Rate to Electrolyze (m^3/h)	Required Power (kW)	Dimension	
				Filter L(mm)*W(mm)*H(mm)	Electrolysis Unit L(mm)*W(mm)*H(mm)
BC-300	100-400	6	11	780*630*1650	1700*1600*2322
BC-500	401-600	6	17	987*780*1800	1700*1600*2322
BC-1000	601-1200	12	35	1177*950*2300	2100*1400*2200
BC-1500	1201-1700	20	51	1370*1120*2500	2200*1800*2573
BC-2000	1701-2200	20	70	1480*1220*2605	2400*1500*2590
BC-2500	2201-2700	36	87	1575*1320*3115	2400*1500*2590
BC-3000	2701-3200	36	105	1575*1320*3115	2700*1500*2600
BC-3500	3201-3700	36	122	1700*1430*3280	3000*1500*2914
BC-4000	3701-4200	36	140	1865*1590*3450	3000*1500*2914
BC-5000	4201-5200	45	175	1575*1320*3115 (*2)	3000*2500*3150
BC-6000	5201-6200	54	210	1575*1320*3115 (*2)	3200*2500*3150
BC-7000	6201-7200	65	245	1700*1430*3280 (*2)	3500*2500*3150

Ballast Water Management System Industry

The BWMS which is installed on ocean ship for the first time

The BWMS which is installed on ship abroad for the first time

The BWMS which is installed on VLCC for the first time

The first seawater desalination project of Sunrui is for Indonesia Awar-awar power station

Sunrui is a consulting firm specializing in designing and engineering contracting of seawater desalination projects, mostly using the reverse osmosis (RO) treatment technology. It has obtained two projects, one of which is signed a contract in 2008 for Indonesia Awar-awar power station, and the other for China Sanmen nuclear power station in 2011.

Seawater desalination is desalting the seawater and turning it to freshwater, for industrial consumption and potable water. Nowadays, the main technologies of seawater desalination are distillation, refrigeration and reverse osmosis. Sunrui has mainly used the reverse osmosis technology before and it is developing the multi-effect distillation (MED) technology and products to expand the industry field.

Seawater Desalination Industry

Application

- Circulating water treatment of coastal power plants
- Seawater desalination to produce industrial water
- Seawater desalination to produce residential water

Service

- Independent design and manufacture of seawater desalination equipment
- Providing seawater desalination solutions for customers and undertaking seawater desalination engineering
- Design, installation and engineering services of seawater desalination project
- Commissioning on-site service and technical training

Technical Features

Optimum design

- Products serialization: suitable for users with different water quantity and quality needs
- Equipment modularization: convenient for equipment installation and maintenance

High efficiency and energy saving

- Adopting membrane module of DOW company-market share of membrane module is No. 1 in the world
- Adopting energy recovery device: improving energy utilization of concentrated water

Quality assurance

- Make sure that the sustainable operation life could last for more than 3 years
- Stable electronic control equipment with optimized design

Industry Advantage

Technology accumulation

- Decades of technology accumulation of seawater treatment
- Substantial experience of design, manufacture, construction and installation of engineering projects

Market base & Corresponding guarantee

- Has the long-term stable partnership with ship industry, thermal power plants and nuclear power station
- Establish and maintain good relations with cooperation enterprises and supplier
- Now production capacity of desalination equipment to make freshwater is 20,000 tons/day
- The production capacity of desalination equipment to make freshwater is 200,000 tons/day in the 4th industry base is built

Seawater Desalination Industry

Seawater desalination workshop of the Awar-awar project

Production of fresh water successfully of the Awar-awar project

On March 17, 2013, the first seawater desalination project of Sunrui for Indonesia T.J. Awar-awar power station project (signed in 2008) successfully produced freshwater. After examination, the water yield and water quality of the freshwater are up to the standard of the project completely. This marked the ability of Sunrui to undertake large-scale seawater desalination projects independently.

On May 14, 2011, Sunrui obtained the seawater desalination project of Sanmen Nuclear Power Co., Ltd. This project is the first AP1000 nuclear power project in the world. And the seawater desalination system of the project has the largest single capacity to produce freshwater using the RO technology at that time. Now the design and manufacture of the project have been completed.

The seawater desalination project for Sanmen nuclear station

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Future Prospects

Sunrui will insist on the features of "modern, science, green and environmental protection", grasp opportunities of the market, and it vigorously develops the corrosion control industry, electrolytic chlorine industry, seawater desalination industry and ballast water treatment industry. Sunrui will also make innovations in the treatment technology of industrial wastewater and sewage, the technology of ship waste gas processing, and the technology of multi-effect distillation(MED) of seawater.

All the staff of Sunrui are struggling for building it into a leading and advanced high-tech engineering company which is world famous and could offer comprehensive solutions for customers. The company has three industry bases of anti-corrosion technology, water treatment technology and ballast water management system. In the 4th industry base construction, Sunrui will have 1,000 sets of ballast water management system and 200,000 tons/day manufacturing capacity of seawater desalination equipment.