

**ELITE MARINE CORPORATION**  
**易俐特自动化技术股份有限公司**



**Seascape®-BWMS**

**Ballast Water Management System**

English Version



# Seascope®-BWMS

BALLAST WATER MANAGEMENT SYSTEM



## Advantages of Seascope® –BWMS

- Worldwide services
- Small size & compact design
- Pure physical treatment technology
- Ex-proof and EMC approval to fit all vessel types
- Suitable for all high salinity seawater, brackish water, fresh water
- Automatic Flow/Power Adjusting function
- Highly intelligent operation
- Easy and economical maintenance
- Optional Global Remote Support System

## Company Introduction



Elite Marine Corporation is an innovative high-tech enterprise specialized in integrated solution for ballast water treatment system including research, design, construction, installation and after-sale service. We provide perfect service for the global customers with our mature technology and high quality products.

Customer oriented, struggle based, hard-working persistent and insisted on self-criticism is the core value of our company. Elite marine R&D team consists of domestic & foreign chief engineers and researchers.

Seascope®-BWMS has been certified by the classification societies such as USCG, DNV-GL, RINA, ABS, CCS, BV, LR, RS etc.

We have sales & service partner all over the world. Up to now, our own global marketing and 5S service network has been established in the worldwide main port states to provide high quality service for our the clients, including onboard surveying, 3D scanning, installation and maintenance etc.



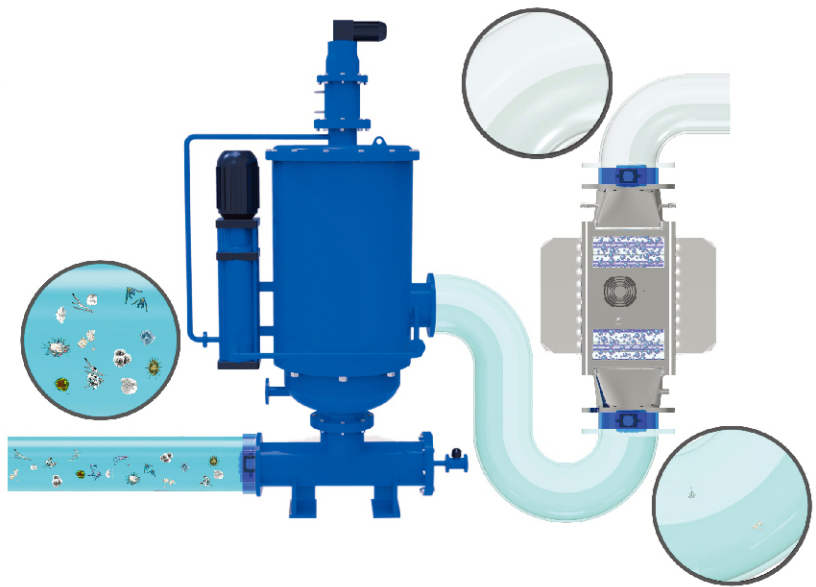
## Elite Marine Global Clients





Seascope®-BWMS is a combined treatment system which takes advantage of filter and EPT ( Enhanced Physical Treatment-UV/US ) unit. It is most environmental friendly and optimally designed for all types of vessels.

Adopting a pure physical treatment technology, Seascope®-BWMS effectively disinfects harmful aquatic organism and pathogen in water without generating any toxic substance during ballasting and de-ballasting process.



#### Compared to chemical technology:

- A. Be safe and reliable due to chemical-free operation. Chemical technology produces harmful chemicals, such as  $H_2$  and  $Cl_2$ , which is a potential risk to vessels and personnel; while Seascope®-BWMS utilizes pure physical technology and is completely environmental friendly.
- B. Be highly efficient and fits all vessel types. Chemical technology needs a long holding time to disinfect organisms in ballast water, which limits its application during short voyage. For Seascope®-BWMS, there is no salinity limitation and no need of holding time.
- C. Simple structure and easy operation. Concentration of Total Residual Oxide ( TRO ) needs to be detected for chemical technology, which is more tedious than physical technology.
- D. Low cost and economical maintenance. A high maintenance cost would be necessary for chemical technology, while it only needs to replace UV lamps for Seascope®-BWMS.

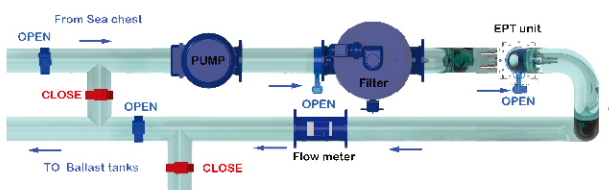
#### Compared to other physical technologies:

- A. Seascope®-BWMS owns an US device to clean quartz tubes and enhance treating efficiency, which makes the system much smaller and have the lowest power consumption compared with other systems.
- B. Due to the application of US device, no other cleaning units are needed in the system, simpler structure and easier installation.
- C. Self-cleaning filter possesses independent international patent with our own intellectual property rights, and it fits waters with high TSS content, free of manual dismounting and cleaning.
- D. UV output power can be adjusted according to water quality in order to save power.
- E. Seascope®-BWMS is fitted with global remote support system for easy and high-effective service.

## Treatment Process

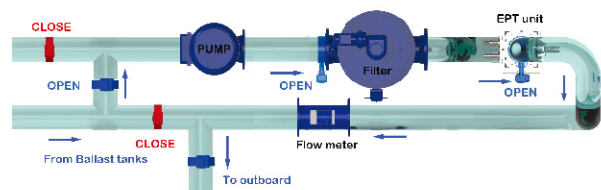
### Ballasting

During ballasting process, ballast water firstly passes through a self-cleaning filter for filtration of big microorganism and particulates. The filtered ballast water then passes through an EPT chamber where UV light is used to disinfect the water prior to entering the ballast tank.



### De-ballasting

During De-ballasting process, ballast water is pumped from the ballast tanks through the filter and EPT disinfection chamber for final treatment before being discharged overboard.





## Filter Unit

During uptake ballast water passes through an automatic self-cleaning filter. The filter removes particulates, sediments, zooplankton and phytoplankton over 50 microns. Automatic back flushing ensures and maintains filtration precision, which can achieve high working efficiency in the waters of high turbidity.

During the back-flushing cycle, the filtered water continues to flow in the normal manner, without being interrupted

- High UV transmission
- Low pressure drop
- Treating capacity: 80~5,000 m³/h
- Applies to process in the waters of high turbidity
- Low inflow of sediment
- Automatic back flushing



## EPT Unit

UV (Ultraviolet) radiation is used to disinfect water efficiently and safely. UV technology is easy to operate and needs no expensive and potentially hazardous chemicals. US (Ultrasound) device is combined with UV radiation to penetrate cell membrane and cell wall to assist UV in destroying DNA and RNA of the microbes, affecting synthesis of enzymes and protein in the cells caused by variation, with the result of cell's death due to abnormal metabolism.

What's more, US (Ultrasound) device can effectively clean the quartz tubes to ensure the maximum UV transmission at all times by preventing the accumulation of scales on the quartz tubes.

UV dose can be monitored continuously and adjusted automatically by PLC (Programmable Logic Controller) and light intensity sensor to fit all kinds of water of different turbidity in order to achieve maximum treatment efficiency. An extra level sensor and a temperature sensor provide additional guarantee of safety.

- No active substances nor toxic by-products
- No corrosion problem
- US Self-cleaning
- Long life & High efficiency
- Easy maintenance and operation
- Capacity: 80~5,000 m³/h



## Power Cabinet & Control Cabinet

Control unit is PLC (Programmable Logic Controller) based and configured, which can make local control achievable. The real-time network communication protocol can also be used to integrate Seascope®-BWMS with other automatic control systems on board, providing access to all Seascope®-BWMS functions through the vessel's standard interface.



- On line data display
- Touch screen operation
- Alarm function
- Data record for at least 24 months
- Controller: SIEMENS PLC
- Human machine interface system



## Global remote monitor module

A global IOT+ ship service platform is being built, collecting all the marine equipment operation data by using sensors. Through maritime satellite, the major equipment operation data is transferred to land base integrated ship management service center for real time monitoring. And the big database is been developing. With big data analysis technology, maintenance plan can be accurately predicted, and abrupt failure can be further decreased. So it helps ship owner to reduce ship maintenance cost and increase the vessel operating efficiency.





## Specifications of Seascope®-BWMS

TYPE	Rated capacity (m³/h)	Rated power consumption (Kw)	Contour Size (mm)			
			Filter (φ × H)	EPT Unit (L × W × H)	Power Cabinet (L × W × H)	Control Cabinet (L × W × H)
Seascope-200-BWMS	200	36	512*2167	475*1012*1142	1000*750*2200	600*230*900
Seascope-300-BWMS	300	37	616*2329	475*1012*1142	1000*750*2200	600*230*900
Seascope-400-BWMS	400	46	616*2329	475*1012*1156	1000*750*2200	600*230*900
Seascope-500-BWMS	500	61	616*2784	575*1120*1588	1000*750*2200	600*230*900
Seascope-600-BWMS	600	61	616*2784	575*1120*1588	1000*750*2200	600*230*900
Seascope-800-BWMS	800	84	616*2778	575*1120*1570	1000*750*2200	600*230*900
Seascope-1000-BWMS	1000	90	616*2778	660*1120*1500	1000*750*2200	600*230*900
Seascope-1200-BWMS	1200	113	766*3283	2*575*1120*1588	1000*750*2200	600*230*900
Seascope-1600-BWMS	1600	167	2*616*2778	2*575*1120*1570	1000*750*2200	600*230*900
Seascope-2000-BWMS	2000	178	2*616*2778	2*660*1120*1500	1000*750*2200	600*230*900
Seascope-2400-BWMS	2400	231	2*766*3283	3*575*1120*1570	1000*750*2200	600*230*900
Seascope-3000-BWMS	3000	247	2*766*3283	3*660*1120*1500	1000*750*2200	600*230*900
Seascope-4000-BWMS	4000	335	3*766*3283	4*660*1120*1500	1000*750*2200	600*230*900
Seascope-5000-BWMS	5000	424	4*766*3283	5*660*1120*1500	1000*750*2200	600*230*900

## Installation Case

Four sets of Seascope®-600-BWMS were installed in MSC container vessels in Tianjin Xingang Shipyard.





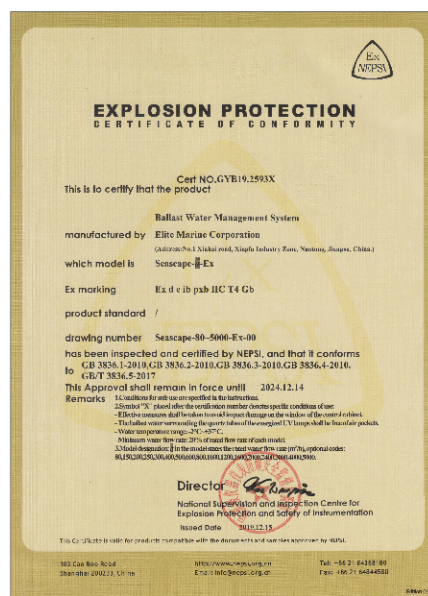
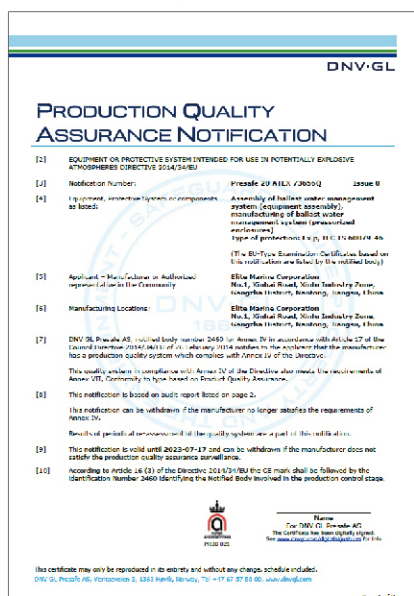
Seascope®-BWMS is in compliance with IMO standard and has received Type Approval certificates from USCG, DNV-GL, RINA, ABS, CCS, BV, LR, RS, IMO, KR.

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## Explosion – proof system certificate



## Technical Consulting & Engineering Services:

### 1. Onboard survey & 3D scanning of engine room spaces

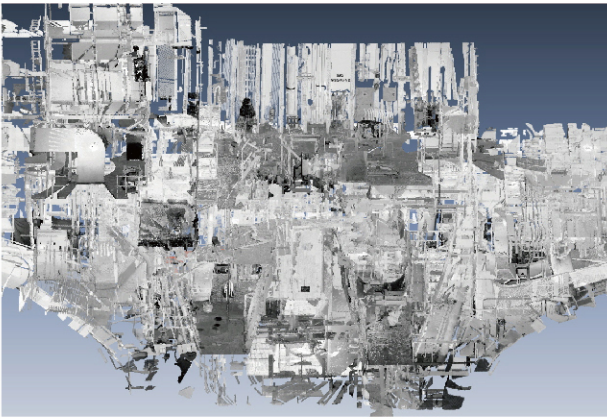
Carry out 3D Laser scanning and onboard survey of the proposed engine room spaces and associated systems for the installation of BWT equipment and associated piping arrangement.



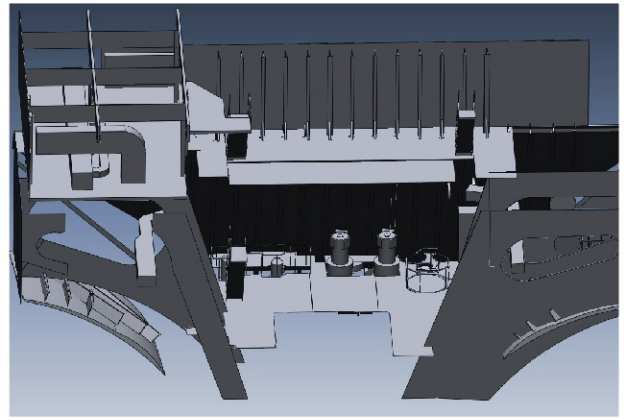
### 2. BWT system 3D modelling and installation pre-engineering

Prepare 3D modelling for the associated engine room spaces. Carry out a thorough review of vessel associated plans, manuals and specifications during onboard survey in order to evaluate the actual situation of engine room, lay out of machinery spaces and all issues in relation to: electrical circuit, power supply, ballast pumps piping arrangement, control, monitoring and safety, structural issues etc.

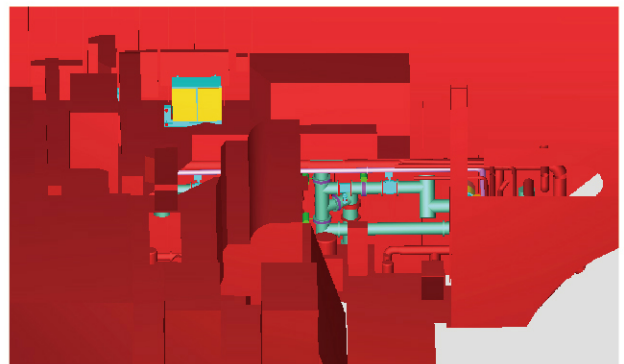
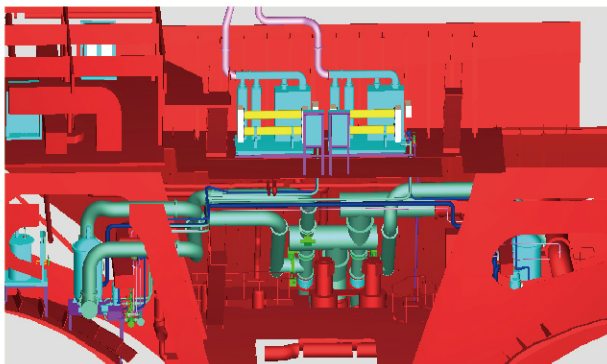
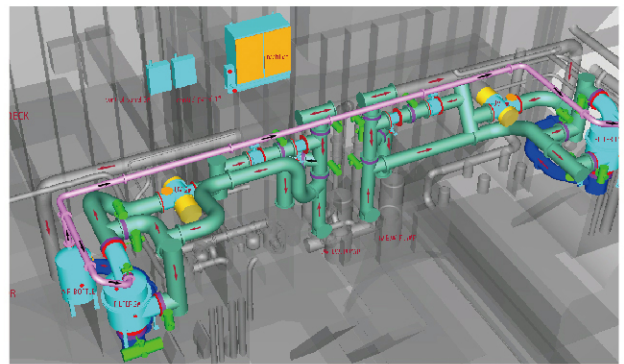
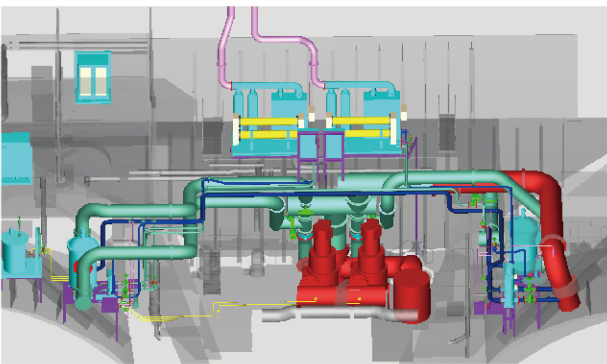




Original scan data



Scanning data modeling



New Pipe & Equipment Modeling

### 3. BWT system engineering & plan approval

Upon final selection of the ship specific BWT equipment by the clients, prepare the required plans and documentation to submit for CLASS approval and follow up all pertinent CLASS matters for final approval of the BWT system retrofit works. Prepare detailed technical specification for the required modification/retrofit works (according to the final selection of the ship-specific BWT equipment) and submit installation cost budget to the clients.

### 4. Installation & commissioning onboard

- |                                  |                            |
|----------------------------------|----------------------------|
| 1 ) Installation preparation     | 2 ) Hull base installation |
| 3 ) Treatment units installation | 4 ) Pipes connection       |
| 5 ) Assembly                     | 6 ) Commissioning          |



## Worldwide Service



### Quality assurance

Elite Marine's Seascope®-BWMS adopts electrical components made by international famous brand, all consumable parts are served with a certain amount of spares. Elite Marine provides warranty of 2 years and the global after-sales service.

Elite Marine's Seascope®-BWMS is easy and convenient to operate and maintain. The UV-Lamp of the system is made by international well-known brand which has characteristics of low costs, high interchangeability and long life. The preventive maintenance of the system is to clean the quartz-sleeve of the UV-lamp annually and to change the UV-Lamp after 3500-5000 hours operation. Detailed maintenance information please refer to the system OMSM.



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