DESMI Ocean Guard CompactClean

Ballast Water Management System

PROVEN TECHNOLOGY

DESMI

CompactClean
One of the Most Compact Ballast Water Management Systems on the Market!

DESMI Ocean Guard A/S is part of the DESMI Group, which was founded in 1834 by Henning Smith and is one of Denmark's oldest companies.

For decades DESMI has developed, sold and manufactured pumps for marine applications and today many DESMI pumps are used and installed on board ships all over the world.

The DESMI Group portfolio includes pumps, oil spill response solutions, pumping solutions for defence applications, energy saving systems, automation and contracting activities next to ballast water management systems.

One of the Smallest Footprints Ever!

Are you looking for a ballast water management system that can be **installed easily** and without relocating other equipment? CompactClean is the answer! Almost as easy as **plug and play**! It is one of the first ballast water management systems on the market that combines very low space with large flow rates. Only 2.8 m^2 / 30 sqft is necessary for a 1000 m^3/h / 4403 gpm system + 0.6 m^2 / 6.4 sqft for the electrical panel, which can however be placed up to 100 m / 328 ft away from the system itself.

The system is based purely on mechanical treatment and therefore it **does not involve any use of chemicals** or active substances. This eliminates risks of hazards to crew, vessel or the environment.
First treatment step is filtration, second step is UV treatment. During de-ballasting, UV treatment is repeated, but the filtration step is skipped.

- ✓ No chemicals
- ✓ No risk of increased corrosion
- ✓ No hazards to crew, vessel or environment
- ✓ No salinity limitations
- ✓ No temperature limitations
- ✓ Very small footprint
- ✓ Easy operation
- ✓ Easy maintenance

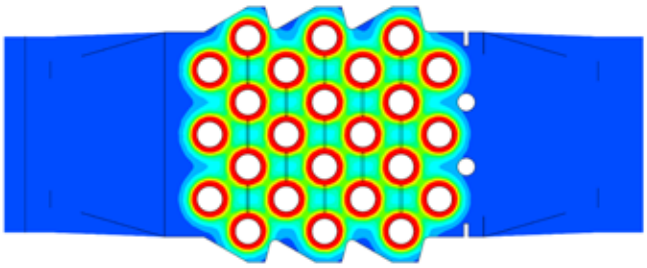
CompactClean has **no salinity or temperature limitations** and is undergoing type approval to both IMO and USCG requirements at record-breaking low UV transmission values! This enables compliant performance anywhere in the world in even very dirty and challenging water conditions. This superior performance comes from the unique and patent pending shape of the UV chamber, which has been carefully developed and optimized through hundreds of state-of the-art CFD (Computational Fluid Dynamics) simulations.

New System Special Features

Smooth Port Operations

Automatic adjustment of treatment in order to cope with extremely challenging water, avoiding alarms and interrupted port operations in dirty and challenging water conditions.

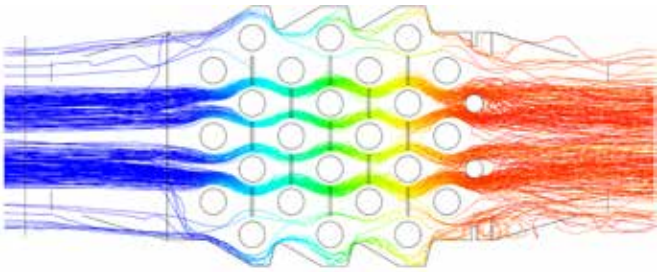
CompactClean does not just raise an “out of compliance” warning in very dirty water conditions as some other systems. Instead, CompactClean automatically reduces flow through the system to ensure compliant treatment even under extreme conditions. This enables the vessel to carry on with its port operations instead of forcing the vessel to interrupt the ballast water discharge and you will save costs relating to delays in harbour.

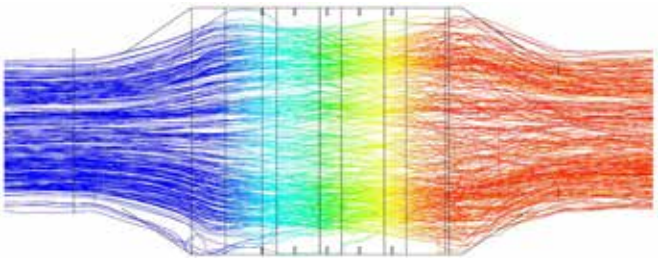


High Efficiency Keeps your OPEX Down

Patent pending UV unit design with very high treatment efficiency reduces the power consumption.

The special shapes of the CompactClean UV chambers have been developed and optimized on the basis of hundreds of state-of-the-art CFD simulations. This ensures that each kW of generated UV light is utilized to the max, which means that the power consumption is as low as possible, resulting in reduced operational costs!





Easy Reporting to Authorities

Automatic generation of PDF report to authorities, documenting the performed treatment

With the IMO convention in force, vessel owners will experience increasing demands from authorities for documentation of performed ballast water management. Therefore, CompactClean features automatic generation of PDF reports that document the ballast water operations performed, including key parameters monitored during the treatment. The PDF files are automatically stored and can be transferred to a USB memory stick when inserted into the front of the electrical panel.

Stripping Operations

The CompactClean filter backflush pump can be used as stripping pump during stripping of ballast tanks.

Use of ejectors for stripping of ballast tanks jeopardizes compliance with the IMO and USCG discharge standards, because untreated drive water is mixed with treated ballast water. In addition, the untreated drive water can introduce significant wear and tear of the system components. As one of the only systems in the world, CompactClean solves this, as the system is fitted with a special filter back-flush pump that can be used as dedicated stripping pump during de-ballasting. One system, one pump: two problems solved!

Fully Automated with Easy Integration into Ship Automation System

CompactClean is PLC controlled and supports all generally used main types of communication interfaces.

With CompactClean the crew on board the vessel will hardly notice that they are treating the ballast water. The system is fully automatic and can be seamlessly integrated with already existing systems on the vessel. When wanting to take ballast water on board, press the “Start Ballast” button on the touch screen, and when discharging the ballast water press the “Start De-ballast” button on the touch screen. That’s how simple it should be – that’s how simple it is!

Long Lifetime of Components Gives you Reliable Treatment and Low OPEX

UV unit made of Nickel-Alu-Bronze material with superior corrosion resistance and proven very long lifetime.

The CompactClean UV units are made of cast Nickel-Alu-Bronze with proven sea-water corrosion resistance. DESMI has decades of good experience with sea water pumps in the same material: Proven Technology keeps the downtime and maintenance costs to a minimum!

Six Standard Systems

CompactClean 135
135 m³/h, 595 gpm

CompactClean 340
340 m³/h, 1498 gpm

CompactClean 500
500 m³/h, 2201 gpm

Compact Clean 340

Description	CC-135	CC-340	CC-500
Max. Flow	135 m³/h, 595 gpm	340 m³/h, 1498 gpm	500 m³/h, 2201 gpm
Min. Flow	25 m³/h, 110 gpm	45 m³/h, 198 gpm	50 m³/h, 220 gpm
Max. Power	24 kW	48 kW	72 kW
Avg. Power	~ 18	~ 36	~ 54
Electrical Panel L x W x H	606x505x1700 mm, 24x20x67 in	606x505x1700 mm, 24x20x67 in	606x505x1900 mm, 24x20x75 in
Footprint L x W x H		1878x1166x2384 mm, 74x46x94 in	

Many Sizes - for Your Specific Need

CompactClean 750
750 m³/h, 3302 gpm

CompactClean 1000
1000 m³/h, 4403 gpm

CompactClean 1500
1500 m³/h, 6604 gpm

Compact Clean 1000

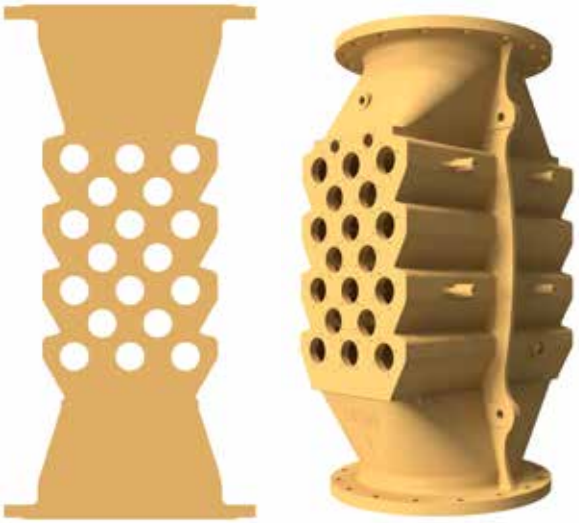
Description	CC-750	CC-1000	CC-1500
Max. Flow	750 m³/h, 3302 gpm	1000 m³/h, 4403 gpm	1500 m³/h, 6604 gpm
Min. Flow	65 m³/h, 286 gpm	95 m³/h, 418 gpm	126 m³/h, 555 gpm
Max. Power	108 kW	144 kW	216 kW
Avg. Power	~ 81	~ 108	~ 162
Electrical Panel L x W x H	606x605x2300 mm, 24x23x91 in	1212x505x1900 mm, 48x20x75 in	1212x605x2300 mm, 48x23x91 in
Footprint L x W x H		1979x1436x3284 mm, 78x57x130 in	

Manufactured by DESMI

UV Transmission

The unique UV unit is designed and manufactured by DESMI. The special patent pending shape ensures the highest possible applied UV dose to all organisms in the treated water.

This enables IMO and USCG compliant management under even very adverse conditions with low UV transmission. The CompactClean UV unit is delivered in 6 sizes with max. flow rate from 135 m³/h / 595 gpm to 1500 m³/h / 6604 gpm.



UV unit for 750 m³/h, 3302 gpm

PATENT PENDING

UV unit for 340 m³/h, 1498 gpm

What is UV Transmission?
UV-T is a measure of the capability of UV light to penetrate water. When the UV-T is high, close to 100%, the water is very clear and the UV light can penetrate deep into the water. On the other hand, when the UV-T is low, the water is very unclear and the UV light can only penetrate a limited distance into the water.

Clearly, the UV-T of the water to be treated is of utmost importance. To kill or render an organism non-viable, a certain UV dose is required, and the applied UV dose is directly proportional with the UV intensity. Therefore, when the UV-T is low, significantly more UV power is needed to treat the water according to the required discharge standards.

Limitations of Ballast Water Management Systems
It should be acknowledged that all BWMS have limitations. Typically, chemical systems (e.g. electro-chlorination) have limitations related to the salinity of the water to be treated, its temperature or the amount of organic material contained in the water; whereas UV-based BWMS have limitations with regard to the UV transmission of the water to be treated. In other words, all BWMS have special circumstances under which they cannot be expected to treat the water according to the IMO and USCG discharge standard. The trick for the ship owner is to select a BWMS that will work under normal operational conditions.

UV Transmission of Ballast Water
The UV-T found in different ports around the world varies significantly. Some ports are located at river estuaries, which means that the water in the port is fresh water containing high amounts of sediments, organic particles and dissolved organic compounds. This makes the UV-T very low. Other ports are located on islands in the middle of an ocean, and here the UV-T is typically high. In the same port the UV-T can vary from day to day depending on tide, weather (rain and strong wind), and season.

Port	UV-T
Istanbul, Turkey	95%
San Pedro, CA, USA	95%
Vera Cruz, Mexico	94%
Halifax, NS, Canada	94%
Rotterdam, Netherlands	93%
Port of Singapore, Singapore	93%
Skagen, Denmark	92%
Brisbane, Australia	92%
Porto Grande, Cape Verde	92%
Wallhamn, Sweden	91%
Houghton, MI, USA	91%
Melbourne, Australia	87%
Erie, PA, USA	87%
Zeebrugge, Belgium	85%
Gothenburg, Sweden	85%
Charleston, SC, USA	84%
Tanjung Pelepas, Malaysia	83%
Baltimore, MD, USA	83%
Hong Kong, China	80%
Houston, TX, USA	74%
Hamburg, Germany	69%
Antwerp, Belgium	66%
Bremerhaven, Germany	60%
Shanghai, China*	55%
New Orleans, USA	54%
Lisbon, Portugal*	53%
Brunswick, GA, USA	51%
Southampton, England	51%
Shanghai, China*	49%
Lisbon, Portugal*	41%

** In the same port the UV-T can vary from day to day depending on tide, weather (rain and strong wind), and season.*
Source: DHI & DESMI Ocean Guard

Type Approvals

The CompactClean system will be type approved according to both IMO, US Coast Guard and Lloyd's Register standards. This means that the system will be approved for treatment and discharge of ballast water everywhere in the world.

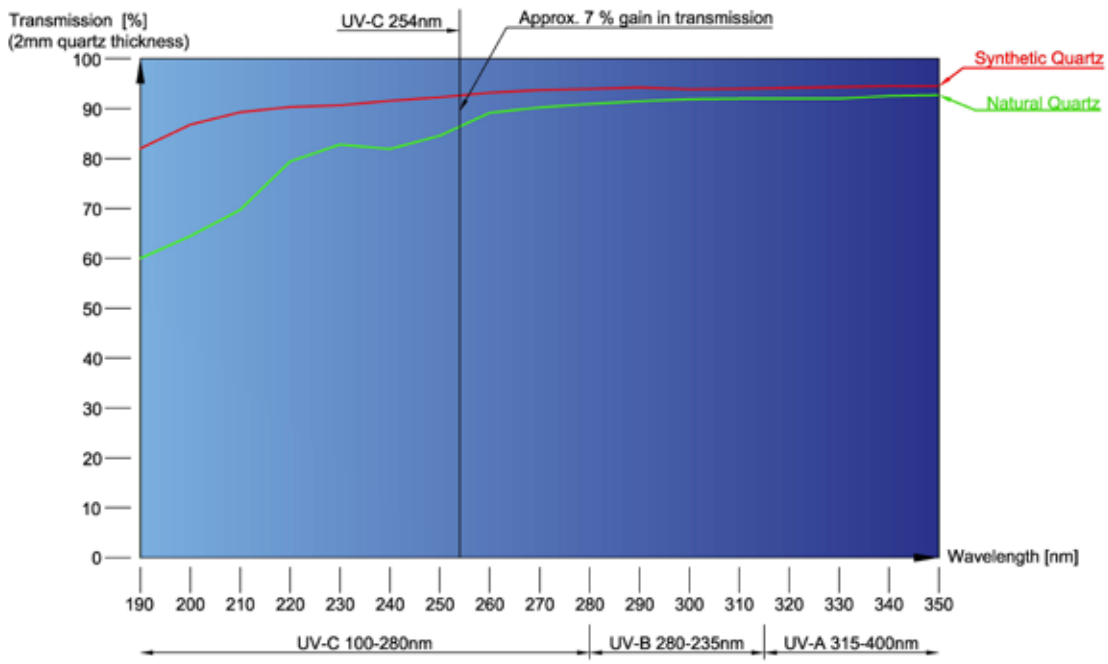
When installed on a vessel not classed by Lloyd's Register, the CompactClean system installation will be approved by the Class of the vessel.

High UV Efficiency

The medium-pressure UV lamps in the reactor employ specially designed lamp tubes of synthetic quartz.

The synthetic quartz tubes support transmission of a broader wavelength spectrum and provide more UV light during disinfection.

Combined with the reactor's internal design, this ensures optimal UV dosage and high efficiency.



The System is Delivered with a Standard Electrical Panel. Additional Remote HMI Screen on e.g. Bridge or in Engine Control Room can be Added

The BWMS is delivered with a main panel that can be placed in any convenient place. The main panel is equipped with an HMI screen, from which the system is controlled and alarms are visualized.

All operations can be done from a secondary screen in the deck control office or on the bridge, if option for installing remote control screens is used.

Standard fully automated operating modes for treatment are:

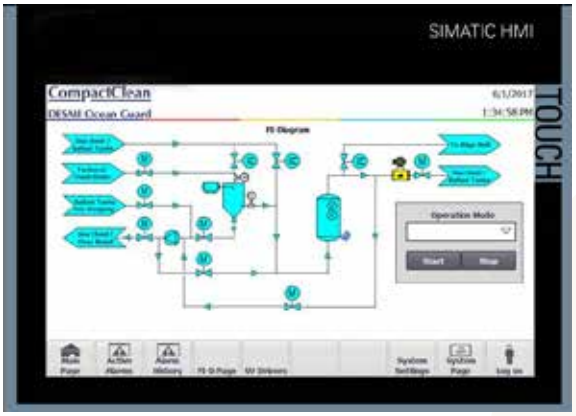
- Ballast
- De-Ballast
- Stripping

Other automated modes which can be selected are:

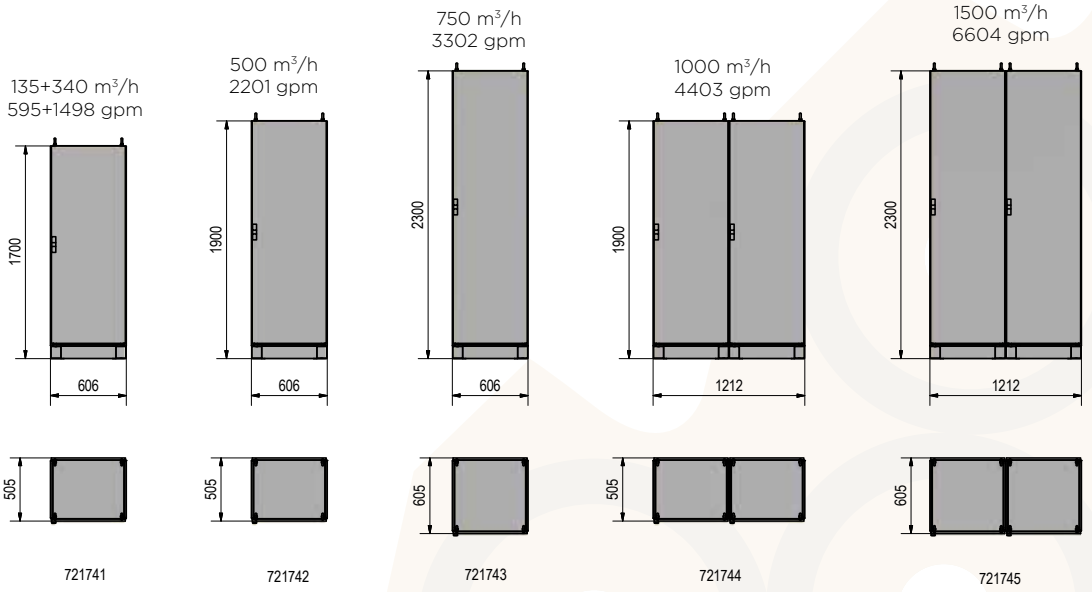
- Water Filling
- Recirculation

On the HMI screen, the operator can switch between several screen views (main page, active alarms, alarm history, PI-D page and UV drivers) to display all relevant information. During operation, the status of all components and sensors can be monitored, and operational values such as flow, pressure, temperature and UV intensity can be viewed instantaneously; and trend curves can be displayed to see the development over time.

Main page



PI-D page



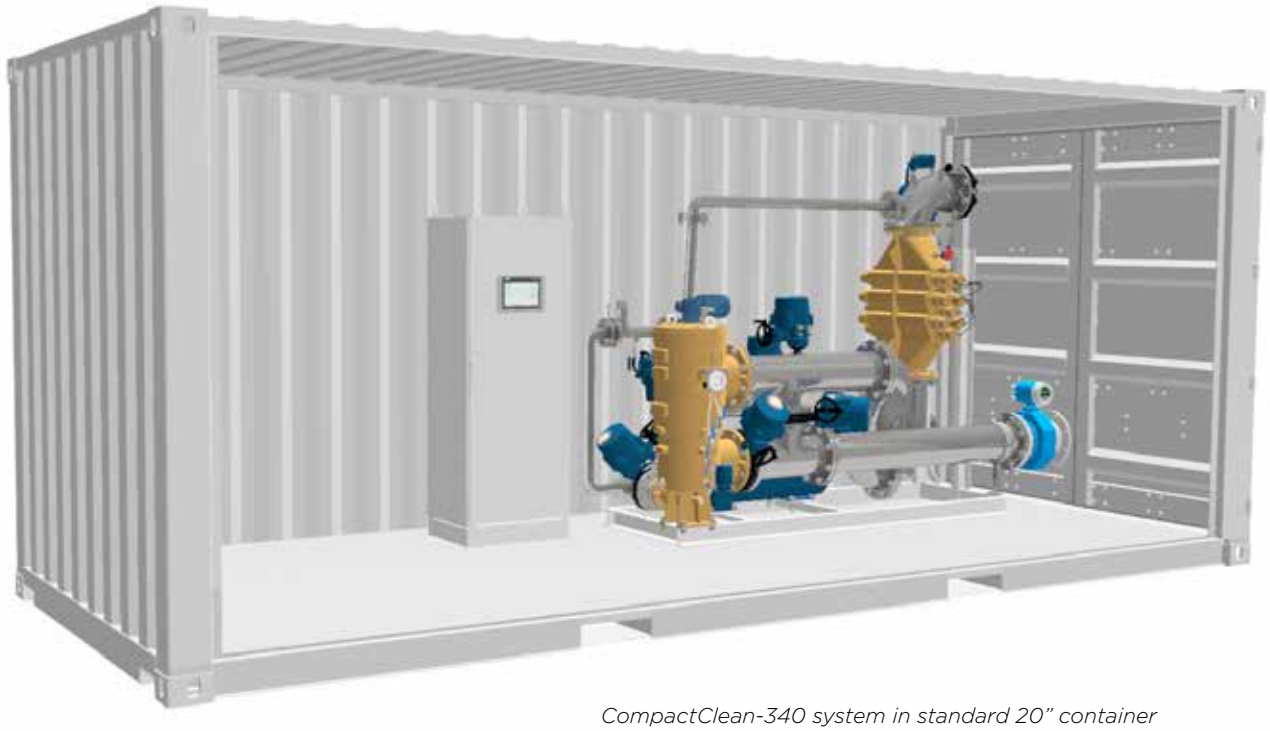
System Configurations

Our systems can be delivered as **loose components**, **skid-mounted** or **containerized**.

Loose components mean that the system will be assembled on board the vessel, and this is often necessary for retrofit projects or installation of large systems.

We often deliver **skid-mounted systems** as they are the optimum solution for newbuildings and small to medium-size systems.

Complete **containerized systems** are a third option, which is used for retrofit on container vessels or on the deck of tankers with no space available elsewhere.
Containerized systems can also be used as port-based systems for treatment of ballast water from a ship without a BWMS installed, or a malfunctioning BWMS.



CompactClean-340 system in standard 20" container

System Delivery, Components Delivery & Containerized Delivery

Electrical Panel

UV-unit

Filter

Loose Component Delivery
Product pictures are not scalable

Frequency Converter

Stripping Pump

Skidmounted delivery

Easy installation on board ships

DESMI Service 24 / 7 / 365

We are here to serve you!
The DESMI Service Team operates globally and around the clock. We can offer simple advice over the phone or full, on-site maintenance and service programmes.

The team is factory-trained and fully capable of meeting both your technical and practical demands. We have customized programmes to meet specific client requirements and be your partner of choice.

DESMI Service Team supports a working culture based on an appropriate respect for health, safety and environmental issues.

In case of emergency breakdowns, we are always able to access our global parts database, sending spare parts or complete pumps 24 / 7 / 365.

Our service includes various concepts and services:

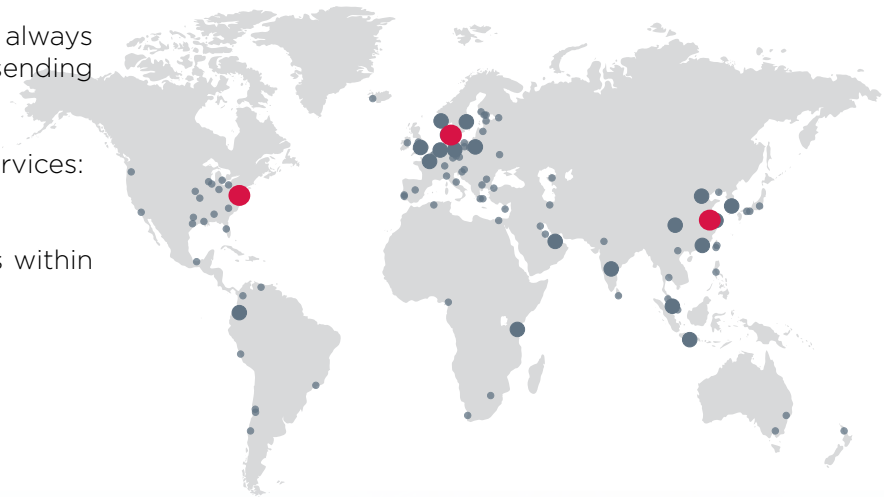
- Genuine spare parts kits
- DESMI 48 - Fast track delivery of pumps within 48 clock hours
- Technical advice by phone
- Skilled service engineers
- Maintenance agreements
- Etc.

Other services from our team also include:

- Documentation & project engineering
- Application guidance
- Pump training seminars
- Etc.

And online you can access our:

- Pump selection programs
- Product videos
- Overhaul videos
- Manuals
- Etc.



Case Story

CompactClean Installation on Board PROVIDANA

The 1000 m³/h / 4403 gpm installation of DESMI Ocean Guard's CompactClean system was conducted in Chengxi Shipyard on the vessel Providana owned by Masterbulk Pte Ltd.

The installation was a full integration of the system, which included:

- A full 1000 m³/h / 4403 gpm CompactClean ballast water management system
- An additional valve package and control system
- Frequency converters on the ballast water pumps
- Deck office operative system
- Internet uplink system

Kevin Leach-Smith, Vice President, Operations, Masterbulk Pte Ltd:

"We chose DESMI's CompactClean system because of the very small footprint and our trust in DESMI as a well-established supplier of marine equipment.
An installation like this is a large project and requires good cooperation between the owner, technical manager, shipyard and system supplier. All parties did a professional job in making this BWMS installation a smooth and efficient process."

Ship's name	MV "PROVIDANA"
Ship type	General cargo/Container Carrier/(DNV) I.D. no.26604
IMO number	9380788
Built	OSHIMA Shipbuilding Co.,Ltd.-Japan / Ship Hull No.10508
Flag	Singapore
LOA	212.5 metres / 697 feet
GT	39,258 MT
DWT	54,810 MT
Ballast cap.	17,833 MT

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