



OptiClean™ - Energy Saving Ballast Water Treatment Concept

The combination of DESMI's proven ballast water treatment system RayClean™ and energy optimization system OptiSave™ provides annual energy savings in addition to IMO compliant treatment of ballast water

DESMI's innovative OptiClean™ concept provides net energy savings in combination with compliant ballast water treatment. This is the first time any type of ballast water treatment concept has been able to provide a net energy saving to ship owners and operators.

By combining DESMI's proven energy saving system OptiSave™ with its type approved and energy efficient ballast water treatment system RayClean™, a ship owner can obtain an annual net energy saving although he treats all ballast water being discharged from the ship.



The OptiSave™ system automatically adjusts the speed of the vessels cooling system pumps to the actual cooling need, which can lead to significant annual energy savings. This is well documented by around 500 OptiSave™ systems sold by DESMI to date.

The RayClean™ system has been designed to be a highly energy efficient ballast water treatment system without any use of chemicals. The system has been designed with highly efficient low pressure UV lamps which means the max power consumption of the system is just 7 kWh for every 100 tonnes ballast water treated.

From July 2017 to mid December 2017 the following savings was accomplished at an onboard installation:

1 seawater pump with an average use of 8 kW used 23 MWh in the test period. If DESMI OptiSave™ had not been installed the normal MWh would have been 53 MWh. This means

that a **total saving of 31 MWh was made**. The RayClean™ ballast water treatment system had 16 ballast operations with a duration of 37 hours in total. The consumption of kWh was in total 723.

This means:
The OptiClean™ concept in this case provided a **net energy saving of 91,980 kWh yearly**, while at the same time treating all discharged ballast water in compliance with the IMO ballast water management convention.

Can you afford to wait on your OptiClean installation?



**Yearly Saving of 91,980 kWh
= 11,830 USD Saving
= ROI in just 15 months**

OptiSave™ + RayClean™ = OptiClean™ - Net Energy Saving System

When the required cooling is lower than the design criteria, OptiSave™ automatically reduces the power consumption of the seawater cooling pumps. This situation occurs when the seawater temperature is lower than 32°C and/or the main engine is operated at reduced load.

It is a fact that only in limited areas in the seas around the world and within certain seasons does the sea temperature ever get this high. This means that sea going vessels are frequently designed with significant over-capacity built into the cooling systems.

Given the over-capacity with the limited ability to regulate the pumps via on/off control and static orifices, DESMI decided to develop an energy optimization system for the marine industry. The DESMI OptiSave™ solution was conceived.

The many benefits of DESMI OptiSave™ are:

- ✓ Energy savings up to 80%
- ✓ Short return on investment
- ✓ Prolonged lifetime of pumps due to less wear and tear
- ✓ Proven technology
- ✓ Proven savings
- ✓ Reduced OPEX



RayClean™ Ballast Water Treatment System is the leading system in the marine industry with unrivalled treatment performance and lowest energy consumption in class.

RayClean™ is IMO and DNV-GL type approved and tested to meet the latest requirements and guidelines adopted by the International Maritime Organisation (IMO) and the US Coast Guard, from which the system also has earned the Alternate Management System (AMS) acceptance.

RayClean™ can be used in all water salinities and temperatures and the approved UV-Transmittance ranges from very high to very low.

- ✓ Based on filtration and UV-treatment
- ✓ No chemicals! No risk of increased corrosion!
- ✓ No hazards to crew, vessel or the environment!
- ✓ Approved for both fresh-, brackish and marine water salinities
- ✓ Alternate Management System (AMS) acceptance by the US Coast Guard (USCG)
- ✓ Approved for extreme water conditions with UV-Transmission as low as 33%
- ✓ Reliable treatment that meets the IMO and USCG discharge standards every time.

