



OptiClean™ - Energy Saving Ballast Water Treatment Concept

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 new and 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 optimization 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 the more than 100 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.

Example: A container feeder vessel operating in Northern Europe with **5.000 seagoing hours** and **3760 harbor hours** in a year, and with cooling pump flow around **200 m³/h** can save approx. **50.000 kWh per year** by installing the OptiSave™ system.

On the same vessel a RayClean™-300 system capable of treating **300 m³/h ballast water**, which is used for **110 ballast operations** in a year, each with a duration of **6 hours** in average, will as a maximum consume about **14.000 kWh**.

This means:

The OptiClean™ concept in this case provides a **net energy saving of 36,000 kWh annually**, while at the same time treating all discharged ballast water in compliance with the IMO ballast water management convention



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.

