

# A Ballast Water treatment system unlike any other

Trojan Marinex is a Trojan Technologies business. Trojan Technologies is the largest UV water treatment company in the world, treating a collective flow rate of over 8 million m<sup>3</sup>/h. Trojan is renowned for expertise in creating, customizing and optimizing UV technology under the highest risk conditions where human well-being literally depends on the equipment operating exactly as needed. Take New York City, for example. In order to meet stringent drinking water regulations, Trojan provided a UV treatment system that plays a critical role in supplying safe drinking water to nearly 9 million people. This system treats a flow rate of 395,000 m<sup>3</sup>/h – that's equivalent to 66 VLCCs.

Direct access to nearly 40 years of industry-defining water treatment expertise, in combination with steadfast backing, has enabled Trojan to create a suite of ballast water treatment systems unlike any other. These systems are purpose-built for the marine environment, and provide filtration + UV in a single, compact unit.



Monitoring pressure differential throughout the ballast cycle, a backwash sequence will be triggered when cleaning is required. This sequence consists of opening an actuated backwash valve and signaling the filter drive motor to initiate a cycle. When covered by the flush arm, flow through a filter element is reversed, flushing out debris and backwash water and returning it to its point of origin. As each individual filter element is cleaned, the remaining filter elements continue to process water. Once the pressure differential falls below the set point, the backwash valve closes completing the cleaning sequence.

The second treatment stage during ballasting is UV. UV light is a form of light that is invisible to the human eye. Its wavelengths are shorter than visible light but longer than X-rays. A

specific range of its wavelengths, those between 200 and 300 nanometres (billionths of a meter), are germicidal, meaning they are capable of destroying the reproductive capabilities of organisms. In ballast water treatment, organisms that are unable to reproduce are ultimately unable to grow, colonize and cause an infestation or nuisance.

Low-pressure UV lamps offer high efficiency and long lamp life. Medium-pressure lamps have higher UV output. The TrojanUV Solo Lamp combines the best features of both, enabling high efficiency, high UV output and long lamp life. This technology is proprietary, and has over six years of development, lab and field testing behind it.

UV lamps are housed in quartz sleeves. Over time, the surface of these quartz sleeves can become fouled with debris, reducing the amount of UV light available for treatment. An automatic, chemical-free cleaning system removes fouling without any interruption to treatment. During deballasting, previously treated water is moved from the ballast tank, bypasses filtration and is again directed through the UV chamber for treatment.

#### SERVICE & SUPPORT

In order to provide customers with an unparalleled level of support, Trojan has formed mutually beneficial, strategic partnerships with organizations around the world. These organizations are helping them provide vessel owners with robust ballast water treatment systems, and 24/7 service.

In Turkey, Trojan's ballast water treatment channel partner network includes Esko Marine Trading Ltd Co. Headquartered in Istanbul, Esko represents several marine equipment manufacturers and



provides support to the Turkish shipping industry. For more information, please visit [www.trojanmarinex.com](http://www.trojanmarinex.com) and [www.eskomarine.com.tr](http://www.eskomarine.com.tr).

Esko Marine Managing Director Erhan Esinduy and Director Adem Kocadağ have both expressed how honored they are to be representing a market leader such as Trojan Marinex.

"Trojan has the know-how, years of experience and is the world's largest UV producers," says Esinduy. "The Trojan Marinex BWT system is like no other in the market – it addresses all the key issues which are of concern to shipowners, including footprint, power

consumption and UV lamp life."

"We believe that once the uncertainty over the regulations and compliance clears in the near future, Trojan Marinex will definitely be one of the most popular and sensible choice of BWT systems," explains Kocadağ. "Together, we will be here to serve shipowners in providing access to the highest quality equipment."

Esko Marine would also like to thank Ulusoy Deniz Yolları and Finner Ship Management for trusting and choosing Trojan Marinex as the Ballast Water Treatment System provider for their entire fleet.

## Answers to your ballast water treatment opex questions

With the wide array of ballast water treatment technologies and solutions on the market, not only should vessel owners assess a manufacturer's ability to achieve United States Coast Guard (USCG) Type Approval, they must also carefully consider operational expenditure (OPEX).

Here are six questions and answers that should help as you continue to evaluate various ballast water treatment system suppliers.

### 1. How prominently should OPEX figure into the buying decision vs. capital expenditures (CAPEX)?

The answer depends on the expected operational life of the vessel. Annual operational expenses can range from 3% to more than 15% of the capital cost of the treatment equipment. A significant portion of these expenditures only occur in later years when replacement and maintenance of the equipment become necessary, so owners deciding to keep a vessel for more than 3 – 5 years should consider OPEX as an important factor.

### 2. What important advantages do various technologies provide that minimize OPEX?

All technologies have operational benefits that can minimize OPEX. For instance, Electrochlorination systems can be very efficient at delivering the necessary dose when ballasting seawater, and a few are designed to reduce electrode scaling by using triple tube electrode (TTE) technology to lengthen the time between cleaning. Alternatively, UV systems are not affected by salinity or temperature, which allows for consistent and reliable performance in all ports. Furthermore, the Trojan Marinex™ BWT system is equipped with TrojanUV Solo Lamp™ Technology. Typical medium-pressure lamps have a life expectancy of 4,000 hours. The Solo Lamp, however, has a life expectancy of beyond 10,000 hours of ballast water treatment operation, which is equivalent to 10+ years.

### 3. Compliance is the driving force for installing a ballast water treatment system. Are there specific compliance costs that ship-

### owners should be aware of?

Compliance costs may include regular calibration of equipment sensors and recurring sampling of the ballast water discharge to evaluate the levels of active substances and disinfection by-products. The USEPA's 2013 Vessel General Permit (VGP) specifies a monitoring schedule for residual biocides sampling of two to four times per year, tested independently, submitted as reported and not averaged, and annual calibration of monitoring equipment. This dual-compliance requirement for all active substance systems (biological and residual biocide monitoring) increases the cost of compliance over physical treatment methods (e.g., UV) and is an additional consideration when evaluating technologies.

### 4. Planned replacement of consumables or equipment is an important consideration when evaluating OPEX. How should a shipowner seek confidence that these expenses are accurate and representative?

Technology is best proven in the

field, but the reality is that few ballast water treatment systems are currently in operation, and disclosure of any operational information has been limited. In light of this, relevant data should be provided by the manufacturer that demonstrates the system's expected performance based on years of testing, experience during the Type Approval process, and track record in other applications. Life cycle testing of critical components is becoming standard practice in the marine industry, and many manufacturers may be able to share the degree of which they stress-tested their technology to support the proposed replacement schedule.

### 5. Unplanned maintenance can greatly impact OPEX. What are some risk areas that shipowners should be aware of?

Anticipating problems requires a degree of familiarity with the equipment and knowledge of what can go wrong. All systems attempt to remain clean during operation, but over time, scaling, biofouling, and sediments can accumulate on critical components and inverse-

ly affect performance or prevent treatment. Similarly, high concentrations of active substances can, over time, cause premature seal failure or adversely affect ballast tank coatings and ballast piping systems. A regular inspection program is necessary to identify early warning signs and resolve issues.

### 6. Periodic cleaning may be important to maintain the performance of a ballast water treatment system. What environmental conditions will impact the frequency of cleaning?

Similar to other marine equipment, periodic cleaning of the equipment may be necessary to maintain performance over the life of the system. Since ballasting rarely takes place in clear marine waters, systems will treat water with sediments, contaminants, and high organic loading that may exceed the capacity of the system. The combination of heavy sediment and biological material loading has been known to affect filters and disinfection equipment uptime, and should be considered when ballasting to signal potential problems.