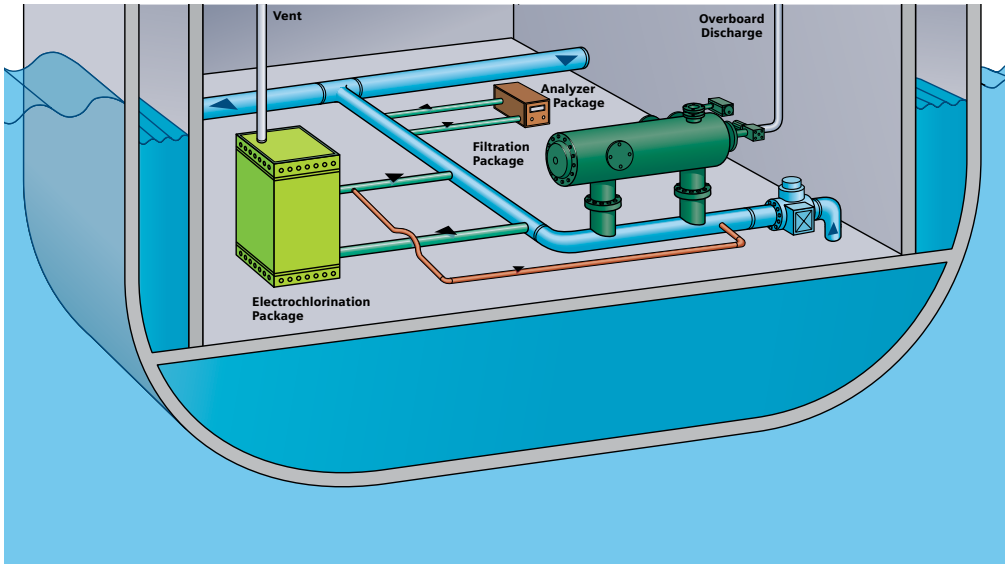




Navigating IMO Regulations with SiCURE™ Ballast Water Management Systems

Water Technologies

SIEMENS



The SiCURE™ system is based on our proven Chloropac® biofouling control system.

Answers for Ballast Water Management

The introduction of Aquatic Invasive Species (AIS) via ships' ballast water is an increasingly disastrous ecological issue. Numerous mechanical, physical and chemical treatments that may reduce such occurrences are presently being investigated. The 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments is the major driving force for the development and adaptation of ballast water treatment systems. Today, new regulations developed by The Maritime Environmental Protection Committee (MEPC) of the United Nations' International Maritime Organization (IMO) are being put in place to address AIS issues.

Siemens Water Technologies helps customers navigate these regulatory challenges by providing cost-effective treatment systems that help conserve energy and that offer flexible equipment configurations requiring virtually no operator attention. Siemens Chloropac® and Capac® technologies are well-regarded in the maritime industry and have been proven to control biological fouling and corrosion wherever sea water is used as cooling or process water. Now, Siemens' newest maritime solution, the SiCURE™ ballast water management system, offers a safe, reliable solution for adhering to IMO regulations for ballast water.



Skid-mounted SiCURE™ system

Since 1950, our proprietary Electrocatalytic line of core technologies has provided superior technical solutions to the maritime industry worldwide. A division of the Siemens Industry Solutions group, Water Technologies, capitalizes on the world-class experience, technology, R&D support, and manufacturing facilities of the group which provides innovative solutions and services to the maritime industry, resulting in improved life cycle costs and reduced system maintenance.

The patent pending SiCURE™ ballast water management system uses a combination of physical separation and a proprietary, on-demand treatment with biocides, produced in-situ from seawater without the addition of chemicals. The system is based on a proven 30+ year history and over 2,500 shipboard installations of Siemens' well-known Chloropac® biofouling control system.

The SiCURE™ system provides a technical solution that is designed to be in full compliance with IMO Convention D-2 regulations for ballast water management.

The SiCURE™ system is based on three pillars:

- Filtration
- Electrochlorination
- Demand-regulated control logic

The major function of the filter in the SiCURE™ system is to remove or break up larger organisms using a 40 micron weave wire screen, and to provide reliable, non-stop operation at high sediment loads while minimizing backwash flow. The patent pending biofouling control provided to the filter assures its reliable function and minimizes maintenance requirements of the system.



Containerized SiCURE™ system

Advantages of the SiCURE™ system

- Treatment only on intake
- In-situ biocide generation
- Flexible footprint
- Dose on demand
- Biofouling protected ballast water filter
- Low energy requirements
- Optional Dual-Action operation
 - Ballast water treatment in port and biofouling control for seawater circuits during voyage

The electrochlorination module of the SiCURE™ system is used to produce a biocide, sodium hypochlorite (NaOCl), from seawater and inject it into the filtered ballast water to eliminate AIS. Sodium hypochlorite, a chlorine compound, has been used for many years to prevent marine growth in the seawater piping and heat transfer systems of land-based, offshore and shipboard installations. The SiCURE™ system uses the most efficient method of hypochlorination by producing sodium hypochlorite in-situ, electrolytically, on demand, using Concentric Tube Electrode (CTE) technology. This hypochlorination technology is based on the Chloropac® system.

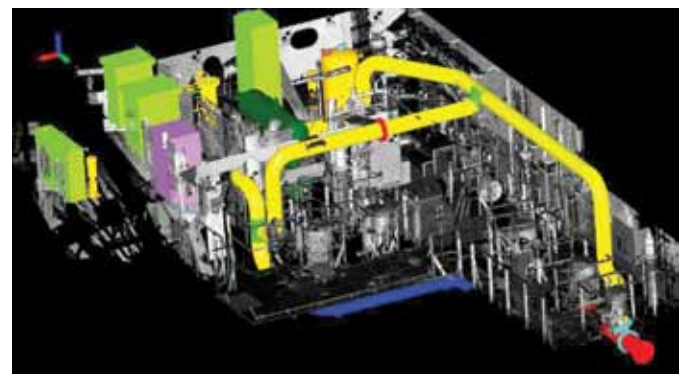
Proprietary control logic of the SiCURE™ system monitors the appropriate hypochlorite dose level necessary to provide the required efficacy while avoiding any detrimental effects on the ship, its crew or the environment. Biocide dosing level is variable and depends on ballast water conditions – the physical, chemical, and biological characteristics that are called, cumulatively, chlorine demand.

The SiCURE™ system treats ballast water only on intake, allowing the system to be sized for ballast water flows (e.g. for one pump) while discharge can be done with higher flow rates (several pumps). This is especially suitable for those container and bulk carrier ships that use only one pump on intake and two pumps on discharge.

Another important feature of the SiCURE™ system is that the generation of sodium hypochlorite solution takes place in a small side stream taken off the ballast water main, minimizing footprint and maximizing available space. This feature is very useful for retrofits where space can be an issue.

Low energy requirements of the SiCURE™ system translate into lower operational costs and elimination of additional generator capacity, further helping with any space limitations.

The self-cleaning design of the hypochlorite generator and in-situ production of the biocide eliminate any need for storage or handling of chemicals.



Loose components in customized SiCURE™ system shown in actual engine room.

Siemens
Water Technologies

USA
+1.908.851.2277

UK
+44.1291.426500

Singapore
+65.6490.6062

sicure.water@siemens.com

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