

19.39 SiCURE™ Ballast Water Management System	
<p><b>Name of System:</b> <i>SiCURE™ BWMS</i></p> <p><b>Manufacturer &amp; Country:</b> <i>Water Technologies, Siemens Industry Solutions, Germany</i></p> <p><b>Status:</b> <i>IMO Basic Approval March 2010</i> <i>Final Approval to be reviewed at GESAMP-BWWG 18 in September 2011</i></p>	
<b>Overview of System:</b>	The SiCURE™ system operates a two stage combined disinfection process on ballast intake only: physical separation by filtration followed by the electrochlorination of seawater producing biocides <i>in situ</i> .
<b>Company:</b>	Water Technologies is a sub-division of Siemens Industry Solutions Division (Erlangen, Germany) and has a wide-ranging portfolio of environmental solutions to help industrial companies use energy, water and equipment efficiently, reduce emissions and comply with environmental guidelines.
<b>The System:</b>	<p>The two stages (with an optional third stage) of the SiCURE™ BWMS are:</p> <ul style="list-style-type: none"> <li>• Filtration – using a 40 µm wire screen to remove or break up larger organisms like plankton and algae. A biofouling control (patent pending) ensures its reliable function and minimises maintenance</li> <li>• electrolysis of seawater using the Siemens Concentric Tube Electrode (CTE) technology to produce NaOCl (sodium hypochlorite) which is injected into the ballast water intake. This technology is well known in the maritime industry under the trademark Chloropac, which has over 2,500 shipboard installations over the last 30 years</li> <li>• optional dechlorination module installed for vessels with voyage times of less than 5 days. Sodium sulphite is used to neutralise remaining TRO in the discharge water.</li> </ul>
<b>Features:</b>	<ul style="list-style-type: none"> <li>• Treatment only on ballast water intake means that discharge can be carried out using several pumps, at higher flow rates. This is particularly suited to container and bulk carriers that use only one pump during ballast intake and two pumps on discharge</li> <li>• <i>in situ</i> generation of biocide (sodium hypochlorite solution) in a small side stream taken off the ballast water main. This maximises space available and is very useful in retrofit installations. It also eliminates the purchase, storage and handling of chemicals</li> <li>• flexible footprint. The system can be supplied pre-assembled for newbuilds or as separate components for retrofits</li> <li>• dose on demand. The hypochlorite level is monitored and adjusted in order to maintain the required efficacy and to ensure excess biocide production does not occur</li> <li>• low energy requirements translate into lower operational cost and the elimination of additional generator capacity</li> <li>• filter protected from biofouling, so increasing reliability and reducing maintenance.</li> </ul>
<b>Further Technical Details:</b>	<p>Hydrogen and oxygen gas, which are by-products of the electrochemical process, are collected in a de-gas tank before being vented overboard. The concentration of the active substances (AS) in the side stream is varied by the current drawn across the electrochemical cells. The SiCURE BWMS applies a variable dosage of AS depending on the oxidising power necessary to achieve disinfection. This is the ORP (oxidation reduction potential).</p> <p>For the effective use of the SiCURE™ electrodes the salinity in the side stream should be <math>\geq 14\text{g/L}</math> chloride. In the application for IMO Basic Approval, it was stated that the SiCURE system should be limited to ships that operate in salt or brackish water and ships that do not operate only in freshwater.</p> <p>In the application for Final Approval it is recommended that ships that occasionally operate in fresh or brackish water have a dedicated ballast tank containing ballast water of sufficient salinity to feed the electrolyser before entering the low salinity area. The SiCURE BWMS can accommodate ballast water capacity from 200 m<sup>3</sup>/hr to 5,000 m<sup>3</sup>/hr ballast flow in 6 to 8 standard size systems. It is primarily aimed at large ocean-going vessels such as tankers, LNG, bulkers and container ships. There is a Dual-Action option that is particularly attractive for newbuilds. In this case, the ship benefits from the design to treat ballast water when the ship is in harbour and also to prevent biofouling when at sea. The system can be delivered containerised, skid-mounted or as modular components, depending on customer requirements.</p> <p>Based on ballast retention times, Siemens will be offering two alternative models of the SiCURE™ system, with and without a dechlorination module. When ballast retention time is <math>\geq 5</math> days a neutralisation module is not necessary since the TRO dissipate to safe levels over that time scale. However, the SiCURE™ system is effective after 24 hours, so for shorter ballast retention times a dechlorination module is installed to ensure effective neutralisation of TRO before discharge.</p>
<b>News:</b>	The application for Final IMO Approval was submitted to the IMO and is scheduled to be assessed at GESAMP-BWWG 18 in September 2011. The results of the assessment will be reported to MEPC 63 in 2012.



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