

U.S. Department of
Homeland Security

United States
Coast Guard



Commandant
United States Coast Guard

2703 Martin Luther King Jr. Ave. SE
Washington, DC 20593-7509
Staff Symbol: CG-OES
Phone: 202-372-1431
Fax: 202-372-8382
Email: John.A.Meehan@uscg.mil

5760
February 12, 2015

Bawat A/S
Attn: Mr. Kim Diederichsen, CEO
Lejrvej 25
3500 Vaerlose
Denmark

ALTERNATE MANAGEMENT SYSTEM ACCEPTANCE

The Coast Guard has completed its review of the Alternate Management System (AMS) application submitted by Bawat A/S for the Bawat ballast water treatment system (BWTS). This letter grants AMS acceptance in accordance with the requirements of 33 CFR 151.2026 for the Bawat BWTS, as type approved by DNV-GL (Det Norske Veritas - Germanischer Lloyd) on behalf of the Danish Maritime Authority and the Danish Nature Agency, and as detailed in DNV-GL type approval (TA) certificate No. P-15056 issued on January 5, 2015 and expiring December 31, 2018.

The Bawat BWTS is assigned the following AMS identification number:

AMS-2015-Bawat-001

Coast Guard acceptance of the Bawat BWTS as an AMS does not accord or imply conformance to or compliance with any other Federal, state, or local water discharge effluent limitations that may apply to the vessel on which the AMS operates or the regulatory regimes and locations within which it operates. The owner and operator of the vessel must comply with all applicable laws, regulations, and treaties, including the Clean Water Act and associated provisions of the Vessel General Permit (VGP); the Federal Insecticide, Fungicide, and Rodenticide Act of 1972, as amended (FIFRA); other Coast Guard safety regulations and requirements; and other applicable laws and regulations.

In accordance with 33 CFR 151.2026 (a)(5), the AMS application required the submittal of a type approval application for the BWTS. The type approval information submitted with the AMS application does not have any bearing on the type approval status of the BWTS, nor does Coast Guard acceptance of the Bawat BWTS as an AMS indicate that the BWTS meets requirements for Coast Guard type approval.

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The following conditions apply for the operation of the Bawat AMS in U.S. waters:

1. The AMS manufacturer must comply with all the general conditions of certification stipulated in the type approval certificate issued by DNV-GL under the authority of the government of Denmark, as referenced above. Revocation of type approval by the approving authority will result in revocation of this AMS acceptance. Copies of all reports required under the stated conditions of use must be submitted to the Environmental Standards Division (OES-3) at the following address or email:

COMMANDANT (CG-OES-3)
United States Coast Guard Stop 7509
2703 Martin Luther King Jr. Ave SE
Washington DC 20593-7509
Tel: 202-372-1402
e-mail: environmental_standards@uscg.mil
2. Installation and repairs of the AMS must be performed in accordance with the manufacturer's instructions and approved by the flag administration or its representative.
3. Operation and maintenance must be conducted in accordance with all specifications and limiting conditions stipulated on the type approval certificate and with the manufacturer's instructions, including any limitations posed by the environment (for example, water quality, temperature, salinity, or other parameters) or vessel operations (for example, voyage duration, pumping rates, or other constraints). The following specific conditions apply:
 - a. **Flow rate:** This AMS is limited to the treatment of flow rates for which the installed system is approved. Treatment rated capacity (TRC) is different for each unique ship installation of this BWTS. In general, TRC is equal to the pumping capacity of the circulation pump that moves ballast water from each treated ballast tank to the heat treatment chamber(s) and the holding tank located in the BWTS pasteurization unit.
 - b. **Heat treatment criteria:** This BWTS disinfects ballast water via heat treatment (pasteurization) and oxygen stripping / displacement, which is accomplished through nitrogen gas injection into the ballast water. This process occurs within the ballast tanks, the adjacent pasteurization unit, and the associated nitrogen injection equipment and circulation piping. Accordingly, the disinfection process does not occur during ballasting or de-ballasting operations, but as part of an in-voyage procedure involving ballast water circulation between ballast tanks and the heat treatment and nitrogen injection components of this BWTS. Since this system uses both pasteurization and de-oxygenation processes to disinfect the ballast water, the salinity and the temperature of the intake ballast water are not limiting factors to effective treatment.

According to the specifications provided in the type approval (TA) certificate and associated design guidelines, the Bawat BWTS is required to have a "pasteurization unit" holding tank (or equivalent arrangement) with an adequate volume to meet

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- design circulation flow multiplied by required holding time. This BWTS is also required to have a heat exchanger designed for each vessel installation in accordance with the Bawat A/S document “Design Guidelines and Operational Sequences, Version D”, in order to ensure a ballast water temperature of at least 72 degrees C (162 degrees F) within the holding tank located downstream of the heat treatment chamber(s). The TA certificate also specifies that treated ballast water must be held within the pasteurization unit holding tank for a minimum of 75 seconds to ensure adequate disinfection. The heat source for the heat exchanger may be hot water from the vessel’s engine cooling water jackets or low pressure steam from a steam generator or waste heat economizer. The number of required circulations and the associated ballast water flow rate through the heat treatment chambers and pasteurization unit holding tank shall be calculated during system design in accordance with the instructions provided by the document “Design Guidelines and Operational Sequences, Version D”. This circulation information is then programmed into the proprietary Bawat BWTS Control and Monitoring Unit (CMU), which provides the capability to monitor and adjust circulation as necessary to meet treatment criteria. One complete circulation is achieved after the entire volume of ballast water in the ballast tank being treated passes through the heat treatment chamber(s). The required dedicated circulation pump may be obtained from pump manufacturers approved by Bawat A/S. The TA certificate specifies a minimum recirculation factor of 5. Recirculation of the ballast water through the holding tank for less than 5 cycles implies that the ballast water has not been treated in accordance with the requirements of the TA certificate.
- c. **De-oxygenation treatment criteria:** According to the type approval certificate for this BWTS, this system must be capable of reducing the dissolved oxygen content in the ballast water in a treated ballast tank to a value equal to or less than 1.5 mg/L (1.5 ppm) via the injection of nitrogen gas. This oxygen stripping / displacement process is accomplished by injecting nitrogen gas from a nitrogen generator (one supplied by a manufacturer pre-approved by Bawat A/S) into the ballast water return line downstream from the pasteurization unit holding tank. The nitrogen infused and heated ballast water is then recirculated back into the ballast tank undergoing treatment through a series of jet nozzles located in the ballast tanks. These jet nozzles, which are supplied by Bawat A/S at the time of system installation, are located between each web frame in accordance with the design criteria provided by the Bawat A/S document “Design Guidelines and Operational Sequences, Version D”. The flow capacity of the nitrogen ($\text{Nm}^3 / \text{hour}$) injected into the ballast water must be equal to or greater than 8% of the total recirculation flow (m^3 / hour) of ballast water through the BWTS in order to ensure oxygen stripping is accomplished in accordance with the limits set by the TA certificate.
- d. **Additional AMS conditions:** The TA certificate for this BWTS lists documentation that must be submitted to DNV-GL for case-by-case approval prior to the installation of this system on any vessel.

The standard Bawat BWTS Control and Monitoring Unit (CMU) is not delivered with a human-machine interface (HMI) or PC that allows operator interaction with

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the system. Instead, this BWTS uses the vessel's ether-net with a vessel owner supplied PC for its operation from the engine control room or other selected location on board the ship. The CMU can also be hardwired directly to a PC for operator control purposes. The PC used for this purpose shall be of a type approved by DNV-GL or shall carry documentation to prove compliance with DNV Standard for Certification No. 2.4.

The Bawat BWTS must be equipped with a water flow meter, a nitrogen flow meter, water pressure sensors, a dissolved oxygen sensor, and water temperature sensors installed in accordance with the information provided in the Bawat A/S document "Generic Piping and Instrumentation Diagram, Revision A".

The Bawat BWTS CMU is equipped with critical alarm capabilities. One of the most important alarms relates to the temperature of the ballast water in the ballast tank being treated. If the temperature of the ballast water in the tank undergoing treatment exceeds 50 degrees C at the temperature sensor location, an alarm will actuate at the operator station. The system is capable of undergoing a controlled stop in 5 minutes if corrective actions are not taken by the operator. Other critical alarms, including those related to water flow, nitrogen flow, and the dissolved oxygen content of the ballast water, are discussed in the Bawat BWTS "Operation, Maintenance, and Safety Manual".

A historical record documenting that the system has been operated within these criteria, including a record of any alarm conditions, shall be made available for review onboard the vessel.

4. If installed on a U.S. flag vessel, it must be shown that the system and installation comply with or provide an equivalent level of safety to the requirements of 46 CFR Subchapter F (Marine Engineering) and Subchapter J (Electrical Engineering). All electrical equipment located within hazardous areas must be explosion proof or intrinsically safe as certified by an independent laboratory recognized by USCG per 46 CFR 111.105-7.
5. Use of the AMS is specified in the ship's ballast water management plan (BW plan), required by 33 CFR 151.2050(g). The BW plan must identify the following: (1) the ballast water management practices to be used in the event the AMS cannot be used, and (2) the personnel responsible for the operation, maintenance, and repair of the BWTS. An up-to-date record of the operation, maintenance, and repair of the BWTS must be maintained onboard the ship.
6. Any change in design, materials, manufacturing, or intended operational conditions of this BWTS without prior notification to, and acceptance by, the U. S. Coast Guard will automatically invalidate this AMS acceptance. Prior to any such change, the manufacturer of an AMS must notify the Commanding Officer, U. S. Coast Guard Marine Safety Center (MSC), at the following address or e-mail:

Commanding Officer (MSC)
Attn: Marine Safety Center
U.S. Coast Guard Stop 7410
4200 Wilson Blvd, Suite 400
Arlington VA 20598-7410
e-mail: msc@uscg.mil

The notification must include the following: (1) a description of the change, the reason it is required, and its intended advantages; (2) an explanation of any effect of the change on installation, operation, maintenance, or repair requirements; and (3) an indication of whether or not the original configuration of the BWTS will be discontinued.

7. If the installed AMS does not operate properly when treating ballast water intended for discharge in U.S. waters, the person directing the movement of the vessel must ensure that the problem is reported to the nearest Coast Guard Captain of the Port (COTP) or District Commander as soon as practicable. The Coast Guard shall be notified of any treatment system or component failures, irreparable damage to components of the AMS, frequent process upsets or out-of-bounds operating conditions, or other situations or process-related conditions that may reduce treatment effectiveness. The vessel may continue to the next U.S. port of call, subject to the directions of the COTP or District Commander, as provided by 33 CFR 160.
8. All transport and handling of chemicals required for proper operation of the AMS must be conducted in accordance with 46 CFR 147 (Hazardous Ships' Stores), 49 CFR 171-180 (Hazardous Materials Regulations), and 46 CFR 98.30 (portable tanks), as appropriate.
9. Use of the AMS must be reported in the ship's ballast water management reports submitted to the National Ballast Information Clearinghouse, as required by 33 CFR 151.2060, as follows:
 - a. In Section 4, report the number of tanks treated by the AMS in the space labeled "Underwent Alternative Management";
 - b. In Section 4, write the AMS identification number (AMS-2015-Bawat-001) in the space labeled "Please specify alternative method(s) used, if any", and;
 - c. In Section 5, in the middle section titled "BW MANAGEMENT PRACTICES" identify the management method as "ALT" under the heading "Method (ER/FT/ALT)" for each tank for which the AMS was used.

The Coast Guard may suspend, withdraw or terminate the acceptance of this BWTS as an AMS in accordance with 46 CFR 2.75-40, 2.75-50(a) and 2.75-50(b), respectively.

A copy of this letter shall be provided to each vessel with this installed AMS and shall be available for review when the vessel is operating in U.S. waters.

Subj: AMS ACCEPTANCE LETTER – BAWAT

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I thank you for your dedicated efforts to seek out AMS acceptance, and we look forward to working with you throughout the type approval process. If you have any questions concerning this letter, you may contact Mr. John Meehan of my staff at John.A.Meehan@uscg.mil.

Sincerely,



R. E. BAILEY

Captain, U.S. Coast Guard

Office of Operating and Environmental Standards

By direction