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June 16, 2016

Alfa Laval Tumba AS  
Attn: Mr. Niclas Ericson  
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SE-147 80 Tumba  
Sweden

#### ALTERNATE MANAGEMENT SYSTEM ACCEPTANCE

The Coast Guard has completed its review of materials submitted in addition to the Alternate Management System (AMS) application submitted by Alfa Laval Tumba AB (part of AlfaWall AB) for the PureBallast 3.0, 3.0Ex, 3.1, and 3.1Ex 3.1 ballast water treatment systems (BWTS). This letter, which is a revision to the AMS acceptance letters issued June 4, 2014, grants AMS acceptance in accordance with the requirements of 33 CFR 151.2026 for the PureBallast 3.0 and 3.1 models, as type approved by Det Norske Veritas-Germanischer Lloyd (DNV-GL) on behalf of the Norwegian Maritime Directorate and as detailed in DNV-GL type approval certificate No. TAP0000010 issued July 3, 2015, and expiring June 30, 2018. *This revised AMS acceptance letter recognizes the updated type approval for PureBallast 3.0 and 3.1, including the "Ex" models; this revised AMS letter also recognizes the constraints and requirements DNV-GL specifies for the expanded operating range.*

The PureBallast 3.0, 3.0Ex, 3.1, and 3.1Ex models accepted for use as an AMS in U.S. waters are available with the following treatment rated capacities (TRC):

| <b>Model</b> | <b>TRC (m<sup>3</sup>/h)</b> | <b>Model</b> | <b>TRC (m<sup>3</sup>/h)</b> |
|--------------|------------------------------|--------------|------------------------------|
| <b>87</b>    | 32-87                        | <b>750</b>   | 100-750                      |
| <b>135</b>   | 42-135                       | <b>1000</b>  | 100-1000                     |
| <b>170</b>   | 50-170                       | <b>1200</b>  | 120-1200                     |
| <b>250</b>   | 30-250                       | <b>1500</b>  | 200-1500                     |
| <b>300</b>   | 30-300                       | <b>1750</b>  | 200-1750                     |
| <b>500</b>   | 60-500                       | <b>2000</b>  | 200-2000                     |
| <b>600</b>   | 60-600                       | <b>3000</b>  | 200-3000                     |

The Alfa Laval PureBallast 3.0, 3.0Ex, 3.1, and 3.1Ex models are assigned the following AMS identification number:

AMS-2016-Alfa Laval-PureBallast-001

According to the DNV-GL type approval certificate, the difference between the PureBallast 3.0 and 3.1 models is the inclusion of updated electrical components in the 3.1 models; the biological treatment function is the same.

Coast Guard acceptance of the Alfa Laval PureBallast 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 Alfa Laval PureBallast 3.0 /3.1 BWTS as an AMS indicate that the BWTS meets requirements for Coast Guard type approval.

The following conditions apply for the operation of the Alfa Laval PureBallast BWTS in U.S. waters:

1. The AMS manufacturer must comply with all general conditions of certification stipulated in the TA certificate issued by DNV-GL under the authority of the Norwegian Maritime Directorate, 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  
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 certificate of type approval 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 rates:** The flow rate of ballast water through the system should not be greater than or less than the TRC value for the model listed above. Flow capacities greater than 1,000 cubic meters/ hour are achieved by installing PureBallast UV Advanced Oxidation Technology (AOT) reactors in parallel configurations, as detailed in the PureBallast Design and Installation Guide and the type approval certificate. The control panel provides a historical record of flow rates.
- b. **Differential pressure across the filter:** The PureBallast BWTS may be installed with any of three automatic self-cleaning filter types. In accordance with the type approval certificate, the filters have the following design features and salinity limitations:

|  |                                      |  |                              |
|--|--------------------------------------|--|------------------------------|
| <b>Filter Model</b>                          | Hydac AutoFit RF 10 Automatic Filter | Boll & Kirch Automatic Self Clean Type 6.18.3 Filter | Filtrex ACB Automatic Filter |
| <b>Screen Size</b>                           | 50-um wire mesh                      | 40-um wire mesh                                      | 20-um wire mesh              |
| <b>System Design Pressure</b>                | 6 Bar                                | 6 or 10 Bar  | 10 Bar                       |
| <b>Pressure Differential for Backwashing</b> | 0.85 bar                             | 0.38 Bar   | 0.5 Bar                      |
| <b>Salinity Limitations</b>                  | Brackish and marine only             | Brackish and marine only                             | None                         |

The filters will automatically backwash when the differential pressure across the filter reaches the pressure indicated in the table. The control system activates an alarm if the differential pressure is greater than the permitted maximum for the installed filter type. The control panel retains a record of pressure differentials and any associated alarms.

- c. **UV intensity, transmittance, and dosage:** An internal sensor measures UV intensity within the reactors. The PureBallast BWTS is also equipped with a UV power optimization control. This control reduces UV lamp power output by up to 50% in favorable water conditions (such as when turbidity is low). The reduction in lamp power is determined based on input from the UV intensity sensors in the reactors.

The minimum permissible UV intensity within the reactors with size capacities of 170 m<sup>3</sup>/h to 600 m<sup>3</sup>/h when used with the Hydac or Boll & Kirch filters is 312 Watts/square meter (W/m<sup>2</sup>). When these reactors use the Filtrex filter, the minimum UV intensity is 210 W/m<sup>2</sup>. The minimum permissible UV intensity within the 1,000 m<sup>3</sup>/h reactors when used with the Hydac or Boll & Kirch filters is 380 W/m<sup>2</sup>; with the Filtrex filter, the minimum intensity is 252 W/m<sup>2</sup>.

Minimum permissible UV intensities when using a Hydac or Boll & Kirch filter correspond to a 50% UV light transmission within the reactor. Minimum permissible UV intensities when using a Filtrex filter correspond to a 42% UV light transmission within the reactor. UV intensities below these minimum permissible levels indicate that the ballast water is not being treated in accordance with the DNV-GL type approval certificate. An alarm will actuate at all control panels if UV intensity falls below the permissible minimum value for the installed system. The control panel retains a historical record of UV intensity and any alarm conditions.

*A historical record documenting that the system has been operated within these criteria, including a record of any alarm conditions, any deviations from the manufacturer's operating instructions, or any conditions and requirements noted above, shall be available for review onboard the vessel.*

4. The PureBallast BWTS employing the Filtrex filter has been successfully tested in freshwater during type approval. Therefore, PureBallast systems employing approved Filtrex filters are accepted as an AMS for use in all fresh, brackish, and marine waters with salinity concentrations less than 1 practical salinity unit (PSU) and above. PureBallast systems employing Hydac or Boll & Kirch filters have not been successfully tested in freshwater with a practical salinity unit (PSU) concentration of less than 1. . Therefore, PureBallast systems using Hydac or Boll & Kirch filters are not accepted as an AMS for use in U.S. waters with a PSU concentration less than 1.
5. As required by the type approval certificate, changes in the system's computer software or logic controllers must be recorded and reported to DNV. Major changes, as defined in the type approval certificate, must be approved before installation or upgrades.
6. The PureBallast "Ex" models (reactor sizes 300, 600, and 1,000) are type approved for use in hazardous areas; however, Ex certification is not covered by the type approval certificate. As required by the certificate, installation in hazardous areas must be approved by a recognized certification body or class society.
7. 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.

8. Use of the AMS must be 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.
9. 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 Headquarters  
2703 Martin Luther King Jr. Ave. SE  
Washington, DC 20593-7509  
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.

10. 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, any irreparable or recurring 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.
11. 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.
12. 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:

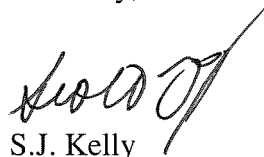
- a. Report the number of tanks treated by the AMS in the space labeled “Underwent Alternative Management,”
- b. Report the AMS identification number (AMS-2016-Alfa Laval-PureBallast-001) in the space labeled “Please specify alternative method(s) used, if any,” and
- c. Report the “BW MANAGEMENT PRACTICES” 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.

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 Ms. Regina Bergner of my staff at Regina.R.Bergner@uscg.mil.

Sincerely,



S.J. Kelly

Captain, U.S. Coast Guard

Office of Operating and Environmental Standards