

Alfa Laval PureBallast 3 Ex booster pump unit (BPU)

Optional pressure supply for vessels with deckhouse installations



The technical teams for Alfa Laval ballast water treatment systems and Framo pumping systems have developed a solution for providing additional pumping head when PureBallast 3 Ex is installed in a deckhouse. By ensuring that the PureBallast 3 Ex system can handle its own pressure requirements, the optional booster pump unit (BPU) removes the need for changes in the existing ballast pumping system, thereby retaining its optimization and the vessel's cargo offloading rates.

For more information about deckhouse installations, please refer to the deckhouse product leaflet for Alfa Laval PureBallast 3 Ex.

Application

A ballast water treatment system may be installed in a deckhouse for several reasons. A large portion of the world's tanker fleet uses submersible pumps, e.g. Framo pumps or the equivalent, to eliminate the need for a pump room and maximize space for the transport of product. Other vessels simply lack internal space, or their pump room is classed as Zone 0 because they sail under the United States flag. Whatever the reasons for doing so, installing a ballast water treatment system at deck level can pose challenges. The system's filter backflushing sequence may require pressure in excess of those available from today's market-standard submersible ballast pumps.

Integrating a BPU into the deckhouse ensures that sufficient backflushing pressure is generated by the ballast water treatment system itself. This avoids complex and time-consuming modifications to an already optimized ballast water pumping system.

Benefits

- Retained optimization of the existing pumping system
- Pressure self-sufficiency within the Alfa Laval PureBallast 3 Ex system
- Energy efficiency through only-as-needed BPU operation
- No pressure drop when the BPU is idle
- Soft starts that prevent unwanted loads
- Full backing from Alfa Laval's global service organization

Configuration

The BPU (blue in image on reverse) is located within the PureBallast 3 Ex deckhouse and is completely separated from the existing ballast pumping system. In addition to the pump itself, the solution comprises logic and variable-frequency drive (VFD) control that are managed by the PureBallast 3 Ex system.



Safety classification

All BPU components are classified for use in hazardous areas in accordance with the IEC 60079 series of standards:

- ATEX certified Zone 1
- Explosion group IIB + H2
- Temperature class T4 (135°)
- Operation

The BPU boosts the ballast water pressure as needed, based on data gathered from several transmitters and provided via the PureBallast 3 Ex control system. Typically, a boost is needed during the filter backflushing sequence when ballasting and cargo unloading occur simultaneously. The BPU can also support other situations, such as deballasting when the the PureBallast 3 Ex system filter is bypassed (UV treatment only), to avoid unnecessary strain on the ballast pumps.

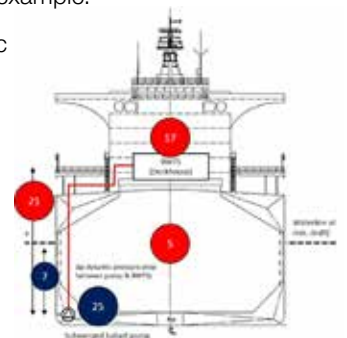
BPU operation is steered by the VFD integrated into the PureBallast 3 Ex control system. This means the BPU runs only when needed and provides only the exact amount of extra pressure required, which ensures optimal energy efficiency. Because the pump freewheels in idle mode, it does not use any power or cause any pressure drop in the ballast water flow when idle. Likewise, the VFD ensures very soft starts that avoid unwanted loads on the vessel's electrical supply.

PureBallast 3 Ex system	Ballast flow (m³/h)	Deballast flow (m³/h)	Duty motor power up to 13 mlc (kW)
600	600	600	0 – 45
750 / 1000	750 / 1000	1000	0 – 63
1500	1500	1500	0 – 91
2000	1500 / 2000	2000	0 – 126

Usage example

In general, a BPU should be used on all MR tankers whose ballast pumps are designed with less than 25–35 m of discharge head, or mlc (meter liquid column). The image here shows a typical example:

- Ballast pump provides 25 mlc
- Draft adds approx. 7 mlc
- Height to ballast water treatment system is approx. 21 mlc
- Dynamic pressure loss is approx. 5 mlc



In total: $25 + 7 - 21 - 5 = 6$ mlc

Since the ballast water treatment system requires around 17 mlc, the installed ballast pumps alone will not support proper backflushing, which may result in failure and the shut-down of cargo operations. Installing a BPU, or a combination of a BPU and backflush pump, inside the deckhouse will remove this problem by ensuring adequate discharge head in the ballast water treatment system at all times.

Scope

- The BPU scope of supply includes the following:
 - High-quality, low-maintenance electric propeller pump
 - VFD
 - Converter
 - Control panel
 - Transmitters
 - Flow and pressure at booster pump inlet and outlet
 - Leakage detection for pump house

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