

IMPORTANCE OF PERFORMANCE, RELIABILITY AND SERVICING OF MARINE PUMPS

▶ FLUID MANAGEMENT IN THE MARITIME SECTOR

Today's shipping vessels operate with a constant flow of diverse fluids moving inside and through different machinery and systems for numerous purposes. Virtually every major machine and/or operation on-board a ship is supported by a pump—in fact, few systems or auxiliary machinery could run without them.

▶ PUMPS THAT WORK AS HARD AS YOU DO

For over 85 years, ARO® has designed and manufactured industrial pumps for some of the world's most extreme operating environments, including the marine industry. ARO pumps are designed to meet the most critical needs of maritime operators guaranteeing performance and reliability when you need it.

ARO pumps are manufactured to strict industry standards and are covered by a five-year warranty for quick replacement of certain non-consumable parts such as castings. Built to take on a wide range of marine applications, ARO pumps offer lasting performance value and easily configure with existing on-board systems. Known worldwide, ARO maintains an extensive global supplier network that spans every major port for access to parts and technical support wherever the user is located.

▶ MARINE FLUID TRANSFER APPLICATIONS

Fluid management is central to all marine vessels. ARO air-operated diaphragm (AOD) pumps, centrifugal and piston pumps are used in numerous on-board applications including:

- Dewatering Systems
- Deck washing and jet washing pumps for low and high-pressure cleaning applications.
- Fuel transfer pumps move different forms of on-board fuel from one repository to another.
- Chemical transfer and dispensing.
- Lubrication to prevent engine and gearbox seizing.

▶ CARGO TANK CLEANING

Cargo tank cleaning is routinely done in preparation for new cargo. Assigned to the deck crew, tank cleaning is typically done following cargo discharge. Safety measures include a detailed cleaning/purging work plan, the use of proper protective apparel and positive air-pressure monitoring during the cleaning operation.

Tank cleaning systems may be portable or fixed. Portable machines are connected by hose to a deck water-main and introduced into the tank through a tank cleaning hatch. On-board tankers and other carriers that require heavy-duty tank stripping maintain fixed washing systems and may also deploy vacuum cleaning systems to collect liquids over long-lifting heights and horizontal lengths. Hand-held water jet guns are helpful for cleaning smaller tanks, working in restricted areas or where intensive spot cleaning is required.



The pump is at the heart of tank cleaning systems whether fixed or mobile. The ARO Pit Boss™ pump is perfectly suited to high-volume applications where performance is a must. With leak-free fluid handling, this submersible AOD pump helps eliminate

messy and/or dangerous leaks during cleanup applications creating a safer work environment. As it can be submerged, this pump is also ideal for clearing slurries from the bottom of tanks. Compact and portable, the Pit Boss is also a popular choice for limited-space environments. In addition to tough dewatering jobs and solids-handling applications, it can also be used for surface-prep and blast cleaning of decks, deck machinery and anchor chains.



ARO piston pumps or wash pump systems complete with suction and high-pressure jet hose can be mounted on a heavy-duty cart for easy on-deck transport. Wash pump systems offer a convenient portable solution for cleaning tanks and removing stubborn debris from other exposed surfaces.

▶ METERING PUMPS

Metering pumps are typically in the form of chemical dosing pumps used to transfer precise amounts of chemicals or other media. On ships, dosing is used to ensure proper boiler operation and for adding chemical additives to protect against corrosion in cooling water systems. Both of these applications require precise fluid or media dosing. Over- or under-dosing may cause corrosion and other damage.

Air-operated diaphragm pumps offer highly-reliable dispensing functionality and can handle both viscous and non-viscous fluids. ARO AOD Electronic Interface pumps can be equipped with the ARO Controller, a closed-loop system designed to control multiple pumps, customize production lines and remotely monitor fluid transfer to - ensure precise dosing with greater efficiency and less downtime. Benefits of a closed-loop controller include live-time leak detection, automatic pump performance monitoring and emergency shutdown.



▶ WASTE WATER

Ships produce two types of wastewater:

- Gray wastewater from sinks, laundries and showers.
- Black wastewater containing sewage or water used in medical procedures.

IMO law bans the discharge of gray or black wastewater into the open sea. Several types of equipment installed in the engine room are used in treating wastewater prior to the proper disposal of the processed water and remaining sludge. These may be complete systems containing the tanks, pumps and piping to move waste water through the treatment process and achieve environmentally acceptable standards prior to discharge.

Pumps used in processing wastewater are self-priming and have no seal to securely pump waste materials. They are designed to handle viscous and abrasive media as well as solids. ARO offers a variety of pumps designed to tackle the complex challenge of wastewater. With leak-tight bolted construction and a corrosion-resistant center body, these pumps feature an unbalanced major air valve to help eliminate valve centering and pump stall-out even under low air inlet pressures.



Air-operated diaphragm pumps are ideal for wastewater systems. This type of positive displacement pump is tough enough to withstand submersion and continuous flow rates inherent in this type of application. Ideal for low- to mid-range flow rates—up to 350 gallons per minute—AOD pumps produce enough back pressure, up to 250 psi, to move highly viscous fluids and sludge.



▶ PUMP SELECTION AND MAINTENANCE

The purchase price of a pump is a rather small piece of the total cost-of-ownership. Calculate downtime as well as labor and parts/servicing costs against the large number of pumps aboard a ship and the users is dealing with a sizeable financial commitment. By ordering from a reputable and reliable pump manufacturer such as ARO, you're assured lasting performance and lower lifetime operating costs.

After decades of working with customers to solve some of the most complex fluid handling challenges in demanding and often extreme conditions, ARO pumps are recognized above all for reliability and ease-of-use. When it comes to keeping ships moving on the open sea, you can trust an ARO pump to get the job done.

ARO, a brand of Ingersoll Rand and member of IMPA, is Fluid Intelligence. A leading worldwide manufacturer of fluid handling products that are expertly engineered to deliver performance and serviceability, enabling our customers to achieve the best total cost of ownership. Learn more at AROzone.com. ARO will also participate in IMPA London 2015.