

- low fluid shear
- high reliability/long service life/low maintenance
- low NPSH requirement
- handles entrained gases
(advantage vs. centrifugal)
- positive displacement maintains critical flow in case of back pressure increase (advantage vs. centrifugal)
- high volumetric efficiency
(advantage vs. other PD's and centrifugal)

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Leistritz Pumps in Shipbuilding Industries

Leistritz Pumpen GmbH with its headquarters in Nuremberg, Germany has been producing screw pumps since 1924. These are positive displacement pumps designed to pump liquids of various viscosities.

The screw pumps are successfully used in the shipbuilding and in other industries (e.g. oil & gas, chemical industry or energy sector). Latest technology in combination with strictly controlled quality is the basis for the globally recognized product efficiency and reliability. Producing the world's widest range of screw pumps, Leistritz can offer complete pump systems and packages as perfect partner in the shipbuilding industry.

The testing of the pumps by admitted classification societies as ABS, BV, DNV, GL, LRS, RINA and others is made on Leistritz test fields to generate contribution to international shipping safety and maritime regulation. Ships are one of the oldest means of transportation in history. Due to the globalization with its worldwide freight and goods traffic, the shipbuilding industry increases constantly the past

decades and the growing demand for larger and faster ships is still on a high level.

Lube oil system in engine rooms

The screw pumps series L3NG for lube oil transfer fulfil various applications around the ship engine. This series is available in foot, flange and pedestal version for various installations. With one design but different housing materials and seals, all different kind of lube oils can be handled. According to Leistritz standard, the pumps are equipped with mechanical shaft seal.

In main and pre lube oil applications for diesel engines, screw pumps series L2, L3 and L5 are used. Besides submerged versions for tank installation and dry mounted versions, also flanged pumps, directly driven by the main engine, are available. Submerged pump versions save space and grant trouble free starting at cold conditions. Special tailor made designs can be supplied in cooperation with the engine manufacturer. Screw pumps are known for excellent NPSH values and noiseless running. They are properly designed to accept high percentages of dissolved air in lube oil.

Fuel oil system in engine room

Fuel oil modules for supply of diesel engines are operated by screw pumps series L3NG as feeder and booster pumps in flange or pedestal design. Parallel to conventional mechanical shaft sealing systems for these pumps, also magnetic couplings are more and more used. Especially when heavy fuel oil with temperatures above 120°C will be handled, this sealing system grants zero leakage and a maintenance free design.

Steering gears and pitch propellers

Nearly all hydraulic devices on ships include applications for screw pumps. Central hydraulic systems, e.g. for the supply of hydraulic motors, hydraulic driven propellers and steering gears are only a few examples. Steering gears have an important function for ships. Therefore the usage of high reliable parts is a must. Screw pumps L3MF in duty or standby configuration provide proper fluid delivery and pressure to the actuator. For steering gears a 100-hour test of Leistritz screw pumps was made successfully under classification supervision in order to prove the reliability of these pumps under different working conditions.

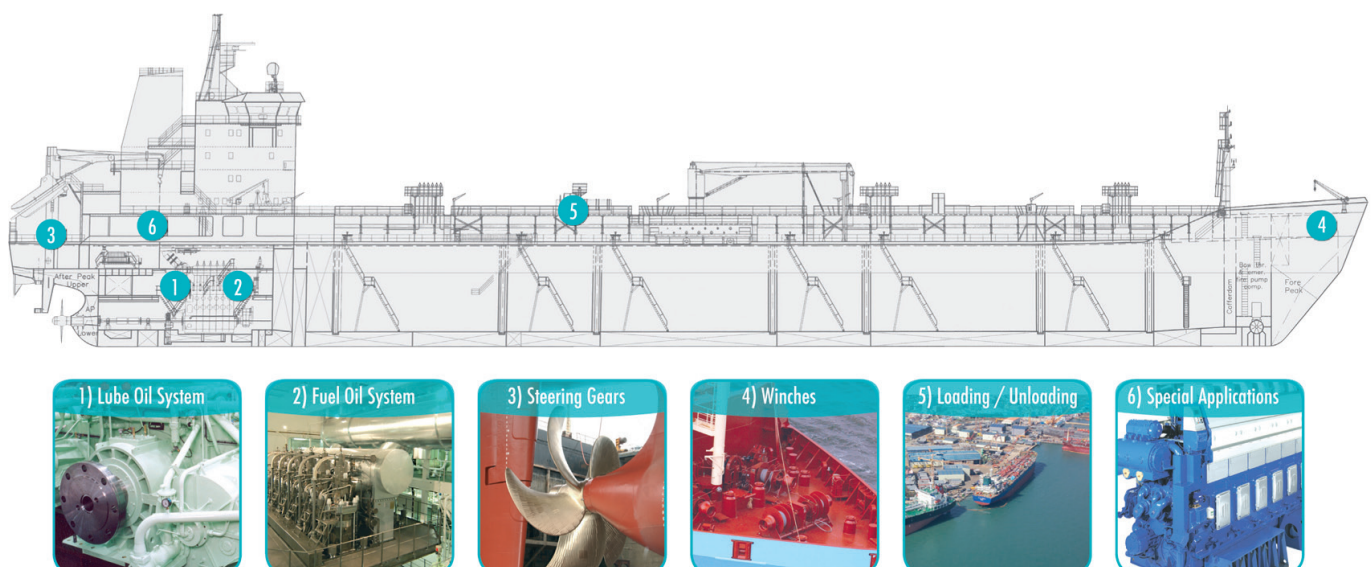


Fig. 1: Illustration of several shipside applications for Leistritz Screw Pumps Series L2, L3, L4 and L5



Fig. 2: Fuel Oil Feeder and Booster Pump L3NG with magnetic coupling

Winches

On ships and vessels several winches are in use for e.g. pulling anchors or mooring lines. Winches with gear assemblies are often powered by special hydraulic drives. Pump series L3MF reliably supply fluid to the components of the system. The pressure demand in the system develops as a reaction to the workload. According their operating principle, screw pumps, equipped with appropriate driving power, always operate against the effective pressure demand of the system.

Loading and unloading

Cargo fluids from low viscous diesel oil to high viscous bitumen, asphalt or molasses are handled with Screw Pump Series L2/L4/L5. The design and operating principle of these pumps ensure a very low noise level and almost pulsation free delivery. In use with frequency controlled motors, based on the nearly linear relation of speed and flow rate of the Leistriz screw pumps, the delivery rate can easily be adjusted by changing the speed of the pump. Alternatively screw pumps can be driven by hydraulic motors as well. Available materials for pump casings are cast iron, nodular cast iron, cast steel and stainless steel, relating to the necessities of the application and cargo products. Leistriz screw pumps are either available as submerged unloading and stripping pump or also for dry installation on the tank top. For hazardous areas, Leistriz offers gastight bulkhead seals (type approved) where the motor is installed in safe area.

Example given: Leistriz submerged Universal Cargo Pump for unloading processes

Deck installations of cargo screw pumps usually are not able to satisfactorily unload the full range of cargo viscosities in tanks with depths of



Fig. 3: Bitumen Tanker

more than 7 to 8 meters. Such installations cannot provide suction conditions necessary to avoid cavitation effects during unloading and stripping. Furthermore, other standard submerged pump types are normally not able to provide proper stripping and draining.

Leistriz Pumpen GmbH manufactures a special submerged pump series L2NT/L5NT, which is installed in a separate barrel, normally hanging from the deck in the aft cargo tank (Fig. 1). The barrel works as a large suction chamber providing the pump with additional suction power. The pumps have only one shaft seal (stuffing box or mechanical seal) to the atmosphere. They are suitable for handling hydrocarbon products and other viscous liquids including slightly abrasive and corrosive fluids. Special profiled screws provide continuous, almost pulsation-free pumping of cargo liquids at low power consumption. With the suction line flange of the barrel connection placed above the inlet of the pump, the entire pump is flooded by the pumped liquid. Therefore the pump handles entrained air and gases without vapour locking or losing prime. Pumps in asphalt operation are recommended with heating coils in the suction area of the barrel as well as with heating jacket for the stuffing box. With normally at least two pumps installed, each pump can be designed with full unloading capacity to achieve complete system redundancy. With the layout of the suction piping system (Fig. 2) any of the pumps can service any of the cargo tanks. The pumps can be driven either by diesel engine through a right angle gear connected to the vertical drive shaft or by electric motor and optional variable frequency drive. This helps to strip the line and tanks in order to optimize the total cargo discharge time.

Special Applications

Leistriz offers a wide range of tailor made and customized screw pump designs. Direct flanged Lube Oil Screw Pumps L3NG for main diesel engines are used by all well-known four stroke engine manufacturers. Further special screw pump designs are made for manufacturers of gear boxes for ships. These pumps are flanged on gearboxes and driven directly through gears. For Naval Industry demands, Leistriz delivers gear driven and electrically driven pumps which are non-magnetic and shock-resistant, being built according to the rules of BV043/044 and operating in submarines as well.

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