

SHIPBUILDING

Screw Pumps & Systems



PUMP TECHNOLOGY

Leistritz Pumpen GmbH, with its headquarters in Nuremberg/Germany, has been producing screw pumps since 1924. The first Leistritz screw pump was developed by Paul Leistritz as main lube oil pump for bearings of steam turbine generator sets.

Now, nearly one century later, Leistritz offers the widest product range of screw pumps world-wide, and has become a reliable supplier and partner for complete plant engineering with an extended scope of supply.

The testing of the pumps through all well known classification societies as ABS, BV, DNV, GL, LRS, RINA and others is made on Leistritz test fields to generate contribution to international ship-ping safety and maritime regulation.

Permanent improvement and development of latest technology in combination with strictly controlled quality is the basis for the globally recognized efficiency and reliability of Leistritz screw pumps.



Cruise Liner



Tanker



Containership



Frigate/Corvette

» The international requirements for the operational reliability of ships and machines in the ship-building and marine sector as well as the general conditions and limitations regarding energy efficiency and the emission of pollutants are constantly increasing. Leistritz has been meeting these rising requirements for decades. High-quality products and the globally unique range of different types of screw pump designs offer the corresponding sustainability. «



Steering gears and pitch propellers

- Feeder and booster pump for fuel oil modules
- Transfer pump for fuel and diesel oil



Special applications

- Customized screw pump solutions
- Example: direct flanged pump on diesel engine



Lube oil system for engine rooms

- Main engine lube oil pump for diesel engines
- Transfer pump for lube oil



Fuel Oil System for Engine Rooms

- Feeder and booster pump for fuel oil modules
- Transfer pump for fuel and diesel oil



Loading and Unloading

- Cargo pump for loading and unloading tankers



Winches

- Hydraulic pump for winches

LUBE OIL SYSTEMS

Main engines on sea going vessels are today mostly diesel engines. These engines, including their added components and peripheral equipment are subject to stresses and loads when operating at sea and have to fulfil detailed rules and requirements. For lube oil supply to the main engines, pumps are required, which must simultaneously guarantee appropriate flow and pressure, reliable operations in rough sea state, small installation space, high robustness and long service life.



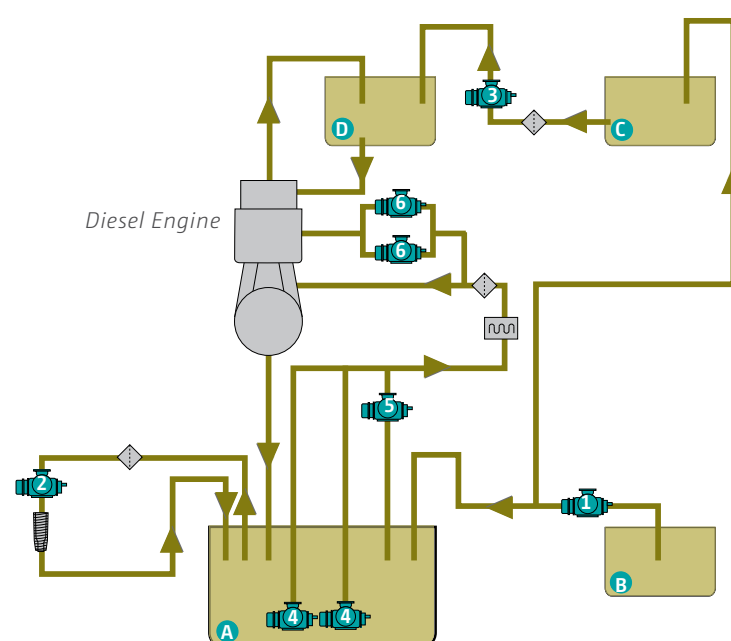
LEISTRITZ TRANSFER PUMP L3NG FOR LUBE OIL

Leistriz screw pumps series L3NG for lube oil transfer fulfil various applications around the ship engine. The L3NG series are available in foot, flange and pedestal version for various kinds of installation. With one design but different pump materials and seals all different kinds of lube oils can be handled. The standard sealing for L3NG series is made by mechanical shaft seal.



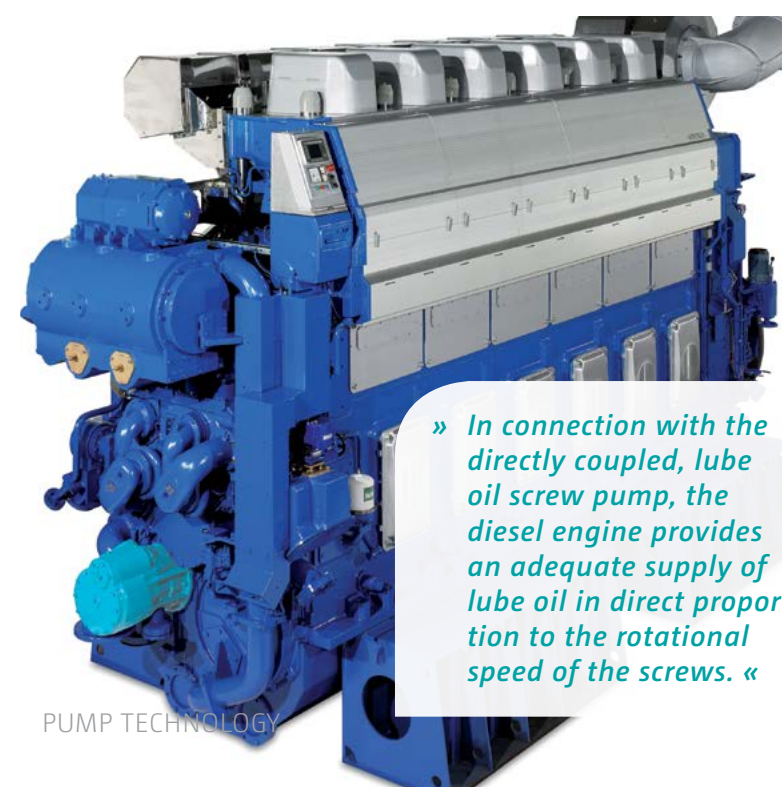
MAIN LUBE OIL PUMP L2, L3 AND L5, OPTIONAL SUBMERGED

Leistriz screw pumps series L2, L3 and L5 are used as main- and pre lube oil pumps for diesel engines. Several design versions are available, e.g. submerged tank pumps or dry mounted versions for horizontal or vertical execution and finally also special customized pumps can be delivered. Leistriz screw pumps are known for excellent NPSH values and noiseless operation. They are properly designed to accept high percentages of dissolved air in lube oil.



- Lube oil
- ◆ Filter
- ▨ Separator
- ⦿ Cooler
- 1 Lube oil transfer pump
- 2 Lube oil separator supply pump
- 3 Cylinder oil transfer pump
- 4 Main lube oil pump
- 5 Pre lube oil pump
- 6 Crosshead lube oil pump
- A Lube oil circulation tank
- B Lube oil storage tank
- C Cylinder oil storage tank
- D Cylinder oil day tank

DIRECT-DRIVEN SCREW PUMP FOR DIESEL ENGINES



Direct-driven pumps have numerous advantages, e.g. small size, customized design and less required installation space. The pumps are easy to handle for dismantling and maintenance and have only few parts. Electrical drive or supply is not needed, since the pumps are directly coupled to the diesel engine. Furthermore, the pumps do not require any shaft sealing. Lubrication of the pump internals is done by the lube oil itself as pumped fluid, so replacement of mechanical seals is unnecessary. In connection with the directly coupled lube oil screw pump, the diesel engine is provided with an adequate supply of lube oil in direct proportion to the rotational speed of the pump screws.

» In connection with the directly coupled, lube oil screw pump, the diesel engine provides an adequate supply of lube oil in direct proportion to the rotational speed of the screws. «

OPERATING CONDITIONS

Pump type e.g.	L3NG-225/195-IFOGVA-O
Operating temperature	lube oil SAE 40 from ca. +10° to +100°C
Rated temperature	+20°C to +80°C
Flow rate	370m³/h @ 10 bar, 80°C, 26 cSt and 1,500 rpm
Power demand (pump)	134 kW

FUEL OIL SYSTEM

Pumps in service for fuel oil supply of ships main engines and also for the engine's periphery (e.g. separators) are subject to high restrictions, given by ship class and other societies. Conditions of operation for the pumps are furthermore touched by additional standards of organisations as IMO, MARPOL and others regarding safety, efficiency and sulphur emission. Depending on pump speed and size, especially screw pumps are well known for high reliability and stability for flow rate and needed pressure.



TRANSFER PUMP L3NG FOR FUEL AND DIESEL OIL

Leistriz screw pumps are applicable as fuel oil supply and transfer pumps for boilers and separators in different locations and installations (horizontal/vertical) of the fuel oil system. The pumps are suitable for heavy fuel oils as also by special treatment for very thin diesels (low sulfur fuels).

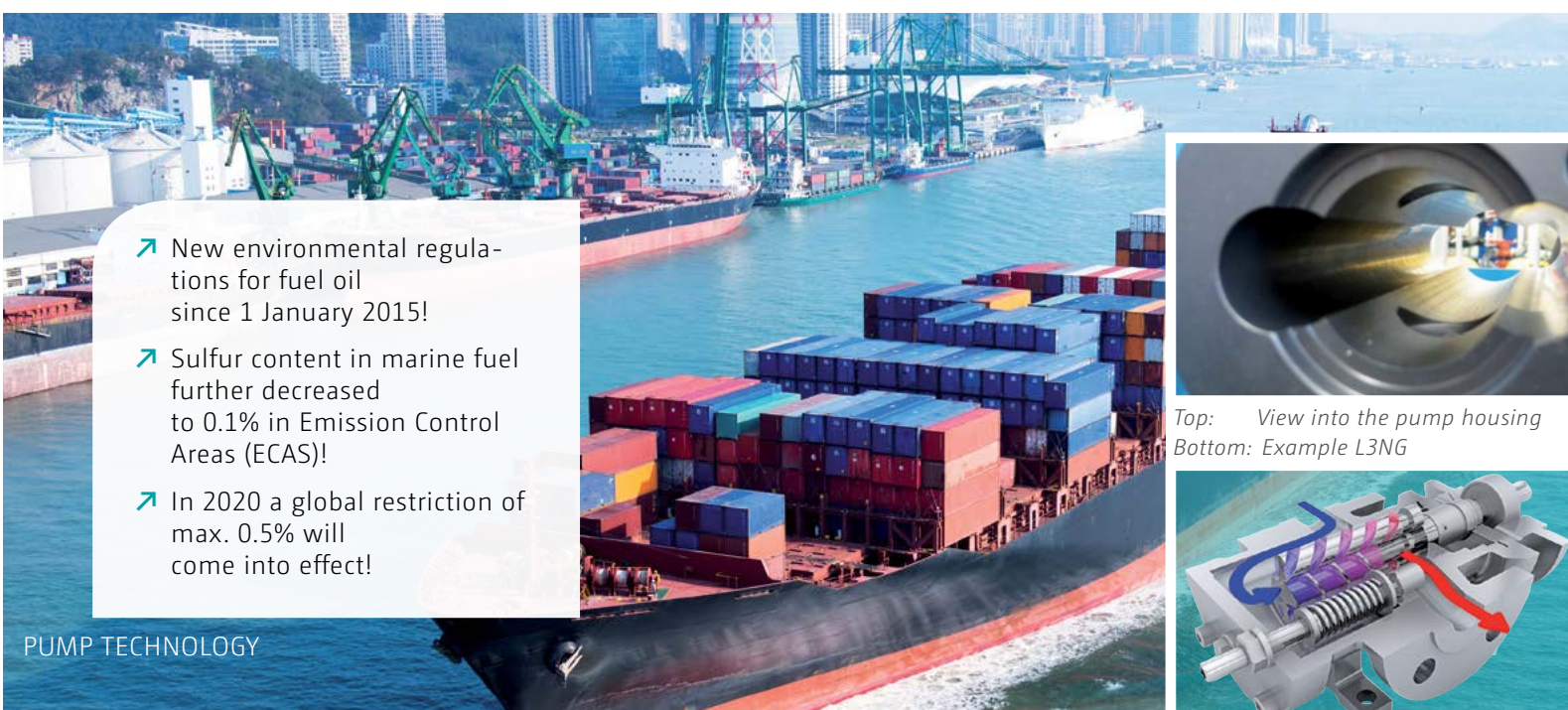
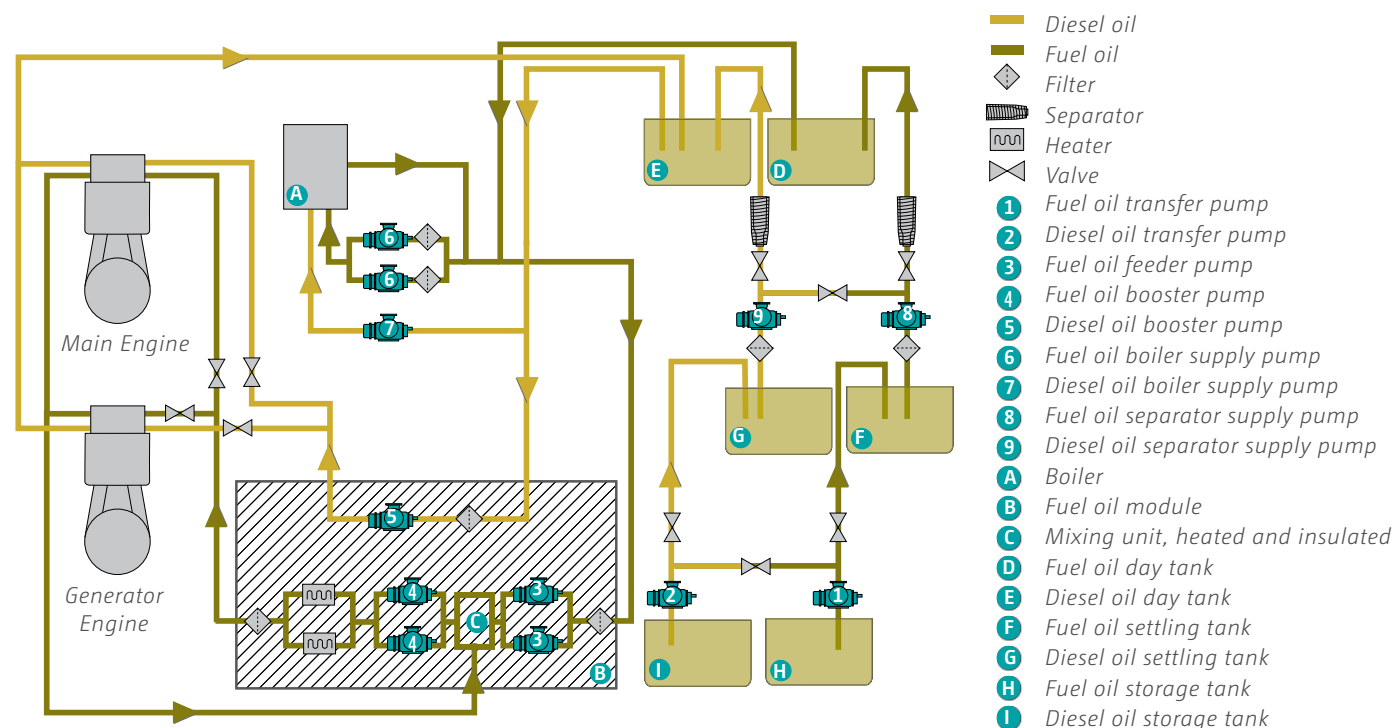


FEEDER AND BOOSTER PUMP L3NG FOR FUEL OIL MODULES

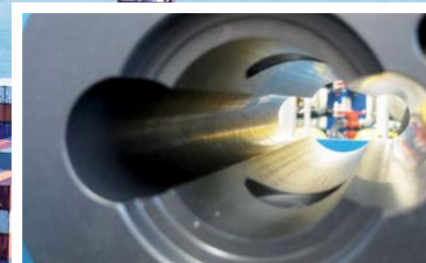
Fuel oil modules for supply of diesel engines are operated by Leistriz screw pumps series L3NG as feeder and booster pumps. Parallel to a mechanical shaft sealing also magnetic couplings are used furthermore grant zero leakage as well as a maintenance free design, especially when operating with heavy fuel oil at temperatures above 120°C are important features for this application.

LOW SULFUR FUEL OIL (LSFO) SCREW PUMPS

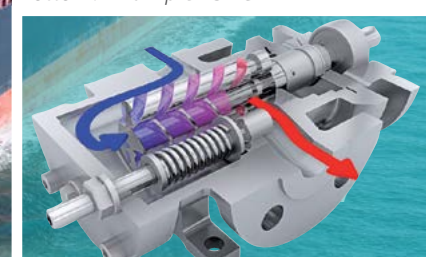
Reducing the sulfur content reduces viscosity and additionally generates poor lubricity of the fuel, especially when operating with Low Sulfur Diesel Fuels (MDO/MGO). At a too low viscosity the lubricating fluid film between the spindles and the pump housing of a 3-spindle pump becomes inadequate. The danger of metallic contact between spindles and housing, with jamming of the pump as a result, is highly increasing. Leistriz offers specially treated pumps to avoid danger of damage and malfunction.



- New environmental regulations for fuel oil since 1 January 2015!
- Sulfur content in marine fuel further decreased to 0.1% in Emission Control Areas (ECAS)!
- In 2020 a global restriction of max. 0.5% will come into effect!



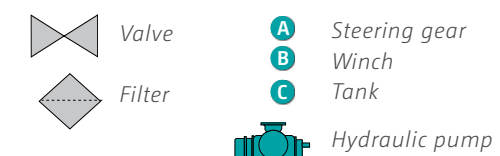
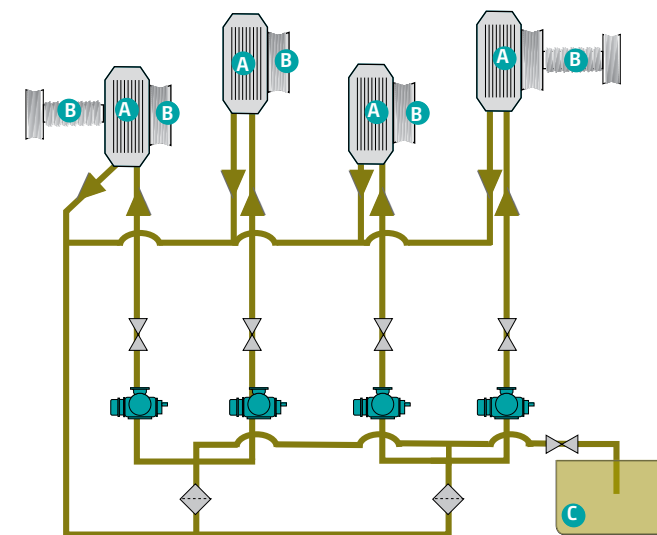
Top: View into the pump housing
Bottom: Example L3NG



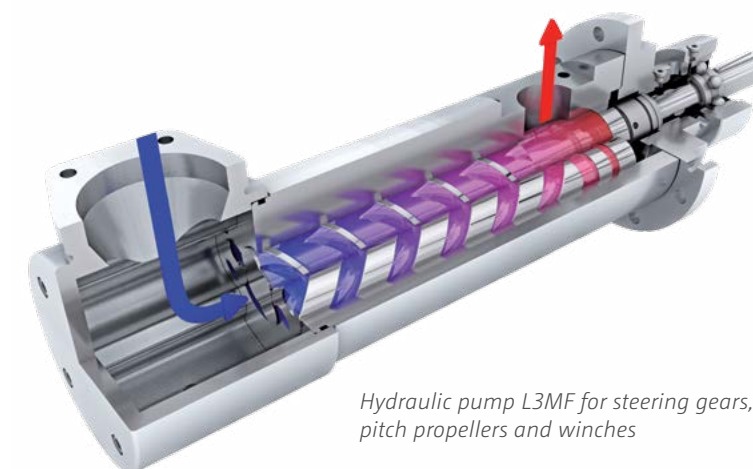
HYDRAULIC PUMPS

Nearly all hydraulic devices on ships can be supported by Leistriz screw pumps. Applications can be central hydraulic systems for e. g. supply of hydraulic motors, hydraulic driven propellers or steering gears.

WINCHES

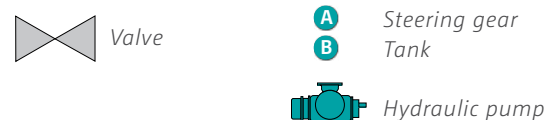
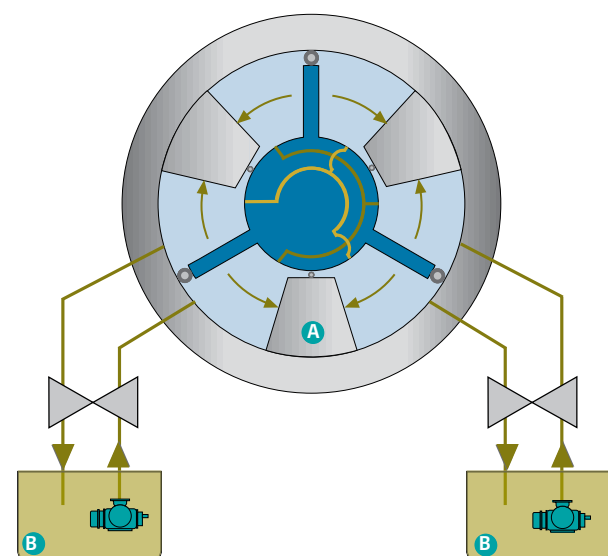


Several winches, powered by hydraulic drives, are in use on ships e. g. for pulling anchors or mooring lines. Leistriz hydraulic screw pumps reliably supply hydraulic oil to the components of the system, while the working pressure of the pumps develops as a reaction to the losses and pressure demand of the system's workload.

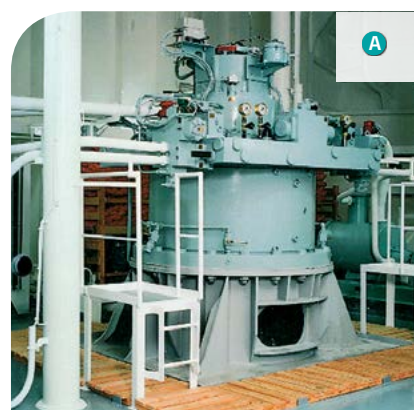


Hydraulic pump L3MF for steering gears, pitch propellers and winches

STEERING GEARS AND PITCH PROPELLERS



Steering gears have an important function for ships maneuverability and therefore high reliable components are a must. Leistriz screw pumps are in duty/standby configuration and provide appropriate pressure to the actuator. For steering gear applications a special 100 hour test of Leistriz screw pumps was made successfully in different working conditions and under classification supervision in order to prove the reliability of the Leistriz screw pumps.



Steering gear



Tank with hydraulic oil pumps L3MF

ASPHALT TANKER

Nearly all different cargo fluids from low viscous diesel oil to high viscous bitumen or molasses can be handled by Leistriz loading and unloading screw pumps.

The design and working principle of these pumps ensure a very low noise level and almost pulsation free delivery. With the use of frequency controlled motors and nearly linear relation of speed and flow rate the delivery can be adjusted easily by changing the speed of the pump. Leistriz 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 for the handling of different kinds of fluids. Leistriz offers screw pumps for several kinds of installations, such as dry installed, submerged or semi-submersible design for the use as cargo or stripping pump on deck or inside the pump room. For hazardous areas Leistriz offers gastight bulkhead seals (with type approval) where the motor is installed in the safe area.

DRY INSTALLATION

The cargo fluid (asphalt) normally had been loaded into the tanks of the asphalt carrier at the tank terminal before transport. Leistriz screw pumps are used mainly for unloading of the product from the asphalt carrier at the arrival port. Control of the trim and list of the ship can be done by transferring the cargo from tank to tank on board. The Leistriz screw pumps (cargo pumps) will also be utilized as circulation pumps to keep the cargo temperature or property under control during transportation of the highly viscous cargo. Gas tight bulkhead seal available as option.

STRIPPING PUMP

There is no separate stripping pump installed on the asphalt carrier. The work of cargo and line stripping will be done through the cargo pump as well.

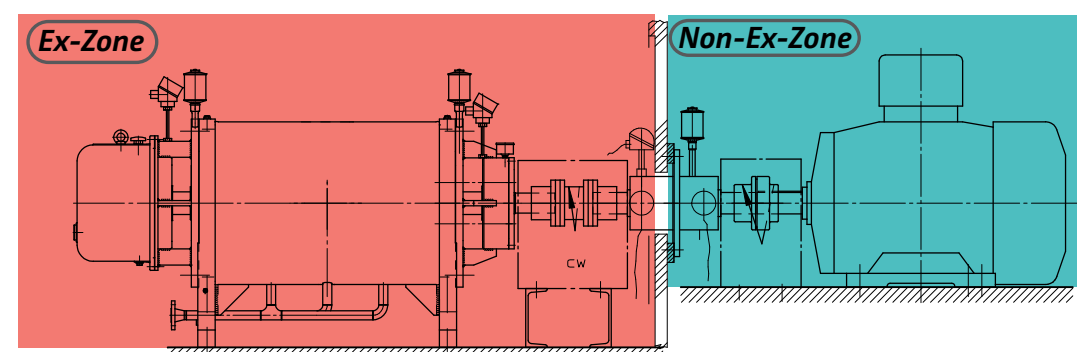
EXAMPLES OF INSTALLATION:



Loading pump L4MG



Cargo pump L4



Arrangement with gas tight bulk head seal

LEISTRIZ SCREW PUMPS AS DEEP WELL ASPHALT CARGO PUMP - SUBMERGED INSTALLATION

Leistriz screw pumps arranged as vertical submerged pump can be installed e.g. inside barrel with suction piping between the tanks of the asphalt carrier. Cargo of nearly all viscosities – from kerosene to asphalt – can be unloaded and effectively stripped from tanks and suction lines. The pumps are designed as five-screw (or two-screw), single flow pumps for high-capacity unloading and stripping. Drives are suitable as electrical- or hydraulic motor.

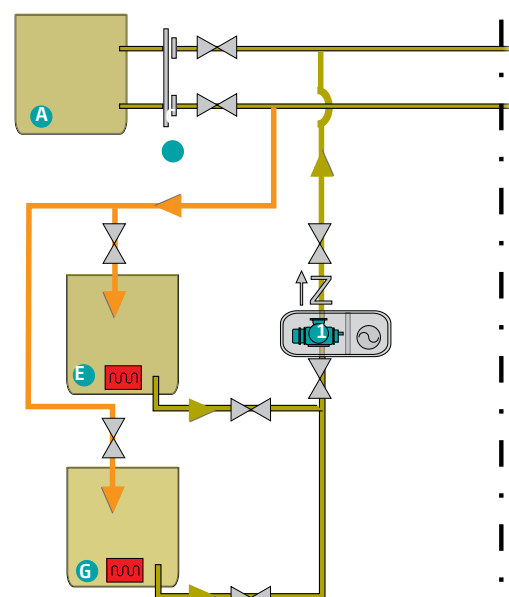


Pump and assembly

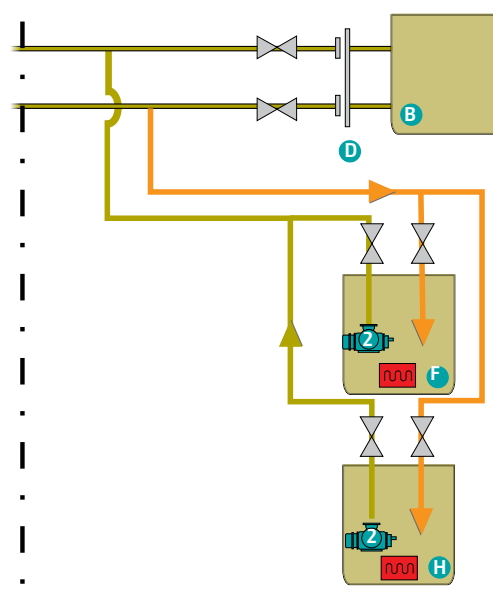


Vertical "in-tank installation" of L5NT-pumps

DRY INSTALLATION



SUBMERGED INSTALLATION



- 1 Cargohandling pump (dry installation)
- 2 Cargohandling pump (submerged installation)
- A Slop tank (installed at port side)
- B Slop tank (installed at port side)
- C Connecting manifold
- D Connecting manifold
- E Cargo tank
- F Cargo tank
- G Cargo tank
- H Cargo tank

Asphalt
Filling line
Discharge pipe line

Suction pipe line
Valve
Check valve

Heat exchanger
Leistriz sealing system
Leistriz variable frequency converter



ASPHALT TANKER

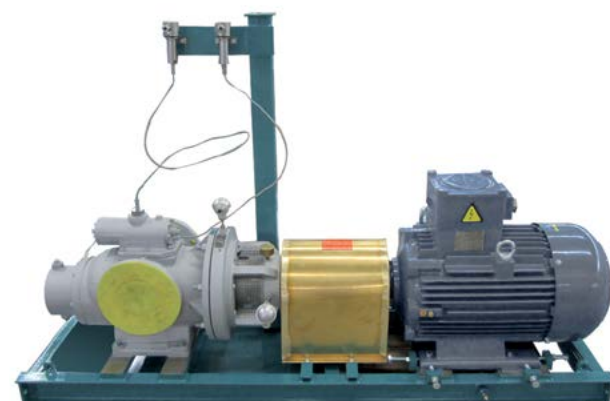
Petrochemical companies continuously increase their output of feedstock and finished products all over the globe to satisfy the vast growing demand for fuel, bitumen and other petrochemical products.

Recently the fluctuating oil price strongly affects the oil & gas sector as well as global petrochemical economies. On the other hand decreasing oil prices result in growing demand and consumption. Therefore still high storage capabilities and large and reliable positive displacement pumps are needed.

Energy demand, HSE regulations and above all the reduction of operating costs are in the focus of today's terminal operators. Leistrizt Pumpen GmbH, with its headquarters and sole production facilities in Nuremberg/Germany, has perfect pumping systems to achieve the operator's goals.



Cargo pump L5

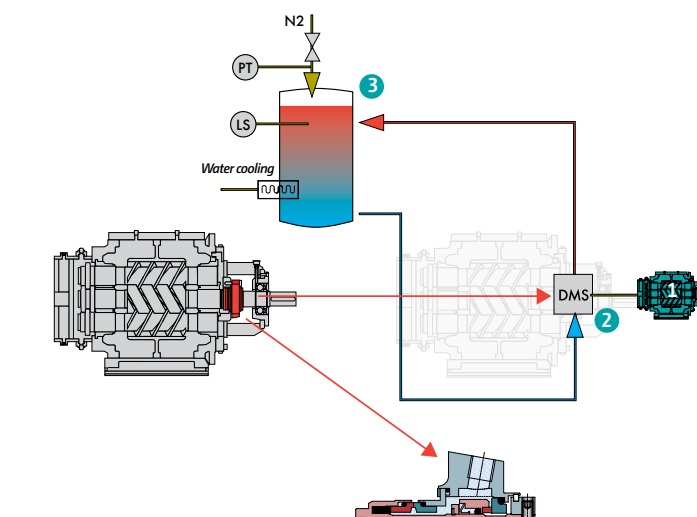


Cargo pump L2

DRY INSTALLATION:

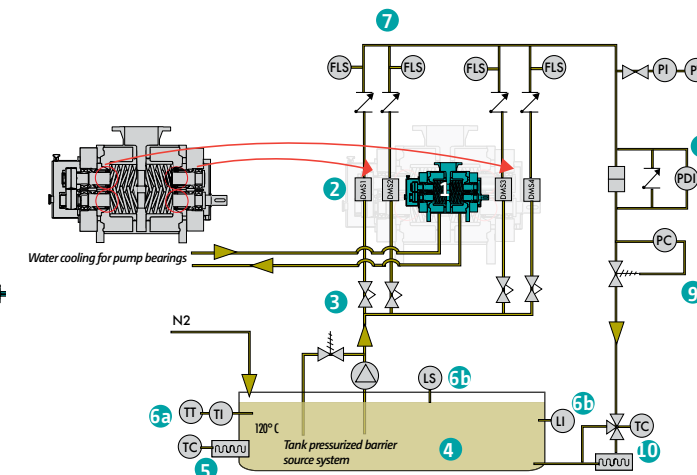
Comparison L2/L5 pumps vs. L4 pumps

SINGLE VOLUTE SCREW PUMP - API PLAN 53 A



- 1 Single volute pump
- 2 1 Double acting mechanical seals
- 3 Barrier fluid tank

DOUBLE VOLUTE SCREW PUMP - API PLAN 54

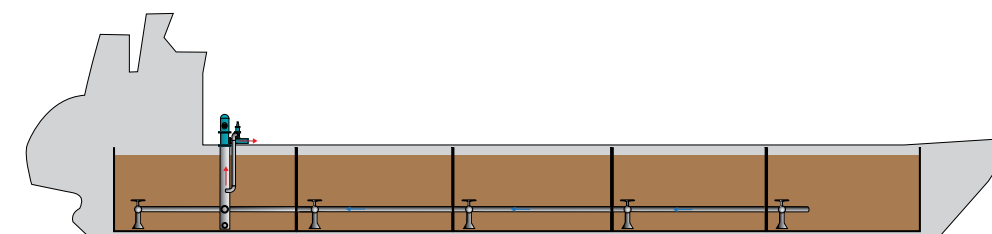


- 1 Double volute pump
- 2 4 Double acting mechanical seals
- 3 Flow control incl. Safety valve and pump
- 4 Barrier fluid tank
- 5 Heater with temperature control
- 6a Tank temperature transmitter and indicator
- 6b Level control and indicator
- 7 Flow control with non return valve, flow meter, pressure transmitter and indicator
- 8 Filter unit with switch and pressure indicator
- 9 Pressure control with valve
- 10 Cooling unit with control valve

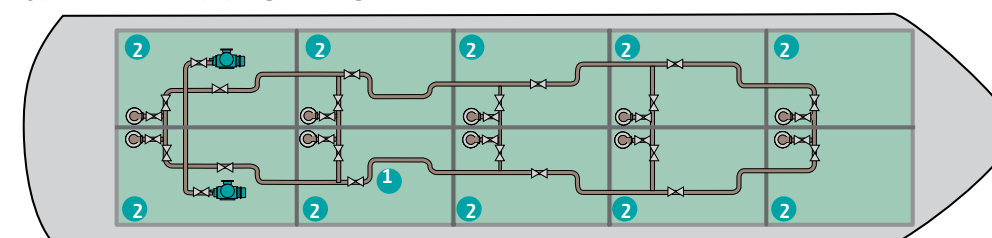
SUBMERGED INSTALLATION:

L2/L5 cargo pump for high and low viscosity cargos

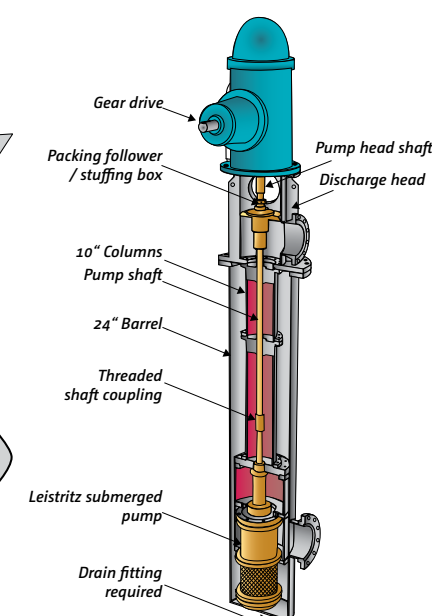
Leistrizt has developed a submerged cargo pump, which can be installed in a separate barrel, normally hanging from the deck in the aft cargo tank. The installation inside the barrel replaces an otherwise required pump room. The barrel works as a large suction chamber providing the pump with additional suction ability. The Leistrizt cargo pump has only one shaft seal (stuffing box or mechanical seal) to the atmosphere and is suitable for handling hydrocarbon products and other viscous liquids including slightly abrasive and corrosive fluids.



Typical suction piping arrangement



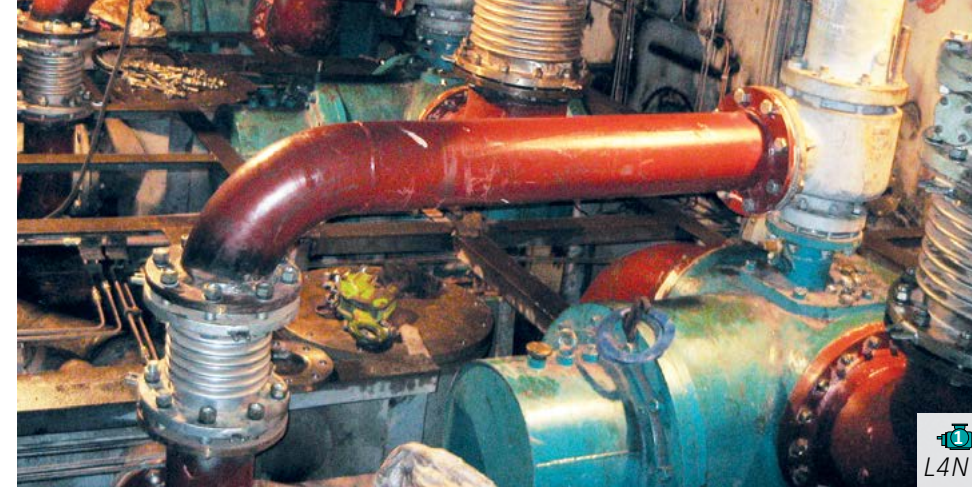
- 1 Cargo pump
- 2 Safety valve
- 1 Suction piping
- 2 Bellmouth sumps
- 2 Tanks





CHEMICAL AND OIL TANKER

Tankers for oil- and chemical products, which are designed to transport several kind of chemicals in bulk put high requirements to pumps and pumps periphery, given by organizations such as MARPOL and other societies. Cargo tanks partially are specially coated to upgrade the resistance against the sensitive and/or aggressive chemical cargo fluids and products. Pumps and their materials of all wetted parts are challenged by the same conditions. Leistritz offers several suitable cargo pump variants according the specified needs and regulations.



CARGO PUMP

All different fluids from low viscosity diesel oil to high viscosity crude oil or molasses are handled with Leistritz screw pumps. The design principle and operation of these pumps ensure a very low noise level and almost pulsation free discharge.



STRIPPING PUMP

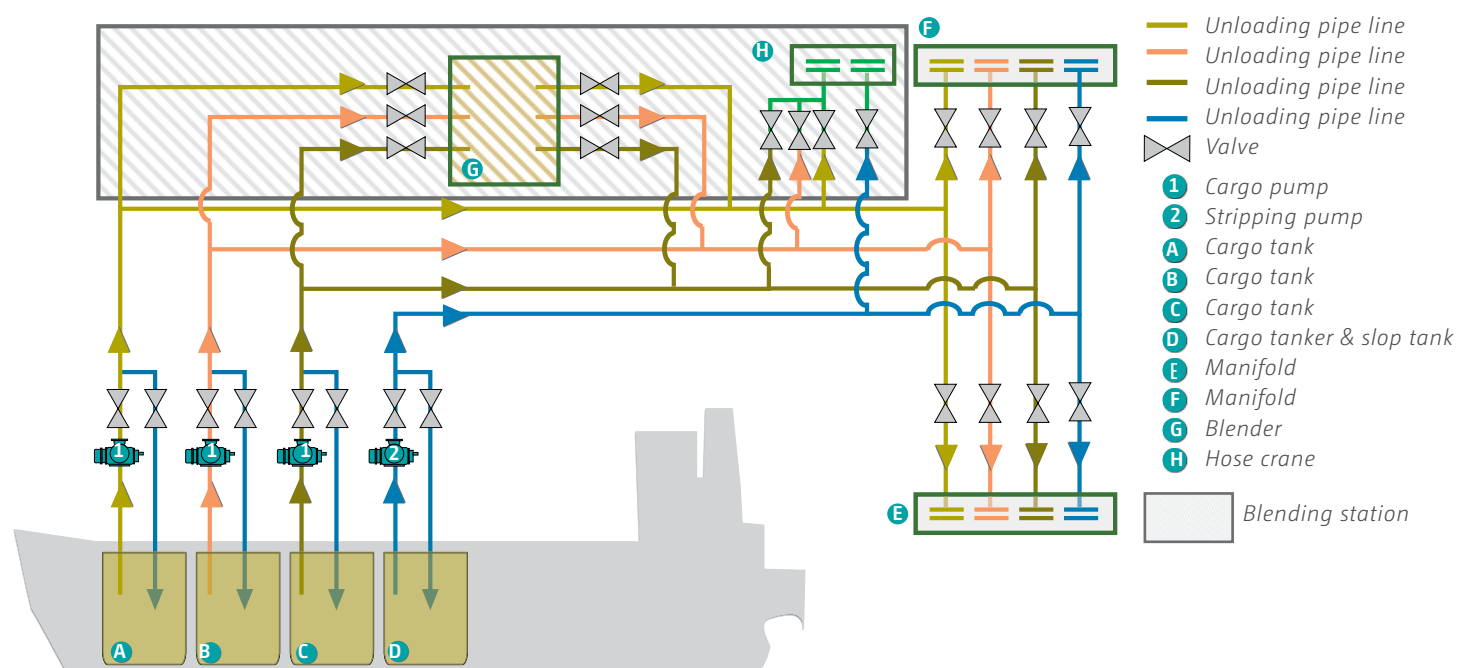
For tank emptying and cleaning tasks, normally the standard main cargo pump is not suitable to pick up the last residues out of the tank, especially with higher viscous fluids. By using e.g the Leistritz submerged cargo pump inside barrel with their excellent suction ability and by varying the speed, all flow can be controlled. This helps to strip piping line and tanks in order to optimize the total cargo discharge time and to strip all residues coming to the pump and makes a further stripping pump unnecessary.



SPECIAL APPLICATIONS: BUNKERING TANKER

Leistritz screw pumps can handle the wide ranges of the viscosity in bunkering refueller tanker equipped with a blending station.

Viscosity ranges from 1 to 2000 cSt are possible without additional heating system.

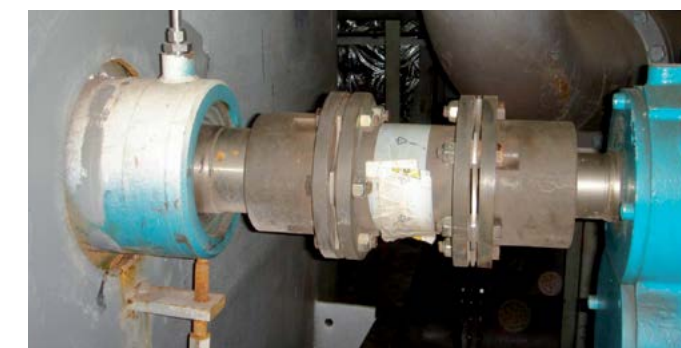


PUMPING SYSTEM - OPTIONAL FEATURES

By using frequency controlled motors, the delivered flow rate can be easily adjusted by linear relation to the speed of the pump shafts.

In addition to the the Leistritz cargo pump these variations are optionally available:

- Frequency converter with air or water cooling
- Monitoring (PLC) for viscosity and temperature and automatic speed adjustment
- Alternative pump drive by hydraulic motor and/or gas tight bulk head
- Penetration sealing (type-approved) for installation of electric motor in "non ex area"
- Pump casing materials available for specified needs of pumped fluid
 - Cast iron
 - Nodular cast iron
 - Cast steel
 - Stainless steel



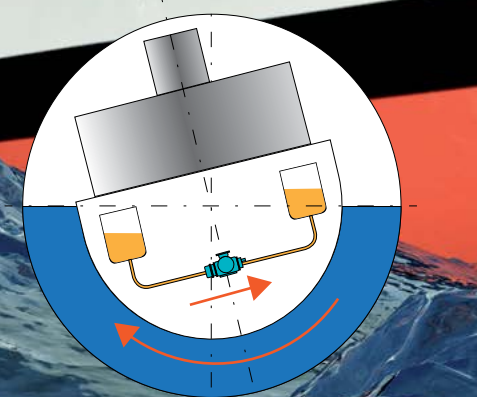
Top: Gastight Bulkhead Seal
Bottom: Control apparatus mounted in Cargo room





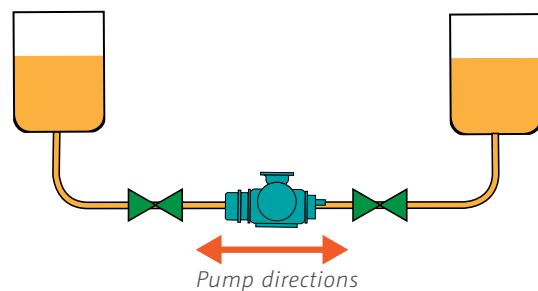
ANTI-HEELING

When ships tilt to port or starboard and don't return back to their upright position, it is known as „heeling“ of the vessel. Heeling is unsafe for ship, machineries and people on board. The main reasons for heeling are strong winds, hard and speedy turns and especially uneven cargo loading. Anti Heeling systems correct undesirable movements of ships by transfer of ballast water between the heeling tanks. Leistriz offers a L2NG solution as reversible and seawater resistant pump up to 3 bar and approx. 400 m³/h which can replace the otherwise needed centrifugal pump including the complicated valve periphery as shown in below sketch. Further benefit: high stability of pumped flow rate in connection with speed control.

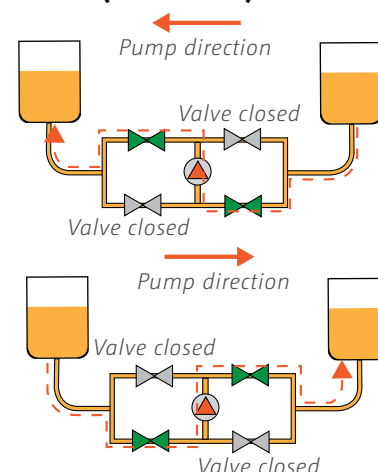


The anti-heeling principle

Reversible Leistriz L2NG Screw Pump (2 valves)



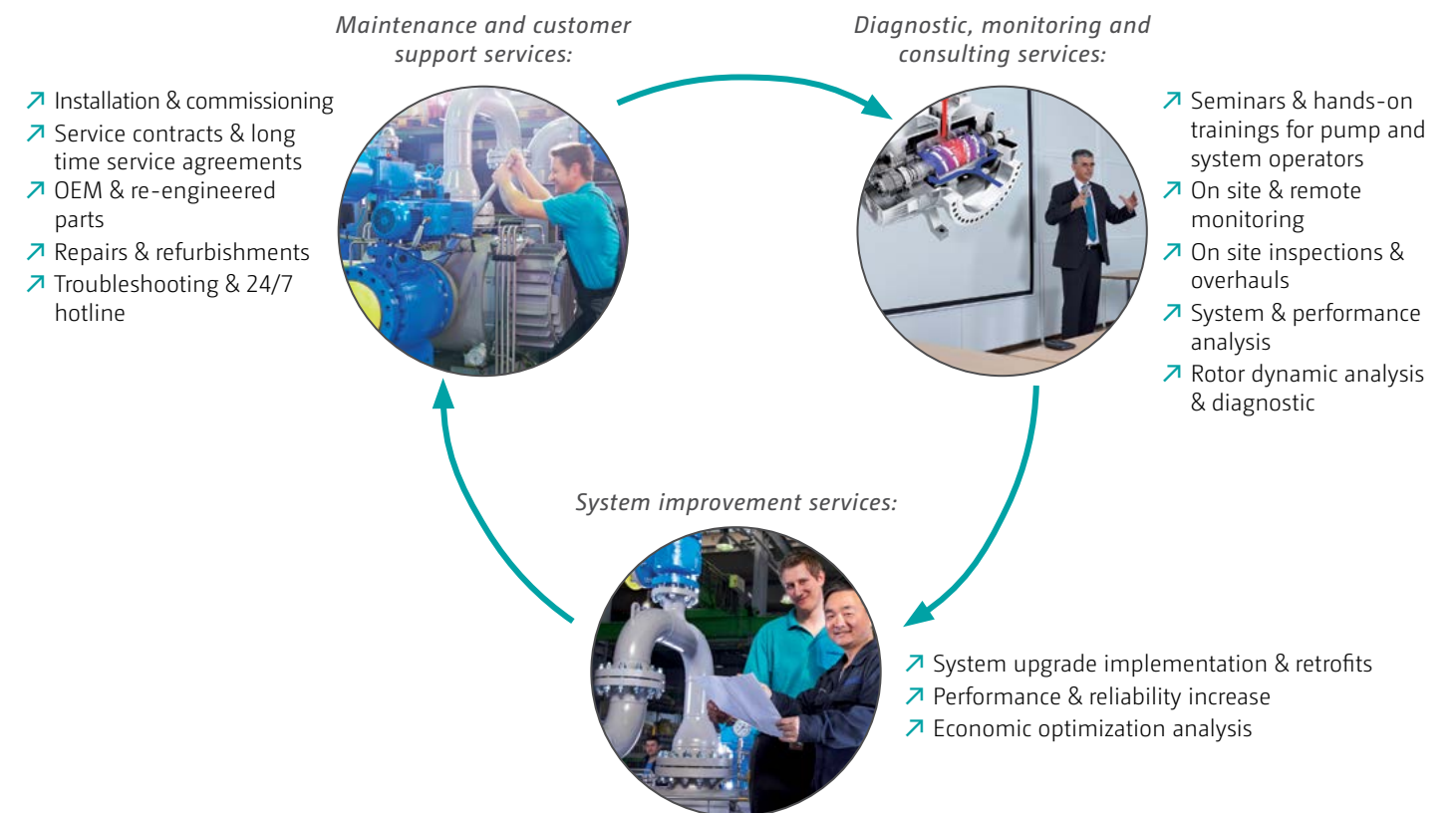
Non reversible Centrifugal Pump (4 valves)



DEDICATED SERVICE TEAM

Your satisfaction is the focus of our work.
Each day we want to advise and actively support you

An after-sales service that can be reached at any time and the immediate global availability of service technicians and spare parts are essential in the modern era. Thus, our service personnel are highly qualified and motivated in order to be able to provide technical support beyond the product itself.

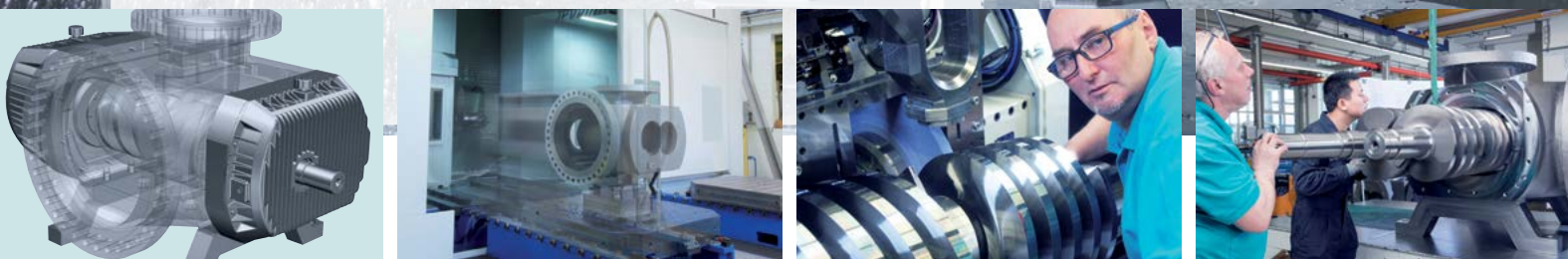


» The Leistriz 24/7 service hotline provides you with advice and assistance in the event of an emergency: +49 911 4306-690.«

Our Service sites:

- Leistriz Italia srl., Milan
- Leistriz Advanced Technologies Corp., Allendale
- Leistriz Machinery (Taicang), Co.,Ltd., Taicang
- Leistriz SEA, Pte. Ltd., Singapore
- Leistriz Middle East FZE, Sharjah, UAE
- Leistriz India Pte. Ltd., Chennai

MANUFACTURING KNOW-HOW



»Leistriz pumps are manufactured with expertise and passion.«

Rising demands on pump manufacturers regarding wear protection, service life or flow rate require the use of state-of-the-art machine technology and process chains that are ideally coordinated with one another. These are the prerequisites to facilitate the high-quality manufacturing of pump components.

To accomplish this high standard, we produce the screws and housings, i.e. the core elements of the Leistriz pumps, ourselves in Germany - under the aspect of the ultimate precision and with a high level of production knowledge vertical integration. This is particularly due to the symbiosis of the various products of the Leistriz Group in the form of superior materials know-how and in-house metal processing technologies, such as whirling. In addition to our numerous machines, it is particularly our team that convinces our customers with its well-founded expertise and extensive manufacturing know-how.



PUMP RANGE

SERIES	USE FOR	PUMP TYPE	PERFORMANCE DATA			
			Flow rate	Pressure	Viscosity	Temperature
L2N	Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.		900 m³/h 3,960 GPM	16 bar 232 psi	100,000 cSt	280°C 536°F
L3N	Low pressure duty, suitable for transport of non-abrasive lubricating fluids.		700 m³/h 3,100 GPM	16 bar 232 psi	15,000 cSt	180°C 356°F
L3M	Medium pressure duty, suitable for transport of non-abrasive lubricating fluids.		300 m³/h 1,320 GPM	80 bar 1,160 psi	10,000 cSt	280°C 536°F
L3H L3V L3U	High and ultra high pressure duty, suitable for transport of non-abrasive, slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.		200 m³/h 880 GPM	280 bar 4,060 psi	10,000 cSt	280°C 536°F
L4N L4M L4H	Low, medium and high pressure duty, suitable for transport of abrasive/non-abrasive, corrosive/non-corrosive, lubricating/non-lubricating, high or low viscous fluids.		5,000 m³/h 22,000 GPM	150 bar 2,175 psi	150,000 cSt	350°C 662°F
L5N	Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.		1,700 m³/h 7,500 GPM	10 bar 145 psi	100,000 cSt	280°C 536°F

This list offers a general overview of the standard pump range by Leistriz. Various options and systems are individually configured according to customer requirements and tested on our test bench (drive power up to 4 MW) in Nuremberg.

PUMP TECHNOLOGY

Available for you all over the world

USA

Leistritz Advanced Technologies Corp., Allendale

GERMANY

Headquarters
Leistritz Pumpen GmbH, Nuremberg

CHINA

Leistritz Machinery (Taicang), Co., Ltd., Taicang

ITALY

Leistritz Italia srl., Milan

UNITED ARAB EMIRATES

Leistritz Middle East FZE,
Sharjah, UAE

INDIA

Leistritz India Pte. Ltd., Chennai

SINGAPORE

Leistritz SEA, Pte. Ltd., Singapore