

POWER & ENERGY

Screw Pumps & Systems



PUMP TECHNOLOGY

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

Now, nearly one century later, Leistrizt 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.

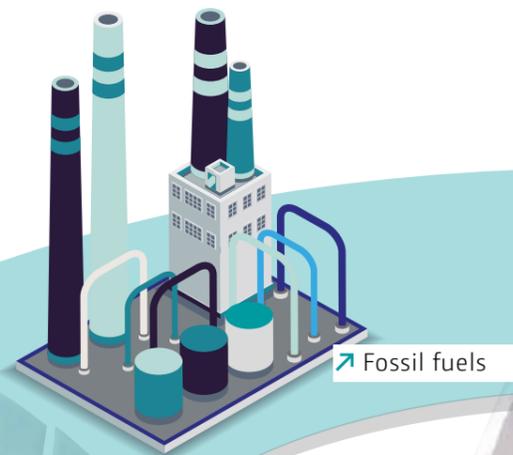
Innovative pumping systems contribute to flexible, smooth and cost-efficient operations.

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

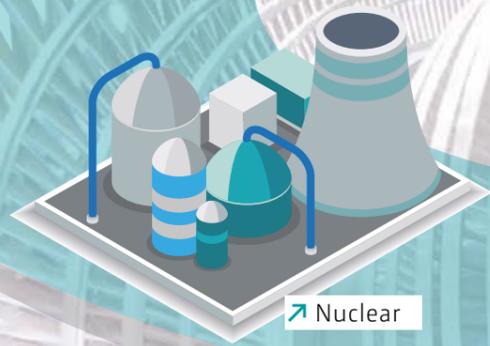
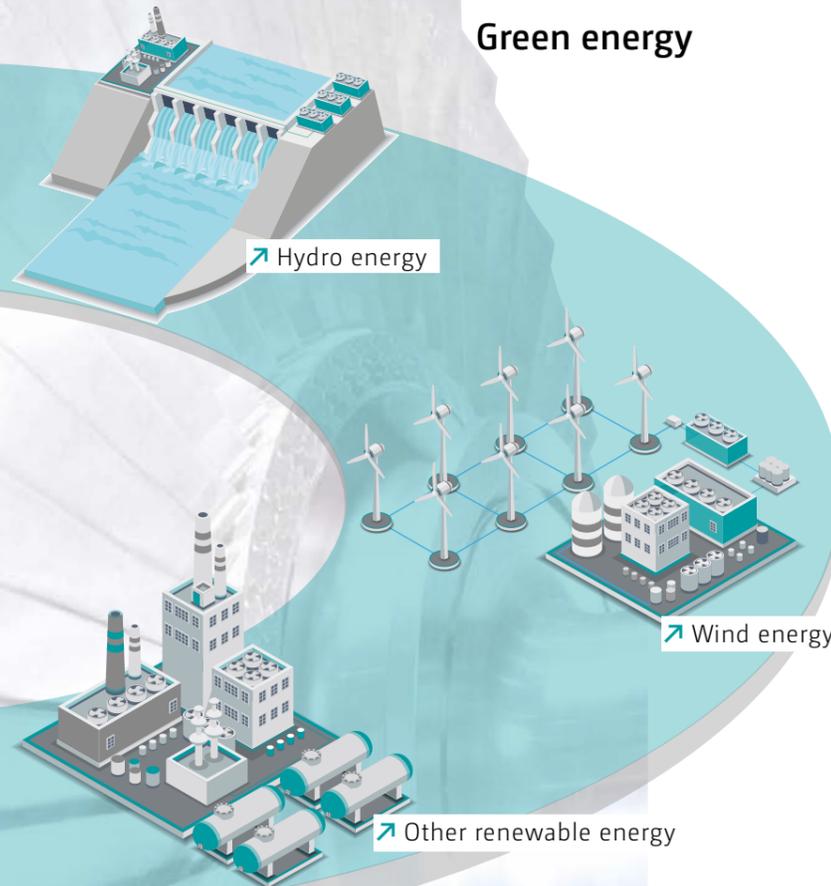
The power and energy industry

The importance of dependable generation, transmission and distribution of electricity was revealed when it became apparent that electricity was useful for powering human technologies from various sources of potential energy. The first power plants were run on wood, while today most of them use petroleum, natural gas, coal, hydroelectric or nuclear power. The forecast for the world electricity consumption is considerable, reaching almost 30 billion kWh in the year 2020.

Conventional power plants



Green energy



1) Conventional power plants

- Gas
- Coal
- Nuclear
- Diesel engines

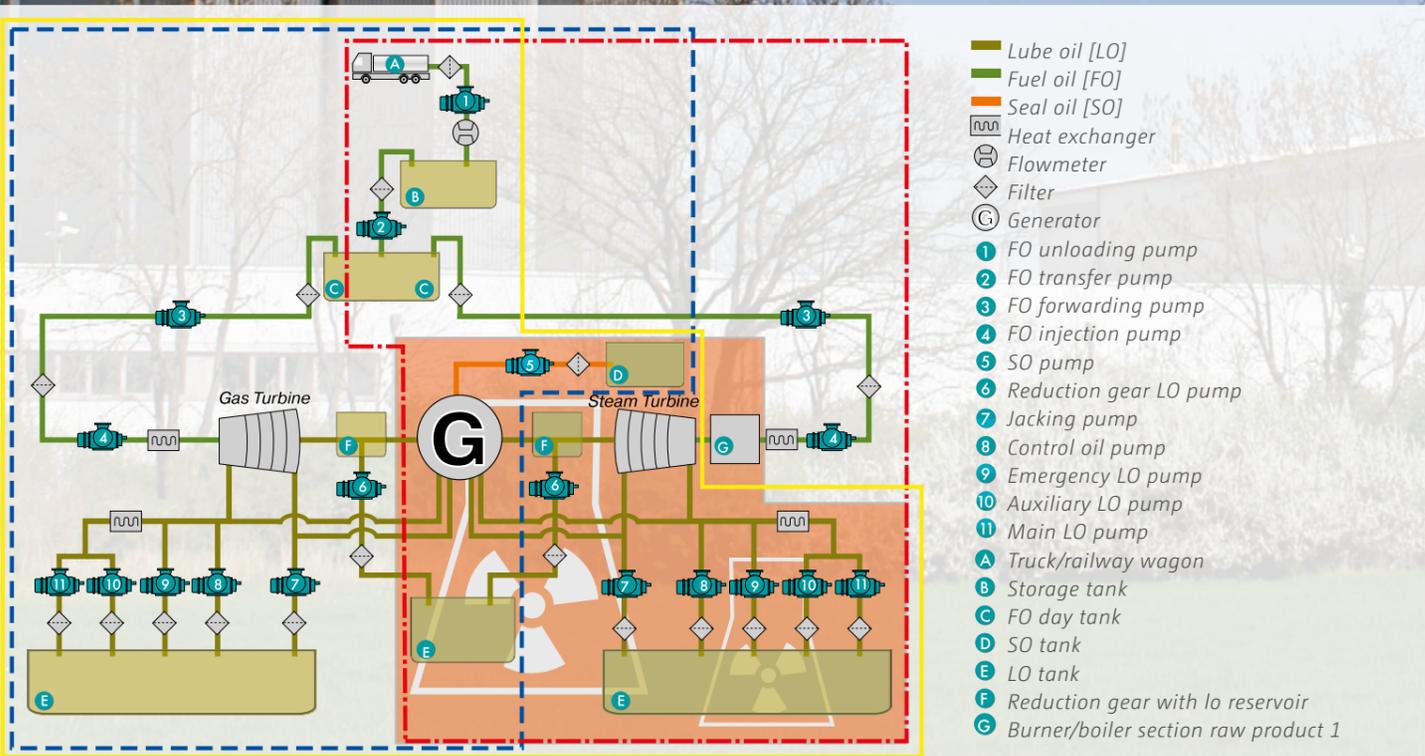
2) Green energy

- Hydro power
- Wind energy
- Biomass energy
- Geothermal energy

CONVENTIONAL POWER PLANT

In the conventional thermal power stations electricity is produced from the use of fossil fuels such as coal, fuel-oil or natural gas, by means of a thermodynamic cycle of water-steam. Thermal power stations are also nuclear and combined cycle stations.

-  Combined Cycle Power Plant
-  Simple Cycle Power Plant
-  Steam Power Plant
-  Nuclear Power Plant



-  Lube oil [LO]
-  Fuel oil [FO]
-  Seal oil [SO]
-  Heat exchanger
-  Flowmeter
-  Filter
-  Generator
-  1 FO unloading pump
-  2 FO transfer pump
-  3 FO forwarding pump
-  4 FO injection pump
-  5 SO pump
-  6 Reduction gear LO pump
-  7 Jacking pump
-  8 Control oil pump
-  9 Emergency LO pump
-  10 Auxiliary LO pump
-  11 Main LO pump
-  A Truck/railway wagon
-  B Storage tank
-  C FO day tank
-  D SO tank
-  E LO tank
-  F Reduction gear with lo reservoir
-  G Burner/boiler section raw product 1

oversimplified illustration



1) Fuel oil unloading pump

The unloading of various kinds of fuel oil from truck or railway wagons is handled by all series of Leistriz screw pumps. However, Leistriz twin screw pumps, of the L2 (single volute) and L4 (double volute) series, are the preferred choice because of their ability to run dry (L2 with time limitation), to prime more effectively and to accept bigger sizes of solid product particles.

2), 3) Fuel oil transfer and forwarding pump

Leistriz triple screw pumps, of the L3 series, are used for fuel oil transfer through different storage facilities and cleaning filters. Furthermore, Leistriz triple screw pumps, of the L3 series, act also as forwarding pumps for feeding the following injection pumps.

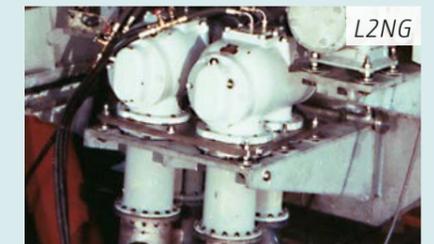


4) Fuel oil injection pump

The injection of fuel oil into burners (steam power plant) or into gas turbines (simple/combined cycle power plant) is realized by Leistriz medium or high pressure screw pumps, of the L3M/H/V/U series, which are designed to withstand high differential pressures even in combination with very light fuels and therefore low viscosities.

6) Reduction gear lube oil pump

Reduction gears are installed to adapt the speed between the gas/steam turbines and the generators. Leistriz triple screw pumps, of the L3N/M/H/V series and Leistriz twin screw pumps, of the L2 series, are used for lubrication of the reduction gears.



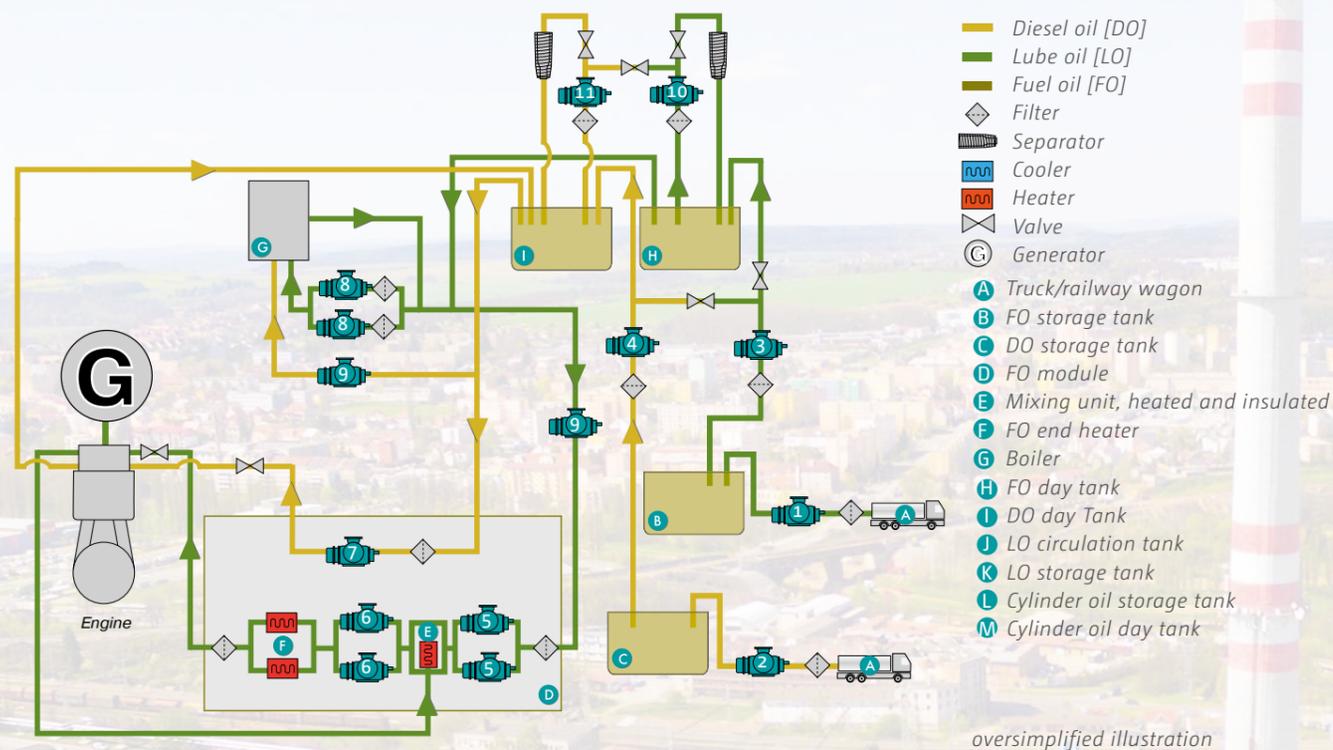
10) Jacking-, control oil-, main-, auxiliary- and emergency lube oil pump

Gas/steam turbines need constantly proper lubrication. Leistriz triple screw pumps, of the L3N/M/H/V series, and Leistriz twin screw pumps, of the L2 series, are used for turbine lubrication. Semi-submersible pump designs or dry mounted versions on common lube oil consoles are available.

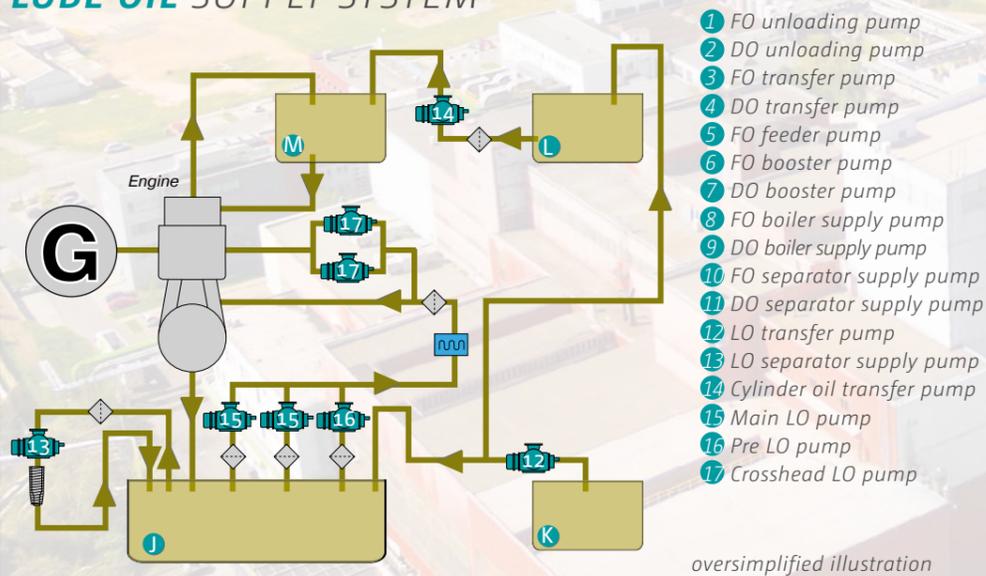
Seal oil pump generator

Hydrogen cooled generators require seal oil for their rotating shafts. Leistriz triple screw pumps, of the L3N/M series, are responsible for the seal oil supply.

FUEL OIL SUPPLY SYSTEM



LUBE OIL SUPPLY SYSTEM



1) Fuel oil / diesel oil unloading pump
The unloading of various kinds of fuel oil from truck or railway wagons is handled by all series of Leistriz screw pumps. However, Leistriz twin screw pumps, of the L2 (single volute) and L4 (double volute) series, are the preferred choice because of their ability to run dry (L2 with time limitation), to prime more effectively and to accept bigger sizes of solid product particles.

3),4),10),11) Fuel oil / diesel oil transfer and separator supply pump

Leistriz triple screw pump, of the L3N series in standard execution, are used for transfer and separator supply of fuel and diesel oil and are able to operate with low pressure (up to 16bar) and low fuel oil temperature. The pumps are available in foot, flange and pedestal design for adaption to the individual system.



L3NG



5),6) Feeder and booster pump for fuel oil modules

Fuel oil supply modules are equipped with Leistriz triple screw pumps, of the L3N series, as feeder and booster pumps. They are designed for product temperatures up to 180°C and available with mechanical shaft sealing or magnetic drives for a hermetically sealed operation.

12),13) Lube oil transfer and separator supply pump

Leistriz triple screw pumps, of the L3N series, are used for lube oil transfer and separator supply around the engine. This series are available in foot, flange and pedestal design for horizontal or vertical installation. One pump design with different seal arrangements can handle all kinds of lube oils.

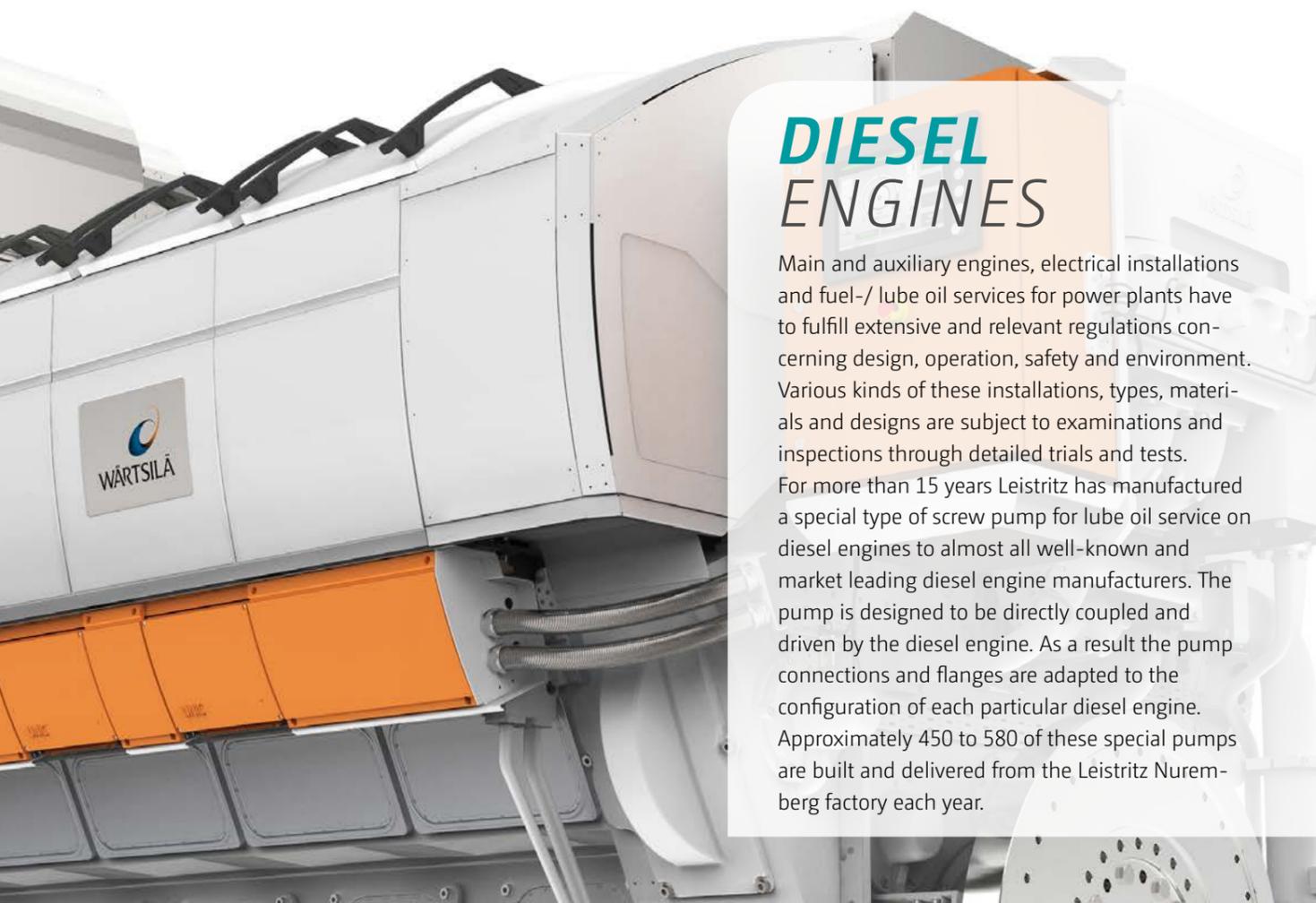


L3NG



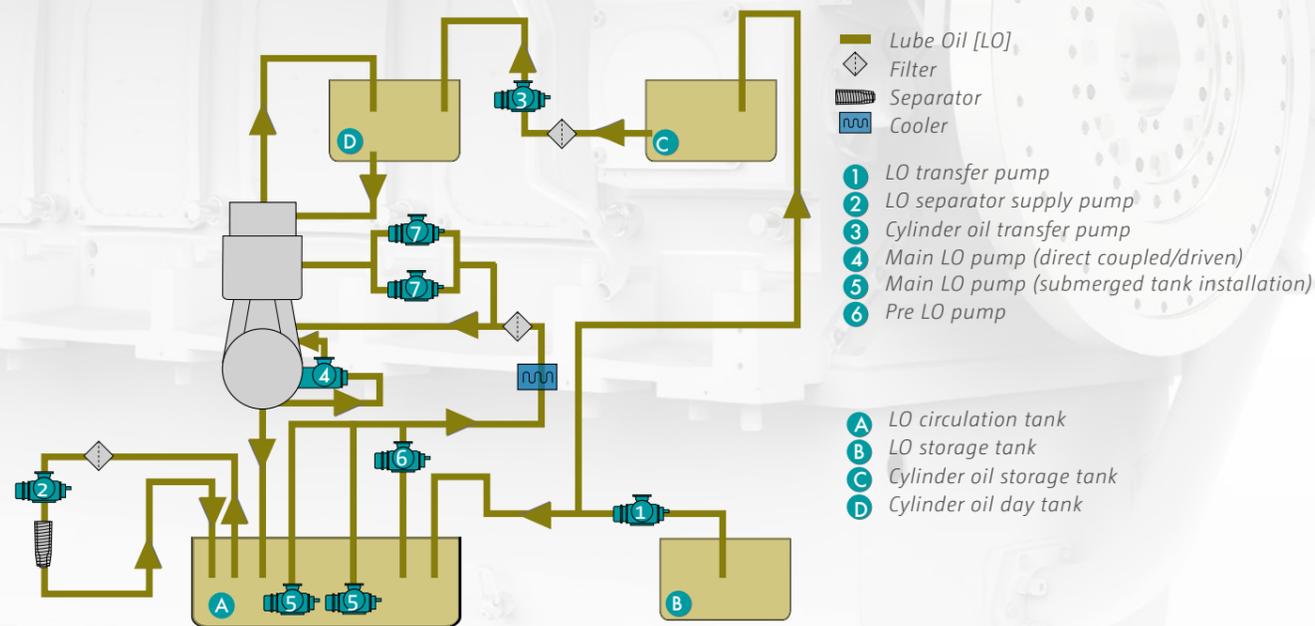
15) Main/pre lube oil pump

Leistriz screw pumps, of the L2, L3 and L5 series, are used as main lube oil and pre lube oil pumps, accepting high percentages of dissolved air in the lube oil. Semi submersible executions for tank installation (series L2NT, L3NT, L3MF, L5NT) and dry mounted executions for horizontal/vertical installation (foot/pedestal mounting), as well as flanged versions are available.



DIESEL ENGINES

Main and auxiliary engines, electrical installations and fuel-/ lube oil services for power plants have to fulfill extensive and relevant regulations concerning design, operation, safety and environment. Various kinds of these installations, types, materials and designs are subject to examinations and inspections through detailed trials and tests. For more than 15 years Leistriz has manufactured a special type of screw pump for lube oil service on diesel engines to almost all well-known and market leading diesel engine manufacturers. The pump is designed to be directly coupled and driven by the diesel engine. As a result the pump connections and flanges are adapted to the configuration of each particular diesel engine. Approximately 450 to 580 of these special pumps are built and delivered from the Leistriz Nuremberg factory each year.



oversimplified illustration

Photo by Wärtsilä



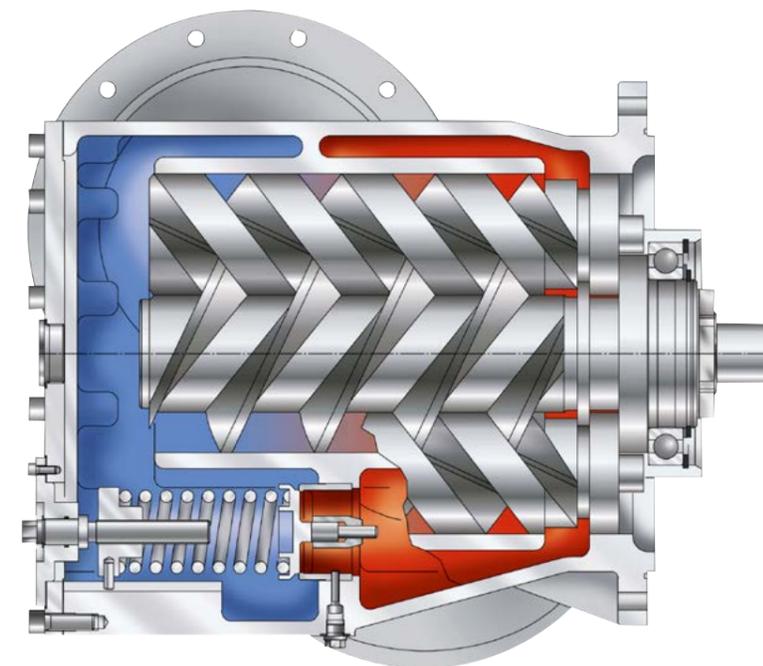
Directly flanged lube oil pump
 Leistriz offers a wide range of tailor made screw pump designs for lubricating purposes, e. g. Leistriz main lube oil pumps, which are directly flanged and individually adapted to the engines.

Operating data (sample)

Pump series:	L3NG-225/195-IFOGVA-O
Operating temperature:	lube oil SAE 40 from ca. +10° to +100°C
Rated temperature:	+20°C to +80°C
Capacity:	370 m³/h @ 10 bar, 80°C, 26 mm²/s and 1500 rpm
Power demand (pump):	134 kW

Design and operation

When compared to other main lube oil pumps, the direct driven pumps have numerous advantages, such as its small size, structure and required installation space.



In connection with the directly coupled lube oil screw pump, the diesel engine itself provides adequate supply of lube oil, which is directly related to the rotational speed of the screws. The screw pump has reliable suction capability to lift the lube oil from the internal oil sump of the engine. If necessary prefilling of the system after longer stops of the diesel engine has to be done with an additional pre-lube-oil-pump of the same type "L3NG".

User advantages

- Easy to handle for dismantling and maintenance
- Only few parts
- Does not require any electrical drive
- Inherent to the design
- Directly coupled to the diesel engine
- No shaft sealing required, therefore replacement of mechanical seals is not necessary
- The lubrication of the pump internals is done by the lube oil itself

GREEN ENERGY

Green energy comes from natural sources, such as sunlight, wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they are naturally replenished, and they also have a much smaller impact on the environment.



1) Hydraulic pump

In order to guarantee an efficient water turbine operation for a wide range of water flow conditions, the water inlet of a Francis turbine has to be adjusted by wicket gates. These wicket gates are adjustable via a hydraulic control block. The corresponding hydraulic system is properly fed by Leistriz triple screw pumps, of the L3M series, to maintain a system pressure of 40 to 70 bar.

2) Jacking pump

Leistriz triple screw pumps, of the L3H/V series, are used for rotor and generator shaft lifting during start up of a turbine. These Leistriz screw pumps are capable to a fast pressure rise up to 180 bar. Dry mounted or semi-submersible pump designs are used alternatively.

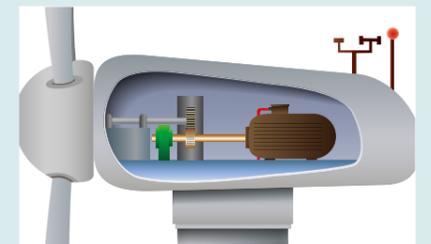


3) Fuel lube oil pump for generator/water turbine bearings

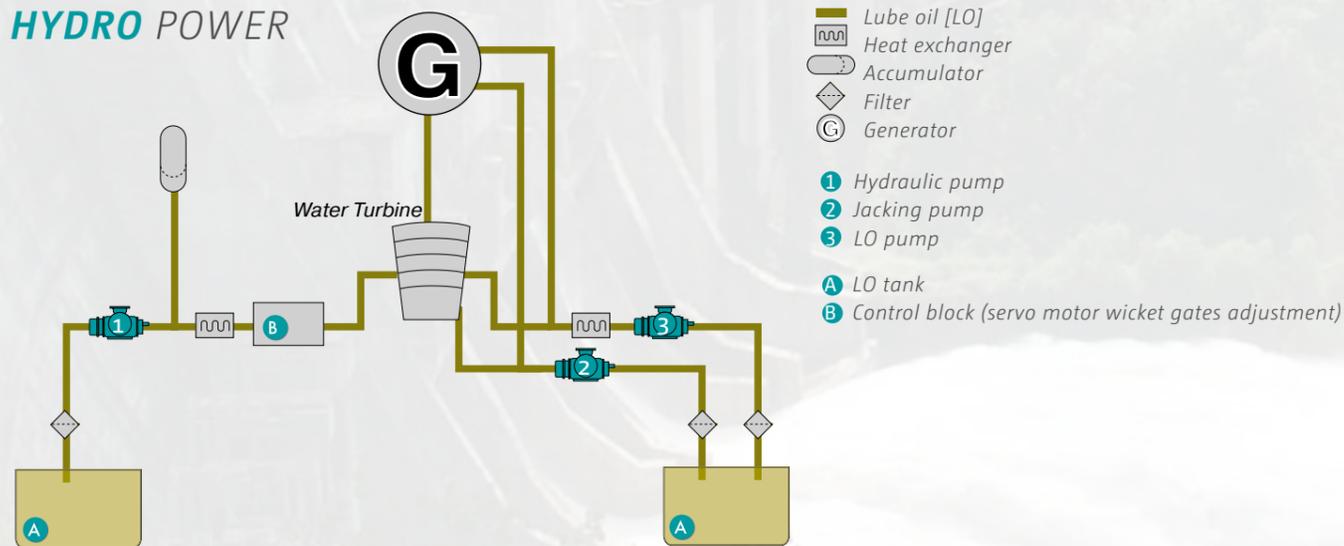
The bearings of turbines and generators are lubricated by Leistriz lube oil pumps (main/emergency), of the L3N and L2 series, which are usually operating below 16bar. For this application Leistriz screw pumps have standard designs to accept a high percentage of dissolved air in the pumped lube oil.

Adjustment for windturbines

Leistriz triple screw pumps are used to adjust the rotors of a wind mill to increase the efficiency of the generator.



HYDRO POWER



oversimplified illustration

L23NG SOLVING CRITICAL FIREFIGHTING PROBLEMS



General use

Leistriz proportioning systems are used to mix water with foam in different concentration (1%, 3% and 6%) and spray the mixture on the fire.

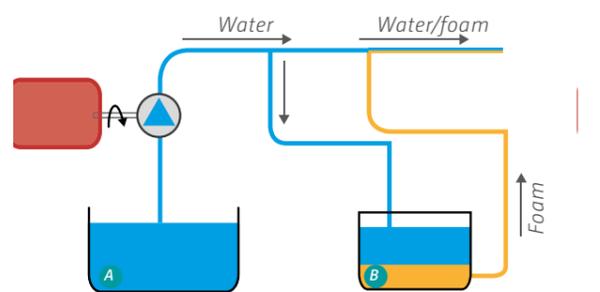
Traditional solution

In the traditional solution – liquid displacement system – the water coming from the water line is used to pressurise the foam in the tank and to inject it in the water line.

This solution has four major critical points:

- The system has to be calibrated.
- It is sensitive to the changes of water pressure and foam viscosity.
- It cannot be tested without consuming foam.
- As the foam tank is pressurised, it cannot be easily refilled.

Furthermore, these traditional systems cannot easily handle highly-viscous foams like alcohol resistant foams, which are applied when the fire comes from fuels.

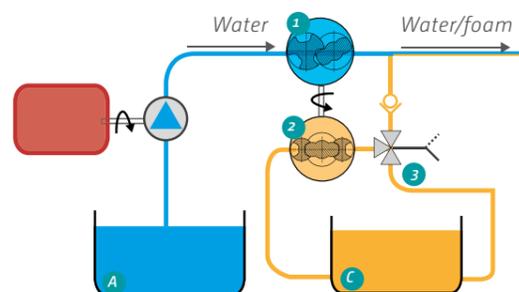


- A Water tank
- B Pressurised foam tank
- C Atmospheric foam tank

Leistriz solution

The L23NG Leistriz solution uses a combination of two screw pumps.

The water motor and the injection pump are both derived from the Leistriz screw pumps, respectively from the series L2NG and L3MF. The two pumps, together with the 3-way valve, the injection piping and the non-return valve, are assembled on a common base plate and are fully interconnected.



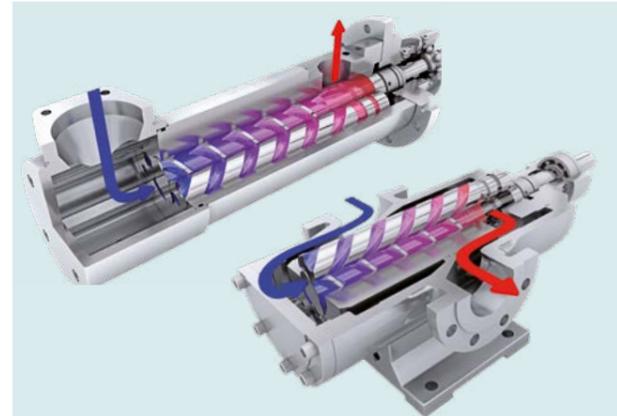
- 1 Water motor
- 2 Foam pump
- 3 3-way valve

Advantages of Leistriz solution

The Leistriz L23NG can solve the critical points of the traditional solution, in particular:

- The system is intrinsically calibrated - the required percentage of the foam concentrate in the foam solution is obtained with a proper selection of the unit capacities of both hydraulic motor and injection pump.
- It is insensitive to the changes of water pressure and foam viscosity.
- As the foam tank is connected to the water line with a 3-way valve, setting it to recirculation is possible in order to test the system only with water (without consuming foam).
- The foam tank is atmospheric and therefore easily refillable.

L3MF/MG



Performance data

Flow rate:	MF: Max. 120 m ³ /h [530 GPM] MG: Max. 300 m ³ /h [1,320 GPM]
Differential pressure:	Max. 80 bar [1,160 psi]
Viscosity:	Max. 10,000 cSt
Pumping temperature:	Max. 280°C [536°F]

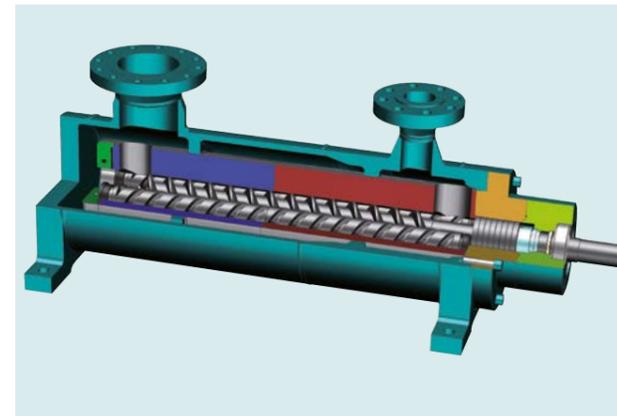
General use

Leistriz screw pumps of the L3MF/MG series are triple screw single volute, self-priming positive displacement pumps for medium pressure duty, suitable for transport of non abrasive lubricating fluids.

User advantages

- High efficiency → low operating costs
- Interchangeable casing insert (MG) → easy maintenance
- Axially balanced rotors → no axial forces to bearings
- Only one shaft seal → easy maintenance, low costs
- Availability of sealless design by magnetic drive
- Semi submersible pump design available
- Resistant against aeration → low noise, minimized vibration
- Simple design → reasonable price
- Motor driven or direct gear driven

L3UG



Performance data

Flow rate:	Max. 180 m ³ /h [792 GPM]
Differential pressure:	Max. 280 bar [4,061 psi]
Viscosity:	0,8 mm ² /s – 1000 mm ² /s
Pumping temperature:	Max. 280°C [536°F]

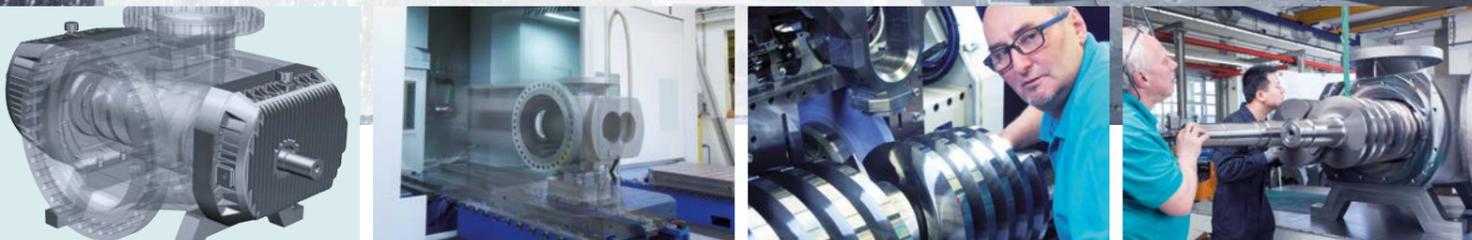
General use

- High pressure transfer pump for heavy and light fuel oils
- High pressure, lubricating, regulating, hydraulic, cooling applications
- Booster pump for diesel engines, compressors, gas and steam turbines
- Transfer pump for pressure increase and transport of crude oil, bitumen, glycerin
- More than 300 pumps of this design are installed in applications with more than 100 bar differential pressure

User advantages

- All wearing parts are located in a separate sealing/and bearing cover and can be easily replaced without disassembling of the complete cartridge unit
- All main running parts are designed as a cartridge unit and can be easily disassembled
- In service cases only the cartridge unit can be replaced. The pump casing can still be used and can stay connected to the piping system.
- Mechanical seal is forced only by suction pressure
- The idler rotors are hydraulic balanced by the operating pressure and designed with a „start-up“ bearing to absorb axial forces during start up. Due to these features the rotors are free from wear in all operating conditions
- Running surfaces with excellent dry-running protection
- Bearings are located external from the pumping liquid and most likely unencumbered

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 m ³ /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 m ³ /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 m ³ /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 m ³ /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 m ³ /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 m ³ /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

