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. 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 Leistritz 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 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.

1) Fuel oil unloading pump
The unloading of various kinds of fuel oil from truck or railway wagons is handled by all series of Leistritz screw pumps. However, Leistritz 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
Leistritz triple screw pumps, of the L3 series, are used for fuel oil transfer through different storage facilities and cleaning filters. Furthermore, Leistritz 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 Leistritz 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.

5) Seal oil pump generator
Hydrogen cooled generators require seal oil for their rotating shafts. Leistritz triple screw pumps, of the L3N/M series, are responsible for the seal oil supply.

6) Reduction gear lube oil pump
Reduction gears are installed to adapt the speed between the gas/steam turbines and the generators. Leistritz triple screw pumps, of the L3N/M, series and Leistritz 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. Leistritz triple screw pumps, of the L3N/M/H/V series, and Leistritz 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. Leistritz triple screw pumps, of the L3N/M series, are responsible for the seal oil supply.
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 Leistritz screw pumps. However, Leistritz 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

Leistritz 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.

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

Fuel oil supply modules are equipped with Leistritz 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

Leistritz triple screw pumps, of the L3N series, are used for lube oil transfer and separator supply around the engine. One pump design with different seal arrangements can handle all kinds of lube oils.

15) Main/pre lube oil pump

Leistritz 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.
Conventional power plant

**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 Leistritz 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 Leistritz Nuremberg factory each year.

For more than 15 years Leistritz 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 Leistritz Nuremberg factory each year.

**Operating data (sample)**

<table>
<thead>
<tr>
<th>Pump series</th>
<th>L3NG-225/195-IF00VA-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>lube oil SAE 40 from ca. +10° to +100°C</td>
</tr>
<tr>
<td>Rated temperature</td>
<td>+20°C to +80°C</td>
</tr>
<tr>
<td>Capacity</td>
<td>370 m³/h @ 10 bar, 80°C, 26 mm²/s and 1500 rpm</td>
</tr>
<tr>
<td>Power demand (pump)</td>
<td>134 kW</td>
</tr>
</tbody>
</table>

**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

Photo by Wärtsilä

Directly flanged lube oil pump

Leistritz offers a wide range of tailor-made screw pump designs for lubricating purposes, e.g. Leistritz main lube oil pumps, which are directly flanged and individually adapted to the engines.
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 Leistritz triple screw pumps, of the L3M series, to maintain a system pressure of 40 to 70 bar.

2) Jacking pump
Leistritz triple screw pumps, of the L3H/V series, are used for rotor and generator shaft lifting during start up of a turbine. These Leistritz 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 Leistritz lube oil pumps (main/emergency), of the L3N and L2 series, which are usually operating below 16bar. For this application Leistritz screw pumps have standard designs to accept a high percentage of dissolved air in the pumped lube oil.

Adjustment for windturbines
Leistritz triple screw pumps are used to adjust the rotors of a wind mill to increase the efficiency of the generator.

**HYDRO POWER**

- Hydraulic pump
- Jacking pump
- Lube oil (LO) pump
- Heat exchanger
- Accumulator
- Filter
- Generator
- LO tank
- Control block (servo motor wicket gates adjustment)
**L23NG SOLVING CRITICAL FIREFIGHTING PROBLEMS**

**General use**
Leistritz 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.

**Leistritz solution**
The L23NG Leistritz solution uses a combination of two screw pumps. The water motor and the injection pump are both derived from the Leistritz 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.

**Advantages of Leistritz solution**
The Leistritz 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.

**Performance data**

<table>
<thead>
<tr>
<th></th>
<th>MF:</th>
<th>Max. 120 m³/h [530 GPM]</th>
<th>MG:</th>
<th>Max. 300 m³/h [1,320 GPM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential pressure</td>
<td></td>
<td>Max. 80 bar [1160 psi]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
<td>Max. 10,000 cSt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumping temperature</td>
<td></td>
<td>Max. 280°C [536°F]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**L3MF/MG**

**General use**
Leistritz 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

**Performance data**

<table>
<thead>
<tr>
<th></th>
<th>MF:</th>
<th>Max. 180 m³/h [792 GPM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential pressure</td>
<td></td>
<td>Max. 280 bar [4,061 psi]</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
<td>0.8 mm²/s – 1000 mm²/s</td>
</tr>
<tr>
<td>Pumping temperature</td>
<td></td>
<td>Max. 280°C [536°F]</td>
</tr>
</tbody>
</table>

**L3UG**

**General use**
Leistritz screw pumps of the L3UG 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 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

**Performance data**

<table>
<thead>
<tr>
<th></th>
<th>Max. 180 m³/h [792 GPM]</th>
</tr>
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<tbody>
<tr>
<td>Flow rate</td>
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<td>Viscosity</td>
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</tr>
<tr>
<td>Pumping temperature</td>
<td>Max. 280°C [536°F]</td>
</tr>
</tbody>
</table>

**Special applications**

**Pumps for the power & energy industry**

**Advantages of Leistritz solution**
The Leistritz 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.

**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 hydraulically 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 unemcumbered**
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 Leistritz 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 Leistritz 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.

**Screw pump range**

This list offers a general overview of the standard pump range by Leistritz. 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 RANGE**

<table>
<thead>
<tr>
<th>SERIES</th>
<th>USE FOR</th>
<th>PUMP TYPE</th>
<th>PERFORMANCE DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2N</td>
<td>Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>L2N Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>980 m³/h 3,400 GPM 16 bar 220 psi 100,000 cSt 280°C 536°F</td>
</tr>
<tr>
<td>L3N</td>
<td>Low pressure duty, suitable for transport of non-abrasive lubricating fluids.</td>
<td>L3N Low pressure duty, suitable for transport of non-abrasive lubricating fluids.</td>
<td>700 m³/h 2,400 GPM 16 bar 232 psi 15,000 cSt 180°C 356°F</td>
</tr>
<tr>
<td>L3M</td>
<td>Medium pressure duty, suitable for transport of non-abrasive lubricating fluids.</td>
<td>L3M Medium pressure duty, suitable for transport of non-abrasive lubricating fluids.</td>
<td>300 m³/h 1,080 GPM 16 bar 232 psi 10,000 cSt 280°C 536°F</td>
</tr>
<tr>
<td>L3H</td>
<td>High ultra high pressure duty, suitable for transport of abrasive/non-abrasive, slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>L3H High ultra high pressure duty, suitable for transport of abrasive/non-abrasive, slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>200 m³/h 720 GPM 280 bar 4,060 psi 10,000 cSt 280°C 536°F</td>
</tr>
<tr>
<td>L4N</td>
<td>Low, medium and high pressure duty, suitable for transport of abrasive/non-abrasive, corrosive/non-corrosive, lubricating/non-lubricating, high or low viscous fluids.</td>
<td>L4N Low, medium and high pressure duty, suitable for transport of abrasive/non-abrasive, corrosive/non-corrosive, lubricating/non-lubricating, high or low viscous fluids.</td>
<td>5,000 m³/h 22,000 GPM 150 bar 2,175 psi 150,000 cSt 350°C 662°F</td>
</tr>
<tr>
<td>L5N</td>
<td>Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>L5N Low pressure duty, suitable for transport of slightly abrasive and corrosive, high or low viscous fluids with poor or good lubricity.</td>
<td>1,700 m³/h 7,500 GPM 10 bar 140 psi 100,000 cSt 280°C 536°F</td>
</tr>
</tbody>
</table>
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