

Mobile high pressure



The flexible cooling lubricant unit provides machining and cost advantages when turning high-strength materials

With the LubiCool®-M, KNOLL Maschinenbau has developed a mobile cooling lubricant high-pressure system where the user can connect to any fixed and sliding headstock automatic lathes if they need to. The LubiCool®-M demonstrated its strengths regarding availability, filtration capacity, pressure and volume flow in the field test at the site of precision turned parts manufacturer, Gerland.

Roughly 100 years ago, the southern Black Forest town of Sankt Georgen was the hub of the Black Forest watch industry. Gerland KG (see box), which is also based there, started out as a cuckoo clock manufacturer before developing into a specialist for precision turned parts. Managing director, Andreas Paul, explains that regional competition is still strong: "In the Black Forest region, there is at least one turned parts manufacturer in almost every town." In order to stand out from the competition, he relies on a broad range of products: "Nowadays, many customers want to obtain as large a portfolio as possible from a single source. That is what we are prepared for. We are able to supply anything from simple to complex turned parts in sizes ranging from 3 to 42 millimetres in diameter – whether they are prototypes of a few hundred

pieces or a large series of several million pieces per year." The central element of production is our modern machinery with roughly 50 of the latest generation CNC-controlled automatic lathes, sliding and fixed headstock lathes as well as CNC multi-spindle lathes and cam-controlled multi-spindle lathes. Equipped with C-axes, Y-axes and counter spindles, they enable Gerland's turning specialists to carry out economical machining operations for even the most complex of requirements. "We like tricky parts the best," says Paul. "This is because we are happy to show off our manufacturing expertise to the customer, even as early as the development phase."

Wide range of materials: From brass to V4A stainless steel

Regardless of the complexity, Gerland produces many brass parts – expertise that goes back to the clock manufacturing days. However for applications e.g. in the food industry, in measurement and control technology or in medical apparatus engineering, customers demand variants made of V4A stainless steel and other materials that are difficult to machine. As Paul explains, Gerland is prepared for this and its machinery is equipped accordingly: "In order to be able to machine these sophisticated materials precisely, optimum machine conditions must be in place. In addition, a high-pressure system is essential in order to remove the

Advantages of LubiCool® -M

- Space-saving and flexible installation
- Quick plug-and-play installation
- Screw pump generates high pressure up to 150 bar
- This results in short-breaking chips, higher cutting speeds and extended tool life
- Belt filter for reduced concentration of ultra-fine particles
- Long service life of the components and the cooling lubricant
- High process reliability and availability
- Reduced electricity costs thanks to demand-driven pump control
- Short amortisation period



KNOLL Maschinenbau has packed all of its extensive expertise regarding the high-pressure cooling lubricant supply of automatic lathes into the mobile LubiCool® unit.

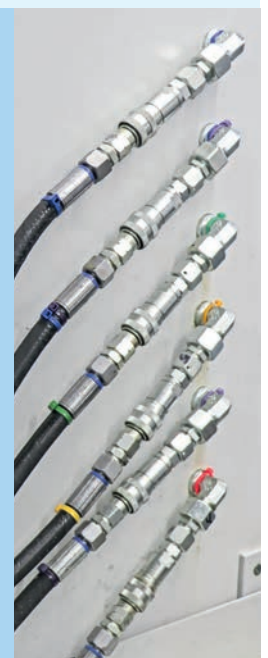
chips and bring the cooling lubricant to the cutting edge." He therefore had some of his automatic lathes fitted with a permanently installed combination of chip conveyors, filtration systems and high-pressure pumps from KNOLL Maschinenbau. Paul appreciates the partnership with the company, which is based in Bad Saulgau and is regarded as a leading supplier of conveyor systems, filtration systems and metalworking pumps: "KNOLL is a very reliable partner who has been precisely adapting every one of our chip conveyors to the respective machine or factory environment for years. With the filters and pumps mounted, KNOLL ensures that the cooling lubricant is always available with a high degree of purity and with optimum pressure." The production employees are also enthusiastic about KNOLL products' simple handling and low maintenance requirements. The products' long-term quality and high availability are particularly appreciated and are of great importance because many machines run in continuous operation.

Mobile high-pressure unit supplies cooling lubricant on demand

Recently, KNOLL developed the LubiCool® mobile high-pressure system as an alternative to this type of permanently installed cooling lubricant supply. The compact unit can be driven on rollers to the fixed or sliding head-stock automatic lathes, which require a high-pressure supply for special jobs. This saves on costs for the respective fixed installations. Thanks to the universal control interface, the LubiCool® can be connected to any machine tool without technical modification. The mechanical connection is made via standard hose couplings according to the plug-and-play principle. The interior of the LubiCool®-M consists of a compact cooling lubricant filter with filter fleece. A transfer pump pumps the contaminated cooling lubricant from the machine tool into the compact filter. It separates chips and foreign matter from the cooling lubricant, which then flows into the clean tank. Finally, a high-pressure pump (KTS screw pump) provides the machine tool with cleaned cooling lubricant.



For years, Gerland has had KNOLL equip automatic lathes with a permanently installed combination of chip conveyors, filtration systems and high-pressure pumps.



Connecting the LubiCool®-M device works according to the plug-and-play principle via six standardised hose couplings.

Another component of the LubiCool® is the SmartConnect operating concept developed by KNOLL, in which a small industrial PC is connected to the PLC plant. The user can access the system via a 7" touch display, visualise statuses, check and change system parameters, and switch over to manual operation. An LED status light helps to keep an eye on the operating status at all times.

Before entering the market, an extensive practical test is carried out

In order to put the LubiCool®, or rather its pump and filtration capacity, through its paces, KNOLL chose field test partners that included Gerland. KNOLL's product manager, Marco Lutz, is pleased that the machining experts at Gerland all agree that "LubiCool® is a standard product that should be tested as extensively as possible. Thanks to the wide range of automatic lathes, workpieces and materials, Gerland is predestined for a test run of several months as requested by us."

The physical proximity of roughly 100 km enabled KNOLL to provide intensive support. By installing on two different automatic lathes that run 24/7, some initial weaknesses could, as intended, be detected and eliminated. It was also interesting for Andreas Paul to test KNOLL's mobile high-pressure system, especially as he can compare it with two similar products from other manufacturers.

His decision to adopt the LubiCool®-M unit after the field test phase, which lasted from June to the end of last year, reveals how this turned out. This is because Gerland were highly satisfied with it. "The advantages are already clear to see when you look at the external appearance," Paul believes. "LubiCool® has a compact design despite its extensive equipment. In addition, the control display is clearly arranged so that the device can be operated quickly and easily. This also includes querying the system status, where-

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A typical Gerland component for automation technology made of brass (left) and a special aluminium alloy (right). Machining requires a stable machine design. A cooling lubricant supply of more than 80 bar increases the surface quality and service life considerably.

by the current status can be seen from a distance via an LED signal system."

Field test confirms diverse strengths

What is more crucial is the performance of LubiCool® and its availability. In this regard, Paul emphasises that the fleece filter with up to 20 µm filter fineness achieves better values than his other mobile devices that are equipped with cartridges or backwash filters: "On the one hand, the higher degree of cooling lubricant purity benefits us in the processing quality. On the other hand, the pumps' wear is minimised."

The KTS screw pump is able to generate high pressure up to 150 bar. Pressures between 80 and 120 bar are usually sufficient for Gerland. However, for machining on the main and counter spindles, several tools must be supplied simultaneously with cooling lubricant at the appropriate pressure. The high volume flow of up to 27 l/min proved to be sufficient for Gerland's usual machining processes. Since the high-pressure pump is equipped with a frequency controller, pressure drops during tool changes, etc. are excluded. This is a very welcome criterion at Gerland that distinguishes LubiCool®-M from other mobile high-pressure equipment. Frequency control also means lower energy consumption, as the current consumption is adapted to the required volume flow and does not have to be permanently 100%.

Proven components ensure high availability

Finally, Paul's verdict on the availability of the LubiCool®-M device: "After improvements at the beginning of the field test phase, the mobile high-pressure device from KNOLL was used around the clock without any problems. We assume that this reliability will not change over the next few years, as we are used to this from the other KNOLL systems. And the same proven components are used in the LubiCool®."

KNOLLREPORT

AT GERLAND KG IN ST. GEORGEN-PETERZELL



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KNOLL
.It works

Product manager, Marco Lutz, confirms this and points out that the filters and pumps used are not purchased parts, but are manufactured by KNOLL itself in Bad Saulgau: "We produce thousands of pumps and coolant lubricant filters per year. Our in-house development and production enables us to react quickly to changing requirements and even influence component design."

Just how quickly KNOLL reacts to customer requirements is shown by the product range expansion: At EMO 2019, the "big brother" of the M version, LubiCool®-L, celebrated its launch. It is designed for larger turning centres as well as small and medium-sized machining centres that require higher volume flows and flushing processes. Here, a TG 30 centrifugal pump for flushing is added to the KTS 25-50 high-pressure pump. As an option, a BS 40

lifting pump can be integrated, which guarantees a self-sufficient high-pressure supply.



Andreas Paul: "LubiCool®-M has many strengths. For us, high availability is particularly important, as the high-pressure unit is used 24/7."



Andreas Paul (left) discusses the requirements of a component with KNOLL product manager, Marco Lutz. Both are delighted with the successful field test of the LubiCool®-M.



KNOLL Maschinenbau GmbH

KNOLL Maschinenbau is one of the leading suppliers of pumping and filtration systems for chips and coolants in the metalworking sector. Ultra-flexible transport systems round off KNOLL's product range. With a comprehensive range of products, KNOLL develops complete systems and system solutions with centralised or decentralised functions. KNOLL has been a byword for innovation, progress and growth since 1970.

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Gerland – guarantor for sophisticated turned parts

Founded in 1926 in Triberg as "Hans Gerland Fasson-drehteile", the company moved to its current Sankt Georgen im Schwarzwald location in 2006 and became known as Gerland KG. In an area of approx. 3000 m², the family business is now in its fourth generation, producing precision turned parts for automation, measurement and control technology as well as hydraulics, pneumatics and apparatus engineering. A growing proportion of them are exported to Eastern Europe, China and the USA.

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