

## AT HAIMER, IGENHAUSEN

### The Finest Grinding Oil Cleaning



To complement its product line for tool clamping, HAIMER developed a solid carbide milling tool and built a new grinding department for this.

#### Exemplary cooling lubricant care thanks to central system with KNOLL MicroPur® filters

*Haimer GmbH has established a new tool grinding facility. In order to keep the quality of the cooling lubricant especially pure, the decision-makers selected a central system from KNOLL Maschinenbau. Core elements are the back-flushable MicroPur® superfine filters, which require no filter additives. The result: high quality of the grinding oil and largely dry metal carbide chips without contamination.*

In addition to various tool holders, Haimer GmbH, the European market leader in tool clamping technology, produces related machines for shrinking and balancing technology as well as 3D measurement devices – now also with solid carbide cutting tools. CEO Andreas Haimer argues: "We want to carry the advantages that our high-quality tool holders offer through to the cutting. For this, we have developed our own Power Mill milling program and the Duo-Lock™ modular interface for metal carbide tool heads."

An essential success factor for all Haimer products is their high quality, which starts with the raw materials selected and continues through delivery to complete production. "Quality wins – this is our company philosophy," explains

Andreas Haimer. His brother, Franz Josef Haimer, who is responsible for technical special projects at the company, adds: "We do everything so that every Haimer product – whether the first or the ten-thousandth – is of the same high quality. This applies for our chucks, our machines, and now also for our new solid carbide milling tools." For the latter, a dynamic and motivated Haimer team established the company's tool grinding shop last year with approximately 20 premium machines from Germany and Switzerland. In order to ensure the desired high quality, Haimer decided to invest in a central system for cooling lubricant cleaning from the filtration specialist KNOLL Maschinenbau, Bad Saulgau.

#### Clean cooling lubricant at a constant temperature

The decision in favor of central cooling lubricant cleaning was made for various reasons. For example, the maintenance of such a system is easier than with decentralized systems, where a filter is installed on each machine. Furthermore, the production workshop stays cleaner, and the temperature of the grinding oil and thus also of all the machines can be kept very constant.

KNOLL Maschinenbau was selected as the supplier for several reasons, as Franz Josef Haimer explains: "We are already familiar with KNOLL from other systems and individual products such as filters and chip conveyors, whose quality always fulfilled our highest requirements. Since KNOLL also had experience as a complete supplier of central systems and we wanted to get everything from the engineering to the components from a single source, making the decision was quite easy."

Of course the Haimer planning team also considered other systems, but KNOLL's solution with the MicroPur® superfine filter won them over with its technology: "The purity of the oil that we require has a maximum particle size of 5 µm. Only a few suppliers could provide this, especially since the clean discharge of the grinding chips was another important criterion. We did not want to use cellulose filters since we wanted to have absolutely pure separation particles. Therefore, the backflushable MicroPur® filters are an optimal solution, for they discharge all of the metal carbide sludge, directly, cleanly, and only minimally contaminated with oil. We can sell it as a valuable raw material and we do not have to pay disposal fees."

## Clean solution: central cooling lubricant system outside of production

While the grinding shop was housed in the brand-new technology building, a two-story building with a small footprint was "docked" onto the production hall since Haimer wanted to eliminate temperature effects, noise, and dirt in production. But a glance at the new cooling lubricant building reveals that it is clean everywhere. The 17,000 liter tanks for clean and dirty media are in the "cellar." Another 3,000 liters of cooling lubricant is in pipes, filters, and automatic concentrators.

The pumps themselves make quite a bit of noise. Haimer placed great value on redundancy in order to guarantee production without downtime. The supply of the grinding machines is handled by two 55 kW pumps that are changed out according to a multi-day cycle. Each of them can convey up to 2,400 l/min with a pressure of up to 14 bar. "This gives us a little buffer,"

explains Franz Josef Haimer. In order to maintain constant pressure on each machine, appropriate pressure sensors are installed, which correspond to the frequency regulation of the pumps.

## Constant temperature for precise grinding results

Just as important for precise grinding is the constant temperature of the grinding oil. At Haimer, a large heat exchanger maintains an even 24° Celsius +/-0.3°; it is also housed in the cellar. Franz Josef Haimer argues: "Each degree by which the machine warms up makes for a length change on all axes, which affects the precision produced." And the precision of the tools is an inviolable basic principle at Haimer. In the end, the company makes the commitment that the tool shaft of the Power Mill endmill has h5 tolerance and its length adheres to a precision of +/- 0.05 mm. "Furthermore, we deliver all millers finely balanced with a true running accuracy of less than 5 µm," reports Oliver Sax, Director of Product Management, with considerable pride. "A drift of just 1 µm in the machine would already add up in the interplay of the axes and compromise the overall precision."

The grinding oil not only ensures the necessary cooling during the chipping and the transport of the chips, it is also used for spindle cooling. To prevent damage to the spindle and premature wear, the purity of the oil must maintain a particle size of less than 5 µm.

## Economical Superfine Cleaning

Three MicroPur® 480F superfine filters, which are housed one story up, handle this task; they are designed especially for cleaning grinding oils from metal carbide and solid metal carbide grinding, honing, and lapping processes. Thanks to their special design, they do without filter consumables, which makes a significant contribution to their great economy. Instead, they have backflushable filter cartridges. Each one of these has a star-shaped fold, which provides approximately 3.4 square meters of filter area.

In the modular MicroPur® 480F, there are up to four housings, each of which are fitted with two such filter cartridges. These can be backflushed individually with clean coolant without interrupting the filter process. An individual flushing pump increases the backflushing effectiveness, which is evident from the longer life span of the filter cartridges and lower maintenance costs.

At the moment, 20 filter cartridges are installed in the system at Haimer. This corresponds to a cleaning capacity of up to 1,200 l/min. As the volumetric flow might lead one to



For its new tool grinding shop, HAIMER invested in a central cooling lubricant system from KNOLL; its core element is the MicroPur® superfine filter.



The filter cartridges are regularly backflushed parallel to the process. In case of wear, they can be replaced cleanly and in a very short time.

suspect, the filter system can be expanded up to 2,400 l/min without a lot of effort. All of the peripherals – the pump technology, containers, and automatic concentrators – are prepared for this retrofitting. As soon as the grinding shop, which is still in the start-up phase, has reached its limits, the third filter module (currently only half-fitted), will supplement the two others and the cooling lubricant system will start up in its final stage of expansion.

### Only minimal oil carry-over

The AK50 automatic concentrator ensures the recovery of the valuable metal carbide chips from the backflushing of the MicroPur® filter. During the backflushing of the MicroPur® filter, the highly-concentrated filter cake is conveyed to the automatic concentrator together with the rinsing medium. This medium is cleaned through the filter cartridges of the AK50 so that it is superfine; it is then pumped back into the system by a separate pump via the clean tank. For filtration in the AK50, the same filter cartridges are used as in the MicroPur®. Since these are also subject to

an accumulation of chips over time, they too have to be backflushed. Here control is generally not via pressure measurement as in the MicroPur®, but using a timing relay. The process starts when the fill level in the automatic concentrator has not been removed in a certain period of time. Thanks to the repeated filtration and oil recovery, the KNOLL system produces very little oil carry-over, so that the metal carbide chips with a residual moisture of less than 10 percent are conveyed via scraper conveyor to the disposal container. The company earns a surprising amount of money by selling the pure metal carbide.

The entire Haimer team is very satisfied with the company's cooperation with KNOLL: "Although the time from when the



Redundancy reigns, in other places among the large 55 kW supply pumps.



The heat exchanger keeps the temperature of the grinding oil at a constant 24 °C.

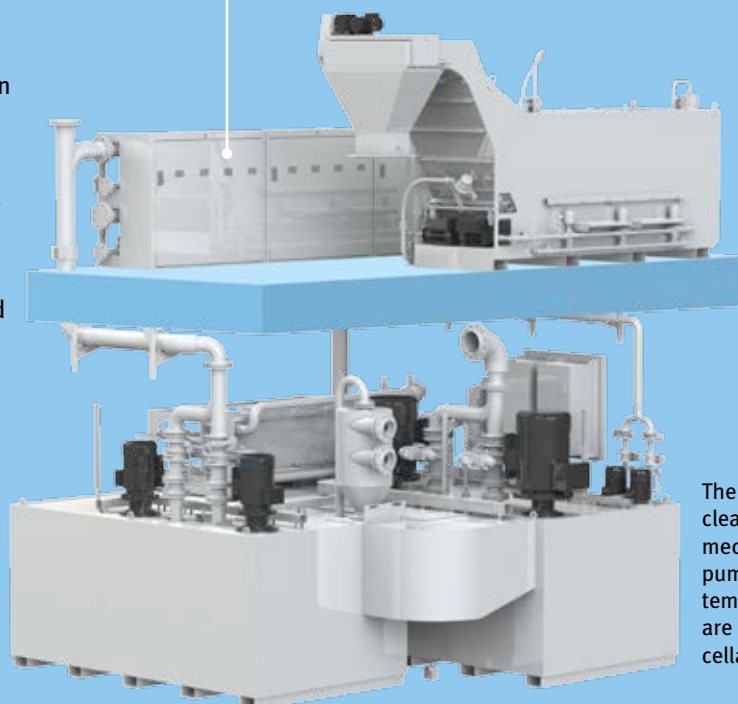
### KNOLL's MicroPur® sets standards:

- Effective backflushing with clean coolant thanks to separate pump; guarantees long life span of the filter cartridges
- Very short backflushing times < 4 s without air, therefore great energy efficiency without filter interruption
- Display of the differential pressure on each filter and control panel; thus direct localization of damaged filter cartridges
- Differential pressure for regeneration can be set on each individual filter housing; this guarantees optimal filter quality
- Filter cartridges in tandem arrangement; thus less space required
- Drip-free filter change < 1 min; less maintenance and cleaning work required



The MicroPur® filters are on the upper floor. At the moment, three filter housings are installed with two times four and one times two filter housings.

The cleaning capacity is currently 1,200 l/min. A doubling of the filter capacity is already planned.



The tanks for clean and dirty medium, the pumps, and the tempering unit are almost in the cellar.



The central cooling lubricant system is also housed on two levels in this addition.

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The AK50 automatic concentrator ensures the clean recovery of the fine metal carbide chips. It also contains MicroPur® filter cartridges, which can be backflushed automatically.

order was placed to start-up was quite short and access to the facilities required some tricks, everything worked extremely well. KNOLL provided us with a turn-key system, which was very important to us and their team also briefed our own pipe installers very well. Immediately after start-up, we were able to rely on the full power of our machines."

### KNOLL Maschinenbau GmbH

KNOLL Maschinenbau ranks among the leading suppliers of systems for conveying and filtering chips and coolant in the metal machining industry. Its displacement pumps are also used in the chemicals and foodstuffs industries. Highly-flexible transport systems complete the KNOLL product portfolio. Thanks to its comprehensive product range, the company is able to implement complete systems and system solutions incorporating central or localised functions. Since 1970 the name KNOLL has been associated with innovation, progress and growth.

### Precision tools made by HAIMER

HAIMER is a family-owned mid-sized company with 350 employees worldwide; its headquarters are in Igenhausen bei Augsburg, Bavaria (Germany). The 280 employees in the only production location in Igenhausen develop, produce, and sell innovative, highly-precise products for metal chipping. In addition to tool holders with all common interfaces and in a variety of lengths, its product line includes related machines for shrinking and balancing technology, 3D measurement devices, and most recently, endmills. The Power Mill VHM endmills are made of high-quality solid carbide and feature the proven Safe-Lock™ pull-out protection. They have the pull-out protection for endmills developed by HAIMER; in recent years it has gone from being an innovation to the standard for metal carbide and solid carbide processing. The tool geometries developed by HAIMER with unequal cuts and spiral angles ensure high-performance and low-vibration processing of the highest quality. All tools are produced in Igenhausen on state-of-the-art tool grinding machines and coated with the latest PVD technology. They distinguish themselves through their extremely smooth surfaces, which guarantee optimal chip discharge.

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