



WORLD WIDE WEAVE

MAXFLOW passes the tool company test

Maximum flexibility in the filtration of cooling lubricants without filter aids

With a product range of more than 1,650 tool types and over 44,000 different articles, Gühring KG is one of the world's leading suppliers of rotary cutting tools and ranks among the top addresses for equipping new machines. Structured into four divisions – tool, service, carbide as well as machine and plant division – this owner-managed company provides solutions from a single source optimised for the specific process and application. Its comprehensive range of high-quality standard products and innovative customised solutions sets international standards in terms of quality, efficiency and process reliability. To maintain and further advance this leading position, Gühring is continually optimising its processes and products. For this reason, in the special tools area, a comprehensive test has been running for the last two years into changing the cooling lubricant filtration on the grinding machines for spiral grooves over to systems that do not use filter aids. In addition, these systems must be flexibly deployable with oils or emulsions, and be as compact as possible. In view of the consequences of such a decision, the types of equipment available on the market were all subjected to complex practical testing. The tool company was particularly impressed by the MAXFLOW compact filter system of GKD – Gebr. Kufferath AG, which works without filter aids and combines filtration and briquetting in a single piece of equipment.



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Maximum precision indispensable for process reliability

Founded in 1898, Gühring specialises, among other things, in the manufacture of high-precision tools for drilling, tapping, milling, reaming and countersinking as well as thread-cutting tools. First-class, cutting-edge geometries and surface qualities are characteristic of its products. This is particularly called for in the field of special tools, where Gühring develops made-to-measure solutions to customer specifications or on the basis of its own engineering competence. In terms of twist drills, these are tools with an external diameter of up to 106 mm that are deployed, for example, in shipbuilding or in heavy industry. But Gühring know-how is also indispensable in considerably smaller formats. Whether in the automotive or aerospace industries, in general engineering or in the manufacturing of timepieces and printed circuit boards – with precise tool design, short response times and high quality, Gühring guarantees not only the required precision of processing results but also the necessary productivity and cost-efficiency.

Key factor cooling lubricants

The process from customer enquiry to the commissioning of a special tool only takes a few weeks at Gühring, in emergencies often only a few days. As soon as the special tool has been defined in terms of length, diameter and application-specific core parameters and ordered, the technical product drawing is completed and the tool is made from type HSS or HSCO high speed steel. After the soft machining, i.e. all processing stages up to hardening, the parts are hardened and then, in the production area, the external diameter is processed, the spiral grooves are ground in and the tip geometry is created. In this process, not only the precise design of materials and machining tools but also the efficiency of the cooling lubricant



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is of crucial importance for meeting the stringent customer requirements regarding surface quality, shape accuracy and tolerances. The task of the cooling lubricant used here is to ensure consistent lubrication and cooling of the grinding tool and the workpiece during processing, and to reliably remove the filings created and the dust from the grinding discs themselves. Even the slightest contamination of the cooling lubricant with abrasive particles could cause loss of precision, increased tool wear and thus shorter service lives. For this reason, the long-term efficiency of the processing of the cooling lubricant is a key factor for the efficiency of the whole grinding process.

Four filter units tested

In the past, the tool maker with its headquarters in Albstadt in Baden-Wuerttemberg has been using precoat filters and magnetic separators for this job. The aim was to cut the costs of the high consumption of filter aids required for this approach – 15 tons of cellulose per year – and the concomitant disposal costs. So the company was looking for a new type of equipment that can guarantee long-term maximum processing precision and process reliability of the machining tools through particle retention without the use of filter aids. Depending on the tool, the workpiece and the process parameters, Gühring uses either oil or emulsion as a cooling lubricant. The new filtration equipment must be able to deliver equally reliable results for both variants. One by one, the company has therefore tested a vacuum belt filter, a paper cartridge filter, a disc filter and the Maxflow filter system.

MAXFLOW proves itself across the board

The tested systems were unable to meet the requirements in all respects. Only the MAXFLOW CS 1000-504 filter system, which works with both oil



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and emulsion, excelled across the board in the tests. Gühring deployed this compact unit, which works without filter aids, with one filter head and a round tank system. The filter head contains vertically aligned filter discs made of the multi-layered stainless steel blended mesh type YMAX[®], which is specifically configured to the process in question. Filtration takes place according to the cross-flow principle, with the filtrate streaming around these filter discs. The filtration rate achieved is up to 400 litres per minute at a filtration fineness down to 5 µm. A dirt tank integrated into the clean tank and equipped with a tapered run-off prevents deposits from accumulating on the tank floor. The filter cake is detached from the disc filters through automatic backwashing of the filter, compressed by the integrated pressing unit into homogeneous briquets and ejected. The automatic backwashing operates trouble-free. The profibus-compatible control system allows material-specific settings of programme and parameters to be entered directly at the unit. Remote maintenance is available on request.

Satisfactory intermediate results

After a brief test with oil, Gühring has been testing the GKD compact filter unit for the last six months with an innovative, process-specific, proprietary developed emulsion mixture. The fact that there are no deployment values for this emulsion posed some challenges for MAXFLOW. For this reason, adjustments are still being made to the fineness of filtration. Generally MAXFLOW enables particle separation down to the micron range. Asked for an initial conclusion, Wolfgang Löckel, Head of Plant Engineering at the parent plant, expressed his satisfaction: "The measured residual moisture content of 20 – 30 percent is due to the chip shape. MAXFLOW is a good and also very compact piece of equipment with the great advantage that I get a relatively dry sludge out of it that is already pressed into briquets." Volker Zizmann, Head of Production Unit 2 (cylindrical and conical special



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tools) agreed with this evaluation: "The sludge discharge is uncomplicated. No after-treatment is required – in contrast to the other systems." Despite the difficult operational conditions, the robust Maxflow system continues to prove itself in the tough everyday production at Gühring. Volker Zizmann expected the stainless steel blended mesh filter discs to operate effectively for at least twelve months. Thanks to its very compact form and simple operation, there were no problems in integrating MAXFLOW into the process. Volker Zizmann's evaluation of the unit's handling is correspondingly positive: "This system means the least amount of effort for me. I have to intervene less. With the other systems, a lot more process monitoring and intervention was required." After about six weeks, Gühring switched MAXFLOW over from emulsion to oil filtration. "I expect the unit to function even better with oil than with this relatively new emulsion," said Zizmann optimistically.

Planned deployment as a central unit

The decision as to which type of equipment will be used for cooling lubricant filtration during grinding of spiral grooves will be made in 2010. One thing is certain: the new filtration equipment in the grinding shop at Gühring will be responsible for the central supply of oil and emulsion. The demand on filtration rate: up to 6,000 litres of oil per minute and 800 litres of emulsion. For GKD, this means that, if the decision is made for Maxflow, an analogous large-scale plant will have to be used instead of the compact unit currently being tested. But, as a modular system, Maxflow is capable of meeting even these changing customer requirements.

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GKD – GEBR. KUFFERATH AG

The owner-run technical weaver GKD – GEBR. KUFFERATH AG is the global market leader for metal and plastic woven solutions as well as transparent media facades. Under the umbrella of GKD – WORLD WIDE WEAVE the company combines three independent business units: SOLID WEAVE (industrial meshes), WEAVE IN MOTION (process belt meshes) and CREATIVE WEAVE (architectural meshes). With its six plants – including the headquarters in Germany and other facilities in the US, South Africa, China, India and Chile – as well as its branches in France, Great Britain, Spain, Dubai, Qatar and worldwide representatives, GKD is never far from its customers.

For more information:

GKD – GEBR. KUFFERATH AG
Metallweberstraße 46
D-52353 Düren
Tel.: +49 (0) 2421 / 803-0
Fax: +49 (0) 2421 / 803-233
E-mail: solidweave@gkd.de
www.gkd.de

Please send a reprint to:

impetus.PR
Ursula Herrling-Tusch
Charlottenburger Allee 27-29
D-52068 Aachen
Tel.: +49 (0) 241 / 189 25-10
Fax: +49 (0) 241 / 189 25-29
E-mail: herrling-tusch@impetus-pr.de