WORLD WIDE WEAVE

# MAXFLOW completely convinces a precision grinding company

## High surface quality and process security through a compact filter system with integrated briquetting

**Small causes have a huge effect in the metal processing industry: Even the finest grinding particles in the cooling lubricant affect precision, surface quality and the working life and hence the efficiency of the entire process. Thus for companies such as Heinrich Müller GmbH based in Wendelstein, Middle Franconia, the cleanliness of the grinding medium takes a high priority. This company that is being managed by the fourth generation is a highly sought after supplier of precision turned parts that are ready for installation by customers in the automotive, electrical and electronics industries, for medical technology, aircraft and aerospace and the optical and toy industries. With this wide ranging spectrum of centreless (no-point) ground turned parts the company motto "Security through precision" is a guarantee of first class products. In order to ensure that it can continue to hold this leading position, managing directors Lothar and Florian Müller, the grandson and great-grandson respectively of the company founder, are committed to a continuous improvement of all processes. The commissioning of the MAXFLOW compact filter system from GKD – Gebr. Kufferath AG brought about a significant increase in efficiency in grinding operations at that company.**

### Over 100 years of success through precision

The company that was founded by Heinrich Müller in Nuremberg in 1907 has been based just 12 kilometres away in Wendelstein since 1923. Today

this company that has an annual turnover of 10,4 million Euro is regarded as a specialist for the production of highly complex parts that are produced on automatic lathes for medium- and large scale production runs. Turned parts with diameters from 1 mm to 90 mm are produced in the main factory in Wendelstein and the facilities in Schwarzenbruck. Whether valve parts for camshaft positioning, valve guides or armatures, bearing sleeves for the throttle flaps of truck engines or plug pins – all the components that are fabricated here have in common the toughest requirements for precision and surface quality. The required tolerances in the range of thousandths of a millimetre presuppose absolute control over the process. The large number of items to be produced – up to five million per year per product – require maximum productivity in addition. Flexibility in production, measuring longer working lives and the reliability of the machining processes ensure the degree of cost-effectiveness that is required here. Heinrich Müller tackles the problem of pressure from the market by using the very latest machines, a degree of know-how that has been built up over decades and trend-setting processes.

**Order-related production**

The required degree of customer-specific flexibility at Heinrich Müller starts in its own toolmaking section, where hard metal forming tools are created on optical profile grinding or wire erosion machines. In addition to free cutting steels, stainless steels, brass, nickel silver, copper, aluminium or titanium are used for the high-quality components, depending on the customer specifications and intended purpose. Parts with complex geometries and numerous machining steps are produced on one- and six-spindle automatic grinders – cam-controlled or CNC-controlled. In the course of the subsequent washing process in special washing machines two full baskets with turned parts are washed with hydrocarbons for 7 to 8

minutes and then dried under a vacuum. A portion of the production then goes into the Centreless grinding shop for further processing to produce final dimensions in the µ range. From a there a swivelling conveyor transfers the valve guides to the grinding shop. The armatures with delicate edges are laid by hand on a conveyor belt and brought to the grinding shop. The company secures the required degree of quality with absolute reliability through the use of high-quality measuring technology and optical automatic sorting devices. The certified Quality Management system in compliance with DIN EN ISO 9001:2008 also stands for this. Precision turned parts that had been made to order are packed ready for shipping according to the customer's requirements in the company's own shipping department.

**Quick work for precision**

It is only possible to produce the required number of parts with the maximum possible precision with ever shorter processing times. For example, every year in the grinding shop in Wendelstein two million valve guides are ground from a special brass alloy by a centreless procedure. The time per part is only two seconds, which corresponds to an output of 1,800 valve guides an hour or 60,000 parts per week. Each of these valve guides that is around 45 mm long is ground to a tolerance of 11 µm, which is a tolerance spectrum of between a third and a tenth of the thickness of a human hair. In order to be able to comply with these tolerances, the properties of the cooling lubricant play a crucial role in addition to the exact configuration of the material and the automatic machinery. The grinding process is done with three-point contact. This is done by guiding the component to be machined through the unit on a hard metal straight edge, where a rubber-covered controller wheel turns it slowly against a rapidly rotating grinding wheel. Within two seconds a valve guide thus takes on the

dimensions that had been specified by the customer. The grinding dust and particles worn off from the wheel are carried away by the cutting oil.

**Cutting oil filtration on the test bench**

This process has been done for more than 20 years at Heinrich Müller on two automatic centreless grinders with grinding wheel diameters of 350 and 400 mm. The filtration of the cutting oil is done in a centrifuge, since the solution with paper belt papers that had be tested before did not meet expectations. In the middle of 2010 the decision was taken to obtain a third and larger grinder without points. Its grinding wheel has a diameter of 600 mm and rotates at 1000 rpm. This also increased the demands placed on the filtration of the cutting oil: Today 1,200 litres of cutting oil circulate permanently through the three automatic grinders to evenly lubricate the grinding wheels and work pieces and to keep them free of chips or dust worn off the grinding wheels. Even the smallest amount of contamination of the oil by grinding particles would affect the precision and the grinding process and endanger the tools. The significant factor for the desire to optimize the filtration process was in the last resort the elaborate disposal of the filter sludge that was carried away. For Lothar Müller the temporary storage of the sludge, which was a substantial risk and need to be handled as designated special waste, was a constant concern. In addition to this there was difficult and expensive disposal of this waste, which he wanted to avoid in future.

**Better laboratory results without producing special designated waste**

For that reason Michael Mullee, the department manager for toolmaking and grinding at Heinrich Müller, obtained information at GrindTec in Augsburg concerning new solutions involving hydrocyclones. While he was making his way through the hall of the trade fair he saw a filter package at

the stand of GKD – Gebr. Kufferath AG. This aroused his curiosity, because he already knew from reference reports about the MAXFLOW concept that combines filtration and briquetting in one unit. Laboratory samples of unfiltered and filtered oil clearly showed better results than were obtained from the centrifuge that had been used up until then in the grinding shop. At the same time he immediately took a liking to the briquetting of the remaining materials concerning the abraded wheel dust. He saw here the possibility to dispose of the briquettes without any further treatment while at the same time complying with all the legal requirements without any disposal costs. This was an advantage that also fascinated technical managing director Lothar Müller at once. His company is committed to working with the certified environmental management system in compliance with DIN EN ISO 14001:2005. “For several decades now we have felt that we have an obligation to conserve resources For that reason the prevention of special designated waste was an important point for us when it came to making the decision to buy the new filter unit,” explained the senior director. The choice fell on the MAXFLOW CS 1000-503 filter system with a filter head and round tank system from the dirty and clean tanks with a volume of 1200 litres. The housing, filter disks and fabric of the unit are made completely out of stainless steel. The filter disk package is installed vertically in the filter head. The static disks are spanned with multi-dimensional mixed fabric of type YMAX® that is designed for the specific process in question and the oil that has been contaminated with the filter chips passes through it in a cross-flow system. The filter capacity is 200 litres a minute with a filtration fineness of up to 5 µm. A dirty tank that has a pointed discharge outlet to prevent any accumulation on the base of the tank is integrated into the clean tank. The filter cake is released from the disks by an automatic backwash system, and this is pressed into a dry briquette by the system’s own press unit and then carried away.

**Full satisfaction through the many benefits**

Michael Mullee is full of praise for the “very professional and rapid type of setting up.” He adds: GKD convinced us also in comparison with other companies. We can always contact somebody at any time and any problems that crop up are dealt with quickly and smoothly.” The MAXFLOW compact unit has been in operation since July 2010. Both Lothar Müller and Michael Mullee greatly value its reliability. “We are very satisfied with the unit,” enthuses the technical managing director. “In view of the requirements for ever shorter production times and Just In Time production the markedly longer working times and the reliability of the process are very important to us.” For Michael Mullee “the fact that the quality of the oil is several times better than before” and the “cleanliness of the process” are crucial advantages: “The better filtration capacity enables us to achieve even better surface quality for our work pieces. In addition, our machines no longer produce any sludge, which improves the hygienic conditions for our workers.” The centrifuge that had been used before worked with a collecting tank for dirty oil, measuring 2.5 x 1.2 metres, which had to be cleaned out twice a year. Today lifting units at each grinder ensure transport of the dirty oil into the filter without any contact. A further plus point is also the compact construction of the MAXFLOW system. The amount of room that was available in the grinding shop was greatly limited by the commissioning of the third grinder. The CS 1000-503 only requires a setup area of 2.5m² and thus finds enough room behind the three grinders. The enthusiasm of Michael Mullee for the discharge of dry briquettes is as great as ever. The briquettes, which weigh around a kilogram each, drop into a bucket and are disposed of together with the steel scrap.

**Additional MAXFLOW unit in the planning**

As a result of the positive experience with the MAXFLOW system in the grinding shop in Wendelstein planning is already under way at Heinrich Müller GmbH to buy an additional MAXFLOW filter unit. “The long working times and the improved quality of the work pieces justify the investment costs,” says Lothar Müller in defence of the decision. The new unit is planned to be used for the filtration of the cutting oil from the automatic lathes. Up to 2,000 litres of cutting oil circulates here, which must be filtered continuously to ensure a maximum amount of particle retention. He expects from the MAXFLOW system a greater degree of process security, especially when looking at internally-cooled drills with a diameter of a few millimetres. “Even the smallest chips can be disastrous in these tiny openings that the oil is pumped though at high pressure,” he says. The unavoidable result would be tool breakage or even a fire at the machine. Since it is a modular system, MAXFLOW can also be expanded to cope with this demanding task. When it comes to the business area of GKD-CompactFiltration, system vendor for filtration technology and plant engineering, Heinrich Müller GmbH sees here a reliable partner to choose for this future requirement as well.

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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.

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