



WORLD WIDE WEAVE

Increase production – reduce costs

Compact filter MAXFLOW in a precision grinding works

Whether brake discs, ball bearing liners or transmission housings – the automotive industry depends on high-precision parts to produce efficient vehicles. For this reason, manufacturers of machine tools and tools, metal-working companies and autoparts suppliers all work at the highest technological level to deliver precision products.

Grinding works for precision metal workpieces

In the modern precision contract grinding works Paul Jores GmbH in the Rhineland-Palatinate that has been processing metallic workpieces for renowned customers for several decades now, one piece of machinery often used is a two-disc fine grinding machine. The two grinding discs rotate in opposite directions and so enable two-sided grinding of the workpiece. To ensure an optimal grinding process, the Paul Jores GmbH uses cooling lubricant oil to cool and lubricate the grinding discs and the workpiece. In this way, the stringent specifications for surface quality, flatness, parallelism and dimension accuracy can be reliably maintained for all grinding processes.

Contaminated cooling lubricant oil as a cost factor

Through the process, the cooling lubricant oil becomes progressively contaminated with ultrafine filings or dust from the abrasive grinding discs. The existing filtration equipment at Paul Jores was not able to continuously filter these fine particles out of the oil. Once it reached a certain degree of contamination, the cooling lubricant oil had to be conditioned at great cost. Contaminated cooling lubricant oil reduced the abrasion capacity of the



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grinding discs. Even though they were trimmed with increasing frequency it was not possible to extend the service life. In addition, fluctuations in the production tolerances occurred. Also contamination of both the grinding machine and the workpieces was a substantial cost and efficiency factor for the grinding works Paul Jores. An attempt was made to counter this and extend the service life through regular filtration of the cooling lubricant oil, at first with paper belt filters and later with an edge chip filter. But the results were modest. The filter plate integrated into the edge chip filter swells up very fast on first contact with moisture, drastically reducing filtration performance, and so must be frequently replaced. Another problem are the wet grinding chips, which are dried in a centrifuge and then have to be transported to a utilization facility as loose material at great cost and effort.

MAXFLOW as a filter solution

In order to optimize the processes described, the Paul Jores GmbH started looking for a new filter technology. The compact filter concept MAXFLOW of GKD – GEBR. KUFFERATH AG caught their attention. The patented filter system MAXFLOW combines filtration and briquetting of the wet grinding chips in a single unit. In addition to a pump system and a filter head, the MAXFLOW also has a round tank system with a volume of 1,000 liters. Inside the round tank system, the dirt tank is integrated into the clean tank and equipped with a tapered run-off that prevents the accumulation of deposits on the tank floor. The filter head consists of a stainless steel enclosure in which static filter discs are arranged vertically. After a comprehensive laboratory and test phase, a MAXFLOW compact system was installed in one of the grinding works' two-disc fine grinding machines.



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Clean process fluids thanks to individual filter discs

Filtration with MAXFLOW takes place according to the cross-flow principle, with the filtrate streaming around the filter discs, which are composed of multi-layered GKD stainless steel mesh type YMAX[®]. This process and the fact that, in terms of mesh construction, the filter discs are precisely tuned to the specific application means that no filter aids are required. MAXFLOW is the smallest filter unit in the MAXFLOW series and provides the grinding works with filtration of the cooling lubricant oil with an output rate of 140 liters per minute. In 80 percent the pollutant particles are smaller than 15 microns. With a pollution supply of 500 milligrams per liter, the filtrate has a purity level of less than 40 milligrams per liter. Thanks to this high level of purity, the cooling lubricant oil needs to be conditioned considerably less frequently. Because filter aids are not used, cooling lubricant oil consumption can be reduced by up to 60 percent.

MAXFLOW ensures an exemplary degree of cleanliness of both grinding machine and workpiece during the processing. This is crucial for the further processing by the automotive industry, which relies on the supplied parts to be as clean as possible. Both the dimensional consistency of the parts and the length of time before the grinding discs need to be trimmed is increased enormously. The grinding discs become less contaminated and, because of the reduced wear, do not need to be trimmed or replaced so often – up to 30 percent less often. This means important cost savings for the grinding works.

Dry discharge makes handling easier

Automatic backwashing detaches the wet grinding chips from the filter discs as filter cake and ejects them as a dry briquet which is not



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interspersed with filter aids. The fact alone that no filter aids are needed reduces the volume of waste to a third and makes secondary processing of the wet grinding chips unnecessary. Even without filter aids there is about 60 kilograms of it; when it was processed with filter aids like paper tissue there was up to 80 kilograms. Instead of having to carry the waste away manually in containers, it is simply a matter of 20 to 30 dry metallic briquets per shift with a dry weight of about 20 kilograms that are sorted regarding constituent material and can be simply disposed of or recycled. In contrast to the edge chip filter with the same output rate, the MAXFLOW unit is also more compact and requires only three square meters of floor space as opposed to the eight square meters previously needed. The integrated round tank system is modular and can be extended at any time to a tank volume of up to 20 cubic meters. Furthermore, MAXFLOW can be used variably – whether for the filtration of cooling lubricant oil, aqueous emulsion or other process fluids.

Optimistic prognosis

Sascha Schönecken of GKD is optimistic: "The deployment of MAXFLOW at Paul Jores GmbH is very successful and has brought lots of advantages in terms of handling and costs." Torsten Jores, Managing Director of Paul Jores GmbH, confirms this opinion: "We are very satisfied and after the very good start of the first MAXFLOW unit, we will install further units on our fine grinding machines."

Thanks to the round tank system and the lower delivery rate required of the pumps, MAXFLOW makes it possible to reduce cooling requirements by about 30 percent. Moreover, the compact filtration system uses about 30 percent less energy compared to precoat or wedge wire filters.



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At a glance: advantages of MAXFLOW for Paul Jores GmbH

- No cooling lubricant is lost, it stays in the process longer and needs to be replaced less frequently
- Grinding machine and workpiece are cleaner
- Grinding discs are cleaner, have a longer service life
- Dry metallic briquets as recyclable material instead of loose grinding chips
- No addition of filter aids
- Cooling requirements and energy consumption reduced
- Compact construction of MAXFLOW instead of larger edge chip filter
- Can be used for various filtration tasks, e.g. oil or emulsion

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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



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Britain, Spain, Dubai, Qatar and worldwide representatives, GKD is never far from its customers.

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