

Filtering 5,000 Litres per Minute

o manufacture a large family of components, AGA Zerspanungstechnik Gera has set up a completely new production line together with strong partners. Lehmann-UMT from Pöhl was responsible for coolant filtration and chip removal. Automation and flexibility were key priorities throughout the project.

As a supplier to the automotive industry, AGA also manufactures a considerable proportion of its products for companies in the mechanical engineering, agricultural machinery and medical technology sectors. Around 80 percent of the components produced by the Gera-based company, which is part of the Samag Group, are manufactured for the automotive industry: drive components for major automotive manufacturers, shock absorber and chassis components for automotive suppliers, as well as components for electric mobility. And in most cases, these are produced in large volumes. But how are these volumes handled? And how does AGA respond when flexibility is required for the production of new components?

Consistent and Integrated

Large-scale production is also the focus of an order that AGA received some time ago from a major German manufacturer of mechanical engineering components. Under a multi-year contract, milled components from a single component family are to be produced in series running into the millions.



The supplier developed the manufacturing concept together with its partners virtually from scratch. "When it came to the machining centres, we were particularly impressed by the technology offered by Unitech-Maschinen," reports Thomas Epperlein, Key Account Manager at AGA Zerspanungstechnik. Designed with the future in mind, the concept enables AGA to manufacture new component variants efficiently and automatically in series production at any time.

The production line consists of several identical machining centres linked by automated workpiece handling. Unitech-Maschinen, a Fanuc system house since 2015, supplied a standard vertical machining centre that is simple in design and is regarded as flexible, fast and robust.



"Above all, the machining centre can be automated with ease and expanded in terms of its axes," emphasises Michael Christoph, Sales Engineer at Unitech-Maschinen. In this particular case, AGA took responsibility for designing the workpiece automation itself, while implementation was carried out together with Handlingtech. The automation specialist from Steinenbronn near Stuttgart generally implements such handling solutions using Fanuc and Yaskawa robots. To ensure smooth communication between the production systems, it made sense to use machines and robots from the same manufacturer. One robot was positioned between each two machining centres, allowing the machines to be automatically supplied with workpieces. Today, this type of automation runs throughout the entire production operation, meaning that, in addition to the high degree of automation, standardisation also contributes to competitiveness.

Individual Systems vs. a Centralised Concept

Lehmann-UMT was brought into the project as a specialist in coolant filtration and chip disposal. Based on its long-standing cooperation with Unitech, the Pöhl-based specialist was asked to develop a coolant concept and supply 22 chip conveyors.

The conditions prevailing at the Gera site resulted in several possible approaches. Two, to be precise. One option was to equip each machining centre with its own small filtration unit. Alternatively, there were several arguments in favour of a centralised system. Extensive discussions followed. Ultimately, the

available space in the production hall tipped the balance in favour of a central solution. Given the limited space available, individual systems would have required special designs and would have left very little room for coolant supply at the machines. In addition, the individual-system concept would have resulted in greater effort when handling the filter media and would have required considerably more personnel.



Custom-Designed Filtration Concept

Lehmann-UMT then created an initial layout of the central system based on the production hall floor plan. This quickly proved to be the final solution.



Designed around compact filtration technology, the system was required to filter 5,000 litres of emulsion per minute and deliver it to the machines via supply pumps. For this purpose, Lehmann-UMT developed a special compact filter module specifically for the project.

The filter is designed for filtering oil, water, emulsions and solutions where space is limited. Operating according to the principle of a paper-band filter, it can filter between 30 and 1,500 l/min, depending on the customer-specific configuration. Its compact design makes it easy to integrate into existing systems, including installations where space is limited. The well-designed paper-band filter can also be easily expanded with additional filtration components, such as a magnetic separator.



The coolant filter developed by Lehmann-UMT's R&D department can be used for machining steel, aluminium, cast iron, grey cast iron and stainless steel. It also offers flexibility in terms of machining processes, whether turning, milling, grinding, drilling, honing or lapping. Depending on the filter media used, filtration fineness of down to 10 µm is possible. The paper-band filter is equipped as standard with complete electrical monitoring.

The conveyor belt carrying the filter media has a C-shaped design, creating a filter trough inside the compact filter. Thanks to this design, the filter surface available for filtering oil and other media is particularly large, while the utilisation of the filter aids is maximised. In addition, a high water column is created, resulting in the formation of an excellent filter cake. This, in turn, enables a high degree of filtration fineness.

Reliable Coolant Management

"Just like the compact filter module, we also manufactured a 40 m³ tank specifically for the AGA project, which was equipped with four filter modules," reports Marcus Ludwig, Technical Sales Representative at Lehmann-UMT. In addition to the size of the tank, its immersion depth presented a particular challenge.

In the new concept, robust pumps reliably supply both the booster stations and the machines. The more than 20 chip conveyors that Lehmann-UMT connected to the vertical machining centres operate with a media plate that provides the required power supply.

"Because there is always a certain amount of coolant loss when using emulsion-based cooling, we also supplied a dosing unit that automatically mixes the emulsion and replenishes the amount lost from the main tank. This keeps the coolant concentration constant without any manual intervention," Ludwig continues. "We also installed a circulation pump that operates throughout the entire tank. If the system is not in operation for a period of time, this ensures that no anaerobic bacteria can form."

Maintaining the coolant in good condition is particularly important in centralised systems. "That is why we have assigned an employee to coolant management who regularly checks parameters such as concentration and pH value," reports Epperlein.

Production Is Underway

Despite the considerable size of the central system, the implementation period was ultimately very short: "We completed the entire project in 16 weeks – from the initial on-site meeting to the freshly painted, fully assembled system," says Ludwig with some pride.

Production in Gera has now been running since June. Most of the machining centres have already been commissioned. The remaining machines are being brought online step by step, while additional component variants are being introduced and approved by internal quality assurance and the end customer.

Production at the site is now well established. The concept is proving successful.

"We are therefore very satisfied with the solution we developed together. All the components work well together," emphasises Epperlein. "The most important thing is that the components are manufactured to the required quality."

And, it should be added, this is achieved through automated, flexible and competitive contract manufacturing.



Unitech-Maschinen GmbH

Unitech-Maschinen is a family-owned company founded in 1995. Based in Chemnitz, the company designs, manufactures and sells its own machine tools for milling and turning, as well as machines from renowned partner companies.

Its range of services also includes the development of complete solutions, technological consulting, operator training, as well as maintenance and spare parts services.

The company employs around 50 people.