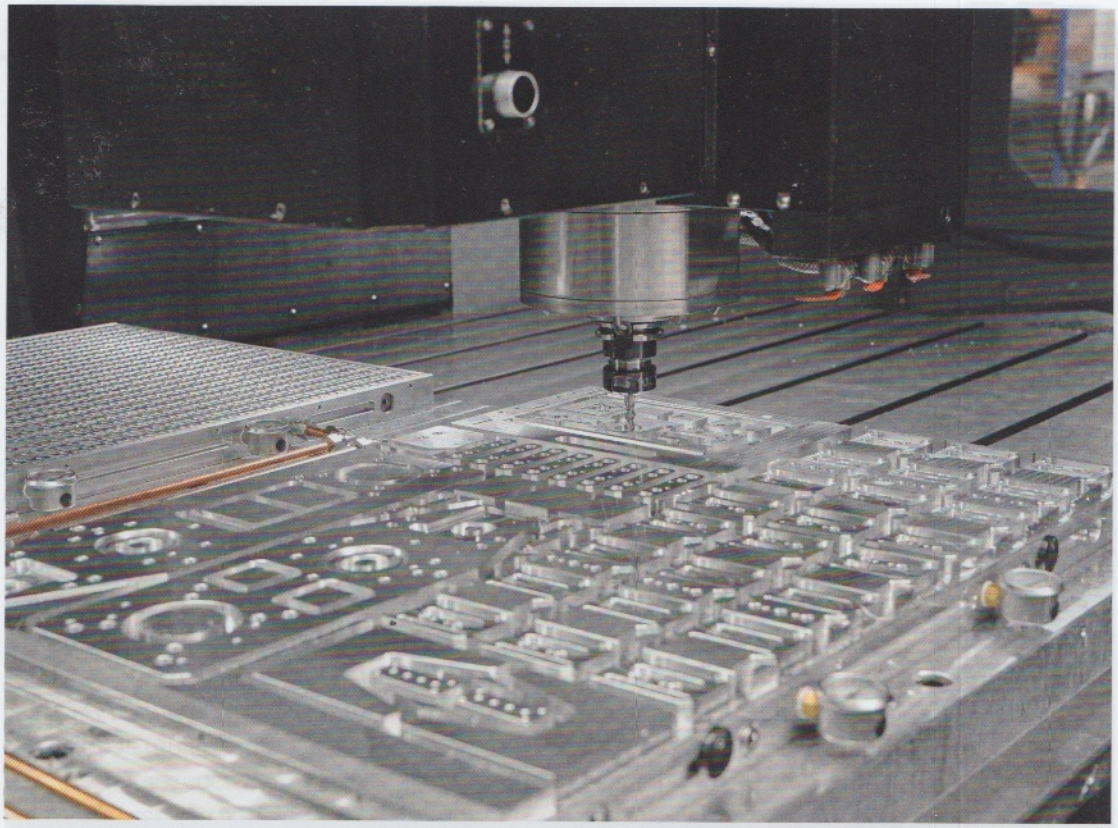
International magazine

Issue 1/2024

The mold & die journal

Machine tools | Standards | EDM technology | Accessories | 85088

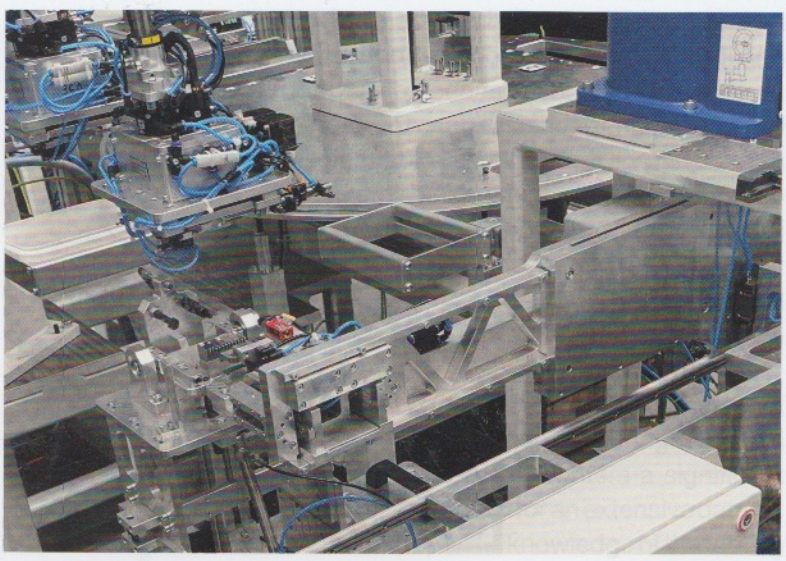
Fachverlag Möller • Neustr. 163 • D-42553 Velbert • Phone: +49/2053/981250 • www.fachverlag-moeller.de • 12th Year • Jan./Feb. 2024



AMF vacuum clamping technology makes it possible: Tens of milled parts in a single clamping operation

Vacuum clamping technology reduces set-up times for single-part production

Just in time for the largest order in the company's history, a trusted dealer suggests using vacuum clamping technology to a specialist mechanical engineering manufacturer. This allows many aluminium workpieces to be produced in a single clamping operation, where otherwise individual workpieces had to be clamped. With this, the clamping experts at AMF have virtually pulverised the set-up time. A wonderful example of how partners who think along with us contribute to a success story.



Ingenieurbüro Uwe Neubauer specialises in special machine construction with a focus on robot-based complete lines

"The vacuum clamping technology is a great help for the production of our many different aluminium workpieces. It makes it much easier to produce what are frequently small series or individual parts," reports Marcel Schramm, CNC department manager at Ingenieurbüro Uwe Neubauer. And machine operator Ronny Neidnicht puts it in a nutshell: "We have reduced set-up times by around 95%." Naturally, such almost fairytale-sounding savings require a closer look. So let us break down the success story.

Three experts find an ingenious solution together

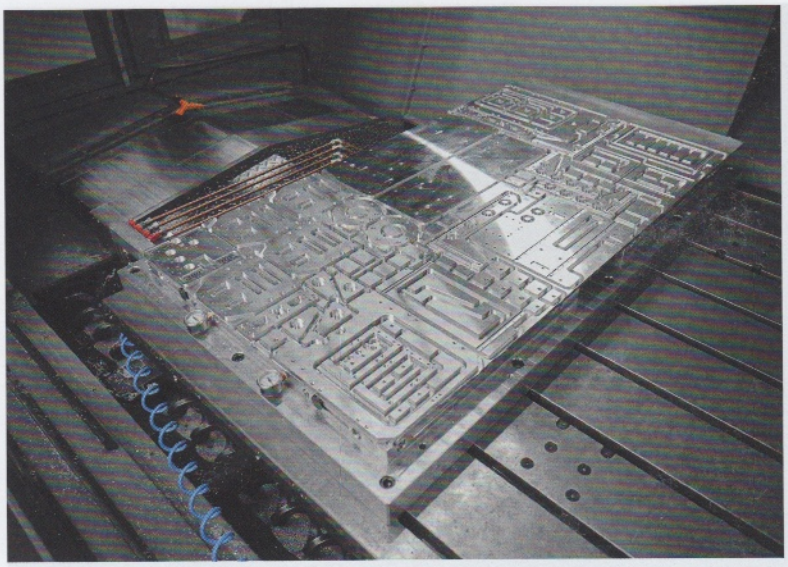
The engineering office in Föritztal, Thuringia, Germany, with 30 employees guided by its boss Uwe Neubauer, specialises in special mechanical engineering. In doing so, their specialised knowledge is in complete automated robot systems, including quality and presence checks using the latest camera technology. In doing so, each order is an individual customised solution that ensures the best possible efficiency for the customer. From design to delivery, almost all parts, sub-assemblies and fabrications are produced in-house. For weight reasons, aluminium is predominantly the material of choice. And in this way, the machiners use a gantry milling machine and two CNC machining centres to produce every single part - from small to large - with a precise fit. This is very time-consuming, as clamping the individual blanks takes a significant amount of time and is very laborious. Each individual part requires its own special clamping solution to ensure that the cutter reaches all the necessary sides and edges.

When long-standing technical consultant Heiko Meyer from Wütschner Industrietechnik GmbH in Schweinfurt took a look at the situation, he brought in a faster solution. A vacuum clamping plate should be able to achieve an enormous improvement and save time. "When viewed from the outside, the solution is quickly obvious," says Meyer, who has a lot of experience and thinks very broadly and initially in a manufacturer-neutral way. His employer – Wütschner Industrietechnik GmbH - is a brand specialist for precision tools. The family-run company has a wide range of tools from various supplier partners. Meyer always looks for the right solution for the customer from this pool. In this case, Andreas Maier GmbH & Co. KG (AMF) from Fellbach.

A great trick brings exorbitant time savings

Since spring 2023, two Premium Line vacuum clamping plates from the clamping experts based in Fellbach, measuring 600 × 800 mm, have been attached to a base plate

The 40 mm high vacuum clamping plate has grooves and 16 suction points on the upper side. Holes for stop pins or lateral, height-adjustable eccentric stops position workpieces easily



on the machine table of the Hurco DCX 22i. Neubauer has dispensed with the optional AMF zero-point clamping technology for quick changing and alignment of the plates. This is because – and this is the great trick with this solution – individual blanks are no longer clamped at all. Instead of that, large aluminium plates are fixed in place, from which the individual parts are milled out. This means that individual parts are no longer machined in a single clamping operation, but rather many parts are produced at once from the large plate. This already gives an idea of where the 95% saving in set-up time comes from. The designers calculate the optimum utilisation of the aluminium plate with the aim of keeping waste to a minimum.

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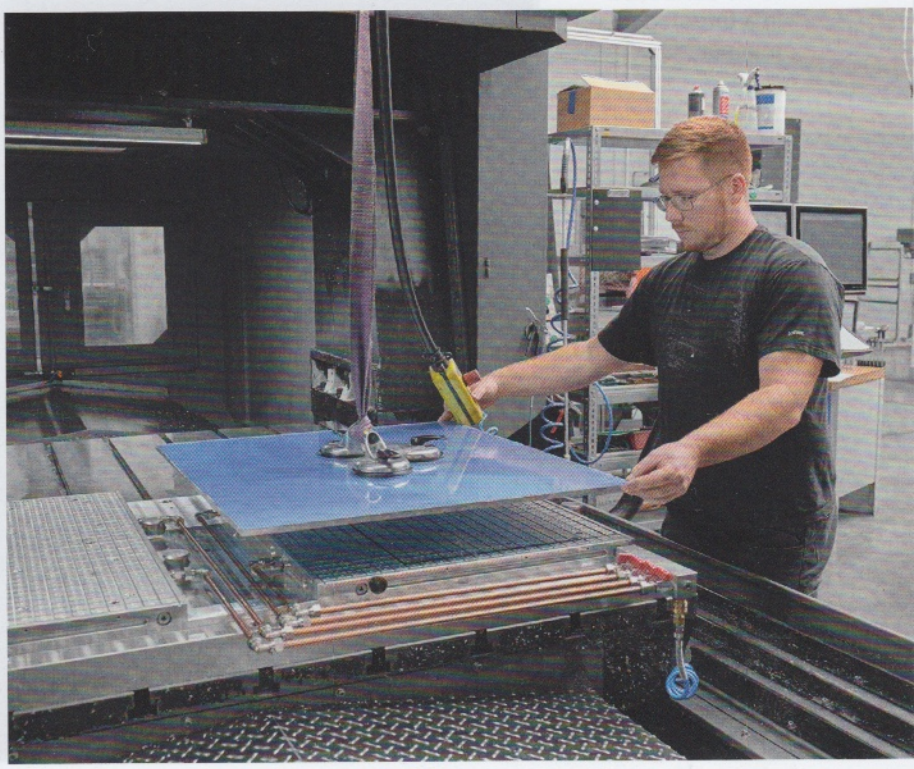
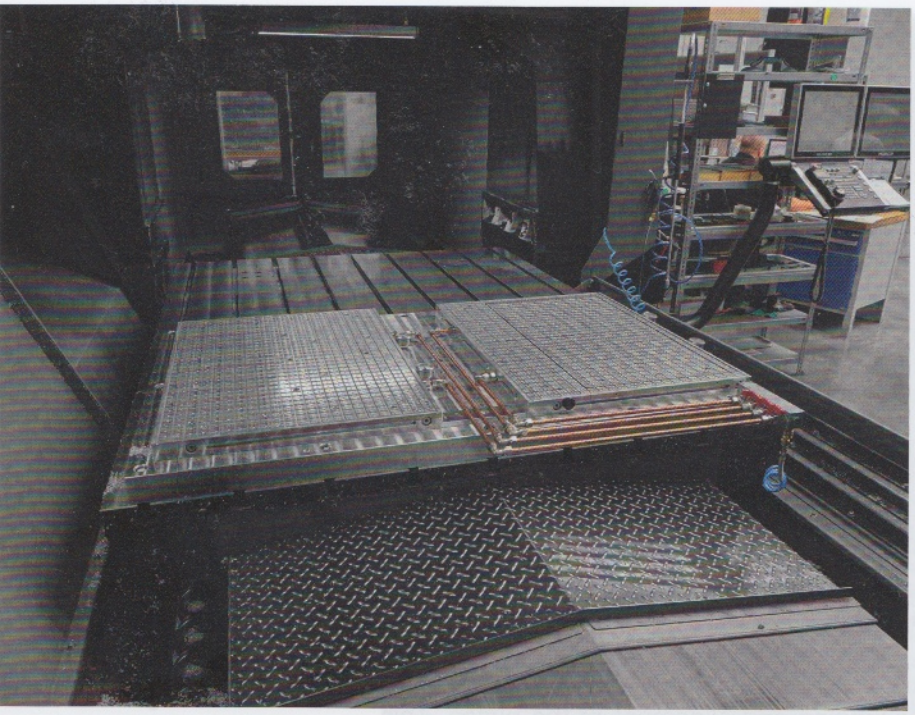
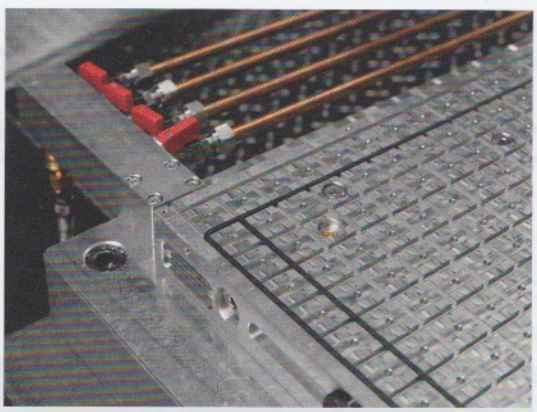




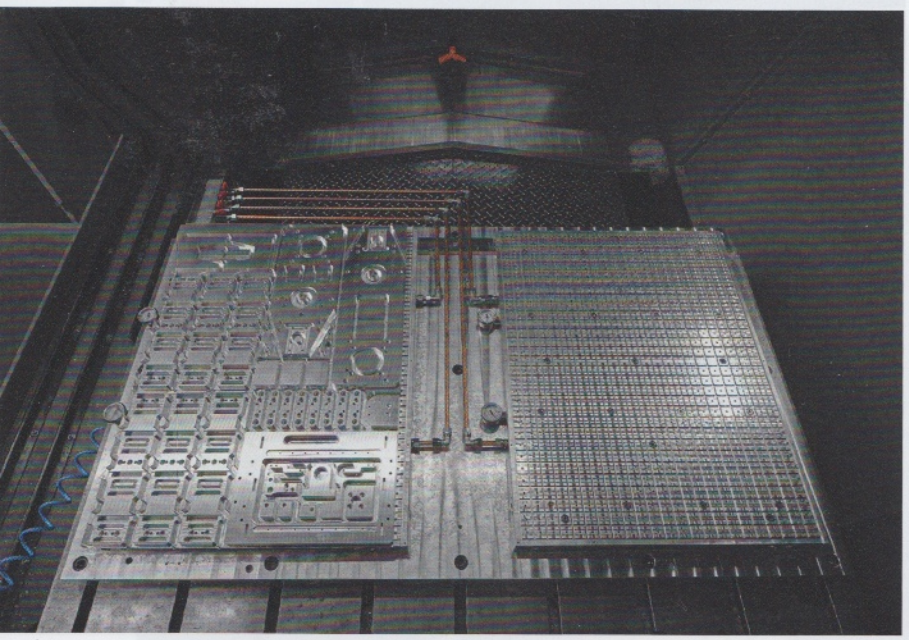
Since spring 2023, two AMF Premium Line vacuum clamping plates from the Fellbach-based clamping experts measuring 600 × 800 mm have been attached to the machine table, connected to a base plate

The vacuum filter system with liquid separator and a pressure monitor with sensor is extremely sensitive



The resourceful inventors at Neubauer manufactured the pipework themselves. The shut-off valves allow the pumping capacity to be controlled in a targeted manner

The individual parts are produced in a five-sided machining process almost to their final dimensions. 0.45 mm of the aluminium plate remains. This is necessary to prevent the vacuum from breaking. The parts are later broken out of the plate, deburred and – if necessary – finished. Individual areas on the vacuum clamping plate can be marked out with the corresponding sealing cord if the entire area is not required. The sealing cords also compensate for minor unevenness on the workpiece surface. The pipework for controlling certain areas and sectors was manufactured by the resourceful inventors at Neubauer themselves. The pumping performance can be precisely controlled using the shut-off valves. The 40 mm high vacuum clamping plate has grooves and 16 suction points on the upper side. This makes it easy to insert the sealing cord. All grooves are labelled with the coordinates so that clamping can be easily reproduced. Holes for stop pins or lateral, height-adjustable eccentric stops make it easy to position workpieces.



The associated sealing cord can be used to mark out individual areas on the vacuum clamping plate if the entire surface is not required

Sensitive filters and pressure monitors protect the vacuum circuit

The pipework has a major benefit over plastic hoses that can also be used, as Schramm emphasises: "If the hot chips fly around during milling, they can also burn holes into a hose. Then the system would leak. And we definitely don't want that to happen." This is why the vacuum filter system with liquid separator and a pressure monitor with sensor is extremely sensitive. If, for example, the plate is accidentally drilled through and the vacuum circuit leaks, the machine moves to stop immediately. A clever solution developed by the user bridges a possible leakage for a certain amount of time before cooling lubricant in the circuit reaches the pump and destroys it.

The vacuum required for clamping the aluminium plate is generated by the AMF rotary vane vacuum pump. It ensures reliable continuous operation of the clamping plates used. Because the pump is very compact, it can be installed directly on the machine. A motor power of 0.75 kW suction performance of and 20 m^3/h generate a output pressure of 1.5 mbar. Two Venturi nozzles are also integrated into the Premium Line plate, which suck in a maximum of 48.8 l/min of suction volume against the atmosphere at an operating pressure of 3.5 bar and generate a 92 per cent vacuum.

Partners thinking along find the optimally suited solution

The two vacuum clamping plates used at Neubauer can be connected to each other and then operated via a common connection. "This provides the flexibility that the machiners at Neubauer were looking for," emphasises Norman Rhein from AMF. "Our solution for reducing set-up times drastically convinced very quickly. With 95% time savings, I also do not need to argue any further." As a forward-thinking sales engineer, the state-certified mechanical engineer not only brought in a product, but also a solution. And this is exactly what Wütschner Industrietechnik GmbH and its employees offer: they not only sell, but also think along with the customer and find solutions for their tasks.

Company boss Uwe Neubauer also appreciates it when the supply partners think along with him and implement his ambitions. "With our high-precision customised solutions, we cover a huge area so that our customers don't have to look for many different suppliers. We expect the same understanding from our partners. With Wütschner Industrietechnik and AMF, we have two suitable partners on board." This should also make the largest order in the company's history a success story for Ingenieurbüro Uwe Neubauer's engineering office.

Partners who think along with you to find the perfect solution: (from left) Normann Rhein, AMF, Uwe Neubauer, Marcel Schramm, Ingenieurbüro Uwe Neubauer, Heiko Meyer, Wütschner Industrietechnik (© Pictures: AMF)