



CASE STUDY

BURGMAIER AND NIKON SLM SOLUTIONS

A CASE STUDY ON HOW METAL 3D PRINTING IS
REDUCING MANUFACTURING COSTS OF PARTS

Burgmaier is a leading manufacturer of precision parts in large series. Around 350,000 parts leave the factory every day and statistically there are five Burgmaier parts in every European car. Burgmaier combines its expertise in subtractive manufacturing with the unique advantages of Nikon SLM® technology: filigree and bionic geometries are created in the shortest possible time; lightweight structures, close to contour channels and the integration of new functions enable real added value for the products.

With the unique combination of milling and turning and the Nikon SLM technology, the company also opens up new business models in the tooling industry.

CONVENTIONAL METHODS NO MORE

Amongst other parts, Burgmaier additively manufactures nozzle claws. The nozzle claw is a high-pressure turning tool for long-chipping materials (e.g. Inconel or Titanium). A medium is fed through the internal channels to the cutting point, which efficiently shatters the chip and cools the cutting insert. This tool impressively demonstrates how Selective Laser Melting can contribute and change tool manufacturing.

The conventional production of the tool involves several bores, some of which have to be resealed. The numerous machining steps result in high costs. Sufficient and optimum supply of the cooling medium is likewise not possible with conventional production.



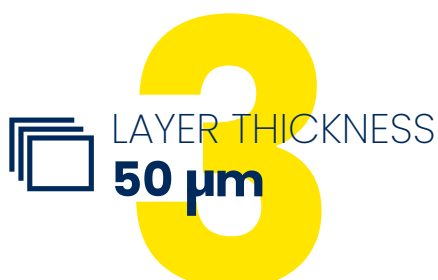
FUTURE-ORIENTED SOLUTIONS WITH **NIKON SLM TECHNOLOGY**

In order to improve the tool with a high-pressure claw for process-reliable machining, Burgmaier first realized a new component design for additive manufacturing (DIAM). With the help of Nikon SLM technology, channel shapes and guidance were optimized and the claw was designed for series production. Through testing, Burgmaier determined the optimal flow rate for the best possible medium feed. The component, produced in case-hardening steel with a layer thickness of 50 µm on the SLM® 280, provides minimal support structures to simplify post-machining as far as possible.

“ **With our 16MnCr5 material, which is specially qualified for additive manufacturing, we can produce numerous wear-resistant tools for turning and milling. In particular, the ability to integrate cooling channels is a major advantage of additive manufacturing.** ”

– **Ken Krauß**, Head of Additive Manufacturing at Burgmaier

After the part was printed, precision milling of surfaces was carried out using an additively manufactured clamping device.



SELECTIVE LASER MELTING

Additive manufacturing encompasses a variety of processes to build, however, they are all based on the same principle of adding material to create opposed to traditional methods that subtract material. Specifically, in selective laser melting a layer of metal powder is spread onto a substrate plate. Then lasers selectively melt powder to create the first layer of the build. A fresh layer of metal powder is evenly distributed over the build surface and the lasers melt each successive layer to the layers underneath until the desired component is produced. Unlike laser sintering, selective laser melting completely melts each layer into the previous for completely dense metal parts. Compared to traditional manufacturing methods, additive manufacturing enables parts with complex geometric shapes and hollow structures to be produced.

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The SLM®280 2.0 absolutely fulfills our requirements in order to meet the standards both in prototyping and in series as well as spare part production."

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- Ken Krauß, Head of Additive Manufacturing at Burgmaier



BURGMAIER

has been committed to the development and manufacture of precision parts in large series at the highest quality level since its foundation in 1931. Through its innovative strength, Burgmaier has developed into one of the leading manufacturers of precision parts and supplies customers worldwide. Around 700 employees in development, design, production, assembly and quality assurance, on 250 production machines, on 31,000 m2 of production space strive together to live up to the credo Quality First.

The passion for zero defects is the guarantee that Burgmaier can inspire its customers. Burgmaier reacts flexibly to changes in the market in order to ensure the company's long-term success and to be able to offer customers innovative solutions and employees attractive jobs. The world is currently in the midst of the greatest change in the history of the automobile. Burgmaier will continue to play a key role as a manufacturer of high-precision parts in the future automotive and networked world. Especially in the areas of electric power steering, hybridization, camshaft phasing, transmissions, brakes and electric motors, Burgmaier sees billion-dollar markets for its products for decades to come.

Around 350,000 parts leave our plants every day and statistically there are five Burgmaier parts in every European car.

Burgmaier is not only a specialist in machining a wide range of materials and alloys. Burgmaier combines this expertise in subtractive manufacturing with the advantages of additive manufacturing: Filigree and bionic geometries are created in the shortest possible time. Lightweight structures, near-contour channels and the integration of new functions enable added value for your products.

Burgmaier accompanies you along the entire process chain of additive manufacturing: from the design and engineering of the products to additive manufacturing and precision CNC machining. Standardized quality assurance with test certificates is a matter of course for Burgmaier.

NIKON SLM SOLUTIONS

is an integrated solutions provider and metal additive manufacturing partner. The company takes a vested interest in customer's long-term success with metal additive manufacturing. Robust Selective Laser Melting machines optimize fast, reliable and cost-efficient part production and Nikon SLM Solutions' experts work with customers at each stage of the process to provide support which elevates use of the technology and ensures their return investment is maximized. A publicly traded company, Nikon SLM Solutions Group AG is headquartered in Germany, with offices in Canada, China, France, India, Italy, Singapore and the United States.

Further information is available on
www.nikon-slm-solutions.com