



Success Story

Quality, precision and 5-axis technology

Quality and precision are two of the guidelines for Rudolf Brügger SA from Minusio, Switzerland, a company that produces jewels for the watch industry and bearing and industrial stones from extra-hard materials such as ruby, sapphire...

...hard metals, technical ceramics, titanium and stainless steel. Rudolf Brügger has expanded in recent years into a second line of business and has applied the same high quality standards: CNC machining of high-precision micro-mechanical metal components. The company sees its best opportunities for growth in 5-axis milling. Today, the production chain here consists of *hyperMILL*® CAM software from OPEN MIND, Mikron machining centres and System 3R automation solutions.

The family tradition reaches back to 1887. Rudolf Brügger SA has also owned a branch office in Spiez in the canton of Bern since 1953, where eight employees produce components made of extra-hard materials such as ruby, sapphire or ceramics, as well as hard metals. These materials are used to make jewels for the watch, bearing and

The successful development of Rudolf Brügger SA in Minusio is based on two areas of business: firstly, extra-hard precious stones for the watch industry, for bearings and industrial usage; secondly, CNC machining of high-precision micro-mechanical metal components.



About Rudolf Brügger SA

Rudolf Brügger is a leading Swiss company engaged in the project planning for and the machining and production of high-precision micro-mechanical components. It processes extra-hard materials such as ruby, sapphire, hard metals, technical ceramics, titanium and stainless steel. In 1949, Rudolf Brügger founded what is now a future-oriented production firm in Minusio on the Swiss shore of Lake Maggiore. The company is increasing its specialist knowledge by investing in the drive towards CNC technology in addition to its traditional production methods.

> www.rudolfbruegger.com

People associate the idea of 'Swiss-made' quality with products such as Swiss clocks. Quality is reflected in accuracy and reliability, as well as aesthetic values such as elegance and original design. Complicated mechanical clockworks ensure maximum precision and are the best protection against cheap copies. Every single component counts.

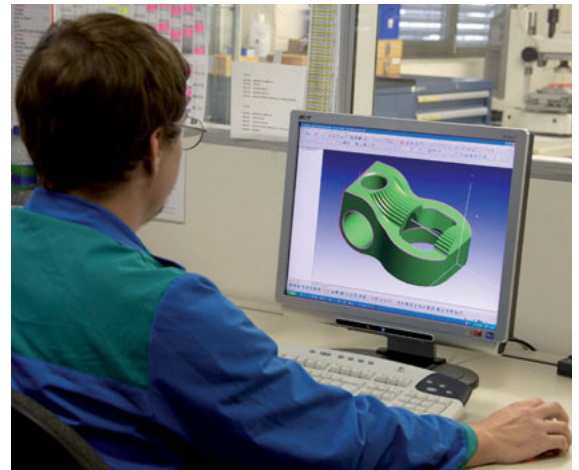
A family business with a long tradition

Rudolf Brügger SA plans and produces micro-mechanical components with the greatest precision for the watch, electronics, medical and aerospace industries, to name but a few fields of application. Rudolf Brügger – father of the company's present director – founded the company in 1949 in Minusio on the Swiss banks of the Lago Maggiore:



“Looking back, we made the right decision to go with the complete 5-axis solution, including OPEN MIND’s CAM software.”

Rüdiger Brügger, Company head



In terms of CAM solutions, Rudolf Brügger decided to use *hyperMILL*®, which probably offers users the largest range of 2D, 3D, HSC, 5-axis and mill/turn strategies, all within a very user-friendly interface.



industrial industries, balls and prisms, and jewels for counters and compasses, in a wide array of colours, shapes and dimensions. These products are used in the watch industry, but also in high-precision micro-mechanical or medical devices. Nozzle bricks for inkjets, valves, spraying and metering systems are used in food, chemical or textile industry applications. Rudolf Brügger SA makes products primarily for Swiss customers; one third of their production is exported. The largest export markets in this regard are the USA, Germany, Finland, Sweden, the Netherlands and Japan.

Drilling holes in extra-hard blanks, which is known as “Perçage” in industry lingo, requires tools with a diamond tip; external surfaces are finished with diamond paste. Even honing, the internal milling of an interior hole to a desired diameter requires the utmost precision, with tolerances in the μ range. The machines used in manufacturing are sometimes no longer in production and must therefore be maintained and overhauled by in-house specialists, making the company’s expertise considerable and increasing production accuracy. Whether small batch or mass production, all Brügger products feature impeccable quality and the highest precision. Every part is checked under the microscope in the internal quality control system. Rudolf Brügger has been ISO 9001:2000 certified since 2000, and this certification was renewed with top marks in 2008.

Micro-mechanical components

Watch jewels and industrial stones are also produced by the 30 employees at the main branch in Minusio. The micro-mechanical division is a second, equally strong component that has been built up since the 1980s and makes an important contribution to the company’s success. Using various CNC technologies such as eroding, turning and milling, Rudolf Brügger SA has comprehensive machining expertise that enables them to complete a broad variety of customer projects.

From the prototype to production batches running to the tens of thousands, Brügger has established a solid reputation in Switzerland with metal components for the machine industry, fibre optics and the aerospace

industry. The company sees its greatest market opportunities in the medical sector, where it produces products such as implants for orthopaedics and oral surgery. Titanium is the material most often used – a very hard material that has brought the company full circle.

Investment in 5-axis technology

An innovative machine park is an absolute requirement to meet the customer’s high quality and precision needs. For example, optical, mechanical and three-dimensional measurement technology ensures the preservation of the highest level of quality throughout the entire production process. Rudolf Brügger SA has invested a great deal in the 5-axis area in the last four years: Today, they have four ultra-high-speed Mikron machining centres from GF AgieCharmilles, including a System 3R automation solution with robots and pallet switchers. Company head Ruedi Brügger says: “5-axis is the technology of the future. Parts are becoming increasingly complex in both the machining and medical fields. Our parts portfolio has also developed in the direction of 5-axis. Investment was therefore required to retain existing orders and to generate new ones.”

Comprehensive CAM solution

The company already had a 5-axis core machine. The existing CAM software, however, required significant effort for 5-axis machining. New CAM software was required to fully exploit the performance of modern milling machines such as the Mikron. Different CAM systems were available for selection, including *hyperMILL*®, the CAM software from OPEN MIND Technologies AG. OPEN MIND has made a name for itself internationally as a pioneer in innovative 5-axis technologies. OPEN MIND’s CAM solutions combine a user-friendly interface and the largest range of 2.5D, 3D and 5-axis modules available to users. Intelligent functions and automated programming, such as feature technology and machining rules (macros), reduce programming times. Efficient machining strategies shorten machining times while retaining high process reliability. Postprocessors from OPEN MIND generate NC programs that are optimised to meet the customer’s requirements and are matched with the existing machines and controllers. OPEN MIND therefore maintains close partnerships with machine tool manufacturers such as GF AgieCharmilles.

Cost-efficient programming with *hyperMILL*®

On the one hand, the CAM software had to demonstrate its capabilities in the programming of a sample part from the medical sector. On the other hand, Brügger finally decided to go with *hyperMILL*® because the machine manufacturer uses OPEN MIND software in their application technology. The training time and effort for Brügger employees, who perform complete programming with a CAM solution from 2.5D to 5-axis, was also lower and therefore more cost-efficient.

For almost three years now, *hyperMILL*® has been used as a CAD-integrated solution for *hyperCAD*®, OPEN MIND's proprietary design software based on the Think3® kernel. The *hyperMILL*® software package also includes multi-axis indexing in addition to three 5-axis cycles. These 5-axis strategies offer a true alternative to 3+2-axis machining – especially near steep walls. For example, surfaces with a uniform curvature profile or undercut geometries can be machined even more effectively. The number of individual machining steps is reduced, more stable tools result in better process parameters, and the use of alternative tools generates higher stock removal rates. Overall, 5-axis machining makes it possible to complete complex machining jobs in a simpler way.

Automation comes up trumps

Rudolf Brügger created the preconditions for flexible production through automation with System 3R. System 3R belongs to the GF AgieCharmilles Group and is a leading provider of customised automation solutions for increasing productivity, from reference and palletisation systems to robots and software solutions. Michel Brügger, the son of the company's CEO, works in sales at System 3R and has equipped the family-owned Brügger business's micro-mechanical production machines with System 3R components, including the Mikron and Kern HSC milling machines. Rudolf Brügger therefore serves as an important demonstration centre in southern Switzerland.

Equipped for the future

So Ruedi Brügger comes to the following conclusion: "Looking back, we made the right decision to go with the complete 5-axis solution, including OPEN MIND's CAM software. I'm convinced that there is still significant growth potential in 5-axis machining. For us, 5-axis is a way to set us apart from the competition. We have given ourselves a head start, and we are well-positioned for the future."

This assessment was confirmed by the purchase of an additional *hyperMILL*® license for another workstation. Rudolf Brügger is also investing in software training for its employees, because the company places a lot of value on well-trained, skilled personnel. As part of this plan, an extension is planned for 2009, which will include space for a training centre for poly-mechanics. ■



Using various CNC technologies such as eroding, turning and milling, Rudolf Brügger SA has comprehensive machining expertise that enables the firm to complete a broad variety of customer projects in the area of micromechanics.

About OPEN MIND Technologies AG

OPEN MIND is one of the world's most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2.5D, 3D as well as 5-axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*® CAM system. *hyperMILL*® provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2015 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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