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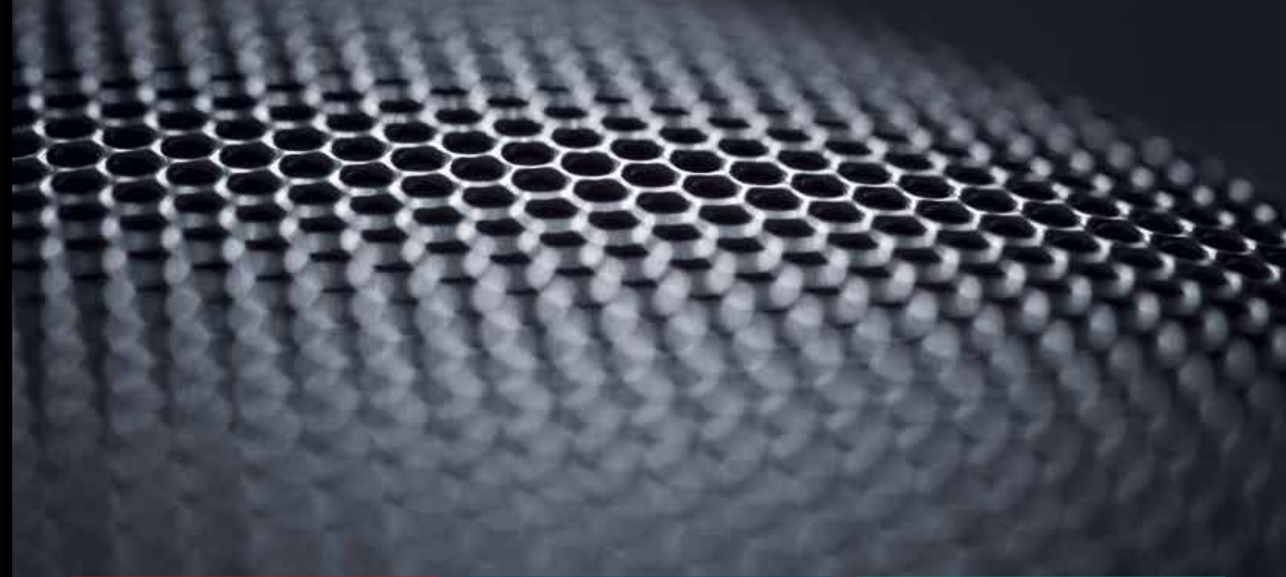

The smart magazine for users.

Profile

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Editorial

> “The best way to predict the future is to invent it.”
>
> *Alan Kay (US computer pioneer)*

Hans-Jürgen Pelzers

Measuring the future

Measuring equipment manufacturer WIKA is a world leader in pressure, temperature and level measuring instruments – the expectations of its EDM systems are therefore exceptionally high. Drop in on this world on page 30.

In scenic Tyrol, against the backdrop of the Alps, Rathgeber produces its intricate grilles. These grilles not only look good in the interiors of luxury vehicles but have to deliver high performance acoustically as well (p. 36).

It is precisely such high performance that has been the common denominator of everything that Sistmolding (p. 52) has been manufacturing since the 1950s.

What next? The teaching factory’s “360° toolmaking” model for the future is concerned with things to come in real-life production on page 48.

I wish you an enjoyable summer and always the best-possible wire-cutting performance.

Hans-Jürgen Pelzers
from the Technology Centre in Ratingen.

News

Mitsubishi Electric Receives IEEE Milestone for Outdoor Large-Scale Color Display System

The Diamond Vision™ series of outdoor large-scale colour display systems has received the prestigious IEEE Milestone award from the Institute of Electrical and Electronics Engineers (IEEE). Diamond Vision is Mitsubishi Electric’s series of proprietary displays, of which more than 2,000 have been installed globally since the first unit was introduced at Dodger Stadium in Los Angeles, USA in 1980. The award recognises the prominent role and high esteem of Diamond Vision as the world’s first outdoor large-scale colour display systems for creating impressive video images.

Mitsubishi Electric Develops Intelligent Wireless Communication Technology Supported with Artificial Intelligence

Mitsubishi Electric has developed the world’s first wireless communication technology capable of automatic optimisation using its Maisart* proprietary artificial intelligence (AI) and advanced digital technology to enhance both performance and capacity.

* Mitsubishi Electric‘s AI creates the State-of-the-ART in Technology

Mitsubishi Electric Delivers Elevators and Escalators to The Avenues, One of Kuwait’s Largest Shopping Malls

Mitsubishi Electric has delivered 69 elevators and 64 escalators, including 2 spiral escalators—133 units in total—for the fourth phase of expansion at The Avenues, one of Kuwait’s largest shopping malls with more than 800 stores.
The pair of unique spiral escalators, created with proprietary escalator technologies from Mitsubishi Electric that no other company has been able to duplicate, lend an atmosphere of architectural elegance and sophistication to the large atrium of the mall’s “Prestige” luxury-shopping district. The elevators carry between 14 and 27 passengers each and have a rated speed of 60 metres per minutes.

Redefining Flexible Production for Smart Industry

Mitsubishi Electric’s dedicated Linear Transfer System for intelligent control of the flow of goods in production represents the world’s most advanced transfer solution for manufacturing production processes. At the heart of the system is the unique Smart Carriage. Developed in conjunction with e-F@ctory partner APT Automation, the Smart Carriage with onboard intelligence delivers new levels of flexibility for the global manufacturing sector, with vastly increased flexibility for packaging processes and the promise of smaller batch sizes and ever greater levels of customisation for manufacturers.

Enjoy your read of this issue!

Bacher GmbH

His own architect.

Short ways are a must.

Form follows function – this design principle is fully embraced by metalworking company Bacher GmbH in Upper Bavaria, not only in its products, but also at its newly built company headquarters. Participating in the firm's success are EDM systems from Mitsubishi Electric.

The headquarters of Bacher GmbH Metallverarbeitung in Bad Feilnbach is situated in magnificent scenery. Could it be that the view of the Alps, with the Wendelstein mountain always within sight, has a positive effect on everyday work? Space and openness coupled with short distances, beautiful design and functionalism were at any rate key points for Josef Kuchlmeier, Bacher's Managing Director, when it came to designing the new building.

Yet the company's beginnings were modest. Sebastian Bacher started out more or less in a garage back in the Seventies – a far cry from today, with 70 employees busy on a 5500 m² site. Although Sebastian still drops in on the company every day, the day-to-day running has been entrusted to the safe hands of Kuchlmeier, who learnt his trade under Bacher's watchful eye. Kuchlmeier, Bavaria's youngest master toolmaker in his day, gradually grew into the management role, before officially taking a majority share in Bacher GmbH last year.

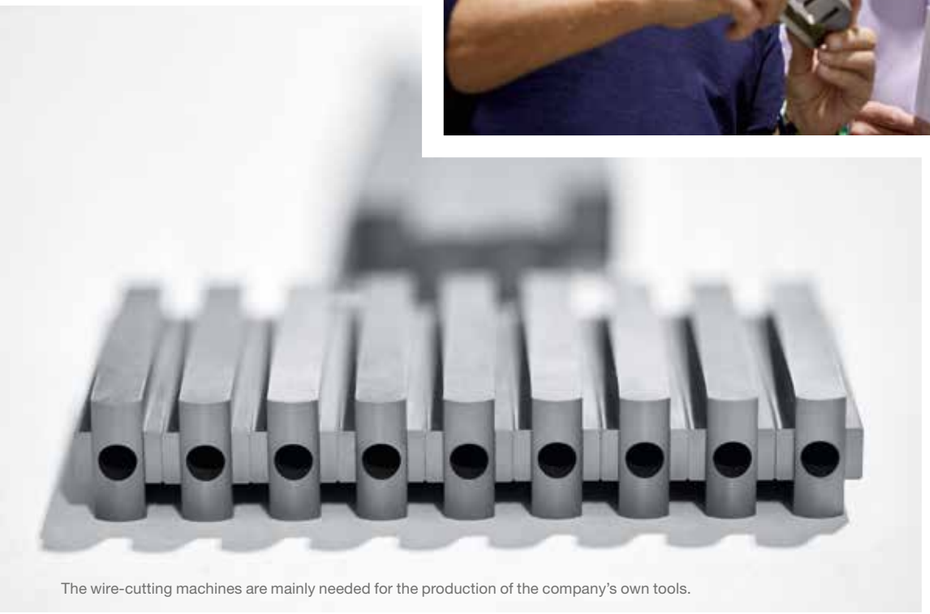
Over the last few years, Kuchlmeier has imprinted his stamp on the company. When the existing shop space

at the previous site proved again to be too constraining, Kuchlmeier decided finally to break with the past and have a new building erected in Au near Bad Feilnbach. The plans for the building completed last year were the work of Kuchlmeier himself. The building was to be functional, so the distances between the various departments were to be kept short, i.e. from toolmaking with its roughly 20 machines to the stamping shop, quality assurance and laser-cutting etc. “But I also wanted shops with plenty of headroom and light, and plenty of space between the offices so that it’s enjoyable to work there,” says Kuchlmeier. Only then, he believes, is it possible to be creative and come up with unusual solutions for customers.

Creativity, speed and accuracy – these are the hallmarks, as it were, of the Upper Bavarian company. This also finds expression in its broad portfolio of products and services, ranging from the achievement of tolerances in hundredths of a millimetre in the chip industry, for example, to lamps and showcases for the restaurant trade where, in addition to production proper, it is above all a question of explaining to the customer where there is potential for improvement, e.g. by optimising a lighting system. The size of run varies from one sector to the next – some parts are produced in their millions; in other cases, it’s a single prototype.

“We serve a broad base of sectors, ranging from the automotive industry and beverage bottlers to office furniture makers. And each sector has its own requirements,” says Kuchlmeier quoting the example of on-site sampling from the furniture industry. Large companies wishing to furnish new buildings typically request sample items for their offices. The deadline pressure here is high, as work on the new furniture is performed right up to the last minute. “The hardware sometimes has to be supplied in a matter of hours,” Kuchlmeier explains. His team then works right up to the deadline so that office furniture maker Steelcase can present its best design.

Josef Kuchlmeier (left) and Herbert Linseisen checking a workpiece.



The wire-cutting machines are mainly needed for the production of the company’s own tools.

A friend and colleague of mine has been very happy with his four Mitsubishi Electric machines for many years, and he made the decision easy for us.

Josef Kuchlmeier.
Managing Director of Bacher GmbH

The procedure is not quite as hectic for products for Krones, the world market leader for beverage filling lines. This is where the company has been supplying components for filling lines for decades. Working closely with Krones, it has no inhibitions about making its own suggestions. In this way, it has improved a gripper that turns the bottles before sterilisation. Bacher also supplies drainage components for shower rails, is currently modifying stands for mobile radiant heaters and produces layers for chip test devices. Whatever product is ultimately supplied, each of them has to comply with Kuchlmeier’s quality and design standards.

Change of make in the EDM sector

And it’s not only architecturally that Kuchlmeier has a clear vision. More or less concurrently with the erection of the new building, he invested EUR 2.5 million in new machine tools even though the machine park is always state-of-the-art. Among them were two wire-cut EDMs (MV1200R and MV2400R) and a start-hole drilling machine from Mitsubishi Electric, which were installed in the new building. This was associated with a change of make.

“30 years ago we were genuine pioneers by resorting to EDM,” Martin Schmid of toolmaking recalls. Although output and surface finish have improved significantly in the intervening years, speed is not everything. “We even prefer to err on the slow side, particularly if the machines are running overnight in any case. What’s important is that the component is finished by the next morning,” Schmid adds.

More or less concurrently with the erection of the new building, EUR 2.5 million was invested in new machine tools – among them two wire-cut EDMs.

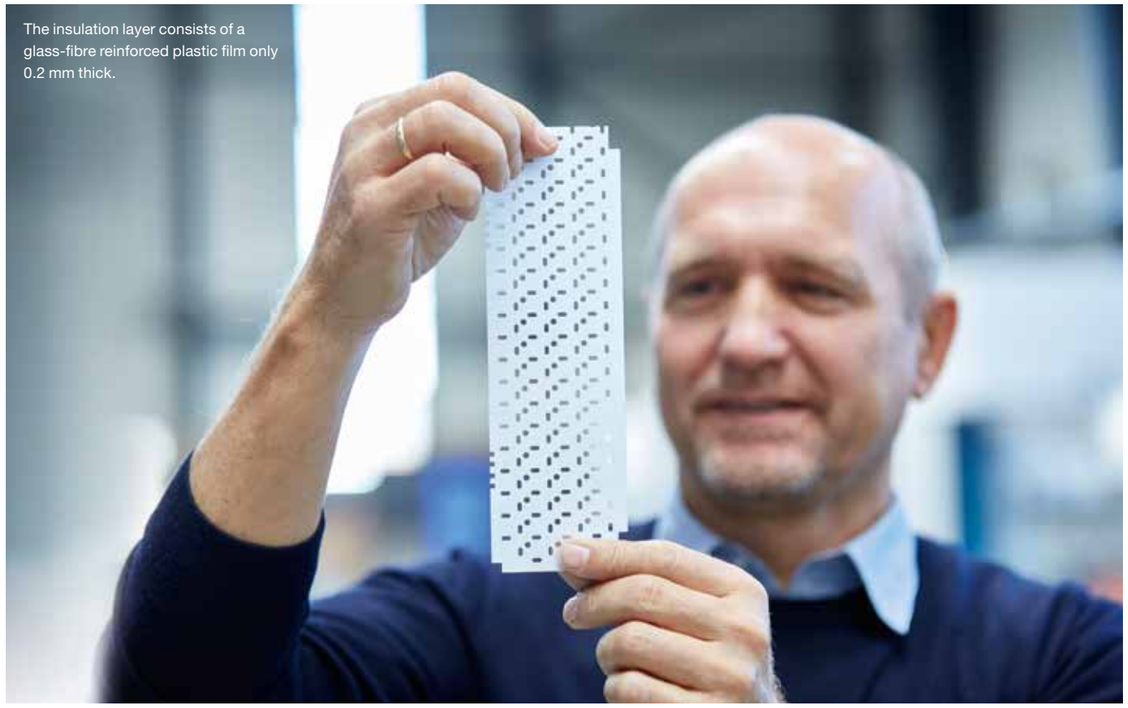
The two machines are used mainly for the production of the company's own tools, of which about 350 are in circulation. "The oldest dates back to 1975 and is still needed," says Schmid. The company also produces, on a smaller scale, new tools or repairs existing ones for local companies. "In the production of components, we work hand-in-glove with other companies in the region," Kuchlmeier stresses. "In our Wendelstein network, we can count on one another and we all adhere to the same quality standards."

It was in these circles that Bacher was given the tip to change to EDM systems from Mitsubishi Electric for the future. "A friend and colleague of mine has been very happy with his four Mitsubishi Electric machines for many years, and he made the decision easy for us," says Kuchlmeier. He was also persuaded by the 12-year guarantee on the control system and drives, and the accuracy and minimal maintenance requirements of the Mitsubishi Electric machines. Learning the ropes on the new machine type went smoothly. Schmid and has workmate Markus Kotz attended training in Ratingen and felt well-equipped afterwards.

They recently experienced the true quality of the Mitsubishi Electric systems in the production of insulation layers of a glass-reinforced plastic film 0.2 mm thick. In a chip testing machine, this layer prevents the tiny chips (measuring just 2 by 2 mm in size) from slipping during testing. For the tool required for this, which later has to generate, among other things, 180 extremely precise penetrations in the film, the Mitsubishi Electric system operated continuously for 254 hours. "Our old machines wouldn't have achieved this accuracy – the kerf width itself is only 0.01 mm – so we would have had to farm out the job to someone else," Schmid admits. In the production of the tool for the layer, they also witnessed the quality of automatic threading – some 2000 threading operations were performed on the workpiece without interruption. Perfect, from Schmid's point of view!

Some 2.000 threading operations were performed on the workpiece without interruption

The tool for the insulation layer that, among other things, has to generate 180 penetrations.



The insulation layer consists of a glass-fibre reinforced plastic film only 0.2 mm thick.

Looking ahead

When the company moved into the new building last year, Sebastian Bacher was still convinced that his successor had chosen a size too large. But the company continues to grow –the shops are already well stocked with machines and workplaces. The company, after all, also attaches great importance to training, and Kuchlmeier has no difficulty attracting good youngsters. Convincing proof of this is that the guild's best apprentice three years ago came from Bacher's ranks. And the special working atmosphere here undoubtedly played its part.

EDM GOES MOVIE!

Scan the code now and watch the film!

www.mitsubishi-edm.de/bacher-en

Bacher GmbH Metallverarbeitung

Employees
70

Founding year
1971

Managers
Sebastian Bacher, Andrea Bacher,
Josef Kuchlmeier, Herbert Linseisen

Core business
Stamping, toolmaking and laser-cutting, from prototypes through to parts produced in series

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AMA Ateliers de Moules Andrésiens

Getting silicone into perfect shape

with the aid of intricate mould inserts.

AMA, Ateliers de Moules Andrésiens, in Grossoeuvre, France specialises in silicone mouldings. On the basis of its expertise acquired over many years, the family business designs and produces complex injection moulds. In the production of small mould inserts, the specialists trust in the MV1200R wire-cut EDM system with its dependable repeat accuracy.

Silicone is used in art and some products are miniature works of art in their own right.

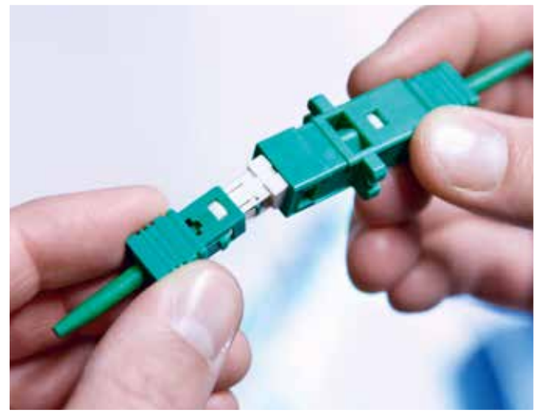
A multitude of components made of silicone are needed in the electronics, vehicle engineering, medical technology, measuring instrumentation, chemical & pharmaceutical, and aerospace industries and even sports equipment manufacture. For this material has special properties that clearly set it apart from other plastics. Its hardness and elasticity can be varied over a large range. In addition, silicone withstands temperatures up to 360 °C while being resistant to ageing. Even on exposure to extreme stressing, e.g. solar radiation, liquids and chemicals, this plastic retains its beneficial properties in the long term.

Elastic and resistant to ageing

Numerous branches of industry therefore use silicone for components that have to stay gas- and liquid-tight under testing environmental conditions. Owing to its elastic behaviour, this is even possible on seal surfaces with imprecisely defined geometries. Parts of protective and diving goggles and of breathing masks for use in aircraft, in the chemical industry, mining and power stations are therefore made of silicone. Electrical and electronic plug connectors that have to work reliably in the long term in tough conditions, e.g. outdoors or in road, rail and construction vehicles, are also fitted with sealing elements made of silicone. The same applies to components in medical technology, among other things in devices for cardiovascular surgery and in ear, nose and throat (ENT) medicine.

In addition, silicone feels pleasant to the touch. Sports equipment manufacturers in particular therefore produce grips made of this material. Because of its elastic and good damping properties, silicone components are also a material of choice in occupational safety, among other things in hard hats.

Ear protectors made of silicone are light, comfortable to wear and provide reliable protection.



Inserts made of silicone prevent moisture and dirt penetrating into electronic plug connectors.

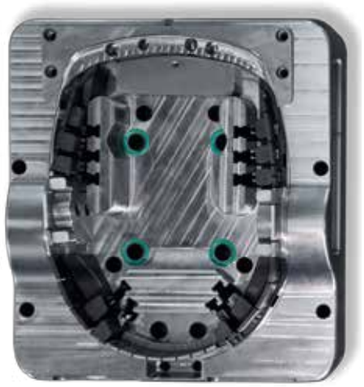
Specially designed injection moulds

Silicone components can also be produced with integrated metal elements, Alexandre Vigneux, owner and managing director of the mould-making company in Grossoeuvre, tells us. In this connection he shows us an oil dipstick for an internal combustion engine. Also possible is multi-component injection moulding that combines an elastic silicone with a rigid, dimensionally stable plastic.

For this, AMA designs the best-possible component geometry as well as the injection moulds required for their production. The company produces and assembles them and tests them on injection moulding machines specially equipped for them. Injection moulding is only possible, Vigneux adds, with specially balanced parameters. The silicone injected in two separate components into the mould cavity expands, while conventional thermoplastics, on the other hand, shrink in volume as they cool in the cavity. These factors have to be taken into account when designing and building

MV1200R operating with high repeat accuracy.

the injection moulds. Like with conventional thermoplastics, it is still possible to create highly intricate features and the tiniest geometries on the moulded components – as required, for example, in medical technology and specifically for heart surgery. For pumps, cannulae and valves, highly filigree, flexible and elastic sealing elements can be produced using silicone that function extremely dependably for a long time. “Being able to produce such components has given us a unique reputation beyond the immediate region – something made possible by our knowledge accumulated over many



Working with the customer, AMA develops and realises the ideal strategy, from the mould through to the product.

years and our wide-ranging experience of the processing of silicone,” Vigneux explains.

Intricate mould inserts with repeat accuracy to the nearest 0.01 mm

To produce tiny structures in injection-moulded silicone, AMA naturally needs suitable mould inserts and slides for the injection moulds. And this is true, for instance, of an injection mould for producing helmet shells and the matching helmet inserts (webbing with a width adjustable strap), which are provided with narrow, dovetail grooves. With the aid of these grooves, the two components can be easily and firmly joined together. AMA produces the mould inserts required for this mainly on the MV1200R wire EDM system

from Mitsubishi Electric – a machine programmed and operated largely by the owner’s daughter Bérengère Vigneux, who is very interested, she says, in innovative technology. This is why she decided early on to continue her father’s business.

Before investing in the current MV1200R, the company in Grossoeuvre had already had experience of an FX10 and of wire-cutting machines of rival manufacturers. Bérengère Vigneux sees the special advantage of wire-cutting technology in its unmanned operation: “The wire EDM is capable of cutting several mould inserts from a single plate over the weekend. High-speed cutting would only be possible in the presence of a highly skilled operator.” She also mentions another feature with which the MV1200R excels: “This wire EDM system is very easy to program, set up and operate.” After only a few days of training, she learned the main functions and programming and operating procedures – child’s play, as she puts it. She now communicates her knowledge to other employees on the job. Since programming is easy, it is also quick – another benefit in her view. And this frees up staff for other tasks. At AMA, the MV1200R is usually set up and used during two day shifts with an operator for relatively short cutting jobs. In the afternoons and before weekends, Bérengère also sets up the wire-cutting machine for longer-running machining operations. “Thanks to the highly reliable wire threader, I can let the MV1200R run unmanned for up to 50 hours. As it can be relied on to cut the programmed components, it proves – despite the longer machining time – to be much more economic than high-speed cutting on a much more cost-intensive milling machine which also always requires a skilled worker to monitor the process,” the owner’s daughter continues.

Less maintenance and expert, available after-sales service

In making their investment, Alexandre Vigneux and his daughter Bérengère mainly concentrated on purchasing a technically mature, reliable machine. They wanted one that would meet current needs in terms of simple programming and operation. In addition, it should ensure repeat accuracy of less than 0.01 mm. “We often produce

All-round protection: Wearing masks made of silicone, jet pilots and skilled workers in hazardous environments, e.g. during fire-fighting or in power stations, can work safely.

AMA Ateliers de Moules Andrésiens

Employees
10

Founding year
1975

Managing Director
Alexandre Vigneux

Core business
Design, production, optimisation and testing of specialised injection moulds for silicone components

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27220 Grossœuvre, France

Tel +33 2 3237 9276

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Learning on the job: Because operation and programming are so straightforward, Bérengère Vigneux has been able to pass on her knowledge to other skilled hands after only brief training at Mitsubishi Electric.

Thanks to the highly reliable wire threader, I can let the ***MV1200R run unmanned*** *for up to* ***50 hours.***

Bérengère Vigneux. Daughter of Managing Director Alexandre Vigneux.

Alexandre Vigneux and his daughter Bérengère are enthusiastic about progressive technology.

mould inserts with recurrent geometries and contours for multi-cavity moulds. It is therefore essential for us that the wire EDM cuts all contours absolutely identically. The components fitted later in the multi-cavity moulds naturally have to be totally indistinguishable," says Alexandre. Over and above these technical requirements, AMA also attached importance to an after-sales service that is constantly available and at short notice. A high-tech machine, Bérengère adds, can only sustain high productivity and profitability if it is constantly available. However, this is only possible with a rapidly available service.

On the strength of their excellent experience of the FX10 wire EDM system from the Japanese manufacturer, supplied by its French licensed distributor Delta Machines, they again chose a wire-cutting machine from Mitsubishi Electric as their replacement investment in 2016. "The MV1200R has a larger workspace than the FX10. With the same consumption of wire, filters and dielectric, we have now improved productivity and economy, boosting our capacity without increasing costs," she says describing the advantages of the MV1200R. The MV1200R operates much more dependably, she continues, and requires less maintenance than the machines from the competition.

Interview

Mr Vigneux, what prompted you to take over the business in 1999?
Alexandre Vigneux: I was the workshop manager and the then owner asked me if I was interested. Since I have always been keen on technical things and also wanted to preserve my workmates' jobs, I agreed.

What's your motivation for continuing to run the business?
Alexandre Vigneux: I'm fascinated by technology. The daily challenge of solving difficult technical problems I find particularly rewarding. I enjoy tinkering, i.e. taking on a tricky job and trying to find the best-possible solution.

How would you describe what your company does?
Alexandre Vigneux: We develop and design optimal component geometries and the injection moulds required for producing the components made specifically of silicone.

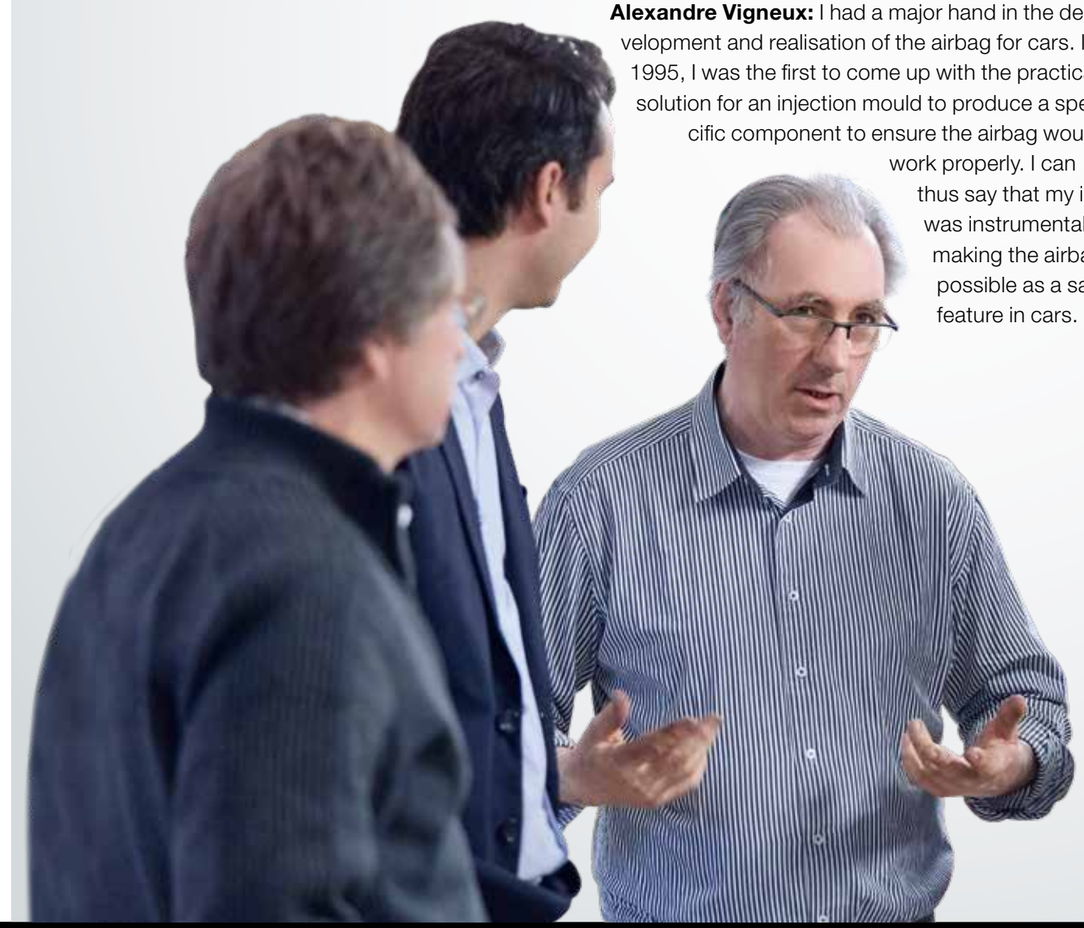
What was your biggest business success?
Alexandre Vigneux: I had a major hand in the development and realisation of the airbag for cars. In 1995, I was the first to come up with the practicable solution for an injection mould to produce a specific component to ensure the airbag would work properly. I can thus say that my idea was instrumental in making the airbag possible as a safety feature in cars.

How have you helped your company develop in the last few years?
Alexandre Vigneux: We have firstly invested comprehensively in new technologies, e.g. in 5-axis machining centres and the current MV1200R wire EDM. Secondly, we are concentrating on our speciality, silicone. We now only produce very few injection moulds for conventional thermoplastics.

Where do you see your company in five years' time?
Alexandre Vigneux: We shall continue to specialise in mouldmaking for silicone components. Since my daughter, like me, is very interested in technology, we shall stay a small, family-run, technical company. We operate in a lucrative niche and serve a select circle of customers whom we wish to satisfy mainly with convincing ideas and ingenious technical solutions.

What interests do you have outside work?
Alexandre Vigneux: I'm particularly interested in mathematics. In addition, I enjoy exercising and often engage in endurance cycling. These two predilections also colour the way I see the world and other people. For example, I judge applicants for a job in my business mainly on the basis of their marks in maths and sport.

Mr Vigneux, thank you very much for this information.



Stammberger Werkzeugbau GmbH

The Mitsubishi Electric MV4800S is ideal for machining large workpieces.

Making the most

of milling and wire-cutting.

Innovative equipment, highly skilled staff and a clear, future-oriented company policy are the foundation on which Wolfgang Stammberger established his business in 1995. The master toolmaker analysed the market situation closely before taking this step. “In German industry in the Nineties, there was a widespread opinion that Germany was too expensive as a location for business. Labour-intensive sectors like toolmaking, it was claimed, wouldn’t have a future here,” Stammberger recalls. “If you saw how people worked in some large companies at the time, you could understand this assessment. Production on this basis couldn’t stay competitive in the long run.”

EDM and milling are two technologies that go together perfectly at Stammberger.

But for Stammberger, Germany as a business location with modern machines and suitably organised operations did indeed have a future. Today, a good 20 years after the founding of Stammberger Werkzeugbau GmbH, there can be no doubt about the accuracy of his analysis and his conclusions.

Today, we can see that production is flourishing throughout the sector. Most companies have done their homework. “In the course of digitisation on the principles of ‘Industry 4.0’, Germany will benefit and experience a further boost,” Stammberger believes. “In the milling sector, we have already made a few changes, but there is still plenty of room for improvement. We’ve got to boost productivity again, as there’s no denying the pressure on costs.”

All services from a single source

With his decision to introduce a 5-axis machining centre, Stammberger has advanced technologically into the top rank in the region. “This technology made a big impact,” Stammberger reports, “and the machine park grew swiftly until six CNC machining centres were lined up in the shop.”

Most of his customers are mould-makers and injection moulders in the region who produce large parts for the automotive industry, amongst other things. For these customers Stammberger produces components for moulds and tools, repairing, extending and modifying them if needed. “We cover the whole range of subcontracting jobs,” says the business owner describing his activities. Normally, production runs in two shifts from Monday to Friday. These are supplemented with unmanned shifts in which three to five machines are constantly running.

To get the company fit for the future, Stammberger intends to extend the unmanned periods. The first problem to be mastered, in his view, is process security. “Initially we concentrated on milling,” Stammberger explains. “Later we then invested in EDM so that we can offer customers services from a single source. Many customers want to transfer all of their production to our company. We’ve got some customers who won’t accept outside services. They’re concerned about quality, punctuality and expertise.” EDM and milling are two technologies that go together perfectly at Stammberger. “After all,

But we will certainly be more successful in our sector if we master different technologies and then use them selectively or in combination.

Wolfgang Stammberger. Managing Director of Stammberger Werkzeugbau GmbH

customers entrust their expertise to us. For this reason, there's a ban on photography and smartphones in all areas of production." As an exception to the rule, we were allowed to take a few pictures after all.

EDM launch

After purchasing the first EDM system, Stammberger discovered the advantages of flexible machining on his own premises. A combination of milling and EDM often yields improvements in quality and costs. "Some workpieces are better wire-cut, while others are better milled. Often there's not just one correct machining strategy. But we will certainly be more successful in our sector if we master different technologies and then use them selectively or in combination," says the entrepreneur.

When introducing the EDM systems, Stammberger's team jumped in at the deep end, as they'd had no practical experience of wire-cutting at all. They examined the technology closely and studied machine programming in depth. For wire-cutting you need a little more technological knowledge, although the programming is not as complex as on a 5-axis machining centre. "We were therefore convinced," says Stammberger, "that if we can master 5-axis milling, we ought to be able to get a handle on EDM."

Building up systematic know-how

To make experience quickly available to all employees, from the outset all jobs with all parameters were recorded in detail, assessed and then evaluated. "For this kind of introduction, you definitely need competent employees and a good hotline like the one at Mitsubishi Electric. It is enormously important as it enables employees to talk to specialists and pick up a few useful tips. And after a while the team understands the machine," says Stammberger proudly.

In the run-up to the investment decision, Stammberger took a close look at the market. Important in making his choice were not only the technical data, but also the price-performance ratio and the compatibility of the control equipment with the machine park. And cost-effectiveness is a key factor in any purchasing decision. "Before taking the plunge, we compared the data from reference customers," Stammberger explains. "We usually cut with standard brass wire. Both Mitsubishi Electric machines operate well with this and deliver very good results. We're very happy with the Mitsubishi Electric systems."

Process security is all-important

One advantage of EDM is its process security. Once the job has been properly programmed and clamped, it will in all probability run smoothly even for many hours and days. Even wire breakage is not an issue if the machines in operation have automatic wire threading. "Our 5-axis machines," Stammberger explains, "finish the same job faster, but require much more elaborate programming. On top of this, there's the multitude of tools that can cause difficulties during machining."

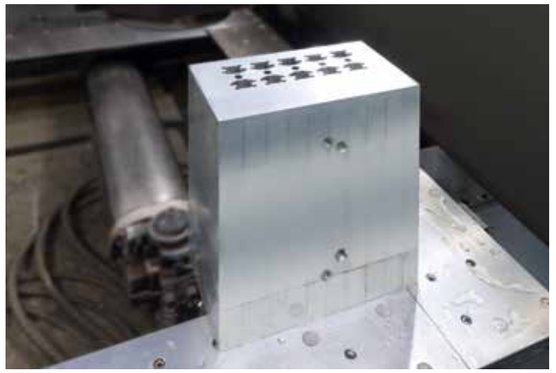
Stammberger's first wire EDM system was a MV4800 from Mitsubishi Electric. "Pretty unusual as an entry model," Stammberger admits, "but it had to slot into our existing machine park. We work among other things for injection moulders in the region and offer milling for workpieces weighing up to 5 tonnes and measuring 2000 by 1800 millimetres. In this machining dimension, we wanted to also have wire-cutting available. At the same time, it was obvious that a good number of the workpieces could also be processed on a smaller machine. But after only a good year, it turned out that we could no longer handle all the work in

? Choosing between milling and wire-cutting

When do we cut and when do we mill? This is the question the toolmakers ask themselves anew every day. For Stammberger, the follow issues have to be considered: With which method do I achieve the demanded quality? And which machining method is more economic? For such a brief check, Stammberger cites three factors:

1. For wire-cutting we need a continuous contour.
2. From a certain material thickness, wire-cutting is simply less expensive.
3. The available machine capacities have to be taken into account.

A greater emphasis on prototyping from now on.



Stammberger currently produces at least 50 % prototypes.

Wolfgang Stammberger appreciates the process security of EDM: "Once the job has been properly programmed and clamped, it will in all probability run smoothly even for many hours and days."

Charlie has a nose for precision.

hand with a single machine. Since then, we've had a second Mitsubishi Electric, a MV1200S, in our production shop."

Prototyping and production automation
"Today we produce initial samples in plastic, aluminium and steel and small series for the development departments of large companies," Stammberger explains. "For tool- and mouldmaking, we produce all the components, mainly blank parts, and do special finishing work."

In the future the company plans to expand its prototyping activities. This is where Stammberger sees an interesting market in which the company has its strengths. "The parts are relatively complex and we can fully exploit our skills," is Stammberger's assessment. At the same time, he does not want to neglect his bread-and-butter tool- and mouldmaking. "We also want to do more in the series production sector, so that we can increase our output. With the new machining centre, we are taking a first step towards the automation of production," he adds.

Services

- CNC milling – 5-axis
- CNC milling of large parts up to 5 t – 5-axis
- Wire-cutting up to 1200 x 1000 mm
- Die-sinking up to 1200 x 900 mm
- Zeiss measuring instruments
- Grinding of small parts

Focuses

Mouldmaking
As a supplier to mouldmakers, we specialise in the production of complex mould inserts, slides, inclined profile ejectors and other components.

Machine manufacture
Thanks to CAM, multi-sided machining and measuring equipment, we have tight control of fits and shape and position tolerances.
The parts are measured on the basis of stored data and drawings and supplied with machining logs.

Prototypes
In the prototyping sector, we mill initial samples, pilot series and series parts, precisely to your 3D data. For increasingly complex parts, 5-axis machining centres are exclusively used.
Only this way is it possible to replicate your design down to the finest detail. Whatever the issue – shape and position tolerances, distances between centres, angles, two-dimensional shapes etc. – there is (almost) always a solution.

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SNOP61

Unmanned operation for profitability.

Wire-cut EDM preferred for hard materials.

With its focus on precision, jobshop SNOP61 SARL in Athis de L'Orne in Normandy, France produces high-precision components – anything from prototypes and one-off items to medium series – mainly using materials that are difficult to machine. With his pronounced interest in high-grade technology, owner and Managing Director Frédéric Tertre has established his company as a specialist in precision machining beyond the immediate region.

Concealed behind the unassuming frontage of the business premises in Athis de L'Orne is top-flight production equipment. The company has several state-of-the-art 3- and 5-axis machining centres as well as a number of high-grade lathes and precision grinding machines. Pride of place, however, is taken by the two wire EDM systems MV2400R and MV1200R from Mitsubishi Electric purchased by Tertre in 2016 and placed in a separate enclosure in the workshop. He explains the reasons for this: "Accuracy between 3 and 5 µm calls for extreme cleanliness and air-conditioning." The two EDM systems are largely responsible for the fact that the jobshop is now appreciated beyond the region for its dependable precision machining. The company produces parts as single items and in very small series for tool- and mouldmakers, among other things for stamping tools, forming dies and injection moulds. It also machines wear tools for plastics machines, e.g. superfine nozzles for the extrusion of glass fibres. In addition, the precision specialist machines prototypes and series parts exposed to extreme wear. These can be components for special-purpose, assembly, textile and packaging machines, such as guide sleeves, nozzles, and guide and deflection levers. The experts in Athis de L'Orne have also produced bushings for the aviation sector. So that these components perform durably, they are made of unalloyed tool steels, cold- and hot-work steels, and high-strength and hardenable steel alloys.

Reliable, faster and more profitable

Using such materials, precision components can be milled these days on extra-heavy-duty 3- and 5-axis machining centres. But Tertre also appreciates the benefits of wire-

The advantages of wire-cutting.

Intricately shaped wire-cut nozzles for exhaust gas systems.

Of course, that's where the reliable wire threader of the MV from Mitsubishi Electric proves indispensable. These wire-cutting machines work very reliably anyway.

Frédéric Tertre. Managing Director of SNOP61

cutting. The process, he says, is slow, "but with wire EDM we generate high-precision components that meet all the requirements of a superlative surface finish in a single cycle". A highly beneficial feature in his view is that the wire EDM systems are capable of running entirely unsupervised. "Of course, that's where the reliable wire threader of the MV from Mitsubishi Electric proves indispensable. These wire-cutting machines work very reliably anyway," Tertre adds. To keep costs down despite the slow machining speeds, the specialists in Athis de L'Orne cut several components out of single large plates. The MV2400R and MV1200R were purchased precisely for this reason. Although he had acquired plenty of experience with the highly dependable FX20 wire-cutting machines from Mitsubishi Electric starting in 1998, the new machines have a much larger workspace. As a result, the jobshop can now produce not only small components in series in an unmanned process, but also handle large workpieces measuring up to 800 x 400 x 150 mm. The latter workpieces can be machined into hold-down devices for forming dies. The MV2400 machines are much faster than the trusty FX20.

Shaping components of difficult-to-machine materials up to

30%

more cheaply.

Consequently, the jobber can machine a large number of components made of difficult-to-machine materials up to 30 per cent more cheaply, says Managing Director Tertre. Furthermore, the MV2400R is equipped with the optional digital fine finishing generator (DFS). In

With their sharp edges and smooth surfaces, freely shaped small components of hard steel alloys can only be machined with wire EDM.

combination with top-quality wire, they achieve a superb surface finish. "This accelerates throughput considerably. The wire-cut components can be installed in stamping tools or special-purpose machines without elaborate reworking," Tertre reports. The MV machines thus also contribute to high flexibility and short delivery times at the French jobshop. Moreover, the MVs are easier and more comfortable to operate than the FX20s, which is why they are preferred by skilled staff. The CNC control built onto the machine displays the current and programmable production parameters much more neatly and clearly.

Programming on the CAD/CAM system close to production

To minimise set-up and tooling time, the specialists in Athis de L'Orne program both wire EDM systems on an external MasterCAM CAD/CAM system. "So that the machine operators can access the data in the CAD/CAM system directly, we have positioned the PC workstation in the air-conditioned enclosure next to the wire-cutting machines," Tertre explains. This also helps to reduce unproductive downtime, accelerate throughput and boost productivity and profitability. At the company, the two MVs are kept running 24/7, workload permitting. "We invested in a MV2400 and a MV1200 so that we would have wire-cutting machines

SNOP 61

Employees
13

Founding year
1986

Managing Director
Frédéric Tertre

Core business
Production of high-accuracy precision parts made of high-strength, hard and hardenable steel alloys, as single items and in series, for stamping tools, forming dies and special-purpose machines in the plastics, food, automotive and aerospace industries.

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The experts at SNOP61 prefer working at the two wire EDM systems of the MV series because of their simple and straightforward operation.

that
com-
plement
one another
while also being in-
terchangeable. This means
that we can double our produc-
tivity if we use the two machines
in parallel for a single production
job. Alternatively, we can sustain
our productivity and keep to
deadlines when one machine is
laid up for maintenance or ser-
vicing," says Tertre explaining his
far-sighted production strategy.

Interview

How did you start your career?
Tertre: I started off as a chef. Later, when doing maintenance work on machines, I discovered my special interest in technology and mechanical engineering. After my national service I worked as a design engineer and technician. My then employer worked with component supplier SNOP61, which is how I got to know its owner and managing director. And that gave rise to the offer to continue the business on his retirement. I bought the business in Athis de L'Orne in 2008.

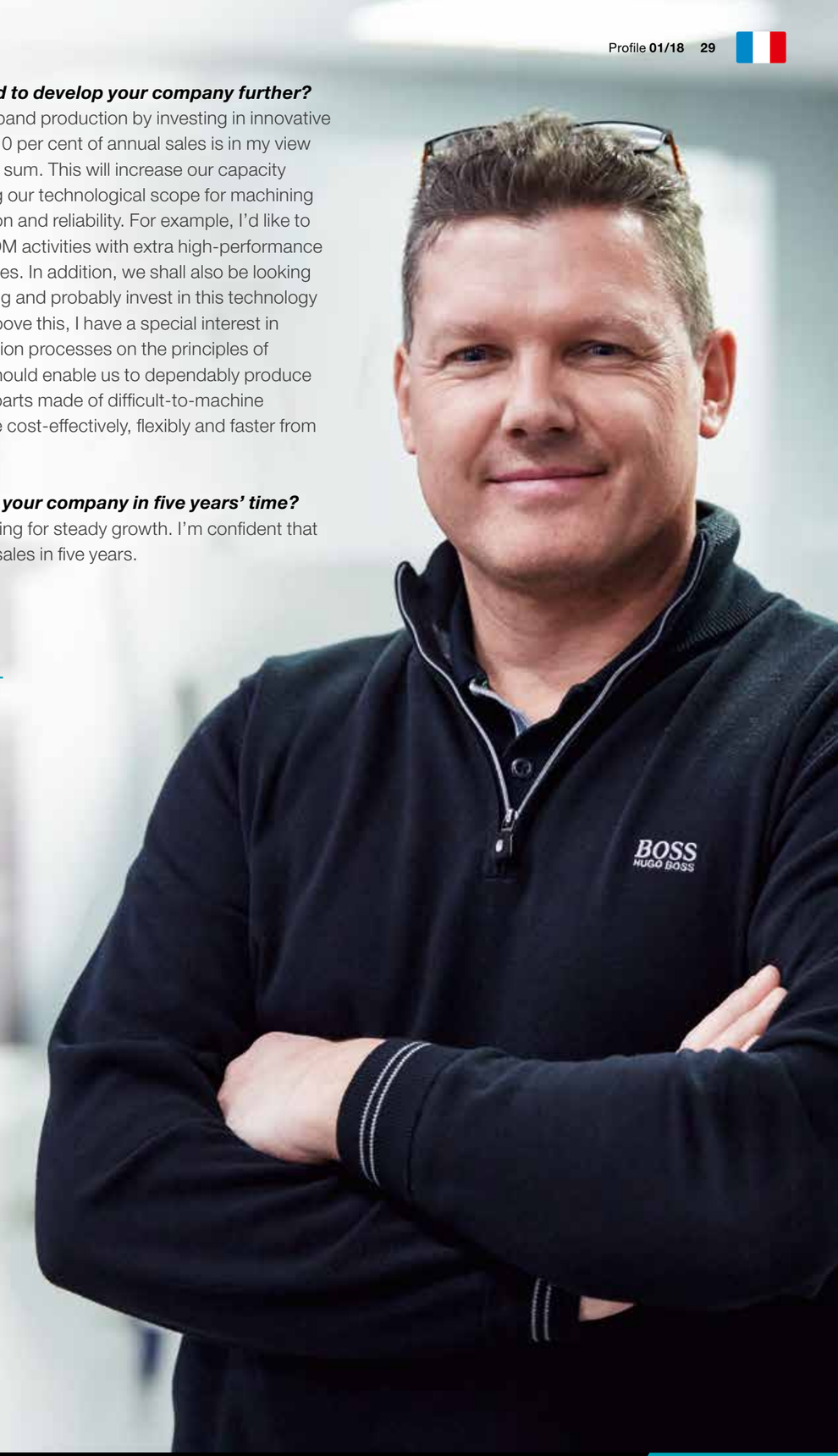
What do you consider your big-gest successes?
Tertre: We were badly hit by the global financial crisis in 2009. Only shortly after my takeover, I had to face and survive a 35 per cent drop in sales. With my perseverance and enthusiasm for innovative technology, I soon mastered the crisis. Since 2010 the company has been growing steadily, which is partly due to the continuing investment in high-grade equipment and machines.

How do you run your business?
Tertre: My employees and I are on very friendly working terms. For me, the workforce is a company's biggest asset. Only committed employees integrated in the company's strategy are capable of pursuing shared goals and contributing to success. We are also on good and collegial terms with the other production firms in the region. We try to help one another out. At the same time, our strategy is to consistently supply the best-possible precision and quality. We always focus on components that call for exceptional accuracy in their machining.

How do you intend to develop your company further?
Tertre: I want to expand production by investing in innovative technology. About 10 per cent of annual sales is in my view the right investment sum. This will increase our capacity while also extending our technological scope for machining with greater precision and reliability. For example, I'd like to build up our wire EDM activities with extra high-performance wire-cutting machines. In addition, we shall also be looking at additive machining and probably invest in this technology as well. Over and above this, I have a special interest in automating production processes on the principles of Industry 4.0. This should enable us to dependably produce complex precision parts made of difficult-to-machine materials even more cost-effectively, flexibly and faster from now on.

Where do you see your company in five years' time?
Tertre: We're planning for steady growth. I'm confident that we can double our sales in five years.

Frédéric Tertre
Managing Director
of SNOP61
in Athis de L'Orne



WIKA Alexander Wiegand SE & Co. KG

Production engineering

on the project principle.

For Alexander Wiegand, head of the WIKA Group, quality, dependability and proximity to the customer belong together. Founded in 1946, WIKA has steadily grown into a family company with over 9,300 employees, globally active in 75 countries.

Today, WIKA is the world market leader in pressure and temperature measurement and calibration instruments. The company also sets standards with the parameters of filling level, force and flow rate. To ensure efficient production, the production engineering specialists develop and produce an abundance of equipment for its plants.

Quality, dependability and customer proximity have enjoyed high priority among staff at all levels since the company's founding. The successful company history of WIKA Alexander Wiegand SE & Co. KG is built on this canon of values. WIKA is an internationally recognised supplier of and expert in pressure, temperature, level, flow and force measuring instruments. The requirements vary greatly and are challenging: each field of application has its own parameters, and each sector of industry, such as machine manufacture, HVAC and semiconductors, operates on the basis of its own guidelines and standards.

"To satisfy customer wishes, we have built up a broad product range that is constantly growing in accordance with market needs," explains Ralf Bayer, group manager in production engineering at WIKA. In addition to standard products, the company also develops tailor-made solutions in cooperation with the customer. "Our expertise and high-tech production plant permit the production of high volumes – and at competitive prices and with short delivery times," Bayer adds. "We produce much of our production machinery in our internal production engineering department."

When maximum safety counts and measuring components have to withstand tough conditions in the field, WIKA force measuring equipment comes into its own.

Attractive employer
The company values its workforce, regarding it as is its biggest asset – a fact illustrated not only by the extra social benefits and by the working conditions in production and administration. WIKA differs strongly from other employers on a large number of counts. The reconcilability of work and family life is a central issue for many young employees. Is it possible to resume a job after maternity leave? What's the best way for children to be cared for? And who takes parental leave when? These are the issues that young parents are faced with.

Since 2009, WIKA has been running the WIKALINO day nursery in cooperation with the municipality of Klingenberg. Immediately opposite the company site, it provides places for 24 children. During holiday programmes lasting several weeks in the summer holidays, employees' children are taken care of. To make it easier for young female employees to get back to work after a pregnancy, the company provides its own parent benefit. These are just three examples of the list of bonuses and incentives for staff.

The basis for reliable processes
WIKA's pressure, temperature and level measuring instruments often have to operate in extreme outdoor conditions, aggressive media or in areas exposed to explosion risk. In the overall chain of process engineering components, measuring equipment plays a crucial role. It supplies process-related information, thus making high-quality production possible. Measuring equipment improves safety for people, processes and the environment. "A lot depends on their dependable operation," explains Karl Zimmermann of production engineering. "Our certified instruments comply with all relevant international guidelines, have been awarded global approvals and meet the highest standards of quality and safety."

Production engineering pools manufacturing expertise
Production engineering with its 80 employees is certainly not the largest department at WIKA. But it is where the entire production expertise is pooled. "We develop, design and produce equipment for the WIKA plants worldwide as well as for external customers. It is still an advantage to have our own departments for instruments and tooling with highly skilled specialists. Our experts understand the needs of production," explains Bayer. The internal production engineering department is in direct competition with external operators.

When things get tough, measuring equipment from WIKA reveals its strengths.

A Mitsubishi Electric MV1200R has been assisting the production equipment manufacturer since the end of 2016.

But for equipment exploiting WIKA's own expertise, there is a hard-and-fast policy of only producing it internally. The production engineering specialists are employed at the parent location in Klingenberg. The department includes not only design engineering, but also production and software development, control engineering, assembly and maintenance. And each step is subject to comprehensive quality assurance.

The definition of production equipment at WIKA is straightforward and covers all machines, plant and tools that the company needs for its own production activities. These extend from tiny toggle presses to complex automatic assembly plant linked up with conveyors. So that each job can be completed in the agreed time, production engineering works on the project principle. Each job is a project with someone in charge who is responsible for all activities.

"So that all the pending jobs can be completed on time, the department is adequately manned with specialists in mechanics, electrics and software and even has its own purchasing section and store. Everything we need for the construction of our plant and for maintenance is procured and warehoused largely independently by our department. Our customers, be they internal or external, receive everything from a single source. They are comprehensively served so that production is kept up and running," Zimmermann elucidates.

For Karl Zimmermann (left) and Ralf Bayer it's important to pool practical expertise in production equipment manufacture.

The future is electronic
In production engineering, it is electronics that dictates the pace. Electronic products offer genuine extra value in many cases and modern production equipment is incapable of doing its job without computers, actuators and sensors. "This transition is adding enormously to the complexity of our work," says Bayer. "We've had to introduce new test technologies, as printed circuit boards and sensors are subject to entirely different requirements and standards. Electrostatic discharge is not an issue with mechanical measuring instruments, for example, while electronic instruments are very sensitive in that respect. We've had to thoroughly re-equip ourselves in many areas and have taken on new staff with the necessary expertise."

Modernising the machine park
Since all the departments in the company can basically decide for themselves whether to order their production equipment internally or externally, the production engineering department has to make efforts to stay competitive. "When we make internal estimates, they have to be tightly costed. We're no exception in having to aim for a top-quality price-performance ratio," says Bayer.

In addition to highly skilled employees with the necessary specialisations, a machine park equipped with the latest hardware is absolutely essential. WIKA is constantly investing in this area. Four years ago, for instance, in

The performance data of the new MV were just what we needed. In the last 20 years, our experience with Mitsubishi Electric has been very positive. The after-sales service with wear parts and consumables has always worked well in the past. The package is simply perfect.

Ralf Bayer

The first measurements are already underway on the machine.

the course of the modernisation of the machine park, a new CAD/CAM system was introduced via which the design data can be transmitted straight to the machine.

A Mitsubishi Electric MV1200R was also added to the production engineering machine park at the end of 2016. WIKA has been practising wire-cut EDM on Mitsubishi Electric machines since 1997. “The decision to buy the new MV1200R wasn’t difficult for those responsible,” Bayer stresses. “The performance data of the new MV were just what we needed. In the last 20 years, our experience with Mitsubishi Electric has been very positive. The after-sales service with wear parts and consumables has always worked well in the past. The package is simply perfect.”

“We attach a lot of importance to working in partnership,” Zimmermann adds, “and it has paid off. It then means that some issues can be settled quickly over the phone and we can rely on the solution working. For an on-going, intricately timed process, this has a lot of benefits.”

WIKA Alexander Wiegand SE & Co. KG

Employees
9,300

Founding year
1946

Management Board
Alexander Wiegand

Core business
Equipment for pressure and temperature measurement and calibration

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1946 WIKA’s founding

1960 Expansion at home and for the first time outside Germany

1970 Biggest manufacturer of manometers in Europe

1980 Production of the 100,000th manometer

1994 Certification to DIN ISO 9001

1996 World’s No. 1 with mechanical pressure and temperature measuring instruments

1999 New sensor/technology centre with 10,000 m² of production space

2002 WIKA goes lean: start of kaizen activities to optimise production

2008 Majority interest in KSR KUEBLER Niveau-Messtechnik AG

2011 Takeover of DH-Budenberg

2012 Acquisition of Euromisure and Gayesco

Rathgeber GmbH

Superfine grilles
meeting the highest standards.

Rathgeber GmbH in Innsbruck ranks among the world's leading specialists in tightly meshed, visually and acoustically sophisticated plastic grilles for the car interior. To machine the complex injection moulds, the Innsbruck company relies on two MV2400R systems. These constitute the ideal combination of compact design and large workspace and operate highly reliably with little operator supervision.

"Our aspiration is to be the world's best mouldmaker in our core business areas," says the head of change management at Rathgeber GmbH in Innsbruck. The Austrian tool- and mouldmaker is a force to be reckoned with and highly valued in the automotive industry. For several decades, the company has been specialising in producing technically and visually high-grade components for the vehicle interior.

As regards grilles for the sound systems in quality limousines and luxury sports cars, they enjoy an outstanding reputation as an exceptionally skilled supplier to car manufacturers. The Innsbruck engineers work together closely from design and mouldmaking through to the injection moulding of prototypes and pilot series to test and verify the demanded properties. The grilles have to be visually appealing, e.g. always showing the same structures from different viewing angles. And they also have to upgrade the acoustics of the protected loudspeakers to ensure the best-possible sound experience.

Multitude of intricate structures

The grilles developed in Innsbruck in cooperation with car makers are produced in large series and are injection moulded using thermoplastics. Because of the tight mesh, 3-dimensional curvature and in most cases specially designed webbing, the grilles call for ingenious and complex injection moulds. To release the fine grille webbing, which is very susceptible to kinking after injection moulding, the mould inserts are provided with a multitude of ejector pins only 1 to 3 millimetres in diameter. For grilles measuring roughly 250 x 120 mm, there can be well over 100 pins. The bores for the pins have to be produced with accuracy to the nearest 0.01 mm in terms of diameter and position.

Sophisticated grilles for the car interior.

As the EDM team leader at Rathgeber in Innsbruck reports, such structures and geometries can only be produced with wire EDM. This applies particularly in view of the high warm hardness of the mould inserts of hardened steel.

In addition, the injection moulds have to be provided with a large number of penetrations for slides. These geometries can also only be cost-effectively realised with wire EDM. The team leader explains: “Because of the highly challenging geometries of the injection moulds, we looked into wire-cutting in mouldmaking as soon as we became aware of the technology. Since then we’ve acquired a wealth of expertise.” The Innsbruck mouldmakers also use wire EDM to machine stamping and pressing tools, e.g. for grinding wheel manufacturers, under subcontract.

Large workspaces required

For the mainly two-dimensional grilles, the injection moulders need very large mould inserts. The specialists at Rathgeber can only produce these on wire-cutting machines with large machining ranges. This was one of the reasons why the Innsbruck toolmakers invested in the MV2400R from Mitsubishi Electric. “Our previous machines were wearing out. So last year we gathered detailed information on current technologies and machine equipment from a number of manufacturers. Amongst other things because of the excellent combination of compact design and large workspace, we chose the MV2400R from Mitsubishi Electric,” says the EDM team leader. The mouldmakers commissioned the first MV2400R in Innsbruck in September last year. “It proved to be up to the task after only a few weeks,” says the EDM team leader. It was joined by an MV2400R Connect at the turn of the year.

In the view of specialist staff at Rathgeber in Innsbruck, the wire-cutting machines from Mitsubishi Electric are easy to operate and program. At Rathgeber, the CNC programs are produced from the 3D CAD

Technically and visually premium-class: High-grade grilles from Rathgeber are in big demand from manufacturers of quality limousines and sports cars.

On mould inserts for the injection moulding of high-grade grilles, a large number tiny geometries have to be cut. For this, the wire-cut EDMs need above all a sound and extremely dependable wire threader.

EDM team leader at Rathgeber GmbH.

The quality of wire-cut components is meticulously checked with an eye for precision.

data on an external CAM system. In doing so, they set the process parameters that they have arrived at and established on the basis of years of experience. In the toolshop, the only remaining task is to clamp the plates, equip the wire EDM systems and start the CNC program.

Unsupervised thanks to exceptional dependability

The EDM team leader considers exceptional dependability to be another advantage of wire-cutting. “Because of the long machining times, the wire-cutting process can take place largely unsupervised,” he says. This applies particularly to large components on which a wide range of contours have to be cut. At the same time, the EDM team leader considers Rathgeber to be a special case in the mouldmaking sector. “On mould inserts for the injection moulding of high-grade grilles, a large number tiny geometries have to be cut. For this, the wire-cut EDMs need above all a sound and extremely dependable wire threader.” He stresses that the MV2400R from Mitsubishi Electric has fully met his requirements. “We can program even the most complex geometries and intricate structures, set up the machines and have no misgivings about running the machines during weekend shifts. The wire threader is so dependable that we always start the new week with fully machined components,” the EDM team leader continues. The MV2400R creates hundreds of tiny bores for ejector pins without difficulty and unmanned thanks to its high reliable automatic Intelligent AT wire threader. The optionally installed wire station for 20 kg reels contributes to interruption-free operation.

Efficient and flexible

The mouldmakers at Rathgeber in Innsbruck also particularly appreciate the highly cost-effective operation of the MV2400R. On the basis of their experience, these machines need much less maintenance than

Always aiming for the optimum: The EDM team leader in conversation with a wire-cutting colleague

Trusting in mature technology, the specialists in Innsbruck have fully accepted the MV2400R wire-cutting machines thanks to their straightforward operation.

the previous and comparable systems from the competition. In addition, the use of brass wire reduces operating costs. On top of this, there is the optimum combination of high cutting speed, sufficient accuracy to well below 0.01 mm and high surface quality, as the mouldmakers in Innsbruck report. Thanks to the straightforward and comfortable operation at the touchscreen, the skilled staff at Rathgeber totally identified with the technology from the outset and fully exploited the benefits of the MV2400R – one of these being its high flexibility. “We can either machine single, large components on these machines or cut a large number of smaller parts from a single, large plate. This ensures a high machine workload and boosts our capacity,” the EDM team leader explains.

Expert service

Finally, the specialists at Rathgeber value the expert aftersales service of manufacturer Mitsubishi Electric and its regional agent Büll & Strunz – service which is always available at short notice. Six days per week, the manufacturer’s service technicians are available by phone and email with expert advice on the operation and functioning of the wire EDM systems. His own operators, the EDM team leader continues, were instructed and schooled by skilled trainers during the commissioning of the MV2400R in Innsbruck. Thanks to the particularly simple and user-friendly program structure of the Advance Plus CNC control, this took only a few days. The mouldmakers in Innsbruck were positively surprised by this, which sets the MV2400R clearly apart from machines of rival manufacturers. Summing up, Rathgeber is both highly satisfied with the performance and equipment of the MV2400R from Mitsubishi Electric after the first few months of experience. These wire-cutting machines have fully met their expectations of and demands for efficient, flexible and process-secure wire-cutting.

EDM team leader: “We’ve been highly impressed by the service and expertise.”

Rathgeber in Innsbruck contributes its expertise to the vehicle interior.

Rathgeber GmbH

Founding year
1939

Employees
100

Core business
Mouldmaking with the focus on loudspeaker grilles, back-injected plastic parts and highly visible components made of PMMA
System engineering/component and precision part production
Automation technology

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Highly satisfied on all counts.

Japan Special

Beer brewed with rice –

is this possible?!

Anyone who thinks most Japanese drink mainly sake and plum wine are mistaken. Beer is by far the nation's most popular drink and, having travelled from Europe to the Far East, has become a huge success. Brewed in Japan with rice and maize, it full-bodied in flavour but a little lighter than German beers. The best-known brand is Kirin Beer K. K.

Kirin Beer K. K. – company history
When the Norwegian Johan Martinius Thoresen came via America to Japan in the middle of the 19th century, he brought the recipe for a genuine European beer with him to the Far East. Under the name of William Copeland, he first opened a dairy and a short while later the country's first brewery of note. After several attempts to introduce the beverage, he finally gathered financially potent helpers who established the Kirin brand in 1888. The name "Kirin" was derived from an ancient fabulous creature from Japanese and Chinese mythology. The figure – half dragon, half horse – has been adorning the bottle ever since.

Characteristic crisp flavour.

The right blend for beer production was ultimately brought by technicians and experts from the USA and Germany. They ensured that high-grade brew kettles were purchased and that all the processes were efficiently coordinated. The firm's early takeover by the technically proficient Mitsubishi Corporation underpinned the expertise in production still further. By the 1950s, beer consumption in Japan had already overtaken that of sake, the traditional drink. Although the latter is also made from rice, the beer-brewing method yields a much more pronounced flavour which has become popular with the Japanese. On the Japanese market, Kirin has remained one of the leading brands to the present day, its only major competitor being Asahi.

Well-known beers: Kirin Lager

One of the best-selling beers in Japan is Kirin Lager. In Japan it is brewed with malt, rice and maize, which give it its distinctive sparkling flavour. Kirin Lager is brewed to its longstanding recipe with great care and fermented at low temperatures. This drink with its 5 % alcohol content is celebrated for its finish with a citrus note. Typical of Japanese beers in general is the balanced blend of malty sweetness and a slightly bitter taste that only develops late on the palate. Obtaining the original rice lager from Japan in Germany is sometimes a little difficult. In Germany itself, it is brewed by the Weihenstephan brewery in accordance with the Purity Law. Its composition is therefore slightly different.

Ichiban Shibori – beer with a method

Ichiban Shibori is a very special beer. Made in Japan of rice and maize and in Europe of malt and hops, it uses the internationally unique "first press" method which involves filtering the mash once without the usual sparging. Once the wort has been obtained in this way and boiled, fermentation can start. In two pressurised vessels, the beer becomes clear and flavourful. A bitter note is characteristic of Ichiban Shibori. Striking are the crisp flavour at the beginning and the rich bouquet that unfolds immediately afterwards. Despite the use of 100 per cent malt, this Kirin brew is astonishingly light and is a popular choice in Japanese restaurants with haute cuisine. Be it with sushi, takoyakis or ramen noodles, the trendy beer is versatile in its combinations with different foods. In many places, Ichiban Shibori is advertised with the slogan "Teinei ni", a term referring to a certain life-style that stresses conscious decisions, simplicity and purity of flavour. With its small number of select ingredients, Ichiban Shibori goes particularly well with this Japanese philosophy. The brewery intends to continue to work on its first press method and develop further creations for the international market.

Where can I buy Kirin Beer in Germany?

Kirin Beer products are available in virtually all oriental shops and in specialised Japanese shopping centres. Along with major cities like Berlin, Hamburg, Cologne and Munich, Düsseldorf is worth a visit. This is where Japan's largest community in Germany lives, runs its own shops and celebrates a whole series of Japanese cultural festivals. In many European cities, picnics and open-air events are also staged to celebrate the blossoming cherry trees in March or April. It is good to know that Kirin also produces beers itself in Germany, so they do not have to be imported. This reduces the price considerably. Many years ago, the company signed a deal with the Bavarian Weihenstephan state brewery that brews beer for Kirin using the proven and patented method. In return, the Japanese have committed themselves to marketing the German beer. A possible drawback is that the Bavarian variant does not resort to maize or rice because of the German Purity Law of 1516. Weihenstephan uses exclusively hops, malt, yeast and water. Since the first press method for Ichiban Shibori is the same, the European equivalent comes close to the original. Anyone travelling to Japan will nevertheless notice marked differences in the taste – the flavour imparted by rice simply differs from that of barley malt.

Internationally unique method.

Schulz GmbH + Co. KG

Masters
of precision machining.

Machines usually work with greater precision than humans – but this does not apply to the Schulz family. When it matters, the company's owner shows the machines what he means by precision.

Alfred Schulz has no time for carelessly machined workpieces. On many occasions in the past, he used to be annoyed when a workpiece was machined in principle to specification but still had burrs attached here or there, was poorly marked or had become scratched due to clumsiness in the packing process. After 25 years of experience in a company for measuring equipment, he therefore founded his own company with three fellow shareholders in 2001 – a move prompted by a company in the semiconductor industry that required components machined with a degree of extreme precision that were not available on the market.

Ten years on, Schulz became the sole owner of the company. He was recently joined by his son Michael who had been working for several years for a large car maker. The next son will soon be joining the team. Father and sons share the same passion for precision craftsmanship. "We still do a lot of work for the semiconductor industry where precision-machined surfaces are called for. This is where we have tolerances of around 1 µm," says Michael Schulz, who happily tells us the story of his father who showed a manufacturer of lapping machines what's feasible. "At the time a customer needed extremely level surfaces, but his lapping

The company is firmly in the family's hands: Michael (left) and Alfred Schulz (right).

The MP 2400 Advance has been supplemented with a B-axis from ITS-Engineering.

Michael Schulz appreciates the user-friendliness of the Mitsubishi Electric machine but is always looking for ways of squeezing extra precision out of it.

machines had so far been unable to produce them. My father thereupon lapped the components by hand and showed him that such accuracy is indeed possible." But Alfred Schulz didn't stop there – together with the manufacturer, he developed the machine further so that it was capable of the demanded accuracy.

Tapping new markets

"If you're interested in precision production methods, there's no getting around electric discharge machining," says Michael explaining their adoption of spark erosion. He also sees EDM as another way of extending the company's portfolio. An MP 2400 has been in operation at the firm in Urbach for the last 9 months, supplemented with a B-axis from ITS-Engineering. Although the company had had little previous experience of EDM, it already has a good command of the processes. "Now it's a question of extracting the final 10 per cent. From our point of view, it simply isn't enough to press a button to achieve the desired accuracy," says Schulz junior outlining the next steps. At the same time, he appreciates the machine's user-friendliness, one of the factors contributing to its purchase. At the moment, for example, clearance gauges and setting masters are being produced on the machine. For these 20 mm components, it's a question of achieving an axial runout of 1 µm. But that's not all, as the family's clear goal is to tap new markets with EDM. "We deliberately chose the most accurate machine because we want to be open for all future options," says Michael.

Incidentally, Mitsubishi Electric also gained first-hand experience of the family's expectations of precision. "At the beginning we experienced a phenomenon, the cause of which we couldn't immediately pinpoint. Mitsubishi Electric, the spindle manufacturer ITS-Engineering and we ourselves invested a lot of time in tracking down the fault, which we ultimately collectively identified. But it certainly wasn't usual for a machine manufacturer to devote so much time to this," says a still-impressed Michael Schulz. The machine is now demonstrably Germany's most accurate machine. In the course of the search, it was measured with lasers from top to toe – a real gift for the champions of accuracy.

If you're interested in precision production methods, there's no getting around electric discharge machining.

Michael Schulz
Managing Director
of Schulz GmbH + Co. KG

Interpreting measurement results

"We occupy our own niche," Michael explains. Whenever finer points are at issue, the company is consulted. The situation is still similar to that when the company was founded: most customers still come on the strength of recommendation and in most cases the customers have been looking for a satisfactory solution for some time. The Schulz family business has remained true to the semiconductor industry, and this is where the lion's share of the products are destined, e.g. as components for contactless gas seals. "Once you've acquired a feeling for accuracy, you stick with it. It becomes second nature," says the business owner. "And this commitment to quality spreads to all components and industries." Manufacturers of optical instruments and machines have now also come to appreciate the Urbach firm's production expertise.

"Unfortunately people often claim to achieve a certain level of precision, but in practice the tolerances aren't always realised," says Michael Schulz from his many years of experience with component suppliers to the automotive industry. And this

Various workpieces produced on the MP 2400 Advance (from left to right): workpiece stops, alignment pin, grinding wheel adapter, clamping tool.

Many customers don't know what's technologically feasible. We show them.

Michael Schulz. Managing Director of Schulz GmbH + Co. KG

is where the Schulz business has carved out its niche, covering the entire production process inclusive of marking and packing. This often includes many secondary tasks that they also take great care with. "We want to keep as many production steps as possible within the firm because we've not been happy with the quality from component suppliers." The machine park is therefore large, and practically every machining method is covered – milling, turning, flat grinding, cylindrical grinding, polishing, laser machining and EDM. The firm's biggest asset is that it doesn't shy away from new methods, but familiarises itself with a new method until the demanded accuracy is achieved. In Michael Schulz's view, one of the most important activities in machining is the measurement of the components and controlling their quality. "Customers want proven accuracy. But we also have to be capable of interpreting measurement results so that we can improve the machining process and ultimately also extend this claim to the component itself," Michael Schulz explains.

This clearance gauge is just one example of a workpiece produced on the new machine.

Open to suggestions

Another important activity in the company's portfolio is the optimisation of prototypes, which may well involve suggesting new production methods or other coatings. "When our customer saves time later on during final assembly because our component can be fitted faster, then we've achieved a great result," says Michael Schulz highlighting the close consultation with his customers. For instance, a manufacturer of optical instruments once came to them with a subassembly that fell a long way short of the Schulz family's conceptions of quality and aesthetics. Within 6 to 8 weeks, the business developed a new component and proposed a new surface finish that not only looked better but was also harder-wearing. A short while later, this component was exhibited at a trade fair and sold with great success. "Many customers don't know what's technologically possible," says Michael Schulz describing a typical situation. "We show them."

The company business has extended its portfolio by adding the MP 2400 Advance.

With its current 25-strong workforce, the family business has ambitious plans. Since the current premises are already bursting at the seams, the firm is planning to move into a new building of its own in Welzheim, a short distance away. In 2018, not only will larger facilities for production be available, but they will also have their own Class 5 cleanroom which – how could it be otherwise in this family? – will additionally contain an even more accurate measuring machine.

Schulz GmbH + Co. KG

Employees
25

Founding year
2001

Managing Director
Michael Schulz

Core business
Prototype development for tools and subassemblies as well as subcontracting by covering the entire process chain

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Innovationszentrum Fennel

360° toolmaking as a model for the future: teaching factory and business enterprise.

The Deutsche Angestellten-Akademie (DAA) (German White-Collar Academy) in Bad Oeynhausen held its fourth Innovation Day for tool- and mouldmaking on 22 March 2018. The challenging purpose of this event was to enable visitors to experience automation and innovation live. PROFILE talked to Jörg Schlüpmann (Deputy Branch Director of DAA GmbH) about this lighthouse project for initial and further industrial and technological training.

Mr Schlüpmann, the "360° toolmaking" project has brought together machine manufacturers, software developers, component suppliers and service providers under the umbrella of Innovationszentrum Fennel (Fennel Innovation Centre). What are the goals pursued by the project group?
In the medium term we want to develop the entire Fennel Innovation Centre into a teaching factory focusing on toolmaking and metalworking. In the toolmaking sector, we're already making good progress with our partners. In metalworking, since the financial commitment and rate of innovation are less spectacular, we're not seeking any partnerships.

At the IZF in Bad Oeynhausen, we want to make all company processes – from design engineering, production and administrative activities to IT – transparent for our customers. All areas are fully interlinked. It will be a place where technological progress can be learnt and experienced.

What is the 360° toolmaking teaching factory?
For me, a teaching factory, as the name suggests, is a place where industrial production and teaching take place. "Learning by doing" is the principle. We run a normal business enterprise with production activities. With the proceeds from the sale of our products, we support our teaching activities. It goes without saying that the teaching factory costs a lot of money getting started. The premises themselves, the compressed air, electricity, maintenance and manpower cost the German White-Collar Academy a six-figure sum each year.

Where do you see the biggest challenges for small and medium-size tool- and mouldmakers in the coming years?
One of the biggest challenges will be to recruit sufficiently skilled young staff. The increase in automation demands special knowledge and abilities from employees. They have to master CAD and CAM systems, operate high-performance milling machines and EDM systems and be able to deal with robots. In the general guidelines for the training of toolmakers, however, only milling is mentioned.

Michael Willwacher presenting the latest wire-cut EDM from Mitsubishi Electric.

Organisers of the DAA: Klaus Schomburg, Rebecca Priemer and Jörg Schlüpmann (from the left).

The second big challenge is maintaining sufficient liquidity for investment in new technology. Modern machines can easily cost several hundred thousands of euros, plus the cost of software and instruction.

The latest developments in the VISI programming systems explained by Sebastian Krause, MECADAT AG.

Matthias Köhler showing the measurement and control equipment from DR. JOHANNES HEIDENHAIN GmbH for challenging positioning tasks.

Forward-looking production processes call for highly advanced, automated plant and machines. How do you keep your teaching factory up to date?
We've got enthusiastic partners who have agreed to regularly upgrade their machines and supply us with new equipment. We have just received a new wire-

cutting machine from Mitsubishi Electric. In the coming months we will also be getting a 5-axis milling machine. At the end of our production chain – after the injection moulding machine – we are using a 6-axis robot which has the task of transferring the products to the measuring station or packing station.

In the 360° toolmaking project, you've opted for a teaching factory. What are its distinguishing features?
Our toolshop is absolutely state-of-the-art. Normally, educational establishments trail behind reality, but we can say that we are right up to date and at the forefront of developments. This is possible thanks to our project partners who make their latest equipment available.

The teaching factory as we understand and run it is unique. There are a series of teaching factories that replicate reality but none that are also real-life businesses. Such teaching factories are all right for the purpose of practice, but they are still a good way removed from reality. We have real-life production operations and serve the market.

Even today, all machines in tool- and mouldmaking are connected to a server that supplies them with the necessary CAD data. But that's pretty well as far as it goes. What has to change?
Workflows will be more strongly automated. I'd like to illustrate this with the example of electrode production on our site. For die-sinking, we continuously mill electrodes in small series: two electrodes A, two electrodes B, six electrodes C etc. Today this is still labour-intensive one-off work. In the future, these tasks will be controlled by a central computer and handled by an automated milling machine, feed system and measuring machine. The future belongs to such automatic machining systems because of their high productivity and profitability. My forecast is that the market will take a big step towards automation in the next ten years. Anyone who fails to automate in these ten years will no longer be able to compete.

What do you say to company owners who express such reservations as "Our business isn't suitable", "We haven't got the capacity or the money" or "We haven't got the right staff"?
I tell them, you've got to make the step. You've got to change your list of priorities and then target investment on staff development. You've also got to start working on people you've been ignoring until now because they haven't met your quality aspirations. You've got to develop them – I don't see any other option.

What can your customers expect of the teaching factory?
We and our training are right at the cutting edge. Our teaching factory operates with the very latest technology. Our processes are forward-looking and we have top experts who are true masters of their crafts. Also worth mentioning are of course our expertise and experience in the field of automation.

Where do your graduates find work on the job market?
Anyone who graduates from us is already taken care of, i.e. has found a job. We regularly receive inquiries from larger companies including some from the immediate region, asking for skilled staff, but we're unfortunately unable to promise anything. There are no more unemployed skilled employees in this area. We are increasingly finding jobs for our graduates directly in industry. A few years back, temporary employment agencies were the springboard for many of our graduates. These times are over.

Mr Schlüpmann, thank you for the interview.

Technology partners

In cooperation with the 360° toolmaking project – a joint venture of 11 leading machine manufacturers, software developers, component suppliers and service providers – a fully automated teaching factory for tool- and mouldmaking, equipped with the latest technologies and solutions for the sector, has been established in Bad Oeynhausen.

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Sistmolding Srl

The common denominator: **Difficulty.**

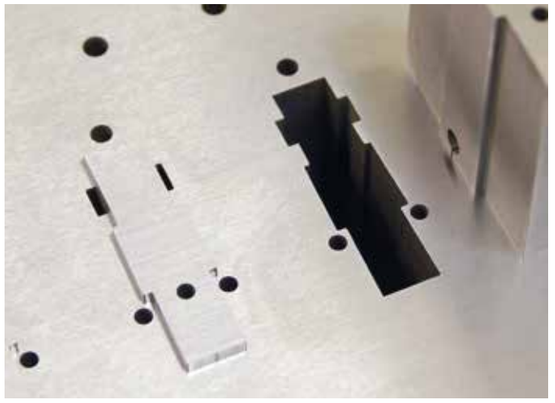
Sistmolding Srl was founded only in 2012, but was already one of the front runners in its sector, as it is the continuation of a family business that was established in the precision mechanics sector in the 1950s. Over the years, it adapted to market requirements and focused on mouldmaking and the injection-moulding of thermoplastics, specialising particularly in medicine, electrics and electronics.

Today's Sistmolding is devoted to the development of new products, the design and construction of moulds, and injection moulding itself, as Cristiano Lippi, head of the technical department, reports: "Today's production reality came about through the strong determination to complete a process of change based on the idea of putting our ten years of experience in the service of a modern and flexible company that is equal to the challenges of an increasingly global, dynamic and discerning market. Our mission – Giving Life to Ideas – is the driving force behind our daily commitment. This is not just a slogan, but the attitude with which we approach each project with passion and the will to innovate. Sistmolding is capable of manufacturing technically sophisticated products of high aesthetic value. Our important role is to support the customer in conducting feasibility tests for new products while taking care to optimise the moulds for industrial production in terms of quality and costs."

Low cost, high tech

Sistmolding comprises two plants. The plant in Pomezia (Rome) accommodates the toolshop for the design and construction of moulds, while the plant near Albano Laziale is where injection moulding is carried out. Sistmolding produces high-precision moulds that are ex-

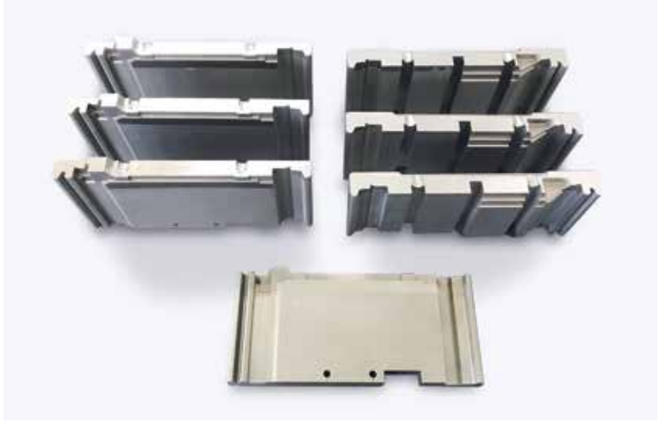
The hot-runner injector invented by Sistmolding to eliminate costly and bulky sprues.



Mitsubishi Electric's EDM systems are an indispensable resource for high-precision machining.

ceptionally wear-resistant and maintenance-friendly. This makes them ideal for mass production, as the customer can rely on a long service life, superlative repeat accuracy and the assurance of millions of strokes. The moulds are usually made of stainless steel, and the materials employed and heat treatments are all certified. Sistmolding is capable of producing multi-cavity moulds with electronic process control for co-moulding, high-pressure polyurethane and thermoforming.

The two areas in which the Roman company operates confront the toolshop with constantly new challenges in the making of moulds that are becoming increasingly productive as well as increasingly complex and machine-like – with specially developed extractors, slides and control systems. Nor is there any lack of inventions, such as the hot-runner injector with 8 outlets per mould and with a total of 128 plungers and minute dimensions: “The traditional suppliers of hot runners make them too large for our requirements and produce sprues whose weight and size exceed those of our in most cases small or very small components. In addition to producing expensive waste, these sprues also create a disposal problem. Our mechanism eliminates this disproportionality and improves the performance of the mould that is capable of producing hundreds of parts in a single cycle. An example of this is an intravenous catheter cannula holder. The item itself is not valuable (it is a disposable article), but, like almost all moulds that we design, it has to satisfy all special requirements. These start with the very tight tolerances which are difficult to achieve with polypropylene, although this is the material that the medical sector has chosen because



Mould inserts produced on the NA1200 Essence and EA8PV Advance.

of its high cost-effectiveness. Unlike industrial polymers, it is distinguished by a certain degree of shrinkage after injection moulding and by compliance with tolerances of hundredths of millimetres at the holes, it is less stable and precise (than the more expensive polycarbonate), which makes the matter really difficult! On plastic-needle and needle-cannula couplings, maximum precision is also demanded. They have to withstand pull-out forces of several kilos, a widespread phenomenon in hospitals. If therefore the tolerances are not met, the components cannot be plugged into one another and are useless in practice because they slip out and the liquid escapes.”

The importance of EDM

There’s never a shortage of problems that have to be solved – and they are never trivial. Sistmolding cooperates closely with multinational companies that demand different technical specifications, depending on the destination

Mitsubishi Electric’s EDM systems play the leading role in the production of catheter moulds.

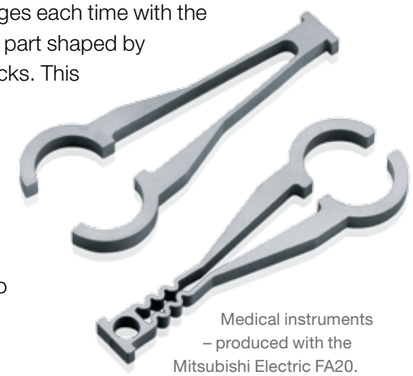
country. Long before the moulding process can start, the Roman company’s product development engineers together with the customer play an important part in finding beneficial and intelligent solutions. A high degree of difficulty these days is the common denominator for all sectors of industry: who would ever have imagined that moulds for conventional circuit breakers would call for such extreme accuracy? Problems could arise on the assembly line where the internal circuits all have to be inserted in confined space and deep ribs. If anything fails to fit the complex geometry, the assembly line grinds to a halt – one can easily imagine how costly this could be.

In addition to numerous turning and milling centres, the toolshop has a truly extensive EDM section with numerous Mitsubishi Electric wire-cutting and die-sinking machines so that the company also performs EDM services under subcontract. Alessio Lippi runs the toolshop and

is already the third generation to work for the company: “We’re familiar with the advantages of EDM. These are better results combined with precision, the possibility of cutting highly complex shapes with excellent and homogenous surfaces, and radii and micro-holes that are impossible to produce in any other way. With each product of its broad product range in this sector, Mitsubishi Electric is among the leaders and we can confirm this every day with everything that we do with these machines. Particularly when it comes to producing highly intricate parts or machining tough steels with deep ribs or tiny details, the Mitsubishi Electric machines are an indispensable resource for high-precision production operations. The machines run smoothly and maintenance is minimal and plannable. Once they are programmed, the machines simply keep on running without an operator having to monitor them.”

Die-sinking and wire cutting

There isn’t a Sistmolding mould without parts produced by EDM: “Our design philosophy is based on inserts. Each mould holder is virtually identical, while the mould changes each time with the geometry of the part shaped by the inserted blocks. This standardisation process enables us to exploit considerable synergies. The toolshop is in a position to



Medical instruments – produced with the Mitsubishi Electric FA20.

The Mitsubishi Electric machines are an indispensable resource for high-precision production operations.

Alessio Lippi, toolshop manager at Sistmolding Srl

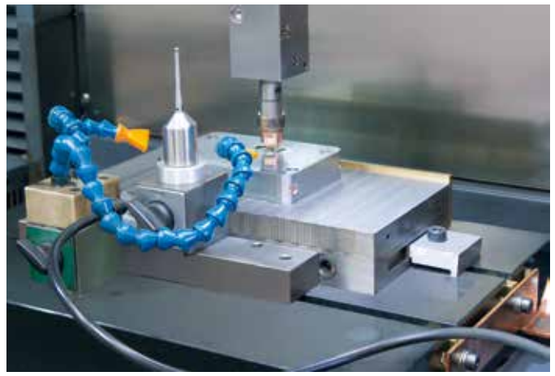
Die-sunk and polished nozzle – cut open for test purposes.

generate new moulds by inserting a single metal block; we can thus build a pilot mould in a matter of hours – also thanks to our extremely well-equipped toolshop. Instead of the usual rendering, the customer can inspect his component in its final form very early on."

Two Mitsubishi Electric machines stand out from the rest, the EA8PV Advance and the NA1200 Essence. Alessio Lippi: "The die-sinking machine is notable for its programming speed, its absolute precision and the mirror-like surfaces that it guarantees us. It keeps to the set tolerances without deviating by as much as a hundredth of a millimetre. The machine was purchased for a job concerning a medical system for replacing the lens of the eye (cataract operation), including the moulding of the lens and the surgical equipment for implantation. In short, the demanded precision was extreme. Manual polishing was to be avoided at all costs as it could slightly modify the surface of the tiny lens. The NA1200 Essence new wire-cutting system, on the other hand, was purchased to produce a T-shaped pin measuring 0.4 x 0.7 x 70 mm. It is distinguished by tiny closure radii of 0.7 hundredths. We used 0.1 mm wire with a special technology so we could maintain parallelism over the entire length. In this phase the supplier Overmach supported us through local agent Sicomut Sud, which was also responsible for after-sales service. Today we can say it's the machine we use most. Whatever job we set up on it, we can be sure there won't be any surprises."

The EA8PV Advance is productive, precise and reliable. Mounted in a cast-iron frame, it makes use of digital drives and optical scales on the X-, Y- and Z-axes with a resolution of 0.1 µm. Working together with several temperature feelers installed in the machine the Advance CNC control corrects heat-related drift in real time. In addition, the 3D data can be processed straight from the CAD application and used for direct programming. Electrode replacement is inclusive, while the C-axis can be programmed as-standard to up to 30 rpm.

The EA8PV Advance model, which commands its place in the Sistmolding toolshop thanks to its equipping with a special technology package, has been developed by Mitsubishi Electric specifically for high speed, exceptional precision and maximum user comfort. The broad array of technology includes a fully-fledged CAM system integrated in the machine – and owing to its versatility and intuitive use, the technicians at the Roman company often happen to prefer it for programming over the CAD/CAM system in the engineering office.



Production planning on the Mitsubishi Electric EA8PV Advance.

Sistmolding's toolshop is notable for its EDM section with numerous wire-cutting and die-sinking machines from Mitsubishi Electric.

SISTMOLDING S.r.l.

Founding year
2012

Core business
Mouldmaking and the injection-moulding of plastics for medicine, electrics and electronics

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In cost-effective series production, high-precision clamping jaws for grinding machines are wire-cut in unmanned shifts.

Mager Erodiertechnik

EDM as a calling.

Mitsubishi Electric – a dependable partner for life.

Producing high-grade components made of hard materials flexibly and at short notice has proven to be the recipe for success for Michael Mager in Zimmern ob Rottweil in Swabia. In doing so, he has been relying on EDM equipment from Mitsubishi Electric since the 1980s.

The second generation, Stephan and Benni Mager, are already following in the footsteps of their father and company founder. The latter first became acquainted with the then young technology of die-sinking during a holiday job in 1977. A few years later, as a mechanic working in a now long defunct toolshop in his home locality of Zimmern ob Rottweil, he turned his attention to wire-cutting. This contributed to his growing interest in technology and particularly in electrical discharge machining.

Appreciation of advice and service

At the beginning of the 1980s, Michael Mager recognised the special advantages of machine manufacturer Mitsubishi Electric at his then employer. “The advice and after-sales service even in those days were outstanding and impressive,” he says today, reporting on his longstanding experience. He mainly worked on a DWC90 wire-cutting machine. Since then, wire EDM systems from the Japanese manufacturer have been his constant companions in his continuing career.

In 1994, Mager started a jobshop in an outhouse of his family home. He concentrated on cutting workpieces made mainly of hardened materials. Even at that time, he was aware of and appreciated the special advantages of EDM technology. “EDM is a highly reliable process. You can work productively and generate value without constantly standing at the machine,” he explains. Building on his contacts and good experience, he invested in a DWC110SA from Mitsubishi Electric. This has proven highly successful. It is almost a

For many geometries, e.g. toothing, there is no alternative to wire-cutting

member of the family and is still working accurately and reliably today at the Mager Erodiertechnik jobshop in Zimmern ob Rottweil.

Rapid growth thanks to specialisation

On the strength of his above-average quality, flexibility and tight delivery deadlines, Mager made a name for himself with a large number of companies in the region within only a few years, solely through personal recommendation. He thus increasingly received orders for the production of single items and small series. Back in 1996, he therefore invested in a second wire-cutting machine, opting for an SX10 from Mitsubishi Electric. This happened to be the 30,000th machine to be supplied by Mitsubishi Electric. In this series, the Japanese manufacturer installed, for the first time, the high-speed anti-electrolysis generator, which was extra-efficient according to the standard of technology of the time. “It had a large hand in ensuring that I could earn sufficient revenue from the outset of my own business venture. After tooling and setting-up before the end of work, wire EDMs from Mitsubishi Electric earn my income at reduced hourly rates to some extent overnight,” he explains. Having subsequently taken over the existing production building of the old toolshop and transferred his business there from his home, the jobshop went from strength to strength.

Today, Mager is joined by his sons Stephan and Benni and three more employees in his small business. His wife is also still responsible for the paperwork. His firm now has seven wire-cutting systems from Mitsubishi Electric – along with a few machines of other makes.

Reliable wire threader permits multiple clampings

Mager has only recently added a MV2400R Connect to his machine park. Its large workspace was crucial for the investment, he says. Smaller workpieces can now be machined in series much more efficiently and cost-effectively, his son Stephan adds. “Using large plate and after programming we can let the machine produce in series totally unsupervised overnight and at weekends,” Stephan continues. The extremely dependable wire threader of the MV2400R Connect goes a long way towards making this possible. Stephan confirms that they can rely totally on it. Even in difficult situations with tiny geometries, the wire threader reliably finds the kerf or start hole so the machine can rethread the wire swiftly and resume cutting.

The MV2400R Connect also shows its strengths when machining large workpieces. Among other things, jobshop Mager machines larger shifting rings and specifically the gearing on the outer circumference. Thanks to the large workspace of the MV2400R Connect, this is now possible in a single clamping. This shortens throughput time considerably while also boosting accuracy by omitting the second clamping.

> *For jobshops in particular that have to process a broad range of different workpieces reliably within minimum time, the current wire EDM systems of the MV-R Connect series offer the best cost-benefit ratio.*
>
> *Michael Mager. Managing Director of Mager Erodiertechnik*

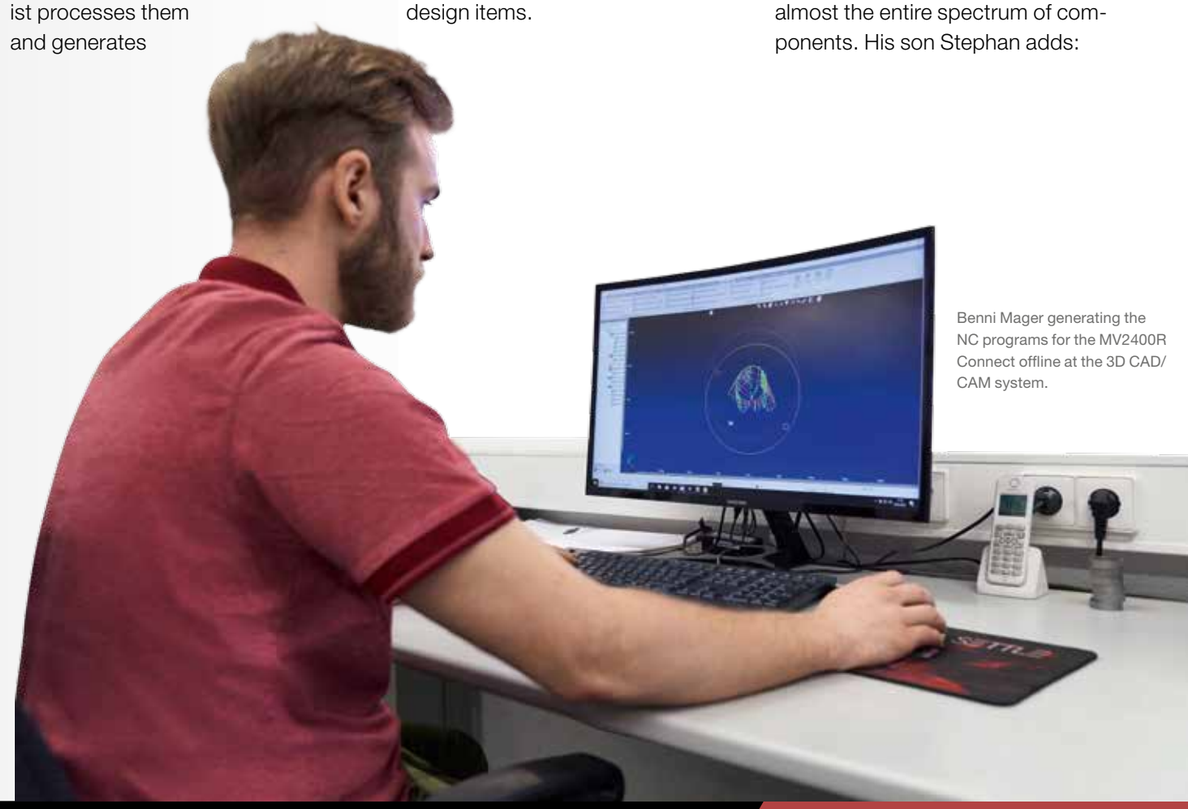
Programming and operating the MV2400R at the CNC control touchscreen is impressively simple.

The components due for cutting are programmed at several CAD/CAM workstations. Usually Mager receives 3D CAD data of the required parts from his customers. Stephan or Benni as the CAD/CAM specialist processes them and generates the NC programs for the wire-cutting machines. Via direct data lines and in some cases via data carriers (USB drives), these are then transferred to the machines. As the machine operators in Zimmern ob Rottweil report, equipping and machining are extremely comfortable and straightforward on the wire EDM systems from Mitsubishi Electric. The neatly presented plain-language dialogue of the CNC control has proven to be particularly useful. Simpler components can be conveniently programmed directly at the machine, Stephan adds. This option is used by the subcontractors for single items for which no 3D CAD data are available, e.g. when cutting jewellery and design items.

Low-maintenance, low-cost

For Michael Mager, another advantage of the current wire EDM systems of the MV-R Connect series is its particularly cost-effective operation. The MV2400R Connect needs much less maintenance than the preceding machine generations, such as the SX and NA series. The service life of the deionising system and the filters is much longer. This extends the intervals between replacements, saves labour and cuts costs. This advantage also applies to wire-cutting machines from the competition. “For jobshops in particular that have to process a broad range of different workpieces reliably within minimum time, the current wire EDM systems of the MV-R Connect series offer the best cost-benefit ratio,” says Mager from his own experience.

In this connection he mentions precision. On the MV2400R Connect, he can effortlessly machine with 0.003 mm accuracy. This is just right for almost the entire spectrum of components. His son Stephan adds:

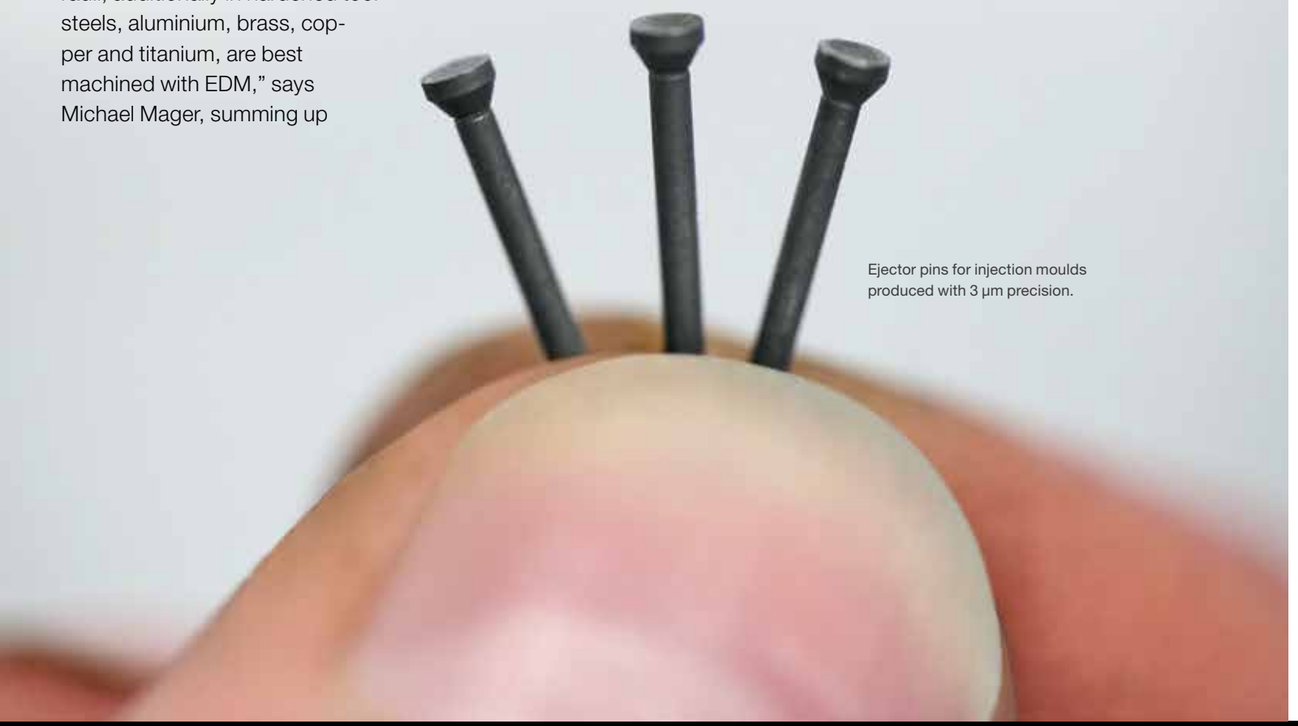


Benni Mager generating the NC programs for the MV2400R Connect offline at the 3D CAD/CAM system.

“Higher accuracy is demanded only for very few jobs.”

To machine small and complex components, jobshop Mager Erodiertechnik has equipped one of the two FA10S Advance systems with a B-axis. On this machine, the firm in Zimmern ob Rottweil currently mainly produces die inserts for stamping tools and injection moulds. These are used for producing large series of micro-components for electrics and electronics.

With the aid of the B-axis, the jobber also machines micro-parts in series for electrical engineering, medical technology and the textile industry. On such workpieces, Mager confirms, wire EDM still proves to be extremely cost-effective – and not only because of unmanned operation. “It is not so much the pure machining time as component geometry that dictates whether we use EDM. Deep holes and cavities, narrow grooves, intricate penetrations with angled edges, sharp corners almost without radii, additionally in hardened tool steels, aluminium, brass, copper and titanium, are best machined with EDM,” says Michael Mager, summing up his experience as an EDM specialist going back almost 40 years. The realism of his assessment is confirmed by the ongoing business success of the specialised jobshop in Zimmern ob Rottweil.



Ejector pins for injection moulds produced with 3 µm precision.

Professional in Profile

How do you deal with the pressures of your work?
Michael Mager:
I’m very interested in music and studied music before embarking on my technical career. I play several instruments and for many years I played dance music. Today I still make music as a way of relaxing from the pressures of my business. As a side-line, I’m happy to take on engagements as a conductor of regional music groups.

What plans do you have for your company?
Michael Mager:
We’ve got five children. Two of my three sons have a strong interest in technical things and have decided to work in our small business. They now also handle responsible duties themselves. I thus see very good prospects of the business being successfully continued in the near future. Among our grandchildren I have also detected a special technical interest, so the company may well be continued in the third generation.

What is your strategy for handing over your company to the next generation?
Michael Mager:
Since I still feel pretty fit at not even 60 and will certainly carry on working for a few more years, handing over the reins to my sons in the coming years should be a very smooth process. Stephan and Benni are already aware that in your own business you don’t have fixed working hours and also have to work sometimes at weekends, so they know what it means to be self-employed.

Mager Erodiertechnik

Employees
5

Founding year
1994

Managing Director
Michael Mager

Core business
Wire-cutting of all hard materials under subcontract: single items and small series for stamping press construction, special-purpose tools and jewellery, drive and textile engineering, medical technology and the clock-making industry.

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Horoscope

for hard-wired EDM experts.

Capricorn
21 December – 20 January

Your future ego will pay you a visit and reveal to you the key ideas for THE gilt-edged wire-cutting idea. Don't let yourself be side-tracked by other suggestions – be it for a wire-cut cash cow or a laser-cut metal shoe design for your personal Cinderella. You've got the Midas touch outside work as well – make use of it!

Aquarius
21 January – 19 February

Your partner's surface finish is improving, slowly but surely. Simply raise her pulse frequency with flowers and chocolates and spend more time with your family than with your extravagant ideas for workpieces. Immediately afterwards Mercury revives your enterprising spirit and sends you on an exciting journey – get ready to go!

Pisces
20 February – 20 March

After various experiments with the dielectric, you hit upon a brilliant idea for a new cocktail. Even the most celebrated astrologists cannot agree on the scale of Jupiter's influence. Difficult decisions are in store for you – choosing the name for the cocktail isn't one of them.

Cancer
22 June – 22 July

Jupiter is currently in the constellation of Gemini, so you're currently able to make your enemies stop and stare. Not only with your laser-cutting skills, but also with the way you handle your workpieces. Make use of Jupiter's energy in your private life and broaden your horizons. How about yoga, meditation or tai chi?

Leo
23 July – 23 August

Don't let up! The Neptune-Uranus square is on the advance. Jobs that have been set aside should be finished off at last. On Sundays, green tea is the solution for new vitality – procrastination is the thief of time! You like challenges, don't you? Then get going now by drilling a start hole.

Virgo
24 August – 23 September

You're not making much headway with diplomacy, so put your foot down – it's the right decision. With your top-flight EDM systems you're equal to any challenge, however testing. At work and at home, everything is in perfect order. Give yourself a treat and swim a lap around the lake nearby.

Aries
20 March – 20 April

With good ideas and solid arguments, you'll soon be head and shoulders above your workmates. You're unusually energy-charged and suddenly full of drive. Your partner also benefits from this. It's been a long time since the stars in your love life were so exciting and promising. The sparks just keep on flying – and there's no end to this in sight.

Taurus
21 April – 21 May

In a night of the full moon, you dream of a floating Tubular Shaft Drive for EDM systems. This sense of floating on air spreads to almost all areas of your life in the course of the week – and even the shopping bags only weigh a fraction of their normal weight. With this extra momentum you succeed in finishing off jobs that have been lying around for some time.

Gemini
22 May – 21 June

The trine between Jupiter and its ascendant is currently limited. You will feel uncomfortable in the current situation. Get your life back onto the ascendant – then you can be sure of staying healthy and of finding the time to put your plans into practice.

Libra
24 September – 23 October

Constructive criticism is always welcome, but don't overdo it in the coming weeks. Be a little less outspoken among your workmates. The stars suggest a surfeit of negative wire erosion. In your love life, things are currently looking better. A flirt here and a few flowers there – everything goes to your complete satisfaction.

Scorpio
24 October – 22 November

You're lucky in love and in your career. It's been a long time since you last felt so good. You naturally owe it all entirely to your ambitious urge to improve productivity. When die-sinking you should devote special attention to the electrodes, as they are currently under the influence of Mars.

Sagittarius
23 November – 21 December

Caution, as Pluto is currently in a highly dynamic aspect with the sun. Your travel paths have become a little longer again – in view of your stature, it's not that easy, even with an extended Z axis, to wire-cut a perfect replica of yourself. Make an effort! Half-hearted compromises are no good to anyone – particularly if in the end your nose is missing.