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Legal notice

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Sky-rocketing with high-end technologies

In their bid for quality and reliability, MT Aerospace AG banks on an FA20-S Advance from Mitsubishi Electric in its development workshop.



This booster segment consists of three separate cylinders that are joined together at MT Aerospace (see image opposite).

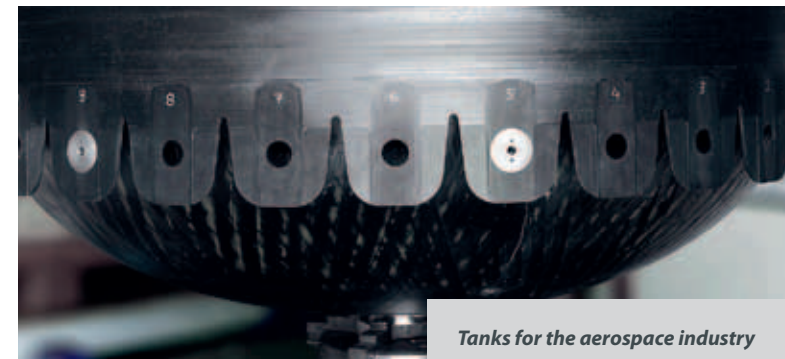
11 m

Half as long as a football pitch and weighing as much as 750 small cars – the attributes of the Ariane 5 European launcher rocket are quite staggering. Thrust of 13,000 kilonewtons is required just to get the missile off the ground. By comparison, Concorde with its afterburners achieved only about a twentieth of this thrust. On behalf of the European Space Agency (ESA), companies of all twelve member states are involved in the development and construction of the Ariane 5. Outside France, MT Aerospace AG with a share of ten per cent is the biggest supplier of hardware to the programme. Booster cases and fuel tanks are the core business of the space flight specialists in Augsburg, Germany.

Strict safety guidelines and the cost-intensive development and manufacture of rocket components impose tough production requirements on MT Aerospace. The components that leave the plant therefore exhibit “superlative quality and maximum reliability”, as Michael Servo, the company’s production manager, puts it. With its booster cases, tanks and bulkheads, MT Aerospace supplies components of existential importance for the Ariane 5 launcher.

Supreme quality for a brief service life

Ariane 5 propels satellites into orbit and spacecraft to the international space station (ISS). A large portion of the launcher rocket is discarded shortly after launch and falls into the sea – the



Tanks for the aerospace industry are also part of MT Aerospace AG’s portfolio.

booster, for example, after a good two minutes. This means that the products manufactured by MT Aerospace have on the one hand a very short life-cycle. On the other hand, the components are exposed to extreme stressing during these few minutes. It is not without good reason that Michael Servo therefore underlines MT Aerospace’s responsibility for setting extra-high quality standards: “A malfunction due to quality shortcomings would inevitably be a disaster – firstly for Ariane 5 project business and secondly and particularly for our own reputation.”

MT Aerospace satisfies the exacting technical requirements with exhaustive quality control. In practice, this means that specimens are taken from each supplied batch of each material and specially processed to prepare them for stringent testing. This can involve mechanical load tests, analyses of dynamic vibration or tests to determine how components behave under pressure and exposed to strong temperature fluctuations. “In quality control, we replicate every situation that our components can encounter in practice on the rocket,” Michael Servo explains.

Specimen preparation is one of the tasks of the development workshop where the 20 employees work to the same strict guidelines as in production. Materials difficult to machine like steel alloys and titanium and small piece numbers call for ultra-modern production technologies and maximum flexibility. Last year, time was up for a

made all the difference,” recalls Sixtus Metzger, head of the development workshop.

High-tech wire erosion creates new scope

Since its installation, the FA20-S Advance has been in almost continuous operation, which is possible thanks to automatic wire threading. “We can set up the machine in the afternoon, let it run unsupervised at night and in the morning all we have to do is separate the finished parts,” says Sixtus Metzger describing the new procedure, before stressing: “This automated operation gives staff in the development workshop greater scope and offers us extra flexibility.”

15-year-old wire EDM machine. The selected replacement was a FA20-S Advance from Mitsubishi Electric. “Its excellent price-performance ratio



Machining on a grand scale: The boosters of Ariane 5 have a diameter of about 3 m and a total height of 25 m.

Another benefit of the switch to hypermodern technology in the wire-cut EDM sector is the speed of the FA20-S Advance. Whereas many parts were conventionally machined in the past, our employees are now going new ways, as Sixtus Metzger explains: "Our colleagues are coming up increasingly often with ideas of what could be eroded instead of elaborately milled." The advantages of wire-cut EDM in his view are its higher productivity overall and lower costs compared to milling in that tooling costs have been largely eliminated.

Well equipped for the future of space flight

The big changeover from an antiquated machine to the very latest control technology was quickly accomplished



Before and after: The many machining steps for the component are preceded by wire-cutting.

after two training sessions given by Mitsubishi Electric. The employees soon came to appreciate the new system and enjoy the convenience of PC-supported programming. "We still receive drawings, but it's now child's play to replicate them on the PC. The machine program is then produced automatically more or less at the press of a button," says the head of the development workshop.

In the development workshop, it's not productivity that counts above all else. In fact, the challenge involves flexibly producing a large diversity of parts from a huge range of materials – and this with great reliability and precision. In this connection, Sixtus Metzger sees the special value of the FA20-S Advance for his department: "Wire erosion has developed into a key technology for us. It has already demonstrated its value and will have paid for itself within the foreseeable future."

» Wire erosion has developed into a key technology for us. It has already demonstrated its value and will have paid for itself within the foreseeable future. «

Both Sixtus Metzger and Michael Servo are convinced that the purchase of the new wire EDM machine will continue to pay off, as accompanying specimen preparation depends directly on tank and booster production. MT Aerospace benefits here from a comparably stable aeronautical and very stable space industry. To be more precise, production of the rocket components has a long-term schedule and is assured until 2014. At the same time, the company has long ceased to be purely a component supplier, because with its technological innovations MT Aerospace is also going a long way towards boosting the efficiency of the Ariane programme.

Professionals in Profile: Michael Servo

How would you describe in a sentence what your company does?

Booster casings, large tank components, structures for space flight, Ariane 5 and components for aeronautics.

How did you earn your first money?

Holiday job.

What motivates you?

Our wonderful team of staff and my fascination for space flight.

What's different about how you do things now, compared to five years ago?

I'm calmer.

Where do you see your company in five years?

Systems leader for the new Ariane 5 upper stage.

What was your biggest business success?

Putting together a team of staff that works with great enthusiasm, enjoyment, responsibility and outstanding quality.

What's your favourite way to relax?

With physical exercise in my free time.

What attributes do you value most in other people?

Fairness.

How would you briefly describe your occupation to someone with no technical knowledge?

I have the good fortune to be able to work in the most fantastic branch of technology, space flight.

Companies in Profile

Name and place of business:

MT Aerospace AG, Augsburg, Germany

Founding year: 2005

Number of employees: 20 in the development workshop, 700 overall

Managers:

Hans J. Steiniger
Board Chairman,
Walter H. Köppel
Board Member

Core business: Booster cases and fuel tanks for space flight



Customer contact:

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Production Manager
Michael Servo
(centre) talking to
Sixtus Metzger (right),
head of the develop-
ment workshop, and
Matthias Becker.

Sophisticated materials such as special steel alloys, call for the use of a high-performance wire erosion machine.

Flex appeal

Krüger Erodieretechnik crowns its equipment for the machining of large workpieces with the FA50-S Advance V – no less than the world's biggest wire-cut EDM machine.

Would you risk modifying your high-tech wire erosion machine with a flex in order to create a longer Z-axis and an enlarged tank? Probably not. And it is precisely this that makes the Krüger Erodieretechnik GmbH & Co. KG success story unique. The jobshop from Biedenkopf has not only modified one of its now many Mitsubishi Electric machines, but has grown in boldness from machine to machine. The company has thus managed to achieve impressive cutting heights of 980 mm in this unconventional way. And because even these dimensions didn't always satisfy its own needs and, more importantly, those of its customers, the company recently became the first European company to install the world's biggest wire erosion machine – namely, the FA50-S Advance V from Mitsubishi Electric.

Against the background of its own (success) story, the investment of Krüger Erodieretechnik GmbH & Co. KG in the FA50-S Advance V from Mitsubishi Electric is a logical consequence, as the chronology leading up to its "European first" illustrates. Because, for a good 14 years now, Krüger Erodieretechnik GmbH & Co. KG in Biedenkopf has been successful as a jobber for a huge array of sectors, ranging from mechanical engineering, plant engineering, the automotive industry and tool- and mouldmaking through to projects in the aerospace industry and for the flourishing sector of energy technology. Having committed itself exclusive-



» We looked for ways and means of improving on the standard ... and we were suddenly able to offer our customers a spectrum of services that were unavailable elsewhere, or only on less attractive terms. «



Components measuring 2000 x 1600 x 600 millimetres can be machined on the FA50-S Advance V.

» Both in terms of its operating characteristics and accessibility as well as its precision, cutting speed and reliability, I was aware of nothing better. «

ly to wire and start hole erosion in the early years of its existence, the company gradually extended its process chain, initially to include die-sink erosion and then milling.

All-inclusive customer orientation

This was later followed by the consistent introduction of high-speed milling and (as a complementary service) investment in mobile laser welding. In view of the all-inclusive customer orientation of the Krüger corporate strategy, it goes without saying that it has achieved mastery not only of manufacture, but also of CAD, CAM and CAQ together with 3D coordinate measur-

ing technology with equal perfection. No less comprehensive than the technology and process chain is the company's range of services and materials. Krüger Erodieretechnik has an excellent command of all facets of its trade and some evidently quantifiably better than the competition. This applies particularly to the machining options in the field of wire-cut EDM on the installed machines from Mitsubishi Electric. Although these machines are items of standard equipment, they have been gradually adapted with supreme mechanical engineering finesse to its own needs and those of its clients. For instance, the maximum cutting height of about 620 mm of a series machine has been raised to 750 mm

and, with an FA 30-V modified on the premises, Krüger now achieves up to 980 mm – on workpieces measuring up to 1,920 x 1,450 and weighing up to 3,000 kg.

However, the fact that high-tech from Mitsubishi Electric has been the key to the company's success in wire erosion since the founding of the company has nothing to do with its "set-up friendliness", as Friedhelm Krüger explains looking back: "I knew the machines from Mitsubishi Electric from my earlier years working for other employers, and also became acquainted with other makes. Both in terms of its operating characteristics and accessibility as well as its precision, cutting speed

The world's biggest erosion machine on the way to its proud owner.



done properly – without compromising on performance. Consequently, we were suddenly able to offer our customers a spectrum of services that were unavailable elsewhere, or only on less attractive terms." But only if it's done properly! Because the modifications were anything but trivial, as Friedhelm Krüger stresses. Extra height mustn't be achieved at the expense of precision. "Today, we cut components 700 mm high on a tuned FA 30-V from Mitsubishi Electric with a parallelism of ± 0.02 mm," says the company founder quoting a both impressive and representative example. Although such results were not achievable with mechanical engineer-

and reliability, I was aware of nothing better. So it was only natural that I didn't want to take any risks when setting up my own business and trusted in proven and familiar equipment."

Mitsubishi Electric, a leading innovator

And there has evidently been no reason for questioning the decision taken when the company was founded, as Friedhelm Krüger confirms: "Of course, I wanted to keep myself abreast of developments and looked at alternatives when it came to investing in new machinery. However, anyone who wants to replace an established supplier has to be clearly and quantifiably better. And no competitor has so far filled the bill." He doesn't hold back with praise either: "The earlier machines and today's technology are worlds apart – this applies as much to the user-friendly control as to the efficient generator systems. This is where Mitsubishi Electric is in my view one of the undisputed innovative leaders in the field of wire erosion. On top of this, there's the machine's high degree of reliability over all the years, an all-important feature for a service provider, and excellent support from Ratingen in all matters concerning technology and service."



Mr Krüger taking charge of the unloading of his new FA50-S Advance V.

Improving on the standard

But what about the penchant for unusual cutting heights in wire erosion? Friedhelm Krüger supplies the answer: "We simply hate having to turn down a job merely because we don't have the necessary working range. So we looked for ways and means of improving on the standard instead of having to invest straight off in more expensive, larger machines. And so we boldly risked a modification on a smaller machine and discovered that it is possible to increase the cutting heights on Mitsubishi Electric machines – if it's

ing skill alone, Krüger continues. All the cutting parameters also have to be adapted to the new task, as the standard values are not much use when working on a larger scale. And it is not without good reason that he emphasizes (and probably to discourage potential imitators): "Knowing how to use a flex is not enough!"

Despite the performance spectrum of his "tuned height-extended cutter", Friedhelm Krüger wouldn't be Friedhelm Krüger if he had been content with the status quo. Because however flexible his machines may have become

in terms of cutting height, there were other basic parameters like the maximum clamping weight that he was unable to manipulate. And in terms of workpiece dimensions, i.e. clamping area, he could have done with the odd extra centimetre from time to time.

The world's biggest erosion machine

And because that's the case, he recently installed a huge FA50-S Advance V from the Mitsubishi Electric Power

Master series and now calls nothing less than the world's biggest erosion machine his own. The FA50-S now enables him to effortlessly machine workpieces measuring up to 2,000 x 1,600 x 600 mm and up to a weight of 4,000 kg.

As far as the accustomed outstanding performance and operating comfort are concerned, nothing has changed. The only novelty for the operator is that the table is so large that it is accessed from a platform. No individual modifications have yet been made to the ma-

chine, nor does Friedhelm Krüger intend to make any changes to cutting height at present. But he doesn't want to entirely exclude it ...



Mr Krüger (right) and Mr Neuendorf from Mitsubishi Electric (left) in front of the world's biggest erosion machine.

Companies in Profile

Name and place of business:
Krüger Erodieretechnik GmbH & Co. KG, Biedenkopf, Germany

Founding year: 1996

Number of employees: 12

Managing director:
Friedrich Wilhelm Krüger

Core business: Jobshop in the field of wire erosion, die-sink erosion and HSC milling.



Friedrich Wilhelm Krüger has been operating successfully as an EDM jobber for a good 14 years.

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Professionals in Profile: Friedrich Wilhelm Krüger

How would you describe in a sentence what your company does?
We're a jobshop in the fields of wire erosion, die-sink erosion and HSC milling and are at home in the world of everything from the minute to the monumental in prototype and series production.

How did you earn your first money?
Washing cars in my youth.

What motivates you?
Positive thinking.

What's different about how you do things now, compared to five years ago?
Did I do anything wrong five years ago?

Where do you see your company in five years?
I think we shall continue to specialize. In which area depends to a large extent on our customers. As a result of our close cooperation with our customers, their aims are also ours.

What was your biggest business success?
Having ideas and putting them into practice.

What's your favourite way to relax?
With friends.

What attributes do you value most in other people?
Honesty and reliability.

What was the best advice that anyone ever gave you?
To set up my own business.

How would you briefly describe your occupation to someone with no technical knowledge?
We cut pretty well any metal with a 0,3 mm wire without coming into contact with the material.

Karlsruhe University demonstrates the extra cost of milling

Costs 45 per cent higher than EDM.

The question of the best manufacturing technology has been a matter of contentious debate for generations, in manufacturing on all levels, and from the shopfloor to the university chair. There probably never will be a universal answer.

Anyone attentively following the various articles and publications on this subject cannot help but notice a clear trend towards milling. In the field of hard machining in particular, there are repeated reports highlighting the possibility of replacing electrical discharge machining with hard milling. These articles suggest that EDM is on the retreat on the grounds that it doesn't offer any scope for innovation. The reason for this is without doubt that technological advances extending to new spectacular materials and workpieces in the conventional machining sector are more memorable than incremental improvements in performance in the EDM sector.

Unlike conventional machining, the limits to the use of EDM are set by the physical properties of the workpiece and by the demanded level of productivity. When it comes to volume per unit of time, conventional machining is vastly superior to EDM. If, however, complex geometries are involved, EDM has more to offer. Deep holes, thin and deep slits and sharp edges are the domain of EDM. Thanks to the latest cutting materials and coatings, the workpiece is becoming an increasingly important factor in conventional machining as well. But there is no let-up in development in EDM, with advanced generator technologies and efficient electrode materials with optimized parameters achieving significantly improved erosion rates and better surface quality at the same time. Major progress has been made in the last few years, particularly in wire erosion.

Institute of Materials and Processes

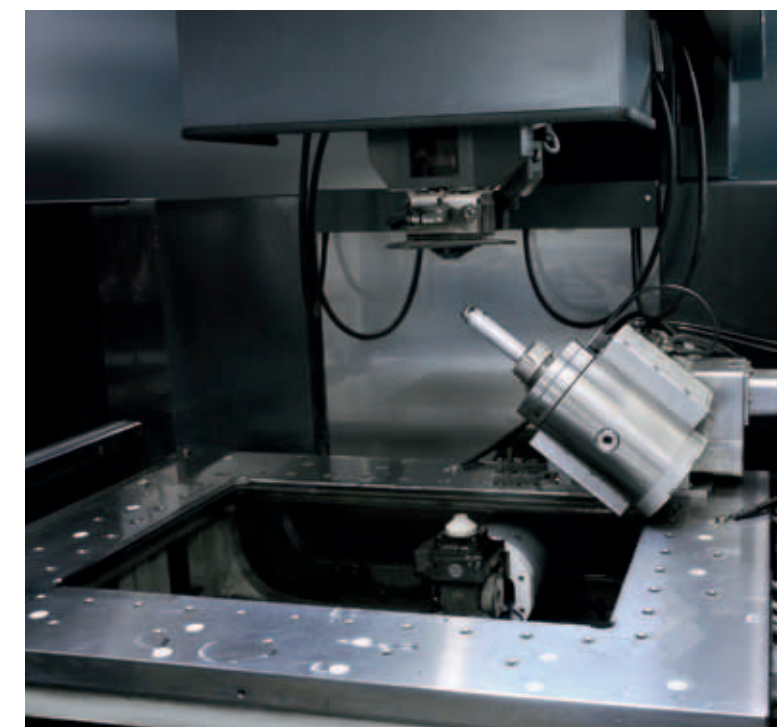
The Institute of Materials and Processes (IMP) of Karlsruhe University of Applied Sciences engages in the ongoing

ing further development of manufacturing and production processes. In a research project funded by the German Ministry of Economics and Technology (BMWi), research and development activities are focused on wire erosion. Together with numerous partners in industry, the aim is to adapt wire erosion to highly complex component geometries – while sustaining high productivity. For this, a Mitsubishi FA20-S Advance wire-cut EDM system has been equipped with two extra rotational axes to facilitate the machining of metals in a complexity hitherto unachieved. By contrast with the current procedure, the components no longer have to be reclamped, thus permitting a further improvement in quality. These components are destined ultimately for use in the medical technology sector.

High-speed cutting (HSC) versus wire-cut EDM

To illustrate the state of performance achieved in the project so far, a sample component, a bevel wheel gear made of steel, was produced at the IMP. The production of individual gears is a key activity in the drive sector in mechanical and plant engineering. The machining of individually adapted bevel wheels represents a special challenge in this connection. With the aid of this sample geometry, the IMP compared the production processes of high-speed cutting (HSC) and wire-cut EDM.

The two processes were demonstrated with modern machines; wire-cut EDM, as described, with the use of extra axes. The workpiece selected was a bevel wheel with a pitch circle diameter of 18 mm and 12 teeth. The dimensions of the bevel wheel make it relatively easy to produce, both on the milling machine and the wire erosion machine. The blank of 16MnCr5 (Mat. No. 1.7131) was prefabricated on a lathe.



Mitsubishi FA20-S Advance with rotational and swivel axes.

The IMP at Karlsruhe University presents the focuses of its research

Before and after: Blank and finished component.



Milling was divided into roughing and smoothing processes. Milling tools with diameters of 0.8 and 1.0 mm were employed. Milling was performed with five axes.

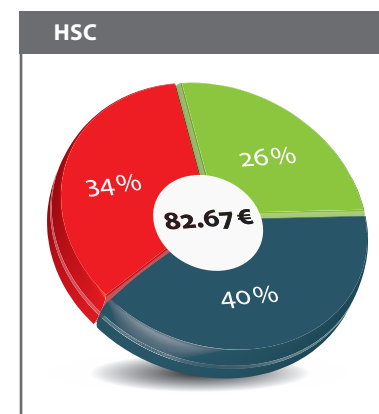
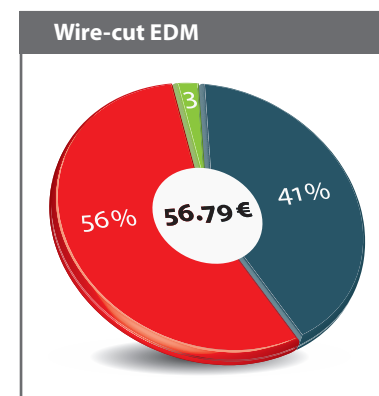
For wire-cut EDM, an FA20-S Advance from Mitsubishi Electric was employed with a rotary/swivel table from Jauch-Schmider. This makes it possible to produce virtually any contour described by the straight line of the erosion wire. By using the rotational and swivel axes, further process improvements were realized with constant flushing conditions. These are the result of the vertical position of the wire during machining, accompanied by higher processing speed and precision. It is also possible to cut larger conical angles, even on workpieces of low height. A big advantage of the rotational and swivel axes is the reduction in reclamping frequency for the production of components with complex contours.

The lower cost of wire erosion

The criterion for the comparison of the techniques was cost-effectiveness. This encompasses both labour costs and

machine and tool costs. Since production time has a direct effect on component cost, it is a crucial factor in this comparison. Also considered are the cost of tooling in the form of erosion wire and milling tools. The pie charts (below) show the breakdown of costs for the machining of the bevel wheel gear by HSC and wire-cut EDM.

Breakdown of costs for the two machining processes



cent were facilitated by the use of additional axes on the wire-cut EDM machine for this sample geometry. The attainable surface quality and tolerances are the same as those for milling.

The tests have shown that wire-cut EDM has huge potential. In this example, it was possible to machine the gear at much lower cost. Highly intricate components ought therefore to be machined in future by wire erosion. It offers engineers in development departments totally new scope in component design. The productivity of wire erosion can also be significantly increased by reducing the frequency of reclamping. These issues will play a prominent role in the future of manufacturing engineering.

- Machine costs
- Labour
- Consumables (milling tool/erosion wire) per component

Although machining by erosion took longer (34 minutes) than milling (30 minutes), the erosion process is clearly less expensive. This is due to the lower cost of machine purchase and the lower cost of consumables (wire) compared to the much higher equivalent figures for milling. Cost savings of about 30 per

The Institute of Materials and Processes (IMP) at Karlsruhe University of Applied Sciences concentrates on the development of new modelling and simulation techniques for virtual design, on the optimization of processes in production and manufacturing and on applications in fluid dynamics. The three departments are organized in a matrix form and are supported by cross-sectional technologies in the characterization of materials.

Research subjects

Materials modelling, simulation of microstructure formations in multi-phase and polycrystalline grain structures, heat and mass diffusion in multi-component systems, elasticity, plasticity and magnetism

- Tool- and mouldmaking, medical technology, aerospace, HSC/HPC, EDM, tool machines
- Applied fluid dynamics and fan aero-acoustics
- Materials testing and structure characterization

Production and manufacture department

The production and manufacture department is concerned with the opti-

mization and further development of conventional and nonconventional machining in production processes and particularly milling, turning, laser-cutting and electrical discharge machining.

Focuses

- Cooling lubricant additives
- Low-temperature treatment of cutting tools to investigate wear behaviour
- Extension of the process boundaries of EDM drilling
- Improving process stability and achievable erosion results by using different oil- and water-based dielectrics
- Development of time prediction models for die-sink erosion
- Development of additional simultaneously controlled erosion axes for EDM cutting with a running wire electrode
- Nano-coatings for injection moulds to increase the stability under load of aluminium moulds
- Determination of energy conversion in machine tools

- Development of active clamping systems for conventional machining

The development and research activities take place in close cooperation with German and international industrial partners, mainly small and medium-size enterprises. With its state-of-the-art machine and equipment park, it yields results relevant to modern processes and ensures a high quality of teaching.

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The Institute of Materials and Processes team – production and manufacture department

Hypermodern production for superlative measuring tools

Flexible and customer-oriented – with an FA10-S Advance from Mitsubishi Electric, Nedo produces complex tools for specialized solutions.

For over a century, Nedo GmbH & Co. KG has been synonymous in the construction industry with high-grade and reliable measuring tools and the associated surveying accessories. Managed by Walter and Gisela Fischer and their sons Frank and Thomas, the family-run company is now in its fourth generation. High quality is a continuous theme throughout the product range and is attributable to integrated manufacture. Virtually all the processing steps are carried out on the premises – from toolmaking through to final assembly.

“There’s a tradition of customer orientation at Nedo,” says Gerhard Hofmann. The graduate engineer was appointed plant manager at the surveying specialists three years ago. In its early years, Nedo acquired the reputation of a pioneer in the field of surveying and measuring and has upheld its high standard of staff skills and innovative capacity through to the present day. Its lavishly equipped plant with the very latest

technologies has everything that’s needed for successfully operating on the market.

Toolmaking enjoys high priority

Gerhard Hofmann sees market trends realistically: “Because of the tough competition, it’s up to us to develop ever better products. At the same time, if we

want to maintain our position, we have to achieve high productivity as well.” Therefore, while the designers continually set new standards, it is up to production to convert the ideas into cost-effective reality. “This is why we are constantly optimizing our processes so that our 120 employees can handle increases in demand,” the plant manager continues.

Components of punching and bending tools are also cut with the FA10-S Advance.



Superlative quality thanks to reliable high-end technology

By making its most recent investment in the FA10-S Advance, Nedo has taken another step into its technological future. The modern wire-cut EDM machine was purchased in 2009 to replace a good 15-year-old machine from a different manufacturer. “On the old machine, we were constantly having to deal with wire breakages and weren’t

» First of all, we have a contact that’s always there for us and can often help over the phone. And, failing that, the after-sales service is quickly here if need be. «

Process optimization at Nedo presupposes a high manufacturing depth. “This is the only way we can respond flexibly without being dependent on outside service providers,” says Gerhard Hofmann, explaining the regular investments in machining centres and key technologies. A recently completed investment project to bolster toolmaking included not only an injection moulding machine but also a new wire-cut EDM machine from Mitsubishi Electric, an FA10-S Advance.

Toolmaking is an existential activity for Nedo. As an important aspect of manufacturing depth, the department creates flexibility towards the customer, as Gerhard Hofmann explains: “Since we are not dependent on outside component suppliers, we are able to react extremely fast, particularly when it comes to customized solutions.” From the point of view of costs, having its own tooling department is important for Nedo. “In our tooling department we have all the necessary technologies and make full use of them. We are thus in a position to produce punching dies and injection moulds on our own premises much less expensively than an external supplier.”

able to run the machine continuously overnight,” Gerhard Hofmann recalls. Wire feed on the new machine is much better by a long chalk, he claims, and should a breakage occur, the wire is automatically rethreaded, day or night.

The machine’s superior wire feed and automatic threading were only two of the crucial points they considered in their search for a new machine. The speed of the FA10-S Advance was also a decisive factor, because: “Our top priority was productivity. Reliability and speed were therefore the most important criteria,” says the plant manager. The machine was impressive in its totality and also featured an unbeatable price/performance ratio.

Since huge importance is attached to staff training at Nedo, there was also strong interest in good training for the new wire erosion machine. “A female employee who already had prior experience of wire-cutting was able to work at the machine after the basic course, while another staff member attended the advanced course as well,” Gerhard Hofmann reports. In the programming field, Nedo had three employees trained by Mitsubishi Electric so that it can always be sure of having sufficient manpower.



Nedo stands for consummate machining quality. These complex injection moulds are used for producing high-grade plastics mouldings.



Nedo's pipe laser is designed specifically for tough site conditions.



The plant manager also has words of praise for Mitsubishi Electric's after-sales service. "First of all, we have a contact that's always there for us and can often help over the phone. And, failing that, the after-sales service is quickly here if need be." Compared to those of other suppliers, the service charges are more than reasonable in Gerhard Hofmann's view.

Key technologies as a competitive advantage

Thanks to the FA10-S Advance, tool- and mouldmaking in the company have developed into an efficient department that processes even complex jobs quickly and reliably in close cooperation with product development. Gerhard Hofmann regards modern

production technologies as a clear competitive advantage for future business development. "We're dependent on such productive and reliable machines so that we can deliver the quality that Nedo customers are used to and have come to expect."

Companies in Profile

Name and place of business:
Nedo GmbH & Co. KG, Dornstetten, Germany

Founding year: 1901

Number of employees: 120

Managers:
Dipl.-Ing. Walter Fischer,
Gisela Fischer,
Dr.-Ing. Thomas Fischer,
Dipl.-Wirtschaftsing. Frank Fischer



Core business: Development and production of measuring tools and the associated surveying accessories for the construction industry.

Customer contact:

Nedo GmbH & Co. KG

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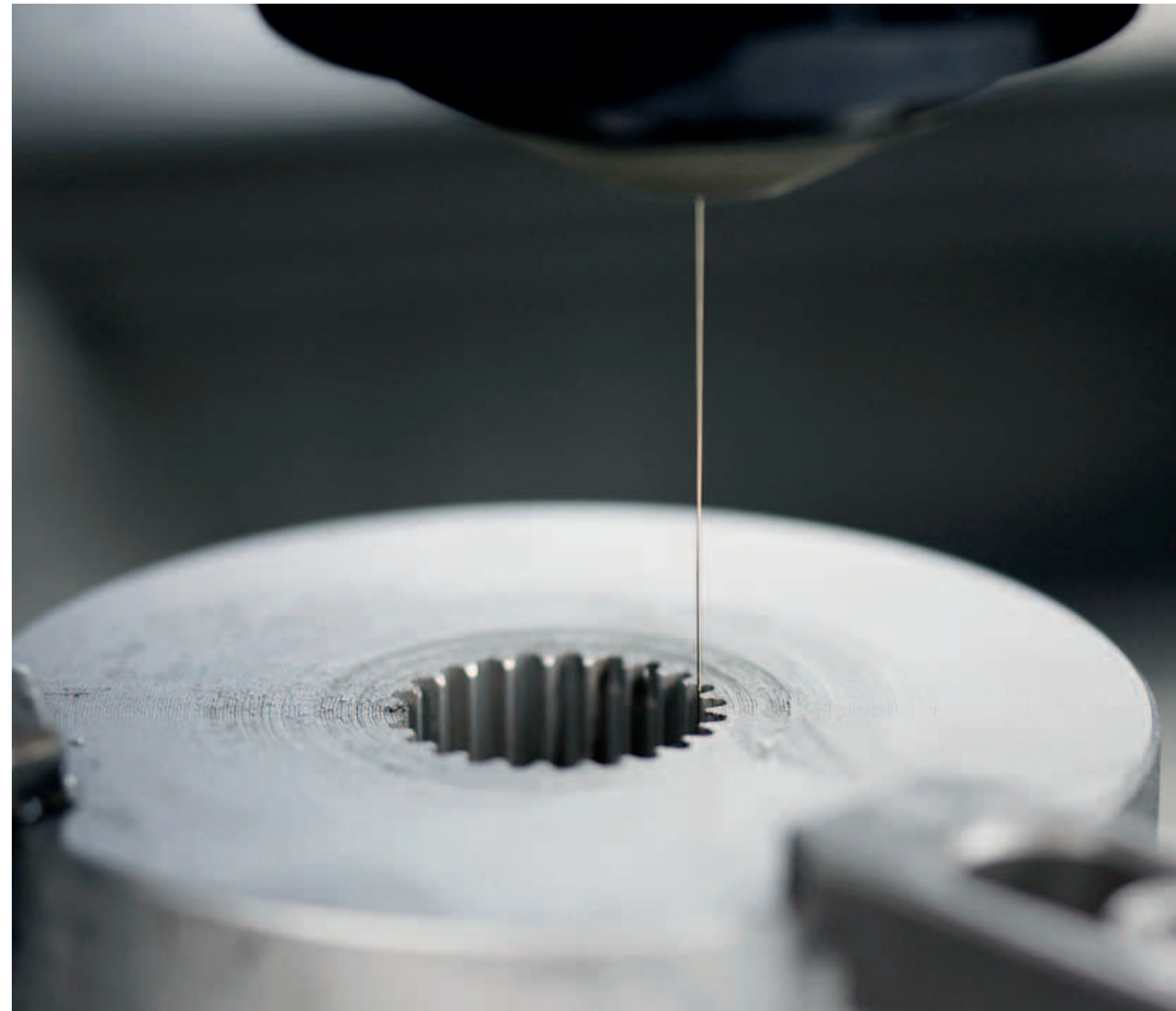
Wire eroder Bart Pinxten produces top-quality components. His customers are impressed by his attractive pricing and speed.

Pinxten Bart Vonkverspaning

Profile July 2010 19

With his small business in Overpelt, Belgium, Bart Pinxten has been impressively demonstrating since 1999 that a one-man set-up can be successful with a high manufacturing depth. His work revolves around two wire-cut EDM machines from Mitsubishi Electric – an FA20-S Advance and an FA20-VS – together with a start hole drilling machine from the same manufacturer. Design and programming with CAD/CAM, surface treatment and comprehensive quality control are also covered by his range of activities.

"Tight delivery deadlines and increasingly sophisticated designs are the rule in my line of business," says Bart Pinxten, describing the daily challenge of an EDM jobshop. The highly competitive market is also affected by a sustained squeeze on prices, as the experienced wire eroder adds: "I aim to undercut the prices of the competition without compromising on quality."



The business run from home – the workshop is built onto his house – gives Bart Pinxten the necessary flexibility to check up on things in the evening or at weekends.

The product portfolio of Pinxten Bart Vonkverspaning is as varied as his customers' target markets. All sectors – from the computer and automotive industries to mechanical engineering – are represented. "There are no limits. As long as the material is electrically conductive and the design will allow it, I can machine anything that comes along and is practicable," Bart Pinxten sums up. However, he once had to turn down, with a smile, an inquiry about cutting a ceramic component.

Once Mitsubishi Electric, always Mitsubishi Electric

Bart Pinxten has been relying on wire-cut EDM machines from Mitsubishi Electric in the pursuit of his goals since 2001. "Every few years I switch to a new generation," the satisfied user explains. The reasons for this are increased speed and even greater precision, he says. "Keeping in line with the latest state of

the art is essential, I believe, in order to stay competitive." He has very straightforward reasons for staying faithful to the Japanese manufacturer: "Quality, reliability, an optimal price/performance ratio and good service." Bart Pinxten will continue to closely follow further technological innovations in order to invest at the right moment.

Since starting his own business, Bart Pinxten has had four machines from Mitsubishi Electric in operation – all of them models of the FA series. The most recent, an FA20-S Advance, was installed at the beginning of this year. Bart Pinxten has benefited again and again from the improvements integrated in each new generation of machines. "Operation via the large touch-screen has become much more comfortable." The speed and accuracy are also very impressive, he adds.

After a slight drop in business last year, Bart Pinxten has already noticed a significant recovery in workload: "I'm confident of getting back to 2008 order levels soon." The improved productivity of the FA20-S Advance is therefore all-important for the wire eroder's work.

» Mitsubishi Electric: Quality, dependability, optimal price/performance ratio and good service. «

Pinxten also cuts fine gearing in components for the automotive industry.



Bart Pinxten runs a one-man business and has been relying on machines from Mitsubishi Electric since 2001.



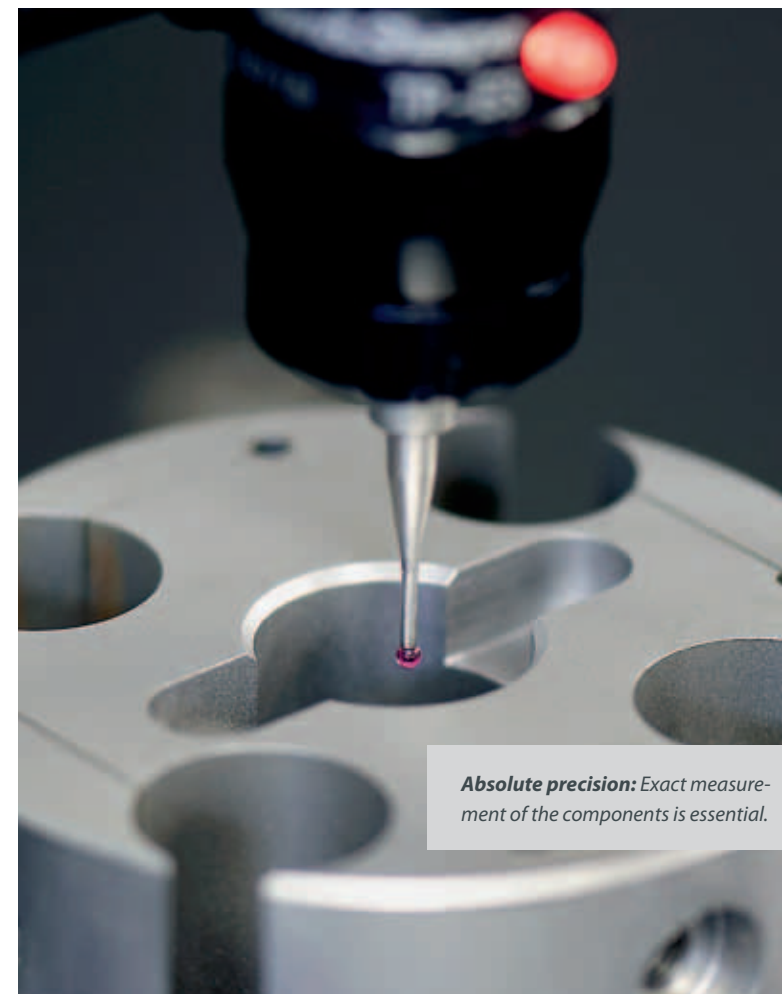
"The new generator is so powerful that I can achieve the demanded quality with fewer downstream cuts," Bart Pinxten continues. The FA20-S comes into its own particularly on large, long-running components.

The current FA20-S Advance offers further advantages to jobbers like Bart Pinxten. Constantly changing materials and thus constantly new cutting parameters are part of the daily round. On the FA20-S Advance, many of these parameters are already stored in the system, a fact which simplifies programming and set-up enormously. "This reduces my workload even further compared to my previous machines," says Bart Pinxten, satisfied with what the control has to offer.

Automatic wire threading, which all of his Mitsubishi Electric machines have been equipped with, is indispensable for Bart Pinxten. "Since the components are cut at night, it is important if the wire breaks that the machine continues to work automatically, i.e. that it can re-thread the wire without my help," says Bart Pinxten, explaining the importance of this machine feature.

Unique selling point: customer-oriented service

With the FA20-S Advance combined with the FA20-VS purchased in 2006,



Absolute precision: Exact measurement of the components is essential.

self-employed Bart Pinxten has everything he needs for flexible operations. His machine park also includes an FD20 start hole drilling machine, two precision measuring tools, a machine for the necessary surface treatment and an advanced CAD/CAM system. The purpose of this complete set of equipment for Bart Pinxten is obvious. "This means that I'm ready for any challenge and can supply my customers with finished end-products inclusive of the complete design and subsequent downstream treatment.

Bart Pinxten wishes to continue the success of the first few years of his business. The family-minded man is interested not so much in expanding his capacity – because he feels perfectly

happy with the small scale of his business run from home – as in continuing to be a skilled and reliable partner to his customers: "I'm happy when my customers are happy with my work and come back to me for their next component."

Companies in Profile

Name and place of business:
Pinxten Bart Vonkverspaning, Overpelt (Belgium)

Founding year: 1999

Number of employees: 1

Manager:
Bart Pinxten

Core business: Wire erosion for a variety of sectors



Bart Pinxten, a wire eroder serving a broad range of sectors, lives and works in Overpelt, Belgium.

Customer contact:

Pinxten Bart Vonkverspaning

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Complex tools efficiently produced

With its direct drives, the NA1200 Essence achieves maximum precision. WÖLLNER + FRANZ has been successfully using this technology since 2010.

The history of WÖLLNER + FRANZ GmbH started in 1994 with the hiving-off of a larger company's toolmaking activities. The move to premises newly built in 2004 and a workforce that has swollen to a good 50 employees are the outcome of continuous growth. In Halsbrücke in Saxony, Germany, WÖLLNER + FRANZ has made a name for itself as a supplier of punching, bending and follow-on composite tools. Distinguished by its high manufacturing depth and years of accumulated expertise, the company is a supplier to be relied on.

"New technologies soon become standard in production." Michael Wöllner, owner and managing director of WÖLLNER + FRANZ GmbH, knows what he's talking about, quoting wire EDM as an example: "Such innovations open up totally new possibilities for design engineers and they relish exploiting them." As a specialist in punching, bending and follow-on composite tools, WÖLLNER + FRANZ encounters these trends at first hand. The increasingly complex follow-on composite tools are very much in demand because they help to reduce production costs considerably. For Michael Wöllner it is simply "part and parcel of the company's customer-oriented outlook" to adjust in good time to changing requirements.

Commitment to comprehensive service

Service enjoys top priority at WÖLLNER + FRANZ and is something to which the company is wholeheartedly committed. Most affected by this are planning, design and production, where a balance is skilfully achieved between punctuality and the pressure of costs. This can be extremely challenging and calls for a good deal of flexibility, as Michael Wöllner notes: "We've had jobs where the design of an almost finished tool has been changed. In such cases, it's often back to the drawing-board." WÖLLNER + FRANZ is well equipped for such eventualities, which the managing director attributes to the company's high manufacturing depth. "We

handle everything internally – from design and programming in CAD/CAM, CNC-controlled turning, milling and grinding through to die-sinking and wire EDM." The only process entrusted to external service providers is hardening.

From the situations like the one just described, it's obvious to the graduate engineer that his customers must also be under enormous deadline pressure. "We're service providers to component suppliers in all branches of industry. At the moment, of course, they're glad of any work they can get and are quick to respond." However fast-moving business is, WÖLLNER + FRANZ stays true to its customer orientation and provides its comprehensive service not

only up to product delivery, but also beyond. "We don't immediately write an invoice whenever we have to send out a fitter to the customer," Michael Wöllner stresses. He considers this approach necessary if he wants to keep his customers and stay competitive.

Although WÖLLNER + FRANZ wasn't left unscathed by the events of the past year, current trends are a source of optimism for Michael Wöllner. "The level of orders is such that we are now operating with two shifts and a third unmanned shift." The managing director stresses that they still have unused capacity and looks ahead: "When the order situation becomes stable, production will soon be back to the old level."

Superior quality and extended capacity with advanced wire erosion

Nevertheless, the level of orders is not entirely responsible for the vacant capacity. In fact, WÖLLNER + FRANZ has invested in wire erosion over the last few months, and the toolmaker has thus taken a huge technological leap forward. The FA10-S Advance installed in 2009 was followed by an NA1200 Essence from Mitsubishi Electric at the beginning of 2010. "The original plan was to give back the FA10 in return for the NA1200," says Michael Wöllner in retrospect. However, in the end he was swayed by the extra capacity of the two machines.

FA10-S Advance and NA1200 Essence are WÖLLNER + FRANZ's first wire-cut EDM machines from Mitsubishi Electric. His staff didn't experience the change-over to a new manufacturer as an obstacle, he claims. "The differences from the ten-year-old predecessors would have been major, whatever the make," Michael Wöllner confesses. The example of Mitsubishi Electric shows in addition that new doesn't necessarily mean more complicated, he adds. On the contrary: "The machine controls make



Exact positioning of the wire by remote control.

» The original plan was to give back the FA10 in return for the NA1200 ... «

use of the Windows interface. Anyone familiar with computers will therefore quickly learn how to use the software."

The machines from Mitsubishi Electric are not only easy to operate, but they also support the toolmaker with a whole range of preset parameters. "We machine a huge range of metals and would normally have to define numerous values for the respective program each time in order to achieve the desired results," Michael Wöllner explains. "Mitsubishi Electric has programmed so many parameters that we're either relieved of this task entirely or, in the case of very exotic materials, only have to make at most slight modifications."

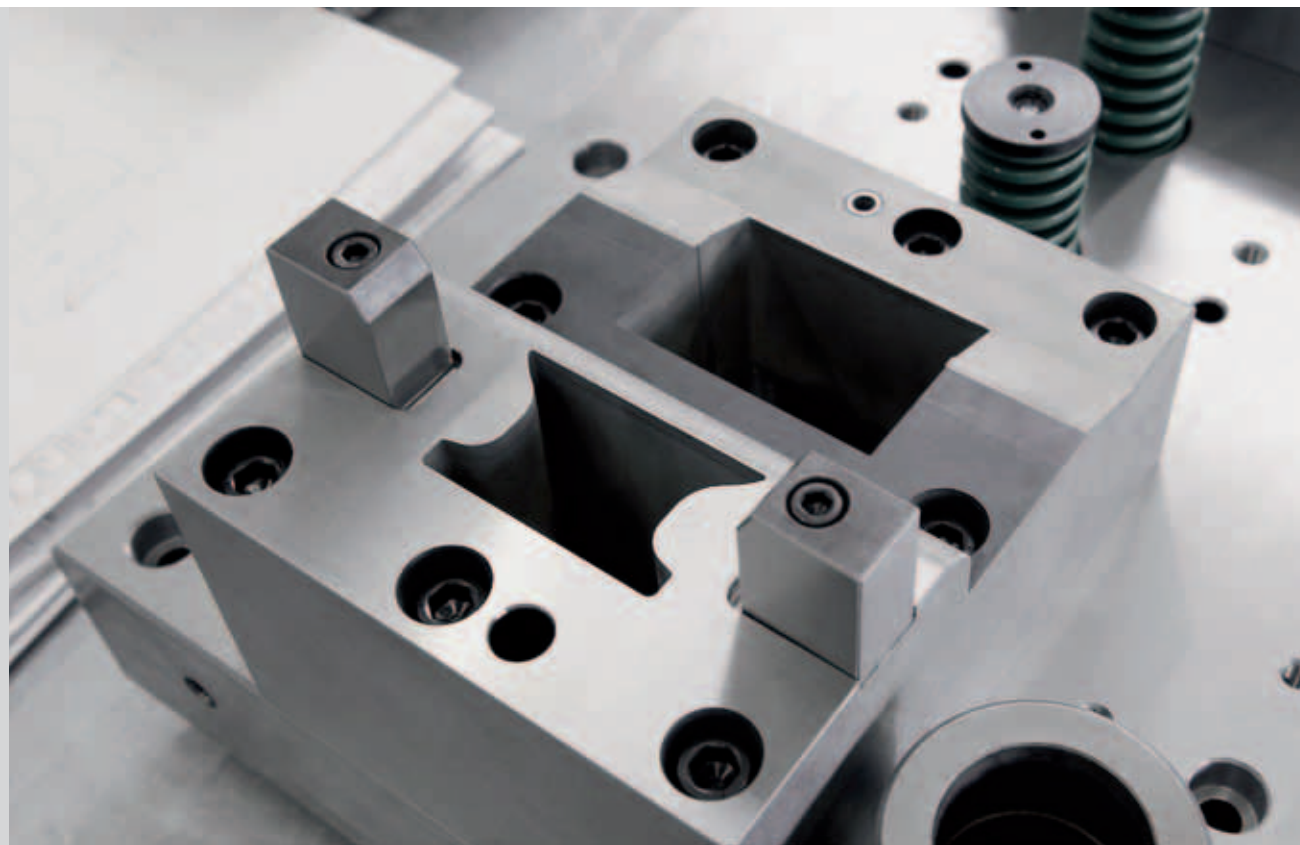
Innovation for the future: Wire erosion with direct drive

The technological step forward that WÖLLNER + FRANZ has taken with the two new wire-cut EDM machines is huge. Their higher cutting rate accelerates the process and boosts

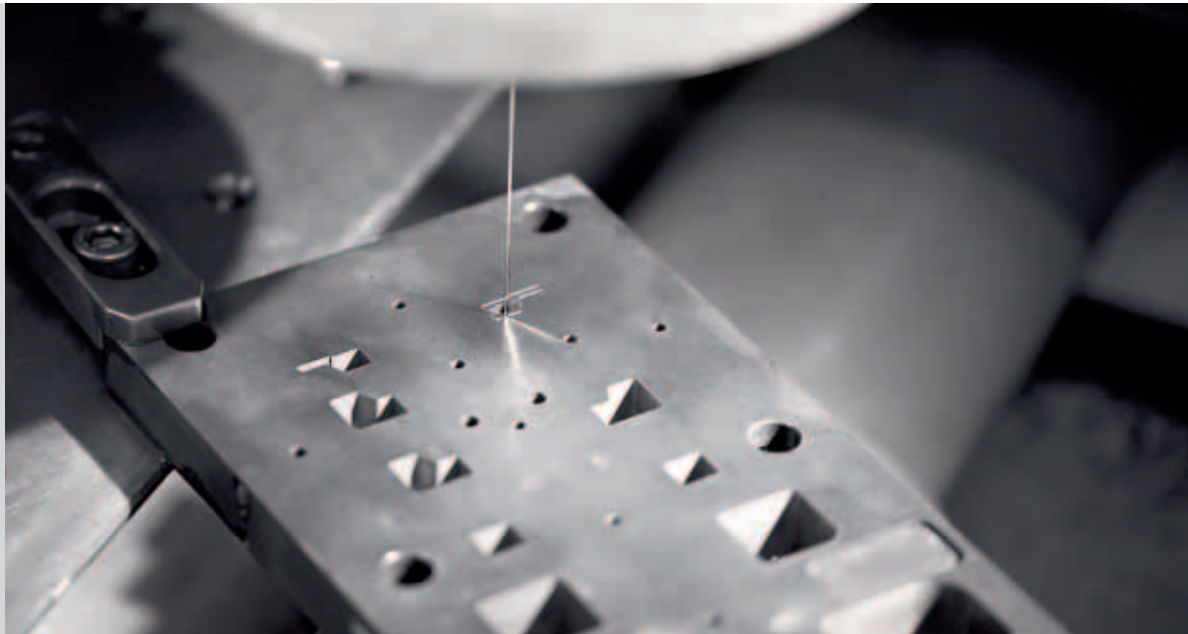
productivity. The improved surface precision reduces the number of necessary downstream cuts, which is also a boon to productivity. The machining of hard metal and the use of thinner wires with diameters of 0.1 mm are further factors from which WÖLLNER + FRANZ have profited. "What really impressed us, though, is the new machine strategy of the NA1200 Essence," Michael Wöllner adds.

There's a trend towards follow-on composite tools because they boost productivity and cut production costs.

Wire-eroded components are indispensable for punching, bending and follow-on composite tools.



With its tubular direct drives, the NA1200 Essence is extremely precise with its positioning.



The NA series from Mitsubishi Electric represents a further evolutionary step in wire erosion. The basis of this innovative system is the load-free tubular direct drive with ultra-fast communication by fibre optic cable between the control, axis amplifiers and drives – a technology known as Swift Optic Communication. Michael Wöllner sees clear advantages here over other machines: "Response behaviour is more dynamic, faster-reacting and more precise." Furthermore, direct drives are non-wearing and hence much more dependable, he adds.

**Powerful selling points:
Advice, price-performance
and after-sales service**

Mitsubishi Electric's after-sales service has proven to be extremely reliable, Michael Wöllner finds. "Our contacts are very forthcoming, both technically and commercially," he says in praise of the manufacturer. It was not least the expert advice and good price-performance ratio that contributed to the purchasing decision. The managing director hasn't regretted the investment, because with the new generation of machines Michael Wöllner sees his compa-

ny ideally equipped for future orders. "Wire EDM is existentially important for us for the production of active parts in

the tool. There's no more efficient and at the same time more precise production method."



3D-design of the tool components accompanies each job.

Professionals in Profile: Michael Wöllner

How would you describe in a sentence what your company does?
Development, design and production of punching, bending and follow-on composite tools for the production of punched parts made of various sheet and plate materials for the automotive, home appliance and electrical industries.

How did you earn your first money?
Working in the dispatch department of a carpet weaver's during my school holidays.

What motivates you?
The new technical challenge that comes with each new job.

What's different about how you do things now, compared to five years ago?
Today I'm less impulsive in my reaction to problems, and this helps me in the search for a solution.

Where do you see your company in five years?
We shall continue to build on our market position as a reliable supplier of tools of a superlative technical standard.

What was your biggest business success?
The creation of our new plant in 2004, in just four months from groundbreaking through to moving in.

What's your favourite way to relax?
In my ballroom dancing group in my free time when learning new Standard and Latin dance steps.

What attributes do you value most in other people?
Honesty and dependability.

What was the best advice that anyone ever gave you?
Sometimes you have to say "no".

How would you briefly describe your occupation to someone with no technical knowledge?
Our tools are used for shaping metal sheet and plate into parts of all kinds in large numbers so that they are ready to install in the end-product.

Companies in Profile

Name and place of business:
WÖLLNER + FRANZ GmbH, Halsbrücke, Germany

Founding year: 1994

Number of employees: 48 including trainees

Managing director:
Michael Wöllner

Core business: Development, design and production of punching, bending and follow-on composite tools



Michael Wöllner (left) founded the business in 1994. The managing director is now aided by his son Uwe (right).

Customer contact:

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Flexible and quick to react

Simple wire-cutting was yesterday. With its B-axis and "column-up" option, Lüntech GmbH also offers its customers out-of-the-ordinary solutions.

By taking over a small one-man business, Karen and Jörg Lünstedt founded Lüntech GmbH in 2000 in order to establish themselves in the EDM metalworking sector. The first two wire-cut EDM machines from Mitsubishi Electric – a FA20-S and a RA90 – were installed in 2001. Impressed by their quality and performance, the master toolmaker invested in further machines of the FA series and rounded off his machine park in 2009 with a "column-up" FA20-S Advance V and a FA20-S Advance with an integrated B-axis. With four employees, Lüntech in Werther in Westphalia, Germany, today serves some 140 customers within and outside the region.



High-precision wire EDM calls for a trained eye.

"After last year, staffing and output are now back to the high 2008 levels," says Jörg Lünstedt, optimistically summing up his company's current situation. What has remained unchanged is the huge deadline pressure. Jokingly, he adds: "Ordered yesterday, supplied the day before." However, their flexible way of working enables the team to respond appropriately – naturally always with the intention of producing top quality.

As a company specializing in wire-cut EDM, Lüntech benefits from being able to run its machines at night unmanned. "At about 4 o'clock in the afternoon, we see what has to be clamped on the machine," says Jörg Lünstedt, outlining the procedure. Not only long-running jobs are handled at night, but short ones as well. "Our freedom of choice is so large because we use a clamping system from Erowa and can clamp several workpieces at the same time." The managing director makes use of the installed VPN link to monitor the machines from home. "Access to the machines, modifications to the programs – everything can be controlled with this, including a machine restart," Jörg Lünstedt adds.

Experts in wire erosion

Jörg Lünstedt also owes the company's flexibility to its machine park. He has been working with wire-cut EDM machines from Mitsubishi Electric since 2001. "A wire EDM friend had switched to Mitsubishi Electric and was very happy with it. At the EMO trade fair in Hannover, we then followed suit," Jörg Lünstedt recalls. He now has four models in operation. What impressed the master toolmaker at the time was the speed of the wire EDM machines from Japan. "The current generation is of course much faster still and, more importantly, more precise." Far fewer downstream cuts are now necessary in order to achieve dimensions in the μm range. Lüntech's performance spectrum additionally comprises die-sinking EDM and laser welding, which means that customers can avail themselves of a wide range of services.

Business relations with Mitsubishi were for Jörg Lünstedt a very positive experience right from the outset. "As a newcomer to wire EDM, I was taken seriously by the salesmen from the beginning – contrary to my experience with other manufacturers." What's more, he was made to feel one of the family. "The service alone is extremely helpful – if anything goes wrong, then mostly Friday evening at around seven." In 80 per cent of cases, the assistance via the hotline is sufficient and production can resume, he says.

Money well spent on equipment worth having

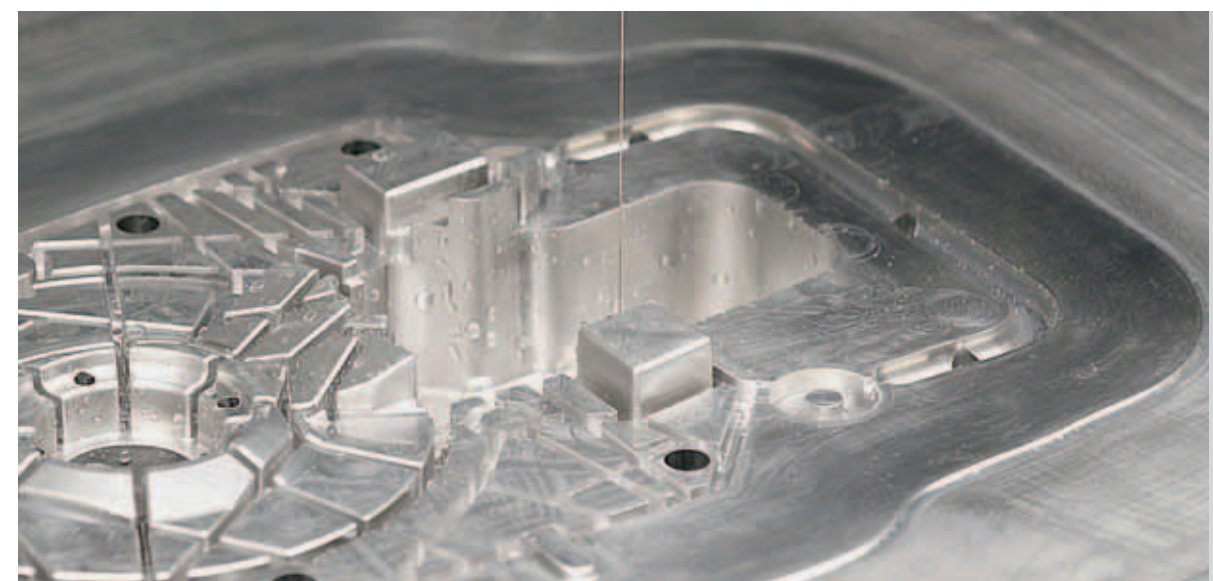
Last year, Jörg Lünstedt modernized his machine park. In part-exchange for an older model from Mitsubishi Electric, he purchases the FA20-S Advance V. "We chose the version with the 'column-up' option so that we can machine a larger product range," says Jörg Lünstedt, explaining the purchase. The decision in favour of the V-generator was taken for similar reasons. "On taller components, the superior cutting performance makes an appreciable difference." The timing of the investment was also favourable – despite or perhaps because of the economic crisis, as Jörg



Lünstedt believes. "Now that order levels are so good again, we are perfectly equipped and are ready for anything."

At the same time as the "column-up" FA20-S Advance V, Jörg Lünstedt bought a B-axis for rotationally symmetrical wire-cut EDM so as to extend his range of services still further. "However, we installed this on a one-year-old FA20-S Advance, because this makes us more flexible," the managing

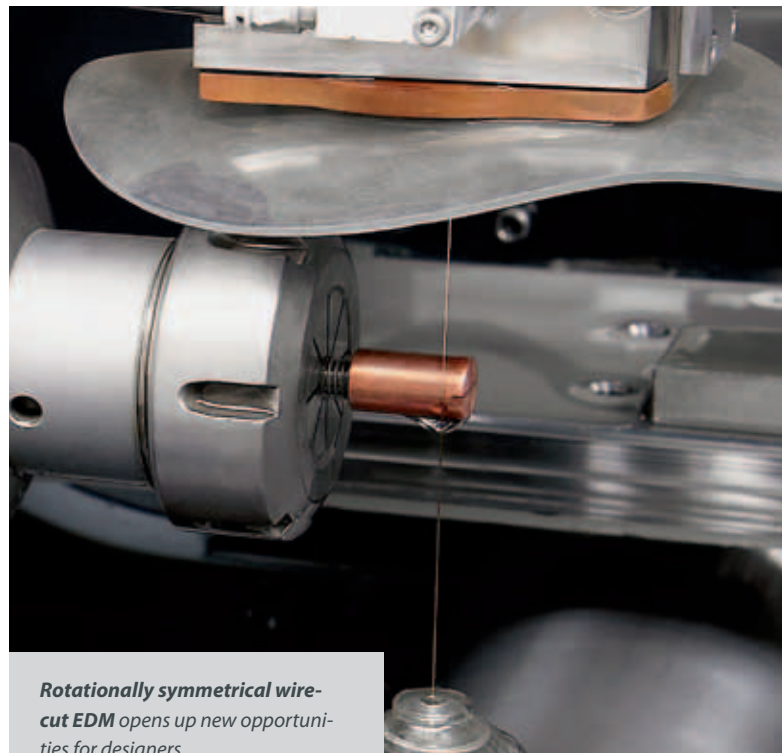
» The service alone is extremely helpful – if anything goes wrong, then mostly Friday evening at around seven. «



Complex and intricate tasks are the bread-and-butter of the EDM job shop.

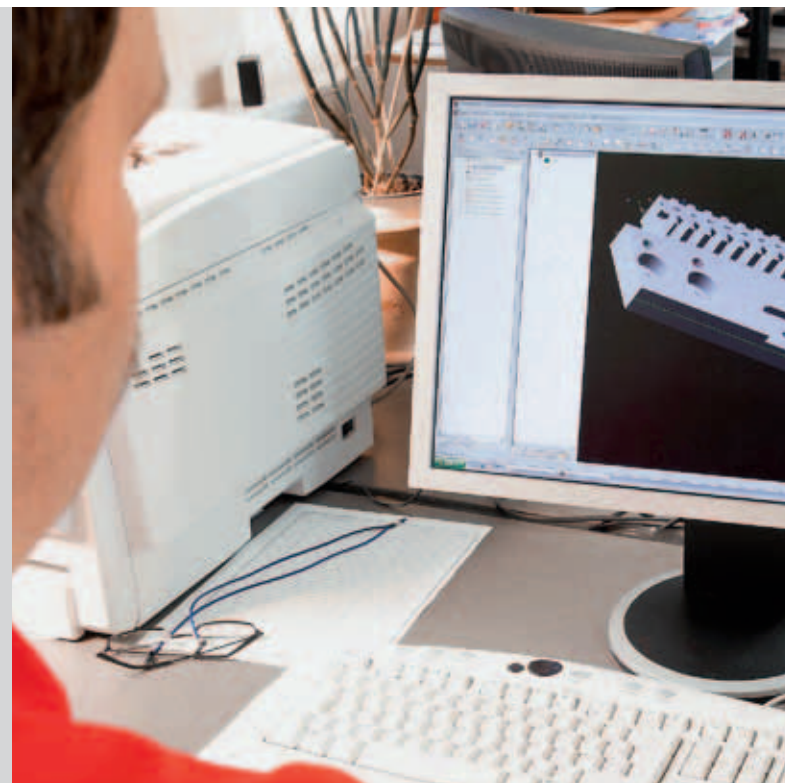
director explains. Because of the possible height of the components, he in fact has to reckon with longer machining times on the more recent machine. Jörg Lünstedt has one more option for the future: "Should the need arise, we can quickly retrofit the B-axis on the 'column-up' machine as well by additionally installing an axis amplifier."

Jörg Lünstedt sees big potential in rotationally symmetrical wire-cut EDM. "So far this has accounted for only a small proportion of our jobs, but design engineers are gradually recognizing the new possibilities." It is therefore his goal to push ahead with this technology and firmly establish it in Lüntech's everyday production operations. In rotationally symmetrical wire EDM, the jobber's staff can exploit their full range of skills. "3D programming is our strength and an appealing challenge again and again," says Jörg Lünstedt. Customers are thoroughly satisfied with the immaculate fruits of the service provider's labours.



Rotationally symmetrical wire-cut EDM opens up new opportunities for designers.

Lüntech has long been regarded as a specialist in wire erosion. With the raised column on one machine and the B-axis on the other, it will consolidate its position in the long term because the team of staff can also realize complex designs. Jörg Lünstedt hopes to expand his business in the future. "With further investments in wire EDM and 3D laser ablation, we shall expand our production capacity and extend our range of services."



Design and programming are mainly carried out in 3D.

Professionals in Profile: Jörg Lünstedt

How would you describe in a sentence what your company does?
We're the extended work bench for customers in the EDM sector.

How did you earn your first money?
Doing a newspaper round in Schleswig-Holstein.

What motivates you?
Our willingness to serve and the new challenge every day of fulfilling the customer's wishes.

What's different about how you do things now, compared to five years ago?
We approach a job with greater deliberation in order to exploit the best possibilities.

Where do you see your company in five years?
We shall continue to grow and occupy new premises.

What was your biggest business success?
We managed to survive 2009 and restore staffing to the previous level.

What's your favourite way to relax?
On extended motorbiking tours.

What attributes do you value most in other people?
Reliability, punctuality and honesty.

What was the best advice that anyone ever gave you?
From my wife, to set up my own business.

How would you briefly describe your occupation to someone with no technical knowledge?
What a locksmith achieves with millimetre precision in wood with a belt saw we cut with our electrically charged wire in the micrometre range.

Companies in Profile

Name and place of business:
Lüntech GmbH, Werther, Germany

Founding year: 2000

Number of employees: 6

Managing director:
Jörg Lünstedt

Core business: EDM metalworking and laser welding

Jörg Lünstedt (2nd from the left), his wife Karen Lünstedt and the four-man team.



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Mitsubishi erosion machines – too precise for some

Thanks to an FA20-V Advance with a Z-axis extension, FEZ Mengemann now cuts tall components – with great precision and high output.

Funken-Erosions-Zentrum Mengemann has its origins in a machining shop founded by Bernd Mengemann in Dresden in 1971. Having worked for State-owned enterprises for many years, the fine mechanical engineer and his brother Rolf were faced in 1990 with the challenge of piloting the firm safely through the initial difficult years after German reunification. The at the time astronomical investment in a new building and machines called for a good deal of staying power. But the effort has paid off. The busy jobshop now supplies high-grade components to customers throughout Germany and abroad.

After German reunification, Bernd Mengemann and his company were confronted like many other firms with the challenge of not only keeping the company afloat, but also of generating new business. "We had hardly any West German currency and our customers had fallen away from one day to the next," the owner recalls. Bernd Mengemann was one of the first in his region to take the initiative and took out a loan for over a million German marks – a sum that he "could hardly grasp". All the same, the sum was necessary for investing in the future in good time. Because only with new machines and suitable new premises was it possible to strengthen the company's position in the long term.

The entrepreneurial responsibility was huge. In return for the government grant, Bernd Mengemann was committed to creating jobs and at the same time keeping the business going – with new customers and continuous production. To avoid the risk of production



stoppages, he had the new premises built right next to the old shop. "This took a lot of persuasion, because the policy at the time was to locate businesses like ours exclusively in industrial estates," Bernd Mengemann recalls.

the East. "We finally enjoyed the freedom to buy and make what we wanted." Thanks to higher productivity and increases in capacity, FEZ Mengemann went from strength to strength, thus necessitating further investment in

» We wanted the FA20-S Advance V, of course, to boost our output and capacity. By selecting the 'column-up' option, we have been able to considerably extend our range of parts as well. «

Wire erosion for greater manufacturing depth

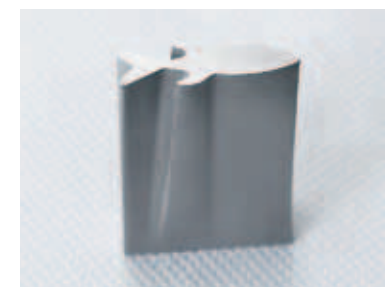
When purchasing his machines, there was also another obstacle which the owner is keen to mention: "Mitsubishi Electric was one of the manufacturers banned from supplying goods to East Germany. However, totally incomprehensibly, this ban stayed in force after reunification." It was not until the end of 1991 that they were able to install the first wire-cut EDM machine from the Japanese maker – a DWC 90C. The model was purchased through cover firms who were allowed to export to

manufacturing depth. "This is important so that we can supply our customers with complex components from a single source," says Bernd Mengemann, explaining the investment.

Wire erosion has since accounted for the lion's share of sales, backed up by die-sink erosion and conventional metalworking. Bernd Mengemann and his staff were delighted with their experience of the first wire EDM machines from Mitsubishi Electric – the DWC 90C was followed by a DWC 90H: "Their performance was impressive even then, and choosing subsequent models was



High precision and maximum surface accuracy – FEZ Mengemann machines components for a wide range of industries.



not therefore a difficult task." The fact that they later bought two more machines from Mitsubishi Electric is also attributable to the supplier's knowledgeable staff and their good advice. These were the FX20 in 1998 and a FA20-S Advance V in 2008 in a "column-up" version.

Greater variety of parts thanks to the Z-axis extension

The possibility of also being able to machine parts up to a height of 450 mm was a key factor for the jobshop, as Bernd Mengemann explains: "We wanted the FA20-S Advance V, of course, to boost our output and capacity. By selecting the 'column-up' option, we have been able to considerably extend our range of parts as well." The accustomed high cutting rate is of benefit for tall components in particular, he adds.

Intricate designs and small series are all part of the daily round at FEZ Mengemann. A big help in the overall process, therefore, are the software and control of the wire-cut EDM machines from Mitsubishi Electric. "The menu guidance is clearly structured, and the functions also permit complex programming,"



The Mengemann family focuses its attention on customer orders: Meeting on site at the machine.

says Bernd Mengemann, citing angle compensation and virtual table rotation through 360° as examples.

The machine park with its diverse array of machinery gives FEZ Mengemann a good deal of flexibility in its operations. The beneficiaries of this are firstly the customer, because the company can respond quickly, and secondly the company itself: "We work in two shifts with all the machines running to full capacity. The long-running jobs are handled unsupervised overnight," Bernd Mengemann adds. This is only possible because wire breakages are rare on the machine and the wire is in any case automatically rethreaded if a breakage ever does occur.

Same views on customer orientation

The flexibility exhibited by FEZ Mengemann is matched by that of Mitsubishi Electric's service, says the company owner: "The fitter may have finished work long ago, but still goes to the phone and helps us as best he can." If hotline support isn't enough, someone is sent round straightaway to keep loss of output to a minimum. Bernd Mengemann adds: "You can tell that Mitsubishi and FEZ Mengemann share the same conceptions of dependability and service."

Despite everything the machines are capable of, skilled staff are still a big priority in the company. "We employ highly skilled workers and three engi-



Precision cuts are carried out on large components like this gearwheel.

» You can tell that Mitsubishi and FEZ Mengemann share the same conceptions of dependability and service. «

neers and offer long-term prospects so that we all benefit," says Bernd Mengemann explaining the manpower structure. The shrewd choice of employees pays off: "The whole team shows total commitment – even when there's more to do – and we can uphold an appropriate standard of quality." This applies not only to production itself, but also to all the consultations relating to the component.

Quality, flexibility and customer orientation will continue to be the cornerstones of FEZ Mengemann. Rico Men-

gemann, the owner's son, has already decided to follow in his father's footsteps. He's got plenty of ideas of his own: "We may well extend the portfolio to include fine cutting with thin wires or broaden the range of components with even larger machining ranges."



The FEZ Mengemann production shop has plenty of space for the advanced machine park.

Professionals in Profile: Bernd Mengemann

How would you describe in a sentence what your company does?
We're an EDM jobshop, a service provider to our customers.

How did you earn your first money?
Harvesting potatoes as a child.

What motivates you?
The pleasure of my profession.

What's different about how you do things now, compared to five years ago?
I allow my work to benefit from the experience of the last five years.

Where do you see your company in five years?
Continuing to be a successful EDM jobshop.

What was your biggest business success?
The successful transition from the East German planned economy to the free market economy.

What's your favourite way to relax?
Walking in Saxon Switzerland.

What attributes do you value most in other people?
Honesty and reliability.

What was the best advice that anyone ever gave you?
"Anything that can go wrong, will go wrong."

How would you briefly describe your occupation to someone with no technical knowledge?
With electrically generated heat, we cut metal parts in a controlled fashion and thus change the workpiece contours and shape to precise specifications.

Companies in Profile

Name and place of business:
Funken-Erosions-Zentrum
Bernd Mengemann, Dresden, Germany

Founding year 1971

Number of employees: 14

Managing director:
Rolf Mengemann

Owner:
Bernd Mengemann

Core business: EDM jobshop in the field of wire and die-sink erosion for a wide range of industries and applications, e.g. tool- and mouldmaking, research institutes, medical technology and aeronautics



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Bernd Mengemann (left) founded the company with his brother **Rolf Mengemann** (centre). His son **Rico Mengemann** (right) will one day take over the business.

The big EDM machine user horoscope



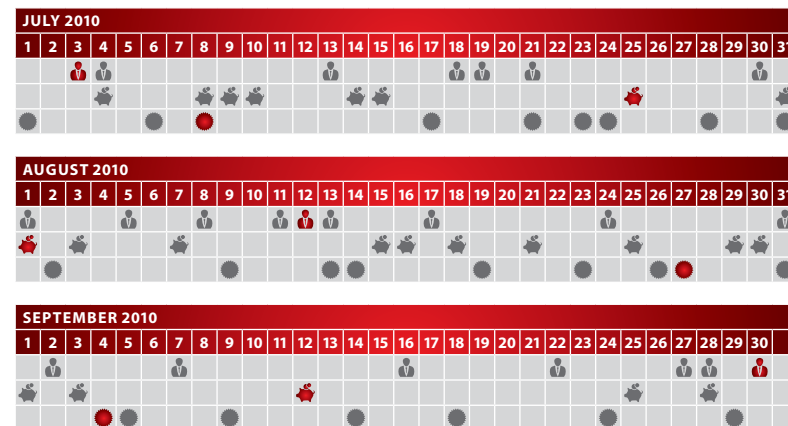
Erodia's horoscope is always right*



Leo (23.07.–23.08.)

Showdown in the erosion duel

It's your lucky month! You can choose between the horoscopes for Gemini and Aries – I know which one I'd choose! Go out into the street more often – there's money waiting there to be picked up!



Luck at work
 Good day for making money
 Good day for ventures of all kinds
 Extra-lucky days in the respective categories



Aries (21.03.–20.04.)

The athletic Arian loves to be lavishly pampered. Little Mercury is simply well disposed towards you and channels cash onto your account – and this makes being pampered twice as much fun. But take care when using the microwave, the vibrations might throw you off-balance – so play it safe and flee to the restaurant.

Taurus (21.04.–20.05.)

Iron discipline and true pluck are called for, and not only in the moonlight. With this combination of thought, foresight and action, you can outwit fate. So there's no time to lose after you have studied the sign of Leo Recumbent at length.

Gemini (21.05.–21.06.)

With the summer solstice just behind you, there's a mountain of enjoyable experiences ahead of you. You're piggy in the middle, so to speak, and the Mars moon Deimos is delighted. Make use of the good cards that drop into your lap so that you can get to the pot of gold at the end of the rainbow. Any other sign would be happy to swap places with you.

Cancer (22.06.–22.07.)

One comet doesn't make a summer, but with your unperturbed attitude in the next few weeks, summer is nothing more than a feeling, though a good one all the same.

Top Tip

Practise a smug grin in the mirror whenever you're approached about your hair or your performance at work.

Virgo (24.08.–23.09.)

I can see it in the stars that your birthday is approaching, and there are quite a few things to watch out for. If you now need more candles than will fit on your birthday cake, you should look for support. If you now want to make big things happen, an FA50-S Advance would be just right. It will be a source of endless joy, even without a ribbon.

Libra (24.09.–23.10.)

Holiday fever grabs you and lures you away from your regular petrol station to a totally different location. Don't forget your petrol cap! One of Saturn's moons holds sway over your sign so you don't know when you're in for a surprise. Be prepared and order plenty of consumables.

Scorpio (24.10.–22.11.)

The falling euro and rising gold price may worry some, but you know what you're capable of and are more confident in your abilities than ever. Your steady hand helps you not only when building card houses in the sky, but also makes you seem a tower of strength for your friends. When eroding, you let extra-fine colourful sparks fly.

Sagittarius (23.11.–21.12.)

Changes first have to be integrated into your everyday life. But when you know you've got three moons on your side, you've got to simply hang on in there. Beware of yoghurt containing left-handed bacteria and eat something fruity straight afterwards. Don't let yourself be distracted when you're doing something important.

Capricorn (22.12.–20.01.)

Working flat out in recent weeks is making its mark physically – you'd do well to take a bit of a rest and listen to the gentle hum of your erosion machine. Money alone isn't everything, and don't rely on Greek gods and old machines.

Aquarius (21.01.–20.02.)

Obstacles are there to be overcome. Should your erosion wire ever break once too often, don't lose heart – your best option is to change to the FA Advance series. In your love life, things will be sparking encouragingly in the coming months. Excitement is on its way.

Pisces (21.02.–20.03.)

At the beginning of the month, set off full-throttle and compliment everyone on their outward appearance – this always makes a good impression. And should your thoughts ever turn to mouldmaking, an elderflower juice from the health food shop is a quick remedy.

Go for it!

Simply send your name and time, date and place of birth to:



* Otherwise it's adjusted to make it fit. In the event of any discrepancies, appeal directly to Jupiter, he'll sort it out.

erodia@mitsubishi-profil.de

Dry hands in an average of ten seconds with jet technology

The Jet Towel hand dryer dries hands washed in public, medical, industrial or commercial premises quickly and without making mess. The unique dual-jet technology with its streamlined hyper-nozzles emits a fine film of air jets that dries the whole hand.

The "feel fresh factor" for your hands

Mitsubishi Electric has launched a newly designed hand dryer. The product makes use of a new dual-jet technology that cuts drying time to a matter of a few seconds. Encouraging an ergonomically natural posture, the hands are introduced into the product from above. Sensors then switch on the air flow and wipe the water off the hands, in much the same way as drying in an automatic car wash. The water is collected in a special tank. All the parts of the unit that come into contact with water

is recovered within a few years – unlike paper towels which have to be replaced. It also represents a clean solution for drying hands," explains Björn Donners, Sales Support Engineer at Mitsubishi Electric. It eliminates not only the cost of paper towels, but also the time spent on filling towel containers and especially for cleaning wash-room areas. This technology is already established in Japan.

It also compares favourably with conventional electric hand dryers. In these, the wet hands are held under the unit and the water drips onto the floor,

Since up to 1,000 hand drying cycles are recommended per day, the unit is suitable for much-frequented public facilities.

Dry hands in seconds

The average drying time is only ten seconds. At about 52 dB(A), the product is much quieter than conventional electric hand dryers. The reason for this is its new hyper-nozzle, which is also responsible for the rapid drying process. The arched nozzle ejects a fine film of air jets that flow around and thus dry the whole hand in a single



Average drying time of ten seconds
New dual-jet technology

No paper towels to dispose of
Water collected in a tank

Hygienic with an antimicrobiological coating
Antibacterial properties of the water collection tank confirmed by hygiene institute

Maximum efficiency and low operating costs
Brushless DM motor

or the hands are given a special antimicrobiological coating. The water collection tank has been successfully tested for its antibacterial properties at the Gelsenkirchen Hygiene Institute. Maximum efficiency is ensured by its brushless DC motor.

"Owing to its low energy consumption, the cost of purchasing the Jet Towel

where it inevitably makes a mess. The new product's drying zone, by comparison, is open at the top. This way the water cannot run off at the sides or onto the floor and all of it is collected in the tank.

The product is also particularly suitable for security areas, e.g. at airports, as there is no need for wastepaper bins.

process. Conventional round nozzles, as are still currently used, are only capable of targeting certain parts of the hands and do not dry the hand as a whole. Moisture is left on the hands.



Drying time of about ten seconds with quiet operation, guaranteed hygiene and maximum efficiency – these are the key characteristics of the new Jet Towel hand dryer from Mitsubishi Electric.

Flexible installation and appearance

So that it can be adapted to the needs on site, there are several settings for the air flow rate. Measuring 300 x 225 x 835 mm (WDH), the hand dryer can be simply fastened to the wall. Also optionally available is a base mounting. It weighs about 14 kg. The air velocity is 80 m/s. Available in the colours of white and anthracite/silver grey, the product can be additionally adapted to the colour scheme of the sanitary installation.

www.mitsubishi-les.de



The new hand dryer is only open at the top. Water can only run into the collection tank beneath, thus preventing messy conditions in the washroom.

This is where, among other things, you can order back issues of Profile. Order now as long as stocks last.

Technology from space – now available for everyone



Mitsubishi Electric Photovoltaics has now improved its supply line from the sun as an energy source. With an efficiency of 19.3 per cent, the world championship title goes to the new and reigning efficiency champion with polycrystalline photovoltaic cells.



You don't have to go into orbit to make use of the world efficiency champion's technology.



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This is excellent news for all house owners because a good deal of extra energy can now be generated on the same area of roof. A photovoltaic system is therefore not only environment-friendly but also a sound investment in one's own property.

When selecting a manufacturer it is essential to go for quality and decades of experience. For best results, the solar modules and inverters should come from the same manufacturer – Mitsubishi Electric, for instance. This unique combination of quality and innovation goes down really well with buyers.

Rocketing demand

To keep up with the constant growth in demand, Mitsubishi Electric's global output of inverters was upped by 50 per cent in May. Another plant with 23,970 square metres of floorspace will go into operation in March 2011. All this will be accompanied by the establishment of further production lines for the production of monocrystalline photovoltaic cells in order to extend the product range and make technology from space available to everyone.

Online you can calculate in a matter of seconds how much the roof of your house is capable of earning: www.strom-in-die-steckdose.de/pro



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