

Profile

Issue 02 · December 2013

 **EMO SPECIAL**
What you couldn't afford to miss at EMO!

06

EMO Hannover

A 360 degree view

Mitsubishi Electric Europe

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At full speed into the future

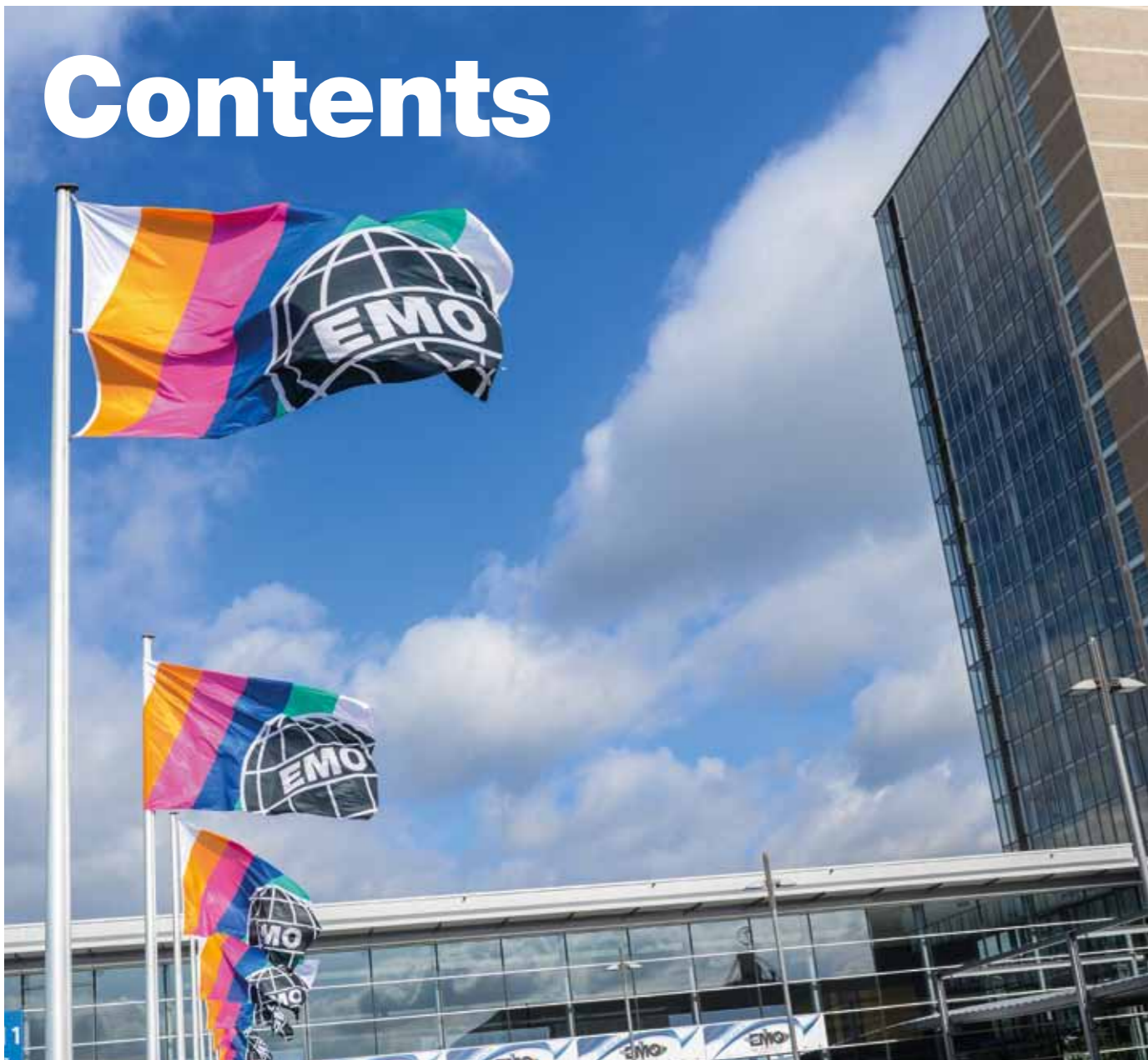
Newport Toolmakers Ltd

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The will to chill

Cryogenic Ltd





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HANS-JÜRGEN PELZERS

Editorial



Plenty going on at EMO

One of the biggest crowd-pullers was the fully automated production cell, which operates dependably unmanned. (Page 09)

For many users, smooth operations depend on a wire threader that simply does what it's supposed to, even on difficult workpieces. An FA20 at HellermannTyton Engineering runs for about 40 hours without an operator. (Page 08)

The Micro Vibe 300 developed by IMM (soon to be a Fraunhofer Institute) promises 70 per cent time savings during die-sinking EDM. (Page 11)

There were so many highlights that it is hard to choose the best ones for you. The first oil-based wire-cut erosion machine with tubular direct drive – an assurance of high-precision machining in the long term – celebrated its world premiere.

Thumb through this issue, experience the EMO highlights on the coming pages and find out what's new. The next EMO is taking place in Milan in 2015 with the motto "Let's build the future". But we don't need to wait until then.

Best regards from Ratingen

Hans-Jürgen Pelzers
Distribution Manager Europe

Legal notice

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Newsflash



EMO Hannover: International diversity at the world's flagship metalworking fair

Overall, some 145,000 visitors from over 100 countries came to Hannover for the six days of EMO. Some 50,000, i.e. one in three, visitors came from beyond Germany's borders. European neighbours improved their attendance, with Italy, Switzerland and Sweden being the countries with the strongest contingents. From Asia, China led the field, well ahead of Japan, Taiwan and India.



Lifts for what will be Thailand's tallest building

Mitsubishi Electric was awarded the contract to supply 38 lifts and escalators to the Mahanakon Tower, a residential and commercial complex, that is being built in Bangkok. 314 metres tall and with 77 levels and 1 sub-level, it will be Thailand's tallest building on completion – with the fastest lifts nationwide.



Fume detectors for Ratingen's new-born

"In safety through life" is the name of a campaign in which the fund-raising association for Ratingen's fire brigade in cooperation with Ratingen's youth department is presenting fume detectors to parents of new-born babies. With the support of four sponsors, Mitsubishi Electric among them, the fund-raising association of Ratingen's fire brigade has purchased 700 fume detectors that are supplied to the parents of new-born babies as part of the "welcome to the world" baby pack.

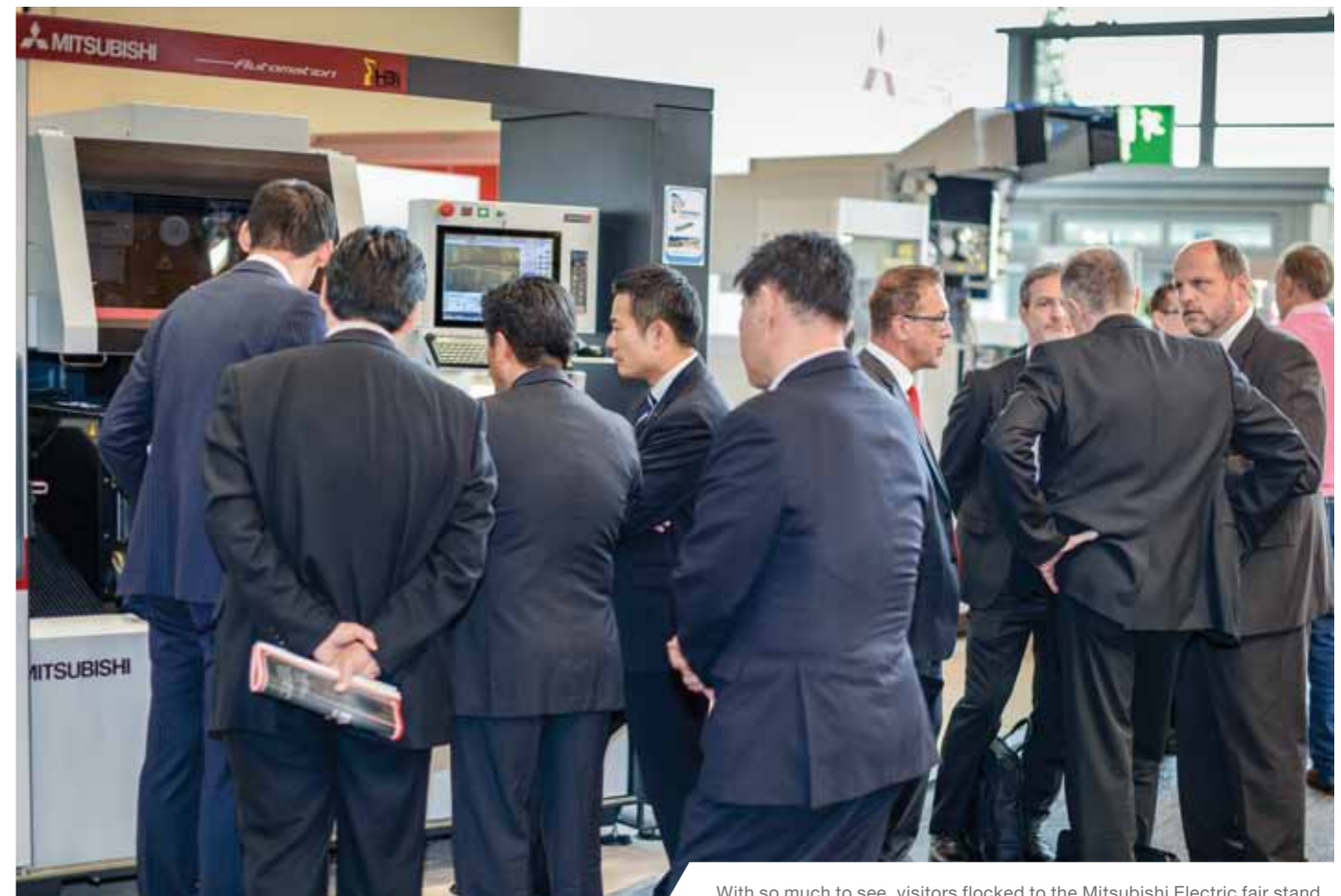


Ideal for applications in the food and beverage industry

With its new Ethernet-embedded CPU FX3GE, Mitsubishi Electric has extended the performance range of its compact MELSEC FX3G PLC. Thanks to its analog and network functions combined with the performance and extensibility of the MELSEC FX3G, the new compact PLC is capable of meeting the requirements of a broader spectrum of applications.

A 360 degree view

Mitsubishi Electric at EMO 2013



With so much to see, visitors flocked to the Mitsubishi Electric fair stand.

MITSUBISHI ELECTRIC

Visitors thronged around the exhibits, and all the tables for meetings were occupied. Visitors from all over the world and advisers from Mitsubishi Electric put their heads together and talked shop. At the company's EMO fair stand, the big issues were new machines, automation solutions and, above all, cultivating contacts. Alongside all this, there was always enough time for a cup of freshly brewed coffee or for a snack. Or for a beer.

Managing Director Jörg Lünstedt and his wife Karen from LÜNTECH Erodieretechnik GmbH in Werther, Westphalia were among the visitors to the Mitsubishi Electric stand at EMO 2013 in Hannover. For Jörg Lünstedt it was important to stress the great service and diversity of machines at the stand. In a sweeping gesture towards the stand, he summed up his enthusiasm: "What I like is that Mitsubishi shows nothing but machines in action. You see things in motion. I also like the

friendly atmosphere. I feel well looked-after and thoroughly welcome." LÜNTECH is a jobshop for tool- and mouldmakers that operates with six wire EDM machines from Mitsubishi Electric. "Our experience with them has been nothing but positive. This also applies to Mitsubishi's service capability," Karen Lünstedt stresses. "And when we officially opened our new plant shop at our in-house show in July 2013, Mitsubishi was there and demonstrated our equally new MV2400R." The

What I like is that Mitsubishi shows nothing but machines in action. You see things in motion. I also like the friendly atmosphere. I feel well looked-after and thoroughly welcome.

new MV series is meeting with big customer interest in general. Thomas Schlemmbach, Production Manager at AWEBA Werkzeugbau GmbH, Aue, reported that he bought three MV1200R machines in 2013. The reason was to boost capacity. "We bought the machines virtually on the spur of the moment. We needed the machines from one moment to the next and Mitsubishi supplied them promptly." Schlemmbach leaned back contentedly in his chair. "Without the MV1200R we'd never have managed the work in hand. We expect it to run for at least 500 hours per month." Before making its decision, AWEBA conducted extensive tests, some of them with rival machines. Mitsubishi was the only company able to deliver

the desired quality within the demanded short space of time."

Holger Rose, Technical Toolshop Manager at HellermannTyton Engineering GmbH in Tornesch, made a scheduled investment at the Mitsubishi Electric fair stand. The manufacturer of components for injection moulds was interested in purchasing a wire-cut erosion machine. "We'll probably go for an FA30-S Advance V, although a machine from the MV series is also under consideration," Rose revealed, sipping his mineral water. "We've been working with an FA20 for years and are very impressed by it – the same can be said for Mitsubishi's technical advice." The decisive



Jörg Lünstedt and his wife Karen from LÜNTECH Erodier-technik GmbH in Werther were among the visitors to the fair stand.



The fully automated production cell met with lively interest from visitors.



At the Mitsubishi Electric fair stand, there were live demonstrations of many technical innovations.

features when choosing a machine, he believed, are the automatic wire-threading system and the possibility of running the machine at night unmanned. As far as the latter was concerned, his experience with the FA20, which operates for about 40 hours without an operator, had been very good. The new machine, he claimed, was an absolute must for capacity reasons. And he was also planning to replace an old machine from a different supplier. In the medium term, HellermannTyton would probably switch entirely to wire EDM systems from Mitsubishi Electric.

Silvio Wendler from Fresenius Kabi Deutschland GmbH in Bad Homburg also intended to buy a wire

erosion system. He said he had come to EMO to look at the MV2400R. Because of its high precision, he needed this machine among other things for the production of infusion components for the medical technology sector. He was also considering buying an ED24-NC start hole drilling machine. In addition, he was interested in general in new products and wanted to intensify his contacts with Mitsubishi Electric. "For the latest investment, the decision has been taken in favour of Mitsubishi Electric," Wendler explained over a cup of coffee. "There are several reasons for this. Firstly, I like what the company offers in terms of service and training. And secondly, the selected machine is technically in line with our future plans." He said



The Mitsubishi Electric team was delighted by the many interested visitors and provided an inviting and relaxed atmosphere.

he had already been in contact with Mitsubishi Electric for some time for accessories. And this is how he had gained confidence in the company.

Making use of ideas from cooperation partners

At EMO, Dipl.-Ing. Harald Bader, Managing Director of HBi Robotics GmbH, Gosheim, a Mitsubishi Electric cooperation partner, showed how diamond-coated grinding wheels can be dressed (= profiled and sharpened) by wire erosion. He explained the process to visitors at the production cell. "The

visitor interest, Bader named other advantages for the customer: set-up time at the grinding machine is reduced and the user can produce or dress his grinding wheels himself. Dipl.-Ing. Jochen Hipp, Managing Partner of ITS-Technologies GmbH & Co. KG, Oberndorf am

» The advantage of the process is that the wheels last four or five times longer and can also be dressed much more often.«

mentioned the benefits to the user. For the customer, the system's flexibility is useful, particularly if ready-to-use grinding discs are needed at short notice. In addition, he continued, the process enables EDM jobshops to produce grinding wheels for specialist grinders and improves process security in the downstream production steps.

Another cooperation partner present at the fair stand was Institut für Mikrotechnik Mainz GmbH (IMM), Mainz, which demonstrated micro-machining with wire-cut and die-sinking erosion.



Dipl.-Ing. Harald Bader, Managing Director of HBi Robotics GmbH in Gosheim, a Mitsubishi Electric cooperation partner, received visitors at the production cell.



The production cells revealed interesting features and afforded exciting insights.

binder is extremely gently eroded from the grinding wheel by electrical discharge, leaving the diamond grains exposed. The advantage of the process is that the wheels last four or five times longer and can also be dressed much more often." Delighted by the lively

Neckar, also supported Mitsubishi Electric as a partner at EMO. At the production cell, he demonstrated how easy it is to clamp grinding wheels. "We are suppliers of supplementary axes and made a B-axis available on which the wheels rotate for dressing." Hipp also

According to Dipl.-Ing. Frank Neumann, Head of the Precision Engineering Department, IMM tests machines for performance in the microscopic range. Neumann pointed to components in a glass case. "On a PA20 wire EDM system, we achieved a surface quality of

16 nanometres back in 2007. And that is still the benchmark today." Neumann then turned to the Sonodrive 300 vibratory spindle for sinker EDM developed by IMM that permits vibration-assisted drilling in the micrometre range for holes of all kinds. IMM, he claimed, had achieved process security with 14 and 18 micrometre bores. The process, he continued, makes rotation of the Z-axis and conventional drilling spindles superfluous. It also makes it easier to remove abraded particles from the drilled hole. In series of tests, reductions in machining time of up to 60 per cent over conventional standard equipment have been demonstrated, he claims.

Another development of IMM, soon to become a Fraunhofer institute, is the Micro Vibe 300 vibration unit for use during die-sinking EDM, which achieves time savings of 70 per cent.

A look ahead

What would a fair stand be without a look ahead? To expectant visitors, Mitsubishi Electric raised the curtain on the world's first oil-based wire-cut EDM system with tubular direct drives. The MX600 wire-cut erosion machine which celebrated its world premiere at EMO and is synonymous with superfine surfaces and the machining of corrosive materials with very high long-term precision rounded off Mitsubishi Electric's trade fair showing.

www.mitsubishi-edm.de

A perfect match: wire EDM and software as a package

Thanks to Christijan Lenz, Indirect Sales, DCAM GmbH, Berlin, the subject of programming was also represented at the Mitsubishi Electric fair stand.

"We specialise in developing 3D software for wire-cutting and have been engaging in strategic cooperation with Mitsubishi for two years." Asked how this looks in practice, Lenz tells us that Mitsubishi Electric always offers DCAM software when a potential user shows interest in purchasing a machine. We're a perfect match, he adds, because Mitsubishi Electric is highly innovative and supplies a compact product.

In addition to this, Mitsubishi Electric's approach to customer relations is totally in line with DCAM's philosophy, Lenz adds. He sees plenty of advantages for the user: "Thanks to cooperation with Mitsubishi, we are in a position to respond at short notice to new technologies and integrate them in our software. The operator benefits from this, because he doesn't have to search for a solution on the market. Good partnership is also important so that tests can be carried out – in terms of the use of additional axes, for example."



Centre stage and behind the scenes

Interview with Hans-Jürgen Pelzers, EDM Distribution Manager Europe of Mitsubishi Electric Europe B.V.



Hans-Jürgen Pelzers, EDM Distribution Manager Europe of Mitsubishi Electric B.V. in Ratingen: "We offer everything from handling systems to wire-cut EDM production systems from a single source."

**MITSUBISHI ELECTRIC
MECHATRONICS
MACHINERY**

Taking time-out from the hubbub of the fair, EDM Distribution Manager and Profile editor granted us a few interesting glimpses behind the scenes at EMO Hannover 2013.

Mr Pelzers, what expectations do you have from attending the trade fair?

Pelzers: We at Mitsubishi Electric have taken part in EMO 2013 in order to meet new potential customers and introduce them to our technologies. It is

not our sole aim to sell as many machines as possible here. We want to lay the foundations for future business.

How has business been so far?

Pelzers: Today, on the third day of the fair, we've pulled out all the stops, had

interesting meetings, discussed new projects and picked up our first orders. It's been really great fun!

To what extent have your expectations been confirmed so far?

Pelzers: We're satisfied. The cautious



» We're showing what matters. In addition, visitors have the chance to sit down in a bright environment – this makes a good impression. «

→ expectations that we had were realistic and have been fulfilled.

And how have visitors reacted to the fair stand?

Pelzers: Entirely positively. We're showing what matters. In addition, visitors have the chance to sit down in a bright environment – this makes a good impression. We invite them to spend time among themselves and with us.

On the principle of "people for people".

How important is EMO as a trade fair?

Pelzers: Attending EMO is absolutely essential although it is not the most important trade fair for us in Europe. AMB

in Stuttgart is more important for us today. But our participation at EMO has also generated a large number of new projects.

www.mitsubishi-edm.de

www.emo-hannover.de

Name and seat of the fair:

EMO (Exposition Mondiale de la Machine Outil) Hannover, Germany

Fair premiere:

1975 in Paris, France

Organiser:

Verein Deutscher Werkzeugmaschinenfabriken e.V. (German Machine Tool Builders' Association) (VDW), Frankfurt am Main, Germany

Chairman:

Martin Kapp, Coburg, Germany

Spectrum:

World's biggest metalworking fair

Visitor figures:

142,804 trade fair visitors overall in 2013

EMO Hannover

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Trade fair facts:
EMO Hannover –
The world of
metalworking



EMO Hannover is the undisputed flagship fair for the sector. It is the only one to reach the globalised markets all over the world – and this in the heart of Germany, one of the most important customer countries.

Exhibitors come to EMO Hannover from all over the world and from all fields of metalworking. With roughly 60 per cent of its exhibitors coming from abroad, EMO Hannover is the most international trade fair for metalworking worldwide. The innovation potential for productivity and efficiency that visitors expect is beyond compare. This is well known and acknowledged in the trade world and makes EMO Hannover the mecca for top-level suppliers and users. Visitor internationality reflects this.

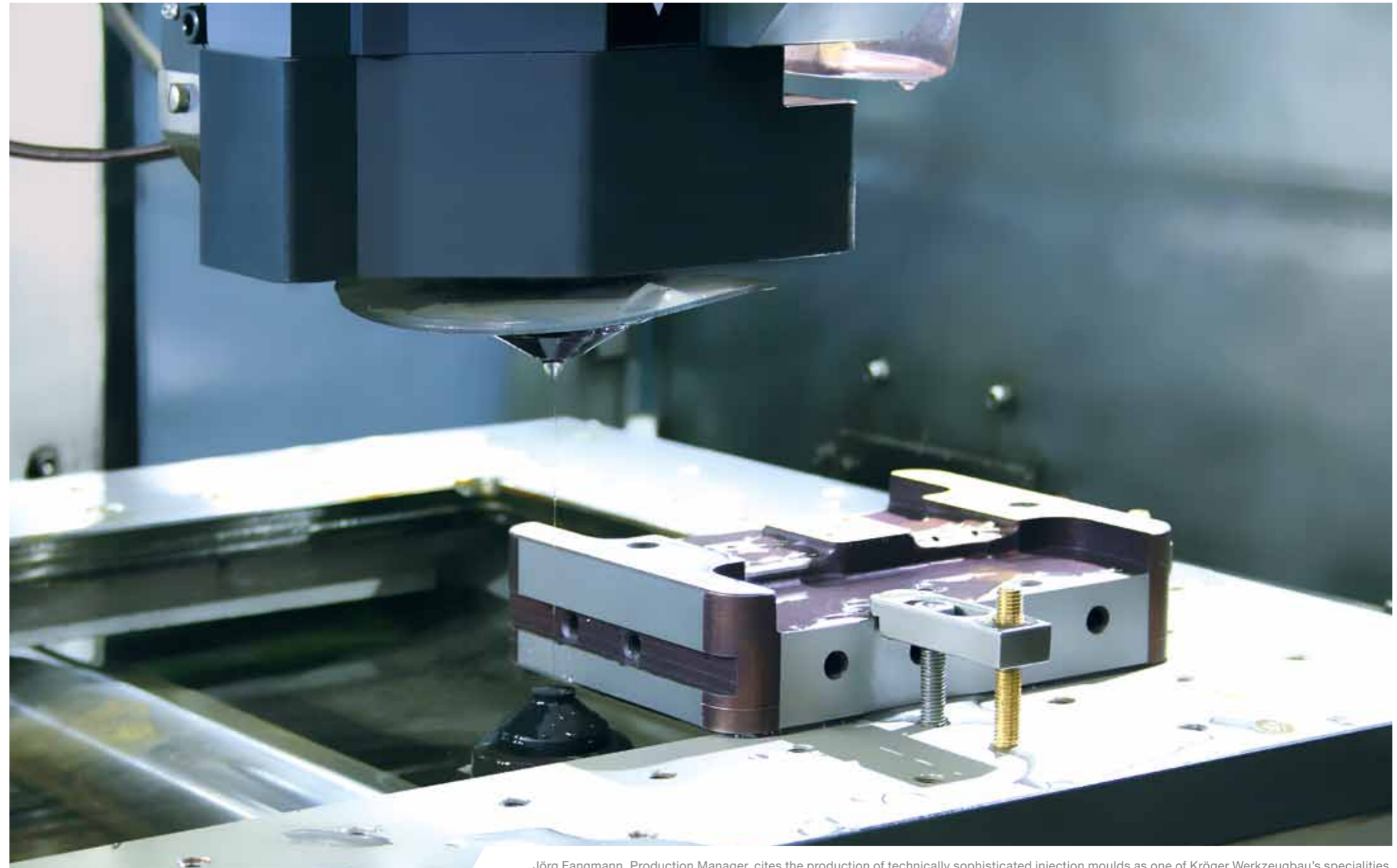
EMO Hannover's exhibitors have long attuned their innovation cycles to the world's leading metalworking fair. This means that more innovations are unveiled here than at any other trade fair in the sector – which in turn makes EMO Hannover a key point of reference for decision-makers in the production technology segment.

EMO Hannover presents an unparalleled breadth and depth of products and services throughout all production areas. These cover everything from machine tools and production systems for cutting and forming as the nucleus of machining via precision tools, accessories and control technology to system elements and components for automated manufacturing plus process linking systems and industrial electronics. This attracts the whole spectrum of user industries to Hannover.

The technical quality and decision-making competence of visitors to EMO Hannover is unsurpassed. This is due to the innovation potential for productivity and efficiency that awaits them at the fair. EMO Hannover is where top-flight suppliers and users meet.

WERKZEUGBAU KRÖGER

A big step forward



Jörg Fangmann, Production Manager, cites the production of technically sophisticated injection moulds as one of Kröger Werkzeugbau's specialities.

By investing in an MV2400R Grand Tubular from Mitsubishi Electric, Werkzeugbau Kröger has taken huge a step forward in terms of productivity and efficiency.

A step that reveals itself among other things in shorter machining times and lower energy consumption.

Hans-Jürgen Kröger strides forth. The Managing Director of Werkzeugbau Kröger GmbH, Lohne (Oldenburg), is on his way to his new wire EDM machine. "Mouldmaking is becoming more and more challenging. And we have to stay competitive with the Asian market. We can do this best by satisfying our customers. They have high expectations and demand precision and high surface quality at an affordable price."

Werkzeugbau Kröger, a toolshop founded in 1998, mainly serves plastic parts manufacturers and automotive component suppliers in Germany. A currently 24-strong team attends to customer needs. Special requests are by no means out of the question, the owner stresses. What Kröger means by quality workmanship is demonstrated by Production Manager Jörg Fangmann who presents a contoured insert for the

ejector side of an injection mould that they produce for the agricultural industry. "The production of technically sophisticated injection moulds is one of our specialities. For this component, we produced the holes on the wire-cut erosion machine. The sizes of parts that we machine on the MV2400R extend from small to the machine's maximum work space dimensions." Kröger underlines this statement by placing a minuscule

component, a slide guide, next to it. "Here you can clearly see the contoured areas that we wire-cut on the injection mould components."

Technologically the best machine on the market

The mouldmakers in Lohne produce parts for series production, development work, testing and the 2-component



By investing in the MV2400R Grand Tubular, Kröger Werkzeugbau benefits among other things from faster machining and lower energy consumption.

view of the high standards expected of

→ sector using heat-treatable steels. The company also carries out repairs, produces testing tools and modifies moulds. In

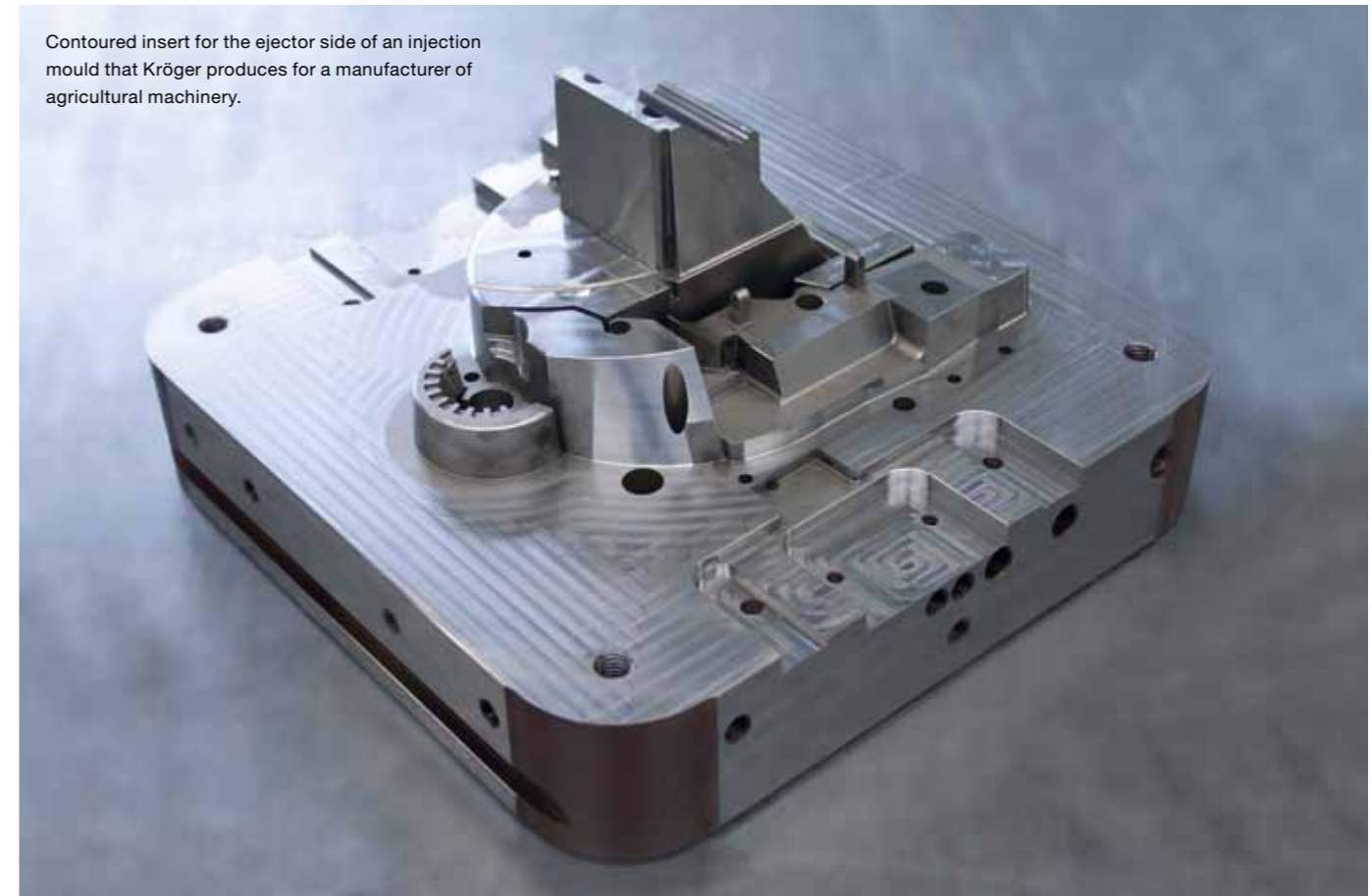
injection mould precision and quality, Kröger is constantly investing in forward-looking technologies. And this includes the MV2400R Grand Tubular EDM system from Mitsubishi Electric. Kröger stops at the machine. “We’ve been working with our new Mitsubishi since the middle of August 2013. The MV2400R is technologically the best

machine on the market at the moment. Until now we’ve had an FX20, and we shall continue to use it for certain tasks.” Kröger sees no alternative to wire-cutting. Thanks to this flexible process, he says it has become easier to produce components for tools and moulds. As an example, he lifts a long, thin element produced on a machine of the MV series.

Fangmann clamps a workpiece in the MV2400R Grand Tubular, which is known for its higher machining speed, reliability, energy savings and for corner and circular accuracy. “The machine threads the wire much more speedily and neatly. And in the cutting gap as well, which we also attach great importance to. This used not to be possible.” The reasons why the MV2400R Grand Tubular cuts appreciably faster and more precisely can be found in the modern drive strategy with Tubular Shaft motors that ensure totally cogging-free movements that can be controlled with great sensitivity. And also in its totally digital ADVANCE PLUS CNC control and its Optical Drive System in which an optical network handles data interchange. Apart from this, the machine has fewer wear parts, to some extent because it does without spindles.

High performance in economy mode

Kröger leafs through his papers. “According to Mitsubishi, the MV2400R Grand Tubular is capable of reducing machining time by up to 17 per cent. For us, the step has been even bigger. This is because we changed to the MV series not from the predecessor model, but from the FX20. This means that we’ve leapfrogged several machine generations in one go.” The operating costs reveal that this performance boost is achievable in economy mode. Mitsubishi Electric has thus reduced energy consumption by as much as 69 per cent over the previous series.

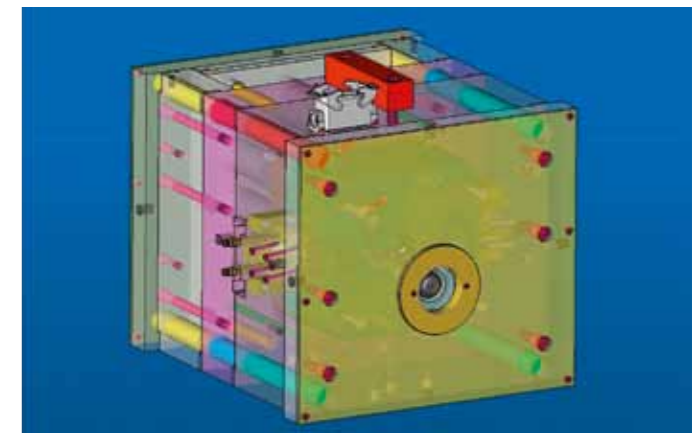
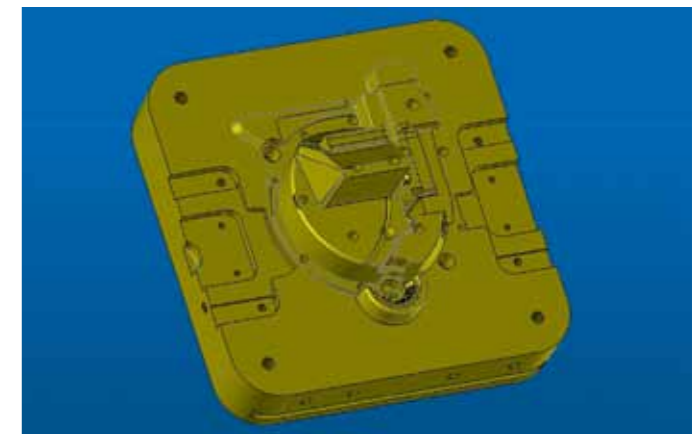


Contoured insert for the ejector side of an injection mould that Kröger produces for a manufacturer of agricultural machinery.

For Kröger this is another positive feature: “In view of the sharp increase in energy costs, this is a considerable advantage.” Then there are savings on filter cartridges and ion exchange solutions. And wire consumption up to 45 per cent lower than on conventional wire EDM machines thanks to optimised wire running speeds.

All in all, Werkzeugbau Kröger benefits from significantly lower hourly machine rates and from the resultant higher cost-effectiveness. These are points that can be decisive for an investment on top of the already attractive price/performance ratio of the MV2400R Grand Tubular.

Fangmann stands at the console of the ADVANCE PLUS CNC. “Our CAD data



Contoured insert for the ejector side of an injection mould and its assembly as CAD files.



→ are imported straight from the control. And this control is much more straightforward and intuitive to operate than the previous one." In addition, once he has fed the machine with data, he can let the machine run unmanned at night. And he can sleep peacefully because the toolmakers have had the optional mcAnywhere Contact function installed so that the system texts critical status messages to a defined mobile phone number.

» The MV2400R is technologically the best machine on the market at the moment. «

A worthwhile investment

Kröger points to sample parts that have been cut on the MV2400R Grand Tubular and are now in a showcase. "On the basis of my experience to date, the investment in the MV2400R Grand Tubular has paid off. We've been able to confirm the practical improvements in efficiency promised by Mitsubishi and the machine has even surpassed our expectations on a number of counts – in terms of short machining times, quick and pre-

It is very important for Werkzeugbau Kröger that the MV2400R Grand Tubular threads more speedily and neatly.

cise wire-threading, energy efficiency and ease of operation. I expect the machine to have paid for itself within eight years."

www.werkzeugbau-kroeger.de

www.werkzeugbau-kroeger.de

Name and place of company:
Kröger Werkzeugbau GmbH, Lohne, Germany

Founding year:
1998

Managing Director:
Hans-Jürgen Kröger

Number of employees:
24

Core business:
Making injection moulds

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Professional in Profile: Hans-Jürgen Kröger



How would you describe in a sentence what your company does?
We produce injection moulds.

How did you earn your first money?
As a toolmaker.

What motivates you?
Keeping up with the state of the technology.

What's different about how you do things now, compared to five years ago?
We're much more modern and respond more closely to customer wishes.

Where do you see your company in five years' time?
I'd like to extend our technical offering.

What was your biggest business success?
Building up the business myself.

What's your favourite way to relax?
When I can get complete peace and quiet.

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

What failings in others do you find easiest to forgive?
Ignorance.

If you were asked what you do by a friend with no technical knowledge, how would you explain your work in a single sentence?
We cut metal in the same way as school kids cut polystyrene with wire.

NEWPORT TOOLMAKERS

At full speed into the future

Newport Toolmakers Ltd has taken delivery of a Mitsubishi MV2400S CNC wire EDM featuring revolutionary cylindrical drive technology. Supplied by exclusive UK distributor, HK Technologies, the machine has been set to work producing press tool punch and die sets, largely for the automotive industry.



Owned by two directors with more than 40 years' experience in the toolmaking industry, Kevin Brewer and John Nicol, Newport Toolmakers began life in 1995 in a small unit at Newport Pagnell, Buckinghamshire. Acquiring basic machinery the company grew rapidly in its first two years until, to keep pace with new technology and techniques, Newport Toolmakers decided that addi-

tional machinery was required. This resulted in the need for more space and a move to the company's current 3000 sq ft premises in Bletchley near Milton Keynes. That was in 1997 and today the philosophy of ongoing investment continues at this progressive toolmaking enterprise, where core business centres on high quality press tools, die cast tools, assembly jigs, fixings and

checking fixtures. The company can also provide a comprehensive tool refurbishment service.

Wire erosion is one of the core manufacturing processes at Newport Toolmakers as this facilitates the generation of extremely detailed and precise tools. Until recently, the company was running a pair of Mitsubishi wire EDM

machines that, although reliable, were reaching the end of their working life.

Impressive performance

"We have no complaints with the performance of our Mitsubishi machines over the years, and while they were still producing accurate parts, we realised there was an opportunity to take advan-

tage of next generation technology," says Mr Nicol. "I admit to having a look at one or two alternatives to Mitsubishi, but when I saw the new MV Series I was really impressed."

The MV Series of wire cut machines feature a host of game-changing engineering improvements, many of which are industry firsts. Arguably the most signif-

icant is the revolutionary cylindrical drive technology, which Mitsubishi EDM says removes many of the pitfalls associated with linear drive motors.

At the core of this breakthrough are innovative tubular shaft motors that move a number of axes. These motors prevent 'cogging' and ensure smooth and highly controllable movements.



The MV2400S Tubular in operation.

Quality pays off

“We have an excellent reputation for supplying the highest quality press tools to manufacturers ranging from small businesses in the electrical and plastics industry, through to large international automotive companies,” says

Mr Nicol. “Quality is paramount because predominately our work is bespoke toolmaking, whether die cast tools, pierce and blank tools, form tools, progression tools or compound tools. This investment in new machinery means we are now one of the most comprehensive

toolrooms in the area in terms of capability and quality.”

Endless possibilities and precision to perfection

Quality is further enhanced using the new MV Series via integrated functions such as ODS (Optical Drive System), which deploys fibre optic communications between the control unit, servo amplifier and linear motor to improve machining accuracy ($\pm 2\mu\text{m}$) and provide reaction times up to four times faster than electrical cable. Productivity is also boosted by the PFC (Precise Finish Circuit), which is able to generate finishes up to 30% finer than previous generation models with less skim cuts.

Higher speed with with fewer skim

“As well as offering enhanced quality I would say our new Mitsubishi MV2400S is at least 50% faster than the models we replaced,” says Mr Nicol.

For quicker and more continuous operation, Mitsubishi EDM has also enhanced its Intelligent AT automatic wire threading system, which operates reliably and quickly, not only when re-threading a submerged hole but also when threading the cutting gap or discontinued initial holes. What’s more, the

Digital Matrix Sensor and V350 generator digitally shape the pulse to decrease wire vibration and minimise electrode wear, reducing wire consumption by 46%. “We really like the wire saving functionality,” he adds. “Low operating costs are vital to small

» We really like the wire saving functionality. «

I admit to having a look at one or two alternatives to Mitsubishi, but when I saw the new MV Series I was really impressed.



John Nicol benefits from the new and easy-to-operate Advance Plus CNC.

businesses like ours, particularly considering the price of brass wire these days.” The Mitsubishi MV2400S at Newport Toolmakers is configured with a two-axis (XY) linear shaft motor and a three-piece, U-shaped hardened table. It can accommodate parts up to 1050 x 820 x 305mm.

“Despite being of far higher specification than the machines it replaced, installing the Mitsubishi MV2400S hasn’t required any sort of learning curve,” says Mr Nicol. “Overall the whole acquisition, commissioning and training process was very straightforward. HK delivered everything we needed and

the machine is already providing differentiation against our competitors.”

www.newport-toolmakers.co.uk

Bonsai – big in Japan



PRECISION IS A JAPANESE TRADITION

The word “bonsai” means literally a tree or plant in a bowl. The name says what it is. In many cases, scenes and natural shapes – such as wind-blasted, lopsided mountain spruces – are replicated in microcosm and look precisely how Mother Nature would have formed them in their natural setting.

BONSAI

In fact, anyone who has ever looked at a bonsai nurtured by a master knows that we are talking here about more than just a tree. Because the moss growing at the foot of the miniature tree, stones that look they’ve been shoved here by a landslide and even figures can contribute to the overall arrangement.

Decorative skills and precision are required

If you look at it like this, artists and designers can really go the whole hog on a bonsai. Some of the little trees have a single trunk, while others come in twos and threes. A bonsai can stand by itself or form a glade or short avenue. You are free to do as you please – a tree in a bowl can blend in with the rest of the interior decoration. For instance, by placing it on an Asian cabinet, in front of illustrated scrolls with matching motifs or in front of a screen adorned with Oriental stylistic elements.

On the subject of bowls, the container is capable of contributing a great deal to the overall work. Some have plain rectangular or oval shapes so that they do not divert attention from the central feature, the tree itself. The bowl itself, however, can also be very striking, have zigzag edges, or a bonsai, a popular stylistic feature, can appear to grow out of a stone. In the film “Karate Kid”, in which caretaker Mr Miyagi (alias Noriyuki “Pat”



The once so exotic-looking bonsai has meanwhile found aficionados all over the world.

Morita) teaches his hothead novice not only the martial art of karate, but also self-control, composure and the precise use of the bonsai shears, we learn that the care and pruning of a bonsai, at least in the Far East, is an almost meditative act. At the same time, bonsai gardeners, however regimented the treatment of these miniature trees may appear to be, are relative free in their choice of vegetation for potted cultivation. Pines are popular, although juniper and European larch are also worthy of consideration.

Naturally flowering trees are particularly impressive. You can thus find bonsai azaleas. At the same time, maple, various elms and the Japanese apricot can be fashioned into attractive miniatures. Today, most of these plants come from seeds and

Well-tended, a bonsai can be passed on to one’s children and from them to one’s grandchildren.

cuttings, although digging up bizarrely shaped trees in the wild is still very popular, especially in Asia.

Modelled on nature

Of course, any would-be bonsai grower should take pains not to let his love of creative pruning run away with him. Because even if the *fukinagashi*, a crooked tree with its branches and foliage blasted and dishevelled by mountain gales, or the *nebari*, a bonsai with exposed and visible roots, are legitimate and popular stylistic features, the natural shape of the tree should never be lost. In other words, whether a group of trees or glade around a central tree is imitated, whether the bonsai is placed on a stone (*ishizuke*) or simply stands as a solitaire in its bowl, the ensemble as a whole must still be a replication of nature, which is why upright trunks and the broom shape (*hōkidachi*) characteristic of German broad-leaved trees are also very popular.

A companion for life

At the same time, the potted miniature can grow as old as its model in the wild. Well-tended, a bonsai

can be passed on to one's children and from them to one's grandchildren. However, it should be borne in mind that where nature is replicated on a small scale, the plants are easy prey for pests. In addition, fertiliser must be regularly applied – the frequency and type of fertiliser depending on the type of tree and choice of substrate. Mineral fertiliser is therefore advised for substrates with a large proportion of peat, whereas the fertiliser should be rich in organic matter for mineral plant substrates. Bonsai experts are therefore keen to stress that there is no universal guideline for plant care.

Indoors or outdoors?

The location, indoors or outdoors, has always been a matter of controversy. There is no doubt that conifer bonsais, for example, would feel at home outside exposed to the wind, rain and sun. Also, indoors, the bonsai pot needs sufficient light, although it should be remembered that tender leafy trees are inclined to shrivel quickly behind glass. Some argue of course that deadwood, which would have to be removed with the bonsai shears, also contributes to the detailed replication of natural features, since trees in the wild do not always grow straight.



Oriental garden art in manifold manifestations



While the Japanese style mainly seeks compliance with formal requirements, the European style aims to replicate near-natural shapes.

Bringing a bonsai home

Bonsais, which are fairly fashionable these days, can also of course be found in supermarkets. Many experts advise against buying one, despite the attractive price. Because often the pots are the wrong size, wires have grown into the twigs, and the earth and roots have dried out because no one really takes the time to water them properly. In addition, these plants, even if they are healthy and thriving, can never keep pace with the meticulously designed arrangements of horticultural specialists. So a bonsai that we want to stay with us for many years should be worth its purchase price. But simply buying the plant in the pot is not the end of it. Because pruning and

shaping of the miniature tree take time and involve effort and expense. A bonsai should be kept in shape exclusively with bonsai shears and other special tools. There are leaf cutters for removing shoots and branch saws when twigs have grown thicker and stronger. The accessory trade also sells knives for scoring and peeling off the bark, along with shovels and rakes so that the bowl and the tree's surroundings are always neatly kept. If a bonsai is ever transplanted into a larger dish, there are also special root hooks and pliers.

Getting the mini-tree to thrive and perfectly mimic its model in the wild is therefore a lot of work.

CRYOGENIC

The will to chill

Mitsubishi MV Series wire EDM cuts the ice at Cryogenic Ltd

Cryogenic Ltd, a leading supplier of high field superconducting magnets and low temperature measurement systems, has installed a high performance Mitsubishi MV1200R wire cut EDM. Supplied to the company's Acton, West London facility by exclusive UK sales and support agent, HK Technologies, the machine has eliminated the need to outsource wire EDM operations and helped expedite the progress of new measurement devices.

The cryogen-free measurement systems designed and manufactured by Cryogenic Ltd need to accurately assess and record temperatures as low as 1°K (-272°C), typically for the characterisation of new materials intended for use in extreme conditions. Cryogen-free is preferred because liquid helium is an expensive consumable which limits the application of low temperature technology, especially in countries that do not have indigenous sources of liquid helium.

"We were previously subcontracting our wire EDM requirements and realised how useful the process could be," explains Dr Yury Bugoslavsky, Senior Project Engineer. "We tend to hold all of our key technologies in-house, so acquiring a wire EDM was deemed part of our general development as a sector leader." The machine selection process commenced with inviting a small number of EDM sales representatives to the London headquarters of the 70-employee, £10 million turnover company.

"The presentation by HK Technologies was by far the best," states Dr Bugoslavsky. "The Mitsubishi MV Series has certain key advantages that set it apart from competitor models, such as cylindrical drive technology, for example."



The new cylindrical drive design on the Mitsubishi MV Series prevents many issues associated with linear drive systems, which trap heat behind the iron back-plate on the magnetic mount. This

George (left) and Paul Rowledge (right) in front of the MV1200R Grand Tubular

can cause geometric issues or lead to high electricity consumption due to cooling requirements. Furthermore,

there can be problems aligning the linear drive motors together on the drive-ways without generating a ‘crabbing’ effect.

Cryogenic Ltd opted to install a Mitsubishi MV1200R, a specially designated ‘high performance’ model in the MV Series. Installed in February 2013, the machine features four-axis (XYUV) linear shaft motors and one-piece, four-sided hardened tables. Both X and Y axes are mounted directly to a set of ways on the ‘T’ cast base. This style of direct axis mounting removes the squareness and repeatability issues associated with stack-table designs, providing higher rigidity and smoother movement. The MV1200R can accommodate workpieces measuring up to 810 x 700 x 215mm.

“During the commissioning period, initial cutting trials on a stainless steel cube measuring 10mm³ demonstrated accuracy of ±1µm,” says Dr Bugoslavsky. “We knew we had made the right choice.”

Today, Cryogenic Ltd uses the machine day-in, day-out to produce intricate, complex small parts with unusual forms from materials such as copper, brass, aluminium and stainless steel. For example, copper components might form part of measurement probes used to study the thermal conductivity of materials at extremely low temperatures. Similarly, brass gearbox parts might be used at very low temperature and strong mag-



Parts of the low-temperature probe manufactured by Cryogenic Ltd

→ Mitsubishi’s revolutionary cylindrical drives remove many of the pitfalls associated with linear drive

smooth and highly controllable movements.

“To achieve progress with new low temperature measurement devices we are constantly looking at ways to enhance component precision,” says Dr Bugoslavsky. “The design configuration of the MV Series is a significant benefit in this respect.”

motors. At the core of this breakthrough are innovative tubular shaft motors deployed to move a number of axes. These motors prevent ‘cogging’ and ensure



Left Sample stage for measuring physical properties of materials in a vacuum and at low temperatures



Below Miniature rotating sample stage for operation at a temperature of down to 2 Kelvin (-271°C)

netic fields to measure the electrical resistance of anisotropic materials.

“As well as eliminating outsourcing costs, the Mitsubishi MV1200R has also imparted greater levels of control in our manufacturing process,” concludes Dr Bugoslavsky. “We have some customers who demand very specific requirements and extremely short lead-times, particularly for prototypes.”

Cryogenic Ltd is a vertically integrated operation in that it designs and builds

using in-house facilities, then tests and installs its equipment. The use of internal resources is preferred as it allows the company to control all the critical elements of the production process. The production facilities today include a substantial machine shop: aside from multi-axis Mitsubishi wire cutting, the company operates several milling and turning machines.

www.cryogenic.co.uk



George Rowledge at work



Environmental protection – a change of heart in metalworking

Environmental protection is now on the map in the metalworking sector. But what exactly does this mean? In metalworking particularly, such as with EDM systems, high power consumption and the cost of materials are a key factor. So what improvements are possible here and what steps have already been taken?

The onset of industrialisation brought with it ever-increasing pollution. Today, each wave of modernisation and each new technological breakthrough is accompanied by increasingly strict environmental standards. A change of awareness has taken place not only in the minds of end-users but also among industrialists. The key concepts here are not only the consumption of power and ma-

terials, but also product and machine durability and the resources used. Mitsubishi Electric takes a clear stand on environmental protection with a commitment to the sparing use of resources and cutting energy costs. The EDM systems of the MV series conserve resources with their Long Life System (LLS). This is an overall strategy that facilitates, for example, new strategies for deactivating functions no longer required, intelligent "sleep mode" management and significant savings thanks to reduced quantities of circulating dielectric. These clearly testify to a change of heart in metalworking.

The facts leave no room for doubt: up to 69% less energy, up to 46 %

lower wire consumption, up to 45 % lower filter costs and up to 25 % less ion exchange resin. In addition, with its MV series, Mitsubishi Electric also scores with an innovative drive system. The Optical Drive System using Tubular Shaft motors makes wire-cutting much faster and also entirely wear-free. And this has been essential for achieving the marked drop in expenditure on energy, filters etc., in practice.

Ultimately, environmental protection means not only waste separation, renewable energy and durability, but also innovative, eco-friendly processes. And this is only possible with properly thought-out machines. And on this count, Mitsubishi Electric clearly heads the field.

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FRANKFURT AIRPORT

Energy-conserving air conditioning

An exciting proposition for industrial companies

So that Frankfurt Airport will stay competitive in the long term, the new Gate A-Plus for up to six million passengers per year has been built at Terminal 1. Conditioning the air of the interior retail areas posed a major challenge and created almost insoluble problems for designers and plant engineers.

The new terminal building with its floor space totalling 185,000 m² has been open to the public since October 2012. Up to seven wide-body aircraft like the Airbus A380 can dock at the gates here at the same time.

There are three levels, for arriving, departing and transit travellers respectively. So that passengers can make use of various services and spend their stay in comfort, an atrium is available as a marketplace comprising shops, restaurants and five business lounges.

Special requirements of the air conditioning

The very first drafts envisaged an innovative retailing and restaurant concept in the form of spacious marketplaces so as to offer passengers a quality ambience during their stay. A major problem was how to handle the high input of heat from the bright and welcoming lighting, high passenger throughput and aircraft traffic in the immediate vicinity that made continuous air-conditioning of the shopping areas necessary. "The

task of air conditioning mainly involves creating a pleasant climate for travellers

The new Gate A-Plus in Terminal 1 is equipped with hypermodern terminal installations.



while shopping before or after their flights," explained Rolf Wiesinger and Klaus Westermayer, Managers of W+W Kälte- und Klimaanlage GmbH, who were responsible for the concept, design and implementation of this project.

Because of the unique situation, an air-conditioning strategy "off the peg" was out of the question. "This is where more specialised solutions were called for," Wiesinger continued, "in order to appropriately air-condition the floor space let by operating company Fraport AG to retail chains. The factors that have to be considered include the architecture and the needs of security and safety. In this part of the building, for instance, it's not possible to discharge the heat loads outside via the roof."

Comparison of different approaches

Air conditioning requires, first of all, a supply of cold water by the operating company that comes from a central cooling station via a pipeline system – with a feed temperature of 15 °C and a return temperature of 19 °C. In view of these high temperatures for a cold water system and the high density of installed lines above the suspended ceiling, it soon became obvious that, with a heat load of 60 W/m², cooling with conventional cold-water recirculation air coolers would not be the ideal solution, if only for installation reasons. As an alternative to cold water, a solution with a water-cooled VRF (Variable Refrigerant Flow) direct evaporation system was included in the strategy. The choice of the best air-conditioning concept finally depended on a comparison of investment and operating costs over a period of five years of operation.

Cost-effective VRF technology

In the comparison, the direct evaporation system (City Multi VRF System from



Rolf Wiesinger (W+W Kälte- und Klimaanlage GmbH) and Thomas Schmidt (Mitsubishi Electric Frankfurt) during the function testing of the first ready-to-use installation.

Mitsubishi Electric) proved to be far less expensive. "This is mainly due to the very much lower air throughput and hence the lower power input of both the cooling plant and the ceiling-concealed units. Cooling performance is identical despite the superior air-conditioning comfort," Wiesinger explained.

The client was impressed by the detailed list of costs and the comparison of all relevant parameters of the various air conditioning systems. Trusting relations with the client stretching back years



The conditioned air is blown draught-free via slotted rails into the retail areas.

and the specialist installer's experience with comparable systems on the Frankfurt Airport site also prompted the client to approve this system. In the new A-Plus terminal, a total of 5,600 m² of retail space will be cooled and heated with the proposed solution in all-year operation. The first area in which this strategy came to fruition is the Heinemann Duty Free Shop on the second level of the new terminal building. This is where four water-cooled refrigeration units (type PQHY-P450) accommodated in a plant room adjoining the shop are in action, each with an output of 50 kW for refrigeration and 56 kW for heating. The air is conditioned by ceiling-concealed units with recirculated air, each with an output of 16/18 kW for cooling/heating. For the purposes of control, several units have been grouped together in a single climate zone. "In view of the size of the areas, it is by no means impossible for one climate zone to be cooled while another has to be heated," Wiesinger explained.

www.frankfurt-airport.de

Japanese cocktails

A journey for the senses

After a busy day at work, our body often needs release from stress and from the mulling-over of problems. A good idea in this context could be to savour a delicious Japanese cocktail in a pleasant environment. Take yourself on a voyage of discovery and allow yourself to be surprised by the variety of cocktails available.



MODERN JAPAN

No two bars are the same, and bartenders differ equally in terms of quality and what they serve. Such factors as units of measurement, capacity and alcohol strength are just as important in the accurate mixing of a cocktail as the visual presentation of the finished result. Precise measurement in the centilitre range is all-important for a Japanese cocktail.

For this, the bartender uses his measuring cup as well as special scales. The bartender also needs experience and a keen palate for the tasting of newly created cocktails. Then there are the soft skills, such as empathy, humour and charm that all go to make a good barman or barmaid.

Sake – rice wine or rice liqueur?

The making of sake involves the generation of heat that inevitably arises during fermentation. The conversion of the rice-and-water mixture into sake by adding yeast is an art in its own right. How exactly it should be defined, however, is a matter of controversy. Some experts call sake “rice wine”, while others insist on “rice spirit”. Basically, there are several makers, and the alcohol content varies upwards from 15 per cent by volume. While wine is traditionally made from grapes and usually has an alcohol content of 9 to a maximum of 14 per cent by volume, spirits have higher contents. Interestingly, the alco-

hol content of Japanese sake at 15-20 per cent is much lower than that of its Chinese counterpart (at up to 40 per cent by volume). For the sake of compromise,

In Tokyo's High Five bar, ice sculptures and avant-garde cocktails are celebrated.

one could agree to classify sake as potent rice wine or a thin-bodied spirit.

Since Japanese sake is not as alcoholic as the Chinese equivalent, it can be used entirely differently as a cocktail ingredient. To create a good Japanese cocktail, you can dispense almost entirely with a large repertoire of

**Mix, shake and shout
» Kampai! «**



You've got to try this cocktail: the Ayaka based on sake and vermouth with redcurrant liqueur and lemon juice. New is a sake-sparkling wine mixture which is often enjoyed with Aperol.



The trendy SuperDeluxe bar in the heart of Tokyo is famous for experimental art, music and exquisite cocktails.

can add a little crème de cassis or lychee liqueur to your sparkling sake.

Ayaka – cocktail of Japanese culture

Ayaka is the name not only of a well-known Japanese singer, but also of a cocktail. All it takes is 3 cl sake, 1 cl redcurrant liqueur, 1 cl vermouth (amber), 1 cl freshly squeezed lemon juice and, as a garnish, a slice of lemon and a cocktail cherry. Pour all the ingredients apart from the garnish into a shaker with ice and shake thoroughly. Then strain the mixture into a chilled Martini cocktail glass. Just add the lemon slice and cherry on a

cocktail stick to the Japanese cocktail – and there you have it!

Sakerinha – a Japanese cocktail Brazilian-style

While the caipirinha is made with cachaça, its brother, the “sakerinha”, calls for good Japanese sake. The preparation of these two cocktails is basically identical apart from the main ingredient. You need 5 cl sake, an un-

treated and washed lime, two bar-spoonsful of cane sugar and crushed ice. First dice the lime and tip it into a tumbler together with the cane sugar. Then mix and crush everything well with a muddler. Finally, add the crushed ice and sake. The sakerinha is served with a straw and occasionally with mint leaves.

What many people don't know is that the Japanese distil their own whisky. Well-known brands such as the Yamazaki 18 or the Hibiki 30 years prove that the Japanese are capable of producing good whiskies. The Japanese whisky from Hibiki has been marketed by Campari Germany since mid-2013. And the market is continuing to grow.

Anyone who prefers to sip older whisky neat can resort to 12-year-old Japanese whisky for his

cocktails. In addition to the well-known “old-fashioned”, there are numerous other whisky cocktails that are worth trying.

Ginger Hibiki, Japanese coffee and mint julep

To make a ginger Hibiki, pour 4 cl Hibiki whisky with ice cubes into a tumbler and then top up with ginger ale. A very refreshing beverage and easy to mix as well. Japanese coffee, on the other hand, is the equivalent of Irish coffee but with Japanese rather than Irish whisky. Another variation on the whisky cocktail theme is the mint julep. For this you need about ten leaves of mint, a sugar cube, 6 cl Japanese whisky, 4 dessertspoons crushed ice and about 4 cl soda water. Using a muddler, first crush the mint leaves together

with the sugar cube in a tumbler. Then add the Japanese whisky and stir the mixture with a bar spoon until the sugar has completely dissolved. Add the crushed ice and soda water and your refreshing whisky cocktail is ready to savour.

The world of the cocktail is not only colourful, but also incredibly multifaceted as well as varied. New compositions are created every day. What makes Japanese cocktails different is that they make use of Japanese alcoholic beverages. Very popular is of course sake, the national drink, although there is no end to the rise of Japanese whisky. MIZUBASHO PURE sparkling sake is also highly celebrated as well.

So it would seem that cocktails are subject to the same laws as fashion: tastes are constantly changing. Cheers!



→ ingredients. It takes just a single additive, such as raspberry syrup or grenadine, to convert Japanese sake into a cocktail. Compositions of sake and gin are also very popular. In winter, hot sake cocktails have their seasonal appeal.

Much like rum in grog, sake can serve as the magic additive to hot water. Nagai Inc. in Kawaba in Japan has now introduced a new production process for its MIZUBASHO PURE sparkling sake.

Premium Sake Junmai Ginjo serves as the basis. Sparkling sake can be drunk neat or in a cocktail.

How about MIZUBASHO PURE plus Aperol, for instance? If you prefer something a little sweeter, you



User horoscope



♑ Capricorn (22.12.–20.01.)

Venus is in trine with Mars. Now is the right time to fall in love again. Cupid fires arrows by the quiver in your direction, and the object of your desire succumbs to your ardour.

But caution is advised: mind you don't burn your fingers on the glowing wires.

♒ Aquarius (21.01.–20.02.)

Jupiter is in conjunction with Saturn. In the first half of the month, you have a turbulent love life. In your choice of words and actions, beware of the effects around the edges, otherwise your relationships may suffer from unwanted embrittlement.

The second half of the month is then more peaceful and you've got more time for your hobby.

♓ Pisces (21.02.–20.03.)

The gloomy sky is currently the only thing that bothers you. Your work and your love life are both coasting along. The stars couldn't be better for you, but don't relax. Instead, erode everything you can. Your hard work will make your bank account swell and you will be richly rewarded at home as well.

♈ Aries (21.03.–20.04.)

You and your EDM system understand each other blindly. Your career is going from strength to strength, but the moon and Pluto are now in disharmony.

Your partner is displaying increasing surface roughness. So why not raise the pulse frequency with flowers and chocolates and spend more time with your family than on your unconventional ideas for workpieces.

♉ Taurus (21.04.–20.05.)

The trine between Jupiter and the Ascendant is currently limited. You will feel a little uncomfortable in the current situation.

So treat your life to a combination flush – it is the only way to maintain your health and find time to pursue your plans.

♊ Gemini (21.05.–21.06.)

Don't let up! Neptune will soon be in square with Uranus. Things you've been putting off for a long time now need to be tackled at last.

Procrastination is the thief of time. Since you love challenges, begin now by drilling a start hole.

♋ Cancer (22.06.–22.07.)

Transiting Saturn is in square with the moon. The unpleasant experiences of your life are now trying to impose themselves on your thoughts again. Simply treat these thoughts to a skim cut and go away for a few days with your die-sinking machine. At your holiday destination a little surprise awaits you that will give you the necessary energy for the coming weeks.

♌ Leo (23.07.–23.08.)

You're affected by a Mars-Pluto dynamic. You feel that your will is being

denied, and the gulf between you and your plans is constantly growing. Don't even consider giving your partner eroded workpieces to make these plans come true.

You lack both the compassion and the time to maintain good relations.

♍ Virgo (24.08.–23.09.)

Watch out, Jupiter is in square with Saturn. Everything's got to go. Get rid of all the scrap that's been accumulating. You don't need the rejects either.

After the turmoil in the recent past, the subject of romance has little interest for you at the moment.

But there are more important things: concentrate more on your career, for example.

♎ Libra (24.09.–23.10.)

Saturn is in sextile with Neptune. You discover hidden talents.

The clock generator helps you develop your musical abilities and, in coordination with pulse duration and interval, you're soon launched on a musical career – in a duet with your beloved wire-cutting machine.

♏ Scorpio (24.10.–22.11.)

Pluto is in a dynamic with the sun: Many a physical ailment vanishes as if by magic, and at work everything's a breeze.

Between you and your EDM machine the atmosphere is electric. Your ideas yield improvements, and you earn praise from all sides.

Lean back and savour this pleasant state of affairs.

This month's horoscope

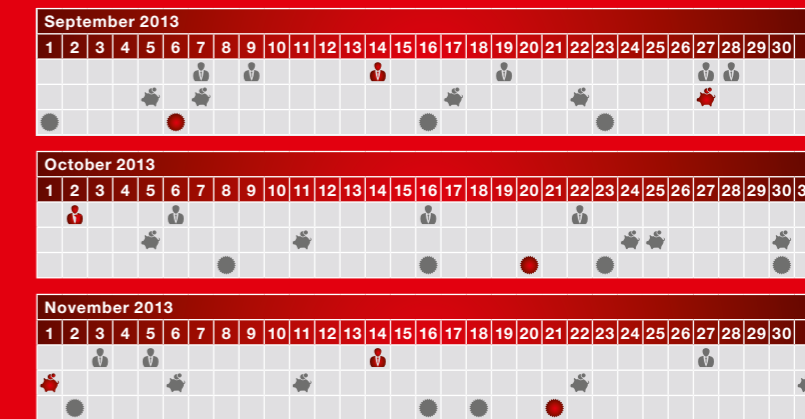
SAGITTARIUS

(23.11.–21.12.)



Ho, ho ho! Delight your children by replacing tooth-decaying chocolate on the advent calendar with your wire-cut workpieces.

Don't do things by halves: your kids will be grateful for healthy teeth, you'll have cleansed your karma and you'll be able to relax at long last.



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

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