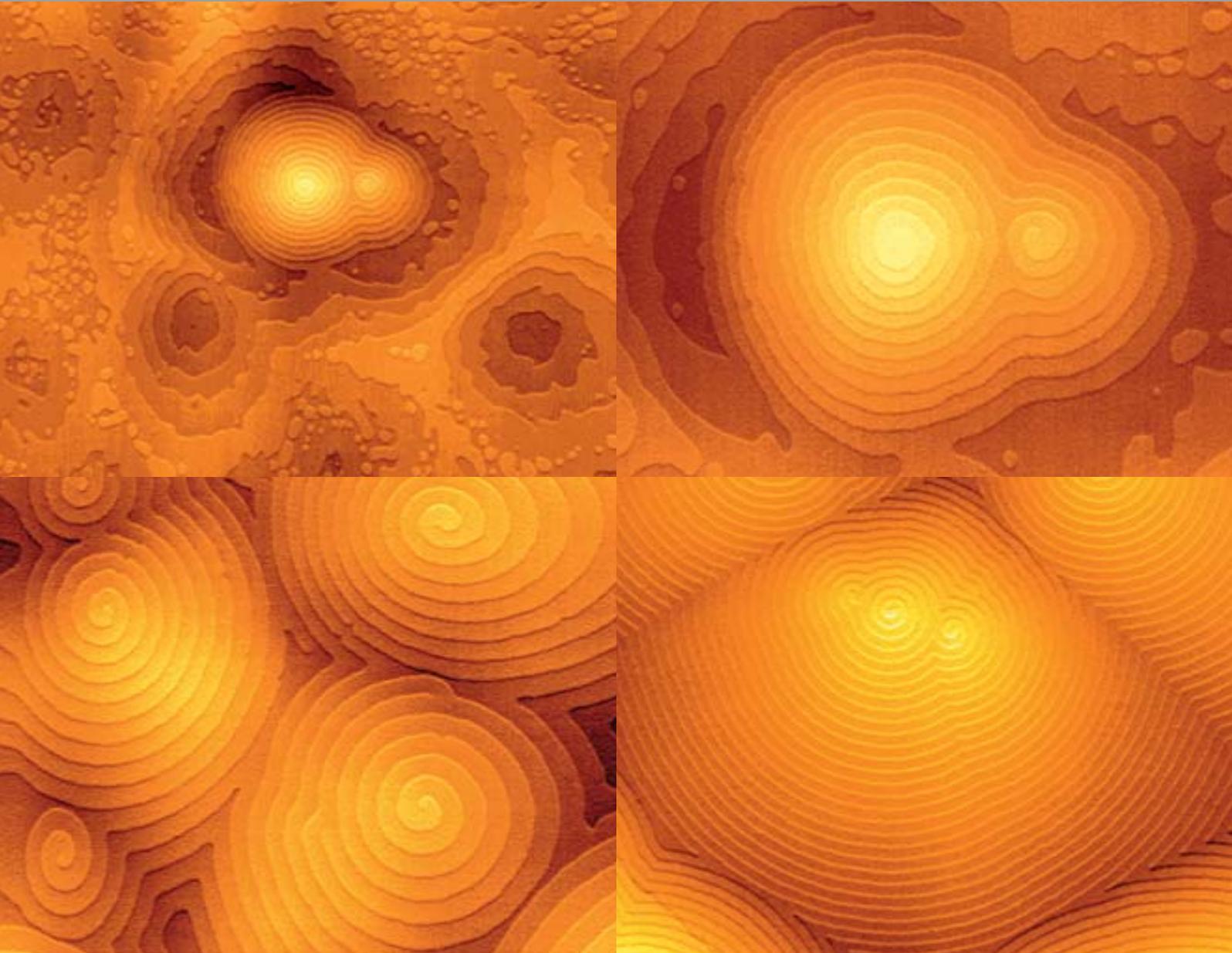


weld+vision

FRONIUS MAGAZINE

2.04



THE WORLD 25 YEARS FROM NOW:

The key: Nanotechnology

THE CMT PROCESS: A brand-new dimension of welding technology

AN IMPRESSIVE LINK: East and West build a bridge

DETROIT: The Motor City sets the trends





Management Team, from l. to r.:

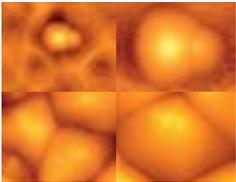
Herbert Mühlböck
 Klaus Fronius
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 Heinz Hackl

Editorial

“Trends” - that’s the subject of this edition of weld+vision. Which is why its publication date was chosen to coincide with the Fronius ProductLaunch. Being a technological leader, Fronius naturally has a big say when it comes to future trends - especially those in the welding technology field. Read more on pages 7

to 11. You’ll also find an interesting article on this year’s Ars Electronica Festival in Linz, Austria. The motto of the 2004 festival was “Timeshift: The world 25 years from now”, and it could have been coined with this edition of weld+vision specially in mind. This year’s Ars Electronica analysed the

currents that have taken place in the arts, society and technology over the past 25 years, and hazarded a critical look ahead to the next 25. With a cross-reference to the momentous field of nanotechnology. So settle down and immerse yourself in the world of tomorrow!



A few words on our cover picture:

Pictorial greetings from the NanoScience and Technology Centre Linz - NSTL for short - at the Johannes Kepler University. Seen under the scanning tunnel microscope, crystal surfaces reveal themselves at the atomic level. Giving researchers additional clues to help them achieve the desired ability to manipulate matter. With a view - among other things - to completely new physical, chemical and biological properties of materials. An evolving - and revolutionary - area of research that Fronius will definitely not be losing sight of. The reason being that we are always asking ourselves the very question posed in the cover story of this edition of weld+vision: What are our world and the world of technology going to look like 25 years from now?

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Intermixing levels

WHAT WILL THE NEXT 25 YEARS BRING?



“Timeshift – The World in 25 Years” – was the title of this year’s Ars Electronica Festival. With its analysis of the trends in the arts, technology and society over the last and over the next 25 years, the festival succeeded in spanning an impressive bridge between the past and the future. The interdisciplinary approach for which the festival stands out will also characterise the future. A key technology here: nanotechnology, which – as this issue’s cover suggests – will re-define the picture of the natural sciences. Ars Electronica’s “Timeshift” anticipated just this. In the same way as Fronius, too, is constantly endeavouring to advance the future with its new developments in the field of welding technology.

“I’ll throw the damned rear-view mirror out of the damned window because I don’t want to know where I’ve come from, but where I’m going”, the famous architect and thinker Frank Lloyd Wright is reputed to have said once in the 1930s, and indeed he did actually break off the car’s rear-view mirror and throw it out of the window – what a fantastic anecdote! But not a particularly apposite one for the Ars Electronica Festival. For this was before the discovery of the DNA double helix, before Dolly the cloned sheep, before the deciphering and patenting of entire genomes, before the development of the transistor, before the age of digital simulations, and before the spread of the Internet and the triumphal advance of cell-phones and computer games. That’s quite a lot of future reflecting in our rear-view mirror.

Drawing on its 25 years’ experience and the archives that have accreted in this time, the Ars Electronica Festival 2004 also addressed the question of whether onward societal development is possible in terms of learning from the past for the future. For ultimately, we shouldn’t be staring ahead so intently that we forget to look in our rear-view mirrors.

Is the next technological revolution on the way?

The world has changed at a breakneck pace in the past few years. Will the new key technologies bring about equally profound changes in our lives? If we look at the various different disciplines, that have hitherto led rigorously separated parallel lives, then we can give an unequivocally affirmative answer to this question. Because nanotechnology has a good chance of becoming the most significant enabling technology of all time. It should be understood as an array of technologies dealing with structures

and processes on a “nanometric” scale: A nanometre is one billionth of a metre and designates a boundary zone in which the surface properties of the materials play an ever greater rôle than their volume properties, and in which increasing attention has to be paid to effects from the realm of quantum physics.

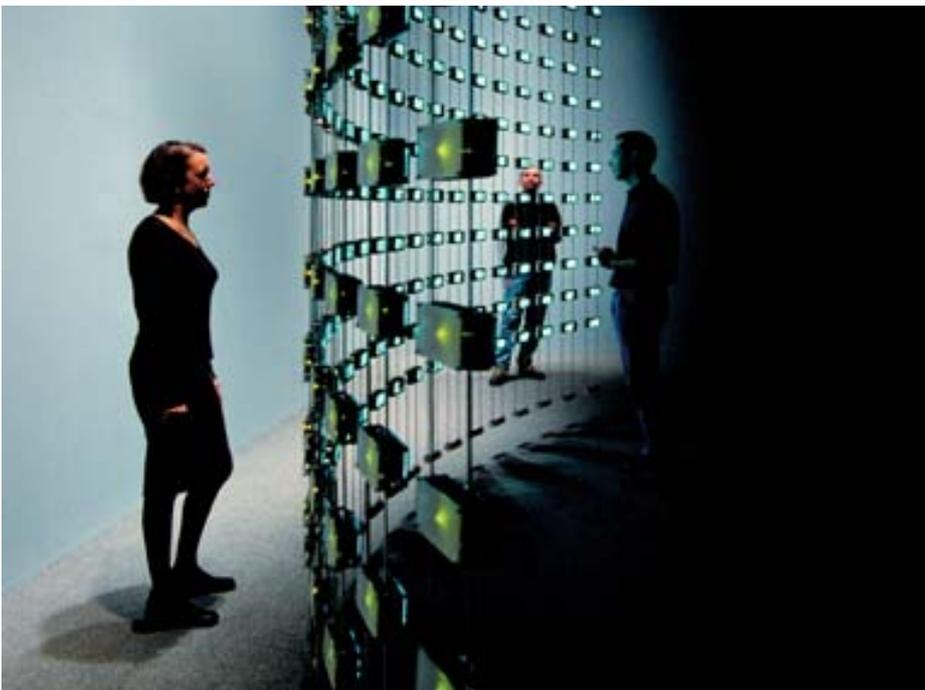
One peculiarity of nanotechnology is its cross-disciplinary interplay of many different areas of knowledge, each in itself highly specialised. In nanotech, physical laws converge with chemical properties and biological principles; the boundaries between mechanics, information technology, biology and chemistry cease to apply. It is from this fact that the many and varied possible uses for nanotechnology are derived: Further miniaturisation of semi-conductor electronics and optoelectronics, combating tumours, programmable manipulation of matter at the atomic level, creating novel materials. With wholly new classes of materials coming into being, we can expect to see a “re-invention of nature”, with organic molecules being used instead of silicon as the hearts of the ultra-fast computers of tomorrow. Molecular medicine, anti-ageing, tissue culture, gen-foods and cloning are further stages along the road.

The Computer is becoming indispensable

All areas of life will be affected; opportunity or risk? But it’s not only in the scientific field that individual disciplines are coming closer together, the different levels are more and more intermingling elsewhere, too: Technology, culture, society. Is it at all possible to keep these things apart? Indeed, has it ever been? What belongs where – today? What was it like yesterday?

For instance, one development is the gradual disappearance of the computer as a stand-alone unit. Or, to put it another way: As intelligent “beings”, computers can nowadays be found more or less everywhere, integrated within over-arching systems. In the car industry, for example. Electronic monitoring keeps a constant check on e.g. the speed at which each of the wheels is rotating. For us humans, this is completely invisible, and – ideally – we’ll never even notice a thing. The computer as a discrete device which we can program and operate is increasingly on the way out. Another example: RFID (radio frequency identification). These chips are a new and better alternative to the ubiquitous barcode. They are radio-enabled microchips that are set to be incorporated in every single product, and to remain there for its entire life. All the characteristics of the product are stored on them – but also interesting information on its user.

The possibilities are mind-boggling – industry and retailers are jubilant, but how should we respond? Another trend that the Ars Electronica Festival cast a very revealing spotlight upon is the massive spread of technology into many and varied areas of our lives (like our present-day text-messaging and e-mail-based communication culture). “Timeshift” examined a period spanning a total of 50 years, over which time this development could be observed very clearly. First and foremost, however, the individual trends were examined from different viewpoints and subjected to altogether critical comment. And that was exciting. Very exciting. Opportunity or risk? That’s a question everybody must answer for themselves. By the way, you can find all the talks, summaries and write-ups of the events at www.aec.at/timeshift.



Ars Electronica 2004

Top: "Moving Thoughts" – the human computer interface: Brain waves that directly control a computer.

Bottom: "Listening Post" – every message that pops up on this installation was written only seconds beforehand in a chatroom, message board or forum somewhere on the Web. Text displays and a sound system reflect this global communication.



Heinz Hackl,
Head of R&D at Fronius
International GmbH

The world of welding in 25 years' time:

What will be the shape of welding technology in the next quarter-century? Fronius is significantly involved in shaping this future. In our view, these are some of the main developments:

- miniaturisation of system components as a result of ongoing advances in computerisation and digitisation (a power source in shoe-box format?)
- novel operational concepts, incl. integration of essential operator functions in the welding torch (so that the entire welding process can be controlled "on the spot")
- pushing out the boundaries of what has previously been possible (smaller sheet thicknesses with higher deposition rates)
- controlled arc (the ever greater mastery of the arc permits completely new skills, e.g. the CMT process)
- development of new process variants (with a view to higher efficiency or to other applications, e.g. joining steel to aluminium)



Epitaxy plant in the cleanroom of the Institute of Semiconductor and Solid-State Physics at the Johannes Kepler University, Linz. This is used for depositing semiconductor heterostructures with atomic scale precision.

Nanotechnology

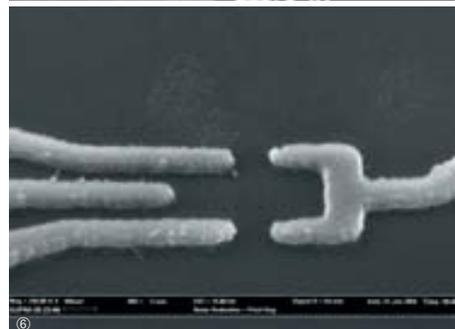
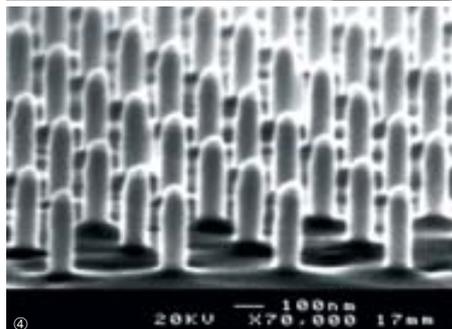
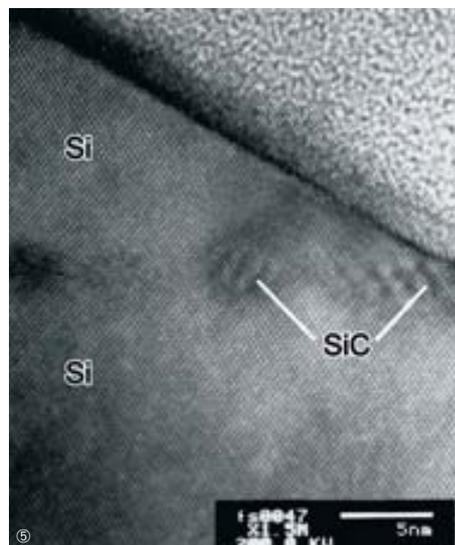
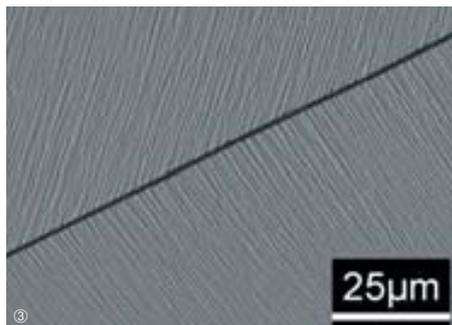
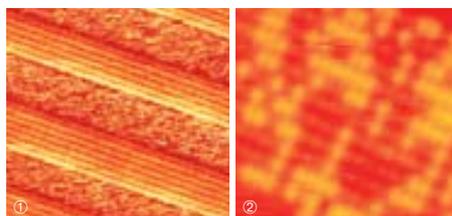
A nanometre (from the Greek “nanos” = dwarf) is the billionth part of a metre. The relationship in size between a nanostructure and a football is the same as between this football and the Earth.

By “nanotechnology”, we mean the manufacturing of materials and systems in just this infinitesimally small order of magnitude, i.e. on a nanometric scale. By altering matter at the nanometre level, it is hoped that better properties – optical, electrical, chemical and mechanical – will result.

At the Johannes Kepler University in Linz, Austria, co-operative development ventures have been underway since the early 1990s on the topic of nano-science, which originally came under the subject heading of physics. Today, the university boasts a NanoScience and Technology Centre with a well established nano-network, and can offer courses that take an interdisciplinary approach to the study of nanotechnology. More at www.nanoscience.at.

① Copper/copper-oxide stripe phase at atomic resolution. ② Cobalt/cobalt surface alloy at atomic resolution. Both images were taken with a scanning tunnel microscope. ③ Organic crystals with needle-shaped distribution, for optical applications. ④ Etched semiconductor nano-

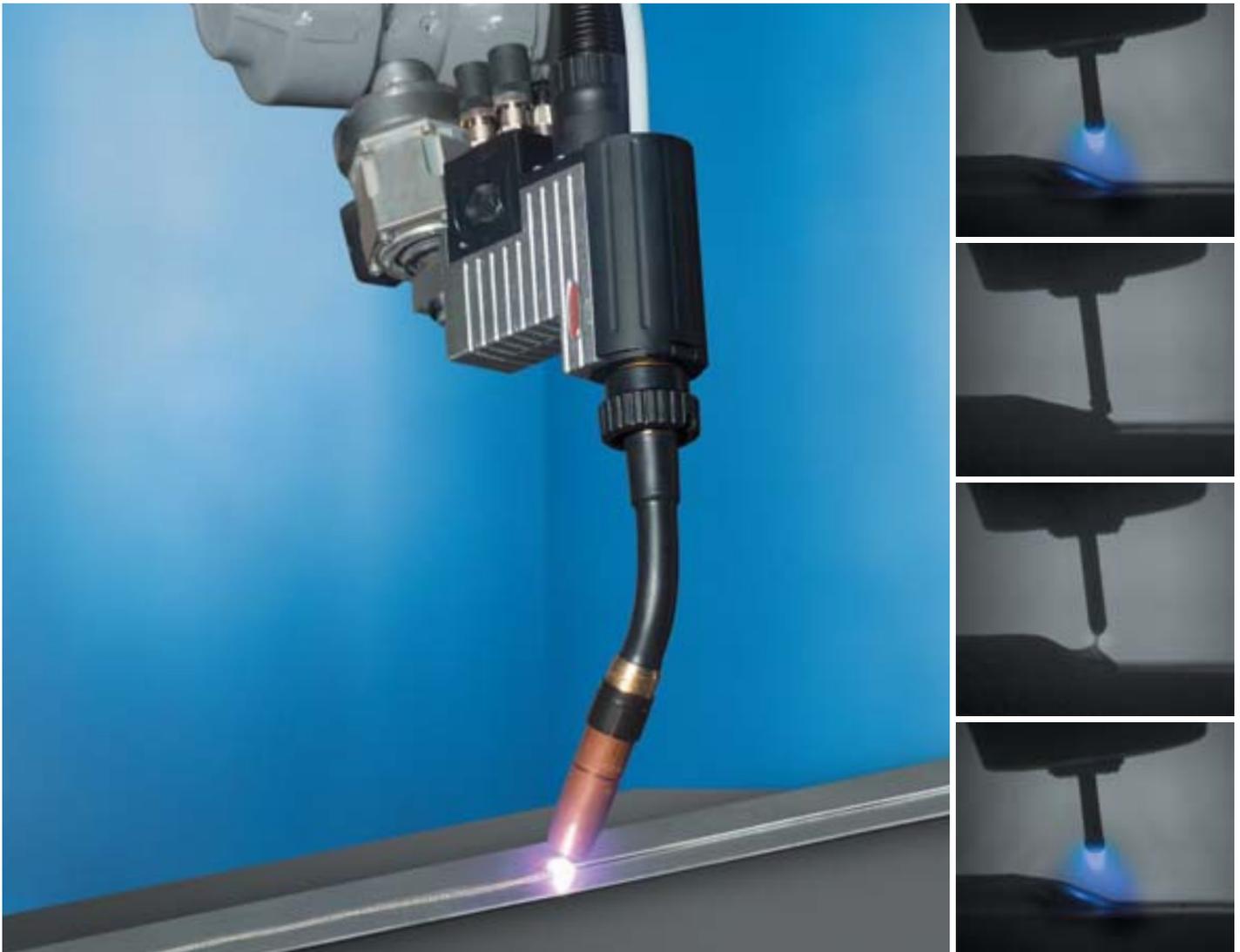
structures for laser applications. ⑤ Approx. 5nm small silicon carbide precipitations in a Si crystal. Transmission electron microscopy at atomic resolution. ⑥ Electrode configuration for a single-electron transistor (SET) fabricated by electron beam lithography.



Some like it cold

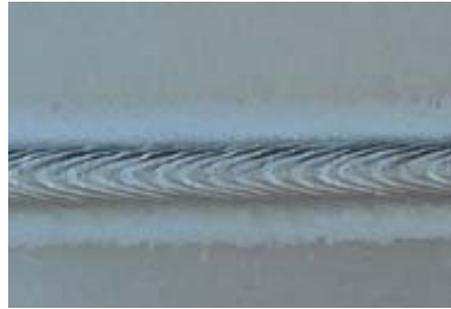
THE NEW WELDING PROCESS CMT IS **THE** INNOVATION
IN THE FIELD OF JOINING TECHNOLOGY

There are materials and applications that cannot withstand the constant heat of a welding process. These are the situations where one has to resort to other joining processes and to forego all the advantages of a welded joint. This will be very different from now on. Fronius has developed an ingenious process that makes a lot of things possible that have so far been impossible. CMT – Cold Metal Transfer. The characteristic feature of this process: hot, cold, hot, cold, hot, cold. Simple as it sounds, it took five years' intensive research work. Now the process is ready for series production.

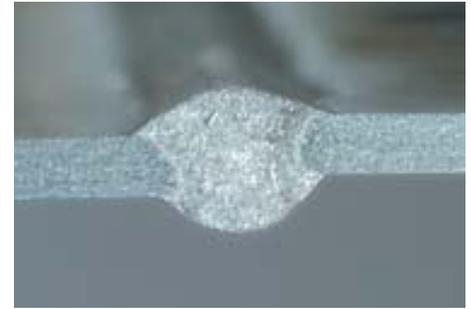




CMT-brazed joint between hot-dip and electrolytically galvanized sheet. Sheet thickness 1.0 mm, filler metal CuSi3.



Fillet weld on 1.0 mm AlMg3 sheet with welding speed of 2.0 m/min.



Butt-weld, without weld-pool backing support, on 0.8 mm AlMg3 sheet.

Spatter-free MIG-brazing and MIG/MAG welding; light-gauge joints from 0.3 mm (still spatter-free even in butt-weld configurations without a weld-pool backing support); joints between steel and aluminium – these are all typical situations that “like it cold”. And are the applications that CMT was developed for. A process with a lot that’s different about it.

CMT gives the material the hot&cold treatment

The first big difference from dip-transfer welding is that the wire motions are directly incorporated into the process-control. The digital process-control detects a short circuit, then helps to detach the droplet by retracting the wire. All digitally controlled. The wire goes forward and back, forward and back.

Which brings us to the second difference – virtually current-free off-circuit metal transfer. The wire moves forward, and as soon as the short circuit happens, it is pulled back again. Automatically. In this way, the arc itself only inputs heat very briefly in the arcing period, after which the thermal input is immediately reduced. Hot, cold, hot, cold, hot, cold.

And it is precisely this which leads to the third big difference. The continuity is provided by the constant forward and back motion of the wire. This motion supports droplet detachment during the short circuit. The result: spatter-free metal transfer. And thanks to these three differences, applications are now possible that could only be accomplished previously with a great deal of effort.

A further difference: The rapid forward and back motion of the wire meant treading completely new paths, technologically speaking, on the robot welding torch. Firstly, there are two wire-drives – one at the front, that pulls the wire forward and back up to 70 times a second (as against up to only 5 times in SyncroPuls) and one at the rear, that pushes the wire. Secondly, there is a “wire buffer” interposed between the two drives, to decouple them from one another and to provide additional storage capacity for the wire.

CMT is absolutely unique – you won’t find anything like it anywhere in the world. With CMT, Fronius has taken a giant developmental leap forward – and one that will have a lasting influence on welding technology.

New spectrum of applications

As so often at Fronius, it was a customer who got the CMT research drive rolling. A very small part had to be welded, but could not be fabricated using conventional fusion welding processes. Straight away, that typically Fronius “there must be a way we can do this” sort of feeling came into play. And as we can see, they did it. And not only that. Some brand-new applications are opening up, especially automated ones. Like joining ultra-light gauge sheets (from 0.3 mm) with no weld-pool backing support, no post-weld machining and no spatter. For visually exposed seams in the automobile industry, for instance. Or for welding steel and aluminium together, something which used only to be possible with huge effort.



The wire buffer decouples the front and rear wire-drives from one another and ensures smooth wire travel.



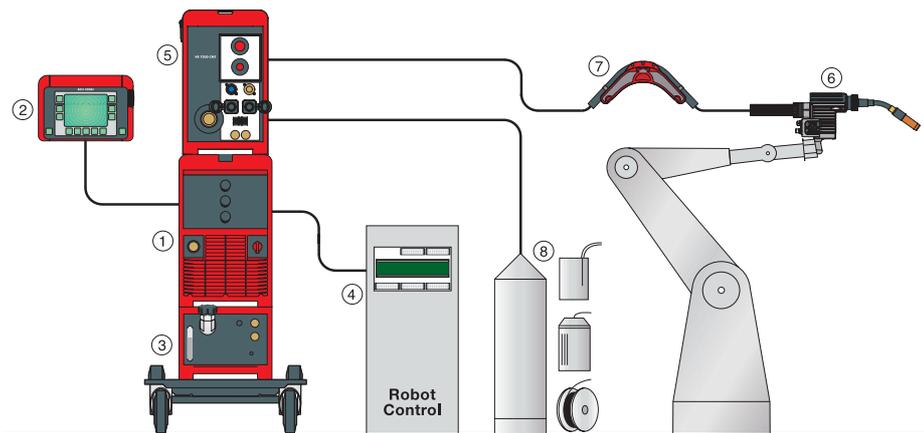
Compact and practical. Integrable into every system, the inner-liner changer works quickly and easily.



The new tension-lever system in the welding torch ensures constant and reproducible contact pressure.

The success package

The CMT process is a totally new development. All the components were given a rethink, adapted to the CMT process and harmonised with one another.



1. TPS 3200 / 4000 / 5000 CMT power source
A fully digitised, microprocessor-controlled and digitally regulated GMA inverter power source (320 / 400 / 500 A) with an integral functional package for the CMT process.

2. RCU 5000i remote-control unit
Remote-control unit with full-text display, weld-data monitoring with Q-Master function, easy-to-follow user guidance, systematic menu structure, user administration features.

3. FK 4000 R cooling unit
Sturdy and dependable, ensures optimum cooling of water-cooled robot welding torches.

4. Robot interface
Suitable for all customary robots, irrespective of whether these are addressed digitally, in analogue or via field-bus.

5. VR 7000 CMT wirefeeder
Digitally controlled wirefeeder for all common types of wirepack.

6. Robacta Drive CMT
Compact robot welding torch with digitally controlled, gearless, highly dynamic AC servo motor. For precision wirefeed and constant contact pressure.

7. Wire buffer
This decouples the two wire-drives from one another and provides additional storage capacity for the wire. For mounting on the balancer (preferably), or on the third axis of the robot.

8. Wire supply

CMT – The innovation that came in from the cold.

OK, “cold” is relative. But in relation to the thermal input that is usual in the MIG/MAG process, CMT counts as a cold process. What is altogether new – and is characteristic of CMT – is the way in which the wire motions are incorporated in the process-control. The wire is constantly moved forward and back, throughout the entire welding operation. And the net result of this is the tremendous advantage of low thermal input, with all the resulting benefits for many different applications.



CMT joint between steel and aluminium. Welded on the aluminium side; brazed on the steel side.

Everything under control

HOW DOES A MERE WELDING TASK BECOME A PROPER “JOB” THAT CAN BE DOCUMENTED FROM A – Z?

Gathering, storing, evaluating, documenting, visualising, analysing, correcting, transferring... and so on and so forth. Users have a lot in mind with their welding data. Quite apart from the fact that the welding process itself – as a central element in this chain of requirements – should also be very easy to operate, of course. Fronius offers different tools for different jobs here.

With the RCU 5000i, welding data are documented locally, and analysed centrally.



Essentially, there are two common approaches to documenting welding data: Central and local documentation. Fronius has something for both of them.

Local data documentation

With the RCU 5000i remote-control unit, welding data can be stored locally on a SmartMedia card. This makes it easy to transfer the welding data to a PC, meaning that they are then available centrally as well.

The RCU 5000i is a remote-control unit that can perform a lot of intelligent services “on the spot”, right where the welding action is.

A few examples:

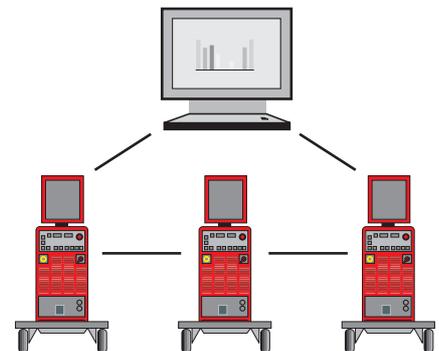
- creating and administering jobs
- online process monitoring with Q-Master functionality
- highly flexible user administration (by user profile)
- access authorisations by touchless transponder key
- saving the welding parameters for documentation and analysis

For the user, the most satisfying thing about using the RCU 5000i is definitely its graphical full-text display in the desired language – no abbreviations, no codes, and PC-style menu navigation.

WeldOffice is used for collecting, visualising, evaluating and archiving the welding data from all power sources at one central point.

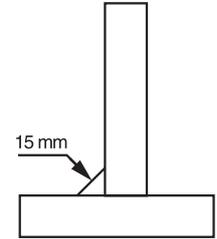
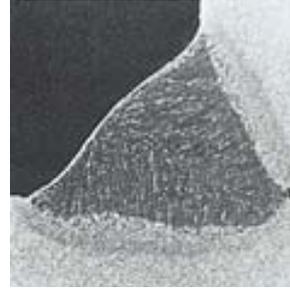
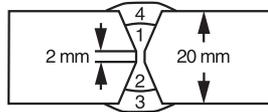
Central data documentation

It's a different story with WeldOffice, a program that sends all the welding and telemetric data from several welding installations to one central computer, where they are collected, archived and evaluated. With an integrated early-warning system.



Digital TIMEs

SUCCESSFUL HIGH-PERFORMANCE PROCESS SOON WITH NEW TECHNOLOGY



Double-V weld in gravity position

Fillet weld in horizontal position "a 5"

| Manual weld | 1 st – 2 nd bead | Manual weld | 3 rd – 4 th bead |
|------------------|--|------------------|--|
| Welding voltage | 28-32 V | Welding voltage | 33.5-38 V |
| Welding amperage | 240-300 A | Welding amperage | 320-380 A |
| Wirefeeder | 9-12 m/min | Wirefeeder | 15-18 m/min |
| Welding speed | 40-50 cm/min | Welding speed | 74-80 cm/min |
| Deposition rate | 4.8-6.4 kg/h | Deposition rate | 6.0-9.6 kg/h |

| Manual weld | 1 st – 2 nd bead |
|------------------|--|
| Welding voltage | 37 V |
| Welding amperage | 330 A |
| Wirefeed speed | 15 m/min |
| Welding speed | 65 cm/min |
| Deposition rate | 8.0 kg/h |

Included angle 50°, gap 2 mm, without grooving-out

There can't be that many welders that aren't familiar with it: The classic MAG high-performance welding process for manual welding. We're talking about TIME, a welding process that unites superb cost effectiveness and impressive seam quality. A sensation at the time; an established player today. And from the beginning of next year, totally digitised.

The TIME success story began back in 1990. This was when Fronius received an enquiry from a client in Japan asking whether Fronius could produce wirefeeders capable of higher speeds than the 20 m/min that were usual at the time. Fronius got down to work straight away and marked the "beginning of TIME" by developing a unit that managed 30 m/min. And that was a huge success right from the word go.

With steel, the generally accepted definition of high-performance welding is when either the wirefeed speed is higher than 15 m/min or the deposition rate is higher than 8 kg/h.

Fronius' TIME process manages wirefeed speeds of 30 m/min, and welding speeds that are up to a third faster. In nearly all welding positions. This boost to productivity, and the economic advantage it confers, are still of very great significance in the manual welding field. And this, in turn, depends very closely on the gas mixture. In the early 1990s, Fronius worked with a special – and somewhat expensive – shielding gas mixture licensed from Japan. Today, there are a number of more economical shielding gases for the TIME process, e.g. with a composition of: 3 % O₂ / 25 % He / 72 % Ar.

From 2005, TIME will be even more interesting

The digitisation of the TIME process has made it more attractive still. All the advantages resulting from the use of digital technology, such as reproducibility and welding quality, easy updating and handling etc., will also be available for the TIME process from the beginning of next year.

Digital TIMEs – long may they live.

Fronius triples its photovoltaic production capacity



Solar power – the trend of our times

The trend towards solar electric power installations has risen by leaps and bounds this year. Above all, the surge in demand from Germany has prompted Fronius to expand the capacity of its inverter manufacturing operations by another 200 %. Only a year ago, shortly after the successful launch of the FRONIUS IG series, Fronius doubled its capacity. Despite this massive boost, Fronius is sold out until the end of the year. Among the reasons for this brisk demand are the improved state grants that are now available, as well as the higher power classes (4 kW and 6 kW) launched at the beginning of this year, the above-mentioned IG appliances and the MIX concept.



Despite a big capacity hike, inverter-production is booked out until Christmas

CIP up and running since May

In 1 year's project work, Fronius conceived and designed a "continuous improvement process" – CIP for short – which is now being implemented. A cornerstone of this CIP is a weekly, moderated team meeting at which pending ideas and solutions are systematically dealt with and implemented. In the process, team members pick out potential improvements that they have recognised as such in their working environment. These improvements may derive from the product or the work process, or from the design of the workplace. There are already seven CIP teams, with ten more on the way before the year is out. The aim of CIP is to continuously improve the working environment, and to enhance both the workflow and employee satisfaction. Ultimately, this has a very positive impact for our customers, in terms of our reliability as a supplier and our manufacturing quality.

Important expo dates

Beijing Essen Welding:

10.–13.11.2004, Peking, China

AWS Welding Show:

26.–28.4.2005, Chicago, USA

59th Annual Assembly of the International Institute of Welding:

28.8.–2.9.2005, Quebec City, Canada

Schweissen und Schneiden:

12.–17.9.2005, Essen, Germany

Safe current in the auto workshop with Acctiva Flash

Nowadays, if a car has to be taken to the workshop, then very often it will be because the sensitive interplay of software and sensor systems is malfunctioning. Electronic componentry has now become crucial to keeping vehicles running smoothly. This means that when it comes to repairs, there are countless functions and actuators to be checked: DVD, navigation, ABS, air-conditioning, rain sensor, parking assistant, power windows, headlamp washer system, boot-lid release etc. The power needed for all these operations can drain the battery, meaning that the vehicle needs an additional power supply. Fronius has recognised this trend and joined with the automobile industry to develop the Acctiva Flash – a combination of a charger and a vehicle power-supply unit. With it, all the testing sequences can be carried out without any problems.

Up-to-the-minute welding news – free!

At www.fronius.com, you can sign up for our newsletter, which is sent out once a month. In it, you will find out everything about the latest Fronius activities, as well as about general industry news. The following newsletters are on offer: Welding Technology, Battery Charging Systems, Solar Electronics, The Company.

Fronius promotes Austria's up-and-coming young welders



Fronius congratulates the young welding talents

The fourth Austrian youth welding championship took place in Vienna in May 2004. The Austrian Chambers of Commerce and their Institute of Business Promotion (WIFI) called this multi-discipline and specialists' contest into being as a way of promoting young talents by giving them an opportunity to put their skills to the test, both practically and theoretically. There are two separate welding competitions – a specialist contest and a combination contest. This event is also supported by Austrian companies such as Fronius. This year, Fronius donated the main prizes for the two winners, Tolgahan Aydogan and Daniel Welte, each of whom received a TransPocket 1500. Here's wishing them "happy welding"!

Fronius Slovakia delivers the proof



High-quality service at the Slovak trade-fair stand, too

"Identical quality, worldwide" – one of the main planks of the Fronius philosophy – is put to the test every day in Slovakia. For this is a country with a great many foreign investors who can make a direct comparison and who also insist on the same high quality of customer care that they are used to back in their home country. And Fronius Slovakia provides unambiguous proof that the philosophy really works. Slovakia comprises three geographical regions, which Fronius services as follows:

- Western Slovakia, from Fronius' branch in Nitra
- Central Slovakia, from the branch in Banská Bystrica
- Eastern Slovakia, by way of our long-standing distribution partner Technozvar

Fronius Slovakia's biggest clients are Volkswagen Bratislava, Dura Automotive and Tower Automotive. The main medium-range goal is market penetration.

Find out more at www.fronius.sk

Axson opens Robot Welding School



The new training rooms in Gothenburg

Since 2003, the importance of industrial robots has been on the rise once again, throughout the world. The predominant application is welding. It's not only Fronius that has been banking on this growth market for many years, but our partners have also been responding to developments. Axson Sweden, for example, which recently opened its Robot Welding School – a training centre for customers. Axson took the opportunity presented by the building of its new 1300 m² HQ in Gothenburg to place a strong emphasis on customer care. The interest shown in its training courses is simply huge. Six different robots from ABB and Motoman are available. It is also intended to deploy Kuka technology. However, Axson not only trains its customers on brand-new products, but also on older types of machine that are still in use in large numbers out on the market. For Axson, imparting this know-how is a significant factor behind its success in the field of automated welding.

Forward to the client land

*THE MOST IMPORTANT ROUTE: "ON THE SPOT"
EXPERTISE*

VSP is the phrase on everyone's lips at Fronius when it comes to customer care. VSP is the German initials for "Distribution and Service Processes". The underlying goal: "On the spot" expertise. Right at the customer's. Meaning decentralisation instead of centralising.



It all began in 2000. This was when a decision was taken at Fronius to organise sales and distribution along strategic lines. Rather than the customer having to come, it's Fronius that goes to the customer. From as close as possible. The aim was to create a lot of little competence units at the local level. A restructuring phase got underway, which is due to be completed throughout Fronius' direct-sales organisation by 2008. Step-by-step implementation with the representatives will begin in 2005.

"On the spot" expertise means being on hand to offer the customer everything it needs to keep production and workflows humming away smoothly. From the solution itself, to service and spare-parts deliveries (see also the interview). Within the shortest possible time. And with contact persons who not only speak the same language but also share the same culture, and for whom 8 in the evening is not 3 in the morning.

The principal building-blocks of VSP are:

- uniform distribution and service guidelines
- communication via worldwide "Schweisser-Cafés" (a virtual communications platform with real "welders' cafés", presently at 33 locations)
- the same initial and in-service training worldwide, for all employees of Fronius and representatives
- support from international and national process experts: building up a network of experts who work as a team

Setting trends in customer care as well

Wolfgang Lattner, Head of Sales, Welding Technology Division, Fronius International GmbH



w+v: *Mr Lattner, you've spent 26 years working in Fronius' sales organisation. One might say that you know the sales organisation like the back of your hand.*

W.L: *Yes, that's true. Although it certainly doesn't mean that this occupation has ever become monotonous. Just about every single day is different. And has been for 26 years. Which is why I've never felt like changing to any other area of work.*

w+v: *Has customer behaviour changed at all in these 26 years?*

W.L: *Yes. Customers have become much more demanding, and are also considerably better informed nowadays, as well as having a more thorough grounding in welding technology.*

w+v: *More demanding – in what ways?*

W.L: *They expect more from us. In my opinion, there are several causes for this. Firstly, all technological products are getting ever more complex, which means that the issues raised by customers automatically require more from us. Secondly, many years ago Fronius was just one supplier among many. Today, Fronius is a brand, as well as being the European market leader. And the expectations made of a market leader are altogether different. A third aspect, as I've mentioned, is our customers' higher levels of training and knowledge. This means that the enquiries start from a much higher level.*

w+v: *How does that make itself felt?*

W.L: *Well, on the one hand, customers are coming to us with more difficult enquiries. On the other hand, we offer customers a comprehensive package of services along with the product itself. This begins with preliminary trials, and continues with prototyping and trials on the actual weldment – taking in anything from economic appraisals of many different types of process to individual configurations, not to mention commissioning – and ends with training, production support and after-sales service as needed. And all of this "in-situ" – that's the whole point.*

w+v: *Is that usual?*

W.L: *Not really – not yet, anyway. In the welding technology field, Fronius is definitely a trendsetter here.*

w+v: *What's the picture in other sectors?*

W.L: *I believe that more and more companies in the industrial goods sector are taking this route, even if the customers here are still somewhat more conservative. They think the service is wonderful, but then they're surprised to find that it also involves expenditure. It's not like this in other sectors. In the IT sector, for example. Nowadays, everybody knows that it's not just the hardware that's an investment, but that installing, configuring, commissioning, maintenance, updates etc. are also part-and-parcel of the investment.*

w+v: *Mr Lattner, thank you very much for talking to us.*

You can join a lot of things with 212 tonnes of steel

A PRACTICAL EXAMPLE CONCERNING A NEW FOOTBRIDGE IN WELS, UPPER AUSTRIA

Wels and Thalheim, Austria and the Czech Republic, commerce and industry, the public and politics – they all came closer in the course of a single project: The building of the new “Traunsteg”, a bridge for pedestrians and cyclists across Upper Austria’s River Traun.



On the opening day, 5th June 2004, the atmosphere was happy almost to the point of euphoria. The mayor of Wels spoke of a great community spirit on the part of all those present, saying that the footbridge was an impressive demonstration of how the “Welser Land” district is growing together and belongs together.

Getting to this point had been a long, hard slog, even if the bridge itself did only take a mere 10 weeks to construct. What with the architectural competition, the tendering and planning phase, approvals, the search for partners etc., it’s not difficult to imagine how much work goes into a privately sponsored project like this. At any rate, the first time anyone

thought aloud in public about the idea was back in 2000. And now the bridge is finished.

Královopolská, a.s. – a specialist for heavy, complicated steel constructions

The bridge was built by the Czech company Královopolská, a.s., a Fronius Česká Republika customer of seven years’ standing. This private company has been in existence since 1889, and has built up an excellent international reputation (export ratio: 80 %). In two giant production hangars, heavy equipment is produced for petrochemicals plants, power stations,

steel structures and cranes. The individual parts may weigh as much as 160 tonnes. Among the company’s references are AMRO, ABB, Lummus Global, ALSTOM, Falkria and Noell, to name but a few.

Královopolská, a.s. can look back on a very satisfactory working relationship with Fronius. Some time before building the “Traunsteg”, the company purchased a sizeable number of VarioStar 457-2 power sources and has experienced nothing but the best with them – in terms of both operational performance and the accompanying services. Královopolská a.s. aims to continually modernise its welding systems, and so is interested in further co-operation.



Technical details of the “Traunsteg” footbridge

The bridge is suspended on three cables slung from the approx. 26 m tall, triangular-profile pylon. It is interestingly shaped on two planes, with a pronounced curve and camber. The steel construction itself consists of five segments which were fitted together in the shape of an arch. The structure rests on shoe-shaped, triangular-profile piers.

Overall length: approx. 100 m, 5 parts measuring 18 – 24 m each

Weight: 212 t

Constructional shape: Trapezoidal, width 4 m, height 1.2 m

Base metal: S355J2G3

Butt-welds: 100 % verified

Welding method: mainly MAG

Length of weld-seams: 1200 m, most of them P 14, 12, 8 fillet welds

Filler metal: to EN 440:

- G3Si1 (OK Autrod 12.51),

Total consumption 2340 kg

Longitudinal seams on the pylon:

Submerged-arc method, filler metal: to EN 756:

- S2 (OKI Autrod 12.20),

total consumption 360 kg

Power source: VarioStar 457-2



I only ever buy the very best

WELDING STAINLESS STEELS

Carlos Egberts has a habit of asking what his customers want. A method with which his niche engineering firm competes successful with the “big boys”. Because purity is paramount for his customers, the only other constructional material he uses apart from plastic is stainless steel. His clients from the food-processing, cosmetics and pharmaceutical industries are so satisfied with the results that his firm is working to capacity. This is why investments in time-saving, productivity-boosting welding systems are right at the top of his list of priorities. When deciding which new welding system to invest in, he was true to his motto: “I only ever buy the very best. Because I only pay the price once – but we have to work with the welding system every day!”



The Dutch company EFM specialises in machinery for the food-processing, cosmetics and pharmaceutical industries; here proprietor Carlo Egberts with a packaging plant for convenience foods.



Top: Jos van Keulen and Carlo Egberts give the TPS 2700 CrNi Edition top marks for speedy selection of the ideal program, and ease of operation in real-life testing.



Top right: Jos van Keulen, one of the welding experts at EFM, welds at least four to five times faster with the TPS 2700 CrNi Edition than with the TIG equipment he was using previously.

Carlo Egberts has had his own engineering business for the last seven years. He now has a workforce of five and generates over EUR 1 m in annual sales revenues. In-house value addition accounts for around 70 % of this. Over 20 % of the value added by the firm is attributable to welding. "Welding is very important for us. Clean weld-seams, of perfect appearance, are what make our machines stand out. And because it inspires confidence, this quality is something our customers have to be able to see. If we supply good machines that our customers are satisfied with, they'll come back for more. That's why we have enough orders", is Egberts' explanation of his successful business development strategy.

Buying only the best also holds good when it comes to welding-systems. However, the firm's old TIG appliances were only "the best" with regard to quality. For this dynamic entrepreneur, their productivity was much too low. At a trade-fair in Utrecht early this year, Carlo Egberts found the solution he was looking for: A MIG/MAG welding system suitable for stainless steel, featuring push-pull wirefeed and directly selectable CrNi programs for every application. "If that really works the way

they say it does, then I'll buy it", was his spontaneous decision.

As a hard-nosed businessman, the proprietor of EFM Machinery BV wanted to make absolutely sure. So he agreed on in-house testing with Fronius' Dutch distribution partner, Interlas BV: "The Interlas advisers came here to give us introductory training. For a new welding system, the induction period needed for my employees was extremely short. I've never seen anything like it with other welding systems. We were so impressed with the test results that we bought the TPS 2700 CrNi Edition straight away." And how do things look now, after three months' practice? "For the sort of massive constructions we do, the quality is just great. As well as the other advantages I outlined, the productivity is much higher. Given the high labour costs that we have here compared to other countries, this is a crucial competitive plus", the successful entrepreneur sums up. And his employee Jos van Keulen adds: "Now I'm welding at least four or five times as fast as with our 160 A TIG machines". With around 30 t of austenitic CrNi material being processed every year, this gives the firm a hefty competitive edge.

EFM Machinery BV

Based in the Dutch town of Roelofarendsveen, EFM Machinery BV specialises in machinery for filling, sealing, labelling and coding containers. These may be used for packaging anything from ready-made meals to shampoo or disinfectant. Some highlights over the past year have been a labelling machine for engine-oil canisters for an Exxon plant in Cairo, and currently a major project for filling, sealing and labelling bottles of contact lens care solution.

Technical data

Technical data of TPS 2700 CrNi Edition

| | |
|-----------------------------------|-------------|
| <i>Welding current range</i> | 3 - 270 A |
| <i>Welding current at:</i> | |
| <i>10 min / 25 °C, 100 % d.c.</i> | 210 A |
| <i>10 min / 40 °C, 100 % d.c.</i> | 170 A |
| <i>Dimensions LxWxH mm</i> | 625x290x475 |
| <i>Weight</i> | 2.5 kg |

Seen from the moon, the world looks quite different

VISIONARY KLAUS FRONIUS ON IDEAS, FREEDOM AND THE FUTURE OF THE COMPANY

It takes visions to be able to lead a company successfully into the future. Visions that sweep everybody along and give them momentum. No easy task. But one to which Klaus Fronius has risen nonetheless, well aware of the responsibility it entails: That of securing the long-term livelihoods of over 1450 employees.

“A vision must hold out a promise of success, motivate, attract, and be unique. To be quite sure of not just copying an existing vision, I started by going on a mental journey a long way from the Earth. In my thoughts, I took a seat on the moon”, says Klaus Fronius, explaining how he approached this headwork. “Because from up there, you’ve got the best overview. With other perspectives opening up. And the interesting thing is, I’ve found that the further away your viewpoint is, the closer you can get to the core of things, and the better you can get to know your own environment.”

“Fronius as a driverless, self-steering bus”

“And so it was that the Fronius company revealed itself as a multi-coloured bus. There was music to be heard, laughter, eager discussions, serious words, and jokes galore. The bus was powered by

the sheer energy of the people sitting in it. And energy starts in the head. Without consuming any raw materials or emitting any exhaust fumes. What was more, the bus was moving ahead with no help from any driver, accurately and single-handedly following a red line. If you like, it was self-steering.”

These and other such powerful images, all replete with potential associations, were garnered by Klaus Fronius from his detached, secluded vantage point. A wealth of material to interpret. Which it duly was. In collaboration with the Management Team, this vision was distilled into the company’s fundamental strategy. This relates to finance, markets, innovations and processes. Fronius is pursuing a strategy of growth, and striving for technological leadership in all the fields it works in. The primary motive force behind this is the company’s employees. With their skills, their attitude and their motivation, they constitute its core potential. Both their personal and professional development is a real concern to Fronius. Work at Fronius takes place in projects and teamwork; honest communication, tolerance, a pronounced feedback culture, keeping within budgets, consensus solutions and a harmonious balance between rules and freedom of manoeuvre – all these are typical of the company.

Every limitation also limits what is possible

“We take a broad-minded and open approach to many things. Deliberately. Because every limitation diminishes our scope for looking into the future”, continues Klaus Fronius. “The important thing for me is that our culture allows for ideas. In principle, everything ought to be possible. With my ideas, too, quite a few folk shook their heads to begin with, and thought I’d gone crazy. At Fronius, nobody is dismissed as crazy. Each and every one of us is equally important and is taken equally seriously. Our people sense this.” And are spurred on by it.

The simple ideas are the best ones

And ideas there are in abundance at Fronius – more, indeed, than there are resources on hand to implement them. Ideas like developing solar-powered fuel cells; or cars that not only protect their occupants in an accident, but also protect pedestrians by yielding on the outside. The important thing here is that new products must be strikingly different from existing ones. And the simplest ideas are almost always the best ones. Long years of experience bear this out. What advice does Klaus Fronius give to all those who have their difficulties with visions, ideas and the inventive spirit? “Sit back and think a bit, take a little trip up to the moon.”



Trends made in Detroit

*FRONIUS IS WHERE
THE ACTION IS*



Detroit is interesting not only for historical reasons, but also for its rôle as the innovation leader in one of the world's most important industrial sectors: The automobile industry. Detroit is where the trend-setters cluster. And where, once a year, they unveil their latest developments – at NAIAS, the North American International Auto Show. Fronius knows which way the trends are moving, for the simple reason that Fronius belongs to the élite circle of auto-industry vendors.

Fronius has had branches of its own in the USA for two years now. In Brighton, MI and in Birmingham, AL. Shortly after Fronius opened its branch in Brighton, one of the biggest auto-industry suppliers of all – Benteler – became a Fronius customer. This company already owns 180 TransPuls Synergic 4000's, six of our plasma systems and five Fronius TIG systems. A gratifying mark of confidence. After all, Detroit has always appreciated the pioneering spirit.



Detroit was founded by a Frenchman in 1701. Not quite 200 years later, in 1896, Henry Ford built his first motor car there. Today, Detroit is the worldwide headquarters of Ford Motors and General Motors, as well as being the North American headquarters of DaimlerChrysler and Volkswagen. Once every year, Detroit is the venue for NAIAS – the Mother of all Auto Shows. The industry's latest ideas and offerings, that the whole world pays attention to and that more often than not become the international trend, are all unveiled here first. Not for nothing, then, is Detroit known as the "Motor City". Even so, it has much more than just this to offer.



Inventions have always played a big rôle

When it comes to classic sightseeing, Detroit is more of a do-it-yourself sort of place. Because the various attractions are all so far apart that guided bus tours tend to be the exception. Maybe because Detroit is, true to its name, a “motor city”. So Detroit has to be marvelled at through a car window. Your own. But there really is no reason to let that put you off. For there are just so many fascinating places to visit. Like the Henry Ford Museum & Greenfield Village: America’s biggest indoor/outdoor museum pays especial tribute to the inventive spirit of this city. You’ll find Edgar Allen Poe’s desk there, for example. The “Spirit of Ford” is an interactive science and technology centre that spotlights recent and future innovations in the fields of automotive design, engineering and manufacturing. As well as all this, there are of course any number of historic places and museums that are well worth a visit and that refer again and again to the many and varied inventions that this city has brought forth. The Detroit Historical Museums, for instance.

When it comes to nightlife, here too there’s more than enough to go round. And the music business is big in Detroit – very big. Not least because Motown Records is headquartered here. Bringing to mind evocative names like Marvin Gaye, Aretha Franklin, Michael Jackson, Diana Ross and Stevie Wonder. By the way, Madonna is one of the best-known Detroiters. What is more, Detroit is a world-famous sporting city. Red Wings, Detroit Pistons, Detroit Tigers – legendary teams, to a name. An altogether stimulating milieu to live and work in, then. And to be part of.

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