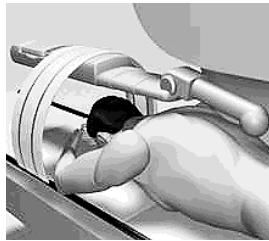




## ENSINGER plastics in special medical equipment MIRA and ROBITOM

Close co-operation with the Research Centre "Forschungszentrum Karlsruhe"

As part of the training course „Processes and Innovative Technologies for Production“, provided by the Research Centre „Forschungszentrum Karlsruhe“, ENSINGER could demonstrate their expertise and knowledge in the field of plastics and the further processing to finished parts. Contact with the FZK has been in existence for several years. Since then, ENSINGER has provided several prototypes with high performance plastics and specially produced parts. Examples are ROBITOM and MIRA, which are special machines in the field of medical technology.



The Research Centre Forschungszentrum Karlsruhe FZK works in the fields of technique and environment on research and development projects of public interest.

In their programme "medical technology" they develop instruments and procedures for diagnostics, therapy and rehabilitation. A basic element is the development of robotic systems suitable to be used in combination with imaging techniques such as computer tomography (CT) or magnetic resonance imaging (MRI). The "Institute of Medical Technology and Biophysics" (IMB) develops systems suitable for use in strong magnetic fields; therefore this field, in particular, has to rely on technical plastics.

With ROBITOM (Robot for Biopsy and Therapy Of the Mamma

carcinoma) and MIRA (Manipulation system for Interventional Radiology) they have developed two systems for different applications.

ROBITOM is a manipulator system intended for breast cancer diagnosis and therapy directly in the Iso-center of closed MRI systems.

The system enables the radiologist to remotely take a precise biopsy of a localized lesion whose coordinates were determined by the MRI system in less than sixty minutes, while the patient will be spared as much as possible.

ROBITOM is very important in the development of advanced methods for diagnostics and therapy.

MIRA is a manipulator system to be used for minimally invasive interventions in both the open and the closed MRI system as well as in the X-ray computer tomograph (CT). MIRA allows the radiologist to approach sites of interest remotely and under permanent image control, and e.g. to inject a drug.

*A manipulator is a machine consisting of components that are linked by joints with the aim of gripping and moving objects. A robot might work autonomously, whereas a manipulator is always under control of the operator.*

Within the manipulator devices of MIRA and ROBITOM the ENSINGER high performance plastic TECAPEEK comes into operation.

Decisive factors for the choice of this material were mainly its radiation resistance, its strength and the extraordinary electrical insulation.

Furthermore, for load-bearing structures in MIRA, glass-fibre reinforced plastics are used to provide the highest precision while the magnetic resonance compatibility will be reached.

The precision parts are produced

either directly at the Research Centre or at the ENSINGER machining department in Cham.

"ENSINGER closely co-operates with research" said Fred Nass, Head of the machining department in Cham. „It is a great challenge for us, to be present at the development of an application from the very beginning, and to finally see how the products go into full-volume production. Nothing is more important than steady innovation. That's why we always participate in such projects."

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### Lecture about high performance plastics

The FZK regularly organizes training courses on „processes and innovative technologies for production“. For January, the topic was „High Performance Plastics“. ENSINGER was asked to prepare and arrange this seminar.

45 participants from research departments attended. All had a special interest in the topic, since they are responsible for their projects' material choice themselves.

"With the help of this seminar, the employees should be made more aware of plastic as an alternative material e.g. for metals" said Holger Krause, organizer of the event, during his introduction.

After a short general overview on plastics, ENSINGER speaker Peter Bongardt from the Technical Marketing department in Nufringen gave a report on practical applications from



the field of medicine. In the second part of the event, Fred Nass spoke about the challenges and difficulties of the further processing technique – machining.

With a small presentation of exhibits from the ENSINGER product range the participants gained an impression of plastic applications.

## ENSINGER sets the course

Maintenance-free sliding plate for points – success in the rail industry

**The facts.** Frequently used points are moved 50 times per day. During this time, heavily loaded wagons thunder with 3,500 axles over the rails. For points to perform free of problems, steel slide seats regularly need the application of lubricants. These lubricants mix together with particles from sand and brake dust and react like a grinding paste. The points therefore need regular cleaning with a high pressure cleaner. Maintenance is very expensive, dangerous, with a high labour content and ecologically harmful.

**The task.** In 1970, there was a close connection and a very successful co-operation between ENSINGER and the Suisse Railway Company, Schweizer Bundesbahn SBB on the area of maintenance-free machine elements from semi-crystalline thermoplastic materials for use in

brake systems, turning systems and point setting systems.

Positive experiences with ENSINGER products and our expertise in the case of new developments and production of technical plastic parts were crucial factors in their decision. They asked ENSINGER to develop and produce sliding plates to equip the steel base plates. The sliding plates needed to guarantee a secure and maintenance free switching operation. Life and costs should correspond to the previous solution of lubricated steel on steel. Further requirements such as the easy and fast exchange of worn out sliding elements without dismantling of the steel slide seat, UV- and weather resistance, environmental compatibility and operating safety had to be met.

**The material.** In accordance with the profile of requirements – especially

tribological stress together with high load stress during use – the choice could only be a material with high load absorbency, a consistently low friction factor and a low wear rate. Basic material was a high molecular modified polyamide 6.6., which was very unusual for injection moulding, the ENSINGER plastic TECAMID 6.6. CF mod.

**The development.** Numerous bench tests based on actual usage formed the first practical use of the plastic sliding plates. They finally led to the availability for use that enabled volume production and installation with SBB and other railway companies. The slide elements are protected by a patent.

**The success.** Quality assurance and observation of the parts begins with the raw materials, goes through compounding and on to the production stage. It includes mechanical,

tribological and dynamic controls on ENSINGER test equipment used for the continual improvement and optimisation of the technique.



The gliding parts are formed in dovetail shape. Diagonally to the gliding direction there are notches that drain off wear dust and dirt particles.

## Editorial



Dear reader.

Fifty years ago the German-French Treaty of Co-operation was established. This event had to be celebrated by politicians, town councillors and ordinary citizens. Among them were many who were doing pioneering work to re-establish friendly relations between the people. Of course these were occasions of joy and satisfaction. But in speeches and essays again and again the worry became apparent that communication and understanding between people were endangered if no one did anything to preserve them. The number of pupils who take part in exchange programmes has de-

creased continually in recent years as well as the interest in town partnerships or in the acquisition of the language of another country.

An occasion to think? I think so!

For those of us who are members of the post-war generation, many achievements – such as freedom, prosperity, democracy – have become so natural that we almost forget about the basic principles.

An important prerequisite to maintain peace is a minimum measure of open-mindedness and tolerance for other cultures and values. Therefore, some smatterings of English and a visit to exotic sites on the internet are not sufficient.

We should experience different world concepts, especially the major cultures, and assess how fixed and

well-justified their convictions and world views are – even if they may seem strange to us.

Amazement and understanding create respect for the dignity of the individual and its culture. And this respect is the basis for a peaceful life together.

The fundamental basis for growing prosperity (and also for a country at the stage of economic take-off) is free trade. Right now it is time to oppose the increasing creation of trade barriers, put up out of ideological reasons or for the protection of national interests. If the German export industry is to progress further, we – the general public – have to show commitment for the support of free trade and open markets.

Political stability also depends on the flourishing of international govern-

ments, built to form an international community from individual people and to create a reconciliation of national interests. We have to be ready to transfer local and national authorities to these institutions.

I think that we should react more sensitively to violations of these principles. Unfortunately, such infringements can be observed on the international floor more and more, and unfortunately scarcely anyone takes note of them.

Best regards,



Klaus Ensinger

## ENSINGER produces components for respirator

### Fall asleep . . . snore . . . stop breathing

Almost one in three adults complain about insomnia, some of them are even affected by sleeping apnoea. Sleeping apnoea means that a person's breathing stops due to an occlusion of the upper respiratory passages. The muscular system of the body becomes limp, including the muscles of the throat and the soft palate. Consequently, the tongue falls back. Meanwhile, the brain continuously transmits signals to our most important breathing muscle, the diaphragm, and gives the order to carry on working. As a result, in the lower respiratory passages low pressure builds up which contracts and even totally closes these passages. This can result in a dangerous burden to the body, since it cannot be sufficiently supported with oxygen. The person affected does not get enough sleep and feels exhausted. Life quality is definitely diminished.

The use of nasal excess pressure machines achieves most success in therapy of the sleeping apnoea syndrome. This machine prevents the blockage of the respiratory

passages by keeping them open with the help of individually determined air pressure that acts like a splint. The air stream gets to the patient's nose mask via a special hose system.

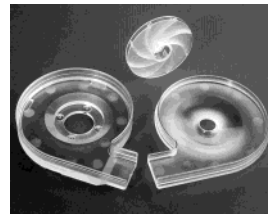
For a large German medical technology enterprise, ENSINGER injection moulding division produces the radiator and its casing as part of such a respirator.

The radiator was developed in cooperation with DLR in Berlin. According to the producer, it is currently the most efficient product of this kind in the market.

The propeller and the cover which goes with it are made from polycarbonate. The finished components are then fitted together by ultrasonic welding.

The casing around the propeller is also produced in two separate parts.

To avoid any instability, the separate parts are finally assembled with the help of a snap-action device and, to achieve absolute air-tightness, a labyrinth seal is integrated.



Casing and radiator.

The radiator needs to withstand up to 30,000 turns per minute. In the radiator chamber there is static excess pressure of up to 20 mbar. Every minute, 200 l of air flows through the part that must remain stable at temperatures from +10 °C to +60 °C.

All these requirements had to be taken into account during manufacture and for the choice of the material. That's why ENSINGER carried out simulation studies regarding choice of tool and shape of the gate before the tools were constructed. The simulation results

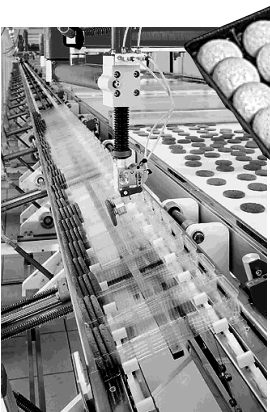
were confirmed in practice and the first trials were successful.

ENSINGER has proved to be a proficient supplier for the medical industry.

ENSINGER works with a simulation software that allows detailed predictions to all phases of tool and moulded part construction, production and the resulting quality of the parts. Prior to volume production, the software recognizes possible problems that could arise and offers appropriate solutions. The specific forming and shaping of the moulded part and of the tool reduces subsequent costs and time for corrections. There will also be a time advantage. The basis for these calculations is a 3D CAD model that is imported into the software. After the definition of the material and the injection moulding process parameters the simulation can start.

## Packaging machines for sweets

### Toothed rack and gear casing produced from TECAPEEK



Gerhard Schubert GmbH, Craillseim, is one of the three largest producers of packaging machines. Since the 1970s the Suanian company had been developing special machines that fill boxes from the top and during the 1980s these machines became electronic for the first time. The first packaging robot in the world was created.

The machines work with a CNC drive and a control system that was especially developed for such ma-

chines. The whole technique was worked out by Schubert.

One of the Schubert product lines is the F44 packaging system that is used particularly in the confectionery and food industry. F44s are pure volume-production machines for picking and placing products in trays, sales and shipping cartons.

F44 picking lines operate in accordance with an extremely simple concept. The product is fed free-standing or lying on a continuously moving conveyor belt. The packaging trays or boxes also run continuously to the left or right of the belt – but in the opposite direction of the product.

The speed is matched to the product quantity and control is fully automated.

An F44 robot station can pick up to 240 parts per minute and put them in a box. During work the product is sped up with up to ten times acceleration of gravity and to a speed up to 5 metres per second.

To replace the original metal components of the picker arm construction – a toothed rack and a gear casing – the company was looking for an alternative and turned to ENSINGER. They had decided on plastic because of its low weight. The mass restriction is a big advantage with such high acceleration values and, in contrast to

metal parts, lubrication that would soil the products is unnecessary.

Since the parts are subjected to strains, the choice of TECAPEEK as gear casing material was the result of joint discussions. TECAPEEK is suitable for use in food contact.

The toothed rack was made from TECAPEEK PVX which is modified with graphite, carbon fibre and PTFE. In particular, its very good abrasion behaviour and optimum dry run properties made this material the first choice.

The precise solution for the gear component is produced complete and ready to install in the ENSINGER machining division in Cham.

## Donation for children who suffer from heart disease

### Plastic cutting boards put to good use

As in previous years, ENSINGER's commercial and industrial trainees have again carried out a donation campaign for a social project. The young people sold plastic cutting boards they had made on their own in the ENSINGER workshop.

The company management matched the proceeds of 1684,50 Euro with the same sum to a total amount of 3.369 Euro which was then donated to the Tübingen action group „Parents of children who suffer from Cancer“ (ELHKE e.V.).

The donation cheque was personally handed over during a lecture event at ENSINGER. Michael Klein, himself the father of a boy suffering from a weak heart and a member of the executive committee, was presented with the cheque by Nicole Ebner, trainee representative, and Karl-Heinz Ruhe, Personnel Manager.

After receiving the cheque, Klein gave a presentation on the association's work: The ELHKE e.V. is a self-help group that accompanies and advises families in close cooperation with the Tübingen University Hospital. Members organize



The trainees sell their self-made cutting boards.

family-oriented rehabilitation for affected children and young people. Since the ELHKE e.V. is exclusively financed by membership subscriptions and donations, they are in urgent need of financial support for their organisation.

Each year, the trainees carry out a donation campaign of this kind. Last year, the proceeds were given to the Heim-statt-Tschernobyl e.V. that supports contaminated children, and in the previous year proceeds were given to an association that cares for children with cancer.

## 14 first aiders trained at ENSINGER

### Co-operation with the German Red Cross

12-year-old Felix has fallen on the cellar stairs when he wanted to fetch a bottle of juice. Broken pieces of glass stick deeply in his hand. He whimpers silently. Blood is running over his arms and dripping on the floor...

Well, the scenario is not really as dramatic: In reality, the cellar stairs are the stairs of the ENSINGER head quarters, the blood is theatre make-up out of a tube – and Felix is a bright-eyed, bushy-tailed and healthy teenager. He is one of the German Red Cross' offspring and was ready, together with three Red Cross friends, for the final examination of the ENSINGER first-aiders.

In this examination the 14 participants had to put their newly acquired first-aid skills into practice. The role-play emergency cases were "an accident on a staircase, with cuts", "a motorbike accident with a base skull fracture", "an overdose of tablets" as well as "serious burns and panic in an injured person".

The first aid training had taken place for the sixth time and the participants were ENSINGER employees from administration and production.

Under the direction of Thomas Kalandar from the Red Cross, the volunteers were trained in eight double periods with theory and practice at the same time.

They learned how to make the scene of an accident safe, how to carry out basic first aid treatment, how to make an emergency call and how to apply a dressing.

In the end, the participants received an official certificate to show they had successfully completed the training.

"Since every year a considerable number of severe accidents are reported, the trade association with liability for industrial safety and insurance prescribes that in each company at least 10% of the employees have to be trained as first aid persons. We are proud that, with more than 70, we have far more helpers than necessary," says Security Manager Rolf DeLenardis who has been organising the courses for years.



The first-aiders fix Felix' cuts

## Tough competitors on the track

### A good team at ENSINGER

To transfer everyday working speed with processes in the stock department into measurable times, the despatch department for semi-finished products took part in a race at the go-kart track in Sulz/Neckar. Some weeks ago, organisation team Dieter Scharf, Markus Saile and Rainer Grzella had reserved the track for several hours. 16 of the 18-people from the ENSINGER team who had travelled there wanted to face the challenge of the competition. Two teams were formed, with each having a racing time of half an hour. Both teams did their introductory laps to become familiar with the course.

Then followed the time trials – by hook or by crook – for pole position in the two races. Roco Pomposo and Markus Saile won the top starting positions.

The participants chased each other over the track in two great races of twenty minutes.

The fights for position and the laps on the track should not remain unmentioned as well as the penalties in the pit lane.

Nevertheless, fair-play was not entirely foreign to the rivals on the track.

For a bright end to a nice evening, dinner in a "limestone cave" in Sulz was planned. During a convivial evening they dined well.

But who was the final winner of the day, and who got positions two and three? It remained exciting until the end. The three employees with the fastest times were decided and got a winner's cup from Dieter Scharf. Roco Pomposo, Harald Nefzger and Markus Saile were the lucky winners of this racing day.

"This event has forged stronger bonds between the employees of our department. For my part, I can recommend something like this for other departments," says Dieter Scharf, head of the department.



## Works committees of Cham and Nufringen

### First joint meeting

At the beginning of this year, the first meeting of the joint ENSINGER works committee took place; the motto was "Collaboration between ENSINGER management and works committee based on trust".

Instead of a video conference or telephone call the members of the committee met personally and discussed many questions. There were the everyday topics such as general functions and business of the members but urgent matters such as areas of responsibility and expertise were also reviewed.

During the first evening, ENSINGER Managing Director Klaus Ensinger was present and spoke about how he sees the relationship between the management team and the works committee. In particular, absolute trust and cooperation between the teams is his personal interest; he stressed, that both pursue the same aims and work in the same direction.

Karl-Heinz Ruhe, Director of the personnel department, introduced the new personnel manager from Cham, Markus Philippi.

On the second day, Ruhe presented his ideas about cooperation with the works committee and about future personnel work. He also regards mutual trust as the basis of successful communication.

Under the chairmanship of Ilona Brodt, all the participants finally formed a group agreement on

different points of collaboration of the works committee. For example it is important to everybody that in the case of problems, the head of the works committee is the first person to go to since a straight communication line is essential. They spoke about the necessity for critical faculties on the part of the members of the works committee who really have to listen to quite a lot of things.

A further important point was the fast flow of information and how the regular law changes reach the individual members.

Guidelines for the co-operation between management and the works committee, and within the committee itself, were discussed together with support for the Cham committee which is still quite young.

"For us it is very important to search for solutions together and that there is a steady exchange between Nufringen and Cham. We are one team and want to solve together with our colleagues their small and big problems – in line with the ENSINGER guidelines," was the unanimous opinion of chair persons Ilona Brodt and Franz Schönberger.



Participants of the meeting were (from left in the back) Ludwig Zwickelbauer, Michael Gründl, Jürgen Haase, Markus Menacher, Stefan Raab, Ilona Brodt, Angelika Stumpf, Franz Schönberger, Jochen Skarke, Alexander Gall

## Anniversary in Cham

Uwe Martin from the production area Extrusion 1 recently celebrated 10 years' service with ENSINGER. Martin (centre) was congratulated by Andreas Alsfasser (left), Technical Manager of the Building Products Unit and Karlheinz Daiminger (right), Production Manager of the Extrusion 1 area.



## Successful completion of training in Cham



In January, three trainees from Cham completed their apprenticeships with excellent results. All three have now taken up permanent skilled positions: Stefanie Mühlbauer (4th f.l.) is now working as an industrial clerk for the office in Cham, Peter Raith (3rd f.l.) and Martin Panzer (left) have joined the Machined Finished Parts Unit as – of course – milling workers.

Cham work's manager, Andreas Alsfasser, had the pleasure of congratulating the successful employees, together with the trainers Rosemarie Zangl and Max Langlechner. We are pleased with our new skilled workers and wish them success in their future areas of responsibility.

## Mental training in snow

### Ski trip 2002



the merry one (mental resuscitation). But they all had the same aim: to spend a great day in the upper Austrian Schruns. And based around this the whole thing was arranged.

In marvellous weather some spent their day sledging, others were skiing and the third group eliminated the stocks of the snow bar. No limits were imposed on fantasy.

Those who did not have a sleigh to sledge just used the good old plastic bag. Those who had no hill to slide down harnessed a colleague in front of the bag. Those who could not drink any more beer, nevertheless found a reason to queue up near the nice bar girl and last but not least those who were puffed out, just got fished.

But after all the day was used to cultivate personal contacts with colleagues outside the office and so in the end many replaced formal "Sie" by informal and amicable "Du".

After the collective chill-out at the snow bar they set off home.

As for the return journey, in contrast to the way there the crew did not split up into three parties, but was carried out in three phases: The residual euphoria phase (last physical rear up), the coming down phase (slow physical breakdown)

and the sleep well phase (physical and mental retirement).

"After such a strenuous and long but very nice day it is no wonder that the only thing we long for is just a warm and comfortable bed," is the comment of Irene Dengler who has not missed any ski trip so far.

"Start up and enjoy" was the motto for almost 40 ENSINGER employees who took part in the "Ski trip 2002".

At first, however, they worried whether the trip would take place at all, because up until one week before the set date there still was not one snow flake to be seen.

We suppose, therefore, that Karl-Josef Rebmann who had organised this trip yet again, at the very last moment fell back on his good contacts "at the top" so that everybody could enter the bus on the date mentioned.

On the voyage out, the bus crew split up into three parties: The silent one (mental preparation), the sleeping one (mental recovery) and

## A hearty welcome

from ENSINGER to the new employees who have joined our team since January 2003

### Nufringen

Klaus Gerstmayr	Export Manager, Building Products Unit
Achim Lehmann	Lawyer
Ernest Igiebor	Operator, Injection Moulded Products
Erdal Gürdal	Toolmaker, Injection Moulded Products
Gisela Gorse	Operator, Injection Moulded Products
Simone Gauss	Sales employee, Service Centre Sales and Marketing
Arnt Stumpf	Personnel Clerk, Service Centre Finance/Control

### Cham

Jürgen Schröpfer	Manager, Semi-Finished Products
Markus Philippi	Personnel Clerk, Service Centre Finance/Control
Norbert Müller	Plastic Processor, Semi-Finished Products

We wish you all a good start at ENSINGER!

## Markus Philippi

### New Personnel Clerk in Cham

Since January 2003, ENSINGER Cham has had its own personnel clerk, who will take care of employees with regard to questions concerning personnel matters: Markus Philippi, 36 years old, is a graduate in business management and personnel, who comes from Koblenz and who has been working in different branches of industry in the areas of human resources and organization. His last job was in the human resources department of a similarly sized industrial company to ENSINGER in the Cham area.

Why this change to ENSINGER? "The possibility of taking on a challenging role in a company with a very good reputation in the area met with my personal desire for change. Another pleasant side effect is that I can positively introduce the contacts and networks I established in the last two years."

The new personnel clerk will support and advise all employees with their personnel questions as well as keeping in close contact with

the central human resources department in Nufringen.

Privately, Markus Philippi enjoys cooking – he is keen to experiment – and is an admirer of good wines. To balance this he is also a member of a fitness centre.

"I enjoy working with my new colleagues and employees and I look forward to the challenges that will come in the future and to mutual co-operation with new colleagues."



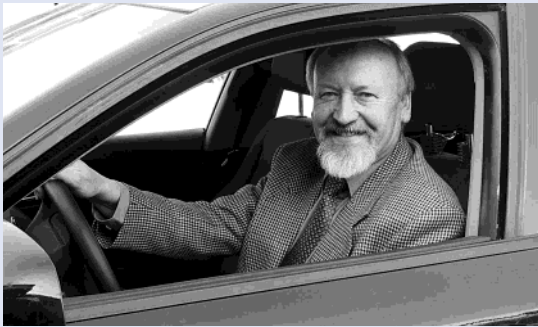
## Cham Ski trip



It started quite early, the trip to Hinterstoder in Upper Austria. But none of the 18 trippers had any regrets about getting up early. The two day ski trip 2003 was – as it is every year – a great experience and a really fantastic weekend. The sun was shining and the ski runs were well visited; since the glorious, sunny weather lured everyone up the hills. In short, the winter sportsmen had much fun, there was enough snow and everybody returned in one piece. At this point a hearty „Thank you very much“ to Simone Greil who organized the event.

## The impulse interview

### 5 questions to Hans-Joachim Weiss



Hans-Joachim Weiss has been working at ENSINGER for 16 years. He is our sales representative and technical support for customers in eastern Baden-Wuerttemberg and western Bavaria.

*How have you personally developed in the company? And how has the development of the ENSINGER sales staff been?*

Weiss: At the moment, we have eight sales representatives at ENSINGER, but we have not always been that many. When I started working for the company, we were only two. It was not very easy, since we each had to cover a relatively large area. Furthermore, we occasionally had to handle administrative tasks in the office.

Then, the use of thermoplastic materials, especially of technical high quality materials, was new ground for many companies.

What was particularly positive for my own professional development was the fact that, due to the manageable number of employees at ENSINGER, regular contact with our senior chief, Wilfried Ensinger, was possible. His enormous technical knowledge, which I could fall back on when I had difficult applications, was of considerable importance for my career.

Today, I can introduce my experiences in discussions with customers and contribute to the solution of difficult tasks. I am proud to say that during my work at ENSINGER, I have established some amicable contacts with some of the customers who have become very important and very loyal customers of the company.

*It is well-known that sales representatives are rarely on site in the company. How do you manage to stay up-to-date?*

Weiss: Regular contact with our Technical Marketing Department, technical lectures about new product developments by our raw material producers, and last but not least, intensive conversations with our customers are the best ways for me to stay informed.

A very important information pool is the contact with my colleagues during meetings that regularly take place in Nufringen. These conventions always offer sufficient opportunities to exchange experiences about extraordinary applications as well as everyday work. Independently from this, we also keep in regular contact with each other. The pleasant atmosphere among us, not only from our professional viewpoint, contributes to successful co-operation.

*What does your schedule look like? How do you prepare a customer's visit?*

Weiss: For me, the working week begins on Friday. On this day, I make my plans and appointments for the following week.

The times when we could visit our customers without an appointment have passed long ago. Today, when employees have a fixed daily routine with many points on their agenda, topics have to be prepared very carefully and they have to be restricted to the most important points. This means, that technical and commercial data have to be researched and drawn up in advance. Nothing is worse for a sales representative than visiting a customer unprepared. My job more or less means living on the road – rarely a pleasure with current traffic conditions. Travelling 60,000 km per year and more is routine.

Those who want to be successful these days, have to stay in regular contact with their customers. Only then do you get to know what the customer expects from you. Sometimes the discussion can be transformed into a detailed inquiry. Thanks to the modern equipment that is at our disposal – mobile phone and internet – I can easily keep in contact with customers and colleagues at ENSINGER. For specific questions or spontaneous enquiries this is very important so that I can react to customers' wishes.

*What are the most innovative things you have experienced during your time at ENSINGER?*

Weiss: There were changes from the previous traditional sectors such as industrial and electrical engineering to industrial areas like automotive, medical technology, the semi-conductor industry and aviation and space technology.

The automotive industry for example steadily endeavours to increase the power and efficiency of components in the engine compartment and to lower their weight. Central components with difficult geometry and high precision are now produced from high performance plastics.

Medical technology needs plastics that fulfil high hygienic demands and that have no side effects for the patient. Grips for surgical instruments made from plastic have often replaced metals.

Also aviation and space technology demands engineering materials that are light and that decrease the risk for passengers and crew in case of fire. Special plastics are used to replace metal components.

*Where do you see future potentials for high performance plastics?*

Weiss: In my view, in future, technical developments will go into the direction of smaller size with higher performance. It will be impossible to achieve these aims without the use of plastics that are specially adapted for these applications. That's why I believe the need for high performance plastics will increase in future.

ENSINGER's ability to modify plastics with selected additives to meet specific demands guarantees us the vision to have an influence on these developments.

*Herr Weiss, thank you very much for talking to us!*

### In short:

#### Cham packaging department moves to new premises

In order to meet the increasing demands for insulbar® products, the ENSINGER branch at Cham had been looking for new premises for the Building Products Division's packaging department.

For the final choice of new quarters, size and immediate proximity to the main factory building were the main features to be considered.

The move took place some months ago, fast and economical; all pro-

duction lines were completely reinstalled within five working days – thanks to the committed help of all employees from the packaging and technique departments in Cham.

For the packaging department, this tripling of the previous area creates important potential for further optimisation of the production processes.

## Finest precision engineering

### Test plugs made from ENSINGER plastics

In the field of measuring and test equipment construction, Tekon Test Engineering has concentrated on technically sophisticated parts. Tekon offers outstanding solutions for contacts in subassemblies, such as switches, pumps, motors, control units and much more. The emphasis is on four-wire metrology. This is often essential to today's test requirements. Tekon Test Engineering has become an important partner for many car suppliers.

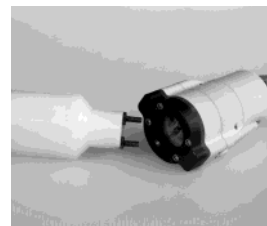
For their connectors, Tekon uses ENSINGER plastics such as TECAPEEK GF 30 or TECADUR PBT GF 30. Due to their glass fibre reinforcement, these materials are very abrasion resistant and have low water absorption as well as very good values for electrical insulation.

Two example connectors that use high performance plastics are a 2-pin test plug that is used for a contact stud of four wire metrology and a 77-pin test adapter.

The 2-pin test plug is a matter of the finest precision engineering. This 2-pin plug is used for test pieces that have stud bolts as contacts. For economic reasons it is not possible to screw a nut on the test piece of the component. The connector is simply put over the thread and locks itself while the thread itself remains undamaged. With this connector, even a four wire meter can be checked. The housing is made from TECADUR PBT with glass fibres.



The 77-pin plug is used on an assembly line with an integrated test station. The part to be tested is completely installed and then tested. Therefore, an appropriate interface between tested parts and test electronics is necessary – the Tekon adapter. The contact sensor of the plug is made from TECAPEEK GF 30, the housing is made from aluminium. The test plug has a very long life.



## Interesting things for the "Year of Chemistry"

2003 is the official „Year of Chemistry“. We took this as an opportunity to take a closer look at the field of polymer chemistry in this and the following issues of „impulse“.

Historical things, interesting facts, funny and curious stories – everything can become part of this subject.

With this issue, we introduce you to the earliest milestones of polymer history.

Did you know, for example, that the history of plastics reaches far back into the millennium before Christ? – There was for example ...

I ... the year 1000 B.C. when the Chinese discovered lacquer, a resin

from a lacquer tree. They used it to form waterproof and durable coatings, that were applied until the 1950s to coat domestic tableware.

Between 23 and 79 B.C., Amber was first mentioned. The thermoplastic resin was pressed into compression moulds to produce small articles.

Around the year 0, horn was discovered as a natural plastic. Layers could be laminated together to build thicker products or pressed into wooden moulds to form snuff boxes or buttons. Horn was also ground up and mixed with a binder such as blood before being compression moulded for buttons and other products.

Around 400 A.D., tortoiseshell was produced out of the shell of a turtle and processed similarly to horn. Until few years ago, spectacle frames and combs were made from this material.

Around 800 A.D., Gutta percha, a natural resin was extracted from the bark of Malayan trees.

In 885 A.D., artificial horn was produced from the milk protein Casein. This was a hard and brittle material that could be machined in many ways.

In 1550 natural rubber was discovered during an expedition to Central America. The native Indians had been using it for 1000 years for different sports or for waterproofing.

1650 John Tradescaut introduced gutta percha to the West. This material was used to make products from garden hoses to furniture for many years after the introduction to the West and was only replaced for undersea cable insulation in the 1940s.

To be continued!

*This information was supplied by Dietrich Groetzner.*

*Do you also know an interesting story or anecdote about plastics? Send an email to impulse@de.ensinger-online.com.*

## “Excellence in Quality in everything we do”

ENSINGER Singapore – Five years and still rocking!



Gerd Kienscherrff and his team

The Singapore government attaches great importance to the protection of intellectual property in order to encourage the investment of advanced knowledge-based industries, like ENSINGER, thereby expanding trade and increasing globalization.

Thus, the regional head office for Asia was moved to Singapore in 1998 and has grown steadily since then. The ENSINGER regional head office for Asia, serves as a platform to market the company's brand name and distribute products into the Asian market.

Gerd Kienscherrff, Vice President Asia, is responsible for the Singapore regional head office for Asia with seven dedicated employees. The office is now five years old.

ENSINGER Singapore has recently taken Shanghai's operations under its umbrella. This is to assist their operations with the manpower from Singapore, and to facilitate faster

growth of the market share of ENSINGER.

ENSINGER Singapore has established a strong network of customers over the years by offering a sound range of quality products in stock, competitive prices and good customer service.

“Our customers are from various kinds of industries, for example pharmaceutical, food, machine shops etc., and especially the semiconductor industry,” confirms Kienscherrff. “We work closely with all our customers, striving to build good partnerships on the basis of mutual business benefits. Customers' visits are often conducted to see how we can be of any further help, and what we can offer for customers' changing engineering plastics needs.”

Gerd Kienscherrff and his team develop and improve business strategies through internal meet-

ings, as well as with both their customers and fellow counterparts. These discussions serve as great opportunities for the exchange of ideas and knowledge.

In November 2002, Peter Bongardt from Nufringen visited South Korea, Taiwan, Malaysia and Singapore, to provide technical support and conduct seminars with both customers and employees.

Despite his busy schedule, Gerd Kienscherrff makes regular trips to Germany, to stay in close contact with our Headquarters and the other subsidiaries. Furthermore, ENSINGER Singapore has always received precise and reliable help from our counterparts. To illustrate, Fred Nass, has contributed significantly to the projects which we undertake here in Singapore.

‘Excellence in Quality in Everything We Do’ is the 2003 slogan for ENSINGER Singapore. “This depicts knowledge and consistent applications of our policies and procedures with the required discipline and spirit, and also to strive for quality in a broader context, with a strong link to other values. For example, quality in customer service”, quoted Gerd Kienscherrff.

ENSINGER Singapore, with the strong support of the other ENSINGER offices around the world, aims to be a company of high order and therefore undertakes initiatives, to be recognized as a leading brand name in the field of engineering plastics.

Audrey Loke (Ms.)  
 Sales & Project Coordinator  
 ENSINGER International GmbH,  
 Singapore

## New material: TECAPRO MT

First introduction at AAOS fair in New Orleans

New in the ENSINGER product range is the high-performance plastic TECAPRO MT. This material, based on polypropylene, is modified particularly for applications in medical technology.

By using a special heat treatment and stabiliser during production, TECAPRO MT can withstand higher temperatures than standard propylene whilst maintaining high dimensional stability.

TECAPRO MT can be easily machined and is especially suitable for the production of dimensionally stable parts with variable cross sections. Its main characteristics are resistance to chemicals such as detergents and disinfectants and to hydrolysis.

TECAPRO MT is approved by the American Food and Drug Administration (FDA) for use in food and medical technology. Applications are surgical equipment, components in medical technology or sterilisation containers.

The standard colour of TECAPRO MT is white; but it can be produced in other colours if required. Laser marking is also possible. TECAPRO MT is available as plates with dimensions ranging from 12.7 mm to 63.5 mm.

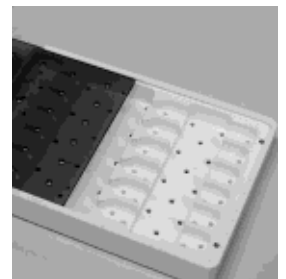
The material is produced at ENSINGER Hyde in the U.S.A., and its first introduction in Europe was at the MedTec fair for Medical Technology in Stuttgart, at the end of March.

The official introduction on the part of ENSINGER took place in February at the “70th Annual Meeting” of the “American Academy of Orthopaedic

Surgeons”, AAOS, in New Orleans as part of the congress at a table top exhibition.

The AAOS is the world's biggest meeting point for surgeons and producers of medical applications. It features companies specializing in implants, bone and tissue products, computer software, practice management, including publishers and numerous other products and services relating to the specialty of orthopaedics. This year, over 400 companies were displaying their products and services; they attracted more than 14,000 visitors.

Frank Kirchner from the Technical Marketing Department in Nufringen visited the fair to exchange knowledge with internationally acting US companies. He wanted to discuss markets and material trends and the opportunities for global co-operation. This was very successful for the company – within a few hours many promising contacts were made with European and American enterprises.



Surgical caddy

### THE LITTLE LATERAL THINKER IN SESAME STREET

WITH GEAR PARTS MADE FROM OUR ALL-ROUNDED PLASTIC TECAPEEK THE ARM WILL BECOME FLEXIBLE

BUT IT LOOKS DIFFERENT IN REALITY

THE ROBOT'S ARM IS STICKING. THE COOKIES ARE BROKEN BEFORE IT CAN CRUMBLE THEM!

COOKIES, MMMH, COOKIES, MMMH, COOKIES, MMMH