

1 | 2008

*made by*  
**KraussMaffei**



World premiere  
for a perfect  
technology trio



KraussMaffei CEO  
Dr. Dietmar Straub

EDITORIAL

“KraussMaffei has a local presence, close to customers around the world.”

Dear Customers, dear Readers,

This is the second issue of *made by KraussMaffei*. The year 2007, when the magazine was launched, was an eventful and successful year for KraussMaffei. The company was restructured and renamed, and our extrusion activities were merged to form the new KraussMaffei Berstorff brand. We believe these changes will bring benefits to you, our customers. A highlight for all of us was the K2007, where we were happy to welcome so many of you to our booth and as our guests. At the K, we showcased a machine integrating our three core technologies – injection moulding, extrusion and reaction processing – in a single manufacturing cell. Systems like this one signpost the way forward for plastics processing technology. Which is why we decided to make them the cover story in this issue.

Looking back at 2007, I am naturally delighted that the KraussMaffei Group had a very successful year. Orders topped the one billion euro mark for the first time; sales totaled 950 million euros. Growth not only secured existing jobs, but also allowed us to expand our workforce compared with the previous business year. The group now employs around 4000 people worldwide. With over 570 service staff and a network of over 140 subsidiaries and partner agencies, KraussMaffei can respond fast whenever our customers need us anywhere in the world. I look forward to a continued good business relationship with you all!

With best regards  
Dr. Dietmar Straub

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COMING EVENTS

# Trade shows 2008

April 08-11	Plastimàgen	Mexico City, Mexico
April 17-20	Chinaplas	Shanghai, China
April 23-24	Kunststoffe	Friedrichshafen,
	Medizintechnik	Germany
May 27-30	Chemexpo	Budapest, Hungary
May 26-29	Aseanplas	Singapore
Sept. 03-05	PU China	Shanghai, China
Sept. 18-22	Taipeiplas	Taipei, Taiwan
Oct. 14-18	Fakuma	Friedrichshafen,
		Germany
Oct. 23-26	Plastex	Cairo, Egypt
Oct. 20-24	Equiplast	Barcelona, Spain
Nov. 19-22	DMP	Dongguan, China
Dec. 04-06	Tyres & RubberTec	Shanghai, China

AWARD FOR DR. ERWIN BÜRKLE

## Commitment spanning many decades

In Aachen on February 20, 2008, Dr. Erwin Bürkle, Director of Pre-Development New Technologies/ Process Engineering in KraussMaffei’s Injection Moulding Machinery division, was awarded the Georg Menges Prize. He received the honour from the hands of Prof. Dr. Walter Michaeli, Director of the Institute for Plastics processing (IKV) at the RWTH Aachen, and from Dr. Werner Feistkorn, 1st deputy chairman of the IKV Friends and Supporters Association. The biannual prize – awarded for the sixth time in 2008 – honours outstanding personalities who have made their mark in implementing R&D results at the interface between business and science. Dr. Erwin Bürkle won this award, among other things, for untiring work on many specialist committees and advisory groups and for his efforts over many years to assist and encourage young engineers, who value his support very highly. ■

# New division director Dr. Karlheinz Bourdon



Dr. Karlheinz Bourdon (50), a manager with 22 years of industry experience, took over as head of KraussMaffei's Injection Moulding Machinery (IMM) division on February 1, 2008. Dr. Bourdon's link with the plastics industry dates from 1985 when he began work on his doctoral thesis at the Institute for Plastics Processing (IKV) at the RWTH Aachen. His career has already included a successful stint with KraussMaffei, as manager of the Systems Technology unit. He held this post from 1990 until he joined Ferromatik Milacron first as director of development and design and subsequently as production manager and then plant manager. In 2000, he was appointed managing director of Ferromatik Milacron, and from 2001 he took on responsibility for all Milacron's engineering activities in Europe. In 2003, Dr. Bourdon became president

of Global Plastics Machinery responsible for Milacron's worldwide activities in injection moulding, blow moulding and extrusion. "I'm delighted that in Dr. Bourdon KraussMaffei has gained a manager with substantial international experience and many years' know-how in our industry. He will continue our drive to expand the outstanding position of our injection moulding machinery business," said Dr. Dietmar Straub, KraussMaffei CEO. KraussMaffei owes a special debt of thanks to Manfred Reichl who took over as acting manager of the IMM division in August 2007 and whose profound market know-how will provide strategic support for the division in the coming months. In addition, Manfred Reichl continues to head up KraussMaffei's Extrusion activities. ■

Over 20 years' experience in the plastics industry: Dr. Karlheinz Bourdon, director of Injection Moulding Machinery since February 1.



Frank Peters (left) took over as RPM divisional general manager from Walter Tesche on April 1.

Reaction Process Machinery (RPM) division. He succeeds Walter Tesche (63) who will be retiring mid-year. Frank Peters (41), a mechanical engineering graduate, joined KraussMaffei RPM in 1997 as part of the North America sales team. From 1999 to 2003, he was head of Strategic Product Management at GEA Lufttechnik, before returning to KraussMaffei as general sales manager for Reaction Process Machinery in 2003. Since

## NEW CHALLENGE FOR FRANK PETERS

# Change at the top for Reaction Process Machinery

2006, he has been head of RPM activities at the Munich plant. CEO Dr. Dietmar Straub wished the new head of RPM a successful start: "With the able support of a great team, Frank Peters will keep RPM on its successful growth track. KraussMaffei also owes a huge debt of gratitude to Walter Tesche for his trailblazing achievements during 35 years with the company." Initially, Walter Tesche worked in international sales for IMM. Between 1986 and 1999, he was general sales manager first for extrusion and then for injection moulding machinery. He took over as head of the RPM division in 2000. ■

# New application areas for the future



Signpost to the future: roll restrictor combining a thermoplastic substrate with a crosslinked TPU-X damping element.

KraussMaffei not only has the know-how to engineer advanced systems for the three major plastics processing technologies – injection moulding, extrusion and reaction moulding. The company also develops innovative processes that open up totally new applications for plastic components.

Plastics are extremely versatile materials and the number of applications in which they are used has been growing steadily for decades. Two factors are driving this development. Firstly, plastics compare very favourably with conventional materials, like metals, because of the greater degrees of freedom for specifying material characteristics. Secondly, plastics offer huge potential for optimizing manufacturing costs. Multicomponent technology is a striking example. Multicomponent processes are sometimes very complex, on the other hand, the potential for savings is amazing. Savings come mostly through reducing component count, which in turn reduces manufacturing and assembly costs. There are different methods of shaping several different types of plastic melt in one mould to an integrated component. These include composite, multicolour, sandwich and assembly moulding. For Dr. Erwin Bürkle, Director of Pre-Development New Technologies/ Process Engineering in KraussMaffei's Injection Moulding Machinery division, has this important comment to make, "It takes the right combination of machine, mould and process to provide the

necessary framework for cost-competitive production." The machine itself is by no means the only factor that has to change in order to drive development of advanced plastics technologies. But as Jochen Mitzler, head of Product and Technology Management in KraussMaffei's Injection Moulding Machinery division says, "Innovative plastics need smart machine engineering. And here's where KraussMaffei is a competent development partner." His statement is backed up by trailblazing technologies that successfully combine different processes. Take SkinForm, for example, where an injection moulded substrate is overmoulded with a PUR cast skin. It's a one-step process capable of producing diverse, high-value surfaces, for example, automotive cockpit components.

### X-Form instead of a metal-rubber composite part

X-Form is one of the newest variants of multicomponent moulding. Combining three technologies – injection moulding, extrusion and reaction processing – X-Form opens up a completely new range of applications for plastics.



Using a turntable mould shortens cycle times.



1998 saw the premiere of a revolutionary machine at the K show: KraussMaffei's injection moulding compounder – IMC for short. The IMC was the first machine to successfully combine a continuous compounding process with injection moulding, a discontinuous process. Ever since, the IMC has been opening up new application areas and pointing the way to the future – for example with the X-Form process.

It was developed by KraussMaffei in a collaboration with Elastogran GmbH and Mues Products & Moulds GmbH. X-Form has been designed for applications which currently use metal-rubber composites. Possible applications include covers for housings with integrated seals or engine mountings. The process uses a new thermoplastic polyurethane (TPU) called Elastollan, made by Elastogran, that crosslinks to TPU-X during cooling. Crosslinking takes place in an injection moulding compounder where the crosslinking agent is mixed evenly with the TPU melt. The mix is then supplied, via a shot-pot, to the discontinuous injection process.

As a practical illustration of the process, KraussMaffei and our partners designed a roll restrictor, a component used in machine mountings or in the running gear of a car or truck. At the K2007, we demonstrated an injection moulding compounder cell producing this multicomponent part. The roll restrictor is made of two materials: the body and collar are made of Ultramid CR, a glassfibre-reinforced plastic from BASF. Between the body and the collar is a damping element made of TPU-X. An elastic seal around the component is also made of TPU-X.

### Enormous time savings

The most strikingly innovative aspect of the production process is the cycle time; a finished part is produced every 60 seconds. This is achieved by producing each part in three

work phases that take place simultaneously in the manufacturing cell. The fourth phase is demoulding by a linear robot. The damping element in the roll restrictor has a wall thickness of 15 mm to be capable of absorbing strong vibrations. Material this thick would normally need a longer cooling time and therefore a longer cycle time. Using a turntable mould and a smart process, the cooling time can be kept to a minimum. The body and the collar are first injection moulded from polyamide. The mould turns 90 degrees and TPU-X is injected between collar and body in a star shape. Another 90-degree turn and the gaps are filled with more TPU-X. Finally, in the fourth phase, the part is removed while the mould is closed. Compared with conventional elastomer processing, cycle time here is reduced by a factor of four to six. Nonetheless X-Form is in many respects a conventional 2C thermoplastic injection moulding process. The mould need not be designed with the hot and cold zones, normally required when working with rubber/thermoplastic composites. This makes process control far easier. ■

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Manufacturing cell with a KraussMaffei injection moulding compounder.

# The whole added-value chain from a single source

Manufacturing processes for plastic products are often extremely complex. So there are clear advantages in having all these processes integrated in the technology supplied by a single machine company. KraussMaffei delivers exactly this. The company's expertise covers the entire value-adding chain, from raw materials to the finished product.

The first step is producing, compounding and extruding the raw materials.

In addition to intensive expertise in the separate sectors injection moulding, extrusion and reaction moulding, KraussMaffei is also ideally positioned to combine technologies and processes that cover the entire value-adding chain. The starting point might be a big KraussMaffei Berstorff extruder extruding raw material granulate as part of the polymerization process. The granulate is compounded with various additives to produce a semifinished product with specified mechanical, physical and chemical properties. The next stage might be injection moulding to produce a thermoplastic product. The surface could then be finished with a PUR skin. Finally automation technology comes into play as the component is demoulded by a robot and the finished product

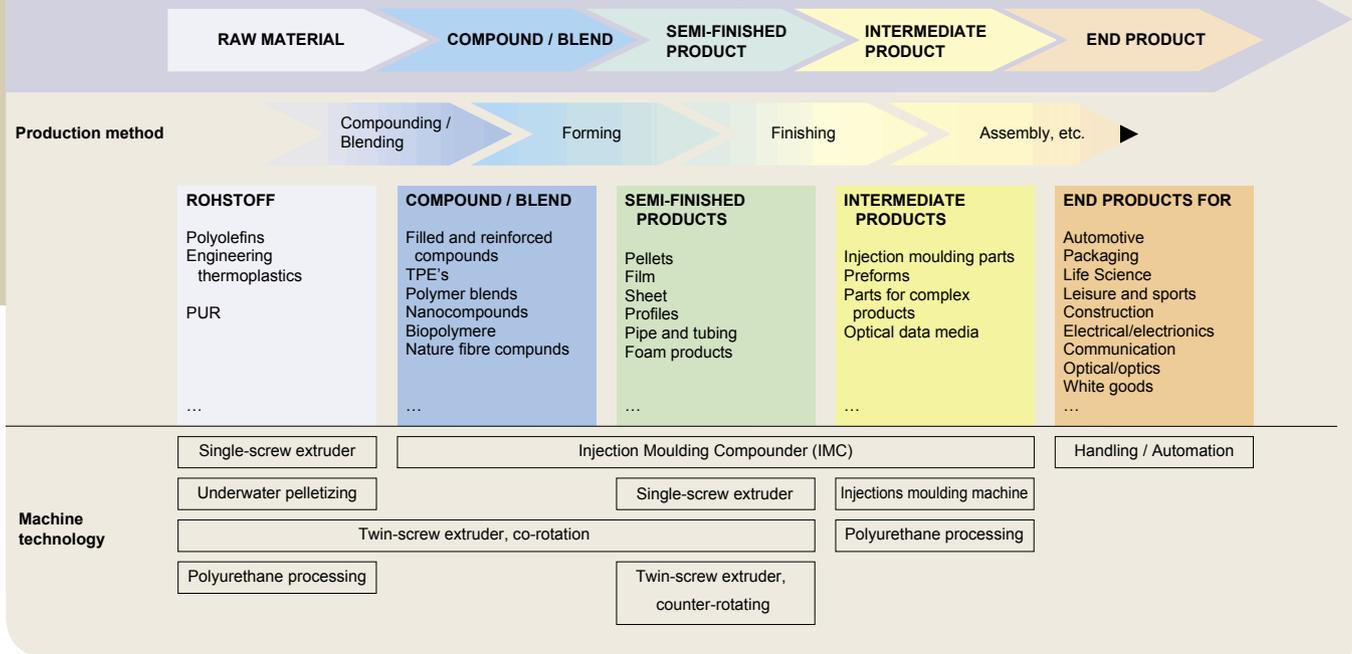
is finished and assembled in a succession of automated processes, eg, cutting or joining. A manufacturer intending to set up this complex process chain in his factory usually has to work with at least two machinery suppliers. He'll need to deal with the compounding machinery supplier and also with the injection moulding machine supplier. Unless, of course, the customer decides on a complete solution from KraussMaffei.

## Fit for a competitive market

In many sectors, product development cycles are becoming shorter and shorter, while pressure on prices escalates. At the same time, the application spectrum for plastics products is surging. Car making, including the whole components supply industry, is a prime example of these trends. "For customers in this sector, being able to cover the entire process chain through KraussMaffei is far more than just a convenient way to invest in machinery", explained Dr. Erwin Bürkle, Director of Pre-Development New Technologies/ Process Engineering in KraussMaffei's Injection Moulding Machinery division. "In fact, it supports a strategic approach to achieving core aims – improving quality, saving time and reducing costs." To put it concisely: KraussMaffei makes its customers fit for highly competitive markets.



# Value-adding Chain



## Optimal price-performance ratio

The ability to supply technology for the entire value-adding chain is unique to KraussMaffei. It derives from our mastery of the three key technologies: extrusion, injection moulding and reaction moulding. KraussMaffei is the only manufacturer worldwide offering all these technologies. "In addition to our exceptional understanding of the formulations used and the processes involved, KraussMaffei is also in a position to provide a complete turnkey solutions from a single source. This means that we can deliver maximum cost-effectiveness along the entire process chain," explained Dr. Jens Liebhold, head of the twin-screw extruder business area at KraussMaffei Berstorff. He added: "We don't have

to buy in extra technologies. In many product development projects, KraussMaffei is the only machinery manufacturer sitting at the table from the very beginning. It cuts out 'frictional losses' completely." Processes that allow the substitution of plastic components for rubber-metal composites (see page 4/5) point the way forward. We are really only just starting to exploit the huge potential that lies in combining different machine technologies to cover the entire process chain for plastics products. And to engineer manufacturing solutions that are innovative and outstandingly cost-competitive. ■

Input: plastic pellets;  
output: an injection  
moulded product.

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## BIO-COMPOSITES IN PLASTICS PROCESSING

# Making good sense economically and environmentally

Lightweight, low-cost and with low environmental impact, natural fibre composites are on a roll. KraussMaffei is a leader in developing machinery and processes to work these innovative compounds.

Automotive components like package trays, covers and liners are already made using natural fibres.

Biocomposites – plastics reinforced with natural fibres – are superior in many ways to their counterparts reinforced with glass, aramid or polyester. They are lighter and under impact they break up with fewer sharp edges than glassfibre-reinforced materials – an important consideration in automotive applications. Made with relatively low energy inputs from renewable raw materials, they have a lower environmental impact. Often, like wood plastic composites, they incorporate residues from other production processes. While many glassfibre-reinforced composites must be

sent to landfill, biocomposites can be incinerated without residues.

### Cooperations with universities

It's easy to see the attraction of renewable raw materials in plastics processing, however, their use in series production is still a relatively new area of process engineering. But it is an area where Krauss Maffei Berstorff (KMB) has undertaken trailblazing work. In a cooperative project with the Faculty of Bioprocess Engineering at the Technical University of Hanover, KMB

has developed a new twin-screw extruder concept for compounding biocomposites. The system can process the fibres without a prior, energy-intensive drying stage. "The stars here are our multi-process elements (MPE)," explains Georg Scheel, project



Natural fibre composites are popular for outdoor use. They look like wood, but they keep their shape better and they're more resistant to moisture.



engineer working on development projects at KMB, “they ensure that our machines compound the natural fibres very gently and at a low cost.” The system can be set for optimal processing of wood flour, wood fibre, flax or hemp, making allowance for the varying water content of the material. An important advantage of processing the natural fibres without energy-intensive predrying is that it eliminates the risk of dust explosions.

### Processing

The polymer is metered into the feed zone of the compounding extruder via a gravimetric unit. Additives to improve product characteristics are also fed in at this stage. The polymer melts as it moves through the plasticizing zone. The natural fibres are then fed into the melt via a side-mounted feed unit. From this point on the MPEs come into action ensuring that the fibres are mixed very gently into the melt. Vents along this section of the processing unit allow the moisture in the fibres to escape as it is released. Further along the extruder barrel, a vacuum degassing unit removes any remaining moisture and constituents with low molecular weight. The final stage of the process is pressure build-up prior to extrusion.

### Expertise in reaction processes

Polyurethane processes are an ideal basis for biocomposites. KraussMaffei has adapted its successful LFI process to create the NFI (Natural Fibre Injection) process. The natural fibre from a roving is chopped in the special mixing head into filaments with a preset length. These are thoroughly wetted with the polyurethane compound emerging from the mixing chamber of the mixing head. A robot guides the pouring pattern of the PUR-fibre

mix into the open mould. Using natural fibres from a roving instead of glassmat inserts saves costs in several ways. Labour costs are reduced by eliminating manual insertion and waste is also significantly reduced.

### Automotive and beyond

The automotive industry is enthusiastically adopting biocomposites. In an S-Class Mercedes-Benz, for instance, they are used in components like parcel trays and door trim, replacing around 23 kg of conventional materials. They are also enjoying growing popularity in construction and recreational products. Wood plastic composites are attractive and practical as decking or fencing. They have the look and feel of wood, but are cheaper and more weatherproof. ■

## NATURAL FIBRES FOR COMPOUNDING

### Seed fibre

- Cotton
- Kapok

### Bast fibre

- Bamboo
- Hemp
- Jute

### Fruit fibre

- Coconut

### Rigid fibre

- Wood
- Sisal

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## KEYNOTE

“Plastic is taking over from other materials, yielding moulded parts that were previously inconceivable.”

Dr. Karlheinz Bourdon,  
head of Injection  
Moulding Machinery

Dear Customers, dear Readers,

I would like to take this opportunity to introduce myself as the new head of injection moulding at KraussMaffei. It gives me great pleasure to work for a company that leads the world in sales of plastics and rubber processing machinery and systems. The reason why we are in this position is the trust placed by you in our solutions expertise. I thank you for that vote of confidence and sincerely hope that you will continue to actively collaborate with us. Feel free to avail yourself of the contacts in the KraussMaffei Injection Moulding Machinery division around the world. What is the secret to being successful in plastics engineering? I firmly believe a key element to be a focus on the future of our technologies. That would aptly describe the main themes running through this issue of *made by KraussMaffei*. It shows, for example, how KraussMaffei taps into new plastics applications by combining its injection moulding expertise with other technologies. Plastics can take over from other materials – while yielding improved product properties – and produce moulded parts that were previously inconceivable.

Examples abound in this issue.

Happy reading!

Dr. Karlheinz Bourdon,  
Head of Injection Moulding Machinery

## MX SERIES ORDERS

# Hugely cost-competitive

Two orders for large MX series machines were placed with KraussMaffei's Injection Moulding Machinery division in late 2007. The first came from HP Pelzer Group, headquartered in Witten, North Rhine-Westphalia, who ordered a KM 2300-14000 MX Injection Moulding Compounder (IMC). HP Pelzer is the world's leading supplier of vehicle acoustic systems. The new IMC will produce a part for BMW 3 Series that provides acoustic insulation between the engine and the passenger compartment.



An Injection Moulding Compounder of the type ordered by the HP Pelzer Group.

Markus Schinabeck, IMC technology manager at

KraussMaffei, reveals some specifics: “For the first time, up to 85% barium sulphate powder is being added to the thermoplastic elastomer.” The IMC process is superseding an RPM spray process at HP Pelzer because it offers substantial savings on material costs – a perfect example of how KraussMaffei devises cost-saving solutions for our customers by merging different technologies.

The second order, for a KM 4000/101000 MX machine, is headed for South America. Ordered by Conorsa S.A. in San Luis, Buenos Aires, Argentina, this is a giant among injection moulding machines, combining the largest plasticizing unit KraussMaffei ever developed with the second-largest clamp unit. With an impressive maximum shot weight of 40 kg, it will be used to make polyethylene garbage containers. Specially developed machines, such as the huge plasticizing unit, and the logistics of shipments to South America, are typical of the challenges regularly handled with aplomb by global player KraussMaffei. ■



# KraussMaffei takes Gold

On February 22, the winners of the International German Training Prize 2008, awarded by German Federal Association of Sales Promoters and Trainers (BDVT), were announced during Europe's biggest education trade show, the didacta in Stuttgart. The KraussMaffei training concept – a skills campaign with the motto “Driving the upswing” – took one of the four first places. Rupert Gruber, head of training at the company's Munich plant, was delighted: “In addition to teaching customers' employees technical skills, our new training programme puts a special emphasis on soft skills like avoiding errors, communication, interaction and leadership. It's good to know that the BDVT jury endorses this approach.” KraussMaffei customers reap the benefits: their employees are not only highly trained in machine operation or maintenance, they are also coached in taking responsibility as part of a team. The new training programme has been in operation since 2008, with up to 950 customer employees

expected to participate in around 180 training courses a year. ■  
Contact: rupert.gruber@kraussmaffei.com

## MACHINE MOVING SERVICE

### Leave it all to us

If you need to move a machine, simply call KraussMaffei's Service unit and we'll do the rest. In our business, moving injection moulding machines is something we do pretty often, as a result we're expert at it. For customers, our complete service means huge savings in time, effort and costs. If your machine is crossing borders, KraussMaffei specialists will make any modifications necessary for troublefree operation in its new location. This includes adapting the power supply and changing the operator interface language. But this is only the start of our full service package. We'll de-install your machine at its original site, checking and documenting the actual status before we start. You might want to plan an upgrade to coincide with re-installing the machine at its new site. “KraussMaffei hands over a production-ready machine at the new location – and if necessary, we'll train your new operators and service technicians too.” ■  
Contact: wolfgang.ballas@kraussmaffei.com



Celebrating the contract: CEO Dr. Dietmar Straub, K. S. Lee, Director of Advanced R&D Center IL Kwang and Manfred Reichel, from KraussMaffei's board of management.

IL Kwang has bought an integrated manufacturing cell developed by KraussMaffei for the production of large automotive interior trim components with premium softtouch surfaces. The system combines injection moulding, reaction moulding and extrusion – technology to the power of three. Dr. Dietmar Straub, KraussMaffei CEO, commented, “Our huge SkinForm system was a magnet for spectators at the K2007 last October. The order shows that

## SKINFORM SYSTEM FOR IL KWANG IN KOREA

### Technology to the power of three in action

Korean automotive components supplier

the market is more than ready for this innovative technology.”

IL Kwang supplies the Hyundai/Kia Group. The new turnkey SkinForm system integrates a KM 2300 swivel-platen machine from the MX Series, the injection moulding compounder, the patented SkinForm process and two part-handling robots. It will be producing large car interior trim elements with luxury, leather-look sections. KraussMaffei is the only company capable of linking three key plastics processing techniques in a fully automated system to achieve this outcome. ■

# Unique and cost-effective

Automation is an integral feature of KraussMaffei's complete systems approach. Using standard components, KraussMaffei experts design the perfect robotic solution for each injection moulding machine. A ClassiX/LRX linear robot combination is just the latest example.



**Dream team:**  
A ClassiX injection moulder teamed up with a linear robot for parts removal.

KraussMaffei premiered the first two-platen injection moulding machine at the K1992 in Düsseldorf. This machine concept went on to become an unbeatable KraussMaffei classic in the following years. At K2007, the company paid tribute to that success in the name chosen for its latest series of injection moulding machines: ClassiX. The new machines are a particularly economical subset of the CX family, targeting the lower clamp force range between 35 and 130 t. They are all-hydraulic machines, whose two-platen technology delivers a small footprint and four-tiebar clamp system ensures high precision. The ClassiX is an ideal modular base for lowering the costs of injection moulding to the highest criteria. It offers 83 basic clamp/screw-diameter

combinations and a choice of over 500 options that will help customers find the perfect production solution. The machines' productivity can be increased by combining them with the new LRX series of linear robots.

## The perfect match

An LRX linear robot installed with a ClassiX injection moulding machine can be used to unload parts from the mould and place them on a conveyor belt, to position inserts in the mould, cut sprues, assemble products and pack them into bags or trays. These linear robots are configured for payloads of five, ten or 15 kg. This makes them the ideal economical match for the ClassiX machines, which are designed for injection moulding small and medium-sized parts. Standard practice is to integrate the LRX into the machine control system. This configuration allows the robot to be programmed from the machine or manually via the handheld unit. Communications between the machine and the robot take place via a VARAN bus – which is ten times faster than the DIAS bus used in the predecessor model. A ClassiX machine and LRX robots can be combined in different configurations. Typical applications are in the automotive sector as well as in medical technology, packaging, and in the electrical and electronics industry. A CE-conformity declaration comes with the complete system comprising injection moulding machine, robots, conveyor and safety housing. KraussMaffei offers a stand-alone version of the linear robots under the name LRX-S. This can be combined with earlier injection moulding machines and those of other manufacturers.

## CLASSIX AND LRX: BENIFITS AT A GLANCE

### ClassiX IMC

- Compact, space-saving two-platen technology, easy on the mould
- Plasticizing with minimum wear and extra-long uptimes
- Hydraulics and electrics optimized for minimum power consumption
- More than 500 optional extras for specific production tasks

### LRX linear robot

- Space-saving because control unit integrated on the Z axis
- VARAN bus, ten times as fast as a conventional DIAS Bus
- Simplified navigation, software for offline programming and much more
- Data stored jointly with injection moulding machine data
- Handheld with touch functions



- When teamed with integrated linear robot, the ClassiX is transformed into a reliable manufacturing cell.
- CE-conformity declaration for complete single-source system

### Ideal for very fast cycles

Also new are the KraussMaffei SR side-entry robots. The hallmarks of these robots are speed, flexibility and reliability. They are typically used in medical technology and packaging applications producing thin-walled items with cycle times under six seconds. The SR is either mounted directly on the machine or integrated into a mobile automation cell. Both variants are suitable for cleanroom production, which is essential for medical items. Like the linear robot, the SR is designed to integrate into the machine control system. It is also available as a stand-alone version, and is supplied in two sizes with 8 or 12 kg payloads.

### Complete range of robots

KraussMaffei can supply – at very competitive prices – all the components required for automating injection moulding processes. In addition to linear robots, we offer the IR range of six-axis industrial robots for handling large parts,

especially in complex demoulding processes. They are extremely flexible and able to execute operations that are too demanding for linear robots.

KraussMaffei can deliver maximum flexibility for your process by offering the right industrial robots for any brand of injection moulding machine right through to complete processing cells. We supply customized automation solutions engineered using standard components. ■



IR industrial robots are the solution to automating large injection moulding machines.

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# Another batch of winners

Every year, a jury from SPE Central Europe, which has more than 38,000 members, announces the winners of the prestigious SPE Award, often called the “Plastics Oscar.” KraussMaffei swept the boards at the latest awards ceremony, building on its successes of the previous year.



The winner: an innovative car exterior body part made on a KraussMaffei system.



On October 22, 2007, the Society of Plastics Engineers (SPE) Central Europe released the winner’s names for the Automotive Division Award. This prestigious prize singles out developments in the automotive industry that display an innovative use of plastics in manufacture, processing and application.

The awards go not only to the component manufacturer, but also to all partners who played a part in design and development. KraussMaffei swept the boards in the category

Body Exterior, with three components produced on KraussMaffei machines taking first, second and third places. Products made on KraussMaffei machines were also short-listed in other categories: twice for power train components and once in the category Electronic/Optical Parts. In addition, the SPE jury awarded second place in the category Digital Media to KraussMaffei’s new website for its outstanding user-friendliness.

### A string of awards

KraussMaffei is accustomed to receiving prestigious awards for outstanding technologies: for several years running, we have had winners in the Automotive Division Award organized by SPE Central Europe. In 2006, KraussMaffei won first prize in the two categories Body Exterior and Electronic Parts. In 2006, too, the SPE in America gave its Innovation Award for a moulded air duct for the instrument panel of a Jeep. The part is produced on a KM 2700-24500 MX Injection Moulding Compounder. Taking the first, second and third places at the Automotive Awards 2007 are very much in keeping with the tradition of award-winning technology made by KraussMaffei. ■

## 11TH AUTOMOTIVE AWARD PARTS & COMPONENTS 2007

### Prize-winning parts made with KraussMaffei machine technology

#### Category Body Exterior

Place	Part	Innovation
1	Body module, Smart	First exterior part made of PP/EPDM by MIC with one-layer clearcoat
2	Thermoplastic side wall, front, BMW M3 Coupé and Cabrio	Innovative design, mould and attachment design
3	Covering roof, rear Mercedes-Benz R Class	First back-foamed body part to be made using film technology (car colour)

#### Category Power Train

3	Intake plenum, BMW M3	Process for concealed weld seams
5	Front module carrier, Smart	Fully automatic production using hybrid technology

#### Category Electronic/Optical Components

2	Carrier for adaptive headlights, BMW 5 series	Material bond between bushing and base material
5	Shot channel with holding strap cover, Skodia Fabia	Fully automated overmoulding of the polyester strap

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MULTICOMPONENT INJECTION MOULDING MACHINE



# New machine expands a leading position

BIRÖ Edwin Bishop AG, a Swiss company, specializes in injection moulding complex technical parts and high-quality optical components. The company recently beefed up its production capacity with a multicomponent injection moulding machine from KraussMaffei.

For many years, Romanshorn-based BIRÖ Edwin Bishop AG has specialized in the development and production of sophisticated technical parts for the automotive industry, manufacturers of household appliances, the construction industry and the electrical and electronics sector. The company recently expanded its inventory of approximately 70 injection moulding machines with a KM 1000-4300/1400 MX Z multicomponent injection moulding machine from KraussMaffei. The 1000 t clamp force machine means that the clamp force range BIRÖ has available spans 70 t to 1000 t. This puts the Swiss injection moulding specialist in an even better position to satisfy its customers.

**Market leadership consolidated**

At a special ceremony to mark the occasion, Bruno Schleiss, general manager of KraussMaffei (Switzerland) AG, handed over the new injection moulding machine to Daniel Bischof, managing director and owner of BIRÖ Edwin Bischof AG. “This investment in an MX machine is also an investment in the future, because the extra clamp force range opens up new possibilities for us and our customers,” said Daniel Bischof. “What’s more, it helps us further consolidate our position as a provider of high-tech multicomponent components. And it strengthens our position as one of the market leaders in this segment in eastern Switzerland.” Intended for the production of multicomponent parts for the automotive and household industry, the machine will certainly not lie idle – the first projects are already well into the planning stage. ■



Bruno Schleiss (right) hands over the new injection moulding machine to Daniel Bischof.

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SWISS PLASTICS FAIR

## Premiere in Lucerne

For the first time ever, the Swiss Plastics Fair was held in Lucerne, Switzerland, from January 15 to 17. KraussMaffei was there with a 70 m² booth focusing on its core technological expertise and exhibiting a KM 240-1000 EX all-electric injection moulding machine. This machine represents the top end of our range. The fast, clean, high-performance EX series is available in clamp forces from 50

to 2400 t. The machine exhibited at the fair was teamed with the latest version of the SR 80 side-entry robot. “This type of compact, high-speed machine solution is a typical application for the Swiss market, where customers come mainly from the automotive, medical and packaging sectors,” explains Bruno Schleiss, general manager of KraussMaffei Switzerland. ■



In Lucerne, KraussMaffei demonstrated an injection moulding machine with a side-entry robot.

# Clearly superior plastic



Lower weight and completely new prospects for creating new shapes give plastic a clear edge over glass in many areas of glazing. KraussMaffei's MX SpinForm system is designed specifically for compression moulding these very large parts.

The panorama roof of the Smart forfour has a surface area of 0.8 m<sup>2</sup>.

Plastics offer numerous advantages over conventional glass in the production of automotive glazing. These include a weight saving of up to 40%, which cuts fuel consumption and helps lower the vehicle's centre of gravity. Plastic also offers designers huge scope for shaping and colouring the products.

The surround – often black – is moulded on instead of being printed, as in the case of glass. This provides an opportunity for integrating functions, such as fastening elements. This type of process can be used for large panorama roofs, tailgate glazing with integrated functional elements, and glass-look side panels.

an absolutely smooth and flawless surface that are a match for glass in terms of glossy appearance. The SpinForm concept also allows two-component injection moulding to be combined with compression moulding in a single machine. This kind of set-up is vital for making large-area low-stress components, such as the increasingly popular panorama roofs. ■



Typical SpinForm user: Freeglass, a supplier based in Schwaikheim, Germany.

## For extremely large parts

However, compelling results in the manufacture of plastic glazing need the kind of sophisticated production technology offered by the KraussMaffei MX SpinForm spin-platen system. A SpinForm machine can make parts twice as large as a comparable turntable machine with the same machine dimensions. The MX SpinForm has two dedicated injection units, one processing the transparent polycarbonate for the panes, and one for injecting the surround. Customized plasticizing units produce a very high-quality, homogeneous melt at extremely constant processing temperatures. The result is panes with

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# Durable and low cost



The Injection Moulding Compounder (IMC), developed by KraussMaffei, combines the benefits of injection moulding and extrusion. The manufacture of pallets from filled HDPE illustrates the potential savings achievable with this technology.

The Injection Moulding Compounder with its integrated twin-screw extruder achieves hugely increased throughput because plasticizing takes place continuously. The biggest advantage over traditional injection moulding machines is that processors can do their own compounding, ie, start with the basic HDPE and then add fibres, fillers or masterbatch during processing. Since it's much cheaper to buy individual raw materials than ready-made compounds, this has a dramatic impact on costs. Using an IMC to make pallets slashes costs relative to conventional production methods – among other things, because it's possible to raise the proportion of wood flour, rice husks or other fillers to over 50%. Low-cost materials can replace a high proportion of the high-cost polymer. Further savings result from shorter throughput times due to the lower-temperature melt requiring less cooling.

### Plastic pallets last 15 times longer

Cost-for-cost, a filled HDPE pallet made in this way lasts 15 times as long as a wooden pallet. This cuts the ratio of waste to pallets in circulation. Plastic pallets are immune to fungal infection and, unlike many wooden counterparts, they are not subject to import restrictions and will also meet high hygiene requirements. If the pallets are made using recycled materials, a degassing stage removes the volatiles from the material during extrusion. Additionally, injection moulding compounding also offers a whole swathe of additional design possibilities that cannot be achieved with wood. There's also the option of making complex structures that look like wood. ■



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Continuous  
plasticizing on the  
KM 2000-14000 MX  
IMC makes for high  
throughput.

# A new departure for a processor

Engine components such as throttle valve housings have typically been made of metals. Yet plastics have a lot to offer in this application. A good illustration of this is a multiple award-winning product from Christophery Kunststofftechnik that utilizes KraussMaffei machine expertise.



Plastic (right) instead of metal.



Top performance: each cylinder in the V10 engine has its own individual throttle valve in a plastic housing.

Based in Brilon, North-Rhine Westphalia, Christophery Kunststofftechnik GmbH is a specialist processor of thermosets and thermoplastics, with a customer base spanning the automotive, sanitary and household appliance sectors. Christophery has built intensive expertise in areas that include chromed and painted surfaces, 2-component injection moulding and bulk polyester processing (BMC). The last of these is the basis for a highly innovative product range which the company has been making since 2006, namely the first thermoset throttle housings for gasoline engines. Currently, these are used in powerful Chrysler engines, from the six-cylinder 3.4 litre model for the crossover Pacifica through to the 8.4 litre V10 in the Super Dodge Viper sports car.

## Clear benefits

Throttle housings are usually made of die-cast metal. Thorsten Becherer, CEO of Christophery, reels off a list of benefits gained from the metal-replacement approach developed by his company. "First, there are the cost savings. The moulds

last four to five times as long as the tooling for aluminium and the raw materials for BMC are cheaper. With the right design, savings of up to 50% are possible. Then, there is the absolute precision of the plastic part, its smooth surfaces and chemical resistance. After that there are the broad design latitude, even for very complex geometries, and the fact that the superior insulating properties of the polymer prevent ice from forming on the throttle valve.

## Top awards

Christophery produces a throttle valve housing every 90 seconds in a three-shift operation on four KraussMaffei CX integrated injection moulding machines – it has made over a million parts so far since the start of production. This innovative product – for which Christophery also developed the moulds – scooped several awards in 2007. Foremost among them is the Innovation Award which was presented in America by the Society of Plastics Engineers (SPE) International. Christophery also captured Europe's prestigious TT award, and took second place in the AVK's Innovation Award. ■

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## TECHNICAL CLEANROOMS

# Fewer rejects, higher quality

Originally developed for medical applications, cleanroom technology is now firmly established in specialty automotive and optical components production.

Foreign particles can be a major problem in the manufacture of a wide range of technical products. Once they adhere to or become embedded in the plastic, the part is either fit only for scrap or else requires extra processing steps. Contamination is as much a problem for CDs, DVDs, miniature gears and circuit boards as it is for car surfaces and glazing, optical lenses and diffuser panels. The solution here is to produce in a technical cleanroom.

Setting up a technical cleanroom means sealing off the smallest possible space around the production area and filtering the air supply to the required cleanliness. These measures slash the contaminant count, the inserts retain their pristine surfaces and the mould surfaces remain clean. Products come out of the mould with clean surfaces and can be kept this way for downstream operations. We can equip a cleanroom-compliant injection moulding machine to suit application requirements. The clamp can be fitted with a top-mounted sliding laminar-flow box. Alternatively the clamp area can be completely accommodated in a cleanroom or cleanroom cabin. All emission

sources for solid particles, oil, lubricants and plastic melt should be eliminated or isolated, on both the injection moulding machine and the peripheral equipment. The clamp should allow unimpeded laminar air flow, and provide good heat dissipation and easy access for cleaning.

### Projecting into the cleanroom

All KraussMaffei series machines are designed to cleanroom specifications and GMP guidelines. The cantilevered clamp on the CX series means that only the clamp with the mould need project into the cleanroom, while the rest of the machine remains outside. On our EX series, water-cooled drive motors and closed-loop lubrication to ensure cleanroom capability are standard on all models. Machine operation is simplified by the MC5 controller, which continuously monitors and displays quality parameters which indicate that the process is operating within specifications. ■



CoverForm system for cleanroom production.



Six-axis robot handling and cleaning a film preform in a cleanroom.



EX injection moulding machine for cleanroom production.

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# More KraussMaffei than meets the eye!

You may not see the logo, but you can be sure our know-how is working for your success. From optimizing your value-added chains, to developing profitable production solutions. Intensive know-how in injection moulding, reaction processing and extrusion technologies fuels our ability to engineer machines and systems that produce a vast range of automotive components – for interiors, exteriors, engine compartment, underfloor, tires and transparent elements. Not forgetting combined-technology solutions like SkinForm®. We continue to build our expertise in projects with over 500 carmakers and automotive component suppliers worldwide. Our know-how is at your service. And you can be sure it will pay off for your project, your product and your company.

**KraussMaffei is a premium partner  
for the plastics and rubber processing  
industries worldwide.**

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***KraussMaffei***

Affix stamp  
if you have  
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## INJECTION MOULDING MACHINERY

# KraussMaffei

PEOPLE FOR PLASTICS



Dr. Karlheinz Bourdon,  
General Manager,  
Injection Moulding  
Machinery

### Please send me information on the topics I checked:

- SkinForm
- Automation solutions
- Multicomponent moulding
- Injection Moulding Compounder
- Technical cleanrooms
- Product spectrum KraussMaffei Reaction Process Machinery
- Other: \_\_\_\_\_

It would welcome a visit from a KraussMaffei representative.

\_\_\_\_\_  
Last name, first name

\_\_\_\_\_  
Function

\_\_\_\_\_  
Company

\_\_\_\_\_  
Street address

\_\_\_\_\_  
City, Postcode

Dear Customers, dear Readers,

A major focus in this new issue of our customer magazine made by KraussMaffei is on the future of plastics processing. This includes our fast track approach to opening up new applications for plastics by combining our competence in injection moulding with other technologies. We're building the machines that will enable you to substitute plastics for conventional materials – with significant gains in product properties – or to make components that were never even dreamt of.

With best regards  
Dr. Karlheinz Bourdon

## GALLERY



### The smart choice

A great little car for the city. So compact that it parks in half a normal parking place.

The original idea from Swiss entrepreneur Nicholas G. Hayek, founder of swatch watches, was taken up by Daimler and reached the market as the smart car. The

first smart, the two-seater, caused a sensation when it was launched in 1998. Today this model is dubbed the fortwo to distinguish it from its big brother, the fourfor. The cars are smart through and through. Take the shape, for example, streamlined as it is, it nonetheless maximizes the amount of usable space. To achieve this, the designers used plastics wherever possible for the car's inside and outside.

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## Injection Moulding Machinery Division

Injection Moulding Machinery is KraussMaffei's biggest division. The CX, EX and MX Series, KraussMaffei's three injection moulding machinery ranges, offer solutions for almost all injection moulding tasks, from standard to special processes. KraussMaffei holds a strong position in the market for big machines and as a machine and systems supplier to the automotive industry. Other industry focuses include packaging, electrical/electronics and medical technology. With its expanding knowledge base in robotic systems and automation, the division is rapidly building a significant position as a full-system supplier of complete manufacturing cells.

At your service  
worldwide

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World premiere  
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