

# KraussMaffei

PEOPLE FOR PLASTICS



LONG-TERM, PREMIUM QUALITY PARTS WITH CROSSLINKING MOULDING COMPOUNDS

PolySet & DuroSet injection moulding solutions

## IN PARTNERSHIP WITH INDUSTRY

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



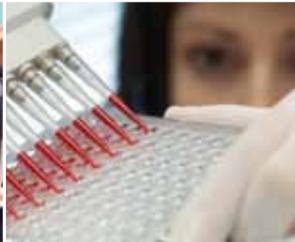
Automotive



White goods



Construction



Life Sciences



Electrical/electronics

Whatever you aim to achieve in plastics or rubber processing, KraussMaffei is your partner. We are the only company with intensive expertise across the three main engineering fields. And we have a strong track record in integrating this expertise to develop new processes and systems.

### Ready for any challenge

Our **Injection Moulding Machinery Division** supplies machinery and systems from 35 to 4,000 tonnes for standard applications and for all processing variants, together with fully automated solutions. We have a strong customer base in all the relevant industries worldwide.

Our **Reaction Process Machinery Division** supplies machines and complete systems for processing polyurethanes and other reactive materials.

Completing our product portfolio, **Automotive Component Systems** supplies foam moulds, cutters and routers. Our customer base is wide, with a focus on the automotive, construction and white appliances industries.

Our **Extrusion Technology Division** supplies machinery and systems for compounding, for pipe, profile and sheet extrusion, physical foaming, and the production of technical rubbers and intermediates for tire production. Machinery from the company's range – from single extruders to

complete extrusion lines – is used in many industries, including chemicals, pharmaceuticals, automotive, construction, furniture and packaging.

### People for Plastics

We are the “people for plastics”. We are your partners from the first exploratory discussion, through development to commissioning, servicing and operating your system, and final disposal. At all times, you are assured of outstanding competence in planning and engineering, as well as reliable and fast spare parts, service and support.

### Adding value for customers

We put our expertise to work for your success. With machine ranges engineered for modularity, we can deliver application-specific solutions based on our wide range of standard modules and specially engineered solutions. This strategy offers customers technical and cost advantages.

### Close to customers around the world

As an international company, KraussMaffei has a presence in all the major markets for the plastics and rubber processing industries and employs over 3,000 people worldwide. Our sales and service network keeps us close to all our customers around the world.

PolySet and DuroSet injection moulding machines are complete systems for continuous, high-precision processing of thermosetting plastics.



Packaging

KraussMaffei's PolySet and DuroSet injection moulding machine ranges are highly efficient solutions for processing freeflowing and non-freeflowing moulding compounds, eg, BMC, SMC, TMC, phenolic and melamine resins.

KraussMaffei's expertise in machinery for processing crosslinking plastic materials goes back to 1958. PolySet and DuroSet machine ranges score on high-performance material feed systems and application-specific screws, the level of wear protection and the rugged engineering of the two-platen clamp.

**TRANSPARENT TECHNOLOGY**

# Take a tour of a PolySet and DuroSet system solution

**2-platen clamp unit**  
Precision moulding, uniform clamp force distribution, tilt-free platen movement



**CX 130-750 Polyset**

**Thermoset package**  
Core compression, venting, mould vacuum, etc.

**Cantilevered clamp unit**  
Compact, leaves more space for downstream and peripheral equipment



**Unique material feed: Polyload AZ**  
Much reduced filling effort for polyester moulding compounds

**Wide choice of application-specific screws**  
Non-destructive for reinforcing fibres + optimal wear protection

**Liquid-medium barrel temperature control**  
Optimal processing conditions throughout

## ADDITIONAL PRODUCT INFORMATION

# Two-Platen clamp unit: Rugged and precise thanks to two-platen technology

PolySet and DuroSet machines are available from 35 to 650 tonnes. All machines offer high precision and unsurpassed long service life, the result of KraussMaffei's two-platen technology.

### **Built-in precision – guaranteed availability**

The four tiebars of the 2-platen clamp operate to ensure absolutely symmetrical application of force. This is especially important for functions such as compression or venting to reduce the risk of uneven pressure on the mould. The benefits are extended mould service life and consistent product quality, even with multi-cavity moulds.

Up to 16 different mould safety steps can be preset, so that even when movement sequences are optimized to cut cycle times, complex moulds can still be used easily and safely.

### **Compact manufacturing cells with easy access**

KraussMaffei's CX series of injection moulding machines are built to a compact 2-platen design. In consequence, they can be integrated into manufacturing cells with a very small footprint. The smaller the production area, the lower your manufacturing overheads and the more competitively you can

produce. CX machines offer good access to the clamp area from all sides and ample space in the ejector area, making it easy to connect up various automation systems.

### **Optimally adapted to processing thermosets**

PolySet and DuroSet machines provide compression and venting functions as standard. For specific production demands an extensive program library offers an additional choice of programs for closing and mould movement including:

- Core compression processes
- Sprue cutting and compression in the closed mould
- Vacuum management
- Clamping force build-up synchronized with screw stroke



Production line for throttle valve bodies, part of thermoset production at Christophery. The precision of the moulding operation reduces the need for post-mould processing.

#### **Poschmann Union goes for precision with PolySet solutions**

Poschmann Union's Christophery plant in Brilon, Germany, operates system solutions using KraussMaffei PolySet and DuroSet machines to produce technical components made from thermoset plastics.

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“Christophery develops and produces innovative, high-tech components for the automotive and electrical industries. Our name has always stood for highest quality products, so we want a competent partner capable of supplying us with the high-performance, long life machinery that we require. In KraussMaffei we've found the right partner.”

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**Karl-Heinz Balkenhohl**, sales manager at Christophery

## ADDITIONAL PRODUCT INFORMATION

# Processing the moulding compound: Optimally matched to the material

The plasticizing unit is at the heart of any injection moulding machine; plasticizing unit engineering is one of KraussMaffei's great strengths. 50 years' application technology experience in engineering screws for general and specific applications ensures highest material quality. With their optimal wear protection and the unique material feed systems for polyester moulding compounds, our systems deliver reliable processes and constant processing quality over many years.

### **Plasticizing units – engineered for high processing quality**

In addition to application-specific screw geometries and special check valves, the injection units are fitted with mechanical screw rotation blocking devices to ensure constant shot weights. The temperature of the material can be controlled precisely for best results by means of liquid-medium barrel temperature control.

### **Tough and wear-resistant – the injection unit**

Thermoset materials with high concentrations of mineral fillers pose a special challenge because of the increased wear on any parts in contact with the material. For this reason, all components of DuroSet and PolySet plasticizing units have effective wear-resistant coatings. This extends the operating life of nozzles, barrels and screws.

### **Plasticizing units with exemplary wear protection**

KraussMaffei also offers solutions for highly abrasive materials – screws up to 80 mm diameter made of powder metallurgical steel. This type of PM screw has around three times the wear resistance and hardness of conventional steel screws. To date KraussMaffei is the only company offering powder metallurgical screws in this diameter range.





Baumgarten Automotive Technics has made an impressive success of processing highly-filled thermo-set moulding compounds on KraussMaffei DuroSet machines from the B, C and CX series.

### **Baumgarten Automotive Technics & KraussMaffei Together we drive innovation forward**

Processes and machinery for manufacturing brake pistons from thermosets reached market maturity several years ago. They gained such swift acceptance that today competition is exerting noticeable pressure on prices. Baumgarten decided to increase the cavity count in order to maximize productivity and reduce unit manufacturing costs. KraussMaffei was both willing and able to help this endeavour. Experts from both companies collaborated to develop the SP 3000, a larger plasticizing unit with a highly-wear resistant 80 mm screw, for freeflowing thermosets with mineral filler, and to adapt the unit to operate on an all-hydraulic CX injection moulding machine. Baumgarten can now work with shot weights up to 1400 grams.

# Materials conveying and post-mould processing: Unique, highly automated systems, from a single-vendor partner

Automating all material flows – from raw materials feed to post-mould processing – sharply improves the cost-effectiveness of your production. KraussMaffei offers a wide range of application-specific robot solutions – from simple to complex – using in-house resources. Integrated feed units for positive feed of dough-like, glass-fibre reinforced moulding compounds are supplied from in-house production. Operating under the control of the MC5 injection machine control system, they ensure the best processing conditions and significantly improve machine availability.

### Custom automation – fully integrated

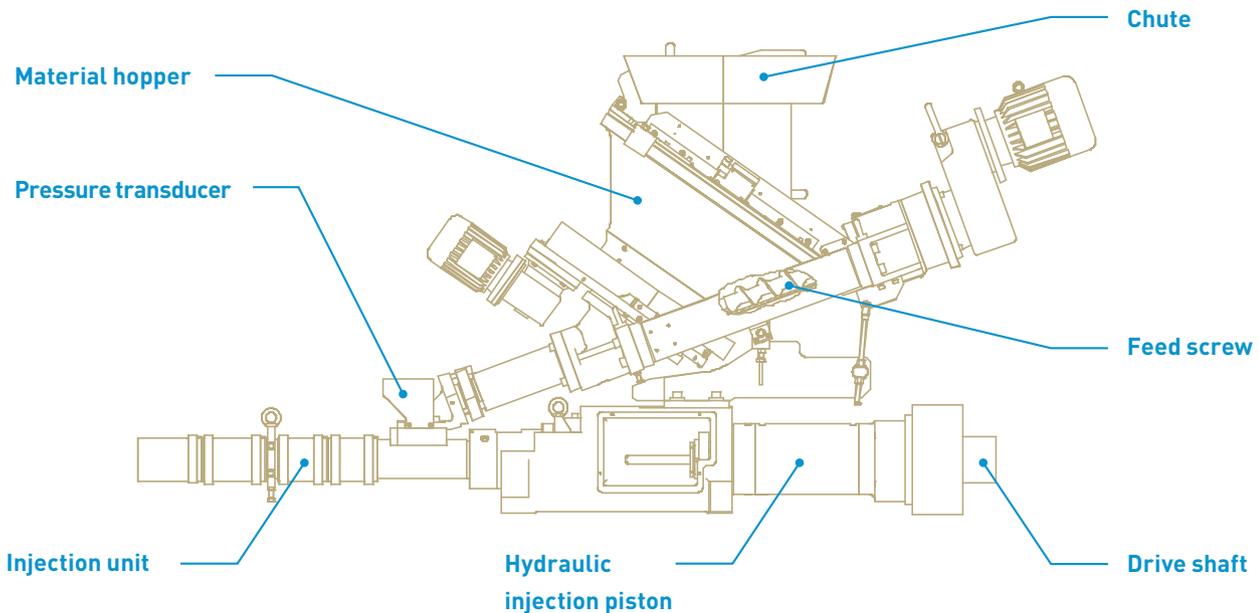
KraussMaffei automation solutions have been on the market for over 25 years. Characteristic of our linear and industry robots is precise repeatability and high speeds.

They are mechanically rugged and powered by high-performance servo drives. These strengths are fully utilized when the robots are teamed up with KraussMaffei machines.

### Constant processing conditions with the Polyload AZ

KraussMaffei offers the automatic Polyload AZ with up to 100 l theoretical capacity for loading dough-like glass-fibre reinforced polyester and vinyl ester compounds (eg, BMC, SMC und TMC) and HCR silicone, which require positive feed. Installed on PolySet machines, these tried-and-tested screw feeders require far less frequent topping up. Together with the precision stuffing-pressure control, the Polyload AZ helps to create constant process conditions.

### The Polyload AZ guarantees a steady material flow





A high level of automation and Polyload AZ material stuffers allow Automotive Lighting to produce reflectors from BMC under constant processing conditions together with high product quality.

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“We’ve built a reputation with our customers as an absolutely reliable supplier. They expect us to keep exactly to agreed delivery schedules and to supply high volumes of high quality products. The KraussMaffei Polyload AZ solution helps Automotive Lighting do just this. Thanks to the continuous feed and the automatic control of the stuffing pressure, we are able to produce under constant processing conditions. The large capacity of the material hopper for the screw feed reduces the number of top-ups required, keeping labour effort lower. These features and the fact that topping up the hopper is really easy, help to increase the availability of our systems.”

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**Jürgen Albrecht**, head of Process Engineering ALRT/MFE at Automotive Lighting

## CUSTOMER BENEFITS AND SAMPLE APPLICATIONS

# The sum of the details makes KraussMaffei PolySet / DuroSet machines reliable and high-performance systems

The plastics sector is a challenging market to work in. For years, the drive to innovate and a reliable machine park have helped our customers to succeed in this tough market – and we're proud of the contribution we've been able to make to their success.

### High availability for higher productivity

PolySet and DuroSet machines are engineered for reliable performance over extremely long operating lives. The main contributory factors here are the clamp – with its rugged mechanical systems and enclosed mould area – and the comprehensive wear protection, from hardened surfaces to powder metallurgical materials.

### Precision for higher yields of good parts

Crosslinking plastics are ideal for making technical components where the specification demands high dimensional and thermal stability. CX two-platen machines, where clamp movement is precision controlled, are capable of delivering the necessary moulding accuracy. Using a liquid medium for temperature control of the injection units and check valves guarantees the consistent shotweight essential for successful production. Efficient monitoring systems for mould heating circuits and cavity pressure, together with comprehensive quality assurance and the unique Polyload AZ material feed, all support your drive for cost-efficient production.



### Circuit breakers for electrical installations:

The high availability and productivity of KraussMaffei systems makes it possible to produce this type of part cost-effectively.



### Throttle valve bodies for the automotive industry:

Applications for the engine area are generally high specification products. KraussMaffei systems are capable of producing these challenging components with tight tolerances.



Domel, d.d. in Slovenia is a successful processor of polyester moulding compounds and has built a reputation for product quality. Like Domel d.d., many companies in the thermoset segment have been producing outstanding quality products for many years on KraussMaffei systems.

**Your key benefits from KraussMaffei machines:**

- Always meet your delivery schedules thanks to high machine availability and optimal wear protection
- Outstanding productivity with a multiple machine base – proven successful for many years
- High yields of good parts and accurate replication of complex parts with very tight tolerances
- Enduring high performance and constant processing conditions



## SERVICE WORLDWIDE

# Service, support and spare parts – when you need them, where you need them

Rely on us for a fast and competent response to all your service needs anywhere in the world. Whatever you need – from troubleshooting or training to spares or repairs – we're on the job.

We're dedicated to supplying service quality on a par with the outstanding quality of our machines and systems. We offer far more than spare parts and hotlines. We'll work with you to choose the best and most cost-effective solution for your operation. We'll help you test new applications and we'll plan customized service packages.

### All-round service

Our service offering is broad. We'll configure your system, install and commission it, train your staff, plan measures to minimize your downtime risk and maximize productivity, and carry out maintenance, repairs and upgrades. You'll find us fast, reliable and competent. Our hotline is manned by highly-trained and experienced service technicians. If necessary, we'll get a technician to you quickly. Remote diagnosis, interfacing directly with your machine's control system, can be a practical alternative. Spares for all important wear parts are available at short notice. We're continuously expanding our service network to speed up spare parts shipment. Talk to us about the right service solution for your business.

### Customer trials and prototyping in our test lab

The Injection Moulding Division operates a test lab fitted with the latest machinery and equipment. We can run trials, produce prototype parts and fine-tune processes on your behalf. We can work with you to test and evaluate processes, machines and equipment in order to identify the best approach for a particular project. Our highly-qualified application engineers are there to help you.

### Training with high hands-on content

Courses are held in our lab and training centre, or, optionally, on your premises. We offer clearly-structured basic and advanced training in operation, process control and maintenance for KraussMaffei injection moulding machines. On request, we'll plan and hold special courses on topics of your choice. All participants spend a high proportion of their training working hands-on with original KraussMaffei machines. A well-structured training program produces skilled operators and technicians, which will positively impact your up-time and productivity.

### Contact for training:

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## At your service worldwide

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## How to contact us

Apart from email you can contact us on the service hotline or by post at this address:

**Hotline**

Phone: +49 89 8899-3300

Fax: +49 89 8899-153300

**Injection Moulding Service**

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KraussMaffei is a premium partner for the plastics and rubber processing industries worldwide. KraussMaffei machines and systems are used wherever plastics and rubber are converted into products. As a knowledge-driven technology company, we build on many decades of experience and a strong commitment to research and development.

Thermoset plastics – freeflowing and dough-like moulding compounds, such as BMC, SMC, TMC, phenolic and melamine resins – are used to make products with striking advantages. Among these are high dimensional stability and good resistance to chemicals, temperature extremes and mechanical influences. They are, however, challenging to process, partly because they are extremely abrasive. With our **PolySet and DuroSet** machines KraussMaffei supplies dependable and rugged solutions for precision processing of these materials under constant processing conditions. High levels of wear protection, rugged mechanical systems and our unique materials feed technology ensure high machine availability and productivity over many years.

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