Innovative mixing and metering machines
Outstanding product quality in PU processing
Facts and figures regarding KraussMaffei metering machines

Application areas

Automotive
Automotive
Automotive
Automotive

Automotive
Utility vehicles
Utility vehicles
White goods
Innovative mixing and metering machines
Outstanding product quality in PU processing

The extensive range of metering and mixing machines from KraussMaffei is suitable for all application areas in PU processing. The modular design and flexible configuration of the machines allows them to be optimally tailored to customer-specific requirements. This means KraussMaffei offers the optimum solution for every production requirement. This includes being easy to operate and maintain.

Your advantages at a glance:
– High process reliability thanks to innovative machine engineering
– Outstanding component quality thanks to precise control engineering
– Excellent price-performance ratio
– Flexible machine configuration
– Easy to operate and maintain
Meet the machines:
Take a tour of the RimStar Series

Easy-to-read displays
Easy to operate, service and maintain

Frequency converter for metering pump drive

Proven tank design with double-walled agitator tanks

Automatic air dryer
Complete processing system with heatless adsorption dryer, pre- and after-filters and condensate drain

Plate heat exchangers mounted on machine frame
Covers all processing applications, short pipelines, mounted compactly on the base frame, higher component quality and less scrap thanks to improved temperature, pressure and process control

Suction line with edge-type filter

Mixing head hydraulics
with feed pump, pressure accumulator, high-pressure filter, return flow filter, minimum fill-level sensor and oil cooler

(Image contains optional equipment)
Optional outrigger
Can be mounted on the machine base, no additional costs thanks to external piping

Centrally mounted connections for component supply lines and central outlet

HMI interface

Switching cabinet with Siemens S7 control unit

KraussMaffei high-pressure metering pump (axial piston pump) with handwheel adjustment
Pumps and motor with magnetic coupling
Enormous flexibility
Now and in the future

Our machine concepts offer you maximum flexibility so you can respond to your industry’s latest demands at any time. This flexibility makes it possible to build intelligent machine components that can be easily added to and combined.

**Flexibility now:**
- The modular design of our frames allows us to create flexible solutions to suit your space requirements
- Switching cabinet can either be permanently mounted on the frame or variably positioned

**Flexibility in the future:**
- Our machine concept offers you multiple options for adding to and upgrading machine components in response to changes in production requirements

**Proven tank design**
Double-walled agitator tanks with the option to connect a nucleation unit, mounted compactly on the base frame [RimStar Compact Series with max. 250 L tank], cartridge heaters for cost-effective component heating.

**Central water supply**
Installed on-site to lower installation costs.

Two-component metering machine with color metering
Technical equipment variations in the RimStar Series

- **P** = Pressure measurement
- **V** = Volume flow measurement
- **T** = Temperature measurement
- **FU** = Frequency converter
- **FA** = Non-KraussMaffei system
- **MAK** = Magnet coupling
- **USE** = Switchover units

### POLY
- 4.5 bar
- 10 bar
- Standard agitator
- Viscojet agitator
- Fill-level sensor
- Fill-level limit switch
- 25 L
- 60 L
- 100 L
- 250 L
- 500 L

### ISO
- 4.5 bar
- 10 bar
- Standard agitator
- Viscojet agitator
- Fill-level sensor
- Fill-level limit switch
- 25 L
- 60 L
- 100 L
- 250 L
- 500 L

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**Legend:**
- **Pentamix**
- **CO₂ batch**
- **Shut-down valve**
- **Viscojet agitator**
- **Standard agitator**
- **Fill-level sensor**
- **Fill-level limit switch**
- **Control system**
- **Profibus**
- **PUC**
- **Robots**
- **Outrigger**
- **Rotary table**
- **Oval table**
- **Mold carriers**
- **Additional color**
- **Number of mixing heads**

**Technical equipment variations in the RimStar Series**
Outstanding component quality and minimal scrap
Short, rheologically optimized supply lines between the machine components result in lower pressure losses, more precise temperature control and optimized control engineering. This increases process reliability and the quality of your parts.

Minimal maintenance costs
The series is also extremely easy to operate and maintain, which helps to avoid unnecessary downtimes.

RimStar Nano
The RimStar Nano was specially developed to handle low output rates and limited space requirements: This means that the supply lines running between the tank and the high-pressure pump, and between the filter and the volume gauge in the high-pressure zone, are kept as short as possible and that materials can be changed quickly and easily.
RimStar Compact
The RimStar Compact has a one-piece machine frame and a compact, space-saving frame design. The machine is installed together with the control cabinet on one frame only and can be put into operation immediately thanks to the plug-and-play principle.

RimStar Modular
The RimStar Modular has a modular machine frame, which can be added to as necessary to meet any current or future requirements. The control cabinet can be supplied as a standalone unit, if required.
Features of the RimStar Series
for perfect conditioning, metering and mixing

Machines in the RimStar Series can condition, meter and mix PU materials to the highest standards.

**Perfect conditioning**
Heat exchangers, temperature control and thorough mixing are required to keep the material in the day tank in perfect condition. KraussMaffei boasts an extensive range of different systems for optimal material conditioning – ranging from proven double-walled agitation tanks and cost-effective cartridge heaters to complex systems with heat exchangers and heat-balancing systems. We also offer a large number of design variations to bring you the best possible component heating and material homogenization. Agitation tanks in different sizes for optimal distribution – of filler materials, for example – are also available as an option.

**Temperature-control system**
Heat exchangers can be installed in the return flow circuit, in the tank bypass with a circulation pump, upstream of the pump on the suction side or upstream on the pressure side.

**Perfect metering**
High-pressure pumps, edge filters, high-pressure filters, magnetic couplings and volume- and mass-flow measurement ensure the material is metered precisely and reliably.

**Perfect mixing**
Our range includes a large number of mixing heads for outstanding processing in different PU systems.
Magnetic coupling
We also equip our machines with a magnetic coupling if required. All the axial piston pumps we use have been specially engineered for processing polyurethane. This way, you can benefit from machines that do not leak, are maintenance-free and have a long service life. Forced rinsing also prevents materials from overheating and becoming damaged. Frequency-regulated drive units - the basis of a closed-loop system - are also available if required.

Edge and high-pressure filters
To ensure trouble-free processing of different PU systems, we use one type of filter for the suction (low-pressure) side and another type for the high-pressure side. We also offer variants with switchover and motor-driven filter systems.

Measure, control, regulate
We offer manual and automated testing systems: We can integrate any available sensor technology (including mass-flow measurement) to monitor the process parameters – pressure, temperature and throughput – in order to ensure machine processing stability.
Premium quality with low installation costs: The EcoStar Series

The EcoStar Series from KraussMaffei contains premium-quality PU metering machines with low investment costs.

The EcoStar Series is equipped with premium-quality components to guarantee reliable process control and high component quality. The very attractive price-performance ratio of the series has been achieved through systematic standardization and a reduced number of variants. This also results in an attractive delivery time.

**Standard specification**
- Double-walled feed hopper with agitators and fill-level monitoring
- Suction line with screen pack filter
- High-pressure metering pumps
- Flow-rate monitoring
- E-control with S7-OP77B
- Hydraulic unit for mixing-head control
- Mixing head with hose pack
- Machine base frame

**Optional additional equipment**
- Tank heating with heating cartridges
- Pump drive with frequency converter [closed loop]
- Magnetic coupling on the metering pumps
- Edge filter in the suction line
- High-pressure filter
- Heat exchanger in return line
- Low-pressure bypass valve
- Barrel pumps
- Mixing-head outrigger [radius 2.2 m and 3 m]
- Compressor cooling unit
- Additional equipment for pentane

**Your advantages:**
- Low investment costs
- Attractive delivery times
- Attractive price-performance ratio
- Reliable process control
- Premium-quality components
- High component quality
- Additional function packages are also available if required
The EcoStar Series is characterized by an attractive price-performance ratio.
The Comet metering machine from KraussMaffei is ideally suited to processing PU formulations containing filler. This series also offers a solution for any requirement.

For abrasive filler materials
A hydraulically driven piston is used to meter polyols and isocyanates. The piston speed is controlled servo-hydraulically. The Comet metering machines have proven themselves in PU systems with abrasive filler materials, such as barium sulphate, calcium carbonate, glass fibers or wollastonite. They can also be used to meter PU components that are highly viscous or have a high gas content (up to 60 percent).

Processing small quantities of material: Comet Twin
The Comet Twin metering machine enables precise processing of very small quantities of material in PU high-pressure engineering. Each of the PU components is metered by a tandem piston unit. While one piston meters, the second piston sucks the components – this allows flow rates to be continuous, for example for low output rates.

Your advantages:
- Constant processing parameters even in filled systems
- Highest production and process reliability
- Can be used with the most exact output rates and shot weights
- Precision at high and low flow rates
- Numerous items of additional equipment to meet a wide variety of different production requirements

Metering machines for filled PU systems:
The Comet Series
Metering with pistons and pumps: Comet Hybrid
The Comet Hybrid metering machine is designed to process standard isocyanates and polyols containing filler. A frequency-controlled axial piston pump is used for isocyanates. Polyols are metered using hydraulically driven pistons. Two different models of hybrid machine are available. Where a single metering piston is used, the filled component is fed discontinuously. A continuous stream of the filled component can be achieved with two electrically driven metering pistons (Hybrid Tandem).

The tandem arrangement combines the advantages of pump metering with those of piston metering.

Your advantages:
- Flexible and cost-effective metering of abrasive PU components
- Technically and economically optimized machine design
RimStar Thermo metering machines can be used to optimally meter systems with high processing temperature requirements.

High-pressure engineering ensures that the components are thoroughly mixed in the mixing head. RimStar Thermo metering machines are available with either pumps or pistons and can process two or more components. The machines can be fitted with special metering pumps or pistons that are also suitable for corrosive materials, such as hardeners for epoxy resins.

The temperatures between the tank and mixing head are constantly monitored. This allows stable and precise temperature control with a constant operating point. Direct heating of the material-guiding machine components increases energy efficiency. The tanks can be evacuated.

**Your advantages:**
- Can be used for different systems (epoxy, polyamide, polyurethane)
- High level of process reliability thanks to constant machine monitoring and precise temperature control
- Clean, environmentally friendly and efficient part production
- High level of energy efficiency thanks to the enclosure of high-temperature components

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Roof module made from carbon fibers with epoxide matrix, made in HP-RTM process
Powerful in continuous production: Metering machines for double-belt systems

Large-format sandwich elements with fixed or flexible top layers are made on continuously running double-belt systems.

KraussMaffei metering machines for double-belt systems can process all common PU and PIR systems and their additives, depending on the specification. The modular design of the metering machines increases the flexibility of your production: In addition to the basic components polyol and isocyanate, they can also be expanded to process many other additives as required.

The metering machines are equipped with high-performance, high-pressure axial piston pumps for metering the main components. Additives are metered using high- and/or medium-pressure piston or gear pumps. Mixing heads are supplied for use in simple portals, i.e. with one mixing head, and in portals with two mixing heads. When there are two mixing heads, one is always on standby. A static mixer is used for additives in high-pressure systems, whereas a dynamic pre-mixing station is used in low-pressure systems.

Your advantages:
- High-performance metering machines for continuous processing
- Ability to process all common PU and PIR systems
- Outstanding product quality
- Modular machine design that can be expanded at any time
- Specifically tailored to customer requirements
Mixing and metering machines
Low-pressure metering machine

The F Series from KraussMaffei is particularly suited to producing small, complex, premium-quality parts made from polyurethane.

In the low-pressure process, the reactive PU mixture is mixed using dynamic agitators and poured into the mold under next to no pressure, usually while the mold is open. The low pressure results in splash-free laminar pouring of the mixture into the mold. F Series machines are also suitable for mixing even very small pour rates of less than 2 g/s. This allows them to make parts with a low shot weight. The series can even process high-viscosity components and systems that do not mix well. Metering of up to seven individual components (polyol, isocyanate, paints, catalysts, etc.) directly into the mixing chamber of the 7K mixing head allows colors and systems to be changed quickly. Storing painted polyols is not necessary when using colors. The low-pressure machines can also be used in the upper discharge zone (up to 7000 g/s), such as in discontinuous block foaming applications.

**Your advantages:**
- Great flexibility
- High efficiency
- Low loss of material
- Optimal mixing quality in different PU systems and discharge zones

F Series for reaction-casting under low pressure (lower output rates)
F Series for reaction-casting under low pressure (lower output rates)
Low-weight molded parts thanks to nucleation with air or CO₂

Nucleation using air or gas lowers the mold part weight and reduces material costs.

Gas nucleation is carried out either directly in the day tank of the metering machine or in a separate tank connected upstream of the day tank. In CO₂ nucleation, it is also possible to nucleate directly before the mixing head. Precision metering, high throughput and quick post-nucleation ensure an optimum production process.

**Air nucleation**
The air is metered in the machine’s day tank. This ensures a uniform gas charge from shot to shot and from the beginning of a shot to the end. A dynamic mixer ensures perfect homogenization of the gas and the component. The nucleation unit is installed in the day-tank bypass circuit and has its own controller.

**CO₂ nucleation**
KraussMaffei offers two different processes for CO₂ nucleation: CO₂ nucleation in the buffer tank (batch) or directly in the day tank. CO₂ nucleation can also be carried out directly before the mixing head. CO₂ concentrations can be varied from shot to shot.

**Your advantages:**
- Lower-weight molded parts
- Lower materials costs
- Better flow properties in the mold and improved mold filling
- Higher process reliability

**CO₂ nucleation in day tank**

1 Mixing head
2 Day tank components
3 Static mixer
4 Metering pump
5 Recirculation pump
6 CO₂ mass-flow controller

**CO₂ nucleation in buffer tank**

1 Mixing tank
2 Screw pump
3 Static mixer
4 Day tank/buffer tank
5 Axial piston pump
6 Mixing head
7 CO₂ mass-flow controller
Quick color changes without cleaning: MicroDos color metering system

Some PU applications need to use several colors that are frequently changed. The MicroDos color metering system from KraussMaffei allows colors to be changed in a few minutes.

Intelligent color-change module

All parts that come into contact with the color are integrated in a color-change module. To change the color, the module is swapped for a completely new one. This prevents contamination between different colors, which means there is no need to rinse the unit between colors. The MicroDos system therefore allows you manage your colors in a cost-effective and time-saving way. A MicroDos unit can also be used for metering PU additives such as blowing agents, catalysts and stabilizers, which must usually be added in low concentrations.

Your advantages:
- Ability to change color modules quickly
- Cost-effective and time-saving color management
- Short set-up times and no-waste color changes
- Precise metering even at the lowest mass flows
- Capable of processing highly viscous and abrasive colors
- Can be flexibly integrated into machines
- Compact and space saving

MicroDos color metering system

Fully changeable color module
Optimal preconditioning: Premixing stations, drum stations and container stations

Manufacturers of raw materials supply PU components either in drums, in IBC containers or pumped from a tanker. Premixing, drum and container stations from KraussMaffei precondition PU components in the optimum way for processing.

Premixing stations operate fully automatically to process PU components with filler materials, such as glass fibers, barytes, melamine and blowing agents (e.g. pentane). The filler materials are fed in the desired concentration from containers, such as BigBags, into the premixing tank, where they are mixed with the PU components. Then the metering machine’s day tank is automatically supplied with the filled PU components.

Drum stations are simple, cost-effective systems that can be used to automatically fill day tanks. They are used to hold the component drums.

Container stations are used when PU components are supplied in IBC containers. Very simple stations or highly complex stations – such as piggyback systems with an additional buffer container, special agitators, intermittent operation for the recirculation pump and agitator, etc. – can be used depending on requirements.

Your advantages:
– Day tanks are filled automatically
– Consistently high component quality thanks to optimal preconditioning of PU components
– Cost-effective, tailored solutions thanks to the modular design
Reproducible material pouring: Robots and mixing head manipulators

When pouring PU into open molds, the mixing head must usually move in pouring patterns to distribute the material. Manipulators or robots from Krauss-Maffei can be used to execute exact, reproducible foam pour patterns across the mold.

Manipulators or robots are used to handle mixing heads. The movement of the mixing head can be freely programmed to pour the PU mixture even into narrow sections, for example. Challenging product specifications are met by continuously operating systems, in which the pour pattern in the mold must be additionally overlaid with the movement of the mold on a conveyor system. To do this, KraussMaffei has developed special software that can control the foam pour rate on the conveyor, section by section.

The mixing head is attached to the flange of the manipulator or robot and connected to the metering machine via pipes or hoses. The robot identifies the assigned pour-pattern program, which has been taught in advance, by reading codes on the foaming station or mold. The start of the shot is enabled via an interface to the metering machine, and the pour pattern is executed.

Your advantages:
– High product quality thanks to reproducible pouring patterns
– Cost reduction thanks automated production
– Greater freedom in PU pouring
Mixing and metering machines

Multi Panel

The Multi Panel MP 277 is a user-friendly and reliable visualization system for PU processing.

The MP 277 can be programmed using WinCC flexible and Visual Basic Script. It is connected to the control system via Profibus. The Multi Panel is available in two designs, either as an integrated control panel in the console or as a mobile control panel. The mobile control panel can be used at a maximum distance of 20 meters away from the Multi Panel. Over 100 programs, each for four partial shots, can be stored – up to nine programs, each for four partial shots, can be variably allocated to each mixing head via foam program management. The machine continues production, even if the MP277 breaks down.

**Your advantages:**
- Can support up to four component pumps
- Can connect up to eight mixing heads with shot-time correction
- Graphic display of the machine with all production parameters
- Tolerance monitoring of all process data
- Flexible shift data allocation
- Password protected
- Large-screen view of throughput or pressure
- Ethernet interface for transferring shift protocols to external applications
Intuitive to use and extremely reliable: PUC08 process data acquisition

The PUC08 from KraussMaffei allows process data for polyurethane processing to be acquired in a clear and user-friendly way.

The clear and intuitive-to-understand user interface reduces training time and costs while ensuring quick analysis of errors and faults. Wetside and dryside components are visualized. The PUC08 gives users a complete overview of the system’s current status and is not only comfortable to use but also extremely reliable. The robust computer has been designed without any moving parts – that means no fans and flash memory instead of a hard drive. The PUC08 communicates with the PLC via Ethernet.

Your advantages:
- Touchscreen with intuitive user interface
- Flexible system visualization
- Alarm, stoppage and shot records, plus all other process-relevant data, are logged and stored in an SQL database
- Production is extremely reliable as all production parameters are saved in the PLC
- System runs even when the computer breaks down
- Robust industry computer without moving parts
- Easy to expand thanks to modular design
Further information which might also interest you

Ask us for information about the following, for example:
- High-pressure mixing heads for PO processing
- Foam molds and mold carriers
- Milling and punching machines for trimming PU parts
- Special techniques in PU processing, such as spraying, SkinForm or Clear Coat Molding

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KraussMaffei
A strong brand in a unique global group

Cross-technology system and process solutions
Whether in Injection Molding, Reaction Process Machinery or Automation – the KraussMaffei brand stands for pioneering and cross-technology system and process solutions in plastics processing worldwide. For decades, our expertise, innovative ability and passionate commitment to plastics engineering have been your competitive edge. As a cross-industry system provider, we offer you modular and standardised systems as well as solutions customized to your needs.

There for you around the world
With our worldwide sales and service network, we offer our international customers an excellent basis for a successful business relationship. Due to the close proximity to our customers, we are able to answer your individual inquiries very quickly. We work out the best possible technical and economical solution for your product and production requirements together with you. Test our machine technology for your applications and let our experts put together an individualized service package for you.

Individualized service
Our employees from customer service, application technology and service help you with your questions and needs on every topic dealing with machines, systems and processes – around the globe, quickly and with a high level of expertise. We have developed an extensive customized service spectrum with our lifecycle design, which accompanies you throughout the entire lifecycle of your machines and systems. Take advantage of the personal interaction and flexibility we offer in our practically oriented seminars. We carry out customer-specific trainings either at your location or at our sales and service locations.

You can find additional information about KraussMaffei at: www.kraussmaffeigroup.com

KraussMaffei Group
Comprehensive expertise

Unique selling proposition Technology
The KraussMaffei Group is the only provider in the world to possess the essential machine technologies for plastics and rubber processing with its KraussMaffei, KraussMaffei Berstorff and Netstal brands: Injection Molding Machinery, Automation, Reaction Process Machinery and Extrusion Technology.

The group is represented internationally with more than 30 subsidiaries and over ten production plants as well as about 570 commercial and service partners. This is what makes us your highly skilled and integrated partner. Use our comprehensive and unique expertise in the industry.

You can find additional information at: www.kraussmaffeigroup.com

The KraussMaffei Group has a global presence. Countries with subsidiaries are marked in dark blue. In the white-colored regions, the Group is represented by over 570 sales and service partners.
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