Innovative mixing and metering machines
Outstanding product quality in PU processing

Engineering Passion

KraussMaffei

Facts and figures regarding KraussMaffei metering machines

Application areas

Automotive

Automotive

Automotive

Automotive

Automotive

Utility vehicles

Utility vehicles

White goods

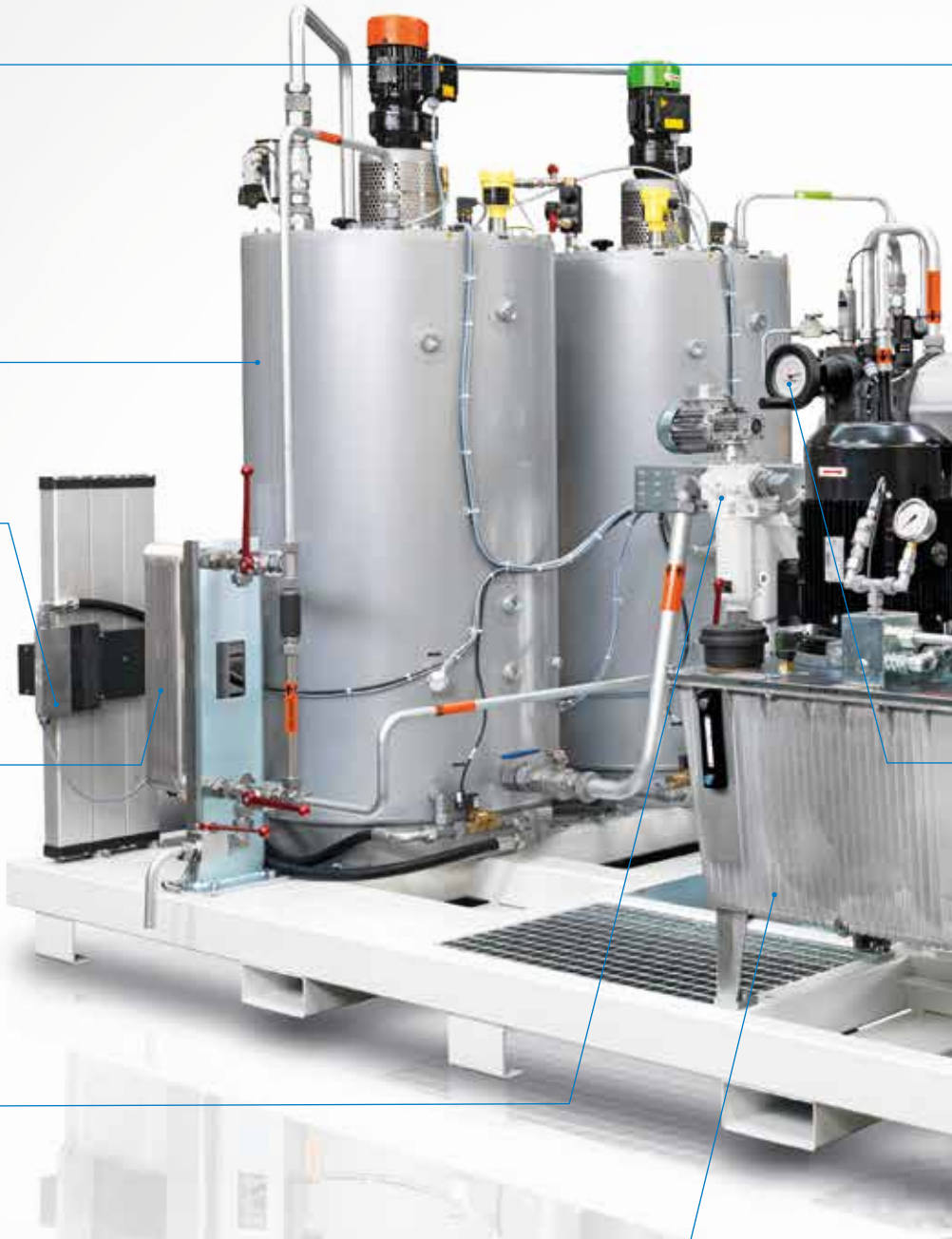
Innovative mixing and metering machines
Outstanding product quality in PU processing

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



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)

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

HMI interface

Switching cabinet with Siemens control unit

KraussMaffei high-pressure metering pump (axial piston pump) with handwheel adjustment
Pumps and motor with magnetic coupling

Optional outrigger
Can be mounted on the machine base, no additional costs thanks to external piping

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

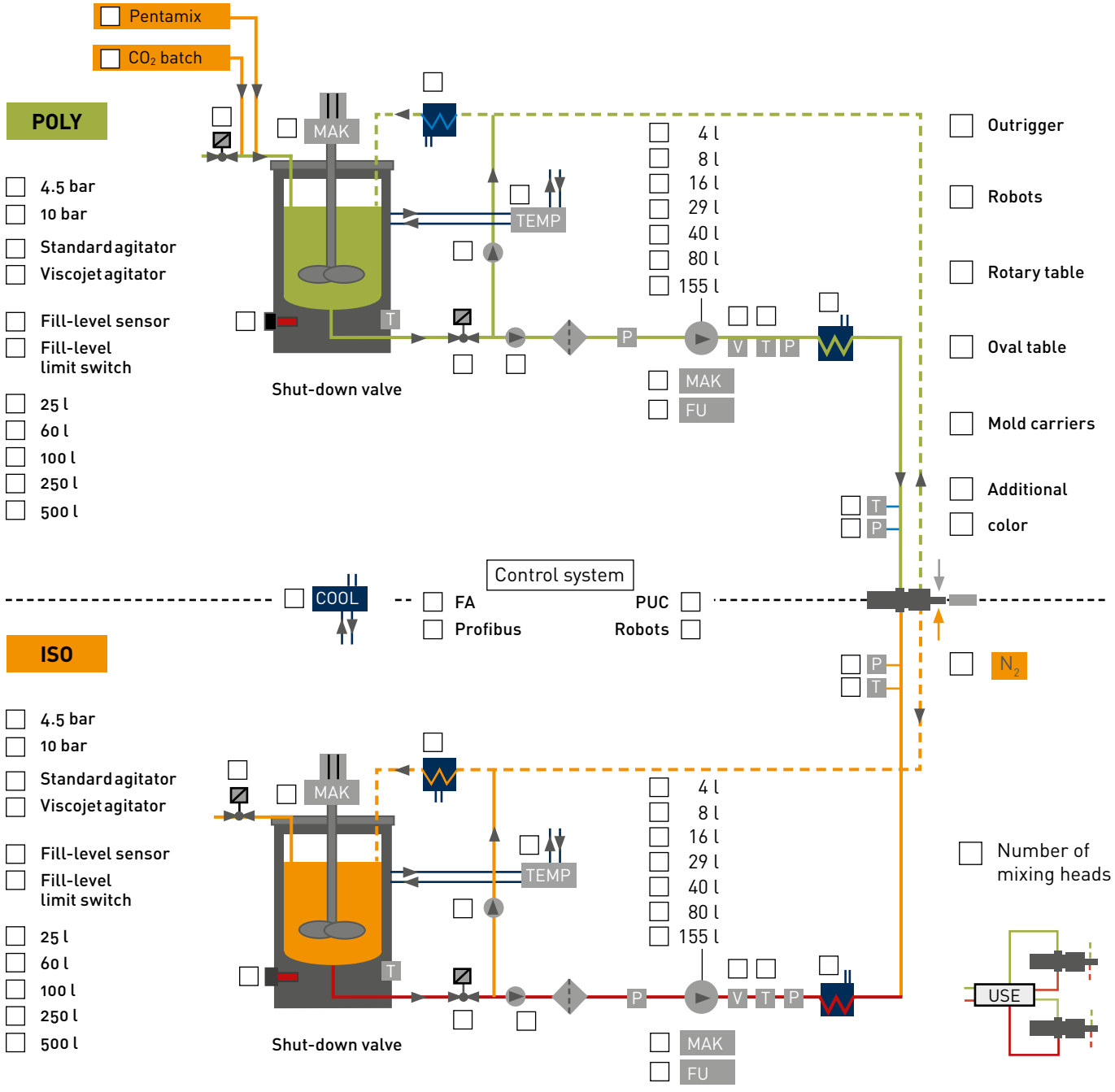
Flexibility in the future:
- Our machine concept offers you multiple options for adding to and upgrading machine components in response to changes in production requirements

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.

12-component metering machine with two pouring robots

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

RimStar Nano: For low output rates and minimum space requirements

RimStar Compact: Space-saving thanks to compact frame design

The RimStar Series at a glance – RimStar Modular, Compact, Nano and Flex

KraussMaffei technologies were combined using "best practice" processes when developing the new RimStar Series. The machines are so versatile that they can be used in any PU processing application. Their modular design allows them to be flexibly configured and therefore tailored to customer-specific requirements.

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 Flex: Especially for use in our T3 technologies ColorForm and SkinForm

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 gage 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.

RimStar Flex

The RimStar Flex was specially developed for use with ColorForm and SkinForm technologies and is characterized by its flexible system configuration and adjustment to individual requirements. Day tanks and metering pumps are installed independently of each other on a supply module and a metering module. The modules can thus be positioned individually and at different points on the injection molding machines. In addition, it is possible to combine two metering modules with a supply module.

Features of the RimStar Series
for perfect conditioning, metering and mixing

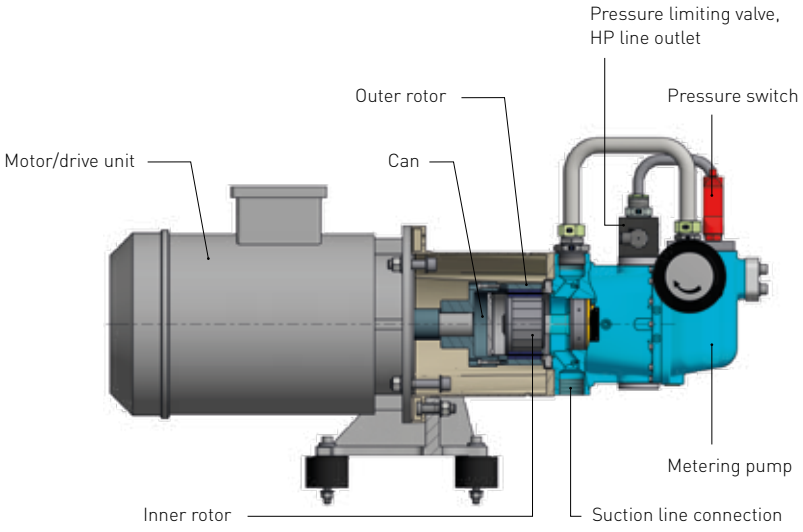
Machines in the RimStar Series can condition, meter and mix PU materials to the highest standards.

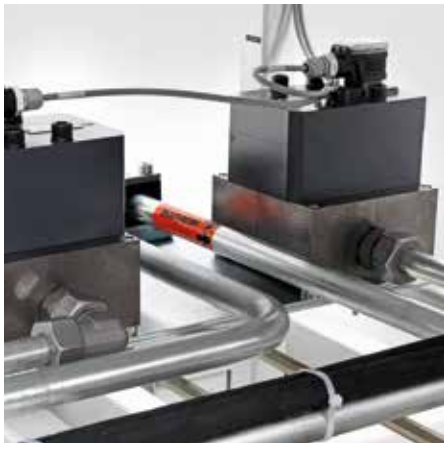
Perfect conditioning
Heat exchangers, temperature control and thorough mixing are required to keep the material in the day tank in perfect condition. KraussMaffei boasts an extensive range of different systems for optimal material conditioning – ranging from proven double-walled agitation tanks and cost-effective 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.





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.

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.

Premium quality with low investment 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-KTP400 Comfort
- 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

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.

Comet metering machine with hydraulically driven pistons

Precision with small quantities: Comet Nano

Metering machine for filled PU systems
The Comet and Hybrid Series

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 Nano

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

Combination of pump and electric piston metering of the Hybrid Series

Metering with pistons and pumps: Hybrid

The metering machine of the Hybrid Series 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

Comet Series metering

Processing of systems in higher temperature ranges RimStar Compact -CCM, -RTM or -PA

Systems with demanding processing temperature requirements can be metered to perfection with the RimStar Compact -CCM, -RTM or -PA.

High-pressure engineering ensures that the components are throughly mixed in the mixing head. RimStar Compact -CCM, -RTM or PA metering machines are available with either pumps or pistons and can process two or more components. The machines are fitted with special metering pumps 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

RimStar RTM metering machine with heat-balancing cabin (machine with extensive customer-specific equipment)

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 isocynate, 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 premixing 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

Metering machine for a double-belt system with six components

Sandwich panels have outstanding thermal insulation properties

Metering under low pressure
F Series low-pressure metering machines

The F Series from KraussMaffei has a wide range of applications with use of medium- and low-pressure procedures.

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 colored polyols is not necessary when using paints. 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 CO_2

GBE-CO_2 batch nucleation unit

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. Precision metering, high throughput and quick post-nucleation ensure an optimum production process.

Air nucleation

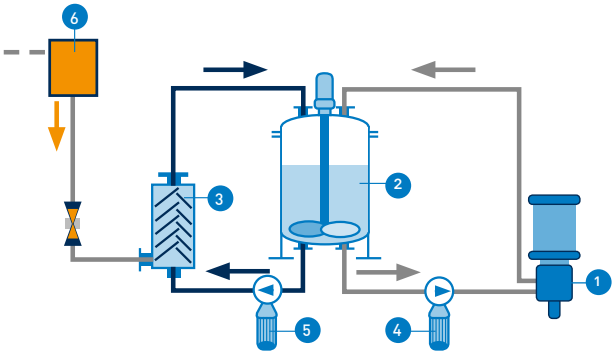
The air is metered in the machine's day tank. This ensures a uniform gas charge from shot to shot and from the beginning of a shot to the end. A dynamic mixer ensures perfect homogenization of the gas and the component. The nucleation unit is installed in the day-tank bypass circuit and has its own controller.

CO_2 nucleation

KraussMaffei offers two different processes for CO_2 nucleation: CO_2 nucleation in the buffer tank (batch) or directly in the day tank. CO_2 concentrations can be varied from shot to shot.

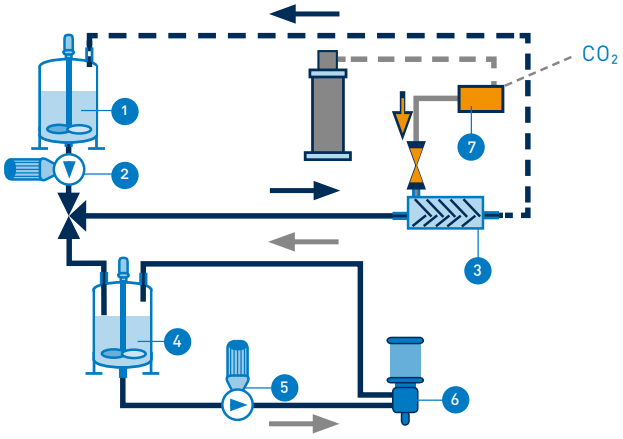
Your advantages:
- Lower-weight molded parts
- Lower materials costs
- Better flow properties in the mold and improved mold filling
- Higher process reliability

CO_2 nucleation in day tank



1 Mixing head
2 Day tank component
3 Static mixer
4 Metering pump
5 Recirculation pump
6 CO_2 mass-flow controller

CO_2 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 CO_2 mass-flow controller

Precise, reliable, user-friendly and economical in operation
Intelligent color-metering systems

The innovative systems from KraussMaffei guarantee precise metering, and thus excellent component quality, even for the smallest flow rates. With the compact frame concept, tailored solutions can be provided.

Faster color changes

Certain applications require using several colors that are to be changed frequently. The MicroDos color metering system allows for fast and cost-effective color management without needing to be cleaned. All elements in contact with the color are integrated in a module that is completely replaced within minutes when the color is changed.

Innovative color-metering systems

With the hydraulic or servo-electric piston metering, highly viscous and abrasive colors can be processed. For the processing of non-abrasive colors, the color-metering system with a frequency-controlled metering pump is appropriate. Both systems offer you the most innovative solutions from both worlds with their closed-loop control system and double-walled agitator tanks for constant color component temperature. In addition, a central supply for several mixing and metering machines is possible (multi-point metering), with a large selection of multi-color mixing heads.

Your advantages:

- High process reliability
- Outstanding component quality
- Maximum reliability and availability
- Easy to operate and maintain
- Space-saving

MicroDos: Cost- and time-saving color management with exchangeable color module

Color-metering system: Hydraulic or servo-electric piston metering

Color-metering system: Frequency-controlled metering pump

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 cost-effective systems that can be used to automatically fill day tanks. They are used to hold the component drums as an alternative to simple barrel pumps.

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

Container station for preconditioning PU components

Pentamix premixing station for pentane

Robots and mixing-head manipulators ensure exact, reproducible PU pouring patterns

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 to automated production
- Greater freedom in PU pouring

Clear and reliable
Touch Panel TP1200 Comfort

Touch Panel TP1200 Comfort

The Touch Panel TP1200 Comfort is a user-friendly and reliable visualization system for PU processing.

The TP1200 can be programmed using WinCC in the TIA Portal and Visual Basic Script. It is connected to the control system via Profibus or ProfiNet. The Touch Panel is available in two designs, either as an integrated control panel in the switching cabinet or as a mobile control panel. The mobile control panel can be used at a maximum distance of 20 meters away from the Touch Panel. Up to 99 programs, each for eight partial shots, can be stored – of which nine programs, each for eight partial shots, can be variably allocated to each mixing head via foam program management. The machine continues production, even if the TP1200 Comfort breaks down.

Your advantages:
- Can support up to six component pumps
- Can connect up to sixteen 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
- External application via Ethernet interface optional for remote service connection or transferring shift protocols

Intuitive to use and highly reliable
PUC08 process data acquisition

Process data capture with the PUC08

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

You can find our brochures and flyers online at: www.kraussmaffei.com. On request, we would also be happy to send you information and technical data for our products free of charge.

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 standardized 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.kraussmaffei.com

KraussMaffei Group
Comprehensive expertise

Unique selling proposition Technology[3]
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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Outstanding product quality in PU processing

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