

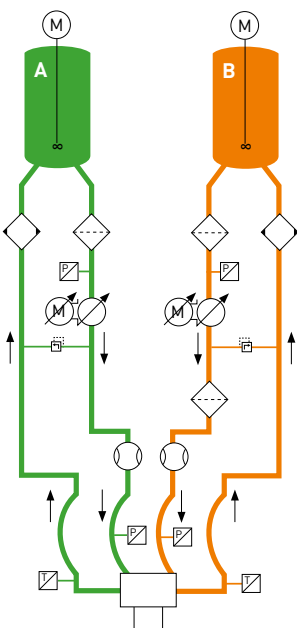
Having more than 40 years of experience in the production technology for the processing of polyurethanes (PUR), the FRIMO Group offers its customers complete PRe solutions along the entire process chain. PRe Line mix-, metering machines and mixing heads as well as the patented FRIMO spray head used for spraying polyurethane complete the range of products. Therefore FRIMO is able to offer customized manufacturing solutions covering the entire range of technologies that are required for PUR processing. In this respect, the biggest development and saving potential is the control of the entire process. That means that the customer will profit from a substantial added value that is provided by the accurate interaction of the FRIMO products.



FRIMO Application, Development and Try-Out Center

## PRe Line Mix-, Metering Machines

For the production of parts made from diverse PUR systems, Frimo offers as one example the PRe Line pump metering machines. The machines are configured according to the customer's product requirements and processing parameters. Even the basic version already includes extensive equipment and first-class mechanical and electrical components.



Exemplary flow diagram

### Technical Information:

- Close Loop controlled metering machine
- Leakage-free metering pumps with magnetic couplings
- Process optimized, jacketed raw material tanks with large heat exchanging area in variable sizes ranging from e.g. 30l to 500l volume
- Output rates from < 10 g/s to 300 kg/min
- Raw material agitators with maintenance-free seals
- Freely programmable filling level indicators including automatic filling function
- Additional temperature indicators on the raw material tanks
- Mixing head hydraulic system with air cooling, filling level and temperature control
- Flowmeters with high resolution and low pressure loss
- solid pipes instead of hoses (except for pump connections)
- Electric cabling in hollow profile of the frame to the control cabinet
- Use of globally available, approved component brands



FRIMO PRe Line

# FRIMO PRe Line.

## PRe Line Spraying Machines

FRIMO offers PRe Line spraying machines for different applications, however mainly for spraying PUR surfaces. The application areas do not only include instrument panels, door panels, seats for motorcycles, tractors, or motor mobile /jet skis but also components for medical engineering and other areas of plastic processing. In addition to the extensive equipment of all FRIMO basic metering machines, PRe Line spraying machines provide the following features:

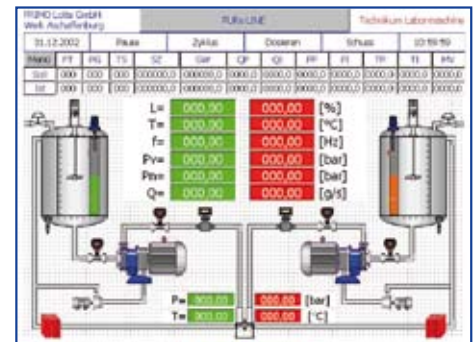
- Temperature control optimally adjusted to the process
- High-pressure heaters installed closest possible to the spray-mixing head
- Temperature acquisition and regulation directly on the spray-mixing head
- Highly accurate output metering of a few g/s



FRIMO PRe Line spraying machine



FRIMO Spray development and application center



FRIMO PRe Line HMI

## PRe Line Hybrid and Piston Metering Machines

FRIMO PRe Line hybrid and piston metering machines are especially used for tailored applications with filled PUR systems. If only the polyol component contains abrasive filling materials such as barium sulphate, glass fibres or wollastonite, we recommend the use of a hybrid machine. Here only the polyol containing side is provided with a piston metering unit. Depending on the final product and the PUR system in use, both component sides can be equipped with piston metering units. Equipped with the same advantages as all PRe Line dosing machines hybrid and piston dosing machines provide the following additional technical features:

- Tailor-made metering piston sizes for e.g.: 1.5l, 3l, 5l, 15l, 25l, 30l
- Automatic piston packing flushing and piston venting
- Highest service life even with abrasive filler materials



FRIMO PRe Line Hybrid machine

## Peripheral Equipment

In connection with the processing of PUR and the manufacture of PUR components FRIMO also supplies peripheral equipment for all kinds, such as pre-mixing stations, nucleation units or color dosing units.

## Tailor-made system solutions.

### PURe Line Mixing and Spray Mixing Heads

Hydraulically operated high-pressure mixing heads of the FRIMO PURe Line program function according to the countercurrent double-angle mixing principle. Depending on the requirement there are different transfer and linear mixing heads available for open or closed pour application, adjusted to the customer's specific product requirements.

#### Technical Information:

- Output rates of a few grams per second up to 5.000 g/s with first-class mixture
- Self-cleaning mixing head principle
- Homogeneous mixing already at the beginning of the shot by simultaneous opening of the component feed lines
- Special steel qualities and modern finishing and coating procedures for nearly frictionless run of the mixing and cleaning pistons so far unequaled
- Only one nozzle per raw material component required. Hence it follows that the adjustment of the recirculation or high pressure phase can be progressively done at the identical place
- High- and low-pressure circulation of the components before shot is effected via recirculation grooves
- Optionally available as armored type for filled PUR systems
- Two and multiple component mixing heads available

#### Especially with transfer mixing heads:

- Ideal laminar output over the entire output range
- Adjustable cleaning piston for manipulation of the mixing chamber discharge cross-section, to intensify the mixing.

#### Especially with spray mixing heads:

- Patented hydraulically operated spray mixing head with up to four components
- Excellent high-pressure mixing of the components
- Length and angle of spray lances individually designed to the mold geometry
- Special nozzles for different spraying patterns
- Nearly self-cleaning, countercurrent mixing principle without static mixer
- Variable output rates, e.g. from 10 to 120 g/s
- Small, compact size, low weight
- Service-friendly design, consisting of a few components

### Advantages of the PURe Line Mixing and Metering Technology

- Tailor-made machine concept
- Modular, compact design
- "Plug-and-produce" philosophy
- Simple relocation
- Fully equipped basic version
- Close loop metering machines
- "Open" visualization software
- Leakage free metering pumps with magnetic couplings
- Process optimized, jacketed raw material tanks
- Mixing and spray mixing heads with first-class mixture
- One Stop. All Services.



Spraying head type FSH



Spray lance

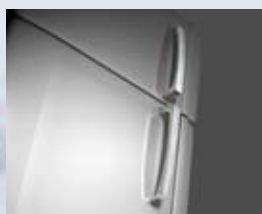
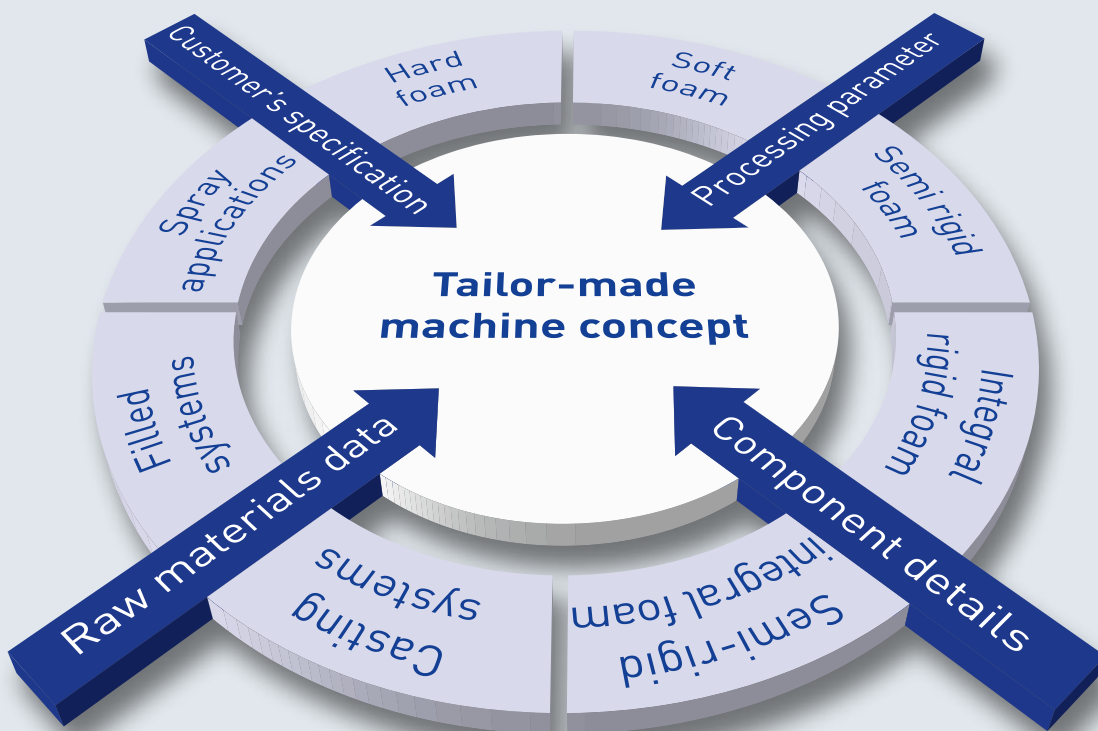


Mixing head examples

# One Stop. All Services.

## FRIMO PURE Technology offers

- extensive component competency and many years of experience in the polyurethane processing industry
- support with component design for optimization of producibility and for reduction of material consumption
- process neutral consultation for optimum technical and economic solutions
- application specific consultation for an optimally designed manufacturing concept
- delivery of tools, machines, and plants for the processing of polyurethanes and other reactive materials from one hand. Bundled competency for fewer interfaces and shorter ways
- "in-house" sample, prototype and spare part production with modern equipment and all relevant processes
- modification, relocation, upgrading and service of existing tools, machines, and plants



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## Mixing and Metering Technology

