

High-performance mixing and metering systems

for processing polymer
flexibly



Solutions for feeding and mixing tasks

Oerlikon Barmag offers the solutions – for a large variety of mixing and metering tasks when processing plastics – which actually enable economical production.

Extremely high metering accuracy and mixing performance ensure that your products are top quality. There is a series of systems available for the various feeding and mixing tasks, optimally designed to fulfill the requirements of flexible production.

Additives and dyes for plastics are becoming an increasingly important part of the manufacturing process. The properties of the polymers can be extensively modified as a result of additives. The option of directly introducing these additives during the manufacturing process (e.g. fibers or films) provides a high degree of flexibility and increased efficiency.

For this, Oerlikon Barmag offers tried-and-tested systems such as extruders, mixers, filters and pumps. As a result of more than 30 years of design and process experience and state-of-the-art manufacturing technology, Oerlikon Barmag is able to offer both complete injection systems as well as individual components for melt processes. When manufacturing top-quality films or fibers, the system components must be very carefully selected and combined in a manner suitable for the process.

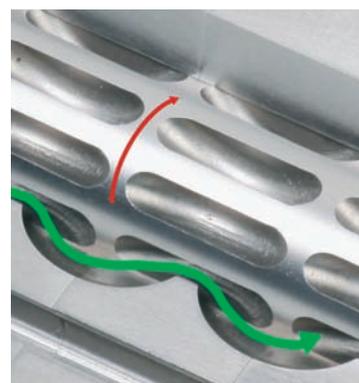
The dynamic, three-dimensional mixing principle has proven to be an excellent choice when feeding additives, dyes, stabilizers, lubricants and other polymers or materials. Pumps for liquid additives, or a combination of feed extruders and gear pumps for molten additives, are used for feeding. The systems can be integrated in various areas of the melt system.

3DD mixer

One or more additive flows can be added to the main melt flow upstream to the mixer. As a result of the flow of the various components within the arc-shaped cavities of the rotating interior (rotor) and the static stators, the axial, partial flows are reduced into disc-shaped, fine cuts that are continually blended by staggering them. Therefore, this produces several thousand cuts for each revolution, ensuring outstanding mixing performance.



The PROMIX AC pump is an example of the 3DD mixing principle.



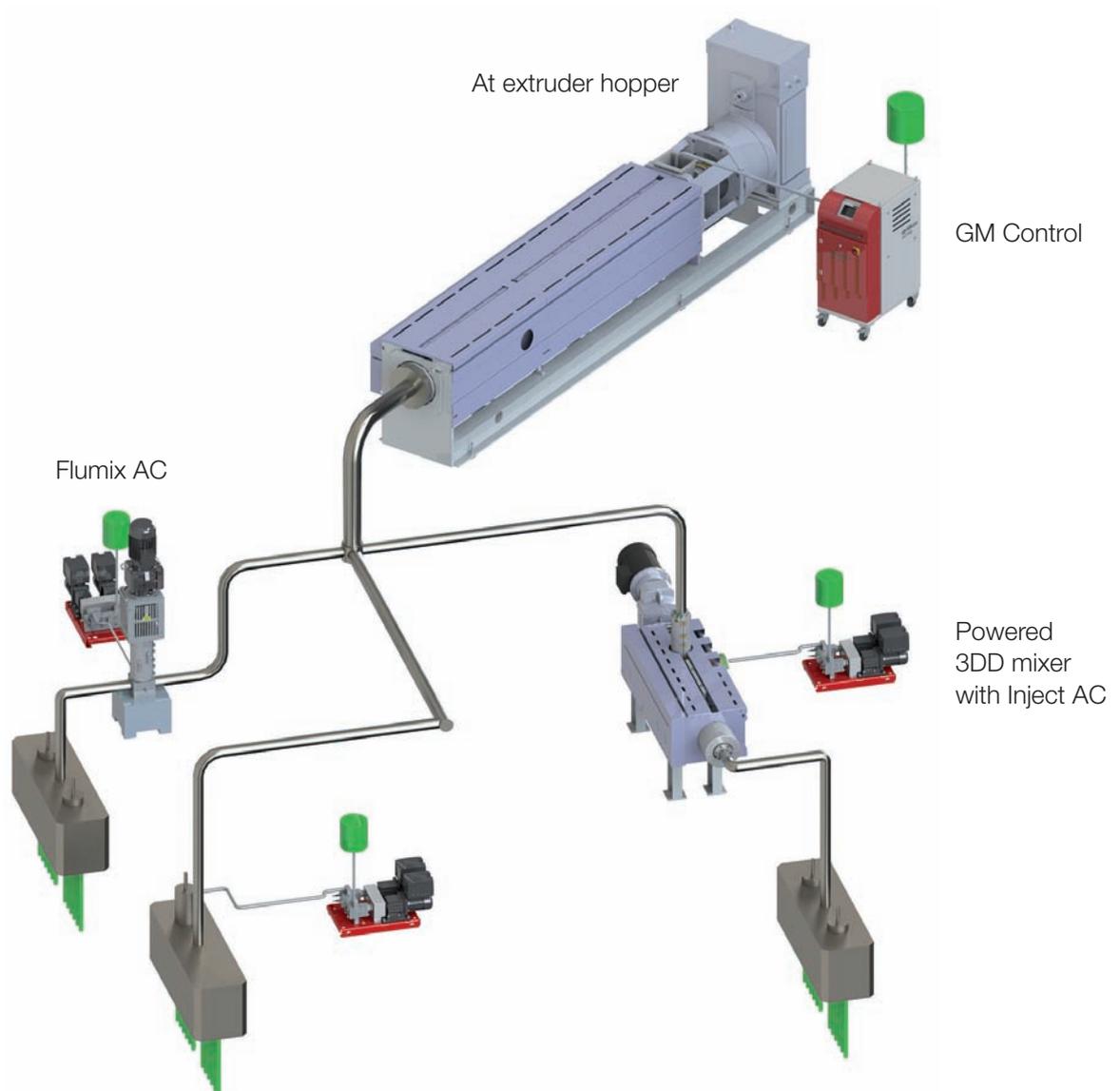
Feed options

Dyes and additives can be fed into the polymer at various points.

The suitable point must be determined on an individual basis after considering the flexibility and cost factors for each process.

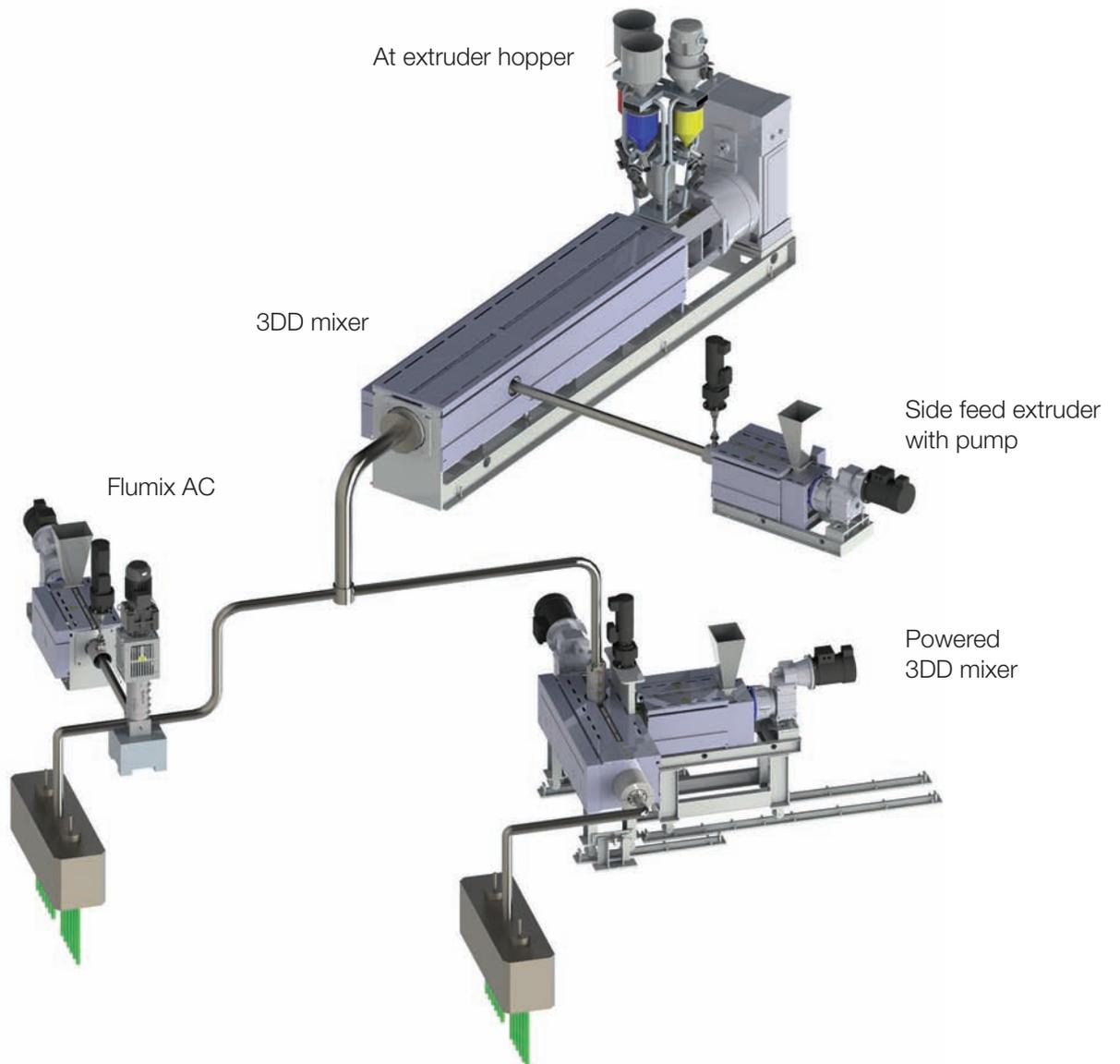
Feed position	Form of additive	Flexibility
Extruder hopper	Granulate; liquid additive	Medium
3DD mixer on the extruder	Melt; liquid additive	Medium
Powered 3DD mixer or Flumix AC	Melt; liquid additive	Good
Promix AC/VS mixer pump	(Melt); liquid additive	Excellent

Possible positions for the injection of liquid additives into an extruder spinning system





Possible positions for the injection of masterbatches into an extruder spinning system



Metering systems

Feed extruder with metering pumps

These components are required whenever melt-like masterbatches are to be metered into the main melt flow with precision and under high pressure. Throughput rates from 0.3 kg/h upwards can be metered.

Throughput feed for additive extruder for masterbatches on PBT basis

Type	Min. throughput kg/h	Max. throughput kg/h
3E10/24D	3	18
4E10/24D	7	55
6E10/24D	13	84
7E10/24D	20	112

Other sizes on request



Inject AC



This system was developed for feeding liquid dyes or additives into plastic granulate (pressureless) or in polymer melts (under pressure).

In the case of pressureless feeding, the unit operates using one metering pump.

For feeding under pressure, two serial metering pumps are used, the first responsible for generating pressure, the second for high-precision metering. The speeds of both pumps are adjusted using an intelligent control system.

The system can be supplemented with pressurized tanks equipped with electrical filling-level monitoring and valves. The valve technology, coupled with a rinse module, enables quick dye change times.

GM Control – the self-sufficient metering unit

Whether for feeding additives to a running extrusion process, for casting PUR molded parts, for laminating composite components or for flexible deployment in production systems with changing requirements – the compact, mobile GM Control unit can now support all these tasks with the accustomed metering accuracy even more simply than in the past. The unit can be directly controlled, but can also be retrofitted to existing process control units, while all important process data is clearly displayed on the touchscreen.

Communication with other metering or mixing systems is achieved using CAN bus interfaces or network (LAN) connections. Quick couplings at the inlets and outlets permit clean, leakage-free connections to the supply tanks and to the product lines. Smooth running rollers ensure the entire unit can be flexibly deployed in different places.

Operational range

Throughput: 0.0005 – 40 liters/min.

Pressure: 0 – 20 bar (also higher on request)

Viscosity: from 1 mPas upwards

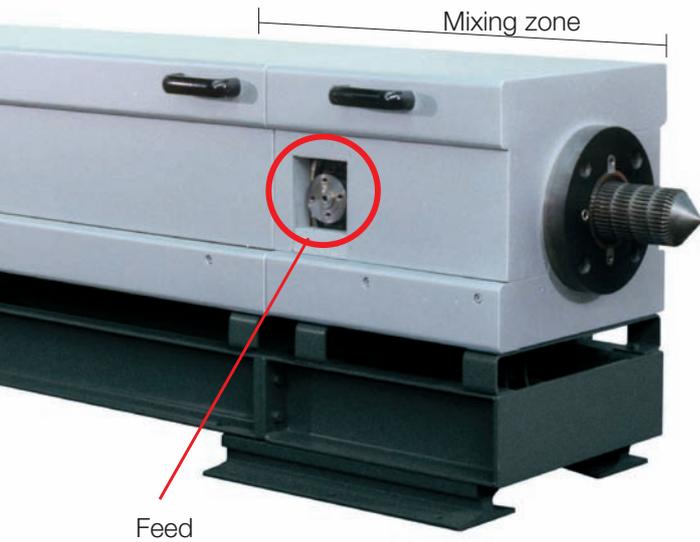
Easy-to-set process parameters:

- Operator-friendly control using touchscreen
- Presetting of metering amount
- Pressure monitoring
- Tank filling-level monitoring



Mixing systems

3DD mixer as an extruder extension



The mixer unit is attached to Oerlikon Barmag extruders as a screw and barrel extension. The masterbatch to be added is introduced into the mixing zone either via the extruder hopper (granulate/liquid additive) or through the side (melted or in liquid form). The mixing zone can be heated and cooled separately.

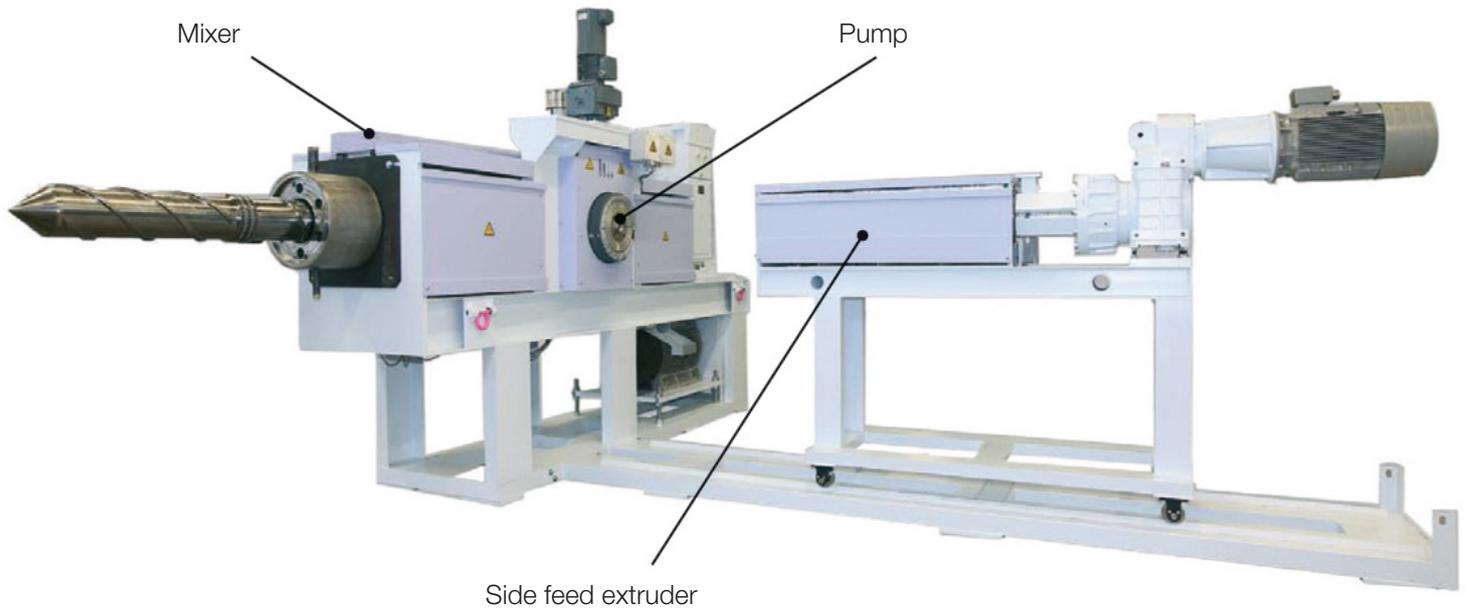
Flumix AC

This unit is added at the appropriate stage of the melt distribution system, where it dynamically mixes molten (masterbatch) and liquid components into the main flow.

With freely adjustable mixer speeds, the operator can achieve the optimum mixing effect. This unit does not include a metering function. The FLUMIX AC mixer is suitable for installing in melt distribution systems with throughputs in excess of 10 kg/h. Alternatively, the mixer is equipped with an electric heater or a heater/cooler combination system (air-cooled).



Powered 3DD mixer



This unit is a hot-melt extruder with a dynamic mixer function.

The pressure difference required for mixing is extensively compensated by the pressure build-up in the screw section of the unit. The speed can be

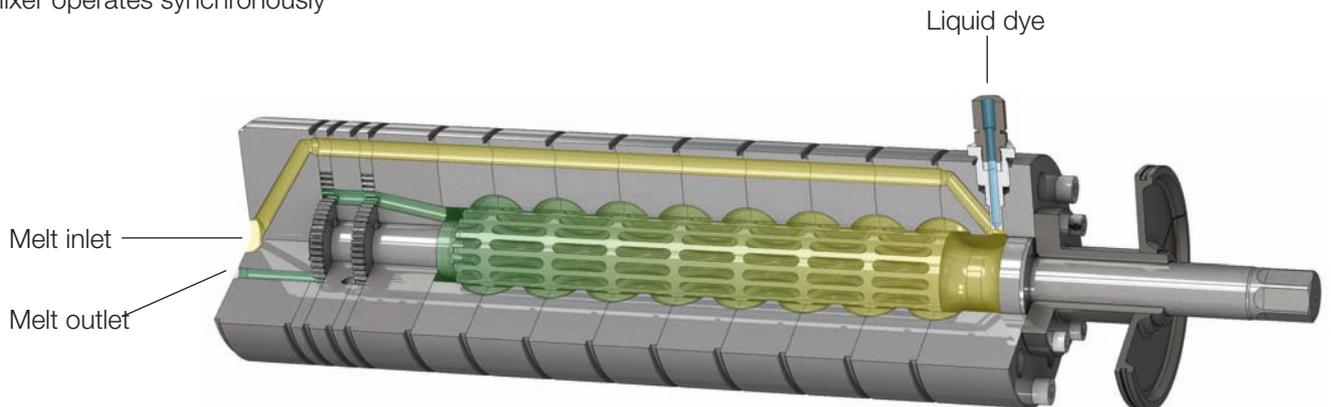
freely selected in accordance with the mixing task required. The melt temperature can be influenced using the air-cooled mixer barrel. The mixer is designed for installation in melt distribution systems for larger throughput quantities (> 200 kg/h). Melt-like and liquid mass flows can be mixed.

Mixing pumps

Promix AC

This planetary pump offers a mixer function to aid individual feeding of additives or dyes (liquid) at the spinning position. To this end, the dynamic mixer operates synchronously

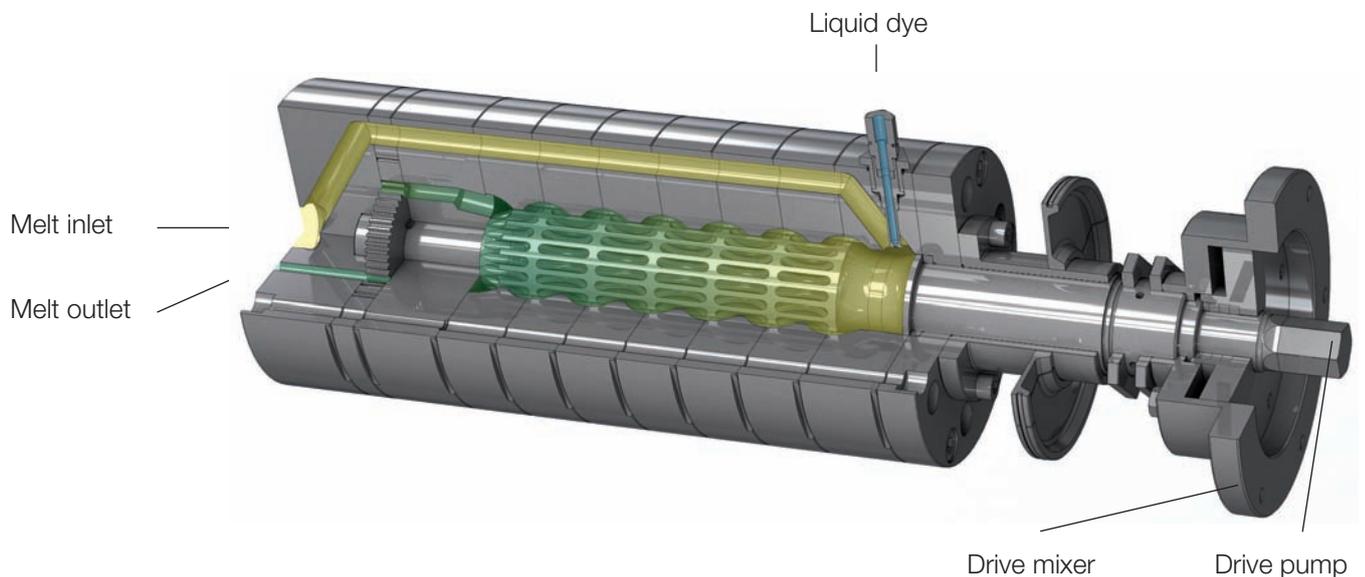
to the pump speed. Pumps with 3, 4, 5, 6, 8, 10, 12 or 16 outlets are available.



Promix VS

To enable the mixer and gear pump to be operated separately, a planetary pump was developed with 2 separate drives, one for the mixing and one for

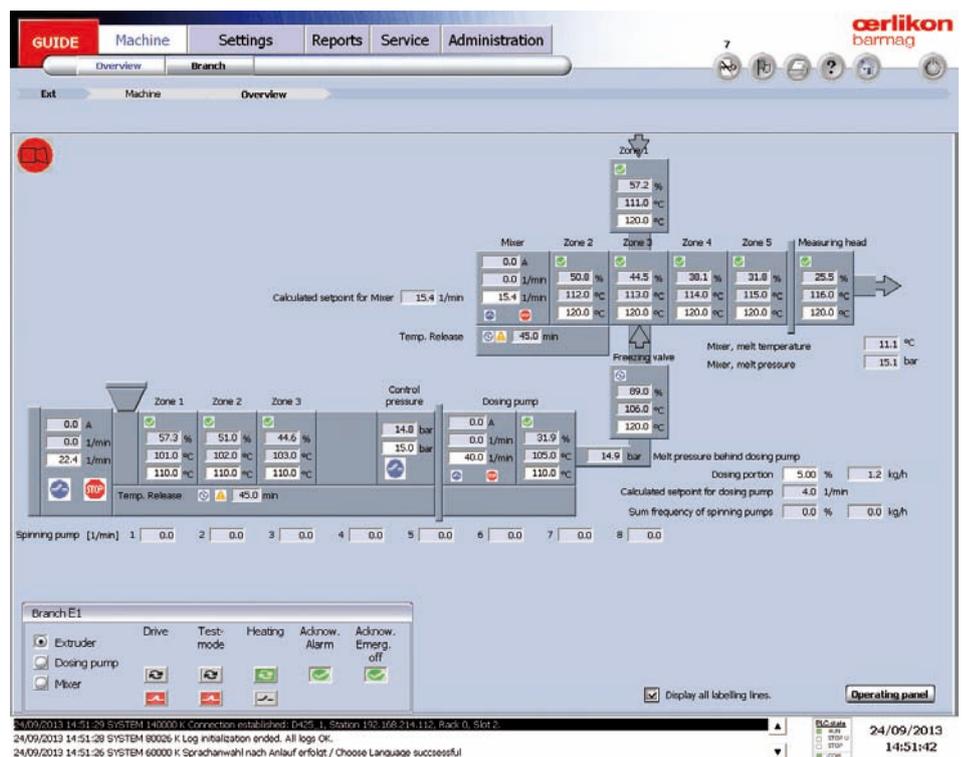
the metering. The pump unit is integrated into the spinning position.



Mixer and metering systems electrics

Oerlikon Barmag offers the entire range of electrical equipment required for all of the components presented here. This essentially comprises visualization, heat control and drive activation in connection with the complete line, including alert system and emergency stop function.

The correct ratios of dye feed (as liquid or melt) to the main polymer are calculated according to the specifications. The metering pump drives are then activated accordingly.



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