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■ Dispensing equipment

K-M revamps RIM-Star: The RIM-Star and RIM-Star Eco series from Krauss-Maffei have been replaced by the EcoStar, which combines the advantages of the two ranges.

The compact layout of the EcoStar keeps distances between machine components short, minimising pressure losses, giving more precise heat-balancing and optimising control.

The EcoStar machines have a modular construction, so they can be adapted to requirements with the addition of components such as feed-pumps.

The EcoStar is mounted on a frame together with its control cabinet and can be installed immediately in 'plug-and-play' operation.

The range can be equipped with pumps delivering between 4 and 80 l/min per component.

K-M will also be showing [Stand 15 C24/B24] its entry level machine for high-pressure PU processing. Standardisation enables the Puomat range to be delivered quickly, and also means that parts are available quickly worldwide.

In standard form, Puomats are equipped with water-filled double walled day tanks. Components can be heated by cartridge heater or water-cooled. This allows the tank to be heat-balanced even when the machine is not in operation.

The machines are fitted with axial piston pumps and the mixing heads equipped with a recirculation system. The height adjustment of the standard boom (optional extra) is aided by a pneumatic cylinder, which eases handling. The machine can be equipped with additional modules, such as a pentane package for rigid-foam production. [Stand 15 C24/B24].

■ Mixing heads

Six heads for a variety of applications: Six mixing heads are being shown for the first time by Krauss-Maffei [Stand 15 C24/B24].

The 2 + 2KV enables colour dosing inside the mixing chamber. With this head the colour is added to the components inside the mixing chamber and not, as previously, blended with the polyol. This means that only the amount of blend actually to be processed will be pigmented.

The mixing head is equipped with four nozzles, two of which inject the polyurethane components into the mixing chamber, the other two are each available for a different colour and enable colours to be changed from shot to shot.

The recirculation system had to be modified to prevent pigmentation being carried over by adding a hydraulic needle valve. A recirculation channel is opened at the same time as the needle valve is closed, allowing the colour to drain off.

Before a shot is started, the recirculating colour is pressurised. When a shot is called-up, the recirculation groove is shut-off, while the nozzle is opened at the same moment, so that the colour is injected into the mixing chamber.

The latest six-component mixing head MK 18/22 ULP-6-CN-G enables flexible foam components to be selected at high speed. Six hydraulically controlled needle valves, grouped around the mixing chamber in star-shape, are available for component switching.

Volume control on the head is by axial piston pumps fitted with frequency converters, which readjust the volumetric flow-rate by changing the RPM. The additional valves interrupt the flow of components not wanted, without having to turn the pump unit off, so during change-overs, only small amounts of fluid have to be moved. This means that change-over times in the 20 to 30 millisecond range are possible.

All the PUR-components are pumped around the system through recirculation grooves in the control piston of the mixing head. For switched-off components, channels in a bypass block are opened, so that the pressure for the next shot is immediately available.

A new mixing head enables the established LFI technology to be used for flax, hemp or sisal fibres. In the LFI process the polyurethane blend is mixed with glass fibres in the mixing head. Direct wetting of the fibres gives optimum adhesion of the matrix to the reinforcing material. Fibre quantity and/or length can be set as required and so can vary within the moulding.

To make the process work with natural fibres it has been necessary to develop a special rotary fibre cutter. Unlike glass fibres, natural fibres cannot be broken, so in the NFI-cutter they are transported by two meshing gear wheels which chops them to length.

The NFI mixing head operates on the high-pressure impingement principle. This mixes the PUR components and the air-entrained fibres are subsequently fed into the centre of the PUR stream. The air expands and ensures that the natural fibres are wetted before they are deposited in the open mould as part of the PU blend.

Output rates of Krauss-Maffei LFI/NFI-mixing heads cover a range from 80 to 500 g/s. The natural fibre content can amount to up to 40 per cent.

A spray adapter has been added to the MK 10 P-2KV mixing head to produce a system for the production of sandwich components which overcomes drawbacks with the conventional method. In this process the highly viscous PU reaction blend is pressurised with compressed air in order to fluidise it. Normally air

channels are routed directly to the mixing chamber, but these can get clogged-up, increasing the risk of production downtimes and limiting these heads to an output rate of 30 g/s.

The K-M solution is to meter the air into the PU blend in a chamber mounted on the mixing head so that fluidising takes place, not in the mixing head itself, but in front of the spray-nozzle's discharge gap. This automatically removes the risk of air-channel clogging and also increases the space available for the air supply, so that larger amounts of compressed air can be delivered. K-M says that up to three times higher output can be achieved.

The new ULP-2K VV G mixing head has been developed for rigid foam processing. Because of the adhesive forces that occur during processing, the cleaning plunger in the mixing head has been fitted with a more powerful hydraulic drive. To combat the adhesive tendency of the material even more effectively, the metal friction areas of the cleaning plunger have been reduced. In addition, a device has been installed between cleaning plunger and hydraulic drive to prevent polyurethane from being carried over into the hydraulic system.

Normally, to prevent ignitable gases forming when cyclopentane is used as the blowing agent, the mould cavity is flooded with nitrogen before the polyurethane is poured. The new mixing head carries a module to enable nitrogen to be introduced through the discharge tube.

To reduce the weight of the mixing head so that it can be carried by smaller robots or manipulators cylindrical sections are now made from high-strength aluminium, which has cut the weight by 25 per cent.

The last of K-M's new mixing heads is for the splash-free open pouring of polyurethane. During open pouring, such as in the production of refrigerator doors, the blend has to be dispensed quickly, but at higher output rates and low viscosity there is a risk of the material splashing.

For these applications K-M has developed the 3B range of mixing heads, which operate by impingement mixing to give a laminar, turbulence-free discharge. The polyol is divided into two equal material streams by a flow-divider before it enters the mixing chamber. These streams are then injected into the mixing chamber through opposing nozzles. Thus a 'wall' of polyol is generated, into whose centre the

isocyanate jet is directed. The mixing quality can be tuned by controlling the pressure at which the isocyanate impinges on the polyol. Hydraulically controlled pins in the discharge tube calm the outflowing stream of material even further.

■ Mould carriers

Transport systems automate moulding: Conveyor systems for continuous production from Krauss-Maffei [Stand 15 C24/B24] include overhead conveyors with independently driven mobile units, rotary tables and oval conveying systems, in which the mould carriers can be changed without interrupting production runs.

The Star Trac Plus overhead conveying system uses mould carriers equipped with their own drives which can therefore move independently, in contrast to chain-propelled conveyors. This enables them to be diverted, for instance, to parallel sections of track when individual processing stages require more time than could be allowed by a chain conveyor. The production of different mouldings is simplified because the mobile units can be shunted in or out for mould changing, without having to interrupt the production process. A floor-supported conveying system based on Star Trac Plus modules is also available.

The company's rotary tables use curved track guides instead of hydraulics to open and close the mould carriers. This simplifies the plant's design, makes it easier to maintain and removes the risk of hydraulic leaks. A patent is pending on the method of reducing wear on the guide rollers.

Krauss-Maffei also produces an oval conveying system which allows individual mould carriers to be exchanged without interrupting production. The flying change is achieved with the aid of a carriage which moves in synchronisation with the conveying system. The truck on which the mould carrier is mounted stays within the conveying system during this operation. This means that peripherals, such as compressors and temperature controllers, can stay permanently connected to their supply lines. The mould carrier receives power, compressed air and water through a manifold connector, which can quickly be unplugged and reconnected by a handling unit during mould carrier changes. As the system requires no sub-structure, the trucks move on a track at floor level.



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