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INNOVATIVE MIXER TECHNOLOGIES



Batch mixers are getting smaller, more energy efficient, and more productive.

Peter Mapleston reviews some of the latest developments in the sector

Equipment makers mix it up

The trend across the compounding industry today is to more flexible production. Suppliers of batch mixers are responding to that with the development of mixing machines that are more compact, more energy efficient, and easier and quicker to clean and maintain. Meanwhile, manufacturers of continuous mixing equipment are not standing still. This article looks at the latest developments in both sectors and explores why compounders might consider moving from one technology to the other.

Michael Kaiser, regional sales manager at batch mixer producer **MTI**, says the company sees a general trend across all compounding applications towards smaller more flexible mixing units rather than high capacity systems. "The complete mixing process including the material handling systems is becoming more complicated. The number of ingredients is increasing, there is a constant drive to increase the amount of fillers and the optimal moment to feed raw materials into the mixer is receiving more attention," he says.

"We also see a lot of developments with more 'health friendly' plasticizers and newly-built mixing units are mostly equipped with aspiration systems to improve the quality of the mixed materials. Especially with PVC compounding units, the necessity for a cooling mixer between high/speed mixers and compounders is coming under question more and more."

Kaiser says MTI is responding to these demands by offering tailor-made solutions alongside its standard-

ised mixing equipment. For example, the company not only provides solutions for minimum contamination of the mixers by material deposits inside the mixers, but also offers options for quick and easy cleaning to keep down times to a minimum, he says.

MTI highlights its capability in mixing systems for lines producing pipe in polyethylene polymer crosslinked using peroxides—PE-Xa. Crosslinked PE is widely used for gas, heating and water pipe systems and, according to MTI, production of PE-Xa piping is growing steadily. It says high-volume manufacturers of small-diameter pipe in particular increasingly prefer the two-stage production process, in which polymer and additives are batch mixed prior to extrusion.

The company says its equipment provides more thorough intermixing of the raw materials than is possible with mixing in the extruder, and so delivers a higher quality and more homogeneous result. It says customer trials show that even if the mix is stored for several weeks prior to further processing, cross-linking levels remained virtually unchanged due to the intense peroxide diffusion.

Kaiser says growth in PE-Xa pipe production is being brought on in part by the increase in the use of twin-screw extrusion technology (taking the place of slower ram extrusion). This has made the production of PE-Xa pipes more competitive. "With higher output and more production lines, a central mixing unit has logistical and economic advantages compared to an

Right: A complete MTI mixing system for PE-Xa at pipe maker Agru-Frank in Germany



individual dosing/mixing system on each production line," he says.

A single MTI mixing system can serve multiple extrusion lines while the spatial separation of the two stages helps pipe makers meet safety requirements applying to the processing and storage of peroxide and other additives, which carry an explosion risk. Organic peroxide is both flammable and toxic (although the hazard is reduced with peroxide/white oil solutions), while PE and additives in powder form are typically classified as combustible substances or substances carrying a powder explosion hazard.

Explosive markets

Kaiser says MTI mixers are ATEX (explosive atmosphere)-compliant. "We continuously adapt to changing standards," says. "The mixing technology continuously improves, especially the development of mixing tools to improve the mixing performance for individual materials and mixing processes and of course wear protection."

MTI offers universal Uni Tec and horizontal Flex-Line mixers for this and other applications. Both use short mixing cycles that put minimal strain on the raw materials, but still provide a high quality mix. They operate under ambient conditions or with pre-defined temperature profiles. MTI has been selling both types of mixers since the mid-70s, but Kaiser says they have evolved in terms of energy consumption, flexibility and control systems.

Flex units are high speed mixers (turbo mixers) that have multiple mixing tools rotating at high speed (tip speeds are around 30 m/s). Through intense material movement, the dispersion of ingredients is very good but

the friction created also causes the material temperature to increase quite rapidly. Uni Tec models are low speed mixers, which have just one mixing tool rotating with a tip speed of around 8.0 m/s. This type of mixer is used for materials that require gentle handling or that must not be exposed to a significant increase in temperature during mixing. In cases where dispersion by the one mixing tool is insufficient, one or more high speed choppers can be installed to improve mixing quality. [...]

Do you have any questions?

Please visit our website www.mti-mixer.de for further information on all MTI products or contact our Sales Team for consultancy and your individual offer:

MTI Sales

Tel. +49 (5231) 914-127 · Email: info@mti-mixer.de



MTI Mischtechnik International GmbH

Ohmstr. 8 · 32758 Detmold · Germany
www.mti-mixer.de



Right: MTI's Uni Tec batch mixer features low speed mixing for thermally sensitive blends