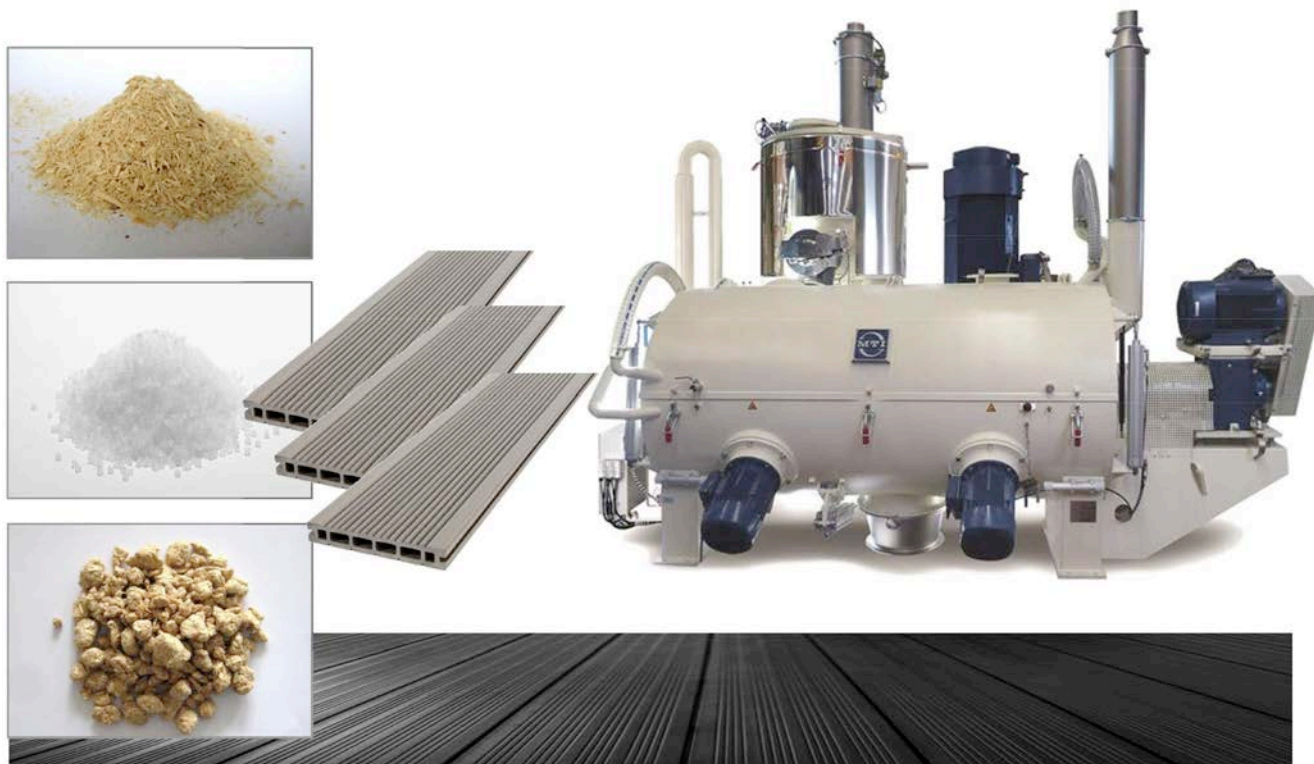


Efficient mixing of fibre compounds

WPC/NFPC/PPC and more



Due to the continuously growing consumption of fibre compounds in the past years producers are faced with the demand for rising production quantities. As a result especially in extrusion plants with high output capacities the trend is towards two-step processing. In the first step all raw materials are prepared to a compound in a heating/cooling mixer which allows for considerably more efficient processing in the following extrusion stage as a second step. The significant advantage compared to the one-step process in which all recipe components have to be mixed, dried and compounded in the extruder, is an increased output by 30 – 50 % combined with a considerably reduced wear – using the same equipment as before.

The MTI technology for the two-step process

In a discontinuous mixing process in the Heating/Cooling Mixer Combinations type MTI Flex®-line polymer binders, fibers and additives are processed to a high-quality, dry and free-flowing compound. In PVC-based recipes the fiber is used as a filler and normally fed into the heating mixer at the beginning of the mixing process. The further processing is similar to the traditional preparation of PVC-U dryblend.

The process for polyolefin-based recipes is much more challenging and mixing temperatures can go up to 190 °C. In the high speed mixer all recipe components are heated-up to the melting temperature of the polymer by means of special mixing tools designed for a high specific

friction input. At this stage the polymer together with the incorporated fibres will form a free-flowing agglomerate. The bulk density of the mixture increases to up to approx. 600 g/l. In combination with the aspiration system developed by MTI this thermalmechanical treatment allows a systematic drying of the mixture down to a residual moisture content of < 1 %. Afterwards the agglomerate is discharged into the cooling mixer where it is cooled down to approx. 65 °C for further processing or storage.

With special choppers installed in the cooling mixer the processing parameters can be influenced so that a reproducible particle size distribution from fine to coarsegrained and almost dust-free with a low content of over- or undersized particles can be achieved. The mixer combinations type MTI Flex®-line are available for capacities of up to 2000 kg/h and can be equipped with a variety of options especially with regard to wear protection and ATEX-designs to adapt them to almost every possible production environment.

The MTI Aspiration System

During processing in the heating mixer drying of the raw materials will take place. Due to the relatively high water content in the fibres of up to 15 % and the required process temperatures far above 100 °C moisture, resins and other volatile components will be extracted from the material. Moisture and fiber properties are an enormous challenge for the aspiration system of the heating mixer. For this reason MTI uses specifically developed filter cartridges with a separation efficiency of > 98 % for 0.3 µm and a vapour permeability even at the very high processing temperatures required. Usually the filter and connecting piping are electrically heated and insulated to prevent premature condensation efficiently. Compared to the one-step process the processable range of moisture content in the fibres is much wider.

Benefits when compounding on MTI Mixer Combinations:

- reduction of moisture and resin content to < 1 %
- reproducible quality of the compound
- constant and high bulk density
- increased extrusion performance by up to 50 %
- reduced wear during extrusion
- fibres processable without cost-intensive pre-drying

MTI R&D Center

Fibre compounds are subject to ongoing and continuous developments. So next to wood, sisal, hemp, rice hulls and bamboo also paper waste materials gain increasingly in importance. New applications with a bioplastics polymer matrix have already been processed successfully by MTI.

We are prepared to meet these challenges.

For the development of recipes or optimisation of mixing parameters in MTI's own R&D Center in Detmold high performance mixers in several sizes are available. Here we develop top-quality products for the future together with our customers.



Test equipment in the MTI R&D Center in Detmold