Maximum Production Output from Compounding to Pelletizing

Perfect Interaction

Compounding plastics requires precise control of parameters such as temperature and viscosity. The process becomes even more demanding when processing sensitive materials such as fillers that react to high temperatures or pressures. Buss co-kneader technology makes it possible to optimize compounding, pressure build-up and pelletizing independently of each other.

The core of the co-kneading technology is a temperature-controlled, oscillating screw shaft.
© Buss

Co-kneaders from the Swiss company Buss AG are among the leading systems in mechanical process engineering. The central element in the kneader housing is a temperature-controlled, oscillating screw shaft (**Title figure**), which mixes and kneads the raw materials supplied, such as polymers, additives or fillers, with maximum efficiency and precision. The two-piece, hinged housing allows easy access to the process sections. This ensures fast cleaning and easy recipe changes – a key benefit for frequent product changes. The modular design of the machines allows flexible adaptation to different production requirements.

Compounding and Pressure Build-up Efficiently Separated

The machine concept, with its modular design and different process zones, is designed for the most demanding mixing and kneading tasks (**Fig. 1**). The Buss co-kneaders allow an extremely wide range of applications from pasty compounds to thermoplastics and thermosets through to elastomers. One of the key advantages is the separation of compounding, pressure build-up and pelletizing. Compounding is the first stage of mixing the ingredients at low temperature and low pressure. This is followed by pressure build-up, which prepares the melt for pelletizing. From the preparation of cable compounds and PVC pelletizing to sophisticated material blends such as biopolymers and high-performance plastics, formulations with a wide range of specifications can be processed.

Example: Wood-Fiber Filled HDPE

A practical example of the application of the technology is the production of wood-fiber filled high-density polyethylene (HDPE). Here, HDPE with a wood

Info

Service
More information:
www.busscorp.com

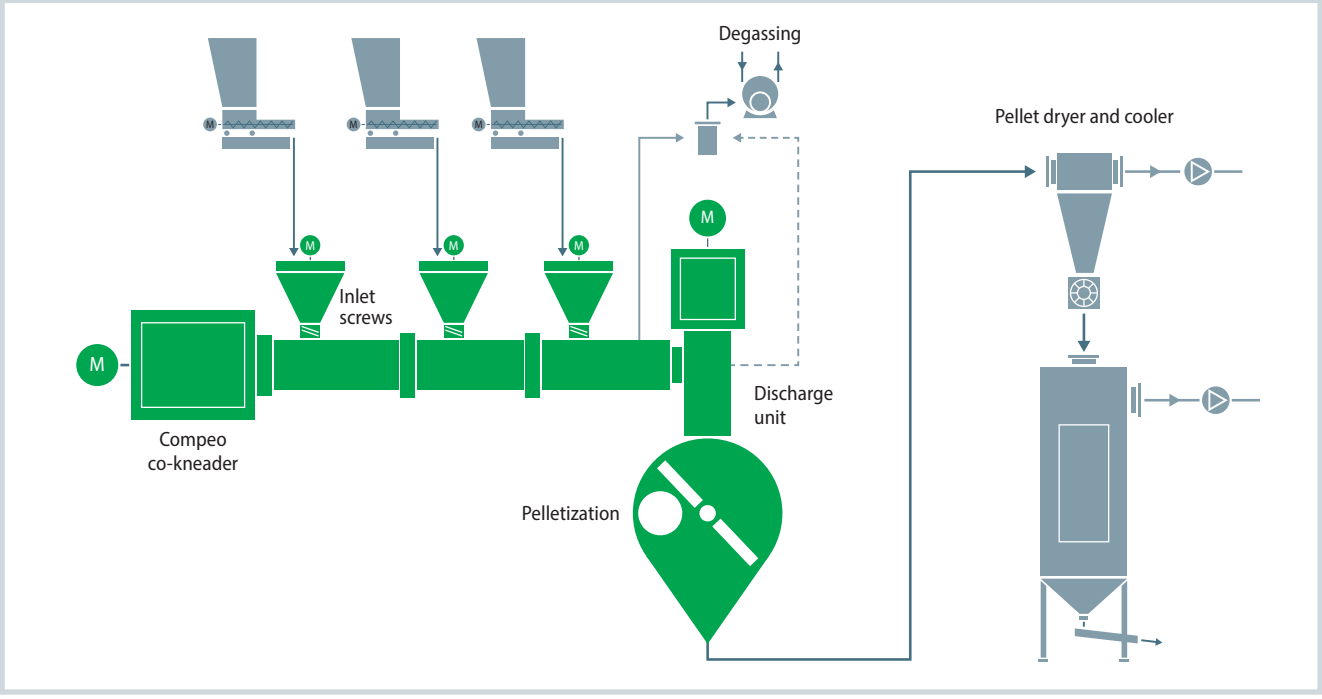

Fig. 1. The modular concept of the compounding systems allows optimum matching of the individual process parameters. © Buss

fiber content of around 55 % was processed into a wood-fiber plastic composite. A particular challenge with this material combination was to test and optimize component feeding and degassing using a flexible kneader in different configurations. This was done at low temperatures and under low pressure to avoid damaging the wood fibers. Extensive testing compared different degassing methods to determine the exact point and amount of wood fiber to be fed. This optimized process resulted in a more uniform blend and a finished product that met both the customer's high quality requirements and the required production volume.

Side Feeder versus Top Feeder

An important aspect when processing complex material mixtures is the feeding system. Buss offers two options, side feeder and top feeder solutions, each with specific advantages. A liquid injection option is also available: Injection bolts can be mounted anywhere along the process section of the co-kneader. This allows liquid components to be injected directly into the polymer melt at the optimum point for processing. The side feeder (**Fig. 2**) allows efficient filler feeding, especially for high filler content materials such as halogen-free flame retardant (HFFR) cable compounds. Side feeding allows higher filler contents to be processed, resulting in increased production capacity at reduced cost. It also provides greater flexibility in adjusting the filler content. This allows finer temperature control and improved product quality.

In comparison, the top feeder offers easier handling for less demanding applications. It is particularly suitable for materials processed with lower filler densities and where more precise control of filler addition is less critical. Both systems provide the flexibility to meet different production requirements.

Downstream Systems Are Also Perfectly Integrated

In addition to the kneader itself, Buss offers the necessary flexibility for customer-specific applications and different process requirements with downstream technical extensions such as discharge extruders, discharge pumps, screen changers or pelletizing systems. In addition to direct extrusion, several system options are available for pelletizing: air/water pelletizing, underwater pelletizing and strand pelletizing. Each of these technologies is designed for specific material properties and is suitable for processing highly filled formulations or difficult to process materials such as PVC or elastomers. All components are engineered to operate seamlessly, ensuring an efficient and integrated process.

With its comprehensive equipment portfolio, Buss delivers tailored co-kneader systems that meet a wide range of production needs from efficient compounding to pelletizing and finishing. Flexible feeding systems, combined with independent control of temperature and pressure build-up, enable companies to boost production capacity while enhancing product quality. ■

Fig. 2. The side feeder is the first choice for processing materials with high filler content. © Buss