FE CPS from Fette Compacting – New standards for simplicity and efficiency in continuous tablet production

Schwarzenbek/Düsseldorf, May 4, 2023 – To date, Continuous Manufacturing has been considered a promising but cost-intensive and complex production solution in the production of pharmaceuticals and nutrition supplements. With its newly-developed FE CPS direct compressing solution, Fette Compacting paves the way for easier and more efficient processes in the production of Oral Solid Dosages.

Presented for the first time in summer 2022, the dosing-mixing unit sets new standards for continuous tablet production thanks to its compact, modular design and easy operability.

The system's modular design permits flexible arrangement and installation of the process units on a total area spanning only five by ten meters, including all free spaces for handling the material. The FE CPS, for example, can be set up in one room while the tablet press is located in an adjacent room. This means that users can not only install the system from scratch at low cost, but also integrate it particularly easily into an existing production environment.

Tablets in five steps – Continuous Manufacturing with the FE CPS

The path taken by the raw materials to the subsequent tableting process comprises five steps. The powder or premix passes through several flexibly adjustable process steps. Upstream granulation processes are eliminated.

1. Material feed

The dosing-mixing unit has up to six infeed ports for material supply. Each inlet can be used for a single ingredient or a premix of several ingredients. A premix is used when the total number of ingredients exceeds six or the concentration of an ingredient in the formulation is particularly low. Each feed is equipped with an Automatic Refill System (ARS) that reliably and evenly feeds the material intermittently to the next process step. Since this first step is crucial for correct operation of the entire line, Fette Compacting has developed its own refill system with special screws. They are able to feed complex raw materials reliably and evenly into the metering process.

2. Dosing

The dosing system forms the heart of the new technology. Up to six gravimetric (loss-in-weight, LIW) powder feeders are used here. For each blending unit, the concentration of the respective material in the recipe is stored in the plant-wide product recipe. Combined with the requisite system throughput, the control system automatically calculates the required feed rate. The LIW feeders use twin screws to feed the material into the next process step at the required feed rate and minimum feed variability.

3. Blending process

The next step involves a specially developed horizontal powder blender. It has two successive but independent mixing zones – without a dead zone in between. This allows mixing processes with high and low shear energy to be combined in a single mixer and the best mixing results to be achieved depending on the formulation requirements. The mixer is equipped with four inlets: two in the first mixing zone and two in the second. The various ingredients are directed from the LIW feeders to the mixer’s inlet ports using a combination of downpipes and transfer hoppers. Each specific hopper configuration determines which outlet of

the mixing unit is connected to which port of the blender. This determines the mixing time for the specific ingredient. Various hopper configurations are available as format parts, offering great flexibility. In this way, users achieve the optimum process setting of shear intensity and mixing duration for a wide range of recipes.

4. Inline quality control

Embedded process analytical technology (ePAT) can be used at the output of the blender. Several near-infrared spectroscopic sensors check the homogeneity of the mixed powder and the concentration of the active ingredient, among other things. This way, the system can be permanently monitored and deviations in quality can be responded to directly. Especially in product development, it is relevant to continuously record and optimize the mixing process. Further ePAT sensors are located on the tablet press, which enables continuous in-process control at high speed.

5. Conveying

As the last step before tableting, the powder mixture is conveyed evenly and without the risk of segregation to the inlet of the tablet press. A powder transport system was developed for this purpose that conveys the product by dense phase conveying over a distance of up to ten meters without the risk of segregation. Via a conveying hose, it reaches the conveying arm of the FE CPS, which can be flexibly aligned to the inlet of the tablet press. This ensures that the thoroughly mixed powder reaches the tablet press without any problems and is pressed there in the usual quality. The mixing conveyor system also enables a two-room set-up of the direct compression line.

Efficiency and quality

These interacting process steps open up new perspectives for efficiency and product quality in tableting. Thanks to a lean system design and

coordinated process analysis technology, the FE CPS offers a compact yet reliable solution for Continuous Manufacturing.

About Fette Compacting

Fette Compacting is the leading international supplier of integrated solutions for the entire process of industrial tablet production. Fette Compacting is the only manufacturer of tablet presses and capsule filling machines to operate its own global network with fully-equipped and interactively-networked Competence Centers in Germany, the USA, Brazil, India and China. Fette Compacting belongs to the LMT Group, a medium-sized, family-owned group of companies. More than 1,800 people work for LMT Group companies at over 20 locations worldwide. The Group achieved sales of 375 million euro in fiscal 2021. www.fette-compacting.de

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