GRINDING, THE SMART WAY

A matter of ideas or: How grinding becomes as easy as 1, 2, 3 — Sometimes, situations require us to reinvent the wheel. Taking another perspective, gaining new insights from an external user's perspective, or getting to the bottom of an issue, can help us to find an original solution with an existing product.

Nothing ventured, nothing gained. Sometimes it's just a matter of daring to try something that hasn't been done before – like the combination of two identical grinding systems.

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During a kick-off meeting at a customer site, Frewitt specialists the optimal grinding process for the preparation of API products. The initial assumption would always be grind product in one mill, before filling it directly into containers or drums. The system would require cleaning by WIP or CIP once a batch was completed before changing over to a new product. But as new layouts were developed during additional meetings, alternative approaches were established—with a surprisingly simple solution.

Two factors contributed to this solution: safety and time. As mentioned above, it needed to be possible to completely clean, rinse and dry the system following completion of a batch. On the other hand, due to the rapid, prerequisted, product changeovers, the company needed to minimize the time lost during switching without any expense to safety.

It had been concluded beforehand the Frewitt Coniwitt-150 would best meet the customer's needs. Features of this conical sieve mill included a large selection of sieves, infinitely variable regulation of the rotor speed from 400-2,400 rpm and a rotor with either a rectangular profile for grinding dry products or a round profile for grinding moist products. While equipping a mobile system with the Coniwitt-150's grinding head had certainly led to good results, this would have been too slow during the conversion process. By contrast, two identical systems—both featuring a CW150 grinding head with a drive system—proved to be the ideal solution with regard to the time saved during conversion and process safety.

A WIP system and the drive were located on a static column, which was fastened to the production room floor. But the heart of the solution is the grinding system, notably, the mobile part of the plant. One element of the grinding system consists of a two-part docking station. The docking process could be carried out either with the mobile vessel by lifting the column or using the active valve with automatic feeding. The mandrels for locking the system are used to centrally align the active and passive valves during the docking process. Product is fed contamination-free into the inlet vessel, which featured a sight glass and a level probe. A magnetic sensor prevents the motor from starting up unintentionally, as long as the feed hopper is not correctly assembled. Downstream of the feed hopper is the conical sieve mill that grinds product batches of max. 300 kg.

Identical Twins

Dry, or moist powder, as well as granulates can be deagglomerated or ground using sieves with different mesh sizes. Under the sieve, two probes were installed for measuring the grinding chamber temperature, which would bring the mill to a stop if a specified value is exceeded. The outlet hopper is assembled with a protective grating and connected to the feed hopper to ensure balanced pressure throughout the system. This leads to the last element of the system, the passive valve. Finally, the filling vessel is docked to pick up the ground product.

This sophisticated grinding set-up was duplicated—and with good reason: while one system was in operation, the second could be prepared for a new product. Inserting the correct sieve and choosing the right rotor are just two examples. To illustrate just how important details could be: once cleaning was complete, the spray nozzles were dried out with air so that water, known to potentially cause product jams, could not get into the product under any circumstances. Each of the systems was equipped with eight cleaning nozzles. One nozzle each was located in the active valve, feed hopper, outlet hopper and the passive valve while a total of nozzles were located in the sieve mill. Cleaning of the grinding system could be controlled and checked using a PLC or a mobile operating panel (HMI) on the static column.

Vessels (containers, drums) of various shapes and sizes could be connected to the mobile grinding system. A mobile lifting column was used to pick the vessels up, transport them to the production site and bring them to the correct height to then finally enable proper docking.

High Levels of Flexibility

Flexibility and safety were both ensured throughout the entire system. The grinding chamber was designed for Atex II 1 D (zone 20), while PTC probes ensured a controlled temperature in this critical area. All components, including vendor parts such as active and passive valves, complied with the Atex directives. Both internal and external Atex certificates ensured safety in the customer's internal operations, while assuring an indefinite plant service lifetime.

Nothing ventured, nothing gained. This centuries-old adage has once again stood the test of time; even today, sometimes it's just a matter of daring to try something that hasn't been done before. In our situation, the solution was two identical grinding systems. The result was certainly one to be proud of, with unexpected time savings achieved during conversion, greater flexibility enabled during the process, and a system that met all the safety requirements set in API production.

3 Figures on Topic

5 cm to 150 µm
is the Particle Size range that can be processed with the Coniwitt-150.

500-1,500 kg/h
of product with a maximum density of up to

2 kg/dm³
can be processed.

Source: Frewitt

PROCESS-Tip

- **Powtech**: Hall 1, Stand 343
- Discover why "There is no alternative to testing when it comes to **grinding new products**" on www.process-worldwide.com.

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