

Novartis

Crusher and grinding line for pre-processing **Metformin** and other agglomerated active pharmaceutical ingredients



Introduction

Millions of people worldwide are affected with type 2 diabetes, also known as adult-onset diabetes. An increasing tendency to develop type 2 diabetes has been observed in recent years, particularly in industrialized countries. Physicians resort to prescribing blood sugar-lowering medications when dietary measures are no longer enough to treat the condition.

Novartis, an innovative producer of pharmaceutical products, is taking a leading role in the manufacture of diabetes medications with the fixed combination of the DPP-4 inhibitor vildagliptin and Metformin, enabling a comprehensive control of hyperglycaemia.

Owing to a worldwide increase in the demand for blood sugar-lowering medications; Novartis has been compelled to increase its production capacities at various sites in Europe.

Initial situation

From its contract manufacturers, Novartis acquires active pharmaceutical ingredients and adjuvants that are usually delivered to the production facility in 25 kg cartons with liners. The active pharmaceutical ingredient is delivered in various particle sizes and sometimes in block form. It has poor flow properties and tends to form lumps, therefore requiring pre-processing before undergoing further processing (customer-specific process).

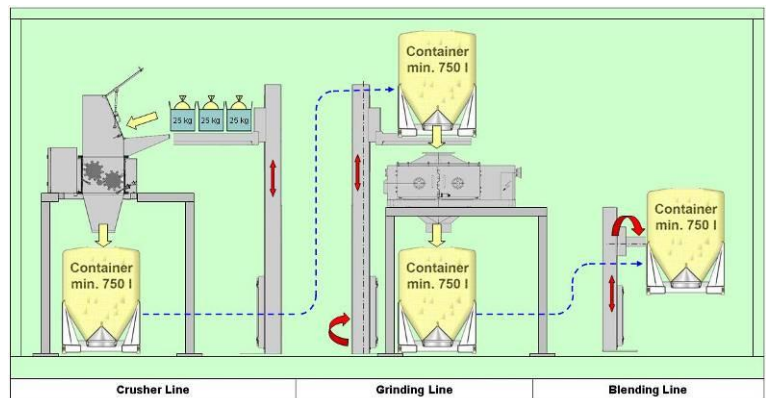
Because the product cannot be used as delivered, it must undergo a suitable grinding and pre-processing, which is generally a complex procedure. Only after pre-processing are active ingredients and adjuvants in the ideal powder state and ready to undergo the actual manufacturing process.

Current state of the pre-processing line

The entire pre-processing line went into operation in 2006 and consists of 3 mechanical procedures:

1. Crushing
2. Grinding
3. Blending.

The block goods are delivered packaged on pallets. A lifting column raises them up to the infeed hopper of the platform-mounted crusher, where they are hand loaded. The pre-ground product flows into a container placed under the discharge of the crusher.

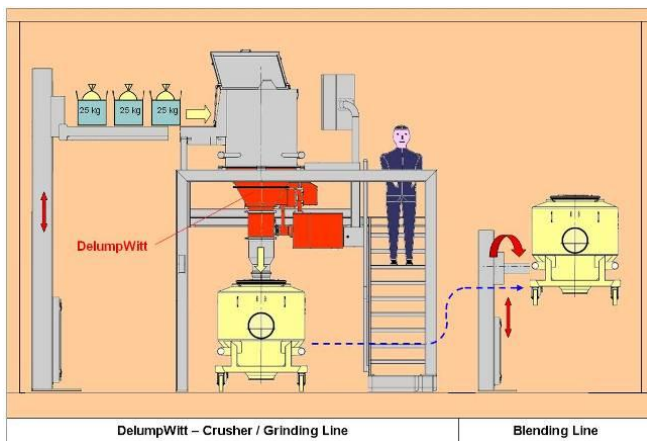


The filled container is then placed on a second lifting column, where it is docked above a milling unit. The product is ground in the milling unit and then flows into the container positioned underneath. After other processing agents and adjuvants are added manually, the container is taken by another lifting column to the blender unit.

Once the mechanical pre-processing is complete; the blended batch then undergoes further customer-specific processing.

Frewitt solution for a new productivity-increasing pre-processing line

Frewitt participated in the evaluation of a new processing line for increasing capacity. The new pre-processing procedure could thus be validated based on preliminary experiments conducted with the newest generation of Frewitt equipment.



Frewitt had since reengineered its DelumpWitt crusher and grinding line. Hence this new development could be incorporated as the core of the process.

Thanks to the DelumpWitt's compact construction and 2-in-1 process, only one, rather than two lines were required for the crushing and grinding process. Active pharmaceutical ingredients and adjuvants in powder and lump form are raised by a pallet lifting column onto a single line, where they are manually fed into the DelumpWitt hopper. The

ground product then flows directly into a moveable container placed underneath. The scale-mounted container can be loaded with all active ingredients and adjuvants in a single operation before its contents undergo the final blending cycle on a separate lifting column.

Substantial cost savings with a simultaneous increase in production

Along with the grinding of solidified bulk goods to fine powder in a single operation, the DelumpWitt offers considerable advantages in terms of processes, applications, and investment. Novartis highlighted the following advantages of the new DelumpWitt crusher and grinding line:

- ✓ **Simplified process cut investments in the new line by ca. 30%**
- ✓ **Simplified process saved ca. 0.5 million EUR in infrastructure design**
- ✓ **Up to 70% increase in productivity**
- ✓ **The new line takes up to 50% less space**
- ✓ **DelumpWitt easy to handle**
- ✓ **Fewer process parts to clean**
- ✓ **Compact construction**
- ✓ **Simplified application for production
→ immediate operator acceptance**