NTE PROCESS

How to minimize ingredient contamination when formulating different recipes on the same production line, even with numerous raw materials?

CASE STUDY
Animal Feed

BACKGROUND
An international, market-leading company with more than 15 plants worldwide producing nutritional solutions in the field of animal feed additives turned to NTE Process. The customer needed to solve problems related to formulating different raw materials within multiple recipes on the same production line by preventing contamination phenomena of ingredients and dispersion of powders on the plant, without having dedicated dosing stations for more than 50 ingredients.

THE CUSTOMER'S REQUEST
The customer needed to reduce the number of dosing stations dedicated to the many ingredients that could potentially be used within the many recipes designed with its customers and highly customized. The Company produces animal feed additives on a large scale and for different uses, but there was a need to limit the installation space and the number of machines while minimizing contamination between recipes.

THE SOLUTION
NTE Process has designed a system based on Wonderbatch® technology that combines the advantages of dosing through a cone valve with the ability to perform in-line formulation directly from a big bag. Having defined the maximum number of ingredients that can be part of the recipe, with the Wonderbatch® system it is indeed possible to rotate potentially an unlimited number of raw materials in bags. Minors additives, which are fixed in the recipe, are instead dosed through gravimetric feeders.

All Wonderbatch® dosing stations are equipped with M510 bag unloading and dosing units, designed to unload 1000/1500 kg capacity big bags, dust-tight, complete with spout. In addition, the docking station is equipped with a weighing system for loss-in-weight dosing.

Each big bag is positioned 'off line', without affecting recipe times, on a mobile structure - the M513 station - equipped with a passive cone at the discharging point. The operator opens the big bag's spout, using latex gloves and the sight glass, easily and without dispersing dust into the environment. Then the universal structure is placed on the M510 unloading and dosing station.

A control panel manages the unloading/dosing control sequence of the product contained in the big bag in the underlying process via PLC and operator panel. The dosing sequence is selectable via the HMI in loss-in-weight, batch and continuous modes. The M510 unloading and dosing station is also capable of unloading/dosing mobile plastic and stainless steel containers.

The passive cone valve allows the product to be dosed with minimal contamination and without the product residue typical of traditional dosing systems such as screw feeders, rotary valves or vibrating channels, which therefore require dedicated dosing stations and hoppers.

The M513 station, on the other hand, can be removed at the end of dosing from the M510 unloading station even if the big bag is not completely empty, as the cone valve allows the powder to be perfectly sealed after each dosing cycle. As a result, it is possible to replace one or more products with minimal cleaning by switching to the next recipe.

All stations can dose simultaneously on the conveying line, increasing production capacity and feeding batch processes or continuous mixers.

The conveying was carried out in line 1 using Venturi ejectors and in line 2 using a vacuum system, for production requirements. Both technologies are a perfect match for the Wonderbatch® technology. Finally, the system was completed with a vacuum line and Atex certification, equipped with explosion-proof compartmentalisation systems and components suitable for contact in the animal feed industry.

TYPICAL SYSTEMS FOR THE IN-LINE FORMULATION OF RECIPES

BENEFITS AND RESULTS

- reduction of waiting times for the formulation of recipes
- dosing directly from big bags or IBC mobile containers
- automatic monitoring of the entire process
- reduction of contamination
- reduction of costs related to product handling
- traceability through weighing and control systems
- reduction of cleaning times and rapid production changes

CONCLUSIONS

The customer was able to install the automatic ingredient dosing system and the conveying system to the mixers in a space of 3m by 10m. In a very compact area and without the need for supporting structures, it was able to manage recipes from over 50 raw materials on 4 dosing stations and 4 for micro-ingredients.

Operators can place big bags "off line" on the M513 structure without affecting recipe times and in an ergonomic way. With the help of a forklift it is possible to quickly position the materials on the M510 stations at each recipe change.

The plant is dust-free and has significantly accelerated productivity - estimated at + 50% - compared to traditional systems. After 10 years, this made it possible to install the same technology on line 2 during a substantial expansion of production.

ABOUT NTE PROCESS

NTE Process is the Single Source Provider of process solutions for the industry ranging from dense phase pneumatic conveying to mixing, but also liquid injection, drying, spray drying and in-line formulation, up to packaging. The headquarters is in Gorgonzola (MI), while in Pessano con Bornago (MI) there are both the second site which includes the assembly and testing area and the NTE Scientific Hub, where a team of specialized engineers deals with R&D and carries out full scale and scientific test.

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