



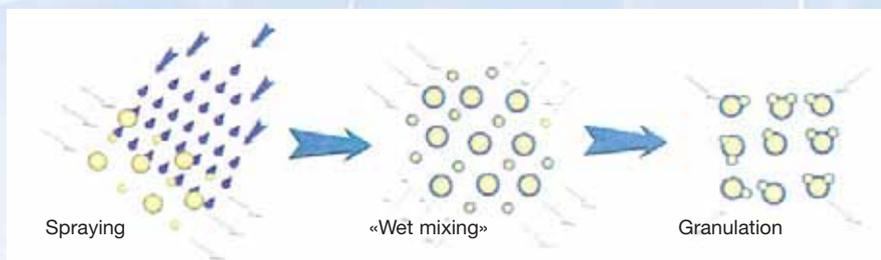
FORBERG®

PHARMACEUTICAL MIXER/GRANULATOR/ DRYER

DELIVERY OF A MULTI PURPOSE PHARMACEUTICAL SYSTEM



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Delivery of a multi purpose Pharmaceutical system.

FORBERG International AS is pleased to declare the successful delivery and hand-over of a Forberg® system to a Swedish Pharmaceutical company.

The manufacture products formulations for several different administration forms as nasal sprays, injectable.

Our compact ingenious design, which has world-wide patent protection, is based on our know-how from 30 years of deliveries to landbased process industry.

This system enables the customer to coat active substances onto a carrier, granulate and finally dry the finished product.

Design:

The system operates to the highest regulatory standards of safety, efficiency, hygiene and environmental control.

The granulator is designed to meet requirements for Current Good Manufacturing Practice (cGMP) as defined by FDA and EC.

CIP:

A complete cleaning-in-place system is installed. The machine is parted into different zones, and each zone is washed separately with city water and purified water. After cleaning, the machine is dried with heated air.

Safety:

The Forberg® system is CE marked and has the highest degree of dust explosion safety due to the low temperature in our drying process. This is documented and confirmed by GexCon that conducts a safety assessment of every system delivery.



Process Description:

Powder product is filled into the process chamber. Filling of the process chamber is done by a pneumatic conveying system via an existing Quadro-Comil.

Next the powder is homogeneously mixed and mechanically fluidized by our patented synchronized twin shaft dryer.

Coating & granulation of the carrier powder is achieved by spraying a liquid solution of binder and active substance onto the dry powder. Granules are built up by means of the liquid/binder solution.

Using low-temperature, indirect steam heating, the liquid is evaporated. Heated air is used to transfer the necessary evaporation energy to the product. Paddles bring the heated air through the material and up in the fluidized zone.

The granules are dried to the required moisture content. Moist air and free suspended particles flow up to the primary filter. The primary filter, which is mounted over the chamber, stops the free suspended particles.

The individual primary filter pockets are cleaned by compressed air. The separated particles fall back into the chamber.

Operating the vibrators in pre-programmed pulses prevents unwanted build up of powder on the walls.

Moist clean air continues through a pipeline to the fan. The fan blows moist air from the secondary filter down into a coil cooler.

Condense from the dehumidified air is drained out beneath the droplet chamber.

Cold and humid air flows up into the heater where it is heated and returned to the process chamber.

Product is discharged through the bottom hatches into the discharge hopper.

Control System:

Forberg delivers the machine with a fully integrated control system included an operator interface.

All process-parameters as well as start and stop of the process can be controlled and monitored from the operator interface.

The process setup is made very flexible to optimize the process.

After each batch a batch-report is available and can be printed out.

The control system is developed and tested according to GAMP Good Automated Manufacturing Practice.



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