

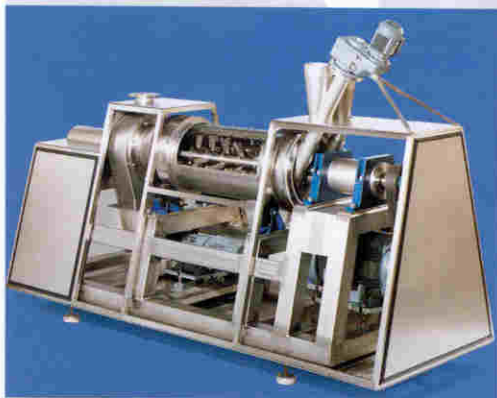


Powder Technology
Division

Niro

High Shear Granulator

HEC™



- Continuous Granulation
- Particle Densification
- Product Dedusting

Continuous High Shear Granulator

HEC™ Granulator Series

Niro has for many years specialized in the design and supply of batch and continuous plants to produce granular dried products using spray and fluidization techniques.

The latest Niro design is the continuous high shear granulator (HEC™ Series). This has been developed to meet industrial requirements of converting dusty, light powders into high density, free-flowing granulates.

There are many dusty powders being produced on existing dryers. The HEC™ enables an upgrading of product quality at low cost and without the need to shut down existing production plant.

Granulators of this design are continuous operating plants. Powder is mechanically fluidized and simultaneously wetted with liquid under controlled conditions that lead to uniform granule growth.

The HEC™ Series is synonymous with high performance mixing, agglomeration, compacting and granulation.



Industrial size HEC™-1000



Pilot plant HEC™-400

Plant Capacities

Three industrial sizes are available:

- HEC™-400 (range 100-500 kg/h)
- HEC™-630 (range 300-2,000 kg/h)
- HEC™-1000 (range 2,000-10,000 kg/h)

Actual capacities depend upon the feed material properties and the degree of densification required.

Pilot Plant Facilities

The desired product characteristics such as bulk density, granule size, size distribution, moisture content, and mechanical stability can be determined in the Niro pilot plant and laboratory facilities in Denmark where a HEC™-400 Granulator is available for product and process evaluation.

Patent Pending.

HEC is a trademark of Niro A/S

Applications

The HEC™ handles a wide variety of powders. Developed initially for the detergent industry to produce the latest range of compact, highly effective detergent granules, the HEC™ also finds applications in the agro-, bulk and specialist chemical industries.

- Agro-chemicals
- Detergents
- Fodder (animal)
- Inorganic salts
- Kaolin
- Optical brighteners
- Perborates
- Polymers
- Silicates
- TAED
- Talc
- Zeolit

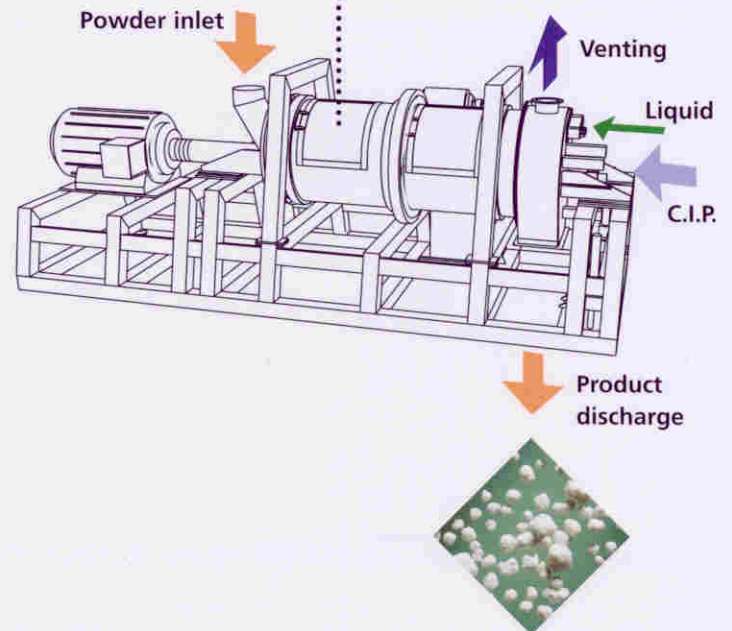
Mode of Operation

Powder having unacceptable dustiness, low bulk density, and flowability is fed into the granulating chamber which consists of a slowly rotating drum in which an intensifier bar rotates at high speed. Liquid is sprayed into the drum at the same time and, with the action of the intensifier bar, energy is effectively transferred to the wetted powder to create a high performance mixing and compacting operation. High density granules (for detergents often up to approx. 1000 kg/m³) with an average particle size in the range of 250-1500µ are produced.

Wetting rate, residence time and bar speed determine the actual final size of the granules. The typical liquid: powder ratio is 1:10, but in practice the ratio is adjusted according to the feed material and the granule specification. The rotating drum is designed to achieve a uniform product flow through the plant, a necessity for achieving a final granulated product specification. Final granule conditioning, i.e. afterdrying, cooling and final dedusting where necessary take place in an attached fluid bed.



Inlet duct and rotating intensifier



On-line PSD Control of Granulation Processes

Due to the short residence time in a high shear granulator, and the high sensitivity of the particle size distribution to the powder/liquid ratio it is important to control this ratio as well as all the other granulation parameters.

Niro offers advanced control system based on image analysis techniques. The particle

size distribution (PSD) function is measured on-line using a special video camera and dedicated image analysis hardware, which delivers information to the granulation model. This predicts the optimal control of the granulation process. Variations in the powder- and liquids rate and the powder moisture content may then be compensated for, enabling production of a final granulate to a narrow size specification.

