Three-in-one: VMA 600 Ex CIP single pot granulator

In December 2014, the VMA 600 was dispatched from Plant 3. Batches of up to 480 litres can be produced.

For decades, high shear single pot granulation has been a well-established process technology within the pharmaceutical industry. This process combines three process steps in one pot

1. blending,
2. high shear wet-granulation and
3. drying (under vacuum, gas stripping and/or microwave heat).

The single pot granulator offers many advantages for pharmaceutical companies:

- Safe production in a closed container under vacuum
- High blending and granulation efficiency, even with low dosage API (<1 %)
- Low drying temperatures under vacuum, especially suited for temperature-sensitive products
- Small product contact surface for quick and easy cleaning and fast product change-over
- Efficient solvent recovery through cooling water
- Small footprint

The Bohle VMA series includes typical pharmaceutical single pot granulators with impeller and chopper unit and top drive for pharmaceutical applications. Two agitators provide the necessary shear forces and de-lumping to achieve high-quality granulates.

The heart of the machine is the GMP-compliant double jacket process bowl. The main aggregates are integrated in the lid of the pot ("top drive"). It contains the impeller shaft and sealing, the chopper shaft and sealing, the product filter, the microwave window, the temperature and pressure sensors as well as the retractable cleaning nozzles.

The granulation process is automated/plc-controlled. The product-specific recipes are simply loaded from a PC and the required process functions can be set via HMI:

FEEDING:
The raw powder is fed by vacuum first, e.g. from an IBC container.

BLENDING:
The powder is blended through the main impeller for a few minutes.

GRANULATION:
The binding agent is added to the product from a stirred liquid tank via mass flow sensor and peristaltic pump to an atomizing spray nozzle. At the same time, the impeller and chopper provide the necessary shear forces to generate granules.

WET MIXING:
If required, a short wet mixing phase can be integrated into the process after adding the liquid to bring the granules to the final size and shape.

VACUUM DRYING:
Three different vacuum processes are available for drying the granules down to the desired moisture content:

1. pure vacuum drying,
2. vacuum drying with strip gas (VAGAS®) or
3. with vacuum microwave drying. The organic solvent vapors are condensed and can be recovered or discharged in an especially effective and environmentally safe way.

Detailed view of the VMA process bowl lid.

DISCHARGING:
The process bowl can be easily discharged through the center discharge valve via an inline conical turbo sieve (Bohle Turbo Sieve BTS 200) into an IBC container.

CLEANING:
Before processing another product, the unit should be cleaned.

The cleaning process of the VMA is automated, recipe-controlled and very quick. A CIP rack in the technical area provides the cleaning water at the required temperature, amount and detergent concentration.

When drying is performed, the evaporated solvents are discharged from the process bowl to the vacuum system.

For environmental reasons, the organic solvent vapors containing e.g. acetone or ethanol are easily and very efficiently condensed in tube condensers.

The required cooling water is held steady at -30 °C or -20 °C or +5 °C in a chiller unit (see picture).

The emission rate of e.g. acetone or ethanol can be set to below 20 % LEL (lower explosion limit).

Bohle is presenting the latest generation of the VMA 300 at the ACHEMA trade fair in Frankfurt.

The "compact all-rounder" is offered at capacities between VMA 70 to VMA 1200 which corresponds to batch sizes of 20 – 960 litres.