



Granulation Technology

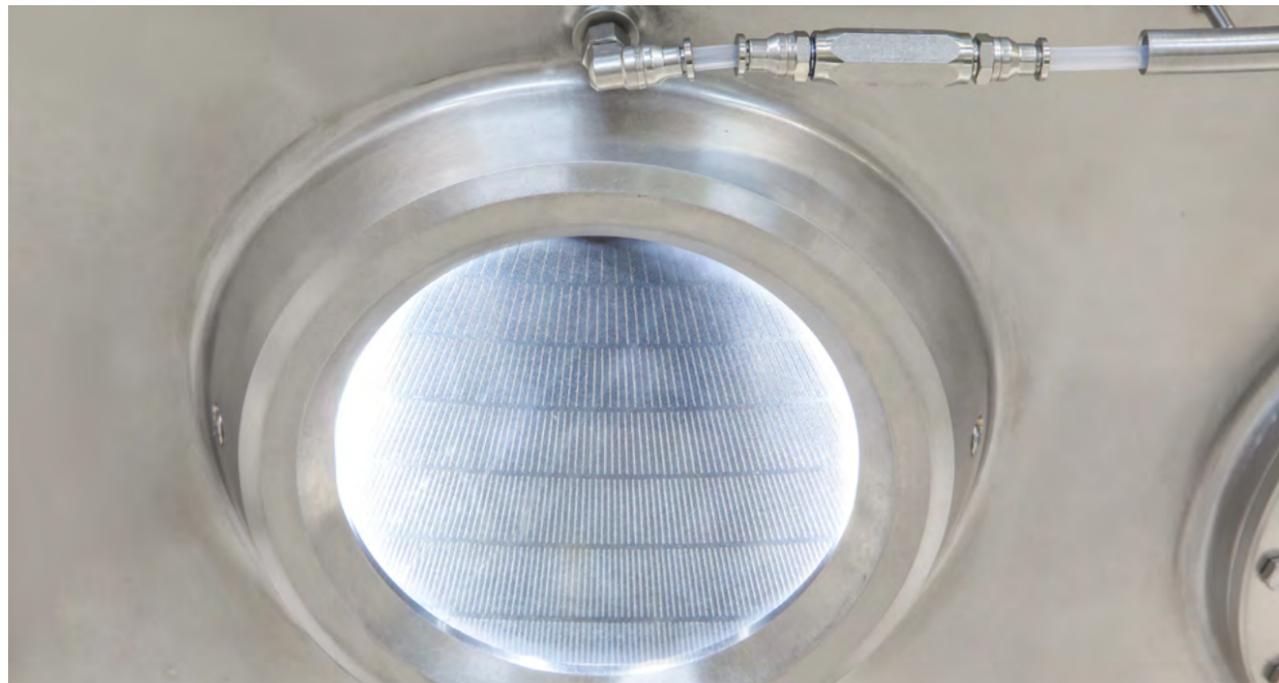
**Bohle Fluid Bed System BFS | Bohle Uni Cone BUC® |
Compact Unit | High Shear GMA | Single Pot VMA**

Fluid Bed System BFS

Using a tangential fluid bed system represents state of the art technology in pharmaceutical manufacturing for particle coating, granulation and drying. With the innovative Bohle Uni Cone BUC® a complete fluidization is assured which leads to high coating uniformities and high yields in the final product due to the absence of particle twinning.

Benefits:

- Inline sieving and product transfer
- 12 bar pressure shock resistant – optimum conditions for containment applications, no effect on environment in case of accident
- Integration of PAT, NIR and WIP
- Filter cleaning by patent - patented diffuser
- Electrical drop down filter movement
- Filter cartridges with spindle drive
- InTouch HMI: the powerful user interface
- Vacuum changing removable bottom plate



Technical Information:

Bohle Fluid Bed System	BFS 3	BFS 30	BFS 60	BFS 120	BFS 240	BFS 360	BFS 480
GMA series		GMA 70	GMA 150	GMA 300	GMA 600	GMA 800	GMA 1200
Working volume product bowl [L]	1 – 9	9 – 90	30 – 120	60 – 240	120 – 480	180 – 720	240 – 960
Air flow [m³/h]	200	750	1000	3000	4000	6000	8000
Supply air [C]	30 – 80	30 – 80	30 – 80	30 – 80	30 – 80	30 – 80	30 – 80
Qty. of product filter bags	4	6	7	9	12	12	14
Approx. height Fluid Bed [mm]	1980	2930	3600	3920	4570	4990	5370
Number of nozzles (tangential spray)	1	2	3	4	5	6	8

Bohle Uni Cone BUC®



L.B. Bohle developed the Bohle Fluid Bed Systems with tangentially mounted spray nozzles and the Bohle Uni Cone BUC®. This equipment is available for batch sizes ranging from 1 to 500 kg. Built in 12 bar shock resistant execution, organic and water based processes are always accessible. Short product transfer times and effective cleaning offer opportunities for additional savings in production time and costs.

By design all size fluid beds are geometrically similar which enables an easy scale up procedure. Dust-free suction and discharge of the product bowl is performed

through the use of a newly developed patented multi-functional valve directly above the distributor plate.

The overall design of the BFS types results in substantial ergonomic benefits, which means major advantages in cleaning and processing in comparison to other existing fluid bed systems on the market. In addition, the low position of the valve allows easy operator access. Bohle Fluid Bed Systems contain fewer gaskets, valves and vents, which makes cleaning fast and easy.

All Bohle systems utilize a very efficient use of space.

High Shear GMA

The Granumator GMA is a granulating system specifically optimized for pharmaceutical applications. The impeller is designed for high shear and compression, ensuring effective granulation. The chopper prevents excessive granule growth and distributes the granulating liquid within the product.

Benefits:

- Less liquid consumption
- Good discharging conditions
- Closed system
- Granulation can be controlled by time, amount or power
- Easy cleaning, no rinse water remaining



Technical Information:

Bohle High Shear	GMA 70	GMA 300	GMA 600	GMA 1200
According fluid bed type	BFS 30	BFS 120	BFS 240	BFS 480
Batches [L]	20 – 55	90 – 240	180 – 480	360 – 960
Impeller [rpm]	15 – 400	5 – 220	5 – 173	5 – 145
Chopper [rpm]	150 – 1500, variable adjustable			
Impeller torque measurement	Patented measurement of mechanical torque/power			
Control system	PLC controlled, Touchpanel operated			

Single Pot VMA

Bohle Vagumator single pot systems are designed for closed, dust-free processing of pharmaceutical granules from charging through discharge including inline milling. Mixing, granulation and drying cycles are completed in a single machine under contained conditions.

Benefits:

- Small footprint
- Easy through-the-wall-assembly
- Gravity feeding is standard
- Installation in hazardous areas



Technical Information:

Bohle Single Pot	VMA 70	VMA 300	VMA 600	VMA 1200
Batches [L]	20 – 55	90 – 240	180 – 480	360 – 960
Impeller [rpm]	15 – 400	5 – 220	5 – 173	5 – 145
Chopper [rpm]	150 – 1500, variable adjustable			
Liquid dosing	Piston membrane pump, included in control panel			
Bowl / lid temperature control	10 – 80 °C			
Vacuum [mbar]	< 10			
Vacuum feeding	For easy, fast and low dust emitting feeding			
Control system	PLC controlled, visualization by In Touch from Wonderware			

Compact Unit

The individual components of the High Shear Granulator GMA, wet sieve BTS, Fluid Bed System BFS and Bohle Uni Cone BUC®, cyclone separator and dry sieve BTS are optimally integrated into the Compact Unit. This integration covers process, cleaning, control and explosion protection as well as qualification.

The Compact Unit is a compelling solution when traditional wet granulation must be economical and ergonomically sound. Featuring many technological advances and inherent safety considerations, the Compact Unit creates an industry benchmark.

Benefits:

- GMA and BFS built into the wall right next to each other
- Small footprint and minimized room height
- Multipurpose use for various processes
- Single operator panel to serve both machines
- Single WIP-skid to serve both machines



Small Footprint, High Quality

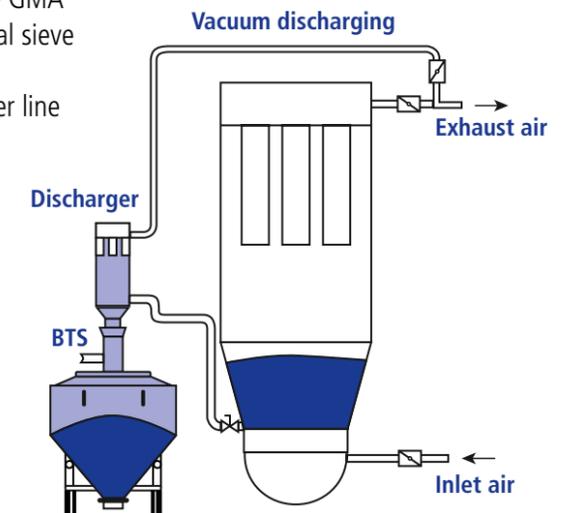
The systems require a minimal footprint due to the close arrangement of the components. Additionally, direct product transfer from the outlet valve of the GMA via a stainless-steel pipe to the suction valve of the BFS is possible. The proven tangential sieve can also be integrated into this pipe system. An additional discharge valve is integrated in the process container of the BFS eliminating the need to refit the transfer line and discharge line during processing.

Wet Tangential Sieve – Patented

The Bohle tangential sieve is exclusively designed for wet sieving of granules. The sieve is attached to the GMA base and situated directly below the GMA discharge. The impeller presses the wet granules through the tangential sieve directly into the transfer line. This design reduces construction height and virtually eliminates transfer line obstructions and blockage of wet granules in the sieve.

Discharge Cyclone

- One level operation
- Short process times
- Completely closed process
- Short transfer routes means safe transfer
- Short cleaning process
- Small footprint





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