

CONTINUOUS FLUIDIZED BED PRODUCTION

High efficiency and great innovation potential in bulk production



↑ Optimum product properties due to continuous fluidized bed processes

The term “fluidized bed technology” covers several application processes: Fluidized bed drying, spray agglomeration, spray granulation, encapsulation, and coating. In addition to simple drying processes for powders or bulk materials, complex processes can also be implemented that optimise the material properties of particles. The dust content can be reduced or the flow and tableting behaviour improved, as well as other functional properties adapted. The change in product properties is worth particular mention. For example, the use of fluidized bed technology results in faster solubility for instant drinks or improved stability of the mixing ratio for maintaining exact dosages.

Due to the high throughput, continuous fluidized bed processes in particular offer increased efficiency as a result of a reduction in operating and manufacturing costs.



Fluidized bed processes are used to optimise the properties of powdered products and improve their transport or flow characteristics.

Optimising processes – reducing costs

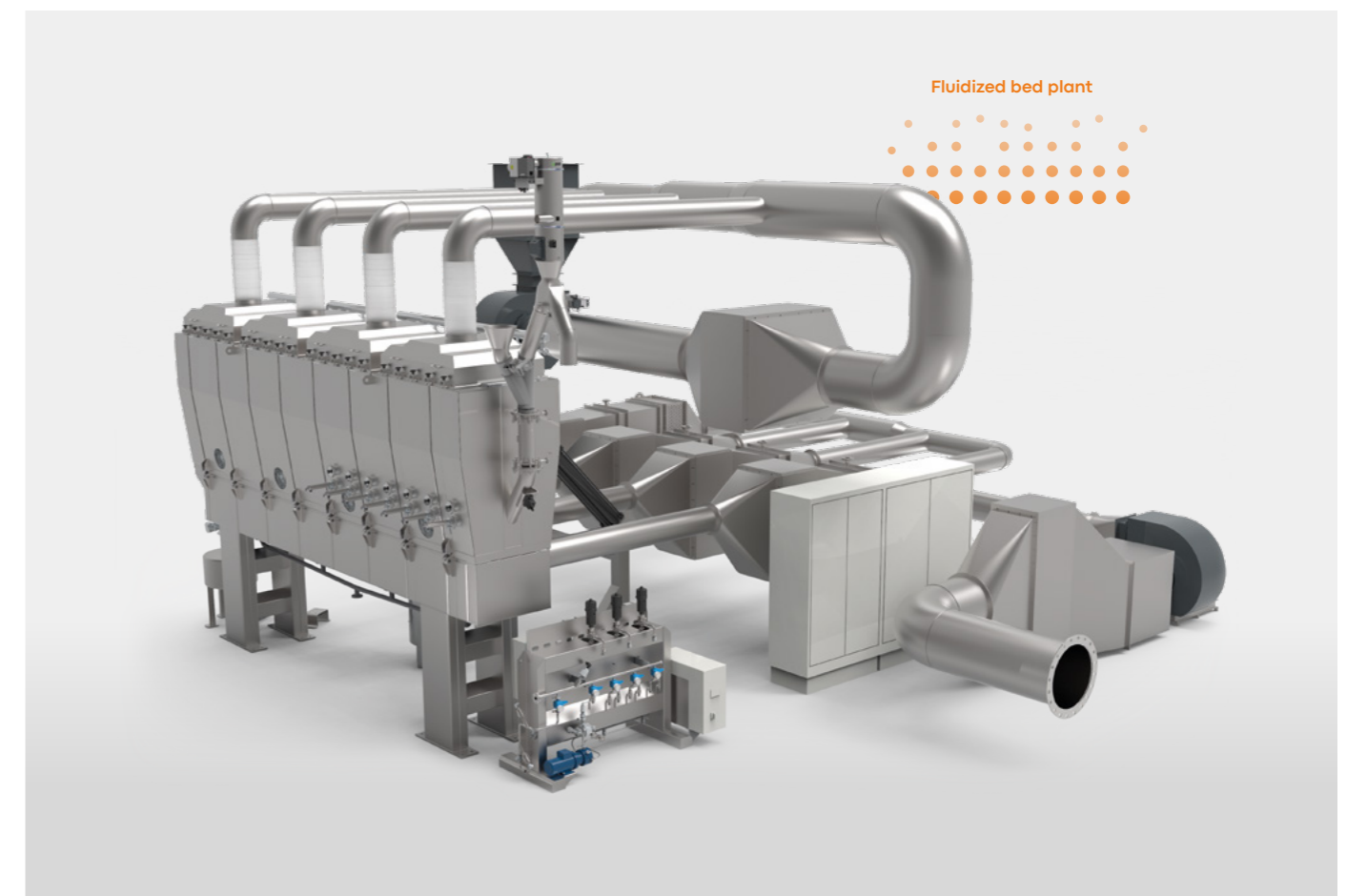
Optimised handling properties are particularly important for powdered products. It should be as easy as possible to transport and dose them, because a heavy dust load can become a hygiene and safety risk in both steps, as well as lead to processing problems. In addition, for products made from complex mixtures, the focus is on homogeneity and

stability of the mixed product. Especially in bulk production, a smooth flow and a safe production process are a decisive factor for the profitability of the product.

Convenience and product confidence

Customers expect not only visually attractive but also high-quality products that are optimal in their application. This includes, for example, granulated product formulations for the production of compressed shapes such as tablets or dishwasher tabs. Particular factors in the food industry are the attractiveness of the product, good handling and

solubility properties – especially in convenience and instant preparation. In addition, there is the possibility of refining the end product with aromas or by taste-masking bitter substances.



↑ Continuous fluidized bed plant with air system

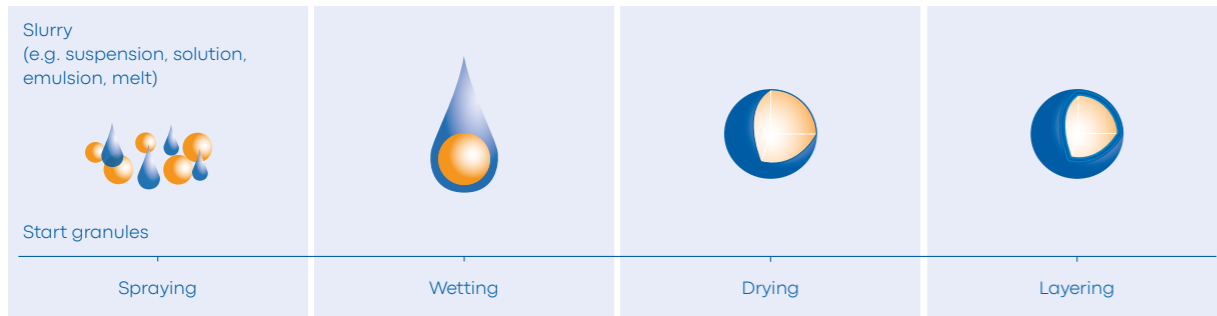
Fluidized bed processes are highly efficient

Fluidized bed processes can be used for different applications:

- For drying and cooling or thermal treatment of bulk products
- For the formation of particles from powders (agglomeration)
- For spray granulation in the form of a particle growth of liquids

Fluidized bed processes can be performed either batchwise or continuously. Fluidized bed plants for batch processing, for example, are usually cylindrical and vertical in design. Their volumetric capacity is limited.

Continuously operating fluidized bed plants are instead rectangular and horizontal in design and provide a continuous product flow. The powdery product is fed in on the face side and discharged at the end, for example as a dried or agglomerated preparation with the desired product specification. This process is characterised by an almost unlimited capacity and is ideal for medium to high production throughputs. Continuous plants can be operated in fully automatic mode and can be handled by a single person in charge. For example, instant drinks, baby food, soup and sauce powders, vending machine mixes or nutraceuticals can be produced this way.



↑ Schematic representation of the spray granulation process

Continuous plants: Constantly high economic efficiency

With continuous fluidized bed processes, a very uniform and reproducible product quality can be produced in continuous operation. The low product layer level compared to the batch process ensures a uniform and significantly better liquid distribution – to achieve optimum agglomerate and granulate properties. For this reason, the use of the continuous process is worthwhile even for lower throughputs.

In order to ensure optimum hygienic conditions, continuous plants should be designed as closed systems and in compliance with GMP standards.

They can be easily integrated into a dividing wall so that there is a separation between the operating room and the technical room.

WIP systems provide almost fully automated plant cleaning. By separating a rear section, smaller batches can also be processed efficiently in large-volume plants, for example for testing new recipes or for sample production.

Innovative product approaches reveal new sales opportunities

Fluidized bed agglomeration improves the structure and thus also the handling of powdery starting materials by means of sprayed-on liquids. This results in loose, highly porous and thus easily soluble agglomerates, which are required for the production of instant products, for example. Fluidized bed granulates are also particularly suitable for subsequent tableting, as high stability can be reached at low compression pressures due to the porous structure.

The fluidized bed spray granulation represents another variant of the agglomeration process. With this innovative process, free-flowing, low-dust and low-abrasion, compact and almost round granulates are produced from originally liquid products, solutions, suspensions, melts and emulsions.

The liquids are atomised in the fluidized bed and subsequently hit the granulation seeds in droplet form. The liquid then evaporates while the solid builds up like a shell around the granulation seed.

Between agglomeration and spray granulation, there are numerous intermediate stages in which liquid and solid materials are combined simultaneously by process technology. This allows the encapsulation of a liquid or solid matrix as well as the coating of a sensitive core – a far-reaching approach to innovation that provides great flexibility.

Our pilot plant: Simulation under real process conditions

In order to test manufacturing processes under the best possible conditions, AMANDUS KAHL offers a modern and sophisticated pilot plant for internal tests. Process temperatures, air volumes, product layer levels, spray nozzle positions or binders can thus be precisely defined to produce an ideal end product.

With its high level of expertise in fluidized bed technology and its modern pilot plant, AMANDUS KAHL is an experienced partner and companion in the research, development and production of high-quality machines and products.



↑ Numerous test options in the pilot plant



↑ Continuous fluidized bed plant with access via the open exhaust air hood



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