

# Fluidized bed technology for product refinement

Drying, cooling, roasting, agglomeration, granulating



## Fluidized bed technology – Gentle product treatment for sensitive products

In a fluidized bed, a particle system is maintained suspended by a flow directed against the gravitational force.

During this, air flows around each individual particle. The resultant large contact surface between particle and air ensures optimum heat and mass transfer and thus enables fast, gentle and energy-efficient drying.

The air cushion between the particles prevents abrasion and agglomeration. The vibration of the dryer supports the fluidized bed and contributes in a very positive manner to the process. This prevents formation of craters and air breakdowns, even in very moist and difficult to fluidize product beds. Particles of different grain size are uniformly and reliably dried.

In addition the vibration dryer empties completely and automatically. The maintenance and cleaning requirement during operation is low.

### Drying

Gentle and effective drying of:

- Granular and crystalline products
- Sticky products or products likely to agglomerate
- Temperature-sensitive products
- Fine powders
- Soft filter cake and pastes
- Suspensions and solutions

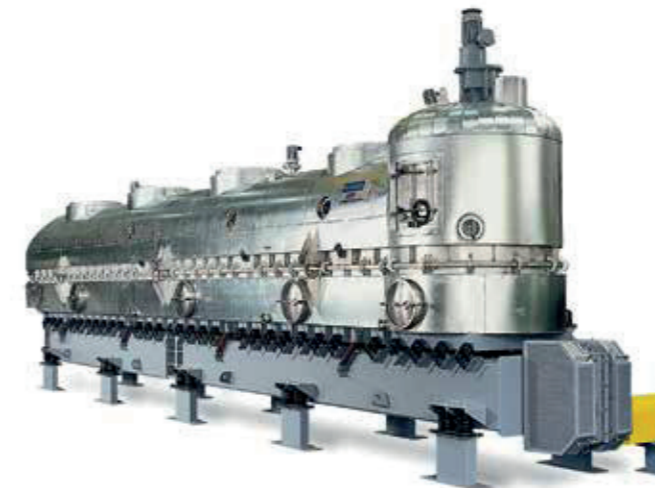
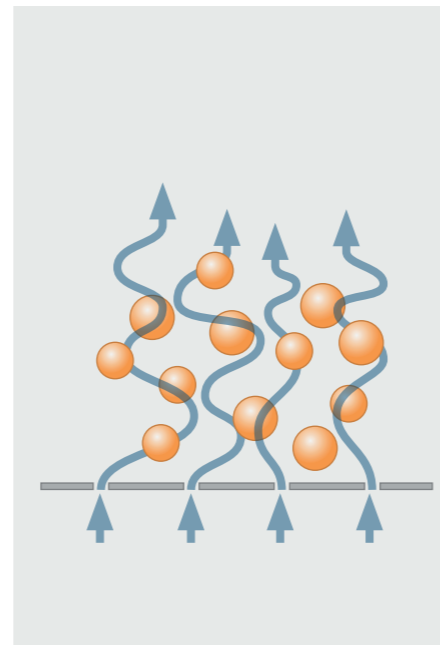
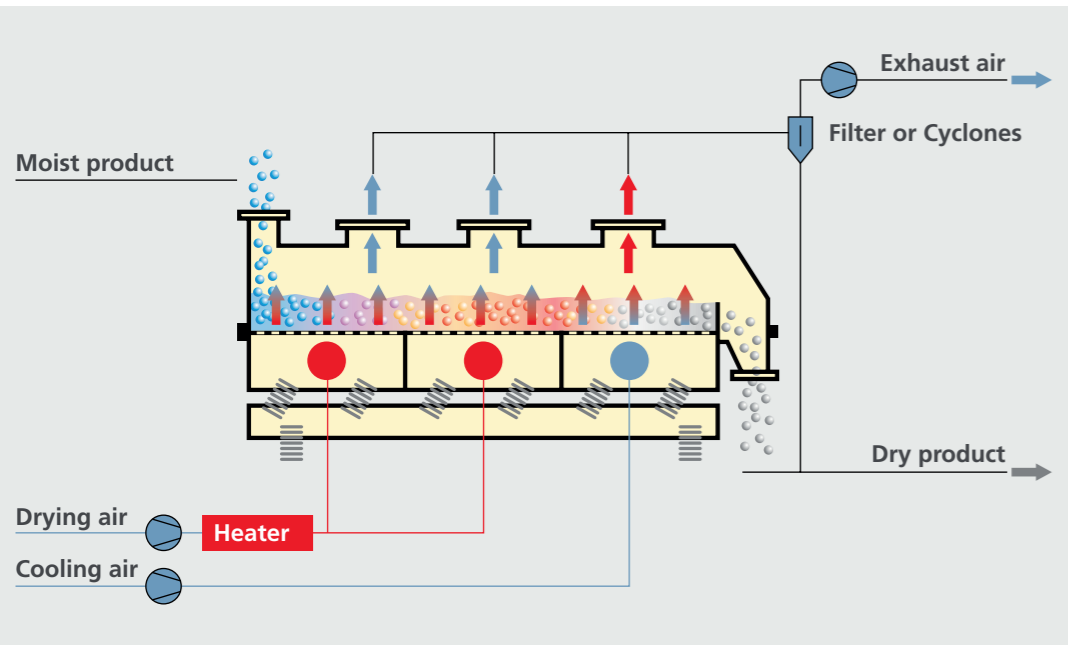
### Cooling

- Effective cooling of dried products
- Combined apparatus for drying and cooling

## Innovative down to the finest detail – Optimizations for special requirements

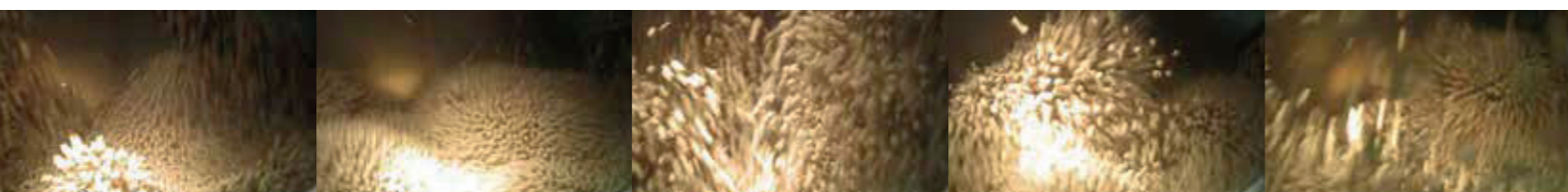
### Mixing zone

For products with a particularly high feed moisture, fluidized bed dryers are equipped with a mixing zone in the product entry area. In this way fluidization is promoted and sticking together is prevented. In combination with the vibration movement, even very moist and sticky products as well as solids with a wide grain size distribution can be processed. Once the mixing zone is left, the product is sufficiently dried to enable reliable fluidization in the rectangular area of the dryer. This counters the sticking together of wet product at the feed point.



### Integrated heat exchangers for optimization of energy consumption

Integrated heat exchangers in the fluidized bed apparatus enables large bed heights and permits highly efficient drying and cooling operations.



## Fluidized bed dryer – Highly versatile to fulfil the highest performance requirements

### Versions

- Vibration dryers and vibration coolers
- Static dryers and static coolers
- Dryer with integrated heat exchangers
- Dispersion dryers and dispersion coolers
- Vibration excitation provided by free oscillating systems and two-mass-resonance system

### Features

- Low temperatures
- Easily exchangeable distribution plate
- Very effective emptying when changing products
- Explosion-protected version
- GMP version, CIP/WIP version
- High equipment availability
- Special sizes
- Heat recovery from the dryer exhaust air
- Multi-stage processes can be performed in a single step
- Dust removal by cyclone, exhaust filter or gas scrubber
- In the inert gas circuit and with solvent recovery
- With simple controls or completely automated via process control systems

### Very versatile

- Multiple areas of application in all industry sectors
- Throughputs from small batch volumes of a few litres through to more than 100 t/h

### Industries

- Chemicals
- Foodstuffs
- Pharmaceuticals
- Environmental and recycling
- Agrochemicals
- Plastics
- Building materials and minerals
- Pigments
- Catalysts and ceramics
- Fodder
- Mining and metallurgy

### Processes

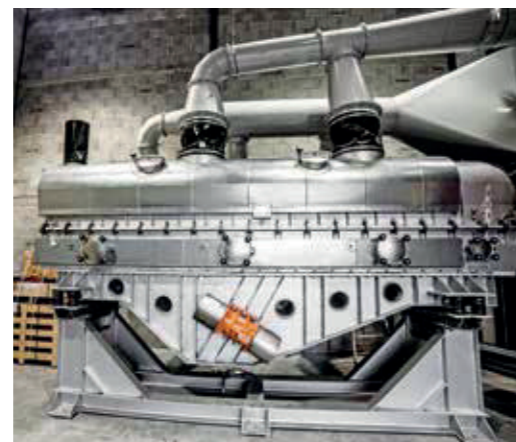
- Drying and cooling
- Granulating, agglomerating and coating
- Roasting and calcination



Vibration fluidized bed dryer used in the food industry



Vibration fluidized bed dryer for drying of mineral raw materials



Fluidized bed dryer configured as free oscillating system for drying soot

## Conversion of liquids – From droplets to dry solids



### Drying of suspensions and pastes WS-IB-T

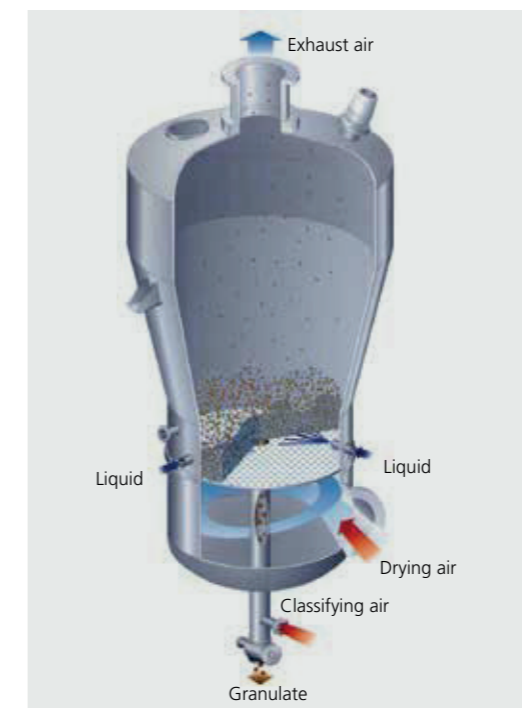
Conversion of difficult suspensions and pastes into powders

- Agglomerate-free powder with good flowing properties

### Agglomeration and granulation

Creation of freely flowing granulates and agglomerates by injection of liquids into the fluidized bed.

- Freedom from dust
- Good solubility
- Uniform particle size



Continuous granulation dryer WS-GT with classifying product discharge

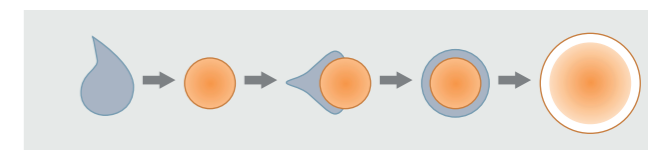


Suspension and paste dryer WS-IB-T for the creation of powders from liquids and pastes

### Continuous spray granulation and drying WS-GT

Conversion of liquids and solutions to stratified granulates

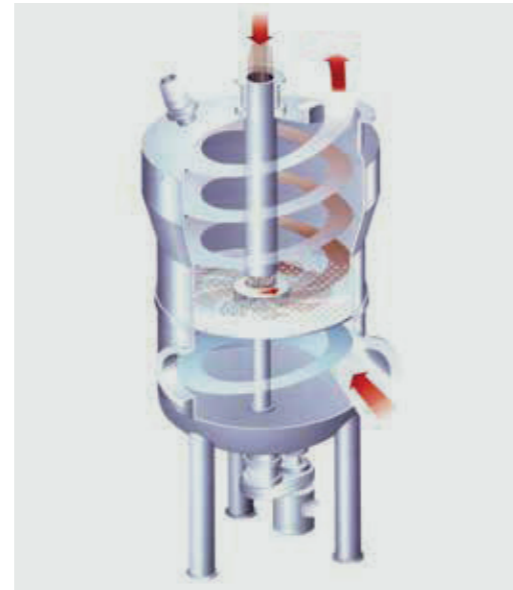
- Formation from solid-containing liquids
- Defined particle or granulate size
- High bulk density
- Good compressibility
- Dust-free



## Benefit from proven technology and extensive experience

### Dispersion dryer FL-T for powder

Moist powders such as flour and starch, salts or fibres can be prepared quickly and gently in the dispersion dryer. It is suitable for the treatment of all materials that can be pneumatically conveyed when dry, up to and including filter cakes and any material being converted to powder by the drying process.



Dispersion dryer

### Special treatments

- Heating
- Roasting
- Coating
- Sterilisation
- De-dusting

### Pharmaceutical systems

- Batch or continuous
- GMP and FDA compliant
- WIP and CIP processes
- Qualification and validation
- WURSTER processes

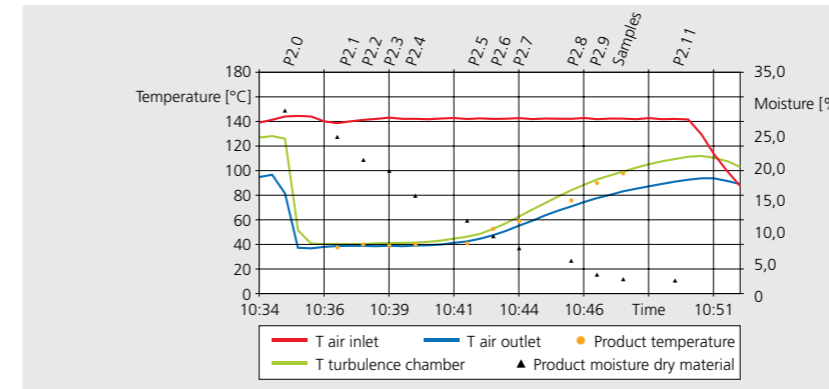


Pharmaceutical drying and coating system

## Product development in the dryer technical centre

### Pilot operation in the drying technical centre

The various processes for drying, cooling, granulation and coating can be tested with quite small product quantities.



The Allgaier test centre provides optimum conditions for product development, research and process confirmation.

Our product and process know-how gained from multiple applications means we can provide optimum solutions. We will be happy to demonstrate our capabilities in tackling your particular project and will support you with your product development. And all with absolute discretion.

We will determine the best solution based on our comprehensive know-how and refined instinct and acumen. The result: A Allgaier Dryer that is just what you need for your products.



Fluidized bed dryer – Laboratory Dryer WS-CTL



Technical Centre Fluidized bed dryer WS-V-T-K



Dispersion dryer FL-T in the Allgaier Technical Centre

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