AMANDUS
KAHL

THE PILOT PLANT FOR FLUIDIZED BED PROCESS TECHNOLOGY

Highly specialised pilot plant serving the food, feed, chemical, fine chemical, biotechnology and pharmaceutical industries

In the pilot plant of AMANDUS KAHL Fluidized Bed Solutions you may carry out product tests before starting your commercial production. You can develop or improve processes, make use of feasibility studies and determine production conditions in advance. Get acquainted with new technological applications, the easy operation of plants and optimal product handling. Good preparation saves time and costs.

The pilot plant features a wide range of test facilities and technical equipment required for performing any type of fluidized bed process:

- Drying / cooling
- Spray agglomeration
- Spray granulation
- Coating / micro-encapsulation

↑ Laboratory and pilot plants for all fluidized bed processes

We have extensive experience in the food and feed industry, the fine chemicals and chemical industry, and in the biotechnology and pharmaceutical industry. We are familiar with all details of the fluidized bed technology and know how to handle innovative product properties or special process requirements.

Variants of the fluidized bed process

We specialise in fluidized bed processes and have a high level of expertise in demanding industries. Fluidized bed processes are used to change or improve the properties of a product. The resulting modified structure of the product optimises its application behaviour. Moreover, fluidized bed processes are used for the development of special substances or innovative products. Fluidized bed processes optimize, for example, flow properties, solubility and dosing properties.

- Defined residual moisture
- Particle size distribution
- Flowability, low dust content
- Solubility and dispersibility
- Instantisation properties
- Coating and micro-encapsulation

Flexible process engineering for product and process development

By conducting tests in our state-of-the-art pilot plant, we develop the desired product properties and can reliably determine all relevant parameters for scaling up the processes and plants to production level. Furthermore, we support you in defining suitable process parameters in order to facilitate product changes for production changeovers. Together with our sister companies, we also offer vacuum and freeze-drying technologies as well as extraction processes in our innovation centre. Almost all application situations can be professionally simulated here. Moreover, our highly qualified process engineers will advise you on all the details of fluidized bed technology and its many applications.

Batch processes

The LFB is a professional fluidized bed system available in different sizes for preliminary tests. With this system, all fluidized bed processes can be carried out with different parameter settings and on different scales.

LFB mini

- Wide range of applications
- Product bin: 3 l / 5 l
- 100 to 2500 g
- 180 Sm^3 / h air flow rate
- 180 °C inlet air temperature
- Top and bottom spray

LFB Batch

- Wide range of applications
- Product bin: 5 l / 10 l / 30 l / spouted bed
- 0.5 to 20 kg
- 300 / 600 Sm^3 / h air flow rate
- 180 °C inlet air temperature
- Top and bottom spray

Examples of products: Cocoa, instant drinks, fertilisers, flavours, herbs, ceramic slurry, salts, lecithin, citric acid, gelatine, biomass, fermentation broths, lactose, baby food, soups, and more.

↑ Reproducible results for plant scale-up

↑ Precise particle size distribution

↑ Solubility and dispersibility

↑ Optimum product properties

Continuous fluidized bed

In the production of powdery substances, the continuous fluidized bed technology offers ideal solutions for efficient production processes. Even in the highly regulated pharmaceutical industry, the continuous process is becoming increasingly important as it is exactly reproducible and can be automated. With our versatile Conti FB 20/4 pilot plant, all processes and almost any product can be tested. The adjustment of a large number of process parameters enables us to develop products with precisely defined properties.

- → Top and bottom spray processes
- → Spouted bed processes
- → Nozzles in every zone, height adjustable
- → Pull-out nozzles, also during the process
- → Product weirs for sectioning
- → Vibration for fluidisation of challenging products
- → Flow velocity ranging from 0.3 to 2 m/s
- → Inlet air temperature up to 180 °C
- → Humidification/dehumidification of the inlet air
- → Reproducible procedures for reliable scale-up

↑ Continuous pilot plant for scale-up trials

↑ Mechanical room of the pilot plant for continuous processes

Measuring and monitoring

Sophisticated measuring equipment ensures reproducible test results and reliable scale-up to plant size. By monitoring all relevant process and plant parameters, a reliable process analysis is possible at any time.

- → Full process balancing
- → Inlet air temperature control or product temperature control
- → Optional PAT systems for monitoring the process parameters during operation
- → Fully automatic process control like in production plants
- → Recipe management
- → Recording of process data and trend graph

Laboratory equipment

With our standard laboratory equipment, we perform various physical analyses such as laser or screen tower particle size determination, determination of bulk density, flowability, residual moisture content, and microscopy etc. Further special analyses such as SEM, concentration determination, porosity measurement and many more are provided in cooperation with the University of Bremen or the DIL (German Institute of Food Technologies).

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Test facilities in the AMANDUS KAHL pilot plant

For fluidized bed tests in our pilot plant, we use different plants in batch or continuous mode, depending on the task.

LFB mini

A versatile laboratory fluidized bed plant for small product quantities ranging from 0.1 to 2.5 kg.

Batch sizes kg	0.1 – 2.5
Max. volume l	3/5
Max. air volume flow Sm^3/h	180
Max. inlet air temperature °C	180

LFB Batch

A versatile laboratory fluidized bed plant with exchangeable process towers for product quantities ranging from 0.5 to 20 kg.

Batch sizes kg	0.5 – 20
Max. volume l	10/30
Max. air volume flow Sm^3/h	600
Max. inlet air temperature °C	180

Conti FB 20/4 Pilot

Ideally suited for continuous fluidized bed processes with throughputs ranging from approx. 5 to 50 kg/h.

Capacity kg/h	5 – 50
Max. air volume flow Sm^3/h	1800
Max. inlet air temperature °C	180

Conti Spouted-Bed Pilot

Pilot plant for continuous processes for testing spouted bed spray granulation and encapsulation with a throughput of 5 to 50 kg/h.

Capacity kg/h	5 – 50
Max. air volume flow Sm^3/h	1800
Max. inlet air temperature °C	180

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