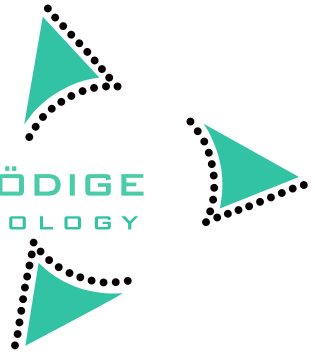


BECTOCHEM LÖDIGE
PROCESS TECHNOLOGY



Fluid Bed Processor LFP

LÖDIGE - ALWAYS THE RIGHT MIX

Innovative Fluid Bed Technology for pharmaceutical and chemical products

The Lödige Fluid Bed Processor is designed for:

- Drying
- Instantising
- Granulating and
- Coating

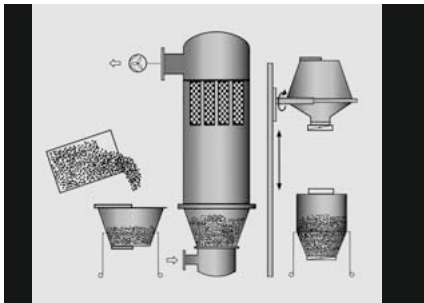
The processor runs in batch operation. The heated inlet air homogeneously flows through the special designed Conidur® bottom into the product vessel, fluidizes the product and keeps it

in constant motion. This ensures an excellent heat transfer and high drying rate.

Integrated jet filters separate the product area from the pure gas area. The product particles are held back in the processor and retained in the process. The process air leaves the processor at the top.

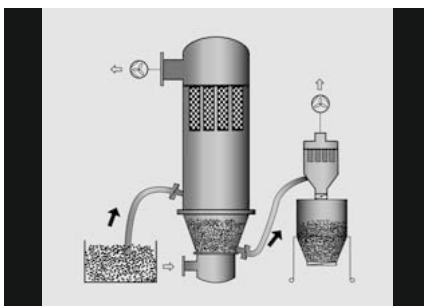


Manual or pneumatic product handling



Mobile product vessel

The product vessel is fixed and sealed by inflatable seals to the processor. It can be easily removed from the processor due to its mobile support. Charging and discharging the vessel are carried out manually or by means of a lifting device.



Pneumatic transport

Charging and discharging are carried out in a closed system. The charging is done by vacuum via the feeding valve. The vacuum is generated by the air unit of the processor. A vacuum conveyor is used to discharge the product which is sucked out of the processor into a separate vessel.

Lödige Pharma Pilot Plant

The new Pharma Pilot Plant is equipped with the most modern machines for:

- **Mixing**
- **Granulating**
- **Sieving**
- **Drying**
- **Tabletting**
- **Coating**

in compliance with GMP and under production conditions. Trials up to 70 kg product can be processed in the Fluid Bed Processor.



Fluid Bed Processors for Laboratory and Pilot Plant

Lödige offers three mobile turnkey systems for developing new recipes and for the production of small batch sizes.

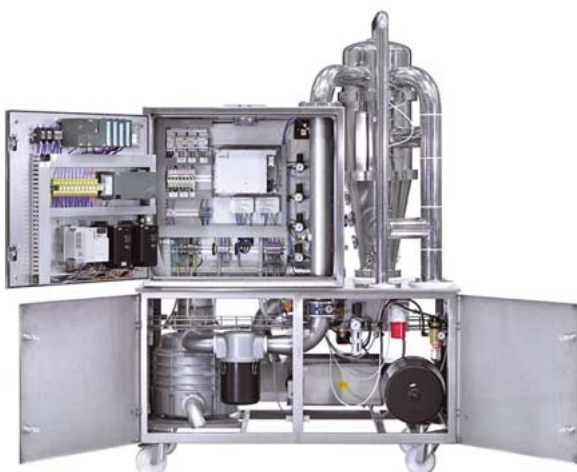
The laboratory models LFP Mini 1 and LFP Mini 2 and the Pilot Plant model LFP 8 offer the same possibilities as the production units.

All models are supplied with air unit and PLC controls, ready for operation.

The LFP-Mini 1 (0.1 to 1 kg) is an ideal unit for process and product development. The small scale model is particularly suitable for various applications; even hybrid mixes can be processed.

The pilot plant unit LFP 8 (0.3 to 8 kg) is designed for development and production of small batch sizes. Quantities of 0.1 to 1 kg are also possible using a special insert.

The air unit and the controls are installed in the machine housing, separated from the product area.



The Lödige Fluid Bed Processor LFP offers many advantages

- **Drying, Granulating and Coating in one unit**
- **High degree of flexibility (25%-100% working volume)**
- **Quick and easy filter replacement**
- **Easy cleaning**
- **Flame proof construction**
- **Customized units**
- **Turnkey units**



The Lödige LFP has as a standard:

- **Mobile product vessel**
- **Conidur® bottom**
- **Individual jet filters**
- **10 bar pressure burst resistance**
- **Variable spray system**



Conidur® bottom

The bottom of the product vessel is made of a Conidur® plate. It ensures an optimal distribution of the inlet air in the processor and generates an ideal product motion. At the same time it minimizes the product loss through the plate. Hole size and clearance can be selected in accordance with the product.

Jet filters

Cylindrical filter bags hold back the product particles in the processor. The bags are cleaned during operation by blowing off with compressed air. As only one filter bag is cleaned at a time, the filter surface available is more than sufficient for the process. The filters are mounted on a filter plate which can be automatically lowered for easy replacement of the filters. Various filter materials can be used. The filter cleaning is controlled by differential pressure measurement. Pressure burst and pause time can be set individually.

10 bar pressure burst resistance

The processor is designed to resist an explosion of up to 10 bar. Quick acting valves isolate the processor from the peripheral equipment. They keep both the pressure and the flame front within the processor. No product exits into the working area.

Variable spray system

The LFP is prepared for fitting a top spray nozzle. Height, position and spray angle of the nozzle can be adjusted. Further spray systems (e.g. tangential spray) are available as option.



Options

A wide range of options ensures customizing of the Fluid Bed Processor to your requirements and conditons.



WIP system

As filters can not always be reliably cleaned with a CIP system, they are dismantled and washed separately. The processor itself is automatically cleaned by cleaning nozzles. The filters are then mounted again. Of course this process can be validated.

Flame proof

Achieving granulates by means of liquids containing solvent can generate a potentially explosive atmosphere in the processor. The air unit, the processor and the controls are customized to ensure a safe operation.

Liquid dosing system

A tank, a pump and a rate measurement (scales or flow meter) are used for addition of granulation or coating liquid. This system can be integrated in the general controls of the complete unit.

Wurster system

The product vessel is equipped with a Wurster pipe and a bottom spray nozzle to achieve the coating of pellets and mini tablets according to the Wurster process. Alternatively the coating can be carried out by means of tangential spray nozzles.

Tangential spray system

Tangential spray nozzles ensure the addition of coating liquid directly into the product bed. These nozzles enable to carry out the same processes as with a Wurster process without any additional insert.



The System

The LFP Fluid Bed System includes not only the processor, but also air unit, exhaust air system, controls, quick acting valves and liquid addition.

Sizes

Model	Batch size (kg)	Max. working volume (l)
LFP Mini 1	0.1 - 1	2
LFP Mini 2	0.2 - 2	4
LFP 8	0.3 - 8	16
LFP 20	3 - 20	40
LFP 70	6 - 70	140
LFP 140	30 - 140	280
LFP 250	60 - 250	500
LFP 400	100 - 400	800
LFP 500	150 - 500	1000
LFP 750	200 - 750	1500
LFP 1200	300 - 1200	2400
LFP 1800	400 - 1800	3600

The Lödige delivery program comprises units for laboratory, pilot plant and production. Special sizes on demand.

Assembly Group 100 Fluid Bed Processor

Assembly Group 200 Inlet air treatment unit

- Filter
- Frost protection
- Air cooler / dryer
- Condensate collector
- Air heater
- Cold / hot air mix
- Fine filter

Assembly Group 300 Exhaust air system

- Jet filter
- Frequency controlled exhaust air
- Silencers

Assembly Group 400 Controls

- Control cabinet (electric and pneumatic)
- Control panel
- Printer

Assembly Group 500 Liquid addition

- Nozzles
- Liquid pump
- Scales / Mass flow meter

Assembly Group 600 Tanks

- Storage / preparation tanks

Assembly Group 700 Feeding / Discharge

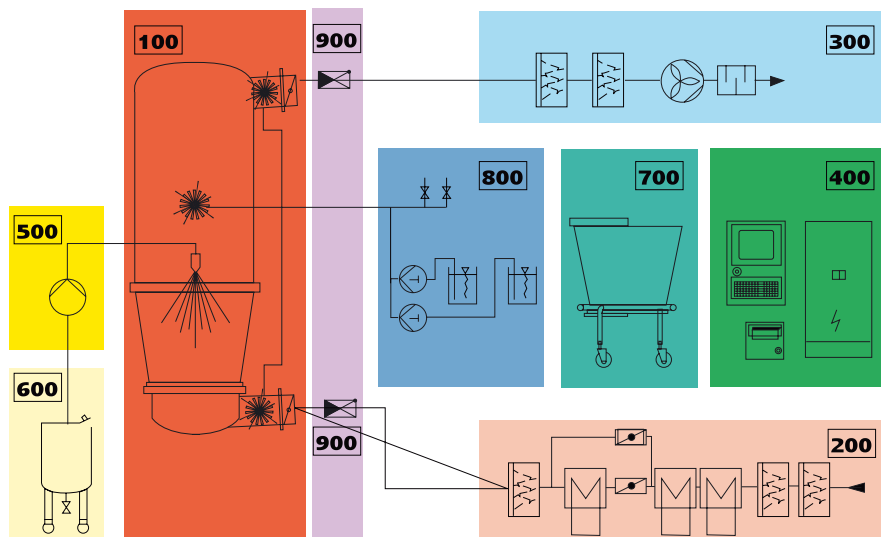
- Mobile product vessel
- Lifting device (option)
- Feeding valve
- Discharge valve
- Vacuum conveyor (option)

Assembly Group 800 WIP system

- Valves and vessels for cleaning media
- Cleaning nozzles
- Valve station
- Pressure increasing pump

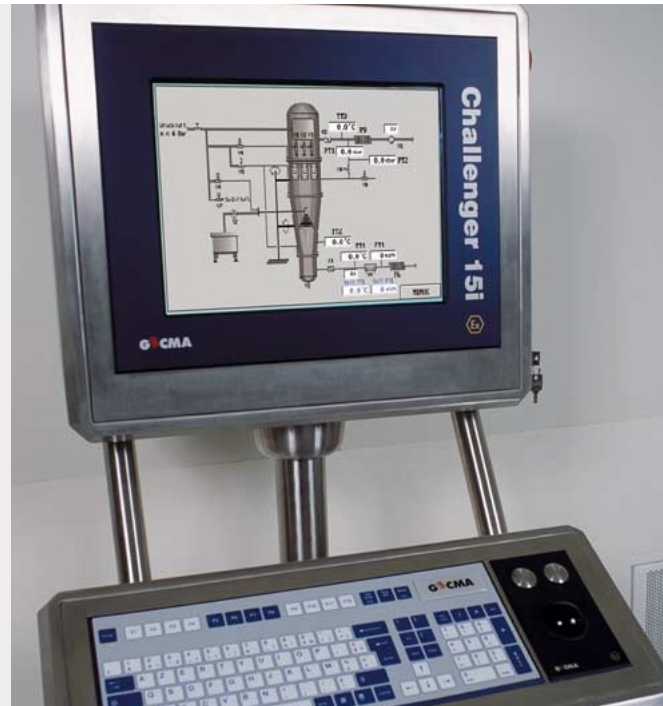
Assembly Group 900 Pressure burst resistance

- Quick acting valves



The System Controls

The Fluid Bed Processor and the complete unit technology are operated by a PLC or by computer-aided controls. The computer-aided controls enable 21 CFR Part 11 compliant operation.



The system controls contains the control panel and the control cabinets. The control panel will be installed in the production area close to the Fluid Bed Processor. The control cabinets will be placed in the technical area, usually next to the air unit. PLC or computer-aided controls are both possible. They are designed and made in accordance with the GAMP 4 regulations.

Control cabinets

All pneumatic and electric control elements like frequency converter, motor contactors, PLC and PC and modems for remote servicing.

Measurement technology

Measuring instruments and all elements for their data processing. The following process parameters are usually recorded:

- Inlet air temperature
- Inlet air quantity
- Inlet air moisture
- Processor pressure
- Differential pressure of product filter
- Exhaust air temperature
- Product temperature
- Exhaust air moisture
- Product moisture (NIR)
- Spraying rate (Spray granulation)

Control panel

The control panel of the processor consists of a monitor integrated in a stainless steel housing. Either a PLC with Operator Panel is used or a computer-aided system (Windows with visualisation Win CC).

The PC controls offers the following modes:

- **Service mode** for the individual control of all functions
- **Manual mode** for preparation tasks

- **Learn mode**

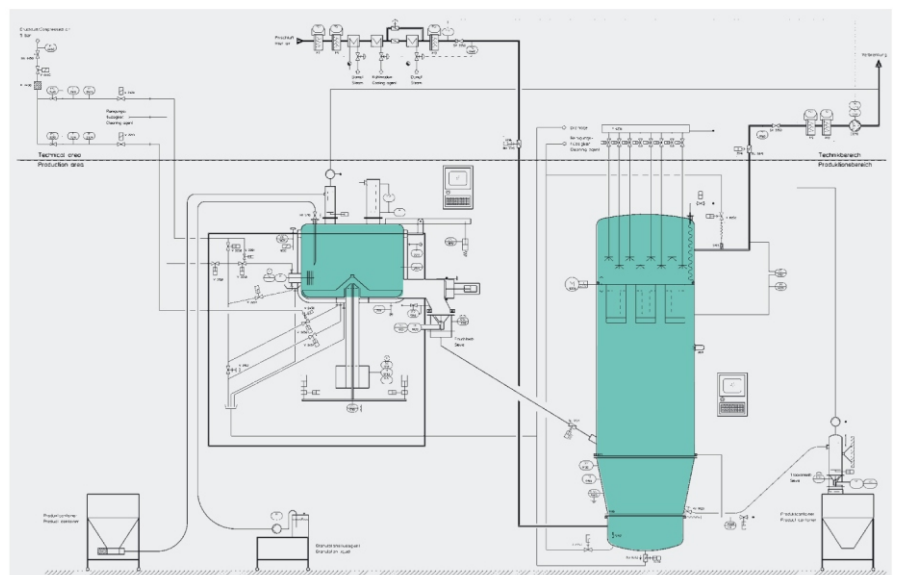
for creation of a recipe

- **Recipe mode**

Fully automatic execution of a recipe created or stored in learn mode.

Cleaning processes are also freely programmable like production processes.

The controls are designed for the administration of up to 200 processes. Recipes and protocols, (curves, events and errors) are stored in data base and can be printed out any time.



The logo features four teal triangles pointing outwards from a central point, each with a dotted black border. The text 'BECTOHEM LÖDIGE' is in a bold, black, sans-serif font, with 'LÖDIGE' in a larger size. Below it, 'PROCESS TECHNOLOGY' is written in a smaller, teal, sans-serif font.

BECTOHEM LÖDIGE
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