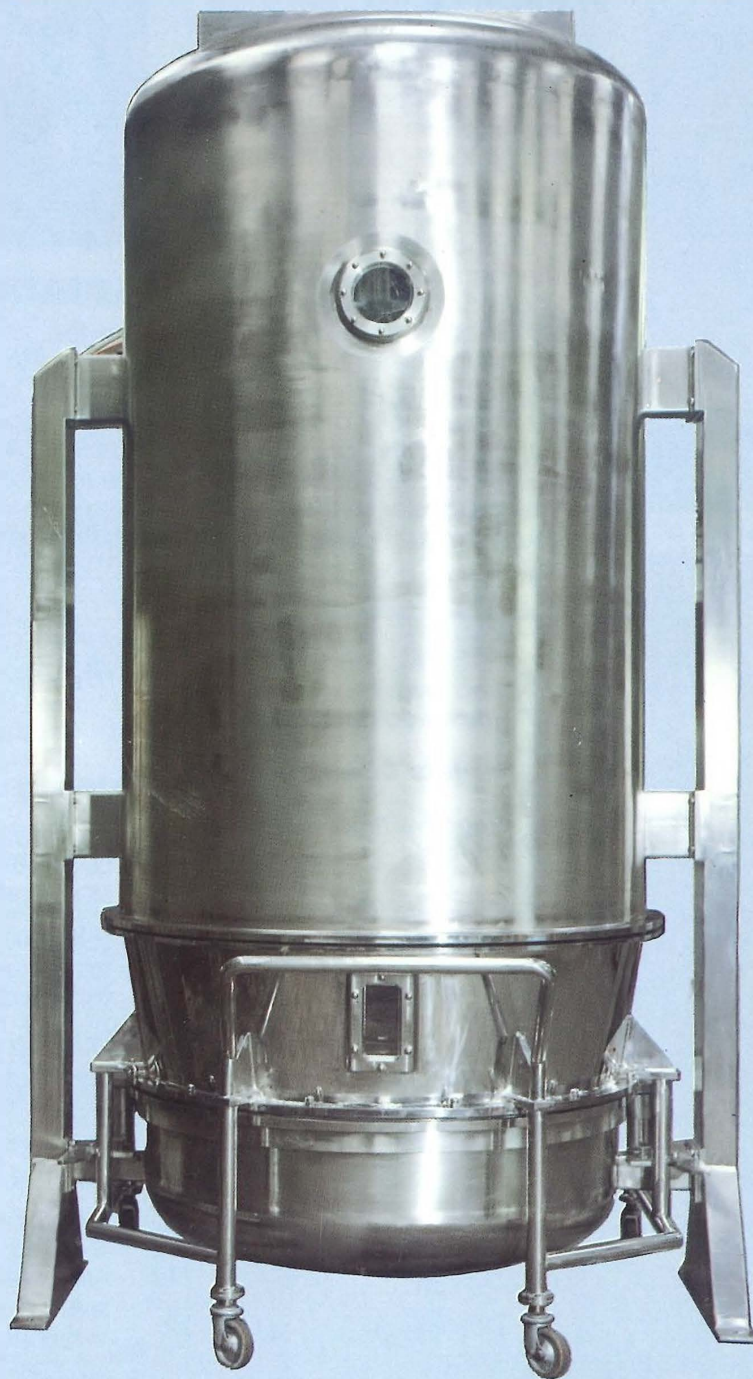




**EURO-VENT LIMITED  
CALMIC ENGINEERING**



**FLUID BED DRYER**  
**SPRAY GRANULATION – COATING**

# FLUID BED DRYERS

## DESIGN

To meet the stringent production and environmental requirements of the pharmaceutical, food, chemical and allied industries, this new range of fluid bed dryers has improved performance, simplified maintenance and utilises modular construction techniques to provide flexible installation options.

## CONSTRUCTION

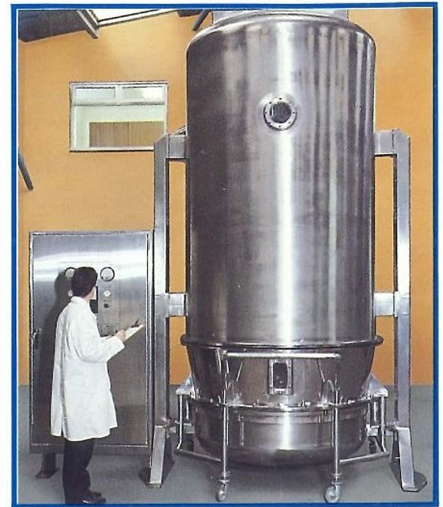
Manufactured from 316 grade Stainless Steel and constructed to high GMP principles, particular attention has been paid to reduce any source of material entrapment by polishing flush all welds to create crevice free profiles both internally and externally.

The accent is on modular construction to give greater

flexibility, e.g. the fan and heater units can be located in a services area – thus simplifying access and maintenance work.

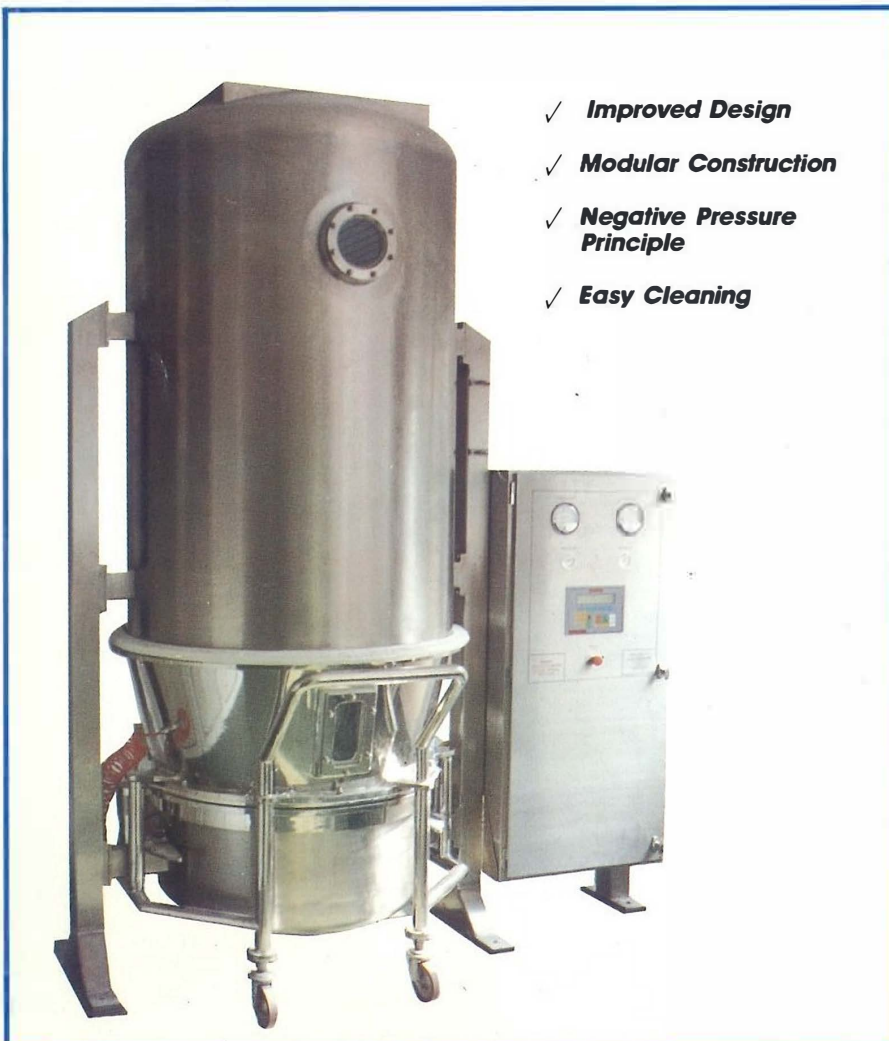
## PRINCIPLE

Fluid bed dryers utilise the principle of passing air at a high velocity through the bed of the material to be dried, thus causing it to fluidise. When the correct velocity of air current is maintained the solid particles are suspended in the intense turbulence and are intermixed and constantly exposed to the drying air current. By application of heat to the air current drying occurs both very rapidly and evenly. The velocity and temperature of the drying air can be accurately set to give maximum transfer in the minimum amount of time.



## NEGATIVE PRESSURE

The fan, situated on the exhaust side of the dryer, operates on a negative pressure principle which, together with the Calmic Fast Action Safety Valves fitted to the inlet and outlet ducting, helps to ensure a safe working environment.



## SUPPLY DATA

- Air filtration supplied to: EU3-EU8 or EU12 (absolute) standards.
- Humidity control – chiller batteries to control inlet temperature and humidity.
- Heating systems by steam control to heater battery or by blending hot and cold air.  
*(thermal fluid and electric heating also available)*
- Filter bags cleaned by shaking.  
For continuous fluidisation, split filter bag housing is available.
- Clean in Place systems for washing down during product changes.
- Fully sealed air control damper with positioner for accurate air monitoring.
- Process air fan on discharge operating on negative air pressure.

# MIXING – GRANULATING – DRYING

## SPRAY GRANULATION

In a Fluid Bed Dryer it is possible to mix various powders together due to the turbulence created by the action of the air.

The introduction of a binding solution can then cause the particles to agglomerate together.

Agglomeration takes place when the surface of the particles partially dissolve and stick together. If the particles will not dissolve, then a binding agent must be added to the solution to be sprayed into the bed.

Similarly, film coating of tablets can be accomplished by spraying with appropriate pigments, solvents or varnishes etc.

After the agglomerate is formed the particle is dried.

This versatility makes the Calmic MGD ideal for rapid even drying of chemical, pharmaceutical and food industry products. Further applications include the production of granules suitable for compression, or with free-flowing properties suitable to the requirements of particular industries, eg. – food vending.

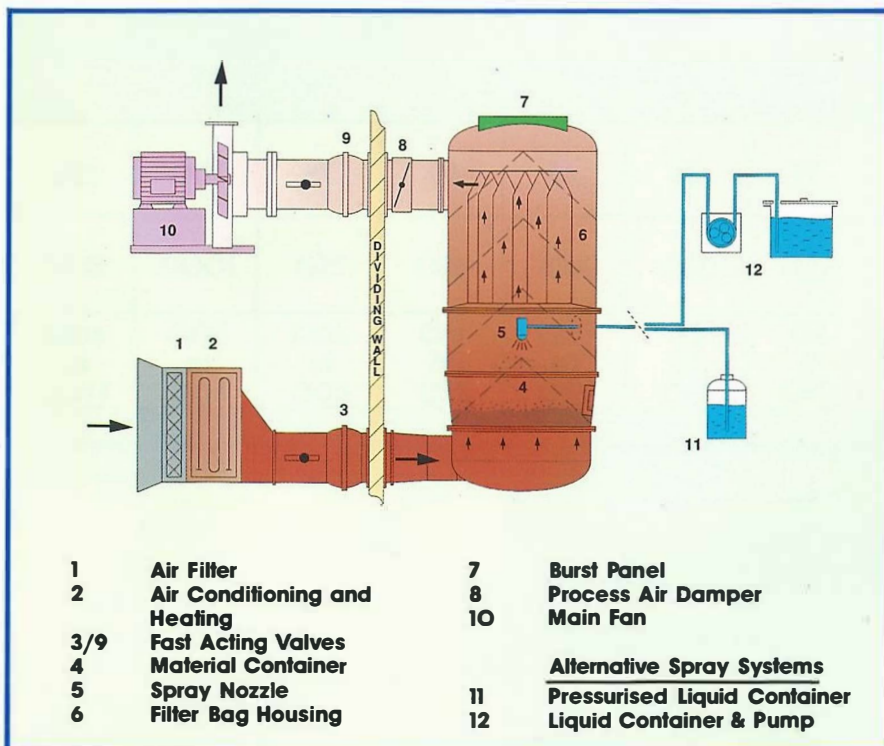
## METHOD OF OPERATION

The Calmic Spray Granulator provides Mixing, Agglomeration and Drying in one unit:

- Thorough mixing of dry powders by fluidisation.
- Agglomeration of powders by spraying with liquid binding agents.
- After agglomeration drying by the application of hot air.
- During agglomeration filter bags continually discharge fine particles back into the product container.
- Automatic variable process air damper control during cycle.

## CONTROL

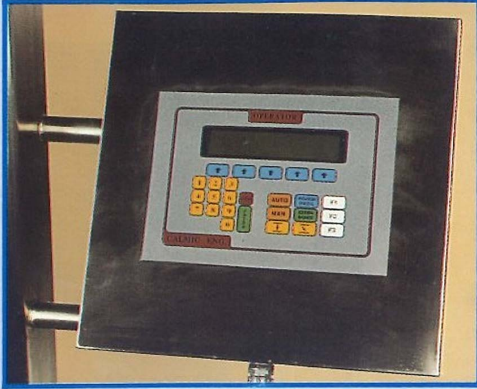
Control of both the Calmic Fluid Bed and the Calmic Spray Granulator Dryer is performed from a single control panel that will repeat its pre-set cycle after the parameters of fluidisation or agglomeration have been established.



## APPLICATIONS

- **Granulation of powders prior to tableting**
- **Granulation of powders to provide better wetting and instantising properties i.e. where it is necessary for powders to dissolve quickly into liquids, e.g. food and beverages instantising for vending machines.**
- **Agglomeration also provides for de-dusting, bulking and better flow characteristics. e.g. Tableting**
- **Film coating tablets.**
- **Spraying an active ingredient onto a carrier bed.**

# ANCILLARY EQUIPMENT



## PROGRAMMABLE CONTROLLER

Control of the operation of the machine by programmable controller.

Operator control of the machine can be by means of an operator interface.

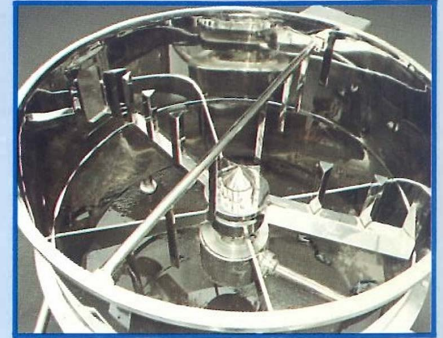
Independent or integrated systems available.



## MATERIAL CONTAINER AGITATORS

In some instances agitation can be beneficial to fluidisation.

Various types of agitator systems are available.



## SAFETY FEATURES

The Calmic Fluid Bed Dryer is designed to withstand an internal overpressure of 2 bar g with the inclusion of a certified explosion panel.

Fast acting explosion valves can be fitted and for containment the Dryer can be supplied with an internal overpressure rating of 12 bar g.



## CAPACITIES

MODEL	3	7	15	25	35	55	75	100	125
BOWL VOLUME (Litres)	35	70	150	250	350	550	750	1000	1250
BATCH LOADING (Kgs)	10 to 25	15 to 45	30 to 100	50 to 150	100 to 250	150 to 450	200 to 600	300 to 800	400 to 1100



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