



Pilot Spray Drying Plant Type PSD 55



APV Anhydro

Packaging - Processing
Bid on Equipment

1-847-854-8577

www.bid-on-equipment.com

The Anhydro Pilot Spray Drying Plant PSD-55 is designed for scientific test work, industrial research and development, as well as for small scale production. Most products undergo careful and thorough performance tests and experiments on pilot spray drying plants in order to determine the optimum operating conditions of the full scale plant. Small scale production is relevant when the feed product is expensive or if only small quantities are required.

A large variety of products are successfully transformed from liquid into powder through spray drying. Typical examples are:

- Milk and egg products
- Organic and pharmaceutical products
- Food products
- Polymers
- Animal feed products
- Detergents
- Inorganic products
- Pigments and dyestuffs
- Ceramic products

Principle of Spray Drying

The liquid product is pumped to the atomizer from where it is dispersed into a mist of fine droplets in the drying chamber.

The basic plant is supplied with a two-fluid spray nozzle placed in the chamber cone (fountain mode), and the atomization of the liquid is effectuated by means of compressed air.

The process air is heated indirectly in an electrical air heater prior to entering the drying chamber. Product and drying air are in counter-current flow.

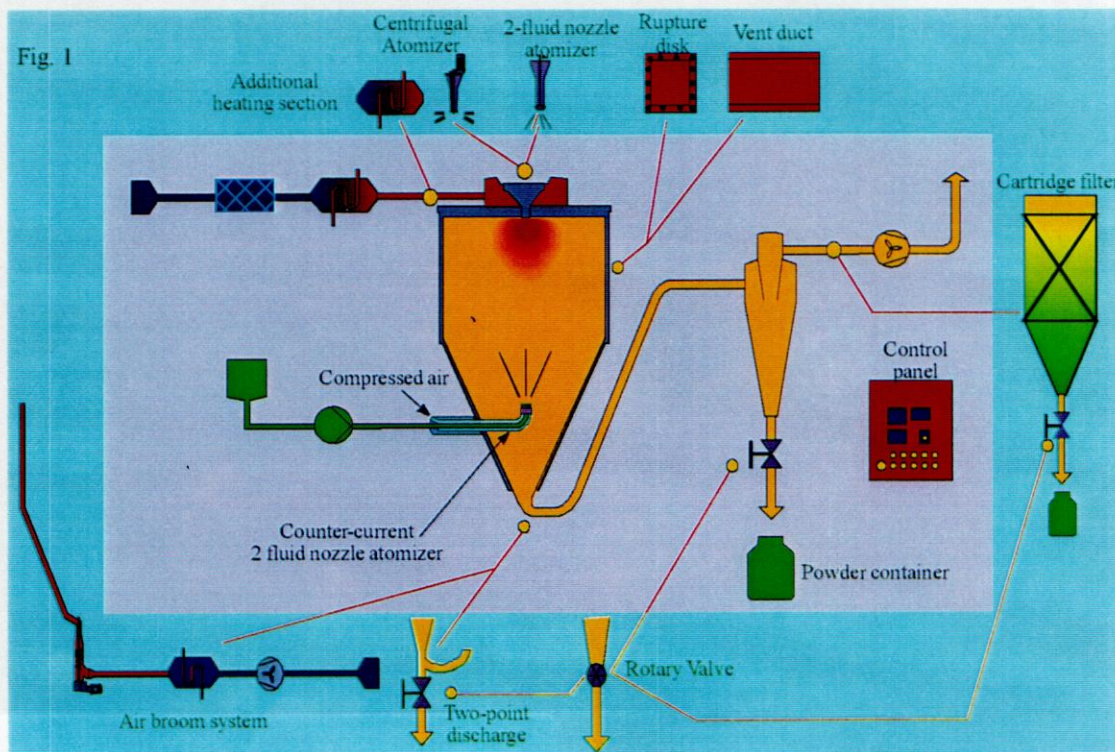


The intensive contact between the hot process air and the atomized liquid ensures fast and gentle drying.

The drying air and powder leave the chamber through the outlet in the conical bottom and are conveyed to a cyclone from where the powder is discharged into a powder container while the outlet air is discharged at the top of the cyclone (see fig. 1).

The basic plant

is supplied as a complete functional unit comprising air intake filter, electrical air heater, feed vat, counter-current two fluid nozzle atomizer, air distributor, drying chamber, cyclone, powder container, fan, necessary duct work, control panel with complete instrumentation, full documentation, and packing.



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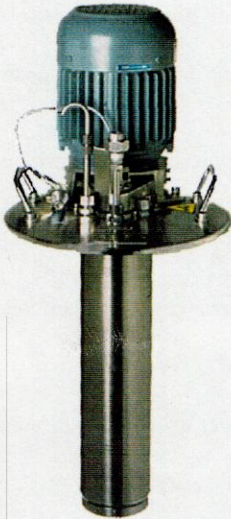
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Optional Equipment

The basic plant can be provided with a wide range of standardized optional modules which offer outstanding flexibility and customized solutions to individual needs.

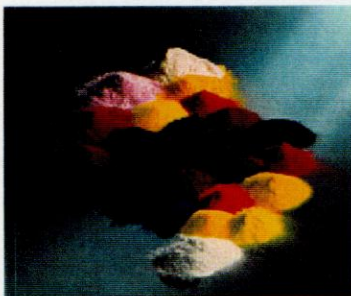
Each optional module is designed for easy and fast installation.



A Centrifugal Atomizer (photo) placed at the chamber top, where the liquid is co-currently dispersed to the drying air by the rotating disc.

Enables atomization of a wide range of heat sensitive products. The centrifugal atomizer type CF-100-SE is sanitary* and is provided with motor and frequency converter for accurate speed control (16000 - 35000 RPM). Different atomizer wheel designs are available.

*The ball bearings are grease-lubricated, thus eliminating the risk of oil vapor contamination.



A Co-Current Two-Fluid Nozzle Atomizer is used for heat sensitive products and enables production of coarse particles.

A Two-point Powder Discharge installed under the drying chamber enables collection of the powder in two fractions, coarse particles and fines.

An Additional Heating Section can be provided for elevating the inlet air temperature up to 450°C, thus allowing higher capacity of the dryer.

An Air Broom System complete with broom, motor and gear, air supply system and separate control panel, is used for trouble-free drying of sticky products. The air broom rotates slowly inside the drying chamber gently sweeping the chamber wall with slightly heated air, thus blowing down powder deposits.

A Cartridge Filter cleans the exhaust air, thus minimizing product loss, and protects the environment.



A Rotary Valve (photo) can be placed under each collection point, thus allowing continuous powder discharge.

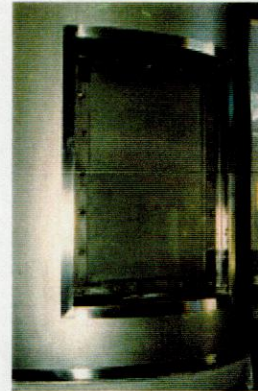
Ladder, Railing, necessary Additional Support Structure and Platform are offered whenever advisable.

A Compressor for compressed air supply is available on request.

A Safety System for protection against sudden pressure rises is available. Drying of most organic products involves a risk of powder explosions. The basic plant is pressure shock resistant to 1 bar (g), and is designed for implementation of dust explosion protection.

• **A rupture disk** (photo) for pressure relief must be installed in the drying chamber for powder explosion protection.

• **A Vent Duct** installed between the rupture disk flange and an external building wall provides explosion venting to a safe area, hence avoiding the risk of personal injuries.



Safety and quality markings

The basic plant is dimensioned and produced according to the valid EU-directives as to dust explosion hazards for products up to max. Kst values 300 Bar x M x S² corresponding to dust explosion class St.2.

CE-marking will be supplied at complete APV Anhydro plant delivery. Rupture disk and vent duct must be included unless specifically agreed. Furthermore, the electrical panel meets the norms EN.60439-1 and EN.60204-1 (electrical material on machinery) and further complies with the EMC-directive. The panel will be delivered with individual CE-marking at complete APV Anhydro delivery.

All plants are produced according to ISO 9001 (standard).

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Process Data

Water evaporation rate, max. 35 (55*) kg/h
Inlet air temp, max. 350 (450*) °C
Drying air rate, design 500 kg/h

Utilities & consumption data

Power consumption 5-50 kW
Compressed air consumption 250 l/min
Power supply 3x400V+N+PE /50Hz**
or 3x230V+PE/50 Hz**
Compressed air supply 4-6 bar(g)

* With additional heating section

** Alternative power supplies on request

Other technical data

Air heater 48 kW
Fan motor 2.6 kW
Pressure shock resistance 1 bar(g)
Insulation drying chamber mineral wool 100mm

Weight and dimensions

Drying chamber diameter 1.25m
Required space, min. (HxWxL) 2.8 x 2.34 x 1.55m
Shipping volume 12 m³
Gross weight 2200 kg
Net weight 1500 kg

Materials

Product contact parts AISI 316
Other parts AISI 304

Process Control and Instrumentation

The drying process is supervised and controlled from an instrument panel provided with:

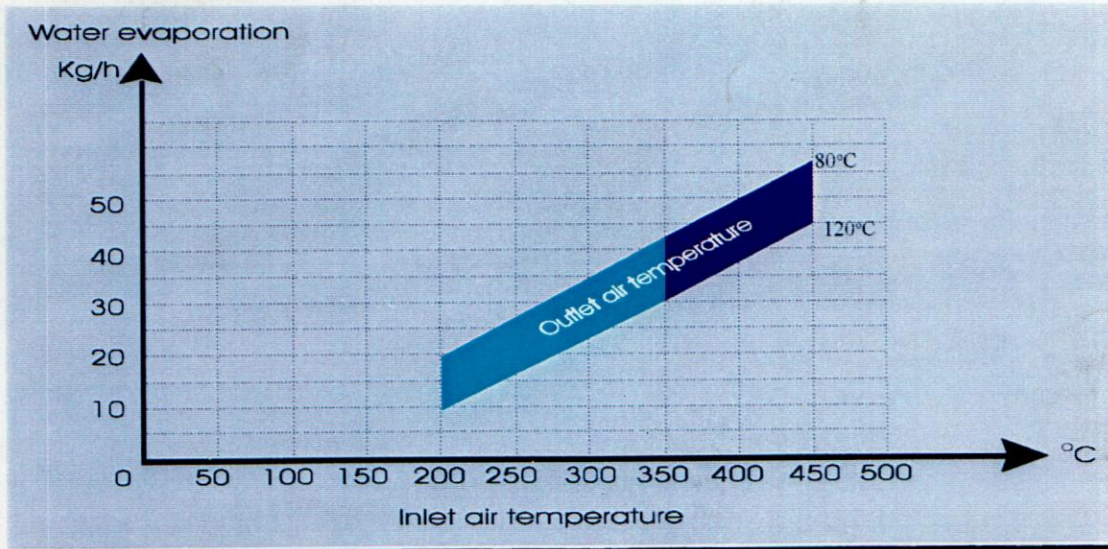
- Temperature control and emergency stop for high air temperature in the electrical heater.
- Digital display and alarm control for inlet air temperature to the drying chamber / outlet air temperature from the drying chamber.
- Digital display for centrifugal atomizer speed
- Digital display for centrifugal atomizer motor ampere consumption.
- Feed pump control from outlet air temperature controller

Remote Manual Control

The centrifugal atomizer speed can be remotely controlled from the instrument panel. Furthermore, the panel contains:

- Main switch
- Start and stop switches with error indication.
- Various interlocks
- Emergency stop with re-set button

All instruments and motors are pre-wired to the panel.



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