

## SD-05 Laboratory Scale Spray Dryer



### Features

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**For production of uniform free flowing powders.**

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**Rapid results from aqueous emulsions, solutions, suspensions and colloids.**

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**Eliminates the drying problems and time associated with freeze drying, rotary evaporation and ovens.**

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**Produces a wide distribution of particle sizes.**

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**All borosilicate glass for easy visual monitoring of process status.**

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**Easy to clean and very simple to assemble and breakdown.**

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**Small volumes required for initial results.**

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**Standard and large capacity spray chambers available.**

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**Supplied complete and ready for most spray drying applications.**

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## SD-05 Laboratory Scale Spray Dryer

The Lab-Plant SD-05 Spray Drier is the result of nearly 30 years of continuous development in the field of laboratory scale spray drying systems.

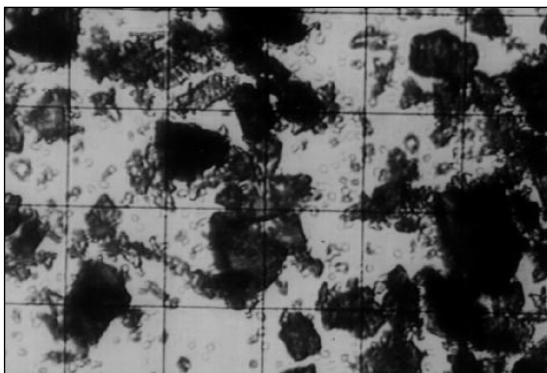
The unit is self contained and is supplied complete and ready for immediate operation. Extremely compact in its design it is intended to be used on a bench top or with the optional mobile bench.

The SD-05 only requires connection to a 13 amp, 220/240 V, 50 Hz power supply and provision for exhausting the evaporated moisture to atmosphere or, if necessary, to an existing extraction system.

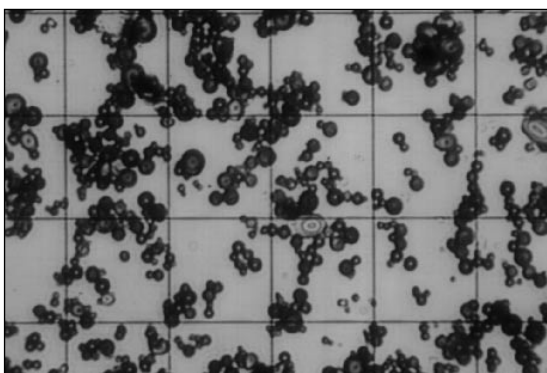
### Technique

A self-priming peristaltic pump delivers the liquid from the sample container through a small diameter jet into the main chamber. Concurrently an integral compressor pumps air into the outer tube of the jet which causes the liquid to emerge as a fine, atomised spray.

Heated air is blown through the main chamber evaporating the liquid content of the atomised spray leaving the solid particles of the material, which are normally in a free flowing state, to be separated from the exhaust air flow by a cyclone and collected in the sample collection bottle. The exhaust air flow is directed through a flexible 50 mm diameter hose direct to atmosphere or to an existing extraction system. An accessory in-line Wet Scrubber system is also available which effectively cleans the exhausted air.



Dried polymer prepared using a ball mill.



Dried polymer prepared using SD05 showing spherical nature of sample.

Grid size 39 x 39 microns.

### Applications

Spray drying can be used in a varied range of applications where the production of a free flowing powder sample is required.

**The SD-05 has successfully processed samples in the following areas:**

Beverages ● Flavours and Colourings ● Milk and Egg Products ● Plant and Vegetable Extracts ● Pharmaceuticals ● Synthetics ● Heat Sensitive Materials ● Plastics ● Polymers and Resins ● Perfumes ● Blood ● Ceramics and Superconductors ● Biochemicals ● Dyestuffs ● Soaps and Detergents ● Foodstuffs ● Adhesives ● Oxides ● Textiles ● Bones, Teeth and Tooth Amalgam and many others.

**Most solutions can be spray dried providing that the resulting product has the characteristics of a solid material.**

The spray drying process is successful, in many instances, in micro-encapsulation where the liquid product is mixed with a suitable filmogenic protecting material. The resulting atomised spray forms hollow globules with a diameter of approximately 10-20  $\mu\text{m}$  in which the product is encapsulated. This method is mainly used where the product is sensitive to moisture, ambient atmosphere, contact with other products, evaporation or oxidation.

A further process is englobulation which is similar to micro-encapsulation but is based on the solid product rather than the liquid and solution is prepared from the product to be processed with a filmogen and a solvent (usually water).

The solution is spray dried and the resulting product is in the form of small globules. In this process the encapsulation is not always totally enveloped but it is of advantage when a sample is required to be freely accessible on the surface.

### Advantages

Almost all other methods of drying e.g. the use of Ovens, Freeze Dryers, Rotary Evaporators etc, produce a soft mass of material or cake. This sample then requires further processing (grinding, filtering etc) and the resulting material is often hygroscopic and of very uneven particle size. The spray drying process usually produces a free flowing powder sample of a spherical nature in a very short time.

### Construction

A robust all-steel cabinet, coated with a hard chemically resistant finish, houses all mechanical and electrical components necessary to perform the spray drying process. All clamps and fittings are designed to allow assembly and removal of the glass components in only a matter of seconds.

*The rear of the cabinet includes an inlet filter designed to remove 99.99% of air laden particles ensuring that the drying air does not include contaminants.*

### Two Fluid Nozzle

The stainless steel spray assembly consists of an inner tube for the liquid sample leading to a close tolerance internal diameter jet. The outer tube directs the supply of compressed air to the nozzle and the close tolerance gap between the nozzle and the jet ensures that the liquid jet is produced as a fine vapourised spray. The SD-05 is supplied as standard with 0.5 mm jet.

The spray assembly has an automatic plunger de-blocking device which when the head is depressed causes a fine, spring restrained needle to push through the jet. This feature is activated by an integral compressor.

*De-blocking is sometimes necessary with materials which may solidify in the jet or when large particles in suspension cause blockages in the jet.*



*Control panel :  
A combination of touch sensitive push button switches and rotary dials ensures accurate control and repeatability.*

### Controls and Functionality

The unit is designed to ensure that all functions are simple to select and adjust, to quickly achieve the optimum conditions for Spray Drying.

#### The control panel includes:

- Inlet temperature setting and digital display of actual temperature.
- Outlet temperature with digital indication.
- Mains connection indicator.
- On/off switch and indicator for all systems.
- On/off switch and indicator for blower.
- Blower control (operates a butterfly valve in the air inlet).
- On/off switch indicates for heater (this will not operate until the blower is switched on).
- On/off switch and indicator for compressor.
- Compressor air flow valve control.
- Automatic jet de-blocking frequency control knob (operated by integral compressor).
- On/off switch and indicator for Pump.
- Pump Speed Control.

### TECHNICAL INFORMATION

Evaporation rate of water at inlet temperature of 250°C using Standard Chamber	Approximately 1500 ml/hour
Air inlet temperature range	40°C to in excess of 250°C
Drying air throughput	variable from 38 to 73m <sup>3</sup> /hr
Heater capacity	3 kW
Compressor	1.4 m <sup>3</sup> /hr @ 1.0 bar to 0.25 m <sup>3</sup> /hr @ 4 bar
Sample feed	peristaltic pump with flow rate variable up to 65 ml/min
Jet de-blocking	integral 3 bar compressed air supply with variable de-blocking plunger frequency
Spray system	2 liquid nozzle with standard 0.5 mm jet and options of larger diameters
Spray/hot air flow	Downward Co-current
Power supply	220/250 V - 50/60 Hz - 13 amps
Dimensions	1050 x 620 x 500 mm (H x W x D)
Weight Nett/Packed	73/117 Kg

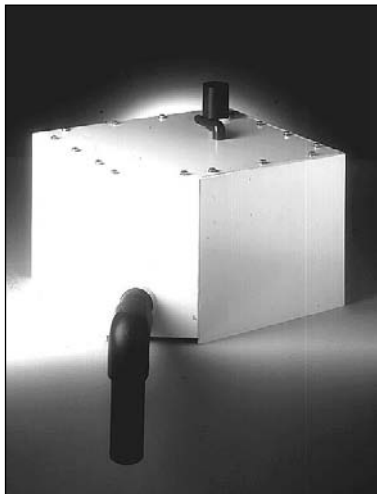
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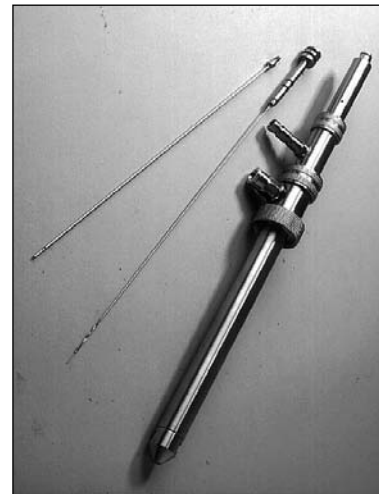
## Accessories



Standard and Large Main Chambers.



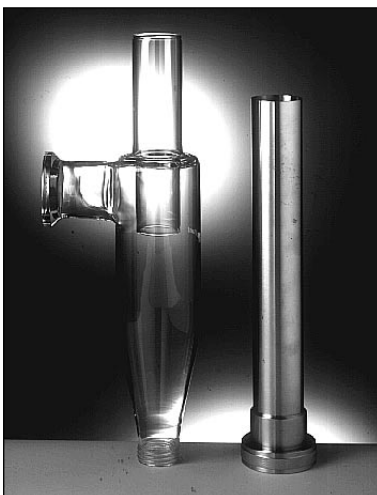
Exhaust Wet Scrubber.



Stainless Steel Jet Assembly with Needles.



Sample Collection Bottle, Collection Tube, SVL Connectors with PTFE Seals and Counter Current Adaptor.



Cyclone and Chimney Extension (for use with large main chamber)

**Additional Optional Accessories Include:** ● Clear Safety Screen ● Mobile Bench ● Inert Gas Connection Plate.

## Ordering Information SD-05

Spray Drier SD-05 complete 220/240 V - 50/60 Hz (other power requirements available). Complete with all parts necessary for spray drying including blower, heater, heater control, exhaust temperature indicator, spray system with 0.5 mm jet, spray atomiser compressor, auto jet de-blocking system with compressor, 215 mm OD x 500 mm long main chamber, cyclone and all glassware.



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.