



Laboratory Equipment Manufacturer
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Instructions

SD-51 Lab Spray Dryer



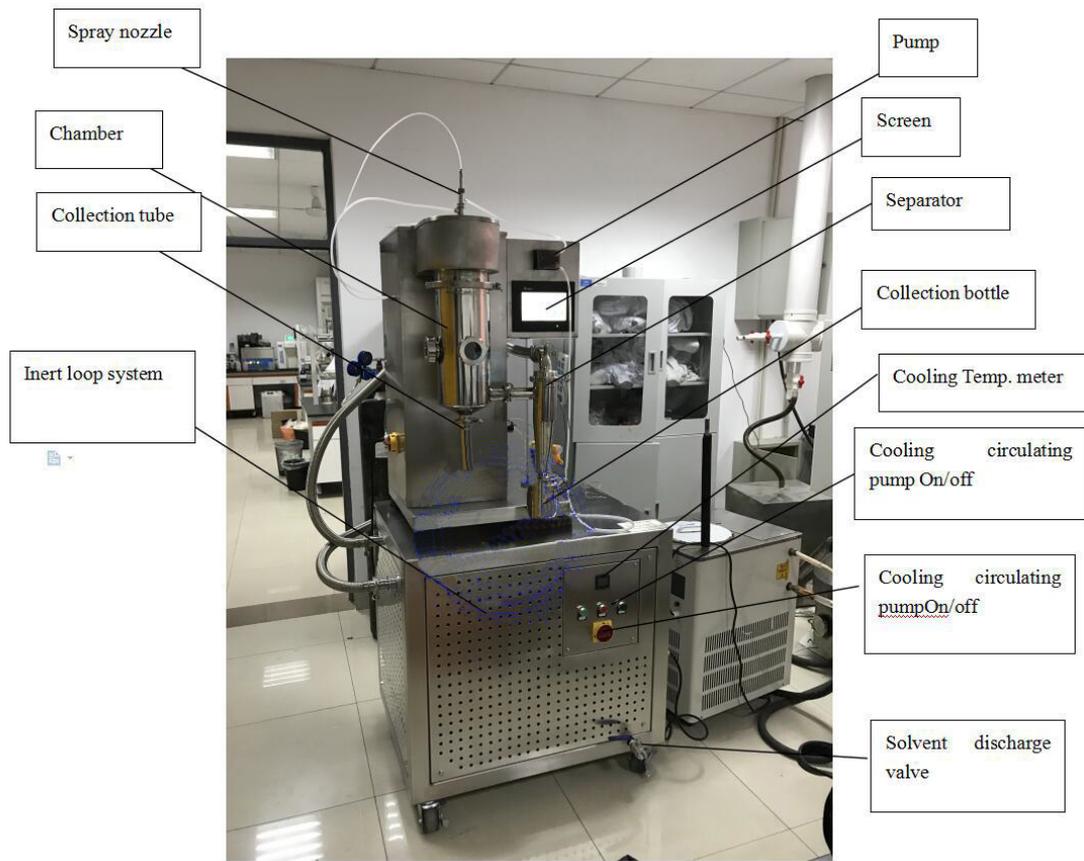
Anhydrous alcohol filling

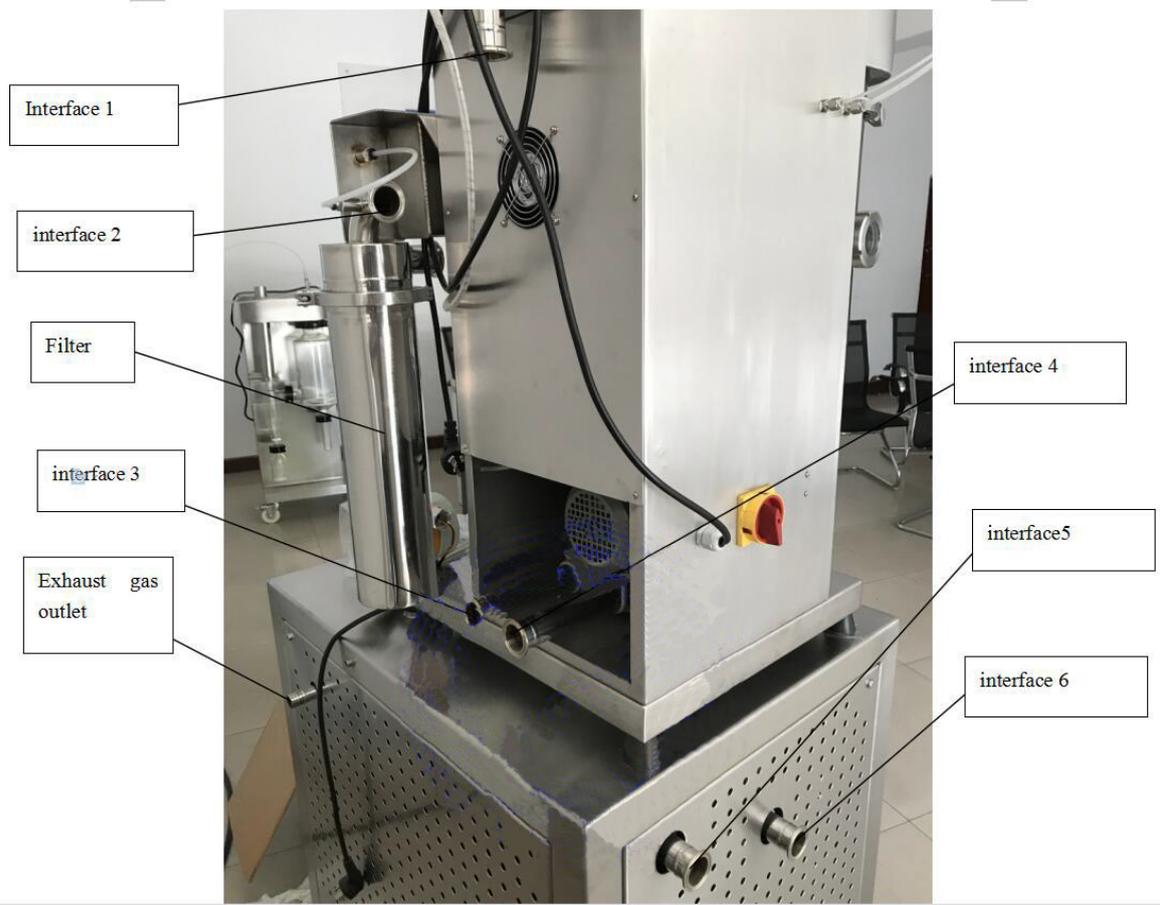
1. You must need to add anhydrous alcohol to the red arrow point .
2. Look at the yellow arrow point glass liquid level , fill up the anhydrous alcohol , then start the refrigeration cycle , the glass liquid level will drop . Fill up the anhydrous alcohol again , cover the lid and tighten the nut.



Main Application

Used to dry water-soluble matters that are heat-stable, matters in the presence of organic solvents, some drugs very sensitive to temperature and materials of low melting points.





Equipment Installation

By virtue of the stainless steel hose, interface #1 is connected to 3, while interface #4 to 6 randomly; as for the tail gas, it can be discharged into a fume cupboard or out of the window.

Equipment Characteristics

Thanks to a semi-closed closed-loop technique, the spray dryer can be applied to produce materials that contain organic solvents or can be easily oxidized.

As inert gases including nitrogen has properties of explosion proof, inflaming retarding and oxidation resistance, they are used as carriers of mass transfer and transmission; in addition, the entire spray dying system is at a state of close circulation. Such a technological concept can be adopted to resolve several problems below that can be frequently encountered during bulk pharmaceutical chemical (BPC) production.

(1) The difficulty in drying materials in the presence of organic solvents can be solved for bulk pharmaceutical production. General organic solvents are both inflammable and explosive. However, materials become able to circulate in a closed drying system because of the application of such a technique so that contact between gases containing organic solvents and oxygen in the environment. Hence, safety production can be ensured.

(2) The difficulty n drying materials that can be easily oxidized can be solved for BPC production. Such a technology makes use of inert gases’ resistance to oxidation to dry and convey materials in a closed circulation system resistant to oxidization, and also isolate such materials from oxygen. In this way, drying and production quality of easily oxidized materials can be ensured.

(3) The problem of poisonous gas contaminations arising from BPC production can be solved. This technology can keep poisonous gases generated during gasification of some materials or solvents tightly closed in the system and then collected in the following process so as to reduce environment pollution, which beneficial for environmental protection.

Operation Steps

1. Before starting up, please make sure that the power has satisfied equipment requirements and also reconfirm that all fasteners have been tightened and solvent discharge valve has been closed.
2. Turn on the power switch of solvent recycling system and start the refrigerating circulating pump and the refrigerating machine successively; then, wait until cryogenic temperature falls to -10°C .
3. Open the inlet valve of inert gases and regulate the pressure to 0.2MPa, to convey inert gases into the system; then, start the draught fan until oxygen concentration goes down to 3% and below (at this time, an excessive oxygen concentration warning on panel disappears). If the oxygen concentration is always displayed to be excessively high, please check sealing of all connecting clamps.
4. Keep the draught fan running, set temperature and start heating.
5. In the case that temperature is below the set value, no materials can be provided (**materials can be offered only when the temperature of solvent refrigerator of a low boiling point is lowered to -20°C and below**).
6. After temperature at the hot air inlet arrives at the set value and becomes stable, please start the peristaltic pump to feed.
7. After the completion of material spraying, the feed solution should be switched to solvents and then please carry out spray for about 1 minute. After that, please shut down the feed pump and electrical heating; besides, you can stop the draught fan, the refrigerating machine and the refrigerating circulating pump when the inlet temperature drops to 90°C .
8. Close the nitrogen inlet valve and then open the clamp to collect materials.
9. Solvent recovery. If the equipment is not used, the solvent recovery valve should remain open.
10. Switch off device power supply.
11. Take out the filter, clear up the powder and wash the cloth bag filter. It is suggested that the filter must be cleaned after each experiment.

Parameter Settings

20-40 for draught fan and it is usually 40Hz as recommended; $120-200^{\circ}\text{C}$ for temperature; 8-20rpm for revolving speed of the peristaltic pump and it can be set at 10rpm as recommended; the frequency of nozzle cleaner is recommended to be set at 8 (i.e., the nozzle cleaner automatically moves once every 8 seconds); and, spray pressure is usually adjusted to 0.1Mpa.

Notes and Potential Safety Hazards of Spray Dryer

1. As recommended, the filter must be cleaned timely after every experiment; and, when pressure displayed on the pressure gauge of filter is beyond 60mbar, the filter must be cleared up to ensure that such a value of pressure is less than 60mbar! all the time.
2. After the completion of experiment, please wash the atomizer in a timely manner (please change the aging seal ring inside the atomizer that has been used for a period of time).

3. When start up the refrigerating machine, you must make refrigerants circulating (materials can be offered only when the temperature of low-boiling-point organic solvents goes down to -20°C).
4. During operating, pressure of inert gases must be guaranteed to be at 0.1Mpa and above at the time of organic solvent spraying; if the oxygen concentration is displayed to be excessively high all the time, please check sealing of all clamps.
5. During equipment running or within a certain period of time after shutdown, surface temperature of it is still rather high; therefore, please do not touch its parts with your hands, such as the filter, the cyclone separator, the air hose, the atomizer and the sight glass, etc..
6. At the time of opening or closing clamps for check or during air hose and cyclone separator assembly/disassembly, please be careful your hands and fingers.
7. For equipment not used for a long time, please electrify it regularly (it should be electrified once in each month and half hour for every time).
8. After the completion of experiment, organic solvents recovered are discharged. At ordinary times when the equipment is not used, the valve should be kept at an open state (please close the valve before starting up for the next experiment).

Please read “Safety Considerations” and the “Operation Manual” of this equipment carefully before use it.

Problem probably

Description	Reasons probably	How to settle
fan not working	Transducer damage Fan damage	connect with sales connect with sales
Heater not working	Fan don't start up Solid state relay(SSR) damaged Heater damaged	Start up fan Replace SSR connect with sales
air compressor not working	Intermediate relay damage Air compressor do not startup Air compressor damaged	Replace Intermediate relay Start up Air compressor connect with sales
equipment has not electricity	Outside socket damaged Air switch 1 closed Intermediate relay damage	Check socket open air switch 1 Replace Intermediate relay
touch screen do not display	Start button damaged 24V switching button damages	Replace Start button Replace switching button

	Screen damage	connect with sales
PLC not working	Air switch 2 closed PLC damaged	open air switch 2 connect with sales
Inlet temp. do not display	PT-100 temp sensor not connected well PT-100 damaged PT100 temp module damaged	tight connect with sales connect with sales
outlet temp. do not display	PT-100 temp sensor not connected well PT-100 damaged PT100 temp module damage	tight connect with sales connect with sales
Inlet temp can not reach the value required	Air flow higher than the required	Adjust fan parameter
10、 Dry incompletely	Inlet temp. too low Fog air pressure too low Compressed air blows Feeding too fast	Increase inlet temp. Open the equipment latter lap and adjust pressure to 2—3Bar (ϕ 6 nylon tube) Check connecting place whether blow Adjust pump parameter
De-block needle not working	Air valve does not open Pressure too low De-block needle frequency too high solenoid valve damaged	Open the air valve (ϕ 4 white nylon tube) Increase reducing valve pressure Adjust de-block needle parameter Replace solenoid valve

Preparation of Equipment

1. Properly install all parts according to installation instructions.
2. Turn on two air switches inside a power distribution cabinet and then close the door; subsequently, turn on power switch of the equipment to electrify it.
3. Input inert gases, perform parameter settings and initiate fan heater.
4. At the time of feeding, please observe atomization conditions of the material as well as temperature changes. You can regulate related parameters, reset the draught fan, feed rates and inlet/outlet air temperature to feed after these parameters become stabilized.

Manual Shutdown Steps

1. After the completion of material spraying, the feed solution should be switched to solvents and then please carry out spray for about 1 minute. After that, please shut down the feed pump and electrical heating; besides, you can stop the draught fan and the refrigerating machine when the inlet temperature drops to 90°C.
2. Close the nitrogen input valve; and, you can open all valves to recover solvents and clear up materials.
3. Turn of the power.
4. Take out the cloth bag filter to empty the powder; then, please clean this cloth bag filter. In addition, the cloth bag filter must be washed after every experiment!
5. Take apart the atomizer to utterly clean it and make preparations for the next experiment.
6. Discharge solvents recovered.

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

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