LPG Series High-Speed Centrifugal Spray Dryer

The state industry standards for this equipment is drafted and specified by YIBU.

Preface

- The Spray drying is the technology most widely used in the liquid technology shaping and in the drying industry. The drying technology is most suitable for producing solid powder or particle products from liquid materials, for example: solution, emulsion, suspension and pumpable paste states, for this reason, when the particle size and distribution of the final products, residual water contents, mass density and the particle shape must meet the precise standard, spray drying is one of the most desired technologies.

Principle

- After been filtered and heated the air enters into the air distributor on the top of the dryer. The hot air enters into the drying room in the spiral form and uniformly. Passing through the high-speed centrifugal sprayer on the top of the tower, the material liquid will rotate and be sprayed into the extremely fine mist liquid beads. Trough the very short time of contacting the heat air, the materials can be dried into the final products. The final products will be discharged continuously from the bottom of the drying tower and from the cyclones. The waste gas will be discharged from blower.

Applications

- Chemical Industry: Sodium fluoride (potassium), alkaline dyestuff and pigment, dyestuff intermediate, compound fertilizer, formic silicic acid, catalyst, sulphuric acid agent, amino acid, white carbon and so on.
- Plastics and resin:AB, ABS emulsion, uric acid resin, phenolic aldehyde resin, urea-formaldehyde resin, formaldehyde resin, polythene, poly-chloroprene and etc.
- Food Industry: Fatty milk powder, protein, cocoa milk powder, substitute milk powder, egg white(yolk),food and plant, oats, chicken juice, coffee, instant dissoluble tea ,seasoning meat, protein, soybean, peanut protein, hydrolysate and so forth.
- Sugar, corn syrup, corn starch, glucose, pectin, malt sugar, sorbic acid potassium and etc.
- Ceramic:Aluminium oxide, ceramic tile material, magnesium oxide, talcum and so on.

Patent: ZL 2006 2 0072786.9
ZL 2006 1 0039883.2

Features

For the LPG series high speed centrifugal spray dryer, it consists of liquid delivery, air filtering and heating, liquid atomizing, drying chamber, air exhausting and material collecting, control system and so on, the feature for each system as bellow:

1. The liquid delivery system consists of liquid tank, magnetic filter, pump and so on as to ensure the liquid enter into the atomizer smoothly.
2. Air filtering system and heating system

   Before the fresh air enter into the heater, it should pass through the Pre&post filter first, and then enter the heater for heating. For the heating method, there are electrical heater steam radiator, gas furnace and so on. Which method to choose depends on the customer site conditions.To ensure the drying medium enter into the drying chamber with high purity, the heated air should go through the High efficiency filter before enters the drying chamber.
3. Atomizing system

   The atomizing system consists of high speed centrifugal atomizer with inverter and so on.

   The powder from the high speed centrifugal atomizer is between 40-120 microns.
4. Drying Chamber system

   The drying chamber consists of the spiral shell, hot air distributor, main tower and relevant fittings.

   a) The Spiral shell and hot air distributor: the spiral shell and hot air distributor at the air inlet of the tower top can regulate air flow rotation angle according to the specific condition, guide the air flow inside the tower effectively and avoid the material stick on the wall. in the middle there is the position for installing the atomizer.

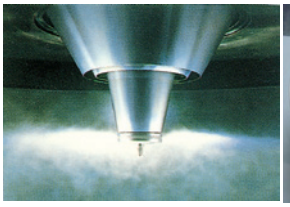
   b) Drying tower: The inner wall is SUS mirror sheet, ad welded by the arc welding. The insulation is rock wool.

   c) The tower is manhole and view port as to convenient to clean and maintain the tower. For the Tower body cross interface, pipe elbow are arc butt design, reduce dead angle; sealed type.

   d) The main tower is equipped with air hammer, controlled by the pulse, and hitting the main drying tower timely as to avoid the dust stick on the wall
5. Air exhausting and product collecting system

   For the material collecting system, there are several types. Such as cyclone, cyclone+bag filter, bag filter, cyclone +water scrubber and so on. The method is depending on the material property itself. For the filtering system for the outlet air, we have filter on request.
6. Control system

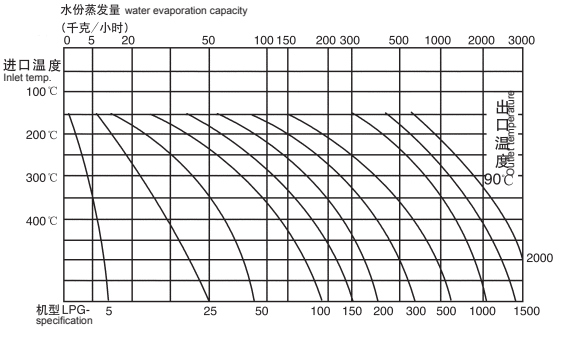
   HMI+PLC, each parameter can be displayed on the screen. Every parameter can be controlled and recorded easily.

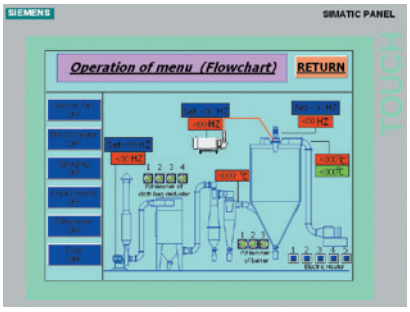


Centrifugal spray atomizer Features

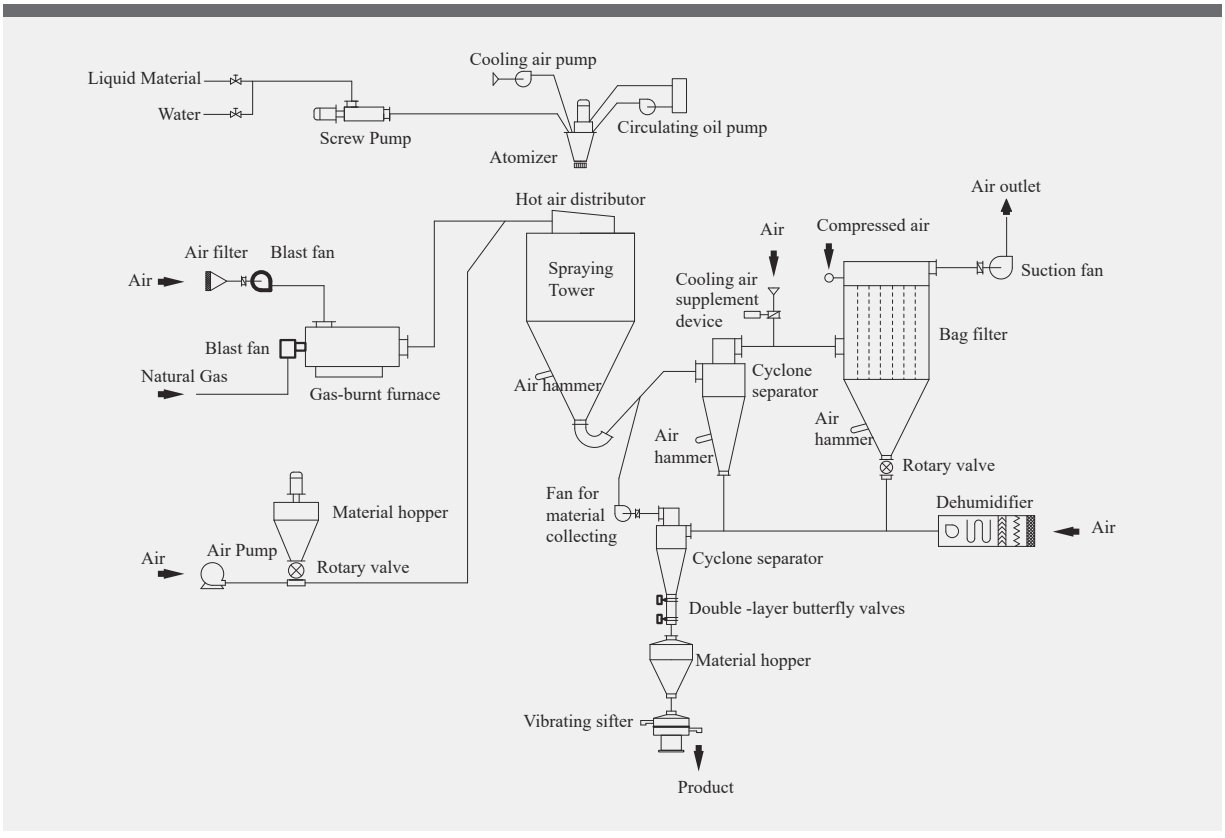
- The drying speed is high when atomizing the material liquid, the surface area of the material will increase greatly. In the hot-air flow, 95%-98% of water can be evaporated at a moment. Completing the drying only takes several seconds. This is especially suitable for drying the heat and sensitive materials.
- Its final products own the good uniformity, flow ability & solubility. And the final products are high in purity and good in quality.
- The production procedures are simple and the operation and control are easy. The liquid with moisture contents of 40-60% (for special materials, the contents might be up to 90%) can be dried into the powder or particle products once a time. After the drying process, there is no need for smashing and sorting, so as to reduce the operation procedures in the production and to enhance the product purity. The product particle diameter, looseness and water content can be adjusted through changing the operation condition within a certain range. It is very convenient to control and operate.

Notes: for water evaporation capacity, it relatives to material property, the inlet and outlet temperatures, please refer to the following diagram.





Flow Chart



Technical parameters

Spec	Inlet temp. (℃)	Outlet temp. (℃)	Max.Water evaporation capacity (kg/h)	Centrifugal spraying nozzle transmission mode	Rotation speed (r/min)	Spraying disc diameter (mm)	Heat supply	Max. Electric heating power (kW)	Overall dimensions (mm)	Dried powder collecting (%)
5	145-350	~80-90	5	Compressed air transmission	25000	50	Electricity	9	1.8×0.93×2.2	≥95
25	145-350	~80-90	25	Mechanical transmission	18000	100	Electricity+steam	36	3×2.7×4.26	≥95
50	145-350	~80-90	50	Mechanical transmission	18000	120	Electricity+steam, fuel oil and gas	63	3.7×3.2×5.1	≥95
100	145-350	~80-90	100	Mechanical transmission	18000	140	Electricity+steam, fuel oil and gas	81	4.6×4.2×6	≥95
150	145-350	~80-90	150	Mechanical transmission	15000	150	Electricity+steam, fuel oil and gas	99	5.5×4.5×7	≥95
20-10000	145-350	~80-90	20-10000	Mechanical transmission	8000-15000	180-340	Settled by users themselves		Depends on the concrete conditions	≥95