



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD



ZHANGHUA PHARMACEUTICAL EQUIPMENT





**BUILD A BRIGHTER
FUTURE**

SINCE 1976



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO., LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO., LTD

DIFFERENT COUNTRIES, BUT THE SAME BRAND

From the moment our products are sold all over the world, ZHANGHUA is not just a well-known Chinese brand, but world-famous.

We have dedicated ourselves to providing more high-quality pharmaceutical equipment to the world for human health as ever.

So far, Zhanghai has been trusted by the worldwide market, its clients from Europe, the Middle East, Southeast Asia and so on.

Even in different countries and areas, Zhanghai is always a reputable brand to them in the same way.

Our clients:



NOVARTIS



MSD



SOLVAY
asking more from chemistry®

BIOCAD
Biotechnology Company



DOOSAN

SINCE 1976

Brief Introduction



Wuxi Zhanghua Pharmaceutical Equipment Co.,Ltd was founded in 1976, committed to researching, developing and manufacturing reaction, crystallization, filtration, drying equipment in the past over 40 years, all products in compliance with FDA and CGMP requirements.





WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Wuxi Zhanghua Pharmaceutical Equipment Co.,Ltd was founded in 1976, committed to researching, developing and manufacturing reaction, crystallization, filtration, drying equipment. With the development of the leading technologies for more than 40 years, our engineering equipment is not only for the pharmaceutical industry, but also for fine chemicals, pesticides, new energy, new materials and other industries. We customize the integrated solution of reaction, crystallization, filtration and drying process equipment for clients.

Large CNC vertical lathe and boring machine equipped allows us to customize agitated nutsche filter dryers with diameter of more than four meters, coupled with Laser Cutty Machine, imported welding robot, which improve the welding accuracy, appearance and quality, as well as safety of the whole equipment.

Our technical team is composed of engineers in various fields, including quality assurance, process, equipment, welding, and electrics, and most of them have working experience and engineering project experience of more than ten years. For inflammable, explosive, toxic and corrosive products in pharmaceutical, fine chemical, pesticide, and new energy industries, we will provide customized technical solutions to clients with well-sealed, high vacuum and fully automatic equipment, ensuring safe, energy saving and environment protecting production process, compliance with EHS requirements. Besides, we will help clients to optimize technical designs for high-quality products. All our equipment has met requirements of FDA, CGMP, ATEX and ASME, certified by PED, MD, LVD, MOM and CE as well.

As our equipment has already been sold to quite a few pharmaceutical and chemical enterprises in Asia and Europe, our engineers in after-sales service department have rich experience of working abroad. Adhering to professionalism, integrity, innovation and harmony, Wuxi Zhanghua is committed to becoming an advanced global company with high technology and high quality trusted by all the clients. Zhanghua holds more than 30 patents and software copyrights, showing its sustainable development and innovation. Through years of efforts, Zhanghua has made considerable progress in reaction, crystallization, filtration and drying technology applied on the equipment in the pharmaceutical, chemical and other industries with good reputation.



SINCE 1976

Capabilities and Advantages

Special Equipment

Pressure Equipment (pressure bearing less than 100 kg)

Anti-corrosion Equipment with special materials

Sterile Equipment

Anti-corrosion Equipment with special materials contains: anti-corrosion plastic/PTFE/ enamel and other lining, Titanium, Hastelloy, Monel

Well-sealed, Vacuum, Automatic

Customization

Double-Cone Dryer in 20L-20 m³

Paddle Vacuum Dryer (with mechanical seal) in 16m³

DN300-DN4600 Agitated Nutsche Filter Dryer

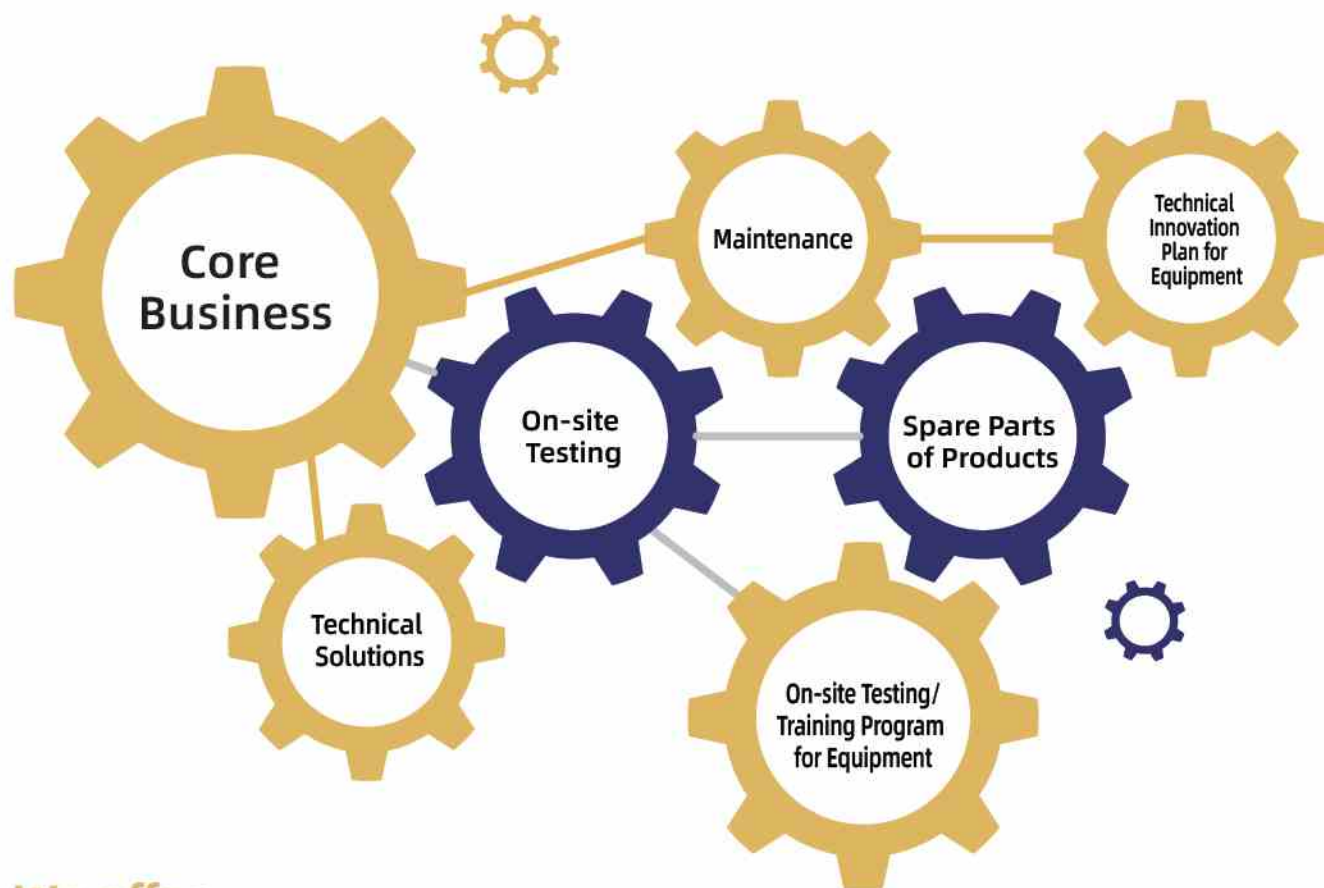
U-shape agitated vacuum dryer coupled with hot-air circulation drying system

Pilot production line of pharmaceutical intermediates

Continuous Reacting, Crystallization Equipment



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD



We offer

- Technical Optimized Structural Design for Equipment
- Fast and Effective Solution to Malfunctions of Equipment
- Highly Efficient and Precise On-site Construction Service
- Commitment to the Customized Deadline
- A Full Range of long-term on-site technical maintenance service

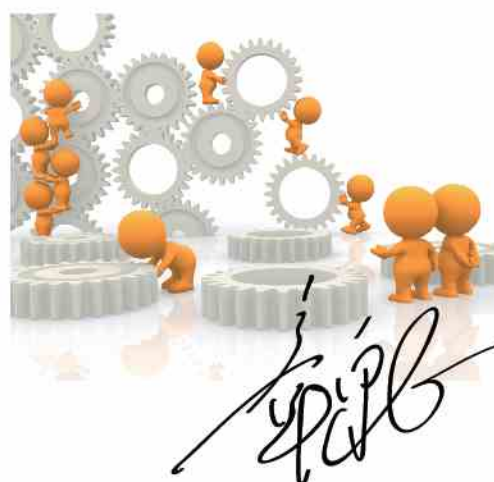
SINCE 1976

It is the leaping and reforming of times, with perfect timing: history moves to where now it is; with geographic advantage: we are located in the metropolis, close to the river and sea; with support of the people: numerous talents, friends and guests, young and old, gather and stick together. Thanks to all of these and the reform and opening-up, Zhanghua has stepped on the stage of China, of the world, of the future.

General Manager Address

In the new economic era, Zhanghua Pharmaceutical Equipment will implement strategic plans for brand, capital, technology, and talent, to establish a hundred-year brand. Through the scientific and modern management model, with high sense of responsibility and the enterprising spirit at the pioneering stage, Zhanghua will create more values for clients, as well as the society.

We are keenly aware that we are facing both opportunities and challenges, and embracing both hopes and difficulties, however, powered and developed on the basis of perfect timing, geographic advantage and supports of the people, including the leaders, experts and friends of all the fields, we have been beyond the past, following the new path. What Zhanghua always pursues is to vitalize the national industry, keep up with the world first-class technology and create values for global clients. We are confident and capable of exploring the new area in Chinese pharmaceutical equipment industry.



General Manager

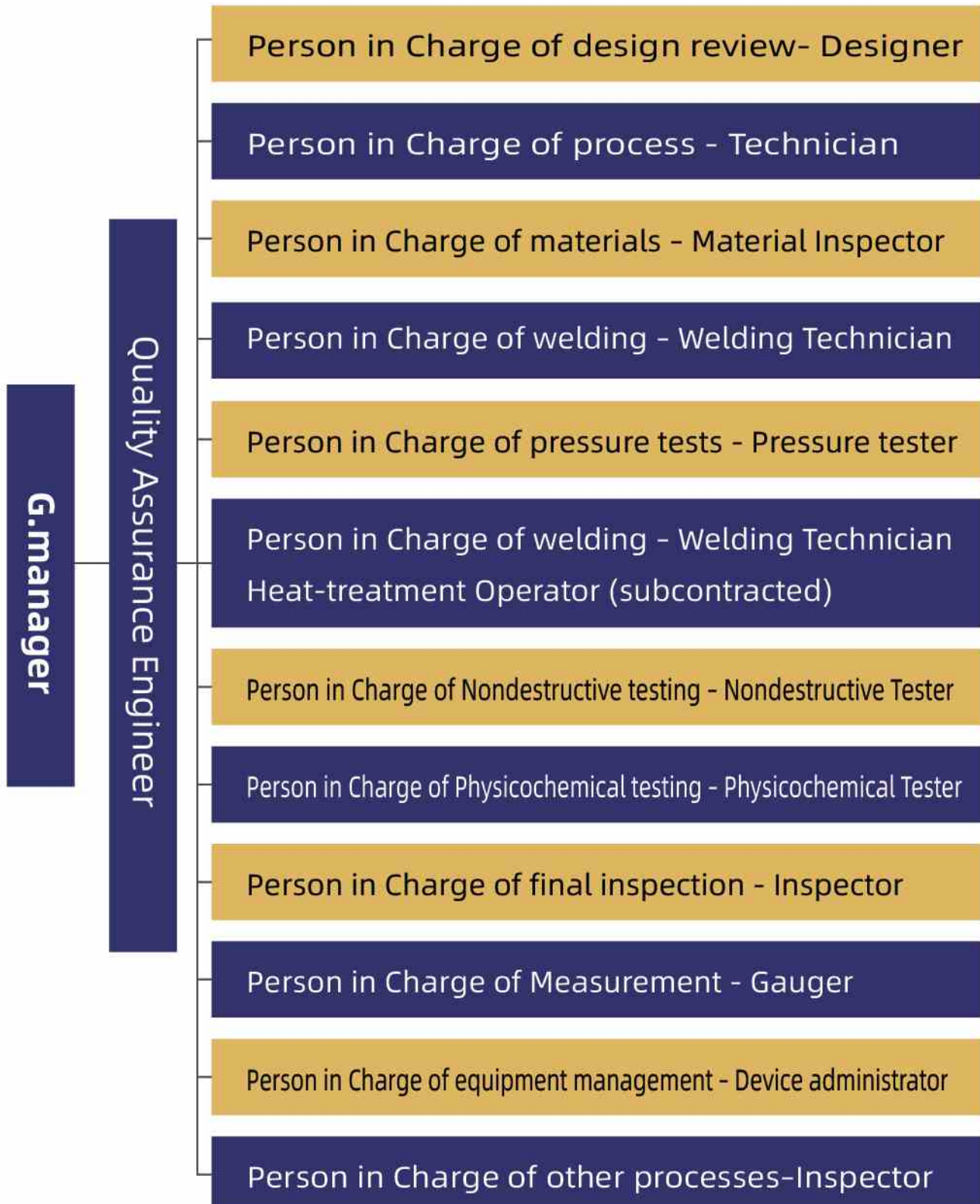
Organization Structure

Perfect structure and highly efficient and strict operation system contribute to good management decision-making and stable business development.





Quality Assurance



SINCE 1976

Qualifications And Honors

Thanks to devotion, where honor comes, all the Zhanghua people shall take credit for the certificates obtained. All these honors are marks on us, passports to the future, and milestones in the development.

In the past years, we have been honored for many times, but still always keeping in a clear head, "neither being arrogant in the victory, nor discouraged by the defeat". All staff members of Zhanghua Pharmaceutical Equipment will focus on quality control for further success. What we have been hankered after is not only the honor, but also the positive comment from the clients.



All our equipment has met requirements of FDA, CGMP, ATEX and ASME, certified by PED, MD, LVD, MOM and CE as well.





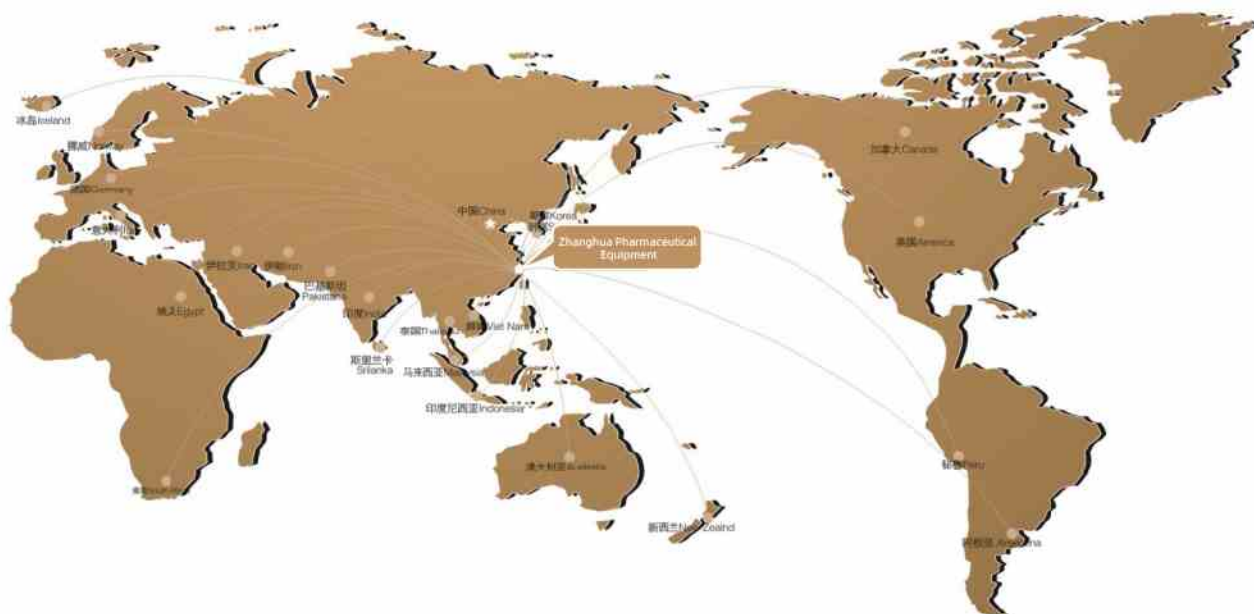
WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Management Sale Network

In addition to accumulation of talents, technology and brand and scale advantage, our company has also focused on the construction of market networks, and gradually developed third level markets based on the primary and secondary market. Our products have been sold to Australia, USA, Canada, Russia, Germany, UK, France, Spain, Italia, Singapore, Netherlands, Pakistan, Saudi Arabia, Africa, India, Southeast Asia etc.



Global Sales, Qualified Service



Our clients:



SINCE 1976

Quality is essential for the product, the basis of the company' s development. The advanced automatic production equipment and standard production management system help to guarantee the stable and reliable quality of Zhanghua's products into full play.



Perfect Quality, Based on Advanced Manufacturing Model



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

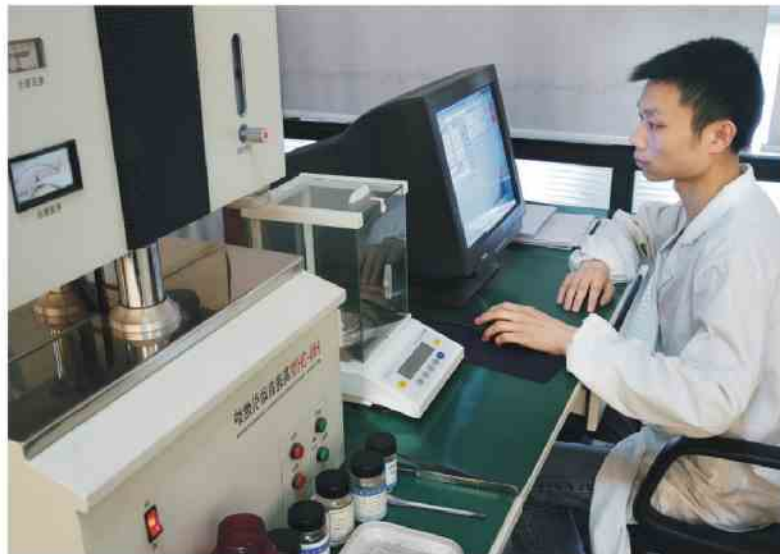
Production Equipment



We have produced high-quality products that are in accordance with international standards with the help of the world-class advanced production equipment, brand new management conception and strong technical force. Quality represents our dignity, with the outstanding quality instead of mediocre performance. We are working hard, fighting with difficulties, planning in fastidious detail, and presenting with the standardized management system and systematic quality assurance, which helps Zhanghua to earn the reputation all over the world. Through effective cooperation with partners, Zhanghua is promoting its product quality to be the most impeccable in the world.

SINCE 1976

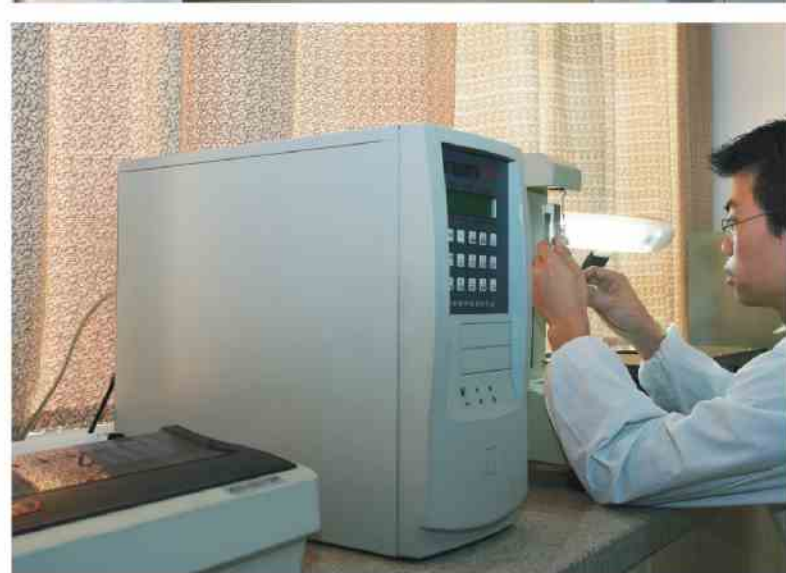
Testing Equipment



Superb inspection
equipment,
Superb quality



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD



“Quality is essential for the company” . This is deeply rooted in the heart of all staff in Zhanghua. Thanks to the good equipment, advanced technology, and scientific management system, the whole production process in Zhanghua Pharmaceutical Equipment is strictly controlled by ISO9001, while the components of products are strictly inspected from the period of material selection, manufacturing, assembly, and testing. The machine must pass the continuous reliable-performance test for 72 hours.

SINCE 1976



Everything you need, from
technical design to equipment
installation and testing,
is available



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD



We want to make sure that all projects can bring their performances into full play in the effective service life by perfect design, manufacturing, and after-sales services. We have produced high-quality products that are in accordance with international standards with the help of the world-class advanced production equipment, brand new industrial conception, and strong technical force.



MOM

SINCE 1976

Pfizer, Sanofi, Novartis, USA Sankai, TEVA, Alcon Laboratories, PHARMAGEN, Novozymes, AkzoNobel, Wuxi AppTec, Guangzhou Baiyunshan Group, United Lab, North China Pharmaceutical Group, Harbin Pharmaceutical Group Co., Ltd. General Pharm. Factory, Citic Guo' an Group, Beijing Pharmaceutical Factory, Lukang Pharmaceutical Group, Lianyungang Hengrui Pharmaceutical Co., Ltd., Zhejiang Haizheng Pharmaceutical Co., Ltd., etc.



Above the main customers in alphabetical order



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Contents

VERTICAL LAYOUT REACTING, CRYSTALLIZING, FILTERING, WASHING AND DRYING SYSTEM WITH NO RESIDUAL		
Reacting fermenting series	BIOLOGICAL FERMENTING TANK	REACTOR
Crystallizing series	CRYSTALLIZER	W SHAPE CRYSTALLIZER
	SINGLE CONIC ROTARY CRYSTALLIZER	HORIZONTAL STATIC CRYSTALLIZER
Condensing series	CONDENSER	SIC HEAT EXCHANGER
Filtering/washing/drying series	AGITATED NUTSCHE FILTER DRYER	NUTSCHE FILTER
	CONTINUOUS TURNTABLE NUTSCHE FILTER	PADDLE VACUUM DRYER
	LOW ENERGY CONSUMPTION ASEPTIC SPRAY DRYER	U-SHAPE MIXING VACUUM DRYER
	U-SHAPE AIRFLOW DRYER	MULTIFUNCTIONAL DRYING UNIT WITH BLADES
	MULTIFUNCTIONAL DRYING UNIT	DOUBLE CONE VACUUM DRYING UNIT
	NAUTA CONICAL DRYER	INFLATABLE SEALING HEMISPHERICAL VALVE
	VACUUM OVEN	
Testing unit series	PILOT AGITATED NUTSCHE FILTER DRYER	
Mixer series	V-TYPE EFFICIENT MIXER	ECCENTRIC POWDER MIXER
	SINGLE-EFFECT AND MULTI-EFFECT EVAPORATING CONCENTRATOR	SCRAPER-TYPE FILM EVAPORATOR

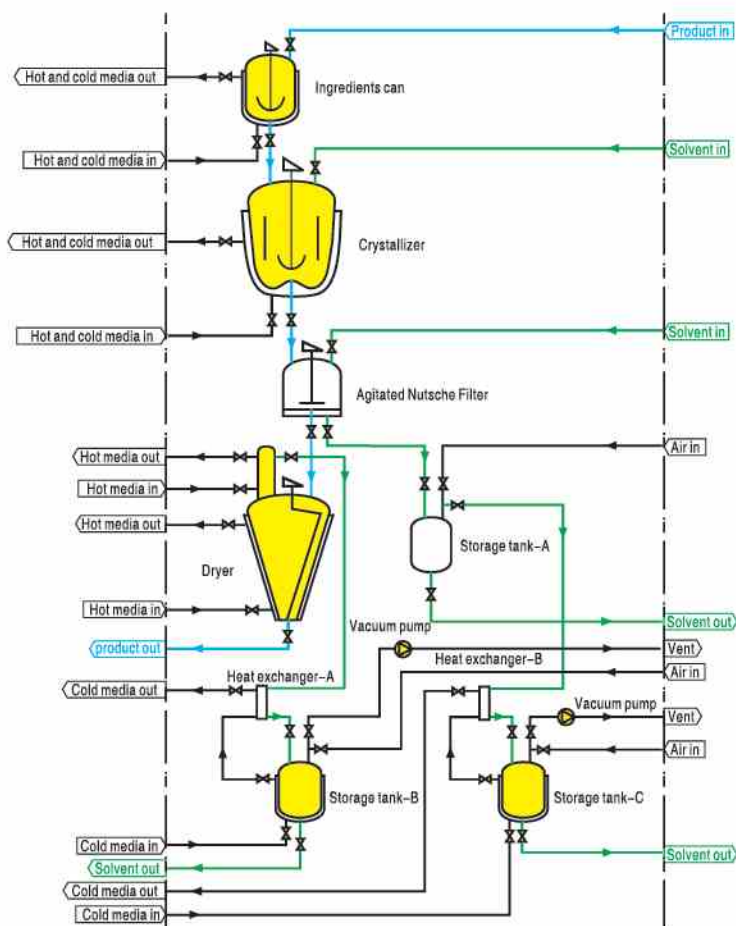
SINCE 1976

VERTICAL LAYOUT REACTING, CRYSTALLIZING, FILTERING, WASHING AND DRYING SYSTEM WITH NO RESIDUAL

Summary

Vertical Layout REACTING, CRYSTALLIZING, FILTERING, WASHING AND DRYING SYSTEM is used for reaction, crystallization, filtering, washing, drying and discharge during the whole production process, which from up to down, includes ingredients can, crystallizer and agitated nutsche filter, connected through pipes one after another. On the bottom of the agitated nutsche filter, it is connected through pipes with single conic dryer and the second storage tank. And the side wall of this single conic dryer is connected with a vacuum filter that is also connected with the first storage tank, while the second storage tank is connected with the third one.

As each unit is operated independently, proper allocation of units and full use of startup rate of the equipment helps to maximize the production capacity per unit time. Thanks to its reasonable design and compact structure, this equipment solves deficiency of the existing technology, large area needed and low work efficiency of pharmaceutical processing equipment, by means of simple combination. The design is so practical that it not only improves the work efficiency and reduce the necessary workspace, but also speeds up the delivery.





Features

1. Control of Crystal Forms' Quality Products are going from up to down after operation of each unit is completed, and gravity outflow is adopted for material delivery between levels to prevent physical damage to crystal forms.
2. High Production Efficiency Proper allocation of units and full use of startup rate of the equipment helps to maximize the production capacity per unit time.
3. Products with Higher Quality The whole system is fully sealed without any pollution and leakage, free from impurities from outside or staff.
4. Low Harm to Human Considering the practicability of complete automatization during the whole process, it allows for unmanned operation, which reduces the labor intensity of workers, saves costs, and minimizes the injury to human body caused by material leakage;
5. Easy to clean and sterilize The design makes CIP and SIP easier. There is no residue in each process during the production, and each device can be cleaned and sterilized separately.



SINCE 1976

BIOLOGICAL FERMENTING TANK

Summary

This kind of fermentation tanks and seeding tanks are made from carbon steel, stainless steel, high nickel-based alloys and so on, mainly used for biochemistry fermentation production, such as monosodium glutamate, citric acid, enzyme preparations, solvents for pharmaceutical, food and other industries. This product is designed according to <Design Regulations for Pressure Vessels of Steel Petrochemical Industry> published by the petroleum, chemicals, and the first machinery department, and manufactured and inspected by GB 150.1~150.4-2011 <Pressure Vessels> as the main parameter for reference.

I. The Basic Conditions

The mechanical agitation fermentation tank is one of the common types used in the fermentation plant. It uses mechanical agitators to completely mix air and the mash, and make the oxygen dissolved in the mash, which guarantees the enough supply of oxygen for microbial growth, reproduction and fermentation. Several basic requirements to make fermentation tanks as followed:

1. Fermentation tanks should have suitable scale of diameter to height, which is generally about 1.7 to 4, the longer the tanks are, the higher the utilization rate of oxygen will be.
2. Fermentation tanks shall be able to bear certain pressure. When fermentation tanks are normally working or being disinfected, pressure (hydraulic pressure and pneumatic pressure) and temperature shall be reached some level in the tanks, so all the components must be hard enough to bear such pressures.
3. The stirring and ventilating device in fermentation tanks make the gas and the liquid fully mixed to make sure that the fermentation broth must dissolve oxygen.
4. Fermentation tanks should have sufficient cooling area. In the process of microbial growth and metabolism, it will release a lot of heat. So



- in order to control the temperatures on different stages in the fermentation process, it should be equipped with adequate cooling area.
5. Fermentation tanks must minimize dead corners to avoid accumulation of dirt, so it can be thoroughly sterilized to avoid bacterial contamination.
 6. The seal of agitators should be so tight to minimize leakage.



II. The Size Scale

There is a certain scale of the size of each part of the tank. The scale of height to diameter of the tank is about 1.7 to 4.

Fermentation tanks usually are equipped with two sets of agitators. The distance between the two sets of agitators (S) is about three times as the diameter of the agitator. For large-scale fermentation tanks or those that have high liquid depth (HL), three or more sets of agitators can be equipped. It will be better if the agitator at the bottom is close to the exit of air dust, and the distance to the bottom of the tank (C) equals to the diameter of the agitator (D_i), but could not be less than 0.8 times of D_i , otherwise it will affect the cycle of liquid.

III. The Structure

An aerobic mechanical agitation fermentation tank is a kind of sealed compression equipment. Its main components include the tank, agitator, seal, a bubbler, couplings, intermediate bearings, air blowing pipe (or air ejector), baffle, cooling device, manhole, pipeline, etc.

Technical parameters of fermenting tank

Nominal volume (m^3)	Shell diameter (mm)	Shell height (mm)	Heat exchanger area (m^2)	Mixing shaft rotational speed (r. p. m)	Mixing shaft power (kw)
10	1800	3800	14	160—260	17—22
15	2000	4800	18	160—260	22—30
20	2200	5000	22	160—260	30—37
30	2400	6600	34	150—250	45—55
40	2600	7500	45	150—250	55—75
50	2800	8000	58	150—250	55—90
60	3000	8300	65	150—250	65—115
75	3200	8800	84	150—250	90—145
100	3600	9400	114	150—250	120—125
150	4200	10800	165	150—250	165—275
200	4600	11500	220	140—240	215—360

Main technical parameters of fermenting and seeding tanks

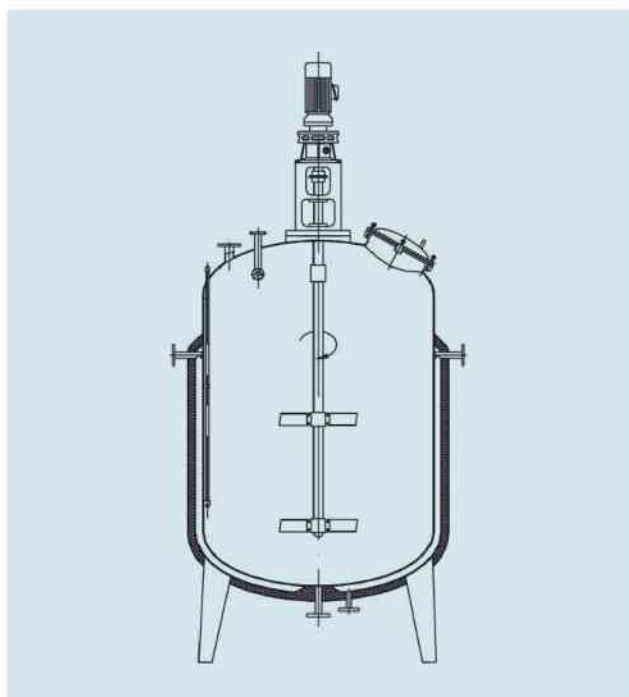
Nominal volume (m^3)	Diameter of internal tank (ϕ mm)	Inner tank height (mm)	Diameter of jacket (ϕ mm)	Mixing shaft rotational speed (r. p. m)	Mixing shaft power (kw)
0.05	300	700	400	300—350	0.55
0.1	400	800	500	300—350	0.75—1.1
0.2	500	1000	600	280—340	0.75—1.5
0.3	550	1200	550	280—340	1.1—1.5
0.5	600	1650	700	280—320	1.5—2.2
0.8	800	1600	900	200—280	2.2—2.5
1.0	800	1900	900	200—280	2.2—2.5
1.2	900	1800	1000	200—280	3—7.5
1.5	900	2200	1000	200—280	3—7.5
2.0	1000	2500	1100	200—260	4—11
3.0	1200	2600	1300	200—260	5.5—11
4.0	1300	3000	1400	200—220	7.5—15
5.0	1400	3200	1500	180—220	7.5—18.5

SINCE 1976

REACTOR

Summary

Reactor is used in the process of hydrolysis, neutralization, crystallization, distillation and evaporation in pharmaceutical, chemical, food, light and other industries. It can use SS304, SS316L, Titanium, Hastelloy, PTFE lined and other materials to manufacture. Several mixing types are available, such as anchor, frame and oar, etc. Cycloidal pinwheel reducer, variable-speed reducer and others could be applied in the rotating mechanism. The sealing device can use machines; Sleeve, semi-tube and coil pipe structure can be used in heating and cooling. There are several heating modes, such as steam, electric heating, heat conduction oil, etc. In order to meet different requirements of acid-and alkali-proof, high temperature resistance, wear resistance, corrosion resistance and others under different working environments, reactors can be designed and manufactured based on clients' requests.



Structural features

Reactor is composed of body, cover, agitator, heating jacket, supporting and driving devices, seal devices, and etc. and equipped with electric heating rods.

Considering clients' different producing technology and operating conditions, usually mixing patterns are divided into anchor, propeller, turbo, push or frame. The support seat has two kinds, hanging or back supporting type. There are holes for oil in and out, venting, and temperature monitoring in the jacket. At the bottom of the kettle, there is a discharge hole.



Operating requirements

- 1.Product in reactor are heated by jacket.
- 2.The vent pipe installed in the upper part of the jacket should be unblocked.
- 3.Oil should be slowly heated, especially in the first warming period, you should pay attention to preventing oil and steam from blasting boiling.
- 4.If there are no materials (heat absorbing medium) in the reactor, don't heat jacket for testing.
- 5.The heating speed and insulation status (on/off) can be adjusted by valves or temperature controller.

Technology Parameters

Type	Nominal capacity L	Actual capacity L	Electro-thermal power r	Oil jacket volume L	The size of the pot mm	Jacket size mm	External size	Base screw hole central distance mm	Base screw hole quantity and size	Reducer model	Electrical power n/K	Mixing speeds	Weight
DFG50	50	78	4×2kw	96	φ400	φ600	φ824×2015	φ750	4×φ14	M3	1450/1.1	80	270
DFG100	100	127	6×2kw	127	φ500	φ700	φ1004×2120	φ894	4×φ16	M4	1450/1.1	80	340
DFG200	200	247	6×3kw	200	φ600	φ800	φ1104×2310	φ960	4×φ16	M4	1450/1.5	80	520
DFG300	300	327	6×4kw	218	φ700	φ900	φ1208×2495	φ1098	4×φ18	M4	1450/2.2	80	700
DFG500	500	509	6×4kw	269	φ900	φ1100	φ1468×2695	φ1328	4×φ20	M6	1450/2.2	80	930
DFG1000	1000	1017	4×2kw	400	φ1200	φ1400	φ1896×3110	φ1696	4×φ22	M6 或 M8	1450/3 或 1450/4	80	1610
DFG1500	1500	1703	4×2kw	500	φ1400	φ1600	φ2050×3700	φ1850	4×φ22	M8	1450/4	80	1920
DFG2000	2000	2244	4×2kw	600	φ1500	φ1700	φ2150×3975	φ1980	4×φ20	M8	1450/4	80	2295
DFG3000	3000	3056	4×2kw	800	φ1600	φ1800	φ2250×4250	φ2050	4×φ25	M10	1450/4	80	3020

Specification (L)	Diameter of internal tank (φmm)	Diameter of jacket (φmm)	Motor power (KW)	Reducer Model	Rotation speed of blending
30	400	500	0.6-1.1	M2	60-80
50	500	600	0.6-1.1	M3	60-80
100	550	650	1.1-1.5	M4	60-80
150	600	700	2.2	M6	60-80
200	650	750	2.2	M6	60-80
300	800	900	2.2	M6	60-80
500	900	1000	2.2	M6	60-80
800	1100	1200	4	M8	60-80
1000	1200	1300	4	M8	60-80
1500	1300	1400	4	M8	60-80
2000	1400	1500	4	M8	60-80
2500	1400	1500	7.5	BLr7.5-4-13	90
3000	1400	1500	7.5	BLr7.5-4-13	90
3500	1400	1500	7.5	BLr7.5-4-13	90
4000	1500	1600	7.5	BLr7.5-4-23	63
5000	1600	1700	7.5	BLr7.5-4-23	63
6000	1800	1900	15	BLr15-5-13	100
8000	2000	2100	15	BLr15-5-13	100
32000	3000	3200	37	BLr450-11-13	50-100

SINCE 1976

CRYSTALLIZER

Summary

Crystallizer can be manufactured by SS304, SS316L, Titanium, Hastelloy, PTFE lined or other materials. Its inside wall is treated with electrolytic mirror polishing or mechanical polishing while its outside wall uses SS304 full-welding structure, and its outside surface is treated with mirror polishing or matte polishing.

0.2 μ m water delivery ventilation filter is installed on the crystallization tank. The crystallization tank can endure 121°C high temperature sterilization, equipped with sanitary pressure meter. The outside connection of the tank uses sanitary rapid open connector. The crystallization tank is equipped with temperature monitoring device, 2 sight mirrors, cleaning ball and nitrogen inlet. The shaft seal uses special sanitary mechanical seal to protect the materials from pollution. The crystallization tank can use frequency conversion speed control device, then the rotation speed of mixing shaft has a wide adjustment range.



Technology Parameters

Specification (L)	Diameter of internal tank (φmm)	Diameter of jacket (φmm)	Heat preservation layer (φmm)	Motor power (KW)	Rotation speed of blending
30	400	500	600	0.55-1.1	60-120
50	500	600	700	0.55-1.1	60-120
100	550	650	800	1.1-1.5	60-120
150	600	700	900	2.2	60-120
200	650	750	1000	2.2	60-120
300	800	900	1100	2.2	60-120
500	900	1000	1200	2.2	60-120
800	1100	1200	1300	4	60-120
1000	1200	1300	1400	4	60-120
1500	1300	1400	1500	4	60-120
2000	1400	1500	1600	4	60-120
2500	1400	1500	1700	7.5	90-120
3000	1400	1500	1800	7.5	90-120
3500	1400	1500	1900	7.5	90-120
4000	1500	1600	2000	7.5	60-120
5000	1600	1700	2100	7.5	60-120
6000	1800	1900	2200	15	100-120
8000	2000	2100	2300	15	100-120
32000	3000	3200	2400	37	50-120

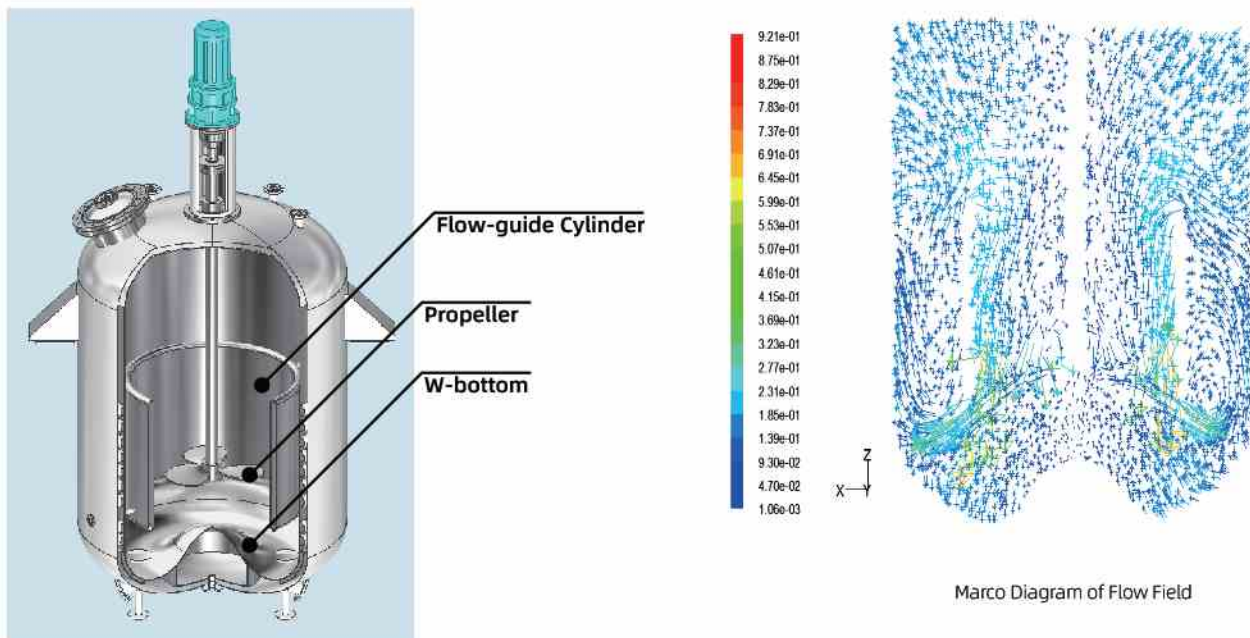


W SHAPE CRYSTALLIZER

Summary

The crystallization tank is used for mixing and blending materials, cooling and freezing, and finished products crystallizing in pharmaceutical industry. The CRYSTALLIZER is also widely used in dairy, food, chemical, beverage and other industries. It can be made from SS304, SS316L, titanium, Hastelloy, PTFE lined or other material. The inside wall is treated with electrolytic mirror polishing or mechanical polishing while the outside wall uses SS304 full-welding structure to preserve heat, and the outside surface is treated with mirror polishing or matte polishing.

Better crystal forms are required after crystallization of some materials, such as polygons, hexahedrons, prisms, spheres, etc. This equipment can create a flow field with regular motion in the process of crystallization, so that final forms can be more regular.



The head of the traditional crystallization tank usually uses the standard ellipsoidal type, and the temperature is controlled by hot liquid in the jacket outside. The traditional structure cannot effectively ensure materials mixed enough and uniformity of temperature control in the tank, especially for those products that have high requirements for crystal form, its crystallizing effect is always not ideal. In order to improve the inside structure of traditional crystallization tank, the standard oval head is replaced by the W-shaped head in the design. The combination of W-shaped head and the air cylinder changes internal flow forms, and realizes good diversion effect, with materials fully mixed, but no too high solute saturation generated that might lead to not ideal crystallization. Besides, the air cylinder structure is added in the tank. Temperature

SINCE 1976

control of the materials in the tank is realized through the hot fluid passing the air cylinder and jacket, instead of only by the jacket in the traditional crystallization tank. This kind of joint control from inside and outside effectively ensures uniformity of material temperature and improves the crystallizing performance. The combination of W-shaped head and the air cylinder changes internal flow forms, and realizes good diversion effect, with materials fully mixed, but no too high solute saturation generated that might lead to not ideal crystallization. Meanwhile, the even flow field can obviously improve the change of loading capacity carried by the blades, so the risk of damaging the mixing shaft is effectively reduced and the final crystal form is more uniform.

Advantages

1.Change crystal forms of materials

When materials are stirred by spiral belt, frame or paddle in the traditional crystallization tank, there is certain mixing dead angle, which easily leads to turbulence or keeps materials only moving and mixing in horizontal level, instead of fully mixed. But in W-shaped crystallization tank, there is a flow-guide cylinder. It fixes the motion path of materials, under high-speed movement, things are fully mixed without any dead angle or turbulence, which is conducive to obtaining good crystal forms. Moreover, refrigerant can be introduced into the flow-guide cylinder to cool down the device, which greatly enlarges the heat exchange area, improves uniformity of the heat exchange under faster cooling speed, and is also conducive to obtaining good crystal forms. According to the experimental results, the W-shaped crystallization tank can effectively improve the crystal size.

2.Improve the Crystallization Yield

The traditional crystallization tank relies on the external jacket or half-pipe to cool down and trigger crystallization. However, the mutual heat transfer between materials doesn't work well by agitating with spiral belt, poor and uneven heat-exchange performance, possibly around 10-20 degrees of temperature difference between the inner wall and the mixing center in the equipment with the diameter of 2000 mm. But in W-shaped crystallization tank, there is a flow-guide cylinder. In addition to the jacket and half-pipe on the wall, after refrigerant is introduced into the flow-guide cylinder, both sides of the cylinder can exchange the heat, which means the heat exchange area is greatly enlarged. What's more, as the cylinder is located at the center of the whole equipment, when materials move fast inside, the heat exchange happens among the cylinder, the tank wall, and materials itself, obviously higher efficiency and uniform exchange performance, and there will be no temperature difference at all the spots in the tank, which can improve the crystallization yield under about 20% on basis of the experimental results.



3. Improve the crystallization efficiency and reduce energy consumption

Thanks to the larger heat exchange area in the W-shaped crystallization tank compared with traditional ones, uniform exchange and high efficiency can be achieved. According to the experimental results, it takes 2 hours to complete the whole process of cooling and crystallization by the traditional tank, however, for the same materials in the same process, it takes only 1.4 hours by the W-shaped tank, productivity increased by 60%. Meanwhile, the use of refrigerant has been reduced by 40%, and the continuous working time of equipment motor and other supporting facilities has also been reduced by 40%, with lower energy consumption by 40%, realizing energy-saving.

4. Save the production cost

If the total production capacity remains unchanged, then it will need 10 traditional crystallization tanks, but only 6 W-shaped crystallization tanks, which helps to dramatically reduce the investment in equipment and supporting auxiliary devices related, as well as the floor area of equipment and the number of workers, effectively cutting the investment and operation costs of production.

Technology Parameters

Specification (L)	Diameter (mm)	High (mm)	Pressure in the tank (MPa)	Pressure in the jacket (MPa)	Pressure in the air cylinder (MPa)	Mixing pulp quantity	Rotation speed of blending (min)	Motor power (KW)
100L	400	2000	0.2	0.3	0.3	2	50-120	0.55
200L	500	2330	0.2	0.3	0.3	2	50-120	0.75
500L	700	2650	0.2	0.3	0.3	2	50-120	1.1
1m ³	900	2900	0.2	0.3	0.3	2	50-120	1.5
2m ³	1200	3800	0.2	0.3	0.3	2/3	50-120	3
5m ³	1500	4480	0.2	0.3	0.3	3	50-120	5.5
10m ³	1800	5250	0.2	0.3	0.3	3	50-120	18.5
20m ³	2300	6550	0.2	0.3	0.3	4	50-120	30

SINCE 1976

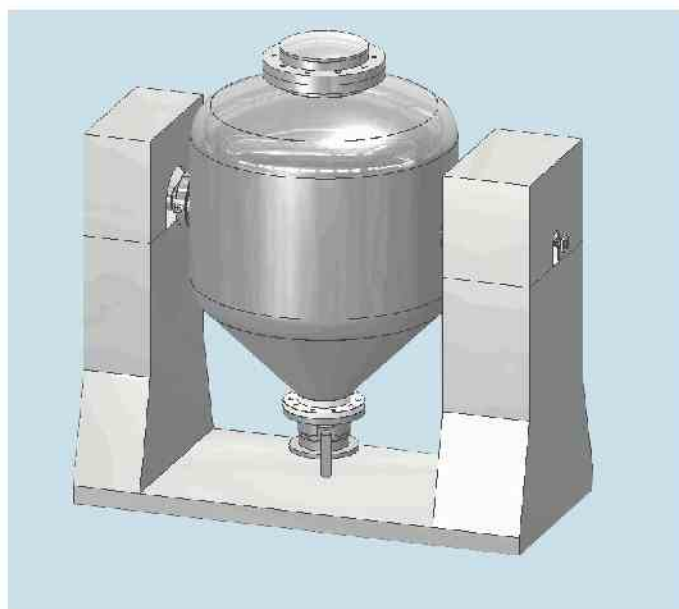
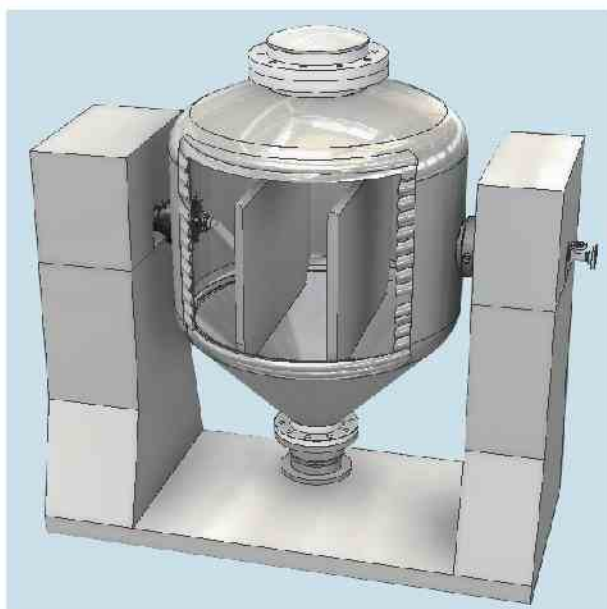
SINGLE CONIC ROTARY CRYSTALLIZER

Summary

Due to the particularity of the material, the traditional structure cannot guarantee the sufficiency of the material and uniformity of temperature in the tank, and the crystal form is not good enough. In order to improve the internal structure of traditional crystallization tanks, an internal heating board has been added in the tank to cool material down to a predetermined temperature in a short time. Comparing with the traditional jacket temperature control method, refrigerant is designed to flow through both jacket and internal heating board to optimize temperature control. The internal and external control design can ensure uniform temperature and form efficiently.

Features

Comparing with the traditional double cone type crystallizer, there is no filter plate needed in this equipment. In the vacuum head, we modify the design from traditional horizontal vacuum tube to a rotatable structure with a bent tube. When upward, it can be used for feeding. When it is downward, the supernatant can be extracted from the upper part of the crystal material. The new structure, instead of the original filter plate, can separate material from mother liquid. Due to the bent feed pipe upwards design, the loading coefficient can reach more than 65%, while the traditional horizontal vacuum tube design can reach below 50%.





Working principle

Turn barrel to the horizontal position after feeding. At the same time, put refrigerant into jacket and internal heat conduction plate. Due to the direct contact between the heat plate and materials, heat exchange is uniform and fast, which not only improves the purity of materials, but also decrease the exchanging time and improve the productivity. After crystallization, switch on and rotate the equipment in 360 °. Materials will be off from the barrel. Prepare for the next step to extract supernatant. The vacuum head is downward when you extract. After this step, adjust vacuum head upward. At the same time, switch on and rotate the equipment to make it vacuum and dry. When materials are dry enough, turn cone end downward, then completely discharge.

Usage

This crystallizer can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. It is mainly used for protecting crystal form of some materials, of which they have high requirements for crystals' purity in the crystallizing process, from being destroyed, for example, refined naphthalene, borneol, Lithium Hexafluorophosphate, pharmaceutical, etc. Comparing with the traditional crystallizer, blade is unnecessary. Cone head design is for fully discharging.

Technology Parameters

Specification (L)	Diameter of internal tank (φmm)	Diameter of jacket (φmm)	Heat preservation layer (φmm)	Motor power (KW)	Speed
500L	850	920	60	2.2	5
1000L	1040	1116	60	5.5	4
2000L	1340	1416	60	7.5	4
3000L	1600	1676	60	7.5	4
4000L	1800	1866	60	11	3.2
5000L	2000	2070	60	15	3.2
6000L	2100	2184	60	15	3.2
7000L	2200	2274	60	18.5	2.2
8000L	2300	2380	60	18.5	2.2
10000L	2400	2478	60	18.5	2.2
12000L	2500	2580	60	22	2.2
14000L	2600	2680	60	22	2.2
16000L	2700	2780	60	22	2.2
18000L	2800	2880	60	30	2.2
20000L	2900	2980	60	30	2.2
25000L	3200	3280	60	30	1.5
30000L	3500	3580	60	37	1.5

SINCE 1976

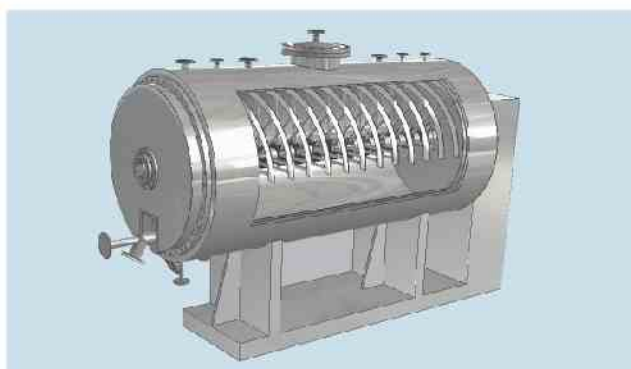
HORIZONTAL STATIC CRYSTALLIZER

Summary

The static crystallizer from our company is designed based on the similar products abroad, but is newly developed and manufactured according to the actual usage of national manufacturers and our rich experience of producing barrel equipment. The horizontal crystallizer is with large volume and small power is needed to stir crystal. This equipment can realize fully sealed operation and manufacture in the whole process, which is especially important for highly dangerous material.

Applications and Features

This crystallizer can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials, mainly used for refined naphthalene, borneol, Lithium Hexafluorophosphate, pharmaceutical, etc, and also crystallization of other products. Jacket structure is applied in this equipment that makes big cooling area available. Ribbon agitator is installed in the barrel with fast cooling speed of materials and efficient crystallization. Meanwhile, through the ribbon agitator, all the materials in the barrel can be cooled uniformly, and ensure that grains after crystallizing will have uniform size.



Technology Parameters

Specification (L)	Diameter of internal tank (Φmm)	Diameter of jacket (Φmm)	Heat preservation layer (Φmm)	Motor power (KW)	Speed
2000L	1200	1280	60	7.5	3
4000L	1300	1380	60	11	3
5000L	1400	1480	60	15	3
6000L	1500	1580	60	15	3
8000L	1600	1680	60	18.5	3
10000L	1800	1880	60	18.5	3
12000L	1900	1980	60	22	3
14000L	2000	2080	60	22	3
16000L	2100	2180	100	22	3
18000L	2200	2280	100	30	3
20000L	2300	2380	100	30	3
25000L	2400	2480	100	30	3
30000L	2500	2580	100	37	3



CONDENSER

Working principle

After absorbing the heat of cooled objects in the evaporator, the liquid refrigerant is vaporized into steam with low temperature and low pressure, sucked in by the compressor. Then it is discharged into the condenser after being compressed into steam with high temperature and high pressure. In the condenser, it releases heat to the cooling medium (water or air), and it will be condensed into high-pressure liquid. After being throttled into refrigerant with low temperature and low pressure by the throttle valve, it enters the evaporator again for heat absorption and vaporization, so that the purpose of repetitive cooling is realized. Thus, one cooling cycle is completed after the refrigerant undergoes evaporation, compression, condensing and throttling, these four basic processes in the system. Material contact parts can be made from SS304, SS316L, titanium, Hastelloy, PTFE lined or other materials. Its inside wall is treated with electrolytic mirror polishing or mechanical polishing while the outside wall is made from SS304 full-welding structure to preserve heat, and the outside surface is treated with mirror polishing or matte polishing.

Main features

1. As the cooling flow is big and its speed is high, so the heat transfer coefficient is high, generally $K=600 \sim 700(\text{kcal}/\text{m}^2 \text{h}^\circ\text{C})$.
2. It takes small land area when installed vertically, and it can be installed outdoors.
3. The cooling water flows straight at a high speed. Therefore, the requirement for water quality is not very high, and common water can serve as the cooling water.
4. The water scale in the pipe can be easily removed, and it can be done without stopping the cooling system.
5. The temperature rise of the cooling water in the vertical condenser is generally $2 \sim 4^\circ\text{C}$, and the logarithmic mean temperature difference is generally $5 \sim 6^\circ\text{C}$, so water consumption is high. As the equipment is put in the air, the pipe will be easily corroded, but leakage will be easily found if it occurs.



Product Specification

Parameters Item No.	Size of Heat Exchange Area (m^2)	Working Pressure (MPa)	Working Temperature $^\circ\text{C}$	Heat-Transfer Coefficient $\text{W}/\text{m}^2\cdot\text{K}$
ZLL1	0.4-1.2	0.6-1.0	≤ 120	≤ 350
ZLL2	1.3-3.5			
ZLL3	4-11			
ZLL4	13-27			
ZLL5	30-54			
ZLL6	55-90			
ZLL7	3-7			
ZLL8	8-11			
ZLL9	12-28			
ZLL10	35-60			
ZLL11	80-120			
ZLL12	140-180			

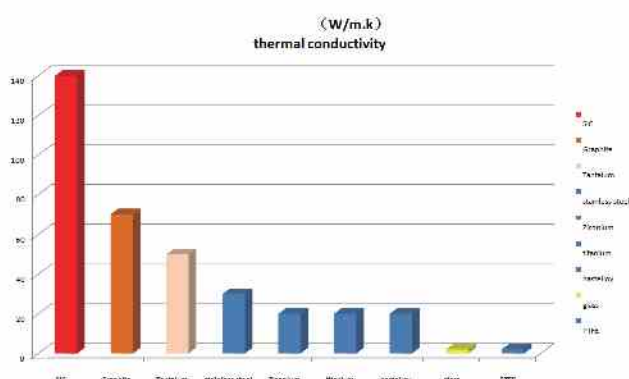
SINCE 1976

SIC HEAT EXCHANGER

Summary

Silicon Carbide ceramic is used as the heat transfer medium in SiC Heat Exchanger, a new type of heat exchanger. Thanks to its excellent performance on corrosion resistance, high temperature resistance, high thermal conductivity, high hardness and wear resistance, Silicon Carbide ceramic heat exchanger is application to the condition of high temperature and corrosion-resistance.

Excellent thermal conductivity



Thermal conductivity for materials

Corrosive medium	Temperature (°C)	Corrosion rate (mg/cm2.Y)	Corrosion rate mm/Y
98% H ₂ SO ₄	100	0.98	0.98
54% HF	25	0.06	0.06
50%NaOH	100	1.25	1.25
45%KOH	100	0.04	0.04
70%HNO ₃	86	0.04	0.04
37%HCL	25	0.07	0.07
10%HF+HNO ₃	25	0.05	0.05
10%HF+HNO ₃	120	1.25	1.25

Corrosion resistance of SiC



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Characteristics

Excellent thermal conductivity
Various corrosion resistance performances
Abrasion and erosion resistance, washed by medium at high speed
Good mechanical properties
No risk of contamination to medium



Advantages

- Multiple patented technologies
- Multiple types of tube sheets: single tube sheet, multi-tube sheet
 - single tube sheet is used for the general working condition
 - multi-tube sheet (patented technology) significantly improves its rigidity, and greatly reduces the risk of leakage to the connector under the condition of high-temperature, high-pressure and mixed process of materials
- Solution of vibration and fracture to SiC tubes
- Special design of the structure greatly cuts the possible leakage points
- Active anti-leakage technology: the heat exchanger can still run normally even slight leakage happens to the gasket
- It can be used as a single heat exchanger, as well as internal parts
- Heat exchange calculation capacity and scientific research team with rich experience
- Strong technical force with anticorrosive equipment
- After-sales service team with quick response

Optional Materials

Optional Materials

Corrosion part: glass-lined, plastic lining, glass reinforced plastics

Service part: carbon steel, stainless steel, enamel, plastic lining, fiberglass

Heat Exchange Tubes: SiC

Remarks: heat exchanger made from different materials has its own advantages, so clients can pick up the best choice based on the process conditions.

SINCE 1976

AGITATED NUTSCHE FILTER DRYER

Summary

The Agitated Nutsche Filter Dryer can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. It can replace the filtering and drying equipments at the same time (such as: vacuum filter, pressure filter, Double-cone Drying machine and drying box...etc.). It completes the whole process of filtering, washing, drying, solid discharging in the same equipment. It is widely applied in the industries, such as pharmaceutical, chemical engineering, agrochemical, food, etc. It is the most ideal equipment for filtering and drying. What' s more, it can realize the continuous operation without air, and even more suitable for producing sterile and poisonous products.



Filter stage: the separation of filter cake and mother liquid. The thickness of filter cake can reach 500 mm.

Washing stage: further purification of filter cake, rinse and dehydration of mother liquid remained. Mix the lotion and the filter cake via up and down of agitator by layers to make the filter cake slurry finally, then the filter cake can get the full wash.

Drying stage: dehydrating and drying the filter cake. Agitator will scrape filter cake loose by layers while the sidewall; the bottom of filter plate and agitator will heat the filter cake at the same time. Moreover, The vacuum inside the equipment will accelerate the evaporating speed; the entered hot nitrogen will take away the damp and accelerate the speed of desiccation.

Bottom plate structure: : SUS304/316L

Filter plate: sintered plate/filter cloth (normally 1~50 μ m)

Flatness degree of single plate: ± 1 mm/m

A: The fixed bottom plate is welded on the vessel and has heating system for heating and drying.

B: The removable bottom plate: clipping the two pieces of flanges with clamps in order to seal completely. The bottom plate can be removed and landed by hydraulic cylinder. Special C-shaped bolts or quick opening clamp can be used to lock the bottom plate and barrel tightly. There are wheels under the bottom plate to help to wash filtering board. The bottom plate has the heating system with two types: flowing heating and pipe heating. The filter plate is fixed with stud bolts under the bottom plate, which makes filter plate balanced. There is no stud bolt in the part of connecting with product. **Discharging section:** The dried materials are automatically discharged from the side discharging vent under the reverse rotation by the S type mixing blade and enter into packaging directly.



A. Stir through clockwise and anticlockwise rotation :

1. The agitator shaft is driven by gearbox and motor. And inverter can adjust the rotating speed.

2. The rotation, up and down of the agitator are driven by Hydraulic system and regulating valve controls the speed. Stir up and down. Up and down of the bottom is also driven by Hydraulic system. The pump can be controlled by hand or by electric or by pneumatic.

B. Reducer uses domestic or imported products

C. Rotation speed: be controlled in the range of 1-15 rpm/min by inverter, containing a safety device.

Main features :

A. Economical energy: The electrical engineering power is small (big speed ratio of Gear Box: I = 46.3)

B. CIP and SIP; sterile by steam (122°C)

C. Double-line O-rings for seal between bottom plate and vessel, no dead angle, "GMP" designs are suitable for sterilizing and cleaning, attaining an ideal sealing effect.

D. Reduce the labor strength of operators, and avoid the pollution of the product, meeting "GMP" request



Sanitary Manway



Discharge Device

Product Specification

Product specification	Capacity (m ³)	Filter area (m ²)	Travel route of the mix blend (mm)	Electrical motor power (kW)
φ800	0.6	0.5	250	4
φ1000	1.2	0.8	300	5.5
φ1200	1.5	1	300	5.5
φ1400	2.2	1.5	400	7.5
φ1600	3	2	400	7.5
φ1800	3.5	2.5	400	11
φ2000	4	3	400	11
φ2300	5.7	4	400	15
φ2400	6	4.5	450	15
φ2800	9.5	6	450	18.5
φ3000	10.2	7	500	22
φ3200	12	8	550	30
φ3600	18	10	550	45
φ4000	22	13	550	45
φ4200	25	14	550	55
φ4600	30	16	550	75

SINCE 1976

NUTSCHE FILTER

The principle of design

Nutsche filter device can be made of 304, 316L, titanium, Hastelloy, PTFE material lined and other materials. The design principle is as follows :

1. The whole vessel is designed and made according to pressure vessel standard.
2. It can work in the closed environment in the whole process.
3. At the filtering stage, it mainly relied on vacuum on the bottom part of vessel. In order to improve the filtering efficiency, pressure can be brought in the vessel, but generally no more than 0.3 MPa.
4. After the filter cake is dried, it' s in high density, so the S-type blade looses the filter cake though the anticlockwise rotation, ascending and descending.
5. At the washing stage, the materials in the vessel can be totally washed through the clockwise rotation, up and down by the S-type blades
6. The bottom plate and the vessel are not removable. The supporting board and punching plate on the bottom plate will not only help liquid flow, but also make installing filter cloth easier.
7. Filter cloth, non-woven cloth and sintering net can be used as the medium of filtration
8. Products are discharged through S-type blades automatically from the side discharge outlet.
9. Clockwise and anticlockwise rotation of the agitator are driven by motor reducing gear, and regulate the ascending and descending speed. Both domestic and imported reducers are acceptable.



Product Specification

Product specification	Capacity (m ³)	Filter area (m ²)	Travel route of the mix blend (mm)	Electrical motor power (KW)
φ1000	1.2	0.8	300	5.5
φ1200	1.5	1	300	5.5
φ1400	2.2	1.5	400	7.5
φ1600	3	2	400	7.5
φ1800	3.5	2.5	400	11
φ2000	4	3	400	11
φ2300	5.7	4	400	15
φ2400	6	4.5	450	15
φ2800	9.5	6	450	18.5
φ3000	10.2	7	500	22
φ3200	12	8	550	30
φ3600	18	10	550	45
φ4000	22	13	550	45
φ4200	25	14	550	55
φ4600	30	16	550	75
φ5000	36.5	19.5	600	75



CONTINUOUS TURNTABLE NUTSCHE FILTER

Summary

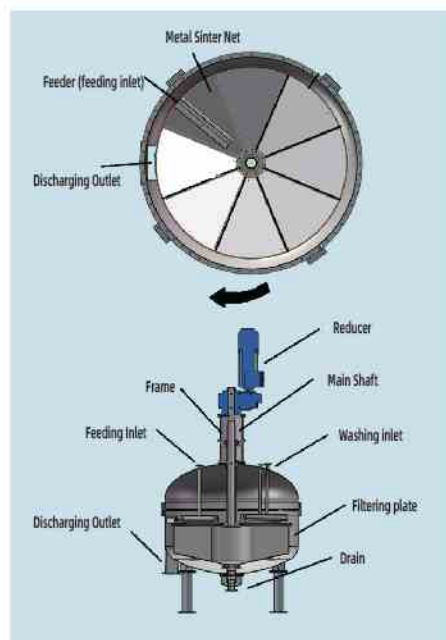
With the development of production in the pharmaceutical and chemical industry, the turntable vacuum filter equipment that can take the place of both filtering and washing equipment (such as suction filter, pressure filter, etc.) has been developed by our company to meet the market demands. The whole process of filtration, washing and unloading can be done in the same equipment, which reduces the labor intensity and avoids huge consumption in each unit. This equipment has the advantages of simple operation, easy feeding and discharging, and it can run under sterile conditions, with less pollution of materials and higher product quality, matching the requirement of "GMP". The vacuum filter consists of frame, cylinder, filtering turntable, transmission mechanism, feeding pump, feeding pump for washing liquid, vacuum pump, electrical controller, etc.

Design Principle

1. The cylinder is designed and made as a vacuum container
2. The whole process can be completed in the sealed environment.
3. The whole turntable filter is equipped with one feeding inlet, two-step washing inlet, and one turntable rotating 360 ° automatically. The feedstock is in the front end of the washing liquid inlet, during the rotation of the turntable, it will be evenly distributed on the filter cloth. After continuous feeding, a filter-cake layer will be slowly formed, while the washing liquid will go through the rear end of the washing inlet, sprayed on the filter cake. The bottom part of the cylinder will be vacuumized, then working on filtering and washing. There is a scraper above the discharging outlet. After fed and washed for several time, the filter cake will be high enough to be automatically scraped from the filter disc by the baffle plate. It works continuously in the process of feeding, washing and discharging during production that improves the filtering and washing efficiency.
4. At the filtering stage, the bottom of the cylinder is vacuumized to isolate the liquid.
5. The outlet sheath is detachable, which is easy for installation, disassembly and cleaning.
6. Materials are automatically discharged by the baffle plate through the reverse push.
7. The motor reducer drives the main shaft, then the turntable rotates forward, the speed of which is changed by regulation.
8. The amount of feedstock and washing liquid can be controlled by adjusting the flow of the metering pump.

Features

1. The turntable vacuum filter can works continuously in the process of feeding, washing and automatically discharging in the sealed condition;
2. The turntable is equipped with several-step washing spots, rotating 360 ° automatically to feed, wash for several time and discharge, which improves the efficiency;
3. Continuous feeding and discharge, fully automatic production;
4. Applicable for viscous, flocculent, flaky and poor crystallized products
5. Its production capacity is greatly improved compared with that of nutsche filter in ordinary batches, tank-type, cone-type and candle-type, increased by 4 to 6 times in the same specifications.



SINCE 1976

PADDLE VACUUM DRYER

Summary

The Paddle vacuum dryer based on the domestic and foreign technology is optimized and improved for various materials, such as slurry, paste, granular, powder, fiber, etc. Materials' contact parts can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. The inside wall is treated with electrolytic mirror polishing or mechanical polishing while the outside wall uses SS304 full-welding structure to preserve heat, and outside surface is treated with mirror polishing or matte polishing.

Application range

1. Material that needs to be dried in the vacuum condition in pharmaceutical, food, chemical and other industries
2. Apply to slurry, paste and powder materials
3. Heat sensitive materials of low-temperature drying requirement
4. Easily oxidized, explosive, strong stimulation, highly toxic materials
5. Organic solvent of materials that needs to be recycled

Features

1. High vacuums, which can reach 20Pa.
2. CIP, improve productivity and quality.
3. The wide application range, fast drying, high thermal efficiency.
4. Easy, practical, reduce labor intensity.



Technical parameters

Project	Item No.								
	ZPG-500	ZPG-750	ZPG-1000	ZPG-1500	ZPG-2000	ZPG-3000	ZPG-4000	ZPG-5000	ZPG-6000
Working Volume L	300	450	600	900	1200	1800	2400	3000	3600
Size of Heating Area m ²	3.2	4.4	5.1	6.3	8.1	10.6	12.3	14.2	16.5
Rotation speed of blending rpm	8~18								
Power KW	4	5.5	5.5	7.5	7.5	11	15	18.5	22
Pressure in Interlayer Mpa	0.35								
Pressure in cylinder Mpa	-0.092/-0.096								



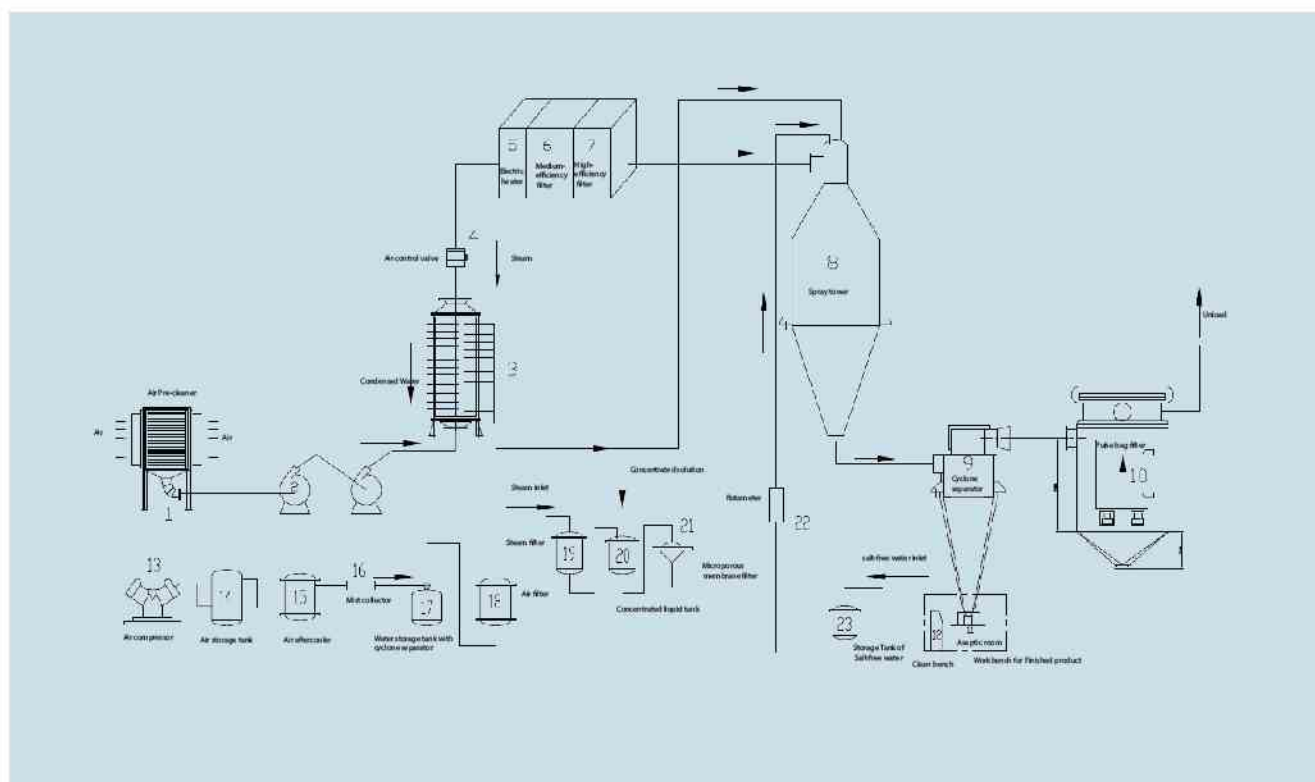
LOW ENERGY CONSUMPTION ASEPTIC SPRAY DRYER

Summary

Air is provided by centrifugal fan or compressing air in this series of the drying unit. Instead of heating by electricity, the primary filtration system and hot air are heated by air-blower and steam of hot air, with electric heating compensation. In the filtering system it has pre-filter, secondary filter and high efficient filter, which improves the decontamination quality of the hot air and reduces power consumption. High efficient air filter takes micro fiber glass paper as medium, using binder that can bear 0~150°C to seal and pack, the decontamination degree of 0.5μm dust can reach no more than 10 /L, which means high purified quality and exactly meet the low energy consumption and sterile requirements.

This machine uses the new developed three-stream type air sprayer that has a good liquid-air contact, spraying uniformly, helps to achieve sterile operation. It can be easily operated due to its simple structure. The contact of the atmosphere with the pressure spray system and hydraulic pump pillar seal is avoided. Centrifugal atomizer rotating shaft is not easy to be sealed and it is possible that material is stick and left in the centrifugal plate. The whole drying processes should be realized in the purified hot air, which protects the material from secondary pollution, well guarantees the sterile condition for material during the drying process, meet the GMP request.

Flow Chart



SINCE 1976

U-SHAPE MIXING VACUUM DRYER

Summary

The U-shape mixing vacuum dryer is one of the main drying equipment that make various antibiotics, crystal and other granular materials in pharmaceutical and the chemical industries. It is especially applicable to drying strong adhesive material.

Structure and characteristics

1. U-shape vacuum dryer has a jacket to conduct heat. Its slot cover can open automatically and heat at the same time. There is a hollow agitator who can conduct heat inside the vessel, and this agitator rotates clockwise and anticlockwise, then the material inside the vessel will fully accept heated during forced mixing, speeding up the evaporation, and take away the steam through vacuuming to dry.

2. The equipment can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials, and the jacket and heat insulation are all made from SUS 304 or 316 L stainless steel, both inside and outside walls are all polished, not only easier to clean to meet the sterile requirement of medicine, but also helping the heat conduction, shorten the drying time.

3. The equipment has bigger area for conducting heat. (Compared with the double-cone rotary vacuum dryer, it has over 1/3 more areas for conducting heat, with 70% loading capacity, 50% drying time less). It has high heat conduction coefficient, small covering area, and lots of other advantages.

4. Low operation cost. The secondary cycloidal-pin wheel reducer is applicable for driving. Its power is 4KW, which is 40% lower than that of other dryers of different types. Therefore, the driving power is low and the speed ratio is high. The output torque can greatly reduce power consumption.

5. It is suitable for treatment of raw materials of high moisture. Due to forced mixing and heat transfer, it is the most suitable for processing particles and raw materials of high moisture. The block materials at the inlet will not agglutinate after finishing drying.





U-SHAPE AIRFLOW DRYER

Summary

U-shape hot air agitated dryer is one of the main drying equipment for refining various antibiotics, crystalline or other powder materials in pharmaceutical and chemical industries, of which the main part is a drying chamber equipped with an agitator. In addition to one feed valve and one discharge valve separately set on the chamber, there is a blower, a heater and the blowback system. The air flow of the blower enters the heater for heating after passing through the primary and high efficiency secondary filter.

Main Structural Features

1. The outlet of the heater is connected to the drying chamber, and a pneumatic valve is set on the heater.
2. Connected with the drying chamber, there is a drying box located on the upper part that is provided with a dust-filtering column to prevent micro powder from being brought out of the equipment with the air flow. The column is equipped with a blowback system, which can be set with timing pulse blowback, or automatic detection of whether the filtering column is blocked through the pressure difference, and automatically opening the compressed air to back blow it.
3. The inner wall, jacket and thermal insulation of U-shape dryer are made of SUS304. All the internal and external surfaces are polished for easy cleaning, which is conducive to meeting the hygienic requirements of drugs, conducting heat, and speeding up the drying process.
4. The loading capacity of common dryers cannot reach 50% of its volume, however, U-shape hot air dryer is not only easy to operate, but its loading capacity can also reach 70% of its volume, which cannot be achieved by other dryers. Under the same conditions, compared with others, its drying speed is as quick as more than five time of them. In a word, it has the advantages of fast drying speed and high efficiency.
5. The operation cost is low, as it is the two-stage cycloidal-gear reducer applied, its motor power required is about 50% of other drying equipment in the same size, so it is with small transmission power, large speed ratio and much less power consumption because of the output torque.



SINCE 1976

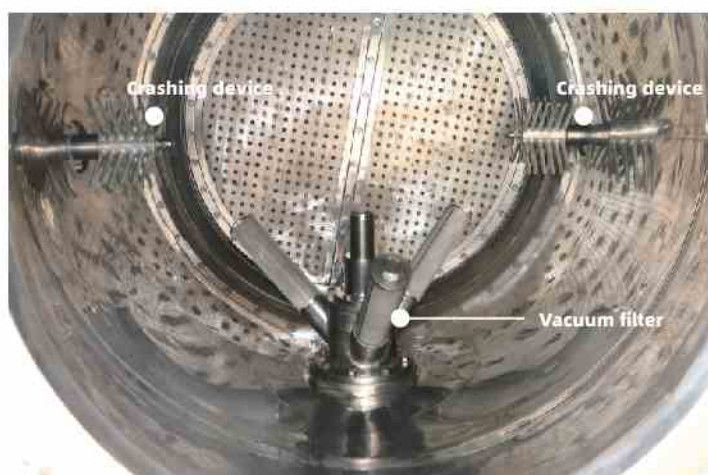
MULTIFUNCTIONAL DRYING UNIT WITH BLADES

Summary

This unit is improved from basis of double-cone vacuum rotary dryer and added two blades at the diagonal position of cones which can help solve the pilling problem. It can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. It is a multifunctional unit with reaction, crystallization, condensing, filtering, cleaning, drying, crashing, etc. The biggest advantages of this unit are its multifunction, small covering area, small investment, simple operation, high efficiency, low labor strength, high safety, long service life, convenient installation, etc. The unit is suitable for pharmaceutical and chemical products with high additional valuable materials, or poisonous, flammable, explosive, little batch. It is even applicable for the material that must meet the GMP request.

Design principle

1. The center of this container is a cylindrical shape; both ends are in the conical shape. The top part of the cone is designed for loading and unloading with the opening type. In addition, in-situ sampling and mixing-breaking device are also installed. Some material may be pilling when rotating step. This breaking device can smash the pilling stuff thoroughly and reach ideal effect.
2. The vacuum absorbing cover is designed in the central part of the container, which has four vacuum heads totally. This kind of vacuum heads is made from the 316L metal sinter net with six layers, which is also imported from Japan. It has following advantages: convenient replacement, easy to clean, anti-blowing and no fleck, etc.
3. At the vacuum part, there are devices for loading material in place, loading lotion in place, pressing and filtering in place, loading for protecting gas-nitrogen and sterilizing interface, etc.
4. This unit has the man-machine interface control and explosion-proof control in all the working procedures of reaction, crystallization, condensing, filtering, cleaning, drying and crashing.
5. One or two crashing devices can be installed according to the product features.





Work principle

1.Reaction, crystallization and concentration stage:

The cone with mixer is downward. Mixing form can be chosen freely according to the characters of materials. The material is sent to the equipment from loading position on the side of the equipment. The continuous turning of the mixing blade makes reaction, crystallization and concentration.

2.Filtering stage:

Rotate the container for 180 degrees and turn the cone with the filtering plate downward. Connect the bottom of this cone with a vacuum device and complete the separation of filter cake and mother liquid.

3. Washing stage:

After filtering, take into the lotion, then start the mixing liquid, rotate the container at the same time, crash the filter cake and purify it further by lotion, then wash the rest mother liquid and dehydrate.

4.Drying stage:

After the second filtering stage, anti-blow the container by nitrogen gas through the vacuum orifice. Make the filter cake separate from the filter net. Rotate the container, and in this process, let the filter cake crashed by crusher. Make the hot water circulate in the jacket to heat the whole container, dry the material under the vacuum condition. Sampling in place process is also done. The tornado separation machine can catch and gather the tiny powder while the condenser can collect organic solvent.

Electrical control

1.The operation site uses the man-machine interface control or explosion proof control. One craft parameter is set in each working procedure, so it can be operated automatically under the normal work conditions, and also can be manually operated according to different sorts of materials.

2.All electrical equipment in the operation site are designed with explosion proof class dB II.

Product Specification

Capacity (L)	500	750	1000	1200	1400	1600	2000	2500	3000	3500	4000	5000	6300	7000	10000
Filter area (m²)	0.125	0.125	0.196	0.196	0.196	0.196	0.5	0.5	0.5	0.8	0.8	0.8	1.1	1.1	1.1
Thickness of filter cake (mm)	500	500	600	650	650	700	700	800	800	1000	1200	1300	1300	1300	1300
Cubage of cake (m3)	0.16	0.17	0.3	0.36	0.39	0.45	0.66	0.81	0.85	1.46	1.89	2.2	3.0	3.2	4.5
Loading quantity (L)	250	370	500	600	700	800	1000	1250	1500	1750	2000	2500	3150	3500	5000
Power of the main electromotor (kw)	2.2	2.2	5.5	5.5	5.5	5.5	7.5	7.5	7.5	11	11	11	15	18.5	22
Power of the blender (kw)	0.75	0.75	1.1	1.1	1.1	1.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Rotate speed of dryer (R/min)	0-5					0-4					0-3.2				
Rotate speed of blender (R/min)	0-280														
Machine weight (kg)	1782	2135	3273	3456	3683	3963	4282	4633	5487	7835	8255	8972	9580	11500	13900
Area of condenser matched (m²)	7	7	10	12	14	16	20	25	30	35	40	50	70	70	100

SINCE 1976

MULTIFUNCTIONAL DRYING UNIT

Summary

This unit is developed on the basis of the design principle of double-cone vacuum rotary dryer and integrate the advantages of agitated nutsche filter dryer and double-cone dryer. It can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. It is a multifunctional unit with reaction, crystallization, condensing, filtering, cleaning, drying, crashing, etc. The biggest advantages of this unit are its multifunction, small covering area, small investment, simple operation, high efficiency, low labor strength, high safety, long service life, convenient installation, etc. The unit is suitable for pharmaceutical and chemical products with high additional valuable materials, or poisonous, flammable, explosive, little batch. It is even applicable for the material that must meet the GMP request.

Design principle

1. The center of this container is a cylindrical shape; both ends are in the conical shape. The top part of the cone is designed for loading and unloading with the opening type. In addition, in-situ sampling device is also installed. Another side of the cone installs a filtering plate, in which is the metal sinter net with six layers made from 316L and imported from Japan. It has many advantages, such as high filtering accuracy, high strength, convenient installation and low cost, etc.
2. The vacuum absorbing cover is designed in the central part of the container, which has four vacuum heads totally. This kind of vacuum heads is made from the 316L metal sinter net with six layers, which is also imported from Japan. It has following advantages: convenient replacement, easy to clean, anti-blowing and no fleck, etc.
3. At the vacuum part, there are devices for loading material in place, loading lotion in place, pressing and filtering in place, loading for protecting gas-nitrogen and sterilizing interface, etc.
4. This unit has the man-machine interface control and explosion-proof control in all the working procedures of reaction, crystallization, condensing, filtering, cleaning, drying.
5. One or two crashing devices can be installed according to product features.

Work principle

1. Reaction, crystallization and concentration stage:

The cone with mixer is downward. Mixing form can be chosen freely according to the characters of materials. The material is sent to the equipment from loading position on the side of the equipment. The continuous turning of the mixing blade makes reaction, crystallization and concentration.

2. Filtering stage:

Rotate the container for 180 degrees and turn the cone with the filtering plate downward. Connect the bottom of this cone with a vacuum device and complete the separation of filter cake and mother liquid.

3. Washing stage:

After filtering, take into the lotion, then start the mixing liquid, rotate the container at the same time, crash the filter cake and purify it further by lotion, then wash the rest mother liquid and dehydrate.

4. Drying stage:

After the second filtering stage, anti-blow the container by nitrogen gas through the vacuum orifice. Make the filter cake separate from the filter net. Rotate the container, and in this process, let the filter cake crashed by crusher. Make the hot water circulate in the jacket to heat the whole container, dry the material under the vacuum condition. Sampling in place process is also done. The tornado separation machine can catch and gather the tiny powder while the condenser can collect organic solvent.



Electrical control

- 1.The operation site uses the man-machine interface control or explosion proof control. One craft parameter is set in each working procedure, so it can be operated automatically under the normal work conditions, and also can be manually operated according to different sorts of materials.
- 2.All electrical equipments in the operation site are designed with explosion proof class dB II .



Product Specification

Capacity (L)	500	750	1000	1200	1400	1600	2000	2500	3000	3500	4000	5000	6300	7000	10000
Filter area (m²)	0.125	0.125	0.196	0.196	0.196	0.196	0.5	0.5	0.5	0.8	0.8	0.8	1.1	1.1	1.1
Thickness of filter cake (mm)	500	500	600	650	650	700	700	800	800	1000	1200	1300	1300	1300	1300
Cubage of cake (m3)	0.16	0.17	0.3	0.36	0.39	0.45	0.66	0.81	0.85	1.46	1.89	2.2	3.0	3.2	4.5
Loading quantity (L)	250	370	500	600	700	800	1000	1250	1500	1750	2000	2500	3150	3500	5000
Power of the main electromotor (kw)	2.2	2.2	5.5	5.5	5.5	5.5	7.5	7.5	7.5	11	11	11	15	18.5	22
Power of the blender (kw)	0.75	0.75	1.1	1.1	1.1	1.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Rotate speed of dryer (R/min)	0-5					0-4					0-3.2				
Rotate speed of blender (R/min)	0-280														
Machine weight (kg) (kg)	1782	2135	3273	3456	3683	3963	4282	4633	5487	7835	8255	8972	9580	11500	13900
Area of comdenser matched (m²)	7	7	10	12	14	16	20	25	30	35	40	50	70	70	100

SINCE 1976

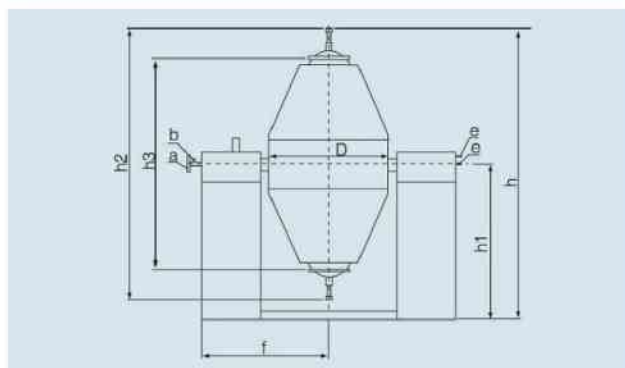
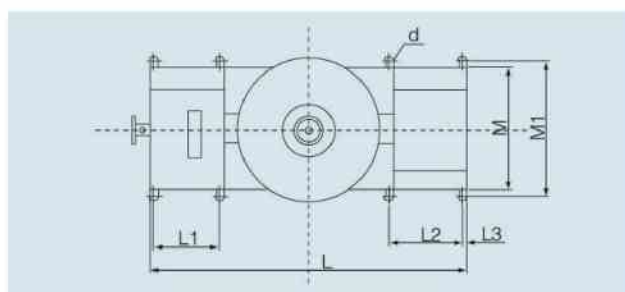
DOUBLE CONE VACUUM DRYING UNIT

Summary

This series of products is one of the equipment that be researched and developed and been transferred by Shanghai Medical Industry Institute, mainly applicable for drying all kinds of granular materials, such as antibiotics, crystal, in the pharmaceutical, chemical and other industries.

Main characteristic

- 1.The cone angle is designed as 60° which prevents materials from pilling during rotary process and avoids powder retention during discharging.
- 2.The special design of vacuum pipes and vacuum filter increases the loading coefficient, which can even reach 65%.
- 3.The device includes three layers. The parts touching with materials can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. Jacket in the middle is for hot water circulation. To prevent stainless steel and carbon steel from producing static corrosion, the jacket must be made from stainless steel, and the outer layer uses fiberglass cotton for heat preservation.
- 4.High concentric degree of two shafts: less than $12\mu\text{m}$ for 1000L or below, less than $16\mu\text{m}$ for 1000L to 3000L, less than $25\mu\text{m}$ for 3500L to 5000L.
- 5.Good stability: The whole frame is welded together with channel steel and carbon steel, outside covered with stainless steel plates.
- 6.Good sealing performance: concentricity of the shaft is well controlled, both ends of which use mechanical seal.
- 7.Good rigidity: Both ends of the cone are welded together with the vessel, hard to be deformed.
- 8.Steady transmission: The whole unit is driven by the electrical motor, reducer, big and small gears, which enables it to run more stably and reliably.
- 9.Designed with SIP, CIP dedicated device.





The First set of Double-cone Vacuum Drying Unit in China in 1978



5L testing Double Cone Vacuum Drying Unit

Technology Parameters

Machine Volume	20L	50L	100L	200L	300L	500L	750L	1000L	1200L	1400L	1600L	2000L	2500L	3500L	5000L	6300L	7000L	10000L	
D	φ380	φ490	φ500	φ600	φ877	φ1027	φ1124	φ1242	φ1312	φ1372	φ1432	φ1544	φ1612	φ1870	φ2070	φ2306	φ2360	φ2614	
h	1155	1306	1640	1890	2312	2390	2553	2935	3014	3094	3162	3293	3557	4125	4606	4322	4167	5190	
h1	800	792	1080	1160	1462	1440	1440	1810	1810	1810	1810	1810	2010	2340	2561	2584	2500	2950	
h2	600	1027	1259	1440	1700	1900	2226	2250	2407	2567	2704	2966	3110	3591	4090	3475	3050	3960	
h3	400	690	785	930	1126	1280	1543	1750	1907	2067	2504	2450	2594	2947	3480	2968	3012	3436	
L	820	1165	1594	1790	1904	2134	2140	2580	2650	2710	2770	2880	2940	3804	4004	4260	4281	4750	
L1	375	360	450	450	450	500	500	700	700	700	700	700	700	1000	1000	1000	1000	1000	
L2	275	275	450	450	450	500	500	700	700	700	700	700	700	1000	1000	1000	1000	1000	
L3	20	20	25	25	27	27	27	36	36	36	36	36	36	42	42	40	40	40	
M	355	400	640	800	804	954	954	1002	1002	1002	1002	1002	1002	1604	1604	2200	2200	2500	
M1	400	465	685	850	850	1000	1000	1070	1070	1070	1070	1070	1070	1700	1700	2300	2300	2610	
a	Pg2.5Dg15		Pg2.5Dg50			Pg2.5Dg70		Pg2.5Dg100						Pg2.5Dg150					
b	M8	M10	M12													M16	M16		
c	DN10	DN15	G3/4 "			G1 "	G3/4 "	G1 "	G1 "								G2 "		
d																			
e	M16×300				M16×400			M16×500		M16×600			M16×700		M30×700				
f	405	630	734	680	1067	1185	1135	1440	1474	1510	1534	1600	1625	2050	2160	2250	2140	2270	

SINCE 1976

NAUTA CONICAL DRYER

Summary

Nauta conical dryer is an efficient, fully sealed, multifunctional vertical vacuum drying equipment integrating drying and mixing, using the spiral belt to rotate and lift materials, meanwhile, simultaneously filling the conical jacket and the hollow spiral belt with the heat transfer medium (such as hot water, heat transfer oil, steam, etc.), so that the heated materials can be lifted from all around, and fall in the middle, then quickly and continuously turn over. The water vapor is taken away in time through vacuum pumping in the cylinder, so that materials can be dried and mixed in a short time.

Structural Features and Functions

1. Heated internally by the jacket and spiral belt, the heating surface of the equipment has been enlarged by 40%.
2. The single spiral belt agitator used in the equipment is a patented product of our company, which can achieve cycle-mixture from bottom to up with good performance of efficient forced heat transfer. When the material loading rate is 40% ~ *, the heating utilization of * can be realized. It is applicable for mixing and drying fine materials.
3. Completely sealed system, without pollution of foreign matter, high purity, especially applicable for mixing and drying of pharmaceutical intermediates, APIs and sterile APIs.
4. The gap between the single spiral belt agitator and the container wall is so small that can effectively prevent materials from adhering to the surface of the container wall.
5. The conical cylinder structure with small angle is adopted to make discharge fast and clean, without accumulation.
6. Equipped with the blowback device

In the process of material drying, the dust raised is adsorbed on the vacuum trap, blocking the vacuum channel, and this leads to the extension of drying time. The lower the temperature is during the drying process, the shorter time it takes, and the less the impact on the material quality is. In view of all above, the single cone dryer developed by our company is equipped with a blowback device on the vacuum trap, which can keep the vacuum channel unblocked to shorten the drying time and improve the drying outcome.

7. The bottom discharge valve is the extraction kind with good performance of reliable sealing and vacuum drying





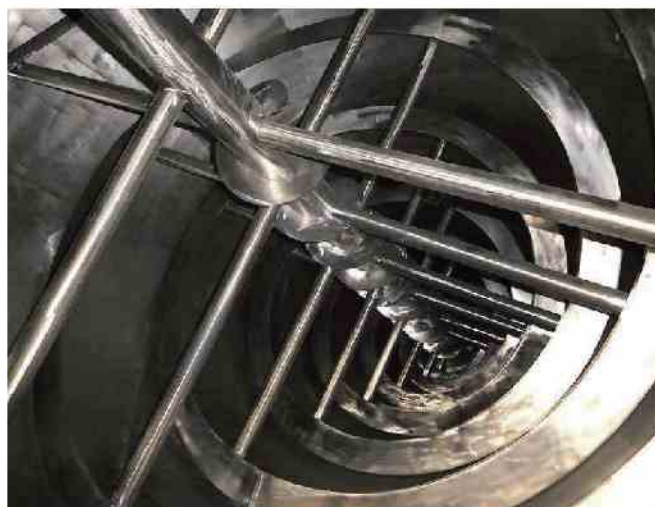
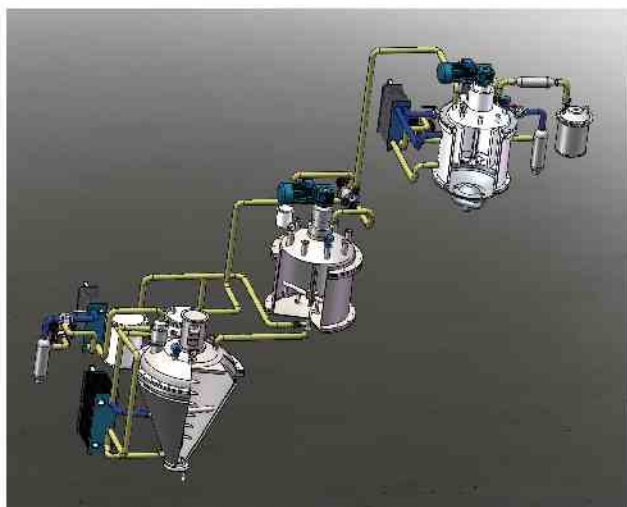
8. The equipment has the advantages of compact structure, smooth operation, good sealing, no lubrication leakage, simple operation, and long service life.

9. Strong adaptability: it is suitable for drying materials with high viscosity, poor heat penetration and easy to pill and agglomerate

- The loading coefficient can be up to 80% of the effective volume
- Large heat transfer surface and uniform heating of materials. The gap between the spiral belt and the cone is so small that can effectively prevent materials from adhering to the inner wall
- Small shear force: no damage to materials with high thermal sensitivity or high requirement on particle size
- Online SIP, CIP and online aseptic sampling are optional

Scope of Application

It is applicable to the concentration, mixing and drying of powder, granular and fiber in chemical, pesticide, dye, pharmaceutical, food, additives, and other industries, as well as materials requiring drying under low temperature (such as biochemical products), and it is more suitable for drying easily oxidized, volatile, heat sensitive, strongly irritating or toxic materials, or those crystals that are not allowed to be destroyed.



SINCE 1976

INFLATABLE SEALING HEMISPHERICAL VALVE

Regarding inflatable sealing hemispherical valve, an airbag pressure ring is fixed on it through bolts, while an annular groove is formed between the valve body and the ring, in which an airbag seal composed of a sealing ring and an annular sealing gasket is installed. There is a hemispherical valve core on the drive shaft on the opposite side wall of the valve body, and a gap fit between the core and the body, airbag seal and airbag pressure ring. When the valve core is opened or closed, no friction happens. The ball valve plays a sealing role only when the airbag seal internally inflates, closely attached to the spherical surface of the core. The lower part of the annular sealing gasket cooperates with the U-shape groove of the sealing ring to form a closed inflation cavity. The side wall of the airbag pressure ring is provided with an air inlet channel connecting with the annular groove, which is sealed at the opening of the annular groove and connected with a ventilation duct extending through the annular sealing gasket into the inflation cavity. The equipment has the advantages of simple structure and good sealing performance, applicable for the feed and discharge valves in the pharmaceutical industry.

Summary

The stainless-steel hemispherical valve equipped with the airbag sealing device fully meets the sealing performance of vacuum resistance and pressure resistance and the requirements of "GMP" sanitary ball valve in the pharmaceutical and food industry, with stable sealing performance, long service life and easy maintenance. Different sealing materials can be applied based on the product requirements, which is suitable for crystal, powder particle and paste material of various densities.

At present, the feed and discharge valves used in the vacuum dryer in the pharmaceutical industry are "stainless-steel eccentric hemisphere valve" (stainless-steel refers to the material and eccentric hemisphere refers to the structure of the valve).

The sealing structure is to make use of the eccentric distance on the rotating shaft of the hemispherical valve. While the valve rotates and closes, with the eccentric wheelbase, the valve core is pressed upward against the sealing surface on the valve seat to finally seal the valve. This kind of valve is specially designed for powdery and granular materials with advantages of no accumulation, no dead angle and easy cleaning that makes it suitable for the pharmaceutical industry.



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD



The sealing ring is in the form of inflation, and there is an external actuator to ensure that the sealing ring remains the inflated state
Materials of the sealing ring: EPDM, fluoro rubber, silicone rubber, perfluoroether, etc

SINCE 1976

VACUUM OVEN

Usage

Vacuum oven is a kind of box type vacuum drying equipment that is widely used for low temperature drying in the negative pressure condition in the pharmaceutical, food, light, chemical and other industries. The parts touching with materials can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. The advantages are fast drying speed, little pollution and good product quality. The oven keeps the workspace vacuum and dry by vacuum pump, which helps reduce the boiling point and fasten drying speed.

Features

Vacuum oven is specially designed for drying heat-sensitive, easily decomposed and oxidized material. Inert gas can be filled into oven, so stuff with some complicated composition can also be dried in a short time. Faster drying speed happens in lower temperature while heat is fully used. Sterilization treatment can be done before drying. And in the drying process, any impurity is prohibited. The dryer is static and vacuum, so that the formation of dry material will not be damaged. It can work in a high vacuum state of 20Pa. Heating methods: steam, hot water and heat conducting oil. The parts touching with materials can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. Its inside wall is treated with electrolytic mirror polishing or mechanical polishing while its outside wall uses SS304 full-welding structure, and its outside surface is treated with mirror polishing or matte polishing.



Compared with the general oven, there are some advantages in vacuum oven. It works under the negative pressure with less oxygen content, which can reduce or eliminate the oxidation reaction. Under the negative pressure, boiling point is reduced, and it avoids the damage of material's quality. If solvent is toxic or valuable, the gas can be condensed and recycled.



Technical parameters

Item No.	BJ YSL-DZF-6020	DZF-6050	DZF-6090	DZF-6210
Size of Working Area: depth x width x height	300×300×275	415×370×345	450×450×450	560×600×640
Overall Size:depth x width x height	605×490×450	730×560×550	610×680×1460	720×820×1750
Power	450	1400	1450	2200
Shelf (standard)	1 块	2 块	2 块	3 块
Temperature range	RT+10°C ~ 250°C			
Temperature resolution	±0.1°C			
Stability of Constant temperature	±1°C			
Vacuum degree	133Pa			
Ambient temperature	+5°C~35°C			
Internal material (optional)	Stainless steel (1gr18ni9ti) or cold rolled sheet (08F)			
Power supply	220V50Hz			

Technical parameters

Item No.	Inter size depth x width x height	Overall size depth x width x height	Number of heat- exchange layers	Gap between layers	Number of baking plates (PCs.)	Size of Evaporation area	Vapor pressure	Vacuum degree	Highest temperature
ZDF-6	1000×1000×1200	1300×1350×1680	8	120	16	5	0.2-0.6	-0.096	80
ZDF-10	1000×1400×1200	1300×1680×1700	8	120	24	7	0.2-0.6	-0.096	
ZDF-15	1160×1360×1200	1500×1700×1700	8	120	32	9	0.2-0.6	-0.096	
ZDF-20	1160×2000×1200	1500×2300×1770	8	120	48	14	0.2-0.6	-0.096	
ZDF-30	1160×2000×1600	1500×2300×2100	10	120	60	18	0.2-0.6	-0.096	

SINCE 1976

PILOT AGITATED NUTSCHE FILTER DRYER

The fully sealed production flow in the pharmaceutical production is the best production mode that is always sought by medicine manufacturers. In this mode, the medicine production flow is not influenced by the outside or any artificial impurities, pollution, etc. Then medicine quality can be effectively ensured and production's environmental influence is the least. The parts touching with materials can be made from SS304, SS316L, Ti, Hastelloy, PTFE lined or other materials. This kind of production mode conforms to the development trend of clean production in the world. To meet the need of sealed production flow, our company has developed the small-sized units for small scale and pilot scale experiments.

It is hard for the traditional shipping method of bulk materials to ensure sterile requirement during the loading or unloading process between conveying vessels (boxes, tanks or PE bags) and production equipment (dryers, mixers, bulk loaders, etc.).

Features

1. The production system flow is fully sealed. The innovative application of the fully sealed material delivery system can realize the fully sealed production flow, from crystallizing till the end of packaging. It is a system operating under the fully closed status, of which the production flow meets GMP requirements better.
2. Safe and environmentally friendly. As the production system is operated under the fully closed status, the pollution of the solvent during production to the operating environment can be completely avoided. Meanwhile, the occurrence of poisoning accident of operators because of contact with noxious materials can be reduced. This advantage becomes more important today with increasingly higher appeal for environmental protection and labor protection.
3. High medicine output rate and complete recovery of solvents. As the whole production system is operated under the fully closed status, the materials and solvents can be fully recycled, avoiding waste caused by material loss, material staying and solvent volatilization. It can bring great economic benefit, especially when the materials disposed and solvents used have high value.
4. High automation degree and easy to master. The flow is carried out in several sections with complete safety measures. The operators can operate the machine after receiving basic training, and the work intensity is greatly reduced.
5. Thorough cleaning of materials can be completed. The filter cake can be mixed again during the washing operation of the equipment, so that the filter cake can be thoroughly cleaned.
6. All operations can be completed in one system. Filtering, washing, drying, delivering and packaging are completed in the same system. The connection of each section is very natural and smooth, and the space is fully used.
7. Clean production. The multifunctional filtering and drying equipment can be operated under fully closed status. It is equipped with dust collector, which is used to collect dust produced during drying and can meet the production and operation requirements for high cleanliness.



Product Specification

Product specification	capacity (L)	Filter area (m ²)	Mixing storke (mm)	E lectrical motor power (kw)
Φ450	80	0.15	120	0.75
Φ500	100	0.2	120	0.75
Φ550	130	0.24	120	1.1
Φ600	170	0.28	150	2.2
Φ650	250	0.4	150	2.2

Introduction of Process

1. First close the whole unit system. Fill aseptic inert gas (such as N₂ gas) for protection. Add the crystallizing liquid to the three-in-one unit through the automatic valve from the crystallizer, and close the feeding valve until certain volume is reached.
2. Add inert gas and increase the pressure to realize the separation of solid and liquid of the crystallizing liquid through the metal filtering plate at the bottom.
3. After the separation of solid and liquid of the crystallizing liquid, spray and wash the filter cake.
4. After washing, lower the mixing device for mixing through the hydraulic pressure device, and heat the materials layer through the heating pipe system for mixing, chassis and tank. Carry out vacuum pumping operation while heating and drying, in order to make solvents evaporate rapidly. At the same time, start the vacuum filter on automatic operation and guarantee normal ventilation of the vacuum system.
5. After the drying degree of materials' layer is acceptable (through sampling inspection or automatic process analysis PAT), stop the vacuum and enter the automatic discharging procedure.
6. Automatic discharging: Lower the mixing device, control the mixing rotation speed and mixing blade slowing the speed to scrape and feed material. Quickly discharge the powder materials into the material-receiving barrel. Cover the material-receiving barrel that is loaded with materials in the glove box. Lean the equipment to thoroughly discharge the materials that cannot be discharged by blades. This can solve the problem of not thorough discharging in the traditional agitated nutsche filter dryer.



DN150 Testing ANFD

SINCE 1976

V-TYPE EFFICIENT MIXER

V-type high efficient mixer is an international widely used powder and granular materials mixer. It owns advantages as simple structure, easy operation, easy maintenance and cleaning, high speed, good mixing effect, etc. It is an ideal mixing equipment that can be widely used in magnetic materials, powder metallurgy, pharmaceutical, chemical, food and other industries.



Working principle

It is suitable for mixing the material with good fluidity and the powder with small differences in physical properties. Also it applies to the material with low requirement of mixing ratio and short mixing time. It will not damage the form of the material because the material in the V-type mixer flows smoothly. Therefore, V-type mixer also applies to mix the granular material that is easily broken and easily wearing. And it is suitable for mixing the finer powder, lump and moisture material.

This design combines advantages of domestic and foreign similar products. Due to the different material plane and transverse force, it can promote the material with lateral interaction. When the mixer is rotated, the material status is from separation to combination and then from combination to separation. The lateral force makes about 25% of the material from one bucket to another one by each circle. In this way, the material is mixed in transversely and longitudinally, so that the material can reach a very uniform mixing effect.

Technical parameters

Item No.	Maximum Loading Volume (L)	Diameter (mm)	Speed(rpm)	Height of Outlet (mm)	Inlet and Outlet (mm)	Overall size L*W*H (mm)	Power (kw)
V-20	10	200	15	550	100*80	1150*380*925	0.37
V-30	15	250	15	550	100*80	1250*400*960	0.37
V-50	25	350	15	550	100*80	1325*420*1000	0.55
V-70	35	400	15	550	150*100	1450*450*1100	0.75
V-100	50	500	15	550	200*100	1570*500*1250	1.5
V-200	100	550	15	550	250*150	1750*700*1700	2.2
V-500	250	600	15	550	250*150	1850*850*2010	3
V-1000	500	650	12	600	250*150	2350*900*1800	5.5
V-1500	750	850	12	700	250*150	2500*900*2280	7.5
V-2000	1000	1000	12	750	300*200	2950*1050*2650	11
V-3000	1500	1200	10	750	300*200	4100*1550*3750	15
V-5000	2500	1350	10	800	300*200	5000*2300*4200	22
V-10000	5000	1750	8	800	450*400	6500*2600*4500	37



ECCENTRIC POWDER MIXER

The eccentric powder mixer is widely used for mixing the material in pharmaceutical, food, chemical, plastic and other industries. Especially it can optimally mix moisture, soft, particles in different proportion and powder material.

Working principle

The equipment is designed by three eccentric principles including center of gravity eccentricity, axial eccentricity, upper and lower eccentricity, and six direction asymmetry including up and down volume asymmetry, left and right volume asymmetry, front and back volume asymmetry. Sided different capacities and multi-directional cross dislocation motion are generated on the basis of design principle for optimizing mixing effect.

Features

1. The equipment owns the advantages of small size, easily feeding and discharging, large capacity, variable frequency control and infrared safety control, etc.
2. The equipment has effectively met the current requirements of domestic large capacity, high efficiency and low cost.
3. The equipment can achieve vacuum feed and discharge, complete discharge and convenient clean, and also meet the requirements of GMP.



Technical parameters

Item No. Project		ZPH-1M ³	ZPH-1.5M ³	ZPH-2M ³	ZPH-3M ³	ZPH-5M ³	ZPH-6M ³	ZPH-10M ³	ZPH-15M ³	ZPH-20M ³
Volume of Mixing barrel (m ³)		1	1.5	2	3	5	6	10	15	20
Maximum loading volume (m ³)		0.6	0.9	1.2	1.8	3.25	3.6	6	9	12
Motor power (kw)		3	4	5.5	7.5	7.5	11	18.5	22	30
Highest speed of vessel (rpm)		6	6	6	6	6	6	6	6	6
Diameter of feeding inlet (mm)		450	450	450	450	450	400	450	450	500
Diameter of Discharge valve (mm)		250	250	250	250	250	250	300	300	300
Overall size (mm)	H	2365	2775	3128	3360	3740	4287	4430	4974	5254
	H1	1572	1815	2012	2138	2504	2980	3035	3185	3318
	H2	500	500	600	600	600	600	600	600	600
	L	2630	3012	3146	3991	4222	4745	4980	5824	5949

SINCE 1976

SINGLE-EFFECT AND MULTI-EFFECT EVAPORATING CONCENTRATOR

When any solution is steamed in the evaporator, secondary steam generated cannot be used any more, and the solution cannot be put in the second evaporator to concentrate, which means that only one evaporator can be used to complete evaporating operation, and it is called "single-effect evaporator". If secondary steam is used for several times to evaporate, then it is usually called "multi-effect evaporation". Actually, multi-effect evaporator is series connection of several single-effect evaporators, but the series connection is divided into three forms, parallel flow, contra-flow and advection.

Usage

The equipment is applicable to recycling of industrial organic solvent (such as alcohol), including traditional Chinese medicine, Western medicine, glucose, wine brewing, starch, oral liquid, food, chemical industry, etc. It can be used in the low temperature vacuum concentration of heat sensitive substances with small batches and large varieties.

Equipment characteristics

1. Recycle alcohol: Large recycling capacity. Vacuum operation method is applied, and it improves the process flow of the device. The productivity can be 5-10 times higher than the similar equipment in old style while energy consumption could be reduced 30%. It is the energy saving equipment with small investment and high recovery benefit.
2. Concentrated liquid: The equipment applies the combination of external heating natural cycling mode and vacuum negative pressure evaporating mode, with instant evaporation and great concentration ratio up to 1.3. The liquid materials are concentrated without foam under the completely sealed status. The liquid medicine concentrated from this equipment has no pollution and strong flavor of medicine, and the cleaning is convenient. (Just open the upper covers of the heater.) The operation is simple, and the area needed is small. The equipment looks beautiful as its heater and evaporator uses stainless steel thermal insulation structure, and the insulating layer is made from stainless steel plates. The touching parts between this equipment and liquid are made from high quality stainless steel, in accordance with GMP medicine standard.





SCRAPER-TYPE FILM EVAPORATOR

Summary

The scraper-type film evaporator is a new type of high-efficiency evaporator, which is forced to form film by rotating scraper and flows at high speed, with efficient heat transfer, short retention time (about 10 ~ 50 seconds), and ability of carrying out falling film evaporation under vacuum conditions. It is composed of one or more cylinders with heating jacket and a film scraper rotating inside. The film scraper continuously scrapes the feed into a uniform liquid film on the heating surface and moves downward. During this process, the components with low boiling point are evaporated and the residue is discharged from the bottom of the evaporator. The equipment shows good performance of high evaporation intensity and good separation, which makes it widely used in evaporation, concentration, desolvation, purification, stripping, degassing, deodorization and other processes in petrochemical, fine chemical, pesticide, food, medicine, biochemical and other industries.



Feature

1. Tiny pressure loss In the rotary scraper-type film evaporator, the material "flow" and the secondary steam "flow" are in two independent "channels": the material falls along the inner wall of the evaporation cylinder (forced film formation); The secondary steam from the evaporation surface leaves the evaporator almost unimpeded from the space in the center of the cylinder, so the pressure loss (or pressure drop) is very small.
2. It can operate under complete vacuum condition.
3. High heat transfer coefficient, high evaporation intensity
4. Evaporation in Low temperature
5. Short flow time
6. Available low-grade steam
7. Good adaptability and easy operation

The background of the entire page features a low-angle shot of several modern skyscrapers reaching towards a bright, hazy sky. A semi-transparent orange band runs horizontally across the middle of the image. Overlaid on the entire scene is a network of thin blue lines connecting small circular nodes, creating a digital or technological aesthetic.

SINCE 1976

**LEADING THE FUTURE
ACCOMPLISHING
THE MODERN ENTERPRISE HONORED
BY PEOPLE.**

**Human surpasses with pursuit and advances
with surpassing. When "seeking limitlessness"
becomes a belief, dream is being realized.
By carrying forward the past brilliance, the indus-
trious and clinging Zhanghua personnel will con-
tinue to
work hard with an attitude of zero starting point.**



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Wuxi Zhanghua will actively face the fierce competition in the future, realize diversified management, create a vigorous Zhanghua brand, accomplish brand expansion and enterprise scale leaping development, and stride towards the international modern enterprise group.

SINCE 1976



WUXI ZHANGHUA PHARMACEUTICAL EQUIPMENT CO.,LTD
JIANGSU ZHANGHUA SCIENCE AND TECHNOLOGY CO.,LTD

Add: Shitangwan Industrial Park, Huishan District, Wuxi City (China)

Tel: 0086-510-83551210, 83557688

Fax: 0086-510-83558558-8777

Marketing Director: Peggy

CELL Phone: 008613961802200 (Wechat, Whatsapp)

Http://www.agitator-cn.com, www.zhanghua1976.com

E-mail: zqz008@126.com, zhangpeijie@zhanghuayaoji.com

PC: 214185



www.zhanghua1976.com



www.agitator-cn.com