KHUNSU

PHARMACEUTICAL EQUIPMENT

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Main Equipment

1. Reaction equipment Reactor:

Materials: glass-lined, stainless steel (316L), Hastelloy (corrosion-resistant).

Function: used for synthesis reactions, equipped with stirring, temperature control (jacket heating /cooling), and pressure monitoring.

High-pressure reactor: used for high-pressure hydrogenation and high-temperature reactions.



2. Separation equipment

Centrifuge:

Types: horizontal centrifuge, tubular centrifuge (used for separation of biological fermentation broth).

Filters: plate and frame filters, membrane filtration systems (ultrafiltration, nanofiltration).

Extraction tower: used for liquidliquid separation.





3. Purification equipment

Fractionating column: used for solvent recovery or product purification.

Chromatography system: preparative chromatographic column (such as HPLC, ion exchange chromatography).

Crystallization tank: controls crystallization conditions (temperature, stirring rate).







4. Drying equipment

Spray dryer: suitable for heat-sensitive materials.

Vacuum drying oven: low temperature drying to avoid oxidation.

Fluidized bed dryer: highly efficient drying of granular materials.



5. Biological fermentation equipment

Fermentation tank:

Material: Stainless steel, equipped with pH/ dissolved oxygen probe, sterilization system (SIP).

Scale: From laboratory scale (10L) to industrial scale (over 10,000L).

Ultrafiltration system: used for separation of proteins or macromolecular products.





6. Auxiliary equipment

Vacuum pump: used for reduced pressure distillation or drying.

Refrigeration unit: provides low temperature reaction conditions.

Automation control system: DCS/SCADA system monitors production parameters.





7. Mixer

Application: mixing powders or granules (such as raw materials for tablets and capsules).

Types: V -type mixer, threedimensional motion mixer, trough mixer.

Principle: the material is evenly distributed through mechanical movement (rotation, flipping).





8. Granulator

Application: To make powder into granules, to improve fluidity or compressibility.

Types: Wet Granulator: Powder is made into granules by means of a binder.

Dry granulator: crush into granules after extrusion molding.

Fluidized bed granulator: uses air flow to suspend powder and spray liquid to agglomerate into granules.



9. Tablet Press

Application: Compress granules into tablets.

Types: Single punch tablet press: suitable for small batch production.

Rotary tablet press: multiple punches for continuous tablet pressing, high efficiency (such as high-speed tablet press).

Principle: The material is formed by applying pressure through the upper and lower dies.



10. Capsule filling machine

Application: filling powder or granules into empty capsules.

Types: semi-automatic, fully automatic (such as intermittent or continuous filling machines).

Principle: quantitative filling via metering disc or piston.





11. Coating machine

Application: sugar coating, film coating or enteric coating for tablets or pills.

Types: high efficiency coating machine (with spray system and hot air drying).

Principle: the tablet cores are rolled in a rotating pan, sprayed with coating liquid by a spray gun and dried.





12. Liquid tank

Application: preparation of solutions, suspensions or emulsions (such as injections, oral solutions).

Function: with agitator, jacket heating /cooling, liquid level sensor.





13. Filling machine

Application: to dispense liquid into ampoules, vials or infusion bags.

Types: peristaltic pump type, piston type filling machine.

Principle: filling after precise measurement, some equipment is equipped with nitrogen protection.



14. Sterilization equipment

Application: to sterilize liquid medicine or container.

Types: Moist Heat Sterilizer: highpressure steam sterilization (such as infusion products).

Dry heat sterilization tunnel: high temperature baking (e.g. ampoule sterilization).

Filtration and sterilization system: 0.22µm filter membrane to filter the liquid medicine



15. Freeze dryer

Application: freezedrying of heat-sensitive drugs (e.g. biological products, vaccines).

Principle: after the liquid medicine is frozen, it sublimates in a vacuum environment to remove moisture.



16. Emulsifier

Application: preparation of semisolid preparations such as creams and ointments.

Types: high shear emulsifier, colloid mill.

Principle: the oil phase and the water phase are evenly mixed through high-speed shear force.

17. Ointment filling machine Application: to dispense ointment into aluminum or plastic tubes.

Principle: quantitative filling by piston and automatic sealing.



Packaging and auxiliary equipment

18. Aluminum plastic packaging machine

Application: to seal tablets and capsules in aluminum-plastic blisters.

Principle: heat the aluminum foil and PVC sheets to form a blister and heat seal.

19. Labeling machine

Application: labeling pharmaceutical containers.

Types: automatic labeling machine (rotary, linear).



Packaging and auxiliary equipment

20. Automatic packaging line

Application: to complete the processes of boxing, cartoning, coding, etc. Composition: cartoning machine, wrapping machine, case sealing machine, robot palletizing system.

21. Purified water preparation system

Application: to produce purified water that meets pharmacopoeia standards. Process: multiple effect distillation, reverse osmosis (RO), electrodeionization(EDI).



Quality Control Equipment

22. Hardness tester: Measures the hardness of tablets.

23. Dissolution apparatus: Simulates the dissolution process of drugs in the body.

24. High Performance Liquid Chromatography (HPLC): detects the content of drug ingredients.





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