

## KJG Series Hollow Blade Dryer KJG 系列空心桨叶干燥机



本公司在吸收国内外先进技术的基础上, 进行改进、优化设计的楔型空心桨叶干燥机, 可对膏状、颗粒状、粉状、浆状物料间接加热或冷却, 可完成干燥、冷却、加热、灭菌、反应、低温煅烧等单元操作。设备中特殊的楔型搅拌传热桨叶, 具有较高的传热效率和传热面自清洁功能。

Our company by absorbing foreign advanced technology, based on to improve and optimize the design of the wedge-shaped hollow paddle dryer can treat paste, granular, powder, paste material through indirect heating or cooling, to achieve drying, cooling, heating, sterilization, reaction, low temperature calcination and other unit operations. Wedge-shaped mixing device in a special heat transfer blade, has a high heat transfer efficiency and heat transfer surface self-cleaning function.



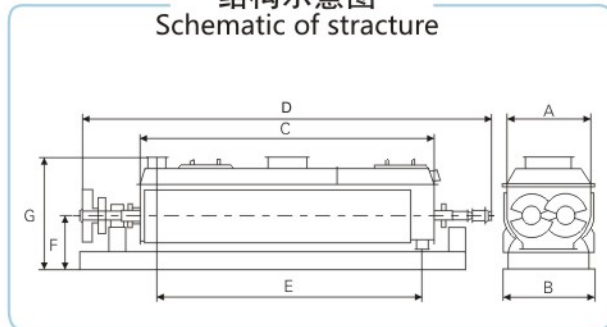
### 概述

空心轴上密集排列着楔型中空桨叶, 热介质经空心轴流经桨叶。单位有效容积内传热面积很大, 热介质温度从-40℃到320℃, 可以是水蒸汽, 也可以是液体: 如热水、导热油等。间接传导加热, 没有携带空气带走热量, 热量均用来加热物料。热量损失仅为通过壳体保温层向环境的散热。楔型桨叶传热面具有自清洁功能。物料颗粒与楔型面的相对运动产生洗刷作用, 能够洗刷掉楔型面上附着物料, 使运转中一直保持着清洁的传热面。桨叶干燥机的壳体为W型, 壳体内一般安排二到四根空心搅拌轴。壳体有密封端盖与上盖, 防止物料粉尘外泄及收集物料溶剂蒸汽。出料口处设置一挡板, 保证料位高度, 使传热面被物料覆盖而充分发挥作用。热介质通过旋转接头, 流经壳体夹套及空心搅拌轴, 空心搅拌轴依据热介质的类型而具有不同的内部结构, 以保证最佳的传热效果。

### Description

Densely lined with wedge-shaped hollow shaft hollow blades, heat medium through the hollow axial flow through blades. Unit effective volume of a very large area of heat transfer, heat medium temperature from -40 °C to 320 °C, can be water vapor, may also be liquid-type: such as water, oil and so on. Indirect conduction heating, the air does not carry away the heat, the heat are used to heat materials. Only through the device body heat loss to the environment, heat insulation layer. Wedge-shaped blades with self-cleaning heat transfer surfaces. Wedge-shaped surface material particles and scrubbing effect relative movement, to wash away the wedge surface material attachments, so in operation have maintained a clean heat transfer surfaces. Blade dryer for the W-type shell, the shell of the general arrangements for 2-4 hollow stirring shaft. Shell with a sealed cover with the cover to prevent dust leakage and collection of materials, solvent vapor materials. Set out and exit pull a block, to ensure a high degree of material level, so that heat transfer surface is covered with fully materials. Heat medium through the rotary joint, passing through the shell jacket and the hollow stirring shaft, hollow shaft stirring according to the type of thermal media have different internal structures to ensure the best heat transfer.

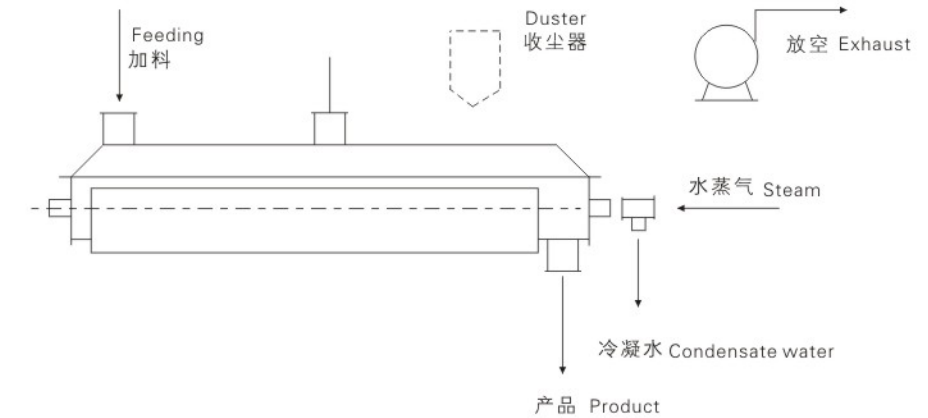
结构示意图  
Schematic of structure



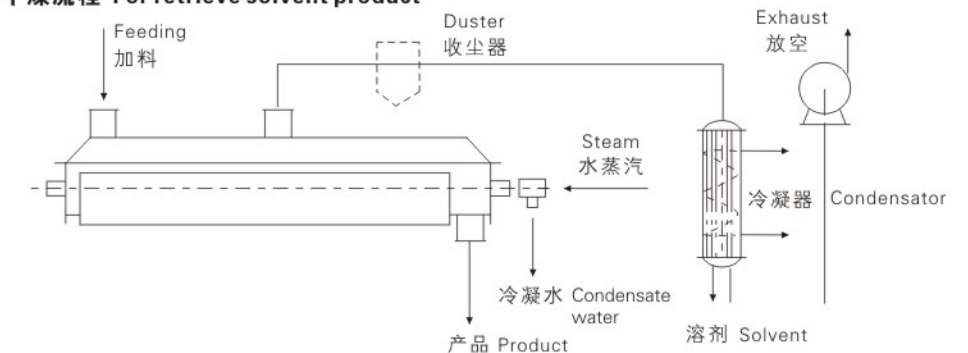
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### 流程图 Flow chart

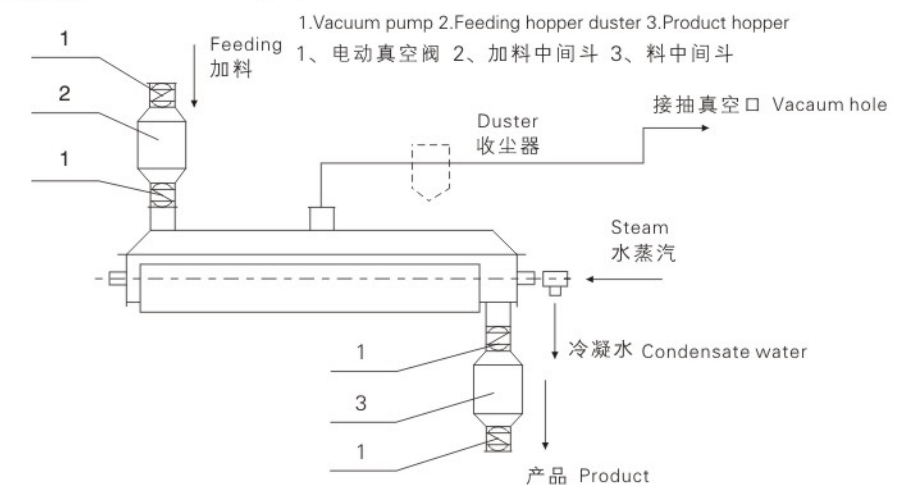
#### 通用产品干燥流程 For drying process



#### 回收溶剂干燥流程 For retrieve solvent product



#### 抽真空干燥流程 For vacaum drying



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#### 应用

桨叶干燥机已成功地用于食品、化工、石化、染料、工业污泥等领域。设备传热、冷却、搅拌的特性使之可以完成以下单元操作：煅烧（低温）、冷却、干燥（溶剂回收）、加热（融化）、反应和灭菌。搅拌桨叶同时又是传热面，使单位有效容积内传热面积增大，缩短了处理时间。楔型桨叶传热面又具有自清洁功能。压缩—膨胀搅拌功能使物料混和均匀。物料沿轴向成“活塞流”运动，在轴向区内，物料的温度、湿度、混合度梯度很小。

- 用导热油做热介质，桨叶干燥机可完成低温煅烧工作。如：二水硫酸钙（ $\text{Ca}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$ ）煅烧转化为半水硫酸钙（ $\text{Ca}_2\text{SO}_4 \cdot 1/2\text{H}_2\text{O}$ ）。碳酸氢钠（ $\text{NaHCO}_3$ ）经煅烧转化为纯碱（ $\text{Na}_2\text{CO}_3$ ）等。
- 通入冷却介质，如水、冷却盐水等即可用来冷却。如：用于纯碱行业的桨叶式冷却机，取代老式的空气冷却冷却机，节省了能源及尾气处理设备，降低了操作费用，还可用于钛白粉、镍铁合金粉及各种粉粒状物料的冷却。在单台机里可以将物料从1000℃冷却到小于40℃。
- 干燥设备最主要的功能，不使用热空气，使溶剂回收、能源消耗、环境控制处于易处理的理想状态。对需回收溶剂、易燃易氧化热敏性物料尤为适应。已广泛用于精细化工、石化、染料行业。
- 轴向区内，温度、湿度、混合度的均匀性，使得设备可以用来加热或融化，或进行一些固体物料反应。在复合肥及变性淀粉行业均已成功使用。桨叶干燥机用来对食物和面粉进行灭菌处理。单位有效容积内大的加热面积，很快就将物料加热到灭菌温度，避免了长时间加热而改变物料品质。

#### 适应物料

石化行业：聚烯烃粉体、聚碳酸酯树脂、高、低密度聚乙烯、线型低密度聚乙烯、聚缩醛颗粒、尼龙6、尼龙66、尼龙12、醋酸纤维、聚苯硫醚、丙烯酸树脂、工程塑料、聚氯乙烯、聚乙烯醇、聚苯乙烯、聚丙烯、聚脂、聚甲醛、苯乙烯~丙烯腈共聚、乙烯~丙烯共聚。

环保行业：PTA污泥、电镀下水污泥、锅炉烟灰、制药厂废渣、糖厂废渣、味精厂废渣、煤灰。

饲料行业：酱油渣、骨基饲料、酒糟、食品下角料、苹果渣、橘子皮、豆粕、鸡骨饲料、鱼粉、饲料添加剂、生物渣泥。

食品行业：淀粉、可可豆、玉米粒、食盐、变性淀粉、药品。

化工行业：纯碱、氮磷钾复合肥、高岭土、膨润土、白炭黑、碳黑、磷石膏、氧化氟化钠、氧化铁黄、硝酸钙、碳酸镁、氧化钠、氢氧化铝、硫酸钡、硫酸钙、碳酸钙、染料、分子筛、皂素。

#### Application

Blade dryer has been successfully used in food, chemical, petrochemical, dye, industrial sludge and other fields. Heating, cooling, mixing features make it to complete the following unit operations: calcination (low temperature), cooling, drying (solvent recovery), heating (melting), response and sterilization. Mixing blades at the same time the heat transfer surface, the effective volume per unit area of heat transfer increases, reducing the processing time. Heat transfer surfaces in wedge-shaped blades with self-cleaning function. Compression -

Expansion mixing features make the material mixed uniformly. Material along the axis into a "plug flow" movement, in the axial zone, the material temperature, humidity, mixing a very small degree of gradient.

● Conducting oil to do with the heat medium, blade dryer to complete the work of low-temperature calcination. Such as: calcium sulfate dehydrate ( $\text{Ca}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$ ) calcined into calcium sulfate hemihydrate ( $\text{Ca}_2\text{SO}_4 \cdot 1/2\text{H}_2\text{O}$ ). Sodium bicarbonate ( $\text{NaHCO}_3$ ) into calcined soda ( $\text{Na}_2\text{CO}_3$ ) and so on.

● Pass into the cooling medium, such as water, salt, etc. can be used to cooling. Such as: use of soda ash industry in blade-type cooler base machine to replace the old air-cooled cooler base machine, saving energy and exhaust gas processing equipment, lower operating costs, but also for titanium, nickel alloy powder and all kinds of powder granular materials cooling. On a single machine where the material can be cooled from 1000 °C to less than 40 °C.

● Dry, the main function of equipment, do not use hot air to solvent recovery, energy consumption, environmental control is easy to deal with the ideal state. On the need to recover solvents, heat-sensitive materials, particularly flammable adapt easily oxidized. Has been widely used in fine chemical, petrochemical, dye industry.

● Axial range, temperature, humidity, mixing degree of uniformity, so equipment can be used to heating or melting, or some solid material response. In the compound and modified starch industries have been successfully used. Blade dryer can be used to carry out sterilization of food and flour. Unit effective volume with a large heating area, will heat the material to sterilization temperature, to avoid prolonged heating change the quality of materials.

#### Adaptation of materials

Petrochemical Industry: polyolefin powder, polycarbonate resin, high and low density polyethylene, linear low density polyethylene, polyacetal particles, nylon 6, nylon 66, nylon 12, cellulose acetate, polyphenylene sulfide, propylene base resin, engineering plastics, polyvinyl chloride, polyvinyl alcohol, polystyrene, polypropylene, polyester, polyoxymethylene, styrene - Acrylonitrile, ethylene propylene copolymer -.

Environmental protection industry: PTA sludge, electroplating sludge into the water, boiler ash, pharmaceutical waste, sugar residue, glutamate factory waste, coal ash.

Feed Industry: soy sauce residue, bone-based feed, grains, food Scraps, apple, orange peel, soybean meal, chicken feed, fish meal, feed additives, bio-sludge.

Food industry: starch, cocoa beans, corn kernels, salt, modified starch, pharmaceuticals.

Chemical industry: soda ash, NPK fertilizer, kaolin, bentonite, white carbon black, carbon black, phosphorus gypsum, oxidation of sodium fluoride, calcium nitrate, magnesium carbonate, sodium cyanide, aluminum hydroxide, barium sulfate, sulfuric acid, calcium carbonate, dyes, molecular sieve, saponin.

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#### 特点

- 桨叶干燥机能耗低：由于间接加热，没有大量携带空气带走热量，干燥器外壁又设置保温层，对浆状物料，蒸发1kg水仅需1.22kg水蒸汽。
- 桨叶干燥机系统造价低：单位有效容积内拥有巨大的传热面，就缩短了处理时间，设备尺寸变小。就极大地减少了建筑面积及建筑空间。
- 处理物料范围广：使用不同热介质，既可处理热敏性物料，又可处理需高温处理的物料。常用介质有：水蒸汽、导热油、热水、冷却水等。既可连续操作也可间歇操作，可在很多领域应用。
- 环境污染小：不使用携带空气，粉尘物料夹带很少。物料溶剂蒸发量很小，便于处理。对有污染的物料或需回收溶剂的工况，可采用闭路循环。
- 操作费用低：该设备正常操作，仅1-2人/天。低速搅拌及合理的结构。磨损量小，维修费用很低。
- 操作稳定：由于楔型桨叶特殊的压缩—膨胀搅拌作用，使物料颗粒充分与传热面接触，在轴向区内，物料的温度、湿度、混合度梯度很小，从而保证了工艺的稳定性。

#### 技术参数 Technical parameters

型号/项目	KJG-3	KJG-9	KJG-13	KJG-18	KJG-29	KJG-41	KJG-52	KJG-68	KJG-81	KJG-95	KJG-110
传热面积 $\text{m}^2$	3	9	13	18	29	41	52	68	81	95	110
有效容积 $\text{m}^3$	0.06	0.32	0.59	1.09	1.85	2.8	3.96	5.21	6.43	8.07	9.46
转速范围 $\text{r.p.m}$	15-30	10-25	10-25	10-20	10-20	10-20	10-20	10-20	5-15	5-15	5-10
功率 $\text{kw}$	2.2	4	5.5	7.5	11	15	30	45	55	75	95
器体宽A mm	306	584	762	940	1118	1296	1474	1652	1828	2032	2210
总宽B mm	736	841	1066	1320	1474	1676	1854	2134	1186	2438	2668
器体长C mm	1956	2820	3048	3328	4114	4724	5258	5842	6020	6124	6122
总长D mm	2972	4876	5486	5918	6808	7570	8306	9296	9678	9704	9880
进出料距E mm	1752	2540	2768	3048	3810	4420	4954	5384	5562	5664	5664
中心高F mm	380	380	534	610	762	915	1066	1220	1220	1220	1220
总高H mm	762	838	1092	1270	1524	1778	2032	2362	2464	2566	2668
进汽口(寸)	3/4	3/4	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	2
出水口(寸)	3/4	3/4	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	2