

致力于成为全球领先的工业装备及系统解决方案服务商

Dedicated to becoming a global leading service provider  
in industrial equipment and system solutions

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## 粉体解决方案 Powder Processing Solutions

电子半导体 | 先进陶瓷 | 新能源材料 | 制药

Electronics & Semiconductors | Advanced Ceramics | New Energy Materials | Pharmaceuticals

上海森永工程设备股份有限公司  
SHANGHAI NAGAMORI MACHINERY CO.,LTD.

2026年7月印刷

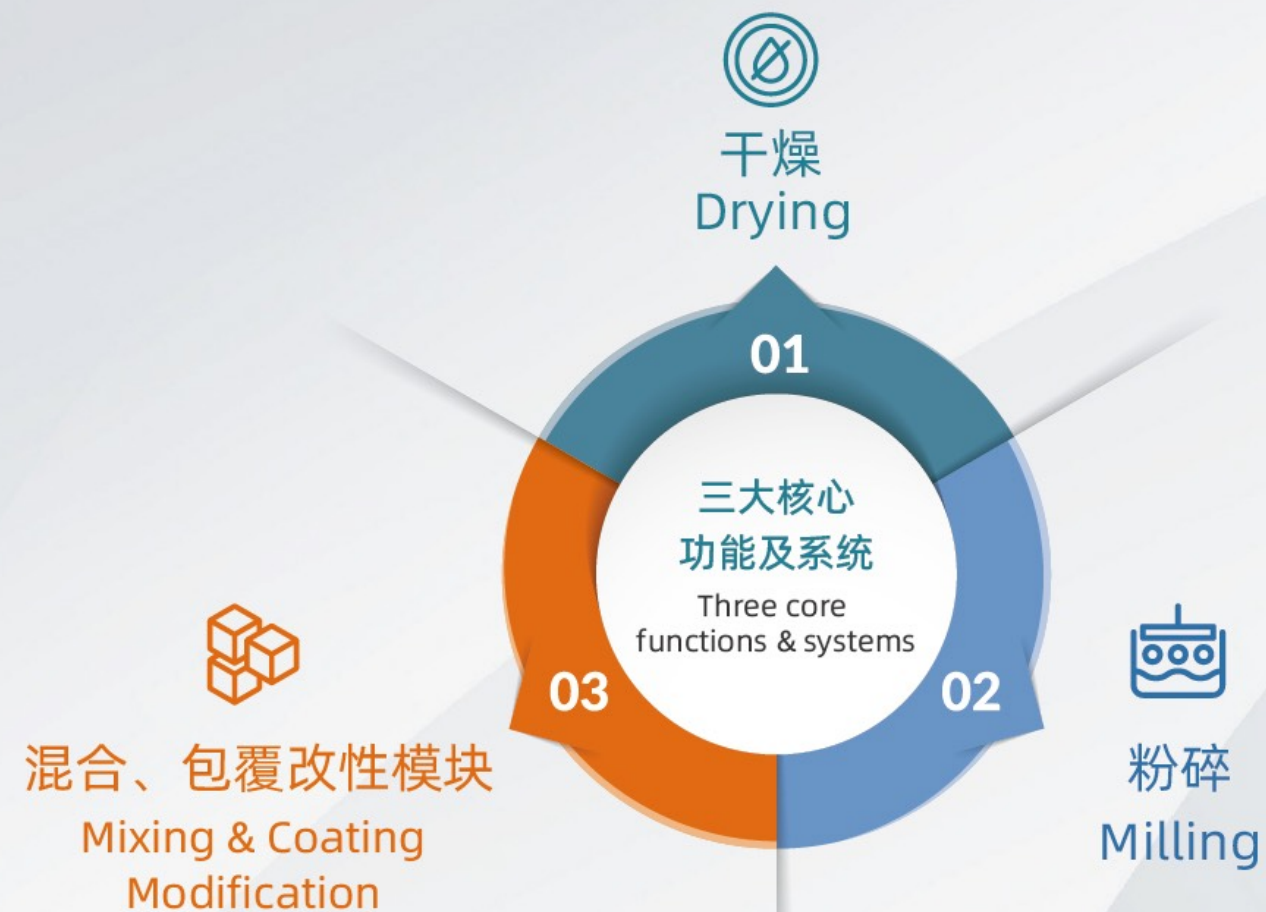


# 上海森永粉体技术全流程服务

Shanghai Nagamori Powder Technology Full-Process Services

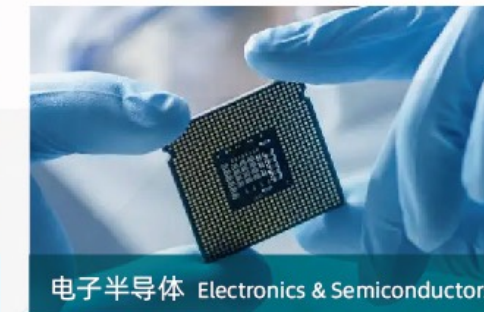
上海森永工程设备股份有限公司，  
2008年从国外引进核心技术及关键部件，  
现成为高端粉体领域卫生级行业标准解决方案服务商。  
可设计制造干燥、粉碎、混合包覆改性模块系统。

Since introducing core technologies and key components from overseas in 2008,  
Shanghai Nagamori Machinery Co., Ltd.  
has established itself as a leading provider of hygienic standard solutions for the  
high-end powder sector,  
specializing in the design and manufacture of integrated modular systems for drying,  
milling, and mixing/coating/modification units .



面向高端粉体行业，提供卫生级行业标准解决方案。

Provide hygienic standard solutions for the high-end powder industry.





# 干燥系统 Drying System

高真空负压、高效均匀、极致干燥的解决方案  
High-vacuum, High-efficiency, & Uniform Drying Solutions



## 产品优势 Product Advantages

- 真空负压环境，绝压在5Pa以下，干燥效率高
- 物料受热均匀
- 低、中、高温灵活选择，也适用于热敏性物料
- 无轴封，无搅拌，无杂质引入
- 通过振动排料，残留少，可实现自动化
- Vacuum environment with absolute pressure below 5 Pa for high drying efficiency
- Uniform material heating
- Flexible temperature options (low, medium, and high), also suitable for heat-sensitive materials
- No shaft seals, no agitators, and no impurity introduction
- Automated, low-residue discharge through vibration

## 高、中、低含水量极致要求 Extreme Requirements for High, Medium, & Low Moisture Content



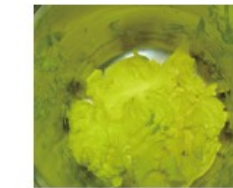
块状 Lumpy



带状 Strip-like



浆料 Slurry



膏状 Pasty



湿粉 Wet Powder

## 加热方式与温度、压力范围 Heating Methods, Temperature, & Pressure Ranges

温度范围

Temperature Range

30°C ~ 230°C

温水加热

Hot Water Heating

蒸汽加热

Steam Heating

导热油加热

Heat Transfer Oil Heating

含液率控制

Moisture Content Control

入口可 > 30% → 出口可 < 100ppm

Inlet > 30% → Outlet < 100 ppm

操作压力

Operating Pressure

常压 ~ 真空

Atmospheric to Vacuum

常压 Ordinary Pressure

大气压 Atmospheric Pressure

最低负压 Minimum Negative Pressure

-0.1M Pa



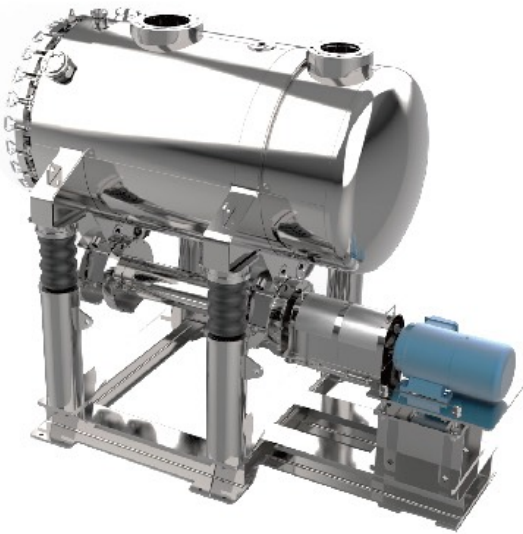


VH系列 卧式干燥机 VH SERIES HORIZONTAL DRYER

工作原理 Working Principle

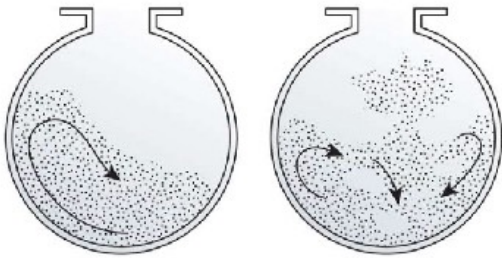
设备下部装有振动源，以圆周方向施加振力，使粉体沿着壁面形成同心圆状的运动。适用于高纯粉料的极致干燥，可以实现自动化，具有高物料填充率，能处理中到大量的物料。

Equipped with a vibration source at the bottom, the equipment applies circumferential vibratory force, causing the powder to move in concentric circles along the wall. Suitable for the extreme drying of high-purity powders, it enables automation, features high material fill rates, and can handle medium to large volumes of material.



技术参数 Technical Parameters

| 型号<br>Model | 最低装料容积(L)<br>Minimum Loading Volume (L) | 总容积(L)<br>Total Volume (L) |
|-------------|-----------------------------------------|----------------------------|
| VH-25       | 15                                      | 25                         |
| VH-60       | 203                                     | 339                        |
| VH-100      | 942                                     | 1570                       |
| VH-120      | 1628                                    | 2714                       |
| VH120-360   | 2520                                    | 4200                       |



设备特点 Equipment Features



适合物料  
Suitable Material

体积变化很小或完全不变  
Materials with minimal or no volume change



操作方式  
Operation Mode

间歇式操作,频率可调  
Batch operation with adjustable frequency



装料容积  
Loading Volume

总容积的60%-80%  
60%-80% of total volume

VU系列 立式干燥机 VU SERIES VERTICAL DRYER

工作原理 Working Principle

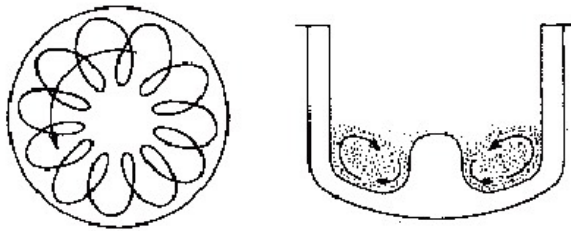
设备侧面有两台马达，以特定的倾斜角度施加振动力，实现了粉体沿着内筒壁面隆起并向中心滑落的复合流动状态。能处理多种混合物料，适用于小到中等规模的分批处理。

Equipped with two motors on the side, the equipment applies vibratory force at a specific inclination angle, enabling the powder to rise along the inner wall of the cylinder and slide toward the center in a complex flow pattern. It is capable of handling various mixed materials and is suitable for small to medium-scale batch processing.



技术参数 Technical Parameters

| 型号<br>Model | 装料容积(L)<br>Loading Volume (L) | 总容积(L)<br>Total Volume (L) |
|-------------|-------------------------------|----------------------------|
| VU-95       | 120                           | 450                        |
| VU-135      | 300                           | 1190                       |
| VU-195      | 1000                          | 3200                       |



设备特点 Equipment Features



适合物料  
Suitable Material

含液量高（如浆状/膏状）  
High moisture content  
(e.g., slurry/pasty)



操作方式  
Operation Mode

间歇式操作,频率可调  
Batch operation with adjustable frequency



装料容积  
Loading Volume

总容积的30%  
30% of total volume

|                                     | 原料形态<br>Raw Material Form | 干燥前水分<br>Pre-drying Moisture Content | 干燥后水分<br>Post-drying Moisture Content | 材料平均粒径<br>Average Particle Size of Material | 材料比重<br>Specific Gravity of Material | 热媒<br>Heating Medium | 热媒温度<br>Heating Medium Temperature(°C) | 操作压力<br>Operating Pressure | 振动数<br>Vibration Frequency | 平均总传热系数<br>Average Overall Heat Transfer Coefficient |
|-------------------------------------|---------------------------|--------------------------------------|---------------------------------------|---------------------------------------------|--------------------------------------|----------------------|----------------------------------------|----------------------------|----------------------------|------------------------------------------------------|
| 有机染料<br>Organic Dyes                | 块状粉<br>Lumpy Powder       | 30                                   | 0.2                                   | max.50mm                                    | 0.65                                 | 水蒸气<br>Steam         | 130                                    | 6.6(50)                    | 19.4                       | 69.7 (60)                                            |
| 有机化学品<br>Organic Chemicals          | 粉末<br>Powder              | 10                                   | 0.1                                   | —                                           | —                                    | 热水<br>Hot Water      | 86                                     | 24.6(185)                  | 29.2                       | 87.2 (75)                                            |
| 合成树脂<br>Synthetic resin             | 粉末<br>Powder              | 27                                   | 1.5                                   | 20μ                                         | 0.37                                 | 热水<br>Hot Water      | 60                                     | 1.3-4(10-30)               | 24.2                       | 69.7 (60)                                            |
| 合成树脂<br>Synthetic Resin             | 珠子<br>Beads               | 40                                   | 1                                     | 200μ                                        | 0.55                                 | 水蒸气<br>Steam         | 130                                    | 0.6-6(5-45)                | 24.2                       | 63.9 (55)                                            |
| 陶瓷<br>Ceramics                      | 浆料<br>Slurry              | 40                                   | 0.5                                   | 1μ                                          | —                                    | 水蒸气<br>Steam         | 138                                    | 101.3(760)                 | 29.2                       | 282.6 (243)                                          |
| 有色金属氧化物<br>None-ferrous Metal Oxide | 糊状物<br>Pasties            | 69                                   | 9                                     | —                                           | 0.93                                 | 水蒸气<br>Steam         | 150                                    | 101.3(760)                 | 24.2                       | 215.0 (185)                                          |
| 金属粉末<br>Metal Powders               | 砂状<br>Sandy               | 6.1                                  | 0                                     | 150μ                                        | 5.3                                  | 水蒸气<br>Steam         | 130                                    | 101.3(760)                 | 29.2                       | 465.2 (400)                                          |

|                                                 | 原料形态<br>Raw Material Form | 干燥前水分<br>Pre-drying Moisture Content | 干燥后水分<br>Post-drying Moisture Content | 材料平均粒径<br>Average Particle Size of Material | 材料比重<br>Specific Gravity of Material | 热媒<br>Heating Medium     | 热媒温度<br>Heating Medium Temperature(°C) | 操作压力<br>Operating Pressure | 振动数<br>Vibration Frequency | 平均总传热系数<br>Average Overall Heat Transfer Coefficient |
|-------------------------------------------------|---------------------------|--------------------------------------|---------------------------------------|---------------------------------------------|--------------------------------------|--------------------------|----------------------------------------|----------------------------|----------------------------|------------------------------------------------------|
| 活性金属粉末<br>Active Metal Powders                  | 浆料<br>Slurry              | 58                                   | 0                                     | 1μ                                          | 0.6                                  | 水蒸气<br>Steam             | 110                                    | 54.6 (410)                 | 29.2                       | 162.8 (140)                                          |
| 黑色无机物<br>Black Inorganic Materials              | 粉末<br>Powder              | 80                                   | 1                                     | 100μ                                        | 0.5                                  | 水蒸气<br>Steam             | 125                                    | 2.6-34.6 (20-260)          | 29.2                       | 157.0 (135)                                          |
| 磨料<br>Abrasives                                 | 浆料<br>Slurry              | 20                                   | 0.03                                  | 10μ                                         | 2.1                                  | 水蒸气<br>Steam             | 130                                    | 101.3 (760)                | 29.2                       | 314.0 (270)                                          |
| 硫化物<br>固态电解质<br>Sulfide Solid-State Electrolyte | 浆料<br>Slurry              | 70                                   | 50ppm                                 | 500nm                                       | 0.5                                  | 导热油<br>Heat transfer oil | 160                                    | -0.98                      | 29.2                       | /                                                    |
| 氧化物<br>固态电解质<br>Oxide Solid-State Electrolyte   | 浆料<br>Slurry              | 80                                   | 100ppm                                | 300nm                                       | 0.5                                  | 导热油<br>Heat transfer oil | 120                                    | -0.98                      | 29.2                       | /                                                    |

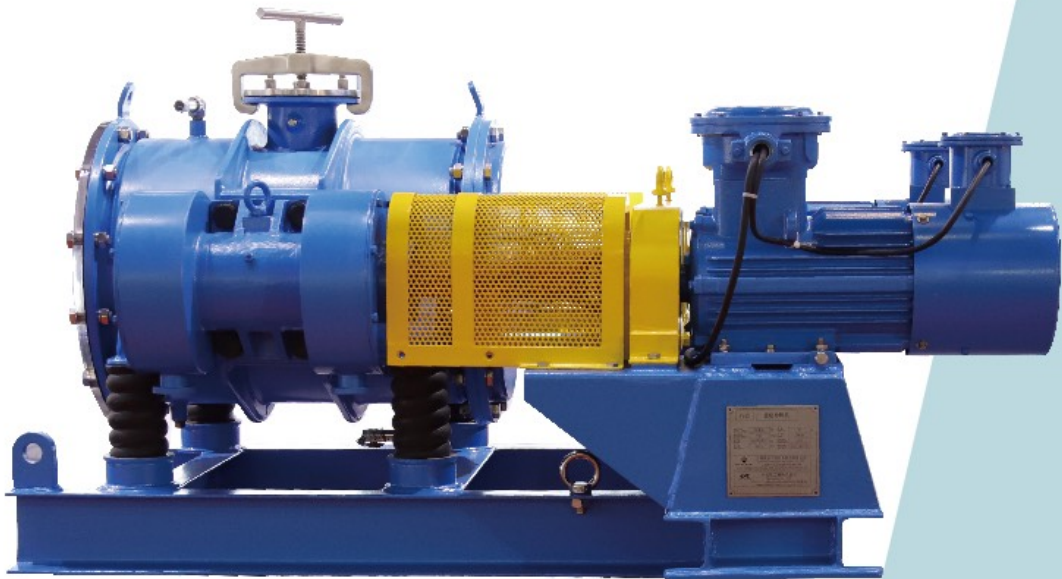
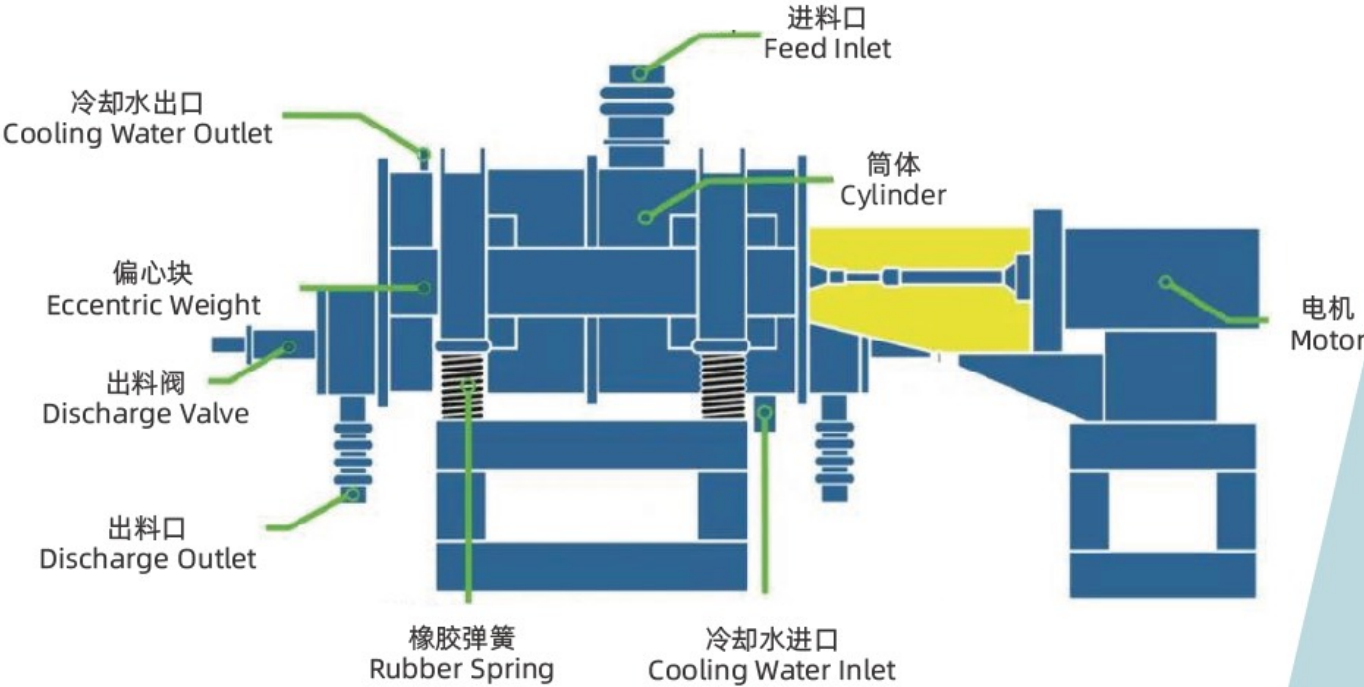


# 粉碎系统

## Milling System

### 工作原理 Working Principle

采用高频振动原理，通过研磨介质对物料进行冲击、摩擦，实现超细粉碎。  
Adopt the principle of high-frequency vibration to achieve ultra-fine milling through the impact and friction of grinding media.



### 六大性能特点 Six Key Performance Features

#### 粉碎时间短 Short Milling Time

是球磨机的十分之一到二十分之一,提升效率  
1/10 to 1/20 of a traditional ball mill,  
significantly increasing efficiency

#### 粉碎幅度广 Wide Milling Range

中粉碎到微粉碎, mm→um  
From medium to micro milling  
(from mm to μm)

#### 密闭容器设计 Hermetically Sealed Design

可惰性气体保护,便于清洁和排料  
Supporting inert gas protection,  
easy to clean and discharge

#### 防掺杂措施 Anti-contamination Measures

多种内衬可选,确保物料纯度,防止交叉污染  
Various lining options available,  
ensuring material purity and  
preventing cross-contamination

#### 占地面积小 Small Footprint

易操作,易维护,可间歇、可连续  
Easy to operate and maintain,  
supporting both batch and  
continuous production

#### 粉碎环境灵活 Flexible Milling Environment

干式、湿式均可,适应不同物料工艺要求  
Suitable for both dry and  
wet processes, adapting to  
different material requirements

### 应用领域 Application Fields

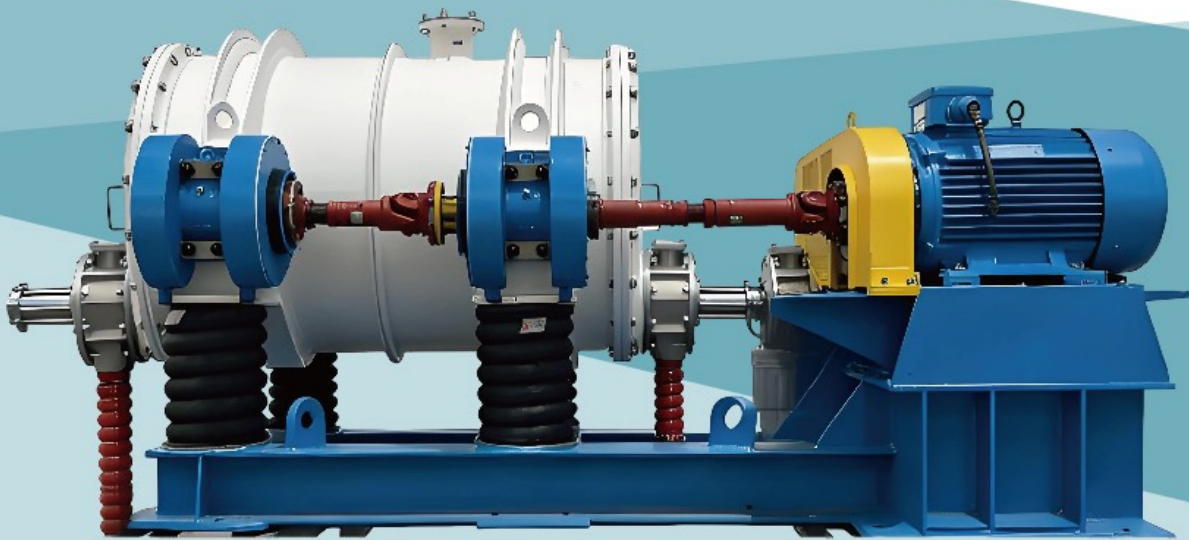
| 物料<br>Material                       | 粒径变化<br>Particle Size Change | 先进陶瓷<br>Advanced Ceramics | 电池材料<br>Battery Materials | 电子半导体<br>Electronics & Semiconductors | 金属<br>Metal | 超硬<br>Ultra-hard |
|--------------------------------------|------------------------------|---------------------------|---------------------------|---------------------------------------|-------------|------------------|
| 氮化硅<br>Silicon Nitride               | D50: 10μm → 1.2μm            | √                         |                           |                                       |             |                  |
| 氧化铝<br>Aluminum Oxide                | D50: 45μm → 3.8μm            | √                         |                           |                                       |             |                  |
| 碳负极材料<br>Carbon Anode Material       | D50: 25μm → 8.5μm            |                           | √                         |                                       |             |                  |
| 磷酸铁锂<br>Lithium Iron Phosphate       | D50: 15μm → 2.5μm            |                           | √                         |                                       |             |                  |
| 氧化锆<br>Zirconium Oxide               | D50: 8μm → 1.0μm             | √                         |                           | √                                     |             |                  |
| 钛酸钡<br>Barium Titanate               | D50: 12μm → 2.8μm            |                           |                           |                                       |             |                  |
| 碳化硅<br>Silicon Carbide               | D50: 35μm → 5.2μm            | √                         |                           |                                       |             |                  |
| 金刚石<br>Diamond                       | D50: 50μm → 3.5μm            |                           |                           |                                       |             | √                |
| 锌粉铝粉<br>Zinc Powder, Aluminum Powder | 扁平化 Flattening               |                           |                           |                                       | √           |                  |



FV系列 批次式 FV SERIES BATCH TYPE

■ 技术参数 Technical Parameters

| 型号<br>Model | 容积(L)<br>Volume (L) | 电机<br>Motor |
|-------------|---------------------|-------------|
| FV-20       | 20                  | 2.2kW 6P    |
| FV-100      | 100                 | 11kW 6P     |
| FV-200      | 200                 | 18.5kW 6P   |



■ 产品优势 Product Advantages

- 筒体全密封、结构精简：内部结构精简、无转动机构、机械密封等
- 振动排料、可实现自动化：物料从侧面排除、残留少
- 批次处理、质量可控稳定：可连续式微粉碎
- 内衬选择多样化
- Fully Sealed Cylinder with Streamlined Structure: Simplified internal design, no rotating mechanisms or mechanical seals
- Vibrating Discharge for Automation: Material discharged from the side with minimal residue
- Batch Processing with Stable and Controllable Quality: Supporting continuous micro-milling
- Diversified lining options

CD系列 连续式 CD SERIES CONTINUOUS TYPE

■ 技术参数 Technical Parameters

| 型号<br>Model | 容积(L)<br>Volume (L) | 处理能力 (参考)<br>Processing Capacity (Reference) | 电机<br>Motor |
|-------------|---------------------|----------------------------------------------|-------------|
| CD-20       | 65                  | 100~200 kg/h                                 | 3.7kW x 2台  |
| CD-50       | 1090                | 1,100~2,300 kg/h                             | 37 kW x 2台  |
| CD-60       | 1910                | 1,700~3,600 kg/h                             | 55 kW x 2台  |
| CD-70       | 3040                | 2,600~5,500 kg/h                             | 90 kW x 2台  |



■ 产品优势 Product Advantages

- 连续生产：底部连排出料, 自动化
- 上下组合：实现中粉碎到微粉碎
- 易拆卸结构：粉碎筒采用易更换结构
- 筒体双层结构：筒体带夹套层、内筒体衬层可选择
- Continuous production: Automated bottom discharge design
- Vertical Configuration: Processing from medium to micro-milling
- Easy-disassembly Structure: Grinding cylinder features an easily replaceable design
- Double-layer Cylinder Structure: Cylinder equipped with jacket, optional inner liner materials



# 连续混合/包覆/改性系统

## Continuous Mixing/Coating/Modification

### 批混工艺与连续式混合,满足不同生产需求

Batch mixing and continuous mixing processes,  
meeting diverse production requirements



#### 产品优势 Product Advantages

- **粉体活化:** 提高表面活性, 增强与载体的结合力
- **改性:** 改变物化性质, 满足特定应用需求
- **均匀混合:** 确保成分均一, 保障产品性能稳定
- **包覆:** 形成壳层结构, 赋予新功能或保护核心
- **Powder Activation:** Increased surface activity and enhanced bonding strength with carriers
- **Modification:** Modified physical and chemical properties, meeting specific application requirements
- **Uniform mixing:** Ensuring compositional homogeneity and stabilized product performance
- **Coating:** Formation of a shell structure that provides new functionalities to the material or protects its core

#### 工作原理 Working Principle

- **高频振动冲击**  
利用振动粉碎机的高频冲击和分散作用,在粉碎或混合过程中实现均匀混合
- **活化剂添加**  
在过程中加入活化剂,实现表面改性
- **磨介数万次冲击**  
通过磨介的密集高频冲击摩擦
- **灵活控制**  
可调时间和灵活温度设定
- **High-frequency Vibratory Impact**  
Utilize high-frequency impact and dispersion of the vibration mill to achieve uniform mixing during milling or mixing
- **Activator Addition**  
Incorporate activators during the process to achieve surface modification
- **Tens of Thousands of Grinding Media Impacts**  
Utilize dense, high-frequency impact and friction from grinding media
- **Flexible Control**  
Adjustable time and flexible temperature settings

#### 装置特点 Equipment Features





# 系统化配置

## Systematic Configuration

系统化配置振动干燥、振动粉碎、混合包覆三类系统和解决方案，实现整体化设计、制造、交付。

Systematic configuration of three categories of systems and solutions—vibratory drying, vibratory milling, and mixing/coating—to achieve integrated design, manufacturing, and delivery.

## ■ 混合包覆系统组成 Components of Mixing & Coating System

- |               |                                             |
|---------------|---------------------------------------------|
| ● 混合包覆机主机     | ● Mixing and Coating Machine Main Unit      |
| ● 活化剂添加系统     | ● Activator Addition System                 |
| ● 导热油机组/蒸汽/温水 | ● Thermal Oil Unit / Steam / Hot Water Unit |
| ● 除尘设备(可选)    | ● Dust Collection Equipment (Optional)      |
| ● 控制系统        | ● Control System                            |

■ 振动粉碎系统 Vibratory Milling System

- |             |                                        |
|-------------|----------------------------------------|
| ● 振动粉碎机主机   | ● Vibratory Milling Main Unit          |
| ● 分级设备 (可选) | ● Classification Equipment (Optional)  |
| ● 收集系统      | ● Collection System                    |
| ● 除尘设备(可选)  | ● Dust Collection Equipment (Optional) |
| ● 输送系统      | ● Conveying System                     |
| ● 控制系统      | ● Control System                       |

## ■ 振动干燥系统组成 Components of Vibratory Drying System

- 振动干燥机主机
  - 过滤器 + 冷凝器
  - 真空泵系统
  - 除尘设备(可选)
  - 溶剂回收罐
  - 控制系统
- 
- Vibratory Dryer Main Unit
  - Filter + Condenser
  - Vacuum Pump System
  - Dust Collection Equipment (Optional)
  - Solvent Recovery Tank
  - Control System



留言备注 Note