

流体与旋转机械板块是十一所（京）航天技术应用产业的重要支柱。三十多年来，我们以液体火箭发动机专业技术（涡轮泵技术、系统集成和结构设计技术）为依托，以设计制造高端流体机械为市场定位，大力推进技术创新和新产品研发，培育了高速泵、破渣机、吨包装机、刮刀过滤器等一系列明星产品，逐步形成了以下技术方向：

Fluid handling and rotating machineries are the core products of BAPC and also the fruitful results of applying aerospace technologies in civil industries. Backed by the technical reserves of liquid rocket engines (turbo technologies, system integrations and structure design techniques), in the past 30 more years, high speed pumps, slag crushers, packing machines and filters have been developed aiming at the top end of the market with innovative and cutting edge technologies.

主要方向

- 流体输送
- 旋转破碎
- 过滤分离
- 物料输送、计量、包装及自动化

Major Fields of Applications

- Fluid Delivery
- Solid Material Crushing
- Filtration and Separation Systems
- Conveying, Weighing and Packaging of Solid Materials, and Automation



流体输送 Fluid Delivery

结合研制液体火箭发动机高压、高速、超低温氢/氧涡轮泵的经验，我们研制了系列化的立式、卧式高速泵，最高转速可达 30000rpm，最大流量 300m³/h，最高扬程 3600m，最大电机功率 2000kW，广泛应用于中石化、中石油、国家能源等企业，并出口到多个国家，产品性能指标和稳定性达到国际先进水平，代表国内高速泵的最高技术能力。

Vertical and horizontal high speed pumps, developed based on technical reserves of liquid hydrogen and liquid oxygen pumps for aerospace liquid rocket engines which require high pressure, high speed and super low temperature, have been broadly applied in Sinopec, CNPC, China Energy and other companies, and have been serving in many countries. Performances and reliabilities of such products represent the advanced international level and top the technology competence in China.

- Max. Speed: 30000rpm
- Max. Flow: 300m³/h
- Max. Head: 3600m
- Max. Motor Power: 2000kW

高速泵 High-speed pumps

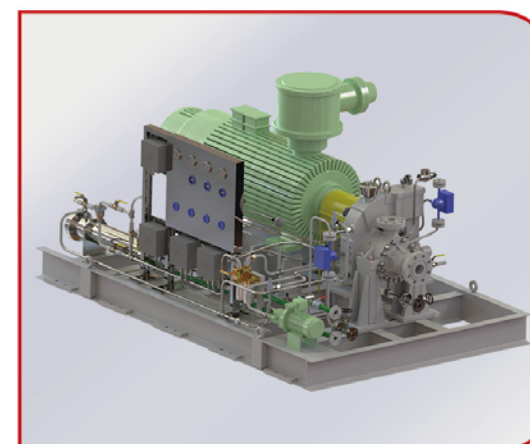


立式高速泵 (API-OH6)

参数范围：
流量：~250m³/h，扬程：~2180m，转速：~30000rpm，功率：~355kW；
应用领域：
化工、炼油、冶金、能源等行业。

Vertical High Speed Pump (API-OH6)

Parameters:
Flow:~250m³/h, Head:~2180m, Speed:~30000 rpm, Power:~355kW
Fields of Applications:
Petrochemical, oil refining, metallurgy, energy industries, etc.



卧式高速泵 (API-OH6)

参数范围：
流量：~300m³/h，扬程：~3600m，转速：~21000rpm，功率：~2000kW；
应用领域：
化工、炼油、冶金、能源等行业。

Horizontal High Speed Pump (API-OH6)

Parameters:
Flow:~300m³/h, Head:~3600m, Speed:~21000rpm, Power:~2000kW
Fields of Applications:
Petrochemical, oil refining, metallurgy, energy industries, etc.

流体输送 Fluid Delivery

高速风机属于整体式齿轮增速压缩机。结合高速泵产品的丰富经验，研制了系列化的立式、卧式高速风机，转速最高达到 33000rpm，压比最高为 3，功率最大为 600kW，可为低压比气体介质输送和增压提供解决方案，填补了国内产品在该领域的空白，广泛应用于聚丙烯、醋酸、己二酸、加氢制氢、重整、芳烃等装置。

GSY Vertical and horizontal high speed compressor series, which rooted from rich experiences of high speed pump development, are the integral gear increaser type. They are applied in delivering or pressure boosting of process gases where low compression ratios are required. Main fields of applications include Polypropylene, acetic acid, adipic acid, hydrogenation, reforming and aromatics, etc.

Max. Speed: 33000rpm
Max. Compression ratio: 3
Max. Power: 600kW

工艺气高速风机 Process Gas High Speed Compressors



GSY-L 立式高速风机

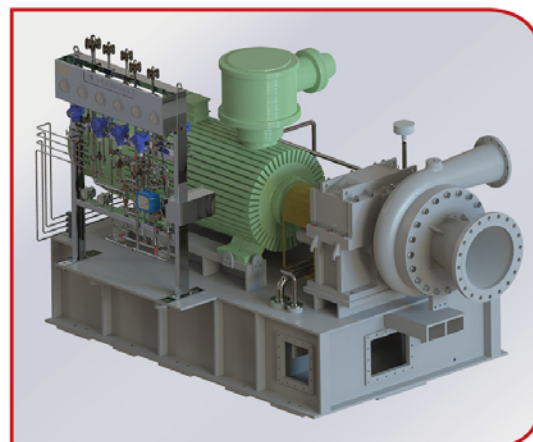
参数范围：
流量：~5000m³/h，压比：~3，转速：~33000rpm，功率：~355kW；

应用领域：
聚丙烯装置循环风机，连续重整装置提升风机、再生风机，醋酸装置醋酸气循环风机，VOC 处理尾气风机。

GSY-L Vertical High Speed Compressor

Parameters:
Flow:~5000m³/h, Compression ratio:~3, Speed:~33000rpm, Power:~355kW

Fields of Applications:
Polypropylene cycling compressor, CCR Units regeneration and lifting compressors, acetic acid gas cycling compressor and VOC exhaust gas treatment compressor.



GSY-W 卧式高速风机

参数范围：
流量：~15000m³/h，压比：~3，功率：~600kW；

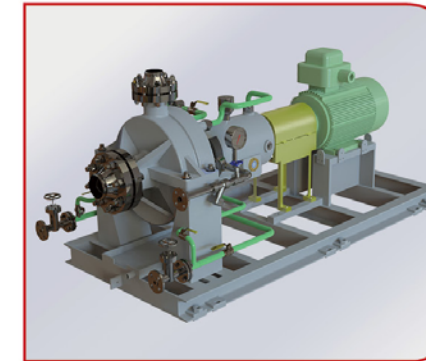
应用领域：
煤制氢工艺循环风机，污水处理曝气风机。

GSY-W Horizontal High Speed Compressor

Parameters:
Flow: ~15000m³/h, Compression ratio: ~3, Power: ~600kW

Fields of Applications:
Coal to hydrogen Cycling compressor, sewage aeration compressor.

苛刻工况特种离心泵 Special Centrifugal Pumps for Harsh Working Conditions



CSB-Wy 型高温高压耐磨泵 (API-OH2)

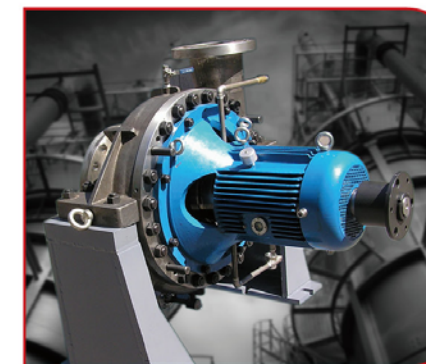
参数范围：流量：(10~900)m³/h，扬程：(10~235)m，温度：~280℃，入口压力：~9.5MPa，含渣量：~20%；

应用领域：各种水煤浆及粉煤气化工艺中的激冷水泵、黑水循环泵、洗涤塔循环泵、锁斗循环泵

CSB-Wy Series Wear Pump (API-OH2)

Features: Working under high temperature, high pressure conditions, Parameters: Flow: (10~900)m³/h, Head: (10~235)m, Temperature: ~280℃, Suction Pressure:~9.5MPa, Solid content: ~20%

Fields of Applications: Chilling water circulation pumps, black water circulation pumps, scrubber water circulation pumps and Locker hopper pumps used in various Coal Slurry Processes and Coal-Gasification Processes.



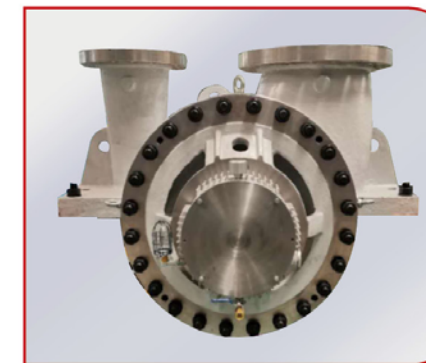
CSB-Ws 型高抗汽蚀性能重载荷耐腐蚀化工流程泵 (API-OH2)

参数范围：流量：(10~2000)m³/h，扬程：(25~235)m，汽蚀比转数：>3000，功率：~900kW
应用领域：PTA 行业料浆泵、双相钢泵、纯钛材泵，煤气化工艺低压灰水泵，纸浆泵；

CSB-Ws Pump Series (API-OH2)

Features: Working under Low NPSHa, heavy load and corrosive conditions, Parameters: Flow: (10~2000)m³/h, Head: (25~235)m, Cavitation Specific Speed: >3000, Power: ~900kW

Fields of Applications: Slurry pumps, duplex steel pumps and titanium pumps in PTA; Low pressure ash water pumps in Coal-Chemical processes; Pulp pumps



HCP/HDCP 型高温泵 (API-BB2)

参数范围：流量：(500~5000)m³/h，扬程：(25~260)m，温度：~320℃，入口压力：~12MPa；
应用领域：煤气化、冶金、电力行业中压/高压锅炉循环水泵；MTO/炼化一体化装置急冷油泵、急冷水泵；PTA 行业料浆泵、耐腐蚀循环泵、纯钛材泵；

HCP/HDCP High Temperature Pump (API-BB2)

Parameters: Flow: (500~5000)m³/h, Head: (25~260)m, Temperature: ~320℃, Suction Pressure: ~12MPa

Fields of Applications:

1. Medium/High pressure boiler water circulation pumps in coal-chemical, metallurgical and power industries.
2. Chilling oil pumps, chilling water pumps in MTO/Refining-chemical Integration
3. Slurry pumps, anti-corrosion circulation pumps and titanium pumps in PTA



HMCP 型多级高速泵 (API-BB3/BB4/BB5)

参数范围：流量：(100~500)m³/h，扬程：(250~3700)m，温度：~360℃，转速：~12000rpm

应用领域：3000rpm 泵应用于煤气化洗涤塔给料固液两相泵；高速多级泵用于特材耐腐蚀、高温、低温、料浆、SCO₂等特殊领域；

HMCP Multi-stage Pumps (API-BB3/BB4/BB5)

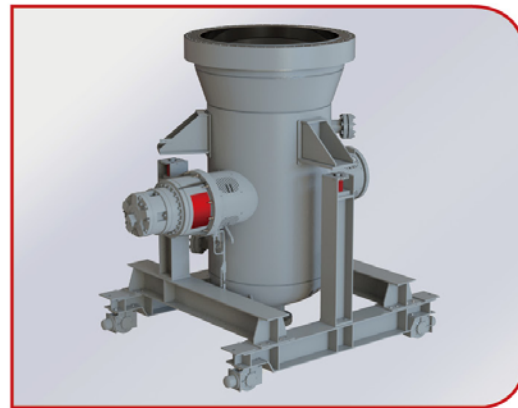
Parameters: Flow: (100~500)m³/h; Head: (250~3700)m; Temperature: ~360℃; Speed: ~12000rpm

Fields of Applications: 3000rpm two-phase (Solid and liquid) scrubber water circulation pumps in coal-gasification processes; high speed multi-stage pumps are applied to handle slurry and SCO₂ or where anti-corrosion, high/low temperature conditions are required.

旋转破碎 Solid Material Crushing

破渣机主要应用于煤气化装置，位于气化炉激冷室与锁渣罐之间，用以破碎大件炉渣或脱落的耐火砖。海绵钛破碎机主要用于破碎以海绵钛为代表的硬塑性物料。垃圾破碎机主要用于破碎以生活垃圾、大件垃圾为代表的各类物料。

The slag crusher, mainly used in the coal-gasification processes, is between the quench chamber of gasifier and lock hopper. Its function is to break oversize slag or fallen firebricks. Sponge Titanium Crushers are mainly applied to crush hard plastic materials, typically sponge titanium. Solid waste crushers are widely used to crush everyday life garbage, large garbage and other materials.



立式破渣机
Vertical Slag Crusher

渣流量 (Solid Flow): ~35000kg/h
压力 (Pressure): ~9.5MPa
温度 (Temperature): ~280°C
扭矩 (Torque): ~35000N·m
破碎后粒度 (Final Particle Size): ≤ 50mm



卧式破渣机
Horizontal Slag Crusher

渣流量 (Solid Flow): ~54000kg/h
压力 (Pressure): ~5.4MPa
温度 (Temperature): ~280°C
扭矩 (Torque): ~10000N·m
破碎后粒度 (Final Particle Size): ≤ 50mm



两级破渣机
Two-Stage Slag Crusher

渣流量 (Solid Flow): ~23000kg/h
压力 (Pressure): ~7.6MPa
温度 (Temperature): ~340°C
扭矩 (Torque): ~30000N·m
破碎后粒度 (Final Particle Size): ≤ 13mm



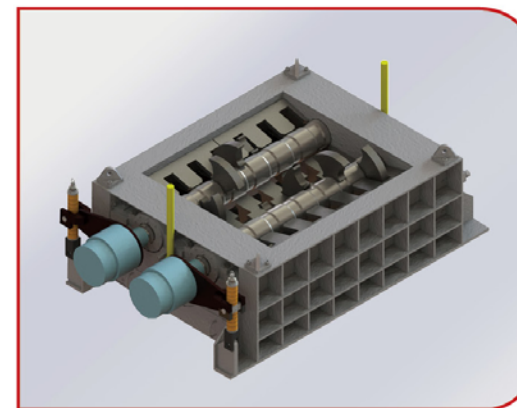
大流量破渣机
Large Flow Slag Crusher

渣流量 (Solid Flow): ~45000kg/h
压力 (Pressure): ~7.4MPa
温度 (Temperature): ~280°C
扭矩 (Torque): ~35000N·m
破碎后粒度 (Final Particle Size): ≤ 50mm



海绵钛破碎机
Sponge Titanium Crusher

处理量 (Capacity): ~3.3t/h
扭矩 (Torque): ~830000N·m
破碎后粒度 (Final Particle Size): ≤ 25mm



垃圾破碎机
Solid Waste Crusher

生活垃圾处理量 (Capacity): ~40t/h($\rho > 0.3t/m^3$)
扭矩 (Torque): ~66000N·m
系统功率 (Power): ~250kW
破碎后粒度 (Final Particle Size): ≤ 250mm

过滤分离 Filtration and Separation Systems

长期从事苛刻工况过滤分离产品的研制和开发，产品广泛应用于石油、炼油、化工等行业的装置。拥有自动清焦过滤技术、旋液分离技术、带压转动轴系设计技术和撬装系统集成技术。

Filtration and separation systems for harsh working conditions, the fruitful results of years of research and development, are broadly applied in petroleum, refinery and chemical industries. Automatic decoking and filtration, cyclone separation of solid/liquid mixtures with low density difference and high flow, pressure vessel with internal rotor system, and skid-mounted system integration are among the most powerful of our technical strength.



自动清焦过滤系统

- 用于清除高温高压工况系统中的固体颗粒；
- 由自动刮刀过滤器与副过滤组成；
- 单台处理流量范围在 (10~6000)m³/h，过滤精度可以达到 50μm；
- 保证系统压差稳定无波动。

Automatic Decoking and Filtration Systems

- Remove solid particles in systems that work under high temperature and high pressure;
- Consist of an automatic scraper filter and a secondary filter;
- Capacity per unit: (10~6000)m³/h; Filtration accuracy: 50μm
- Stable system differential pressure guaranteed.

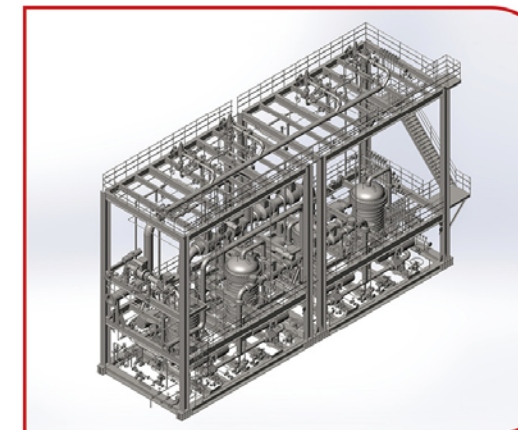


旋液分离过滤系统

- 用于清除高温高压工况系统中的固体颗粒；
- 由旋液分离器与自动刮刷过滤器组成；
- 采用先进的内表面耐磨处理技术，延长设备使用寿命；
- 单台处理流量范围在 (10~6000)m³/h，分割粒径可以达到 10μm；
- 保证系统压差稳定无波动。

Cyclone Separation and Filtration Systems

- Remove solid particles in systems that work under high temperature and high pressure;
- Consist of a cyclone separator and an automatic scraper filter;
- Advanced inner surface hardening technology extends service life;
- Capacity per unit: (10~6000)m³/h; Filtration accuracy: at best 10μm
- Stable system differential pressure guaranteed.



撬装过滤系统

- 用于易结焦工况流体的过滤；
- 由过滤器、管道、仪表、钢结构组成；
- 通过撬装系统内部结构合理设计完成过滤功能；
- 结构紧凑，现场安装方便。

Skid-mounted Filtration Systems

- Filtrate fluids that are prone to form coke;
- Consist of filters, pipes, instruments and steel structures;
- Filtration is fulfilled through careful design of structures within the skid;
- Compact in structure and easy to install at site.

物料输送、计量、包装及其自动化

Delivering, Weighing and Packaging of Solid Materials, and Automation

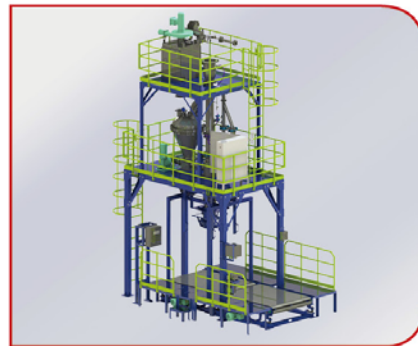


全自动吨袋包装机

应用于化工、化肥、粮食、饲料、建材等领域各种粉料、颗粒料吨袋包装，包装袋采用四吊环吨袋，散袋层叠放置，无需成卷。叉车将散袋托盘放入指定输送机上，其余取袋、上袋、夹袋、灌装、计量、封口等均自动完成。替代人工劳动，实现吨袋包装全自动化。

Fully Automatic One-ton/Bag Packing Machines

Such packing machines are applied to pack powder or granule materials in petrochemical, fertilizer, food, feed and construction industries, etc. Four-Lifting ring bags are stacked and not necessarily roll packed. Except that pallets are loaded onto conveyers by forklifts, bag taking, bag loading, bag clamping, filling, measuring and bag sealing are done automatically.

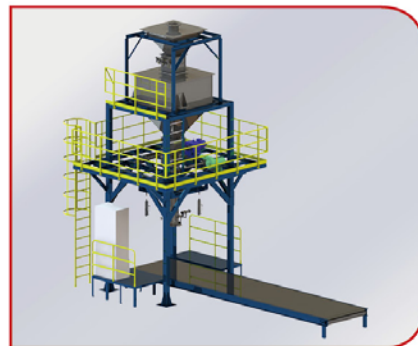


半自动粉料吨袋包装机

应用于化工、化肥、粮食、饲料、建材等领域各种粉料吨袋包装。套袋、封口采用人工完成；皮重法计量称重；除尘器回收粉尘进入成品包装袋，无需单独回收。包装速度：(30~60)包/小时；计量精度： $\pm(1\sim2)\%$ ；粉尘排放浓度：小于 $15\text{mg}/\text{m}^3$ 。

Semi-Automatic One-ton/Bag Powder Packing Machines

Such packing machines are applied to pack powder or granule materials in petrochemical, fertilizer, food, feed and construction industries, etc. Bag loading and sealing are manually carried out. Net weight method can be selected. The duster directs the recycled dust to packing bags, such that no separate dust collection unit is required. Packing Speed: (30~60)bags/h; Accuracy: $\pm(1\sim2)\%$, Dust emission concentration: $< 15\text{mg}/\text{m}^3$.



半自动粒料吨袋包装机

应用于化工、化肥、粮食、饲料、建材等领域各种颗粒料吨袋包装。套袋、封口采用人工完成；净重法计量称重；可根据物料不同或系统配置需求进行非标设计。包装速度：(30~60)包/小时，计量精度： $\pm(0.5\sim1)\%$ 。

Semi-Automatic One-ton/Bag Granule Packing Machines

Such packing machines are applied to pack granule materials in petrochemical, fertilizer, food, feed and construction industries, etc. Bag loading and sealing are manually carried out. Tare method can be selected. Non-standard designs are available per various products or system configurations. Packing Speed: (30~60)bags/h, Accuracy: $\pm(0.5\sim1)\%$.



自动密闭倒桶设备

应用于各种桶装物料自动密闭倾倒。只需人工将物料桶放置在移动小车上，其余过程均自动完成，倾倒完成空桶返回原位。双层密封结构保证零粉尘逸出，有效解决物料倾倒时对环境、对人体毒害及其他恶劣环境下代替人工作业。

Automatic Closed Bucket Dumping System

Such systems are used to dump materials packed in buckets in an airtight enclosure. It is fully automatic except that buckets are manually loaded on carts. Double-seal structure assures zero dust emission which effectively solves the pollution problem. Such systems are widely used under toxic or other hazardous conditions in place of human.



集装箱灌装设备

应用于各种粉料、颗粒料集装箱灌装，分集装箱举升式和平置式两种。举升式可将集装箱举升至 45° 位置，纯重力灌装；平置式叶片旋转式水平喂料，无需举升集装箱。可配装汽车衡控制灌装重量。

Container Filling Equipment

Such systems are applied to fill containers with powder or granule materials. Elevated gravity feeding mode, in which containers are lifted to tilt at 45° and the feed is done by gravity, and horizontal feed mode, in which containers are not lifted, and the feed is done by rotating vanes, can be selected. The amount of filling can be controlled by truck scales.



槽车灌装设备

可悬挂于下料管路上，应用于各种粉料、颗粒料槽车灌装。带粉尘回收装置，回收粉尘直接进入槽车，无需单独处理。料位计停止灌装，可配装汽车衡控制灌装重量。灌装速度：(20~100) kg/s。

Tank Truck Filling System

Such systems, which can be suspended to the material feed lines, fill tank trucks with powder or granule materials. The duster directs the recycled dust to tank trucks, such that no separate dust collection unit is required. The amount of filling can be controlled by level meters or truck scales. Filling Speed: (20~100) kg/s.



固体催化剂加料器

将固体催化剂按一定速度，以气力输送的方式添加到高压反应器中的设备。系统压力、携带气流量、系统相关节点压差、电动机转速等系统参数实时监测、可调。加料速度： $\sim 10\text{kg}/\text{h}$ (可调)。

Solid Catalyst Feeders

Pneumatically feed solid catalyst into high pressure reactors at a certain rate. System pressure, power air flow, differential pressure and electrical motor speed can be monitored and adjusted in real time. Feeding speed: $\sim 10\text{kg}/\text{h}$ (Adjustable).



催化剂密闭卸料系统

用于将集装箱中的固体催化剂以负压输送的方式卸至催化剂储罐中；适合集装箱 20ft 或 40ft；最大负载：40t；卸料速率：15t/h。

Closed Unloading System for Catalyst

Solid catalyst is vacuumed from container to the catalyst storage tank. Good for 20ft or 40ft container. Maximum load: 40 t. Unloading rate: 15 t/h.