

SHINKAI®

Filtration System 过滤系统

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SHINKAI® Filter

雄凯过滤



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公司简介

COMPANY PROFILE

南京雄凯过滤设备有限公司系专业开发以金属膜材料为“核芯”的过滤、分离设备制造商。数十年来服务于国内外石油化工、化学、精细化工、煤化工、食品饮料、核电、造船、汽车制造等行业，在复杂的液固分离，气固分离，气力输送和气体分布等领域积累了丰富的工程经验。

根据市场的需求我们成功开发出多种国际领先的金属膜材料，金属膜的合金材质有不锈钢(304L、316L)、钛及其合金、镍金属、蒙耐尔(Ni-Cu合金)、因康镍(Ni-Cr-Fe合金)、铁铝合金、Hastelloy®B、C、X以及其他特种材料,适用于各种酸、碱、高温以及高压场合。依据其不同的特点为客户开发出性能优异的，高质量的最终过滤产品，努力为客户解决生产中的难题，创造出最大价值。

Nanjing Shinkai Filter Co., Ltd is dedicated in filtration and separation equipment and system with metal membrane materials as “core element”. We serve for petroleum chemical industry, chemistry, fine chemical, coal chemical industry, food and beverage, nuclear power, shipbuilding, automobile manufacturing and other industry for decades home and abroad, and accumulated rich engineering experiences in a complex liquid solid separation, gas-solid separation, powder handling & processing, sparging and so on.

We have been successfully developed a variety of international leading metal membrane materials based on market demand. The materials can be various from stainless steel (304L, 316L), Ti and alloy, Ni, Monel® (Ni-Cu alloy), Inconel® (Ni-Cr-Fe alloy), Fe-Al alloy, Hastelloy®B C X and as well as other special material. And the elements can suitable for various situations of acid, Alkali, high temperature and high pressure. Shinkai develop the excellent performance and high quality final filtration products to for customers to solve production problems and create the greatest value according to customers different technical conditions.

金属膜的选择

Selection of metal membrane elements



雄凯生产的金属膜XKP元件
Shinkai Metal Membrane XKP

雄凯生产的金属膜XKP元件采用金属粉末为原材料,经冷等静压成型后,通过高温真空烧结制成。元件能够提供均一的孔隙度,具有形状稳定、强度高、耐高温、耐腐蚀、透气性与分离效果佳、反冲洗效果好,易再生等特点。适用于医药、农药、染料中间体的催化剂过滤,过滤液体、气体,PTA生产中母液的回收,食品饮料的过滤等。

Shinkai metal membrane XKP element is used metal powder as raw material and produced with isostatic compaction and high temperature vacuum sintering. The element can provide homogeneous porosity with characteristic of stabilized shape, high strength, temperature resistance, corrosion resistance, good permeability and separation effect, good back flush, easy regeneration and so on. Our products is applied to medicine, pesticide, dye intermediate's catalyst filtration, liquid and gas filtration, PTA mother solution recovery, food and beverage filtering.



雄凯生产的金属膜XKW元件
Shinkai Metal Membrane XKW

雄凯生产的金属膜XKW元件由多层(常规为五层)304L或316L不锈钢丝网模压成型后,经高温真空烧结和氩弧焊或等离子焊接而成。元件具有渗透性好、强度高、抗腐蚀性能强、耐高温、易于清洗和反清洗、无材料脱落、使用寿命长等特点。适用于聚酯过滤、油品过滤、制药脱色、食品饮料过滤、化工产品的过滤、水及空气等介质的过滤。

Shinkai metal membrane XKW element is made with 5 layers of 304L or 316L stainless steel wire mesh with method of mould pressing, high temperature vacuum sintering and argon arc welding or plasma welding. The element possesses the feature of good permeability, high strength, high corrosion resistance, high temperature resistance, easy cleaning and back flush, no material falling off, long service life and so on. Which is applied to polyester filtration, oils filtration, pharmacy decoloration, food and beverage filtration, chemical filtration as well as water and air filtration.



雄凯生产的金属膜XKF元件
Shinkai Metal Membrane XKF

雄凯生产的金属膜 XKF 元件是采用进口不锈钢纤维为原材料,经过对金属纤维的无纺铺制、叠配后,通过高温真空烧结制成的多孔深度型过滤材料。具有孔隙率高(最高达90%)、透气性能佳;过滤面积大、纳污性能强(使用周期长);耐高温、耐高压;抗腐蚀性能强;压强损失小;耐受绝大部分溶剂;过滤精度高等优点。适用于高分子聚合物过滤;粘胶过滤;特殊油过滤;蒸汽及高温气体过滤;高粘度的化学溶液过滤等场合。

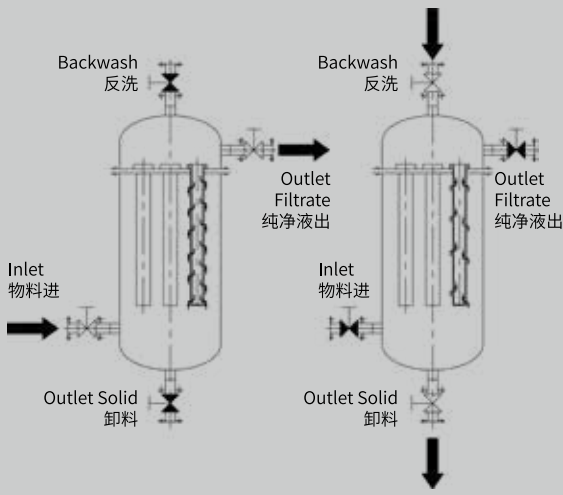
Shinkai metal membrane XKF element is used the imported stainless steel fiber as raw material, and it is a high porosity porous deep filtration material with process of non-spinning, folding of the metal fiber, porous filter material as well as high temperature vacuum sintering. This material possesses the advantage of high porosity (max. 90%), good permeability, large filtration area, strong pollutant received quantity (long period using), high temperature resistance, high pressure resistance, good corrosion resistance, less pressure loss, durable using in most solvent, high filtration precision. Which is applied to high-molecular polymer filtration, viscose filtration, special oil filtration, steam and high temperature gas filtration, high viscosity chemical filtration and so on.

固液分离

Liquid-solid separation

在众多的化学工艺生产过程中会存在固液分离的现象, 根据物料的温度、流量、固含量、PH值及粘稠度等参数值可以选用不同的过滤方法去解决。雄凯提供适用于批次生产中的死端过滤和适用于连续生产中的错流过滤设备系统, 有效地解决了客户在生产过程中遇到的众多过滤、分离问题。

Liquid-solid separation is very common in unit operations of chemical engineering, and we will choose different filtration solution to solve the problem based on material' s temperature, flow, solid content, PH value, viscosity and related parameter. Shinkai provides dead end filtration system for batch production and cross flow filtration system for continuous production so as to solve customer' s various filtration, separation problem during production.



由外向内死端过滤
Outside-in dead end filtration system

此种过滤器可为各种浓度固体流体供由外向内的过滤, 使用简单、维护方便、可提供可靠、持久的过滤能力, 并具有以下优点:

- ① 可方便的拆装金属膜
- ② 金属膜组件可以整体拆除
- ③ 金属膜间距短, 结构紧凑, 节约成本
- ④ 反洗效果好
- ⑤ 过滤面积可达200m², 能承受高达0.8MPa的压差, 滤饼厚度可达20mm
- ⑥ 非常适用于精细化工生产中从母液中完全分离各种贵金属催化剂

This kind of filter can be used for various concentration solid-fluid filtration from outside to inside, easy operation, convenient maintenance, reliable and durable filtration capability with below mentioned properties:

- ① Dismounting and assembling metal membrane cartridge conveniently
- ② Metal membrane cartridge can be dismantled integrally
- ③ Space among metal membrane elements is short, structure is compact, cost is lower
- ④ Back flushing/blowing property is good
- ⑤ Filtration surface can reach 200 m², elements can be borne 0.8MPa pressure drop, and filter cake can reach 20mm
- ⑥ Suitable for precious metal catalyst filtration from mother solution in fine chemical production



由内向外死端过滤
Inside-out dead end filtration system

此种过滤器采用由内向外的过滤方式, 在每个过滤周期结束后, 可通过反冲洗的方式将固体颗粒从金属膜内部排出。其具有以下优点:

- ① 消除滤饼堆积的相关问题
- ② 减少了过滤器底部的存液量
- ③ 具有更大的过滤面积
- ④ 反洗效果好
- ⑤ 过滤、反洗周期频率少, 延长了过滤器在线运行时间
- ⑥ 非常适用于回收贵金属催化剂、活性炭和有机盐催化油浆的过滤

This kind of filter use inside-out filtering method, which can discharge solid from metal membrane element inside through back flushing after each filtration cycle. Main properties as below:

- ① Solve the problem of filtration cake accumulation
- ② Reduce residue liquid quantity in filter bottom
- ③ More filtration surface
- ④ Good back flushing performance
- ⑤ Back flushing frequency is less and longer service life in process
- ⑥ Suitable for precious metal catalyst recovery, activated carbon and organic salt catalytic slurry oil filtration

在加氢领域经常会使用雷尼镍催化剂, 在生产过程中, 催化剂参与化学反应后, 应及时将催化剂与反应溶液分离, 使催化剂继续参加下一批反应。如果不完全分离, 不仅影响化学反应物的质量, 也由于催化剂的损失使得生产成本增加。固体催化剂的颗粒很细, 一般滤布很难将其完全分离, 针对雷尼镍催化剂的特点, 雄凯生产的雷尼镍催化剂过滤器采用错流的原理, 可分离0.45~100um的颗粒, 过滤效率达100%, 浓缩后的溶液可达到固含量20%。

We will use raney nickel catalyst in hydrogenation reaction frequently, and catalyst shall be separated from solution in time and then put into next batch reaction. It will not only influence final product quality, but also increase production cost due to catalyst loss if catalyst can' t be separated from solution completely. Solid catalyst particle is very small and it is not easy separated completely with common filter cloth. Shinkai designed raney nickel catalyst filter adopts cross flow filtering theory based on catalyst feature, which can separate 0,45~100µm particle and filtration efficiency can reach 100%, solid content in concentrated solution can reach 20%.





① 原料液进 Inlet liquid+solids ② 气体反吹 Backflow
③ 纯净液出 Outlet filtrate liquid ④ 固体排出 Outlet solids

此种过滤器提供由内向外的过滤, 具有通过交叉流动的过滤提供连续过滤周期的性能。物料流过两端开口的金属膜元件, 滤清液会透过金属膜流出过滤系统, 固体微粒则会保留在循环流中。这种方法适合过滤具有特殊微粒特征的物料, 或需要连续反应生产的场合, 最大程度的保留贵重的固体颗粒, 如贵金属催化剂等。

其具有以下优点:

- ① 适用于固含量较高的物料过滤
- ② 能够过滤极细小的固体颗粒
- ③ 完全的物理分离, 不改变产品的任何性能
- ④ 提高过滤效率与过滤质量
- ⑤ 非常适用于连续循环反应的工艺操作

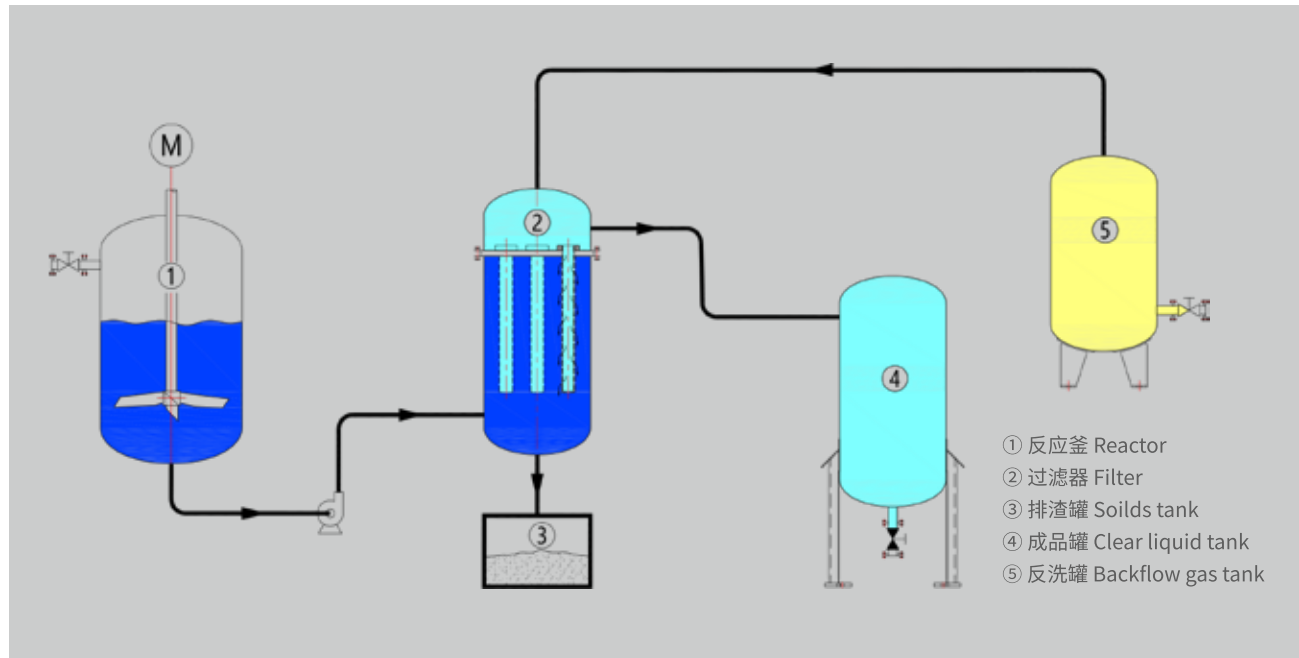
This filter offers inside-out filtration way and has the characteristic of continuous filtration cycle through cross flow. Material traverse both end opened metal membrane element, clear liquid outflow filter system through metal membrane, and solid particle retain in recycle flow. This method is suitable for filtration with special feature material or continuous reaction occasion, which can retain valuable solid particle at the greatest extent, such as precious metal catalyst.

Properties as below:

- ① Suitable for high solid content material filtration
- ② Tiny solid particle filtration
- ③ Physical separation, and not change product property anymore
- ④ Increase filtration efficiency and quality
- ⑤ Suitable for continuous recycle reaction technological operation

固液分离中的典型应用

Typical application in solid liquid separation



催化剂过滤、分离

Catalyst filtration and separation

在很多化学反应领域经常会使用贵金属（钯、铂、钌、铑、铱等）催化剂，为了解决工厂生产过程中出现的催化剂泄漏、工作环境恶劣环保压力大、生产效率低下、设备投资过大、不能连续生产等问题，我公司消化吸收国外优秀的化工公司使用的先进设备，并使用了采用德国技术自主生产的金属滤芯而设计了一种新型催化剂过滤分离系统。已在国内的原料药、染料中间体、石油加氢、TDA/TDI、农药、香料、双氧水、己内酰胺等领域使用了上百套，为客户解决了生产过程中存在的固液分离问题，获得了巨大的效益。



We will often use precious metal (Pt, Pd, Ru, Rh) as catalyst in many chemical reaction field, in order to solve the problem of catalyst leakage, bad working environment, low production efficiency, large investment and non-continuous production, Shinkai designed a new catalyst filtration and separation system based on digesting and absorbing overseas advantage filtration equipment world's leading metal sintered filter element. Our filtration system has been applied in many chemical field more than 100, such as crude drug, dye intermediate, petrochemical hydrogenation, TDA/TDI, pesticide, spice, H₂O₂, caprolactam, and solved the liquid/solid separation problem for customers, and create huge value for customers.



催化剂过滤、分离

Catalyst filtration and separation

采用雄凯公司自主生产的催化剂过滤分离系统具有很多优点:

- ① 绝对的过滤精度—过滤介质的孔径大小和分布均有严格控制，昂贵的催化剂得以100%的拦截。
- ② 高强度的介质—金属粉体颗粒牢固的烧结在一起，避免一般过滤介质的分离、疲劳和穿透性等现象。
- ③ 备用件成本低—过滤器中的金属膜可以长时间使用，最长可达十年。
- ④ 金属膜再生容易—过滤器通过专利的反吹（气体）或反冲洗（液体）等技术方便地清除微粒，而不会刮坏、磨损元件。
- ⑤ 介质种类繁多—雄凯提供了品种齐全的过滤介质，从标准的304L、316L不锈钢到蒙耐尔、因康镍、哈氏合金以及镍金属和钛及其合金应有尽有。可满足各种酸、碱、高温、高压场合。
- ⑥ 解决环保问题—完全密闭空间设计，同时实现系统自动化控制，降低工人的操作风险，减少了环保压力。
- ⑦ 催化剂的性能得到最大的体现—催化剂可反复套用，避免了清理催化剂过程中的失活。
- ⑧ 过滤方式多样—可以实现化工生产中的多种工艺流程，批次处理和连续过滤分离催化剂。

Our own technology catalyst filtration and separation system possess many properties as below:

- ① Absolute filtration accuracy, filter media pore size and distribution is strictly controlled, expensive catalyst can be 100% intercepted.
- ② High strength media, metal powder particles are firmly sintered together to avoid separation, fatigue and penetration of common filter media.
- ③ Reduce the cost of spare parts, metal membrane element can be used long time, longest is 10 years.
- ④ Metal membrane element easy regeneration, particle can be easily removed from metal membrane element surface with back blow (gas) or back flush (liquid) which will not scrape and wear elements.
- ⑤ Various metal membrane materials, Shinkai provided various metal membrane materials from standard 304L, 316L to Monel, Inconel, Hastelloy alloy as well as Ni and Ti metal so as to satisfy all kinds of acid, alkali, high temperature and high pressure occasion.
- ⑥ Solve environment protection problem, complete confined space design, automatically controlling, lower operation risk and reduce environment pressure.
- ⑦ Catalyst performance can be embodied maximally, catalyst can be used repeatedly and avoid catalyst inactivation during normal filtering operation;
- ⑧ Various filter types, we can provide both batch disposal and continuous disposal catalyst separation way to match different chemical technological process



固液分离中的典型应用

Typical application in solid liquid separation

聚合物过滤

Polymer filtration

在塑料、聚酯纺丝挤出成型的生产过程中，混入熔体中的杂质不仅会影响产品质量，而且也会妨碍正常生产。为此在挤出机后均设有聚合物过滤器，以分离熔体中的杂质，保证生产线的正常、稳定生产。

聚合物过滤器的主要功能是在高温、高压、高粘度的操作条件下去除生产流程中熔体中的机械杂质、凝胶、焦化物及其他固体和胶状杂质、金属粉末、添加剂结块及一般性的污染物等，以使通过过滤器的熔体达到一定的均匀度和纯净度，为下游的装置提供高品质的产品。

雄凯生产的聚合物过滤器多采用金属膜XKF为过滤元件，具有过滤面积大、过滤精度高、孔隙率高、纳污量大、压阻小等特点，非常适用于高温、高粘度的产品的过滤。

The impurity mixed in melted polymer will not only influence product quality, but also harm normal production during plastics and polyester extrusion molding process, therefore, polymer filter will be designed after extruding machine so as to separate impurity and guarantee normal and stable operation.

The main function of polymer filter is to remove mechanical impurities, gel, coking and other solid or colloid impurities, metal powder, additive caking as well as general contaminant during high temperature, high pressure, high viscosity operation process in melted polymer so as to make the melted polymer through filter reach some evenness and purity, and provide high quality products for downstream operation unit.

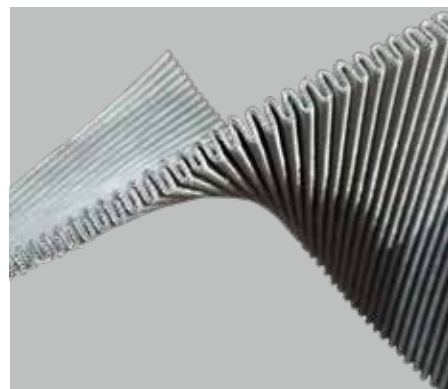
Normally we will use metal membrane XKF as filtration element for polymer filter equipment which possesses the characteristic of large filter area, high filter accuracy, high porosity, strong pollutant received quantity, small differential pressure, and it is very suitable for high temperature, high viscosity products filtration.

应用场合：

- ① 粘胶过滤
- ② 薄膜挤塑和纤维挤塑工业中的过滤
- ③ 聚丙烯、聚酯熔融液过滤
- ④ 高粘度的化学溶液过滤
- ⑤ 高分子聚合物过滤 (尼龙、工程塑料、碳纤维、PET、PTMEG等)

Applications：

- ① Viscose filtration
- ② Melted PP and polyester filtration in film extrusion and fiber extrusion industry
- ③ High viscosity chemical solution filtration
- ④ Polymer filtration (nylon, engineering plastics, carbon fiber, PET and PTMEG)



硅工业中硅粉过滤

Silica powder filtration in silicon industry

硅工业包含工业冶金硅、多晶硅、有机硅、硅烷气体、气相二氧化硅等生产行业，在生产过程中存在大量的液固分离难题。三氯氢硅、四氯化硅、硅粉是生产多晶硅、有机硅、硅烷气的主要原料，由于硅粉的泄露导致生产装置中的管道、换热器容易堵塞，损坏大量泵、仪表、阀门等设备的同时也影响了产品的品质。雄凯拥有自主研发的专利产品-干法冷凝料过滤器在其中得到了广泛的应用，并为客户解决了众多的过滤分离难题，得到用户的广泛好评。

Silicon industry includes industrial metallurgical silicon, polysilicon, organosilicon, silane gas, gaseous silica and other production industries. In the process of production, there are many problems about liquid-solid separation. Trichlorosilane, silicon tetrachloride and silica powder are the main raw materials for polysilicon, organosilicon and silane gas. Due to the leakage of silica powder, the pipes and heat exchangers in the production equipment are easy to clog, and the damage to the equipment such as pumps, meters and valves also affects the quality of the products. The patented product drying condensate filter developed by us has been widely used in it, and has solved numerous filtration and separation problems for customers, which has been widely praised by users.

产品优势：

- ① 过滤精度高 (0.1um)
- ② 降低安全、环保风险
- ③ 耐高温 (最高工作温度900℃)
- ④ 强度高，正向耐压50bar
- ⑤ 抗腐蚀性能力强，耐溶剂、耐酸碱
- ⑥ 拥有专利技术的全反冲洗再生工艺
- ⑦ 硅粉自动排渣设计
- ⑧ 元件最长使用可达10年，无需频繁更换
- ⑨ 确保硅粉100%拦截，零泄漏
- ⑩ 密闭空间设计，全自动操作

Properties：

- ① Good filtration precision (0.1um)
- ② Reduce the risk of safety and environmental protection
- ③ Sufficient thermal strength up to 900°C
- ④ Shape stability, components with high strength (sufficient pressure strength up to 50bar)
- ⑤ Corrosion resistance
- ⑥ Back flushing with patented technology
- ⑦ Automatic exclusion of silica powder
- ⑧ Ten years service life in process
- ⑨ Silica powder can be completely intercepted
- ⑩ Enclosed space design and fully automatic operation

应用场合：

- ① 还原单元硅粉过滤 (专利产品)
- ② 四氯化硅提纯过滤
- ③ 三氯氢硅粉过滤
- ④ 硅片切削液过滤

Applications：

- ① Silica powder filtration in reduction unit of modified siemens technology (Patented product)
- ② Silicon tetrachloride purification and filtration
- ③ Trichlorosilane filtration
- ④ Silicon chip cutting liquid filtration

气固分离

Gas-Solid Separation

随着人们对环境要求愈来愈高, 众多的气体需要处理才能排往大气中, 为了有效地把固体颗粒从气体中分离出来, 雄凯在针对高腐蚀性、高温和高污染物浓度的环境下开发出两种气固分离过滤系统。

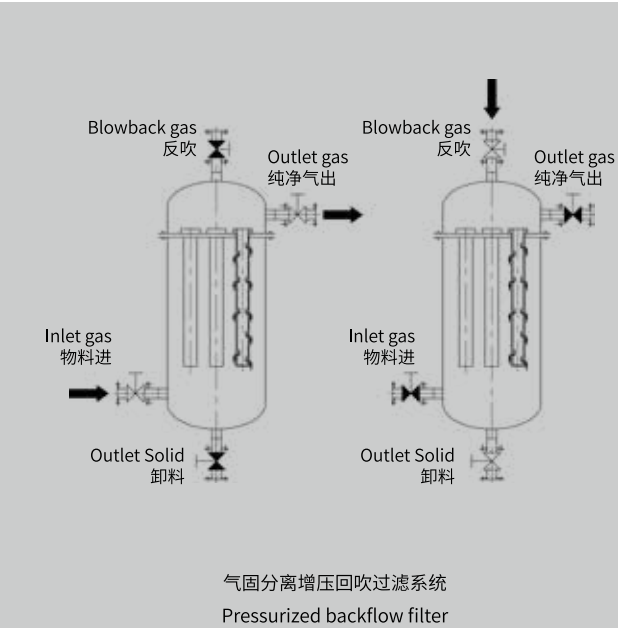
适用于以下场合:

- ① 乙烯工程中的高温气体过滤
- ② 多晶硅行业中的气体过滤
- ③ 煤化工行业中的气体过滤
- ④ 硝酸行业的催化钯网的保护过滤
- ⑤ 石油裂解催化剂的回收过滤
- ⑥ 冶金工业高炉与转炉的高温煤气过滤
- ⑦ 玻璃制造工业的高温尾气排放
- ⑧ 锅炉、焚烧炉的高温废气过滤排放

Tail gas shall be disposed before discharge into atmosphere along with people more and more request for environment, in order to separate solid particle from gas, Shinkai developed two kinds of gas-solid filtration system for high corrosion, high temperature and high contaminant concentration situation.

Suiting for the following applications:

- ① Hot gas filtration in nethylene project
- ② Gas filtration in polycrystalline silicon industry
- ③ Gas filtration in coal chemical industry
- ④ Catalyst palladium net protection filtration in nitric acid industry
- ⑤ Catalyst recovery and filtration in petrochemical refinery industry
- ⑥ Hot coal gas filtration in metallurgical industry
- ⑦ Hot tail gas discharge filtration in glass industry
- ⑧ Hot flue gas discharge in boiler and destructor

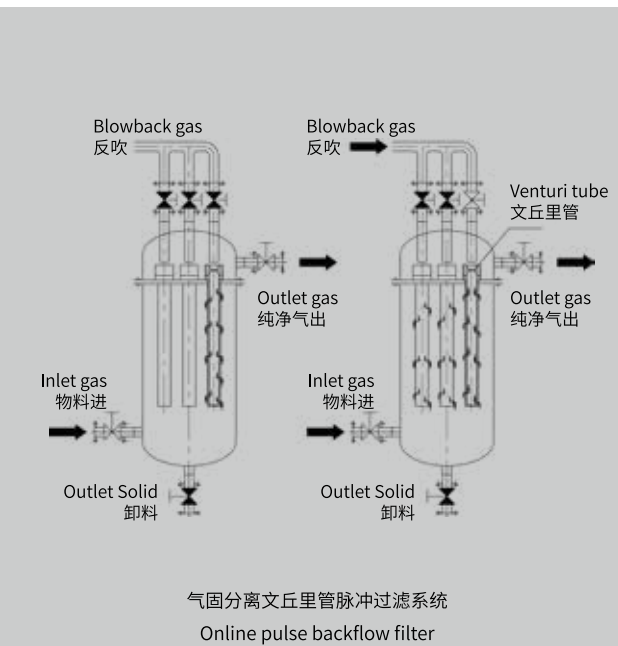


此种过滤器提供由外向内的过滤, 用于工业废气和工业蒸汽过滤以及不允许使用常规微粒控制装置的应用场合, 如袋式除尘器。其具有以下优点:

- ① 设计简单、操作方便
- ② 过滤面积达100m²
- ③ 运行压力可达0.8Mpa
- ④ 最高工作温度达900℃
- ⑤ 金属膜可通过反向流清洗
- ⑥ 适用于过滤高温气体中的污物和蒸汽中的锈迹或管垢

This filter provides outside-in filtration mode, and mainly for industry flue gas and steam filtration as well as some occasion of common particle control method forbidden using, such as bag filter system, the properties as below:

- ① Simple design and convenient operation
- ② Filtration surface can reach 100m²
- ③ Operation pressure can reach 0.8MPa
- ④ Sufficient thermal strength up to 900℃
- ⑤ Metal membrane can be cleaned by back flushing
- ⑥ Suitable for hot gas filtration and steam filtration



此种过滤器非常适用于要求过滤器持续运作的系统。过滤器由多个滤芯组合在一起, 可在不拆除过滤器的情况下依次进行脉冲反吹, 并具有以下优点:

- ① 持续运行;
- ② 处理量大, 但只需最小的反向脉冲
- ③ 过滤面积达100m²
- ④ 运行压力可达0.8MPa
- ⑤ 最高工作温度达900℃
- ⑥ 非常适用于聚乙烯固体物、氧化镁固体物、聚丙烯固体物的回收, 煤气化项目中的高温飞灰过滤以及从流化床反应器中回收催化剂

This kind of filter is suitable for continuous filtration operation system. Filter is organized by several filter element groups together, and can be cleaned by pulse jet device successively without dismantle filter equipment, some properties as below:

- ① Continuous operation
- ② Large disposed quantity with least reverse pulse jet
- ③ Filtration surface can reach 100m²
- ④ Operation pressure can reach 0.8Mpa
- ⑤ Sufficient thermal strength up to 900℃
- ⑥ Suitable for PE powder, magnesium oxide solid and PP powder recovery, high temperature powder filtration in coal gasification industry as well as recovery catalyst from fluidized bed reactor

气固分离中的典型应用

Typical applications in Gas-Solid Separation

一直以来有机硅、多晶硅和硅烷气行业环境污染严重、能耗大、技术和产业化落后，极大限制了硅工业的可持续发展，污染问题也一再被提上日程。硅工业生产过程中会产生大量气相产物和固体微粒，由于一些传统的分离设备精度、耐高温性和力学性能较差，无法满足高温气固分离要求，导致进入后续工段的气相产物中仍然夹带有大量的固体微粒。气相产物需要经过冷凝液化、富集后进精馏塔精馏分离产物，而冷凝液的富集又会产生大量的渣浆（主要成分有三氯化铝、氯化氢、氯硅烷或有机氯硅烷、硅颗粒等，其中硅和氯硅烷或有机氯硅烷占绝大部分），而渣浆恰恰是最难治理的污染物，在过去的一段时间内，大量的渣浆都采用简单的掩埋甚至直接的倾倒方法处理，这样做的后果直接造成了严重的污染事故，土地寸草不生，水源严重破坏。

All this time the environment pollution, energy consumption, technology and industrialization of organosilicon, polysilicon and silane gas industry has been serious, which has restricted the sustainable development of silicon industry. The silicon industry produces a large number of gaseous products and solid particles. Due to the poor precision, temperature resistance and mechanical properties, some traditional separation equipments cannot meet the hot gas-solid separation requirements, resulting in the subsequent stage of the gas phase products still containing a large number of solid particles. The gas phase product needs to be liquefied by condensation and enriched into the distillation column, and the concentration of the condensate will produce a large amount of slurry (mainly aluminium chloride, hydrogen chloride, chlorsilane or Organosilane, silicon, etc). Slag is precisely the most difficult pollutant to treat. But in the past few years, a large number of slurries have been treated by simple burial or even direct dumping, with the result that serious pollution accidents have been directly caused. Land is uncultivated and water sources are severely damaged.



随着技术的进步，人们采用新工艺来处理渣浆并且也取得了一定的成果。时至今日，国内渣浆处理工艺的有碱水解法、干燥法、压滤法等。然而，在渣浆的处理过程中存在一系列的难点，针对渣浆的主要成分分析，其处理难点表现在五个方面：

- (1) 渣浆处理量大，设备、人力和能耗成本高；
- (2) 氯硅烷或有机氯硅烷浪费严重；
- (3) 氯硅烷或有机氯硅烷、三氯化铝处理危险系数大，会给安全操作带来很大不利；
- (4) 水资源浪费严重；
- (5) 需要进行废水处理。

With the development of technology, people adopt new technology to deal with slag pulp and have achieved some results. Today domestic slag pulp treatment process has hydrolysis, drying method, filter pressing and so on. However, there are a series of difficulties in the treatment of slag. According to the analysis of the main components of slag, the processing difficulties are manifested in five aspects:

1. High disposal capacity and high cost of equipment, manpower and energy consumption.
2. Serious waste of chlorsilane or organochlorsilane.
3. High risk factor of chlorsilane or organochlorsilane and aluminium trichloride treatment will cause great disadvantage to safe operation.
4. Water resources waste.
5. Wastewater treatment required.

针对有机硅、多晶硅、硅烷气等领域中流化床反应器中高温气固分离问题，雄凯采用自主生产的金属膜作为过滤元件开发出高温气固过滤器，用于高温高危环境下气相产物与固体颗粒的完全分离。其突出优势是可极大地降低后续工序处理量，减少反应产物和水资源的浪费，切实有效消除安全环保压力，稳定产品质量。

高温气固过滤器由金属膜元件、自动反吹装置和自动排粉装置组成。当高温气流通过过滤器时，夹带的固体颗粒粒径大于金属膜的孔径，在金属膜的进气表面被分离而沉积下来，后来的固体颗粒堆积成滤饼。当达到预定压降或周期时间时，自动反吹装置在线反吹清洁金属膜，使滤饼剥离，自动排粉装置排出滤饼，金属膜恢复到初始压降。需要指出的是，任何时候反吹清洁的金属膜仅是多个过滤元件中的一部分，其余元件仍处于过滤状态，所以能保证高温气体的连续流动。

For hot gas-solid separation in fluidized bed reactor in the fields of organosilicon, polysilicon and silane gas, Shinkai developed a hot gas-solid filter using self-made metal membrane materials as filtration elements, which was used to separate the gas-phase products from the solid particles in high temperature and high risk environment. The outstanding advantages of filter is that it can greatly reduce the amount of subsequent processing, reduce the waste of reaction products and water, effectively diffuse the safety and environmental stress, and stabilize the product quality.

The hot gas-solid filter consists of metal membrane elements, an automatic backflow device and an automatic powder discharging device. When the hot gas passes through the filter, the particles in the strip are larger than the pore size of the metal membrane, and which can be separated from the inlet surface of the metal membrane, then deposited into a filter cake. When the preset pressure drop or cycle time is reached, the automatic backflow device clean the metal membrane online, then the filter cake is stripped. The filter cake is discharged from the automatic discharging device and the metal membrane is restored to the initial pressure drop. It should be noted that at any given time, the clean metal membrane elements are only part of multiple filter elements. The rest of the elements are still working to ensure the continuous flow of hot gas.

气固分离中的典型应用

Typical applications in Gas-Solid Separation



在石油炼制和石化工业中，流化催化裂化(FCC)、连续催化重整/脱硫(CCR)和脱氢工艺中通常会使用到高温气固过滤器。

In petrochemical refinery and chemical industry, catalyst storage tank and powder outlet will use hot gas-solid filter in fluid catalytic cracking (FCC), continuous catalytic reforming (CCR) and dehydrogenation process.

流化催化裂化 FCC

使用雄凯高温气固过滤器来清除流化催化裂化装置烟气中的催化剂粉末，可以使炼厂符合排放标准，并充分保护下游工艺设备。具体而言：

- (1) 在温度高达850℃的强腐蚀环境中，例如煤气化炉及流化床煤燃烧炉，使用雄凯高温气固过滤器不仅能在气体流量变化时保证过滤效率，而且也保护了下游的涡轮膨胀机，使其在最大能量回收同时延长叶片寿命。
- (2) 与常用的静电除尘器不同，雄凯高温气固过滤器的过滤效率在气体流量波动时保持不变，也不受微粒物质变化和静电场的影响，且完全满足排放标准。
- (3) 如有第三和第四级旋风分离器，把第四级换为雄凯高温气固过滤器会改进固体捕获效率，这时用最小的投资便足以符合排放标准。

The catalyst powder in the flue gas of the fluidized catalytic cracking device can be removed by using Shinkai hot gas filter. It enables refineries to meet emission standards and adequately protect downstream equipments. More specifically:

1. In highly corrosive environments with temperatures as high as 850 °C, such as coal gasifiers and fluidized bed coal burners. Using Shinkai hot gas filter can not only guarantee the filtration efficiency when the gas flow changes, but also protect the turbine expansion machine downstream, so that it can extend the leaf life at the same time.
2. Unlike electrostatic precipitators, the filtration efficiency of Shinkai hot gas filter remains constant when gas flow fluctuates. Nor subject to particulate matter changes or static electric fields, and fully meeting emission standards.
3. In the case of a third and fourth stage cyclone separator, switching the fourth stage to shinkai hot gas filter would improve solid capture efficiency, with minimal investment sufficient to meet emission standards.



连续催化重整 CCR

在连续催化重整装置中，催化剂被连续再生，安装在该装置上的雄凯高温气固过滤器防止循环压缩机磨损和污染堵塞。高温气固过滤器还可用来对循环回路再生器的淘洗气体进行过滤，固体被完全滤除无泄漏。

In continuous catalytic recharging, the catalyst is continuously regenerated. Shinkai hot gas filter installed on the device prevents the circulating compressor from wear and clogging up. The hot gas filter can also be used to filtering the gas of the recycle circuit regenerator. The solids are completely filtered without leakage.

脱氢过程 Dehydrogenation process

在流化床反应器的脱氢装置中，可采用雄凯高温气固过滤器来处理催化剂再生器废气。只需简单的一步，就可以使气体达到排放标准。

In the dehydrogenation device of fluidized bed reactor, Shinkai hot gas-solid filter can be used to treat the exhaust gas of catalyst regenerator. A simple step would allow the gas to reach emission standards.

气力输送

Powder Handling & Processing



在粉体处理过程中, 混合不同固体, 排气, 沸腾, 卸料等工序, 雄凯生产的金属膜材料得到广泛的应用。

在HT-L、SHELL或GSP等粉煤加压气化装置中都会存在煤粉的输送现象。其输送系统中的气体输送介质为氮气或二氧化碳, 该技术的重要组成部分便是粉煤的加压送料系统。在使用氮气进行压送粉煤时, 由于粉煤气化中输送的固体颗粒粒径非常细小, 在颗粒流动形式中, 气相介质中的固体颗粒容易出现松散的黏附现象而导致出现架桥。在增加了通气锥设备后, 氮气可通过粉煤放料罐底部的通气锥进入罐中, 对储罐中的粉料进行加压使粉体均匀化, 减少粉体间的作用力, 从而使颗粒在重力作用下可以顺利的流动。

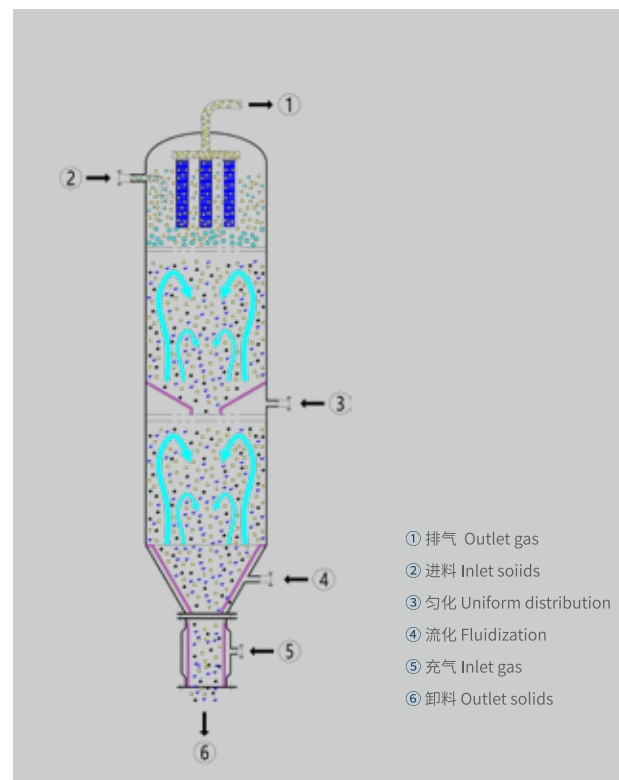
During powder treating process, Shinkai metal membrane materials are widely applied in solid mixing, exhausting, boiling and discharging process.

In the HT-L, SHELL or GSP pulverized coal pressure gasification devices can be transported by pulverized coal. Transportation medium is N₂ or CO₂, normally, the most important part is pulverized coal forcing and transportation system in this technology. It will cause bridging problem due to solid particle in gas media occurring inattentive adhesion phenomenon. Nitrogen can enter into tank through aeration cone in the bottom of coal powder charging bucket and make powder homogenization and reduce acting force among powder so as to make particle smooth fluid under the effect of gravity after processing bulk devices added.



在粉煤加压输送工艺中, 管道吹扫器同样有着重要作用。当粉煤进入管道中, 由于在高压的情况下粉煤很容易堆积在一起, 这样容易形成管道堵塞, 物料不易顺畅输送, 而在输送管道中添加管道吹扫器则有效地解决了这一现象。其原理为气体透过管道吹扫器内的微孔, 在吹扫器内壁形成均匀的薄层气幕, 使粉体呈悬浮流化状态从而顺利的流送到下端输送管道, 避免了粉料的堆积, 使输送效果更高效。

Processing bulk devices are also very important in pulverized coal forcing transportation technology. The pipe is blocked easily and material is not transported smoothly due to coal powder accumulated together in high pressure, so that we will add processing bulk devices in transportation pipeline so as to solve this problem effectively. The reason is that gas form uniform film inside wall of processing bulk devices and powder presents as suspended and fluidized state, thereby, it can flow into next running pipe smoothly and avoid powder accumulation so as to increase transportation effect when gas penetrated through the micro pore in processing bulk devices.



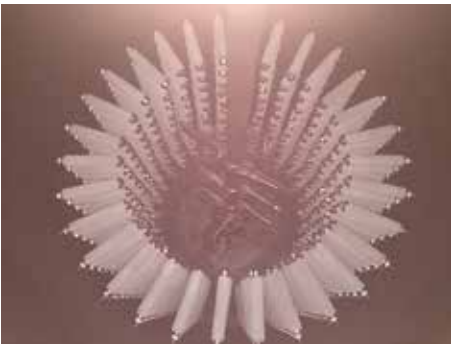
性能特点 Properties

- 形状稳定, 可承受高压差;
- 耐冲击和交变负载;
- 最高工作温度900°C;
- 分离效果稳定;
- 耐腐蚀性能强。
- 高透气性
- Shape stability and can borne high pressure drop
- Good mechanical properties
- Sufficient thermal strength up to 900°C
- Particle retention
- Good corrosion resistance
- Defined permeability

应用场合 Applications

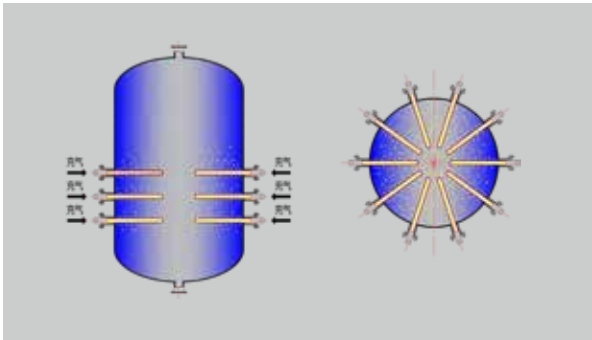
- 铝粉工业;
- 铜粉工业;
- 煤气工业;
- 食品工业;
- 制药工业;
- 化工粉体;
- 水泥行业。
- Powdered aluminium industry
- Powdered copper industry
- Coal gas industry
- Food industry
- Pharmacy industry
- Chemical powder industry
- Cement industry

气体分布 Sparging



在生物反应器和发酵罐中需要用到大量的金属膜材料作为气体分布元件。例如传统的生物发酵技术对于创新而言已经很成熟。雄凯以金属膜滤芯作为生物发酵罐的气体分布器，产生的气泡更小，分布更均匀，更高的气体分布率从而实现减少搅拌次数节约能耗并且缩短了反应周期，提供了更为高效的生物发酵解决方案。

A lot of metal membrane materials are used as sparger elements in bioreactors and fermentation tanks. Traditional biofermentation technology is ripe for innovation. Shinkai provides solutions allow for higher gas absorption than standard and can significantly lower energy costs by decreasing the agitation needed in your biofermentors. Enabling faster absorption allows for increased cycle times and significant time savings.



雄凯根据用户提出的具体工艺参数从而设计的气体分布器有多种材质可以选择 (304L、316L及各种合金), 专业的技术团队能够为用户提供更高效的解决方案, 从而满足各种特殊工况要求。分别有以下产品:

- ① 生物发酵气体分布器
- ② 静态气体分布器
- ③ 动态管道气体分布器
- ④ 多孔金属微分布器
- ⑤ 快速转换分布器

Custom design your biofermentation sparger in stainless steel or virtually any metal alloy to meet the specifications of your system. Our highly trained engineering team will help you design the right sparger system for your application. There are the following products:

- ① Biofermentation sparger
- ② Static sparger
- ③ Dynamic pipeline sparger
- ④ Porous Metal Micro Sparger
- ⑤ Quick change sparger

性能特点:

- ① 形状稳定, 可承受高压差
- ② 耐冲击和交变负载
- ③ 最高工作温度900°C
- ④ 空隙分布均匀
- ⑤ 耐腐蚀性能强
- ⑥ 高透气性

Properties:

- ① Stable pore shape due to sinter processing
- ② Good mechanical properties
- ③ Sufficient thermal strength up to 900°C
- ④ Particle retention
- ⑤ Corrosion resistance
- ⑥ Defined permeability

应用场合:

- ① 食品饮料生产中的曝气
- ② 精细化工行业中气体的均匀分布
- ③ 生物发酵罐的气体分布
- ④ 水产物养殖行业中的气体分布
- ⑤ 催化加氢反应工艺中的氢气均匀分布

Applications

- ① Sparging in food and beverages
- ② Sparging in fine chemical industry
- ③ Sparging in fermentation tank
- ④ Sparging in aquaculture industry
- ⑤ Hydrogen sparging for a broad spectrum of chemical hydrogenation reactions

市场与应用 Markets and Applications

雄凯过滤拥有专业的研发与生产团队, 具有多种多样的新型产品, 满足绝大部分的应用要求。可提供、柱状、片状、锥状、板状的金屬膜产品, 并且还可以根据用户提供的需求和参数设计成套的过滤系统。雄凯在复杂的液固分离、气固分离、气力输送和气体分布等领域积累了丰富的工程经验, 整个过程中雄凯可以为客户提供优质的服务。

Shinkai has a professional research and production team, and provides filtration systems which can meet users need. We have accumulated a weath of engineering experience in the fields of liquid-solid separation, gas-solid separation, powder handling & processing and sparging, etc.

主要应用领域及市场 Applications and Markets

精细化工

- ① 医药、农药中间体催化加氢
- ② 活性炭脱色
- ③ 产品提纯过滤
- ④ 工业用水及气体的过滤

石油化工

- ① 催化剂过滤
- ② 高温气体过滤
- ③ 母液回收过滤
- ④ 高分子聚合物过滤

硅工业

- ① 工业硅
- ② 多晶硅
- ③ 有机硅
- ④ 硅烷气体
- ⑤ 气相二氧化硅

煤化工

- ① 充气锥
- ② 充气笛管
- ③ 管道吹扫器
- ④ 高温气体过滤器

锂电池新能源

- ① 氟化物过滤
- ② 超细固体过滤
- ③ 产品提纯过滤
- ④ 锂盐过滤

仪器仪表

- ① 消音
- ② 阻火隔爆
- ③ 平衡、阻尼气流
- ④ 传感器探头保护
- ⑤ 烟气检测保护、传热

食品饮料

- ① 饮用水处理
- ② 发酵过滤
- ③ 气体分布

军事工业

- ① 核电
- ② 船舶
- ③ 雷达
- ④ 航空航天
- ⑤ 放射性废物处理

Fine chemical industry

- ① Catalytic hydrogenation of pharmaceutical and pesticide intermediates
- ② Activated Carbon decoloration
- ③ Product purification and filtration
- ④ Industrial water and gas filtration

Petroleum chemical industry

- ① Catalyst filtration
- ② Hot gas filtration
- ③ Mother liquor recovery filtration
- ④ Polymer filtration

Silicon industry

- ① Industrial silicon
- ② Polysilicon
- ③ Organic silicon
- ④ Silane gas
- ⑤ Gaseous silicon dioxide

Coal chemical industry

- ① Porous aeration cone
- ② Aeration pipe
- ③ Processing bulk devices
- ④ Hot gas filter

Lithium battery new energy industry

- ① Fluoride filtration
- ② Ultra-fine solid filtration
- ③ Product purification and filtration
- ④ Lithium filtration

Instrument industry

- ① Silencing
- ② Explosion protection
- ③ Fluidization
- ④ Probe protection of sensor
- ⑤ Smoke detection protection and heat transfer

Food and beverage industry

- ① Drinking water filtration
- ② Biofermentation filtration
- ③ Sparging

Military industry

- ① Nuclear power
- ② Ship
- ③ Radar
- ④ Aeronautics
- ⑤ Radioactive waste disposal



资质证书 Qualification

南京雄凯过滤设备有限公司非常注重产品的质量，已通过ISO9001质量体系，ISO14001环境体系，ISO45001职业健康安全体系的认证，经过十几年的努力已经为全球数千家知名企业提供性能优良、质量过硬的优质产品。

Shinkai attach great importance to product quality. We have passed ISO9001 quality system, ISO14001 environmental system, and ISO45001 occupational health and safety system certification. After more than ten years of hard work, it has provided thousands of well-known companies around the world with excellent performance and quality. Excellent quality products.





专利 Patents

南京雄凯通过自主研发已取得多项国家实用新型专利和发明专利, 为客户进行过滤设备和过滤方案的设计提供了有力支撑。

Nanjing Shinkai has obtained several national utility model patents and invention patents through independent research and development, providing strong support for customers to design filter equipment and filtration solutions.

专利名称	专利号	专利类型
一种化工液体原料的过滤装置	201811550283.1	发明
一种无余液干法排渣过滤器	201920618271.1	实用新型
一种多晶硅冷氢化流化床反应装置	201920616889.4	实用新型
一种用于有机硅单体合成流化床反应器的气固分离装置	201920616895.X	实用新型
一种粉末加压气力输送充气锥	202021064964.X	实用新型
一种适用于生物发酵的气体分布器	202021069402.4	实用新型
一种金属过滤元件	202021076232.2	实用新型
一种双层不锈钢金属滤膜	2020210762356	实用新型

Patent	No.	Type
A Filter for Chemical Liquid Raw Materials	201811550283.1	Invention
Dry Slag Removal Filter without Remaining Liquor	201920618271.1	Utility Model
Polysilicon cold hydrogenation fluidized bed reaction device	201920616889.4	Utility Model
Gas-solid separation device for fluidized bed reactor of silicone synthesizing	201920616895.X	Utility Model
Powder pressurized pneumatic conveying inflatable cone	202021064964.X	Utility Model
A gas sparger suitable for biological fermentation	202021069402.4	Utility Model
A metal filter element	202021076232.2	Utility Model
A double-layer stainless steel metal filter membrane	2020210762356	Utility Model

检验检测 Inspection and Testing

南京雄凯的检测机构合作单位有江苏大学、南京工业大学及航空航天116厂, 采用标准的检测方法获得元件相关的技术参数。主要的检测项目: 起泡压强, 通量, 孔隙率, 环拉强度及疲劳分析检测等。

Nanjing Shinkai’s testing institutions include Jiangsu University, Nanjing University of Technology, and Aerospace 116 Factory, which use standard testing methods to obtain component-related technical parameters. Main testing items include bubbling pressure, gas/liquid flux, porosity, ring tensile strength and fatigue analysis and testing, etc.



检验检测

Inspection and Testing



Fatigue Test
疲劳测试



Pilot Filter
实验过滤器



Permeability Test
透气性测试



运输 Delivery



指导安装 Installation Guidance



备注：货到现场的吊装卸货及安装由买方或第三方负责
Note: All the hoisting, unloading and installation of the filters at site will be responsible by buyer or third party.

