





公司拥有两条高频焊自动生产线，可达到年产

3000吨螺旋翅片管的制造规模。

产品规格： $\phi 25\text{mm} - \phi 219\text{mm}$

有效焊接长度 $\leq 23\text{m}$

焊接材质：碳钢、合金钢、不锈钢

相关产品可广泛适用于热管、省煤器以及其它工程换热设备。

The Company owns two automatic production lines of high frequency welding with an annual outcome of 3000-ton spiral fin coils.

Specifications:  $\phi 25\text{mm} - \phi 219\text{mm}$

Effective length of weld  $\leq 23\text{m}$

Welding material: Carbon steel, alloy steel and stainless steel.

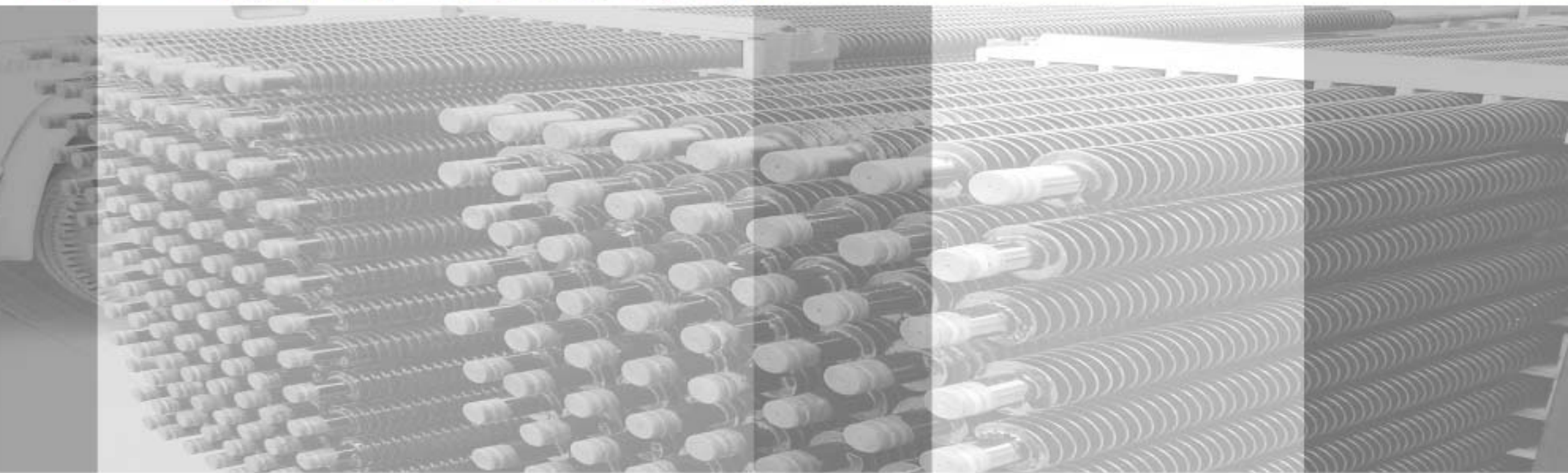
The corresponding products can be widely applied to heat pipe, economizer and other engineering heat-exchanging devices.





公司拥有年产3500吨全套无机高效热管元件的制备系统。下料—高频焊接—清洗、钝化—自动氩弧焊接—除气注料—检验，公司已具有专业化的规模与水平，产品可应用于各类气—气、气—液、汽—气、液—液等工程换热设备，同时为克服换热过程中低温硫腐蚀，公司可提供搪瓷翅片管（热管）系列产品。

The Company has a complete set of lining-up system for inorganic high-efficiency heat pipe components. In the field of blanking-high frequency weld-cleaning and passivation-automatic argon arc welding-degassing and feeding test, the Company has reached a professional scale and level. Its products can be applied to different kinds of engineering heat-exchanging devices such as gas-gas, gas-liquid, steam-gas and liquid-liquid. In addition, the Company is also able to provide a series of enamel fin coils (heat pipes) to prevent low temperature sulfur corrosion.





公司具有年产 100 万套  $\phi 10\text{mm} - \phi 50.8\text{mm}$  铜质传热元件的生产能力。相关产品均采用管芯铜粉烧结工艺，可满足传热元件无重力平行、逆向、变形传热的要求。产品广泛适用微电子、电力电子、航太等行业领域对均温散热的需要。

The Company has the capability of producing  $\phi 10\text{mm} - \phi 50.8\text{mm}$  copper heat-transfer components. The corresponding products all take the technique of die caminated steel shot sintering, which may realize non-gravity parallel, reverse and deformed heat transfer.

The products are widely used in such industries as micro-electronics, power electronics and aviation, which need temperature equilibrium heat transfer.

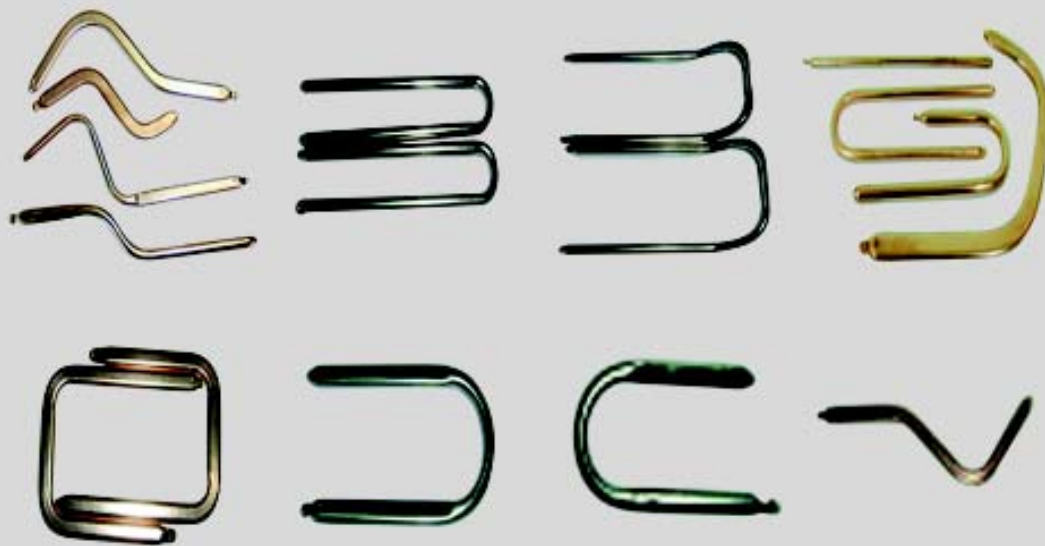




按行业标准而规划的年产 1000 万套  $\phi 3\text{mm}-\phi 8\text{mm}$  小型铜质烧结传热元件的生产制造系统，全套引进国外专机设备，并对厂房设施实施全封闭、净化管理。产品可适用于桌上型电脑、笔记型电脑等微电子行业对散热产品的配套需要，相关产品可根据用户要求压扁、折弯、变形、表面电镀处理，传热元件使用均无传热方向限制。

The production and manufacturing system of  $\phi 3\text{mm}-\phi 8\text{mm}$  small-scale copper sintering heat-transfer components is planned in accordance with professional standards. It uses a complete set of imported special equipment. And the workshops are under complete shut-off and purification management.

The products may be used to such micro-electronic industries as desktop and laptop computers which need supporting heat-radiating products. The corresponding products may be subjected to compressed, bending, deformed and surface galvanization treatment. And the heat-transfer components are not restricted in heat-transfer direction.





阳台壁挂式、单机组合式太阳能集热器，公司具年产5万套的规模，相关产品现已成为中国海尔集团指定的OEM厂家。产品广泛适用于家居单户及集体热供水太阳能工程。

The Company already has the batch production scale of balcony wall-hanging and unit combination solar energy collector. Its corresponding products are applicable to solar energy projects for household and collective hot water supply.





适用于承压、抗冻、分体式太阳能集热器传热、换热需要的单体热管、变径热管、热管管排等传热元件, 公司具有年产10万套的规模能力(每套以15支单管组合计算)。

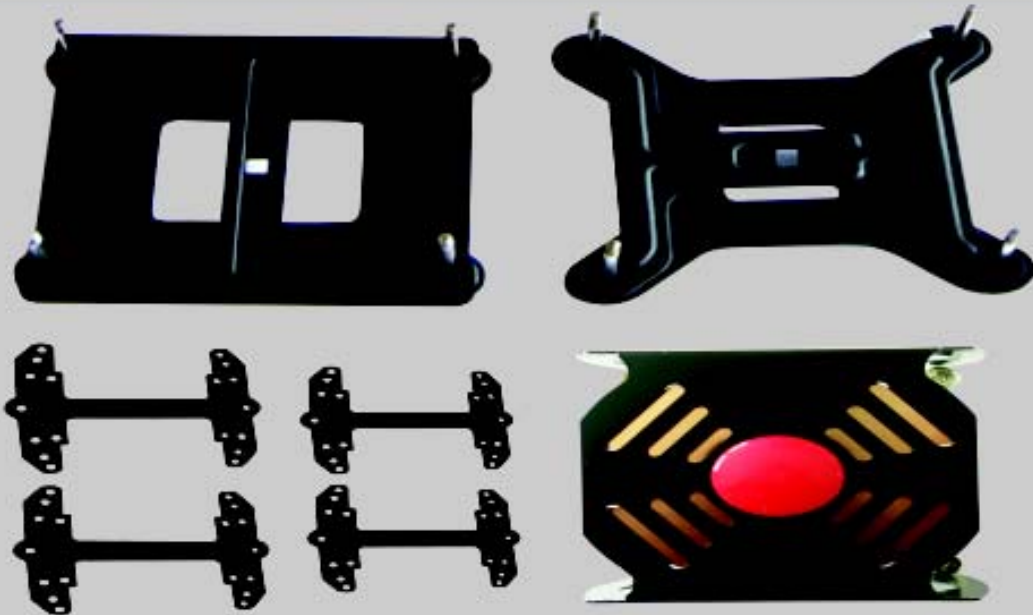
Applicable to pressurization and frost-resisting. The Company has an annual capacity of producing 100,000 sets of separate solar energy collector heat-transfer, single heat pipe for heat-exchange, reducing heat pipe, and heat pipe row (calculated at 15-single pipe combination for each set).



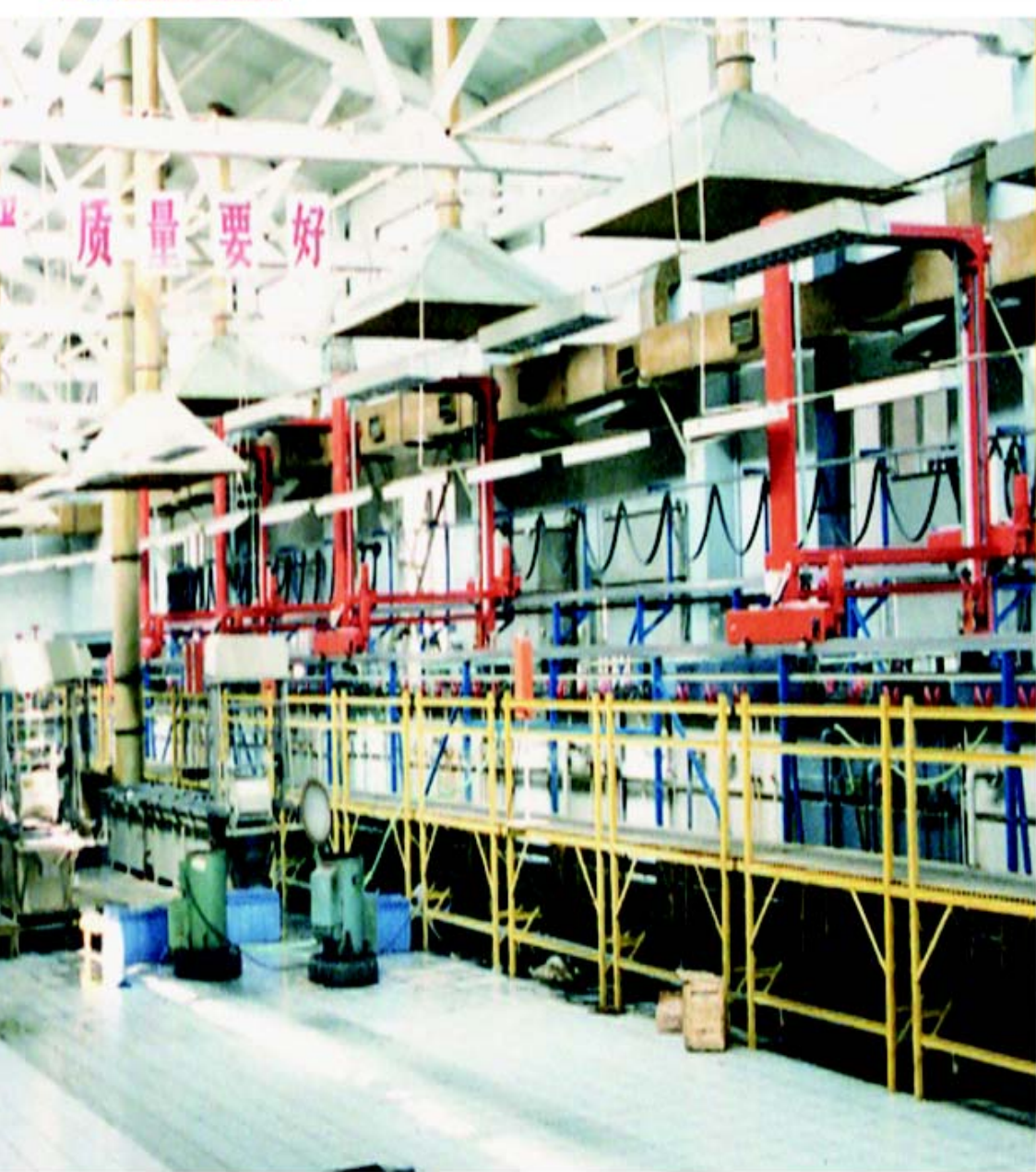


专业设置的喷塑生产线可满足公司对各类产品壳体、配套件外观喷塑的需要。

The professional powder coating production line may satisfy the need of powder coating for different kinds of product cases and appearance of the accessories.







由台湾引进的全套电镀生产线，能够充分满足公司产品外观电镀质量的标准要求。

The complete set of galvanization production introduced from Taiwan can fully comply with the quality requirements for appearance galvanization of the Company's products.





完善的模具加工中心、压铸、冲压、注塑、总装配系统，可满足各类微电子、电力电子等行业对散热模组的配套要求。

The perfect mould processing center, die casting, punching, injection and total assembly system may satisfy the requirements for supporting heat-radiating mould unit of such industries as micro-electronic, electronic power.



## 无机高效热管技术在工业换热方面的主要应用特性:

- 适用范围广: 可应用于气—气、气—汽、气—液、液—液等多种介质间的传热、换热。
- 传热系数高: 以气—气交换为例, 其当量传热系数“K”与传统列管式换热相比, 可提高5-10倍。
- 流体阻力小: 两种交换介质均走管外, 无需往返, 流程可大大缩短, 且介质流动方向与散热片方向一致, 从而可降低流动阻力。
- 设备结构紧凑: 由翅片管所制成的无机高效热管元件, 在换热设备组合使用时, 其结构紧凑、设备体积小、重量轻, 可适用于有限的安装空间。
- 设备运行过程中不易结灰垢, 不易阻塞, 在设备设计时, 可将介质流速调整到具有自清灰的能力, 同时亦可调整传热元件的安装排布方式, 以达到自清灰以及结垢便于清理的目的。
- 依据设备的工况环境, 可通过对冷热介质间换热面积的调整, 改变传热元件的表面温度分布, 以避免发生低温酸露点腐蚀。
- 具有良好的可更换性: 传热元件之间彼此独立工作, 并可与设备采用法兰连接(特指气—气交换), 适于分别拆卸和单独更换。
- 传热元件因特殊工况环境, 如磨损、冲刷、腐蚀等原因造成失效, 冷热介质不会发生混合, 无需停车对设备进行抢修, 此特点尤其适用于气—汽交换或两种液体进行换热且不可混合的工况环境。
- 正常使用时传热元件无传动部件, 勿需维护。

## Main properties of inorganic high-efficiency heat pipe technology in industrial heat transfer:

- Wide application scope: Applicable to gas-gas, gas-steam, gas-liquid and liquid-liquid heat transfer.
- High heat-transfer coefficient: Take gas-gas transfer for example, compared with traditional pipe heat-transfer, its equivalent coefficient “K” may be increased 5-10 times.
- Small flow resistance: The two exchange mediums travel outside the pipe without the need to return, thus greatly shortening the flow path. In addition, the medium flows in the same direction as that of heat sink, thus reducing flow resistance.
- Compact structure: The inorganic high-efficiency heat pipe component made of fin pipe may be applicable to limited installation space when combining with heat-transfer equipment because of its compact structure, small volume, and intense weight.
- During the operation of the equipment, it is hard to form incrustation and be blocked. In designing the equipment, adjust the medium flow rate so that it is capable of self-ash removing. At the same time, it is also proper to adjust the arrangement of heat-transfer components to achieve the goal of self-removal of ash and incrustation.
- In accordance with the work condition of the equipment, change the surface temperature distribution of heat-transfer components by adjusting transfer area between cold and hot medium so as to prevent low temperature acid dewpoint corrosion.
- Good removability: Heat-transfer components work independently and they are connected to the equipment with flanges (gas-gas transfer in particular), so they can be dismantled and replaced separately.
- In the event that heat-transfer components fail because of special work condition such as abrasion, washing, and corrosion, the cold and hot mediums will not mix. So there is no need to stop the equipment for rush repair. This property is especially applicable to gas-steam transfer or the work condition in which two liquids are used for heat transfer but they cannot be mixed.
- In normal operation, there is no need to maintain the fixed parts of the heat-transfer components.



### Applicable scope:

Electric heater at the crude oil extracting well mouth, remaining heat of the heating equipment for crude oil centralized transport; dehesion and heating devices for recovery and crude oil tank.

### 产品适用范围:

原油开采井口电加热器、原油集输加热设备的各种余热回收、原油储罐减粘加热装置等。





### Applicable scope:

Serial products for air pre-heat and remaining heat steam generator such as heating furnace for crude oil unit in petrochemical industry, heating furnace for delayed coking unit, heating furnace for hydrogen production plant, and heating furnace for dehesion unit.

### 产品适用范围:

石化行业的常减压装置加热炉、延迟焦化装置加热炉、加氢装置加热炉、制氢装置加热炉、减粘装置加热炉等空气预热以及余热蒸汽发生器等系列产品。





## 产品适用范围:

### ● 合成氨工业中的应用

上、下行煤气余热回收系统中的余热锅炉；吹风气燃烧气余热回收系统中的余热锅炉、空气预热器；一段转化炉空气预热器；变换工段气-气换热器；二段转化炉高温高压蒸汽发生器；绝热化学反应器级间换热器；

### ● 硫酸工业中的应用

沸腾焙烧炉沸腾层内的余热回收；沸腾焙烧炉矿潭余热回收； $\text{SO}_2$  炉气余热锅炉； $\text{SO}_3$  气体冷却器；开工预热器；

### ● 盐酸、硝酸生产中的应用

盐酸炉余热蒸汽发生器；氨氧化炉蒸汽发生器；

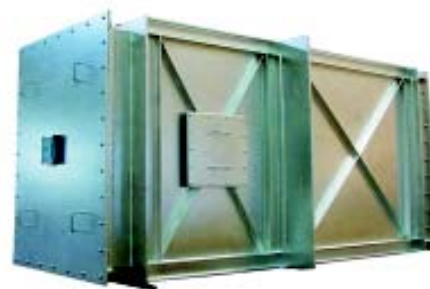
## Applicable scope:

### ● Application of synthetic ammonia in industry

Remaining heat boiler in the recovery system of gas remaining heat in up and down route; remaining heat boiler in the recovery system of gas remaining heat in the air gas combustion and air preheater; air preheater for primary reformer; gas-gas heat exchanger for transformation section; high temperature and high pressure steam generator for secondary reformer; heat exchanger between insulation chemical reactors;

### ● Application in the production of hydrochloric acid and nitric acid

● Steam generator of hydrochloric acid furnace remaining heat; and steam generator of ammonia oxidation furnace;





### Application scope:

Iron-making blast furnace gas-air double preheater, waste-heat recovery devices for different kinds of heating furnace, temperature equilibrium furnace and sintering cooler. The heat exchange form includes air, gas preheating, prepared steam, and hot water. At the same time, the requirements in temperature equilibrium and heat radiation may also be applicable to project plan, design and manufacture of corresponding products.

### 产品适用范围:

炼铁高炉煤气-空气双预热器、各种加热炉、均温炉、烧结冷却机等装置的余热回收设备，热交换形式可实现空气、煤气预热，制备蒸汽、热水等，同时对均温、散热要求公司亦可实施工程规划、设计以及相关产品的制造与安装。



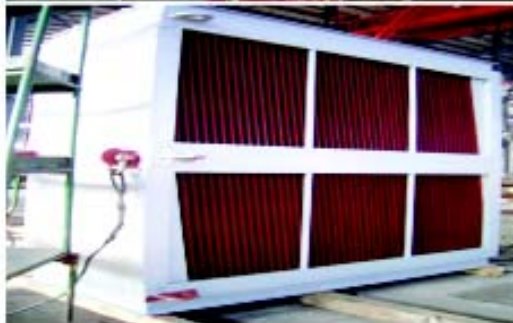


### Applicable scope:

Fin pipe economizer for power station furnace, sleeve economizer for heat pipe and gas preheater and air preheater, etc.

### 产品适用范围:

电站锅炉翅片管省煤器、热管套管式省煤器以及煤气预热器、空气预热器等。







## Applicable scope:

Air preheater, remaining heat steam generator and water preheater for devices such as ceramic tunnel kiln, glass kiln, kaoline spraying drying hot air furnace, cement kiln. The preheated air, steam and hot water produced by corresponding equipment will be available, except that used for production process, for generating electricity or heating after being heated.

## 产品适用范围:

陶瓷隧道窑炉、玻璃窑炉、高岭土喷雾干燥热风炉、水泥窑炉等设备的空气预热器、余热蒸汽发生器、水预热器等，相关设备所产生的预热空气、蒸汽、热水，除满足生产流程需要外可并网发电或加热水用于采暖需要。



## 无机高效热管技术在太阳能集热器中的应用特性

- 启动速度快：无机高效热管在太阳能集热器中的使用，具有传热速度快，散热损失小，单向传热（避免无阳光时逆向散热），玻璃真空集热管内无水、所获得的热量可迅速传递至水中。
- 效率高：日平均效率高于直插式太阳能集热器（详见报告）。
- 承压：可直接与城市自来水系统直接连接，承压使用。
- 密封可靠：单管与变径管结构可采取用机械密封，管排式结构为一体换热无漏水之弊。
- 不宜结垢：采用管排式结构，可有效扩大换热部位单位面积下的热负荷量，同时水流通道具有相对流速，可有效减缓结垢速率。
- 易于维护：由于真空玻璃集热管内无水运行，在非正常使用情况下玻璃管的损坏，不会造成系统漏水。
- 适用地域范围广：  
传热元件具有良好的耐低温性，在零下45度低温状态下不会失效，适应严寒地区使用，同时在高温状态下（空晒），传热元件不存在爆管隐患。



●集热器测试报告 Collector testing report

## Application properties of inorganic high-efficiency heat pipe technology in solar energy collector

- Quick starting: The application of inorganic high-efficiency heat pipe in solar energy collector is characterized by quick heat transmission, small heat loss in radiation, single-way transmission (avoiding reverse radiation when there is no sunlight), there is no water inside the glass vacuum heat-collecting pipes to quickly transmit heat to the water.
- High efficiency: Daily average efficiency is higher than straight-in solar energy collector (See the report for details).
- Pressurization: To be directly connected to urban running water system.
- Reliably sealed: Single pipe and reducing pipe structure may effectively expand the heat load under the unit area of heat-transfer position. At the same time, the water channel has a relative flow rate, thus effectively slowing down the incrustation rate.
- Hard incrustation: Taking pipe row structure may effective expand the heat load under the unit area of heat-transfer position. At the same time, the water channel has a relative flow rate, thus effectively slowing down the incrustation rate.
- Easy for maintenance: Since there is no water inside the vacuum glass heat-collecting pipes, in case of any damage to the glass pipe under unusual use will not cause leaking to the system.
- Wide application region: Heat-transfer components have good resistance to low temperature, therefore, even when the temperature reaches  $-45^{\circ}\text{C}$ , they will not fail to work. This device is applicable to extremely cold areas. At the same time, under high temperature (empty exposure to the sun), the heat-transfer components will not have the hidden danger to explode.

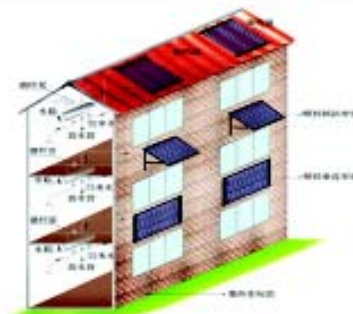
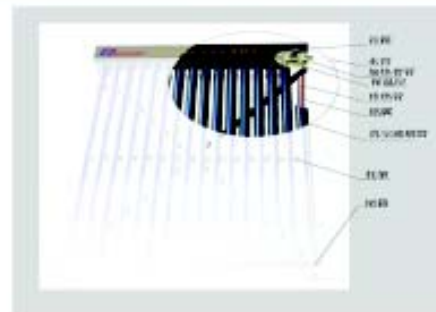


### Applicable scope:

The straight pipe, reducing pipe and pipe row heat transfer unit used for separate, balcony wall-hanging and integrated solar collector.

### 产品适用范围:

分体式、阳台壁挂式、整体式太阳能集热器所需各类直管、变径管以及管排传热组件。单户分体式及太阳能工程集热器系列产品



## 无机高效热管技术在微电子、电力电子散热产品中的应用特性

- 可有效降低功率器件工作时的结温，改善功率器件的工作环境，提高功率器件工作参数极限以及负荷能力。
- 由传热元件所制成的散热模组可有效改善实体散热器不能将大功率器件集中的热量（受导热热阻的限制）快速疏散的弊病。
- 传热元件优良的传热性能，可使传统强制风冷散热实现自然冷却成为可能。
- 对体积较小且发热集中的部件（如CPU元件）可使传热元件小面积接触大面积扩散的方式，实现散热的优化。
- 传热元件可视机体布置，实现任意变形从而适用于狭小空间的散热布局。
- 散热基本通过传热元件与散热片组合而实现，因此散热器体积小、重量轻，有利于设备的小型化。

## Application property of inorganic high-efficiency heat pipe technology in micro-electronic and electronic power heat radiating products

- To effectively reduce joint temperature of power components at work, improve power components' work environment and increase the work parameter limit for power components and load capacity.
- The radiating module unit comprised of heat-transfer components may effectively overcome the disadvantage that physical radiator prevents the heat collected by large power apparatus (restricted by heat conducting resistance) from quickly scattering.
- The excellent heat transfer performance may make it possible for realization of natural cooling from traditional forced air cooling radiation of heat.
- For components of small volume but centralized heating (such as CPU), the method of small-area contact with large-area pervasion to realize the optimum heat radiation.
- The arrangement of the visible body of the heat transfer component may realize arbitrary transfiguration so as to suit the radiating arrangement in small space.
- Heat radiation is basically realized by combining heat-transfer components and heat sink. Therefore, the small volume and light weight are conducive to miniaturization of equipment.

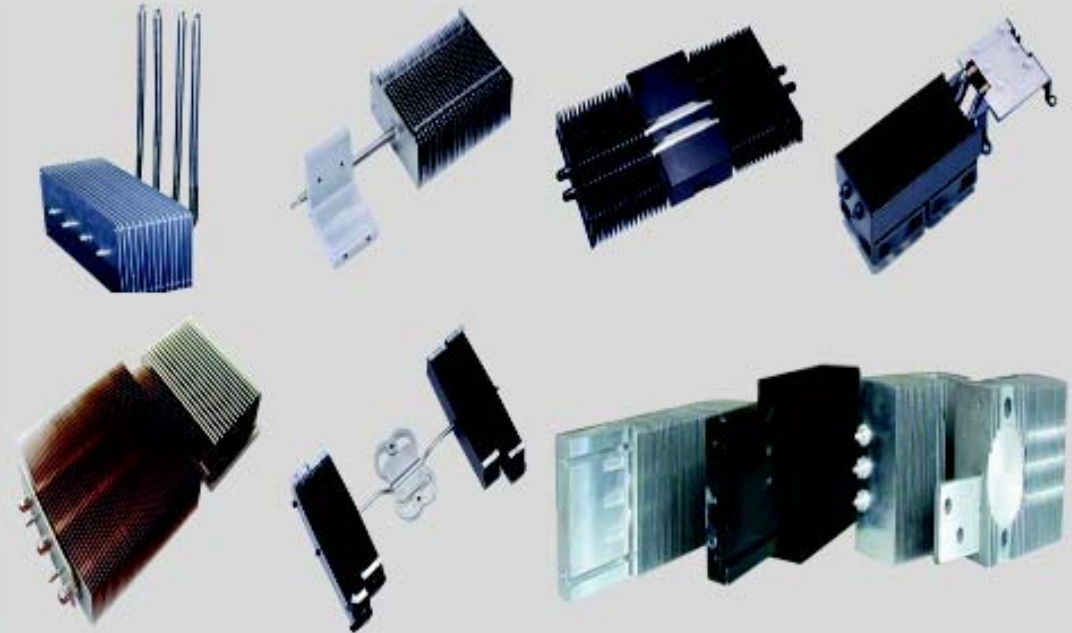


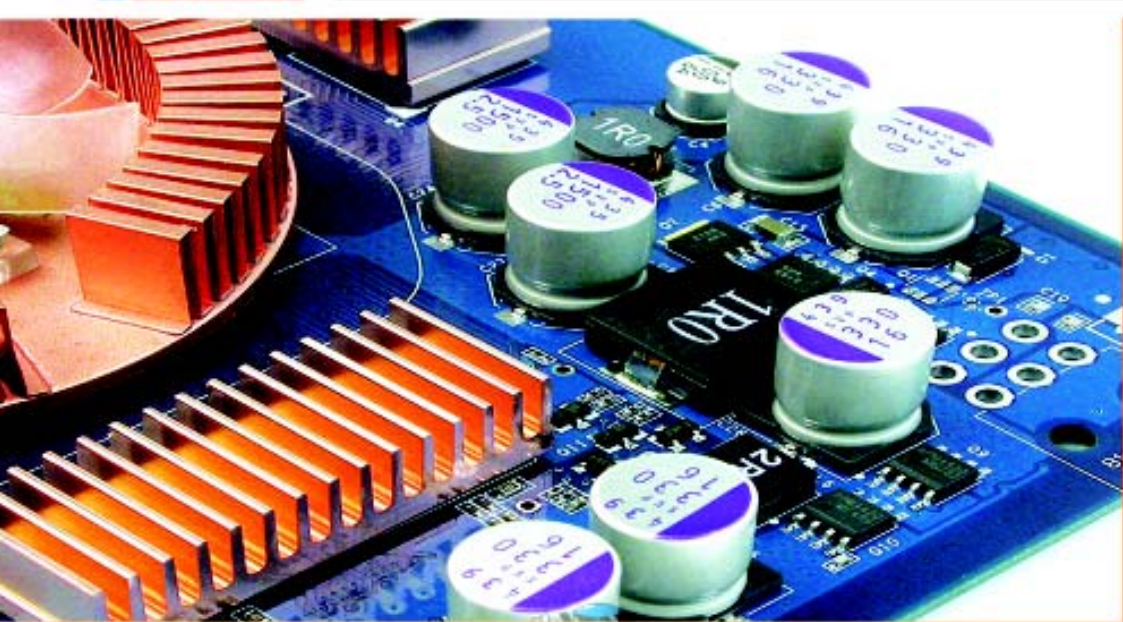
Product applicable scope:

Heat radiating in semi-conductor appliances (IGBT, IPM and MCT), large power thyristor, silicon commutator, UPS power and other appliances.

产品适用范围:

半导体器件 (IGBT、IPM、MCT 等), 大功率晶闸管、硅整流、UPS 电源等器件的散热。



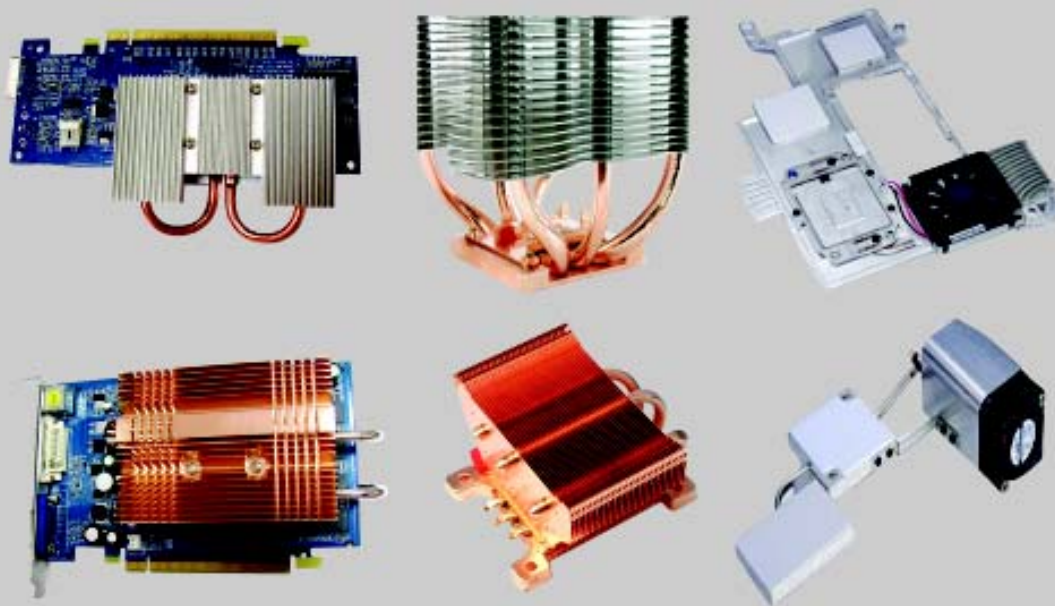


Product applicable scope:

CPU and GPU radiator on desktop computer, CPU and GPU radiator on laptop, CPU radiator on servo, CPU radiator in workstation, and GPU radiator in graphic workstation.

产品适用范围:

桌上型电脑CPU、GPU 散热器，笔记型电脑CPU、GPU 散热器，伺服机CPU 散热器，工作站CPU 散热器，图形工作站GPU 散热器。



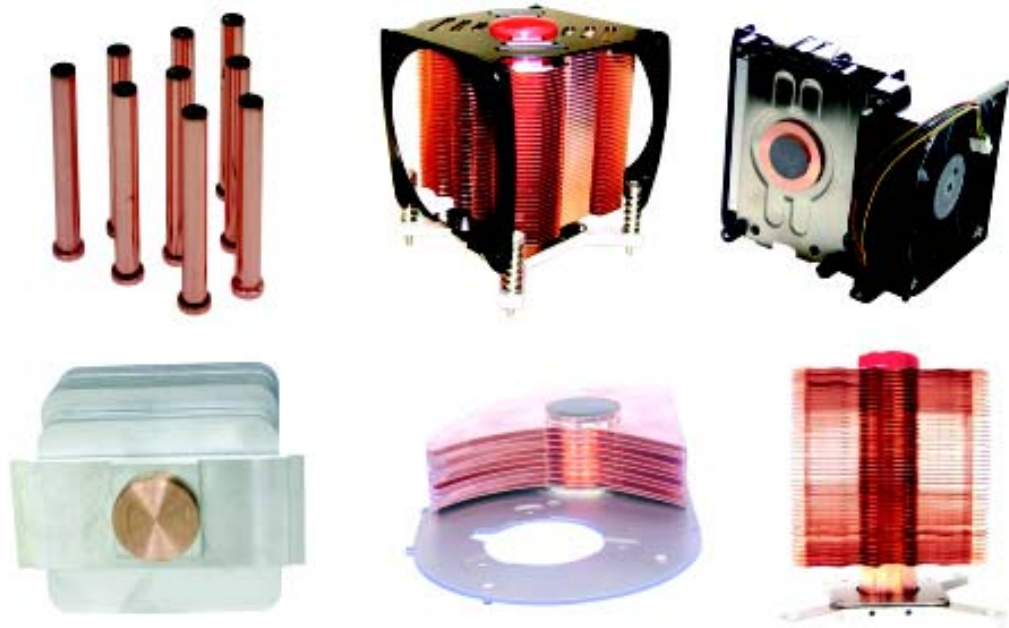


### Product applicable scope:

Large power CPU radiator on desktop computer, CPU radiator on servo, CPU radiator in workstation and high-scale GPU radiator

### 产品适用范围:

桌上电脑大功率CPU散热器，伺服机CPU散热器，工作站CPU散热器，高阶GPU散热器。





Applicable scope:

SPC exchange, electronic instruments and enclosed bus in electrical system etc., and enclosed heat radiation for different kinds of cabinets which have strict requirements for dustproof and flameproof.

产品适用范围:

程控交换机、电子仪器、电力系统封闭母线等，对防尘、防爆具有严格要求的各种控制柜进行密闭式散热。





## 无机高效热管技术在低温传热方面的应用特性:

- 小温差传热: 低温传热元件具有小温差换热的特性, 在温差 $\leq 1^{\circ}\text{C}$ 时, 元件即可工作传热。
- 适用温度范围广: 低温传热元件可在 $-60^{\circ}\text{C}$ — $80^{\circ}\text{C}$ 温度内进行有效工作。
- 长效运行: 依据地质、地貌等工况环境的要求, 在对传热元件表面进行有效防腐的前提下, 低温传热元件可适应相关基础设施对产品使用寿命的长效要求。
- 勿需维护: 传热元件为无“源”运行, 正常使用时勿需进行任何维护。

## Application property of inorganic high-efficiency heat pipe technology in low temperature heat transfer:

- Heat transfer under small temperature difference: Low temperature heat-transfer components are characterized by small temperature difference heat transfer. When the difference is  $\leq 1^{\circ}\text{C}$ , the components may start work.
- Wide applicable temperature range: Low temperature heat-transfer components may effectively work between  $-60^{\circ}\text{C}$ — $80^{\circ}\text{C}$ .
- Long-acting operation: In accordance with the requirements for geological and geomorphical condition, on the premise of administering effective anti-corrosion to the surface of heat-transfer components, low temperature heat-transfer components may meet the long-acting requirements for the service time of corresponding basic facilities.
- No need for maintenance: Heat-transfer components are operating without “source”. Therefore, there is no need for maintenance under normal operation.



## 产品适用范围：

高纬度、高海拔地区常年冻土、季节冻土对铁路、公路、输变电塔基、输油管线支架基础、建筑基础等冻土病害的防治。

## Applicable scope:

The all-year-round frozen soil of the high altitude and high sea level areas and seasonal frozen soil, prevention and treatment to the foundations of railroad, highway and power transmission and transforming tower, foundation of oil pipeline rack and building foundation.





## 产品适用范围:

产品适用于年平均气温 $\geq 10^{\circ}\text{C}$ 以上的冬季寒冷地区,在降雪期间利用地温通过传热元件加温路面,在无能源的情况下实现道路溶雪(冰)。

同时根据用户要求对建筑设施的坡道、弯道,因建筑结构造成地温不能满足要求的情况下,可提供地温加辅助加热的溶雪(冰)传热元件。

## Applicable scope:

Applicable to cold areas with yearly average temperature about  $\geq 10^{\circ}\text{C}$ . During snowing, heat the ground via heat-transfer components by using ground temperature. And realize the thawing of road snow (ice) when energy is not available.

At the same time, in accordance with the user's requirements, provide heat-transfer components that can thaw snow (ice) by using ground temperature plus assisting heating when ramps, bends of building facilities and building structures cause ground temperature to fail in satisfying the requirements.

