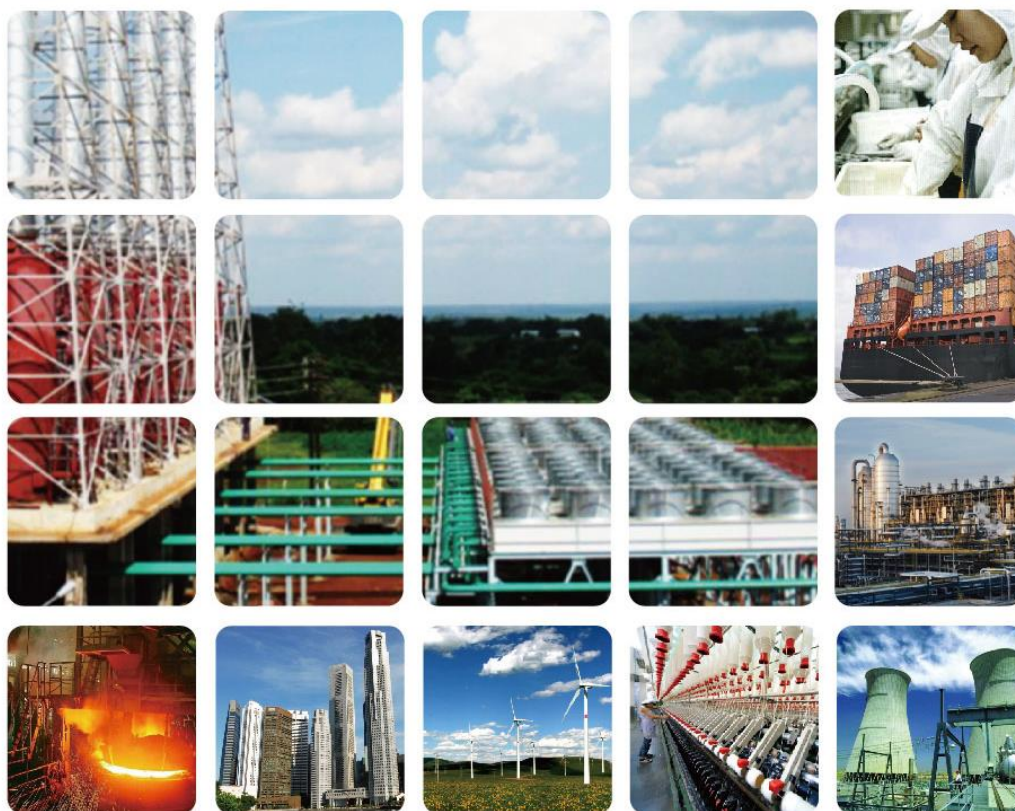


工业换热器及冷却水系统

Industrial Heat exchangers&Cooling Water System



广州市酷浦斯机械有限公司

GUANGZHOU COOLPLUS MACHINERY CO.,LTD.



广州市酷浦斯机械有限公司 (COOLPLUS), 是以热交换系统设计、换热设备制造和换热元件研发的企业; 是国内最专业的液压传动、发动机、发电机组、汽车、工程机械等机械冷却器制造商。多年来, 酷浦斯 COOLPLUS 将自己的专业技术发展到新的应用领域, 使其业务不断向农业机械、压缩机、船舶、风力发电、分布式能源、火车机车及电力、化工、冶金、食品、暖通等热交换领域市场拓展和延伸。酷浦斯已由简单的为客户提供产品发展到能以客户为中心提供热交换系统全套解决方案, 正被全球范围内越来越多的厂商肯定和认可, 成为其在中国甚至全球热系统首选供应商。

INTRODUCTION

Guangzhou coolplus machinery co.ltd was founded in 2009, is the leader of China in the field of mechanical cooling such as engine, automobile and construction machinery, we provide worldwide cooling solutions

Coolplus headquarter located in Guangzhou, have achieved the certificate of ISO/TS 16949:2009. factory of coolplus has 3 workshops including radiator line, condenser line& Plastic tank line.We offer a variety of more than 3000 models yearly. In order to manufacture such a variety of products, our factories operate some of the world's largest, most sophisticated, modern machinery.

Having successfully broken into the industry of cooling system, coolplus has grown into an organization that specializes in producing passenger vehicles, trucks, tractors and heavy duty equipment.

Coolplus proudly sells to more than 30 Countries worldwide. regions in Europe,Middle East,South America and Africa,and is maintaining wide business cooperation with several international famous companies.

We extend our deepest gratitude to the supporters of Coolplus and ask for your continued love and encouragement.

OUR VISION

To lead in the profession of Automobile&Industrail thermal system,We strive to achieve these by constant research, invention and innovation of quality and affordable world-class products to our customers.



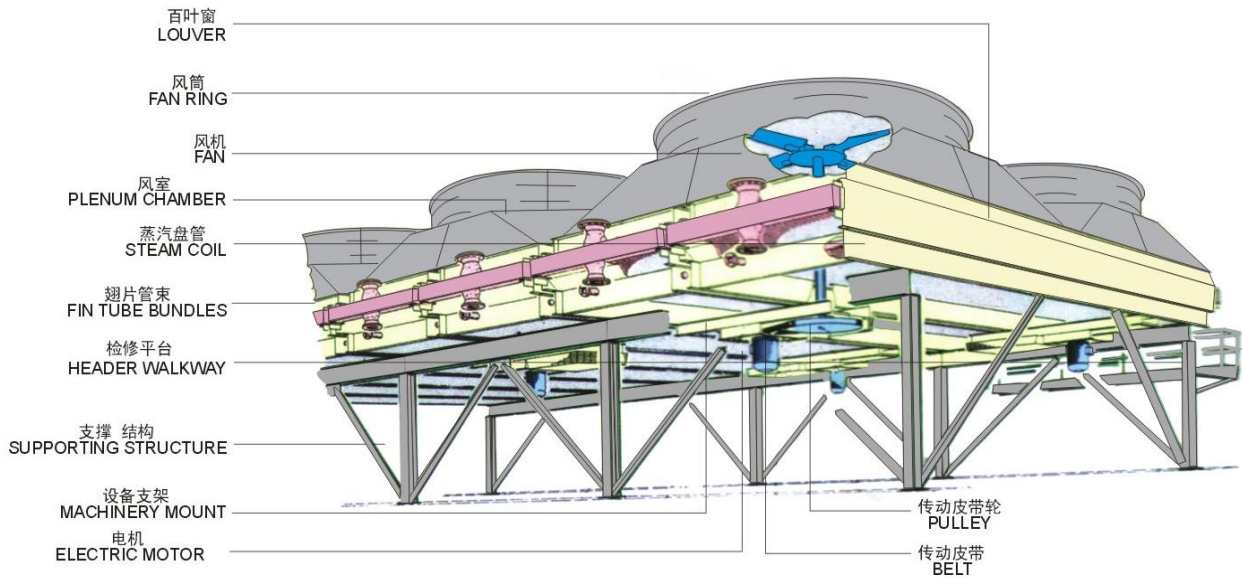


空冷器的设计

Air Cooled Heat Exchanger Design Deatils

空冷器是利用环境大气冷却管内介质，在管内介质温度高于大气温度、并且管内介质与空气的温度温差大时，能特别显示其低成本运行的优势。

air cooled heat exchanger use ambient air to cool fluids. The temperature inside tube is higher than that of air and it will cooling requirements, benefiting fully from the temperature difference between the two fluids.



空冷器单元

空冷器单元由翅片管束、风机罩、风机、电机、支撑结构及检修平台、百叶窗和其他用户要求的部件组成。

Air Cooler Unit

The air cooler consists essentially of finned-tube bundles, fan rings, axial-flow fans with their motors, a support structure as well as maintenance platforms, louvers and other parts required by the client.

翅片管束

翅片管束由翅片管（换热元件）、管箱（或者汇流管）、侧板组成。

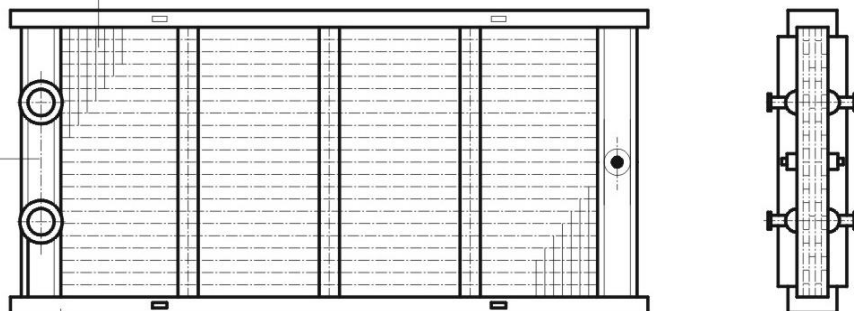
Finned-Tube Bundle

The finned-tube bundle consists of the finned tubes cooling element), the headers (manifolds),sidewall.

翅片管
Finned tube

管箱
Chanber

侧梁
side beam





风机及布置方式 The Fans Configuration

风机的叶片通常是铝或玻璃钢做的。叶片的数量和转速取决于空气流量和噪音的要求。风机的驱动通常是通过电动马达。

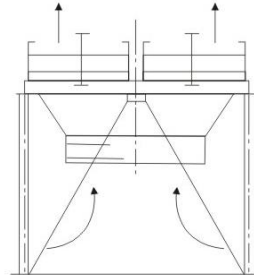
The fans are generally provided with aluminum or plastic blade. The number and the rotational speed of blade depend on the airflow and noise requirement. Electric motors are generally used as driver.

鼓风式

管束位于风机的排风侧、这种结构非常方便维护，并且风机电机始终处于较冷的空气环境中，可以允许装置有着较高的工艺介质进入的温度，风机轴承有着较长的使用寿命。

Forced Draft Unit

With the air blowed into finned tube bundle, the forced draft unit allows an easy access for maintenance to the bundles. Furthermore, the fans remain in the cold ambient air and allow high process inlet temperature, as well as with a long life of fan bearing.

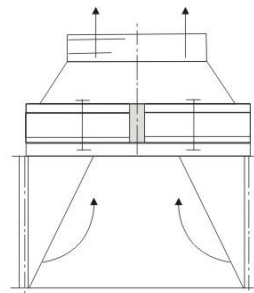


引风式

管束位于风机的吸风侧，由于风筒对换热翅片管有着很好的阻挡阳光、风、雨、雪的作用，使得引风式空冷器具有稳定的换热性能。同时它具有风量分配均匀、热循环少、低噪音的特性。

Induced Draft Unit

With finned tube bundle located in air suction side, the induced draft unit gives a steady and enduring thermal performance due to the protection of the finned surface against wind, rain and snow by the plenum chamber. The induced draft also ensures better air distribution, less hot air recirculation and lower noise level.



鼓风式与引风式的比较 Comparison between Forced draft unit and Induced draft unit

比较项目 Items	鼓风式 Forced draft unit	引风式 Induced draft unit
设备要求 Requirement	无特殊要求 No special requirement	风机在热空气中运行，有耐热的要求 It should be heat-resistant to work in hot air
自然放热的利用 Use of natural heat release	不能利用 No	可以利用通风筒效应带走25~30%的热量 25~30% heat can be brought away by Ventilator effect
气流分布 Distribution of air flow	不均匀、甚至有反向气流 Not uniform, opposite air flow may exist	气流分布均匀 Uniform distributed
气象影响 Influence of climate	受阳光、阵雨、冰雹的影响明显 Easy to be effected by sunshine, rain and hail	气象影响很小 Little effect from climate
热风循环 Circulation of hot wind	容易产生 Easy to be	良好 Good
空间的利用 Use of room	不能起到保护作用 No protection	下部空间安装其他的设备 Other equipment to be installed in the lower part
噪声 Noise	略高 A little high	比鼓风式可低约3分贝 3 decibels lower
功率消耗 Consumption of power	正常 Common	略低 A bit cower
对空冷器的保护 Protection to air cooler machine	下部空间无法利用 Lower part cannot be used	不受阳光、风雨的侵蚀，延长空冷器的使用寿命 Defend from sunshine, wind and rain, to prolong the service life of air cooler



风机的驱动

直接驱动

电机通过轴直接驱动风机叶轮，风机和电机具有同样的转速。

鼓风式皮带驱动

电机安装在管束的下方，通过皮带驱动风机叶轮，电机与风机可以设计成不等速

引风式皮带驱动

风机安装在管束的上方，通过皮带驱动风机叶轮，电机与风机可以设计成不等速

齿轮箱传动

电机与齿轮箱连接，通过齿轮箱的输出轴驱动风机叶轮，电机与风机是不等速的

空气量的控制可以按照以下方式得以实现：

手动或者自动调节百叶窗

变频电机或者多速电机

通过启停翅片管组上的风机数量

Fan Drive

Direct Drive

The fan is mounted directly on the motor shaft. The fan and the motor operate at the same speed.

Forced-Draft Belt Drive

The motor installs underneath tube bundles , through the belt to drive fan blades, electric motor and the fan can be designed not is kinetic.

Induced-Draft Belt Drive

The motor fan installs above tube bundles , through the belt to driver fan blades, electric motor and the fan can be designed not is kinetic.

Drive by gear box

The motor shaft is coupled directly to the gear box which drives the fan blades. electric motor and the fan is not isokinetic.

Airflow control can be realized using either:

Manual or automatic louvers

VSDS or Multi-speed electric motors

Stop or start partly the fan on top of radiator .





管箱的结构类型

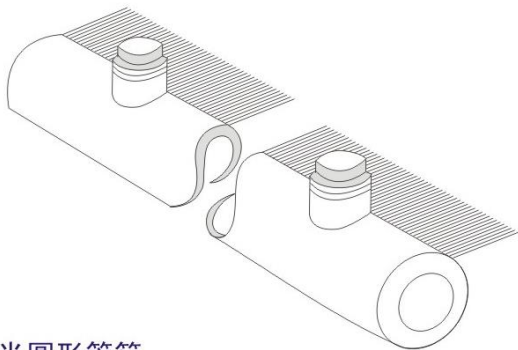
Structure of header

集管式管箱

用在压力超过40bar时，U型的管箱被焊接到管板上，焊缝通过热处理和X射线探伤。

Pipe Header

The pipe header are used for working pressure over 40 bar. The U-bend tubes are welded to the nipples on the pipe. The welding seams are heat treated and X-ray tested

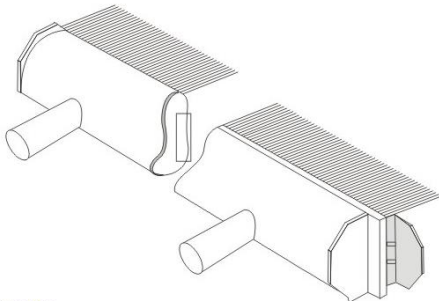


半圆形管箱

这种设计主要运用在氨、氟利昂的冷凝以及蒸汽冷凝器。这种设计优势在于它的全密封的焊接结构。能适应于这些场合的要求。

Welded Bonnet Header

Special service such as ammonia condensers, Freon condensers and vacuum steam condensers. One advantage of this design is the full welded construction which provides the perfect sealing required for such application

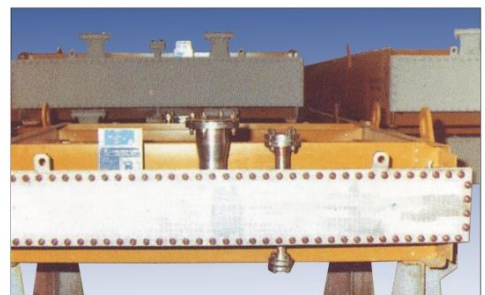
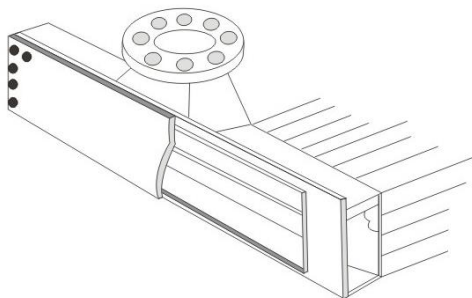


盖板式管箱

它主要适应于介质很脏的且压力最大不超过40bar的但需要频繁清洗的情况。同时它还适应于介质具有很强的腐蚀性而需要定期检查腐蚀裕度的情况。

Cover Plate Header

The cover plate header is used for fluids with high fouling factors up to max 40 bar when a frequent mechanical cleaning is necessary. It is used also for very corrosive process fluids so as to periodically check the corrosion allowance.



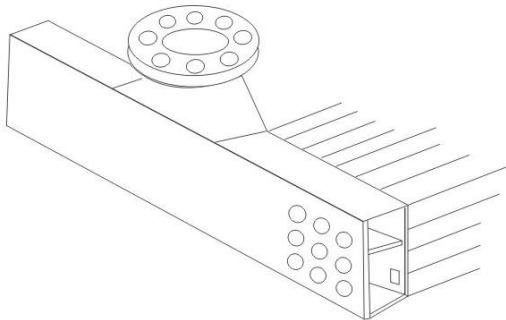


丝堵式管箱

丝堵式管箱是应用最为广泛的一种管箱结构形式，它的工作压力可以高达350bar，与之对应的管板孔，可以用来使管子和管板胀接、清洗、堵漏。对于高含氢高压介质，如果采用密封焊或强度焊的时候，它的成本低于压力超过200bar的集合管式管箱。

Plug Header

The plug header is the most commonly used up to 350 bar working pressure. The plug hole opposite each tube allow expansion of tube in the tube sheet, mechanical cleaning, and plugging in case of leakage. Seal welding or strength welding can be provided for high partial hydrogen pressure services resulting in a less expensive solution than the use of pipe header generally used for over 200 bars service pressure.



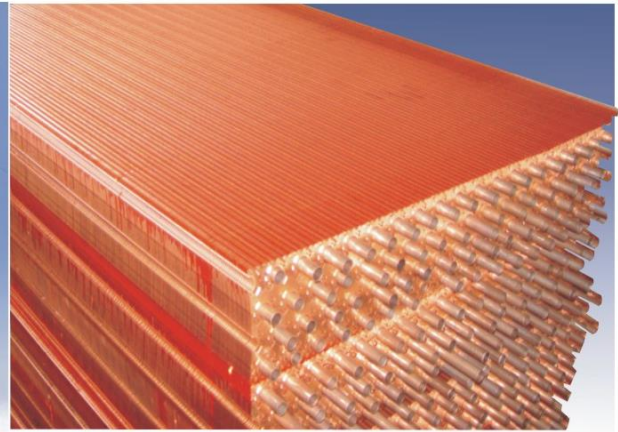
管箱结构的特点比较 Various constructions of header

管箱结构 Type of header 比较项目 Items	集合式管箱 Pipe header	半圆形管箱 Welded bonnet header	盖板式管箱 Cover plate header	丝堵式管箱 Plug header
管箱与换热管的连接方式 Type of connection between pipe box and heat-exchanging pipe	焊接 Welding	焊接 Welding	焊接、胀接 welding, expanding connection	焊接 Welding
适用压力范围 Pressure range	高压 High pressure	低压、负压 Low pressure	低压 Low pressure	中低压管束 Mid-low pressure
管箱的制作要求 Demand of manufacture	高 High	简单 Simple	高 High	简单 Simple
管箱的清洗 Cleaning	极困难 Quite difficult	困难 Difficult	容易 Easy	容易 Easy
使用范围 Usage	洁净的工艺流体和循环 水的冷却 Pure process liquid and circulating water cooling	低压洁净工艺流体 的冷却和汽体的冷凝 Low pressure process liquid cooling and gas cooling	容易产生污垢的介质的 冷却（粘油及来自减压 装置的不清洁介质） Cooling for media, which is easy to make dirt, like sticky oil and dirty media from pressure-release devices	容易产生污垢的介质的 冷却（粘油及来自减压 装置的不清洁介质） Cooling for media, which is easy to make dirt, like sticky oil and dirty media from pressure-release devices



换热元件

Component of heat exchanger



翅片管是热交换器中进行气体-液体或者气体-冷凝气之间热交换时必不可少的元件，翅片管热交换器非常适合气体之间的冷却和加热，尤其是空气冷却。

用水作为冷却介质时热交换系数可以达到 $5000\text{W}/\text{m}^2\text{K}$ 以上，相反，当使用空气时，在普通管中的热交换系数不到 $100\text{W}/\text{m}^2\text{K}$ 。为了在空气侧加强热传递效率，设计师们用增加翅片的办法来增加管子的外表面积，以提高热效率。

翅片越高，热量传递的路径就越长

同时，翅片与管子的连接方式也对热传递有很大的影响，用于钢管或不锈钢管上的翅片主要是铝片或热浸镀锌钢片制成，铝很容易成型并有特别好的热传递性能，钢质翅片有很高的强度和韧性。钢质翅片管和双金属轧片管均可以用高压水清洗。

通常的制造方法是剪切带状铝材或带状钢材，然后安装到管子上，这个过程全部由机器自动地、精确地完成。

除圆管外，椭圆形管也被经常使用。

热传递受下列因素影响：

- 翅片高度
- 翅片厚度及片距大小
- 翅片材料的导热系数
- 介质流速

材质 Materials

Core Tube基管: Carbon Steel/Stainless

Steel/Alloy钢/不锈钢/合金钢

Fin 翅片: 铝、铜

Finned tubes are indispensable design elements where heat is to be exchanged economically between gases and liquids or between gases and condensing vapors. For that reason, finned tube heat exchangers are preferably used to cool or heat gases, especially air

With water, heat transmission coefficient of more than $5000\text{W}/\text{m}^2 \cdot \text{K}$ can be achieved in the tubes. In contrast, heat transmission is much lower when air is used. A coefficient of $100\text{W}/\text{m}^2\text{K}$ can be expected for plain tube. With a view to compensating for the significantly lower heat transmission achieved with air, thermal engineers increase the surface of the outer tubes by provided them with fins

The higher the fin, the longer the heat transfer path.

Moreover, the manner in which the fins are attached to the core tube has also a significant impact on the heat exchanger performance. The fins used on steel or stainless steel core tubes are primarily made of aluminum or hot-dip galvanized steel. Aluminum is easy to shape and has especially good heat transmission properties. The use of steel for the fins makes the tubes very robust and resistant. Both steel finned tubes and extruded aluminum finned tubes can be cleaned under high pressure, as well.

The most widely used manufacturing method consists in cutting fins from strip material and assembling them on the core tubes. This is a mechanical operation which is carried out automatically with great precision.

Besides round tubes, elliptically shaped core tubes of different dimension are also used.

Heat transmission is influenced by the following factor:

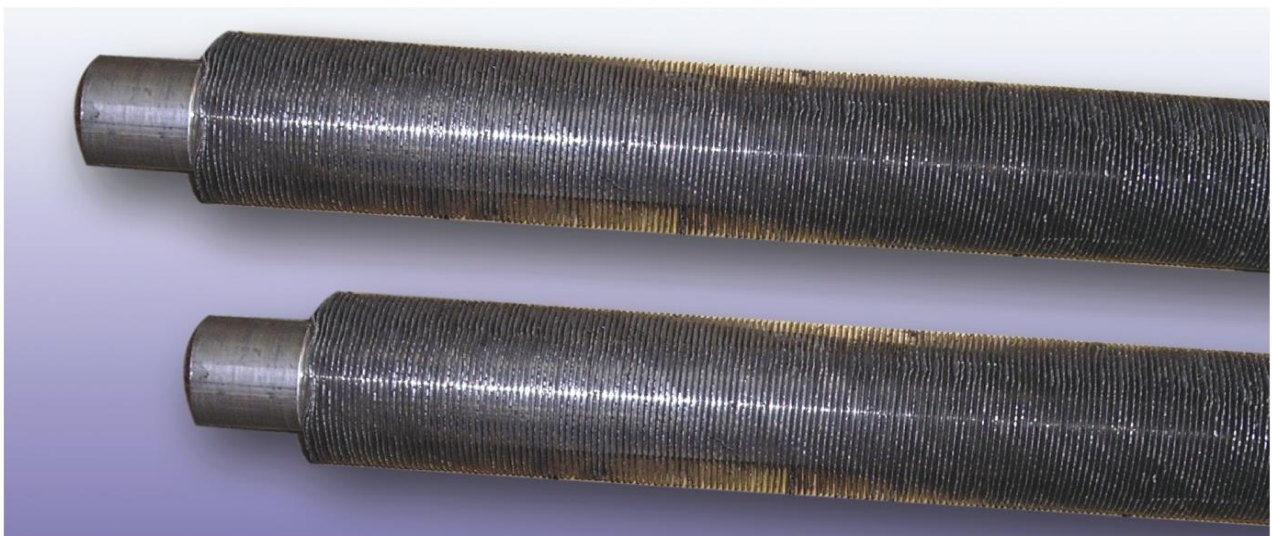
- Fin height
- Fin thickness and pitch
- Thermal conduction coefficient of the fin material
- Velocity of fluid



E型双金属复合轧片管 Bimetal Finned Tube

双金属复合轧片管具有完美的大气防腐性能，它消耗铝的数量比其他管型多40%。它具有很好的机械性能，可以用蒸汽和高压水的清洗。管基材料可以根据介质的特性选取，以适应各种腐蚀性的化工介质。翅片管是用铝管套在基管上，经过机器轧制紧箍在管子上，这种制造工艺能够保证机械强度，并且翅片与管子之间具有很好的热传递特性。

Bimetal finned tubes are designed for increased temperature service and protect the tube fully against atmospheric corrosion. The extruded fins feature 40% more aluminum than comparable fins. They are very sturdy and resistant to mechanical stress and can therefore be cleaned easily by steam or water. The tube material can be adapted to the fluid handled. The tube is for this reason fit for nearly all aggressive chemicals. The fins are extruded from a sleeve around the tube. In this process, the inside diameter of the sleeve is reduced and the sleeve is pressed on the tube. The process produces a strong joint with excellent heat transfer capabilities.



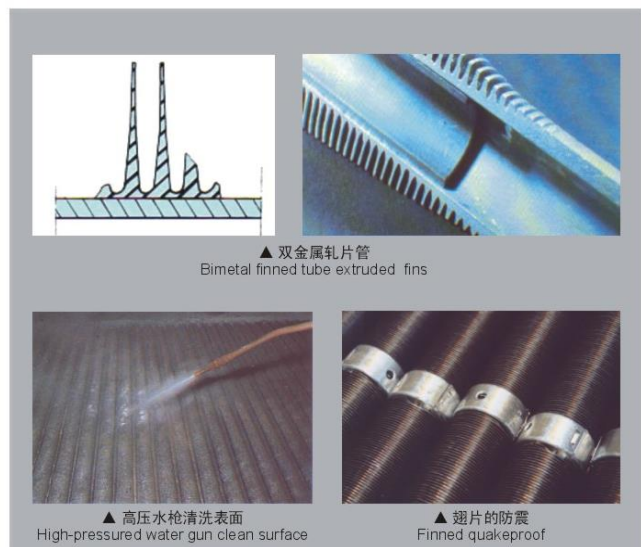
E型翅片的优点：

很好的热传递效果，可以适应不同介质在管内流动的要求，翅片强固（便于清洗），适应大多数化学物品的侵蚀。

Advantage of the E-fin

Excellent heat transfer Adaptable to meet the requirement of the fluids flowing inside the tubes Strong fins (easy to clean) Suitable for almost all chemically aggressive fluids

Fin Material/翅片材料	Aluminum 铝
Tube material/基管材料	Various of metal 各种金属
Working Temperature/工作温度	300 °C
Atmospheric corrosion resistance /防腐性能	Excellent
Mechanical Resistance/机械性能	Excellent





L型绕片管 Wrap-on “L” Finned Tube

L型绕片式管主要用于温度较低而且对基管外壁防腐蚀有一定要求的工艺过程，基管和翅片间大面积的接触提高了热交换效率。预先制成L形的翅片螺旋状的缠绕在管子上。由于这种工艺，翅片和管子的接触面积很大，热量能从管子表面均匀的传递到翅片。

The L tube is a finned tube for low temperature applications where a certain degree of protection of the tube wall against corrosion is required. The broad contact surface between the tube and the finning enhances heat transfer. An L-shaped pre-formed fin strip is spirally wrapped around the core tube. Due to this manufacturing process, the contact area between the tube and fins is very large and the heat is evenly transferred from the entire core tube surface to the fins.

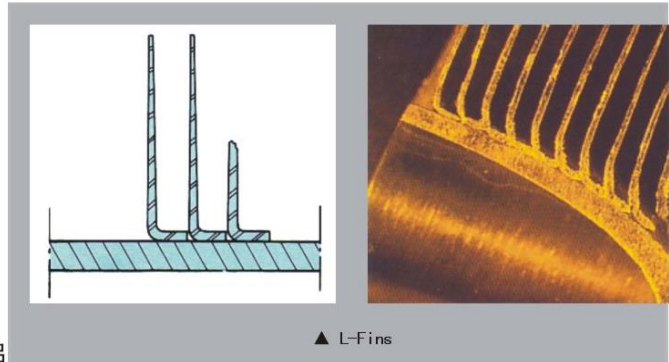
L型翅片的优点：

- ◎ 很好的热传递效果
- ◎ 翅片和管子之间连接牢固
- ◎ 翅片的成本很低
- ◎ 应用范围：用于温度达120℃的热交换系统中

Advantage of the L-fin

- ◎ Very good bond between the tube and fin
- ◎ Low-cost fin tube
- ◎ Application range: up to 120℃

Fin Material/翅片材料	Aluminum 铝
Tube material/基管材料	Any metal 各种金属
Working Temperature/工作温度	120 ℃
Atmospheric corrosion resistance/防腐性能	Acceptable 较好
Mechanical Resistance/机械性能	Poor 差



KL型 滚花绕片管 Knurled “L” Finned Tube

KL型滚花绕片式管是在L型绕片式管基础上根据对温度和基管外壁防腐蚀更高的要求而开发的。铝带经过机器加工，在基管表面绕成L型，铝带的根部与基管结合在一起并覆盖在其表面，并且，由盘式挤压机把根部翅片和基管挤压成滚花突起，确保了基管与翅片的良好接触。

The KL tube was developed from the L tube for increased temperature levels and provides enhanced corrosion protection to the outside wall of the tube. An aluminum strip is folded to form an L-shape and then around the base tube. The feet of fins are joined together and cover the whole tube surface. The root of the fins is knurled simultaneously with inner tube, thus ensuring a tight contact between the fins and the inner tube. Such a result is achieved on the entire width of the fin root, by means of the knurling discs working interdependently.

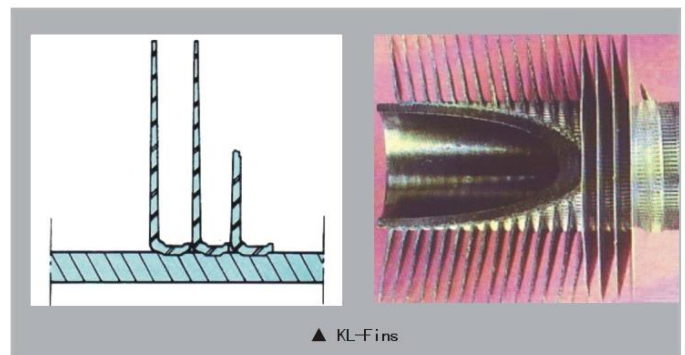
KL型 翅片的优点：

- ◎ 很好的热传递效果
- ◎ 翅片和管子之间连接牢固
- ◎ 工作温度可达250℃

Advantage of the KL-fin

- ◎ Very good heat transfer
- ◎ Very good bond between the tube and fin
- ◎ Application range: up to 250℃

Fin Material/翅片材料	Aluminum 铝
Tube material/基管材料	Any metal 各种金属
Working Temperature/工作温度	250 ℃
Atmospheric corrosion resistance/防腐性能	Medium 好
Mechanical properties/机械性能	Acceptable 较好





LL型 绕片管 Double “L” Finned Tube

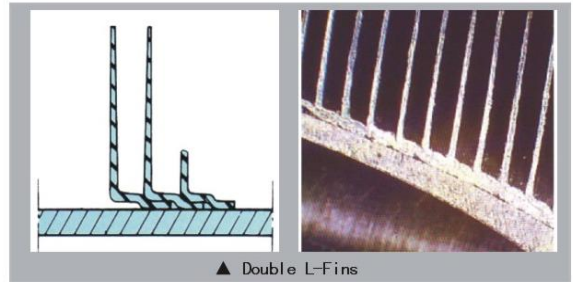
铝带经过绕制，在基管的根部形成双L形状，像台阶一样的翅片根部叠加起来包裹在基管根部外面，这样，使得基管能够得到很好的防腐和清洁的保护。

The aluminum strip foot section is first formed into a double L-stepped shape. This results in a fin base twice as large as that of a single L-shape. The LL-fin strip is then tension-wrapped onto the primary tube so as to obtain, a partial overlapping of the wound fin base. In this way, the primary surface is efficiently protected by continuous strip cover, against corrosive environment and cleaning.

LL型翅片的优点

- | | |
|--|---|
| <ul style="list-style-type: none"> ○ 很好的热传递效果 ○ 翅片和管子之间连接牢靠 ○ 翅片的成本很低 ○ 应用范围：温度达120℃ | <p>Advantage of the LL-fin</p> <ul style="list-style-type: none"> ○ Very good heat transfer ○ Very good bond between the tube and fin ○ Low-cost fin tube ○ Application range: up to 120℃ |
|--|---|

Fin Material/翅片材料	Aluminum 铝
Tube material/基管材料	Any metal 各种金属
Working Temperature/工作温度	120 ℃
Atmospheric corrosion resistance/防腐性能	Medium好
Mechanical Resistance/机械性能	Poor差



S型 高频焊翅片管 Weld “S” Finned Tube

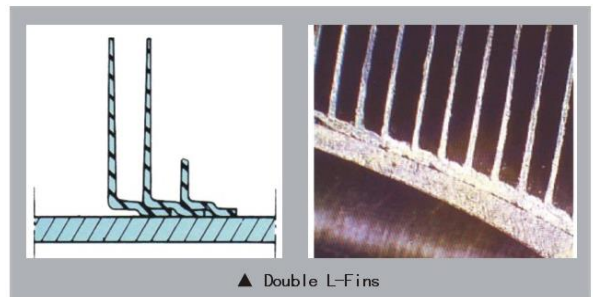
管和螺旋状的翅片组成热交换面积，具有很高的热传递性能。这种设计的特点是螺旋状的钢质翅片缠绕在无缝钢管上，翅片和管子采用连续焊接，非常牢固。

The heat exchange area consists of tubes with high, spiral fins that offer excellent heat transfer characteristics. This design feature finned tubes of seamless steel tubing with steel strip fins spirally wrapped around them. The connection between the core tube and fins are formed by a continuous weld. This manufacturing method ensures a perfect, permanent bond between the core tube and the fin.

S型 高频焊翅片的优点

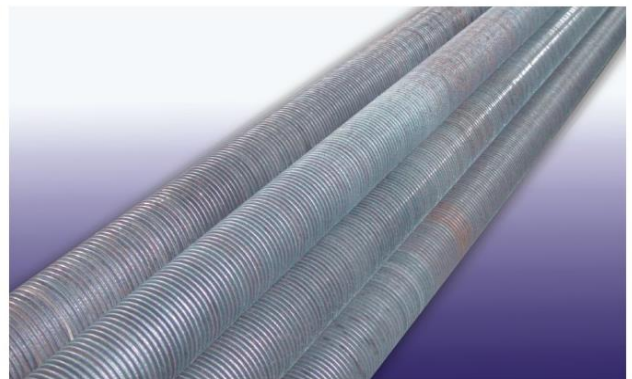
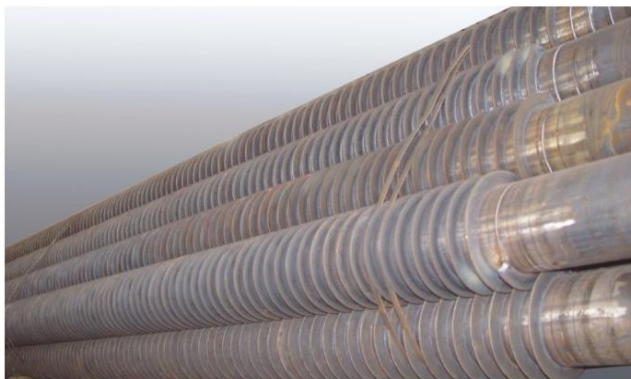
- | | |
|--|---|
| <ul style="list-style-type: none"> ○ 很好的热传递效果 ○ 翅片和管子之间连接牢靠 ○ 应用范围：温度可达550℃ | <p>Advantage of the S-fin</p> <ul style="list-style-type: none"> ○ Very good heat transfer ○ Very good tube/fin bond ○ Application range: up to 550℃ |
|--|---|

Fin Material/翅片材料	Carbon Steel 碳钢
Tube material/基管材料	Carbon Steel 碳钢
Working Temperature/工作温度	550 ℃
Atmospheric corrosion resistance/防腐性能	Excellent很好
Mechanical Properties/机械性能	Excellent很好



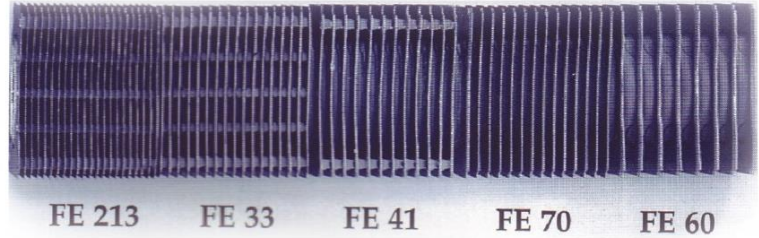
根据应用范围，可以调整翅片管的翅片间隔和面积

Depending to the application, finned tubes are provided with Cutouts in the form of shape or whirl areas.





椭圆形翅片管 Elliptical Finned Tubes



一管多片型翅片管 One tube with multi fins

翅片通过热浸镀锌工艺连接到椭圆管上，这种工艺能够确保基管与翅片之间的金属性连接，降低连接部分的接触热阻，提高元件的换热效率。翅片牢固的固定在基管上，不仅翅片不会脱落，元件整体的强度也会更好，而且由于翅片管的外表面上全部镀上一层锌层，可以有效地防止腐蚀的发生。

基管为椭圆型，翅片侧流体沿椭圆长轴方向流动，有效地降低了流体的运动阻力；同时椭圆截面外周长与面积比大，使得传热效率更高。

The fins are bond to elliptical tubes via hot dip galvanizing, which can ensure the metal connection between tubes and fins and reduce the heat resistance so as to increase heat transfer efficiency. This kind of connection can keep the fins firmly fixed to the tubes, meanwhile the strength of the element bundle will be better. The coated zinc outside will make the finned tube more corrosive resistance.

The elliptical tubes can make fluid pressure drop smaller since the flow direction is along with long axial meanwhile to improve heat transfer efficiency due to high rate of circumference and area.

椭圆翅片管的优势:

- (1) 与圆管相比，被冷却介质通过换热器的压力损失更小，压力降不到圆管的1/3；
- (2) 热效率更高，在相同条件下，换热面积更小；
- (3) 翅片管表面覆盖一层锌层，元件的耐腐蚀性非常强；
- (4) 翅片外型为矩形，结构紧凑，节约安装空间；
- (5) 温度应用范围广，最高温度可到300度。

Advantage of elliptical finned tubes:

- (1) Compared with round tube, the pressure drop of air is less, which is almost one third of that caused by round tubes.
- (2) Heat transfer efficiency is higher with less cooling surface area in the same condition.
- (3) Anti-corrosive ability is high due to galvanization of finned tubes.
- (4)The rectangle fins can make the volume compact and small.
- (5) The range of applied temperature is wide, the max. temp. can be up to 300 degree.

根据应用范围，可以调整翅片管的翅片间隔，满足不同条件的需求钢质镀锌椭圆翅片管的型号。

According to different application, the fin pitch can be adjusted to meet different requirement. There are several type of steel galvanized finned tubes.

型号 Type	翅片间的距离 distance of fin
FE213	2.1mm
FE250	2.5mm
FE280	2.8mm
FE303	3.0mm
FE33	3.3mm
FE350	3.5mm
FE401	4.0mm
FE600	6.0mm





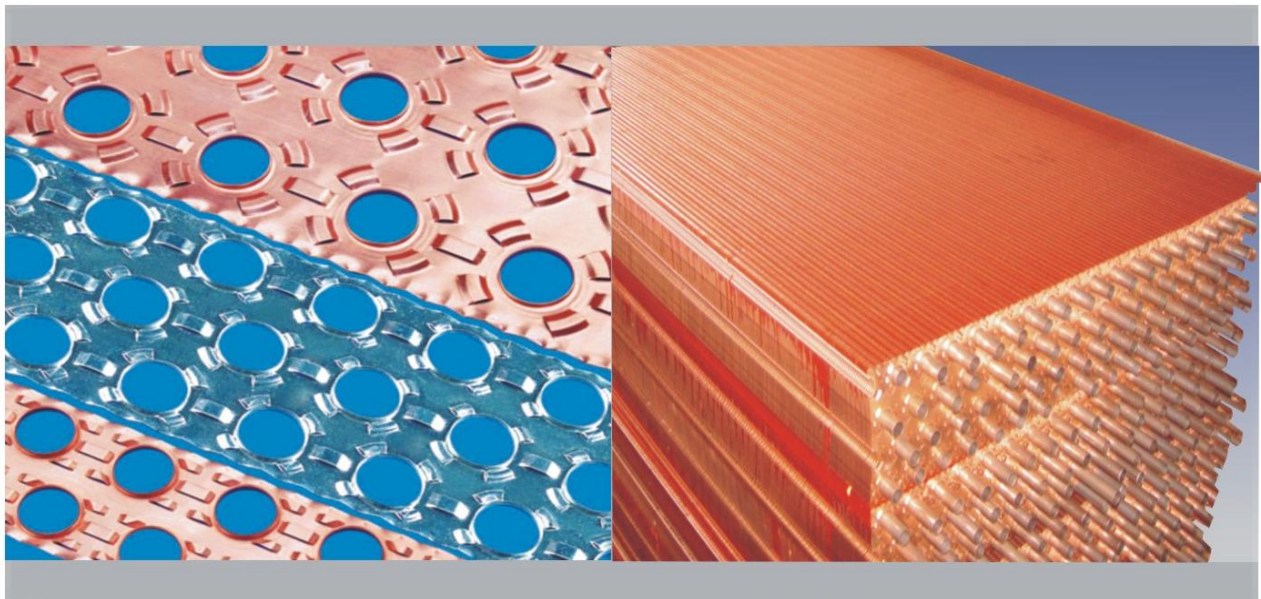
一片多管型翅片管 Multi-tube fin system

翅片和冷却管通过胀接的方式成为一个整体，该翅片管的结构是把多根冷却管穿在一组翅片上，通过机械胀接的方式把冷却管胀大，使冷却管与翅片紧密地贴在一起。这种工艺的特点是多根管子与一组翅片形成一个整体，在该组翅片中有一根或少量冷却管因为泄漏而被堵时，对系统的换热性能没有明显的影响。

The fins are connect to tubes via expansion. Many tubes can insert to one bundle of fins and bonded by mechanical expansion of tubes. In case of plugging one or several tubes due to leakage, the cooling efficiency will not be affect obviously.

这种翅片管是翅片单独冲制好后与冷却管组合在一起的，因而效率很高，而且翅片的厚度为0.12mm-0.2mm，翅片与冷却管间的连接不需要其它的辅助材料，成本较低，翅片的形状为矩形，结构紧凑，单位空间内换热面积很大，而且根据不同的使用环境可以选用铜或铝翅片。

The fins are punched separately and connected to tubes afterwards, the fin thickness is from 0.12 to 0.2 mm, the bond between fin and tube is by mechanical expansion without other material so as to save cost. The shape of fin is rectangle with compact structure. The material of fin can use copper or aluminum according to applied ambient condition.



一片多管型翅片 One fin with multi tubes

一片多管型翅片管 One fin with multi tubes bundle



空冷散热系统设备成套技术

Component technology of air cooling system

我们不仅提供空冷器（空气散热器）的设计、制造服务，而且提供该热交换系统热平衡设计，系统各个换热设备的热工计算和选型设计，管道的计算选取和布置，泵的计算选取，以及系统各个主要温度点的自动控制和节能运行控制技术。

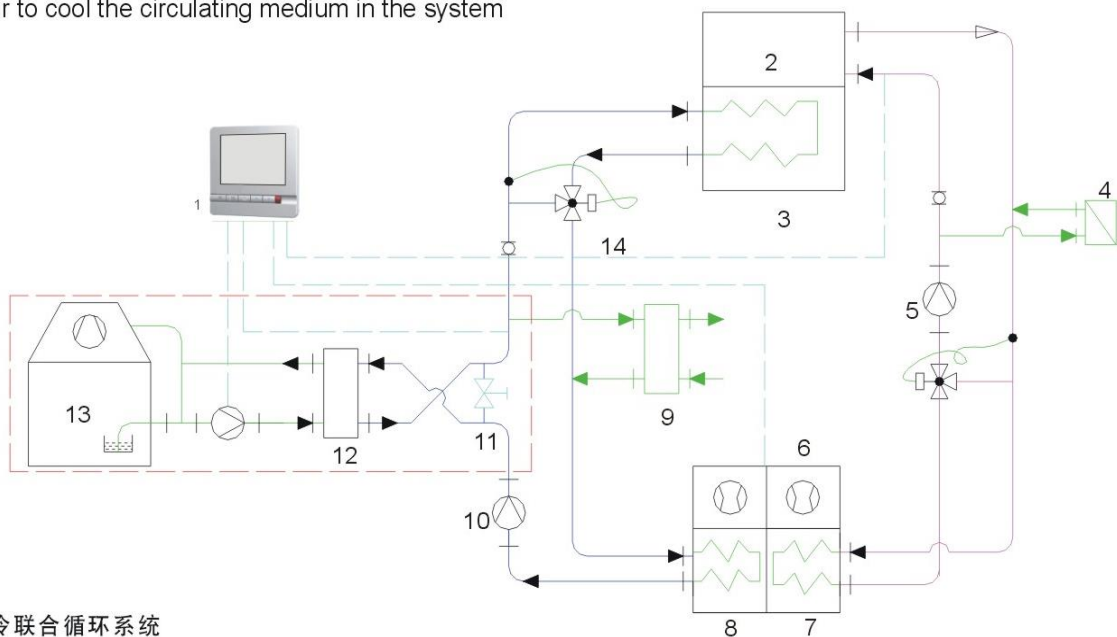
We provide not only the design and manufacture service of air cooler, the design of thermal equilibrium and thermal calculation, the option of the system's type, the selection and arrangement of the pipes, the choice of pump, what's more, the technology of automatic control of the main temperature points and the technology of the energy-saving operation are all in our service.

我们旨在为客户提供一个能满足设计要求的，运行可靠的，且环保节能的系统方案。我们不仅要求为我们的客户节约投资，而且还要考虑到满足低成本运行的要求。

We aims to provide a satisfying system proposal which is reliable and energy-saving. To save the fund of the clients and to satisfy demand of low-cost working are what we will do.

空冷循环系统 Air cooling circulation system

完全用空气来冷却系统的循环冷却介质
use the air to cool the circulating medium in the system



空冷、水冷联合循环系统
Combined-Cycle system of air cooling and water cooling

空冷和冷却塔联合循环，当环境温度高于某一值时，冷却塔自动开启，当环境温度低于某一值时，冷却塔自动关闭。
Both air cooling and water cooling tower work in the circulation system. When the ambient temperature climbs to some degree, cooling tower will work automatically; on the contrary, if the ambient temperature drops to some degree, cooling tower will close automatically.

- | | | |
|----------------------------|-------------------------|--------------------------------|
| 1 控制器 Controller | 6 空冷器风机 Air cooler fan | 11 电动阀 Electromtion valve |
| 2 柴油机缸套 Engine jacket | 7 高温水空冷器 HT aircooler | 12 板式换热器 Plate heat exchangers |
| 3 增压空气冷却 Charge air cooler | 8 低温水空冷器 LT air cooler | 13 冷却塔 Cooling tower |
| 4 喷嘴水冷却器 Nozzle cooler | 9 滑油冷却器 Lube oil cooler | 14 温度调节阀 Temp control valve |
| 5 高温水循环泵 HT water pump | 10 低温水循环泵 LT water pump | |

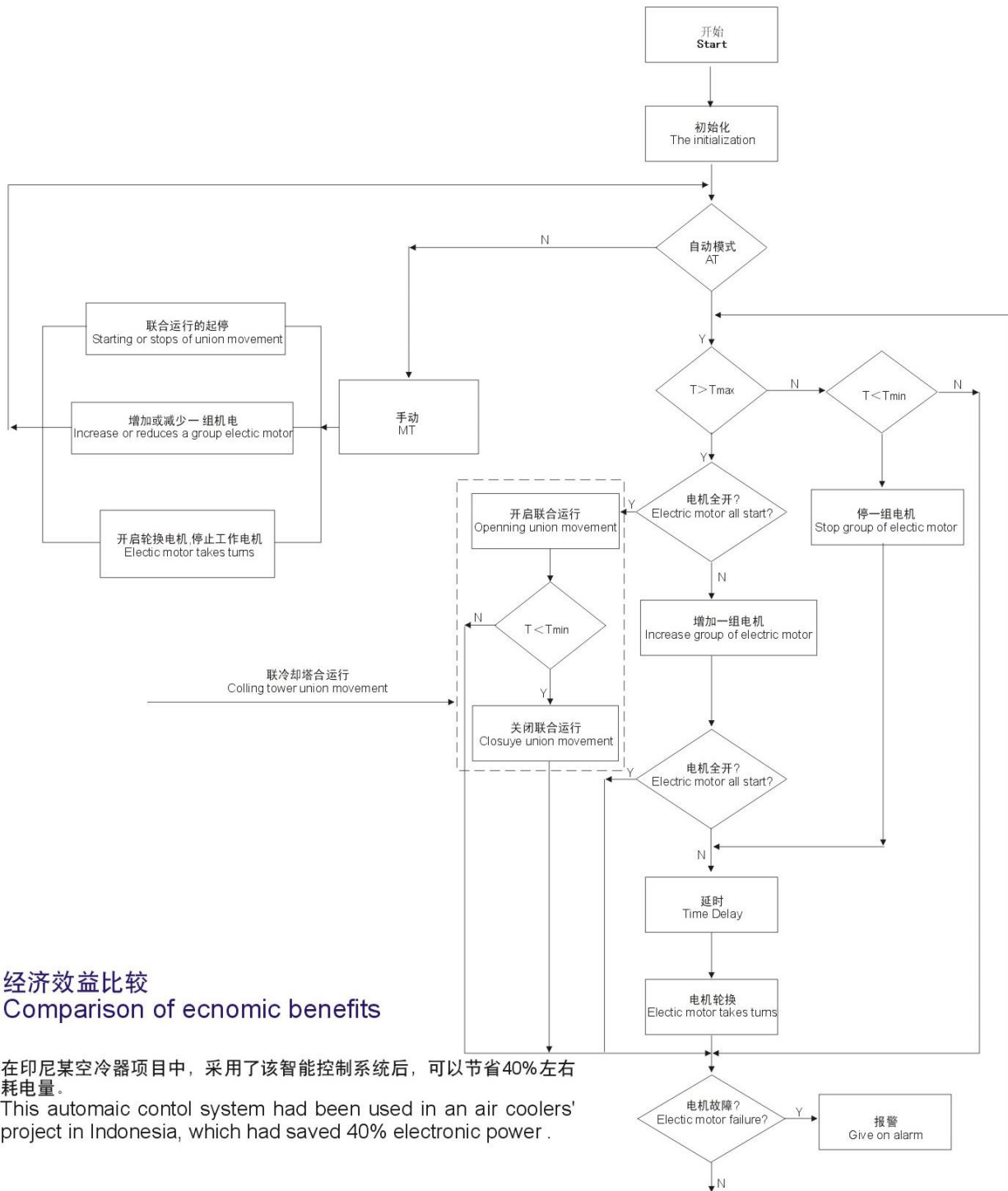
上图为原理图，关于设计参数、管道规格及布置，各点温度的控制在系统图中的描述。
Above is the theorem schema, in which the parameters of the equipment, standards and arrangement of pipes, and the temperature controlling are shown.



风机节能运行的控制技术 Power-saving Technology of fan

根据不同环境条件自动调节空冷器风机运行的数量、频率，大大降低了系统的运行成本，达到节能的目的。
Automatically control the number and frequency of the working fans of air coolers according to specific environments. It will cut off the cost and save power.

风机节能运行控制原理图 Theorem schema of the fan working in power-saving way



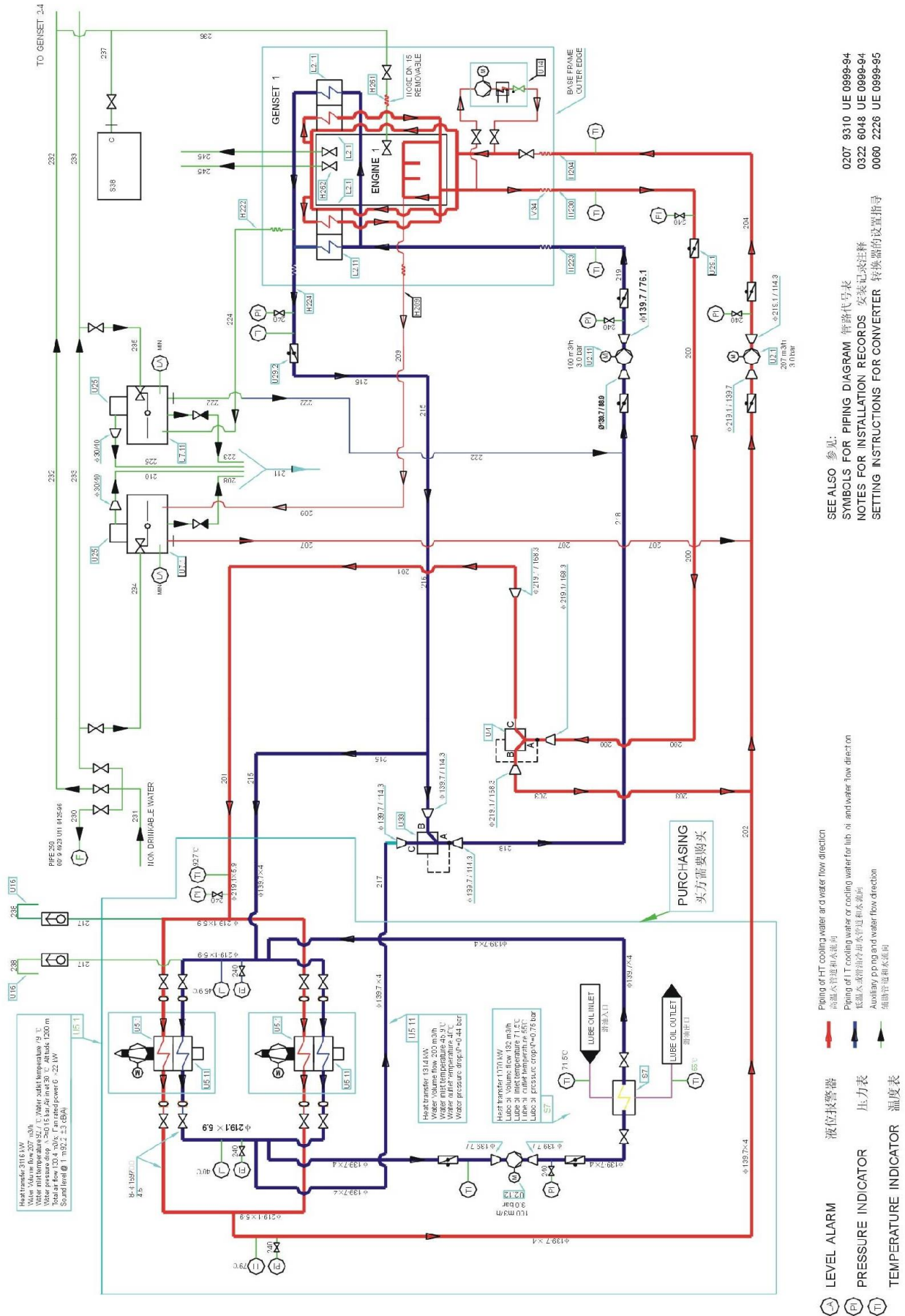
经济效益比较 Comparison of economic benefits

在印尼某空冷器项目中，采用了该智能控制系统后，可以节省40%左右耗电量。
This automatic control system had been used in an air coolers' project in Indonesia, which had saved 40% electronic power.

该原理图为常规设计，我们可以根据用户的特殊要求或特殊环境，做个性化设计。
It's a normal design, and we can give special ones according to particular demands or environments.



空冷器在系统中的运行示例 Sample of the air cooler working in the system





应用领域

Application



▲ 广东瓦锡兰循环水散热器项目
Guangdong (W·X·L) circulating water radiator project



▲ 印尼空冷散热器项目
Air-cooled radiators project in Indonesia (104kw)



▲ 合成气（石化）方面的应用
Synthesis gas (sinopec) the application



▲ 新加坡项目
Singapore project



▲ 空冷器在甲醇（化工）生产项目的应用
CNOOC Hainan 600kT/Yr Methanol Air Coolers

空冷器配套表

Reference list of air cooler

NO	Addrsee 项目地点	Air cooler type 空冷器型号	Quantity of heat 换热量 kw	设计环境温度 °C
1	Indonesia	6V1-1250H6-7500/2117-5CA4 S32D212+ 6CA2 S32D212	6950 × 12	36℃
2	South Africa	25V1-1250H6-10310/2117-6CA2 S32D212	4430 × 4	30℃
3	Sri Lanka	10V1-1250H6-10310/2117-5CA4 S32D212	4200 × 2	32℃
4	The United Arab Emirates	10V1 1250 H22 10310 / 2117 - 3CA1 S32D252 + 5CA1 S32D212	6950 × 4	45℃
5	Singapore	15V1 1250 H32 - 12560/2117 - 2CA1 S32D300 (HT) + 6CA2 S32D212 (LT)	8570 × 8	36℃
6	Dongguan	10V1 1250 H22 10310 / 2117 - 3CA1 S32D252 + 5CA1 S32D212	5660 × 4	36℃



空冷热工计算参数咨询表

Technical data sheet for air cooler thermal layout

Customer information 客户信息

Company name 公司名称			
Company address 公司地址			
Project 项目名称			
Estimate completes date 项目预计完成日期			
Contact person 联系人	Tel 电话	Fax 传真	
Remark 备注			

Equipment technical data 设备技术参数表

No	Item 名称	Medium by cooling 被冷却介质	Unit 单位
1	Media 介质		/
2	Ethylene glycol 乙二醇体积含量		%
3	Heat exchanged 换热量*		kw
4	Flow rate 流量*		m ³ /h
5	Temperature inlet 入口温度*		°C
6	Temperature outlet 出口温度*		°C
At least three of these data per medium have to be indicated 以上注*参数最少需要提供三项			
7	Surface margin 设计余量要求		%
8	Operating pressure at inlet 入口工作压力		bar
9	Pressure drop 压力损失		bar
10	Design pressure 设计压力		bar
11	Design Temperatures 设计温度		°C
12	Maximum noise level at ()m 噪声值		dB(A)
13	Maximum dimensions 最大尺寸 (L×W×H)		m
14	Whether the environment does have flammable or the explosive gas 环境是否存在易燃易爆气体		Yes有 <input type="checkbox"/> no无 <input type="checkbox"/>
15	Circumstance temperature 环境温度 (年最高温度月份的昼夜平均值)		°C
16	Humidity 空气湿度		
17	Lattitude 海拔高度		m
18	Voltage/Frequency 电压/频率		
19	Corrosive of Air 空气腐蚀性	Yes有 <input type="checkbox"/> (注明腐蚀性的成分和浓度) no无 <input type="checkbox"/>	
20	Seismic activity 地震情况是否频繁	Yes是 <input type="checkbox"/> No否 <input type="checkbox"/>	
Physical properties of extraordinary media 特殊介质物理特性参数			
21	Density 介质密度		
22	Dyn. Viscosity at inlet temperature 入口温度下的动力黏度		
23	Dyn. Viscosity at outlet temperature 出口温度下的动力黏度		
24	Specific heat 比热		
25	Thermal conductivity 导热率		

如果贵公司有需要，请复印上述表格，填上相应的内容后传给我们，我们一定会在最短的时间内回复。

If your firm has the need, please photo copy the above form after filling in the corresponding content to us, we will certainly reply in the shortest time.



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