



友道实业
T.S. Industrial

友道实业（上海）有限公司

Shanghai T.S. Industrial Co.,Ltd

地址：中国上海宝山友谊路1588号

Add: Lane1588, Youyi Road, Baoshan, Shanghai, China

电话/Tel:0086-21-66030009

传真/Fax:0086-21-66030005

友道实业（上海）有限公司苏州分公司

Shanghai T.S. Industrial Co.,Ltd Suzhou Branch

地址：江苏省太仓港经济技术开发区北环路20号港城广场D栋

Add: Building D, Gangcheng Plaza, No. 20 North Ring Road, Taicang ETDZ, Jiangsu Province

邮箱/Email: sales@lordfintube.com

网站/Web: www.lordfintube.com



友道实业
T.S. Industrial

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COOPERATION, WIN-WIN,
INNOVATION AND DEVELOPMENT

企业简介

Introduction
Handbook

Tube Sheet ·

Finned Tube ·

U Bend Tube ·

Helical Coiled Pipe ·

友道实业（上海）有限公司
Shanghai T.S. Industrial Co.,Ltd

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>> 公司简介 Company Introduction



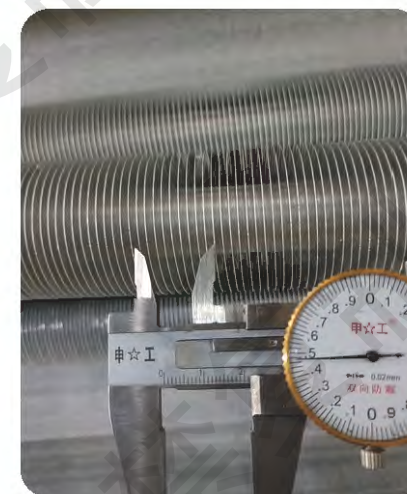
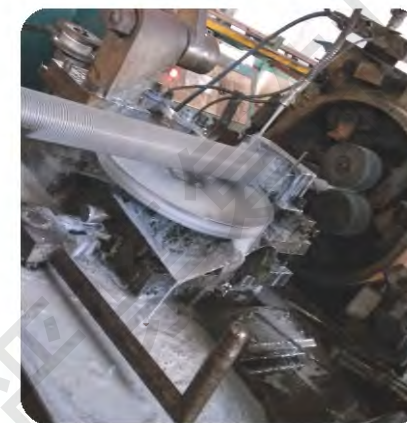
友道实业（上海）有限公司位于上海宝山区，专业从事生产和出口各类高性能翅片管及相关产品。我们的产品范围包括挤压式翅片管、L/LL/KL型缠绕式翅片管、镶嵌式翅片管、高频焊接螺旋翅片管、钉头管、H/HH型方翅片管、纵向翅片管、椭圆翅片管、低翅片螺旋管、波节管以及管板、折流板、加热油盘管和各种材质的U型管等锅炉配件。

我们的产品广泛应用于空冷器、火焰加热炉、换热器、船用锅炉、省煤器、电站锅炉、余热锅炉、余热回收装置、空气加热器等领域。最终客户涵盖电厂、炼油及石化行业、海洋石油平台及船舶行业。

Shanghai T.S. Industrial Co., Ltd is located in Baoshan District, Shanghai, specializing in the production and export of various high-performance finned tubes and related products. Our product range includes extruded finned tubes, L/LL/KL type wound finned tubes, embedded finned tubes, high-frequency welded spiral finned tubes, studded tubes, H/HH type square finned tubes, longitudinal finned tubes, elliptical finned tubes, low finned spiral tubes, corrugated tubes, as well as tube sheets, baffle plates, heating oil coils, and U-tubes made of various materials, among other boiler accessories.

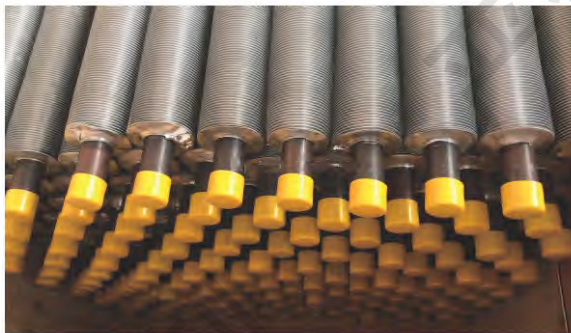
Our products are widely used in air coolers, flame heaters, heat exchangers, marine boilers, economizers, power station boilers, waste heat boilers, waste heat recovery units, air heaters, and other fields. Our end customers include power plants, refining and petrochemical industries, offshore oil platforms, and the marine industry.

>> 生产及检验设备 Equipment and Inspection





>> 挤压翅片管 Extruded Finned Tube

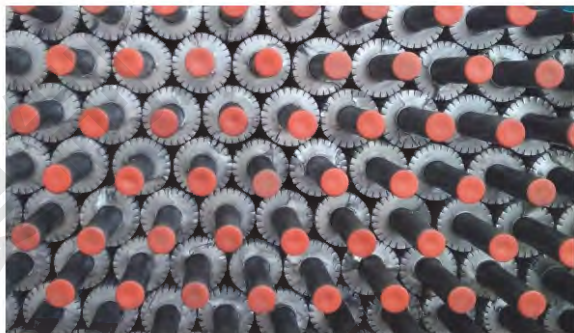


This fin type is formed from a bi-metallic tube consisting of an aluminium outer tube and an inner tube of almost any material. The fin is formed by rolling material from the outside of the exterior tube to give an integral fin with excellent heat transfer properties and longevity. Extruded fin offers excellent corrosion protection of the base tube.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
9.53mm ~ 51mm	≥ 1.0mm	6.0mm ~ 16mm	0.4mm ~ 0.5mm	2.1mm ~ 10.0 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel, Copper Alloy		Aluminum (Standard) or Copper		≤ 20Mtrs

>> 挤压开齿翅片管 Extruded Serrated Finned Tube



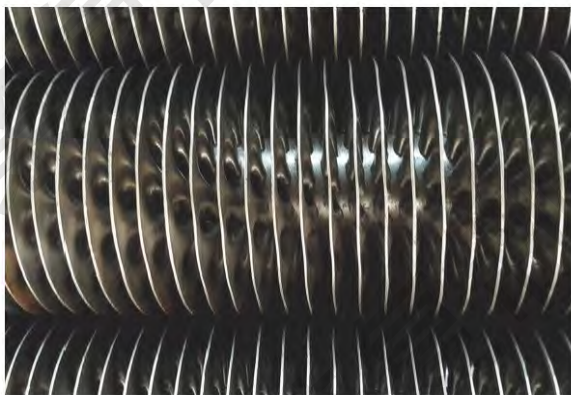
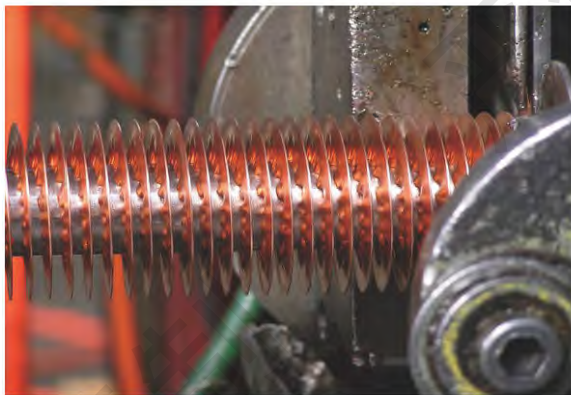
An extruded serrated finned tube is a type of heat exchanger tube where fins formed from a bi-metallic tube consisting of an aluminium outer tube and an inner tube of almost any material. The fin is formed by rolling material and serrated to enhance heat transfer efficiency by increasing the surface area and turbulence.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
12.7mm ~ 51 mm	≥ 1.2 mm	6.0mm ~ 16mm	0.4mm	2.1mm ~ 10.0 mm
基管材质 Base Tube Material		翅片材质 Fin Material	开齿数 Segment Qty	长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel, Copper Alloy		Aluminum	12/24 Segments	≤ 20Mtrs



>> 缠绕翅片管 Spiral Wound Finned Tube

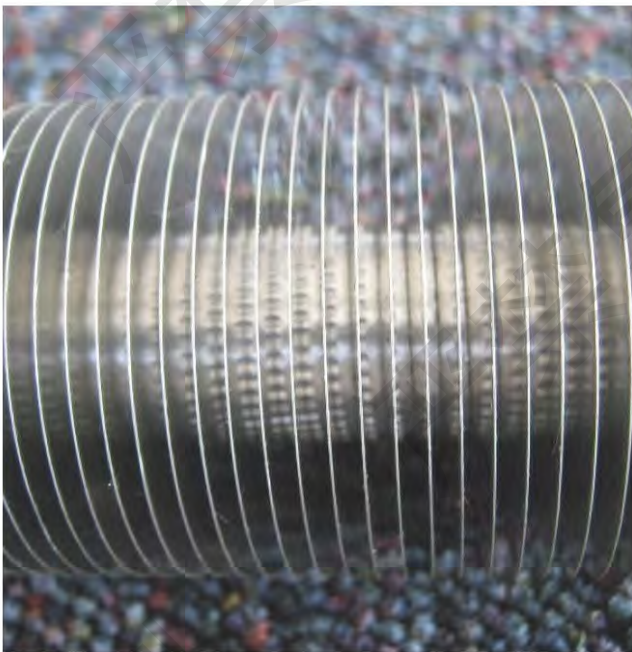


Fins are spirally wound on a base tube, without welding, just fin spot welded. Non ferrous tubes and fins on either root soldered or completely tinned.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
15.88mm~ 50.8mm	1.0mm~3.0mm	6.35mm~25.4mm	0.3mm~0.5mm	2.1mm~ 6.0mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel		Aluminum, Copper		≤15Mtrs

>> L/LL/KLM型翅片管 L/LL/KLM Type Finned Tube



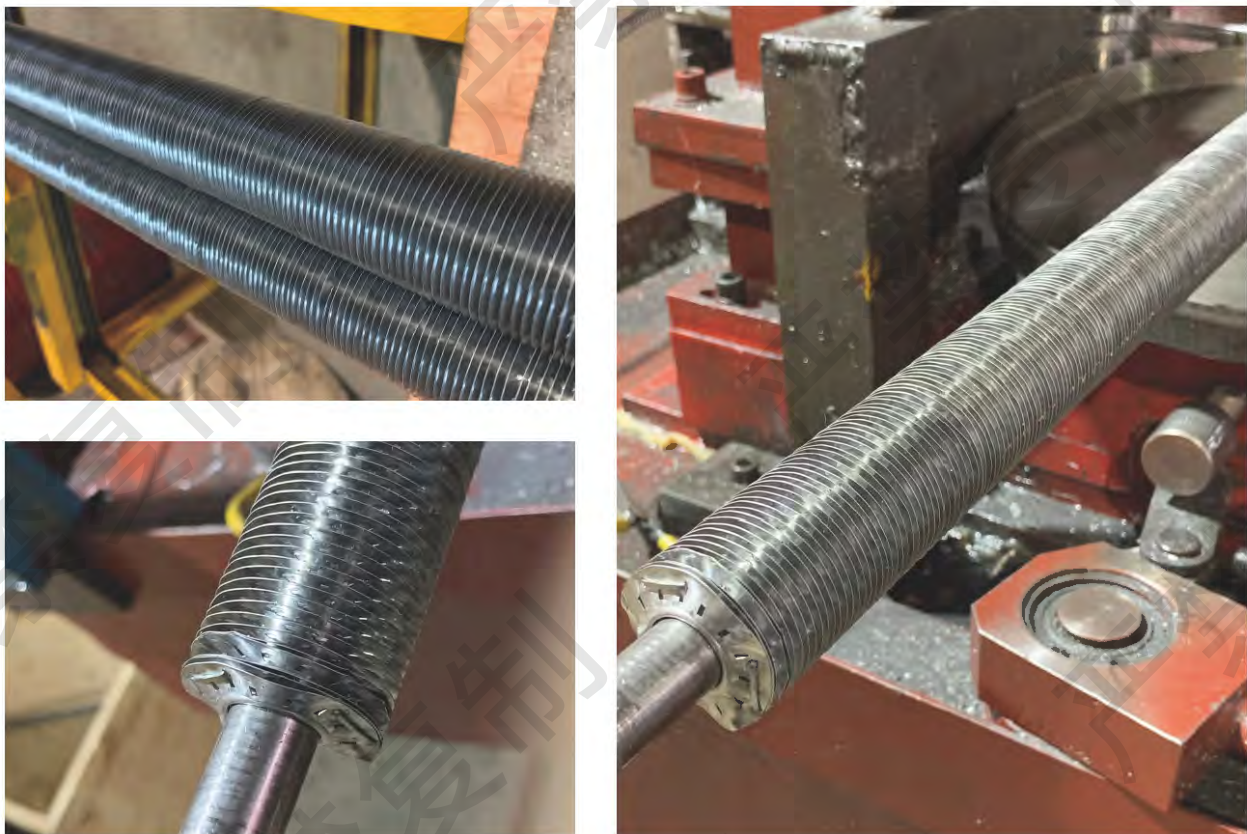
The manufacturing strip is folded to form an L shape or and then wound around the base tube. The feet of the fins are joined together and cover the whole of the finned surface. Both ends are clamped down to avoid unrolling through damage. KL Manufactured exactly as the 'L' finned tube except that the base tube is knurled before application of the fin foot.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
15.88mm~ 50.8mm	1.0mm~3.0mm	6.35mm~25.4mm	0.3mm~0.5mm	2.1mm~ 6.0mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel		Aluminum, Copper		≤15Mtrs



>> 穿孔L型翅片管 Perforated L-Foot Finned Tube



Manufactured exactly same as the 'L' finned tube except holes are perforated through the fins.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
15.88 mm~50.8 mm	1.0 mm~3.0mm	6.35mm~25.4mm	0.3mm~0.5mm	2.1mm~6.0 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel		Aluminum, Copper		≤15Mtrs

>> 镶嵌翅片管 Embedded (G) Type Finned Tube



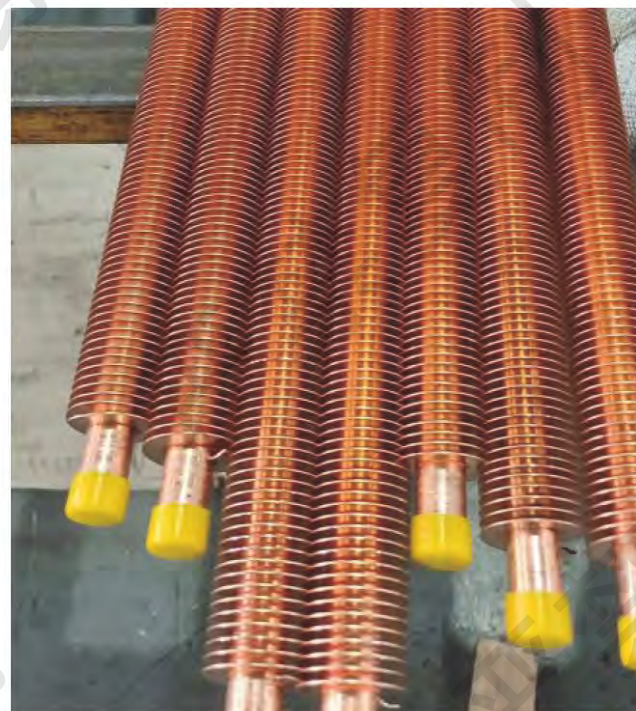
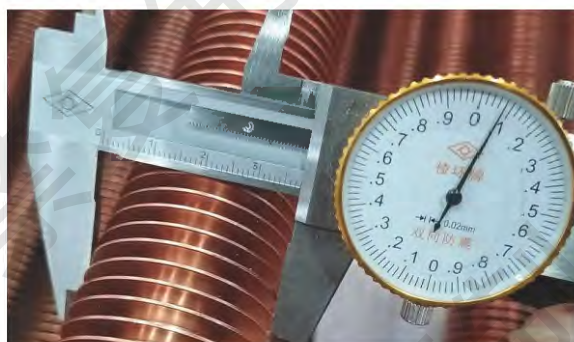
The fin strip is wound into a machined groove and securely locked into place by back filling with base tube material. This ensures that maximum heat transfer is maintained at high tube metal temperatures.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
15.88mm~50.8 mm	1.0mm~3.0mm	6.35mm~25.4mm	0.3mm~0.5mm	2.1mm~6.0 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel		Aluminum, Copper		≤ 15Mtrs



>> 激光焊翅片管 Laser Welded Finned Tube



Laser welded spiral finned tube is using a laser welding machine processing. Because the welding process is fully automatic and mechanical, the scientific and technological content and quality of laser welded spiral finned tube are better than the traditional cooling pipe.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
15.0mm~70mm	1.0mm~3.5mm	4.0mm~17mm	0.3mm~2.0mm	1.15mm~5.08mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Stainless Steel, Titanium, Copper Alloy		Carbon Steel, Stainless Steel, Titanium, Copper		≤ 12Mtrs

>> 高频焊实齿翅片管 High Frequency Welded Solid Finned Tube



This finned tube is manufactured by helically wrapping continuous fin strip on tube. The fin wound around the tube and continuous weld. The fin strip is wound spirally onto the tube and welded continuously with a high frequency electrical process to the base tube along the spiral root.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
22mm~219mm	2.0mm~16mm	8mm~30mm	0.8mm~4.0mm	2.8mm~20mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel and ND Steel		Carbon Steel, Alloy Steel, Stainless Steel and ND Steel		≤ 25Mtrs



>> 高频焊开齿翅片管 High Frequency Welded Serrated Finned Tube

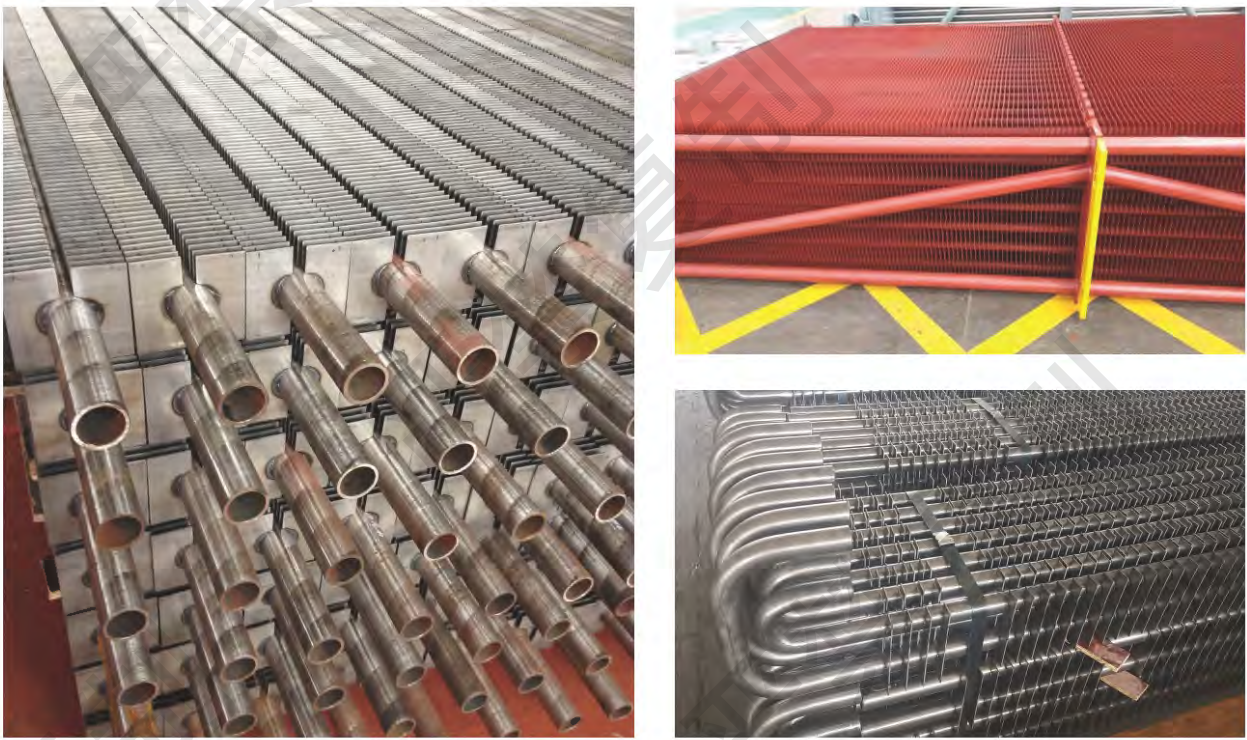


This finned tube is manufactured by helically wrapping continuous serrated fin strip on tube. The fin wound around the tube and continuous weld. The serrated fin strip is wounded spirally onto the tube and welded continuously with a high frequency electrical process to the base tube along the spiral root.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
22mm~219mm	2.0mm~16mm	8mm~30mm	0.8mm~4.0mm	2.8mm~20 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel and ND Steel		Carbon Steel, Alloy Steel, Stainless Steel and ND Steel		≤ 25Mtrs

>> 方型/矩形翅片管 Square H/Rectangle HH Finned Tube



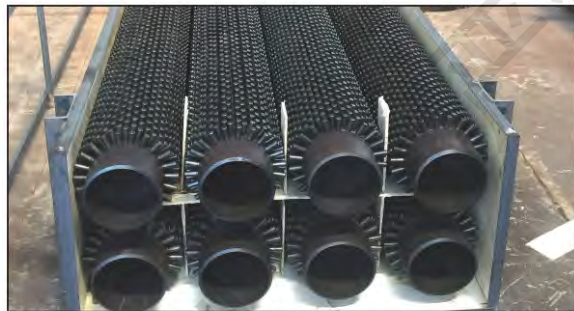
The fins are shaped like the letter "H" and flash resistance welding steel sheet on a central tube, usually in a square configuration. Square or rectangular fins are welded on a steel base tube. While Rectangle HH Finned Tube is square or rectangular fins are welded on two steel base tubes.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
25.4mm~50.8mm	2.5mm~5.0mm	0.5mm~20.0mm	0.5mm~3.0 mm	5mm~25.4 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel		Carbon Steel, Alloy Steel, Stainless Steel		≤ 15Mtrs



>> 钉头管 Studded/Nail Head Pipe

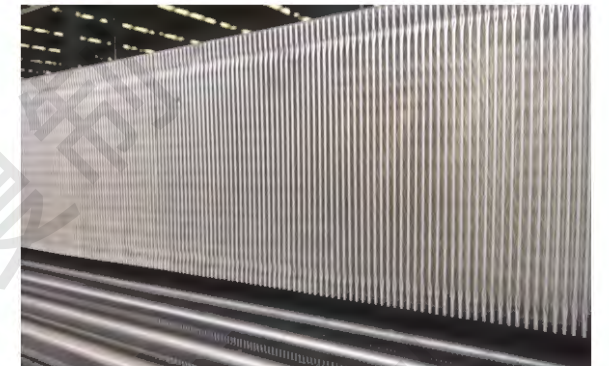
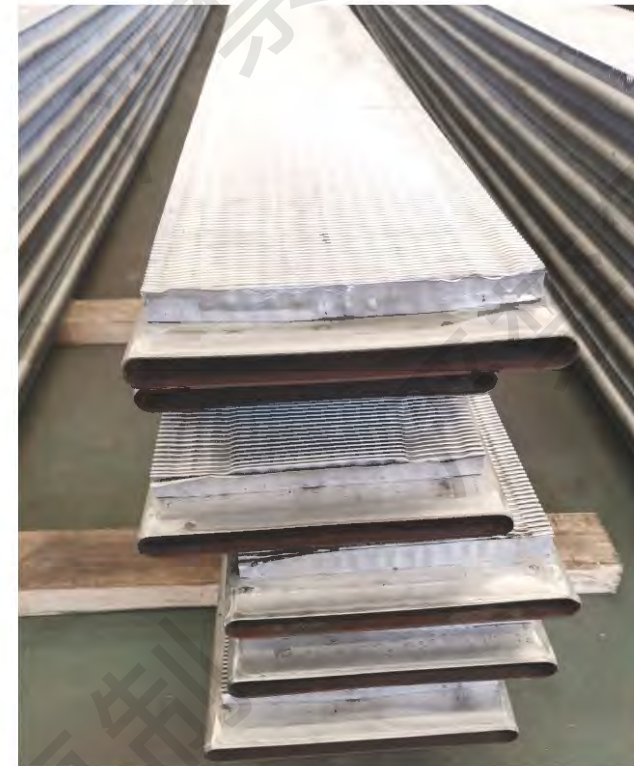


Studded Pipe is made by electrical resistance welding studs in rows around the pipe. The studs can be supplied in a variety of sizes and shapes. The pattern in which the studs are arranged on the tube can also be varied by changing the number of studs per row around the tube, the spacing between the rows, and whether the studs in adjacent rows are offset.

详细参数

基管外径 Base Tube O.D.	基管壁厚Base Tube Thickness	基管长度Base Tube Length
38 mm ~ 219 mm	4.0 mm ~ 20 mm	≤ 25Mtrs
钉头直径 Stud Diameter	钉头间距 Stud Pitch	钉头高度 Stud Height
6.0 mm ~ 12.7 mm	8.0 mm ~ 30 mm	6.0 mm ~ 30 mm
基管材质Base Tube Material		翅片材质Fin Material
Carbon Steel, Alloy Steel, Stainless Steel		Carbon Steel, Alloy Steel, Stainless Steel

>> 钎焊单排扁管 Brazed Single Row Flat Finned Tube



These tubes are formed from 1.5mm thick carbon-steel sheets, which are plated on the tube outside by a layer of 0.05mm aluminum. Aluminum fins are brazed on the long side to the tube.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	翅片尺寸 Fin Dimension	片厚 Fin Thickness	翅片片距 Fin Pitch
220 x 19.1 mm	1.5 mm	200 x 19.1 x 57.3 mm	0.25 mm	2.3 mm
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel		Aluminum 3003		≤ 13Mtrs



>> 纵向翅片管 Longitudinal Finned Tube

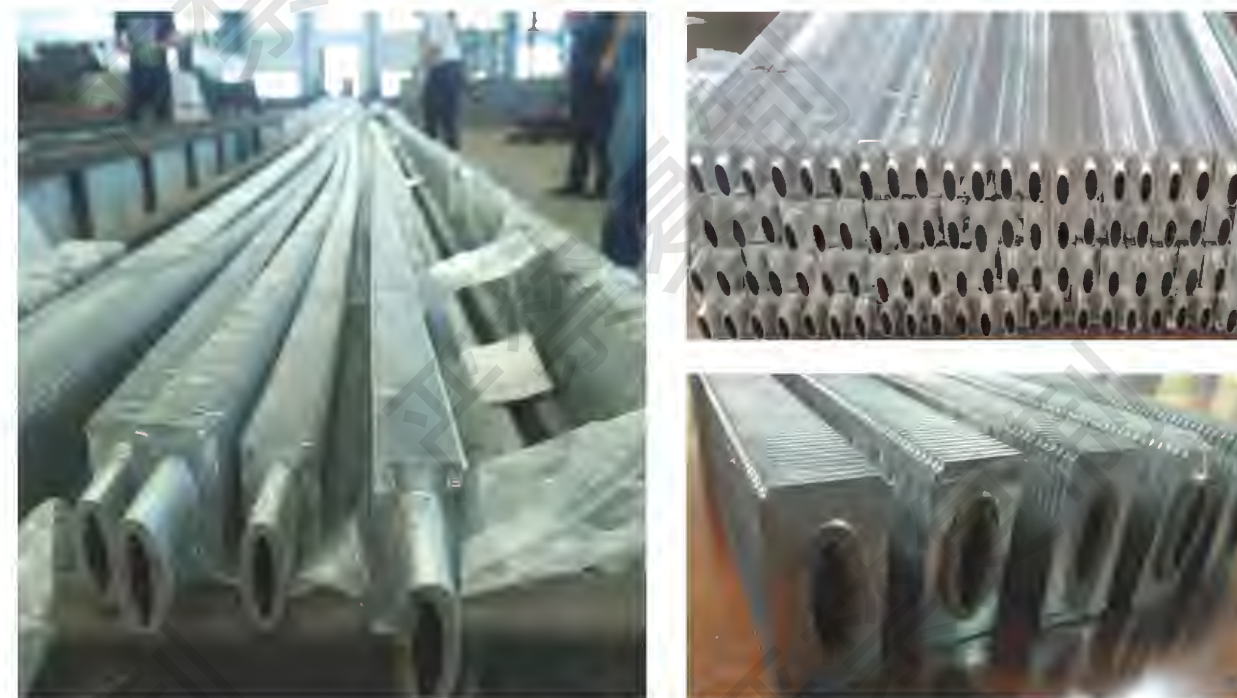


Longitudinal finned tube is produced by high frequency resistance welding fins in the longitudinal direction with the length of the tubes. The fin strip is first bend into U-shaped channel, so that each leg of the U will be a fin. The channels cut into the suitable length and oriented along the length of the tubes and resistance welded in place. The channels weld in pairs, diametrically opposed -- therefore the number of fins specified always be a multiple.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	翅片数 Fin NO. (Pc)
19 mm ~ 76 mm	2.0 mm ~ 6.0 mm	6.0 mm ~ 32.0 mm	0.8 mm ~ 1.2mm	4,8,16,24, 32,40,48
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel, Stainless Steel, Copper Alloy		Carbon Steel, Alloy Steel, Stainless Steel, Copper Alloy		≤ 15Mtrs

>> 热镀锌椭圆翅片管 Hot Dipped Galvanized Elliptical Finned Tube



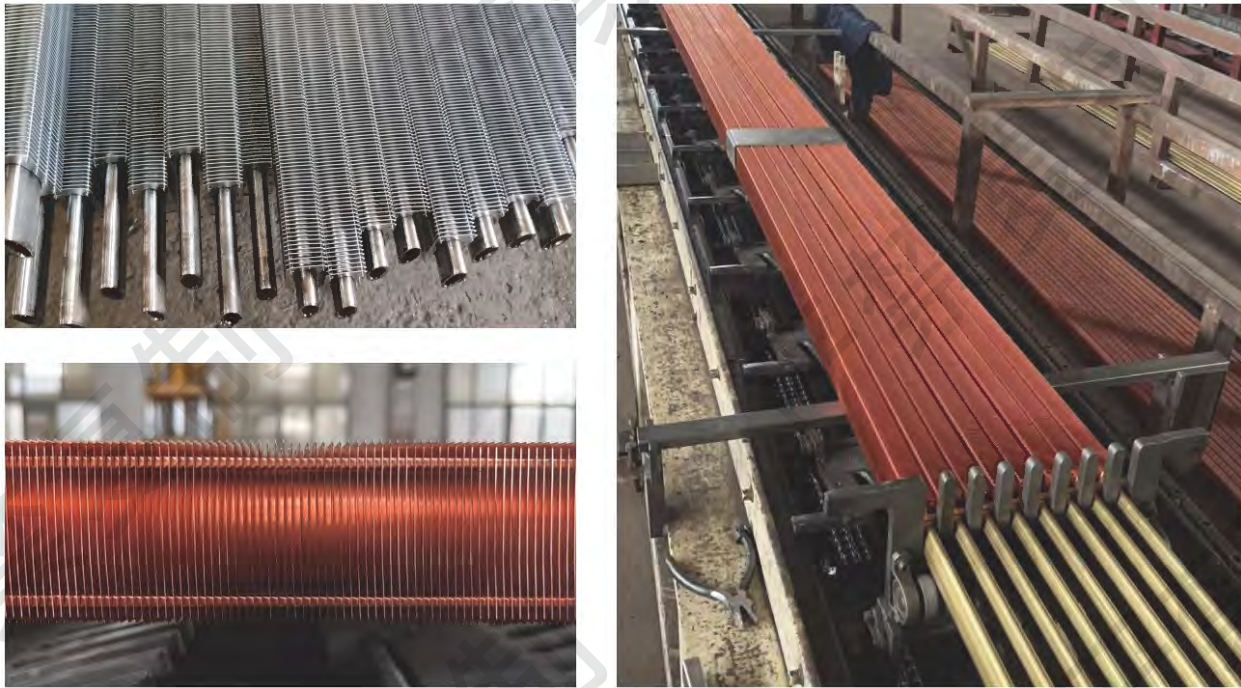
Elliptical finned tubes have two parts, one is elliptical tubes and rectangle fins. The elliptical tube can be seamless steel tube or welded oval steel tube. The fins are carbon steel and in rectangular shape. Furthermore the rectangular fin can be with interrupting holes or without interrupting holes, which hot dipped galvanized after the finning.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
36 x 14 mm	2.3, 2.5, 2.8, 3.2 mm	55 x 26 mm	0.25 mm	2.31, 2.54, 2.82, 3.18
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Alloy Steel		Carbon Steel, Alloy Steel		≤ 15Mtrs



>> 钎焊椭圆矩形翅片管 Brazed Elliptical Finned Tube



Elliptical finned tubes also have two parts, one is elliptical tubes and rectangle fins. The elliptical tube can be seamless steel tube or welded oval steel tube. The fins are available in copper alloy, aluminum and stainless steel and in rectangular shape. Furthermore the rectangular fin can be with interrupting holes or without interrupting holes, which brazed after finning.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
36 x 14 mm	2.3, 2.5, 2.8, 3.2 mm	55 x 26 mm	0.25 mm	2.31, 2.54, 2.82, 3.18
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Carbon Steel, Stainless Steel, Copper Alloy		Aluminum, Stainless Steel, Copper		≤ 15Mtrs

>> 内翅片管 Inner Finned Tube



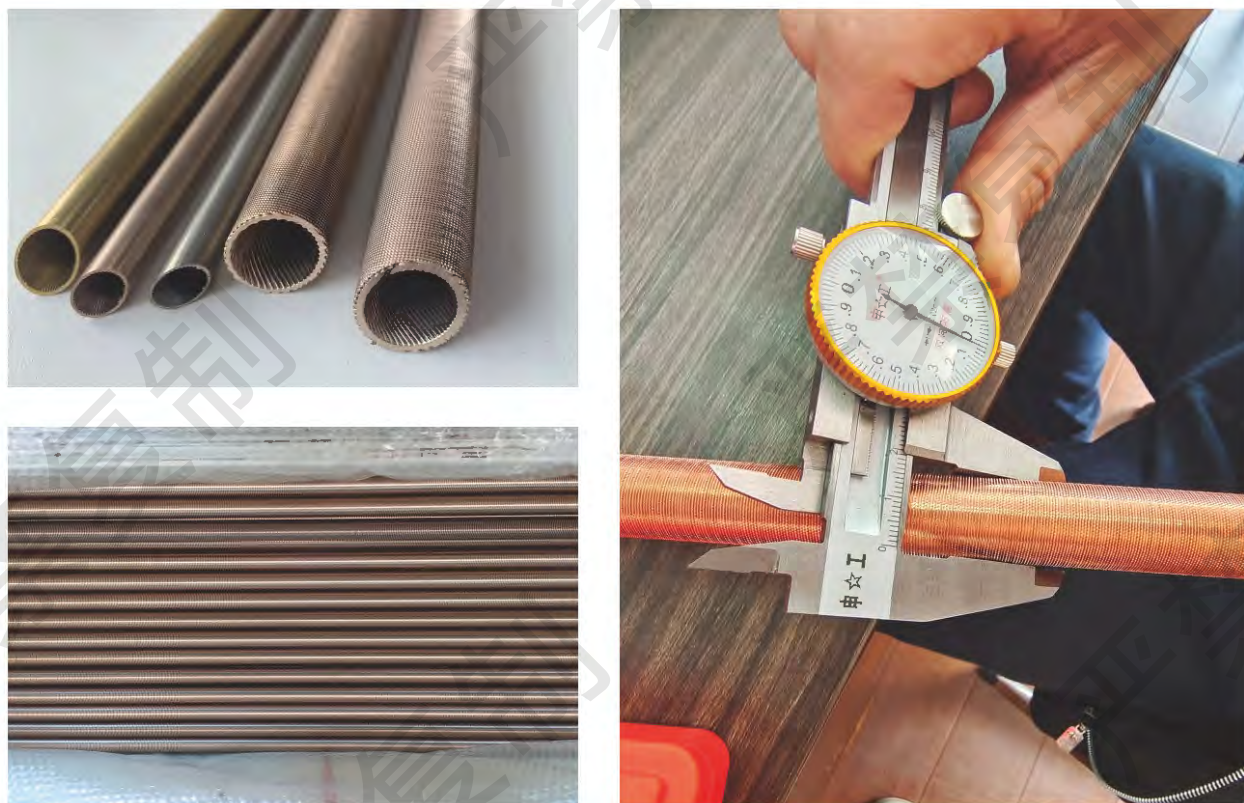
The internally finned tube consists of an outer heat exchange tube, corrugated inner fins, an inner support tube, and tube plugs on both sides of the inner support tube. The addition of corrugated inner fins inside the heat exchange tube enhances heat transfer efficiency.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	片厚 Fin Thickness	片距Fin Pitch
20-36 mm	1.0-1.5 mm	5-10 mm	0.2 mm	20FPD
基管材质 Base Tube Material		翅片材质 Fin Material		长度 Tube Length
Copper Alloy, Stainless Steel		Copper Alloy, Stainless Steel		≤ 1.5Mtrs



>> 低翅片螺纹管 Integral Low Finned Tube

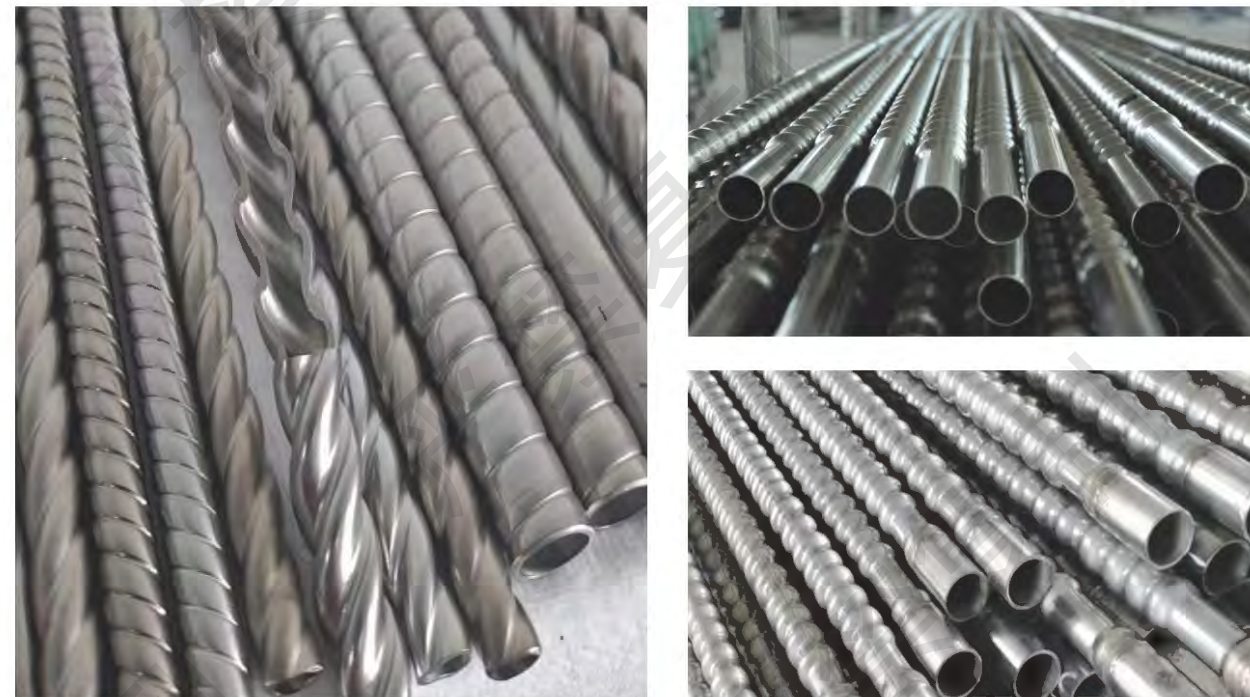


The fins are rolled out of the wall of the plain tube. Tube and fin are consisting of one piece. Low finned tubes can be provided with a smooth or rifled tube inside surface.

详细参数

基管外径 Base Tube O.D.	基管壁厚 Base Tube Thickness	片高 Fin Height	底壁厚 Wall Under Fin	片距Fin Pitch
6.35mm~25.4mm	0.89mm~2.77mm	0.6mm~1.5mm	0.7mm~1.0mm	0.7mm~1.3mm
基管材质 Base Tube Material				长度 Tube Length
Copper, Copper Alloy, Aluminum, Carbon Steel, Stainless Tube				≤ 15Mtrs

>> 波节管/螺旋烟管 Corrugated Tube/Internal Ribs Tube



The corrugated tube is a new type of high-efficiency heat exchange tube. It has the characteristics of high heat transfer coefficient, corrosion resistance and non-fouling. The vortex is caused by the periodic variation of the cross section on the axis of the tube. The corrugated tube has a self-cleaning effect through thermal expansion and contraction, so it is not easy to scale.

详细参数

光管外径 Base Tube O.D.	光管壁厚 Base Tube Thickness	波峰 Wave Crest	波谷 Wave Trough	波距 Wave Pitch
19mm~57mm	1.0mm~3.5mm	19mm~57mm	15mm~51mm	15mm~19mm
基管/翅片材质Single Metal Material		长度Tube Length (Mtr)		
Carbon Steel, Stainless Tube		≤ 15Mtrs		



>> 导油炉盘管 Helical Coiled Pipe



A helical pipe coil is a specific geometric arrangement of a pipe, where the pipe is coiled in a helical or spiral pattern.

材质Material	Carbon Steel, Stainless Steel, Alloy Steel
	单管Single Pipe
最大盘管管材直径Maximum Pipe Diameter (mm)	Ø159×12
最小弯曲直径Minimum Bending Diameter (mm)	Ø1800
	双管Double Pipe
最大盘管管材直径Maximum Pipe Diameter (mm)	Ø133×6
最小弯曲直径Minimum Bending Diameter (mm)	Ø1400
	三管Triple Pipe
最大盘管管材直径Maximum Pipe Diameter (mm)	Ø108×6
最小弯曲直径Minimum Bending Diameter (mm)	Ø1200
	四管Quadruple Pipe
最大盘管管材直径Maximum Pipe Diameter (mm)	Ø89×5
最小弯曲直径Minimum Bending Diameter (mm)	Ø1000

>> U型换热管 U Bend Heat Exchanger Tube



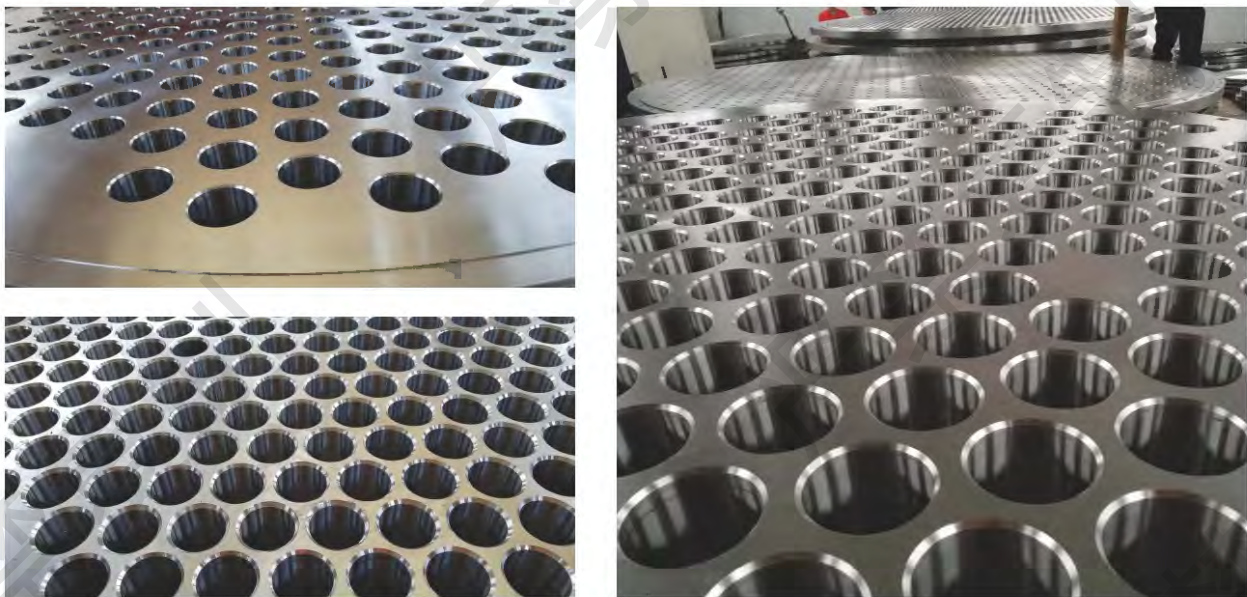
The U-shaped tubing specifically designed for use in high-pressure heaters. Its primary function is to transfer heat under high-temperature and high-pressure conditions, thereby heating boiler feedwater to higher temperatures and pressures to improve thermal efficiency. The U-shaped design provides a longer heat exchange path, enhancing heat transfer efficiency while saving space.

详细参数

生产标准 Produce Standard	生产材质 Tube Material	钢管外径 Tube O.D.	钢管壁厚 Tube Thickness	长度 Tube Length
ASME Sa556/ GB/T 24591	Carbon Steel, C2, 20MnG	12.0 mm ~25.4 mm	1.0 ~ 4.0 mm	≤ 35Mtrs



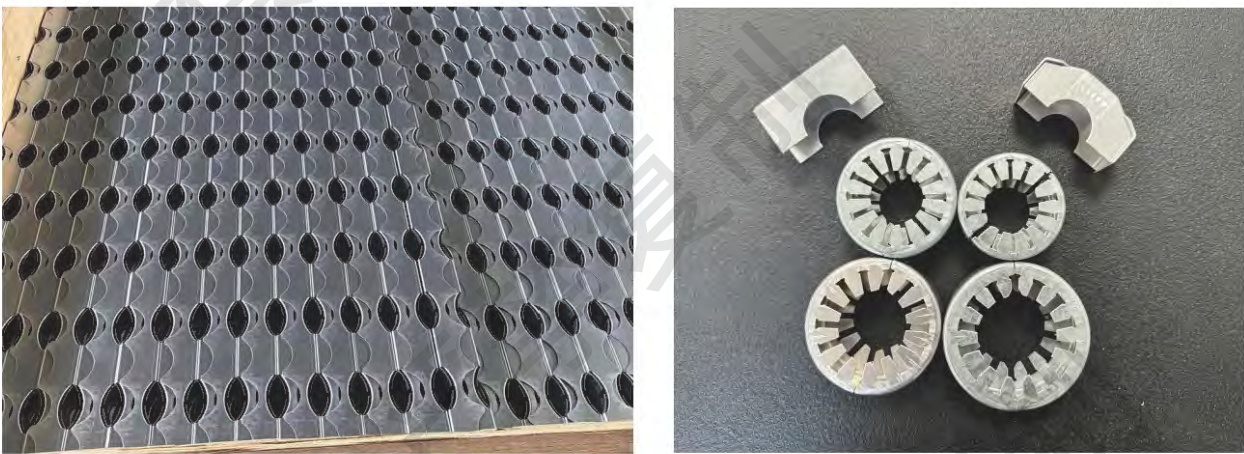
>>> 管板/折流板 Tube Sheet/Baffle Plate



A tube sheet is a critical component used in heat exchangers, primarily designed to fix and support the heat exchange tubes. The tube sheet can be circular or rectangular in shape, with CNC drilled holes for inserting the heat exchange tubes. Through welding or expansion methods, the tubes are securely fixed to the tube sheet

技术要求Specification		参数Parameter
管孔直径Tube Hole Diameter	mm	10 - 150
孔间距Hole Pitch	mm	20 - 250
边缘距离Edge Distance	mm	15 - 100
管板厚度Tube Sheet Thickness	mm	5 - 100
孔数Number of Holes	-	1 - 1000
管板直径Tube Sheet Diameter	mm	100 - 3000
管板形状Tube Sheet Shape	-	Circular, Rectangular, Elliptical
排列方式Arrangement Pattern	-	Square, Triangular
孔公差Hole Tolerance	mm	$\pm 0.1 - \pm 0.5$
材料Material	-	Forged Carbon Steel, Alloy Steel, Stainless, Copper Alloy, Clad Plate

>>> 翅片管管箍 Finned Tube Clamp



Finned tube collars, also known as fin tube clamps, are essential components used in heat exchanger systems to secure finned tubes and enhance their performance.

>>> 出口包装 Export Packing

