



OTHERS
其它系列
E31

全球信赖品质
World Trusted Quality



CRAA产品认证
Certified by CRAA
ISO9001质量管理体系认证
Certified by ISO9001 quality system
ISO14001环境管理体系认证
Certified by ISO14001 environment system
首批荣获国家质检总局颁发全国工业产品生产许可证
First got the refrigeration equipment
production permit issued by National Quality Testing Bureau

COOLING TOWER SERIES PRODUCTS

冷却塔系列产品



www.yatai.cc

以前我们认识世界，现在世界认识我们
We explored the world before, the world exploring us now.

以人为本 / 品质 / 创新 / 服务

Dezhou Yatai Group Co.,Ltd

Dezhou Yajia Refrigeration Air Conditioning Project Co.,Ltd

Dezhou YATAI Group CHINA

Dezhou YATAI Group CHINA
Dezhou YATAI Group CHINA



Dezhou YATAI Group CHINA

Dezhou YATAI Group CHINA

Dezhou YATAI Group China
Dezhou YATAI Group CHINA

中国德州亚太集团

DEZHOU YATAI GROUP

CHINA

Dezhou YATAI Group CHINA
Dezhou YATAI Group CHINA

I Group CHINA
YATAI Group CHINA

亚太的品牌理念

全力推动创新科技的应用

致力于人类生活品质的提升、让科技引领生活

创世界满意品牌

THE CONCEPT OF YATAI BRAND

Promotes,with full strength,the application of innovative technology.Strives for the extension of living quality for human being,let the science and technology lead the new life and creates world satisfactory brand.

全球信赖品质

World Trusted Quality



德州亚太集团是国内大型中央空调制冷系统集成供应商。

集多年潜心研究，博采众长自成体系，打造出一流的中央空调全套设备和众多精品工程。国内以中央电视台新址、酒泉卫星发射中心、国家质检总局、三峡工程及近二十个北京奥运场馆等为代表，国外以巴基斯坦乌奇电厂、柬埔寨金边市大都会广场、印度帕帕多拉工程等为代表的重点项目，采用了亚太中央空调设备，长期稳定，节能环保，获得了广泛的赞誉。

ISO9001、14001、3C、UL、CE、CRAA 等一系列认证；主机列入节能产品政府采购清单、数十项国家专利、国家级高新技术企业、中国驰名商标，充分标明了亚太集团的管理水平和产品水平。

与荷兰阿波罗合资，以欧洲标准制造的洁净设备全部返销发达国家、中央空调设备相继进入十几个国家和地区，展示亚太集团已经步出国门，与国际接轨。

植根齐鲁大地，秉持“以人为本”的经营理念，崇尚“以德待人”的儒家文化，亚太集团愿与您共同开创明天的辉煌。

Dezhou Yatai Group is a supplier of large central air conditioning and refrigeration system in China.

Yatai has developed whole set of advanced central air conditioner and lots of wonderful projects based on long-term research and features of the others. Many famous projects adopted Yatai central air conditioners that run smoothly, save energy, protect environment and won good reputation widely like the New CCTV, the Jiuquan Satellite Launching Center, the General Bureau of National Quality Inspection, Three-gorge Engineering Project, over 20 Beijing Olympic Stadiums and others in China; the UCH Power Plant in Pakistan, the Phnom Penh Capital Squire in Cambodia, the Priyadarshini Jurala Project in India and others across the world.

Yatai has certified by ISO9001, 14001, 3C, UL, CE, CRAA and others; its chiller names have been put on the government purchasing list as energy saving products and obtained dozens of national patents, National High-technology Enterprise and Chinese Famous Trademark, which show the managements and product qualities of Yatai Group.

The filtering equipment made by the joint venture, co-invested with Dutch Afpro Company, according to the European Standards air exported fully to the developed countries; the central air conditioners have exported to over 10 countries or regions, which show that Yatai Group has stepped into oversea market and been in the line with the international.

Located at Shandong Province, insisting on business idea of "humanism" and advocating the Confucianism of "getting along with people by morality" Yatai Group wishes to create a brilliant future with you.



中国德州亚太集团
CHINA DEZHOU YATAI GROUP



以一流技术研制全方位产品

Developing the omni-directional products by the first-class technology

使用精品 造就精品

世界著名制造商生产的最现代化装备和领先同行业的高科技含量是亚太始终保持竞争优势的强力保证

Using high-quality goods Making high-quality goods

The most modernized equipment produced by world famous manufacturers and the high-tech content leading in the field are always strong guarantees of Yatai's advantages.

全球信赖品质

World Trusted Quality



CRAA产品认证
Certified by CRAA
ISO9001质量管理体系认证
Certified by ISO9001 quality system
ISO14001环境管理体系认证
Certified by ISO14001 environment system
首批荣获国家质检总局颁发全国工业产品生产许可证
First got the refrigeration equipment
production permit issued by National Quality Testing Bureau

Honorable Qualification



OTHERS
其它系列

COOLING TOWER SERIES
PRODUCTS
冷却塔系列产品

目录	CATALOG	
	CTI冷却塔 CTI cooling tower	01
	YT-H 系列方形横流冷却塔 YT-H series square cross-flow cooling towers	02
	YTB-H系列横流闭式冷却塔 YTB-H series cross flow closed cooling towers	06
	超低温冷却塔 Ultra-low temperature cooling towers	10
	玻璃钢冷却塔 Glass reinforced plastic cooling tower	11
	闭式冷却塔 Closed cooling tower	34
	消（除）雾式冷却塔 Plume abatement cooling tower	49
	蒸发式冷凝器 Evaporative condenser	51
	产品展示 Product display	67





冷却塔系列产品
Cooling tower series products

CTI 冷却塔

CTI cooling tower

品质/专业/服务

服务感动客户品质赢得市场

Quality/Professionalism/Service
Service touches customers, quality wins market



YT-H 系列方形横流冷却塔

YT-H series square cross-flow cooling towers



高效轴流风扇

大风量、大叶宽、大风速、静音运行
耐腐蚀、优越的稳定性、使用寿命长

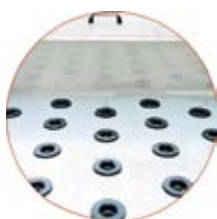
Efficient axial flow fan
High air volume, large blade width, high wind speed,
silent operation
Corrosion resistance, superior stability, long service life



电机、传动

全封闭冷却塔专用电机
防护等级: IP55, 绝缘等级: F
可选: 防震报警装置/外资品牌电机

Motor and transmission
Fully enclosed cooling tower dedicated motor
Protection level: IP55, Insulation level: F
Optional: Anti vibration alarm device/foreign brand motor



布水系统

低压头重力式布水, 大口径无活动件
可适应变流量运行, 配套高效机房应用
热水盆盖板(选配), 便于布水系统维
护, 抵挡外部污染

Water distribution system
Low pressure gravity water distribution, large diameter
without moving parts, capable of adapting to variable
volume operation and supporting efficient machine room
and adopting hot water basin cover plate (optional), easy
to maintain the water distribution system and resist external
pollution



高效热交换填料

收水器、进风百叶、散热填料三合一,
优质PVC原生料, 达到B1级阻燃材料, 高
效的导流纹路, 悬挂式安装

High-efficiency heat exchange packing
The water collector, air intake louver and heat dissipation packing
are integrated into one unit. Made of high-quality PVC raw material
which reaches B1 grade of flame resistance, highly effective
drainage texture, suspended installation



框架结构、面板材质

高于行业标准镁铝锌钢板, 超强防腐性
能可媲美不锈钢, 加工折弯切割口有自我
愈合修复特性, 可根据客户需求选用不锈
钢材质, 扶梯护笼和塔顶护栏(选配)

Frame structure, panel material
The quality of magnesium-aluminum-zinc coated steel plate
exceeds the industry standard. Its super anti-corrosion
performance can rival that of stainless steel, and its processed
bending and cutting edges have self-healing feature. Stainless
steel materials can be selected according to customer's
requirements. Escalator cages and tower top guardrails (optional)

YT-H系列A款方形横流冷却塔参数

YT-H series A square cross flow cooling tower parameters

型号 model	循环水量 m³/h circulating water volume	外形尺寸 mm physical siz			塔体扬程 m lift of the cooling tower body	风机功率 kW power of fan	配管接口 DN pipe interface				重量 kg weight	
		长 L	宽 W	高 H			进水 water inlet	出水 water outlet	自补 self replenishment 手补 manual replenishment	排污 drainage 溢流 overflow	净重 net weight	运行重 operation weight
YT-H600A	100	1780	3620	3720	3	3	100*2	125	25	50	1080	2500
YT-H800A	125	2120	3620	3720	3	4	125*2	150	25	50	1220	2920
YT-H900A	150	2120	3960	4340	3.5	4	125*2	150	25	50	1420	3290
YT-H1100A	175	2520	3960	4340	3.5	5.5	125*2	200	25	50	1610	3850
YT-H1200A	200	2520	4360	4340	3.5	5.5	150*2	200	25	50	1860	4320
YT-H1300A	225	2720	4360	4340	3.5	5.5	150*2	200	25	50	2090	4770
YT-H1500A	250	2880	4560	4340	3.5	7.5	150*2	200	25	50	2460	5420
YT-H1800A	300	2880	5180	4340	3.5	7.5	150*2	200	40	80	2760	6150
YT-H2100A	350	3320	5780	4730	4	11	200*2	250	40	80	3480	8080
YT-H2300A	400	3320	5780	4730	4	15	200*2	250	40	80	3490	8090
YT-H2600A	450	3620	5780	4730	4	15	200*2	250	40	80	4300	9500
YT-H2900A	500	3900	6180	5140	4.5	15	150*4	300	50	80	4720	10720
YT-H3200A	550	3900	6360	5140	4.5	18.5	150*4	300	50	80	5300	11500
YT-H3500A	600	4380	6360	5550	4.8	18.5	150*4	300	50	80	5960	12860
YT-H4100A	700	4660	6680	5550	4.8	22	200*4	350	50	80	6380	14180
YT-H4600A	800	5080	6680	5550	4.8	30	200*4	350	50	80	7520	16040

YT-H系列B款方形横流冷却塔参数

YT-H Series B Square Cross Flow Cooling Tower Parameters

亚太型号 Yatai mode	流量 volume	外形尺寸 mm physical size			风机电机 kW fan motor
		长 L	宽 W	高 H	
YT-H600	100	1940	3540	3922	3KW-12P
YT-H800	125	1940	3540	3922	4KW-12P
YT-H900	150	2400	3780	4334	5.5KW-4P
YT-H1100	175	2400	3780	4334	7.5KW-4P
YT-H1200	200	3100	4090	4334	5.5KW-4P
YT-H1300	225	3100	4090	4334	7.5KW-4P
YT-H1500	250	3100	4300	5158	7.5KW-4P
YT-H1800	300	3100	4300	5158	11KW-4P
YT-H2100	350	3100	4300	5158	15KW-4P

说明: 1、标准设计工况为: 环境湿球温度28℃, 大气压力99.4kpa, 进水温度37℃, 出水温度32℃, 湿球温度28℃;

2、以上技术参数仅作参考使用, 以具体项目方案为准。详情可咨询销售代表。

remark: 1. The designed standard conditions are as follows: ambient wet-bulb temperature 28℃, atmospheric pressure 99.4kpa, inlet water temperature 37℃, outlet water temperature 32℃, and wet-bulb temperature 28℃.
2. The above technical parameters are for reference only. The specific project plan shall prevail.
For details, you can consult the sales representative.



YT-N 系列方形逆流冷却塔

YT-N series square countercurrent cooling tower



高效轴流风扇

大风量、大叶宽、大风速、静音运行
耐腐蚀、优越的稳定性、使用寿命长

Efficient axial flow fan
High air volume, large blade width, high wind speed, silent operation
Corrosion resistance, superior stability, long service life



电机、传动

全封闭冷却塔专用电机
防护等级：IP55，绝缘等级：F
可选：防震动报警装置/外资品牌电机

Motor and transmission
Fully enclosed cooling tower dedicated motor
Protection level: IP55, Insulation level: F
Optional: Anti vibration alarm device/foreign brand motor



框架结构、面板材质

高于行业标准镀镁铝锌钢板
超强防腐性能可媲美不锈钢
加工折弯切割口有自我愈合修复特性
可根据客户需求选用不锈钢材质
扶梯护笼和塔顶护栏(选配)

Frame structure, panel material
The quality of magnesium-aluminum-zinc coated steel plate exceeds the industry standard. Its super anti-corrosion performance can rival that of stainless steel, and its processed bending and cutting edges have self-healing features. Stainless steel materials can be selected according to customer's requirements. Escalator cages and tower top guardrails (optional)



进风百叶

镀镁铝锌板原料，耐磨损，抗腐蚀
防止溅水，阻隔水落差噪音
可选配：高效进风格栅
蜂窝式设计保证进风效果
抗紫外线防止藻类细菌繁殖

Inlet louver
The magnesium-aluminum-zinc coated plate is wear-resistant and corrosion-resistant
Prevent water splashing and block the noise of water drop
Optional: High-efficiency air intake grille
The honeycomb design ensures the air intake effect
Resist ultraviolet rays and prevent the reproduction of algae and bacteria



减速器

设计上下端均装有防水油封，
可避免水汽侵蚀轴承
严格的平衡校核，运行平整

Reducer
There are waterproof oil seals at both the upper and lower ends. It can prevent water vapor from eroding the bearing. Strict balance verification ensures smooth operation.

YT-N系列方形逆流冷却塔参数

YT-N series square counter current cooling tower parameters

型号 model	循环水量 m³/h circulating water volume	外形尺寸 mm physical size			塔体扬程 m lift of the cooling tower body	风机功率 kW power of fan	配管接口 DN pipe interface			重量 kg weight	
		长 L	宽 W	高 H			进水 water inlet	自补 self replenishment	排污 drainage	净重 net weight	运行重 operation weight
							出水 water outlet	手补 manual replenishment	溢流 overflow		
YT-N600	100	2460	2460	3850	4	2.2	150	25	50	1350	2320
YT-N800	125	2460	2460	4010	4.2	2.2	150	25	50	1450	2490
YT-N900	150	2760	2760	4490	4.5	5.5	200	25	50	1520	2630
YT-N1100	175	2760	2760	4490	4.5	5.5	200	25	50	1580	2710
YT-N1300	200	3370	3370	4695	4.8	7.5	200	25	80	1900	3830
YT-N1500	250	3370	3370	4695	4.8	7.5	200	40	80	1930	3890
YT-N1800	300	3980	3980	4500	4.5	11	250	40	80	3050	6590
YT-N2100	350	3980	3980	4955	4.8	11	250	40	80	3250	6790
YT-N2300	400	4860	4860	4810	4.8	15	250	50	80	3640	8040
YT-N2600	450	5300	5300	4810	4.8	15	250	50	80	4050	9000
YT-N2900	500	5300	5300	4810	4.8	18.5	300	50	80	4450	9950
YT-N3500	600	6060	6060	4810	4.8	18.5	300	50	80	4920	11520
YT-N4100	700	6060	6060	4810	4.8	22	300	50	80	6100	13800
YT-N4600	800	6600	6600	4810	4.8	30	300	50	80	6550	15350

说明: 1、标准设计工况为：环境湿球温度28℃，大气压力99.4kpa，进水温度37℃，出水温度32℃，湿球温度28℃;

2、以上技术参数仅作参考使用，以具体项目方案为准。详情可咨询销售代表。

remark:1.The designed standard conditions are as follows: ambient wet-bulb temperature 28℃, atmospheric pressure 99.4kpa, inlet water temperature 37℃, outlet water temperature 32℃, and wet-bulb temperature 28℃.

2.The above technical parameters are for reference only. The specific project plan shall prevail. For details, you can consult the sales representative.



YTB-H系列横流闭式冷却塔

YTB-H series cross flow closed cooling tower



换热盘管

紫铜管或优质不锈钢制成
内部通冷却介质，
外部喷淋水冷却

Heat exchange coil
Made of copper tube or high-quality stainless steel
Internal cooling medium,
External spray water cooling



喷淋泵

功率小、低扬程、大流量
低噪音、无泄漏、寿命长

sprinkler pump
Low power, low head and high flow rate
Low noise, no leakage and long service life

YTB-H系列横流闭式冷却塔参数

YTB-H series cross-flow closed cooling tower parameters

型号 model	循环水量 m³/h circulating water volume	外形尺寸 mm physical size			水泵功率 kW power of the water pump	风机功率 kW power of fan	接管管径 DN diameter of the connecting pipe			重量 kg weight	
		长 L	宽 W	高 H			进水 water inlet	自补 self replenishment	排污 drainage	净重 net weight	运行重 operation weight
							出水 water outlet	手补 manual replenishment	溢流 overflow		
YTB-H600	100	4260	2280	4450	1.5*2	5.5	100*2	25	50	4200	6960
YTB-H800	125	4460	2480	4590	2.2*2	7.5	100*2	25	50	5000	8300
YTB-H900	150	4780	2480	4930	2.2*2	11	125*2	25	50	5400	9210
YTB-H1100	175	5480	2680	4790	2.2*2	11	125*2	25	50	7000	11490
YTB-H1200	200	5900	3000	4990	2.2*2	15	125*2	25	50	8000	13100
YTB-H1500	250	6100	3200	5390	3.7*2	18.5	150*2	25	50	9500	15500
YTB-H1800	300	6580	3480	5390	3.7*2	18.5	150*2	40	80	10800	18500
YTB-H2100	350	6780	3660	5750	5.5*2	22	150*2	40	80	11000	18800
YTB-H2300	400	7060	3980	5750	5.5*2	30	200*2	40	80	12000	21400
YTB-H2600	450	7080	4300	5950	7.5*2	30	200*2	40	80	13500	24000
YTB-H2900	500	8020	4460	5950	7.5*2	37	200*2	50	80	1900	31800
YTB-H3200	550	8020	4680	5950	7.5*2	37	200*2	50	80	198000	33800
YTB-H3500	600	8560	4980	6230	11*2	45	200*2	50	80	20400	34800
YTB-H4100	700	8560	5100	6670	11*2	55	250*2	50	80	21000	37000
YTB-H4600	800	9080	5260	6670	15*2	55	250*2	50	80	24000	42200

说明: 1、标准设计工况为：环境湿球温度28℃，大气压力99.4kpa，进水温度37℃，出水温度32℃，湿球温度28℃；
2、以上技术参数仅作参考使用，以具体项目方案为准。详情可咨询销售代表。

remark:1.The designed standard conditions are as follows: ambient wet-bulb temperature 28℃, atmospheric pressure 99.4kpa, inlet water temperature 37℃, outlet water temperature 32℃, and wet-bulb temperature 28℃.
2.The above technical parameters are for reference only. The specific project plan shall prevail.For details, you can consult the sales representative.



YTB-N系列逆流闭式冷却塔

YTB-N series countercurrent closed cooling tower



电机、传动

全封闭冷却塔专用电机
防护等级：IP55，绝缘等级：F
可选：防震动报警装置/外资品牌电机

Motor and transmission
Fully enclosed cooling tower dedicated motor
Protection level: IP55, Insulation level: F
Optional: Anti vibration alarm device/foreign brand motor



框架结构、面板材质

高于行业标准镀镁铝锌钢板
超强防腐性能可媲美不锈钢
加工折弯切割口有自我愈合修复特性
可根据客户需求选用不锈钢材质
扶梯护笼和塔顶护栏 (选配)

Frame structure, panel material
The quality of magnesium-aluminum-zinc coated steel plate exceeds the industry standard. Its super anti-corrosion performance can rival that of stainless steel, and its processed bending and cutting edges have self-healing features. Stainless steel materials can be selected according to customer's requirements. Escalator cages and tower top guardrails (optional)



YTB-N系列逆流闭式冷却塔参数

YTB-N series counter current closed cooling tower parameters

型号 mode			外形尺寸 physical size			电机 motor		进出水口径 DN inlet and outlet diameters	补水口径 DN water replenishment diameter	溢水排污口径 DN overflow and drainage diameter	重量kg weight	
产品型号 (带填料) product model(with packing)	产品型号 (光盘管) product model(only coil)	流量 volume	长 L	宽 W	高 H	风机电机功率 kW fan motor power	喷淋泵功率 kW sprinkler pump power				自重 self-weight	运行重 operation weight
YTB-NA180	YTB-NB180	30	2000	1000	3050	0.75*2	0.75*1	50*1	20	40	720	1560
YTB-NA230	YTB-NB230	40	2400	1000	3200	1.1*2	0.75*1	80*1	20	40	820	1840
YTB-NA290	YTB-NB290	50	2500	1200	3200	1.1*2	0.75*1	80*1	20	40	1080	2420
YTB-NA410	YTB-NB410	70	1880	1880	4400	2.2*1	1.5*1	80*1	20	40	1240	2790
YTB-NA460	YTB-NB460	80	2100	2100	4400	4*1	1.5*1	100*1	20	40	1460	3520
YTB-NA600	YTB-NB600	100	2520	2520	4250	5.5*1	2.2*1	100*1	20	40	2080	4480
YTB-NA800	YTB-NB800	125	2800	2800	4530	7.5*1	2.2*1	125*1	25	50	2420	5460
YTB-NA900	YTB-NB900	150	3200	3000	4530	7.5*1	3.7*1	150*1	25	50	2940	6740
YTB-NA1100	YTB-NB1100	175	3600	3000	4530	11*1	3.7*1	100*2	25	50	3100	7840
YTB-NA1200	YTB-NB1200	200	4300	3000	4530	7.5*2	5.5*1	125*2	25	50	3460	8900
YTB-NA1500	YTB-NB1500	250	5000	3000	4530	7.5*2	5.5*1	125*2	25	50	3880	9930
YTB-NA1500	YTB-NB1500	250	3800	3800	4830	15*1	5.5*1	125*2	25	50	3880	9930
YTB-NA1800	YTB-NB1800	300	6000	3000	4530	7.5*2	7.5*1	150*2	25	50	5970	13550
YTB-NA1800	YTB-NB1800	300	4200	4200	4830	15*1	7.5*1	150*2	25	50	5970	13550
YTB-NA2100	YTB-NB2100	350	7200	3000	4530	7.5*2	5.5*2	150*2	40	80	7630	16900
YTB-NA2100	YTB-NB2100	350	4600	4600	5230	15*1	5.5*2	150*2	40	80	7630	16900
YTB-NA2300	YTB-NB2300	400	7600	3000	4830	11*2	5.5*2	150*2	40	80	8100	18600
YTB-NA2300	YTB-NB2300	400	5000	5000	5230	22*1	5.5*2	150*2	40	80	8100	18600
YTB-NA2600	YTB-NB2600	450	8000	3600	4890	15*2	7.5*2	150*2	40	80	9980	22400
YTB-NA2600	YTB-NB2600	450	5400	5400	5290	30*1	7.5*2	200*2	40	80	9980	22400
YTB-NA2900	YTB-NB2900	500	9200	3600	5190	15*2	22*1	200*2	40	80	11250	23850
YTB-NA2900	YTB-NB2900	500	6000	6000	5650	30*1	22*1	200*2	40	80	11250	23850
YTB-NA3200	YTB-NB3200	550	6500	6500	6190	45*1	22*1	150*3	50	80	12500	26500
YTB-NA3500	YTB-NB3500	600	6860	6860	6190	55*1	22*1	150*3	50	80	13750	29150
YTB-NA4100	YTB-NB4100	700	7280	7280	5760	55*1	11*2	150*4	/	/	15000	31800
YTB-NA4600	YTB-NB4600	800	7820	7820	5760	55*1	11*2	150*4	/	/	17500	37100
YTB-NA5200	YTB-NB5200	900	8200	8200	5820	75*1	15*2	200*4	/	/	20000	42400
YTB-NA5800	YTB-NB5800	1000	8600	8600	5820	75*1	22*2	200*4	/	/	22500	47700
YTB-NA6400	YTB-NB6400	1100	9200	9200	6320	90*1	22*2	200*4	/	/	25000	53000
YTB-NA7000	YTB-NB7000	1200	9800	9800	6190	90*1	30*2	200*4	/	/	27500	58300
YTB-NA7600	YTB-NB7600	1300	10400	10400	6190	110*1	30*2	200*4	/	/	30000	63600

说明：1、标准设计工况为：环境湿球温度28℃，大气压力99.4kpa，进水温度37℃，出水温度32℃，湿球温度28℃；

2、以上技术参数仅作参考使用，以具体项目方案为准。详情可咨询销售代表。

Explanation: 1. The standard design conditions are: ambient wet bulb temperature of 28 °C, atmospheric pressure of 99.4kpa, inlet water temperature of 37 °C, outlet water temperature of 32 °C, and wet bulb temperature of 28 °C;

2. The above technical parameters are for reference only and subject to specific project plans. For details, please consult the sales representative.

ULT 超低噪音冷却塔

Ultra-low temperature cooling towers

UQD 节静塔
闭式冷却塔
CTI认证
节能节水认证
国检认证
静音可达国家二类标准

UQD low noise tower
 Closed cooling tower
 CTI certification
 Energy and Water Conservation Certification
 National Inspection Certification
 Meet the national class II low noise standard



- 1、超静音风机比标准风机可降低噪声9-15dB(A)，并消除了人耳可听到的采用直叶片的轴流式风机的叶片通过频率。不仅降低了噪声水平，而且改善了噪声质量。
- 2、悬浮式动力系统设计，有效地抑制和降低冷却塔运行时所产生的震动对周边设施或建筑物造成声质量环境影响。
- 3、横流式冷却塔采用整片悬挂式填料，使其冷却水由上至下形成水膜后聚在冷却塔集水槽内，由于采用了整片处理使得中间无段落、悬空间隙，所以杜绝了其噪声的污染和传播。逆流式冷却塔集水盘安装滴水消声毯以降低水落差噪声。该材料具有良好的阻燃性和控噪效果。
- 4、采用了国内冷却塔行业最知名名牌电机和减速器，使用的轴承全部具有低噪声、润滑好、润滑持久、使用长久的质量保证。以进一步降低机械噪声。
- 5、消音进风百叶窗，产品结构为百叶内设空腔结构，外嵌微孔消音板，内置吸音装置，有效降低淋水声和低频噪声对声环境质量造成的影响。
- 6、出风口消声器产品为内置空腔吸音装置结构，外嵌微孔消音板，内置吸音装置。出风流畅、降噪能力强，有效抑制中低频噪声对声环境质量造成的影响。

- 1.Noise of ultra low noise fans is reduced by 9-15dB(A) compared to standard fans. The blade passing frequency of axial flow fans with straight blades that can be heard by the human ears is also eliminated. Not only has the noise level been reduced, but also the noise quality has been improved.
- 2.The suspended power system design effectively suppresses and reduces the impact of vibration generated during the operation of the cooling tower on the acoustic quality environment of surrounding facilities or buildings.
- 3.The cross-flow cooling tower adopts a monolithic suspended packing, which enables the cooling water to form a water film from top to bottom and then gather in the cooling tower's water collection trough. Due to the monolithic treatment, there are no sections or suspended gaps in the middle. Thus the noise pollution and spread can be completely eliminated. The counter-flow cooling tower is equipped with a drip water sound-absorbing blanket on the water collection tray to reduce the noise caused by water drop. This material has excellent flame retardancy and noise control effect.
- 4.Motors and reducers of the most well-known brand in the domestic cooling tower industry are adopted. All the bearings used have features of low noise, good and long-lasting lubrication, long service life, which further reduce mechanical noise.
- 5.The sound-absorbing air intake louver has a cavity inside it, micro-perforated sound-absorbing plates embedded outside, and an internal sound-absorbing device, effectively reducing the impact of water spray sound and low-frequency noise on the acoustic environment quality.
- 6.The air outlet muffler features an internal cavity sound absorption device, with an externally embedded micro-perforated sound-absorbing board and an internal sound absorption device. The air flow is smooth and the noise reduction ability is strong, effectively suppressing the impact of medium and low frequency noise on the quality of the acoustic environment.

FRP 玻璃钢冷却塔

FRP cooling tower

DBNL4系列圆形逆流式冷却塔

DBNL₄ series circular countercurrent cooling tower



优点:

- 1、外型美观线型合理、气流顺畅、耐腐蚀，壳体采用优质玻璃钢材料，表面为耐紫外线照射的胶衣层，厚度不低于0.5mm，耐候性强，经久不褪色；
- 2、骨架为加强型碳钢标准型材，焊接成型后热镀锌防腐处理，强度高、使用寿命长；
- 3、驱动电机采用冷却塔专用电机，密封性能优良、防水、耐温、高效，防护等级高，可常年在水汽环境下运行；
- 4、民用塔可采用噪音较低的皮带式减速机，进口轴承运行寿命长，噪音低；涤纶纤维增强氯丁橡胶连体传动带，耐温、防水不打滑，传动效率高；工业塔采用齿轮减速机，传动效率高，维保率低，减少维保强度；
- 5、采用铝合金轴流风机，机翼形叶片，重量轻、风量大，叶片可调，可根据现场工艺要求，调整叶片角度，满足设计需求；
- 6、填料为改性聚氯乙烯斜波纹式，水的再分配能力大、阻力小、热力性能好，耐高温70℃，低温50℃，氧指数大于35；
- 7、布水装置采用固定式，选用ABS散溅式喷头，喷洒均匀无中空现象，水压要求弹性比较大，压力偏差大的情况下，散水效果也能达到设备要求，优于旋转布水，并免于维护；布水装置上面设置斜波PVC收水层，阻断水雾漂滴现象，使飘水率低于0.01%以内；
- 8、设备可以按用户需求设置智能运行，根据水温变频控制，降低操作强度。

Features:

1. Beautiful appearance, reasonable line, smooth airflow, corrosion resistance. Its shell is made of high quality FRP material. The surface has UV light resistant gelcoat with thickness not less than 0.5mm. It has strong weather resistance ability, durable and fadeless;
2. The skeleton is the reinforced carbon steel standard profile. After welding forming and hot dipped galvanized anti-corrosion treatment, it has high strength and long service life;
3. The driving motor adopts the special motor for cooling tower, which has excellent sealing performance, waterproof ability, temperature resistance, high efficiency and high protection level. It can operate in the water vapor environment all year round;
4. Civil tower can use low-noise belt reducer and imported bearings that have long service life, and low noise. Polyester fiber reinforced neoprene connected transmission belt is temperature resistant, water proof, non-skid, and highly transmission efficient. Industrial tower uses gear reducer which has high transmission efficiency, low maintenance rate and less maintenance intensity.
5. Its aluminum alloy axial fan has adjustable wing-shaped blades, light weight and large air flow. Blade angle can be adjusted according to the on-site process requirements to meet the design requirement;
6. The filling is advanced corrugated PVC. Its advantages include large water redistribution capacity, small resistance, good thermal performance, high temperature resistance ---70℃, low temperature resistance-50℃. Its oxygen index is above 35.

7. Water distribution device adopts a fixed type, and the ABS splashing nozzle is selected to spray water evenly without hollow phenomenon. Under the condition of relatively large elasticity of water pressure and large pressure deviation, the water dispersal effect can also meet the requirement of the equipment, which is better than rotating water distribution and free from maintenance. The oblique wave PVC water collecting layer is arranged above the water distribution device to block water mist drip-drop phenomenon, so that the floating water rate is less than 0.01%;

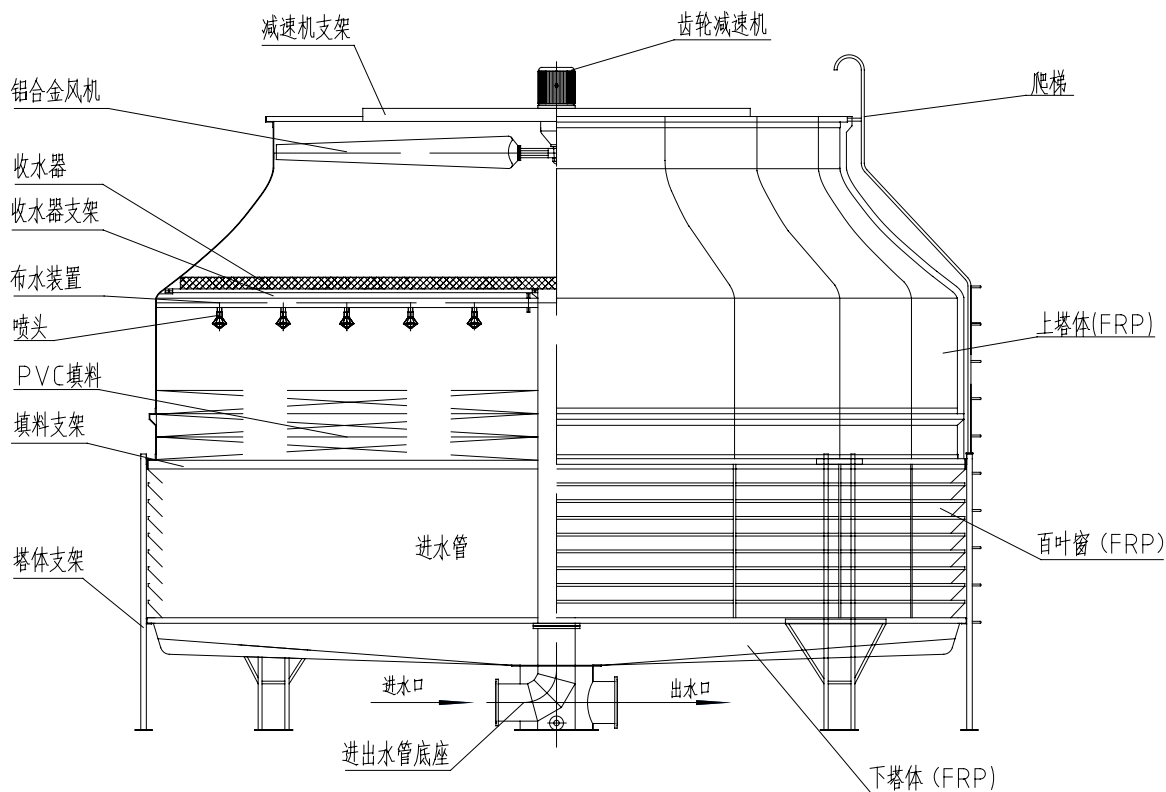
8. According to user's demand the equipment can be set to operate intelligently. Water temperature based frequency conversion control reduces the operation intensity.

选用及使用注意事项:

- 1、选用时须知水量Q, 进水温度t1, 出水温度t2, 设计湿球温度 τ , 根据流量选型表确定型号;
- 2、循环水浑浊度不大于50mg/升, 短期不大于100mg/升, 不宜含有油污和机械杂质; 必要时采取灭藻及水质稳定措施;
- 3、对于最冷月平均低于 -10°C 的地区, 订货时应提出防结冰要求;
- 4、进水温度大于 60°C 时, 订货时需说明;
- 5、安装位置应避免在多灰尘、酸性气体的场所, 应放置在通风良好的洁净场所;
- 6、应避免有热源辐射的场所安装使用;
- 7、多塔使用时应预留足够的进风空间, 否则影响散热效果。

Matters needing attention in selection and use:

1. Instructions for selection: water volume Q, inlet temperature T1, outlet temperature T2, designed wet-bulb temperature τ . Determine the model according to the flow type selection table;
2. Turbidity of circulating water should be not higher than 50mg/ L and not higher than 100mg/ L in a short term. The circulating water should not contain greasy dirt and mechanical impurities; Take measures to control algae and stabilize water quality when necessary;
3. For some area where the average temperature in the coldest month is lower than -10°C , anti-icing requirements should be put forward when ordering;
4. When the inlet water temperature is higher than 60°C , instructions are required when ordering;
5. The installation location should avoid places having dust or acidic gas. A well-ventilated clean place is preferred;
6. Should avoid the place with heat source radiation;
7. Enough air inlet space should be reserved for multi-tower use conditions. Otherwise, the cooling effect shall be affected.



减速机支架 Support for speed reducer

布水装置 Water distribution device

进水管 Water inlet tube

齿轮减速机 Gear reducer

下塔体 Lower tower body

铝合金风机 Aluminum alloy fan

喷头 Sprayer

进水口 Water inlet

爬梯 Ladder

收水器 Water collector

PVC填料 PVC filling

出水口 Water outlet

上塔体 Upper tower body

收水器支架 Support for water collector

塔体支架 Support for tower body

进水管底座 Base for water inlet and outlet tubes

百叶窗 Shutter



DBNL₄系列圆形逆流式冷却塔选型表

DBNL₄ series circular countercurrent cooling tower selection table

环境湿球温度 Ambient wet bulb temperature	$\tau = 28^{\circ}\text{C}$					$\tau = 27^{\circ}\text{C}$				
进出塔水温($^{\circ}\text{C}$) Water temperature in and out of the tower	37-32	40-32	43-33	55-35	60-35	37-32	43-33	43-33	55-35	60-35
温降 Δt Temperature drop delta t	5 $^{\circ}\text{C}$	8 $^{\circ}\text{C}$	10 $^{\circ}\text{C}$	20 $^{\circ}\text{C}$	25 $^{\circ}\text{C}$	5 $^{\circ}\text{C}$	8 $^{\circ}\text{C}$	10 $^{\circ}\text{C}$	20 $^{\circ}\text{C}$	25 $^{\circ}\text{C}$
型号 model	额定冷却水量(m^3/h) Rated cooling water volume									
DBNL ₄ -12	12	9	7	5	3	15	10	8	7	5
DBNL ₄ -20	20	15	12	10	8	24	17	15	13	10
DBNL ₄ -30	30	22	18	15	12	35	27	23	18	15
DBNL ₄ -40	40	30	23	20	17	46	34	31	25	23
DBNL ₄ -50	50	37	30	25	22	57	44	36	30	29
DBNL ₄ -60	60	44	40	35	31	68	51	47	40	36
DBNL ₄ -70	70	51	50	43	36	79	60	55	48	42
DBNL ₄ -80	80	61	60	51	42	92	70	64	56	48
DBNL ₄ -100	100	74	70	64	56	114	86	77	68	60
DBNL ₄ -125	125	92	80	73	65	142	108	88	78	68
DBNL ₄ -150	150	112	100	91	83	171	129	110	96	85
DBNL ₄ -175	175	134	125	114	100	200	150	137	120	106
DBNL ₄ -200	200	153	150	136	119	231	180	166	145	127
DBNL ₄ -250	250	186	175	157	139	283	215	192	168	148
DBNL ₄ -300	300	225	200	180	159	334	260	220	191	169
DBNL ₄ -350	350	267	250	225	193	385	304	275	239	212
DBNL ₄ -400	400	301	300	270	240	455	341	332	290	253
DBNL ₄ -450	450	343	350	316	276	514	387	386	336	296
DBNL ₄ -500	500	375	400	360	315	576	427	442	383	338
DBNL ₄ -600	600	454	450	406	358	680	516	495	431	381
DBNL ₄ -700	700	528	500	449	393	790	600	550	477	422
DBNL ₄ -800	800	590	600	545	480	890	685	660	576	501
DBNL ₄ -900	900	685	700	629	558	1035	790	775	673	591
DBNL ₄ -1000	1000	783	800	728	644	1139	880	880	772	680



DBNL₄低温型、GBNL₄中温型圆形逆流式冷却塔主参数表

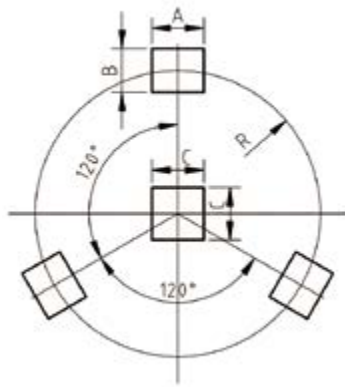
Table of main parameters of DBNL₄ low temperature and GBNL₄ medium temperature circular countercurrent cooling tower

型号 model	外形尺寸(mm) Overall dimensions		功率 power (KW)	风机直径 The fan diameter (mm)	风量 Air volume m ³ /h	重量 (T) weight		进水压力 Inlet pressure 104Pa	Dm 噪声 Dm noise dB(A)	进水管 Inlet pipe DN	出水管 Outlet pipe DN	补水管 Filling water pipe DN	溢流管 The overflow tube DN	排污管 Drainage pipe DN
	直径Φ diameter	高度H Height				自重 Dead weight	运行重 Operating weight							
DBNL ₄ -12	1210	2030	0.75	700	7200	120	450	1.96	55	65	80	15	25	25
DBNL ₄ -20	1460	2125	0.8	800	12400	185	510	2	55	65	80	15	25	25
DBNL ₄ -30	1920	2345	0.8	1200	18000	350	850	2.2	57	100	125	15	25	25
DBNL ₄ -40	1920	2595	1.1	1200	21500	410	1010	2.6	57	100	125	20	25	25
DBNL ₄ -50	2215	2830	1.5	1400	28000	510	1210	2.7	58	100	1250	20	25	25
DBNL ₄ -60	2215	3080	1.5	1400	32300	580	1310	2.95	58	100	125	20	32	25
GBNL ₄ -40														
DBNL ₄ -70	2630	3100	2.2	1600	39200	650	1450	2.9	59	150	200	20	40	40
GBNL ₄ -50														
DBNL ₄ -80	2630	3350	2.2	1600	43400	720	1650	3.15	59	150	200	20	40	40
GBNL ₄ -60														
DBNL ₄ -100	3135	3300	3	1800	56000	875	2150	3.1	59	150	200	20	40	40
GBNL ₄ -70														
DBNL ₄ -125	3135	3550	4	1800	67200	950	2450	3.35	59	150	200	20	40	40
GBNL ₄ -80														
DBNL ₄ -150	3740	3540	4	2400	84000	1250	2890	3.15	59.5	150	200	25	65	50
GBNL ₄ -100														
DBNL ₄ -175	3740	3790	5.5	2400	94300	1450	3120	3.4	59.5	150	200	25	65	50
GBNL ₄ -125														
DBNL ₄ -200	4345	3835	5.5	2800	112000	1850	3650	3.2	61	200	250	32	80	50
GBNL ₄ -150														
DBNL ₄ -250	4345	4085	7.5	2800	134300	2125	4250	3.5	61	200	250	32	80	50
GBNL ₄ -175														
DBNL ₄ -300	5130	4220	7.5	3400	168000	3230	5840	3.5	61.5	250	300	32	80	50
GBNL ₄ -200														
DBNL ₄ -350	5130	4470	11	3400	187400	3530	6340	3.75	61.5	250	300	32	80	50
GBNL ₄ -250														
DBNL ₄ -400	6045	4620	11	3800	224000	3840	7560	3.6	63	250	300	40	80	50
GBNL ₄ -300														
DBNL ₄ -450	6045	4870	11	3800	242000	4325	8150	3.85	63	250	300	40	80	50
GBNL ₄ -350														
DBNL ₄ -500	6750	5220	15	4200	280000	5120	12160	3.8	64	300	350	50	100	65
GBNL ₄ -400														
DBNL ₄ -600	6750	5720	18.5	4200	302200	5950	14650	4.3	64	300	350	50	100	65
GBNL ₄ -450														
DBNL ₄ -700	7765	5590	48.5	5000	393500	6430	16240	4.2	65	350	400	65	100	80
GBNL ₄ -500														
DBNL ₄ -800	7765	6090	22	5000	408000	7250	18360	4.7	65	350	400	65	100	80
GBNL ₄ -600														
DBNL ₄ -900	8840	6040	22	6000	505200	8340	23520	5.1	66	400	450	65	100	80
GBNL ₄ -700														
DBNL ₄ -1000	8840	6540	30	6000	510300	8930	28550	5.6	66	400	450	65	100	80
GBNL ₄ -800														

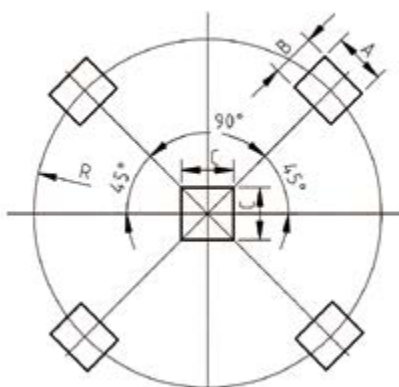


DBNL₄系列圆形逆流式冷却塔基础参数

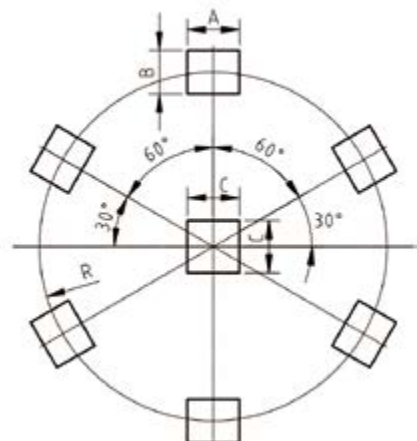
DBNL₄ series circular countercurrent cooling tower basic parameters



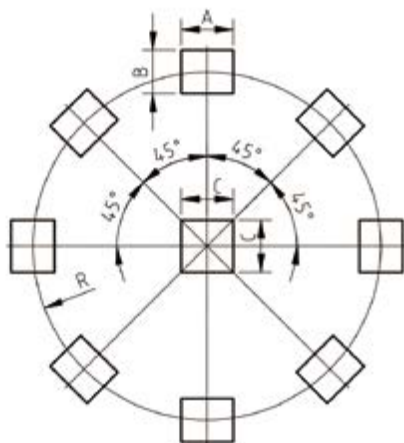
DBNL12-60 型冷却塔基础平面图
Base plan of DBNL12-60 cooling tower



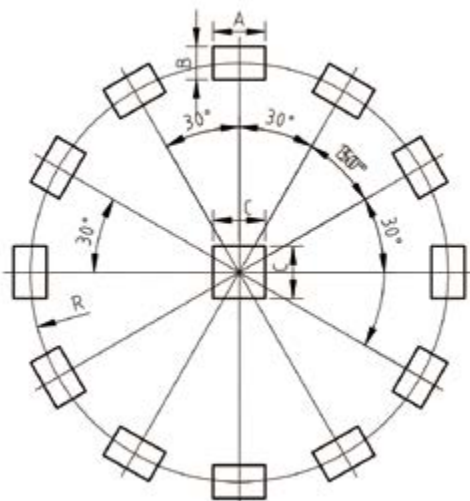
DBNL70-175 型冷却塔基础平面图
Base plan of DBNL70-175 cooling tower



DBNL200-250 型冷却塔基础平面图
Base plan of DBNL200-250 cooling tower



DBNL300-600 型冷却塔基础平面图
Base plan of DBNL300-600 cooling tower



DBNL700-1000 型冷却塔基础平面图
Base plan of DBNL700-1000 cooling tower

基础数据表:

Basic data table:

型号 model	数值mm No.	半径 radius	埋板尺寸 Buried plate size			运行重量 Operating weight
		R	A	B	C	kg
12		550	250	200	250	450
20		660	250	200	250	510
30		820	250	200	250	850
40		820	250	200	250	1010
50		985	250	200	250	1210
60		985	250	200	250	1310
70		1215	250	250	250	1450
80		1215	250	250	250	1650
100		1415	300	250	300	2150
125		1415	300	250	300	2450
150		1835	300	250	450	2890
175		1835	300	250	450	3120
200		2195	300	250	500	3650
250		2195	300	250	500	4250
300		2610	550	300	600	5840
350		2610	550	300	600	6340
400		3030	550	300	600	4560
450		3030	550	300	600	8150
500		3370	550	300	600	12160
600		3370	550	300	600	14650
700		3890	600	300	700	16240
800		3890	600	300	700	18360
900		4425	600	300	800	23520
1000		4425	600	300	800	28550

说明:

- 1、本图与数值表为DBNL系列圆形逆流式冷却塔基础平面及尺寸参数；用户可根据此数值设计砼基础。
- 2、此系列冷却塔基础高度不低于300mm，预埋钢板厚度不低于10mm；各预埋件的上平面在同一水平线上。

Note:

1. This numerical table provides foundation plane and dimensional parameters for DBNL series circular countercurrent cooling tower; Users can design concrete foundation according to this value.
2. The base height of this series of cooling tower is not less than 300mm. The thickness of the embedded steel plate is not less than 10mm; upper planes of all embedded parts are on the same horizontal line.

DFNL方形玻璃钢逆流式冷却塔

DFNL square FRP countercurrent cooling tower



优点:

- 1、塔体为正方形，可以根据现场条件，小单元无限组合，有效降低占地面积，节约用地成本；
- 2、塔外壳体采用优质玻璃钢材料，表面为耐紫外线照射的胶衣层，厚度不低于0.5mm，耐候性强，经久不褪色；
- 3、骨架为加强型碳钢标准型材，焊接成型后热镀锌防腐处理，强度高、使用寿命长；
- 4、驱动电机采用冷却塔专用电机，密封性能优良、防水、耐温、高效，防护等级高，可常年在水汽环境下运行；
- 5、民用塔可采用噪音较低的皮带式减速机，进口轴承运行寿命长，噪音低；涤纶纤维增强氯丁橡胶连体传动带，耐温、防水不打滑，传动效率高；工业塔采用齿轮减速机，传动效率高，维保率低，减少维保强度；
- 6、采用铝合金轴流风机，机翼形叶片，重量轻、风量大，叶片可调，可根据现场工艺要求，调整叶片角度，满足设计需求；
- 7、填料为改性聚氯乙烯S波或斜梯形波，横向增加了凸筋，水的再分配能力大、阻力小、热力性能好，粘接成块，填充在塔内，无中通直缝，排列均匀，散热面积高；每平米承载3kN以上；耐高温70℃，低温50℃，氧指数大于35；
- 8、布水装置采用固定式，选用ABS散溅式喷头，喷洒均匀无中空现象，水压要求弹性比较大，压力偏差大的情况下，散水效果也能达到设备要求；
- 9、布水装置上面设置多波PVC收水层，阻断水雾漂滴现象，使飘水率低于0.01%以内；
- 10、设备可以按用户需求设置智能运行，根据水温变频控制，降低操作强度。

Features:

1. Square tower body can be combined infinitely by small units based on different site conditions. Thus, it can effectively reduce the occupation area and save land cost;
2. The outer shell of the tower is made of high quality glass fiber reinforced plastic (FRP). The surface is UV resistant gelcoat whose thickness is not less than 0.5mm. Weather resistance is strong. Its color is not fading;
3. The skeleton is made of reinforced carbon steel standard profile, which is treated with hot-dip galvanized anti-corrosion after welding and forming. It has high strength and long service life;
4. The driving motor adopts the special motor for cooling tower, which has excellent sealing performance, waterproof, temperature resistance, high efficiency and high protection level. It can operate in the water vapor environment all year round;
5. Civil tower can use low noise belt type speed reducer and long-life imported bearings; Polyester fiber reinforced neoprene connected transmission belt has features of temperature resistance, waterproof ability, non-skid property and high transmission efficiency; Industrial towers adopts the gear reducer which has high transmission efficiency, low maintenance rate, and less maintenance intensity;
6. Aluminum alloy axial fan, adjustable wing-shaped blades, light weight and large air flow. Blade angle can be adjusted according to the on-site process requirements to meet the design demand;
7. The packing is advanced S-shaped or oblique trapezoid shaped polyvinyl chloride. Convex bars are added horizontally. Its water redistribution ability is strong, resistance small, and thermal performance good. The packing bonds into blocks to fill the tower without straightly through seam. It has uniform arrangement and high heat dissipation area; Each square meter carries more than 3kN; It stands 70℃ high temperature and 50℃ low temperature. Oxygen index is more than 35;
8. The water distribution device adopts a fixed type. The ABS splashing nozzle sprays evenly without hollow phenomenon. Under the condition of relatively large elasticity of water pressure and large pressure deviation, the water dispersal effect can also meet the requirement of the equipment.
9. The multi-wave PVC water collecting layer is set above the water distribution device to block the water mist drift and drop phenomenon, so that the floating water rate is less than 0.01%.
10. According to user's demand the equipment can be set to operate intelligently. Water temperature based frequency conversion control reduces the operation intensity.

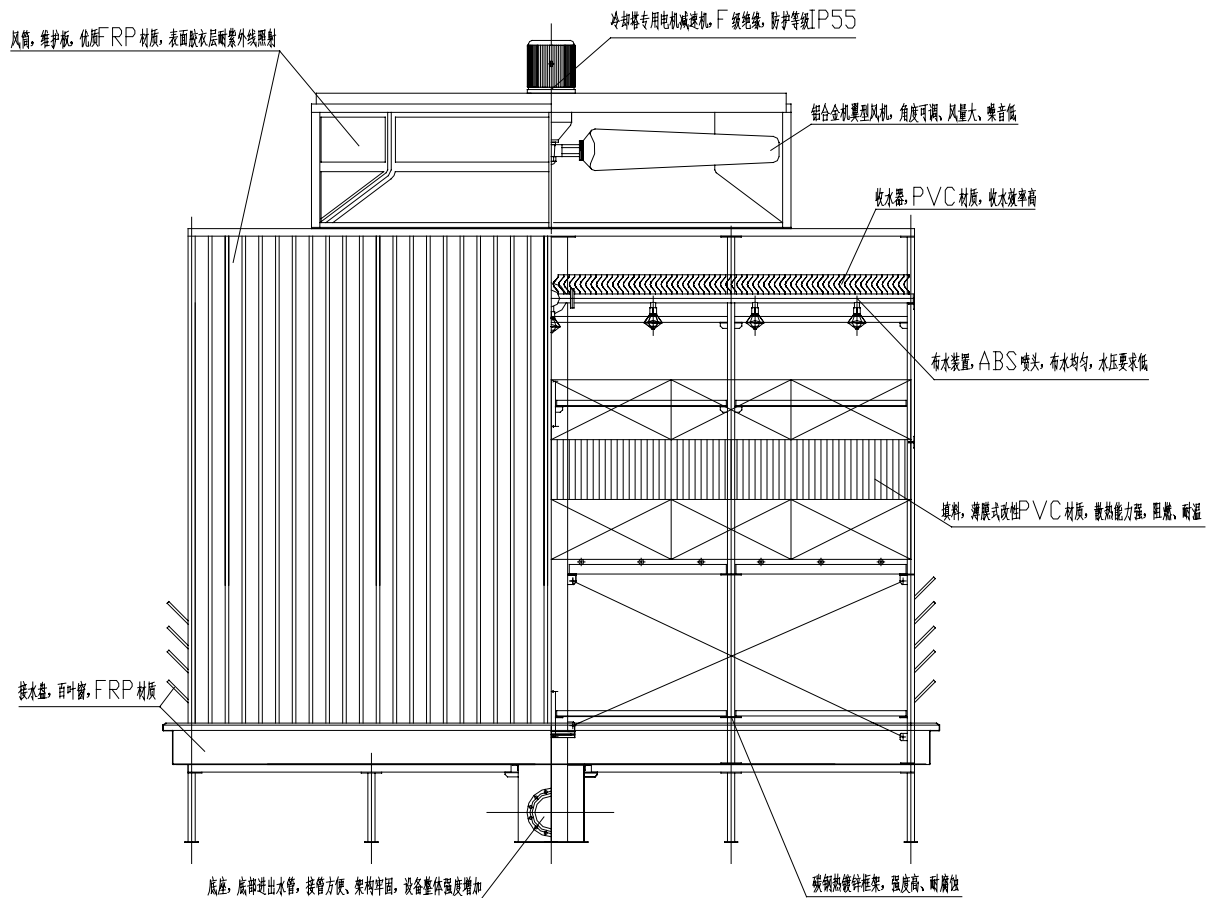
选用及使用注意事项:

- 1、选用时须知水量Q，进水温度t1，出水温度t2，设计湿球温度 τ ，根据流量性能选用表确定型号；
- 2、循环水浑浊度不大于50mg/升，短期不大于100mg/升，不宜含有油污和机械杂质；必要时采取灭藻及水质稳定措施；

- 3、对于最冷月平均低于 -10°C 的地区，订货时应提出防结冰要求；
- 4、进水温度大于 60°C 时，订货时需说明；
- 5、安装位置应避免在多灰尘、酸性气体的场所，应放置在通风良好的洁净场所；
- 6、应避免有热源辐射的场所安装使用；
- 7、多塔使用时应预留足够的进风空间，否则影响散热效果。

Matters needing attention in selection and use:

1. Instructions for selection: water volume Q , inlet temperature t_1 , outlet temperature t_2 , designed wet-bulb temperature τ . Determine the model according to the flow performance selection table;
2. Turbidity of circulating water should be not higher than 50mg/L and not higher than 100mg/L in a short term. The circulating water should not contain greasy dirt and mechanical impurities; Take measures to control algae and stabilize water quality when necessary;
3. For some area where the average temperature in the coldest month is lower than -10°C , anti-icing requirements should be put forward when ordering;
4. When the inlet water temperature is higher than 60°C , instructions are required when ordering;
5. The installation location should avoid places having dust or acidic gas. A well-ventilated clean place is preferred;
6. Avoid the place with heat source radiation;
7. Enough air inlet space should be reserved for multi-tower use conditions. Otherwise, the cooling effect shall be affected.



风筒, 维护板, 优质FRP材质, 表面胶衣层耐紫外线照射

Stacks, maintenance plate, good quality FRP material, UV light resistant gelcoat on the surface

冷却塔专用电机减速机 F级绝缘, 防护等级 IP55

Special motor reducer, F class insulation, protection grade IP55

铝合金翼型风机, 角度可调, 风量, 噪音低

Aluminum alloy wing-shaped fan, adjustable angle, large air flow, low noise

收水器, PVC材质, 收水效率高

Water collector, PVC material, high water collection efficiency

布水装置, ABS喷头, 布水均匀, 水压要求低

Water distribution device, ABS sprinkler, even water distribution, low water pressure demand

填料, 薄膜式改性PVC材质, 散热能力强, 阻燃, 耐高温

Filling, thin-film type advanced PVC material, strong heat radiation ability, flame retardant, temperature resistance

接水盘, 百叶窗, FRP材质

Water pan, louvers, FRP material

底座, 底部进出水管, 接管方便, 架构牢固, 设备整体强度增加

Base, bottom water inlet and outlet pipes, convenient pipe connection, strong structure, high strength of the whole equipment

碳钢热镀锌框架, 强度高, 耐腐蚀

Hot-dip galvanized carbon steel structure, high density, corrosion resistance



DFNL系列方形逆流式冷却塔选型表

DFNL series square countercurrent cooling tower selection table

环境湿球温度 Ambient wet bulb temperature	$t = 28^{\circ}\text{C}$					$t = 27^{\circ}\text{C}$				
进出塔水温($^{\circ}\text{C}$) Inlet and outlet water temperature	37-32	40-32	42-32	54-34	60-35	37-32	40-32	42-32	54-34	60-35
温降 Δt Temperature drop	5 $^{\circ}\text{C}$	8 $^{\circ}\text{C}$	10 $^{\circ}\text{C}$	20 $^{\circ}\text{C}$	25 $^{\circ}\text{C}$	5 $^{\circ}\text{C}$	8 $^{\circ}\text{C}$	10 $^{\circ}\text{C}$	20 $^{\circ}\text{C}$	25 $^{\circ}\text{C}$
型号 model	额定冷却水量(m^3/h) Rated cooling water									
DFNL-100	100	77	75	67	65	119	86	85	75	72
DFNL-125	125	93	85	78	76	145	106	100	88	84
DFNL-150	150	110	100	90	88	174	126	115	100	95
DFNL-175	175	134	125	114	112	203	151	143	123	120
DFNL-200	200	158	150	138	136	237	173	172	150	147
DFNL-250	250	191	175	160	158	288	215	200	176	172
DFNL-300	300	225	200	183	181	351	258	230	200	196
DFNL-350	350	262	225	205	203	410	301	257	225	220
DFNL-400	400	300	250	228	226	467	344	286	250	245
DFNL-450	450	338	275	251	249	526	387	315	275	270
DFNL-500	500	375	300	274	271	584	430	343	300	294
DFNL-600	600	450	400	365	361	700	515	457	400	392
DFNL-750	750	562	500	455	452	875	645	570	500	489
DFNL-900	900	673	600	546	542	1050	773	684	600	587
DFNL-1050	1050	787	700	638	633	1225	903	800	700	686

DFNL系列方形逆流式冷却塔主参数表

Main parameters table of DFNL series square countercurrent cooling tower

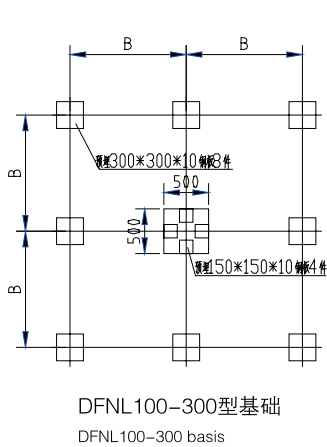
型号 model	外形尺寸(mm) Overall dimensions		功率 power	风机直径 The fan diameter	风量 Air volume	重量 (T) weight		进水压力 Inlet pressure	Dm 噪声 Dm noise	进水管 Inlet pipe	出水管 Outlet pipe	补水管 Filling water pipe	溢流管 The overflow tube	排污管 Drainage pipe
	直径 Φ diameter	高度H highly	(KW)	(mm)	m $^3/\text{h}$	自重 self-respect	运行重 Operating weight	104Pa	dB(A)	DN	DN	DN	DN	DN
DFNL-100	2600	4230	3	1800	62000	1950	3100	6.5	61	150	200	25	50	40
DFNL-125	2800	4230	4	1800	68500	2100	3950	6.5	61	150	200	25	50	40
DFNL-150	3000	4460	4	2400	84000	2450	4830	6.5	61	150	200	25	65	50
DFNL-175	3200	4460	5.5	2400	94500	2600	5300	6.5	62	150	200	25	65	50
DFNL-200	3600	4950	5.5	2800	115000	3230	6750	6.5	62	200	250	32	80	50
DFNL-250	3900	4950	7.5	2800	135000	3420	7120	6.5	62	200	250	32	80	50
DFNL-300	4300	5500	7.5	3400	168600	3650	8420	6.8	62	250	300	32	80	50
DFNL-350	4500	5500	11	3400	189000	3720	8620	6.8	63.5	250	300	32	80	50
DFNL-400	4800	5980	11	3800	224000	4560	11050	6.8	63.5	250	300	40	80	50
DFNL-450	5000	5980	15	3800	243000	4860	12100	6.8	63.5	250	300	40	80	50
DFNL-500	5300	6150	15	3800	275000	5420	14360	6.9	64.5	300	350	50	100	65
DFNL-600	6000	6150	18.5	4200	317500	6870	19500	6.9	64.5	300	350	50	100	65
DFNL-750	6800	6350	22	4200	405000	8670	25600	6.9	64.5	350	400	50	100	65
DFNL-900	7300	7150	30	4700	493000	9560	29440	7	65	400	450	65	100	80
DFNL-1050	7800	7250	30	4700	556000	12550	33610	7	65	400	450	65	100	80



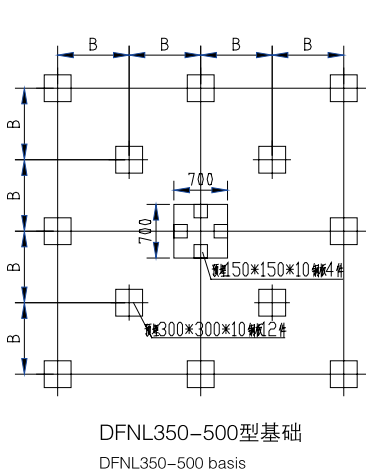


DFNL系列方形逆流式冷却塔基础参数表

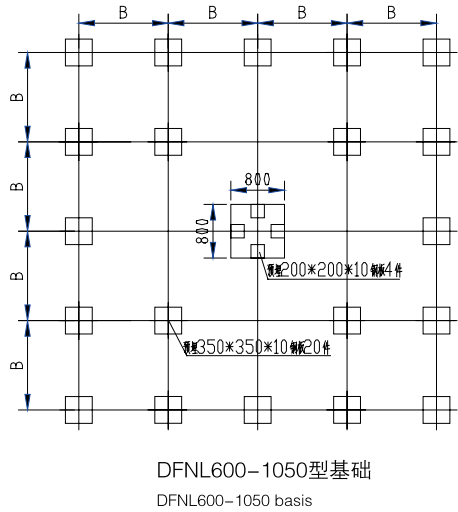
DFNL series square countercurrent cooling tower foundation parameter table



DFNL100-300型基础
DFNL100-300 basis



DFNL350-500型基础
DFNL350-500 basis



DFNL600-1050型基础
DFNL600-1050 basis

型号 DFNL Model	100	125	150	175	200	250	300	350	400	450	500	600	750	900	1050
基础平面尺寸 B (mm) Base plane size B	1300	1400	1500	1600	1800	1950	2150	1125	1200	1250	1325	1500	1700	1825	1950
设备自重 (kg) Weight of equipment	1950	2100	2450	2600	3230	3420	3650	3720	4560	4860	5420	6870	8670	9560	12550
设备运行重 (kg) Operating weight of equipment	3100	3950	4830	5300	6750	7120	8420	8620	11050	12100	14360	19500	25600	29440	33610

注：此系列方型逆流冷却塔基础高度不低于300mm，预埋钢板的上平面在同一水平线上。

Note: The foundation height of square countercurrent cooling tower is not less than 300mm, and all the upper planes of the embedded steel plates are on the same horizontal line.

方形FHL CFHL 横流式/方型FHL CFNL 逆流式玻璃钢冷却塔

Square FHL CFHL cross flow type/square FHL CFNL counter flow type glass fiber reinforced plastic cooling tower

FHL CFHL、FNL CFNL系列玻璃钢冷却塔，是采纳国内外同类产品性能优点，经过严格的测试，对布水系统，散热系统，收水系统以及风机的风量风压合理匹配，优化设计而开发的新产品，具有热效率高，噪音低，环保节能，使用寿命长等优点。

The FHL, CFHL, FNL and CFNL series of FRP cooling towers adopt the performance advantages of its similar product both home and abroad. After strict test, water distribution system, heat radiation system, water collection system and air volume and pressure of the fan are well matched and designed. Their advantages include high heat radiation efficiency, low noise, environmental protection, energy conservation and long service life.



优点:

- 1、采用FRP壁板,外形美观,表面采用抗紫外线照射的进口胶衣树脂层,耐老化,不褪色,光滑如镜面。
- 2、钢结构架,采用折边型钢,重量轻,强度高,表面热浸锌处理,耐腐蚀,延长使用年限。
- 3、选用高效、低噪音专用风机,铝合金叶片,重量轻,风量大,噪音低,功耗小。
- 4、使用全密封冷却塔专用电机,防护等级为IP55,绝缘等级为F级。
- 5、配套进口轴承,氯丁橡胶皮带,使减速箱噪音极低,运转时限延长。
- 6、采用混合波填料,散热面积大,亲水能力好,热力性能增强,阻燃,耐高温70℃,低温-50℃。
- 7、高效收水器,使飘水损失极小,低于循环水量的万分之一。
- 8、超低噪音塔,出风口设消音罩,逆流式塔接水盘处,设淋水消音垫,消除淋水噪声,防止水滴飞溅,满足噪声要求高的场合。
- 9、可根据用户要求,配套变频装置,实现在不同热负荷下,风机转速随冷却水的变化而自动调节,达到节能降噪,为用户节约运行费用。

Features:

1. Adopts FRP panel which has a beautiful outlook. Its surface is covered by a layer of imported anti-ultraviolet resin, and has many features like anti-aging, non-fading, and mirrored appearance.
2. Steel flanged frame has many features like light weight, high strength, hot-dip galvanized surface treatment, anti-corrosion, long service life and so on.
3. Adopt efficient silent special fan with aluminum blades. It has many features like light weight, high air flow rate, low noise, small power consumption, etc.
4. Equipped with fully sealed special motor; protection class is IP55; insulation class is F.
5. Imported supporting bearings and neoprene belt make the speed reduction box run silently and have long service life.
6. Adopt mixed-wave packing, and has many features like big heat radiation area, good hydrophilicity, perfect thermal performance, flame retardant and so on. Its high temperature tolerance is 70℃, low temperature tolerance is -50℃.
7. Efficient water collection device has little water floating loss which is less than one ten thousandth of the circulation water.
8. As for the super-silent tower, muffler is fixed at air outlet; As for the countercurrent tower, shower silent pad is equipped at water pan to reduce noise and prevent water from splashing, suitable for the place requiring silence.
9. Equipped with supporting frequency conversion device according to consumer's requirement; Fan will run automatically according to cooling water flow rate to save power and operating cost.

标准设计工况

进塔空气干球温度 $\theta = 31.5^\circ\text{C}$, 湿球温度 $t = 28^\circ\text{C}$, 大气压 $p = 9.94 \times 104\text{Pa}$, 进塔水温 $t_1 = 37^\circ\text{C}$, 出塔水温 $t_2 = 32^\circ\text{C}$ 。

Standard design working conditions

Inlet air dry-bulb temperature $\theta = 31.5^\circ\text{C}$, wet-bulb temperature $t = 28^\circ\text{C}$, atmospheric pressure $p = 9.94 \times 104\text{Pa}$, inlet water temperature $t_1 = 37^\circ\text{C}$, outlet water temperature $t_2 = 32^\circ\text{C}$.

本系列冷却塔要求进水压力为至进水接管处1.5~2.5米高自由水压。

The inlet water pressure of this series cooling tower is the free hydraulic pressure at 1.5~2.5m in height away from water inlet joint.



FHL低噪音型方型横流式冷却塔选用表

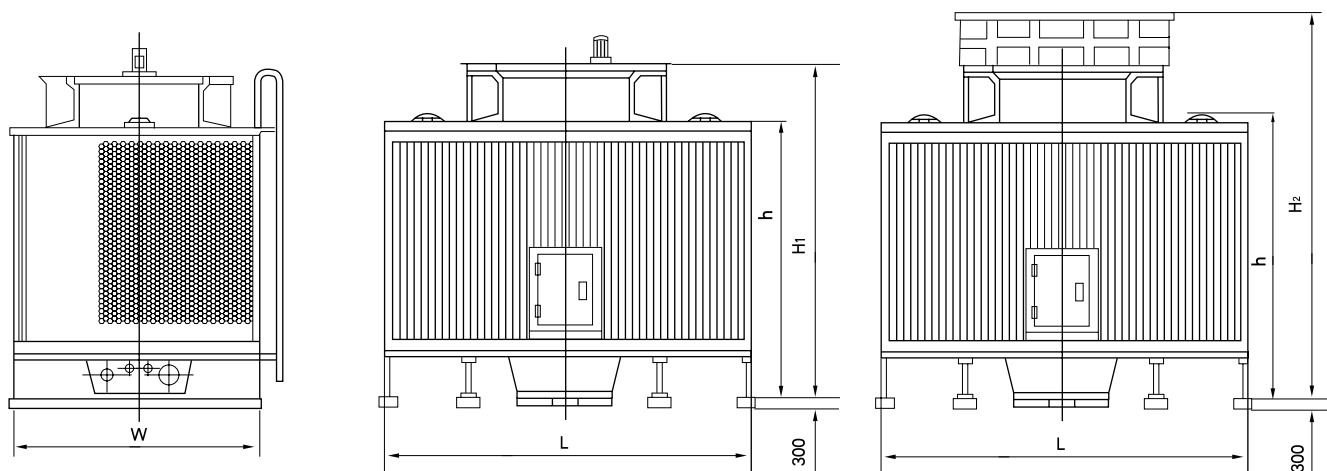
Model-selection table of FHL silent square crosscurrent cooling tower

湿球温度 Wet-bulb temperature		28.5											28										
进水温度 Inlet water temperature		37	38	39	37.5	37.6	37.7	38	39	40	41	42	36	37	38	37.5	37.6	37.7	38	39	40	41	42
出水温度 Outlet watertemperature		32	33	34	32	32	32	32	32	32	32	32	31	32	33	32	32	32	32	32	32	32	32
塔 型 号 Towermode	80	73	89	107	66	65	64	62	58	54	50	47	62	80	96	75	73	73	70	64	58	54	51
	100	91	114	136	84	83	81	77	72	68	64	60	78	100	120	94	93	91	88	80	73	69	65
	125	113	142	166	104	102	100	93	89	82	76	73	97	125	149	116	115	114	109	100	92	86	81
	150	136	168	201	125	123	120	114	108	101	94	88	115	150	179	141	140	138	133	118	106	100	93
	175	159	198	234	146	143	140	134	126	117	109	102	135	175	210	162	160	158	154	138	126	117	110
	200	182	226	268	166	164	161	153	143	134	125	117	155	200	238	186	183	180	176	159	145	135	126
	250	226	284	332	208	204	200	186	178	164	152	146	194	250	298	232	230	228	218	200	184	172	162
	300	272	338	402	250	246	240	228	216	202	188	176	230	300	335	282	280	276	266	236	212	200	186
	350	318	396	468	292	286	280	268	252	234	218	204	270	350	420	324	320	316	308	276	252	234	220
	375	339	426	498	312	306	300	279	267	246	228	219	291	375	447	348	345	342	327	300	276	258	243
	400	364	452	536	332	328	322	306	286	268	250	234	310	400	476	372	366	360	352	318	290	270	252
	450	408	507	603	375	369	360	342	324	303	282	264	345	450	537	423	420	414	399	354	318	300	279
	525	477	594	702	438	429	420	402	378	351	327	306	405	525	630	486	480	474	462	414	378	351	330
	600	546	678	804	498	492	483	459	429	402	375	351	465	600	714	558	549	540	528	477	435	405	378
	700	636	792	936	584	572	560	536	504	468	436	408	540	700	840	648	640	632	616	552	504	468	440
	750	680	845	1005	625	615	600	570	540	505	470	440	575	750	895	705	700	690	665	590	530	500	465
	800	728	904	1072	664	656	644	612	572	536	500	468	620	800	952	744	732	720	704	636	580	540	504
	875	795	990	1170	730	715	700	670	630	585	545	510	675	850	1050	810	800	790	770	690	630	585	550
	1000	910	1130	1340	830	820	805	765	715	670	625	585	775	1000	1190	930	915	900	880	795	725	675	630

CFHL低噪音型方型横流式冷却塔选用表

Model-selection table of CFHL silent square crosscurrent cooling tower

湿球温度 Wet-bulb temperature		27											26										
进水温度 Inlet water temperature		35	37	38	37.5	37.6	37.7	38	39	40	41	42	36	37	38	37.5	37.6	37.7	38	39	40	41	42
出水温度 Outlet watertemperature		30	32	33	32	32	32	32	32	32	32	32	29	32	33	32	32	32	32	32	32	32	32
塔 型 号 Towermode	80	58	91	107	85	84	83	81	74	67	62	59	56	98	111	92	91	90	87	79	72	69	66
	100	74	114	133	109	106	105	102	92	85	79	75	71	123	140	115	114	112	110	98	90	87	83
	125	92	142	166	134	133	132	127	115	106	97	92	89	153	175	145	143	141	138	123	113	109	104
	150	110	171	200	162	160	158	153	137	127	115	109	107	184	210	173	171	169	165	149	135	131	125
	175	130	200	234	188	187	185	179	160	146	136	128	125	214	245	203	201	198	193	173	158	153	146
	200	148	228	267	215	213	211	204	184	168	156	146	143	246	280	232	229	227	221	198	181	175	167
	250	184	284	332	268	266	264	254	230	212	194	184	178	306	350	290	286	285	276	246	226	216	208
	300	220	342	400	324	320	316	306	274	254	230	218	214	368	420	346	342	338	330	298	270	262	250
	350	260	440	468	376	374	370	358	320	294	272	256	250	428	490	406	402	396	386	346	316	306	292
	375	276	426	498	402	399	396	381	345	318	291	276	267	459	525	435	429	423	414	369	339	324	312
	400	296	456	534	430	426	422	408	368	336	312	292	286	492	560	464	458	454	442	396	362	350	334
	450	330	513	600	486	480	474	459	411	381	345	327	321	552	630	519	513	507	495	447	405	393	375
	525	390	600	702	564	561	555	537	480	441	408	384	375	642	735	609	603	594	579	519	474	459	438
	600	444	684	801	645	639	633	612	552	504	468	438	429	738	840	696	687	681	663	594	543	525	501
	700	520	800	936	752	748	740	716	640	588	544	512	500	856	980	812	804	792	772	692	632	612	584
	750	550	855	1000	810	800	790	765	685	635	575	545	535	920	1050	865	855	845	825	745	675	655	625
	800	592	912	1068	860	852	844	816	736	672	624	584	572	984	1120	928	916	908	884	792	724	700	668
	875	650	1000	1170	940	935	925	895	800	785	680	640	625	1070	1225	1015	1005	990	965	865	790	765	730
	1000	740	1140	1335	1075	1065	1055	1020	920	840	780	730	715	1230	1400	1160	1145	1135	1105	990	905	875	835


FNL低噪音型、CFNL超低噪音型方型横流式冷却塔参数表

Parameter table of FNL low noise type, CFNL super low noise square cross flow cooling tower

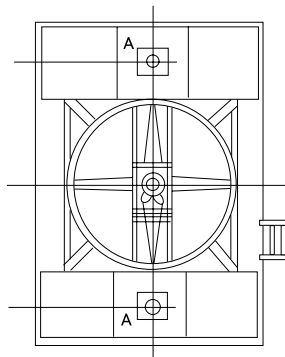
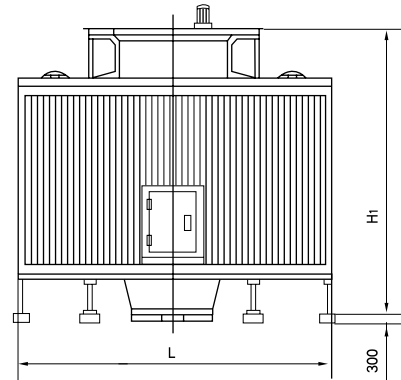
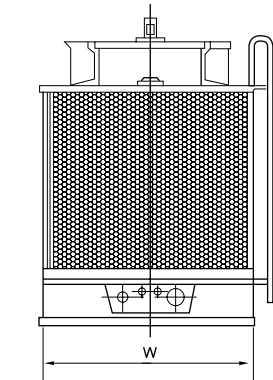
塔型号 Tower model	外形尺寸 (mm) Physical dimension						风机 直径 Fan diameter Φ Dxn	电机 功率 Motor power Kvxn	配管尺寸(DNx _n) Supporting pipe size						重量 Weight		标准点噪声 Noise at standard point	
	W	L	FHL型		CFHL型				进水管 Water supply pipe	出水管 Discharge pipe	排污管 Sewer	溢流管 Overflow pipe	自动补水管 Automatic water replenishing pipe	手动补水管 Manual water replenishing pipe	干重 Dry weight	湿重 Wet weight	FHL DB(A)	CFHL DB(A)
			h ₁	h	h ₂	h												
80※	1825	3120	3150	2850	3700	2850	1500×1	2.2×1	100×2	150×1	50×1	50×1	25×1	25×1	860	2360	60	55
100※	1825	3220	3350	3050	3900	3050	1600×1	3.0×1	100×2	150×1	50×1	50×1	25×1	25×1	950	2450	60	55
125※	2220	3510	3350	3050	3900	3050	1800×1	4.0×1	125×2	200×1	50×1	50×1	32×1	32×1	1120	2990	60.5	56
150※	2480	3730	3350	3150	4000	3150	2000×1	4.0×1	125×2	200×1	50×1	50×1	32×1	32×1	1330	3380	60.5	56
175※	2780	3800	3350	3150	4000	3150	2100×1	5.5×1	150×2	200×1	50×1	50×1	32×1	32×1	1490	3680	61	57
200※	3180	4100	3350	3150	4000	3150	2400×1	5.5×1	150×2	200×1	50×1	50×1	32×1	32×1	1610	4110	62	58
250	4400	3510	3350	3050	3900	3050	1800×2	4.0×2	125×4	200×2	50×2	50×2	32×2	32×2	2200	5900	61.5	56.5
300	4910	3730	3450	3150	4000	3150	2000×2	4.0×2	125×4	200×2	50×2	50×2	32×2	32×2	2580	6300	61.5	56.5
350	5510	3800	3350	3150	4000	3150	2100×2	5.5×2	150×4	200×2	50×2	50×2	32×2	32×2	2900	7110	62	57
375	6580	3510	3450	3050	3900	3050	1800×3	4.0×3	125×6	200×3	50×3	50×3	32×3	32×3	3280	7100	63	58
400	6310	4100	3450	3150	4000	3150	2400×2	5.5×2	150×4	200×2	50×2	50×2	32×2	32×2	3120	8120	63	57
450	7340	3730	3450	3150	4000	3150	2000×3	4.0×3	125×6	200×3	50×3	50×3	32×3	32×3	3900	10040	62	57
525	8240	3800	3450	3150	4000	3150	2100×3	5.5×3	150×6	200×3	50×3	50×3	32×3	32×3	4400	11000	63	59
600	9440	4100	3450	3150	4000	3150	2400×3	5.5×3	150×6	200×3	50×3	50×3	32×3	32×3	4750	12130	64	59
700	10970	3800	3450	3150	4000	3150	2100×4	5.5×4	150×8	200×4	50×4	50×4	32×4	32×4	5800	14520	63.5	59
750	12200	3730	3450	3150	4000	3150	2000×5	4.0×5	125×10	200×5	50×5	50×5	32×5	32×5	6570	16800	63	58
800	12570	4100	3450	3150	4000	3150	2400×4	5.5×4	150×8	200×4	50×4	50×4	32×4	32×4	6330	16350	64	60
875	13700	3800	3450	3150	4000	3150	2100×5	5.5×5	150×10	200×5	50×5	50×5	32×5	32×5	7350	18200	63.5	59
1000	15700	4100	3450	3150	4000	3150	2400×5	5.5×5	150×10	200×5	50×5	50×5	32×5	32×5	7900	20530	65	61

注：1. 标准噪声点，指距塔 $1.13\sqrt{W \cdot L}$ ，距地坪1.5m高处；2. 带(※)的塔型可根据需要并联，不仅限于此表；3. 超低噪声的冷却塔重量增加5%。

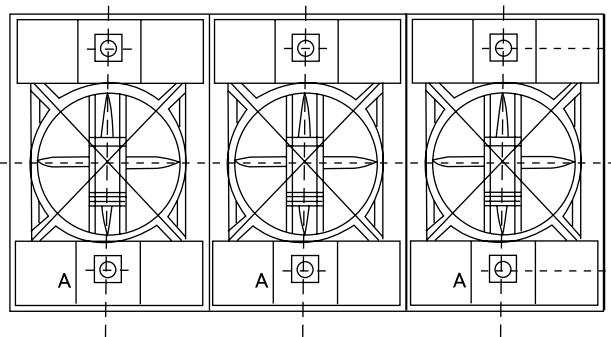
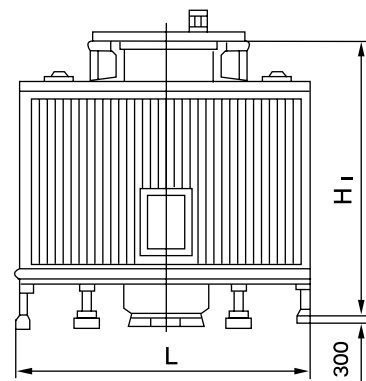
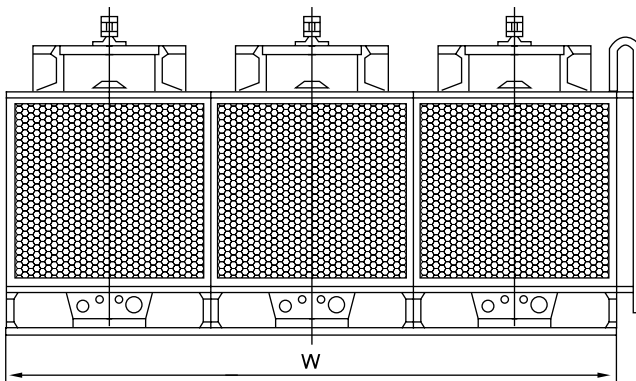
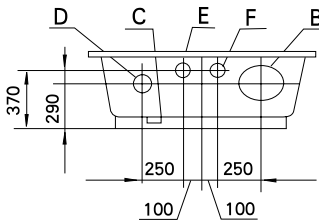
Note: 1. The standard noise measurement point is located at $1.13\sqrt{W \cdot L}$ away from tower, 1.5m height away from ground; 2. The tower marked with (※) can be connected in parallel, not limited to this table; 3. The weight of super-silent tower will increase 5%.

单台或多台并联形式

Single tower or several towers in parallel



水箱接管图
Pipe connecting graph of water tank

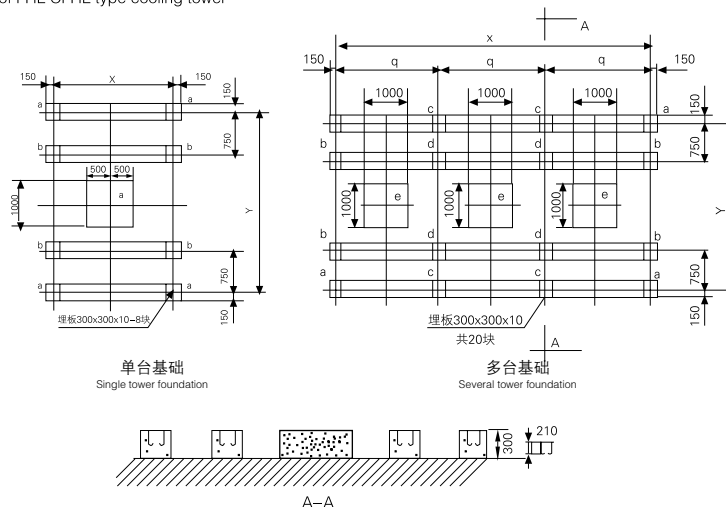


标记 Marks	配管名称 Supporting pipe name
A	进水管 Water supply pipe
B	出水管 Discharge pipe
C	排污管 Sewer
D	溢流管 Overflow pipe
E	自动补水管 Automatic water replenishing pipe
F	手动补水管 Manual water replenishing pipe

链接方式可按用户需求任意组合
Link mode can be arbitrarily combined according to user's need.

FHL CFHL型冷却塔基础尺寸及荷载表

Foundation dimension and load table of FHL CFHL type cooling tower

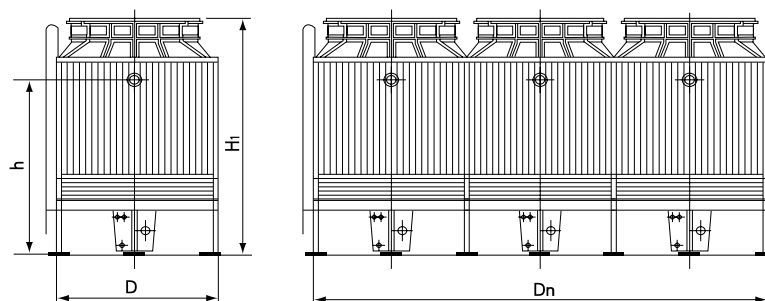


注：各预埋铁必须保持在同一水平面上。
Note: all embedded iron parts must be on the same horizontal level.

FHL CFHL	基础尺寸 (mm) Foundation dimension				基础荷载 (t) load table			
	X	Y	q	a	b	c	d	e
80※	1785	3040		0.23	0.33			0.6
100※	1785	3140		0.26	0.36			0.6
125※	2180	3430		0.29	0.40			0.7
150※	2430	3630		0.34	0.49			0.7
175※	2730	3700		0.36	0.54			0.7
200※	3130	4000		0.45	0.65			0.7
250	4360	3430	2180	0.29	0.40	0.58	0.80	0.6
300	4860	3630	2430	0.34	0.49	0.68	0.98	0.7
350	5460	3700	2730	0.36	0.54	0.72	1.08	0.7
375	6540	3430	2180	0.29	0.40	0.58	0.80	0.7
400	6260	4000	3130	0.45	0.65	0.90	1.30	0.6
450	7290	3630	2430	0.34	0.49	0.68	0.98	0.7
525	8190	3700	2730	0.36	0.54	0.72	1.08	0.7
600	9390	4000	3130	0.45	0.65	0.90	1.30	0.7
700	10920	3700	2730	0.36	0.54	0.72	1.08	0.7
750	12150	3630	2430	0.34	0.49	0.68	0.98	0.7
800	12520	4000	3130	0.43	0.63	0.86	1.26	0.7
875	13650	3700	2730	0.36	0.54	0.72	1.08	0.7
1000	15650	4000	3130	0.45	0.65	0.90	1.30	0.7

方型FHL CFNL 逆流式玻璃钢冷却塔

Square FNL CFNL countercurrent FRP cooling tower



FNL低噪音型、CFNL超低噪音型 方型逆流式冷却塔参数表

Parameter table of FNL silent type, CFNL super-silent type square countercurrent cooling tower

环境湿球温度 Environmental wet-bulb temperature	27℃	28℃	29℃	27℃	28℃	29℃	27℃	28℃	29℃	27℃	28℃	29℃
处理水量 Treated water flow rate m³/h	37℃	38℃	37℃	38℃	37℃	38℃	42℃	42℃	42℃	60℃	60℃	60℃
进水温度 Water intake temperature	32℃	32℃	32℃	32℃	32℃	32℃	32℃	32℃	32℃	35℃	35℃	35℃
型号 Model	80	100	125	150	175	200	250	80	100	125	150	175
	91	85	80	71	65	60	59	51	43	60	56	52
	114	101	100	89	83	76	75	65	53	77	73	67
	137	128	125	108	102	98	91	78	65	92	86	78
	175	154	150	132	120	110	108	95	78	109	102	94
	196	176	175	149	139	127	124	109	89	125	117	107
	234	206	200	177	163	150	145	127	104	146	137	136
	284	251	250	218	205	180	185	163	134	191	180	165

注：用户可根据冷却塔的处理水量及外形尺寸任意组合，确定型号和并联台数。

Note: Consumers can decide tower model, tower parallel number according to the arbitrary combination of their processed water flow rate and physical dimensions.

FNL低噪音型、CFNL超低噪音型 方型逆流式冷却塔参数表

Parameter table of FNL silent type, CFNL super-silent type square countercurrent cooling tower

参数 Parameters 型号 Model	处理 水量 Treated water flow rate m³/h	功率 Power kW	风机 直径 fan Diameter Φmm	外形尺寸 Physical size			CFNL 型H ₂	管径（Dn）						基础 尺寸 size of foundation W	重量 Weight		噪声值dB(A) value of noise	
				D	H ₁	h		进水 water inlet	出水 water outlet	溢水 Water overflow	手动补水 Manual water replenishment	自动补水 Automatic water supply	排污 Sewage		自重 Dead weight	运转重 Operating weight	FNL	CFNL
-80	80	2.2	1680	2300	4200	3450	4850	125	150	50	25	25	50	1050	980	2350	60	56
-100	100	3	1780	2460	4350	3450	5100	125	150	50	32	32	50	1130	1150	2730	60.5	56
-125	125	4	1780	2460	4350	3450	5100	150	200	50	32	32	50	1130	1190	2850	61	57
-150	150	5.5	2380	2900	4500	3450	5350	150	200	50	32	32	50	1350	1250	3010	61	57.5
-175	175	5.5	2380	2900	4500	3450	5350	150	200	50	32	32	50	1350	1360	3210	61.5	58
-200	200	5.5	2780	3500	4800	3450	5650	200	250	65	32	32	50	1650	1750	4050	62.5	59
-250	250	5.7	2780	3500	4800	3450	5650	200	250	65	32	32	50	1650	1890	4650	62.5	59.5

说明Explanation：1、上表参数为FNL、CFNL80-250型单体塔数值，当处理水量大于250m³/h时，可按上表参数组合为多风机塔使用。

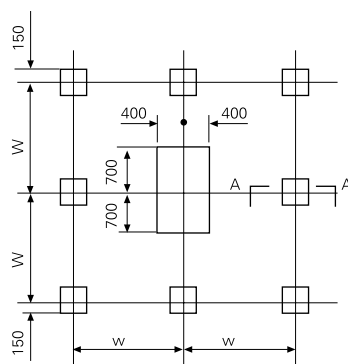
2、噪音测定标点为 $Dm=1.13\sqrt{D \times Dn}$ (n为并联台数，D为塔边长)距地面1.5米处。

Explanation: 1.The parameters specified in the above table are those of FNL, CFNL80-250 single cooling tower. If the processed water flow rate is bigger than 250m³/h, you can combine towers according to the above table's parameters.

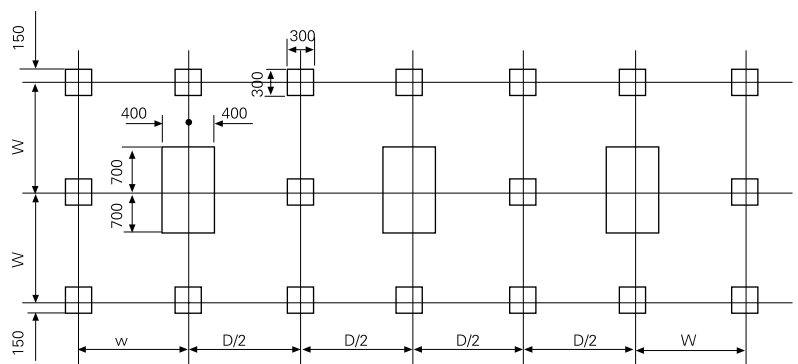
2.The noise measurement point is located at $Dm=1.13\sqrt{D \times Dn}$ (n means tower parallel number, D means tower side length), 1.5m in height from ground.

基础参数

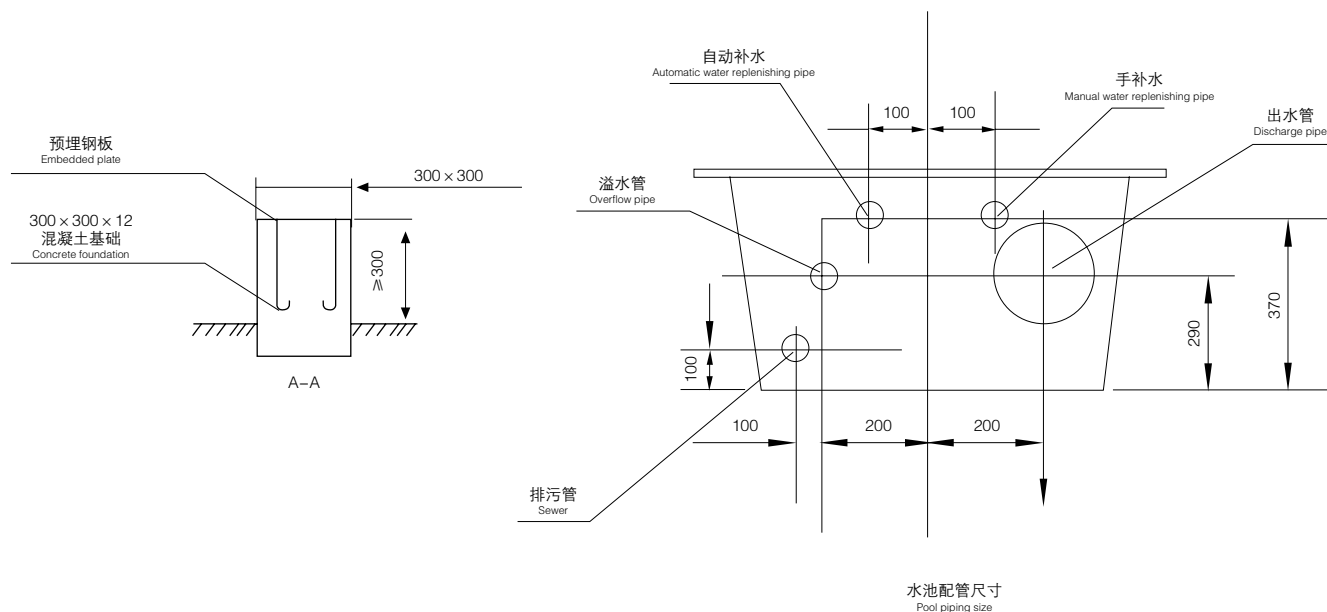
Foundation data



单风机基础
Single fan foundation

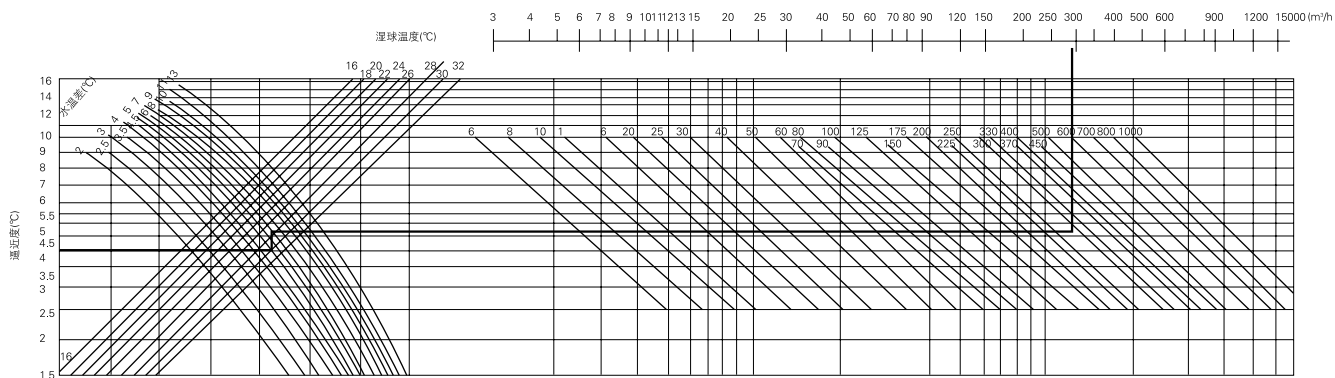


多风机型基础
Multi-fan type foundation



冷却塔选型曲线表

Cooling tower model-selection curve



选型示例

Model-selection example

A: 条件:

1. 需处理水量 280m³/h
2. 进水温度 37°C
3. 出水温度 32°C
4. 室外湿球温度 28°C
5. 逼近度 4°C (出水温度——湿球温度)
6. 水温差 5°C (进水温度——出水温度)

B: 选择方法:

1. 从 4°C 逼近度点上划一条平行于温度的平行线, 找出与 5°C 温差斜线之交点 A。
2. 在 A 点上划一垂直线, 找出与 28°C 湿球温度斜线之交点 B。
3. 在 B 点上划一平行线, 同时在 280m³/h 水汨点上划一垂直线, 找出其交点 C。
4. C 点在 300 和 250 斜线之间, 故例子所选用之型号应该是 300。

A: Condition:

1. Desired treated water flow rate 280m³/h
2. Inlet water temperature 37°C
3. Outlet water temperature 32°C
4. Outdoor wet-bulb temperature 28°C
5. Degree of approximation 4°C (Outlet water temperature——wet-bulb temperature)
6. Water temperature difference 5°C (Inlet water temperature——outlet water temperature)

B: Selection method:

1. Draw a parallel line from the point of 4°C degree of approximation, which parallel with the temperature, find out the intersecting point A with 5°C temperature difference oblique line.
2. Draw a vertical line cross the point A, find out the intersecting point B with 28°C wet-bulb temperature oblique line.
3. Draw a parallel line cross point B, meanwhile draw a vertical line cross the point of 280m³/h, find out their intersecting point C.
4. Point C is located between 300 oblique line and 250 oblique line. Therefore, the example model should be 300.



冷却塔系列产品
Cooling tower series products

环保型FGHL方形横流冷却塔

Environmental protection FGHL square cross flow cooling tower



亚太积极响应国家对环保的号召，减少复合材料等挥发物对大气的污染，结合冷却塔的产品特点及市场需求，推出本系列产品；产品壳体采用金属材质，可按用户要求选择镀锌板、镀铝锌板、不锈钢等材料，减少复合材料服役期满固废处理的二次污染，达到环保节能要求，为发展绿色循环经济贡献力量。

Yatai actively responds to the national call for environmental protection and reduces the atmospheric pollution caused by volatile materials such as composite materials. Considering the characteristics of cooling tower products and market demand, this series of products are launched. The shell of the product is made of metal material, galvanized sheet, aluminized zinc plate, stainless steel and other materials can be selected according to the requirements of users, which can reduce the secondary pollution of solid waste treatment after the service period of composite materials, meet the requirements of environmental protection and energy saving, and contribute to the development of green circular economy.

优点：

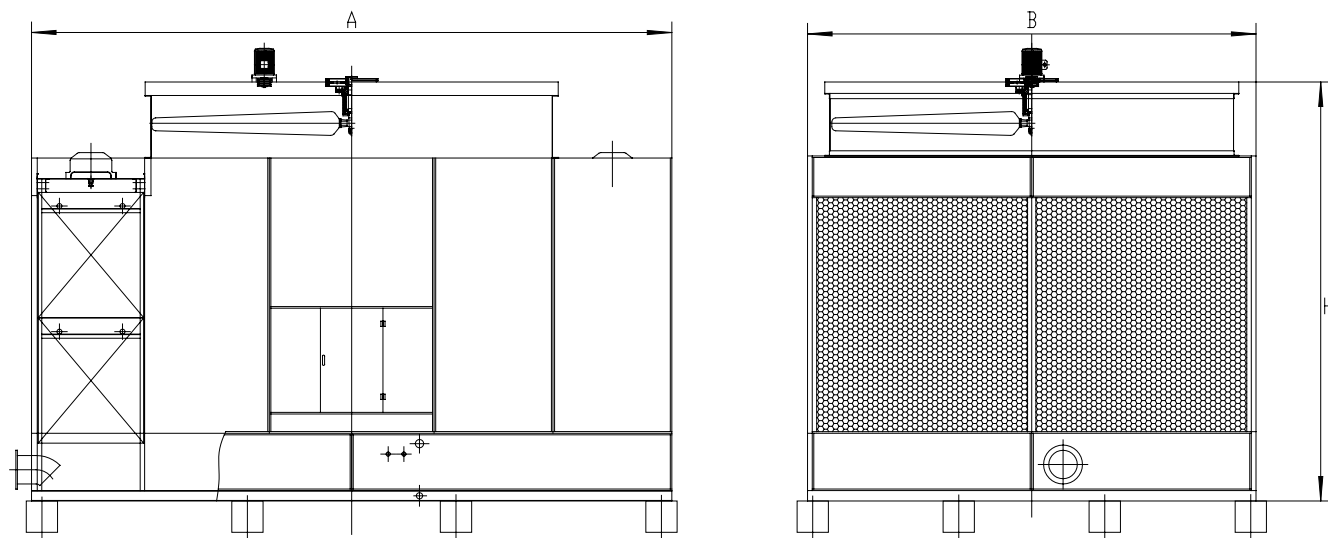
Features:

- 1、金属壳体，外形美观，结构合理，各种材质用户可任选；
- 2、框架选用折边型钢或标准型钢，强度高，表面热镀锌处理，耐腐蚀，使用寿命长；
- 3、采用高效低噪音专用铝合金风机，风量大、噪音低、效率高；
- 4、使用全封闭冷却塔专用电机，防护等级IP55,绝缘等级为F级；
- 5、配套进口轴承，氯丁橡胶传动带，减速器噪音低，运转时限延长；
- 6、采用复合波填料，散热面积大，亲水能力强，散热能力增加，阻燃；氧指数大于40；
- 7、可根据用户需求配套变频控制装置，实现在不同热负荷下，风机随冷却水的温度变化自动调节转速，达到节能降耗的效果。

1. Metal shell, beautiful appearance, reasonable structure, a variety of materials for users to choose;
2. The frame is made of high-strength folded steel or standard steel; hot dipped galvanized surface treatment, corrosion resistance, long service life;
3. Adopt high efficiency low noise special aluminum alloy fan with large air volume;
4. The use of fully enclosed cooling tower special motor, protection class IP55, insulation class F;
5. Equipped with imported bearings, neoprene transmission belt, low noise speed reducer, extended operation time;
6. Adopt composite wave packing, large heat dissipation area, strong hydrophilic ability, increased heat dissipation ability, flame retardant; oxygen index is greater than 40;
7. According to the needs of users, it can be equipped with frequency conversion control device to realize the automatic speed regulation of the fan based on the temperature change of cooling water under different heat load to achieve the effect of energy saving and consumption reduction.

环保型FGHL方形横流冷却塔外形示意图

Schematic diagram of environment-friendly FGHL square cross-flow cooling tower



环保型FGHL方形横流冷却塔参数表

Environmental protection type FGHL square cross flow cooling tower parameters table

型号 model	处理水量 m³/h Treated water volume	外形尺寸 mm Overall dimensions			功率 kW power	风机直径 mm fan diameter	接管口径 DN Over caliber						重量 kg weight		进水压力 Feed water pressure 10⁴Pa	噪声dB(A) noise Dm
		长度A length	宽度B width	高度H Height			进水管 Inlet pipe	出水管 Outlet pipe	排污管 Drainage pipe	溢流管 The overflow tube	补水管 Filling water pipe	自动补水管 Automatic water replenishment	自重 Dead weight	运行重 Operating weight		
FGHL-80	80	3450	1880	3520	2.2	1500	80 × 2	125 × 1	50 × 1	50 × 1	25 × 1	25 × 1	1050	2350	4.0	63
FGHL-100	100	3550	1880	3520	3.0	1600	100 × 2	150 × 1	50 × 1	50 × 1	25 × 1	25 × 1	1200	2640	4.0	63
FGHL-125	125	3680	2300	3650	4.0	1800	100 × 2	150 × 1	50 × 1	50 × 1	32 × 1	32 × 1	1350	2850	4.5	63
FGHL-150	150	3850	2500	3650	4.0	2000	125 × 2	200 × 1	50 × 1	50 × 1	25 × 1	25 × 1	1560	3500	4.5	64
FGHL-175	175	4100	2850	3700	5.5	2200	150 × 2	200 × 1	50 × 1	50 × 1	32 × 1	32 × 1	1850	4460	4.8	64
FGHL-200	200	4300	3200	3700	5.5	2400	150 × 2	200 × 1	50 × 1	50 × 1	32 × 1	32 × 1	1960	4750	4.8	64
FGHL-250	250	5200	3200	3950	7.5	2800	150 × 2	250 × 1	50 × 1	65 × 1	32 × 1	32 × 1	2150	5100	5.0	64
FGHL-300	300	5200	3600	3950	7.5	2800	100 × 4	250 × 1	50 × 1	65 × 1	40 × 1	40 × 1	2800	6080	5.0	65
FGHL-350	350	5800	3800	4100	11.0	3400	125 × 4	200 × 2	50 × 1	65 × 1	40 × 1	40 × 1	2980	6470	5.2	65
FGHL-400	400	5800	4200	4100	11.0	3400	125 × 4	200 × 2	50 × 1	80 × 1	40 × 1	40 × 1	3200	6780	5.2	65
FGHL-450	450	6200	4200	4350	15.0	3800	125 × 4	200 × 2	50 × 1	80 × 1	50 × 1	50 × 1	4350	8450	5.5	65
FGHL-500	500	6200	4600	4350	15.0	3800	150 × 4	250 × 2	50 × 1	80 × 1	50 × 1	50 × 1	4650	8860	5.5	65
FGHL-600	600	6680	4700	5200	18.5	4200	150 × 4	250 × 2	50 × 1	80 × 1	50 × 1	50 × 1	5500	10400	6.2	65
FGHL-700	700	6680	4900	5200	22.0	4200	150 × 4	250 × 2	50 × 1	80 × 1	50 × 1	50 × 1	5800	11300	6.2	65

注:

1. 此系列冷却塔, 用户可根据自己实际情况选择单台或多台并联形式安装, 以上数据为单台参数, 按需求可以无限组合。
2. 根据用户的不同需求, 壳体材料可选镀锌钢板、镀铝锌板、不锈钢板等金属材料。
3. 设计标准工况: 空气干球温度 $\theta = 31.5^{\circ}\text{C}$, 湿球温度 $\tau = 28^{\circ}\text{C}$, 大气压 $p = 99.4\text{KPa}$, 进水温度 $t_1 = 37^{\circ}\text{C}$, 出水温度 $t_2 = 32^{\circ}\text{C}$ 。
4. 噪音为标准点 DM 处数值, DM=距离冷却塔 1.13, 距基础高度 1.5m 处。

Note:

1. For this series of cooling towers, users can choose a single one or multiple ones in parallel connection according to users' actual situation. The above data are parameters for a single cooling tower which can be combined unlimitedly according to the requirements.
2. According to different needs of users, galvanized steel plate, aluminized zinc plate, stainless steel plate and other metal materials can be selected for shell material.
3. Designed standard working conditions: air dry bulb temperature $\theta = 31.5^{\circ}\text{C}$, wet bulb temperature $\tau = 28^{\circ}\text{C}$, atmospheric pressure $p = 99.4\text{ kPa}$, inlet temperature $t_1 = 37^{\circ}\text{C}$, outlet temperature $t_2 = 32^{\circ}\text{C}$.
4. Noise is the value at the standard point DM, DM= 1.13 m away from the cooling tower and 1.5m high from the foundation.

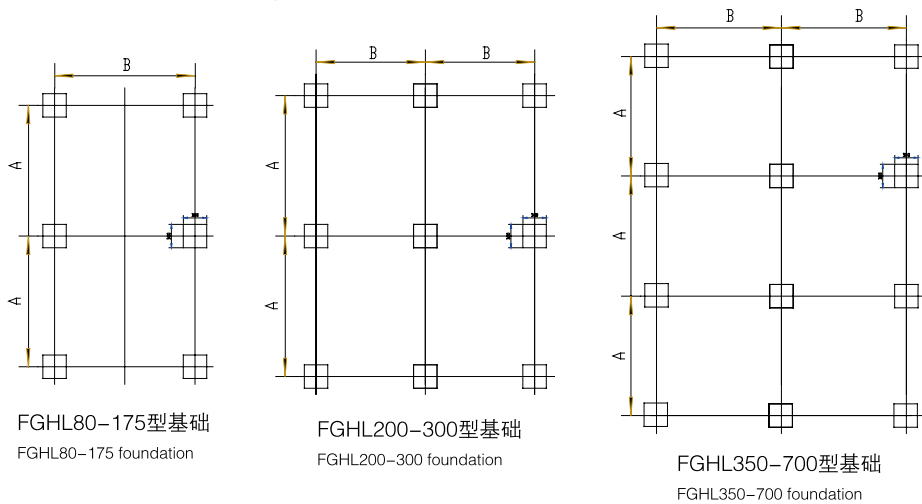
环保型FGHL方形横流冷却塔各工况下流量选定表

Flow rate selection table of environmental protection FGHL square cross-flow cooling tower under various working conditions

环境湿球温度 Ambient wet bulb temperature	T=28℃			T=28.5℃			T=27℃			T=26℃		
进出塔水温 ℃ Inlet and outlet water temperature	37-32	40-32	42-32	37-32	40-32	42-32	37-32	40-32	42-32	37-32	40-32	42-32
温降 Δt Temperature drop	5℃	8℃	10℃	5℃	8℃	10℃	5℃	8℃	10℃	5℃	8℃	10℃
型号 model	额定冷却水量 m³/h Rated cooling water											
FGHL-80	80	58	51	73	54	47	91	67	59	98	72	66
FGHL-100	100	73	65	91	68	60	114	85	75	123	90	83
FGHL-125	125	92	81	113	82	73	142	106	92	153	113	104
FGHL-150	150	108	93	136	101	88	171	126	109	184	135	125
FGHL-175	175	126	110	159	117	102	200	147	128	214	158	146
FGHL-200	200	145	126	182	134	117	228	168	146	246	181	167
FGHL-250	250	184	162	226	164	146	284	212	84	306	226	208
FGHL-300	300	212	186	272	202	176	342	254	218	368	270	250
FGHL-350	350	252	220	318	234	204	400	295	256	428	316	292
FGHL-400	400	290	252	364	268	234	456	336	292	492	362	334
FGHL-450	450	318	279	408	303	264	513	382	327	552	405	375
FGHL-500	500	368	324	452	328	292	568	425	368	612	452	416
FGHL-600	600	435	378	546	402	351	685	504	438	738	543	501
FGHL-700	750	504	440	636	468	408	800	588	512	856	632	584

环保型FGHL方形横流冷却塔基础参数表

Environmental protection type FGHL square cross-flow cooling tower foundation parameters table



型号 model	80型	100型	125型	150型	175型	200型	250型	300型	350型	400型	450型	500型	600型	700型
基础平面尺寸 Base plane dimension	A mm	1670	1720	1790	1870	2000	2100	2550	2550	1900	1900	2030	2030	2190
	B mm	1780	1780	2200	2400	2750	1550	1550	1750	1850	2050	2250	2300	2400
预埋钢板尺寸 mm Dimensions of embedded steel plates	300 × 300													
预埋钢板件数 Number of embedded steel plates	6	6	6	6	6	9	9	9	12	12	12	12	12	12
预埋钢板厚度 mm Embedded steel plate thickness	10	10	10	10	10	10	10	10	10	10	10	10	10	10
设备运行重量 kg Operating weight of equipment	2.35	2.64	2.85	3.5	4.46	4.75	5.1	6.08	6.47	6.78	8.45	8.86	10.4	11.3

注：此系列方型横流冷却塔基础高度不低于600mm，预埋钢板的上平面在同一水平线上。

Note: The foundation height of this series of square cross flow cooling tower is not less than 600mm, and all the upper planes of the embedded steel plates are on the same horizontal line.

工业型砼结构逆流式冷却塔

Industrial type concrete structure countercurrent cooling tower



产品特点

- 1、塔体受力结构：为钢筋混凝土框架结构，自振频率12Hz，运行的最大振幅0.09mm，钢件采用热镀锌加强防腐措施。
- 2、围护结构：为Q235-B材质，重量轻、强度高、减少土建施工量、耐腐蚀、美观、抗老化。
- 3、风筒：为动能回收型，气流组织合理，效率高，玻璃钢材质，质轻高强耐腐蚀。
- 4、风机：叶片材质为环氧玻璃钢，风机气动力合理，风量大、效率高、噪音低、耐腐蚀。
- 5、减速机：水平卧式轴传动，噪声低、效率高、油润滑可靠。
- 6、电机：采用YE3高效节能型电机，设置在风筒外，检修方便、使用寿命长、设备运行费用低。
- 7、填料：钢性及表面积大，对水的再分配能力强，水膜形成均匀，停留时间长，水滴不致避开填料而直接落下，填料上下有双向凸凹安装头，组装粘结牢固、不倒伏、不变形、水质差时也不易粘边堵塞，填料材质为PVC材质，耐温-35~65℃。
- 8、配水系统：为管式配水，采用均溅式喷头，喷头分水均匀、喷水面积广、大口径防堵塞、耐腐蚀。
- 9、收水器：塔内在水管上用BO160-45型收水器，收水效率显著。在高速运行时，漂水率小于0.01%。
- 10、进水管：冷却塔生产厂与冷塔使用单位的接管分界线在布水管出冷却塔500mm处止。
- 11、水池：本塔的水池及基础、预埋钢板等由用户负责，施工图可以委托设计院设计出图。

Features:

1. Mechanical structure of the tower body: it is a reinforced concrete frame structure with natural vibration frequency of 12Hz and the maximum amplitude of operation of 0.09mm. The steel parts are hot-dip galvanized to strengthen anti-corrosion ability.
2. Envelope structure: Q235-B material, light weight, high strength, less civil construction volume, corrosion resistance, beautiful, anti-aging.
3. Stack: kinetic energy recovery type, reasonable air distribution, high efficiency, FRP material, light weight, high strength and corrosion resistance.
4. Fan: The blade material is epoxy FRP. The fan has features of reasonable air force, large air volume, high efficiency, low noise and corrosion resistance.
5. Speed reducer: horizontal shaft transmission, low noise, high efficiency, reliable oil lubrication.
6. Motor: adopt YE3 high efficiency and energy saving motor, set outside the stack, easy maintenance, long service life, low equipment operation cost.
7. Packing: rigidity and large surface area, have strong water redistribution ability, uniform water film formation, long residence time, water droplets can't avoid packing to fall down directly, there are two-way convex and concave attach fittings on the upside and downside of the packing, strong assembly binding, no lodging and deformation, poor quality water is not easy to stick side or plug, packing material is PVC, and the temperature range is -35 ~ 65 °C.
8. Water distribution system: pipe type water distribution, use even water splash nozzle which sprinkles water evenly and has wide spray area, large caliber avoids blockage, corrosion resistance.
9. Water collector: highly efficient BO160-45 water collector is used on the water pipe inside the tower. At high speed, the drift rate is less than 0.01%.
10. Water inlet pipe: the dividing line between the cooling tower production plant and the cooling tower should stop at 500mm from the cooling tower.
11. Pool: the pool, foundation and embedded steel plates are user's responsibility. Construction drawings can be commissioned to the design institute.

技术参数表

Technical parameter table

型号 model	冷却水量 m³/h The cooling water	外形尺寸 mm Overall dimensions			风机直径 The fan diameter		布水系统 Water distribution system		重量 weight	
		L	W	H	直径 mm diameter	电机功率 kW motor power	进水管 DN mm Inlet pipe DN	进塔水压 m Feed water pressure	干重 T Dry weight	湿重 T Wet weight
YTC-800	800	7800	7800	7000	4700	30	450	5.5	18	95
YTC-1000	1000	8800	8800	7800	5000	37	500	5.8	24	115
YTC-1250	1250	9800	9800	8500	5500	45	500	6.1	29	140
YTC-1500	1500	10800	10800	9100	6000	55	600	6.4	36	170
YTC-1750	1750	11600	11600	9400	7000	75	600	6.4	39	190
YTC-2000	2000	12200	12200	9600	7000	90	700	6.5	45	255
YTC-2500	2500	13800	13800	10300	7700	110	700	7.0	53	321
YTC-3000	3000	15000	15000	11400	8000	132	800	7.4	64	368
YTC-3500	3500	16200	16200	12200	8530	160	800	7.6	76	478
YTC-4000	4000	17400	17400	12700	9140	185	900	8.2	82	644
YTC-4500	4500	18400	18400	13300	9140	200	900	8.5	88	700
YTC-5000	5000	19400	19400	14000	9750	220	1000	8.8	99	774

设计条件：干球温度 $\theta = 31.5^{\circ}\text{C}$ ，湿球温度 $\tau = 28^{\circ}\text{C}$ ，大气压 $P = 99.4\text{KPa}$ ，进水温度 43°C ，出水温度 33°C

Design conditions: dry bulb temperature $\theta = 31.5^{\circ}\text{C}$, wet bulb temperature $\tau = 28^{\circ}\text{C}$, atmospheric pressure $P = 99.4\text{KPa}$, inlet temperature 43°C , outlet temperature 33°C

工业钢结构逆流式冷却塔

Industrial steel structure countercurrent cooling tower



Features:

1. Tower structure: all steel structure; tower skeleton, water distribution system, ladder and guardrail are all Q235-B material; hot dip galvanized anti-corrosion treatment, envelope panel is made of FRP;
2. Stack: kinetic energy recovery type, reasonable air distribution, high efficiency, FRP material, light weight, high strength and corrosion resistance.
3. Fan: wing type adjustable special axial flow fan for cooling towers; aluminum alloy or FRP blades;
4. Motor, reducer: YE3 series outdoor high efficiency and energy saving motor, protection class IP55, insulation class F;
5. Packing: advanced PVC raw material packing, high temperature resistance, aging resistance, flame retardant, high strength bonding blocks;
6. Water collector: high efficiency and low resistance "V" shaped water collector, advanced PVC material extrusion molding, remarkable water collection effect; the drift rate is less than 0.01%.
7. Fan system tower is equipped with motor, reducer, fan maintenance platform and channel. The outside of the tower is equipped with ladder and guardrail.
8. Pool: the pool, foundation and embedded steel plates are user's responsibility. The water level should be controlled within $-0.25 \sim -0.3\text{m}$.
9. Used in the large water circulation systems of petroleum, chemical, metallurgy, medicine, electric power and other industries;

产品特点

- 1、塔体结构：全钢结构，塔体骨架、布水系统、爬梯、护栏均为Q235-B材质，防腐采用热浸镀锌，围护面板为玻璃钢材质。
- 2、风筒：动能回收型，气流组织合理，效率高，玻璃钢材质，质轻高强耐腐蚀。
- 3、风机：机翼型可调式冷却塔专用轴流风机，叶片为铝合金或玻璃钢材质。
- 4、电机、减速机：YE3系列户外型高效节能电机，防护等级IP55，绝缘等级F级。
- 5、填料：改型PVC原生料薄腹填料，耐高温、耐老化、阻燃，粘接成块强度高。
- 6、收水器：采用高效低阻“V”型收水器，改型PVC材料拉挤成型，收水效果显著，漂水率小于0.01%。
- 7、风机系统塔内设有电机、减速机、风机检修平台及通道，塔外设有爬梯及护栏。
- 8、水池：本塔的水池及基础、预埋钢板等由用户负责，水位应控制在 $-0.25 \sim -0.3\text{m}$ 为好。
- 9、应用于石油、化工、冶金、医药、电力等工业大水量循环系统中。

技术参数表

Technical parameter table

型号 model	处理水量 m³/h Treated water volume	轴线尺寸 mm Axis size			风机直径 The fan diameter		布水系统 Water distribution system		重量 weight	
		L	W	H	直径 mm diameter	电机功率 kW motor power	进水管 DN mm Inlet pipe DN	进塔水压 m Feed water pressure	干重 T Dry weight	湿重 T Wet weight
YTD-500	500	6000	6000	5800	4200	22	350	5	14	25
YTD-600	600	6600	6600	6000	4200	30	400	5	16	26
YTD-700	700	7200	7200	6200	4700	30	400	5	18	29
YTD-800	800	7600	7600	6400	4700	30	450	5.5	20	33
YTD-900	900	8000	8000	6600	5000	37	450	5.5	22	36
YTD-1000	1000	8600	8600	6800	5000	37	500	5.8	24	4
YTD-1250	1250	9600	9600	7200	5500	45	500	6.1	29	45
YTD-1500	1500	10600	10600	7350	6000	55	600	6.4	36	50
YTD-1750	1750	11400	11400	7500	7000	75	600	6.4	39	53
YTD-2000	2000	12000	12000	7900	7000	90	700	6.5	44	56
YTD-2500	2500	13400	13400	8500	7700	110	700	7.0	52	63
YTD-3000	3000	14600	14600	8800	8000	132	800	7.4	64	83
YTD-3500	3500	16000	16000	9200	8530	160	800	7.6	75	97
YTD-4000	4000	17000	17000	10000	9140	185	900	8.2	82	107

设计条件: 干球温度 $\theta = 31.5^{\circ}\text{C}$, 湿球温度 $\tau = 28^{\circ}\text{C}$, 大气压 $P = 99.4\text{KPa}$, 进水温度 43°C , 出水温度 33°C

Design conditions: dry bulb temperature $\theta = 31.5^{\circ}\text{C}$, wet bulb temperature $\tau = 28^{\circ}\text{C}$, atmospheric pressure $P = 99.4\text{KPa}$, inlet temperature 43°C , outlet temperature 33°C

工业型逆流式水轮机冷却塔

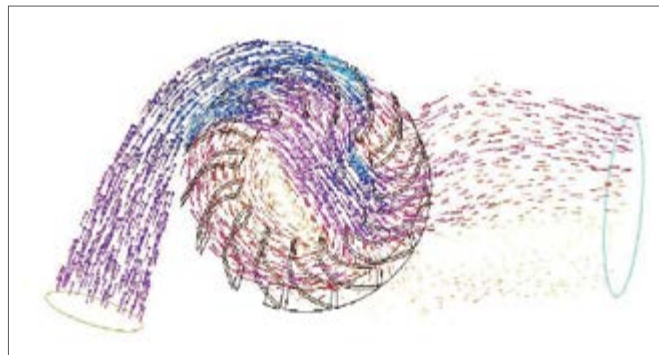
Industrial type countercurrent turbine cooling tower

利用冷却塔设备所在的循环冷却水系统余水能驱动水轮机运转代替原电机驱动风机散热, 代替在传统的冷却塔中用电机驱动风机的散热方式, 代替机械减速装置和电机, 从而实现“零”电能消耗新节能环保型冷却塔。

在安装水轮机时, 可保留原有冷却塔外型结构、尺寸不改变, 水轮机冷却塔的冷效、风机风速、气水比、噪声均比原有电机驱动风机冷却塔有不同程度的改善, 各种技术指标均能达到冷却塔设计要求。

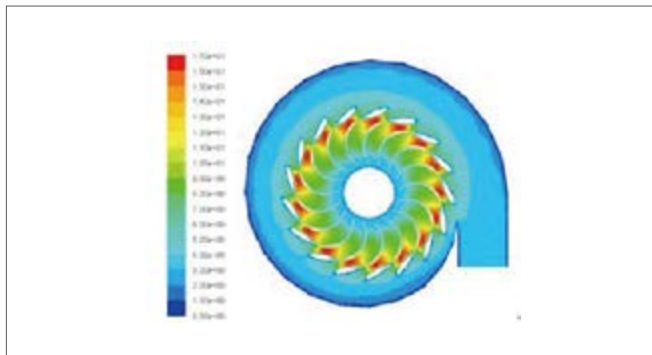
The redundant water energy of the circulating cooling water system where the cooling tower is located is used to drive the water turbine to run instead of the original motor to drive the fan for heat dissipation, and the heat dissipation method of using the motor to drive the fan in the traditional cooling tower is abolished, so as to save the mechanical deceleration device and motor to realize the "zero" energy consumption of the new energy-saving and environmental protection cooling tower.

When the turbine is installed, the original cooling tower structure and size can be retained. The cooling efficiency, fan wind speed, gas-water ratio and noise of the turbine cooling tower are improved to different degrees compared with the original motor driven fan cooling tower. All kinds of technical indexes can meet the design requirements of the cooling tower.



水轮机内部流动解析图 (一)

Analytical Diagram of flow in turbine (1)



水轮机内部流动解析图 (二)

Analytical Diagram of flow in turbine (2)



冷却塔系列产品
Cooling tower series products



举例说明：

以一台 5000m³/h 的工业型冷却塔改造水轮机为例，电机功率 200KW，年运行时间 8000h，工业电价 0.5 元 / 度计算。

年节电收益为：200 × 0.85 × 8000 × 0.5 = 68 万元 / 年。

For example:

Taking a 5000m³/h industrial cooling tower retrofitting turbine as an example, its motor power is 200KW, annual operation time is 8000h, and the industrial electricity price is calculated at 0.5 yuan / kW · h .

Annual electricity saving income: 200 × 0.85 × 8000 × 0.5 = 680,000 Yuan/year.

模压冷却塔

Moulded cooling tower



模压冷却塔是指冷却塔中的 FRP 制品，均采用模压工艺制作而成。

Molded cooling tower refers to the FRP cooling towers which are made by pressure molding.

FRP制品模压工艺优点

- 1、成型周期短，适宜大量生产。
- 2、封闭模成型，没有苯乙烯及玻璃纤维飞散，作业环境整洁环保。
- 3、成型工艺简单，易机械化及自动化，即使没有熟练工人也能成型
- 4、可成型大型制品。FRP 模压制品尺寸准确、表面光洁、制品外观及尺寸重复性好、复杂结构也可一次成型、二次加工无需损伤制品等特点。

FRP products molding process advantages

1. Molding cycle is short, suitable for mass production.
2. Closed molding causes no styrene and glass fiber flying, which creates a good working environment.
3. Simple molding process, easy mechanization and automation; Even if there is no skilled workers, the job can also be done.
4. Large products can be shaped. FRP molded products have the characteristics of accurate size, smooth surface, good appearance and size repeatability. Complex structure can also be formed in one time, and secondary processing doesn't damage products.

模压冷却塔的特点

- 1、整塔重量减轻，有利于保证冷却塔风机运转的稳定性及动能回收性。
- 2、整塔外观大气、美观。
- 3、模块化拼装，减小 FRP 制品的磕碰，划伤。

Characteristics of cooling tower

1. The weight of the whole tower is reduced, which is conducive to ensuring the operation stability and kinetic energy recovery of the cooling tower.
2. The appearance of the whole tower is beautiful.
3. Modular assembly can reduce bump and scratch of FRP products.

FBS 闭式冷却塔

CLOSED COOLING TOWER

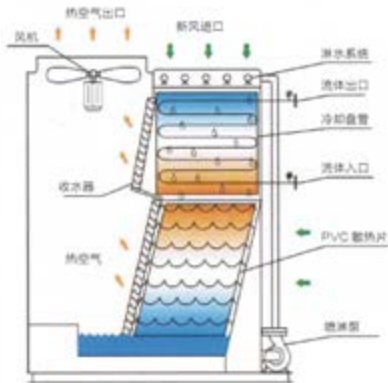
S型（混流高效型）

Type S (Combined-flow efficient)

工作原理 Working principle

流体在盘管中流动，盘管外壁被喷淋水包裹，流体的热量通过管壁传递，与水 and 空气形成饱和湿蒸汽，热量由风机排入大气，水分被挡回集水槽循环喷淋，喷淋水在循环的过程中通过PVC散热片降低水温，与新鲜入风形成风水同向流动，盘管主要依靠显热传导方式。

The fluid flows in the coil, and the outer wall of the coil is wrapped with spray water. The heat of the fluid is transferred through the tube wall, forming a saturated hot and humid steam after encountering water and air. The heat is discharged into the atmosphere by the fan, and water is blocked back to the collecting tank for circulation spray. In the process of circulation, the spray water reduces water temperature through the PVC radiator, and flows in the same direction with the fresh inlet air. Coil mainly relies on sensible heat conduction.



风机 fan

淋水系统 shower system

流体入口 fluid inlet

热空气 hot air

热空气出口 hot air outlet

流体出口 fluid outlet

PVC 散热片 PVC radiator

收水器 water collector

新风进口 fresh air inlet

冷却盘管 cooling coil

喷淋泵 spray pump

显著特点（S型） Striking featulle (Type S)

工作效率高

混流高效型冷却塔的进风方式使得空气流动效率高，而且有利于换热管亲水更完全，装有预冷填料可降低喷淋水温度。因此散热效率更高。

High efficiency

The air inlet mode of mixed-flow high efficiency cooling tower makes the airflow efficiency high, and is conducive to letting the heat exchange tube hydrophilic more complete. Its pre-cooling packing can reduce the spray water temperature. Therefore, the heat dissipation efficiency is higher.

防止结垢

喷淋水的温度可控制低于容易结垢的水平以下，换热管湿润更完全，所以减少结垢的效果明显。

Prevent scaling

The temperature of spray water can be controlled below the level of easy scaling, and the heat exchange tube is wetted more completely, so the effect of reducing scaling is obvious.

维护方便

巨大的塔内空间，为设备的例行检修提供变革性的便利，可通过检修门进入塔内维护，关键部位盘管、喷淋系统的维护可以更直接更方便。

Convenient maintenance

The huge space in the tower provides revolutionary convenience for the routine maintenance of the equipment. We can enter into the tower for maintenance through the access door. The maintenance of the key parts of the coil and the spray system can be more direct and convenient.

适用范围

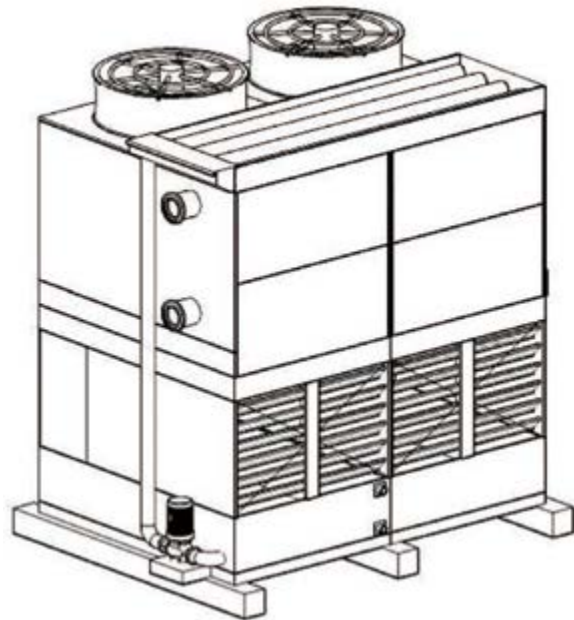
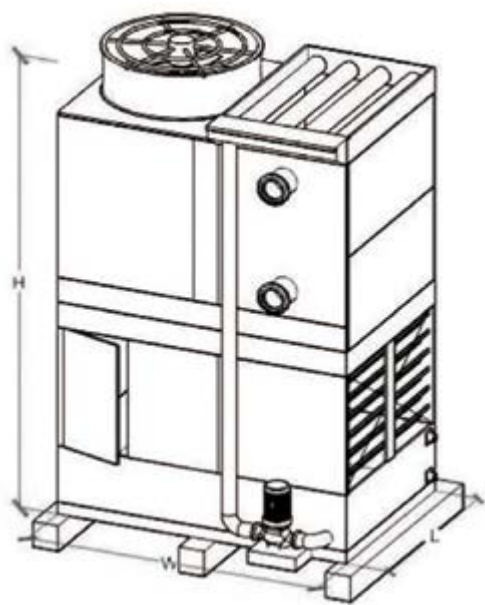
适用于温度较高（例如50-35℃），温差较大（ $\Delta T=5-20^\circ\text{C}$ ）的工业领域工艺水冷却。

Scope of application

Suitable for the cooling of process water with high temperature (such as 50-35 $^\circ\text{C}$), and big temperature difference ($\Delta T=5-20^\circ\text{C}$) in the industrial field.

工程数据-I-II Parameters table-I-II

单箱体形式 & 双箱体形式 SINGLE BOX FORM & TWO BOXES FORM



基础方案：混凝土平面或条形

所有冷却塔均自带底部型钢，可直接放置于承重的水平地面或如上图作少量混凝土基础。

Foundation scheme: Concrete plane or concrete bar

All cooling towers are equipped with steel bottom. It can be placed directly on the level ground or concrete foundation shown in the above figure.

型号 Model	流量 m³/h flow 37-32°C	风机参数 Fan		喷淋泵 Spew Pump		进出口径 mm Inlet & outlet caliber	运输重量 Kg Shipping	运行重量 Kg Operating weight	外形尺寸 mm L × W × H	基础尺寸 mm Foundation size
		功率 kW Power	风量 m³/h Air flow rate	功率 kW Power	水量 m³/h Water volume					
FBS-33R1*	20	2.2	30000	0.75	25	65	1850	3080	1785 × 2380 × 4220	1985 × 2580
FBS-50R1*	30	3.0	46000	1.1	32	80	2550	3880	1785 × 2380 × 4220	1985 × 2580
FBS-67R1*	40	4.0	60000	1.5	45	100	3150	4290	1785 × 2380 × 4200	1985 × 2580
FBS-83R1*	50	5.5	65000	1.5	45	100	3680	5100	1925 × 2380 × 4220	2125 × 2580
FBS-100R1*	60	5.5	75000	2.2	65	100	3850	5500	1925 × 2380 × 4240	2125 × 3180
FBS-117R1*	70	7.5	75000	2.2	65	100	4950	7980	1925 × 2380 × 4220	2125 × 3180
FBS-133R2	80	4.0 × 2	120000	3.0	100	100	5080	8050	3490 × 2380 × 4240	3690 × 2580
FBS-150R2	90	5.5 × 2	130000	3.0	100	100	5280	8250	3490 × 2380 × 4240	3690 × 2580
FBS-167R2	100	5.5 × 2	130000	3.0	100	125	5580	8900	3490 × 2380 × 4240	3690 × 2580
FBS-209R2	125	7.5 × 2	150000	4.0	130	125	5750	9100	3770 × 2580 × 4870	3970 × 2780
FBS-250R2	150	7.5 × 2	174000	4.0	130	100 × 2	6550	9850	3770 × 2980 × 4870	3970 × 3180

注：带*号的塔形，可根据需要并联

1、型号说明：FBS-150R2T(G/S) F: 抽风式 B: 闭式 S: 混流高效型 150R:150 冷吨 2: 双模块 T(G/S): 表冷器材质。

2、参考工况：介质为净水，干球 31.5°C，湿球 27°C，大气压 99.4Kpa，水侧污垢系数为 0.086m²°C/kW。

3、S型适用于温差 Δt=5-20°C 工业领域水温较高或温差较大的工业冷却。

4、上表是基于表冷器为热浸镀锌钢管的数据。

5、更多合理选型，请联系我公司。

Note: tower models with*** can be in parallel connection according to user's need.

1. Model Description: FBS-150R2T (G/S) F:exhaust type B:closed type S:mixed flow efficient type 150R:150RT 2: double modules T(G/S):the surface cooler material.

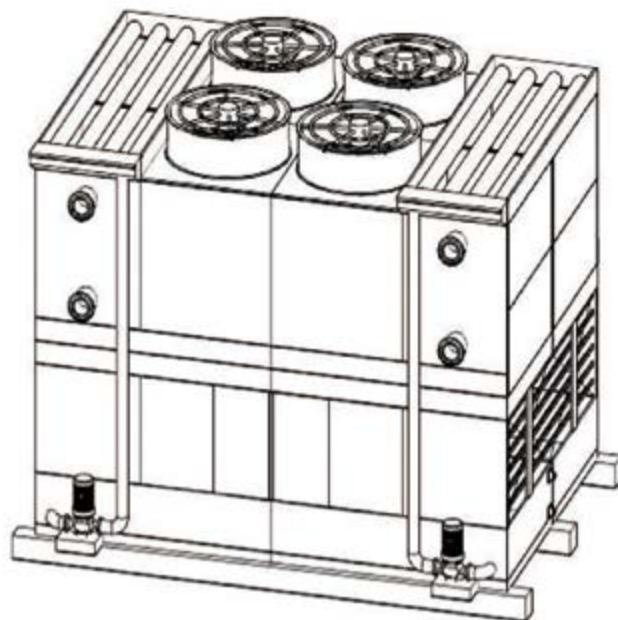
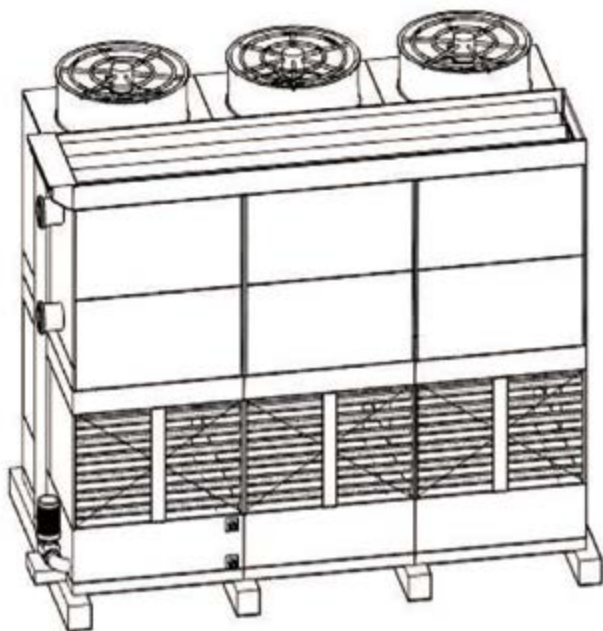
2.Reference working conditions: the medium is water, dry bulb temperature 31.5 °C ,wet bulb temperature 27°C , atmospheric pressure 99.4Kpa, water side fouling coefficient 0.086m²°C /kW.

3.S-type is for the temperature difference Δ t=5-20 °C high temperature industrial water cooling

4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe

5. For more reasonable selection, please contact us.

叁箱体形式 & 双拼模块形式 THREE BOXES FORM & DOUBLE COMBINATION



所有冷却塔均自带底部型钢，可直接放置于承重的水平地面或如上图作少量混凝土基础。

All cooling towers are equipped with steel bottom. It can be placed directly on the level ground or concrete foundation shown in the above figure.

型号 Model	流量 m³/h flow 37-32°C	风机参数 Fan		喷淋泵 Spew Pump		进出口径 mm inlet & outlet caliber	运输重量 Kg Shipping	运行重量 Kg Operating weight	外形尺寸 mm L × W × H	基础尺寸 mm Foundation size
		功率 kW Power	风量 m³/h Air flow rate	功率 kW Power	水量 m³/h water volume					
FBS-292R3	175	5.5 × 3	225000	5.5	180	100 × 2	6890	10900	5610 × 2580 × 4910	5810 × 2780
FBS-333R3	200	7.5 × 3	261000	5.5	180	125 × 2	7350	11200	5610 × 2580 × 4910	5810 × 2780
FBS-375R3	225	7.5 × 3	261000	5.5	180	125 × 2	7880	11800	5610 × 2980 × 4910	5810 × 3180
FBS-417R3	250	7.5 × 3	300000	7.5	250	125 × 2	8860	12600	6000 × 3000 × 4910	6200 × 3200
FBS-500R4	300	7.5 × 4	348000	4.0 × 2	300	100 × 4	10600	13900	7050 × 2980 × 4910	7250 × 3180
FBS-583R4	350	7.5 × 4	400000	5.5 × 2	360	100 × 4	12500	15800	7450 × 3000 × 4910	7650 × 3200
FBS-667R4 I	400	11.0 × 4	480000	5.5 × 2	360	125 × 4	13900	18900	7450 × 3000 × 4910	7650 × 3200
FBS-667R4 II	400	7.5 × 6	522000	5.5 × 2	360	125 × 4	14700	224200	5610 × 5160 × 4910	5810 × 5360
FBS-750R5 I	450	7.5 × 5	500000	7.5 × 2	500	125 × 4	15600	20500	8630 × 3000 × 4910	8830 × 3200
FBS-750R5 II	450	7.5 × 6	522000	7.5 × 2	500	125 × 4	15760	23600	5610 × 5960 × 4910	5810 × 6180
FBS-833R5 I	500	11.0 × 5	600000	7.5 × 2	500	125 × 4	16900	23900	9280 × 3000 × 4910	9480 × 3200
FBS-833R5 II	500	7.5 × 6	600000	7.5 × 2	500	125 × 4	17720	25200	5610 × 6840 × 4910	5810 × 7040

注：带*号的塔形，可根据需要并联

- 1、型号说明：FBS-333R3T(G/S) F: 抽风式 B: 闭式 S: 混流高效型 333R: 333冷吨 3: 叁模块 T(G/S): 表冷器材质。
- 2、参考工况：介质为净水，干球 31.5°C，湿球 27°C，大气压 99.4Kpa，水侧污垢系数为 0.086m²/kW。
- 3、S 型适用于温差 $\Delta t=5-20^{\circ}\text{C}$ 工业领域水温较高或湿差较大的工业冷却。
- 4、上表是基于表冷器为热浸镀锌钢管的数据。
- 5、更多合理选型，请联系我公司。

Note: tower models with*** can be in parallel connection according to user's need.

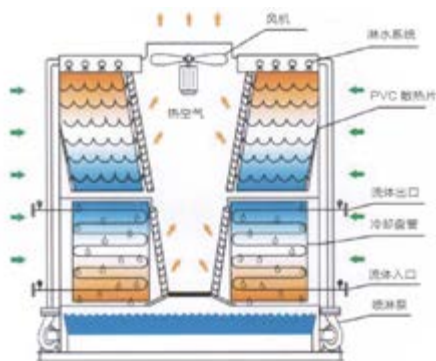
1. Model Description: FBS-333R3T(G/S) F: exhaust type B: closed type S: mixed flow efficient type 333R: 333RT 2: Triple modules T(G/S): the surface cooler material.
2. Reference working conditions: the medium is water, dry bulb temperature 31.5 °C ,wet bulb temperature 27 °C , atmospheric pressure 99.4Kpa, water side fouling coefficient 0.086m²/kW.
3. S-type is for the temperature difference $\Delta t=5-20^{\circ}\text{C}$ high temperature industrial water cooling
4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe.
5. For more reasonable selection, please contact us.

H型（横流低噪型） Type H (cross flow low noise type)

工作原理 Working principle

流体在盘管中流动，盘管外壁被喷淋水包裹，流体的热量通过管壁传递，与水 and 空气形成饱和湿蒸汽，热量由风机排入大气，水分被挡回集水槽循环喷淋，喷淋水在循环的过程中通过 PVC 散热片降低水温，与新鲜入风形成风水同向流动，盘管主要依靠显热传导方式。

The fluid flows in the coil, and the outer wall of the coil is wrapped with spray water. The heat of the fluid is transferred through the tube wall, forming a saturated hot and humid steam after encountering water and air. The heat is discharged into the atmosphere by the fan, and the water is blocked back to the collecting tank for circulation spray. In the process of circulation, the spray water reduces the water temperature through the PVC radiator, and flows in the same direction with the fresh inlet air. Coil mainly relies on sensible heat conduction.



热空气 hot air
PVC 散热片 PVC radiator
流体入口 fluid inlet
风机 Fan
流体出口 fluid outlet
喷淋泵 spray pump
喷淋系统 shower system
冷却盘管 cooling coil



显著特点（H型）Striking featulle (Type H)

工作效率高

横流低噪声产品、盘管双边布置，设计出更大的空气流动空间，风机喷口最大化，增大空气流通面，采用低转速宽叶面航空机翼风叶，降低风压，做到较低的噪音值。

High efficiency
Cross-flow low noise product; double sides coil arrangement; having a larger air flow space; maximized fan nozzle to increase the air flow surface; low rotation speed, wide blade and aviation wing shaped blade to reduce wind pressure and noise.

防止结垢

喷淋水的温度可控制低于容易结垢的水平以下，换热管湿润更完全，所以减少结垢的效果明显。

Prevent scaling
The temperature of spray water can be controlled below the level of easy scaling, and the heat exchange tube is wetted more completely, so the effect of reducing scaling is obvious.

维护方便

巨大的塔内空间，为设备的例行检修提供变革性的便利，可通过检修门进入塔内维护，关键部位盘管、喷淋系统的维护可以更直接更方便。

Convenient maintenance
The huge space in the tower provides revolutionary convenience for the routine maintenance of the equipment. We can enter into the tower for maintenance through the access door. The maintenance of the key parts of the coil and the spray system can be more direct and convenient.

适用范围

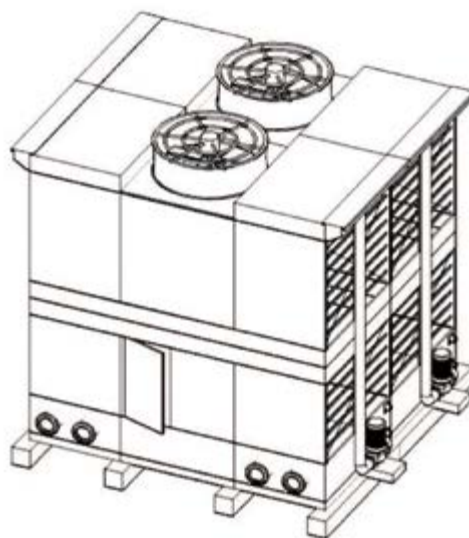
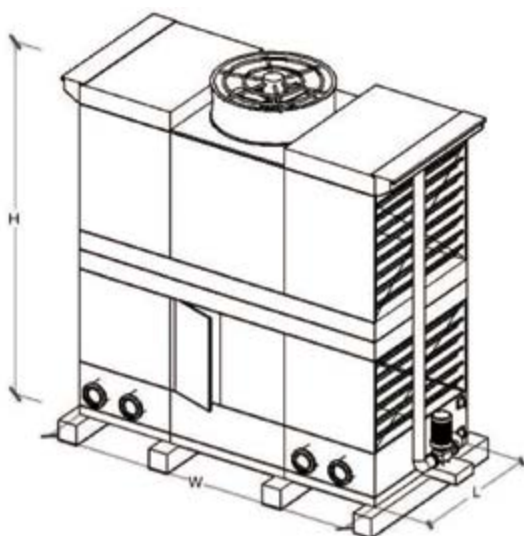
产品模块化工厂组装，单模块再分拆更小的上、下机箱，便于运输及现场吊卸，便于生产管理提高效率；对于噪声要求较严格，温差 $\Delta t=5-15^{\circ}\text{C}$ 项目的冷却。适合选用本机

型。
Scope of application
Modular factory assembly, single module split into smaller upper and lower boxes for easy transportation, on-site lifting & unloading, production management and high efficiency; stricter requirements for noise; this model suitable for the temperature difference $\Delta t=5-15^{\circ}\text{C}$ project cooling.

工程数据-I-II Parameters table-I-II

单箱体形式 & 多箱体形式

SINGLE BOX FORM & SEVERAL BOXES FORM



基础方案：混凝土平面或条形

所有冷却塔均自带底部型钢，可直接放置于承重的水平地面或如上图作少量混凝土基础。

Foundation scheme: Concrete plane or Concrete bar

All cooling towers are equipped with steel bottom. It can be placed directly on the level ground or concrete foundation shown in the above figure.

型号 Model	流量 m³/h flow 37-32°C	风机参数 Fan		喷淋泵 Spew Pump		进出口径 mm inlet & outlet caliber	运输重量 Kg Shipping	运行重量 Kg operating weight	外形尺寸 mm L × W × H	基础尺寸 mm Foundation size
		功率 kW Power	风量 m³/h Air flow rate	功率 kW Power	水量 m³/h water volume					
FBH-42R1*	25	2.2 × 1	30000	0.75 × 1	25	65	1250	2200	1550 × 2690 × 2600	1750 × 2890
FBH-83R1*	50	4.0 × 1	50000	1.1 × 1	50	80	2000	3225	1750 × 3270 × 3385	1950 × 3470
FBH-125R1*	75	5.5 × 1	65000	1.5 × 1	75	100	2210	3800	2150 × 3570 × 3415	2350 × 3770
FBH-166R1*	100	7.5 × 1	87000	2.2 × 1	100	125	2650	4550	2350 × 3870 × 3485	2550 × 4070
FBH-208R2	125	4.0 × 2	100000	1.5 × 2	125	100 × 2	3200	6800	3900 × 3270 × 3385	4100 × 3430
FBH-250R2	150	5.5 × 2	130000	1.5 × 2	150	100 × 2	3800	7500	4300 × 3570 × 3385	4500 × 3770
FBH-292R2	175	5.5 × 2	130000	2.2 × 2	200	100 × 2	4200	9200	4300 × 3570 × 3415	4500 × 3770
FBH-333R2	200	7.5 × 2	174000	2.2 × 2	200	125 × 2	5500	12000	4700 × 3870 × 3470	4900 × 4070
FBH-417R3	250	5.5 × 3	195000	1.5 × 3	225	100 × 3	6200	13500	6450 × 3570 × 3370	6650 × 3770
FBH-500R3	300	7.5 × 3	261000	2.2 × 3	300	125 × 3	7500	17500	7050 × 3870 × 3470	7250 × 4070
FBH-583R4	350	5.5 × 4	348000	2.2 × 4	400	100 × 4	8200	19500	8600 × 3570 × 3370	8800 × 3770
FBH-666R4	400	7.5 × 4	348000	2.2 × 4	400	125 × 4	9500	22000	9400 × 3870 × 3470	19600 × 4070

注：带*号的塔形，可根据需要并联

1、型号说明：FBH-208R2T(G/S) F:抽风式 B:闭式 H:横流低噪型 208R:208冷吨 2:双模块 T(G/S):表冷器材质。

2、参考工况：介质为净水，干球 31.5℃，湿球 27℃，大气压 99.4Kpa，水侧污垢系数为 0.086m²℃/kW。

3、H型适用于温差 Δt=5-15℃项目冷却。

4、上表是基于表冷器为热浸镀锌钢管的数据。

5、更多合理选型，请联系我公司。

Note: tower models with "*" can be in parallel connection according to user's need.

1. Model Description: FBH-208R2T(G/S) F:exhaust type B:closed type H:cross flow low noise type 208R:208RT 2: Double modules T(G/S):the surface cooler material.

2.Reference working conditions: the medium is water, dry bulb temperature 31.5 °C ,wet bulb temperature 27 °C , atmospheric pressure 99.4Kpa, water side fouling coefficient 0.086m²℃/kW.

3.H-type is suitable for the temperature difference Δt=5-15 °C project cooling.

4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe

5. For more reasonable selection, please contact us.



冷却塔系列产品
Cooling tower series products

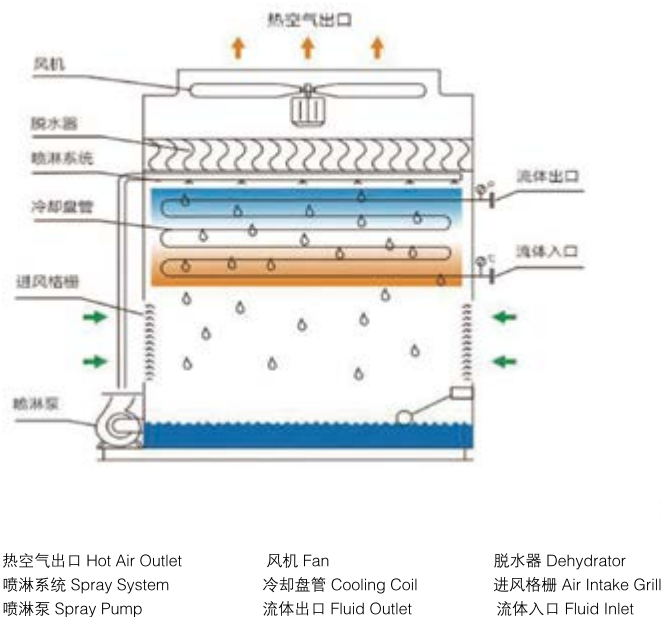
N型（逆流紧凑型）

Type N (countercurrent compact type)

工作原理 Working principle

N型冷却塔的进风形式为底部进风，与下落的喷淋水逆向交替形成饱和湿热空气，热量由顶部风机排出，水分由脱水器挡回集水槽循环使用。

The inlet air form of N type cooling tower is the bottom inlet air, which alternately forms saturated warm and hot air in reverse direction with the falling spray water. The heat is discharged by the top fan, and the water is blocked back to the collecting tank for recycling by the dehydrator.



显著特点（N型） Striking featulle (Type N)

结构紧凑

N型冷却塔结构紧凑，散热面积更大，占地面积更小，此外还生产微型塔，最小的仅为10RT的冷量。

N-type cooling tower has compact structure, larger heat dissipation area and smaller land occupation. Micro-towers are also produced, with the smallest cooling capacity of only 10RT.

可提供辅机配套

对于一些小型冷却项目，我们把冷却塔与循环水泵部系统及控制系统制作连接在一起，形成一个成套的整体机型，方便用户使用。

Provide auxiliary equipment
For some small cooling projects, we connect the cooling tower with the circulating water pump system and control system together to form a complete set of integrated models, which is convenient for users to use.

适用范围

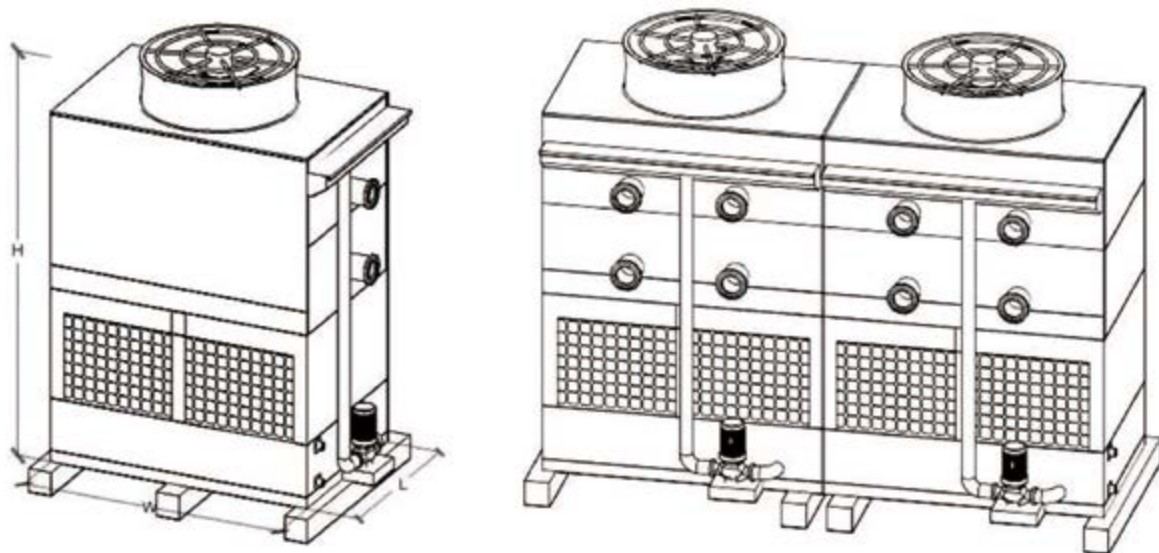
适用于被冷却的流体温度较低或温差较小的项目（水温 $< 45^{\circ}\text{C}$ $\Delta t = 5-10^{\circ}\text{C}$ ）。

Scope of application
It is suitable for the project where the temperature of the cooled fluid is low or the temperature difference is small (water temperature $< 45^{\circ}\text{C}$ $\Delta t = 5-10^{\circ}\text{C}$).

工程数据-I-II Parameters table-I-II

单箱体形式 & 多箱体形式

SINGLE BOX FORM & SEVERAL BOXES FORM



基础方案：混凝土平面或条形

所有冷却塔均自带底部型钢，可直接放置于承重的水平地面或如上图作少量混凝土基础。

Foundation scheme: Concrete plane or Concrete bar

All cooling towers are equipped with steel bottom. It can be placed directly on the level ground or concrete foundation shown in the above figure.

型号 Model	流量 m ³ /h flow 37-32°C	风机参数 Fan		喷淋泵 Spew Pump		进出口径 mm Inlet & outlet caliber	运输重量 Kg Shipping	运行重量 Kg Operating weight	外形尺寸 mm L × W × H	基础尺寸 mm Foundation size
		功率 kW Power	风量 m ³ /h Air flow rate	功率 kW Power	水量 m ³ /h Water volume					
FBN-42R1*	25	2.2	30000	0.75	25	43	1045	1770	1550 × 1850 × 3000	1700 × 1700
FBN-83R1*	50	4.0	50000	1.1	50	45	1760	2870	2000 × 2350 × 3200	2200 × 2200
FBN-125R1*	75	5.5	65000	1.5	75	50	2650	4500	2000 × 2950 × 3350	2200 × 2700
FBN-166R1*	100	7.5	90000	2.2	100	63	3530	5200	2500 × 2950 × 3500	2700 × 2700
FBN-208R1*	125	11.0	125000	2.2	100	68	3900	5900	2500 × 2950 × 4200	2700 × 2700
FBN-250R2*	150	5.5 × 2	130000	1.5 × 2	150	58	5570	7960	4000 × 2450 × 4200	4200 × 2200
FBN-292R2	175	7.5 × 2	180000	2.2 × 2	200	62	6000	8500	4000 × 2950 × 4200	4200 × 2700
FBN-333R2	200	7.5 × 2	180000	2.2 × 2	200	65	6500	10000	5000 × 2950 × 4200	5200 × 2700
FBN-416R3	250	5.5 × 3	195000	1.5 × 3	250	68	9500	15850	6000 × 2950 × 4500	6200 × 2700
FBN-500R3	300	7.5 × 3	270000	2.2 × 3	300	65	10000	16500	6000 × 3100 × 4500	8200 × 3200
FBN-583R4	350	7.5 × 4	360000	2.2 × 4	400	66	11500	20500	8000 × 3100 × 4500	8200 × 3200
FBN-666R4	400	7.5 × 4	360000	2.2 × 4	400	67	12500	22000	8000 × 3100 × 4500	8200 × 3200

注：带*号的塔形，可根据需要并联

1、型号说明：FBH-250R2T(G/S) F:抽风式 B:闭式 N:逆流紧凑型 250R:250冷吨 2:双模块 T(G/S):表冷器材质。

2、参考工况：介质为净水，干球 31.5°C，湿球 27°C，大气压 99.4Kpa，水侧污垢系数为 0.086m²/kW。

3、H 型适用于温差 Δt=5-15°C 项目冷却。

4、上表是基于表冷器为热浸镀锌钢管的数据。

5、更多合理选型，请联系我公司。

Note: tower models with "*" can be in parallel connection according to user's need.

1. Model Description: FBH-250R2T(G/S) F:exhaust type B:closed type N:counter current compact type 250R:250RT 2: Double modules T(G/S): surface cooler material.

2. Reference working conditions: the medium is clean water, dry bulb temperature 31.5 °C ,wet bulb temperature 27°C , atmospheric pressure 99.4Kpa, water side fouling coefficient 0.086m²/kW.

3.H-type is suitable for the temperature difference Δt=5-15 °C project cooling.

4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe

5. For more reasonable selection, please contact us.

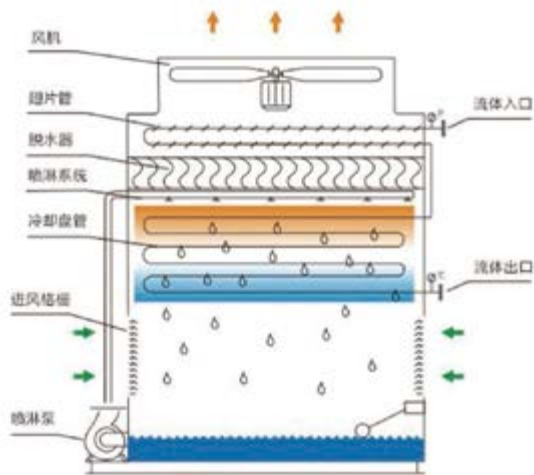
N II 型（逆流干、湿两用节水型）

Type N II (countercurrent dry, wet double purpose water saving type)

工作原理 Working principle

N II 型是闭式冷却塔与翅片式空冷器相结合的模式，干式、湿式相结合或交替运行，高温环境下启用喷淋水模式，而大多数时间仅仅采用翅片式空冷器和光盘管的散热模式，节约用水和减少维护。

N II type is a mode combining closed cooling tower and finned air-cooled heat exchanger. Dry type and wet type combine to run or run alternately. Water spraying mode is used in high temperature environment, and most of the time heat dissipation mode of finned air-cooled heat exchanger and coil is used, which saves water and reduces maintenance.



风机 Fan 翅片管 Finned tube 脱水器 Dehydrator
喷淋系统 Spray System 冷却盘管 Cooling Coil 进风格栅 Air Intake Grill
喷淋泵 Spray Pump 流体出口 Fluid Outlet 流体入口 Fluid Inlet



显著特点（N II型） Striking featulle (Type N II)

适用范围

适用于干旱少水地区，夏季高温、温热天气的天数不多，冬季和过度季节较多，适用于干、湿球温度较低，被冷却的流体温度较高，一般比干球温度大15℃以上的项目。

Scope of application

The cooling tower is suitable for dry places where there are not much high temperature, warm and hot weather in summer but having a longer winter and transitional seasons. It is for projects having low dry and wet bulb temperature and high fluid temperature to be cooled which is normally 15℃ higher than dry bulb temperature.

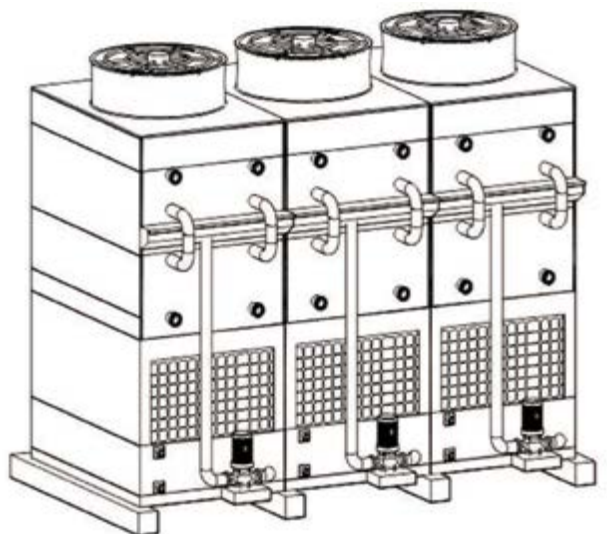
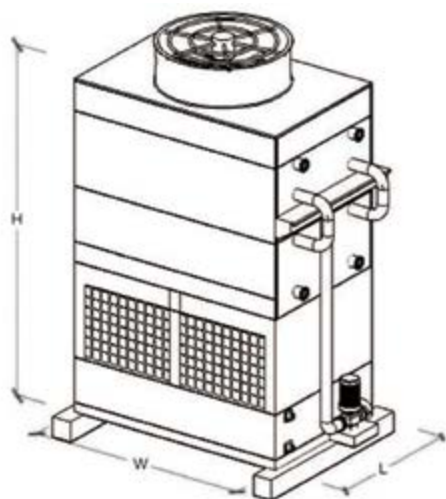
结构特点

换热机理先进，将水蒸发与空气冷却，传热与传质过程融为一体；利用空气冷却的翅片预冷段和水膜减压蒸发段相结合，强化换热预冷后流体进入蒸发温度低，不易结垢，将空冷的通风机和蒸发的引风机合二为一；能效比高，节水节电，运行费用低，性能优异，能达到更高工艺参数要求，投资效率高。

Structural characteristics

Advanced heat transfer mechanism; integrate water evaporation and air cooling, heat transfer and mass transfer together; combine the fin precooling section of air cooling with the evaporation section of water film decompression; the fluid enters the low evaporation temperature after the enhanced heat exchange precooling; not easy to scale, and the air-cooled ventilator and the evaporated induced draft fan are combined into one; high energy efficiency ratio, water and electricity saving, low operating cost, excellent performance; can meet higher process parameter requirements; have high investment efficiency.

工程数据-I-II Parameters table-I-II

单箱体形式 & 多箱体形式
SINGLE BOX FORM & SEVERAL BOXES FORM

基础方案：混凝土平面或条形

所有冷却塔均自带底部型钢，可直接放置于承重的水平地面或如上图作少量混凝土基础。

Foundation scheme: Concrete plane or Concrete bar

All cooling towers are equipped with steel bottom. It can be placed directly on the level ground or concrete foundation shown in the above figure.

型号 Model	流量 m ³ /h flow 37~32℃	风机参数 Fan		喷淋泵 Spew Pump		进出口径 mm Intak export DN	压力损失 Kpa Pressure loss	运输重量 Kg Shipping	运行重量 Kg Operating	外形尺寸 mm L × W × H	基础尺寸 mm Foundation size
		功率 kW Power	风量 m ³ /h Air flow rate	功率 kW Power	水量 m ³ /h Amount of water						
FBN II-42R1*	25	5.5 × 1	65000	0.75	25	65	65	3500	5500	1500 × 1850 × 4500	1700 × 1700
FBN II-83R1*	50	7.5 × 1	90000	1.1	50	80	78	3500	5500	2000 × 2350 × 4500	2200 × 2200
FBN II-125R1*	75	15 × 1	110000	1.5	75	100	80	4000	6800	2000 × 2850 × 4700	2200 × 2700
FBN II-166R1*	100	15 × 1	150000	2.2	100	125	85	4500	8000	2500 × 2950 × 4700	2700 × 2700
FBN II-208R1*	125	18.5	180000	2.2	100	125	90	5500	9000	2500 × 2950 × 5000	2700 × 2700
FBN II-250R02	150	11 × 2	220000	1.5 × 2	150	100 × 2	92	7500	12200	4000 × 2450 × 5000	4200 × 2200
FBN II-292R02	175	15 × 2	300000	2.2 × 2	200	100 × 2	95	8500	13500	5000 × 2450 × 5000	5200 × 2700
FBN II-333R02	200	15 × 2	300000	2.2 × 2	200	125 × 2	98	9000	15000	5000 × 2950 × 5000	5200 × 2700
FBN II-416R03	250	11 × 3	330000	1.5 × 3	250	100 × 3	100	11500	18500	6000 × 2950 × 5000	6200 × 2700
FBN II-500R03	300	15 × 3	450000	2.2 × 3	300	125 × 3	103	13500	21000	6000 × 3100 × 5000	6200 × 3200
FBN II-583R04	350	15 × 4	600000	2.2 × 4	400	125 × 4	103	15500	25000	8000 × 3100 × 5000	8200 × 3200
FBN II-666R04	400	15 × 4	600000	2.2 × 4	400	125 × 4	111	18000	30000	8000 × 3100 × 5000	8200 × 3200

注：带 * 号的塔形，可根据需要并联

1、型号说明：FBN II-250R2T(G/S) F: 抽风式 B: 闭式 N II: 逆流干、湿两用节水型 250R:250 冷吨 2: 双模块 T(G/S): 表冷器材质。

2、参考工况：介质为净水，干球 31.5℃，湿球 27℃，大气压 99.4Kpa，水侧污垢系数为 0.086m²/kW。

3、N II 型适用于被冷却的流体温度较高，一般比干球温度大 15℃ 以上的项目。

4、上表是基于表冷器为热浸锌钢管的数据。

5、更多合理选型，请联系我公司。

Note: tower models with "*" can be in parallel connection according to user's need.

1. Model Description: FBN II -250R2T(G/S) F: exhaust type B: closed type N II: counter current dry and wet double purpose water saving type 250R:250RT 2: Double modules T(G/S): the surface cooler material.

2. Reference working conditions: the medium is water, dry bulb temperature 31.5 °C ,wet bulb temperature 27°C , atmospheric pressure 99.4Kpa, water side fouling coefficient 0.086m²/kW.

3. N II type is suitable for the project cooling whose high temperature fluid needed to be cooled which is 15 °C higher than the dry bulb temperature.

4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe.

5. For more reasonable selection, please contact us.

先进的传热技术

Advanced heat transfer technology



如何解决表冷器结垢问题

How to solve the surface cooler scaling problem

如何便利修理表冷器

How to conveniently repair the surface cooler?

如何有效解决表冷器排水

How to effectively resolve the drainage problem of surface coolers?

如何解决昂贵的材料成本

How to solve the expensive cost of material

答案是先进的表冷器技术！根据不同的使用工况，不同的环境条件，不同的投资理念，众多种类中选择合适的表冷器。我们有多年的用户使用经验，遇到各类问题，经过调整改善，能够根据客户的实际情况，客观做出最合适的表冷器选择方案。

The answer is advanced surface cooler technology! According to different working conditions, environment and investment concepts, there are many types of surface cooler for you to choose. We have many years of experience and have encountered all kinds of problems. After adjustment and improvement, the most appropriate surface cooler selection scheme can be made according to the actual situation of customers.

- 1、不锈钢 (S) : 采用 SUS304 不锈钢焊管，耐压设计 2.5Mpa，耐腐蚀能力强。
- 2、铜管 (T) : 采用 TP2Y 型优质紫铜管，耐压设计 1.6Mpa，换热效果好，回收残值高，防冻要求高。
- 3、钢管 (G) : 采用优质碳钢管制成，经过分级和整体三次 2.5Mpa 强压试验，整体在高温熔槽里进行浸锌处理，确保钢盘的防腐性能。换热效果和材料成本占优，但必须采取较严格的循环系统动力方案，避免空气进入。
- 4、板片式换热器交换表面的波节形状改变导致相邻板片间的通道呈缩放型，外部流体在板片间的流动截面交替的增大和减小，从而提高换热效果。板片采用焊缝的形式，这种焊接流道使板片厚度变得更薄，且受压能力更高。在侧边增加加强筋，消除板片的应力，以减少板片的变形。

1. Stainless steel (S): adopt SUS304 stainless steel welded pipe, designed pressure tolerance --2.5Mpa, strong corrosion resistance.
 2. Copper pipe (T) : adopt TP2Y type high-quality copper pipe, designed pressure tolerance --1.6Mpa, good heat exchange effect, high residual recovery value, high anti-freezing ability.
 3. Steel pipe (G) : made of high quality carbon steel pipe; after classification and whole three times of 2.5MPa strong pressure test, the pipe is zinc-dipped in the high temperature melting sink to ensure its anticorrosion performance. The heat exchange effect and material are superior, but a more strict circulation system dynamic scheme must be adopted to avoid air entry.
- The change of the shape of the wave node on the exchange surface of the plate heat exchanger results in a scaled channel between adjacent plates. The flow cross sections of external fluid between plates alternately increase and decrease, thus improving the heat transfer effect. The welded seam plate makes the plate thinner and has a higher anti-pressure capacity. Reinforcing bars are added to the side to eliminate the stress of the plate to reduce the deformation of the plate.



不锈钢管管式表冷却器
Stainless steel tube type surface cooler



紫铜管管式表冷却器
Copper tube type surface cooler



热浸镀锌钢管管式表冷却器
Hot dip galvanized steel tube type surface cooler



板片式换热器
Plate type heat exchanger



配置说明

Configuration instructions

	部件名称 Name of parts	选项、品牌、材质 Option, brand, material				
塔体外壳 Tower case	 箱体板 Shell material	☐ 国产镀锌板 Domestic galvanized plate	☐ 进口镀锌板 Imported galvanized plate	☐ Z700进口镀锌板 Z700 imported galvanized plate		
	 喷淋集水槽 The spray tank	☐ 进口镀铝镁锌板 Imported magnesium aluminum galvanized plate	☐ SUS 304不锈钢 SUS304 stainless steel	☐ 玻璃钢 FRP		
	 底座、支架 Base, support	☐ Q235热浸锌碳钢 Q235 hot dip galvanized carbon steel		☐ SUS 304不锈钢 SUS304 stainless steel		
表冷器 Surface cooler	 盘管式 Coil type	☐ 碳钢焊接管 Carbon steel welded pipe	☐ T2 紫铜管 T2 copper tube	☐ SUS 304不锈钢 SUS304 stainless steel	☐ 316L不锈钢 316L stainless steel	☐ 翅片管 finned tube
	 管箱式 Pipe-chest type					
	 板式 Plate type	☐ Q235热浸锌碳钢 Q235 hot dip galvanized carbon steel		☐ SUS 304不锈钢片 SUS304 stainless steel plate		
风机驱动 Fan drive	 风机叶轮 Fan impeller	☐ 恒山正源 Hengshan Zhengyuan	☐ 同济明新 Tongji Mingxin	☐ 前川 Qianchuan		
		☐ 铝合金中空翼型叶片 Aluminum alloy hollow airfoil blade	☐ 高强度碳纤维叶片 High strength carbon fiber blades	☐ 铝合金叶片 Aluminium alloy blade		
	 电机 Motor	☐ Siemens	☐ ABB	☐ 万高 Wangao	☐ 前川 Qianchuan	☐ 亿能 Yineng
		☐ 防护等级IP55; 绝缘等级F级 Protection class IP55; Insulation class F				
	 电机轴承 Motor bearing	☐ TNT	☐ NSK	☐ SKF		
喷淋泵 Spray pump	 泵品牌 Pump brands	☐ 东方 East	☐ 荏本 Renben	☐ 川源 Chuanyuan	☐ 卓杰 Zhuojie	☐ 凯泉 Kaiquan
	 电机 Motor	☐ Siemens	☐ ABB	☐ 威尔 Weier	☐ 大同 Datong	☐ 南方 Nanfang
		☐ 防护等级IP55; 绝缘等级F级 Protection class IP55; Insulation class F				
	 轴承 Bearing	☐ TNT	☐ NSK	☐ SKF		
		☐ 免维护、免注油 Maintenance free, oil free		☐ 定期维护注油 Regular maintenance and oil injection		
	 叶轮、过流部分 Impeller, overcurrent part	☐ Q235碳钢 Q235 carbon steel		☐ SUS 304不锈钢 SUS304 stainless steel		

设计、选型时应该考虑的事项

Matters needing attention in design and model selection

使用环境的要求 Demand of working environment

- 1、应避免酸性排气、爆炸性粉尘、严重煤烟、超量水蒸汽等影响冷却塔运行的场所。
 - 2、固定在建筑物旁边，应与进风口保持足够的距离（1-5M，根据型号而定）。
 - 3、安放在井式围墙里，应警惕湿热空气回流造成排热故障，特殊环境可考虑引风装置。
1. Should avoid places where there is acidic exhaust, explosive dust, serious soot and excessive water vapor which can affect the cooling tower's operation.
2. If installed near buildings, distance from the air inlet and these buildings should be kept at 1-5M based on different models.
3. If installed in the well-typed wall, wet and hot air backflow may cause heat discharge problem. Special environment should consider using air induction device.

冷却流体循环动力方案 Cycle power scheme of cooling fluid

用于闭式冷却塔封闭循环的流体，要防止过多的空气混入流体中造成管道内部的氧化腐蚀。因此应对循环系统管道内部防腐、经济性能、操作性能等多方面综合考虑；铜管、不锈钢管作为冷却盘管，系统管道为不锈钢或其他耐腐蚀材料的，可考虑全封闭或半封闭运行；钢管作为冷却盘管，系统管道为耐腐蚀能力差的材料时，必须全封闭运行。管道系统应在管路的最高点安装排气阀，排出管道内的气体，也可以应客户需求加装自动排气装置。用户应该选用合适的循环动力配置方式，流体动力系统推荐采用方案如下：

半封闭简易型（如图 a）铜管或不锈钢管表冷器、内循环材质不考虑生锈腐蚀的系统，可以考虑该方式，简单易操作。

全封闭经济型（如图 b）高位水箱方式，需要放置于比所有管路高 1.2M 以上，要保持系统排气良好，系统不能有空气。

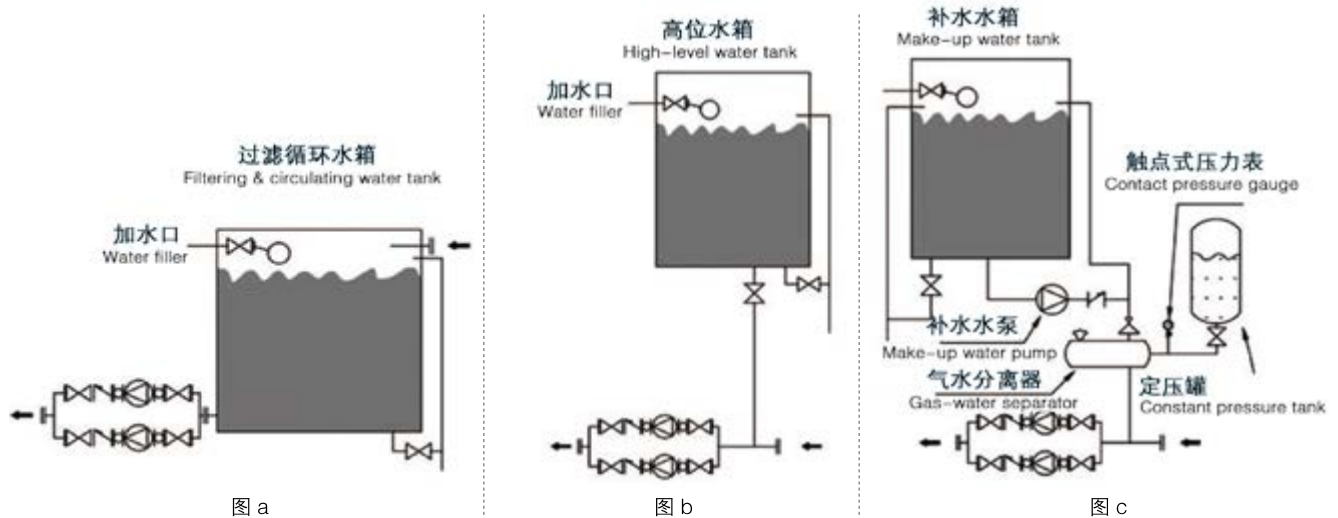
全封闭标准型（如图 c）带有气囊式膨胀罐的小型补给系统，安全可靠。

Too much air, which can cause the oxidative corrosion of the pipe, should be prevented from entering into the fluid used for closed circulation of closed cooling tower. Therefore, anti-corrosion, economic performance and operation performance of the circulation system pipeline should be considered comprehensively; Copper pipe and stainless steel pipe can be made as cooling coil. When the system piping is made of stainless steel or other corrosion resistant materials, the tower can operate fully closed or semi-closed. When the steel pipe is used as cooling coil and the system pipe has poor corrosion resistance ability, the operation must be completely closed. Exhaust valve should be installed at the highest point of the pipeline to discharge its gas, and automatic exhaust device can also be installed according to customer's requirement. The user should choose the appropriate cycle power configuration method. The recommended solution for fluid power system is as follows:

Semi-closed simple type (as shown in figure a) Copper tube or stainless steel tube surface cooler and internal circulation material having no corrosion or rusting problems can consider this way which is simple and easy to operate.

Fully closed economical type (as shown in figure b) High-level water tank should be placed at least 1.2m higher than all pipes, and the system should be well vented without air.

Fully closed standard type (as shown in figure c) Small supply system with airbag type expansion tank, safe and reliable.



配管问题 Tubing issue

- 1、配管、泵阀应安装在冷却塔运行水位以下，防止溢流和空气吸入；考虑设备安放位置时，应有足够的水泵扬程，应该考虑沿程的压力损失和冷却管盘的压力损失；
- 2、冷却塔的接口法兰压力设计为 1Mpa，所有管道应考虑吊架或支撑。
 1. Piping and pump valves should be installed below the operating water level of the cooling tower to prevent overflow and air inhalation; when considering the installation position of the equipment, there should be enough pump head, and the pressure loss along the way and the pressure loss of the cooling coil should be considered.
 2. The interface flange pressure of the cooling tower is designed to be 1MPa, and all pipes should be suspended or supported.

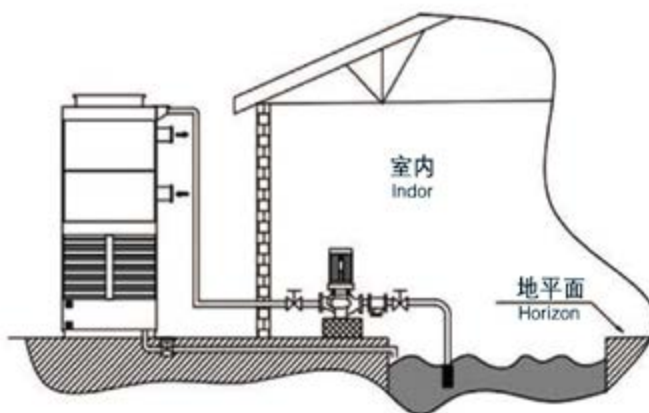
考虑盘管内流体的兼容性和补水 Compatibility of liquid (gas) and water supplement

- 1、闭式冷却塔需要冷却的流体，必须与冷却盘管具有兼容性，否则会导致盘管的腐蚀。
- 2、闭式的盘管内循环水，应符合盘管、生产工艺对水质的要求，可用软化水、除盐水或冷凝水等。
 1. The fluid that needs to be cooled in the closed cooling tower must be compatible with the cooling coil. Otherwise, it will lead to corrosion of the coil.
 2. Circulating water in the closed coil should meet the water quality requirement for the coil and production process. Softened water, desalted water or condensed water are all acceptable.

喷淋系统的要求 Requirements for sprinkler systems

- 1、闭式冷却塔的运行会有部分水蒸发，水中的矿物质和别的杂质积聚在水槽里，因此必须定期检查水质（PH 值：0.65–0.85）。
- 2、定期排污清洗，这样能较好的控制水质和防止结垢。水槽的清洗一般建议夏季每周一次，冬季二周一次；
- 3、喷淋水质要求：参照 GB50050–95 页工业循环冷却水处理设计规范，水质特别差的地区，应考虑净化（软化）处理，采用浸镀锌钢板水槽的，如果 PH 值超过 0.85 则需要采用钝化处理，（具体可与我公司联系或请教专业的水处理）
- 4、喷淋水的补充量： $(\text{蒸发量} \leq \text{流量的 } 0.8\%) + (\text{漂水率} \leq 0.1\%) + (\text{排污量} \leq 0.3\%) = (\text{循环流量的} \leq 1.2\%)$
- 5、喷淋系统防冻需要考虑以下三种方法之一：
 - 设置室内保温水箱（如下图），该水箱有足够的容量，停机时可把喷淋水全部回集保温。
 - 在喷淋水槽里设置加热器，一般采用浸没式电加热器或蒸汽盘管注热器。
 - 热系统停止运行时，把喷淋水排放干净。

1. The operation of closed cooling tower will have some water evaporation, and the minerals and other impurities in the water will accumulate in the sink, so the water quality must be checked regularly (pH value: 0.65–0.85).
2. Regular sewage drainage and cleaning to better control the water quality and prevent scaling. Cleaning of the sink is generally recommended once a week in summer and twice a week in winter.
3. Spray water quality requirements: refer to GB50050 page 95 of industrial circulating cooling water treatment design specification. Very poor-quality water in some areas should be purified (softened). When using dipped galvanized steel tank, the water whose PH value exceeds 0.85 should be passivated, (contact with our company or consult water treatment professionals for more information)
4. Spray water supplement : $(\text{evaporation} \leq 0.8\% \text{ of the flow}) + (\text{drifting ratio} \leq 0.1\%) + (\text{sewage drainage} \leq 0.3\%) = (\text{circulation flow} \leq 1.2\%)$
5. One of the following three methods should be considered for the anti-freezing of the spray system:
 - ① Set the indoor insulation water tank (as shown in the figure below) which has enough capacity. When the machine stops working, all the spray water can be collected back for insulation.
 - ② A heater is placed in the spray tank, usually a submerged electric heater or a steam coil heat injector.
 - ③ When the heat system stops running, drain the spray water clean.



容量控制 Volume control

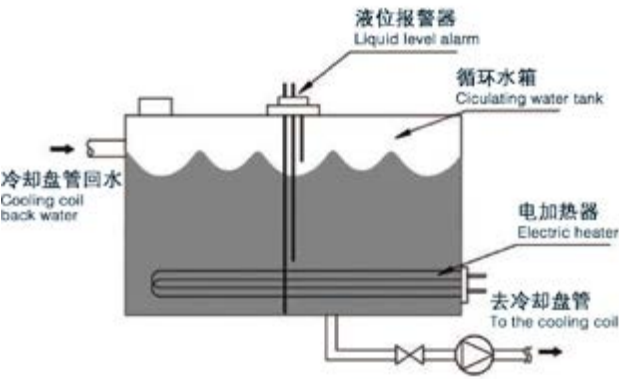
- 1、对于多台运行闭式冷却塔，可变化塔的运行台数；
 - 2、对于多台风机的塔，可变化风机运行台数；
 - 3、改变风机的运行转速或变频控制；
 - 4、变化喷淋水量（仅适合于喷淋水温 < 40℃）
1. For multiple operating closed cooling towers, the number of operating towers can be changed;
 2. For towers with multiple fans, the number of running fans can be changed;
 3. Change the running speed of the fan or frequency conversion control;
 4. Change the spray water volume (only suitable for spray water temperature < 40℃)

闭式冷却塔的盘管防冻问题 Coil anti-freeze problem of the closed type cooling tower

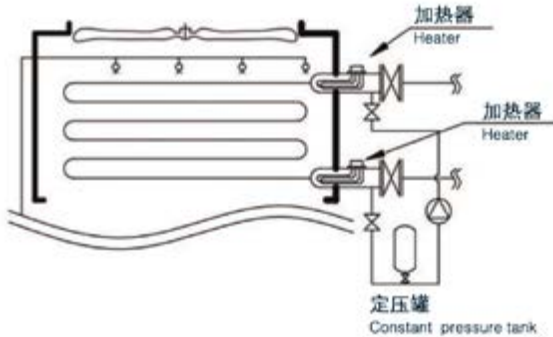
1、北方地区冬季低温时，密闭系统的循环水在没有热负荷的情况下，即使循环水保持流动也会发生结冰现象，必须有妥善的防冻措施，建议比较合适的有以下两种方式：

a、让循环水保持一定的热负荷，保证循环水温不低于 7℃（南方地区不低于 3℃即可），为保证这一热负荷，一般可在配管系统内设置浸没式电加热器或蒸汽盘管注热器；（如图一：在水箱里设置电加热器或如图二在管路里设置辅助加热器）同时保持密闭系统的循环水有最小流量。

1. When the temperature is low in winter in northern China, the circulating water in the closed system without heat load will freeze even if the circulating water keeps flowing. Therefore, proper anti-freezing measures must be taken. Two proper measures are as follows:
A. Keep the circulating water under a certain heat load to ensure that the circulating water temperature is not lower than 7℃ (not lower than 3℃ in the southern region). In order to ensure this heat load, the submerged electric heater or steam coil heat injector can be set in the pipe distribution system; (As show in Figure 1: Set an electric heater in the water tank or set an auxiliary heater in the pipeline as shown in Figure 2) At the same time, keep the closed system has at least the minimum circulating water flow.



图一



图二

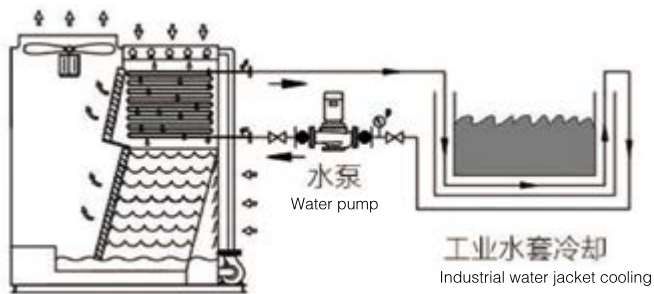
b、最有效的方法是在密闭系统内加注防冻液，加注比例可参考下表，具体实施防冻措施可与我公司共同制定方案。

B. The most effective method is to add antifreeze in the sealed system, and the proportion of filling the antifreeze can refer to the following table. The specific implementation of antifreeze measures can be jointly formulated with our company.

乙二醇 (wt%) glycol	0	10	20	30	40	50	58
凝固点 (℃) freezing point	-0.0	-3.5	-8	-15	-24	-36	-48

典型应用

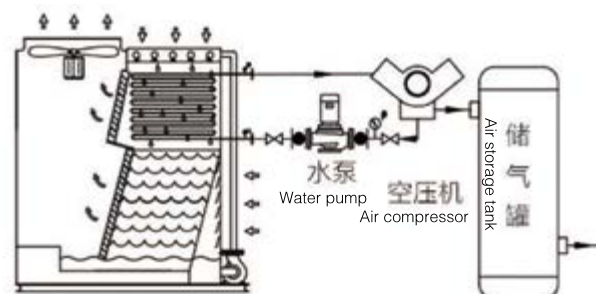
Typical applications



钢厂及铸造厂

淬火槽冷却
轧钢机冷却
感应炉冷却
连铸冷却

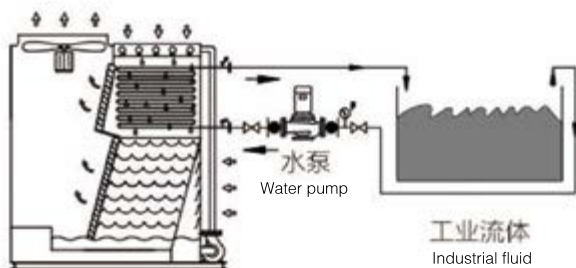
Steel mills and foundries
Quenching tank cooling
Rolling mill cooling
Induction furnace cooling
Continuous casting cooling



制造业

空气压缩机水套冷却
变压器冷却
注塑模具冷却
发动机水套冷却

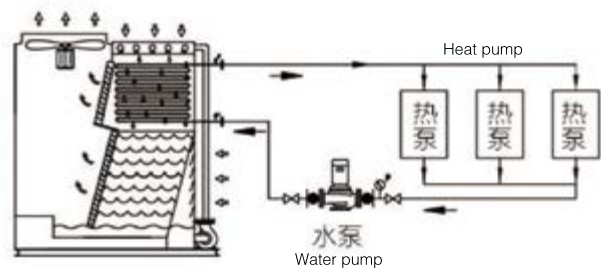
manufacturing
Air compressor water jacket cooling
Transformer cooling
Injection mold cooling
Engine water jacket cooling



工业流体

液压油
淬火油
电镀溶液
工艺流体

Industrial fluid
Hydraulic oil
Quench oil
Electroplating solution
Process fluid



空调系统

水源式热泵系统
辅助供冷系统
机房空调系统

AC system
Water source heat pump system
Auxiliary cooling system
AC system for computer rooms

X(C)W 消（除）雾式冷却塔 FUME ABATEMENT TYPE COOLING TOWER

消（除）雾冷却塔产品优势

Advantages of fume abatement type cooling tower

亚太集团生产的消雾塔，采用两种消雾方式，用户可以自行选择任意一种方式。都可以达到需要的消雾目的。

Plume abatement cooling towers manufactured by Yatai Group take two methods to abate plume. Users can choose either method. Both can achieve the purpose.

消雾原理 Fume abatement principle

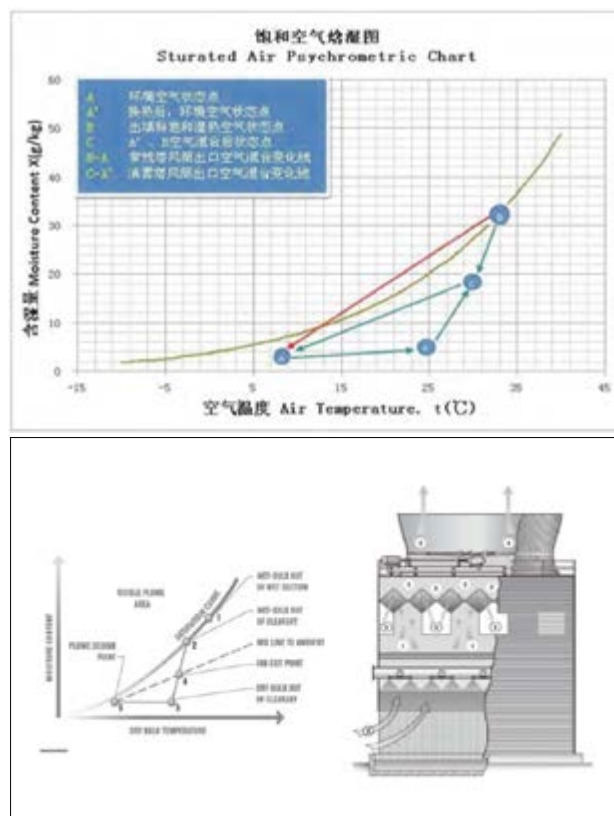
如图所示，图中曲线为饱和空气焓湿图。常规冷却塔（湿式塔），B-A 线为出填料的饱和湿热空气 B 与环境干冷空气 A 混合的变化线，在焓湿图的上方，故而产生大量的羽雾。消雾冷却塔在冷却塔塔体部分的气室层安装高效冷凝模块，利用风机的抽力，将环境的冷空气 A（冷源）引入塔内，并与上塔热水（热源）进行换热，换热后的热空气 A' 再与出填料的饱和湿热空气 B 混合，混合后为筒出口空气 C（相对 B 点，露点和含湿量均下降，为不饱和空气），此时空气 C 再与环境冷空气 A 混合的变化线（羽雾稀释曲线）C-A 在饱和空气焓湿图的下方，即无羽雾产生，此为消雾的原理。

As shown in the figure, the curve in the figure is the saturated air psychrometric chart. For conventional cooling towers (wet tower), line B-A is the changing line of saturated wet and hot air B of the packing mixed environmental dry and cold air A. Because it is at the top of the enthalpy diagram, there is a large amount of plume. The high efficiency condensation module is installed in the air chamber layer of the cooling tower body. The cold air A of the environment (cold source) is introduced into the tower by the suction force of the fan to exchange heat with the hot water of the upper tower (heat source). After heat exchange, hot air A' mixes with the saturated hot and wet air B of the packing to form air C (compared with point B, the dew point and moisture content both decrease and it is unsaturated air). At this time, the change line C-A (plume dilution curve) of air C mixed with environment cold air A is below the saturated air enthalpy moisture diagram. There is no plume fog. This is the principle of fog elimination.

冷凝模块型式 Condensing module type

- 1、消雾模块摆放在塔内部收水器上方，不允许摆放至收水器以下位置。
- 2、模块采用菱形布置，不得水平、矩形放置。
- 3、换热模块基片厚度不得低于 0.4mm，保证优良的换热效率；
- 4、通道要求有冷、热两个通道，通道只间密封严密，均匀布置在冷凝模块下部，便于进风均匀流畅，不允许冷风直接从塔体一侧进入模块。
- 5、进风通道采用玻璃钢材质，厚度不小于 1.7mm，必须保证通道的密封性；
- 6、通道的风量调节装置材质为玻璃钢，厚度不小于 3mm，要求能灵活多角度调节，且能实现塔外操作；通道风量调节手动控制；
- 7、百叶窗材质铝合金，百叶窗角度可调节，且能实现塔外操作，百叶窗手动控制；
- 8、模块冷热通道必须保证密封性完好；
- 9、消雾模块采用模块化生产，便于安装与检修；
- 10、模块必须保证在塔内整塔均匀布置。消雾模块必须塔内满布。
- 11、模块式换热消雾模块式如下图不得偏离。

1. The fume abatement module is placed above the water collector inside the tower, and is not allowed to be placed below the water collector.
2. Modules adopt the diamond layout, not placed horizontally or rectangularly.
3. The thickness of the substrate of the heat exchange module shall not be thinner than 0.4mm



to ensure excellent heat exchange efficiency;

4. Two channels, hot and cold channels, are required. Space between these two channels are tightly sealed and evenly arranged at the lower part of the condensing module to facilitate uniform and smooth air intake and not allow cold air to enter the module directly from the side of the tower body.
5. The air inlet passage is made of glass fiber reinforced plastic (FRP) with a thickness of no less than 1.7mm. The sealing of the passage must be guaranteed.
6. The air volume regulating device of the channel is made of glass fiber reinforced plastic (FRP) with a thickness of no less than 3mm, which requires flexible multi-angle adjustment and can realize operation from outside the tower; air volume in the channel can be adjusted manually;
7. Louvers are made of aluminum alloy, adjustable angles, manual operation from outside of the tower;
8. The cold and hot channels of the module must be sealed in good condition;
9. Fume abatement module adopts modular production, easily installed and maintained;
10. The module must be uniformly placed in the tower. Fume abatement modules must fully fill the tower.
11. Modular heat exchange fume abatement module shall be placed as the following figure without any deviation.

模块简介 Introduction of the module

1、消雾模块

冷却塔模块放置于冷却塔的顶端呈菱形摆放，该模块材质为 PVC 真空吸塑而成，设计为冷热两个风道，制作为片与片粘结而成，外框为碳钢组装成块。根据冷却塔需求现场成品运输块与块拼接组成。配套模块的摆放设计有模块顶棍吊筋，材质为碳钢，模块底座为玻璃钢且设计有橡塑棉，模块放置上面更好的不会因空气对流形成抖动。

1. Fume abatement module

The cooling tower module is placed on the top of the cooling tower in a diamond shape. The material of the module is made of vacuum formed PVC, and it is designed into two air channels of cold and hot. It is made of sheet and sheet bonding together, and the outer frame is carbon steel assembled into blocks. According to the demand of cooling tower, it is assembled by blocks on the site. The supporting module placement design has the module top bar hanging bar, and its material is carbon steel. The material of module base is FRP with rubber and plastic cotton. Module placed above the cooling tower will not form jitter due to air convection.

2、冷却塔风道

冷却塔风道分为冷风道热风道，风道框架材质为不锈钢 304，围板为玻璃钢。

摆放于冷却塔模块下方，收水器上方。安装时做到密封严实，不准冷热空气混流，冷风道两侧对准于进风口，下方安装冷却塔翻板。

2. Air duct of cooling tower

Cooling tower air duct is divided into cold air duct and hot air duct. Material of air duct frame is 304 stainless steel, and material of envelop plate is FRP.

It is placed below the cooling tower module and above the water collector. It should be tightly sealed during installation. During installation, hot air shouldn't mix with cold air. Cold air duct should face the air inlet. Cooling tower turning plate is installed below.

3、冷却塔翻板

冷却塔翻板放置于冷风道内，收水器上方，冷风道进风口下方，作用于阻断热气流进入冷风道，可灵活翻转。当外界气温高于内部时则成开启状态，与冷风道进风口百叶窗成反方向操作，当百叶窗开启，翻板成关闭状态，当百叶窗关闭，翻板成开启状态。框架结构材质为不锈钢，翻板材质为玻璃钢。

3. Turning plate of the cooling tower

The turning plate of the cooling tower is placed in the cold air duct, above the water collector and below the air inlet of the cold air duct, which blocks the hot air from flowing into the cold air duct and can turn flexibly. When the outside temperature is higher than the inside, it is in the open state. It operates in the opposite direction with the air inlet louver of the cold air duct. When the louver is open, the shutter is in the closed state and when the louver is closed, the shutter is in the open state. The frame structure is made of stainless steel, and the turning plate is made of FRP.

4、冷却塔冷风口百叶窗

百叶窗安装于冷风口进风口外侧，作用于控制冷空气进入冷却塔内。

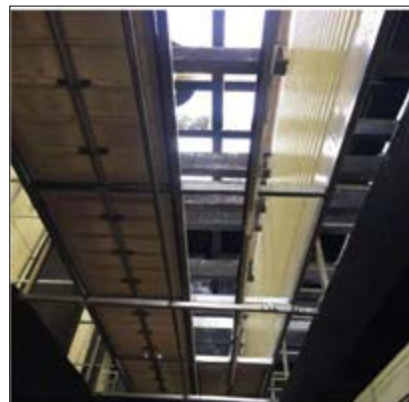
材质为铝合金，固定在进风口外框上面，外框材质为碳钢，控制系统为手动开启，多用于春、秋、冬成开启状态。夏季当外界气温高于冷却塔内部则成关闭状态。

4. Louvers at the cold air opening of the cooling tower

The louver is installed outside the air inlet of the cold air opening to prevent the cold air entering the cooling tower. Its material is aluminum alloy, fixed on the air inlet frame. Frame material is carbon steel. The control system is operated manually. It is in the open state mostly in spring, autumn and winter. In summer, when the outside temperature is higher than the inside temperature, the louver is closed.

根据我公司在国内消雾冷却塔的实际情况，以及使用所在地全年各温度变化情况和消雾工艺进行计算分析，最终都能满足风机出口空气消雾效果达到 CCTI TL001-2014 中规定的标准。冷却塔节水消雾装置全年 7 个月运行（按 4900 小时计算），节水率为 $\geq 17\%$ 。

According to the actual experience of our company in the domestic plume abatement cooling tower, as well as the calculation and analysis of the annual temperature changes and fume abatement process in the location, it can finally meet the fume abatement effect of the air at the fan outlet to meet the standards stipulated in CCTI TL001-2014. Water saving fume abatement device of the cooling tower runs 7 months throughout the year (calculated according to 4900 hours), water saving rate is $\geq 17\%$.





冷却塔系列产品
Cooling tower series products

APPLICATION 蒸发式冷凝器 EVAPORATIVE CONDENSER



蒸发式冷凝器应用领域 Application field of evaporative condenser

ZSX/ZNX 系列蒸发式冷凝器产品广泛应用于能源化工、医药、煤炭、电力、工业制冷、啤酒、饮料、食品的低温加工、冷藏、建筑空调制冷等领域。
ZSX/ZNX series evaporative condensers are widely used in energy and chemical industry, medicine, coal, electric power, industrial refrigeration, beer, beverage, food low temperature processing and cold storage, building air conditioning refrigeration, etc.

化工医药 Chemical medicine

甲醇 / 合成氨压缩机间冷却
合成器冷却冷凝
天然气或焦煤气转化工序气体冷却
净化工序冷凝冷却
尿素的尾气回收
汽轮机的蒸汽冷凝
乙酸乙酯冷凝
Cooling of compressor room of methanol/ammonia
Cooling and condensing of synthesizers
Gas cooling for natural gas or coke gas conversion processes
Cooling and condensing of purification process
Urea gas recovery
Steam condensing of steam turbine
Condensing of ethyl acetate

食品工业 Food industry

家禽屠宰场
多用途冷库 / 冷却和冷冻系统
啤酒和饮料工业
工业制冰 / 溜冰场
冰淇淋厂
鱼类加工业
A poultry slaughterhouse
Multi-purpose cold storage/cooling and freezing system
The beer and beverage industry
Industrial ice/skating rink
Ice cream factory
Fish processing industry

蒸发式冷凝器的优点

Advantages of evaporative condenser

相对传统方式的冷凝器，蒸发式冷凝器具有以下几方面的优势：

Compared with the traditional condensers, evaporative condensers have the following several advantages:

节水 Water saving

蒸发式冷凝器充分利用水的汽化潜热，因而大大减少了水的损耗，对于我国水资源严重不足的北方地区有重要的意义。

Evaporative condenser makes full use of the latent heat of vaporization of water, so it greatly reduces the loss of water. It is of great significance for the northern region of China, where water resources are seriously insufficient.

节能 Energy saving

同风冷式冷凝器相比，蒸发式冷凝器冷凝温度较低。而冷凝温度每升高 1℃，单位制冷量的耗电量将增加 3%~3.5%，所以蒸发式冷凝器总功耗也会显著降低，节能效果明显。

Compared with the air-cooled condenser, the condensing temperature of the evaporative condenser is lower. When the condensing temperature increases by 1℃, the power consumption per unit cooling capacity will increase by 3%~3.5%. So the total power consumption of evaporative condenser will also be significantly reduced. The energy saving effect is obvious.



结构紧凑，节省投资费用

Compact structure, save investment cost

由于不需另外设置冷却塔，故整个装置结构紧凑、体积小、占地面积少。蒸发式冷凝器通过把冷凝器盘管和冷却塔结合成一体节省了宝贵的空间。由于蒸发冷凝器高效率地利用蒸发式冷却换热方式，所以能有效地减少换热面积、风扇的数量和风机电机功耗。

Because there is no need to set up cooling tower, the whole device has the advantages of compact structure, small volume and less area occupation. Evaporative condenser saves valuable space by combining condenser coil and cooling tower together. Because evaporative condenser makes efficient use of evaporative cooling heat transfer method, the heat transfer area, number of fans and the power consumption of fan motor are effectively reduced.

不污染环境

Not polluting the environment

不少化工厂以往采用管壳式或淋激式冷凝器，夏季时由于冷凝压力过高，常采用“放空降压”，但每次放出的并不是不凝性气体，其中含有大量的氨气，据有关部门取样分析，有时高达 90%，不仅氨损失相当严重，还造成环境污染。但用蒸发式冷凝器后不存在这种。

Many chemical plants used to adopt the shell and tube condenser or atmospheric condenser. In summer, due to the high condensing pressure, "venting depressurization" is often used. But the vented gas is not a non-condensable gas, having a lot of ammonia in it which sometimes is up to 90% of the vented gas according to the sample analysis made by relevant departments. Not only the loss of ammonia is quite serious, but also causes environmental pollution. But there is no such thing after using evaporative condenser.



冷却塔系列产品
Cooling tower series products

顺流系列

Down current series

ZSX 工作原理

ZSX working principle

工作流体在盘管中流动，盘管外壁被喷淋水包裹，流体的热量通过管壁传递，与水 and 空气形成饱和湿蒸汽，热量由风机排入大气。水份被挡回水槽循环喷淋，消耗量极少。喷淋水在循环的过程中通过 PVC 散热片降低水温，与新鲜入风形成风水同向流动。

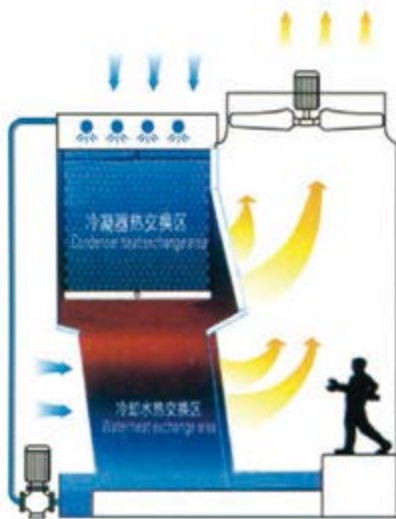
The working fluid flows in the coil. The outer wall of the coil is wrapped by spray water. The heat of the fluid transferring through the pipe and form saturated wet and hot steam with the water and air. The heat is discharged into atmosphere by the fan. Water is blocked back to the tank for circulation spraying with very little consumption. In the process of circulation, the spray water temperature is lowered through the PVC radiator. The circulating water and fresh inlet air flow in the same direction.

维修方便

Convenient maintenance

巨大的维修空间，为设备的检修提供变革性的便利，可在运行条件下通过检修门入塔内维修。

Huge maintenance space provides revolutionary convenience for the maintenance of equipment. We can enter into the tower for maintenance through the access door under the condition of operation.

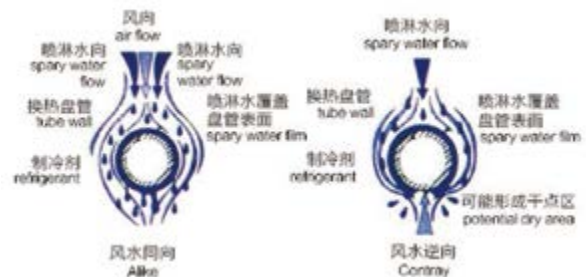


防止结垢

To prevent the fouling

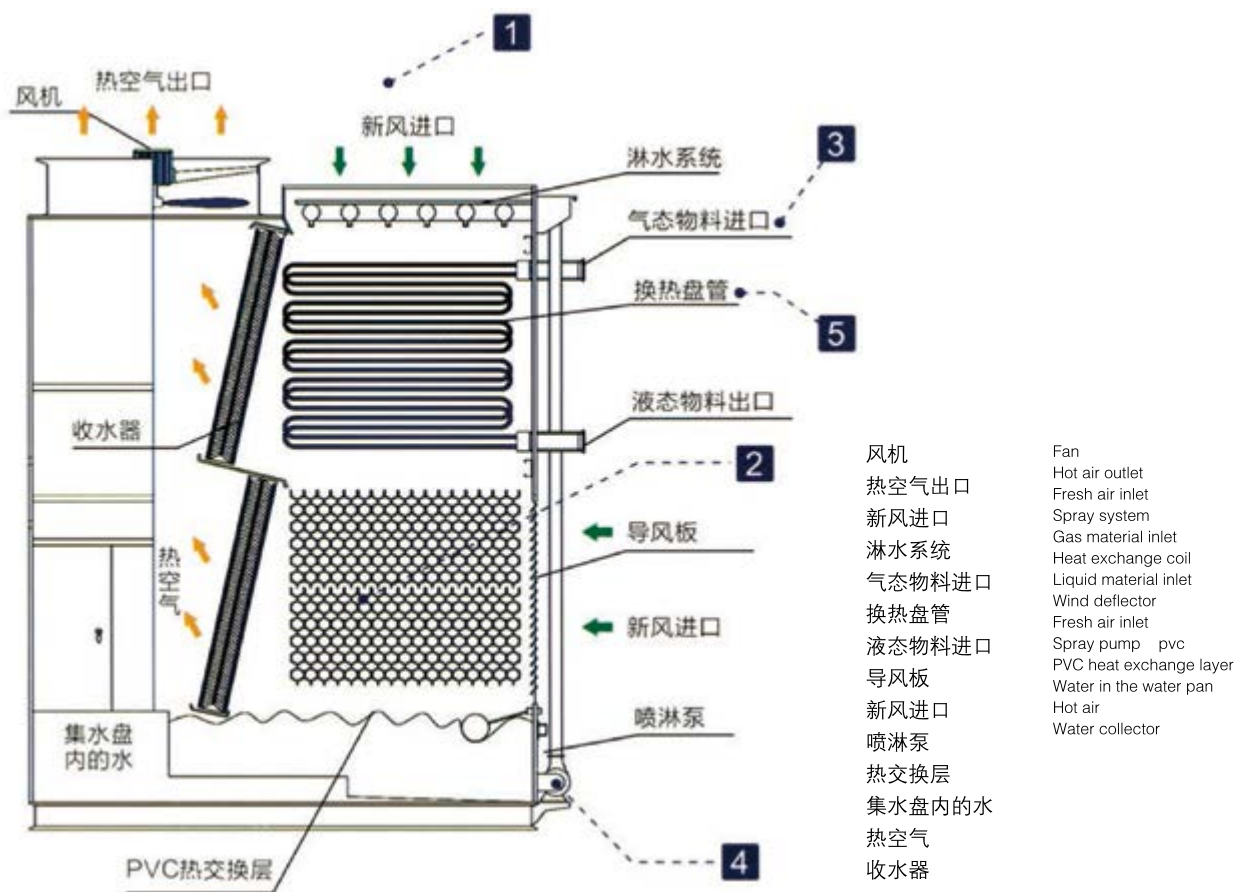
管外表是由空气和喷淋水以同向、平行和向下的路径流过盘管表面，维持了完全管外覆盖。从而消除了有利于水垢形成的干点。

Air and spray water flow through the coil surface in the same, parallel, and downward paths, totally covering the surface of the coil. They eliminate the dry point which can easily cause scaling.



蒸发式冷凝器工作原理图

Working diagram of evaporative condenser



- 1、冷却后的喷淋水和较热的工艺介质之间的温度差增大，增加了热交换效率，从而降低了盘管的散热面积及体积。该特征更进一步减缓了在盘管表面形成结垢的趋势，这是由于较低温度的水在结垢后形成的合成物上提供了较高的溶解度。
- 2、循环喷淋水从盘管上落至 PVC 换热填料上并于 PVC 换热填料上与第二股新鲜空气通过蒸发和显热式的热传导进行冷却。
- 3、平行的气流和水使传统设计的设备在管子底部出现的能够导致结垢的干点现象降低到最低程度。
- 4、将流量最小为 6.5L/S 的水通过水泵喷洒到盘管表面上，以确保主要的传热表面上连续浸润的状态，从而提高热传导率，并将结垢的可能性降到最低。
- 5、盘管段一方面通过新鲜空气的蒸发冷却作用来散热，另一方面更大程度的通过预冷却喷淋水的显热冷却作用来散热。降低盘管表面结垢的可能性。

1. The increased temperature difference between the cooled spray water and the hotter process medium increases the heat exchange efficiency. Thus, the heat dissipation area and volume of the coil are reduced. This nature further slows down the tendency to scale on the surface of the coil, as the cooler water provides a higher solubility for the composite resulted by scaling.
2. The circulating spray water falls from the coil to the PVC heat exchange filling and is cooled with the second stream of fresh air on the PVC heat exchange filling through evaporation and sensible heat conduction.
3. The parallel air flow and water minimizes the dry spots that can lead to scaling at the bottom of the pipe with conventional design equipment.
4. Water with a minimum flow of 6.5L/S is sprayed onto the surface of the coil through the pump to ensure continuous infiltration of the main heat transfer surface, thus improving the thermal conductivity and minimizing the possibility of scaling.
5. On the one hand, the coil section dissipates heat through the evaporation of fresh air, and on the other hand, it dissipates heat through the sensible cooling of pre-cooling spraying water to a greater extent. The likelihood of scaling on the surface of the coil is reduced.

逆流系列 Countercurrent series

ZNX 工作原理 ZNX working principle

进风形式为底部逆流进风，与下落的喷淋水逆向交替形成饱和湿空气，热量由顶部风机排出，水分由特殊结构的脱水器收集水槽循环使用，内部空间没有换热填料，腾出更多的空间增加盘管的单位散热面积，结构更紧凑、占地小。

The air inlet form is bottom countercurrent air inlet, which reversely alternates with the falling spray water to form saturated wet and hot air. The heat is discharged by the top fan, and the water is collected by a special dehydrator back into water collection sink for recycling. There is no heat exchange filling in the internal space, which makes more space to increase the unit heat dissipation area for the coil, with a more compact structure and less land occupation.

结构更紧凑 Compact structure

由于减少了换热填料的空间，使得该类型设备结构更加紧凑，占地空间更小，运输安装方便。更适合用于环境恶劣的场所，如炼铁厂、铸造厂及各类厂矿企业。

Reduced space for heat exchange packing makes the structure of this type of equipment more compact. Its space occupation is much less, and the transportation and installation are convenient. It is more suitable for harsh environment such as ironworks, foundries and all kinds of mine factories.



换热设计出椭圆管，排列更为紧密，相比圆管流体充注量更少，同时可以降低空气的流动阻力。

Elliptical heat transfer tubes are more tightly arranged with less fluid filling than circular tubes, while reducing the air flow resistance.

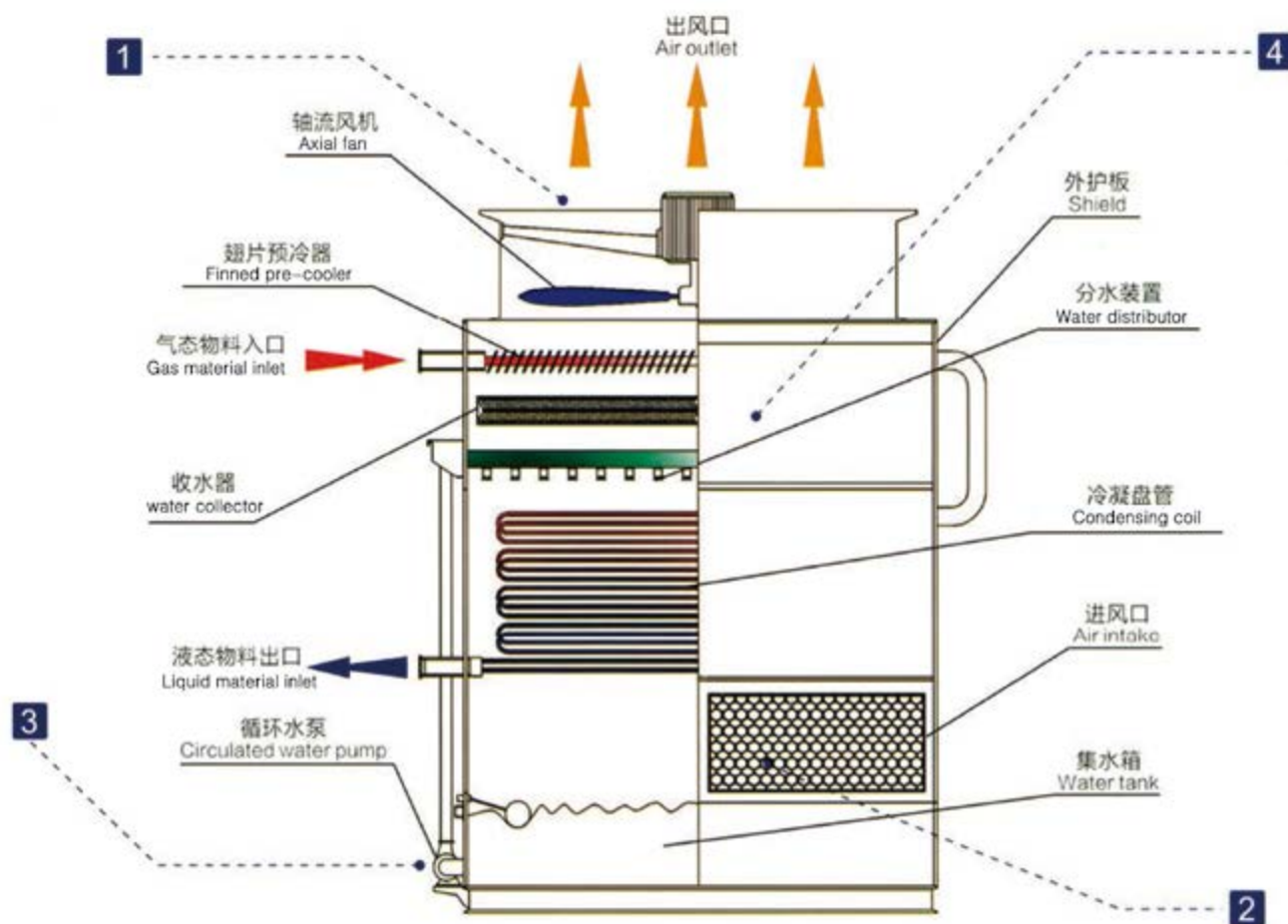


预冷翅片设计 Precooling fin design

可选择增加预冷翅片，实现高温预冷和低温停水，更适合严重缺水地区。

Precooling fins can be added to realize high temperature precooling and low temperature water shutdown, which is more suitable for areas with severe water shortage.

Working diagram of countercurrent evaporative condensers



4、管子内可能沉积可溶性污垢或污泥的条件下，可选择用可清洗式集箱盘管束。

4. Under the condition that soluble dirt or sludge may deposit in the pipe, the cleanable container type tube bank can be chosen.

蒸发式冷凝器结构及主要部件说明

Instruction of the structure and main parts of evaporative condenser

风机 Fan

ZSX/ZNX 系列蒸发式冷凝器采用蒸发冷专用轴流风机，前倾式风叶结构设计，流线型入口风筒，风阻小、风量大、噪音低、性能佳、效率高。无皮带传动的结构，减少了传动部件，并采用全封闭自冷式低噪音专用电机，具有体积小、重量轻、性能佳、运行可靠、经久耐用等优点。

ZSX/ZNX series evaporative condenser adopts special axial flow fan for evaporative cooling with forward inclined blade structure design and streamlined inlet stack. Its advantages include small air resistance, large air volume, low noise, good performance and high efficiency. No belt-transmission structure reduces transmission parts. The fully enclosed self-cooling type low noise motor has many features like small volume, light weight, good performance, reliable operation, and long durability.

循环泵 Circulating pump

专用户外型循环泵其优质机械密封不受转向限制，无泄漏，寿命长。特殊配置的进口轴承保证机泵长期可靠运行，具有小功率，大流量，低噪音，性能优异等特点。

The high-quality mechanical seal of special outdoor circulating pump is not restricted by steering, having long life and no leakage. Specially configured imported bearings ensure the long-term reliable operation of the pumps. Advantages include small power, large flow, low noise, and excellent performance.

采用镀锌锌板 Adopt aluminum galvanized plate

产品外壳采用优质、高强度镀锌锌板，它是当今耐腐蚀性能最强的板材之一，使用寿命是普通镀锌板的 3-6 倍。并且具有阻热性强、耐热性高、外表美观等优点。

The shell of the product is made of high quality and high strength aluminum galvanized plate. It is one of the most corrosion-resistant plates today, and its service life is 3-6 times that of ordinary galvanized sheet. It has the advantages of strong heat resistance, high heat resistance and beautiful appearance.

冷凝盘管 Condensing coil

表冷器由优质的流体制成，盘管组的整体热浸锌处理，增强了盘管防腐能力，延长了使用寿命，盘管倾斜设计便于物料排出，盘管压力降低。

表冷器也可根据管内介质选用不锈钢、紫铜材质制作。

另外表冷器可根据工艺要求选用椭圆管、翅片管、波纹管、复合型表冷器等型式。

The surface cooler is made of high quality fluid tube. The whole hot dip galvanized treatment of the coil group enhances its corrosion resistance and prolongs its service life. The inclined design of the coil is convenient for material discharge and the pressure drop of the coil is lower. Surface coolers can also be made of stainless steel or red copper according to the medium in the pipe.

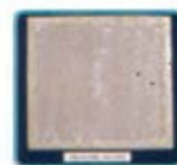
In addition, we can also choose elliptical tube, finned tube, corrugated tube and composite type surface coolers according to the technological requirements.



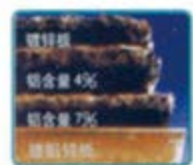
盐雾喷雾 1000 小时试验及曝晒试验
1000h salt spray test and sun exposure test



普通镀锌板
Common Galvanized steel



镀锌锌板
Aluminum zinc steel



镀锌板
铝含量 4%
铝含量 7%
镀锌锌板
历经 17 年户外曝晒试验
17 years of outdoor exposure test



管箱式

电子水处理仪

Electronic water treatment apparatus

配置先进的电子水除垢仪，其利用电子脉冲技术对循环水进行防垢除垢、杀菌灭藻的处理。您只需接通 220V 电源即可对循环水水质进行处理，有效的避免了盘管壁、填料上污垢的形成。

Equipped with advanced electronic water descaling instrument which uses electronic pulse technology to prevent scaling and descaling, sterilize and kill algae of circulating water. You only need to connect it to the 220V power supply to deal with the circulating water quality, effectively avoiding the formation of dirt on the coil wall and packing.

可拆式除水器

Detachable water separator

产品独创的可拆式除水器采用耐腐蚀 PVC 材料，其结构通过改变气流流向，能有效地去除从盘管中出来的湿空气水分，使水的飘逸率降低至 0.001% 以下。当清洗填料时，可方便的将除水器卸除。

The original detachable water separator is made of corrosion-resistant PVC material, and its structure can effectively remove the wet air moisture from the coil by changing air flow direction, so that water drifting rate can be reduced to less than 0.001%. When cleaning the packing, the water separator can be easily detached.

先进的水分配系统

Advanced water distribution system

产品冷却水喷淋系统采用大流量防堵塞的喷嘴，保证了布水的连续均匀喷洒在盘管表面上，在引风的作用下让水最大限度的覆盖于盘管表面，使水、空气与物料充分进行热交换，从而提高了传热效果。喷嘴扣接于喷淋支管上，当清洗喷嘴及喷淋支管时可方便将其拆卸。

Cooling water spray system adopts large-flow anti-clogging nozzle to ensure the continuous and uniform spraying of water on the coil surface. By the effect of suction wind, water will cover the coil surface to the largest extent. Water, air and material can fully exchange heat to improve heat transferring effect. The nozzle is buckled on the spray branch pipe, which can be conveniently disassembled when cleaning the nozzle and the spray branch pipe.

PVC填料热交换层

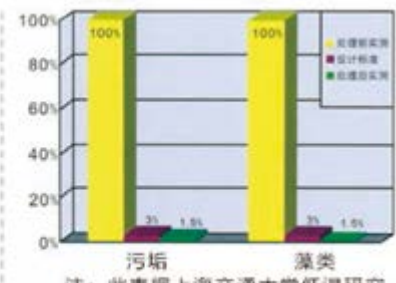
PVC packing heat exchange layer

特殊设计的 PVC 蜂窝式横流填料，捷径的横进风结构，使空气能迅速带走水中的热量。独特的填料流道，使水流在填料表面能形成大面积的流动水膜，延长了在填料里的冷却时间，提高了水冷却效果。具有风阻系数小、抗老化、不易变形等优点。

Specially designed PVC honeycomb cross flow packing and cross air intake structure let air to quickly take away the heat in the water. Unique packing channel enables water to form a large area of flowing water film on the surface of packing, prolonging the cooling time of the packing, and improve the water cooling effect. It has advantages of small wind resistance coefficient, anti-aging and no easy deformation.



电子水处理仪
Electronic water treatment apparatus



注：此表据上海交通大学低温研究与测试中心数据检测

Sludge Algae

Note: this table is compiled by data from Low Temperature Research and Testing Center of Shanghai Jiao Tong University.





冷却塔系列产品
Cooling tower series products

蒸发式冷凝器的选型

Model selection of evaporative condenser



设备选型 Equipment selection

确定系统总排放量：总排热量 = 管内介质冷凝汽化潜热 + 介质冷却的散热量（制冷系统可根据系统制冷量选型）；
确定设计条件：进出口温度、冷凝温度及当地的湿球温度；
查排热量修正系统表，确定修正系数；
确定修正排热量：修正排热量 = 总排热量 × 修正系数；
选择蒸发式冷凝器：从技术参数表中选择标准排热量等于或大于计算出的修正排热量的蒸发式冷凝器。

Determine the total emissions of the system: total exhaust heat = latent heat of medium condensation and vaporization in the tube + heat dissipation volume of medium cooling (for refrigeration system, its model can be selected according to the cooling capacity of the system);

Determine design conditions: inlet and outlet temperature, condensation temperature and local wet bulb temperature;

Check the table of heat correction system to determine the correction coefficient;

Determine the corrected heat emission: corrected heat emission = total heat emission volume × correction coefficient;

Select evaporative condenser: select the model whose standard heat emission volume equals to or above the calculated corrected heat discharge

举例 Example

(以常用氨制冷为例)

氨制冷系统总排热量为 1200kW。(压缩机制冷量 + 压缩机轴功率 = 总排热量)；

使用条件：冷凝温度 36℃，湿球温度 28℃；

查表，排热量校正系数为 1.34；

计算冷凝器的实际负荷：1200kW × 1.35 = 1620kW；

ZSX 选型表，选 ZSX-1765 型蒸发式冷凝器，其排热量 > 1620kW。

(Take common ammonia refrigeration as an example)

Total heat discharge of ammonia refrigeration system is 1200kW. (compressor cooling capacity + compressor shaft power = total heat emission);

Conditions of use: condensing temperature 36℃, wet bulb temperature 28℃;

Looking up in the table, the correction coefficient of heat emission is 1.34;

Calculate the actual load of condenser: 1200kW × 1.35 = 1620kW;

ZSX type selection table, choose ZSX-1765 evaporative condenser, the heat emission > 1620kW.

选型方法注意事项 Matters needing attention in model selection

设备配置表中的数据仅供参考；表中运行重量为设备重量加介质充注量及底部水盘贮水的重量；

用户非标准特殊要求可代为用户设计制造；表中的名义工况排热量是指冷凝温度为 37℃，使用地夏季湿球温度为 26℃时的数据。

The data in the device configuration table is for reference only; the operating weight in the table is the weight of the equipment, the filling volume of the medium and the weight of the water stored in the bottom water tray.

Non-standard special requirements of users can be designed and manufactured; The nominal working condition heat emission in the table refers to the data when the condensing temperature is 37℃ and the wet bulb temperature of the place of use in summer is 26℃.



R717排热量校正系数表 R 717 heat emission correction coefficient table

冷凝温度 (°C) Condensing temperature	空气进口湿球温度 (°C) Wet bulb temperature of air inlet																	
	10	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
29	0.80	0.87	0.95	1.07	1.12	1.21	1.31	1.44	1.59	1.78	2.04	2.40	2.95	/	/	/	/	/
30	0.75	0.81	0.90	0.98	1.04	1.11	1.19	1.28	1.41	1.55	1.76	1.99	2.36	/	/	/	/	/
31	0.71	0.75	0.82	0.91	0.95	1.01	1.08	1.15	1.24	1.35	1.51	1.69	1.93	2.29	/	/	/	/
32	0.68	0.72	0.77	0.82	0.89	0.93	0.99	1.05	1.13	1.22	1.33	1.49	1.65	1.89	2.24	/	/	/
33	0.63	0.68	0.72	0.78	0.81	0.87	0.91	0.97	1.02	1.10	1.19	1.29	1.43	1.61	1.84	2.18	/	/
34	0.61	0.64	0.69	0.73	0.77	0.80	0.84	0.89	0.94	1.00	1.07	1.15	1.27	1.41	1.58	1.81	2.11	/
35	0.58	0.60	0.64	0.69	0.71	0.74	0.78	0.81	0.87	0.92	0.98	1.04	1.13	1.23	1.37	1.52	1.76	2.05
36	0.56	0.58	0.61	0.65	0.68	0.70	0.73	0.77	0.80	0.83	0.90	0.95	1.02	1.11	1.21	1.35	1.50	1.74
37	0.52	0.54	0.58	0.61	0.63	0.65	0.68	0.71	0.74	0.78	0.81	0.88	0.93	1.00	1.08	1.18	1.34	1.48
38	0.50	0.52	0.56	0.59	0.61	0.62	0.64	0.67	0.69	0.72	0.75	0.80	0.84	0.91	0.98	1.07	1.15	1.32
39	0.48	0.50	0.52	0.56	0.58	0.59	0.60	0.62	0.64	0.68	0.70	0.74	0.78	0.82	0.89	0.95	1.05	1.15
40	0.47	0.48	0.50	0.53	0.54	0.56	0.58	0.59	0.61	0.64	0.67	0.69	0.73	0.77	0.81	0.87	0.94	1.03
41	0.44	0.46	0.48	0.50	0.51	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.68	0.71	0.74	0.79	0.84	0.92
42	0.43	0.44	0.46	0.48	0.49	0.50	0.52	0.53	0.54	0.57	0.59	0.61	0.63	0.67	0.69	0.73	0.78	0.82
43	0.41	0.42	0.43	0.46	0.47	0.48	0.49	0.50	0.51	0.53	0.56	0.57	0.59	0.61	0.64	0.68	0.72	0.77
44	0.40	0.41	0.42	0.43	0.44	0.46	0.47	0.48	0.49	0.51	0.52	0.54	0.56	0.58	0.60	0.63	0.67	0.70
45	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.46	0.47	0.48	0.49	0.51	0.52	0.54	0.57	0.59	0.62	0.64

R22和R134a排热量校正系数表 R 22 and R 134a heat emission correction coefficient table

冷凝温度 (°C) Condensing temperature	空气进口湿球温度 (°C) Wet bulb temperature of air inlet																	
	10	12	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
29	0.99	1.08	1.19	1.32	1.44	1.50	1.62	1.79	1.96	2.20	2.53	2.97	3.66	/	/	/	/	/
30	0.93	1.01	1.11	1.21	1.30	1.42	1.48	1.59	1.74	1.93	2.19	2.46	2.93	/	/	/	/	/
31	0.88	0.93	1.02	1.13	1.19	1.25	1.33	1.43	1.54	1.68	1.88	2.09	2.40	2.83	/	/	/	/
32	0.84	0.90	0.95	1.02	1.10	1.15	1.22	1.31	1.40	1.51	1.65	1.84	2.05	2.34	2.78	/	/	/
33	0.79	0.84	0.90	0.97	1.01	1.08	1.13	1.20	1.27	1.37	1.48	1.60	1.78	2.00	2.29	2.70	/	/
34	0.75	0.80	0.85	0.91	0.95	0.99	1.04	1.10	1.17	1.24	1.32	1.43	1.57	1.74	1.95	2.24	2.59	/
35	0.71	0.74	0.80	0.85	0.88	0.92	0.97	1.01	1.08	1.14	1.21	1.30	1.40	1.53	1.70	1.89	2.19	2.54
36	0.69	0.71	0.75	0.81	0.84	0.87	0.91	0.95	0.99	1.03	1.11	1.19	1.27	1.38	1.50	1.68	1.85	2.16
37	0.64	0.68	0.71	0.75	0.79	0.81	0.84	0.88	0.92	0.97	1.01	1.09	1.15	1.24	1.33	1.45	1.67	1.83
38	0.62	0.64	0.69	0.73	0.75	0.77	0.80	0.82	0.85	0.90	0.93	0.99	1.04	1.13	1.21	1.32	1.43	1.64
39	0.59	0.62	0.64	0.69	0.71	0.73	0.74	0.77	0.80	0.84	0.87	0.92	0.97	1.02	1.10	1.19	1.31	1.43
40	0.58	0.59	0.62	0.67	0.68	0.69	0.71	0.73	0.75	0.80	0.82	0.85	0.91	0.95	1.01	1.08	1.17	1.28
41	0.56	0.57	0.59	0.62	0.63	0.64	0.68	0.69	0.71	0.74	0.77	0.80	0.84	0.88	0.92	0.98	1.04	1.14
42	0.53	0.56	0.57	0.59	0.61	0.62	0.64	0.67	0.68	0.70	0.73	0.75	0.79	0.82	0.85	0.91	0.97	1.02
43	0.51	0.52	0.53	0.57	0.58	0.59	0.61	0.62	0.63	0.67	0.69	0.70	0.73	0.75	0.80	0.84	0.90	0.95
44	0.50	0.51	0.52	0.53	0.56	0.57	0.58	0.59	0.61	0.63	0.64	0.68	0.69	0.71	0.74	0.79	0.82	0.87
45	0.47	0.48	0.50	0.51	0.52	0.53	0.56	0.57	0.58	0.59	0.61	0.63	0.64	0.68	0.70	0.73	0.77	0.80

ZSX系列顺流蒸发式冷凝器工程系数表

ZSX series down flow evaporative condenser engineering coefficient table

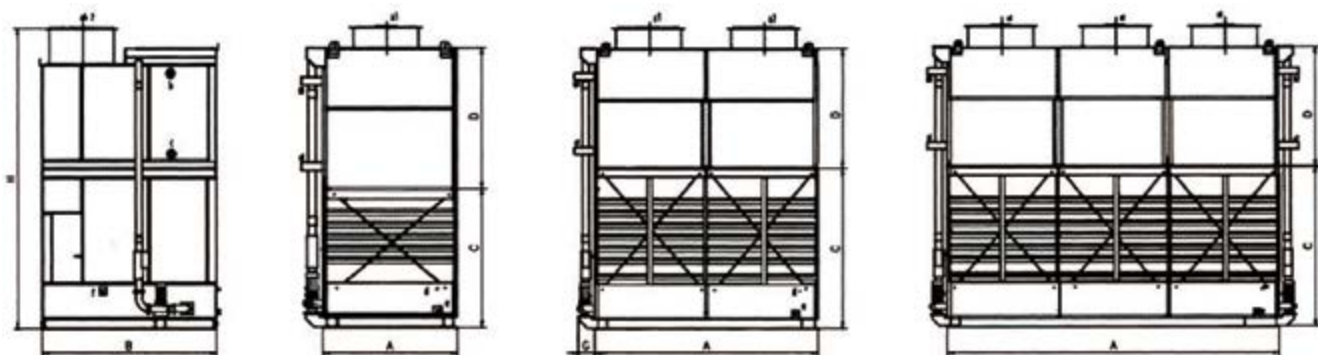
型号 Model	名义处理量 Nominal handling capacity	风机功率 kW Power of fan	风量 m³/h Air volume	水泵功率 kW Pump power	淋水量 m³/h Water spraying volume	接管口径 mm Connecting pipe caliber	近似重量 kg Approximate weight		外形尺寸 mm Overall dimensions		
							运输重量 Shipping weight	运行重量 Operating weight	总长 A Total length A	总宽 B Total width B	总高 H Total height H
ZSX-320	320	3	46000	1.1	32	DN80	2950	3880	1785	2380	4220
ZSX-380	380	4	58000	1.5	45	DN80	3150	4290	1785	2380	4220
ZSX-475	475	4	60000	1.5	45	DN100	3680	5100	1925	2380	4220
ZSX-595	595	5.5	75000	2.2	65	DN100	3850	5500	1925	2980	4240
ZSX-735	735	7.5	87000	2.2	65	DN100	4950	7980	1925	2980	4870
ZSX-850	850	2-5.5	2-65000	3	100	DN100	5280	8250	3490	2380	4240
ZSX-1050	1050	2-7.5	2-72000	3	100	DN100	5580	8900	3490	2380	4240
ZSX-1285	1285	2-7.5	2-75000	4	130	2-DN100	5750	9100	3770	2580	4870
ZSX-1490	1490	2-7.5	2-87000	4	150	2-DN100	6550	9850	3770	2980	4870
ZSX-1765	1765	3-7.5	3-87000	5.5	180	2-DN100	6890	10900	5610	2580	4910
ZSX-2010	2010	3-7.5	3-87000	5.5	180	2-DN100	7350	11200	5610	2580	4910
ZSX-2245	2245	3-7.5	3-87000	5.5	180	2-DN100	7880	11800	5610	2980	4910
ZSX-2450	2450	3-7.5	4-100000	2-3	2-100	2-DN12F	8320	12300	5610	3420	4910
ZSX-2600	2600	3-7.5	3-100000	2-3	2-100	2-DN125	8860	12600	5610	3420	4910
ZSX-2850	2850	3-7.5	3-100000	2-3	2-100	2-DN100	9650	13260	5610	3420	4910
ZSX-3000	3000	4-7.5	4-870000	2-4	2-130	4-DN100	10600	13900	7050	2980	4910
ZSX-3400	3400	4-7.5	4-100000	2-4	2-130	4-DN100	12500	15800	7450	2980	4910
ZSX-3800	3800	4-7.5	4-100000	2-4	2-150	4-DN100	13280	17600	7050	3520	4910
ZSX-4200	4200	4-11	4-120000	2-4	2-150	4-DN100	13900	18900	7450	3520	4910
ZSX-4600	4600	5-7.5	5-10000	2-5.5	2-180	4-DN125	15600	20500	8600	3520	4910
ZSX-5000	5000	5-11	5-12000	2-5.5	2-180	4-DN125	16900	23900	8600	3520	4910

注意：1、该数据不可用于制造。本手册中的数据只在出版时有效的数据；在购买时要重新确认。

2、所有盘管接口的位置是大约的，不应使用尺寸来预接管。

Note: 1. These data cannot be used for manufacturing. The data in this manual are only valid at the time of publication; reconfirm them when purchase.

2. The positions of all coil interfaces are for reference only, and should not be used to pre-connect pipes by size



ZNX系列逆流蒸发式冷凝器工程系数表

ZNX series counter – current evaporative condenser engineering coefficient table

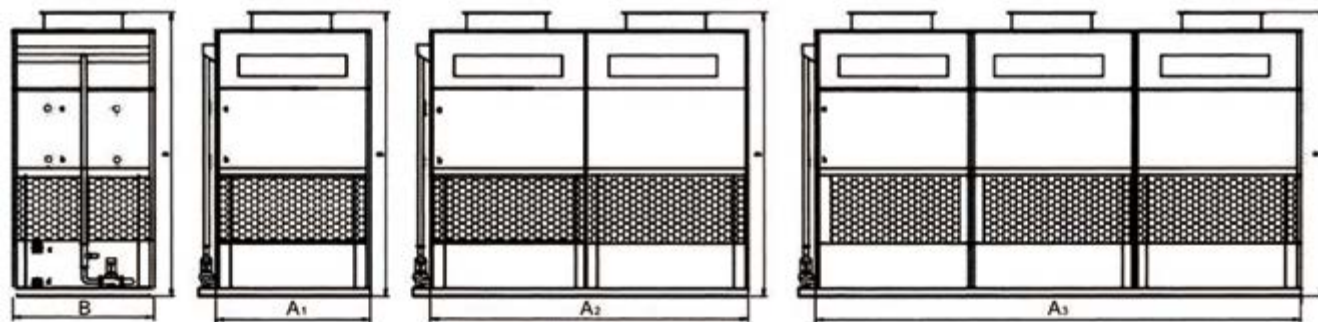
型号 Model	名义处理量 Nominal handling capacity	风机功率 kW Power of fan	风量 m³/h Air volume	水泵功率 kW Pump power	淋水量 m³/h Water spraying volume	接管口径 mm Connecting pipe caliber	近似重量 kg Approximate weight		外形尺寸 mm Overall dimensions		
							运输重量 Shipping weight	运行重量 Operating weight	总长 A Total length A	总宽 B Total width B	总高 H Total height H
ZNX-320	320	4	65000	0.75	28	DN80	1610	2420	1925	1840	3650
ZNX-380	380	4	65000	1.1	36	DN80	1790	2580	1925	1840	3650
ZNX-475	475	5.5	72000	1.1	53	DN80	2250	3360	1925	1840	3900
ZNX-595	595	7.5	87000	1.5	70	DN80	2690	3820	2470	1840	4100
ZNX-735	735	11	125000	2.2	84	DN100	3690	5440	2470	2380	4100
ZNX-850	850	2-5.5	2-77000	3	120	DN100	4890	7520	3770	1840	4310
ZNX-1050	1050	2-5.5	2-77000	3	120	DN100	5120	7750	3770	1840	4310
ZNX-1285	1285	2-5.5	2-80000	3	150	2-DN100	6320	9020	3770	2380	4510
ZNX-1490	1490	2-11	2-125000	3	150	2-DN100	6490	9190	3770	2380	4510
ZNX-1765	1765	3-5.5	3-77000	5.5	233	2-DN100	8400	12450	5610	2380	4550
ZNX-2010	2010	3-5.5	3-80000	5.5	233	4-DN100	9420	13460	6046	2380	4550
ZNX-2245	2245	3-5.5	3-80000	5.5	233	4-DN100	9780	13820	6046	2380	4630
ZNX-2450	2450	2-11	2-125000	2-3	2-150	4-DN100	12360	18170	6046	2980	4830
ZNX-2600	2600	2-11	2-125000	2-3	2-150	4-DN100	12780	19670	6046	2980	4830
ZNX-2850	2850	2-11	2-140000	2-3	2-150	4-DN100	13900	19790	6046	2980	4830
ZNX-3000	3000	2-15	2-180000	2-3	2-150	4-DN100	14320	20210	6046	2980	4830
ZNX-3400	3400	3-11	3-125000	2-4	2-180	4-DN100	16310	24050	7240	2980	4830
ZNX-3800	3800	3-11	3-125000	2-4	2-180	4-DN100	17810	25560	7830	2980	4830
ZNX-4200	4200	3-11	3-140000	2-5.5	2-233	4-DN100	20220	29890	8630	3490	4970
ZNX-4600	4600	3-11	3-140000	2-5.5	2-233	4-DN125	22480	32280	8630	3490	4970
ZNX-5000	5000	3-15	3-180000	2-5.5	2-233	4-DN125	24750	35710	9026	3490	4970

注意：1、该数据不可用于制造。本手册中的数据只在出版时有效的数据；在购买时要重新确认。

2、所有盘管接口的位置仅为参考尺寸，不应使用尺寸来预接管。

Note: 1. These data cannot be used for manufacturing. The data in this manual is valid at the time of publication only; Reconfirm them when purchase.

2. The positions of all coil interfaces are for reference only, and should not be used to pre-connect pipes by size.



工程应用中的注意事项

Matters needing attention in engineering application

位置要求 Position requirement

蒸发式冷凝器必须在进风口处供给充足的新鲜空气。在设备的位置靠近墙壁或者位于密封空间时，必须采取相应措施以确保排出的高温、饱和气体不会发生转向而直接流进进风口。

Evaporative condenser must supply sufficient fresh air at the air inlet. When the equipment is located near a wall or in an enclosed space, measures must be taken to ensure that the discharged hot, saturated gas do not divert directly into air intakes.

考虑流体的兼容性 Consider fluid compatibility

冷凝器所要冷却的流体必须与盘管材质有兼容性，在盘管材质不兼容的流体会导致盘管腐蚀和破坏。某些特定的流体可能要求对盘管内侧做不定期的有压清洗或机械式清洗。在这种情况下，所提供的盘管必须在设计中考虑这方面的能力。

The fluid to be cooled by the condenser must be compatible with the coil material. Incompatible flow with the coil material will lead to corrosion and damage of the coil. Certain fluids may require irregular pressure cleaning or mechanical cleaning of the inside of the coil. In such cases, this capability of the coil must be taken into consideration when design.

管路和阀门 Piping and valves

管道的尺寸和安装必须符合良好的管道设计规范。所有的管道必须采用管道吊架或者其它支撑装置进行支撑，不得采用冷却塔体进行支撑。如果系统设计中有必要将各个冷却塔单元相互隔离时，也可考虑采用外部截止阀。

Piping dimensions and installation must comply with good piping design practice. All pipes must be supported by pipe hanger or other supporting device, not by cooling tower body. External stop valves may also be adopted if isolating cooling tower units is necessary in the system design.

容量控制 Volume control

大多数的蒸发式冷凝器性能在平常的运行季节中随环境湿球温度工况的变化而变化，所以由于环境温度变化而引起的流体温度的偏差时就需要采用容量控制。

风机的周期性运行是容量控制的最简单方式，多应用于多风机或多单元设备的系统。在出水温度控制要求不高的场合，风机周期性运行可以满足温度控制的需要而且简单易行，使用双速风机可以增加能量控制的档位数，与简单的风机周期性运行方式相比，这种方案对于节能更有效。

The performance of most evaporative condensers changes with the change of the ambient wet bulb temperature in its normal operation. Volume control is required for fluid temperature deviations due to ambient temperature changes. The periodical operation of fan is the simplest way of capacity control, which is applied to the system of multi-fan or multi-unit equipment.

Periodic operation of the fan is the simplest way of volume control and is often applied to systems with multiple fans or units of equipment. In the situation where the outlet water temperature control requirements are not high, the periodic operation of the fan can meet the needs of temperature control and it is simple and easy to operate. The use of two-speed fan can increase the number of gear positions for energy control. Compared with the simple periodic operation of the fan, this scheme is more effective for energy saving.

注意：周期性的频繁开停，会导致风机电机过热，建议每小时的开停次数不能超过6次。

Note: Frequent start and stop periodically will cause the fan motor to overheat. It is recommended that the number of start and stop should not exceed 6 times per hour.



蒸发式冷凝器的防冻（特别重要）

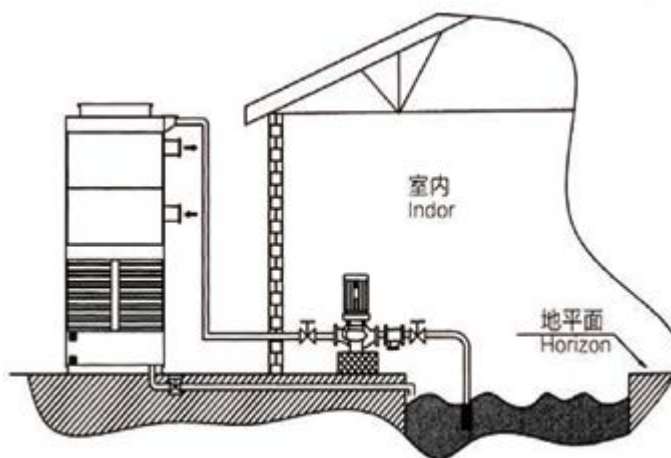
Antifreeze of evaporative condenser (especially important)

集水盘喷淋水的防冻

Antifreeze for water tray and spray water

当温度低于冰点，冷却设备在停机情况下，水池内的水就必须采取防冻措施。应该提供进一步的防结冰保护，将集水盘中的水排至室内的辅助水箱，或者通过浸没式电加热器、蒸汽加热盘管或热水盘管来为配水盘中的水提供辅助加热。

When the temperature is below freezing point and the cooling equipment is shut down, the water in the pool must be taken anti-freezing measures. Further protection against icing should be provided by draining the water from the water pan to an indoor auxiliary tank or by providing supplementary heating for the water of the distribution pan via a submersion electric heater, steam heating coil, or hot water coil.



水处理

Water Treatment

由于喷淋水在蒸发冷凝器中蒸发，原存在于水中的固体溶解物仍留在系统中。固体溶解物的浓度增加过快可导致结垢和腐蚀。此外，包括军团菌在内的空气杂质和生物污染物会被引入循环水中。为了控制各种潜在的污染物，必须实施水处理计划。虽然以下蒸发式冷凝器的循环水质给出了有关建议，但由水处理专家为给定系统设计一个专门的水处理计划始终都是对最终用户的责任。这计划应考虑（至少）水质监控、放水率调节、镀锌钢表面的钝化、腐蚀水垢的化学处理以及生物控制等多种因素。要定期检查水质，以确保对水质适当进行控制。

As the spray water evaporates in the evaporative condenser, the solid solution that originally existed in the water remains in the system. Rapid increase in the concentration of solid solvents can lead to scaling and corrosion. In addition, air impurities and biological contaminants, including Legionella bacteria can be introduced into the circulating water. In order to control various potential contaminants, a water treatment plan must be implemented.

Although the following recommendations for circulating water quality for evaporative condensers are made, water treatment experts should be invited to design a specific water treatment plan for a given system. The plan should consider (at least) water quality monitoring, water release rate regulation, passivation of galvanized steel surface, chemical treatment of corrosive scale, and biological control. Water quality should be checked periodically to ensure that it is properly controlled.

质量保证

Warranties

请在购买本公司产品时，参见适用且在当时有效的保修书，并参考限制条件。

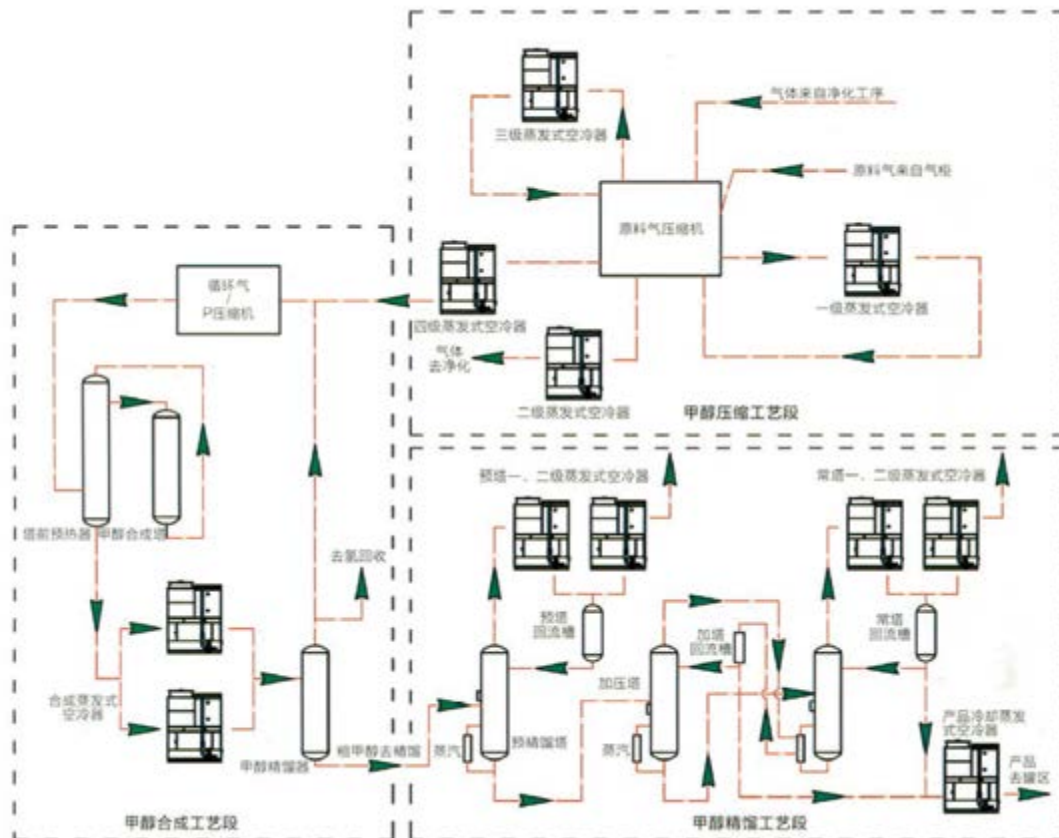
Please refer to the applicable and currently valid warranty and restrictions when purchasing our products.

典型应用

Typical applications

甲醇压缩、合成、精馏工艺流程图

Process flow chart of methanol compression, synthesis and rectification



循环气 / P 压缩机
塔前预热器
甲醇合成塔
合成蒸发式空冷器
去氨回收
甲醇精馏器
粗甲醇精馏
三级蒸发式空冷器
气体来自净化工序
原料气来自气柜
原料气压缩机
四级蒸发式空冷器
气体去净化
一级蒸发式空冷器
气体去净化
二级蒸发式空冷器

甲醇压缩工艺段
预塔一、二级蒸发式空冷器
常塔一、二级蒸发式空冷器
预塔回流槽
加压塔
加塔回流槽
常塔回流槽
蒸汽
产品冷却蒸发式空冷器
产品去罐区

Circulating gas / P compressor
pre-heater before the tower
Methanol synthetic tower
Synthetic evaporative air-cooled heat exchanger
Ammonia removal and recycling
Methanol rectifier
Crude methanol distillation
Third grade evaporative air-cooled heat exchanger
Gas from purification procedure
Feed gas from gas holder
Feed gas compressor
Fourth grade evaporative air-cooled heat exchanger
Gas purification
First grade evaporative air-cooled heat exchanger
Gas purification
Second grade evaporative air-cooled heat exchanger
Methanol compression process segment
Pre-distillation tower first, second grade evaporative air-cooled heat exchanger
Constant pressure tower first, second grade evaporative air-cooled heat exchanger
Reflux channel of pre-distillation tower
Pressurization tower
Reflux channel of pressurization tower
Reflux channel of constant pressure tower
Vapor
Product cooling evaporative air-cooled heat exchanger
Tank removal area of the product



典型用户 Typical user

行业 Industry	典型用户 typical user		配套冷却设备 Auxiliary cooling device
暖通空调 HVAC	苏州环球 188 Suzhou globe 188	无锡八佰伴 Wuxi Babaiban	水源热泵、螺杆机组、溴化锂机组、离心机组 Water source heat pump, screw unit, lithium bromide unit, centrifugal unit
	苏州虎丘婚纱城 Suzhou Huqiu Wedding dress town	美意空调 Mammoth/nc	
化工行业 chemical industry	中石油华东油田 CNPC East China oilfield	扬农化工 Yangnong Chemical	反应釜、固体熔窑、冷冻机 Reaction kettle, solid melting furnace, freezer
	LG 化学 LG chemical	印菲化学 Yinfei chemical	
汽车制造 Car manufacturing	一汽集团 China FAW Group Corporation	芜湖奇瑞 Wuhu Chery Holding	透热设备、淬火液、调质线、挤压线、液压站 Diathermic equipment, quenching fluid, quenching and tempering line, extrusion line, hydraulic station
	上汽集团 SAIC Motor	十堰二汽 Shiyan Dongfeng Motor Corporation	
钢铁制造 Iron and steel making	宝钢集团 Baosteel	江苏沙钢集团 Jiangsu Shagang Group	高炉炉腔、连铸炉、结晶器、工频熔炼炉 Blast furnace cavity, continuous casting furnace, crystallizer, caries melting furnace
	浦项制铁 POSCO		
电炉铸造 Electric furnace casting	苏州振吴 Suzhou Zhenwu	应达工业 Inductotherm Group China	中频熔炼炉、电弧炉、电渣炉 Intermediate frequency melting furnace, electric arc furnace, slag furnace
	上海兆力 Shanghai Zhaoli	西安机电研究所 Xi'an Institute of Mechanical and Electrical Engineering	
冶金材料 Metallurgical materials	中科院硅酸盐研究所 Shanghai Institute of Ceramics, Chinese Academy of Sciences	北京有色院 GRINM Group Corporation Ltd.	真空气淬炉、烧结炉、真空熔炼炉、渗氮炉 Vacuum air quenching furnace, sintering furnace, vacuum melting furnace, nitriding furnace
	北京航空材料研究所 Beijing Institute of Aeronautical Materials	抚顺特钢 Fushun Special Steel Co., Ltd.	
机械制造 Mechanical manufacturing	南车威墅堰机车 Nanche Weishuyan Locomotive	振华港机 Shanghai Zhenhua Port Machinery Company Limited	空压机、冷干机、除湿机、压铸炉 Air compressor, cold - dry machine, dehumidifier, die-casting furnace
	安大航空段造 AVIC Guizhou Anda Aviation Forging Corporation, Ltd.	济南重汽 SINOTRUK	
工业制冷 Industrial cooling	西飞工业 AVIC Xi'an Aircraft Industry Group Company LTD.	沈阳黎明航空发动机 AECC Shenyang Liming Aero-engine Co., Ltd.	工业冷水机组 Industrial chillers
	上海 801 研究所 Shanghai No.801 Research Institute		
食品饮料 Food and beverage	青岛啤酒 Qingdao Beer	杭州娃哈哈 Hangzhou Wa Ha Ha	空压机、食品蒸馏、热压机 Air compressor, food distillation, hot press
	北京汇源饮料 Beijing Huiyuan Beverage	伊利食品 Yili food	
实验室设备 Lab equipment	清华大学 Qinghua university	成飞工业 AVIC Cheng' du Aircraft Industrial (Group) Co., Ltd	烧结炉、真空炉、电焊机、高频机 Sintering furnace, vacuum furnace, electric welding machine, high frequency machine
	中核工业 China National Nuclear Corporation		
塑料制昂 Plastic products	捷普·绿点 (无锡, 苏州1, 南京, 深圳, 天津, 成都) Jabil Green Point(Wuxi,Suzhou 1,Nanjing,Shenzhen,Tianjin,Chengdu)	富士股 Fuji Machinery Co., Ltd.	注塑机、液压站、中央空调 Injection molding machine, hydraulic station, central air conditioning
		无锡健鼎科技 Wuxi Tripod Technology	
光伏电力 Photovoltaic power	华能滇东电厂 Huaneng Diandong Power Plant	晶科能源 Jinko Solar	整流器、变压器、单晶炉、多晶炉 Rectifier, transformer, single crystal furnace, polycrystal furnace
	吴江大唐电厂 Wujiang Datang Power Plant	伊利能源 Inner Mongolia Yili Energy Company Limited	





冷却塔系列产品
Cooling tower series products

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If we strive to meet the demands of the clients

continue to produce more products with high quality

We will nourish and set up a steadfast client group

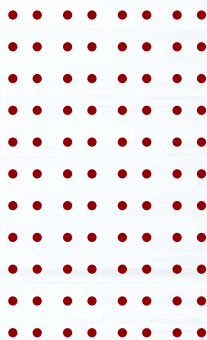
to realise the stable and steadfast expansion of the sales net

优良的品质和周到的服务，亚太集团取得了骄人的业绩。亚太洁净技术工程接连获得了北京小汤山医院、武汉火神山医院、武汉雷神山医院等近百家医院的青睐，以其洁净技术的杰出性能和净化实力，获得市场信任，树立用户口碑。

With excellent quality and considerate service, Yatai Group has made remarkable achievements. Its purification technology projects are successively favored by Xiaotangshan hospital in Beijing, Huoshenshan hospital and Leishenshan hospital in Wuhan. The outstanding performance of clean technology and purification strength have gained market trust for Yatai Group and established its reputation among users.



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