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Certified by ISO9001 quality system
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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

ENCLOSED COOLING TOWER FOG DEMISTING(REMOVAL) COOLING TOWER EVAPORATIVE CONDENSER

封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器



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We knew the world before, the world knows us now.

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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

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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 modernized equipment produced by world famous manufacturers And the high content leading in the same profession

Are Yatai's guarantee of maintaining his competitive advantage all the time

全球信赖品质

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Certified by CRAA
ISO9001质量管理体系认证
Certified by ISO9001 quality system
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Honorable Qualification



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ENCLOSED COOLING TOWER
FOG DEMISTING(REMOVAL)
COOLING TOWER
EVAPORATIVE CONDENSER
封闭式冷却塔 | 消（除）雾式冷却塔 |
蒸发式冷凝器

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封闭式冷却塔 | 消 (除) 雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

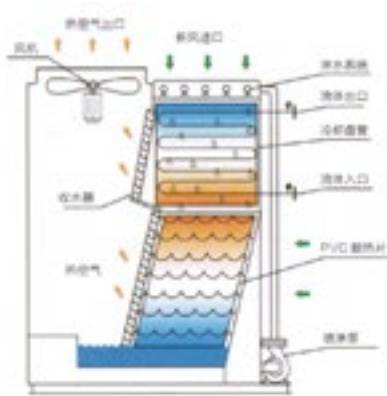
FBS 闭式冷却塔 CLOSED COOLING TOWER

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 空气形成饱和和湿热蒸汽, 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

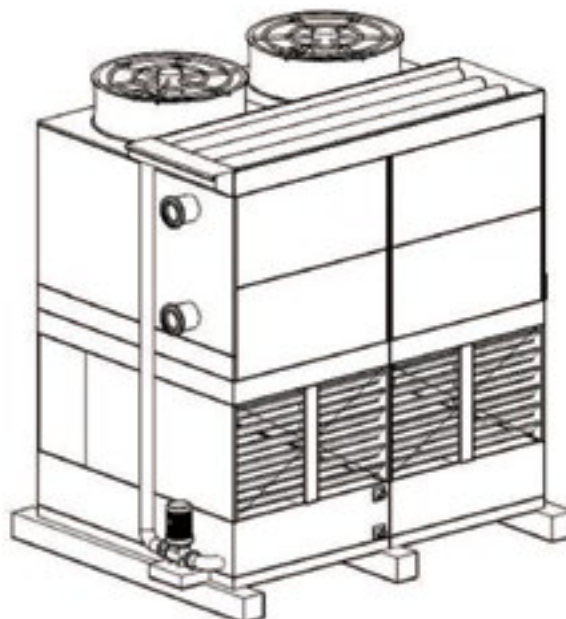
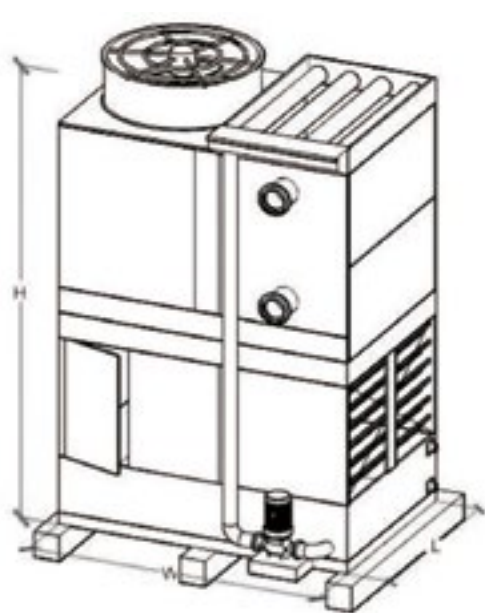
适用于温度较高 (例如 50-35℃), 温差较大 ($\Delta t=5-20^\circ\text{C}$) 的工业领域工艺水冷却。

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湿差较大的工业冷却。

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: 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

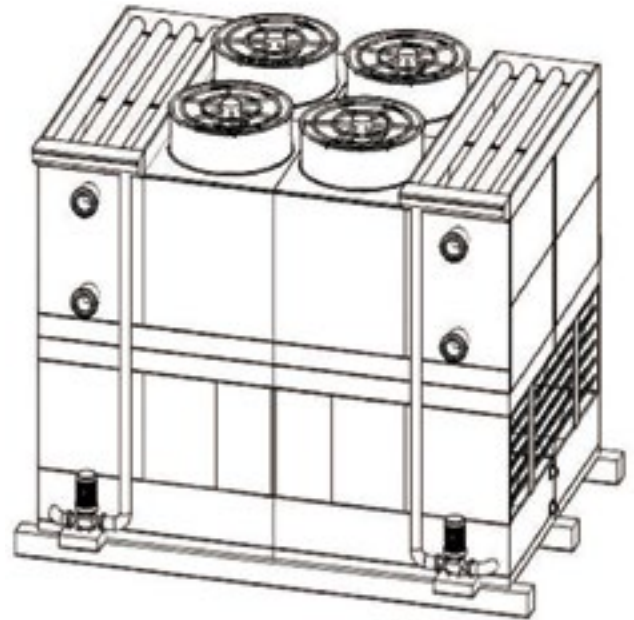
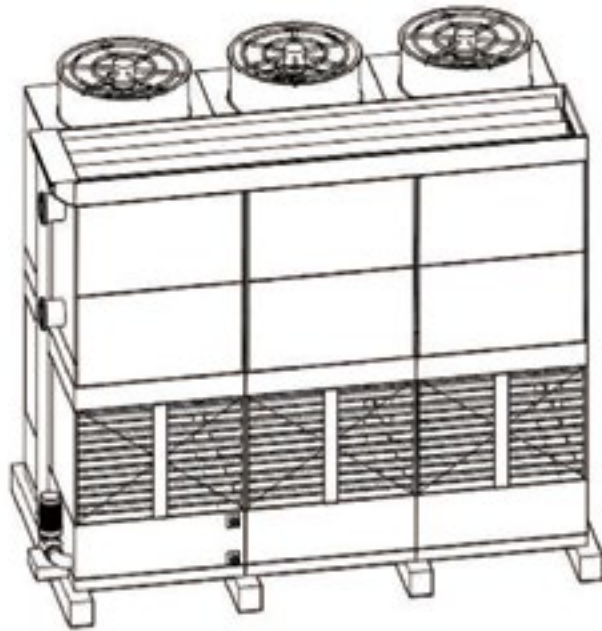
4. Data in the above table is that of the cooling tower with surface cooler made of hot dip galvanized steel pipe

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.

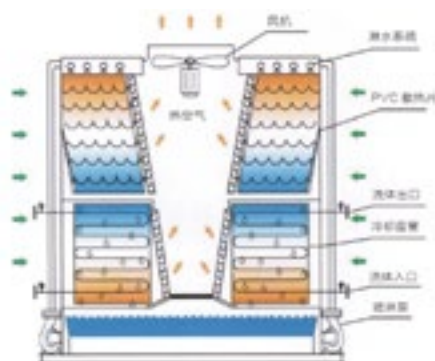
H型（横流低噪型）

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

淋水系统 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，风机喷嘴最大化，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

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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。

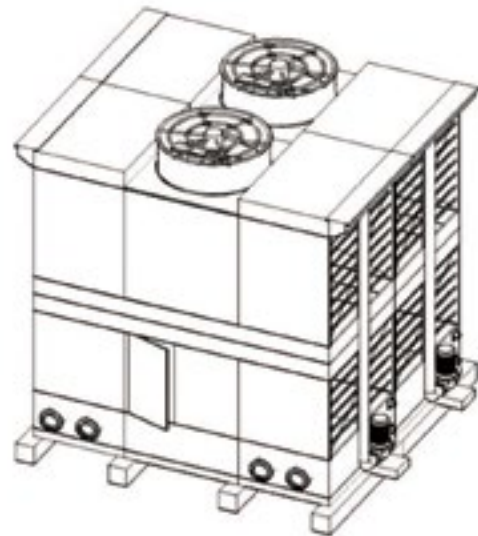
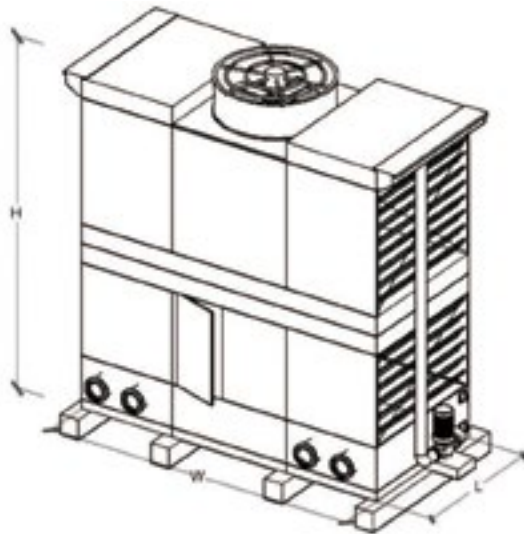
Scope of application

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

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		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: 横流低噪音型 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°C，湿球 27°C，大气压 99.4Kpa，水侧污垢系数为 0.086m²°C /kW。

3、H 型适用于温差 $\Delta t=5-15^{\circ}\text{C}$ 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-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°C /kW.

3. H-type is suitable for the temperature difference $\Delta t=5-15^{\circ}\text{C}$ 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.

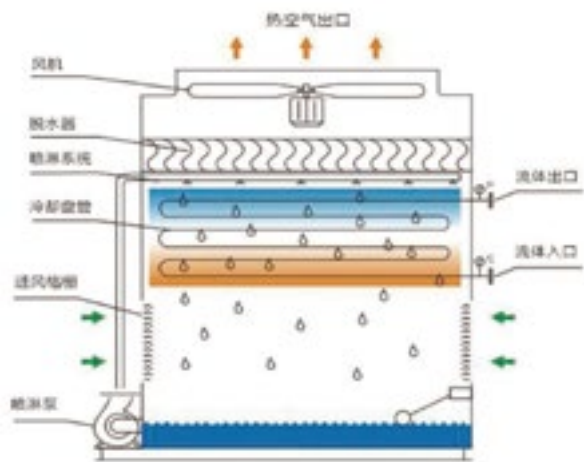
N型（逆流紧凑型）

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.



热空气出口 Hot Air Outlet
喷淋系统 Spray System
喷淋泵 Spray Pump

风机 Fan
冷却盘管 Cooling Coil
流体出口 Fluid Outlet

脱水器 Dehydrator
进风格栅 Air Intake Grill
流体入口 Fluid Inlet



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 $< 45^{\circ}\text{C}$ $\Delta t = 5-10^{\circ}\text{C}$ ）。

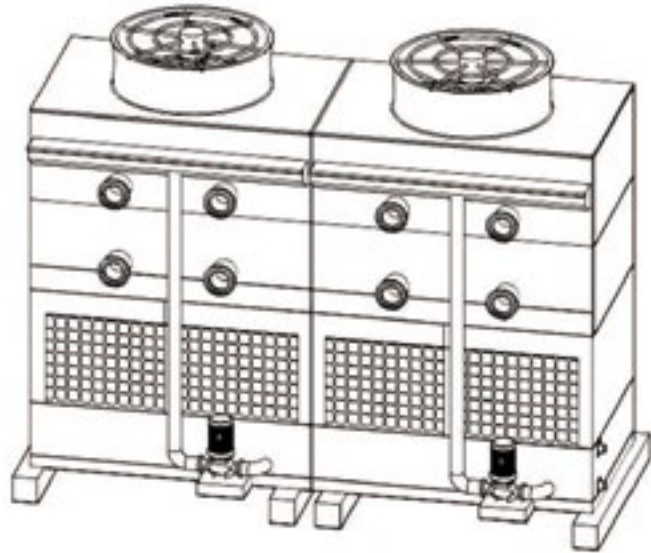
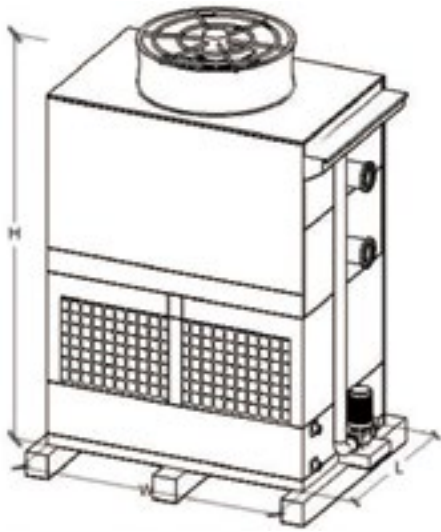
Scope of application
It is suitable for the project where the temperature of the cooled fluid is low or the temperature difference is small (water temperature $< 45^{\circ}\text{C}$ $\Delta t = 5-10^{\circ}\text{C}$).



封闭式冷却塔 | 消 (除) 雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

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					
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°C /kW。

3、H 型适用于温差 $\Delta t=5-15^{\circ}\text{C}$ 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°C /kW.

3.H-type is suitable for the temperature difference $\Delta t=5-15^{\circ}\text{C}$ 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.

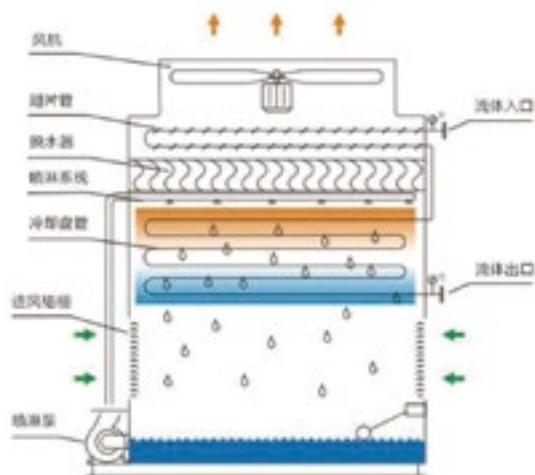
N II 型（逆流干、湿两用节水型）

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

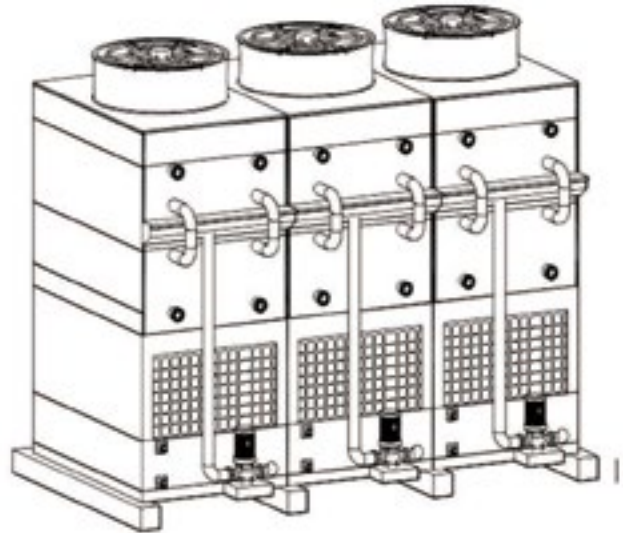
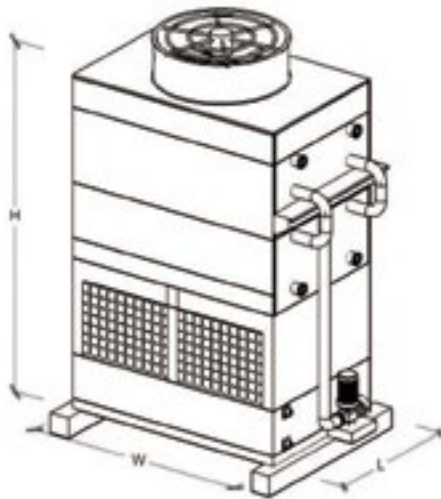
Structural characteristics

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 m³/h flow 37~32°C	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 x W x 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 Amount or water						
FBN II-42R1*	25	5.5 x 1	65000	0.75	25	65	65	3500	5500	1500 x 1850 x 4500	1700 x 1700
FBN II-83R1*	50	7.5 x 1	90000	1.1	50	80	78	3500	5500	2000 x 2350 x 4500	2200 x 2200
FBN II-125R1*	75	15 x 1	110000	1.5	75	100	80	4000	6800	2000 x 2850 x 4700	2200 x 2700
FBN II-166R1*	100	15 x 1	150000	2.2	100	125	85	4500	8000	2500 x 2950 x 4700	2700 x 2700
FBN II-208R1*	125	18.5	180000	2.2	100	125	90	5500	9000	2500 x 2950 x 5000	2700 x 2700
FBN II-250R02	150	11 x 2	220000	1.5 x 2	150	100 x 2	92	7500	12200	4000 x 2450 x 5000	4200 x 2200
FBN II-292R02	175	15 x 2	300000	2.2 x 2	200	100 x 2	95	8500	13500	5000 x 2450 x 5000	5200 x 2700
FBN II-333R02	200	15 x 2	300000	2.2 x 2	200	125 x 2	98	9000	15000	5000 x 2950 x 5000	5200 x 2700
FBN II-416R03	250	11 x 3	330000	1.5 x 3	250	100 x 3	100	11500	18500	6000 x 2950 x 5000	6200 x 2700
FBN II-500R03	300	15 x 3	450000	2.2 x 3	300	125 x 3	103	13500	21000	6000 x 3100 x 5000	6200 x 3200
FBN II-583R04	350	15 x 4	600000	2.2 x 4	400	125 x 4	103	15500	25000	8000 x 3100 x 5000	8200 x 3200
FBN II-666R04	400	15 x 4	600000	2.2 x 4	400	125 x 4	111	18000	30000	8000 x 3100 x 5000	8200 x 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 吨冷 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 0.086m²C/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: 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 0.086m²C/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

如何有效解决表冷器排水

How to effectively resolve the drainage problem of surface coolers?

如何便利修理表冷器

How to conveniently repair the surface cooler?

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.
4. 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 tube type surface cooler



紫铜管管式表冷却器

Copper tube tube type surface cooler



热浸镀锌钢管管式表冷却器

Hot dip galvanized steel tube tube type surface cooler



板式换热器

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	<input type="checkbox"/> 国产镀锌板 Domestic galvanized plate		<input type="checkbox"/> 进口镀锌板 Imported galvanized plate		<input type="checkbox"/> Z700进口镀锌板 Z700 imported galvanized plate		
		喷淋集水槽 The spray tank	<input type="checkbox"/> 进口镀铝镁锌板 Imported magnesium aluminum galvanized plate		<input type="checkbox"/> SUS 304不锈钢 SUS304 stainless steel		<input type="checkbox"/> 玻璃钢 FRP		
		底座、支架 Base, support	<input type="checkbox"/> Q235热浸锌碳钢 Q235 hot dip galvanized carbon steel			<input type="checkbox"/> SUS 304不锈钢 SUS304 stainless steel			
表冷器 Surface cooler		盘管式 Coil type	<input type="checkbox"/> 碳钢焊接管 Carbon steel welded pipe	<input type="checkbox"/> T2 紫铜管 T2 copper tube	<input type="checkbox"/> SUS 304不锈钢 SUS304 stainless steel	<input type="checkbox"/> 316L不锈钢 316L stainless steel	<input type="checkbox"/> 翅片管 finned tube		
		管箱式 Pipe-chest type							
		板片式 Plate type	<input type="checkbox"/> Q235热浸锌碳钢 Q235 hot dip galvanized carbon steel					<input type="checkbox"/> SUS 304不锈钢片 SUS304 stainless steel plate	
风机驱动 Fan drive		风机叶轮 Fan impeller	<input type="checkbox"/> 恒山正源 Hengshan Zhengyuan		<input type="checkbox"/> 同济明新 Tongji Mingxin		<input type="checkbox"/> 前川 Qianchuan		
			<input type="checkbox"/> 铝合金中空机翼型叶片 Aluminum alloy hollow airfoil blade		<input type="checkbox"/> 高强度碳纤维叶片 High strength carbon fiber blades		<input type="checkbox"/> 铝合金叶片 Aluminium alloy blade		
		电机 Motor	<input type="checkbox"/> Siemens	<input type="checkbox"/> ABB	<input type="checkbox"/> 万高 Wangao		<input type="checkbox"/> 前川 Qianchuan	<input type="checkbox"/> 亿能 Yineng	
			<input type="checkbox"/> 防护等级IP55；绝缘等级F级 Protection class IP55; Insulation class F						
		电机轴承 Motor bearing	<input type="checkbox"/> TNT		<input type="checkbox"/> NSK		<input type="checkbox"/> SKF		
			<input type="checkbox"/> 免维护、免注油 Maintenance free, oil free			<input type="checkbox"/> 定期维护注油 Regular maintenance and oil injection			
	风机风筒 Blower	<input type="checkbox"/> 热浸锌钢 Hot dip galvanized steel		<input type="checkbox"/> 202 不锈钢 202 stainless steel		<input type="checkbox"/> 304不锈钢 304 stainless steel			
喷淋泵 Spray pump		泵品牌 Pump brands	<input type="checkbox"/> 东方 East	<input type="checkbox"/> 荏本 Renben		<input type="checkbox"/> 川源 Chuanyuan		<input type="checkbox"/> 卓杰 Zhuojie	<input type="checkbox"/> 凯泉 Kaiquan
		电机 Motor	<input type="checkbox"/> Siemens		<input type="checkbox"/> ABB		<input type="checkbox"/> 威尔 Weier		<input type="checkbox"/> 大同 Datong
			<input type="checkbox"/> 防护等级IP55；绝缘等级F级 Protection class IP55; Insulation class F						
		轴承 Bearing	<input type="checkbox"/> TNT		<input type="checkbox"/> NSK		<input type="checkbox"/> SKF		
			<input type="checkbox"/> 免维护、免注油 Maintenance free, oil free			<input type="checkbox"/> 定期维护注油 Regular maintenance and oil injection			
	叶轮、过流部分 Impeller, overcurrent part	<input type="checkbox"/> Q235碳钢 Q235 carbon steel			<input type="checkbox"/> 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.

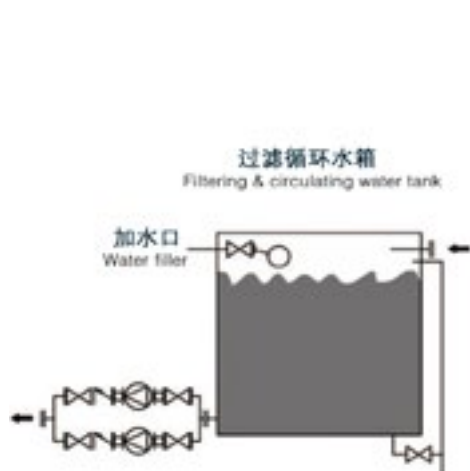


图 a

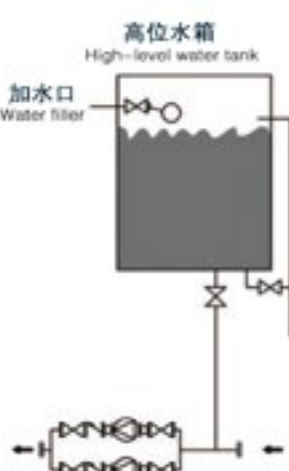


图 b

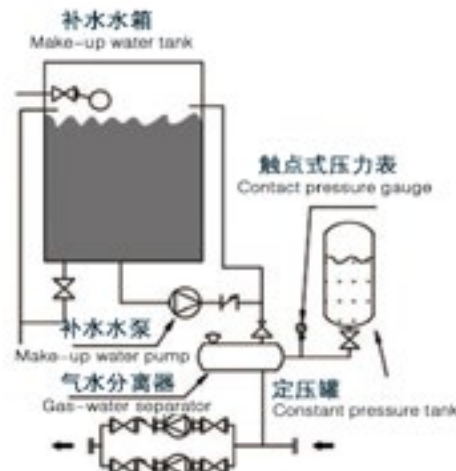


图 c



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)

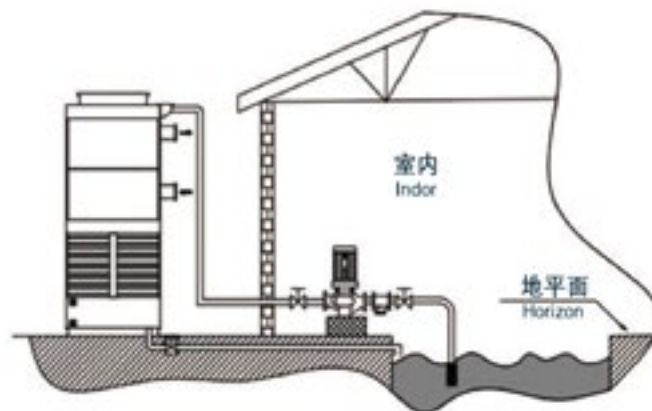
4. Spray water supplement: $(\text{evaporation} \leq 0.8\% \text{ of the flow}) + (\text{drifting ratio} \leq 0.1\%) + (\text{sewage drainage} \leq 0.3\%) = (\text{circulation flow} \leq 1.2\%)$

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℃)

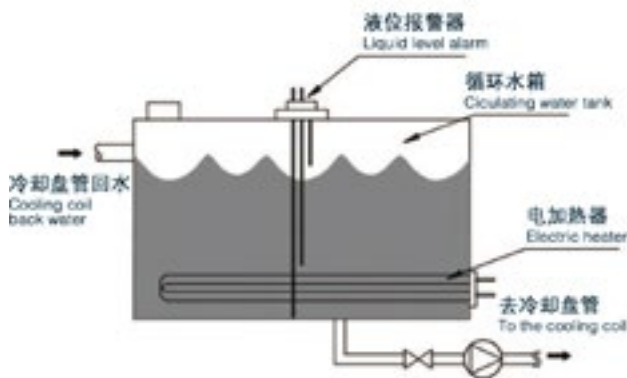
闭式冷却塔的盘管防冻问题

Coil anti-freeze problem of the closed type cooling tower

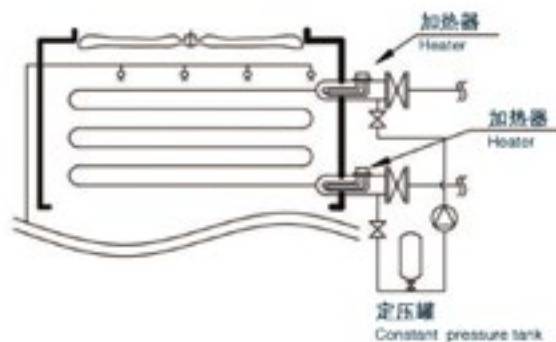
1、北方地区冬季低温时，密闭系统的循环水在没有热负荷的情况下，即使循环水保持流动也会发生结冰现象，必须有妥善的防冻措施，建议比较合适的有以下两种方式：

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.

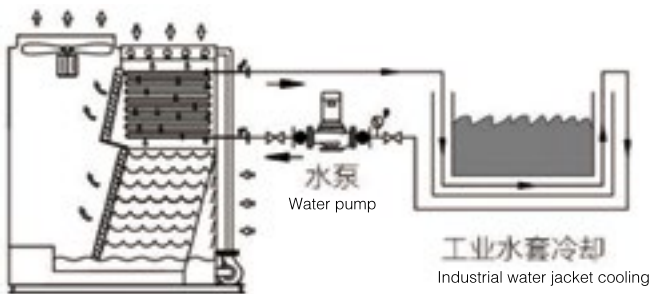
乙二醇 (wt%) glycol	0	10	20	30	40	50	58
凝固点 (℃) freezing point	-0.0	-3.5	-8	-15	-24	-36	-48



封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

典型应用

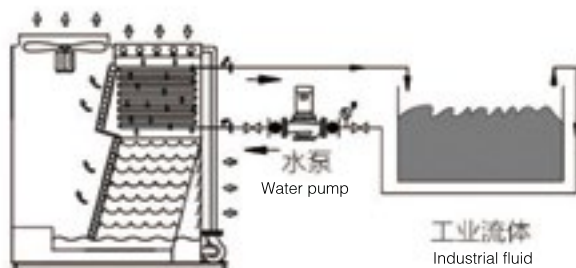
Typical applications



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

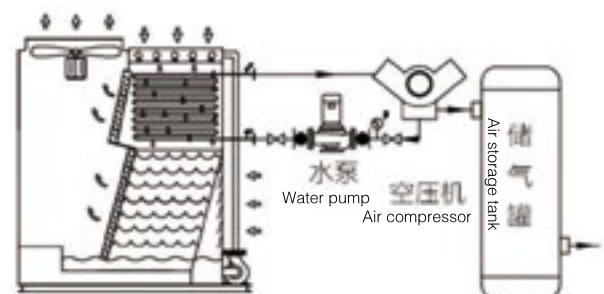
Steel mills and foundries
Quenching tank cooling
Rolling mill cooling
Induction furnace cooling
Continuous casting cooling



工业流体

液压油
淬火油
电镀溶液
工艺流体

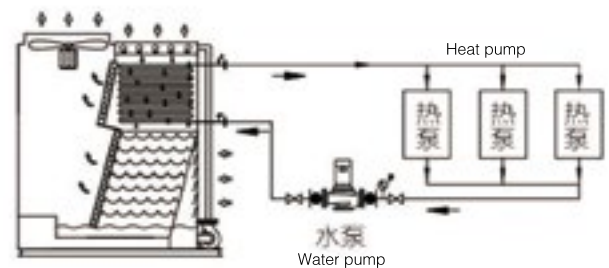
Industrial fluid
Hydraulic oil
Quench oil
Electroplating solution
Process fluid



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



空调系统

水源热泵系统
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

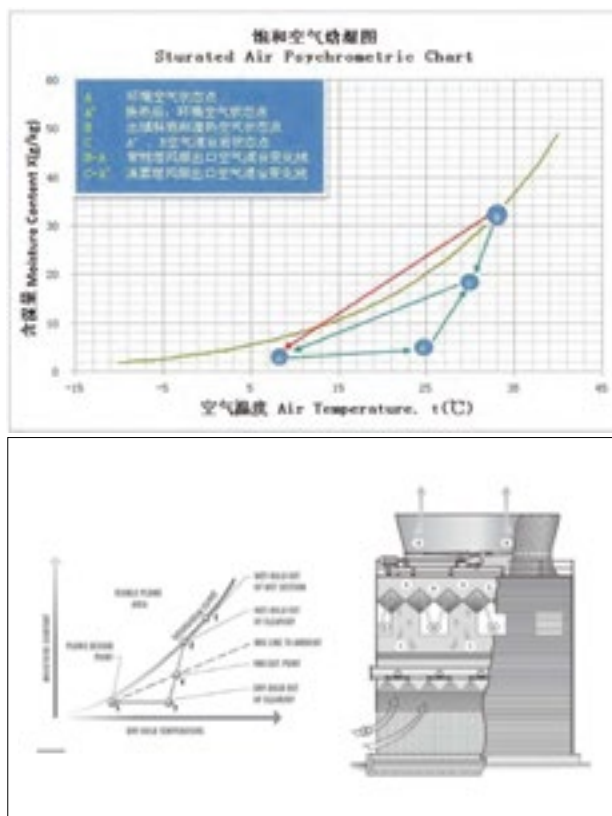
如图所示，图中曲线为饱和空气焓湿图。常规冷却塔（湿式塔），B-A 线为出填料的饱和湿热空气 B 与环境干冷空气 A 混合的变化线，在焓湿图的上方，故而产生大量的羽雾。消雾冷却塔在冷却塔塔体部分的气室层安装高效冷凝模块，利用风机的抽力，将环境的冷空气 A（冷源）引入塔内，并与上塔热水（热源）进行换热，换热后的热空气 A' 再与出填料的饱和湿热空气 B 混合，混合后为筒出口空气 C（相对 B 点，露点和含湿量均下降，为不饱和空气），此时空气 C 再与环境冷空气 A 混合的变化线（羽雾稀释曲线）C-A 在饱和空气焓湿图的下方，即无羽雾产生，此为消雾的原理。

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、消雾模块摆放于塔内部收水器上方，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，通道间只密封严密，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。

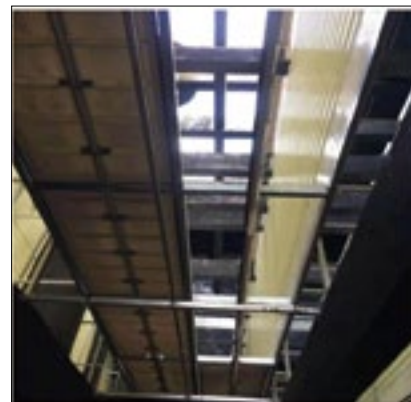
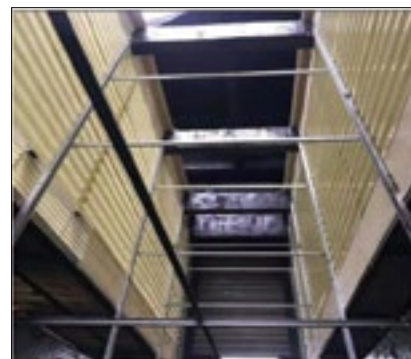
材质为铝合金, 固定在进风口外框上面, 外框材质为碳钢, 控制系统为手动开启, 多用于春、秋、冬成开启状态。夏季当外界气温高于冷却塔内部则成关闭状态。

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经验, 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 $\geq 17\%$ 。

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 $\geq 17\%$.



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



封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

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.

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.

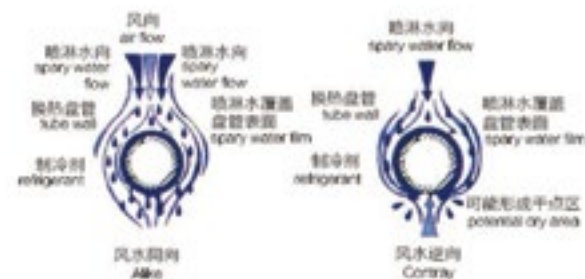


防止结垢

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。

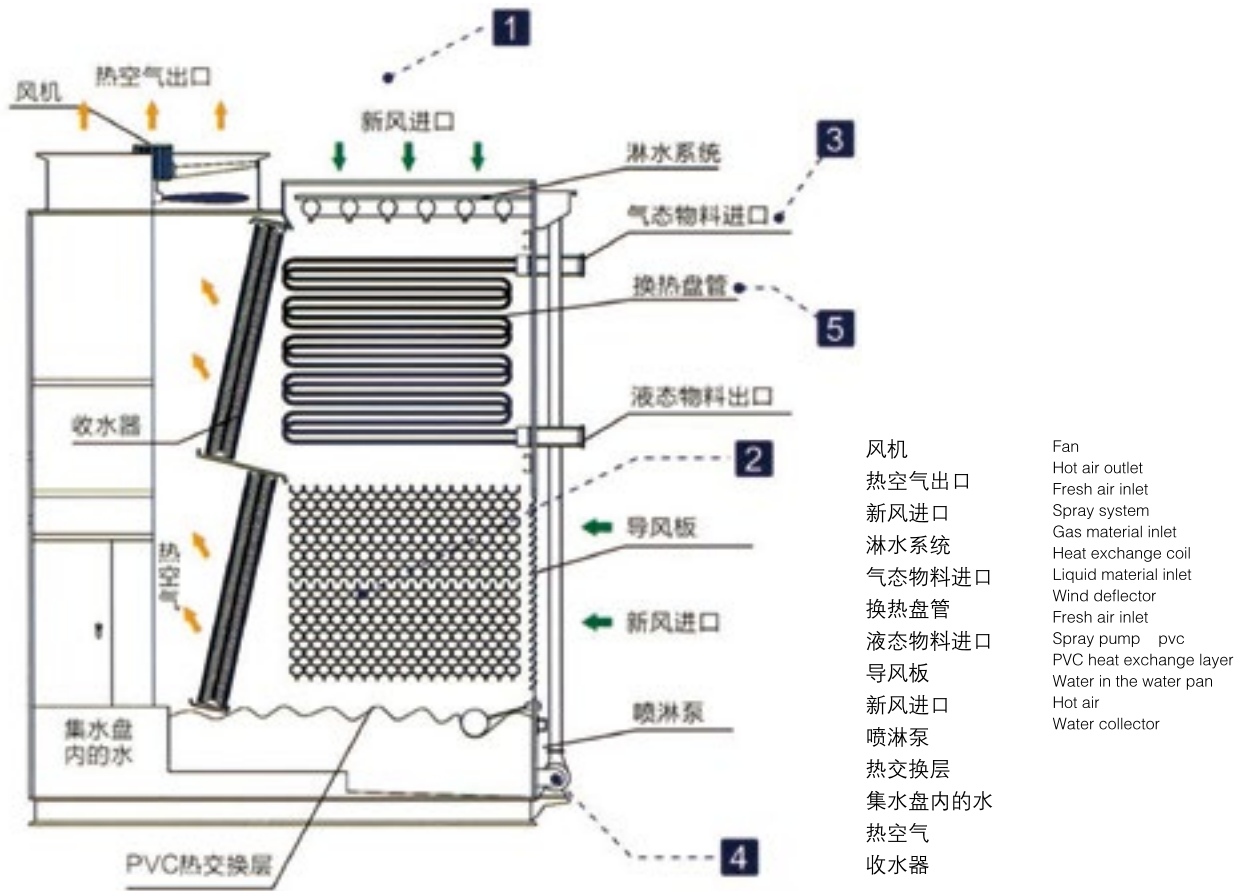
Air and spray water flow through the coil surface in the same, parallel, and downward paths, totally covering the surface of the coil. They eliminate the dry point which can easily cause scaling.





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，从而除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热空气，热量由顶部风机排出，水分由特殊结构的脱水器回收集水槽循环使用，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

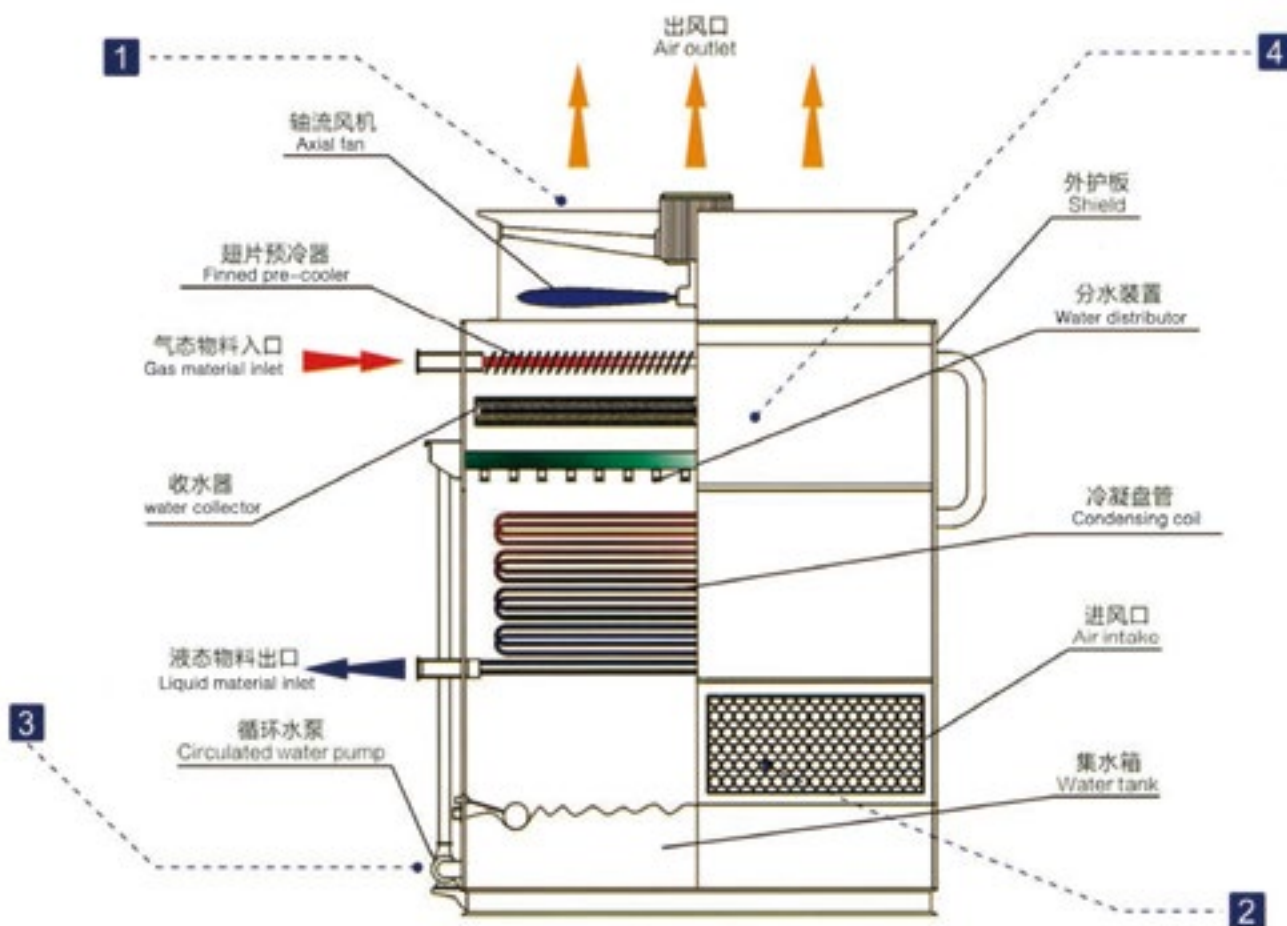
可选择增加预冷翅片，实现高温预冷和低温停水，更适合严重缺水地区。

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.



蒸发式冷凝器逆流系列工作原理图

Working diagram of countercurrent evaporative condensers



1、高效的挡水板，由 PVC 材料制成，可去除排出气流中夹带的水滴，耐辐射，寿命长。并在挡水板侧面板开有检修门。

2、最新改进的进风格栅，进入水盘时拆卸方便，防止阳光直射，并避免了水藻的产生，防止灰尘和赃物进入机组。

3、将流量最小为 6.9L/S 的水通过水泵打到盘管表面上，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，并将结垢降低到最低程度。

4、管子内可能沉积可溶性污垢或污泥的条件下，可选择用可清洁式集箱盘管束。

1. Efficient water baffle which is made of PVC material can remove water droplets in the air flow. Advantages include radiation resistance and long service life. An access door is provided on the side plate of the water baffle.

2. The newly improved air inlet grille can be conveniently disassembled when entering the water tray. It avoids direct sunlight and the generation of algae, prevent dust and dirt going into the unit.

3. Water with a minimum flow of 6.9L/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.

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.

采用镀铝锌板 Adopt aluminum galvanized plate

产品外壳采用优质、高强度镀铝锌板，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，盘管压力降较低。

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、波节管、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.

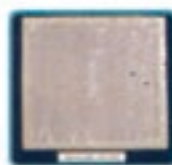
In addition, we can also choose elliptical tube, finned tube, corrugated tube and composite type surface coolers according to the technological requirements.



盐雾试验 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



镀铝锌板
Aluminum zinc steel



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

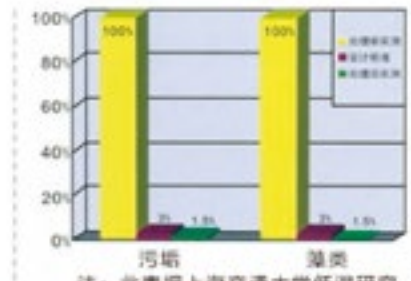
PVC packing heat exchange layer

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绘制

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



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 = 总排放热量）；
 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

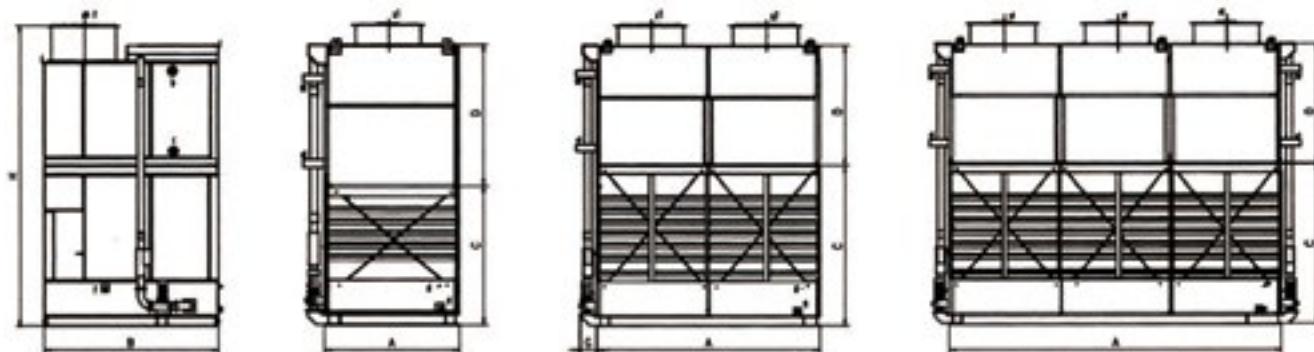
型号 Model	名义处理量 Nominal handling capacity	风机功率 kW Power of fan	风量 m³/h Air volume	水泵功率 kW Pump power	淋水量 m³/h Water spraying volume	接管口径 mm Connecting pipe caliber	近似重量 kg Approximate weight		外形尺寸 mm Overall dimensions		
							运输重量 Shipping weight	运行重量 Operating weight	总长 A Total length A	总宽 B Total 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





封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

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

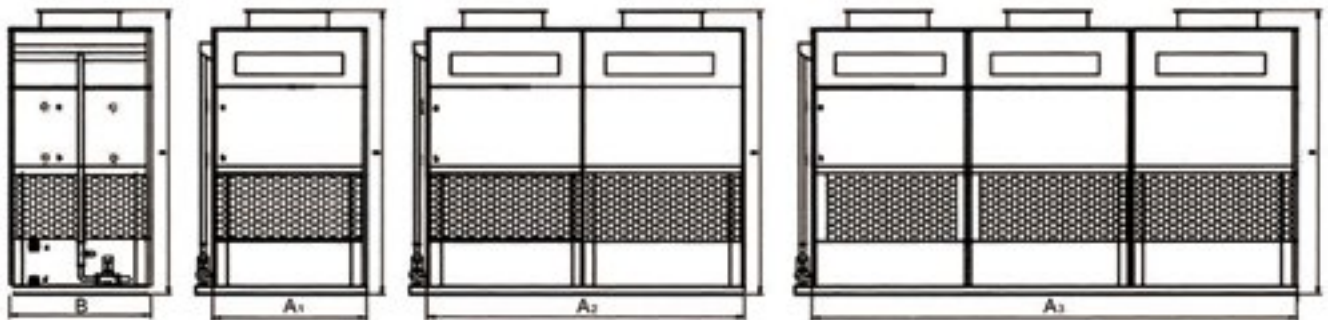
型号 Model	名义处理量 Nominal handling capacity	风机功率 kW Power of fan	风量 m³/h Air volume	水泵功率 kW Pump power	淋水量 m³/h Water spraying volume	接管口径 mm Connecting pipe caliber	近似重量 kg Approximate weight		外形尺寸 mm Overall dimensions		
							运输重量 Shipping weight	运行重量 Operating weight	总长 A Total length A	总宽 B Total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



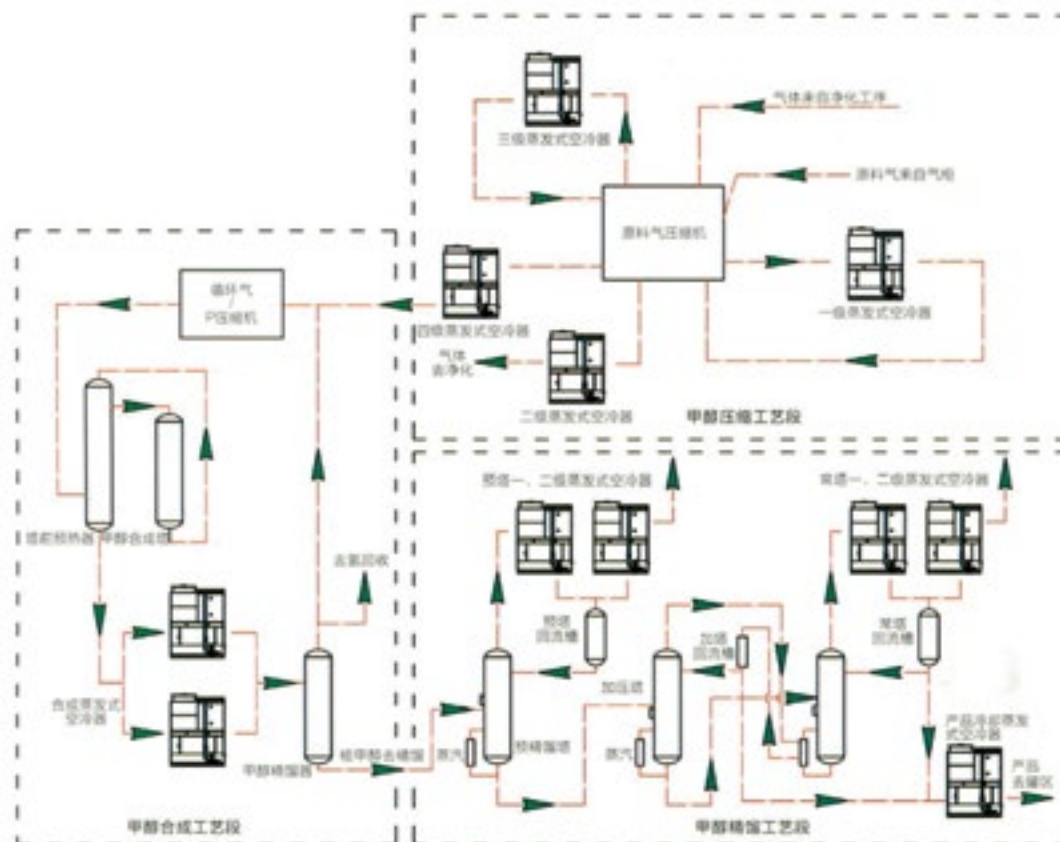


典型应用

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



封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser

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、工藕熔炼炉 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
	安达航空段造 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		
塑料制品 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,Shenzheng,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	

SHOW 产品展示

PRODUCT DISPLAY





封闭式冷却塔 | 消（除）雾式冷却塔 | 蒸发式冷凝器
Enclosed cooling tower | Fog removal cooling tower | Evaporative condenser



BUILD REPUTATION ON PROJECTS

只要努力满足客户的需求

继续引入更多的优质产品

我们一定能够培育出一个稳定的顾客群体

实现销售网络持续、稳定的增长

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.





21Century
YaTai
Group
二十一世纪亚太集团

追求每一个细节尽善尽美
几十年来已溶入我们的血液
光荣与梦想、信念与使命
将激励我们做的更好
seek after the perfection
of every minute details it is melted with
our blood
in the past ten years glory and
dream,faith and mission,will impel us to
do better and more

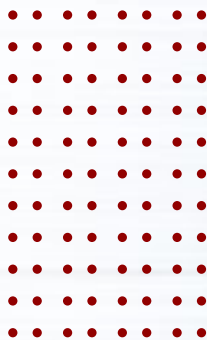
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