

# 「泓昊」系列玻璃钢产品

HONGHAO SERIES OF FRP PRODUCTS

玻璃钢管道/烟囱/储罐/烟道/脱硫塔/非标设备

FRP PIPE/CHIMNEY / TANK / FLUE PIPE/DESULFURIZATION TOWER/  
NON-STANDARD EQUIPMENT



连云港泓昊复合材料有限公司

LIANYUNGANG HONGHAO COMPOSITES CO.,LTD

江苏·连云港

LIANYUNGANG CITY. JIANGSU PROVINCE

# 企业文化 Enterprise culture

- ★ 企业精神： 诚实、努力
- ★ 经营理念： 诚信、务实、团结、创新
- ★ 管理方针： 科学管理、规范生产
- ★ 质量方针： 改善提高、以质取胜
- ★ 服务理念： 竭诚服务、客户为先

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## 公司简介 Enterprise profile

连云港泓昊复合材料有限公司位于亚欧大陆桥东桥头堡—江苏省连云港市国家级经济技术开发区，占地三万多平米，拥有现代化厂房六千余平方米，是集复合材料类玻璃钢产品开发设计，生产制造，技术咨询与服务为一体的全面发展的复合材料企业。

公司主要产品有：缠绕成型玻璃钢管道、高压管道、玻璃钢烟囱及烟道、玻璃钢储罐、食品酿造储罐、现场缠绕大型储罐、脱硫塔、一体化集成泵站、生物除臭装置、湿电除尘器阳极管等，兼营复合材料原辅材料的销售及玻璃钢防腐、保温、维修。

连云港泓昊复合材料有限公司拥有中国复合材料行业中最有经验的工程技术人员与施工人员，尤其在大口径烟囱、大直径玻璃钢管道、烟道防腐的设计方面，积累丰富的行业经验，在国内同行业中处于领先地位，能够熟练运用CAESAR II 及AFT impulse软件为整个管道系统的进行应力计算，使用有限元结构计算对铺层进行优化设计，可确保为工程提供最好的性能保障。公司现有员工百余人，专业技术人员三十余人，拥有多条生产直径DN1000–12000mm的烟囱、烟道生产线；生产直径DN15–4000mm的管道生产线；生产直径DN800–4000mm的储罐储罐及非标设备生产线；生产直径DN4000–20000mm大型容器的立式、卧式储罐生产线；配套模具齐全，生产制造及检验检测严格执行ISO9001质量管理体系。

连云港泓昊复合材料有限公司以“诚信、务实、团结、创新”的经营理念，结合“改善提高,以质取胜”质量方针及“竭诚服务，客户为先”的服务理念，为客户提供全面的技术服务、优质的FRP产品及完善的售后服务，并与广大用户一并携手前进、共铸辉煌！

Lianyungang Hong Hao composite Co., Ltd is located in the East Asian continent bridgehead, DaPu Economic– Technological Development Zone Industrial park, Lianyungang city, Jiangsu province. The company covers an area of more than 30 thousand square meters, has a modern plant 6000 square meters ,is a comprehensive development of composite materials enterprises, which set composite FRP products' development design, manufacturing, technical advice and services as a whole.

The company's main products include FRP pipe ( GRP )、 high–pressure pipe(GRE)、chimney and flue、 flue gas desulphurization device、FRP tank、 food brewing tank、 the large field winding tank、 desulphurization tower、 integrated pumping station、 biological deodorization device、 wet electrostatic precipitator anode tube etc. and run the sale of composite materials and raw materials, glass fiber reinforced plastic anti–corrosion, insulation, maintenance.

Lianyungang Hong Hao composite Co.,Ltd has the most experienced engineering and technical personnel and construction personnel in China's composite industry. Company has been in a leading position in the domestic industry in large diameter chimney, large diameter FRP pipe, flue anti–corrosion design, has accumulated rich experience in the industry, can calculate the skilled use of CAESAR II and AFT impulse software for the entire pipeline system stress, using the finite element calculation of layer optimization design of anticorrosion to ensure the best performance guarantee for the project. The company's existing staff of more than 100 people, professional and technical personnel more than thirty people, has a number of production of DN1000–12000mm diameter chimney, flue pipe production line; the diameter of DN15–4000mm production line; the production of DN800–4000mm diameter tank and non–standard equipment production line; production of DN4000–20000mm diameter large container vertical and horizontal tank production line; All kinds of products supporting the mold is complete, Manufacturing and inspection test strictly implement ISO9001 quality management system.

Lianyungang Hong Hao composite Co., Ltd. Have provided customers with comprehensive technical services ,high–quality FRP products and perfect after–sales service in Adhering to the "integrity, pragmatic, unity, innovation" business philosophy, combining with the improvement of quality and quality policy and the use of our sincerity, and With dedicated services , customer first" service consciousness. Together with the vast number of users to forward, create brilliant!



## 纤维缠绕玻璃钢制品的性能特点

### Properties and characteristics of fiber reinforced plastic (FRP) products

1. 具有优良的力学、物理性能。密度小(1.7~2.2g/cm<sup>3</sup>), 约为钢的1/4, 强度高, 比强度高(抗拉强度与密度之比)

2. 耐化学腐蚀性好、使用寿命长。根据工况不同,使用寿命通常10-50年或更长。

3. 设计性强, 结构性能优异。通过选用树脂、增强材料, 缠绕角和壁厚结构的设计来满足不同工况及某些特殊性能需求。

4. 电、热绝缘性能优异, 环境适应性好, 耐热抗冻性能稳定。可长期在-80° C至180° C的温度下运用, 也可通过添加导电材料来增加玻璃钢的导电性能。

5. 防污抗蛀, 耐磨性好。内壁光滑, 运行阻力小, 无二次污染。

1. Excellent mechanical and physical properties. Low density (1.7 ~ 2.2g/cm<sup>3</sup>) is about 1/4 of the steel, high strength, and high specific strength (tensile strength and density ratio).

2. Good chemical corrosion resistance, long service life. Depending on the operating conditions, the service life is usually 10-50 years or longer.

3. Excellent design, excellent structural performance. Through the selection of resin, reinforced materials, winding angle and wall thickness structure design to meet different conditions and some special performance requirements.

4. Excellent electrical and thermal insulation properties, good environmental adaptability, stable heat and frost resistance. The utility model can be used for a long time at the temperature of -80 DEG C to 180 DEG C, and the conductive property of the glass fiber can be increased by adding conductive material.

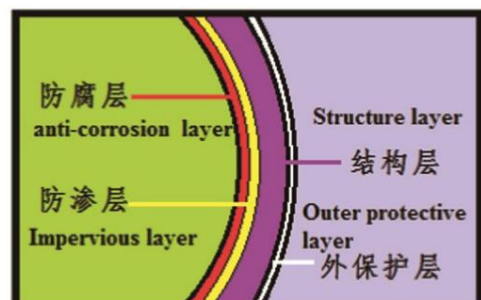
5. Anti pollution, good abrasion resistance. The inner wall is smooth, running resistance is small, no second pollution

## 纤维缠绕玻璃钢制品的结构特点

### Structural characteristics of filament wound glass products

合理的结构层次使得玻璃钢制品具有优异的耐腐蚀性能及高强度的承载性能。泓昊牌玻璃钢制品的结构层次分为：  
内衬层（防腐层、防渗层）+结构层+外保护层

● 1. 防腐层：即内表层，由内衬树脂+玻璃纤维表面毡或有机纤维聚酯毡构成，树脂含量 > 90%。此层气密性好，内表光滑，主要提供制品的防腐蚀、防渗漏、保护防腐层，提高据工况介质不同，层次厚度通常在1-6mm。



● 2. 防渗层：由内衬树脂+无碱玻璃纤维喷射纱或短切毡构成，树脂含量为70-80%。该层主要的作用是防腐蚀、防渗漏、保护防腐层，提高防腐层的抗内压能力。根据工况介质不同，层次厚度通常在1-6mm。

● 3. 结构层：由结构层树脂+无碱玻璃纤维构成，树脂含量为30-40%。此层厚度根据制品的受力情况经过科学、合理的优化设计及积累的工程经验确定，并通过微机控制，采用螺旋、环向或加单向布的缠绕成型方法，使得此层具有较高的力学性能，为玻璃钢制品提供抗内、外压力及外部载荷。此层厚度较大时需要多次成型。

● 4. 外保护层：由富树脂层或耐老化胶衣构成，制品在室内可以用富树脂层加入紫外线吸收剂，室外选用耐老化胶衣。主要作用为延缓制品的光氧老化。此层厚度 < 1mm。

The reasonable structure level makes the glass fiber reinforced plastic products have excellent corrosion resistance and high strength bearing capacity. Wang Hao glass fiber reinforced plastic product structure is divided into: lining layer (anti-corrosion layer, impermeable layer) + structural layer + external protective layer.

● 1. anti-corrosion layer: that is, the inner surface, from the lining resin + glass fiber surface felt or organic fiber polyester felt, resin content of 90%. The air tightness of the layer is good, and the inner surface is smooth. This layer thickness is about 1 mm.

● 2. Impervious layer: from the lining resin + alkali free glass fiber jet yarn or chopped felt, resin content of 70-80%. The main function of this layer is to prevent corrosion, leakage, protect the anti-corrosion layer, improve the anti pressure ability of anti-corrosion layer. According to the working medium, the thickness of the layer is usually 1-6mm.

● 3. The structure layer: Composed of structural layer resin and alkali free glass fiber, resin content is 30-40% The thickness of this layer according to the stress situation of the products through the optimization of scientific and reasonable design and accumulated engineering experience, and through the microcomputer control, and adopts spiral hoop or winding method with unidirectional cloth, the mechanical properties of the layer is high, for the internal and external pressure and external loads for glass steel product. When the thickness of the layer is large, it needs to be formed several times.

● 4. Outer protective layer: Composed of resin rich layer or anti-aging gel, products can be used with ultraviolet absorbent resin rich layer in the indoor, outdoor use anti-aging gel. The main effect is to delay the aging of products. This layer thickness is 1mm.

### 不同材料的密度、比强度明细

项目 Item	材质 Material	纤维缠绕玻璃钢 (FRP)	钢 (STEEL)	铸铁 (CAST IRON)	聚氯乙烯 (PVC)
比重 Density (g/cm <sup>3</sup> )		1.8~2.1	7.84	7.34	1.4
抗拉强度 (MPa) Tensile strength		160-320	380	187	50-60
比强度 Ratio (Tensile strength/density)		100-168	48.5	25.5	36.8



## 不同材料的热传导性能比较

项目 Item	材质 Material	纤维缠绕玻璃钢 (FRP)	钢 (STEEL)	聚氯乙烯 (PVC)
热传导系数 Heat conduction coefficient (W/m°C)		0.48	113	0.21
热膨胀系数 Coefficient of thermal expansion (10 <sup>-6</sup> /°C)		11.2	12.3	60-80

## 玻璃钢物理及其它性能 Physical properties of FRP

项目 Item	玻璃钢物理及其他性能参数 numerical value
巴柯尔硬度 Barcol hardness	40HBα
泊松系数 Poisson's coefficient	ux=0.18, uy=0.3
断裂延伸率 Elongation at break	0.8-1.2%
阻燃氧指数 Oxygen index	30%
体积电阻率 Mass resistivity	5.5x10 <sup>14</sup> cm Ω
内表面粗糙率 Inner surface roughness	0.0084
食品级残余单位含量 Unit content of food grade residue	200ppm
PVC-FRP层间剪切强度 PVC-FRP interlaminar shear strength PVC-FRP	> 7MPa

## 玻璃钢力学性能 (结构层) Mechanical properties of FRP (strength layer)

项目 Item	名称 Product	玻璃钢管道 PIPE	常压中小型容器 TANK	常压大型容器 Large storage tank	管件 FITTING
环向抗拉强度 Hoop tensile strength		320MPa	210MPa	260MPa	
轴向抗拉强度 Axial tensile strength		160MPa	130MPa	90MPa	
环向抗拉模量 Hoop tensile modulus		25GPa	17GPa		
轴向抗拉模量 Axial tensile modulus		12.5GPa	10GPa		
弯曲强度 bending strength		140 MPa			135MPa
弯曲模量 bending modulus		9.3GPa			9.0GPa
剪切模量 Shear modulus		7GPa			
层间剪切强度 Interlaminar shear strength		13 MPa			
拉伸强度					140MPa

备注：上力学性能参数因纤维的种类、方向、含量的不同及成型方法不同会有变化。

Remark: The mechanical properties of the fiber vary with the type, direction, content of the fiber and difference shape

## 纤维缠绕玻璃钢管道 ( GRP PIPE\GRE PIPE\GRV PIPE )

### 聚酯玻璃钢管道 ( GRP PIPE )

- 1、管道直径：DN15mm – DN4000mm；
- 2、压力等级：0.25 MPa、0.6 MPa、1.0 MPa、1.6 MPa、2.0 MPa、2.5MPa；
- 3、单根长度：3 m、6 m、9 m、12m；
- 4、应用领域：化学介质输送工艺管（化学工艺、造纸工艺、海水淡化工艺等）、污水、雨水收集管、输送及盐化工输送管道，饮用水输送干线管及配水管，市政给排水管道，农业灌溉用管

### Polyester glass fiber reinforced plastic pipe (GRP PIPE)

1. Pipe diameter: DN15 mm DN4000 mm;
2. Pressure level: 0.25 MPa, 0.6 MPa, 1.0 MPa, 1.6 MPa, 2.0 MPa, 2.5MPa;
3. Single pipe length: 3 m, 6 m, 9 m, 12m;
4. Application: chemical medium conveying pipe (chemical technology, papermaking technology, seawater desalination technology), sewage, rainwater collection, transportation pipe and salt chemical pipeline, drinking water delivery main pipe and water pipe, municipal water supply and drainage pipeline,

### 大口径加筋 ( 刚性环 ) 玻璃钢管道 ( GRP PIPE ) 规格

- 1、管道直径：DN1200mm – DN3600mm；
- 2、压力等级：0.25 MPa、0.6 MPa、1.0 MPa；
- 3、单根长度：6 m、9 m、12m；
- 4、应用领域：水电站压力水管、电厂循环水管，LNG海水管道，海水输送管道，核电站海水管

### Polyester glass fiber reinforced plastic pipe (GRP PIPE)

1. Pipe diameter: DN1200 mm, DN3600 mm;
2. Pressure level: 0.25 MPa, 0.6 MPa, 1.0 MPa;
3. Single pipe length: 6 m, 9 m, 12m;
4. Application areas: hydropower station pressure pipe, power plant circulating water pipe, LNG sea water pipeline, sea water pipeline, nuclear power plant seawater pipe





## 环氧玻璃钢管道 ( GRE PIPE ) 规格

- 1、管道直径：1.5" (DN40mm) - 24" (DN600mm)；
- 2、压力等级：2.0MPa、3.5 MPa、5.5 MPa、8.0 MPa、10.0 MPa
- 3、单根长度：9 m
- 4、应用领域：油田注水、污水及原油输送用管，小直径高压输水用管

## Standard Specification for epoxy FRP pipe (GRE PIPE)

1. the pipe diameter is 1.5 "(DN40 mm) - 24 " (DN600 mm);
2. pressure level: 2.0 MPa, 3.5 MPa, 5.5 MPa, 8 MPa, 10 MPa
3. single length: 9 m
4. application: oil field water injection, sewage and crude oil transportation pipe, small diameter high pressure water pipe

**附：环氧玻璃钢管道 ( GRE PIPE ) 规格及参数表详见《附录一》**

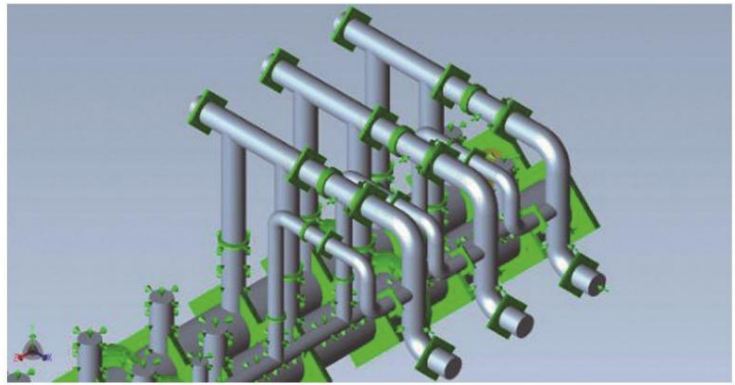
**The specification and parameter list of GRE PIPE is detailed in Appendix 1**

**提供GRP/ GRE管道系统解决方案及管道系统应力分析.**

应力分析软件：CAESAR II；水锤分析软件：AFT Impulse.

**Provide GRP/ GRE piping system solutions and piping system stress analysis**

Stress analysis software: CAESAR II; water hammer analysis software: AFT Impulse.





## 聚酯玻璃钢 ( GRP ) 管道参数表 GRP PIPE DATA SHEET

内径 (DN)	0.6Mpa		1.0Mpa		1.6Mpa		2.5Mpa		最大长度 (m)
	t (mm)	W (kg/m)	t (mm)	W (kg/m)	t (mm)	W (kg/m)	t (mm)	W (kg/m)	
15	4.5	0.5	4.5	0.5	4.5	0.5	5.0	0.6	1
20	4.5	0.7	4.5	0.7	4.5	0.7	5.0	0.8	1
25	4.5	0.8	4.5	0.8	4.5	0.8	5.0	0.9	3
32	4.5	1.0	4.5	1.0	4.5	1.0	5.0	1.1	3
40	4.5	1.2	4.5	1.2	4.5	1.2	5.0	1.4	3
50	4.5	1.5	4.5	1.5	4.5	1.5	5.0	1.7	3
65	4.5	1.9	4.5	1.9	4.5	1.9	5.0	2.1	6
80	4.5	2.3	4.5	2.3	5.0	2.6	5.0	2.6	6
100	4.5	2.9	4.5	2.9	5.0	3.2	6.0	4.0	6
125	5.0	4.0	5.0	4.0	5.0	4.0	7.0	5.8	6
150	5.0	4.7	5.0	4.7	6.0	5.8	7.0	6.8	6
200	5.0	6.3	5.0	6.3	6.0	7.6	8.0	10.0	12
250	5.5	8.5	6.0	9.5	7.0	11.0	10.0	16.0	12
300	6.0	11.2	6.0	11.2	8.0	15.0	11.0	21.0	12
350	6.0	13.0	6.5	14.2	9.0	20.0	12.5	28.0	12
400	6.5	16.0	7.0	17.5	10.0	25.0	14.0	35.5	12
450	6.5	18.0	7.5	21.0	11.0	31.0	15.5	44.0	12
500	7.0	22.0	8.5	26.5	12.0	37.5	17.0	54.0	12
600	7.5	28.0	9.5	35.5	14.0	52.5	20.0	76.0	12
700	8.5	37.0	11.0	48.0	15.0	66.0	23.0	102.0	12
800	9.0	45.0	12.0	60.0	16.0	80.0	26.0	132.0	12
900	10.0	56.0	13.0	72.5	18.0	101.0	30.0	171.0	12
1000	11.0	69.0	14.0	87.0	19.5	122.0	32.0	202.0	12
1200	13.0	97.0	15.0	120.0	23.0	172.0			12
1400	15.0	130.0	18.0	160.0	26.0	227.0			12
1500	16.0	148.0	20.0	186.0	28.0	262.0			12
1600	17.0	168.0	21.0	208.0	30.0	300.0			12
1800	19.0	210.0	23.0	258.0	34.0	382.0			12
2000	20.0	248.0	26.0	324.0	38.0	474.0			12
2200	22.0	300.0	28.0	382.0					12
2400	24.0	355.0	30.0	448.0					12
2500	25.0	386.0	31.0	480.0					12
2800	28.0	485.0	35.0	608.0					12
3000	29.0	538.0	37.0	690.0					12
3200	31.0	615.0							12
3600	36.0	820.0							12
4000	40.0	1050.0							12

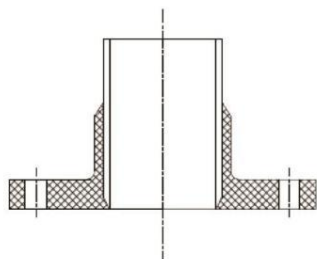
备注：表中参数仅供参考，不作为设计、验收依据，根据工程需要可以单做详细设计。

Remarks: the parameters in the table are for reference only, not for design and acceptance, and for detailed design according to engineering needs.

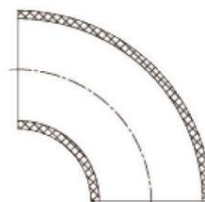


## 玻璃钢管件FRP Fitting

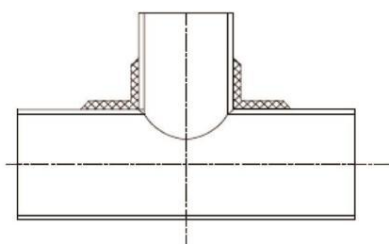
### ● 玻璃钢法兰(Flange)



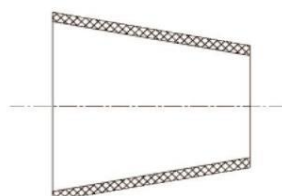
### ● 玻璃钢弯头(Elbow)



### ● 玻璃钢三通(Tee)

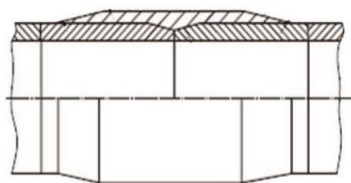


### ● 玻璃钢异径管(Reducer)

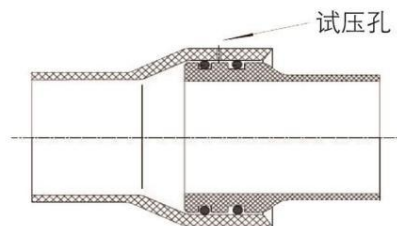


## 连接形式(Pipe connection)

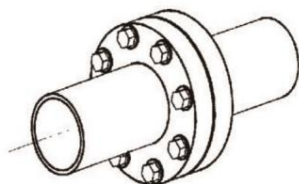
### 1. 平端粘接(Hand lay – up Connection)



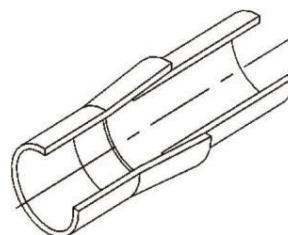
### 2. 双”O”型密封圈(Double “O” ring bell & Spigot Connection)



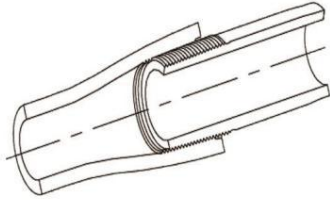
### 3. 法兰连接 (Flange Connection)



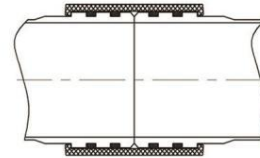
### 4. 承插粘接 (Taper & Socket Connection)



### 5. 螺纹连接(Threaded Connection)



### 6. 管箍连接 ( 螺纹或双密封圈 ) (Coupling Connection)



### 执行标准 Standard of execution

JC552	《纤维缠绕增强热固性树脂压力管》
HG/T21633	《玻璃钢管和管件》
GB/T21238	《 玻璃纤维增强塑料压力管》
SY/T6266	《低压玻璃纤维管线管和管件》 等效采用API 15LR
SY/T6267	《高压玻璃纤维管线管规范》 等效采用API 15HR
AWWA C950-07	Fiberglass pressure pipe
AWWA M-45	Fiberglass Pipe Design Manual
AWWAD2996-01	Standardspecification for Filament-wound “fiberglass” ( Glass-Fiber-Rein - forced -Thermosetting-Resin) Pipe
ASTM D3262	玻璃纤维增强热固性树脂污水管(Gravity Sewer)
ASTM D3754	玻璃纤维污水管和工业用压力管Pressure Sewer
DIN 16868	Glass Fiber-Reinforced Polyester Resin Pipes

## 玻璃钢烟囱、烟道 FRP chimneys and flue

### 一、玻璃钢烟囱 FRP chimneys

燃煤热电中燃煤废气经湿法脱硫后，烟气温度会降至50-80℃，但烟气含水率较高，对烟囱的内壁腐蚀较大，同时考虑烟囱在紧急状态下即事故温度会在150-180℃，所以湿法脱硫中烟气排放烟囱具有耐腐蚀、耐高温的特点才能满足要求。

玻璃钢烟囱与传统的耐酸砖-耐酸胶泥，钢-钛合金复合结构（钛合金、镍合金等），钢-不锈钢复合结构，碳钢内衬橡胶、碳钢内涂树脂鳞片等材质的烟囱相比，玻璃钢烟囱具有耐腐蚀性强，造价低，寿命长、强度高，产品可设计性强，长时间不用维修，耐高温性能优良等优点，满足在运行温度50-100℃，短时事故温度150-200℃下长期使用。

The flue gas temperature will be reduced to 50-80 degrees centigrade after the flue gas desulfurization by coal-fired thermal power, but the moisture content of the flue gas is high and the inner wall of the chimney is corroded. At the same time, the chimney is at 150-180 C in the emergency state, so the flue gas emission chimney has the characteristics of corrosion resistance and high temperature resistance in the wet desulphurization.

The FRP chimney and the traditional acid resistant and acid resistant mud, steel and titanium alloy composite structure (titanium alloy, nickel alloy, etc.), steel and stainless steel composite structure, carbon steel lining rubber, carbon steel coated resin scales and other materials, glass steel chimney has strong corrosion resistance, low cost, long life and high strength. It has many advantages, such as strong design, long time maintenance and high temperature resistance. It can be used for 50-100 days at a running temperature and 150-200 hours at a short time.

**玻璃钢烟囱直径系列：φ 2000 ~ φ 10000，高度：10-240M**

**FRP chimney diameter : φ 2000 ~ φ 10000, height: 10-240M**



## 玻璃钢烟囱的结构形式 The structural form of the FRP chimney

1. 钢结构内套玻璃钢烟囱，适用于排放烟气在100米以内的烟囱，一般为1个钢结构内套1个玻璃钢烟囱，钢支架作为支撑系统。

2. 混凝土内套玻璃钢烟囱。适用于排放烟气在100-240米的内排烟筒，一般为1个混凝土外筒内套1-3个的玻璃钢排烟筒，在混凝土预埋钢结构作为支撑系统。烟囱一般30~50米一段，每段之间增设膨胀节，且每15米设一个导向支撑。

**1. Steel structure inner FRP chimney is suitable for the chimney that is less than 100 meters, which is generally made up of 1 FRP chimneys in 1 steel structures and the steel support as the supporting system.**

**2. Concrete inner sleeve FRP chimney. It is suitable for the 100-240 meter inner exhaust pipe, which is usually made of 1-3 FRP chimneys with 1 concrete outer canister, and the concrete preburied steel structure is used as the supporting system. The chimney is usually 30~50 meters in length, and expansion joints are added between each section, and a guide support is set for every 15 meters.**

## 二、玻璃钢烟道 FRP flue

玻璃钢烟道具有优良的耐蚀抗温性，其原理是利用冷却塔中热空气的巨大热量将脱硫后的湿烟气进行抬升，将混合气体抬升到上百米的空中，从而改善地面的环境。玻璃钢烟道一次性制作直径大，可跨越距离长，重量轻的优点，可根据电厂空间的位置，设计成水平、垂直烟道，长期使用温度50-80° C。

The FRP flue has excellent corrosion resistance, the principle of which is to lift the wet flue gas after the desulphurization by the great heat and hot air of the cooling tower, and lift the mixed gas to a hundred meters of air, so as to improve the environment of the ground. The size of the glass steel flue is large in one time, which can span long distance and light weight. It can be designed into a horizontal and vertical flue according to the position of the power plant space, and the temperature is 50-80 ° C for a long time.

**玻璃钢烟道的直径系列： DN500-DN8000**

**Diameter series of FRP flue: DN500-DN8000**





## 玻璃钢脱硫塔，喷淋管、阳极管

### GFRP desulphurization tower, spray tube and anode tube

玻璃钢脱硫塔具有成本低，耐腐蚀、重量轻等优点，广泛应用于电厂、有色冶炼等行业。

玻璃钢喷淋管具有耐腐蚀，耐磨性能优异，在脱硫塔内与喷嘴连接后喷射石膏浆液，使之与烟气中的二氧化硫等化合物反应达到酸碱中和的效果，达到长期使用温度50-100℃，短时事故温度200℃要求。

玻璃钢阳极管具有导电性强，耐高温，强度高，重量轻，制作、安装时间短，使用寿命长的优点。阳极管规格分为  $\phi$  350mm和  $\phi$  360mm，长度为5米/根，6米/根。

**The FRP desulfurization tower has the advantages of low cost, corrosion resistance and light weight. It is widely used in power plants, nonferrous metals smelting and other industries.**

**The GFRP spray pipe has corrosion resistance and excellent wear resistance. After connecting with the nozzle in the desulphurization tower, the spray gypsum slurry is ejected to achieve the effect of acid and alkali neutralization with the sulfur dioxide and other compounds in the flue gas, reaching a long-term use temperature of 50-100 °C centigrade and a short accident temperature of 200 °C.**

**The GFRP anode tube has the advantages of high conductivity, high temperature resistance, high strength, light weight, short manufacture and installation time and long service life. The anode tube specifications into 350mm and Phi Phi 360mm, a length of 6 meters / root.**



### 阳极管性能指标: Performance index of anode

序号	项目	单位	数值	参照标准
1	内表面电阻率	$\Omega$	$\leq 100$	GB/T1410
2	体积电阻率	$\Omega \cdot \text{cm}$	$\leq 5 \times 10^6$	GB/T1410
3	巴氏硬度 (内表面)	HB	$\geq 40$	GB/T3854
4	密度	$\text{g/cm}^3$	1.6-2.0	GB/T1463
5	热变形温度	$^{\circ}\text{C}$	$\geq 120$	GB/T1463
6	拉伸强度	MPa	120-180	GB/T1447
7	拉伸模量	GPa	$\geq 6$	GB/T1447
8	弯曲强度	MPa	$\geq 250$	GB/T1449
9	弯曲模量	GPa	$\geq 6$	GB/T1449
10	极限氧指数	%	$\geq 28$	GB/T8924



## 纤维缠绕玻璃钢储罐(FRP TANK)

### ★玻璃钢储罐罐壁层次结构

内表层作用：耐化学腐蚀

防渗层（次内层）作用：防腐蚀、防渗漏

结构层作用：提供制品强度、刚度。

外保护层作用：对制品提供外保护，

防水、防紫外线、防光氧化。

The wall structure of FRP tank

Internal surface : chemical corrosion resistance

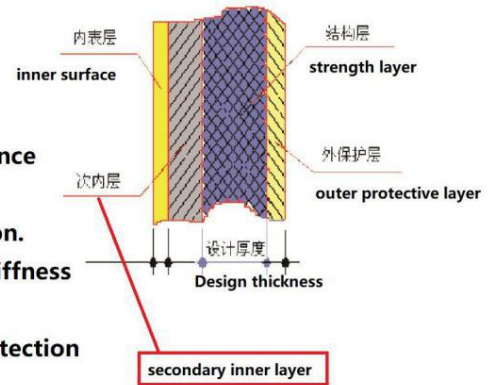
Impervious layer (secondary inner layer):

corrosion protection and seepage prevention.

Strength layer : provide the strength and stiffness of the product.

Outer protective layer: provide external protection for products, and prevent light.

Waterproof, anti ultraviolet, anti aging.



### ★产品规格 Product specification

直径：DN800-25000mm 体积：1- 5000m<sup>3</sup> 压力：常压，-0.1MPa-0.3MPa（特殊设计），  
温度：-80至120° C, 可按要求配做液位计、爬梯、护栏、平台等。

Diameter: DN800-25000mm; Volume: 1- 5000m<sup>3</sup>; Temperature: -80 to 120 degree C

Pressure pressure: normal pressure, -0.1MPa-0.3MPa (special design)

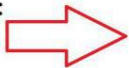
can be used as a level meter, climbing ladder, guardrail, platform and so on.

### ★玻璃钢储罐主要原材料

优质的原材料是保证产品品质及安全使用的前提，根据介质不同，选择不同的原辅材料，达到产品的优化选材。主要的原材料中树脂的类型如下表：

High quality raw material is the premise to ensure product quality and safe use. According to different media, we choose different raw and auxiliary materials to achieve optimal product selection.

The types of resin in the main raw materials are as follows:



材料用途	树脂类型	选用原则	常用牌号及生产商
内衬层树脂 inner layer resin	乙烯基树脂 vinylester resin	耐蚀，耐高温	Dreakare 470, 411, 美国亚什兰公司 SW-977S SW907 SW-901 上海上纬 Atlac 430, 金陵帝斯曼公司
	间苯树脂	常温	A400-972 A400-976a 金陵帝斯曼公司
结构层树脂 strength layer resin	乙烯基树脂 vinylester resin	长期使用温度在 85° 以上	Dreakare 470, 411, 美国亚什兰公司 SW-977S SW907 SW-901 上海上纬 Atlac 430, 金陵帝斯曼公司
	间苯树脂 isophthalic polyester	长期使用温度在 60-80°C	A400-976a 金陵帝斯曼公司 A400-972
	邻苯树脂	常温	P65-901 金陵帝斯曼公司 S-901 南京费隆 FL886 富凌化工

### ★增强材料 Reinforced material

内表层增强材料：表面毡 聚酯毡； 结构层增强材料：玻璃纤维 玻璃纤维布 短切毡

Inner surface reinforced material: polyester felt on surface felt

Structural layer reinforced material: glass fiber glass cloth, chopped strand mat.



## 立式玻璃钢储罐结构形式 Structure form of vertical FRP tank



## 卧式玻璃钢储罐结构形式 Structural form of horizontal FRP tank



### 执行标准 Standard of execution

JC/T587	《玻璃纤维缠绕增强热固性树脂耐腐蚀立式贮罐》
JC/T718	《玻璃纤维缠绕增强热固性树脂耐腐蚀卧式贮罐》
HG/T20696	《玻璃钢化工设备设计规定》
JC586	《热固化玻璃纤维增强塑料食品容器》
ASTM D3299	Standard Specification for Filament-Wound GlassFiber Reinforced Thermoset Resin Corrosion-Resistant Tanks
JC586	《热固化玻璃纤维增强塑料食品容器》
GB/T 14354	《玻璃纤维增强不饱和聚酯树脂食品容器》
GB13115	《食品容器及包装材料用不饱和聚酯树脂及其玻璃钢制品卫生标准》
JC/T718	《玻璃纤维缠绕增强热固性树脂耐腐蚀卧式贮罐》

**玻璃钢立式储罐参数表详见《附录二》**

The parameter list of FRP vertical storage tank is detailed in Appendi II

**玻璃钢卧式储罐参数表详见《附录三》**

The parameter list of FRP horizontal tank is detailed in Appendix III



## 纤维缠绕大型玻璃钢储罐 Filament wound Large FRP

### 产品规格 Product specification

直径: DN4000-25000mm 体积: 100- 5000m<sup>3</sup> 压力: 常压 温度: -80至120° C.

**Diameter:** DN4000-25000mm

**Volume:** 100- 5000m<sup>3</sup>

**pressure:** atmospheric pressure

**Temperature:** -80-- 120° C.

### 执行标准 Standard of execution

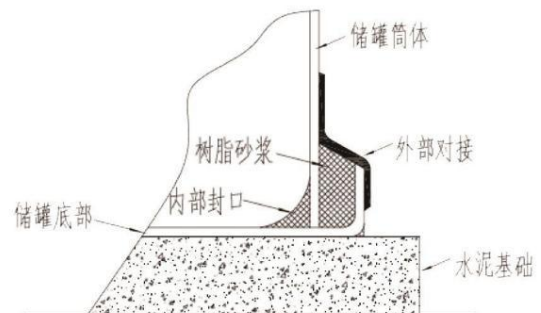
HG/T 3983 《耐化学腐蚀现场缠绕玻璃钢大型容器》

### 应用领域 Application area

氯碱、硫基复合肥、环氧氯丙烷、氟化工、有机硅、多晶硅、农药、造纸行业等

### 大型玻璃钢贮罐的罐底结构 即：承插式罐底，如下简图

The bottom structure of Large FRP tanks is the socket bottom



纤维缠绕大型玻璃钢贮罐规格及参数表详见《附录四》

The specification and parameter list of filament wound Large FRP tank can be seen in Appendix IV



## 玻璃钢一体化泵站 FRP integrated pump equipment

玻璃钢一体化泵站包括纤维缠绕玻璃钢筒体、(预旋转)底座、潜污泵、自动耦合装置、导杆、提升链、不锈钢管路、止回阀、闸阀、可提升安全格栅、二次工作平台,多重液位检查设备,全自动无人值守控制系统等,具有安装空间小,建设周期短,环境友好,工程造价低,维修、管理便捷等优点,在市政行业得以广泛的应用。

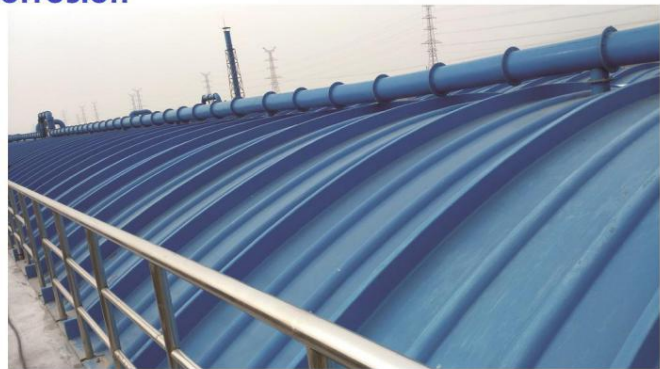
FRP integrated pump equipment include fiber winded tube, (pre rotating) base, submersible pump, automatic coupling device, guide rod, lifting chain, stainless steel pipe, check valve, gate valve, safe grille, second work platform, multiple liquid level inspection equipment, full automatic unattended control system and so on. The advantages of small space, short construction period, friendly environment, low engineering cost, convenient maintenance and management are widely applied in the municipal industry



玻璃钢筒体的直径(内径)为: DN2000, DN2400, DN2800, DN3000, DN3600, DN3800, 筒体长度为2-15米  
The diameter of the FRP tube is DN2000, DN2400, DN2800, DN3000, DN3600 and DN3800, and the length of the cylinder is 2-15 meters

## 玻璃钢非标(废气、污水处理)设备、复合(PVC/FRP、PP/FRP、PVDF/FRP)设备、防腐.

FRP non-standard (exhaust gas, sewage treatment) equipment, composite (PVC/FRP, PP/FRP, PVDF/FRP) equipment, anti-corrosion



## 生产设施 Production facilities

泓昊公司占地三万多平方米，拥有现代化厂房六千余平方米。拥有先进的各类玻璃钢制品的生产线十余条。玻璃钢缠制品的缠绕生产线可通过微机控制主机运行（也可互换为手工控制、半自动控制），以连续的预浸润的玻璃纤维通过一轴、三轴、四轴、六轴模具制作玻璃钢制品。可实现螺旋缠绕、环向缠绕、小角度缠绕，并缠绕方式之间的互换。

Hong Hao, the company covers an area of more than 30000 square meters, has a modern plant 6000 square meters. We have more than ten advanced production lines of all kinds of FRP products. The filament winding production line can be operated by microcomputer control (also interchangeable to manual control and semi automatic control), and the glass fiber is made through one axis, three axis, four axis and six axis mould with continuous pre infiltrated glass fiber. It can realize spiral swash, circumferential winding, small angle winding and interchanging between winding ways



管道缠绕设备 Pipe winding equipment



脱模系统 Ejection equipment



储罐缠绕设备 Tank winding equipment



现场缠绕设备 Field winding equipment



拉挤设备 Pultrusion production line



公司厂区 Company factory area



## 质量控制及服务 Quality control and service

### ★ 质量控制：Quality control

泓昊公司拥有巴氏硬度计、温湿度计、测厚仪、微机控制电子万能材料试验机等齐全的检测设备及完善的质量管理体系，从玻璃钢原材料的检测，生产过程的控制及成品的检验检测等方面严格执行ISO9001质量体系认证，以高标准、高要求来提高泓昊产品的竞争力。

Hong Hao company has complete testing equipment and perfect quality management system, such as pasteurometer, temperature hygrometer, thickness meter, microcomputer controlled electronic universal material testing machine and so on. It strictly holds ISO9001 quality system certification from the inspection of raw materials of glass and steel, control of production process and inspection and inspection of finished products. High demand to improve the competitiveness of Hong Hao products

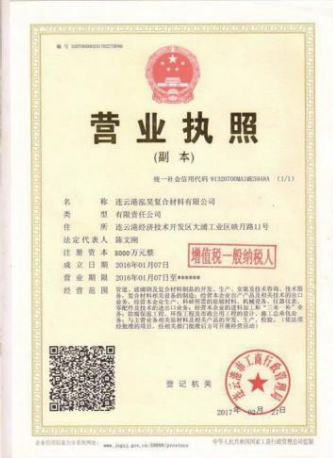


### ★ 服务：Service

根据用户的需求，我公司依据多年玻璃钢制品的设计、生产、安装施工经验，提供完善的售前、售中及售后服务，协助解决设计方或业主的技术需求，做到竭诚服务，客户为先，并与业主和设计方构建和谐的合作互助关系。对于我公司的产品，我们承诺做到：在产品质保期内，产品出现质量问题负责免费维修，非质量问题收取合理的维修费用；质保期结束后，提供终身维修、维护及技术咨询服务。

According to the needs of the users, according to the design, production and installation experience of fiberglass products for many years, our company provides perfect pre sales, sale and after-sales service to help solve the technical needs of the designers or owners, and do our best to serve the customers first, and build a harmonious cooperation and mutual relationship with the owners and the designers. For our company's products, we promise to do this: in the period of product warranty, the product quality problems are responsible for free maintenance, and the non quality problems collect reasonable maintenance costs; after the end of the warranty period, it provides life-long maintenance, maintenance and technical consultation service.

资质文件 Qualifications reference





## 《附录一》 环氧玻璃钢 ( GRE ) 管道规格及参数表

Appendix 1: Specification and parameter list of epoxy FRP (GRE) pipes.

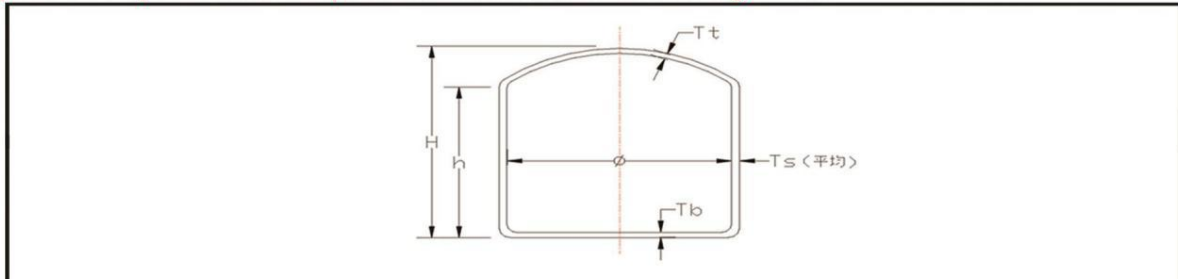
规格		压力	壁厚	管内径	最大长度	连接方式
英制	公制	( Mpa )	(mm)	(mm)	(m)	
1.5 in	DN40	7.0	2.00	38.10	9	螺纹连接
		8.5	2.00	38.10	9	螺纹连接
		10.0	2.50	38.10	9	螺纹连接
		14.0	3.00	38.10	9	螺纹连接
2 in	DN50	3.5	2.00	49.50	9	螺纹连接
		5.5	2.50	49.50	9	螺纹连接
		8.5	2.50	49.50	9	螺纹连接
		10.0	3.00	49.50	9	螺纹连接
		12.0	3.50	49.50	9	螺纹连接
2.5 in	DN65	5.5	2.50	61.70	9	螺纹连接
		8.5	3.00	61.70	9	螺纹连接
		12.0	4.50	61.70	9	螺纹连接
3 in	DN80	3.5	2.50	76.00	9	螺纹连接
		5.5	2.50	76.00	9	螺纹连接
		7.0	3.00	76.00	9	螺纹连接
		8.5	3.50	76.00	9	螺纹连接
		10.0	4.00	76.00	9	螺纹连接
		12.0	5.00	76.00	9	螺纹连接
4 in	DN100	3.5	2.30	101.60	9	螺纹连接
		5.5	3.00	101.60	9	螺纹连接
		7.0	4.00	101.60	9	螺纹连接
		8.5	5.00	101.60	9	螺纹连接
		10.0	5.50	101.60	9	螺纹连接
5 in	DN125	3.5	3.00	122.50	9	螺纹连接
		5.5	4.00	122.50	9	螺纹连接
		7.0	5.00	122.50	9	螺纹连接
6 in	DN150	3.5	3.00	157.20	9	螺纹连接
		5.5	5.00	157.20	9	螺纹连接
		7.0	5.50	148.50	9	螺纹连接
		8.5	7.00	148.50	9	螺纹连接
		10.0	7.50	138.00	9	螺纹连接
8 in	DN200	3.5	4.00	194.00	9	螺纹连接
		5.5	6.00	194.00	9	螺纹连接
		7.0	7.50	194.00	9	螺纹连接
		8.5	9.00	194.00	9	螺纹连接
		10.0	10.50	194.00	9	螺纹连接
10 in	DN250	3.5	5.00	246.70	9	螺纹连接
		5.5	7.50	246.70	9	螺纹连接
		8.5	11.50	246.70	9	螺纹连接
12 in	DN300	3.5	5.50	300.00	9	螺纹连接
		5.5	9.00	300.00	9	螺纹连接

以上参数仅供参考，不作为设计验收依据，详细了解请咨询泓昊公司技术中心

The above parameters are for reference only, not for design and acceptance. Please refer to Honghao Technology Center for details.

《附录二》 玻璃钢立式储罐规格及参数表

Appendix II : Specification and parameter list of FRP vertical storage tank



Φ (mm)	V (m3)	H (mm)	h (mm)	W (Kg)	Tt (mm)	Tb (mm)	Ts (mm)	Φ (mm)	V (m3)	H (mm)	h (mm)	W (Kg)	Tt (mm)	Tb (mm)	Ts (mm)
Φ800	0.8	1700	1500	100	6	7	7	Φ2400	30.0	6840	6240	1650	9	10	11
	1.0	2100	1900	130	6	7	7	Φ2500	20.0	4330	3800	878	9	10	10
	1.2	2460	2260	140	6	7	7		25.0	5340	4810	1080	9	10	11
	1.5	3060	2860	180	6	7	8		30.0	6360	5830	1247	9	10	11
Φ1000	0.8	1100	850	115	7	8	8	Φ2600	20.0	4680	4020	1250	10	10	11
	1.0	1360	1110	127	7	8	8		25.0	5780	5230	1500	10	10	11
	1.5	1990	1740	150	7	8	8		30.0	6890	6230	1800	10	10	12
	2.0	2630	2380	179	7	8	8		40.0	9100	8440	2200	10	11	12
Φ1200	2.0	1870	1570	190	7	8	8	Φ2800	20.0	3490	2790	1100	10	11	11
	2.5	2320	2020	220	7	8	8		25.0	4300	3600	1300	10	11	11
	3.0	2760	2460	260	7	8	8		30.0	5110	4410	1640	10	11	12
	4.0	3640	3340	330	7	8	8		40.0	6730	6030	2000	10	11	12
Φ1400	3.0	2070	1720	225	8	8	8	Φ3000	25.0	3790	3040	1158	10	11	11
	4.0	2720	2370	268	8	8	8		30.0	4500	3750	1389	10	11	12
	5.0	3370	3020	311	8	8	8.5		50.0	7330	6580	2105	10	11	13
Φ1500	3.0	1825	1450	240	8	9	8		60.0	8740	7990	2441	10	11	13
	4.0	2395	2020	300	8	9	8		80.0	11570	10820	3279	10	11	14
	5.0	2955	2580	380	8	9	8.5	Φ3200	30.0	4000	3200	1450	10	11	11
	6.0	3525	3150	440	8	9	8.5		40.0	5250	4450	1780	11	11	11
Φ1600	4.0	2120	1720	269	8	9	8		50.0	6490	5690	2300	11	11	12
	6.0	3120	2720	362	8	9	8.5		60.0	7730	6930	2680	11	12	12
	8.0	4110	3710	443	8	9	8.5	Φ3500	35.0	2900	3060	1600	11	12	11
	10.0	5110	4710	533	8	9	9		40.0	3900	3680	1940	11	12	12
Φ1800	8.0	3300	2850	440	9	9.5	8.5		50.0	5000	4620	2240	11	12	12
	10.0	4080	3630	515	9	9.5	9		60.0	6000	5660	2780	12	12	13
	15.0	6050	5600	706	9	9.5	9		70.0	7100	6700	3150	12	12	13
Φ2000	10.0	3350	2850	545	9	9.5	8	Φ3600	40.0	4230	3330	1685	11	12	12
	15.0	4940	4440	694	9	9.5	9		50.0	5210	4310	2062	11	12	13
	20.0	6540	6040	924	9	9.5	10		60.0	6200	5300	2317	11	12	13
	25.0	8130	7630	1113	9	9.5	10		80.0	8160	7260	3027	11	12	14
Φ2200	15.0	4130	3580	780	9	10	9		100.0	10130	9230	3856	11	12	15
	20.0	5450	4900	1100	9	10	10	Φ4000	50.0	4310	3310	2261	13	14	14
	25.0	6760	6210	1300	9	10	10		60.0	5110	4110	2535	13	14	14
	30.0	8080	7530	1600	9	10	10.5		80.0	6700	5700	3171	13	14	15
Φ2400	15.0	3520	2920	840	9	10	10		90.0	7500	6500	3465	13	14	15
	20.0	4630	4030	1150	9	10	10		100.0	8290	7290	3953	13	14	16
	25.0	5730	5130	1350	9	10	10.5		120.0	9890	8890	4820	13	14	17

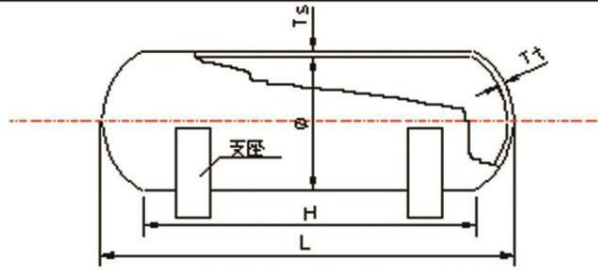
以上参数仅供参考，不作为设计验收依据，详细了解请咨询泓昊公司技术中心

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《附录三》 玻璃钢卧式贮罐规格及参数表

Appendix III : Specification and parameter list of FRP horizontal storage tank.



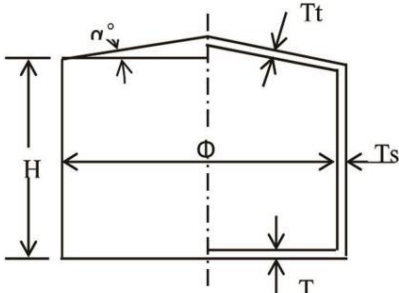
Φ	V	L	H	W	Ts	Tt	支座	Φ	V	L	H	W	Ts	Tt	支座
(mm)	(m <sup>3</sup> )	(mm)	(mm)	(Kg)	(mm)	(mm)	(个)	(mm)	(m <sup>3</sup> )	(mm)	(mm)	(Kg)	(mm)	(mm)	(个)
φ1000	1.0	1440	940	142	9	9	2	φ2400	35.0	8140	6940	2400	15	14	3
	1.5	2080	1580	179	10	9	2	φ2500	20.0	4560	3510	1164	14	12	2
	2.0	2710	2210	217	10	9	2		25.0	5580	4530	1378	14	12	3
	2.5	3350	2850	243	10	9	2		30.0	6600	5550	1548	14	12	3
φ1200	3.0	2860	2260	320	10	10	2		40.0	8640	7590	2096	15	12	3
	4.0	3740	3140	400	10	10	2	φ2600	25.0	6030	4730	1950	15	14	2
	5.0	4630	4030	490	10	10	2		30.0	7150	5830	2500	15	14	2
φ1400	3.0	2180	1480	271	10	10	2		40.0	9350	8040	2900	16	15	3
	4.0	2830	2130	309	10	10	2	φ2800	25.0	4530	3130	1580	14	13	2
	5.0	3480	2780	392	11	10	2		30.0	5340	3940	1960	15	14	2
φ1500	3.0	1950	1200	320	11	10	2		40.0	7070	5670	2450	16	14	3
	4.0	2530	1780	370	11	10	2		50.0	8590	7190	3160	16	15	3
	5.0	3090	2340	490	11	11	2	φ3000	25.0	4040	2540	1533	16	14	2
	6.0	3650	2900	560	12	11	2		30.0	4750	3250	1622	16	14	2
φ1600	5.0	2750	1950	416	11	10	2		40.0	6160	4660	2081	17	14	2
	6.0	3250	2450	478	12	10	2		50.0	7580	6080	2613	17	14	3
	8.0	4250	3450	569	12	10	3		60.0	8990	7490	2981	17	14	3
	10.0	5240	4440	683	12	10	3		80.0	11820	10320	4037	18	14	3
φ1800	8.0	3440	2540	578	12	11	2	φ3200	30.0	4270	2670	2080	16	15	2
	10.0	4230	3330	738	14	11	2		40.0	5510	3910	2500	17	15	2
	15.0	6200	5300	1097	15	11	3		50.0	6760	5160	3160	18	16	3
	20.0	8160	7260	1427	15	12	3		60.0	8000	6400	3650	18	16	3
φ2000	15.0	5110	4110	1002	14	11	3	φ3500	50.0	5790	4040	3100	19	16	2
	20.0	6700	5700	1326	15	12	3		60.0	6820	5070	3550	20	16	3
	25.0	8290	7290	1610	15	12	3		80.0	8900	7150	4700	21	17	3
	30.0	9890	8890	1897	15	12	4	φ3600	60.0	6500	4700	3180	19	16	3
φ2200	15.0	4320	3220	1040	14	12	2		70.0	7480	5680	3499	19	16	3
	20.0	5630	4530	1300	14	12	2		80.0	8460	6660	4068	20	16	3
	25.0	6950	5850	1700	15	13	3		90.0	9440	7640	4394	20	16	4
	30.0	8260	7160	2000	15	13	3		100.0	10430	8630	5071	21	17	4
φ2400	25.0	5930	4730	1650	15	13	2		110.0	11410	9610	5513	21	17	4
	30.0	7040	5840	1950	15	13	3		120.0	12390	10590	6195	22	17	4

以上参数仅供参考，不作为设计验收依据，详细了解请咨询泓昊公司技术中心  
 The above parameters are for reference only, not for design and acceptance. Please refer to  
 Honghao Technology Center for details.



《附录四》 大型玻璃钢贮罐规格及参数表

Appendix IV : Specification and parameter list of Large FRP tank.



说明：1、t1、t2、t3、t4为筒体自下而上厚度  
2、内衬可按4mm-8mm计算，根据工况选用  
T1, T2, T3, and T4 are the bottom-up thickness of the cylinder

规格 mm	容积 m <sup>3</sup>	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg													
4000	75	5970	12.0	10				11	12	15	4050												
	100	7920	14.0	12	10			12	12	15	5257												
	125	9950	16.0	14	12			14	12	15	6641												
4500	75	4720	13.0	11				12	12	15	4361												
	100	6290	14.0	11				12.5	12	15	5464												
	125	7960	15.0	12				13.5	12	15	6434												
5000	150	9430	17.0	15	13	11		14	12	15	7336												
	100	5090	13.0	11				12	12	15	5105												
	125	6370	14.0	12				13	12	15	6336												
5500	150	7860	16.0	14	12			14	12	15	7288												
	200	10190	20.0	18	15	12		16.3	12	15	9591												
	100	4210	13.0	11				12	12	16	5405												
5500	125	5260	13.0	11				12	12	16	5933												
	150	6310	16.0	13				14.5	12	16	7617												
	200	8420	18.0	16	13	12		14.8	12	16	8996												
6000	250	10520	22.0	18	16	12		16.9	12	16	11304												
	125	4420	13.0					13	13	16	6411												
	150	5310	14.0	12				13	13	16	6940												
6000	200	7640	17.0	14	12			14.3	13	16	8950												
	规格 mm	容积 m <sup>3</sup>	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m <sup>3</sup>	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
	6000	250	8840	19	16	14	12	15	13	16	10225	7500	300	6790	20.0	15	12		15.7	13	16	11842	
6500	300	10610	24	19	16	13	18	13	16	12759	7500	350	7070	22.0	15	12		16.3	13	16	13150		
	125	3770	13				13	13	16	6542		400	9050	25.0	22	15	12	18.5	13	16	15364		
	150	4520	14	12			13	13	16	7012		450	10190	27.0	22	16	13	19.5	13	16	17147		
7000	200	6030	16	13			15	13	16	8962	8000	500	11320	30.0	25	20	14	22.1	13	16	20142		
	250	7530	19	16	13		16	13	16	10612		150	2980	13.0				13	14	17	8314		
	300	9040	22	19	16	13	18	13	16	12488		200	3980	15.0	13			14	14	17	9321		
7000	350	10550	25	21	18	13	19	13	16	14718	8000	250	4970	17.0	13			15	14	17	10437		
	125	3250	13				13	13	16	6849		300	5970	19.0	14			16.5	14	17	11857		
	150	3900	14	12			13	13	16	7287		350	6960	21.0	18	14		17.7	14	17	14160		
7500	200	5200	16	13			15	13	16	8569	8000	400	7960	24.0	20	14		19.3	14	17	16074		
	250	6500	18	17	13		16	13	16	10665		450	8950	26.0	21	17	14	19.5	14	17	17305		
	300	7800	21	18	15	13	17	13	16	12142		500	9950	28.0	24	18	14	21	14	17	19418		
7500	350	9090	24	21	17	13	19	13	16	14290	8000	550	10940	31.0	26	19	14	22.5	14	17	21696		
	400	10390	27	22	18	13	20	13	16	16208		600	11940	33.0	28	21	15	24.3	14	17	24353		
	125	2830	12				12	13	16	7109		8500	200	3520	14.0				14	14	17	9779	
150	3400	13				13	13	16	7678	250	4410		16.0	13			14.5	14	17	10703			
200	4530	15	12			14	13	16	8620	300	5290		18.0	14			16	14	17	12006			
7500	250	5660	17	13			15	13	16	9940	8500	350	6170	20.0	16	14		16.7	14	17	14007		
	规格 mm	容积 m <sup>3</sup>	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm		重量 Kg	规格 mm	容积 m <sup>3</sup>	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg
	8500	400	7050	23	20	14		19	14	17		15927	9500	300	4230	17.0	15			16	14	17	12717
8500	450	7930	25	20	17	14	19	14	17	17057	9500	350	4940	19.0	15			17	14	17	13859		
	500	8810	27	22	17	14	20	14	17	18709		400	5640	21.0	15			18	14	17	15087		
	550	9690	29	23	18	14	21	14	17	20470		450	6350	23.0	15			19	14	17	17511		
9000	600	10570	32	25	19	15	23	14	17	22788	9500	500	7050	25.0	19	15		19.7	14	17	18811		
	650	11450	34	26	20	15	24	14	17	24901		550	7760	27.0	21	16		21.3	14	17	20790		
	200	3140	13				13	14	17	9965		600	8460	29.0	23	18	15	21.3	14	17	21782		
9000	250	3930	15				15	14	17	11169	9500	650	9170	31.0	25	18	15	22.3	14	17	23538		
	300	4720	17	13			15	14	17	11955		700	9880	33.0	27	19	15	23.5	14	17	25582		
	350	5500	19	14			17	14	17	13279		750	10580	35.0	28	21	15	24.8	14	17	27732		
9000	400	6290	22	14			18	14	17	15625	9500	800	11290	37.0	30	21	15	25.8	14	17	29811		
	450	7070	24	15			20	14	17	17460		10000	300	3820	16.0				16	14	17	13152	
	500	7860	26	19	14		20	14	17	18578		350	4460	18.0	16			17	14	17	14236		
9000	550	8650	28	22	17	14	20	14	17	19976	10000	400	5090	20.0	16			18	14	17	15401		
	600	9430	30	25	19	14	22	14	17	22214		450	5730	22.0	16			19	14	17	16674		
	650	10220	32	26	19	15	23	14	17	24100		500	6370	24.0	16			20	14	17	19241		
9500	700	11000	34	28	20	15	24	14	17	26271	10000	550	7640	25.5	16			20.8	14	17	20602		
	750	11790	36	30	22	15	26	14	17	28797		600	7000	27.0	21	16		21.3	14	17	21945		
	250	3530	15				15	14	17	11685		650	8280	29.0	24	18	16	21.8	14	17	23232		



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规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg		
10000	700	8910	31	25	19	16	23	14	17	24959	11000	1000	10520	39.0	30	22	17	27	14	17	35073		
	750	9550	33	26	20	16	24	14	17	26702		1100	11570	43.0	33	24	17	29.3	14	17	39633		
	800	10190	35	27	20	16	25	14	17	28527		12000	300	2650	16.0				16	15	18	16202	
	850	10820	37	29	21	16	26	14	17	30738			350	3090	16.0				16	15	18	16825	
	900	11460	39	31	22	16	27	14	17	32971			400	3540	17.0				17	15	18	17776	
11000	300	3160	16				16	14	17	14349	450	3980	19.0	16				17.5	15	18	18614		
	350	3680	17				17	14	17	15323	500	4420	20.5	16			18.3	15	18	19588			
	400	4210	18	16			17	14	17	16054	550	4860	22.0	16			19	15	18	20621			
	450	4740	20	17			19	14	17	17361	600	5310	24.0	18			21	15	18	22318			
	500	5260	22	17			20	14	17	18568	650	5750	25.0	18			21.5	15	18	23390			
	550	5790	24	17			21	14	17	19876	700	6190	27.0	18			22.5	15	18	26396			
	600	6310	25	17			21	14	17	22384	750	6630	28.5	21	17		22.2	15	18	27053			
	650	6840	27	20	16		21	14	17	23287	800	7070	30.0	22	17		23	15	18	28497			
	700	7370	29	22	17		23	14	17	25296	850	7520	32.0	24	17		24.3	15	18	30397			
	750	7890	31	22	17		23	14	17	26606	900	7960	33.0	24	17		24.7	15	18	31603			
	800	8420	32	24	17		24	14	17	28476	950	8400	35.0	28	21	17	25.1	15	18	32937			
	850	8940	34	27	19	16	24	14	17	29238	1000	8840	36.5	29	21	17	25.6	15	18	34343			
	900	9470	36	28	20	16	25	14	17	31104	1100	9730	39.5	31	22	17	27.4	15	18	37994			
	950	10000	38	30	21	17	26	14	17	33385	1200	10610	43.0	33	24	17	29.3	15	18	42021			
	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
12000	1300	11490	46	36	25	18	31	15	18	46477	14000	800	5200	26.5	17				21.8	15	18	27963	
	300	2260	15				15	15	18	17554		900	5850	29.0	18				23.5	15	18	30479	
	400	3010	17				17	15	18	19065		1000	6500	32.0	24	17			24.3	15	18	34661	
	500	3770	19				19	15	18	21171		1100	7150	34.5	25	18			25.8	15	18	37528	
	600	4520	22	17			19	15	18	22645		1200	7800	37.5	26	18			27.2	15	18	40447	
	700	5270	25	17			21	15	18	24787		1300	8440	40.0	32	23	18		28.3	15	18	43277	
	800	6030	28	17			23	15	18	29067		1400	9090	43.0	34	24	18		29.6	15	18	46579	
	900	6780	31	22	17		23	15	18	31170		1500	9740	45.5	35	25	19		31.1	15	18	50202	
	1000	7530	34	25	17		25	15	18	34569		1600	10390	48.0	37	27	19		32.6	15	18	54025	
	1100	8290	37	30	21	17	26	15	18	37215		1700	11040	51.0	39	28	19		34.3	15	18	58204	
	1200	9040	40	31	22	17	28	15	18	40283		1800	11690	54.0	42	29	19		35.9	15	18	62600	
	1300	9790	43	33	24	17	29	15	18	44040		400	2260	15.0					15	16	18	22555	
	1400	10550	46	36	26	18	31	15	18	48486		500	2830	17.5					17.5	16	18	24284	
	1500	11300	49	38	27	18	33	15	18	52629		600	3400	20.0	16				18	16	18	25575	
	14000	300	1950	14				14	15	18		19004	700	3960	22.5	16				19.3	16	18	27238
400		2600	16				16	15	18	20581	800	4530	25.0	17				21	16	18	29329		
500		3250	18				18	15	18	22326	900	5090	27.5	18				22.8	16	18	31615		
600		3900	21	16			19	15	18	23735	1000	5660	30.0	18				24	16	18	33832		
700		4550	24	17			21	15	18	25916	1100	6220	32.5	25	18			25	16	18	38258		
规格 mm		容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
15000		1200	6790	35	25	18		26	16	18	40479	16000	1500	7460	40.5	29	19			29.3	16	18	49498
	1300	7360	38	28	19		28	16	18	44060	1600		7960	43.0	31	19			30.8	16	18	52765	
	1400	7920	41	29	19		30	16	18	47079	1700		8460	45.5	36	26	20		31.6	16	18	55438	
	1500	8490	43	33	24	19	30	16	18	49186	1800		8950	47.5	37	26	20		32.6	16	18	58404	
	1600	9050	46	35	25	19	31	16	18	52513	1900		9450	50.0	40	28	20		34.3	16	18	62278	
	1700	9620	48	38	26	20	33	16	18	56476	2000		9950	52.5	41	29	20		35.4	16	18	65711	
	1800	10190	51	39	28	20	34	16	18	60205	17000		500	2200	17.0					17	16	18	28079
	1900	10750	53	42	30	20	36	16	18	64703			600	2640	19.0					19	16	18	29671
	2000	11320	56	43	30	20	37	16	18	68306			700	3080	20.5					20.5	16	18	31290
	500	2490	17				17	16	18	25968			800	3520	22.5	17				19.8	16	18	32086
600	2980	19				19	16	18	27646	900		3970	25.0	18				21.5	16	18	34062		
16000	700	3480	22	17			19	16	18	28864	1000	4410	27.0	18				22.5	16	18	35792		
	800	3980	24	18			21	16	18	30812	1100	4850	28.5	19				23.8	16	18	37784		
	900	4480	26	18			22	16	18	32571	1200	5290	31.5	19				25.3	16	18	40077		
	1000	4970	29	18			23	16	18	34566	1300	5730	34.0	20				27	16	18	42715		
	1100	5470	31	19			25	16	18	37055	1400	6170	36.0	26	19			27	16	18	46940		
	1200	5970	33	20			27	16	18	39575	1500	6610	38.5	27	19			28.2	16	18	49502		
	1300	6470	36	26	19		27	16	18	43807	1600	7050	40.5	28	19			29.2	16	18	52030		
	1400	6960	38	27	19		28	16	18	46558	1700	7490	43.0	29	20			30.7	16	18	55185		
	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
	17000	1800	7930	45	32	20		32	16	18	58505	18000	2200	8650	51.5	40	28	20		34.9	16	19	70182
1900		8370	48	36	26	20	32	16	18	60509	2300		9040	53.5	42	29	20		36	16	19	73444	
2000		8810	50	39	27	20	34	16	18	63938	2400		9430	55.5	43	30	20		37.1	16	19	76821	
18000	600	2360	18				18	16	19	32036	2500	9820	58.0	45	32	20		38.6	16	19	80841		
	700	2750	20				20	16	19	33664	700	2470	19.0					19</					

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规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
1100	4320	28	18				23	16	19	39706	1100	3880	27.0	19				23	16	19	41768	
1200	4720	30	19				25	16	19	41857	1200	4230	29.0	19				24	16	19	43480	
1300	5110	33	19				26	16	19	43963	1300	4590	31.0	19				25	16	19	45325	
1400	5500	35	20				27	16	19	46379	1400	4940	33.0	20				26.5	16	19	47578	
1500	5890	37	21				29	16	19	48950	1500	5290	35.0	20				27.5	16	19	49609	
1600	6290	39	27	20			29	16	19	53327	1600	5640	37.0	21				29	16	19	52131	
1700	6680	41	29	20			30	16	19	56280	1700	6000	39.0	29	20			29.2	16	19	57038	
1800	7070	43	30	20			31	16	19	58868	1800	6350	41.0	29	20			30	16	19	59294	
1900	7470	45	31	20			32	16	19	61800	1900	7320	43.0	30	20			31	16	19	61806	
2000	7860	47	33	20			33	16	19	64776	2000	7640	45.0	33	20			32.5	16	19	64963	
2100	8250	50	39	28	20		34	16	19	67292	2100	7960	47.0	33	20			33.3	16	19	67550	
2200	7760	49	35	21			35	16	19	71170	20000	2300	6700	48.5	34	22			34.5	17	20	74864
2300	8110	51	40	28	20		35	16	19	72567	2400	7050	50.5	35	22			35.7	17	20	77933	
2400	8460	53	41	29	20		36	16	19	75556	2500	7410	52.5	37	22			37	17	20	81325	
2500	8820	55	42	31	20		37	16	19	79030	2600	8280	54.5	38	22			38.2	17	20	84620	
800	2550	21					21	17	20	41347	2700	8590	56.5	39	23			39.3	17	20	87967	
900	2860	22					22	17	20	42909	2800	8910	58.5	41	24			40.8	17	20	91956	
1000	3180	24					24	17	20	44878	2900	9230	60.5	46	33	21		40.1	17	20	92829	
1100	3500	26	20				23	17	20	45361	3000	9550	62.5	47	34	22		41.3	17	20	96425	
1200	3820	28	20				24	17	20	46990	21000	800	2310	20				20	17	20	43952	
1300	4140	30	20				25	17	20	48713	900	2600	22					22	17	20	45647	
1400	4460	32	21				26	17	20	50694	1000	2890	23.5					23.5	17	20	47298	
1500	4770	34	21				27	17	20	52752	1100	3180	25					25	17	20	49084	
1600	5090	36	21				28	17	20	54779	1200	3460	26.5	21				23.8	17	20	49496	
1700	5410	37	22				30	17	20	57099	1300	3750	28.5	21				24.8	17	20	51136	
1800	5730	39	23				31	17	20	59746	1400	4040	30.5	22				26.3	17	20	53176	
1900	6050	41	29	20			30	17	20	63900	1500	4330	32.5	22				27.3	17	20	55016	
2000	6370	43	31	21			32	17	20	67066	1600	4620	35.5	23				29	17	20	57480	
2100	6680	45	32	21			33	17	20	69424	1700	4910	36	23				29.5	17	20	59155	
2200	7000	47	33	21			34	17	20	72097	1800	5200	38	23				30.5	17	20	61274	
规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
21000	1900	5490	40	24			32	17	20	63484	22000	1600	4210	33	22			27.5	17	20	58823	
	2000	5770	42	24			33	17	20	65955		1700	4470	35	22			28.5	17	20	60699	
	2100	6060	44	25			34	17	20	73117		1800	4740	36.5	23			29.8	17	20	62898	
	2200	6350	45	25			35	17	20	75476		1900	5000	38	23			30.5	17	20	64753	
	2300	6640	47	26			37	17	20	78764		2000	5260	40	23			31.5	17	20	66882	
	2400	6930	49	35	22		35	17	20	78804		2100	5520	42	24			33	17	20	69542	
	2500	7220	51	35	23		36	17	20	81820		2200	5790	43.5	26			34.5	17	20	72382	
	2600	7510	53	37	23		38	17	20	85155		2300	6050	45	26			35.5	17	20	79475	
	2700	7800	55	38	23		39	17	20	87944		2400	6310	47	27			37	17	20	82690	
	2800	8080	56	39	24		40	17	20	90976		2500	6580	49	27			38	17	20	85497	
	2900	8370	58	40	24		41	17	20	94157		2600	6840	50	27			38.5	17	20	87710	
	3000	8660	60	42	24		42	17	20	97914		2700	7100	52.5	37	23		37.3	17	20	87836	
22000	900	2370	21				21	17	20	48166		2800	7370	54	38	23		38.3	17	20	90784	
	1000	2630	23				23	17	20	49897		2900	7630	55	39	24		39.2	17	20	93530	
	1100	2890	25				25	17	20	51563		3000	7890	57.5	40	24		40.5	17	20	97048	
	1200	3160	26				26	17	20	53396	23000	1000	2410	22				22	17	20	52521	
	1300	3420	28	21			25	17	20	53659		1200	2890	25.5				25.5	17	20	56011	
	1400	3680	30	21			25	17	20	55133		1400	3370	29	22			25.5	17	20	58077	
	1500	3950	32	22			27	17	20	57191		1600	3850	32	22			27	17	20	61118	
规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	规格 mm	容积 m³	H mm	T1 mm	T2 mm	T3 mm	T4 mm	Ts mm	Tt mm	Tb mm	重量 Kg	
23000	1800	4330	36	22			29	17	20	64584	25000	1200	2440	24				24	17	20	61622	
	2000	4810	39	23			31	17	20	68741		1400	2850	27				27	17	20	64996	
	2200	5300	42	25			34	17	20	73541		1600	3260	30	22			26	17	20	66429	
	2400	5780	46	26			36	17	20	78450		1800	3670	33	22			27.5	17	20	69395	
	2600	6260	49	29			39	17	20	89843		2000	4070	36	23			29.5	17	20	72906	
	2800	6740	52	37	23		37	17	20	91176		2200	4480	39	24			31.5	17	20	76769	
	3000	7220	56	39	23		39	17	20	96687		2400	4890	42	24			33	17	20	80485	
24000	1000	2210	21				21	17	20	55328		2600	5300	45.5	27			36	17	20	85884	
	1200	2650	25				25	17	20	58823		2800	5700	48.5	27			37.8	17	20	90356	
	1400	3090	28	21			25	17	20	60488		3000	6110	52	29			40.5	17	20	102329	
	1600	3540	31	22			27	17	20	63677												
	1800	3980	34	23			29	17	20	67133												
	2000	4420	37	23			30	17	20	70315												
	2200	4860	41	24			32	17	20	74760												
	2400	5310	44	25			34	17	20	79187												
	2600	5750	47	27			37	17	20	84626												
	2800	6190	50	30			40	17	20	96501												
	3000	6630	54	31			42	17	20	102552												
25000	1000	2040	21				21	17	20	58738												

以上参数仅供参考，不作为设计验收依据，详细了解请咨询泓昊公司技术中心  
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