



FRP PRODUCTS

玻璃钢系列

D2

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World Trusted Quality



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ISO9001质量管理体系认证
Certified by ISO9001 quality system
ISO14001环境管理体系认证
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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

Computer-controlling FRP Winding Products

微控玻璃钢缠绕系列产品



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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



中国德州亚太集团从玻璃钢制品起步，广泛吸收国内外最新科技成果，引进先进设备，已成为以中央空调为主，涵盖净化工程、玻璃钢、通风设备等多元化、多门类的大型企业集团。其传统产业玻璃钢夹砂管道保持了高速发展。能制造各种大中型玻璃钢容器并承揽整体安装工程。是国内缠绕领域重要的制造商和服务商之一。

亚太集团率先通过了 ISO9001、14001 质量、环境管理体系认证，CRAA 产品认证；是首批荣获国家质检总局颁发全国工业产品生产许可证的厂家，企业与著名大专院校联合成立的科研中心能够独自设计和研发各种系列产品。

亚太集团以其自身魅力凝聚着数千名员工，形成朝气蓬勃、富有学习与创新精神、高效率、高素质的团队。坚持以科技为导向、以市场求生存、以质量为本、以信誉为保证、以用户至上为准则的亚太宗旨。贯彻“以人为本、品质、创新、服务”的经营理念。

2003 年亚太集团以对社会的责任感，投资兴建万人规模的山东华宇职业技术学院，为中国制造业培养新一代“金蓝领”，以实际行动回报社会。

Starting from FRP products, China Dezhou Yatai Group widely absorbed the most advanced science and technology at home and abroad, introduced advanced equipment and has been one large-scaled and multi-trade enterprise group whose leading product is central air conditioning and others are air decontamination engineering, FRP and ventilations. Its traditional FRP pipe market grows more and more and is capable of manufacturing large/middle-sized FRP containers and undertaking integral installation projects. It is one of the national leading manufacturers and service-suppliers in the field of FRP pipe winding.

Yatai Group took the leading in being certified by ISO9001, 14001 quality, environment management system and CRAA and obtained the refrigeration equipment production permission certificate issued by National Quality Testing Bureau at the first batch. Its scientific research centre joint-founded with famous universities is capable of designing and researching all kinds of series products independently.

Yatai Group attracts thousands of employees and forms a highly efficient and qualified team with high attitude of learning and innovation. It is always maintaining the science and technology as guideline, depending on market to survive, taking quality as basis, reputation as assurance and customer as number one, implementing "man oriented, quality, innovation and service" as philosophy of management.

In 2003, Yatai Group established Shandong Huayu Professional Technical School with close to ten thousand students and staff which contributed to our society and cultivated new generation of gold and blue collars.



中国德州亚太集团
CHINA DEZHOU YATAI GROUP



以一流技术研制全方位产品

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

使用精品 造就精品

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

Using high-quality goods Making high-quality goods

The 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

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World Trusted Quality



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Honorable Qualification



FRP PRODUCTS
玻璃钢系列

Computer-controlling
FRP Winding Products
微控玻璃钢缠绕系列产品

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通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



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冷却塔系列产品
Cooling towers

Computer-controlling Winding FRP Products

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FRP PRODUCTS
玻璃钢系列

产品简介



一、缠绕夹砂管

Winding mortar pipe

玻璃钢夹砂管是公司多年成功制造经验与科研开发的结果，是可靠性、安全性及经济性的代表，具有重量轻、抗腐蚀、寿命长、运行及维修费用低等特点，可为建设工程节省大量资金。

- 1、连接方式：双“0”圈承接连接。
- 2、执行标准：GB/T21238-2007
ANSI/AWWA C950

FRPM(Fiber reinforced plastic mortar) pipe is the fruit of many years of successful manufacturing experience and scientific R&D. It represents liability, safety and efficiency and has the characteristics of light weight, anti-corrosion, long life span and low operation and maintenance cost which saves large amounts of money for the project.
Connecting type: socket connection by double "0" ring
Executive standard: GB/T21238-2007
ANSI/AWWA C950



应用领域

Application fields

- 夹砂玻璃钢管的工作温度为 80℃以下，使用特殊树脂工作温度可达 120℃以上。
- 饮用水的输送
- 排污
- 海水输送
- 电厂循环水管道
- 化工企业腐蚀介质的输送
- 油、气输送
- 农业灌溉
- The working temperature of FRPM pipe is below 80℃. If special resin is used, the working temperature can reach above 120℃.
- The transportation of drinking water
- Sewage discharge
- The transportation of sea water
- Circulating water pipeline in power plant
- The transportation of corrosion medium of chemical industries
- Oil-Gas transportation
- Agricultural irrigation





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夹砂缠绕 FRP 管 (0.6Mpa) Winding FRP mortar pipe(PN0.6)

DN	SN2500		SN5000		SN10000	
	t(mm)	kg/m	t(mm)	kg/m	t(mm)	kg/m
300	6.0	11	5.5	10.9	6.0	11.8
350	6.5	14	6.0	13.7	7.0	15.7
400	7.0	17	6.5	16.8	7.5	19.1
450	7.5	20	7.0	20.3	9.0	25.5
500	8.0	24	8.5	36.8	9.8	30.6
600	9.0	32	9.4	35.3	11.8	43.7
700	10.0	42	11.0	48.8	14.0	61.5
800	11.0	53	12.6	63.4	16.0	79.7
900	12.5	67	14.0	79.7	17.9	100.8
1000	13.5	82	15.4	90.8	19.7	122.7
1200	17.5	124	18.1	135.1	23.4	173.4
1400	18.0	158	21.2	184.8	27.1	234.5
1500	20.0	185	22.5	209.4	28.9	267.1
1600	21.0	204	23.9	238.2	30.8	304.6
1800	23.0	256	26.6	296.7	34.4	381.1
2000	25.0	295	29.5	367.0	38.1	470.3
2200	28.0	363	32.3	440.1	41.7	564.4
2400	30.0	424	35.0	518.4	45.4	668.3
2800	35.0	615	40.8	700.8	52.8	902.6

玻璃钢夹砂管重力流 FRP sand pipe gravity flow

型号 model	5000刚度总厚度 5000 stiffness total thickness	10000刚度总厚度 10000 stiffness total thickness	型号 model	5000刚度总厚度 5000 stiffness total thickness	10000刚度总厚度 10000 stiffness total thickness
300	5	6	2800	43.5	56
350	6	7	3000	46.5	60
400	6.5	7.5	3500	54.5	70.5
450	7	9	4000	62	80
500	8	10			
600	9.5	12			
700	11	14			
800	12.5	16			
900	14	18			
1000	15.5	20			
1200	19	24.5			
1400	21.5	28			
1500	23.5	30			
1600	25	32.5			
1800	28.5	37			
2000	31.5	40.5			
2200	34.5	44.5			
2400	37.5	49			
2600	40.5	52.5			

夹砂缠绕 FRP 管 (1.0Mpa) Winding FRP mortar pipe(PN1.0)

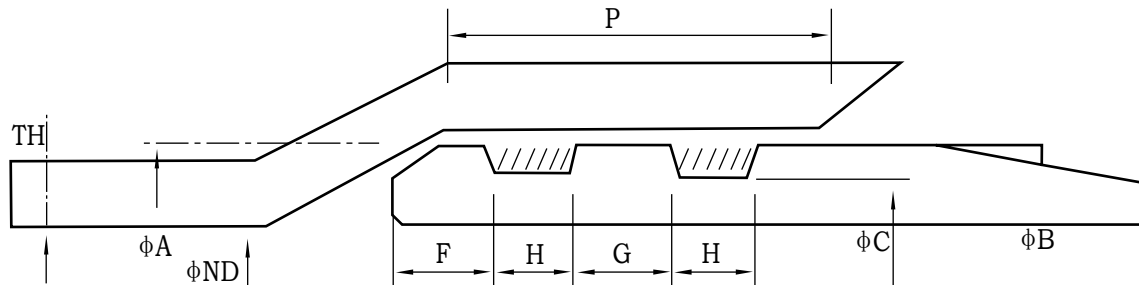
DN	SN5000		SN10000	
	t(mm)	kg/m	t(mm)	kg/m
300	5.5	10.9	6.0	11.8
350	6.0	13.7	7.0	15.7
400	6.5	16.8	7.5	19.1
450	7.0	20.3	9.0	25.5
500	8.9	28.0	9.8	30.6
600	9.8	36.7	11.5	42.7
700	10.7	47.6	13.4	58.9
800	11.8	59.5	14.9	74.4
900	13.1	74.9	16.6	93.8
1000	14.4	90.8	18.2	113.6
1200	17.1	128.0	21.8	161.8
1400	19.6	171.4	25.0	216.8
1500	20.9	195.1	26.6	246.3
1600	22.3	222.9	28.4	281.4
1800	25.0	279.5	31.9	353.9
2000	27.6	344.3	35.2	435.4
2200	30.1	411.2	38.6	523.3
2400	32.7	485.4	41.8	616.3
2800	38.0	654.0	48.8	938.2

夹砂缠绕 FRP 管 (1.6Mpa) Winding FRP mortar pipe(PN1.6)

DN	SN5000		SN10000	
	t(mm)	kg/m	t(mm)	kg/m
300	6.0	11.8	6.5	12.6
350	6.5	14.7	7.0	15.7
400	7.5	19.1	8.0	20.3
450	8.0	22.9	9.0	25.5
500	8.5	26.8	9.5	29.8
600	10.0	37.4	11.2	41.6
700	11.5	49.6	12.5	53.7
800	12.9	63.2	14.2	69.2
900	14.5	80.3	15.7	86.6
1000	15.8	96.7	17.5	106.6
1200	18.7	135.9	20.2	147.1
1400	21.6	183.4	23.8	201.3
1500	22.9	207.5	25.0	225.9
1600	24.6	238.6	26.6	257.3
1800	27.4	297.4	30.0	398.4
2000	30.3	363.4	33.0	398.4
2200	32.9	436.5	36.3	480.1
2400	35.8	516.2	39.1	562.3
2800	41.7	697.3	45.6	761.0

备注：1、表中厚度及重量仅供参考，具体根据实际技术条件另行设计。
2、一般而言，小于或等于DN400的玻璃钢管道不夹砂。

Remark: 1.The thickness and weight in this table are for reference only. Specific data will be given according to real technological conditions.
2. Generally, the FRP pipeline smaller than or equal to DN400 has no sand-filing.



夹砂玻璃钢管道各部尺寸表

FRPM pipeline size parameters

DN	A	B	C	THMAX	P	F	G	H	重量	RING	
											mt
50	71.5	70	63	5	135	15	20	10		7	55
65	86.5	85	78	5	135	15	20	10		7	65
80	101.5	100	93	5	135	15	20	10		7	80
100	122	120	113.5	5.5	135	15	20	10		7	100
125	154	152	142	7	140	15	20	14		10	125
150	179	177	162	7	140	15	20	14		10	150
200	239	237	222	9	165	30	30	20		14	200
250	289	287	272	9	165	30	30	20		14	248
300	347	345	326.5	11	175	30	30	24		17	285
350	397	395	376.5	11	175	30	30	24		17	324
400	447	445	426.5	11	175	30	30	24		17	380
450	502	499	478	12	190	35	40	30		20	427
500	552	549	528	12	190	35	40	30		20	486
550											
600	652	649	628	12	190	35	40	30		20	587
650											
700	752	749	728	12	190	35	40	30		20	650
750	802	799	78	12	190	35	40	30		20	
800	852	849	828	12	190	35	40	30		20	742
900	966	963	942	19	190	35	40	30		25	840
1000	1066	1063	1042	19	190	35	40	30		25	940
1200	1266	1263	1242	19	190	35	40	30		30	1130
1400	1478	1475	1454	25	190	35	40	30		30	1330
1500	1578	157	1536	25	220	45	40	40		30	1400
1600	1691	1687	1649	27	220	45	40	40		30	1500
1700											
1800	1891	1849	1849	27	220	45	40	40		34	1700
2000	2111	2069	2069	30	220	45	40	40		34	1900
2200	2311	2269	2269	30	220	45	40	40		38	2080
2400											
2500	2611	2569	2569	30	220	45	40	40		38	2370
2600											
2700	2811	2769	2769	30	220	45	40	40		38	2550



通风管道与玻璃钢系列产品
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冷却塔系列产品
Cooling towers

夹砂玻璃钢管道的优点：

Advantages of FRPM pipelines

- 1、耐腐蚀性好，对水质无影响：玻璃钢管道能抵抗酸、碱、盐、海水、未经处理的污水、腐蚀性土壤或地下水及众多化学流体的侵蚀。
- 2、防污抗蛀：玻璃钢内衬层表面洁净光滑，不会被海洋或污水中的甲贝、菌类等微生物玷污蛀附。
- 3、耐热性、抗冻性好：在-30℃状态下，仍具有良好的韧性和极高的强度，可在零下50℃至80℃的范围内长期使用，采用特殊配方的树脂还可在110℃以上的温度工作。
- 4、自重轻、强度高，运输安装方便：比重在1.65-2.0间，只有钢的1/4，环向拉伸强度为180-300MPa，轴向拉伸强度为60-150MPa。承插连接方式，安装快捷简便。
- 5、摩擦阻力小，输送能力高：玻璃钢管内壁非常光滑，糙率系数为0.0084，而混凝土管的n值为0.014，铸铁管为0.013，因此，玻璃钢管能显著减少沿程的流体压力损失，提高输送能力。
- 6、电、热绝缘性好：绝缘电阻在1012-1015Ω.cm，玻璃钢的传热系数很小，只有0.23，是钢的5%。
- 7、耐磨性好
- 8、维护费用低：不需要进行防锈、防污、绝缘、保温等措施和检修。对埋地管无南非作阴极保护，可节约工程维护费用70%以上。
- 9、适用性强：可根据用户的各种特定要求，设计制造成不同压力等级和刚度等级的管道。
- 10、工程寿命长，安全可靠：据实验室的模拟试验表明：玻璃钢管道寿命长达50年以上。
- 11、工程综合效益好：玻璃钢管道的综合效益是可取的，特别是管径越大，其成本越低。埋入地下的管道可使用好几代，又无需年年检修，更可以发挥它优越的综合效益。

1. Good anti-corrosion ability, No effect on water quality: FRP pipeline can withstand the corrosion of acid, alkali, salt, sea water, unprocessed sewage, corrosive soil, groundwater and other chemical fluids.
2. Anti-fouling and decay-proof: The lining layer of the GRP pipeline is so smooth and clean that shellfish, fungus and other kinds of microorganisms from seawater and sewage can't easily attach the pipe.
3. Anti-heat and anti-freezing feature: Under the temperature of -30℃, it still has excellent tenacity and intensity which can be used permanently in the temperature range of -50℃ to 80℃ and can operate above the temperature of 110℃ if we use specially-made resin in working.
4. Light weight, high intensity and easy transportation and installation: Rate is between 1.65-2.0 which is only 1/4 that of steel. Hoop tensile strength is between 180-300MPa, axial tensile strength is 60-150MPa. With the socket connection type, it is easy to install the pipe.
5. Small friction resistance, high delivery capability: The inner wall of FRP pipeline is very smooth with the roughness coefficient of 0.0084 and the n value of the concrete pipe is 0.014, the n value of the cast iron pipe is 0.013. Therefore, the FRP pipeline can effectively reduce the loss of liquid pressure and improve the delivery capacity.
6. wonderful electricity and heat insulation feature: Insulation resistance is in the range of 1012-1015Ω.cm and the heat transfer coefficient of FRP is only 0.23 which is 5% that of steel.
7. Superior wear-resistance feature
8. Low maintenance fee: There is no need to take the measures of anti-rust, anti-fouling, insulation, heat preservation and overhaul. There is also no need to do the cathodic protection for the FRP pipeline, which can save more than 70% of engineering maintenance cost.
9. Wide application: We can produce pipelines with different pressure and stiffness degrees according to the customers' various specific requirements.
10. Long life span, safety and reliability: According to simulation experiment, the life span of FRP pipeline will be more than 50 years.
11. Huge engineering comprehensive profits: The comprehensive benefit of FRP pipe is desirable, especially the larger the pipe diameter, the lower the cost. Embedded underground pipeline can be used for a few generations without annual overhaul. Thus, it has superior comprehensive benefits



二、缠绕工艺管

Winding process pipe

纤维缠绕工艺管是亚太公司成功拓展市场的基础，主要用于石油化工、电力、冶金、医药等领域。具有重量轻，抗腐蚀能力强安装维护方便等特点。

连接方式：对接、法兰、承插胶接、双“0”型圈连接。

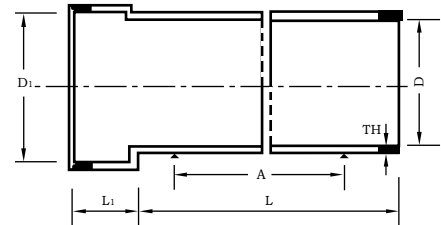
执行标准：JC552-94

ASTM D2996-81

Fiber winding process pipe, which is widely used in the areas of petroleum chemical, electrical power, metallurgy and medicine, is the foundation for Yatai Group successfully expanding the market. Its advantages include light weight, anti-corrosion, easy installation and maintenance.

Connecting types: abutment, flange, socket adhesion and double“0” ring.

Executive standard: JC552-94 ASTM D2996-81



备注：

- 1、调节D1和L1可做承插双“0”圈连接管和承插粘接管两种。
- 2、根据用户需要也可做成聚氨酯保温的热水输送管道。

- 1.Adjust D1 and L1 to make the double “0”ring socket connection pipe and socket adhesion pipe
- 2.According to user's need, hot water transporting pipeline of polyurethane insulation can be made.

承插连接管道尺寸表

Size table for socket connection pipeline

D	L	L1	D1	A	TH		
					0.6MPa	1.0MPa	1.6MPa
50	6000	80	65.2	3000	4.6	4.6	5.5
65	6000	80	80.2	3000	4.6	4.6	5.5
80	6000	80	95.2	3000	4.6	4.6	5.5
100	6000	80	115.2	3000	4.6	4.6	6.0
125	6000	80	140.2	3000	4.6	4.6	6.0
150	6000	80	167.8	3000	5.5	6.0	6.5
200	6000	80	217.8	3000	6.0	6.5	7.0
250	12000	80	267.8	4000	6.0	7.0	8.0
300	12000	80	320.4	4000	6.5	7.0	8.0
350	12000	80	373	4000	7.0	8.5	9.0
400	12000	90	423	4000	7.0	8.0	10.0
450	12000	90	475.6	4000	7.5	8.5	10.5
500	12000	90	525	4000	8.0	9.0	11.5
600	12000	90	630	6000	8.0	10.0	12.0
700	12000	90	733	6000	9.0	11.0	16.0
800	12000	90	835	6000	10.5	14.0	16.0
900	12000	100	938	6000	11.0	15.0	17.5
1000	12000	100	1040	6000	11.5	16.0	22.0
1200	12000	100	1233	6000	13.7	19	26
1400	12000	100	1432	6000	16.3	22	30.5
1500	12000	110	1532	6000	16.3	23.5	32
1600	12000	110	1641	6000	17.6	25	34
1800	12000	110	1843	6000	18.9	28	38.5
2100	12000	120	2151	6000	22.8	32	44.5
2400	12000	120	2456	6000	25.4	36.5	51.5
2600	12000	120	2659	6000	26.7	40	55
3000	12000	120	3067	6000	30.6		
3200	12000	120	3372	6000	33.2		
3600	12000	120	3677	6000	35.8		
4000	12000	120	4085	6000	39.7		



通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



微控玻璃钢缠绕系列
Computer-controlling FRP Winding Products



冷却塔系列产品
Cooling towers



玻璃钢工艺管

FRP process pipe

1、玻璃钢工艺管道的应用

- 化学介质输送
- 各类工艺管（化学工艺、造纸工艺、污水处理工艺、海水淡化工艺、食品及饮料加工工艺、医药工艺）
- 地面上小型水电站压力水管、发电厂循环水管
- 污水收集及输送管道
- 油田注水管及原油输送管
- 热能输送管、海水输送管
- 农业灌溉用管
- 供暖热水输送管道
- 除臭、送风等通风用管道

2、原辅材料

- 树脂、玻纤毡、连续玻璃纤维等

3、产品规格

- 直径：DN25-4000mm
- 长度：1m、3m、4m、6m、12m
- 压力等级：0.6MPa、1.0MPa、1.6MPa、2.5MPa

1.Application of FRP process pipeline

- Chemical medium transportation
- Every kind of process pipe (chemistry, paper-making, waste-water disposal, sea water desalination, food, beverage and medicine)
- Pressure pipes for small hydropower stations above ground, circulating water pipe for power plant
- Sewage collection and transportation pipeline
- Oil field water injecting pipe and crude oil transportation pipe
- Thermal energy transportation pipe and sea water transportation pipe
- Pipe for agricultural irrigation
- Hot water transportation pipeline for heating
- Ventilation pipelines for deodorization and air supply

2.Raw materials

- Resin, fiberglass mat, continuous glass fiber and so on

3.Product specification

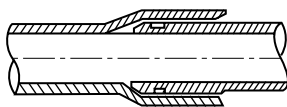
- Diameter DN25-4000mm
- Length 1m,3m,4m,6m,12m
- Pressure level 0.6MPa, 1.0MPa, 1.6MPa, 2.5MPa

三、管道连接方式

Pipeline connecting type

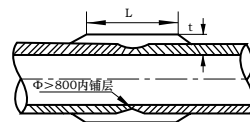
1、单密封圈承插连接：适应于中低压地下埋设管线

1.Single seal ring socket connection:It is applicable for medium and low pressure underground embedded pipeline.



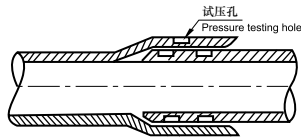
4、对接：适应于高中低压管线及管件连接，L和t取决于使用条件

4.Abutment:It is applicable for the connection of high, medium and low pressure pipelines and pipe fittings. L and T depend on service conditions.



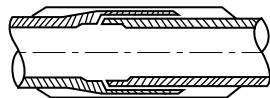
2、双密封圈承插连接：适应于高压地下埋设管线，可进行单接口试压

2.Double seal ring socket connection:It is applicable for high pressure underground embedded pipeline; can be used for single interface pressure testing.



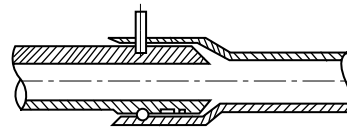
3、承插粘接：适应于高压及复杂荷载的大口径管线

3.Socket adhesion:It is applicable for high pressure and complicatedly loaded heavy-calibre pipeline.



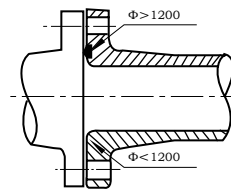
5、承插“O”密封连接尼龙棒“O”键锁口：主要用于轴向拉力大的管道，如深井管

5.Socket connection with o-shaped seal ring; nylon stick o-shaped locking:It is mainly used for pipelines which need a strong axial tensile strength like deep well pipelines.



6、法兰连接：适应于中低压管件及设备连接，可与HG、JB等标准相适应

6. Flange connection:It is suitable for the connection of medium-low pressure pipelines and equipment. Compatible with the standards of HG, JB.



玻璃钢管与水泥管、铸铁管比较分析表

Comparison and analysis table of FRP pipe, concrete pipe and cast iron pipe

项目 Item	玻璃钢管 FRP pipe	水泥管 Concrete pipe	铸铁管 Cast iron pipe
壁厚 Wall thickness	1=Dn/60~100	1=Dn/9~11	1=Dn/35~35
重量 G Weight G	1.0G	10.0G	6~7G
设计工作压力 P Designed working pressure P	最大为2.5MPa The maximum pressure is 2.5MPa	最大为1.2MPa The maximum pressure is 1.2MPa	最大为1.2MPa The maximum pressure is 1.2 MPa
单根管长度 Single pipe length	12M	4~5M	5~6M
接头密封防渗 Joint seal and anti-leakage	双胶圈 100%试压 Double rubber ring 100% pressure testing	单胶圈无法试压 No pressure testing for single rubber ring	单胶圈水试压 Water pressure testing for single rubber ring
耐腐蚀性能 Anti-corrosion	耐腐蚀性能良好 Good anti-corrosion performance	需另做防腐处理 Need do anti-corrosion separately	另行防腐处理 Need do anti-corrosion separately
水质卫生 Water quality	食品级内衬无毒 Nontoxic food-grade lining	内壁不光滑、易结垢、生长微生物 Course inner wall, easy sediment and micro-organism growth	内壁不光滑、易结垢、生长微生物 Course inner wall, easy sediment and micro-organism growth
寿命 Life span	设计疲劳次数1500万次可达50年 Designed fatigue times 15million, 50 years	一般10~20年，有的不满10年，拆除换新 Normally 10~20 years, sometimes less than 10 years, change a new one	一般20~25年 Normally 20~25 years
能耗 Energy consumption	同流量耗能为1.0 Energy consumption of the same flow rate is 1.0	1.4~1.9倍 1.4~1.9 times	1.1~1.2倍 1.1~1.2 times
抗地基沉降 Anti foundation sagging	柔性管抗沉降能力强 Flexible pipe has a strong anti foundation sagging capability	刚性管抗沉降能力弱 Stiff pipe has a weak anti foundation sagging capability	刚性管抗沉降能力差 Stiff pipe has a weak anti foundation sagging capability
流量 Q (m³/秒) Flow Q(m³/second)	玻璃管粗糙率n=0.0084 Q=100 Coarseness ratio n=0.0084 Q=100	水泥管粗糙率n=0.013 Q=64.5 Coarseness ratio n=0.013 Q=64.5	球铁管粗糙率n=0.011 Q=71.4 Coarseness ratio n=0.011 Q=71.4
等流量管直径 Diameter of equal flow pipe	Dn	Dn比玻璃钢管大17.9% 17.9% bigger than FRP pipe	Dn比玻璃钢管大10.6% 10.6% bigger than that of FRP pipe
最大抗拉强度 Maximum tensile strength	300MPa	30MPa	50MPa
造价比较 Cost comparison	单管比水泥管略高但施工费用低于水泥管,总造价相当 Cost of single pipe is higher than that of the concrete one;Cost of construction of the single FRP pipeline is lower than that of the concrete one;Total cost is equal to that of the concrete one.	Dn1400mm 以上水泥造价高于玻璃钢管 The cost of Dn1400mm concrete pipe is higher than that of the FRP pipe	同径管材造价高于玻璃钢管,安装费用高 The cost of the cast iron pipe is higher than the cost of the FRP pipe when they have the same diameter; high installation fee



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冷却塔系列产品
Cooling towers

四、低压管道

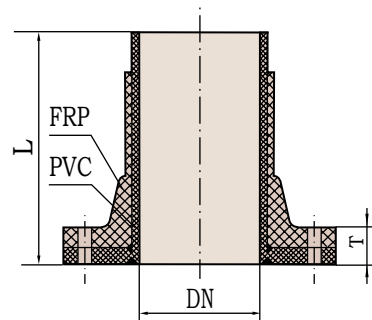
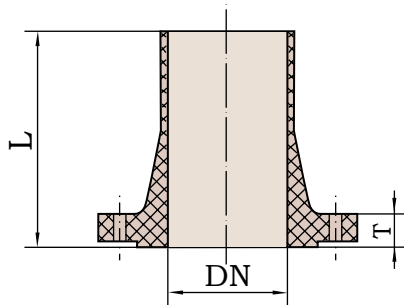
Low-pressure pipeline

法兰

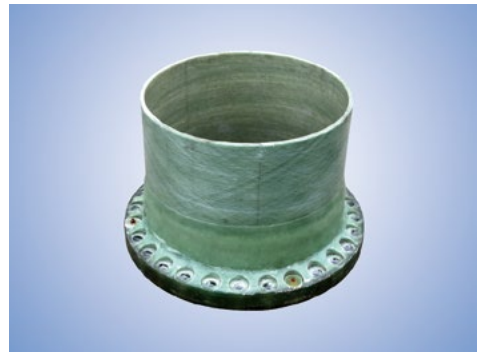
Flange

法兰连接尺寸符合HGJ45-91 GB/T9112-9124-2000标准。

Flange connecting size meets the HGJ45-91 GB/T9112-9124-2000 standard.



DN	0.6MPa		1.0MPa		1.6MPa	
	T	L	T	L	T	L
10	12	100	15	100	15	100
15	12	100	15	100	15	100
20	12	100	15	100	18	100
25	12	100	18	100	20	100
32	15	100	18	100	22	100
40	15	100	20	100	25	100
50	15	100	22	100	25	150
65	18	100	25	150	30	160
80	18	150	28	160	30	200
100	20	150	28	180	35	250
125	22	200	30	230	35	300
150	25	200	32	280	42	370
200	28	220	35	360	52	500
250	30	280	45	420	56	620
300	40	300	52	500		
350	45	400	60	570		
400	50	420				
450	50	480				
500	50	540				
600	50	640				

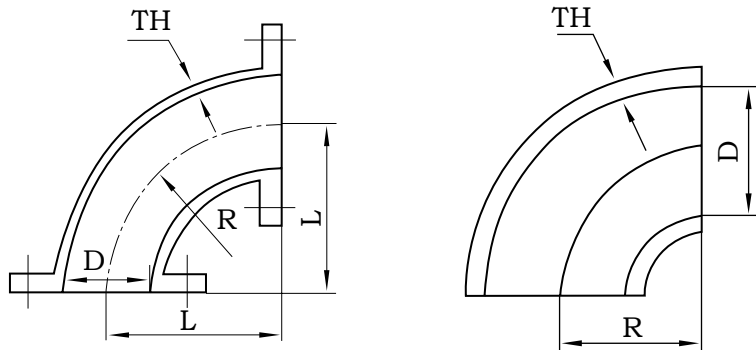


弯头

Elbow

按照HG/T21633-91标准制作， $R=1.0D$ 及 $R=2.0D$ 的圆弧弯头及任意拼装弯头本公司均可制作。

It is produced according to the HG/T21633-91 standard, our company can manufacture the oval elbow of $R=1.0D$ and $R=2.0D$ and any other assembly elbow.



DN	R	0.6MPa		1.0MPa		1.6MPa	
		TH	L	TH	L	TH	L
10	15	5.5	115	5.5	115	5.5	115
15	22.5	5.5	122.5	5.5	122.5	5.5	122.5
20	30	5.5	130	5.5	130	5.5	130
25	37.5	5.5	137.5	5.5	137.5	5.5	137.5
32	48	5.5	148	5.5	148	5.5	148
40	60	5.5	160	5.5	160	5.5	160
50	75	5.5	175	5.5	175	5.5	225
65	97.5	5.5	197.5	5.5	247.5	5.5	257.5
80	120	5.5	270	5.5	280	5.5	320
100	150	5.5	300	5.5	330	9.4	400
125	187.5	5.5	387.5	5.5	417.5	9.4	487.5
150	225	5.5	425	9.4	505	10.9	595
200	300	7.1	520	9.8	660	12.9	800
250	375	9.4	655	10.4	795	15.2	995
300	450	9.4	750	13.3	950	17.3	
350	525	9.8	925	15.8	1095	19.6	
400	600	10.6	1020	16.8		23.8	
450	675	13.0	1155	18.3		26.2	
500	750	13.7	1290	18.9		26.2	
600	900	16.2	1540	22.7		27.6	
700	1050	18.6		24.5		37.2	
800	1200	18.6		28.3		43.8	
900	1350	20.0		30.2		48.3	
1000	1500	22.9		33.2		52.6	



通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



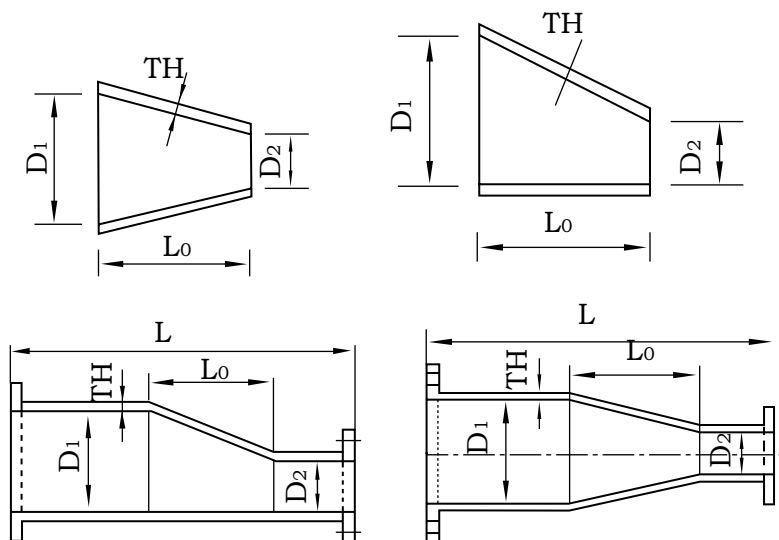
微机玻璃钢缠绕系列
Computer-controlling FRP Winding Products



冷却塔系列产品
Cooling towers

变径管

Reducer pipe



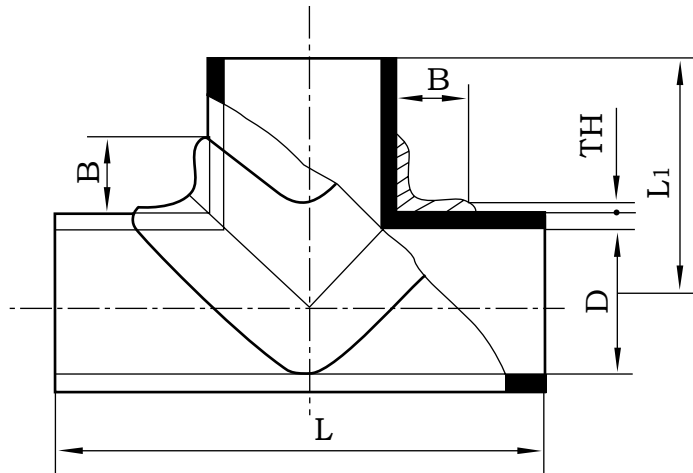
z	D2	L0	0.6MPa		1.0MPa		1.6MPa	
			TH	L	TH	L	TH	L
15	10	37.5	5.5	237.5	5.5	237.5	5.5	237.5
20	15	37.5	5.5	237.5	5.5	237.5	5.5	237.5
25	20	37.5	5.5	237.5	5.5	237.5	5.5	237.5
32	25	37.5	5.5	237.5	5.5	237.5	5.5	237.5
40	32	37.5	5.5	237.5	5.5	237.5	5.5	237.5
50	40	37.5	5.5	237.5	5.5	237.5	5.5	237.5
65	50	37.5	5.5	237.5	5.5	287.5	5.5	347.5
80	65	37.5	5.5	287.5	5.5	347.5	5.5	397.5
100	80	50.0	5.5	350	5.5	390	9.4	500
125	100	62.5	5.5	412.5	5.5	472.5	9.4	612.5
150	125	62.5	5.5	462.5	9.4	572.5	10.9	732
200	100	250	7.1	620	9.8	790	12.9	1000
200	150	125	7.1	545	9.8	765	12.9	995
250	200	125	9.4	625	10.4	905	15.2	1245
300	200	250	9.4	770	13.3	1110	17.3	
300	250	125	9.4	705	13.3	1045	17.3	
350	300	125	9.8	825	15.8	1195	19.6	
40	300	250	10.6	970	16.8		23.8	
400	350	125	10.6	945	16.8		23.8	
450	400	125	13.0	1025	18.3		26.2	
500	400	250	13.7	1210	18.9		26.2	
500	450	125	13.7	1145	18.9		26.2	
600	500	250	16.2	1430	22.7		27.6	
700	600	250	18.6		24.5		37.2	
800	700	250	18.6		28.3		43.8	
900	800	250	20.0		30.0		48.3	
1000	900	250	22.9		33.2		52.6	

三通

Tee-junction

按照HG/T21633-91标准制作，干管和支管从相应压力等级的管道上截取。

It is produced according to HG/T21633-91 standard, main pipe and branch pipe are all cut from the corresponding pressure level pipeline.



D	P=0.6MPa			P=1.0MPa			P=1.6MPa		
	TH	$L=2L_1$	B	TH	$L=2L_1$	B	TH	$L=2L_1$	B
10	5.5	300	50	5.5	400	50	5.5	300	50
15	5.5	300	50	5.5	400	50	5.5	300	50
20	5.5	300	50	5.5	400	50	5.5	300	50
25	5.5	300	50	5.5	400	50	5.5	300	50
32	5.5	300	50	5.5	400	50	5.5	300	50
40	5.5	300	50	5.5	400	50	5.5	300	50
50	5.5	400	50	5.5	400	50	5.5	400	50
65	5.5	400	50	5.5	400	50	5.5	400	50
80	5.5	400	50	5.5	400	50	5.5	460	60
100	5.5	400	50	5.5	420	60	9.4	580	80
125	5.5	400	50	5.5	540	80	9.4	720	100
150	5.5	460	60	9.4	640	100	10.9	840	120
200	7.1	600	80	9.8	820	120	12.9	1100	150
250	9.4	740	100	10.4	960	120	15.2	1420	210
300	9.4	840	100	13.3	1180	150	17.3	1680	240
350	9.4	1000	120	15.8	1380	180	19.6	1940	270
400	10.6	1100	120	16.8	1580	210	23.8	2200	300
450	13.0	1260	150	18.3	1720	210	26.2	2500	360
500	13.7	1380	150	18.9	1940	250	26.2	2800	400
600	16.2	1640	180	22.7	2320	300	27.6	3280	450
700	18.6	1900	210	24.5	2660	330	37.2	3880	550
800	18.6	2180	240	28.3	3100	400	43.8	4360	600
900	20.0	2440	270	30.0	3400	420	48.3	5000	700
1000	22.9	2720	300	33.2	3860	500	52.6	5460	750



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冷却塔系列产品
Cooling towers



五、缠绕贮罐装置

Winding storage tank device



亚太公司生产的FRP、FRP/PVC、FRP/PP贮罐及装置（机械釜、洗涤塔、反应釜、大直径搅拌槽、大直径烟囱）的制作技术均处于国际领先水平、可完全满足不同用户的要求。

The manufacturing technologies used by Yatai Group with which produces FRP, FRP/PVC, FRP/PP storage tanks and devices like mechanical kettle, washing tower, reaction kettle, large-diameter agitating tank, large-diameter chimney are in the international leading level which can fully satisfy different users' demand.

生产规格:

- DN400-DN4000

生产容积:

- $0.5\text{m}^3-150\text{m}^3$

执行标准:

- JC/T587-1995
- HG20696-1999

应用:

- 耐酸贮罐
- 耐碱贮罐
- 盐水贮罐
- 污水贮罐
- 玻璃钢/聚氯乙烯 (FRP/PVC) 复合罐
- 玻璃钢/聚丙烯 (FRP/PP) 复合罐

产品涉及行业:

- 氯碱行业
- 硫基复合肥行业
- 有机硅行业
- 农医药行业
- 造纸行业
- 酿造行业
- 油田行业
- 冶炼行业
- 乳酸行业
- 电解行业
- 复合肥行业

Manufacturing specification:

- DN400-DN4000

Manufacturing volume:

- $0.5\text{m}^3-150\text{m}^3$

Executive standard:

- JC/T587-1995
- HG20696-1999

Application:

- Anti-acid storage tank
- Anti-alkali storage tank
- Salt water storage tank
- Waste water storage tank
- FRP/PVC Composite tank
- FRP/PP Composite tank

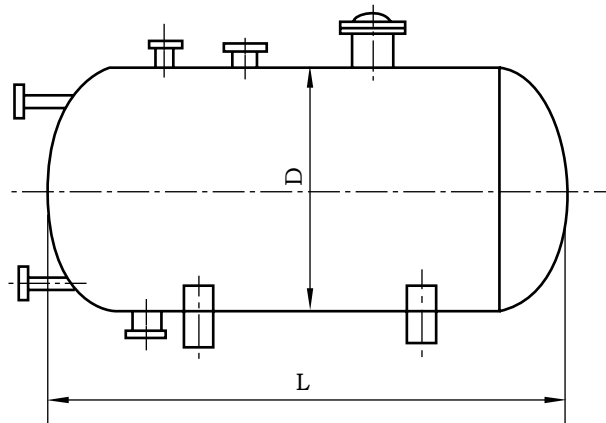
Product-related industries:

- Chlor-alkali industry
- S-based compound fertilizer industry
- Organic silicon industry
- Agricultural and medical medicine industry
- Paper manufacturing industry
- Brewing industry
- Oil field industry
- Metallurgy industry
- Lactic acid industry
- Electrolysis industry
- Compound fertilizer industry

卧式贮罐

Horizontal storage tank

$\frac{D}{L}$ M ³	400	600	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.2	1658	807																
0.5		1867	1415															
1.0			2715	2123	1440													
2.0					2712	1968												
3.0						2852	2181											
4.0							2831	2256										
5.0							3481	2753	2266									
6.0							4130	3250	2659									
7.0								3748	3052									
8.0								4245	3445									
9.0								4742	3838									
10.0								5240	4231									
11.0									4624									
12.0									5017	4153								
15.0										5107	4312							
18.0											5101	4372						
20.0											5627	4815						
25.0												5920	5141					
30.0													6083	5338				
35.0														6150	5450			
40.0														6962	6158	5507		
50.0														8586	7573	6750	5511	
60.0														10210	8987	7994	6494	5442
70.0														11834	10402	9237	7476	6238
80.0																10480	8458	7033
90.0																	9441	7830
100.0																	10423	8625





通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



微控玻璃钢缠绕系列
Computer-controlling FRP Winding Products

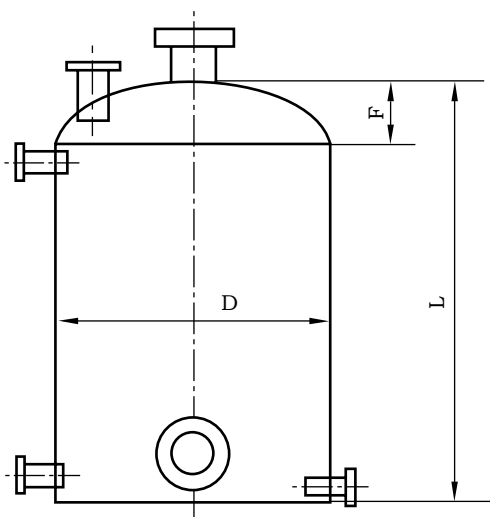


冷却塔系列产品
Cooling towers

椭圆形封头平底立式贮罐

Elliptical head flat bottom vertical storage tank

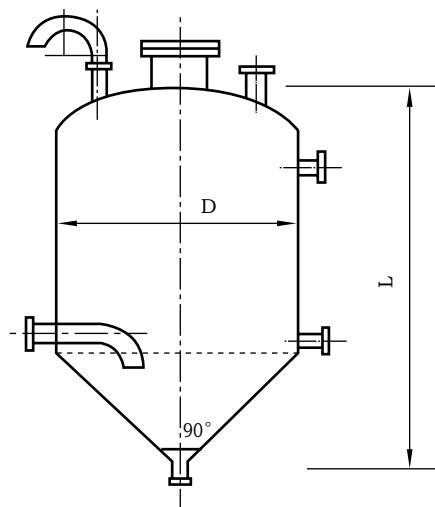
$\frac{D}{L}$ M^3	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.1	979																
0.2		757															
0.5		1818	1061														
1			2630	1356													
2				2630	1868												
3					2752	2065											
4					3637	2715	2123										
5						3364	2620	2116									
6							3117	2508									
7							3615	2901									
8							4112	3295	2713								
9								3687	3031								
10									3350	2814							
11									3668	3077							
14									3986	3340							
15										4129	3512						
18										4918	4175	3606					
20											4617	3983					
25												4925	4293				
30													5105	4493			
40														5908	5240		
50															7323	6484	5211
60																7727	6194
70																8970	7176
80																	8160
90																	9141
100																	10124



锥底椭圆形盖立式贮罐

Taper bottom elliptical cover vertical storage tank

$\frac{D}{L}$ M^3	400	600	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.2	1758																	
0.5		2018																
1.0			2890	2322	1690													
2.5					3600	2716												
3.0						3152	2532											
4.0							3181	2656										
5.0								3153	2715									
6.0									3108									
7.0										3061								
8.0										3377	3020							
9.0											3284							
10.0												3207						
11.0												3428						
12.0													3343					
15.0														3908				
18.0														4473				
20.0													4850					
25.0														5226	4786			
30.0															5493			
35.0																5685		
40.0																	5430	
50.0																	6412	
60.0																	7394	
70.0																		
80.0																		8033
90.0																		8829
100.0																		9625





通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



微控玻璃钢缠绕系列
Computer-controlling FRP Winding Products

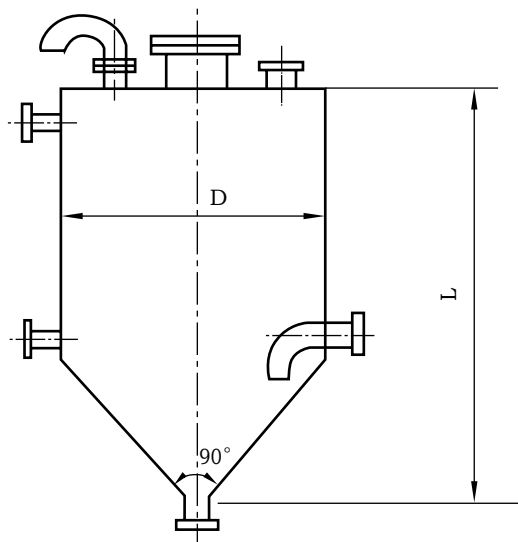


冷却塔系列产品
Cooling towers

锥底平盖立式贮罐

Taper bottom flat cover vertical storage tank

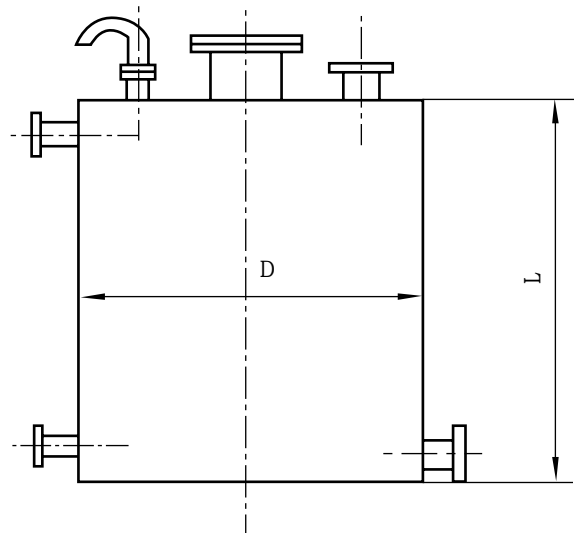
$\frac{D}{L}$ M ³	400	600	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.2	1725																	
0.5		1968																
1.0			2832	2256														
2.0				4245	2880													
3.0					4153	3052												
4.0						3936	3065											
5.0							3715	3020										
6.0								3517										
7.0								4015	3350									
8.0									3743									
9.0									4136	3531								
10.0									4530	3850								
11.0									4922	4168								
12.0										4486								
15.0										5441	4680							
18.0											5468	4778						
20.0												5220						
25.0												6326	5575					
30.0													6517	5805	5244			
35.0														6517	5951			
40.0															6659	6040		
50.0																7284	6112	
60.0																	7095	
70.0																	8077	
80.0																	9060	7700
90.0																	10042	8495
100.0																	11024	9291



平底平盖立式贮罐

Flat bottom flat cover vertical storage tank

$\frac{D}{L}$ M³	400	600	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.2	1591																	
0.5		1768	1299															
1.0			2598	1989														
2.0				3978	2546													
3.0					3820	2652												
4.0						3536	2598											
5.0							3248	2486										
6.0							3897	2984										
7.0								3481	2750									
8.0								3978	3143									
9.0									3536	2864								
10.0									3930	3183								
11.0									4322	3501								
12.0										3820								
15.0										4774	3945							
18.0											4735	3978						
20.0												4420						
25.0												5526	4708					
30.0												6631	5650					
35.0													6592	5684				
40.0														6496	5658			
50.0															7073	6217	4912	
60.0																7460	5894	
70.0																	6877	5570
80.0																	7860	6366
90.0																	8842	7162
100.0																	9824	7957





通风管道与玻璃钢系列产品
Ventilating ducts and fiberglass products



微控玻璃钢缠绕系列
Computer-controlling FRP Winding Products

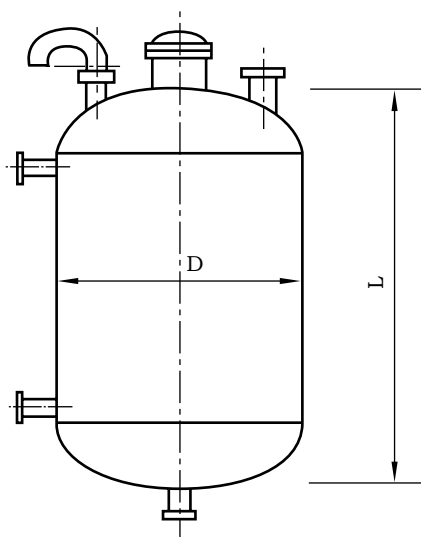


冷却塔系列产品
Cooling towers

椭圆形封头立式贮罐

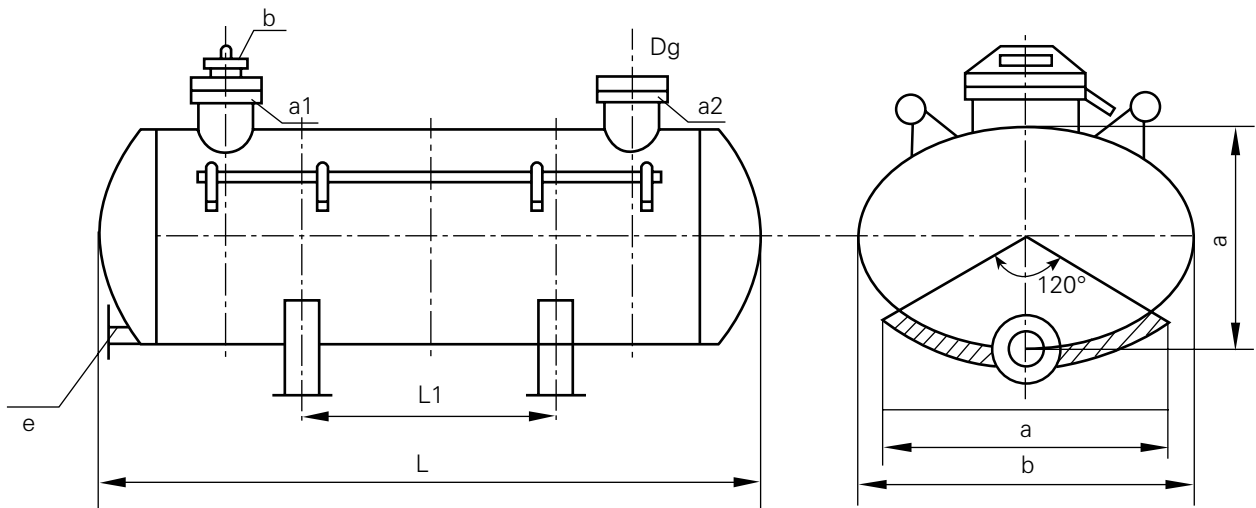
Elliptical head vertical storage tank

$\frac{D}{L}$ M ³	400	600	700	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3600	4000
0.2	1658	807																
0.5		1867	1415															
1.0			2715	2123	1440													
2.0					2712	1968												
3.0						2852	2181											
4.0							2831	2256										
5.0							3487	2753	2266									
6.0							4130	3250	2659									
7.0								3748	3052									
8.0								4245	3445									
9.0								4742	3838									
10.0								5240	4231									
11.0									4624									
12.0									5017	4153								
15.0										5107	4312							
18.0											5101	4372						
20.0											5627	4815						
25.0												5920	5141					
30.0													6083	5338				
35.0														6150	5450			
40.0														6962	6158	5507		
50.0														8586	7573	6750	5511	
60.0														10210	8987	7994	5494	5442
70.0														11834	10402	9237	7476	6238
80.0																10480	8458	7033
90.0																	9441	7830
100.0																	10423	8625



运输罐

Transportation tank



ZFB-T型系列玻璃钢椭圆槽车基本参数表

Basic parameters of ZFB-T series FRP elliptical tank lorry

型号 Model	容积(m ³) Volume(m ³)	长轴b Long axis b	短轴a Short axis a	长度L Length L	支座间距L ₁ Space between supports L ₁	支座数(只) Number of supports	支座底板长L ₂ Bottom panel length of support L ₂	人孔(a ₁ (a ₂)(a ₃) Manhole(a ₁)(a ₂)(a ₃)	出料口(e)Dg Dg Leaving port	人孔数(只) Number of manholes
1	1.96	1000	600	2200	950	2	900	400	50	1
1.5	1.53	1200	900	2000	952	2	1100	400	50	1
2	1.95	1200	900	2500	1000	2	1100	400	50	1
2.5	2.47	1400	950	2600	1040	2	1300	400	50	1
3	2.93	1600	1000	2600	960	2	1500	400	50	1
4	3.94	1600	1000	3400	1890	2	1500	400	50	2
5	4.88	1600	1200	3500	1700	2	1500	400	50	2
6	5.93	1600	1200	4200	2450	3	1500	400	80	2
7	8.0	1700	1400	4600	2850	3	1600	400	80	2
8	8.0	1700	1400	4600	2850	3	1600	400	80	2
10	9.6	2000	1400	4700	2700	3	1900	400	80	2
12	12.0	2000	1400	5800	3800	3	1900	400	80	2

- 1、使用温度：常温
- 2、使用压力：常压
- 3、a₁a₂人孔，b进料口

- 1.Operating temperature: normal temperature
- 2.Operating pressure: normal pressure
- 3.Manhole a₁ a₂ ; feeding port b



通风管道与玻璃钢系列产品
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微控玻璃钢缠绕系列
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冷却塔系列产品
Cooling towers

六、现场缠绕大型贮罐

Onsite winding large-size storage tank



内蒙古亿利化学
Inner Mongolia Yili Chemical

德州亚太集团于2000年从国外引进大型贮罐现场缠绕技术，并购置了具有领先水平的缠绕设备，采用一流的工艺技术，开始制作现场缠绕大型贮罐。

十多年来，亚太集团以先进的设备和成熟的技术，转战东西南北，出色地完成了内蒙古亿利化学、陕西东岭冶炼厂、陕西商洛炼锌厂、新疆圣雄能源开发公司等大型项目工程。

玻璃钢大型容器除了具备一般玻璃钢贮罐的轻质高强、耐腐蚀、使用寿命长的特点外，还具有如下的独特特点：

无需运输、安装方便：采用现场缠绕方式，把生产设备直接运到现场进行制作和安装，解决了大型容器运输不便的难题。

容积大：最大直径可制作25000mm，容积可达5000m³。

产品规格：可施工DN4000-DN25000范围的大型玻璃钢容器。

Yatai Group introduced the onsite winding technology for large-size storage tanks from abroad in 2000 and bought the world leading winding equipment. With the first-class technology, Yatai Group began to manufacture the onsite winding large-size storage tank.

For over the past ten years, with advanced equipments and mature technologies, Yatai Group successfully finished many large-scale projects across China like Inner Mongolia Yili Chemical, Shannxi Dongling Smeltery, Shannxi Shangluo Zinc Smelting Plant, Xinjiang Shengxiong Energy Development Company and so on. Besides the advantages of light weight, high rigidity, anti-corrosion and long life span of the ordinary FRP storage tanks, the FRP large-size vessel also has the following features:

No need for transportation and convenient installation: the production equipment is directly transported to the site for production and installation by means of field winding, which solves the problem of inconvenient transportation of large containers. Large volume: The longest diameter can reach 25000mm and the largest volume can reach 5000m³.

Product specification: large FRP containers in DN4000-DN25000 range can be constructed.



陕西东岭冶炼厂
Shannxi Dongling Smeltery



陕西商洛炼锌厂
Shannxi Shangluo Zinc Smelting Plant



新疆圣雄能源开发公司
Xinjiang Shengxiong Energy Development Company



规格N(mm) Specification	容积(m³) Volume	H(mm)	Ts(mm)	Tt(mm)	Tb(mm)	重量(kg) Weight
4000	75	5970	13	13	15	2250
	100	7960	15	13	15	3000
	125	9950	15.5	13	15	3750
4500	75	4720	13	13	15	2250
	100	6290	14	13	15	3000
	125	7860	15.5	13	15	3750
5000	150	9430	16.5	13	15	4500
	100	5090	14	13	15	3000
	125	6370	14.5	13	15	3750
5500	150	7640	15.5	13	15	4500
	200	10190	18	13	15	6000
	100	4210	14	13	15	3000
6000	125	5260	14	13	15	3750
	150	6310	16	13	15	4500
	200	8420	17	13	15	6000
6500	250	10520	19	13	15	7500
	125	4420	14	13	16	3750
	150	5310	15	14	16	4500
7000	200	7070	18	14	16	6000
	250	8840	18	14	16	7500
	300	10610	20	14	16	9000
7500	125	3770	14	14	16	3750
	150	4520	14.5	14	16	4500
	200	6030	16.5	14	16	6000
8000	250	7530	17	14	16	7500
	300	9040	20	14	16	9000
	350	10550	22	14	16	10500
8500	125	3250	13	14	16	3750
	150	3900	14.5	14	16	4500
	200	5200	16	14	16	6000
9000	250	6500	17.5	14	16	7500
	300	7800	18.5	14	16	9000
	350	9090	21	14	16	10500
9500	400	10390	21.5	14	16	12000
	125	2830	13	14	17	3750
	150	3400	13.5	14	17	4500
10000	200	4530	15	14	17	6000
	250	5660	16.5	14	17	7500
	300	6790	18	14	17	9000
10500	350	7920	20.5	14	17	10500
	400	9050	21	14	17	12000
	500	11320	26	14	17	15000
11000	150	2980	13	14	17	4500
	200	3980	14.5	14	17	6000
	250	4970	17.5	14	17	7500
11500	300	5970	19	14	17	9000
	350	6960	19.5	14	17	10500
	400	7960	20	14	17	12000
12000	450	8950	22.5	14	17	13500
	500	9950	24.5	14	17	15000
	550	10940	26.5	14	17	16500

规格N(mm) Specification	容积(m³) Volume	H(mm)	Ts(mm)	Tt(mm)	Tb(mm)	重量(kg) Weight
8000	600	11940	27.5	14	17	18000
8500	200	3520	15.5	14	17	6000
	250	4410	16.5	14	17	7500
	300	5290	18	14	17	9000
9000	350	6170	20.5	14	17	10500
	400	7050	20.5	14	17	12000
	450	7930	21.5	14	17	13500
9500	500	8810	23.5	14	17	15000
	550	9690	26	14	17	16500
	600	10570	27	14	17	18000
10000	650	11450	28	14	17	19500
	200	3140	15	15	18	6000
	250	3930	17	15	18	7500
10500	300	4720	18.5	15	18	9000
	350	5500	19.5	15	18	10500
	400	6290	21	15	18	12000
11000	450	7070	23.5	15	18	13500
	500	7860	23.5	15	18	15000
	550	8650	24	15	18	16500
11500	600	10220	26.5	15	18	18000
	650	10220	26.5	15	18	19500
	700	11000	28	15	18	21000
12000	750	11790	30	15	18	22500
	250	3530	16.5	15	18	7500
	300	4230	17.5	15	18	9000
12500	350	4940	19	15	18	10500
	400	5640	20	15	18	12000
	450	6350	22.5	15	18	13500
13000	500	7050	24	15	18	15000
	550	7760	24	15	18	16500
	600	8460	24.5	15	18	18000
13500	650	9170	25.5	15	18	19500
	700	9880	27	15	18	21000
	750	10580	28.5	15	18	22500
14000	800	11290	29.5	15	18	24000
	300	3820	18.5	15	18	9000
	350	4460	20.5	15	18	10500
14500	400	5090	23	15	18	12000
	450	5730	23	15	18	13500
	500	6370	24	15	18	15000
15000	550	7000	25	15	18	16500
	600	7640	26.5	15	18	18000
	650	8280	27.5	15	18	19500
15500	700	8910	27.5	15	18	21000
	750	9550	28	15	18	22500
	800	10190	28.5	15	18	24000
16000	850	10820	30.5	15	18	25500
	900	11460	33	15	18	27000
	300	3160	17	15	18	9000
16500	350	3680	18	15	18	10500
	400	4210	19	15	18	12000



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微控玻璃钢缠绕系列
Computer-controlling FRP Winding Products



冷却塔系列产品
Cooling towers

规格N(mm) Specification	容积(m³) Volume	H(mm)	Ts(mm)	Tt(mm)	Tb(mm)	重量(kg) Weight	规格N(mm) Specification	容积(m³) Volume	H(mm)	Ts(mm)	Tt(mm)	Tb(mm)	重量(kg) Weight
11000	450	4740	20	15	19	13500	14000	1100	7150	29.5	15	19	33000
	500	5260	22	15	19	15000		1200	7800	31	15	19	36000
	550	5790	23	15	19	16500		1300	8440	31	15	19	39000
	600	6310	25	15	19	18000		1400	9090	35	15	19	42000
	650	6840	25	15	19	19500		1500	9740	36.5	15	19	45000
	700	6310	25.5	15	19	21000		1600	10390	38.5	15	19	48000
	750	7890	26.5	15	19	22500		1700	11040	40.5	15	19	51000
	800	8420	27	15	19	24000		1800	11690	42.5	15	19	54000
	850	8940	28.5	15	19	25500		400	2260	16.5	16	19	12000
	900	9470	29	15	19	27000		500	2830	20	16	19	15000
	950	10000	31	15	19	28500	15000	600	3400	21.5	16	19	18000
12000	1000	10520	32.5	15	19	30000		700	3960	23	16	19	21000
	1100	11570	34.5	15	19	33000		800	4530	24.5	16	19	24000
	300	2650	16	15	19	9000		900	5090	26	16	19	27000
	350	3090	18	15	19	10500		1000	5660	27	16	19	30000
	400	3540	20	15	19	12000		1100	6220	28.5	16	19	33000
	450	3980	21	15	19	13500		1200	6790	29	16	19	36000
	500	4420	21.5	15	19	15000		1300	7360	31.5	16	19	39000
	550	4860	22.5	15	19	16500		1400	7920	33	16	19	42000
	600	5310	23.5	15	19	18000		1500	8490	34.5	16	19	45000
	700	6190	25.5	15	19	21000		1600	9050	36	16	19	48000
	750	6630	25.5	15	19	22500		1700	9620	39	16	19	51000
13000	800	7070	26	15	19	24000		1800	10190	40.5	16	19	54000
	850	7520	27	15	19	25500		1900	10750	42	16	19	57000
	900	7960	28	15	19	27000		2000	11320	44	16	19	60000
	950	8400	29.5	15	19	28500	16000	500	2490	19	16	20	15000
	1000	8840	30	15	19	30000		600	2980	22	16	20	18000
	1100	9730	32	15	19	33000		700	3480	23	16	20	21000
	1200	10610	34.5	15	19	36000		800	3980	24.5	16	20	24000
	1300	11490	36.5	15	19	39000		900	4480	26	16	20	27000
	300	2260	15	15	19	9000		1000	4970	27.5	16	20	30000
	400	3010	18.5	15	19	12000		1100	5470	28	16	20	33000
	500	3770	18.5	15	19	15000		1200	5970	29.5	16	20	36000
	600	4520	22	15	19	18000		1300	6470	30.5	16	20	39000
	700	5270	24	15	19	21000		1400	6960	32	16	20	42000
14000	800	6030	25.5	15	19	24000		1500	7460	33.5	16	20	45000
	900	6780	26.5	15	19	27000		1600	7960	35	16	20	48000
	1000	7530	29	15	19	30000		1700	8460	37	16	20	51000
	1100	8290	31	15	19	33000	17000	1800	8950	.8	16	20	54000
	1200	9040	32	15	19	36000		1900	9450	40.5	16	20	57000
	1300	9790	34.5	15	19	39000		2000	9950	42	16	20	60000
	1400	10550	36.5	15	19	42000		500	2200	15	16	20	15000
	1500	11300	39	15	19	45000		600	2640	21	16	20	18000
	300	1950	14.5	15	19	9000		700	3080	23.5	16	20	21000
	400	2600	17.5	15	19	12000		800	3520	23.5	16	20	24000
	500	3250	21	15	19	15000		900	3970	25	16	20	27000
	600	3900	21	15	19	18000		1000	4410	26.5	16	20	30000
	700	4550	22.5	15	19	21000		1100	4850	27.5	16	20	33000
	800	5200	24	15	19	24000		1200	5290	30.5	16	20	36000
	900	5850	25.5	15	19	27000		1300	5730	30.5	16	20	39000
	1000	6500	26.5	15	19	30000		1400	6170	32.5	16	20	42000

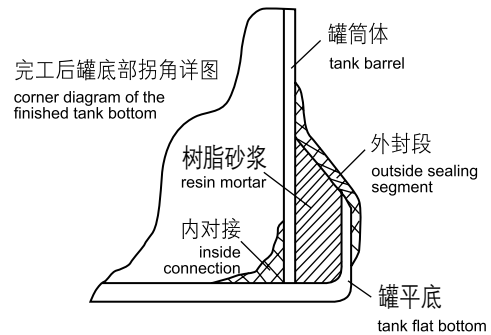
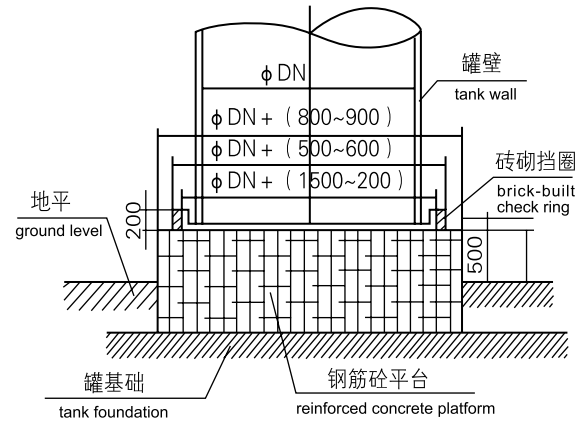


规格N(mm) Specification	容积(m³) Volume	H(mm)	Ts(mm)	Tt(mm)	Tb(mm)	重量(kg) Weight
17000	1500	6610	32.5	16	20	45000
	1600	7050	34	16	20	48000
	1700	7490	35.5	16	20	51000
	1800	7930	36.5	16	20	54000
	1900	8370	39	16	20	57000
	2000	8810	40	16	20	60000
18000	600	2360	20	17	20	18000
	700	2750	22.5	17	20	21000
	800	3140	22.5	17	20	24000
	900	3540	23.5	17	20	27000
	1000	3930	25	17	20	30000
	1100	4320	27.5	17	20	33000
	1200	4720	27.5	17	20	36000
	1300	5110	28.5	17	20	39000
	1400	5500	29.5	17	20	42000
	1500	5890	31	17	20	45000
	1600	6290	33	17	20	48000
	1700	6680	33.5	17	20	51000
	1800	7070	34.5	17	20	54000
	1900	7470	36.5	17	20	57000
19000	700	2470	21.5	17	20	21000
	800	2820	24	17	20	24000
	900	3170	24	17	20	27000
	1000	3530	25	17	20	30000
	1100	3880	26.5	17	20	33000
	1200	4230	27.5	17	20	36000
	1300	4590	28	17	20	39000
	1400	4940	29	17	20	42000
	1500	5290	30.5	17	20	45000
	1600	5640	32	17	20	48000
	1700	6000	32	17	20	51000
	1800	6350	34	17	20	54000
	1900	6700	36	17	20	57000
	2000	7050	36.5	17	20	60000
20000	800	2550	23	18	20	24000
	900	2860	24	18	20	27000
	1000	3180	25	18	20	30000
	1100	3500	26.5	18	20	33000
	1200	3820	27.5	18	20	36000
	1300	4140	28.5	18	20	39000
	1400	4460	28.5	18	20	42000
	1500	4770	30	18	20	45000
	1600	5090	31.5	18	20	48000
	1700	5410	32.5	18	20	51000
	1800	5730	34	18	20	54000
	1900	6050	34	18	20	57000
	2000	6370	35	18	20	60000



大型贮罐基础图

Large-size storage foundation diagram



技术要求:

- 1、基础表面必须平整。
- 2、基础上必须有一圈H=200mm的砖砌挡圈。
- 3、底封头制作好后，将挡圈撤除。
- 4、将贮罐就位且按照图纸最后成型的要求制作底部筒身与底封头之间的连接。
- 5、尺寸H由贮罐重量及当地土壤耐力计算确定。

Technological requirement:

- 1.Foundation must be flat.
- 2.There must be a brick-made check ring with a height of 200mm on the foundation.
- 3.When the bottom head is finished, remove the check ring.
- 4.storage tank in place, make the connection between bottom barrel body and bottom head according to the final finished requirement of the drawing.
- 5.The height is calculated based on the weight of the tank and the soil tolerance.



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Computer-controlling FRP Winding Products



冷却塔系列产品
Cooling towers

七、塔器设备

Tower equipment

德州亚太集团在塔器设备的设计、制造方面使玻璃钢的各项优异性能得到了更全面、合理、有效的发挥。在设计之初，就根据塔器设备的使用行业、工作条件（工作环境）进行科学合理的选材和精确细致的结构强度计算，并且在生产制造过程中依靠严格的管理、先进的设备、完善的工艺充分保证玻璃钢塔器设备良好的整体性能和相关质量指标。

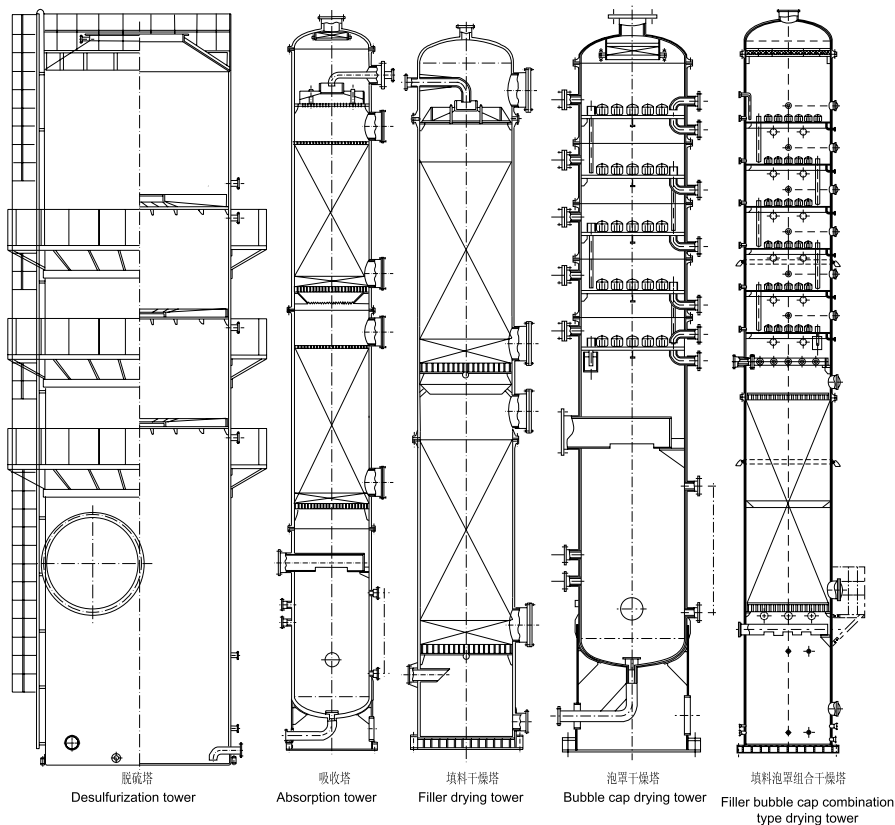
本公司所制造的FRP、PVC/FRP和PP/FRP等材质的塔器设备所用原材料均从国内外大型企业采购，塔器设备在设计时通过改变内衬层和内件的材质或树脂和纤维种类满足不同腐蚀性介质要求，通过有限元分析，改变结构层的树脂和纤维类型，调整铺层方法，即可满足相应温度和压力下的强度要求。

PVC、PP内衬和内件的制作、检验及验收严格执行HG20640-1997《塑料设备》标准，外加强层FRP严格执行JC/T587-1995《纤维缠绕增强塑料贮罐》标准。

Dezhou Yatai Group gives full play to the excellent performance of FRP in the design and manufacture of tower equipment. Early in the design, according to the characteristics of tower equipment applied industry and working conditions (work environment), Yatai conducts the scientific and reasonable material selection and structure strength calculation. It depends on strict management, advanced equipment and perfect technology to fully guarantee the good overall performance and quality indicators of FRP tower equipment during the manufacturing process.

The raw materials of the tower equipment made of FRP, PVC/FRP and PP/FRP are all purchased from large enterprises at home and abroad. The tower equipment is designed to meet the requirements of different corrosive media by changing the material of lining and inner parts or various types of resin and fiber. Through finite element analysis and changing the types of resin and fiber of the structural layer and adjusting the lay-up method, the strength requirements under the corresponding temperature and pressure can be met.

The production, inspection and acceptance of PVC and PP lining and inner parts are strictly in accordance with HG20640-1997 "Plastic Equipment" standard. Outside strong FRP layer strictly comply with JC/T587-1995 "Fiber Winding Reinforced Plastic Storage Tank" standard.



八、玻璃钢搅拌罐

FRP mixing tank

简介

Introduction

玻璃钢搅拌罐主要是由搅拌罐体及搅拌系统两大部分组成，罐体采用高强度的玻璃钢整体缠绕制作，不但解决搅拌时对罐体高强度的要求，也解决了在化工领域对搅拌罐苛刻的防腐要求，在室内使用可以做到耐磨耐腐蚀，使用多年如新，材质不会老化；搅拌桨等配件则根据不同的工艺要求选用碳钢衬玻璃或不锈钢等材质来制作。

FRP mixing tank is mainly composed of two parts: mixing tank body and mixing system. The tank is made of winding high strength FRP, which not only solves the requirements for high strength of the tank during mixing, but also meets the harsh anti-corrosion requirements for the tank in the field of chemical industry. Its indoor use can be wear-resistant and corrosion resistant, still new after using it for many years. Its material will not age. Stirring paddle and other accessories are made of carbon steel lined glass or stainless steel and other materials according to different process requirements.

产品结构

Product structure

- 1、产品由电机、减速机、缸体、缸盖、搅拌桨、填料箱等装置组成。
- 2、容积：0.5~100立方米均可。
- 3、规格：直径DN600~DN4000不等。
- 4、法兰标准：各种标准均可，根据用户的要求选配。搅拌桨及轴；桨式、锚式、螺旋式等多种形式。
- 5、搅拌缸体：采用玻璃钢材料制作（乙烯基树脂作内衬）。
- 6、电动部分：采用国内知名厂家的电机及减速机，也可由用户指定。
- 7、款式：立式（分平底、斜底、圆底罐、锥底等）、卧式。
- 8、外观：半透明，特殊要求要添加胶衣或色浆改变外观颜色。
- 9、支脚：可按用户的要求选配，材质选用碳钢（玻璃钢防腐）或不锈钢等。

- 1.The product is composed of motor, speed reducer, cylinder body, cylinder cover, stirring paddle, packing box and other devices.
- 2.Volume: 0.5~100 cubic meters.
- 3.Specification: diameter DN600~DN4000.
- 4.Flange standard: many kinds of standards can be adopted according to different requirements of users. Stirring paddle and shaft; paddle type, anchor type, screw type and other forms.
- 5.Mixing cylinder body: made of FRP (vinyl resin for the lining).
- 6.Electric parts: adopt motor and speed reducer made by domestic well-known manufacturers. These can also be specified by the user.
- 7.Type: vertical (include flat bottom, inclined bottom, round bottom tank, cone bottom, etc.), horizontal.
- 8.Appearance: translucent. Its color can be changed by adding gel coat or color paste.
- 9.Legs: made according to user's requirements. Carbon steel (FRP anti-corrosion) or stainless steel are available.

产品特点

Characteristics

表面光滑，清洁易清洗抗微生物腐蚀耐高压、抗老化、重量轻、强度高、绝缘、防渗透率低，有效保持恒温储存使用寿命长，长达50年，无须维护。

Smooth surface, easy to clean, anti-microbial corrosion, high pressure resistance, anti-aging, light weight, high strength, insulation, anti-leakage, low thermal conductivity, effectively keep constant temperature storage, up to 50 years long service life, no need for maintenance.

设计参数

Designed parameters

- 1、压力：常压
- 2、安全系数：7
- 3、巴氏硬度：35
- 4、电机功率：1~35kW（按工艺要求）
- 5、适用温度：-40℃~150℃适应范围
- 6、使用条件：强酸强碱，液位或半固体
- 7、转速：采用摆线针轮行星减速器控制，20~200转/分钟
- 8、使用场合：液位或半固体的搅拌、加热、反应、交换、萃取等

- 1.Pressure: normal pressure
- 2.Safety coefficient:7
- 3.Barcol hardness:35
- 4.Motor power: 1~35kW (according to the technological requirement)
- 5.Applied temperature: -40℃~150℃
- 6.Using conditions: Strong acid, strong base, liquid level or semisolid.
- 7.Speed of rotation: adopt cycloidal needle wheel planetary reducer, 20~200 r/min.
- 8.Application: stirring, heating, reaction, exchange, extraction of liquid level or semi-solid substance.





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九、玻璃钢化粪池

FRP Septic Tank

玻璃钢化粪池是使用高分子材料与高强度玻璃纤维复合制成的圆筒形整体化粪池，与传统砖混化粪池相比，具有严密性好、不渗漏、质量轻、易于运输、抗压强度高、耐酸碱、使用寿命长、安装快捷等优点。

筒体中及两端有T字型加强筋，两端外用车轮型封头，凹凸面设计，这种结构可以提高池体的强度及水压强度，池体上部设有进出水和清污孔，池内用膜隔仓分成一级沉淀池、二级沉淀池和处理池三部分。隔仓板上设有环流泛水装置，以延长污水停留时间，提高腐化效果。

本产品适用于住宅小区居住建筑、办公大楼、学校、医疗、公共场所、企业车间、生活间等工业或民用建设的粪便、生活污水的初步处理。



The FRP Septic Tank is a cylinder-shaped integral septic tank made from the composite substance of high polymer material and high-strength glass fiber. Compared with traditional brick-made septic tank, it has the features of good air tightness, leakproofness, light weight, easy delivery, high strength and anti-pressure, anti acid and alkali capability, long life span and easy installation and so on.

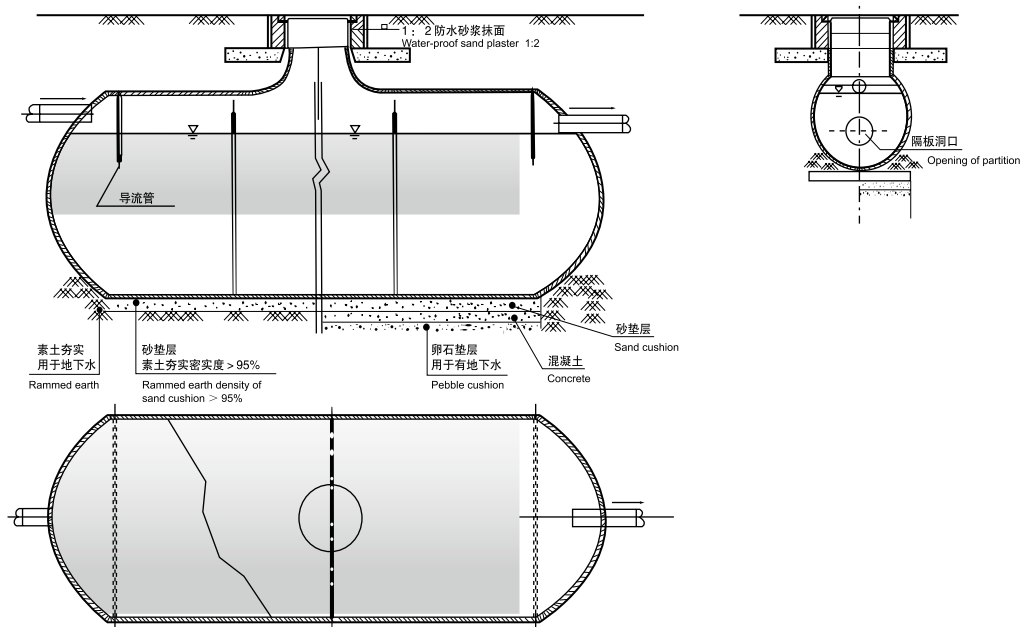
There are T-shaped stiffeners in the cylinder and at both ends, and wheel type heads are used externally at both ends, with concave and convex surface design.

This structure can improve both the strength of tank body and water pressure. The upper part of the tank is provided with inlet and outlet water and sewage cleaning holes, and the membrane compartment inside the tank is divided into three parts: primary sedimentation tank, secondary sedimentation tank and treatment tank. Circulating flooding device on the compartment shall increase the staying time of sewage to improve the effect of corruption.

This product is suitable for the preliminary disposal of excrement and domestic sewage coming from industries or civil structures like residence buildings, office buildings, schools, medical and public areas, manufacturing workshops and living places.

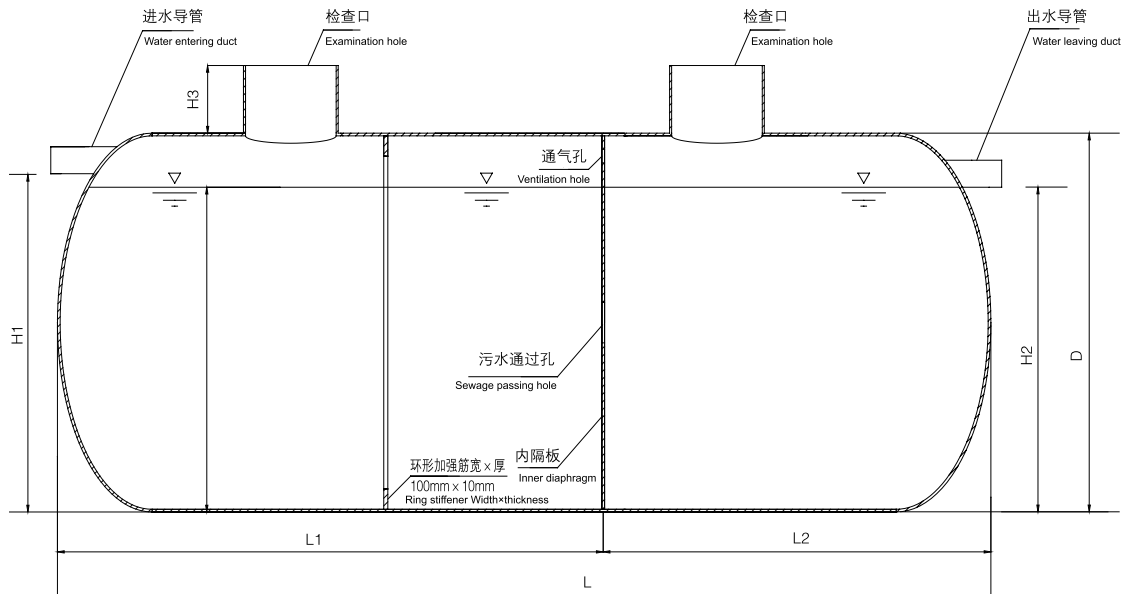
玻璃钢化粪池剖面图

Cross-section view of FRP Septic Tank



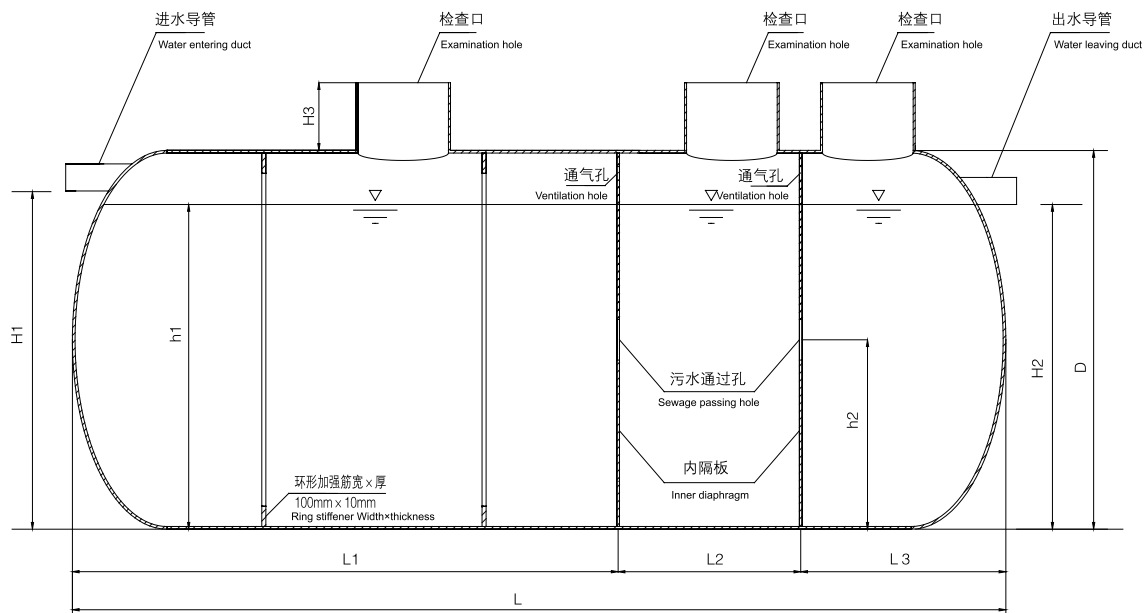
1-5# 玻璃钢化粪池示意图

FRP septic tank schematic diagram



6-13# 玻璃钢化粪池示意图

FRP septic tank schematic diagram





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玻璃钢化粪池设计选用表

FRP septic tank design for selection

型号 Model	有效容积(m³) Valid area	允许使用人数（根据不同建筑场所） Allowed number of users (according to different buildings)			
		医院、疗养院、幼儿园（有住宿） a=100% Hospital, sanatorium, kindergarten (accommodation included)	住宿、集体宿舍、旅馆宾馆 a=100% Dorms, hotels	办公楼、教学楼、试验楼、工业企业生活间 a=100% Office buildings, teaching buildings, experimental buildings, living rooms in industries and enterprises	职工食堂、影剧院、体育馆、商场 餐饮业等公共场所 a=100% Public areas like staff canteen, cinema, gymnasium, mall, food industries and so on
1	2	23---18	33---26	58---46	230---180
2	4	46---36	67---52	117---91	459---360
3	6	69---54	100---78	175---136	689---541
4	9	103---82	150---117	263---205	1033---811
5	12	138---109	200---156	350---272	1377---1081
6	16	184---145	267---208	467---364	1836---1441
7	20	230---181	333---260	583---455	2295---1802
8	25	287---226	417---325	729---568	2869---2475
9	30	351---272	500---390	882---682	3488---2703
10	40	468---362	667---520	1177---909	4651---3604
11	50	585---453	833---649	1471---1136	5814---4505
12	75	877---679	1250---974	2206---1705	8721---6757
13	100	1170---905	1667---1299	2941---2273	11628---9009

注：1、列表按污泥量0.7升/人/天、水量50升/人/天、暂留时间12--24小时计算。
2、清掏周期为180天。

Remark:1.The data in the table above is calculated according to 0.7 liter per person in a day, water volume 50 liters per person in a day, staying time is from 12 to 24 hours.
2.Cleaning cycle is 180 days.

玻璃钢化粪池结构尺寸一览表

Chart of structure and size of FRP septic tank

型号 Model	有效容积(m³) Valid area	直径D(mm) Diameter	化粪池长度(mm) Length of septic tank				H1(mm)	H2(mm)	H3(mm)	H4(mm)
			L	L1	L2	L3				
1	2	1200	2300	1750	550	---	1000	900	200	540
2	4	1500	2700	2050	650	---	1300	1200	200	720
3	6	1800	2700	2050	650	---	1600	1500	200	900
4	9	1800	4000	3000	1000	---	1600	1500	200	900
5	12	1800	5300	4000	1300	---	1600	1500	200	900
6	16	2200	4600	2700	950	950	2000	1900	200	1200
7	20	2200	5800	3400	1200	1200	2000	1900	200	1200
8	25	2200	7200	4300	1450	1450	2000	1900	200	1200
9	30	2200	8600	5100	1750	1750	2000	1900	200	1300
10	40	2800	6900	4200	1350	1350	2600	2500	200	1750
11	50	2800	8700	5300	1700	1700	2600	2500	200	1750
12	75	3000	11200	6800	2200	2200	2800	2700	200	1890
13	100	3000	15000	9000	3000	3000	2800	2700	200	1890

十、玻璃钢盖板

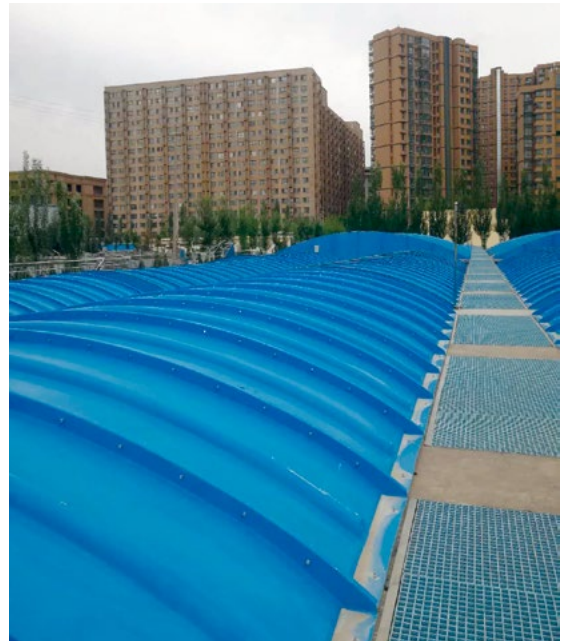
FRP Septic Tank

玻璃钢盖板均采用矩形拱形结构，根据跨度不同，拱高根据跨度分别进行设计，为了安装和运输方便，单块盖板的宽度 $\leq 1500\text{mm}$ ，每块盖板通过不锈钢304螺栓连接，螺栓规格为M12*40，盖板两侧端通过膨胀螺丝与基础进行连接；每块盖板搭接处设计挡雨檐，两端设计堵板进行封堵。盖板颜色可根据客户要求任意调色。

玻璃钢盖板可设计性强，尺寸灵活多样，方便切割，尺寸稳定。

FRP cover plate adopts rectangular arch structure. According to different spans, we design different arch heights. For easy installation and transportation, the width of the single cover plate is less than 1500mm. Each cover plate is connected by stainless steel 304 bolt. Bolt specification is M12*40. Both sides of the cover plate are connected to the base by expansion screws. The rain eave is designed at the lap joint of each cover plate, and blocking plates are designed at both ends. The color of cover plate can be adjusted according to customer's requirement.

FRP cover plate has advantages of strong design ability, flexible sizes, convenient cutting and stable sizes.



十一、生物过滤除臭技术

Biofiltration deodorization technology



生物过滤除臭技术当今在国际上被誉为治理恶臭气体污染的绿色解决方案，在国内近年已被越来越多的企业认同、接受和采纳，其处理工艺对环境的亲善性和建造运行的经济性倍受欢迎。它使用纯自然的材料而不使用昂贵且有潜在危害的化学药品及各种添加剂。与其他方法相比能源需求很低，工程的实施安全可靠，因此生物过滤法比化学洗涤、生物滴滤、热氧化、活性炭吸附等有更广泛的适用性和影响力，应用空间也更为广阔。

Biofiltration deodorization technology is known as the green solution to deal with malodorous gas pollution in the world, and has been recognized, accepted and adopted by more and more enterprises in China in recent years. Its treatment technology is popular for its environmental friendliness and economical construction and operation. It uses pure natural materials and does not use expensive and potentially harmful chemicals and additives. Compared with other methods, the energy demand is very low, and the implementation of the project is safe and reliable. Therefore, the biofiltration method has wider applicability and influence than chemical washing, biotrickling filtration, thermal oxidation filtration and activated carbon absorption. The application area is also broader.



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十二、一体化预制泵站

Integrated prefabricated pumping station

- 1、顶盖：由玻璃钢边盖和可开启的泵站盖板组成。
- 2、筒体：预制泵站的玻璃钢井筒部分。
- 3、底座：与混凝土底板相连，以固定预制泵的部分。
- 4、机电设备：一体化预制泵站机电设备主要包括水泵及其辅助设备、拦污清污设备、压力管道、阀类设备、控制系统等。
- 5、自动耦合系统：潜水泵与固定管道之间接口快装系统叫自动耦合系统。
- 6、进场：一体化预制泵站进入施工现场或其它的指定地点落地并完成开箱验收、交接处理，交付临时保管的过程。
- 7、安装与调试

- 1.Top cover: It consists of a FRP edge cover and an openable pump station cover plate.
- 2.Barrel body: FRP material.
- 3.Base: connected with the concrete bottom plate to stabilize the prefabricated pump.
- 4.Electromechanical equipment: the electromechanical equipment of the integrated prefabricated pumping station mainly includes the water pump and its auxiliary equipment, pollution blocking and cleaning equipment, pressure pipeline, valve equipment, control system, etc.
- 5Automatic coupling system: the quick installation system between the submersible pump and fixed pipe is called the automatic coupling system.
- 6.Enter the site: the integrated prefabricated pumping station will be landed at the construction site or other designated locations and will complete the process of unpacking acceptance, handover and delivery for temporary storage.
- 7.Installation and commissioning



十三、尾气净化工程

Exhaust purification engineering

- 1、尾气净化系统的制作；
- 2、尾气净化系统的安装；
- 3、复杂管路的测绘设计（不提供设计资质）制作并安装；
- 4、玻璃钢烟气管道具备强度高、重量轻、便于安装、高耐腐蚀性、耐候性等特点。

- 1.Manufacture of exhaust purification system.
- 2.Installation of exhaust purification system.
- 3.Production and installation of complex pipeline surveying and mapping design (no design qualification provided).
- 4.FRP smoke pipe has the characteristics of high strength, light weight, easy installation, high corrosion resistance, weather resistance and so on.



十四、玻璃钢烟囱

FRP chimney



玻璃钢烟囱根据使用的材料不同具备高耐酸碱、性耐腐蚀性能，可以制作使用温度在 $-40 \sim 220^{\circ}\text{C}$ 不同工况的玻璃钢烟囱，其使用寿命可长达25年几乎是碳钢烟囱的3~4倍，且性能稳定运行可靠。

FRP chimney can have high acid, alkali, and corrosion resistance abilities according to its different materials. It is working temperature is within $-40 \sim 220^{\circ}\text{C}$. Life is more than 25 years, which is four times the life of carbon steel chimneys. Its performance is stable and operation reliable.



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十五、内衬耐腐蚀性能表

Lining anti-corrosion performance table

介质种类 Kinds of medium	内衬树脂 Resin lining	聚酯 Polyester		环氧 Epoxy		呋喃 Furan		酚醛 Phenolic aldehyde		PP-FRP		PVC-FRP	
	介质 Medium	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature
酸类 Acids	硫酸 H ₂ SO ₄	<50 70 75 发烟 Fuming	104 71 环温 Ambient temperature 99	<20 20-70 70-75	66 40 环温 Ambient temperature	<70	110	<70 80	150 环温 Ambient temperature	<60 78-90 95-96	100 65 50	<90 90-95	60 环温 Ambient temperature
	硝酸 HNO ₃	5 40 发烟 Fuming	71 环温 Ambient temperature 79	<10	环温 Ambient temperature	<5	环温 Ambient temperature	<5	60	<10 10-25 30-70	100 68 环温 Ambient temperature	<68 >68	60 环温 Ambient temperature
	盐酸 HCl	<31 37	110 71	<20 20-37	90 66	37	110		150	<36 >36	100 65		60
	磷酸 H ₃ PO ₄	>85 <85	100 93	>85 <85	90 90		110	<90	150	>85 <85	100 65	<90	60
	氢氟酸 HF	10 30	100 70		66	<20	110	<40	110	稀 Low density 35-70	100 65	<50 50-70	60 环温 Ambient temperature
	氢溴酸 HBr	<40 50	100 70	<20 50	90 60		110		110	100	环温 Ambient temperature		60
	氢氰酸 HCN		100		66		110		100		65		60
	亚硫酸 H ₂ SO ₃	<60 70	100 50	<10 >10	90 40		110		150		65		60
	亚硝酸 HNO ₂	10	环温 Ambient temperature							10	环温 Ambient temperature		环温 Ambient temperature
	碳酸 H ₂ CO ₃	<60 70		104	90		110		150		100		60
	铬酸 H ₂ CrO ₄	<5 5-10 10-20	100 50 环温 Ambient temperature	<10 10-30	40 环温 Ambient temperature	<2 <5	110 环温 Ambient temperature	<10	环温	<50 80	100 环温 Ambient temperature	<50	环温 Ambient temperature
	硼酸 H ₃ BO ₄		100		66		110		150		100		60
	砷酸 H ₂ AsO ₄		80		90				150		65		60
	亚磷酸 HPO ₃		100				110						
	次氯酸 HClO	<20	50		40		环温 Ambient temperature		环温 Ambient temperature		65		60
	醋酸 CH ₃ COOH	10-100	104-环温 Ambient temperature	<50 >50	66 40		110	<100	150	<80 冰 Ice	100 50	<60 80-90	60 环温 Ambient temperature
	甲酸 HCOOH	<10 >10	66-环温 Ambient temperature		66		110		150	<85 100	80 65	<50 100	60 环温 Ambient temperature
	草酸 (COOH) ₂		100		90		110		110		100		60
	柠檬酸 C ₆ H ₈ O ₇		100		90		110		110		80		60
	苯甲酸 C ₇ H ₆ O ₂		100		90		110		110		65		60
	苯磺酸 SC ₆ H ₄ O ₃		100		90		110		110		65		60



介质种类 Kinds of medium	内衬树脂 Resin lining	聚酯 Polyester		环氧 Epoxy		呋喃 Furan		酚醛 Phenolic aldehyde		PP-FRP		PVC-FRP	
	介质 Medium	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature
碱类 Alkalis	氢氧化钠 NaOH	5-50	93-环温 Ambient temperature	10-30 30-50	90 40		110			<70 100	100 65		60
	氢氧化钾 KOH	10 20	60-环温 Ambient temperature	10-30 30-50	90 40		110				100		60
	氢氧化铵 NH ₄ OH	<29 30-50	100 40		100 66	30	110						60
	氢氧化钙 Ca(OH) ₂	100				110		110		100			
	氢氧化镁 Mg(OH) ₂	100				110				100			
	氢氧化钡 Ba(OH) ₂	60				110		环温 Ambient temperature		100			
	氢氧化铝 Al(OH) ₃	60				110				100			
盐类 Salts	硫酸铵 (NH ₄) ₂ SO ₄		100		120		110		150		100		60
	硝酸铵 NH ₄ NO ₃		100		120		110		110	100	100		60
	磷酸铵 (NH ₄) ₂ PO ₃ H ₂ O		60		90		110		90	100	100		60
	碳酸铵 (NH ₄) ₂ CO ₃ H ₂ O	<10 >10	60 40		90		110		90		100		60
	氯化铵 NH ₄ Cl		100		120		110		110		80		60
	硫酸钠 Na ₂ SO ₄ 12H ₂ O		100		10		110		150		100		60
	硝酸钠 NaNO ₃		100		120		110		110		100		60
	碳酸钠 Na ₂ CO ₃	10 >20	82 60		120		110	<100	环温 Ambient temperature		100		60
	氯酸钠 NaClO ₃		99		120		110		110		100		60
	次氯酸钠 NaClO	10	66		环温 Ambient temperature	<5	环温 Ambient temperature	3	环温 Ambient temperature	<6	65		60
	氯化钠 NaCl		100		90		110		150		100		60
	碳酸氢钠 NaHCO ₃		80		120		110		110		100		60
	铬酸钠 Na ₂ CrO ₄ 10H ₂ O		100		90		110				65		环温 Ambient temperature
	硫酸钾 K ₂ SO ₄		100		120		110		150		100		60



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	介质 Medium	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature	浓度 % Concentration	温度 °C Temperature
盐类 Salts	硝酸钾 KNO ₃		100		120		110		110		100		60
	磷酸钾 K ₂ PO ₄		100		90								
	碳酸钾 K ₂ CO ₃	10-50	82-环温 Ambient temperature		120		110		90		100		60
	硫酸铝 Al(SO ₄) ₃ ·12H ₂ O		110		120		110		150		100		60
	硝酸铝 Al(NO ₃) ₃		80		120				环温 Ambient temperature		100		60
	碳酸镁 MgCO ₂		80		120		110		150		100		60
	氯化镁 MgCl ₂		110		120		110		150		100		60
	氯化钙 CaCl ₂		100		90		110		110	100	100		60
	硫酸钡 BaSO ₄		110		120		110		110		100		60
溶剂及其它 Solvents and others	甲醇 CH ₃ OH		100		93		65		环温 Ambient temperature		100		60
	乙醇 CH ₃ CH ₂ OH		100		93		65		70		100		60
	乙二醇 HOCH ₂ CH ₂ OH		100				110		110		100		60
	甲醛 HCHO	<50	60	100	66		110		60	100	60		60
	丙酮 CH ₃ COCH ₃				66		90		110		100		
	苯乙酮 C ₆ H ₅ O		环温 Ambient temperature						环温 Ambient temperature		60		
	甲乙酮 CH ₃ COC ₂ H ₅				40		110				60		
	二苯醚 H ₅ C ₆ OC ₆ H ₅		60		50								
	苯 C ₆ H ₆				66		110		环温 Ambient temperature		50		
	醋酸丁酯 C ₆ H ₅ O ₂		环温 Ambient temperature		40		110		110		环温 Ambient temperature		
	乙炔 C ₂ H ₂		环温 Ambient temperature		环温		110		环温 Ambient temperature		环温 Ambient temperature		60
	丙烷 CH ₃ CH ₂ CH ₃		40		66				110		50		60
	氯气 Cl ₂	干或湿 dry or wet	100	干或湿 dry or wet	90			干或湿 dry or wet	80			干或湿 dry or wet	60
	氯化氢气 HCl	干 dry	100	干 dry	66		110		150		100	干或湿 dry or wet	60
	氟化氢气 HF		60		100		110				环温	干 dry	环温 Ambient temperature
	硫化氢气 H ₂ S	干或湿 dry or wet	100	干或湿 dry or wet	100		110		150		65	干或湿 dry or wet	65



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www.yatai.cc



地址：德州市大学东路1186号
电话：(0534) 2551888 传真：(0534) 2551887
电子信箱：yatai@yatai.cc
Add: No.1186 East of University Road, Dezhou City
Tel: (0534) 2551888 Fax: (0534) 2551887
Http://www.yatai.cc E-mail:yatai@yatai.cc

亚太集团各办事处联系方式：How to contact the branches of Yatai Group:

北京办事处 电话：(010)51908328 传真：(010)51908329 Beijing Office Tel:(010)50918328 Fax:(010)50918329	天津办事处 电话：(022)28350313 传真：(022)28350323 Tianjin Office Tel:(022)28350313 Fax:(022)28350323	山西办事处 电话：(0351)3377255 传真：(0351)3377256 Shanxi Office Tel:(0351)3377255 Fax:(0351)3377256	陕西办事处 电话：(029)87998107 传真：(029)87998105 Shanxi Office Tel:(029)87998107 Fax:(029)87998105	内蒙古办事处 电话：(0471)6914102 传真：(0471)6914103 Neimenggu Office Tel:(0471)6914102 Fax:(0471)6914103	河南办事处 电话：(0371)66205099 传真：(0371)66205228 Henan office Tel:(0371)66205099 Fax:(0371)66205228	辽宁办事处 电话：(024)31963712 传真：(024)31963711 Liaoning Office Tel:(024)31963712 Fax:(024)31963711
青岛办事处 电话：(0532)55669351 传真：(0532)55669350 Qingdao Office Tel:(0532)55669351 Fax:(0532)55669350	安徽办事处 电话：(0551)64274878 传真：(0551)64274868 Anhui Office Tel:(0551)64274878 Fax:(0551)64274868	四川办事处 电话：(028)83317691 传真：(028)83317692 Sichuan Office Tel:(028)83317691 Fax:(028)83317692	甘肃办事处 电话：(0931)8426317 传真：(0931)8426357 Gansu Office Tel:(0931)8426317 Fax:(0931)8426357	吉林办事处 电话：(0431)81232178 传真：(0431)81232178 Jilin Office Tel:(0431)81232178 Fax:(0431)81232178	徐州办事处 电话：(0516)83061415 传真：(0516)83061462 Xuzhou office Tel:(0516)83061415 Fax:(0516)83061462	黑龙江办事处 电话：(0451)51757348 传真：(0451)51754348 Heilongjiang office Tel:(0451)51757348 Fax:(0451)51754348
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