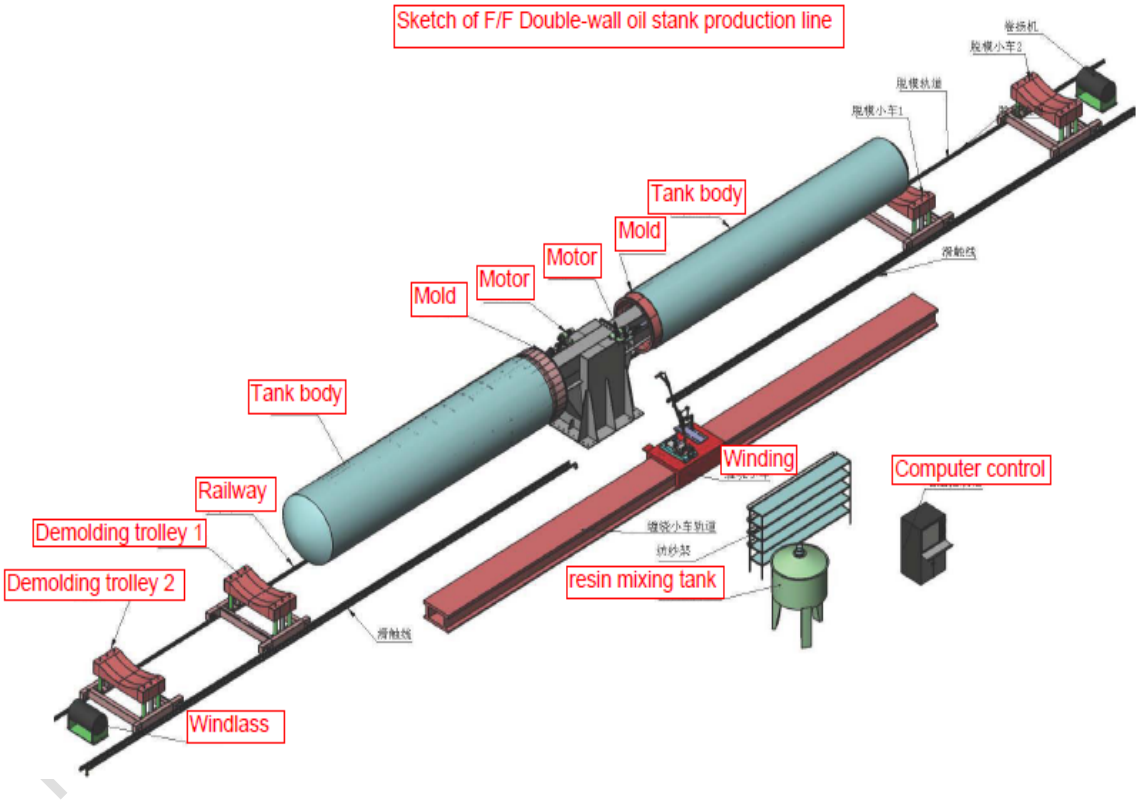
衡水九博复合材料有限公司
HENGSHUI JIUBO COMPOSITES CO., LTD.

Introduction of filament winding machine

FRPM pipe filament winding machine



Hengshui Jiubo Composites Co., Ltd.

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A. QFW-4000VI RPM Pipe Production Line

Introduction

The QFW-4000VI RPM Pipe (Reinforced Plastics Mortar Pipe) Production Line has six parts, such as inner layer manufacturing machine, computer control adding mortar-winding machine, curing station, repairing machine, mould unloading machine and resin mix station. Its controlling center has been adopted the Taiwan's advanced STD industrial control computer. If the parameter of the wound products being inputted the computer, the design of the linearity for winding of the product will be finished automatically, then controlling the combined movements between the mound rolling speed and the running of the carriage. The pipes produced by the adding mortar-winding machine can decrease the cost and improve the stiffness through adding the mortar without bad influences upon the leak-proof layer and the structure layer.

The RPM pipe's cost has decreased 40% than the common FRP pipe; the stiffness has been improved greatly. It has many advantages, such as lightweight, anti-corrosion, lower roughness and proper price. It can be widely used in water supply and drainage, agricultural irrigation, petrochemical industry, ocean development, sewage treatment, etc. The production line annual capacity is 5000t, and reasonable structures, latest design, operate easily, high-grade automation are its characteristics. It got the good valuation from the clients.

2. ***The main parameters***

2.1 The total power: 193.6kw

2.2 The maximum diameter can be manufactured: DN4000mm

2.3 The effective length of the pipe: 12000mm

2.4 The productivity: 1000kg/h

2.5 The baking board's temperature of curing station: 105~160 ℃

2.6 The maxi speed of conveying roving: 90m/min

2.7 The maxi width of roving sheet: 200mm

2.8 The maxi speed of sand conveyance: 100kg/min

2.9 The maxi mould-unloading force: 83t

2.10 The rated drawing force of the capstan: 5t

2.11 The rated lifting force of the supporting pipe trolley: 40t

2.12 The rated pressure of the hydraulic system: 16Mpa

2.13 The central height of mould-unloading machine: 2000mm

2.14 The central height of the other single machine: 1500mm

Note: If the indoor temperature is above 15℃ in winter, the baking board can be power-off, then the total power is 97.6kw.

3. ***The major characteristics of the equipment***

3.1 The single machine of whole set will be positioned according to the ways of manufacturing RPM pipe.

3.2 The computer controlling adding mortar-winding machine is one unit with the highest technical content of the whole set, its features are below.

3.2.1The key electric elements such as the transducer, servo system and photoelectric encoder are made in Siemens, Germany; the industrial control computer is made in Yanhua Corporation, Taiwan. The menu is displayed in Chinese (English), the interface between the person and the machine is reasonable, it is convenient to operate and the working condition can be adjusted on the panel board freely.

3.2.2 It has been adopted the latest version winding software developed by ourselves. And the roving arrangement is regular, enclosure is complete, the position of the trolley is accurate. The wound result should be regular rhombuses checked by one piece of roving. The parameter such as the width of roving sheet, the winding length and the winding diameter are all not limited in the software.

3.2.3 The functions of the controlling system include hand control, semi automatic, automatic, emergency brake, limit switch protection and stepless speed regulation. It should not affect the linearity when the function of stepless speed regulation has been started.

3.2.4 The winding resin and adding mortar supplementary resin are conveyed into the mixer by the standard volume pump, after the curing agent passed the flow meter, atomized by the pressure air, and then mixed with the resin in the mixer. Be flowed out together from the mixer, and then be sprayed into the winding resin tank and the sprayer of adding mortar supplementary resin separately. This type of standard volume pump has some advantages, such as big adjustment range of volume of flow, to operate easily and lower stoppage compared with the other type of mixer.

3.2.5 The motor for conveying sand is a frequency-modulated timing device. It can be adjusted the volume of adding mortar freely to meet the requirements of process.

3.2.6 The distance between the conveying sand framework and the mould can be adjusted freely. There are four guiding wheels that located around the trolley, enable to avoid the waggling of the trolley body during the running, and to ensure distributing mortar steadily.

3.2.7 It is matched with four sets of tie rod extrusion press device. When the winding with adding mortar is finished, the scientific extrusion will be done to the pipe, its efficiency is the density, the stiffness lightness are increased and the cost is declined.

3.2.8 It is adopted the double sand adding cloth device, the sand can be added in two layers to avoid the phenomena of bad immersion of resin as the reason of too thick sand layer one time. It has the following advantages such as large sand adding volume one time, sand adding fast and the adjustable sand adding volume and can meet the requirement of different processes.

Else, one set of industrial computer can match two sets of servo motor enable roving trolley and winding trolley move synchronously, then ensure the constant tense force during the winding

3.3 The running power devices of the inner layer making machine and the winding machine are positioned at one end of the bed body. The motor drives the planetary balance wheel reducer, and drags the trolley to run forward through the chains. The adjusting device of the chain loose or fast has been set at the tail end of the bed body. Or the running power devices are positioned at one side of the trolley, the motor drive the reducer and drag the trolley to run by rack and gear wheel transmission system.

3.4 The trolley of the inner layer making machine matches the hydraulic lifting platform to meet the different diameter of the pipes.

3.5 The resin supply system of the inner layer making machine is same to it of winding machine. The film clamper and the woven fabrics clamper are set on the trolley, and their tensile can be adjusted, they can make the film and the woven fabrics be wound on the mould steadily.

3.6 The curing station is adopted energy saving type infrared ray baking boards, they are positioned in the longitudinal direction parallel with the mould. They can make the pipe heated steadily during the curing. If the indoor temperature is above 15℃ in winter, the baking board can be power-off to save energy and can decline the cost. The baking board can be divided into two groups, it can use only one group when wind the short pipe.

3.7 Except the mould-unloading machine, the other single units are all set machine stock heads and machine tails, used to support and drive the mould.

3.8The repairing machine is set water-spraying device, it can decrease the pollution of the dust in the air, to prolong the life of the grinder.

3.9The resistance center between the pipe and the mould is coincident with the forcing center of the mould-unloading hydraulic container in the mould-unloading machine, and they are fixed. Both of the mould supporting trolley and the pipe supporting trolley are adopted forklift structure for supporting the moulds with different diameter.

During mould-unloading, the mould-unloading force is great at the beginning, the force supplied by hydraulic container; when the mould drawn from the pipe at some distance, the mould-unloading force becoming small, at this moment, the capstan engine has been put on to improve the mould-unloading speed.

3.10 Way of sand-adding: upper sand-adding and below sand-adding.

B．*FW-4000Ⅲ computer control filament winding machine*

The key elements such as the transducer, servo system and photoelectrical encoder are from Siemens, Germany; the industrial control computer is made by Yanhua Corporation, Taiwan, showing the Chinese ideograph chrominance, operating easily; after the parameters inputted into the computer, it can be finished the relative design of winding linearity automatically. The combined movements of the main axle and the carriage controlled by the computer, conforms the winding rules, the technical parameters and its inner quality have arrived the advanced level in China, and the properties are below:

1. The range of diameter can be wound: DN600~ DN4000mm
2. The maxi length: 12000mm
3. The winding angle: 45°<α<90°
4. The total power: 10kw
5. The tolerance of positioning: ＜1mm
6. The maxi width of roving sheet: 150mm
7. The productivity: 500kg/h

C. *Large-scale site winding machine*

Be restricted by the transportability, the tank which its diameter is more than DN4000mm has been become the difficult point between the ordering party and the contracting party. To meet the requirements of the order party, our company developed this set of large scale site winding, this set is combined structure, can be assembling or dismountable, the set can be transported to the client site .The set is to be assembled beside the foundation of the large tank according to the requirements of the client. Then the large tank can be finished.

I. FW-15000 Computer Control Horizontal Site Winding Machine

The major properties of the equipment are below.

2.1The maxi diameter can be wound: 15000mm

2.2The maxi length can be wound: 12000mm

2.3The range of diameter: DN4000~DN15000mm

2.4The maxi torque: 68350N·m

2.5The total power: 18.6kw

2.6The maxi width of roving sheet: 1680mm

2.7The productivity: 550kg/h

Ⅱ. VFW-25000 Computer Control Vertical Site Winding Machine

1. General

VFW-25000 computer control vertical site winding machine is the most advanced winding machine (hereinafter called Winding Machine) with super large diameter developed by our company, absorbing the foreign advanced technique. It is controlled by computer, specially used for site winding of large caliber FRP tanks. This machine can produce FRP tanks with the diameter from 4m to25m with the suitable mandrel. The control center of this machine is industrial computer made in Taiwan. Once input the parameters of winding product, the computer can finish the design of linearity of the tank automatically, and then control the compound movement of mandrel rotation and the shift of trolley, put the fiberglass immersed by resin on the inner liner fully in order. This winding machine is the combination of technique and science, such as mandrel rotation, shift of the trolley, and layout of winding roving are all precisely controlled by computer software. The FRP products wound by this machine are widely used in chemical industry, petroleum, and brewery and so on.

2. Parameters of the Winding Machine

Winding diameter scope: 4m-25m

Max height for each section: 6m (Note: if it is more than 6m, it can be formed by many sections)

Winding angle: 60°-90°

Max rotating speed of the mandrel: 4.6rpm

Woven roving strands: 70*

Productivity: 500Kg/h*

*Note：The productivity and the quantity of strand is based upon the quality of roving

3. Components of the Winding Machine

3.1 Rotating platform and vertical post driven by hydraulic system。

3.2 Hydraulic pump station

3.3 Computer control system and power distribution box

3.4 Resin supply system

3.5 Roving framework and tension controller

3.6 Resin immersing system

3.7 Winding trolley

3.8 Trolley transmission system

3.9 Trolley lift guide track framework

3.10 Mandrel support ring (one specification will be provided upon the requirement of the client)

3.11 Resin pump and spraying gun

3.12 Compressed air supply system (1.4m3, 7 bars)

3.13 Lift platform (lift capacity is 300kg and lift height is 6 meters)

4. Key elements

4.1 Industrial computer: made in Taiwan, China

4.2 Servo motor and driver of the trolley: Siemens

4.3 Photoelectrical encoder: Siemens

4.4 Planet cycloid reducer: from Jiangsu Hongtai Group, China

4.5 Electrical elements from CHNT, People Electricity and Delixi Group

5. Excellent post-sale service

One stop service for installation, adjustment and training.

We also provide the drawing of molds.

D. FW-300 twin shaft computer control cable casing production line

1. Introduction

FW-300 twin shaft computer control cable casing production line is composed of winding machine, curing machine, repairing and unmolding machine. The control center is the advanced industrial computer made in Taiwan by computer, once the parameter of the winding products being inputted, the linearity design of product can be finished automatically, then controls the combined movements between the rolling speed of mound and the running of the carriage. Put the roving immersed by resin bestrewn on the liner. It has the advantages of lightweight, corrosion resistant, low roughness coefficient and low total project cost. It can be used in cable casing, petrochemical and other field. The reasonable structure, fashionable design, convenient operation, high automation, reasonable man-machine interface are appreciated by the clients,

2. Main parameter

2.1 Total capacity: 70kw

2.2 Range of the diameter can be produced：50-300mm

2.3 The length of pipe: 6000mm

2.4 Winding angle：45°~90°

2.5 Precision of roving arrangement：±0.5mm

2.6 Rated unmolding force：40T

2.7 Drawing force of capstan：3T

2.8 Rated working pressure of hydraulic system：16MPa

2.9 The height of the center of the unmolding machine：800mm

3. Main characteristics of the equipment

3.1 The single machine for FW-300 twin shaft computer control cable casing production line will be positioned according to the arrangement way of FRP pipe production line, include winding machine, curing station, repairing machine, mould unloading machine.

3.2 The winding machine is the heart of the whole set; its property and quality will determine the profit obtained by investor. Its main characteristics are:

A, The menu is displayed in Chinese, the interface between the person and the machine is reasonable, it is convenient to operate, and the working condition can be adjusted through the button on the operation board freely.

B, It is adopted latest version winding software developed by ourselves, the roving arrangement

is regular, enclosure is complete, the position of trolley is accurate, the wound result should be regular rhombuses checked by one piece of roving,. The parameter such as the width of roving sheet, the winding length and the winding diameter are all not limited in the software.

C, The functions of the control system include hand control, semi-automatic, automatic, emergency brake, limit switch protection and stepless speed regulation. It should not affect the linearity when the function of stepless speed regulation has been started.

D, There are four guide wheels that located around the trolley, enable to avoid the waggling of trolley body during the running, and to ensure the running of trolley is uniformly and steadily.

3.3 The running power of the winding machine is positioned on one side of the machine body. The motor drives reducer, and drags the trolley to run forward through the chains. The adjusting structure of the chain loose or fast has been set at the tail end of the bed body.

3.4 The multi-shaft curing machine is adopted energy saving type infrared ray baking board, they are positioned in the longitudinal direction parallel with the mould. They can make the pipe heated steadily during curing, if the indoor temperature is above 20℃ in winter, the baking board can be power-off to save energy and can decline cost, the baking board can be divided into two groups, it can use only one group when wind the short pipe.

3.5The repairing machine is set water-spraying device, it can decrease the pollution of the dust in the air, to prolong the life of the grinder.

3.6 The resistance center between the pipe and the mould is coincident with the forcing center of the mould-unloading hydraulic container in the mould-unloading machine, and they are fixed. The mould supporting trolley and the pipe supporting trolley is adopted forklift structure, so it is convenient to make the axis of mould coincide with the center of mould-unloading machine. The large range of supporting (within the range of supporting) is applicable for the moulds with different diameters.

During mould-unloading, the mould-unloading force is great at the beginning, the force supplied by hydraulic container; when the mould drawn from the pipe at some distance, the mould-unloading force becoming small, at this moment, the capstan engine has been put on to improve the mould-unloading speed

4. *The components of* FW-300 twin shaft computer control cable casing *Pipe Production*

Line

4.1 Computer control winding machine, its quantity is one set

Its components are as follows:

4.1.1 Bed body (its length is 18m)	one set
4.1.2 Transmission head	one set
4.1.3 Transit head	one set
4.1.4 Tail	one set
4.1.5 Winding trolley and transmission system	two sets
4.1.6 Comb-shaped resin-soaking trough with controlling device	two sets
4.1.7 Roving framework with tension control system	two sets
4.1.8 Computer and main controlling box	one set
4.1.9 AC frequency conversion timing system (include servo motor)	one set
4.1.10 Sand-adding head	two sets

4.2 Curing station (for curing 8 pieces products), its quantity is one set

Its components are as follows:

4.2.1 Transmission system	one set
4.2.2 The front and rear supports system	one set
4.2.3 Infrared ray heating device（48KW）	one set

4.3 Repairing machine, its quantity is one set

Its components are as follows:

4.3.1 Transmission head	one set
4.3.2 Tail	one set
4.3.3 Grinding head	one set
4.3.4 Electric controlling box	one set
4.3.5 Water-spraying dust remover	one set

4.4 mould unloading machine, its quantity is one set

Its components are as follows:

4.4.1 Gantry	one piece
4.4.2 Traction machine	one piece
4.4.3 Electric controlling box	one piece
4.4.5 Support frame	four pieces

5. Attachments of main machine

5.1 The electric motor for main shaft is general electric motor that made in China,

5.2 Winding trolley: servo motor, encoder and servo driver are original product from Siemens.

5.2 The computer is made in Taiwan, software is developed by our Company, reducer is made in domestic canonical factory, all the electric elements are excellent products made in china.

E. MC-2500 FRP Mandrels Processing Lathe

1. Briefing

Fixed length filament wound FRP pipe is one kind of excellent product, but normally we can't get the best productivity as the reason of shifting of production procedure, so in order to improve the efficiency, the most effective way is increase the quantity of mandrels. For the large diameter of pipe, the manufacturing of the steel mandrel is very difficult and expensive, so it can adopt the steel structure as the framework and processed FRP structure as the surface; this combined structure has the characteristics such as simple production and lost cost. MC-2500 FRP Mandrels Processing Lathe is the special equipment for it.

2. Main technical parameter

2.1 Capacity: 11.42KW

2.2 Range of diameter can be processed: DN250-DN2500mm

2.3 Length can be processed: 12500mm

2.4 Grinding speed: 45.2m/s

2.5 Longitudinal grinder feeding speed: 5.5mm/min—20mm/min

2.6 Rotatory speed: 0.75r/min—77.28r/min

3. Elements

It is composed of headstock, tailstock, bed body, large sliding plate, medium sliding plate, grinding system, electrical control system and water cooling system.

F. SY-2500Ⅲ FRP pipe hydrostatic pressure testing machine

1. Briefing

SY-2500Ⅲ FRP pipe hydrostatic pressure testing machine is one kind of special device for inspecting the leakage of FRP pipe. The characteristics are: reasonable structure, convenient operation, high efficiency and wide range of suitable diameter.

2. Main technical parameters

2.1 Capacity: 27.1 KW

2.2 Range of suitable diameter: DN250-DN2500mm

2.3 Rated pressure of hydraulic pumping station: 16MPa

2.4 Rated discharging pressure of electric pump: 3.5MPa

2.5 Flux of electric pump:560L/h(High pressure); 1120L/h（Low pressure）

2.6 Centrifugal pump of clean water: Flux Q=120m^3/H, lift: H=28m

3. Elements:

It is composed of water supply system, hydraulic system, upper longitudinal beam, bottom longitudinal beam, wall plate, spigot-and-socket active plate, assembly of support rod, support tray, fork bracket, spigot-and-socket envelop cover and electric control box.

G. Inner liner automatic forming machine

The following sets are the attached equipment of FW—4000Ⅲ; The client can manufacture itself according to the free drawings.

The inner liner automatic forming set is served for FW-4000 or FW-2600. It is special equipment that making the inner liner of the tank. If this set utilized for producing the inner liner; it can improve the efficiency above 5 times. The types are ZC-4000 and ZC-2600, the main properties are below.

1. ZC-4000

1.1 The matched diameter: DN3000~DN4000mm

1.2 The power: 5.5kw

1.3 The productivity: 400kg/h

2. ZC-2600

2.1 The matched diameter: DN1600~DN2600mm

2.2 The power: 4.0kw

2.3 The productivity: 400kg/h

H. The complete set of moulds

1 Tank steel moulds: DN600~DN4000mm

2 Pipe steel moulds: DN25~DN2500mm

3 Flange steel moulds: DN25~DN1000mm

4 Elbow steel moulds: DN25~DN300mm.

J. Whole set of spraying machine for S/F double-wall oil fuel storage tank

1. Technical parameters:

1.1 Diameter range: DN1000-3000*12000mm

1.2 Accuracy of roving arrangement: ±0.5mm

1.3 Winding angle: ≥45°≤90°

1.4 Speed of roving transfer: ≤100m/min

1.5 Quantity of winding roving: 1-60

1.6 Power of main shaft:15KW

1.7 Power of trolley: 3KW

1.8 Servo motor for rotation: 0.75 KW

1.9 Servo motor for extension: 1.1KW

1.10 Power of resin transfer: 2*3KW=6KW

1.11 Driven type: chain

1.12 Overall dimension (L*W*H): 15000*9000*3500

2. List of equipment components

No.	Name	Items	Q'ty	Remarks
1	Driven head	Speed reducer	2 sets	
		Motor	2 sets	
		Support	2 sets	
		Connector	2 pcs	
		Support roller & Clutch	2 sets	
		Movable wheel	8 pcs	
		Connection locking device	2 sets	
		Movable support	1 set	
2	Tail support	Connector	1 piece	
		Tail frame	1 piece	
		Support roller & Clutch	1 set	
		Movable wheel& fixed support	1 set	
3	Railway system for trolley	railway	3 pcs	Two is 6m, one is 3m
		Speed reducer	1 set	
		Gear	2 pcs	45# steel
		Gear chain	15m	45# steel
4	Trolley	Speed reducer & servo motor	1 set	
5	Driven rotation	Speed reducer & servo motor	1set	

6	Resin immersing device		1set	
7	Guide device of roving		1set	
8	Roving frame	Tensional	1set	
9	Railway	Movable railway	15 m	
10	Movable cable support		5 pcs	
11	Spraying gun		1set	
12	Resin supply	Resin pump		
		Pipes & valve		
13	Computer control system	Cabinet	1 set	
		Industrial computer	1 set	
		LED display	1 set	
		Omron coder	1 piece	
14	Spares	button	1set	
		Wheel for trolley	1set