

玻璃钢管道·贮罐成套生产设备

微機控制纏繞設備

Whole Set of
computer control winding equipment
for FRP pipe and vessel



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公司简介

COMPANY PROFILE



河北奥联德化工设备有限公司是一家专业生产销售成套化工设备，成套玻璃钢产品生产线，同时生产复合材料 SMC产品的公司，通过了ISO9001、ISO14001、ISO45001管理体系认证SGS认证等产品已销往世界各地，美国、加拿大，澳大利亚 巴西、日本、德国、俄罗斯，印度、马来西亚、印度尼西亚、埃及等国家，赢得广大新老客户的支持和信任好评。

- EPC化工设备系列：曼海姆法硫酸钾成套生产设备 硫酸钠生产设备 成套硫酸设备成套氯化钙生产设备。

- EPC成套玻璃钢产品生产线系列：微机控制成套玻璃钢管道，储罐缠绕生产线 成套玻璃钢格栅生产线 成套玻璃钢拉挤型材生产线 SF/FF油罐生产线。

- 玻璃钢产品系列：玻璃钢高、中、低压管道；玻璃钢储罐；玻璃钢塔；整体浇注超级电解槽；SF、FF双层油罐；玻璃钢冷却塔；玻璃钢模压SMC/BMC、拉挤系列产品及其他定制玻璃钢产品玻璃钢防腐等。

河北奥联德化工设备有限公司根据产品类别设立了曼海姆法硫酸钾化工设备设计 制造 安装，多种复合材料产品生产线设计 制造 安装 多种复合材料产品制造三个分公司，通过在专业和技术上的研发和升级并获得了多项专利。公司凭借先进的技术、精湛的工艺、可靠的质量和完善服务，不但有产品的供货能力，还具有有限元分析（材料、结构、产品的设计）项目总承包能力，我公司可为客户提供技术咨询、供货、运输、安装指导等一体服务。

- 主要应用领域：

硫酸钾、电力、水利、冶金、化工、制药、氯碱、海水淡化、印染、造纸、钛白、污水处理、固废焚烧处理、食品酿造、石油贮存、建筑、市政工程、公路设施、军工等领域。



Hebei Aoliande Chemical Equipment Co., Ltd. is a professional company that produces and sells complete sets of chemical equipment, complete sets of fiberglass product production lines, and composite material SMC products. The company has passed ISO9001, ISO14001, ISO45001 management system certification, SGS certification, and other products, which have been sold to countries around the world such as the United States, Canada, Australia, Brazil, Japan, Germany, Russia, India, Malaysia, Indonesia, Egypt, etc. Winning the support and trust of both new and old customers.



- EPC chemical equipment series: Mannheim process potassium sulfate production equipment, sodium sulfate production equipment, complete sulfuric acid equipment, complete calcium chloride production equipment.

- EPC complete set of fiberglass product production line series: microcomputer controlled complete set of fiberglass pipes, tank winding production line complete set of fiberglass grating production line complete set of fiberglass extruded profiles production line SF/FF oil tank production line.

- Fiberglass product series: Fiberglass high, medium, and low pressure pipelines; Fiberglass storage tanks; Fiberglass towers; Integrated casting super electrolytic cell; SF and FF double-layer oil tanks; Fiberglass cooling tower; Fiberglass molded SMC/BMC, extrusion series products, and other customized fiberglass products, including fiberglass anti-corrosion.

Hebei Aoliande Chemical Equipment Co., Ltd. has established three branches based on product categories: Mannheim process potassium sulfate chemical equipment design, manufacturing and installation, and various composite material product production lines design, manufacturing and installation. Through professional and technical research and development, upgrading, and obtaining multiple patents. With advanced technology, exquisite craftsmanship, reliable quality, and comprehensive services, our company not only has the ability to supply products, but also has the ability to perform finite element analysis (material, structure, product design) project general contracting. Our company can provide customers with integrated services such as technical consultation, supply, transportation, and installation guidance.

Main application areas:

Potassium sulfate, electricity, water conservancy, metallurgy, chemical industry, pharmaceuticals, chlor alkali, seawater desalination, printing and dyeing, papermaking, titanium dioxide, sewage treatment, solid waste incineration treatment, food brewing, petroleum storage, construction, municipal engineering, highway facilities, military industry and other fields.



T 技术检测

ECHNICAL TESTING

检测中心拥有专职的质量负责人员，并按照CNAS认可以及CMA认证的要求建立了一套完整可靠的质量控制体系，保证了测试过程的专业性和公正性。

检测中心与国家标准局以及复合材料行业的权威测试机构保持密切联系；能及时掌握复合材料的技术发展动态、检测技术发展动态、国内外测试标准以及产品标准等信息；保证测试技术、方法的及时有效性、可靠性和先进性。

检测中心拥有多名复合材料、机械设计、结构分析、高分子、非金属材料等等各专业的专业人才，具备了复合材料产品设计和开发能力，可以为客户提供专业的复合材料产品、结构、工艺等的设计开发工作。为客户提供满意的服务。

Testing center has a professional team for testing and quality control. We build a thorough quality control system to make sure that our testing process is accurate and just according to CNAS and CMA requirement.

We keep a closely connection with National Bureau of Standards and authoritative testing institutions of Composite field. We can get the newest informations about testing standard and development direction, and know technology trends of composite material to keep our result reliable. We would improve our testing technology and method timely to make sure it is the latest, reliable, advanced.

Our members are engaged in composite, Polymer, mechanical design, structural analysis, and non-metallic material research. We have a composite material Research and development ability. We can supply client with professional structural design, technology design and composite production. Client is the first. We will provide the most satisfactory service to our client.



精锐的设计团队 An elite design team



長期性能實驗室
Long-term performance Lab



物理性能實驗室
Physics Lab



缠绕成套设备 Whole Set Equipment for Filament Winding

一、QFW—2500VI微机控制纤维缠绕夹砂管道生产线

1. 概述

QFW-2500VI 微机控制纤维缠绕夹砂管道生产线，由制衬机、微机控制加砂缠绕机、固化站、修整机、脱模机和树脂搅拌站六个部分组成。微机控制加砂缠绕机的控制中心采用中国台湾产的先进工控机，只需把所缠绕产品的参数输入进去，微机即可自动完成产品缠绕线型的设计，然后控制模具转速与小车行走的复合运动。加砂缠绕是在不影响普通玻璃钢管道防渗层和缠绕加强层的情况下，通过施加石英砂和树脂，起到既降低成本又增加刚度的作用。生产出来的产品与普通玻璃钢管道相比，成本可降低 40%，刚度大幅度提高，具有重量轻、耐腐蚀、内阻系数小、综合工程造价低等优点，可广泛用于城市供排水、农业灌溉、石油化工、海洋开发、污水处理等领域，整条生产线年产管道可达 5000t。该生产线具有结构合理、设计新颖、操作方便、自动化程度高等特点，深受广大用户的好评。

2. 主要规格参数

2.1 装机容量：193.6kW	2.2 生产管道最大直径：Φ2500mm
2.3 生产管道有效长度：12000mm	2.4 生产能力：1000kg/h
2.5 固化站加热装置温度：105℃—160℃	2.6 最大出砂速度：90m/min
2.7 纱片最大宽度：200mm	2.8 输砂速度：100 kg/min
2.9 额定脱模力：83t	2.10 卷扬机额定拉力：5t
2.11 托管车额定托重：40t	2.12 液压泵站额定工作压力：16MPa
2.13 脱模机中心高：2000mm	2.14 其它单机中心高：1500mm

注：如冬季厂房内工作温度 $\geq 15^{\circ}\text{C}$ ，4台固化站可不配置红外线加热装置，则装机容量为 97.6kW。

3. 设备的主要特点

3.1 QFW—2500VI 微机控制纤维缠绕夹砂管道生产线成套设备的各单机，按流水线生产夹砂管道的方式进行布置。

3.2 微机控制加砂缠绕机是整条生产线技术含量最高的设备，其特点是：

关键元器件变频器、伺服系统、光电编码器均由德国西门子公司生产，工控机由中国台湾研华公司生产，菜单中（英）文显示，人机界面合理，操作简单，通过操作面板按钮可随意调整工作状态。

采用了公司技术人员数年精心研制开发并经多次改进的缠绕软件，布纱均匀，封闭完整，小车定位准确，用单纱检查时为整齐的菱形，纱片宽度、缠绕长度、缠绕直径等参数软件均不做限制。

控制系统有手动、半自动、自动、紧急停车、限位保护、无级调速等功能，无级调速时不影响线型。缠绕树脂和加砂补充树脂，采用标准容积泵打入混合器内。固化剂通过流量计经压缩空气雾化与树脂在混合器内混合，然后一起喷出混合器，分别进入缠绕树脂槽和加砂补充树脂淋头，与其他树脂泵相比，流量调节范围大，可操作性强，故障率低。

输砂电机采用变频调速，可根据产品设计，任意调整加砂量，满足工艺要求。

输砂架与模具的距离可任意调整，以满足不同直径管道的加砂。导向轮设置 4 个，分别置于小车的前后左右，避免小车在行走过程中车身的左右摇摆，使布砂均匀。

设有 4 根连杆机构挤压装置，根据不同直径的管道可以升起和降落挤压辊，从而对管道的外壁进行科学的滚压，通过滚压取得的效果是增大密实度，提高刚度，增加管道表面的光洁度，降低成本。

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该机加砂车配备了双兜砂布装置，分层加砂，避免了在一次加砂过程中砂层太厚树脂浸不透的现象，具有一次加砂量大、加砂速度快、加砂量可以任意调节等优点，可满足不同的工艺要求。

另外可采用一个工控机控制两台伺服电机，使纱车和缠绕车的运动同步，从而达到了在每一个缠绕层中缠绕纱的恒张力。

3.3 制衬机、缠绕机小车行走的动力置于床身的一端，电机带动减速机，通过链条传动拖动小车行走，在床身的尾部设有链条松紧调整装置。也可制造成小车行走动力置于小车一侧，电机带动减速机，通过齿轮、齿条传动拖动小车行走。

3.4 制衬机小车上装有液压升降平台，站在上面能很方便的制作不同直径管道的内衬。

3.5 制衬机树脂供给系统与缠绕机的相同。在小车上装有张力可调的薄膜夹持器和网格布夹持器，使之均匀的缠绕在模具上。

3.6 固化站采用节能型远红外线加热装置，沿模具的轴向布置，使管道在固化过程中受热均匀，如冬季厂房内达到 15°C 以上时也可关掉加热装置，以节约能源，降低成本。固化架加热装置分两路控制，在缠绕短管时只开一路即可。

3.7 除脱模机外，其它单机均设有机头、机尾，用以对模具的支承和驱动。

3.8 修整机设有水喷淋头装置，可以降低粉尘在空气中的污染，并延长磨头的使用寿命。

3.9 在脱模机中，管道和模具的阻力中心与脱模液压缸的施力中心是重合且固定不变的，托模车与托管车采用叉架升降结构，以便模具轴心与脱模机中心重合，以适应支撑不同管径的模具。在脱模过程中，开始时脱模力较大，由液压缸提供，模具从管道中抽出一定距离后，所需的脱模力变小，这时，卷扬机投入工作，用以提高脱模速度。

3.10 加砂方式：上加砂或下加砂。

4. QFW—2500VI 微机控制夹砂管道生产线的组成部分

4.1 制衬机 数量 1 台

由以下部分组成：

主轴传动系统
小车及行走传动系统
床身（18 米）
电气控制系统
支承模具的前后支座
树脂供给、淋胶系统
液压升降平台
薄膜、网格布夹持器
液压泵站

4.2 微机控制夹砂缠绕机 数量 1 台

由以下部分组成：

主轴传动系统
缠绕小车及传动系统
床身（19 米）
加砂小车及传动系统
提砂及输砂系统



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挤压机构
 支承模具的前后支座
 微机控制系统
 加砂动力配电系统
 缠绕树脂、加砂补充树脂供给系统
 纱架
 滑线装置
 4.3 固化站 数量 4 台
 每台由以下部分组成：
 主轴传动系统
 支承模具的前后支座
 电气控制系统
 固化架及远红外线加热装置
 4.4 修整机 数量 1 台
 由以下部分组成：
 主轴传动系统
 支承模具的前后支座
 承口齐边机构
 插口修整机构
 电气控制系统
 除尘系统
 4.5 脱模机
 龙门架
 脱模车
 托管车
 托模车
 快速拉模系统
 脱模液压系统
 电气控制系统
 道轨
 滑线装置
 拉线支架
 4.6、树脂搅拌站
 地槽
 树脂搅拌槽
 树脂输送系统
 电气控制系统



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A. Briefing of QFW-2500VI RPM Pipe Production Line

1. Introduction

The QFW-2500VI 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 mould 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: DN2500mm
- 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 °C
- 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°C in winter, the baking board can be power-off, then the total power is 97.6kw.

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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.

3.2.1 The 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 wagging of the trolley body during the running, and to ensure distributing mortar steadily.



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3.2.7 The extrusion prelt is matched with four sets of tie rrs 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°C 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.

3.8 The 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.

3.9 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. 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.

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4. The components of QFW-2500VI RPM Pipe Production Line

- 4.1. Inner liner manufacturing machine, its quantity is one set
 - 4.1.1 Main shaft transmission system
 - 4.1.2 Transmission system of trolley and running
 - 4.1.3 Bed body (its length is 18 meters)
 - 4.1.4 Electric controlling system
 - 4.1.5 The front and rear support frames for supporting the mould
 - 4.1.6 Resin supply and showering system
 - 4.1.7 The hydraulic lifting platform
 - 4.1.8 Film and cellular fabrics clamber
 - 4.1.9 Hydraulic pumping station
- 4.2. Computer control adding mortar-winding machine, its quantity is one set
 - 4.2.1 Main shaft transmission system
 - 4.2.2 Winding trolley and transmission system
 - 4.2.3 Bed body (its length is 19 meters)
 - 4.2.4 Adding mortar trolley and transmission system
 - 4.2.5 Lifting and supply mortar system
 - 4.2.6 Extrusion press
 - 4.2.7 The front and rear support frames for supporting the mould
 - 4.2.8 Computer controlling system
 - 4.2.9 Power distribution box
 - 4.2.10 The resin supply system for winding and for supplement in adding mortar
 - 4.2.11 Roving guide framework
 - 4.2.12 Sliding device
- 4.3 Curing stations, its quantity is four sets
 - 4.3.1 Main shaft transmission system
 - 4.3.2 The front and rear support frames for supporting the mould
 - 4.3.3 Electric apparatus controlling system
 - 4.3.4 Curing framework and infrared ray baking boards
- 4.4 Repairing machine, its quantity is one set
 - 4.4.1 Main shaft transmission system
 - 4.4.2 The front and rear support frames for supporting the mould
 - 4.4.3 Socket end uniform device

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- 4.4.4 Spigot end repairing device
- 4.4.5 Electric apparatus controlling system
- 4.4.6 Dust removing system
- 4.5 Mould unloading machine, its quantity is one set
 - 4.5.1 Gantry
 - 4.5.2 Unloading mould trolley
 - 4.5.3 Supporting pipe trolley
 - 4.5.4 Supporting mould trolley
 - 4.5.5 High speed dragging mould system
 - 4.5.6 Unloading mould hydraulic system
 - 4.5.7 Power Controlling box
 - 4.5.8 Guide track
 - 4.5.9 Sliding device
 - 4.5.10 Pulling cable bracket
- 4.6 Resin mix station, its quantity is one set
 - 4.6.1 Underground storage tank
 - 4.6.2 Mix tank
 - 4.6.3 Resin conveying system
 - 4.6.4 Electric contribution box

二、FW-4000Ⅲ微机控制缠绕机

该机控制中心关键元器件变频器、伺服系统、光电编码器由德国西门子公司生产，工控机由中国台湾研华公司生产。菜单彩色汉字显示，操作简便，只需把所缠绕产品的参数输入进去，微机即可自动完成产品缠绕线型的设计，通过微机控制主轴与小车的复合运动，满足缠绕规律，该机的各项技术参数和内在质量处于国内领先地位。设备性能如下：

1. 缠绕直径范围：Φ600—Φ4000mm
2. 最大缠绕长度：12m
3. 缠绕角度：45°—90°
4. 装机容量：9.2kW
5. 定位误差：<1mm
6. 纱片最大宽度：150mm
7. 生产能力：500kg/h

B. FW-4000Ⅲ computer control filament winding machine

The key elements such as the transducer, servo system and photoelectrical encoder are from Siemens,

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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: $45^\circ < \alpha < 90^\circ$
4. The total power: 10kw
5. The tolerance of positioning: $< 1\text{mm}$
6. The maxi width of roving sheet: 150mm
7. The productivity: 500kg/h

三、JFW—1500 机械半自动缠绕机

JFW—1500 机械半自动缠绕机，是一种适合于专业生产小型玻璃钢管道、贮罐的缠绕设备，该机有配套脱模机，设备主要性能如下：

1. 最大缠绕直径：1500mm
2. 最大缠绕长度：6m
3. 产品直径范围：25mm—1500mm
4. 缠绕角度： $45^\circ - 90^\circ$
5. 装机容量：5.5kW
6. 纱片最大宽度：150mm
7. 生产能力：450kg/h

该机的电气控制先进，可对缠绕层计数，挂轮计算由软件配合，所以特别适合小型项目。

C. JFW-1500 semi-automatic winding machine

JFW-1500 set is special equipment that can produce small-size FRP pipes and tanks, it has been matched the mould-unloading machine and forming set, its main properties are below:

1. The maxi diameter can be wound: DN1500mm
2. The maxi length can be wound: 6000mm
3. The range of diameter: DN25~DN1500mm
4. The winding angle: $45^\circ \sim 90^\circ$
5. The total power: 5.5kw
6. The maxi width of roving sheet: 150mm.
7. The productivity: 450kg/h

It has advanced electrical control system, can count the winding plies, matching gears are decided by software, it is suitable to the small-sized projects especially.

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四、JFW—2500 机械半自动式缠绕机

JFW—2500 机械半自动式缠绕机，是适合于中小型企业使用的缠绕设备，可以缠绕 $\phi 2500\text{mm}$ 以下，长度 12m 以内的玻璃钢管道、贮罐，该机有配套脱膜机，设备主要性能如下：

1. 缠绕直径范围：25mm—2500mm
2. 最大缠绕长度：12m
3. 缠绕角度： $45^\circ - 90^\circ$
4. 装机容量：7.5kW
5. 纱片最大宽度：150mm
6. 生产能力：500kg/h

D. JFW-2500 semi-automatic winding machine

It is suitable to the middle-sized and small-sized enterprises, it has the mould unloading machine and formed a complete set, and the main properties are below:

1. The range of diameter can be wound: DN25~DN2500mm
2. The maxi length can be wound: 12000mm
3. The winding angle: $45^\circ \sim 90^\circ$
4. The total power: 7.5kw
5. The maxi width of roving sheet: 150mm
6. The productivity: 500kg/h

五、大型现场缠绕机

由于运输能力的限制，所有直径超过 4m 的贮罐都成了加工方和定做方的难点，为了能够满足定做方的需要，我们可耐特公司研制出了大型现场缠绕机，该机结构为组合式，可以装拆，运输方便，然后根据客户的要求，在贮罐安装基础的旁边，进行设备的组装，然后完成大型玻璃钢贮罐的缠绕制作。

(一) FW—10000 微机控制卧式现场缠绕机

设备的主要性能如下：

1. 最大缠绕直径：10m
2. 最大缠绕长度：12m
3. 产品直径范围：4m—10m
4. 装机容量：14.6kW
5. 纱片最大宽度：168mm
6. 生产能力：550kg/h

(二) FW—15000 微机控制卧式现场缠绕机

设备的主要性能如下：

1. 最大缠绕直径：15m
2. 最大缠绕长度：12m

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3. 产品直径范围: 4m—15m
4. 装机容量: 18.6kW
5. 纱片最大宽度: 168mm
6. 生产能力: 550kg/h

(三) VFW-25000 微机控制立式现场缠绕机

1. 概述

VFW-25000 微机控制立式现场缠绕机是我公司在吸收国外先进技术的基础上研制的国内最先进的超大直径缠绕机, 该机由微机控制, 专门适用于大口径玻璃钢贮罐的现场缠绕。使用适当的芯模, 本机可缠绕直径 4 米到 25 米的玻璃钢贮罐。该机的控制中心采用中国台湾产的 PC 工控机, 把所缠绕产品的参数输入进去, 微机可自动完成产品缠绕线型的设计, 然后控制芯模旋转与小车上下移动的复合运动, 把浸透树脂的纤维按规律均匀布满在产品内衬上。该缠绕机是技术与科学的结合, 诸如芯模的旋转、小车的上下移动、缠绕纱带的铺置等都是由软件通过电脑精确控制的。该机缠绕的玻璃钢制品, 广泛应用于化工、石油、酿造等领域。该机结构合理、设计新颖、操作方便、人机界面合理, 深受玻璃钢同仁的青睐。

2. VFW-25000 微机控制立式现场缠绕机的技术参数

缠绕直径范围: 4 米 - 25 米

每段最大高度: 6 米 (注: 更高的高度可由数段一起组成)

缠绕角: 60° - 90°

芯模旋转最高转速: 4.6r/min

缠绕纱股数: 70*

生产能力: 500kg/h*

*注: 生产能力和缠绕纱股数视玻璃纤维的质量而定。

3. VFW-25000 微机控制立式现场缠绕机的组成

该机由以下部分组成:

油压驱动的旋转台及立柱。

液压泵站

微机控制系统及配电柜

树脂供给系统

纱架及张力控制器

浸胶系统

缠绕小车

小车传动系统

小车升降导轨架

芯模支承环 (根据用户要求提供一种规格)

树脂泵及喷枪

供气系统 (1.4m³ 0.7MPa)

升降平台 (起重量 300kg, 起升高度 6 米)



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4. 关键元器件配置

4.1 工控机: 中国台湾研华公司生产

4.2 变频器、伺服系统、光电编码器: 德国西门子公司生产

4.3 行星摆线针轮减速机: 中国江苏鸿泰集团生产

4.4 电器元件: 中国正泰、人民电器、德力西集团生产

5. 优良的售后服务

安装调试与人员培训一步到位, 公司建立了完善的售后服务体系, 承诺向用户提供快捷、满意、到位的售后服务。

我公司可根据用户的要求提供木模的图纸及制造工艺。

E. 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-10000 Computer Control Horizontal Site Winding Machine

The major properties of the equipment are below.

- 1.1 The maxi diameter can be wound: DN10000mm.
- 1.2 The maxi length can be wound: 12000mm
- 1.3 The range of diameter: DN4000~DN10000mm
- 1.4 The maxi torque: 47650N m
- 1.5 The total power: 14.6kw
- 1.6 The maxi width of roving sheet: 168mm
- 1.7 The productivity: 550kg/h

II. FW-15000 Computer Control Horizontal Site Winding Machine

The major properties of the equipment are below.

- 2.1 The maxi diameter can be wound: 15000mm
- 2.2 The maxi length can be wound: 12000mm
- 2.3 The range of diameter: DN4000~DN15000mm
- 2.4 The maxi torque: 68350N m
- 2.5 The total power: 18.6kw
- 2.6 The maxi width of roving sheet: 1680mm
- 2.7 The productivity: 550kg/h

III. VFW-25000 Computer Control Vertical Site Winding Machine

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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 to 25m 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. This machine has reasonable structure and new design, it's easy to operate and it has reasonable interface between operator and the computer, so it is preferable for FRP industry.

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



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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 Frequency converters, Servo motor, Optical Encoder: Siemens

4.3 Planet balance reducer: Hongtai Group Jiangsu in China.

4.4 Electrical elements from CHNT, People Electricity and Delixi Group

5. Excellent post-sale service

One stop service for installation, adjustment and training. Our company established perfect post-sale service system and make commitment to the customers that we are always willing to provide fast and satisfactory post-sale service.

We also provide the drawing of the wood model and manufacture process according to the customer's requirements.

六、FW-300 二轴微控电缆套管生产线

1、概述

FW-300 二轴微控电缆套管生产线，由微机控制加砂缠绕机、多轴固化站、修整机、脱模机、树脂搅拌站五个部分组成。缠绕机的控制中心采用中国台湾产先进工控机，只需把所缠绕产品的参数输入进去，微机即可自动完成产品缠绕线型的设计，然后控制模具转速与小车行走的复合运动。把浸透树脂的缠绕纤维按规律均匀布满在产品内衬上，具有重量轻、耐腐蚀、内阻系数小、综合工程造价低等优点，可广泛用于电缆套管、石油化工等领域。该生产线结构合理、设计新颖、操作方便、自动化程度高，人机界面合理，深受玻璃钢同仁的青睐。



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2、主要规格参数

- 2.1 装机容量: 70kW
2.2 生产管道直径范围: 50-300mm
2.3 生产管道长度: 6000mm
2.4 缠绕角: 45° -90°
2.5 排纱精度: ±0.5mm
2.6 额定脱模力: 40t
2.7 卷扬机额定拉力: 3t
2.8 液压泵站额定工作压力: 16MPa
2.9 脱模机中心高: 800mm

3、设备结构的主要特点

- 3.1 FW-300 二轴微控电缆套管生产线的各单体机, 按流水线生产玻璃钢管道的方式进行布置。
3.2 微机控制加砂缠绕机是整套机组的中心, 其性能和质量将决定着投资效益。该机的特点是:
A、该机菜单中文显示, 人机界面合理, 操作简单, 通过操作面板旋钮可随意调整工作状态。
B、采用了公司技术人员数年精心研制开发经多次改进的缠绕软件, 排纱均匀, 封闭完整, 小车定位准确, 用单纱检查时为整齐的菱形, 纱片宽度、缠绕长度、缠绕直径等参数软件均不做限制。
C、控制系统有手动、半自动、自动、紧急停车、限位保护、无级调速等功能, 无级调速时不影响线型。
D、小车的导向轮设置 4 个, 分别置于小车的前后左右, 避免小车在行走过程中车身的左右摇摆, 使小车行走稳定。
3.3 缠绕机小车行走的动力置于床身的一端, 电机带动减速机, 通过链条拖动小车行走, 在床身的尾部设有链条松紧调整装置。
3.4 多轴固化站采用节能型远红外线加热装置, 沿模具的轴向布置, 使管道在固化过程中受热均匀, 如冬季厂房内达到 15℃ 以上时也可关掉加热装置, 以节约能源, 降低成本。
3.5 修整机设有水喷淋头装置, 可以降低粉尘在空气中的污染, 并延长磨头的使用寿命。
3.6 在脱模过程中, 开始时脱模力较大, 由液压缸提供, 模具从管道中抽出一定距离后, 所需的脱模力变小, 这时, 卷扬机投入工作, 用以提高脱模速度。

4、FW-300 二轴微控电缆套管生产线的组成部分

4.1 微机控制缠绕机 数量: 1 台

由以下部分组成:

- | | |
|---------------------|-----|
| 1、床身 (18m) | 1 台 |
| 2、传动机头 | 1 台 |
| 3、中转机头 | 1 台 |
| 4、机尾 | 1 台 |
| 5、缠绕小车及传动系统 | 2 套 |
| 6、带控胶装置的梳式浸胶槽 | 2 套 |
| 7、筒式张力纱架 (容纱量 30 团) | 2 套 |
| 8、微机控制系统及加砂动力配电系统 | 1 套 |
| 9、交流变频调速系统 (包括伺服电机) | 1 套 |
| 10、加砂装置 | 2 套 |



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4.2 固化站 (固化 8 根制品) 数量: 1 套

由以下部分组成:

- | | |
|------------------|-----|
| 1、传动系统 | 1 套 |
| 2、前后支承架 | 1 套 |
| 3、红外线加热装置 (48kW) | 1 套 |
| 4、电气控制系统 | 1 套 |

4.3 修整机 数量: 1 套

由以下部分组成:

- | | |
|-------------|-----|
| 1、主轴传动系统 | 1 套 |
| 2、支承模具的前后支座 | 1 套 |
| 3、承口齐边机构 | 1 套 |
| 4、插口修整机构 | 1 套 |
| 5、电气控制系统 | 1 套 |
| 6、喷水除尘系统 | 1 套 |

4.4 脱模机 数量: 1 套

由以下部分组成:

- | | |
|----------|-----|
| 1、脱模挡架 | 1 件 |
| 2、脱模车 | 1 套 |
| 3、快速脱模系统 | 1 套 |
| 4、电气控制系统 | 1 件 |
| 5、支承架 | 4 件 |
| 6、液压泵站 | 1 套 |

4.5 树脂搅拌站

由以下部分组成

- | |
|-----------|
| 1、地槽 |
| 2、树脂搅拌罐 |
| 3、树脂输送系统 |
| 4、电气控制系统 |
| 5、关键元器件配置 |

5.1 工控机: 中国台湾研华公司生产

5.2 变频器、伺服系统、光电编码器: 德国西门子公司生产

5.3 行星摆线针轮减速机: 中国江苏鸿泰集团生产

5.4 电器元件: 中国正泰、人民电器、德力西集团生产

F. 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 demoulding 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



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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: $\pm 0.5\text{mm}$
- 2.6 Rated demolding 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 demolding 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.



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D, There are four guide wheels that located around the trolley, enable to avoid the wagging 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°C 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.

3.5 The 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 |



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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
4.2.4 electrical control system	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 The front and rear supports system	one set
4.3.3 Grinding head	
4.3.4 Socket grinding head	one set
4.3.5 Electric controlling box	one set
4.3.6 Water-spraying dust remover	one set

4.4 mould unloading machine, its quantity is one set

Its components are as follows:

4.4.1 Demoulding Stretcher	one set
4.4.2 Demoulding trolley	one set
4.4.3 Quick demoulding system	one set
4.4.4 Electric controlling box	one set
4.4.5 Support frame	four sets
4.4.6 Hydraulic Pump Station	one set

4.5 Resin Mixer station

4.5.1 Resin cell	
4.5.2 Resin Mixer tank	
4.5.3 Resin transmission system	
4.5.4 Electric control system	

5. Attachments of main machine

- 5.1 The main controller : made in Yanhua company Taiwan China.
- 5.2 Frequency converters, servo motor, encoder are original products from Siemens.
- 5.3 Planet balance reducer : Hongtai Group Jiangsu China.
- 5.4 The electric elements : Zhengtai China, China People's electric, Delixi Group

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Whole Set Equipment for Filament Winding

七 MC-2500 玻璃钢芯模加工机床

1、概述

定长纤维缠绕玻璃钢管道是一种优质的制品，但由于往复式缠绕生产工艺过程的工序转换，往往不能得到理想的生产效率，为提高生产率，最为有效的方法之一是增加芯模的数量，对于大直径的管道，钢制芯模制造困难，价格昂贵，而采用钢制卷管组焊作为内衬层，表面缠绕玻璃钢后进行磨削加工成型的芯模，具有加工制造简单、价格低廉等特点，因而得到越来越多的应用，MC-2500 玻璃钢芯模加工机床即是加工制造玻璃钢芯模的专用设备。

2、主要技术参数

- 2.1 装机容量：11.42kW
- 2.2 加工芯模公称直径：DN250-DN2500mm
- 2.3 加工芯模长度：12500mm
- 2.4 磨轮磨削速度：45.2m/s
- 2.5 纵向走刀速度：5.5mm/min—20mm/min
- 2.6 主轴转速：0.75r/min—77.28r/min

3、组成部分

MC-2500 玻璃钢芯模加工机床主要由机头、机尾、床身、大拖板、中拖板、溜板箱、磨削系统、电气控制系统、水冷却系统组成。

G. 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.

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八、SY-2500Ⅲ玻璃钢管道试压机

1、概述

SY-2500Ⅲ玻璃钢管道试压机是我公司自行研制的新一代玻璃钢管道水压渗漏检验的专用机械。该机具有结构合理、操作方便、试压效率高、试压管径范围广等特点，深受玻璃钢同仁的青睐。

2、主要技术参数

- 2.1 装机容量：27.1kW
- 2.2 试压管道直径范围：DN250-DN2500mm
- 2.3 液压泵站额定压力：16MPa
- 2.4 电动试压泵额定排出压力：3.5MPa
- 2.5 电动试压泵流量：560L/h（高压时）1120L/h（低压时）
- 2.6 清水离心泵：流量 Q=120m³/H 扬程 H=28m

3、组成部分

SY-2500Ⅲ玻璃钢管道试压机由上水系统、液压系统、上纵向梁、下纵向梁、墙板、承插活动板、支撑杆总成、托盘、叉架、承插口封头、电气控制柜组成。

H. 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 parameter

- 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=120m³/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.

九、自动内衬成型机

该机主要服务于 FW-4000Ⅲ 微机控制缠绕机，是用来制作贮罐内衬的专用设备，使用该设备可提高效率五倍以上。型号有 ZC4000 型、ZC2600 型。主要性能如下：

(一) ZC4000 型自动内衬成型机

1. 可装配的罐模具：Φ3000mm—Φ4000mm

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2. 装机容量：5.5kW
3. 生产能力：400kg/h

(二) ZC2600 型自动内衬成型机

1. 可装配的罐模具：Φ1600mm—Φ2600mm
2. 装机容量：4.0kW
3. 生产能力：400kg/h

I. 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

十、成套模具

主要模具为：

- 钢制贮罐模具：DN600mm—DN 4000mm
 钢制管道模具：DN25mm—DN 200mm 长 6m
 钢衬 FRP 复合管道模具：DN 250mm - DN 4000mm
 钢制法兰模具：DN 25mm—DN 1000mm
 钢制弯头模具：DN 25mm—DN 300mm

J. The complete set of moulds

1. Tank steel moulds: DN600-DN4000mm
2. Pipe steel moulds: DN25-DN4000mm
3. Composite pipe mould with steel liner and FRP reinforced material: DN250mm-DN 2500mm
4. Flange steel moulds: DN25-DN1000mm
5. Elbow steel moulds: DN25-DN300mm.

