

Luoyang Juxing Kiln Co., Ltd.

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GWDL-VSF Vacuum Atmosphere Furnace Equipment Technical Parameters and Configuration Scheme



1. Overview

The GWDL-VSF 1200 γ high-temperature vertical vacuum atmosphere sintering electric furnace is mainly used for vacuum sintering processes of alloy or non-metallic materials.

The complete

set of equipment consists of a vertical main unit (single chamber), a vacuum system, a gas filling system, a water cooling system, and an electrical control system.

2. Main Technical Parameters

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Specification	parameter
Furnace dimensions,	500×500×500 mm
vacuum level,	6.67×10 ⁻³ Pa
pressure rise rate (empty furnace, cold state), pumping rate (1×10 ⁻³ Pa, under ambient temperature empty furnace conditions, with main valve open)	≤0.66 Pa/h (calculated after 24 hours of pressure holding)
hour)	≤120 min
Maximum design temperature,	1200℃
long-term operating temperature,	1150℃
temperature rise	≤10℃/min (non-linear)
rate, temperature	±5℃ (Nine-point test under no-load at 1200℃)
uniformity,	±1℃
temperature control	Nitrogen, argon, carbon monoxide, oxygen, hydrogen, etc.
accuracy, suitable for atmospheric oxygen content analyzer.	Real-time monitoring of residual oxygen content inside the furnace to ensure a low-oxygen environment. Stability, thereby preventing material oxidation and performance degradation.

3. Standard structure and features

3.1 Vacuum Furnace Main Unit

The vacuum furnace main unit is a vertical single-chamber structure, consisting of a furnace body, furnace door, furnace frame, heating chamber, etc.

3.1.1 Furnace body and furnace door

- The main body of the vacuum furnace sits on the furnace frame, and both the furnace body and the furnace door are double-walled water-cooled structures.
- The furnace body and furnace door inner walls are made of carbon steel welded together, with an outer protective shell.
- The furnace body is machined using CNC machine tools and undergoes processes such as polishing, grinding, pickling, phosphating, powder coating, and high-temperature baking.

The two-tone design makes it aesthetically pleasing.

It has advantages such as anti-oxidation, acid and alkali resistance, corrosion resistance, high temperature resistance, and easy cleaning.

- The furnace lining steel plate is 6–20 mm thick, double-sided welded, and can withstand a positive pressure of 0.1 MPa.
- Furnace shell temperature: Long-term operating shell temperature ≤45℃.

Interface configuration:

- Top cover center: 1 ½" NPT jack (female) available.
- Center of furnace door: 1 ½" NPT socket (female) for backup.
- Upper part of the furnace body: 2 ½" NPT jacks (female) for inert gas inlet.
- Top and bottom of the heating chamber: 1 ½" NPT jack (female) for thermocouple installation.

Furnace door structure:

The furnace door is a side-opening type with a pneumatic locking structure.

3.1.2 Heating chamber, heating element and insulating element

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Furnace lining structure:

- Made of vacuum-formed lightweight alumina material. • Lightweight hollow alumina plates are used in load-bearing or easily impacted areas such as the furnace opening and bottom. • Features: High operating temperature, low heat storage, resistant to rapid heating and cooling, crack-free, slag-free, and excellent thermal insulation.

Thermal insulation materials:

- Three-layer structure:
 - o Inner layer: 99% lightweight alumina material
 - o Middle layer: Alumina fiberboard
 - o Outer layer: Ceramic fiberboard

Heating element:

- Silicon carbide rods are used as heating elements.

3.2 Vacuum System and Vacuum Gauge

The vacuum system consists of a mechanical pump, a diffusion pump, a pneumatic baffle valve, connectors, gauges, and their auxiliary devices.

- Configuration: One mechanical pump and one diffusion pump.
- Vacuum gauge: One digital display resistance vacuum gauge.
- Operation: Automatic programs can be set via the touchscreen to achieve automatic furnace cleaning, gas supply switching, and vacuuming operations.

3.3 Water Cooling System

It consists of a stainless steel shut-off valve, inlet, drain tank, water pressure gauge with electrical contacts, etc.

- Comes with a chiller. • The drain pipe is equipped with an overpressure protection device. • In case of water outage, it features an audible and visual alarm and interlock function, and automatically switches to emergency cooling water.

Chiller parameters

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冷水机配置及技术参数

设备 图片				
	名称	产地	备注	
基本 配置	压缩机	艾默生(美国)		
	蒸发器	温州 瑞速		
	风机	杭州 顿力		
	水泵	台州 利欧		
	冷凝器	温州 瑞速		
	干燥过滤器	丹佛斯		
	膨胀阀	丹佛斯		
	电器	施耐德		
	电脑板	邦普		
技术 参数	型号	RSA-U3(风冷式)380v/50hz		
	制冷量	8.72		
		7500kcal/h		
	压缩机	2.25KW		
	蒸发器	盘管式蒸发器		
	冷凝器	铜管套铝翅片		
	水箱容量	70L		
	水泵	功率	0.37	
		流量	1.5T	
		压力	2KG	
冷水出口/进口管径	DN25			
外型尺寸	960*540*1170			
性能 特点	相许保护 压缩机过热保护、高低压保护、电流过载保护、防冻保护			

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3.4 Inflation System

The inflation system consists of an inflation shut-off valve, an air collection manifold, a solenoid valve, and a vacuum electric contact pressure gauge.

- The vacuum level inside the furnace can be adjusted and controlled during the heating process.
- The pipeline is equipped with a mass flow meter, allowing for manual measurement and control of gas flow.

3.5 Pneumatic System

The pneumatic system consists of pneumatic valves, solenoid valves, oil-water separators, oil mist lubricators, pressure gauges, etc.

- Users can use it simply by connecting the pneumatic interface to the air source.

3.6 Electrical Control System

The electrical control system consists of two parts: a thyristor voltage regulator and an intelligent instrument (for temperature program control), and a PLC (for mechanical motion control). It can achieve the following

functions:

- Programmable temperature control
- Temperature chart recording
- Vacuum chart recording
- Alarms and interlock protection for water pressure, over-temperature, and over-current
- Automatic/manual operation switching

3.6.1 Temperature control instruments

- It adopts a Yudian temperature controller with a temperature control accuracy of $\pm 1\%$.

3.6.2 Temperature and Vacuum Recording Instruments

- It uses a touchscreen for display and recording.

● Touchscreen Function Introduction



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Project Name	Touchscreen Function Introduction
Size,	7-inch TFT true color
resolution,	800*480
backlight	led
power,	5W
weight	1Kg
language	You can switch freely between Chinese and English.
Full-screen display and operation	Instrument panel, bar chart, historical trends, data reports, alarm signals Information, data export, process flow, system management, etc. (adding users) (Login hierarchical management; the host computer screen is not visible here.)
Control object	Temperature, pressure, flow rate, liquid level, etc.
Temperature	Touch screen + high-precision integrated module
control starts	Touch operation
heating, pauses	Touch operation
heating, stops heating.	Touch operation
Temperature profile compilation	Touch operation, 50 segments per curve
Temperature curve storage quantity	Unrestricted (each curve can be named in Chinese or English)
Real-time status display	Running curve name, running segment number, segment time, segment running time, Digital temperature, real-time curve, 100% power output
Select segment number to start (cross-segment start) Touch operation	
Curve range adjustable	
Historical curve (text and images)	Approximately 20 months of storage (the curve includes process gas, vacuum level, and temperature). (degree, etc.)
Data Reports (Excel)	Storage lasts approximately 20 months; multiple displays can be accessed simultaneously (USB flash drive can be inserted for expansion). exhibition) (Data is searchable and exportable)
Historical curves and report records (stored) (Disc) interval time	Adjustable from 1 second to 3600 seconds, multiple points can be displayed simultaneously (USB flash drive can be inserted for expansion). exhibition)
Alarm Indication	Color change (red)
Alarm message language	Chinese display (alarm time and event description in Chinese)
Data export interface	USB
Printer interface	parallel port
Operate the touchscreen to protect	Password required (operation is prohibited without a password).
the communication port	RS485

3.6.3 Temperature measuring thermocouple

- Equipped with a Type K thermocouple for temperature control, recording, and over-temperature alarm.

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• Includes one temperature control channel and one temperature measurement channel.

3.6.4 Programmable Logic Controller (PLC)

- Control logic includes vacuuming, valve interlocking, heating control, and various alarms.
 - Model: Siemens S7-200 main unit + expansion module. •
- Electrical panel has 20% spare space; S7-200 has 30 cm of expansion space on the right side.

3.6.5 Simulation Monitoring and Protection System

- The control cabinet is equipped with an analog screen that clearly displays the working status of the vacuum furnace.
- It has self-diagnostic functions for faults (water shortage, vacuum pump overload, over-temperature, over-current, over-pressure, etc.). • It features a comprehensive audible and visual alarm and interlocking protection system.

3.7 Pressure Protection System

To prevent danger caused by the furnace exhaust port closing, becoming blocked, or excessive pressure, a pressure protection system is installed.

Principle: A pressure gauge or pressure sensor detects a signal and drives the control module to close the electromagnetic intake valve and activates the electromagnetic exhaust valve and alarm and releases the furnace pressure and triggers an audible and visual alarm, thus ensuring safe equipment operation.

4. Power Requirements

4.1 Power Supply

- Power supply: 380V, three-phase, 50Hz •
- Power: 250 KVA

4.2 Water Supply

- Inlet water pressure: 0.2~0.3 MPa • Inlet water temperature: 32~ •
- Water consumption: 10 m³/h

4.3 Compressed Air

- Pressure requirement: 0.4~0.5 MPa

4.4 Inert Gases

- Type: Nitrogen, Argon, or Hydrogen

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- Purity: 99.99%~99.9995%

5. Warranty and Accessories

Project	content
warranty period	The entire unit is covered by a one-year warranty, but heating elements are not covered by the warranty (they will be replaced free of charge if they fail naturally within three months).
and spare	Two heating elements, two sets of rods, one crucible tong, and one pair of high-temperature gloves.
parts packing list	One electric furnace, two heating elements, two sets of rods, one crucible tongs, one pair of high-temperature gloves, one instruction manual, one certificate of conformity, one acceptance report (factory inspection report), and one delivery note.

6. The quoted

price is 270,000 yuan, which includes a 13% VAT invoice, shipping, and installation and commissioning fees. The delivery period is within 50 days.

Overview of Luoyang Juxing Kiln Co., Ltd.

Luoyang Juxing Kiln Co., Ltd., established in 2008, is located in Luoyang City, Henan Province, covering an area of 20 mu in Jianxi Industrial Park, Xin'an Economic and Technological Development Zone.

The technology development zone covers 40 acres and specializes in heat treatment technology services, as well as the research, development, manufacturing, and sales of industrial electric furnaces. It is a member of the China Heat Treatment Industry Association.

It is a council member unit, a provincial specialized and innovative enterprise, and a national high-tech enterprise.

Our company specializes in the research, development, and production of various high-temperature electric furnaces (-100~2600 $\text{\textcircled{C}}$), including laboratory furnaces, vacuum atmosphere furnaces, and industrial kilns.

Manufacturing of complete sets of medium-frequency induction heating and industrial furnace equipment, environmental protection equipment, mainly including: box furnaces, vacuum atmosphere furnaces, tube furnaces, and melting furnaces.

Furnaces, lifting furnaces, thermal shock furnaces, hot press furnaces, pit furnaces, fire-testing ash blowing furnaces, exhaust gas purification furnaces, degreasing furnaces, drying ovens, pusher kilns, platforms

Rotary furnace, bell furnace, tunnel kiln, roller kiln, mesh belt furnace, medium frequency induction furnace, medium frequency furnace for aluminum and aluminum-based alloys, YTO (Yunnan Tunneling) furnace.

Medium frequency furnaces include dual-stage induction furnaces, series inverter medium frequency furnaces, medium frequency furnaces for copper and copper-based alloys, and medium frequency furnaces for melting magnesium, silicon, and zinc-tin. They are widely used in various applications.

New energy, new materials, wafer semiconductors, functional ceramics, photovoltaic power generation, glass and optical fiber, abrasives and grinding tools, machinery manufacturing, military industry, and chemical industry.

In the fields of medicine, our customers are located in various advanced materials laboratories, industrial and mining enterprises, universities and research institutes around the world.

Throughout our nearly two decades-long history, we have consistently pursued technological innovation and the highest quality. Currently, the company has obtained ISO9001, ISO45001, and other certifications.

The company holds ISO 14001 and other management system certifications, as well as EU CE and SC certifications, and has partially passed WPS and WPC certifications. The company has 21 registered trademarks.

We have applied for 29 patents, obtained 7 qualification certificates, 27 software copyrights, and 1 work copyright. In the future, we will continue to uphold innovation-driven development.

Adhering to the development philosophy of innovation, lean manufacturing, and customer first, we will deepen international cooperation, promote technological upgrades, and provide higher quality services to global customers.

Services and products.

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20-acre Jianxi Factory: Located in Xingye No. 1, Luoyang Science and Technology Industrial Park

No. 1 Road focuses on providing customized heat treatment solutions for customers.

The case involves investing 10% of our annual revenue in technological research and development.

Product upgrades and over a decade of R&D team experience have enabled us to...

We provide professional and reliable heat treatment solutions for various industries.



40-acre Xin'an Factory: Located in Xin'an County Economic and Technological Development Zone, Luoyang City

No. 1 Jianfeng Road, focusing on standard electric furnaces, high-temperature kiln furniture and

Mass production of refractory materials. Relying on standardized manufacturing processes,

While ensuring stable product quality, maximize production efficiency.

This improves efficiency, shortens delivery cycles, and enables rapid delivery.



The 5000y warehousing center has a sufficient stock of key components and can be deployed as needed.

Respond promptly to customers' urgent needs, ensuring rapid delivery and stable equipment operation.

Scheduled operation.



The company's meticulously designed showroom showcases its core products and technologies.

Results. In addition to the physical demonstration of the small-scale experimental furnace, large-scale industrial...

For industrial kilns, we are equipped with 3D-printed structural models to assist visitors.

Customers can gain a more intuitive understanding of the design concept and craftsmanship details. The showroom also...

The exhibition showcases the company's development history, global partners, and authoritative certifications.

Certificates and patents. We sincerely welcome every customer to visit.

visit!

Workshop division of labor and responsibilities

Refractory workshop

Responsible for the fabrication of the furnace lining and the processing of the refractory materials. Vacuum forming technology ensures high density and low porosity of the furnace lining, reducing heat loss and improving efficiency.

Enhanced energy efficiency. Offers various high-temperature material formulations and molding solutions, supporting different furnace types (such as box furnaces, tube furnaces, vacuum furnaces, etc.) and processes.

In situations such as ultra-high temperatures and corrosive atmospheres, we adjust the material formula to optimize thermal efficiency and service life, and meet customers' customized needs.

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Sheet metal workshop

This involves sheet metal cutting and welding of the furnace body, covering the processing of various materials such as stainless steel and carbon steel. It encompasses everything from structural design to welding and polishing.

Integrated operation ensures that the furnace body is sturdy, durable, beautiful and practical.

We support customized furnace bodies with irregular shapes (such as multi-door designs and special flange interfaces) to meet customers' production line layout needs. Laser cutting + automated welding.

The process is highly precise and produces minimal deformation, ensuring long-term sealing.



Assembly workshop

Responsible for the electrical assembly, automation system integration, installation, commissioning, and final packaging of the entire machine. This includes the temperature control system (PID/intelligent algorithm), gas...

Core functions such as atmosphere control (nitrogen/vacuum) and remote monitoring modules are debugged. PLC/IoT pre-installation is supported, and all parameters are calibrated before shipment.

The furnace temperature uniformity and temperature accuracy ($\pm 1\%$) meet the standards.

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Semi-finished product area

We have a large stock of standard model semi-finished products, enabling "order acceptance → rapid assembly → debugging". Regular orders are delivered in 3-5 days, and urgent orders can be delivered in 48 days.

Within hours, delivery cycles are significantly shortened, and response efficiency is improved.



warehouse area

Equipped with a 5000² independent warehouse, it maintains a stock of various vulnerable parts and core components to ensure after-sales response and rapid delivery of emergency spare parts.

In case of malfunction, the equipment will be shipped within 24 hours to minimize downtime losses.

Factory advantages

We possess a complete and independent electric furnace production system, covering everything from furnace structure design, refractory forming, heating element selection, and electrical system integration.

We handle the entire production process, from assembly to final debugging, in-house, without outsourcing. This means we can not only deliver standardized products efficiently and stably, but also...

It possesses the capability to deeply meet customers' customized needs.

Throughout its nearly two-decade history, Juxing has consistently pursued technological innovation and superior quality, possessing a strong R&D foundation: every step has been meticulously crafted.

Our experienced professional team possesses multi-dimensional design capabilities, including multi-temperature zone control, irregularly shaped furnace chambers, composite insulation structures, and intelligent control.

Juxing invests 10% of its budget in research and development each year, and its strong R&D capabilities support highly customized solutions: from thermal insulation materials to heating elements.

From heat treatment equipment to automated control systems, we can precisely match the specific process requirements of our clients, truly solving their problems and providing professional heat treatment solutions.

Solution.

Rapid delivery capability: Standard models are always equipped with semi-finished products, and modular assembly processes ensure rapid order response and flexible and controllable delivery time.

Full lifecycle service guarantee, comprehensive service support and after-sales process: ample spare parts, critical spare parts shipped within 24 hours. Fast delivery within 2 hours.

Responding to customer needs, our professional team accurately diagnoses problems and provides remote or on-site solutions; every fault is archived and a quality report is provided.

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On the R&D side, we drive product optimization and continuously improve the customer's user experience.



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