HAOYUE

BE AN

EXPLORER & PIONEER & LEADER

IN THE FIELD OF HEAT TREATMENT

www.haoyue-group.com

ABOUT HAOYUE

Shanghai Haoyue Technology Co., Ltd (Haoyue Technology), was founded in 2009. It is a high-tech enterprise that integrates R&D, production, and sales; Our products cover three major fields: advanced ceramic &composite material equipment, semiconductor material equipment, lithium battery materials&new energy equipment.

At present, the company has over 7000m^2 factory building, a complete set of processing equipment, a good quality management system, and an advanced equipment exhibition hall as well as a heat treatment R&D center laboratory of over 1500m^2. The laboratory is not only available for internal scientific research and exploration, but also for external universities, research institutes, enterprises to conduct experimental research and development.

The company has focused on the industry, gathering a group of technical elites who have been engaged in the manufacturing and service of heat treatment furnaces, vacuum furnaces, and special furnaces for a long time. Currently, it has more than 60 patent achievements and software works, and has the production capacity to produce 200 sets of heat treatment furnaces and 60 sets of large vacuum sintering furnaces annually; Our business covers markets in Europe, America, the Middle East, and Southeast Asia; In addition, the company has maintained long-term scientific research cooperation with Fudan University, Tongji University, Harbin Institute of Technology, Nanjing University of Aeronautics and Astronautics, and other universities, jointly building industry university research bases and talent training bases; At the same time, we have established cooperation with customers such as Huawei, CATL, Tiantong Holdings, Sanan Optoelectronics, China Shipbuilding Heavy Industry Corporation, AVIC Group, and China Electronics Corporation. We maintain a leading position in high-precision temperature control, vacuum systems, automation control, and computer analysis systems, providing customers with comprehensive integrated industrial solutions.

Based in the Yangtze River Delta, facing the whole China, building an international brand, with more than 15 years of stable operation and efficient development, showcasing the continuous pursuit of Haoyue Technology; Significant business performance records the unremitting efforts of Haoyue Technology; Haoyue Technology always adheres to the core values of "integrity, focus, excellence, innovation, and long-term development", continues to adhere to the mission of "promoting the rapid development of heat treatment, creating value, and repaying to society", and strives to become a leader in the field of new materials and new energy heat treatment.

From a high perspective, we strive for innovation, reliable quality, and honest service. Haoyue Technology looks forward to working together with you to create a better future!

C O N T E N T S

S series Spark Plasma Sintering (SPS) System 01

S series Spark Plasma Sintering (SPS+Induction) System 03

S series Spark Plasma Semi-continuous Sintering (SPS) System 05

S series Spark Plasma Continuous Sintering (SPS) System 07

P series Vacuum Hot Pressing Furnace (Graphite) 09

P series Vacuum Hot Pressing Furnace (Induction) 11

P series Continuous Hot Pressing Furnace (Graphite) 13

V series Vacuum Furnace (Graphite) 15

V series Vacuum Furnace (Moly) 17

V series Vacuum Furnace (Tungsten) 19

V series Vacuum Furnace (Induction) 21

V series Continuous Vacuum Furnace (graphite) 23

G series Gas Pressure Sintering Furnace 25

H series Hydrogen Furnace 27

C series CVD (Chemical vapor deposition) Furnace 29

D series Vacuum Diffusion Welding Furnace 31

R series Rotary Furnace 33

R series Continuous Rotary Furnace 35

SPARK PLASMA SINTERING(SPS) SYSTEM S Series

Fast Heating Rate
Short Sintering Time
Controllable Organizational Structure
Energy-saving and Environmental Protection

BRIEF INTRODUCTION

The SPS (Spark Plasma Sintering) DCS discharge plasma sintering system is one ofthe most advanced sintering systems intheworldtoday. It isa new rapid sintering technology that applies pulse current and axial pressure between two electrodes to densify powder sintering. It has distinct characteristics such as fast heating rate, short sintering time, control lable organizational tructure, energy conservation and environmental protection. It can be used to prepare metal materials, ceramic materials, composite materials, as well as nano bulk materials, amorphous bulk materials, gradient materials, etc.

S6 Isometric View

ADVANTAGES

Due to the discharge effect caused by the application of DC pulse current during the SPS process, there are several unique characteristics:

- It can quickly heat up and cool down, significantly shorten production time, and reduce production costs (with a heating rate of up to 200°C/min);
- Low sintering temperature (compared to hot pressing sintering, the sintering temperature can be further reduced);
- It has a unique purification and activation effect (Eliminating the adsorption of gas on the surface of powder particles and breaking through the oxide film), easily achieving the sintering of difficult to sinter materials and multi-element materials;
- Compared to traditional sintering processes, materials with more uniform, denser, and smaller grain sizes can be obtained in a shorter time;
- Compared to traditional sintering processes, it can significantly save electricity;
- Adopting our professional DC pulse power supply technology, it has fast sintering speed, stable and reliable performance, and good energy-saving effect;
- **High pressure accuracy:** Adopting a servo pressure control system, the pressure accuracy is ±3‰;
- Using dual temperature sensors for temperature measurement, K-type thermocouples for temperature control in the low temperature range, and infrared temperature control in the high temperature range;
- **Good safety performance:**
  Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:**
  Dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage.

APPLICATIONS

- **Metals:** Fe, Cu, Al, Au, Ag, Ni, Cr, Mo, Sn, Ti, W, Be;
- **Ceramic oxides:** Al_2O_3, Mulitex ZrO_2, Mg, SiO_2, TiO_2, HfO_2;
- **Carbides:** SiC, B_4C, TaC, WC, ZrC, VC;
- **Nitrides:** Si_3N_4, TaN, TiN, AlN, ZrN, VN;
- **Boride:** TiB_2, HfB_2, LaB_6, ZrB_2, VB_2;
- **Fluorides:** LiF, CaF_2, MgF_2;
- **Metal ceramics:** Si_3N_4+Ni, Al_2O_3+Ni, ZrO_2+Ni, Al_2O_3+Ti, SUS+WC/Co, BN+Fe, WC+Co+Fe;
- **Metal compounds:** TiAl, $MoSi_2$, Si_3Zr_5, NiAl, NbCo, NbAl, Sm_2Co_{17}.

S6 Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
S6	VHPsp-25/70-2200	Φ250×700	Φ150	100	1	2200
S-200	VHPsp-32/80-2200	Φ320×800	Φ200	200	1	2200
S-300	VHPsp-40/80-2200	Φ400×800	Φ300	250	1	2200
S-400	VHPsp-60/80-2200	Φ600×800	Φ400	400	1	2200

SPARK PLASMA SINTERING SYSTEM (SPS+INDUCTION) S Series

Good Temperature Uniformity
Fast Heating Rate
Short Sintering Time
Controllable Organizational Structure
Energy-saving and Environmental Protection

S-400D Isometric View

BRIEF INTRODUCTION

The SPS (Spark Plasma Sintering) /DCS discharge plasma sintering system is one of the most advanced sintering systems in the world today. It is a new rapid sintering technology that applies pulse current and axial pressure between two electrodes to densify powder sintering. It has distinct characteristics such as fast heating rate, short sintering time, control lable organizational tructure, energy conservation and environmental protection. It can be used to prepare metal materials, ceramic materials, composite materials, as well as nano bulk materials, amorphous bulk materials, gradient materials, etc..

APPLICATIONS

- **Metals:** Fe, Cu, Al, Au, Ag, Ni, Cr, Mo, Sn, Ti, W, Be;
- **Ceramic oxides:** Al_2O_3, Mulitex ZrO_2, Mg, SiO_2, TiO_2, HfO_2;
- **Carbides:** SiC, B_4C, TaC, WC, ZrC, VC;
- **Nitrides:** Si_3N_4, TaN, TiN, AlN, ZrN, VN;
- **Boride:** TiB_2, HfB_2, LaB_6, ZrB_2, VB_2;
- **Fluorides:** LiF, CaF_2, MgF_2;
- **Metal ceramics:** Si_3N_4+Ni, Al_2O_3+Ni, ZrO_2+Ni, Al_2O_3+Ti, SUS+WC/Co, BN+Fe, WC+Co+Fe;
- **Metal compounds:** TiAl, $MoSi_2$, Si_3Zr_5, NiAl, NbCo, NbAl, Sm_2Co_{17}.

ADVANTAGES

- Compared to pure SPS sintering, it increases the induction heating thermal field, resulting in a more uniform thermal field temperature and a smaller temperature difference between the center and edge of the material, allowing for sintering of larger sized products;
- Large SPS systems used in production. Fully considering the automation and controllability of the sintering process, the standard configuration of the equipment includes automatic program control systems such as sintering temperature, pressure control, and current control;
- Equipped with a data collection and analysis system, it can save and call physical quantities that determine the quality of sintered body products, such as sintering voltage, current, control temperature, applied pressure, displacement, vacuum degree, displacement change rate, measured temperature, etc., to track the production process of the product;
- The equipment adopts a self-developed pulse frequency conversion DC power supply, which significantly reduces power consumption compared to traditional SPS of the same level, and can truly and effectively achieve energy-saving, consumption reducing, and environmentally friendly high-grade sintering production.

S-400D Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (℃)
S-200D	VHPsp-32/80-2200	Φ320×800	Φ200	200	10	2200
S-300D	VHPsp-40/80-2200	Φ400×800	Φ300	250	10	2200
S-400D	VHPsp-60/80-2200	Φ600×800	Φ400	400	10	2200

SEMI-CONTINUOUS TYPE SPARK PLASMA SINTERING

S Series

Good Temperature Uniformity
Fast Heating Rate
Short Sintering Time
High Production Efficiency
Controllable Organizational Structure
Energy-saving and Environmental Protection

BRIEF INTRODUCTION

The SPS (Spark Plasma Sintering) DCS discharge plasma sintering system is one of the most advanced sintering systems in the world today. It is a new rapid sintering technology that applies pulse current and axial pressure between two electrodes to densify powder sintering. It has distinct characteristics such asfast heating rate, short sintering time, control lable organizational tructure, energy conservation and environmental protection. It can be used to prepare metal materials, ceramic materials, composite materials, as well as nano bulk materials, amorphous bulk materials, gradient materials, etc. Semi continuous production can increase production efficiency.

S6S Isometric View

ADVANTAGES

Due to the discharge effect caused by the application of DC pulse current during the SPS process, some unique phenomena occur, There are several characteristics:

- **Semi continuous design:**
  Designed with a total of 2 chambers for heating and cooling, compared to continuous SPS, it can reduce equipment costs, increase efficiency, and increase production;
- It can quickly heat up and cool down, significantly shorten production time, and reduce production costs (with a heating rate of up to 200°C/min);
- It has a unique purification and activation effect (eliminating the adsorption of gas on the surface of powder particles and breaking through the oxide film), easily achieving the sintering of difficult to sinter materials and multi-element materials;
- Compared to traditional sintering processes, materials with more uniform, denser, and smaller grain sizes can be obtained in a shorter time;
- Compared to traditional sintering processes, it can significantly save electricity;
- Adopting our professional DC pulse power supply technology, it has fast sintering speed, stable and reliable performance, and good energy-saving effect;
- **High pressure accuracy:** Adopting a servo pressure control system, the pressure accuracy is ±3‰;
- Adopting dual infrared temperature measurement, with one infrared temperature control and the other infrared temperature measurement or calibration;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:** The dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage.

APPLICATIONS

- **Metals:** Fe, Cu, Al, Au, Ag, Ni, Cr, Mo, Sn, Ti, W, Be;
- **Ceramic oxides:** Al_2O_3, Mulitex ZrO_2, Mg, SiO_2, TiO_2, HfO_2;
- **Carbides:** SiC, B_4C, TaC, WC, ZrC, VC;
- **Nitrides:** Si_3N_4, TaN, TiN, AlN, ZrN, VN;
- **Boride:** TiB_2, HfB_2, LaB_6, ZrB_2, VB_2;
- **Fluorides:** LiF, CaF_2, MgF_2;
- **Metal ceramics:** Si_3N_4+Ni, Al_2O_3+Ni, ZrO_2+Ni, Al_2O_3+Ti, SUS+WC/Co, BN+Fe, WC+Co+Fe;
- **Metal compounds:** TiAl, $MoSi_2$, Si_3Zr_5, NiAl, NbCo, NbAl, Sm_2Co_{17}.

S6S Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Device form	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
S6S	VSPsp-25/70-2200	Semi-continuous (Two chamber)	Φ150	100	10	2200
S-200S	VSPsp-32/80-2200	Semi-continuous (Two chamber)	Φ200	200	10	2200

CONTINUOUS SPS PLASMA SINTERING FURNACE P Series

S6C Isometric View

- High Production Efficiency
- High Automation Program
- Good Temperature Uniformity
- Fast Heating Speed
- High Pressure Accuracy
- Good Safety Performance

BRIEF INTRODUCTION

The SPS (Spark Plasma Sintering) discharge plasma sintering system is one of the most advanced sintering systems in the world today. It is a new rapid sintering technology that applies pulse current and axial pressure between two electrodes for powder sintering densification. It has distinct characteristics such as fast heating rate, short sintering time, controllable microstructure, energy conservation and environmental protection. It can be used to prepare metal materials, ceramic materials, composite materials, as well as nano bulk materials, amorphous bulk materials, gradient materials, etc..

ADVANTAGES

Due to the discharge effect caused by the application of DC pulse current during the SPS process, there are several unique characteristics:

- By adopting a multi station design, continuous production can be achieved, resulting in a doubling of efficiency;
- It can quickly heat up and cool down, significantly shorten production time, and reduce production costs (with a heating rate of up to 200°C/min);
- Compared to traditional sintering processes, materials with more uniform, denser, and smaller grain sizes can be obtained in a shorter time;
- No need for powder preforming, it can be directly sintered into a dense body;
- We adopt our professional DC pulse power supply technology, which has fast sintering speed, stability and reliability, and good energy-saving effect;
- **High pressure accuracy:** Adopting a servo pressure control system, the pressure accuracy is ±3‰;
- **High degree of automation:** If an automatic loading and unloading system is selected, all processes can be fully automated, digitized, intelligent, and without the need for manual intervention;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:** The dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage.

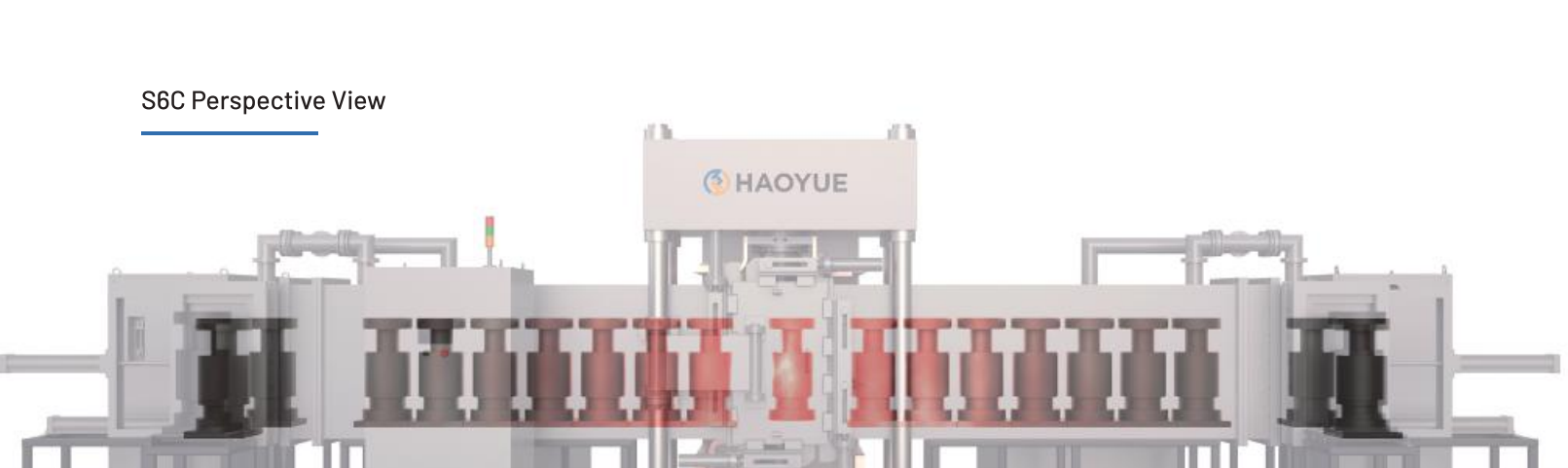
APPLICATIONS

- **Metals:** Fe, Cu, Al, Au, Ag, Ni, Cr, Mo, Sn, Ti, W, Be;
- **Ceramic oxides:** Al_2O_3, Mulitex ZrO_2, Mg, SiO_2, TiO_2, HfO_2;
- **Carbides:** SiC, B_4C, TaC, WC, ZrC, VC;
- **Nitrides:** Si_3N_4, TaN, TiN, AlN, ZrN, VN;
- **Boride:** TiB_2, HfB_2, LaB_6, ZrB_2, VB_2;
- **Fluorides:** LiF, CaF_2, MgF_2;
- **Metal ceramics:** Si_3N_4+Ni, Al_2O_3+Ni, ZrO_2+Ni, Al_2O_3+Ti, SUS+WC/Co, BN+Fe, WC+Co+Fe;
- **Metal compounds:** TiAl, $MoSi_2$, Si_3Zr_5, NiAl, NbCo, NbAl, Sm_2Co_{17}.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Device form	Sample Dia. (mm)	Pressure (Ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
S6C	VCPsp-25/70-2200	Continuous	Φ150	100	1	2200
S-200C	VCPsp-32/80-2200	Continuous	Φ200	200	1	2200

S6C Perspective View



VACUUM HOT PRESSING FURNACE (GRAPHITE) P Series

Good Design Optimization
Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance

BRIEF INTRODUCTION

A vacuum hot pressing furnace is a complete set of equipment that forms materials by hot pressing under vacuum (or other atmosphere) conditions, Mainly using graphite resistance heating, the pressure head driven by the oil cylinder pressurizes up and down. At high temperatures The mutual bonding of solid particles in raw materials leads to grain growth, and the number of voids (pores) and grain boundaries gradually decreases, Through the transfer of matter, its total volume shrinks, density increases, and eventually becomes a microstructure with some kind of microstructure. Construct a dense polycrystalline sintered body, thereby compressing the material into shape.

P7VGR22 Isometric View

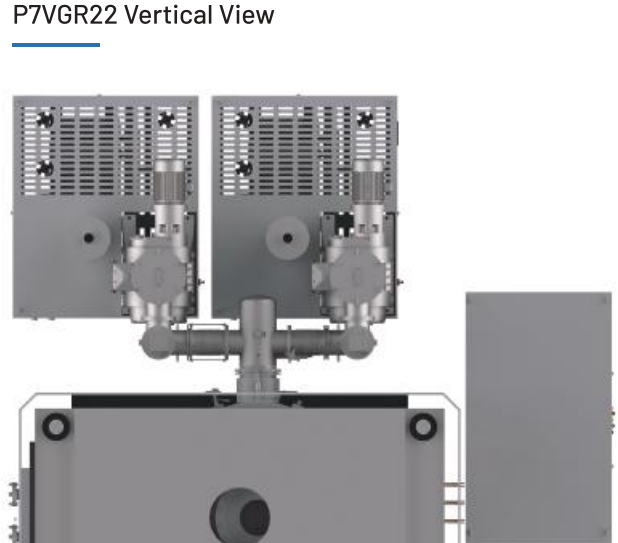
ADVANTAGES

- **Adopting a vertical and side opening door structure:** High precision in mold loading and unloading, easy to operate;
- **Fast heating:** Heating rate of 10°C/minute (≤ 1600°C), heating rate of 5°C/minute (>1600°C);
- **Good design optimization:** The thermal field of the pressurized chamber has been simulated and calculated in thermal state, with very high temperature uniformity. The configured heating elements and insulation layer are designed with modular optimization;
- **Good temperature uniformity:** The average temperature uniformity is ± 5°C (5-point temperature measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **High pressure accuracy:**
  Using a hydraulic control system, the pressure accuracy is ≤ ±3‰;
- **Adopting multi temperature zone control:**
  Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:** The dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage;
- **High degree of automation:** Except for loading and unloading, all other processes are fully automated, digitized, intelligent, and do not require manual intervention;
- **Fast cooling speed:** Optional external circulation fast cooling system under a gas pressure of 2 bar, ensuring fast cooling and efficient operation of the workpiece after hot pressing.

APPLICATIONS

Vacuum hot pressing furnaces are widely used in various composite materials, high thermal conductivity materials, niobium oxide/silicon carbide/boron carbide/nitrogen. Parts of boron or ceramic materials, copper based powder materials, iron based powder materials, iron copper based powder materials, and other materials. Net shaping and densification treatment.
For example: brake discs made of iron and copper based powder materials for aircraft landing, bulletproof vests, armored vehicle shields, helicopter bulletproof armor, etc.

P7VGR22 Vertical View



SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	Stroke (mm)	UltimateVacuum (Pa)	Operating Temperature (°C)	Max. Diameter of mold (mm)
P3VGR22	VVPgr-30/30-2200	Φ300×300	Φ120	60	150	$5/6.7\times10^{-3}$	2200	180
P4VGR22	VVPgr-40/40-2200	Φ400×400	Φ200	200	200	$5/6.7\times10^{-3}$	2200	240
P5VGR22	VVPgr-50/50-2200	Φ500×500	Φ250	300	200	$5/6.7\times10^{-3}$	2200	300
P7VGR22	VVPgr-70/70-2200	Φ700×700	Φ420	600	350	$5/6.7\times10^{-3}$	2200	450
P8VGR22	VVPgr-80/80-2200	Φ800×800	Φ450	800	400	$5/6.7\times10^{-3}$	2200	500
P10VGR22	VVPgr-100/100-2200	Φ1000×1000	Φ600	1500	500	$5/6.7\times10^{-3}$	2200	650

VACUUM HOT PRESSING FURNACE (INDUCTION) P Series

Good Design Optimization
Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance

BRIEF INTRODUCTION

A vacuum hot pressing furnace is a complete set of equipment that forms materials by hot pressing under vacuum (or other atmosphere) conditions, Mainly using induction heating, the pressure head driven by the oil cylinder pressurizes up and down. At high temperatures, the raw material. The mutual bonding of solid particles leads to grain growth, and the number of voids (pores) and grain boundaries gradually decreases. The transfer of matter results in a total volume contraction, an increase in density, and ultimately becomes a material with a certain microstructure, Dense polycrystalline sintered body, thereby compressing the material into shape.

P7VC023-III Isometric Drawings

P7VC023-III Front View

ADVANTAGES

- **Adopting a vertical and upward opening structure:** high precision for loading and unloading molds, easy to operate;
- **Fast heating:** heating rate of 20°C/minute (<1600°C), heating rate of 10°C/minute (>1600°C);
- **Design optimization is good:** The thermal field of the pressurized chamber has been simulated and calculated under thermal conditions, with very high temperature uniformity and compatibility, The heating elements and insulation layer are designed with modular optimization;
- **Good temperature uniformity:** The average temperature uniformity is ±5°C (measured at 5 points, with a constant temperature zone of 1000°C for 1 hour before testing);
- **High pressure accuracy:**
  Using a hydraulic control system, the pressure accuracy is ≤ ±3%;
- **Adopting multi temperature zone control:**
  Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:**
  Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:** The dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage;
- **High degree of automation:** Except for loading and unloading, all other processes are fully automated, digitized, intelligent, and do not require manual intervention.

APPLICATIONS

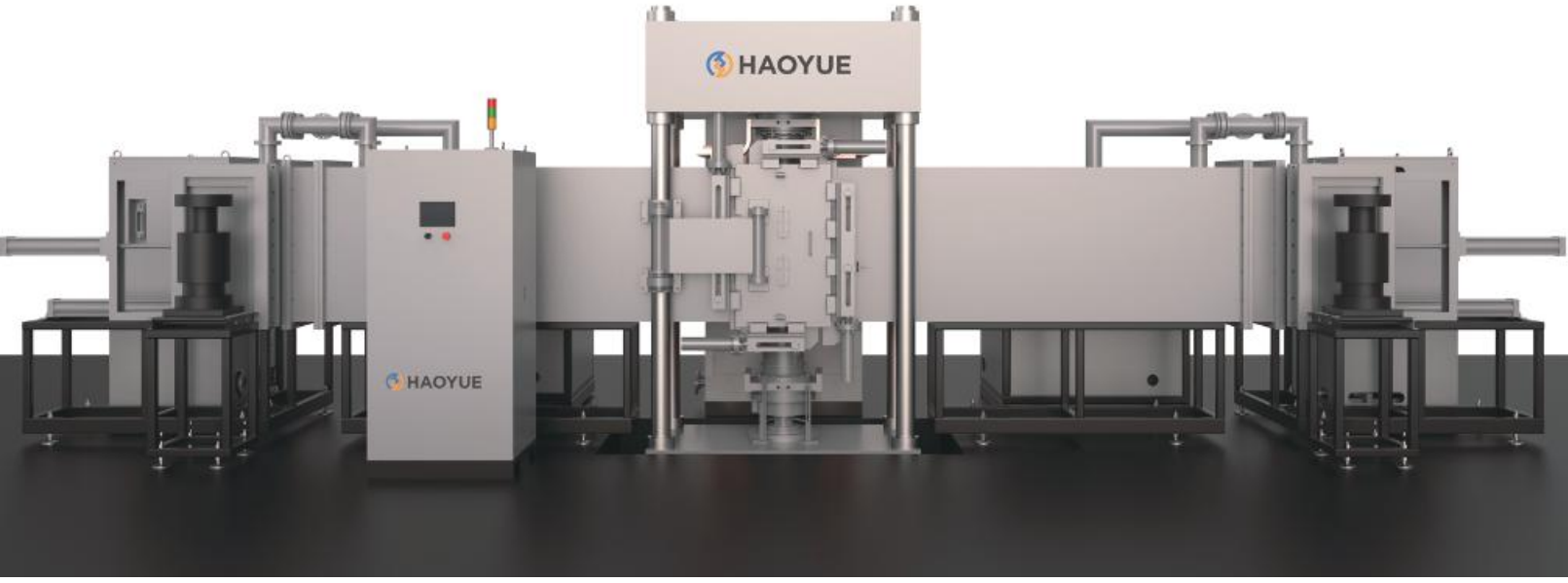
Suitable for ceramic materials such as niobium oxide, silicon carbide, boron carbide, boron nitride, or graphene carbon, High temperature pressure sintering and densification powder metallurgy of fiber and high-temperature alloy metal powder materials,High temperature hot forming of new materials such as gold and functional ceramics can also be used for powder or compact at low temperatures, Heat treatment at the melting point of the main components, with the aim of achieving metallurgical properties between particles combine to enhance its strength.

For example: brake discs made of iron and copper based powder materials for aircraft landing, bulletproof vests, armored vehicle protective plates, and straight upgrade aircraft's bulletproof armor, etc.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	Capacity	Ultimate Vacuum (Pa)	Operating Temperatur (°C)	Note
P7VC023	VVPco-70/70-2300	Φ700×700	300×250/Φ420	500/600	12×1	6.7×10^{-3}	2300	Single
P7VC023-II	VVPco-70/70-2300-II	Φ700×700	300×250/Φ420	500/600	12×2	6.7×10^{-3}	2300	One for two
P7VC023-III	VVPco-70/70-2300-III	Φ700×700	300×250/Φ420	500/600	12×3	6.7×10^{-3}	2300	One for three

P7CGR22 Front View



CONTINUOUS HOT PRESS FURNACE (GRAPHITE) P Series

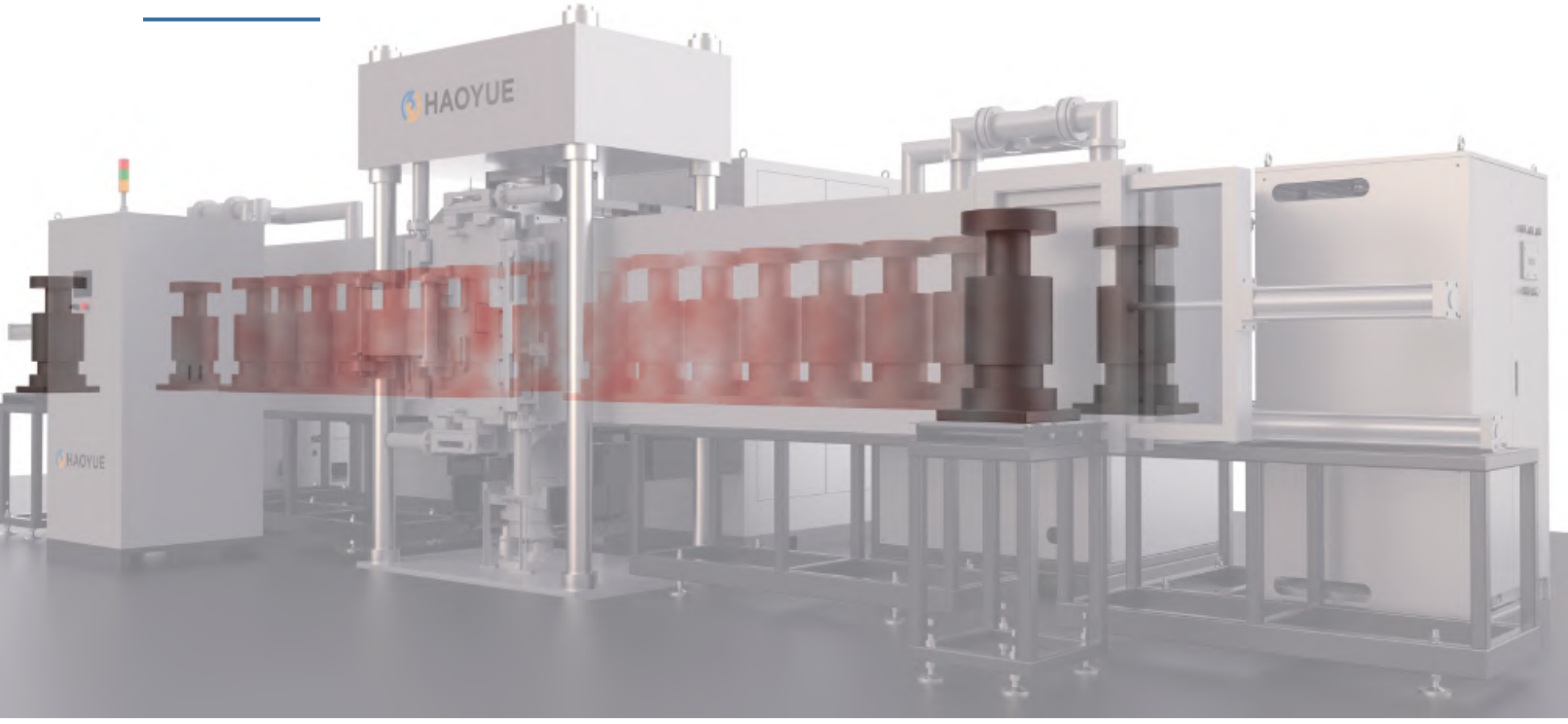
Good Design Optimization
Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance

BRIEF INTRODUCTION

Continuous vacuum hot pressing furnace is a process of forming materials by hot pressing them under vacuum (or other atmosphere) conditions. The continuous complete set of equipment mainly adopts graphite resistance heating and a pressure head driven by oil cylinders. Apply pressure up and down. At high temperatures, the mutual bonding of solid particles in raw materials leads to grain growth. Voids (pores) and grain boundaries gradually decrease, and their total volume shrinks through material transfer. The density increases and eventually becomes a dense polycrystalline sintered body with a certain microstructure, thereby, material compression forming.

Continuous vacuum hot pressing equipment has the advantages of advanced technology, high degree of production automation, large processing capacity, and thermal stability. Advantages such as good product quality. Can greatly improve the production efficiency of enterprises and save labor costs.

P7CGR22 Isometric Perspective View



ADVANTAGES

- Adopting a multi station design, continuous production can be achieved, resulting in doubled efficiency;
- **Fast heating:** heating rate of 10°C/minute (≤ 1600°C), heating rate of 5°C/minute (>1600°C);
- **Good design optimization:** The thermal field of the pressurized chamber has been simulated and calculated in thermal state, with very high temperature uniformity. The configured heating elements and insulation layer are designed with modular optimization;
- **Good temperature uniformity:** The average temperature uniformity is ±5°C (5-point temperature measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **High pressure accuracy:** using a hydraulic control system, the pressure accuracy is ≤ ±3‰;
- **Adopting multi temperature zone control:** reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good sealing performance:** The dynamic pressure heads are sealed with corrugated pipes to ensure no air leakage;
- **High degree of automation:** If an automatic loading and unloading system is selected, all processes can be fully automated, digitized, intelligent, and without the need for manual intervention.

APPLICATIONS

Suitable for ceramic materials such as niobium oxide, silicon carbide, boron carbide, boron nitride, or graphene carbon fiber, High temperature pressure sintering and densification of high-temperature alloy metal powder materials, as well as new developments in powder metallurgy, functional ceramics, etc. High temperature hot forming of materials can also be used for powder or compact materials at temperatures below the melting point of the main components. Heat treatment aims to improve its strength through metallurgical bonding between particles.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Device Form	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
P7CGR22	VCPgr-70/70-2200	Φ700×700	Continuous	Φ420	600	10	2200
P10CGR22	VCPgr-100/100-2200	Φ1000×1000	Continuous	Φ600	1500	10	2200

VACUUM FURNACE (GRAPHITE)

V Series

Good Design Optimization
Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance

BRIEF INTRODUCTION

This vacuum furnace is a vacuum resistance furnace that uses graphite as a heating element, mainly used in ceramics, hard alloys. Composite materials can also be used for heat treatment such as high-temperature sintering or annealing in vacuum or protective atmosphere, as well as for metal materials. High temperature heat treatment of materials under high vacuum conditions or degassing treatment of precious metal materials.

V10GR23 Isometric View

ADVANTAGES

- **Adopting a horizontal and side door structure:** Loading and unloading materials, easy to operate;
- **Fast heating:** Heating rate of 10°C/minute (≤ 1600°C), heating rate of 5°C/minute (>1600°C);
- **Good design optimization:** The heating chamber's thermal field has been simulated and calculated under thermal conditions, with very high temperature uniformity and compatibility. The heating elements and insulation layer are designed with modular optimization;
- **Adopting multi temperature zone control:** Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good temperature uniformity:** The average temperature uniformity is ±5°C (5-point temperature measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **Fast cooling speed:** Optional with a fast cooling system under a gas pressure of 2 bar to 10 bar, ensuring fast cooling and efficient operation of the workpiece after hot pressing;
- **Good stability:** The equipment runs stably for a long time and has a very low failure rate;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Strong scalability:** Capable of sintering, annealing, degreasing, degassing, etc.

APPLICATIONS

This equipment is a cycle operation type and can be used for graphite electrodes, ceramics, etc. under high temperature and high vacuum conditions, Sintering treatment can also be carried out under the condition of filling a protective atmosphere, or carbon fiber felt can be subjected to atmosphere treatment. Protection purification treatment and sintering process have been widely used in many industrial industries such as alloy and metallurgical industries. Applications such as hard alloys, refractory materials, powder metallurgy, and ultra-high temperature material firing all require application sintering process.

Such as carbon/carbon brake discs, carbon plates, hot pressing molds, high-temperature heating elements/fasteners, thermal field materials, Graphite products, carbon paper, carbon cloth, graphene, carbon nanotubes, thermal conductive films, etc.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V4GR20/23	VHSgr-40/40/60-T	400×400×600	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing
V6GR20/23	VHSgr-60/60/90-T	600×600×900	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing
V8GR20/23	VHSgr-80/80/120-T	800×800×1200	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing
V10GR20/23	VHSgr-100/100/200-T	1000×1000×2000	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing

VACUUM FURNACE (MOLY)

V Series

Good Design Optimization / Temperature Uniformity / Fast Heating Speed /
High Pressure Accuracy / Good Safety Performance

V-10M014 Front View

BRIEF INTRODUCTION

This vacuum furnace is a vacuum resistance furnace that uses molybdenum strips as heating elements, mainly used in ceramics. High temperature sintering and annealing of hard alloys, composite materials, metal materials, etc. in vacuum or protective atmosphere. Fire and brazing can also be used for high-temperature heat treatment of metal materials under high vacuum conditions or precious metals. Degassing treatment of materials.

APPLICATIONS

High vacuum molybdenum strip furnace is mainly used for non-ferrous metals, stainless steel, titanium alloys, high-temperature alloys. Sintering, annealing, vacuum brazing, degassing and other processes for materials such as hard alloys.

ADVANTAGES

- **Adopting a horizontal and side opening door structure:**
  High loading and unloading accuracy, easy operation;
- **Fast heating:**
  heating rate of 10°C/minute (≤1600°C);
- **Good temperature uniformity:**
  The average temperature uniformity is ±3°C (5-point temperature
- measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **Adopting multi temperature zone control:**
  Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:**
  Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good design optimization:**
  The heating chamber's thermal field has been simulated and calculated under thermal conditions, with very high temperature uniformity and compatibility. The heating elements and insulation layer are designed with modular optimization;
- **Fast cooling speed:**
  Optional with a fast cooling system under a gas pressure of 2bar-10bar to ensure the workpiece, fast cooling after completion and efficient operation;
- **Strong scalability:**
  Capable of sintering, brazing, annealing, degreasing, deoxidation, degassing, reduction, etc.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V4MO10/14	VHSmo-40/40/60-T	400×400×600	6.7×10^{-4}	1000/1400	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V6MO10/14	VHSmo-60/60/90-T	600×600×900	6.7×10^{-4}	1000/1400	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V8MO10/14	VHSmo-80/80/120-T	800×800×1200	6.7×10^{-4}	1000/1400	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V10MO10/14	VHSmo-100/100/200-T	1000×1000×2000	6.7×10^{-4}	1000/1400	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing

VACUUM FURNACE (TUNGSTEN)

V Series

Good Design Optimization / Temperature Uniformity / Fast Heating Speed /
High Pressure Accuracy / Good Safety Performance

V6W20 Isometric View

BRIEF INTRODUCTION

This vacuum furnace is a vacuum resistance furnace that uses tungsten strips as heating elements, mainly used in ceramics. Ceramics, hard alloys, composite materials, etc. are sintered and annealed at high temperatures under vacuum or protective atmosphere, It can also be used for high-temperature heat treatment of metal materials under high vacuum conditions or for the removal of precious metal materials gas treatment.

APPLICATIONS

It is mainly usedfor metal powder products, metalwire mesh products, ceramic cemented carbide, new materials and complexes Vacuum sintering of composite materials, etc., is used in metals such as transparent ceramics and technical ceramics, as well as in insoluble materials High-temperature sintering of alloy materials composed of metals and ceramic materials, silicon carbide and silicon nitride.

ADVANTAGES

- **Adopting a horizontal and side opening door structure:**
  High loading and unloading accuracy, easy operation;
- **Fast heating:**
  Heating rate of 10°C/minute (≤ 1600°C); Heating rate of 5°C/minute (>1600°C);
- **Good temperature uniformity:**
  The average temperature uniformity is ± 5°C (5-point temperature measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **Good safety performance:**
  Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good design optimization:**
  The heating chamber's thermal field has been simulated and calculated under thermal conditions, with very high temperature uniformity and compatibility. The heating elements and insulation layer are designed with modular optimization;
- **High degree of automation:**
  Multi parameter recording and monitoring, user-friendly human-machine interface, stable operation;
- **Fast cooling speed:**
  Optional with a fast cooling system under a gas pressure of 2bar to ensure the workpiece, Fast cooling after completion and efficient operation;
- **Strong scalability:**
  Capable of sintering, annealing, brazing, degassing, hydrogen gas, etc..

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V3W18/20	VHSw-30/30/40-T	300×300×400	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V4W18/20	VHSw-40/40/60-T	400×400×600	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V5W18/20	VHSw-50/50/70-T	500×500×700	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V6W18/20	VHSw-60/60/90-T	600×600×900	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing

VACUUM FURNACE (INDUCTION)

V Series

Good Temperature Uniformity / Fast Heating Speed /
Good Safety Performance / Fast Cooling Speed

V10C023 Isometric View

BRIEF INTRODUCTION

Vacuum induction furnace adopts induction heating method and is mainly used in ceramics, hard alloys, and composite materials, Composite materials can be sintered and annealed at high temperatures in vacuum or protective atmosphere, and can also be used for high-temperature heat treatment of metal materials under high vacuum conditions or degassing treatment of precious metal materials. The structural design of this equipment is advanced and reasonable, and the design and manufacturing comply with corresponding national and industry standards and specifications, which can meet the user's usage requirements.
Its supporting products and components have international advanced level and can adapt to long-term, stable, safe, and reliable production needs. The energy-saving effect of the equipment is good. Convenient and simple to use, operate, and maintain, with beautiful appearance, safe and reliable, and excellent after-sales service

APPLICATIONS

This Vacuum furnace is a periodic operation type, which can be used for graphite electrodes, ceramics, etc. under high temperature and high vacuum conditions, Sintering treatment can also be carried out under the condition of filling a protective atmosphere, which is widely used in many steel and metallurgical industries, The ceramic industry and other industrial industries have been widely applied, such as hard alloys, ceramics, refractory materials, and powder metallurgy gold, ultra-high temperature material firing, and other applications are required.

ADVANTAGES

- **Adopting a horizontal and side opening door structure:** High loading and unloading accuracy, easy operation;
- **Fast heating:** Heating rate of 40°C/min (≤1600°C), heating rate of 20°C/min(>1600°C);
- **Adopting multi temperature zone control:** Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **Good design optimization:** The induction thermal field in the heating chamber has been simulated and calculated in thermal state, with very high temperature uniformity and compatibility, The heating elements and insulation layer are designed with modular optimization;
- **Expandable:** Capable of sintering, annealing, hydrogen gas, etc..

SPECIFICATIONS & PARAMETERS

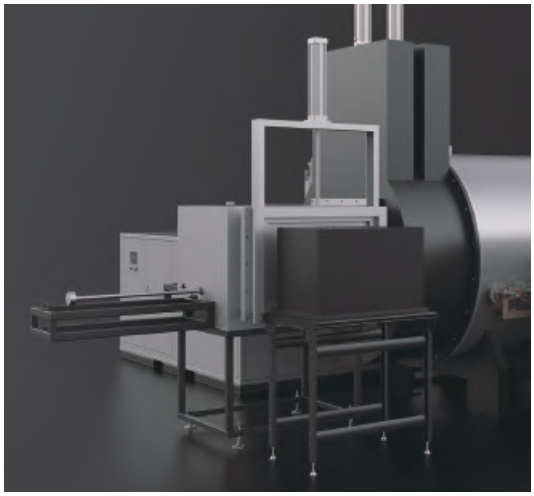
Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V8CO20/23	VHSco-80/80/120-T	800×800×1200	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing/ Hydrogen
V10C020/23	VHSco-100/100/200-T	1000×1000×2000	6.7×10^{-3}	2000/2300	Sintering/Annealing/Degreasing/ Hydrogen

V6CGR20 Isometric View

CONTINUOUS VACUUM FURNACE

V Series

High Production Efficiency
Good Temperature Uniformity
Fast Heating
Good Safety Performance
High Degree Of Automation

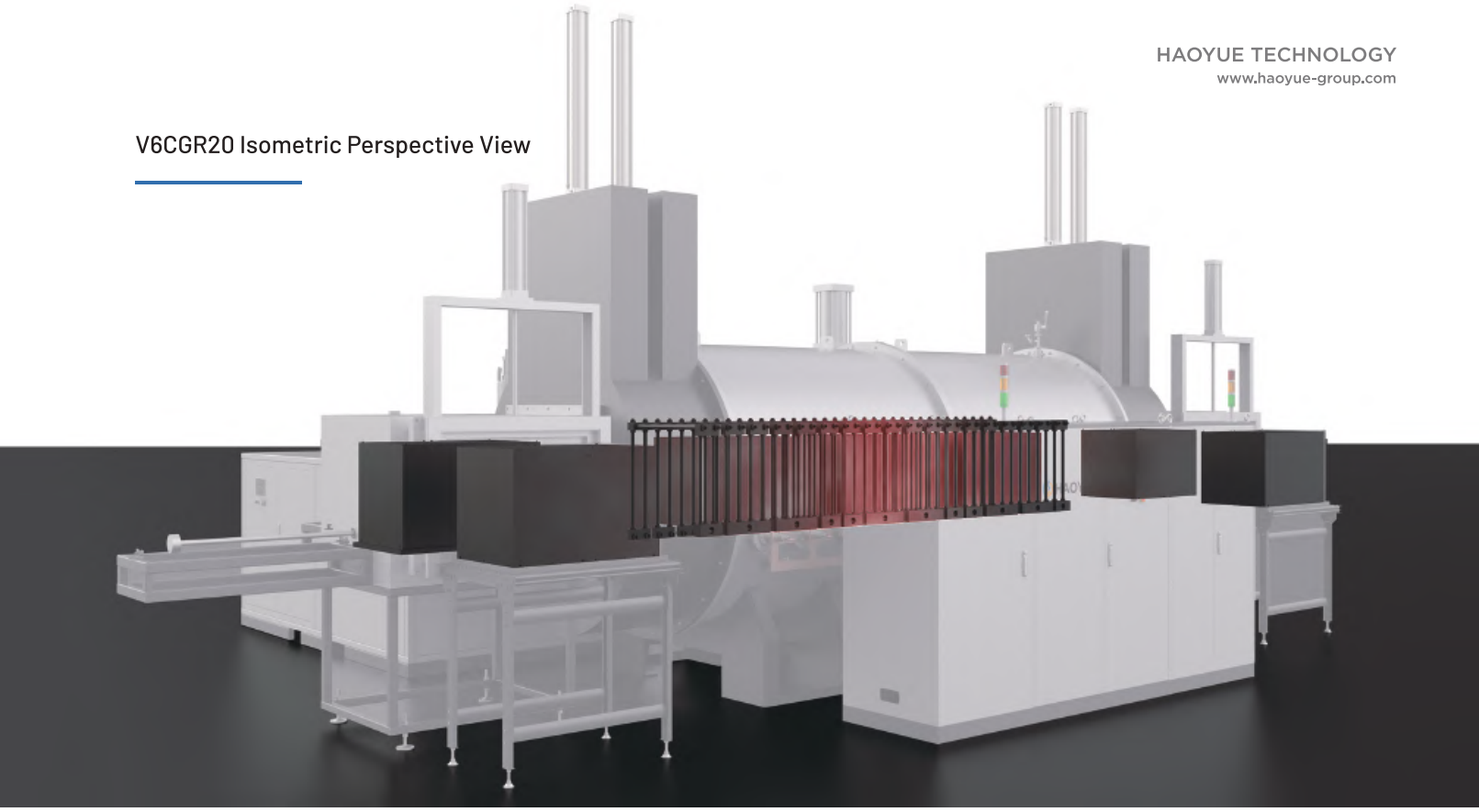


BRIEF INTRODUCTION

This continuous vacuum furnace is a vacuum resistance furnace that uses graphite as a heating element, mainly used in ceramics, hard alloys, A complete set of equipment for high-temperature sintering or annealing of composite materials in vacuum or protective atmosphere can also be used for high-temperature heat treatment of metal materials under high vacuum conditions or degassing treatment of precious metal materials.

Continuous vacuum furnaces have advantages such as advanced technology, high degree of production automation, large processing capacity, and good quality of heat treated products. It can greatly improve the production efficiency of enterprises and save labor costs.

V6CGR20 Isometric Perspective View



ADVANTAGES

- Adopting a multi station design, continuous production can be achieved, resulting in doubled efficiency;
- **Fast heating:** Heating rate of 10°C/minute (≤1600°C), heating rate of 5°C/minute (>1600°C);
- **Good design optimization:** The heating chamber's thermal field has been simulated and calculated under thermal conditions, with very high temperature uniformity and compatibility, The heating elements and insulation layer are designed with modular optimization;
- **Good temperature uniformity:** The average temperature uniformity is ±5°C (5-point temperature measurement, constant temperature zone 1000°C insulation for 1 hour before detection);
- **Adopting multi temperature zone control:** Reserving multiple temperature measurement holes for high-temperature monitoring purposes;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable;
- **High degree of automation:** If an automatic loading and unloading system is selected, all processes can be fully automated, Digitalization, intelligence, and no need for manual intervention;
- **Expandable:** Sintering, annealing.

APPLICATIONS

This equipment is a continuous operation type and can be used for graphite electrodes, ceramics, etc. under high temperature and high vacuum conditions, Sintering treatment can also be carried out under the condition of filling a protective atmosphere, or carbon fiber felt can be subjected to atmosphere treatment, Protection and purification treatment. Sintering technology has been widely applied in many industrial industries such as steel, metallurgy, and ceramics, Applications such as hard alloys, ceramics, refractory materials, powder metallurgy, and ultra-high temperature material firing are all required, Sintering process. Such as carbon/carbon brake discs, carbon plates, crystal furnace thermal field, hot pressing molds, and high-temperature heating, Body/fastener, thermal field materials, graphite products, carbon paper, carbon cloth, graphene, carbon nanotubes, thermal conductivity, Membrane, etc.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V6CGR20	VCSgr-60/60/90-2000	600×600×900	1	2000	Sintering / Annealing
V8CGR20	VCSgr-80/80/120-2000	800×800×1200	1	2000	Sintering / Annealing

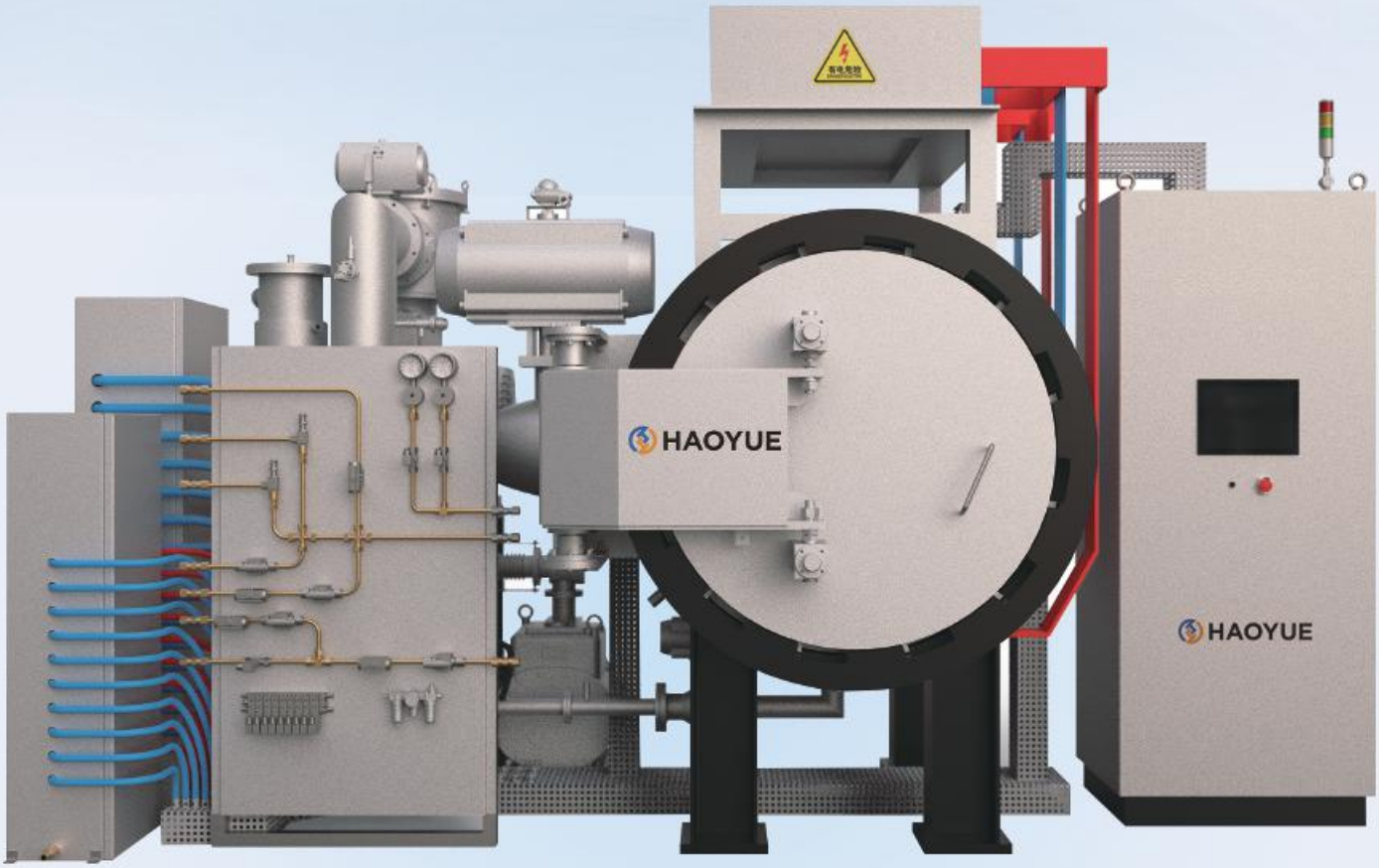
GAS PRESSURE SINTERING FURNACE (GRAPHITE) G Series

Good Temperature Uniformity
Fast Heating Rate
Good Safety Performance
Controllable Organizational Structure

BRIEF INTRODUCTION

The pressure sintering furnace series includes positive pressure dewaxing, vacuum dewaxing, vacuum sintering, partial pressure sintering, and pressure sintering, Integrating functions such as knot, atmosphere control, and cooling. This product is a cycle operation type, suitable for nitriding, Sintering materials such as silicon ceramic balls and ceramic cutting tools in a high-pressure nitrogen or argon atmosphere is beneficial for Increase the sintering density of materials and improve their mechanical properties. Multiple loading designs enable loading and unloading to be coordinated with maintenance work is more convenient. The entire process is automatically controlled.

G5GR20 Front View



ADVANTAGES

- Horizontal design makes loading, unloading, and maintenance work more convenient. Automatic control of the entire process;
- **Good temperature uniformity:**
  Adopting a special furnace liner structure and heater layout, the furnace temperature uniformity is good;
- **Good degreasing effect:**
  Using a special structure degreasing box, the sealing effect is good, and the degreasing is completely on the inside of the furnace components are pollution-free;
- **Multi functional:**
  Equipped with vacuum sintering, pressure sintering, negative pressure degreasing and other functions;
- **Good design optimization:**
  The thermal field of the heating chamber has been simulated and calculated in thermal state, with very high temperature uniformity. The configured heating elements and insulation layer are designed with modular optimization;
- **High safety:**
  Equipped with fault alarms such as over temperature and over pressure, mechanical automatic pressure protection, and mutual action Lock and other functions;
- **High equipment safety:**
  The equipment can be equipped with a degreasing system to achieve one-time degreasing and sintering treatment of ceramic products.

APPLICATIONS

Under high-pressure protective atmosphere conditions, ceramics (such as silicon carbide, zirconia, alumina, silicon nitride, etc.) and metal materials (such as hard alloys) are subjected to hot isostatic pressing sintering treatment, which is also suitable for pilot batch production in colleges and research institutions. Suitable for sintering materials such as silicon nitride ceramic balls and ceramic cutting tools in a high-pressure nitrogen or argon atmosphere. Beneficial for increasing the sintering density of materials and improving their mechanical properties.

G7VGR20 Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Operating Temperature (°C)	Gas Pressure (MPa)	Ultimate Vacuum (Pa)	Applications
G3VGR16/20	PVSgr-30/50-T	GR	Vertical	Bottom Loading	Φ300×500	1600/2000	10	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G5VGR16/20	PVSgr-50/80-T	GR	Vertical	Bottom Loading	Φ500×800	1600/2000	6/10	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G7VGR16/20	PVSgr-70/250-T	GR	Vertical	Top/Bottom Loading	Φ700×2500	1600/2000	6/10	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G3GR16/20	PHSgr-30/30/90-T	GR	Horizontal	Side Loading	300×300×900	1600/2000	6	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G4GR16/20	PHSgr-40/40/120-T	GR	Horizontal	Side Loading	400×400×1200	1600/2000	6/10	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G5GR16/20	PHSgr-50/50/180-T	GR	Horizontal	Side Loading	500×500×1800	1600/2000	6/10	10Pa	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen

VACUUM HYDROGEN FURNACE

H Series

Good Safety Performance / Temperature Uniformity / Fast Heating Speed /
High Temperature Control Accuracy

Vertical Structure

V65/320V Front View

BRIEF INTRODUCTION

Vacuum hydrogen furnace is a vacuum resistance furnace that uses molybdenum strips as heating elements. It is mainly used for high-temperature sintering of ceramics, hard alloys, composite materials, etc. in vacuum or protective atmosphere. It can also be used for high-temperature heat treatment of metal materials under high vacuum conditions or degassing treatment of precious metal materials. The structural design of this equipment is advanced and reasonable, and the design and manufacturing comply with corresponding national and industry standards and specifications, which can meet the user's usage requirements. Its supporting products and components have international advanced level and can adapt to long-term, stable, safe, and reliable production needs. The energy-saving effect of the equipment is good. Convenient and simple to use, operate, and maintain, with a beautiful appearance, safe and reliable, and excellent after-sales service.

Horizontal Structure

V10M014 Front View

ADVANTAGES

- The furnace body adopts a vertical structure, and the columnar structure of the furnace liner ensures uniform airflow distribution and uniform service life. The outer shell material is made of double -layer SUS304 stainless steel material;
- The heating element adopts molybdenum strip with excellent mechanical properties at high temperatures, and its surface load is determined within a reasonable range. The furnace body adopts a vertical structure, which has fast heat transfer, easy maintenance and replacement, and is fast;
- **Fast heating:**
  Heating rate of 10°C/minute (≤1400°C);
- **Good design optimization:**
  The thermal field of the heating chamber has been simulated and calculated in thermal state, with very high temperature uniformity. The configured heating elements and insulation layer are designed with modular optimization;
- This equipment has the characteristics of low investment, low operating cost, simple installation, convenient use and maintenance, high safety performance, and good adjustment performance;
- **High safety:**
  Equipped with fault alarms such as over temperature and pressure, mechanical automatic pressure protection, action interlocking and other functions, ensuring high equipment safety.

APPLICATIONS

Equipment for annealing and purifying metal parts used for ceramic sintering or metalization, brazing, and sealing of glass parts.
Mainly used for heat treatment of tool steel, mold steel, high-speed steel, ultra-high strength steel, magnetic materials, stainless steel, non-ferrous metals and other materials in a hydrogen atmosphere.

Vertical Structure

V65/320V Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
V65/120V	VVSmo-65/120-T	MO	Vertical	Bottom Loading	Φ650×1200	6.7×10^{-4}	1000/1400
V65/320V	VVSmo-65/320-T	MO	Vertical	Top Loading	Φ650×3200	6.7×10^{-4}	1000/1400
V4MO10/14	VHSmo-40/40/60-T	MO	Horizontal	Side Loading	400×400×600	6.7×10^{-4}	1000/1400
V6MO10/14	VHSmo-60/60/90-T	MO	Horizontal	Side Loading	600×600×900	6.7×10^{-4}	1000/1400
V8MO10/14	VHSmo-80/80/120-T	MO	Horizontal	Side Loading	800×800×1200	6.7×10^{-4}	1000/1400
V10MO10/14	VHSmo-100/100/200-T	MO	Horizontal	Side Loading	1000×1000×2000	6.7×10^{-4}	1000/1400

CHEMICAL VAPOR DEPOSITION FURNACE (CVD/CVI) C Series

High Equipment Stability / Good Temperature Uniformity / Fast Heating Speed /
High Control Accuracy / Good Safety Performance

C8VGR16 Isometric View

BRIEF INTRODUCTION

Thermal induced chemical vapor deposition (CVD) is a powerful method for depositing protective coatings on various dielectrics, semiconductors, and metal materials, whether in single crystal, polycrystalline, amorphous, or epitaxial states, in large or small forms. Typical coating materials include pyrolytic carbon, silicon carbide, and boron nitride. By using synthetic precursors, the coating is very pure and meets the typical requirements of the semiconductor industry. Depending on process parameters, there can be multiple layers, ranging from single or several atomic layers to solid protective or functional layers with thicknesses ranging from 10 nanometers to hundreds of micrometers, as well as single chip components with thicknesses up to 100 micrometers, and even up to several millimeters. Thermal induced chemical vapor infiltration (CVI) is a technique related to CVD, which involves infiltrating porous or fiber preforms into a matrix material to prepare components made of composite materials with improved mechanical properties, corrosion resistance, heat resistance to impact, and low residual stress.

APPLICATIONS

Chemical vapor deposition furnaces (silicon carbide) can be used for surface oxidation resistant coatings and matrix modification of materials using silane as the gas source. Vertical chemical vapor deposition furnace (sedimentary carbon) can be used for materials using hydrocarbon gases (such as C3H8, CH4, etc.) as carbon sources. Surface or substrate isothermal CVD/CVI treatment. Horizontal chemical vapor deposition furnaces (SiC, BN) can be used for surface coating of materials, matrix modification, composite material preparation, etc..Substrates for epitaxial wafers, high-temperature refractory materials for crystal furnaces, hot bending molds, semiconductor crucibles, ceramic based composite materials, etc.

ADVANTAGES

- **Adopting a vertical, bottom/top door opening structure:** High loading and unloading accuracy, easy operation;
- Adopting advanced control technology, it can precisely control the flow and pressure of MTS, stabilize the sedimentation airflow in the furnace, and have a small range of pressure fluctuations;
- **Good temperature uniformity:** The average temperature uniformity is ±5°C;
- Adopting a multi-channel sedimentation gas path, the flow field is uniform, there are no dead corners of sedimentation, and the sedimentation effect is good;
- Fully enclosed sedimentation chamber, with good sealing effect and strong anti pollution ability;
- **Good safety performance:** Adopting HMI+PLC+PID pressure sensing control, safe and reliable; Effectively treat highly corrosive exhaust gas, flammable and explosive gases, solid dust, and low melting point viscous products generated by sedimentation;
- Multi stage efficient exhaust gas treatment system, environmentally friendly, capable of efficiently collecting tar and by-products, easy to clean;
- Adopting a corrosion-resistant vacuum unit with a long continuous working time and extremely low maintenance rate;

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
C4VGR16	VVCgr-56/60-1600	Φ560×600	1	1600	CVD/CVI
C6VGR16	VVCgr-84/90-1600	Φ840×900	1	1600	CVD/CVI
C8VGR16	VVCgr-110/120-1600	Φ1100×1200	1	1600	CVD/CVI
C10VGR16	VVCgr-140/200-1600	Φ1400×2000	1	1600	CVD/CVI

VACUUM DIFFUSION WELDING FURNACE

D Series

Good Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance
Fast Cooling Speed

BRIEF INTRODUCTION

Difusion welding refersto a solid-statewelding method inwhich a workpiece is pressurized at a high temperature, but does not produce visible deformation and relative movement. Difusion welding is especially suitable for the joining of dissimilar metal materials, heat-resistant alloys and new materials such as ceramics, intermetallic compounds, composite materials, etc., especially for materials that are diicult to weld by fusion welding methods, difusion welding has obvious advantages and has attracted more and moreattention.

D8M014 Isometric View

ADVANTAGES

- Diffusion welding can weld almost all metals or non-metals without reducing the performance of the welded material, as the substrate does not overheat or melt. It is particularly suitable for fusion welding and other materials that are difficult to weld, such as active metals, heat-resistant alloys, ceramics, and composite materials. For the same type of material with poor plasticity or high melting point, as well as dissimilar materials that are immiscible or produce brittle intermetallic compounds during fusion welding, diffusion welding is a more suitable welding method.
- The diffusion welded joint has good quality, and its microstructure and properties are similar or identical to the base metal. There are no fusion welding defects, overheating structure, and heat affected zone in the weld seam. Welding parameters are easy to precisely control, and joint quality and performance are stable during mass production.
- Welding parts have high accuracy and small deformation. Due to the low pressure applied during welding, the workpiece is mostly heated as a whole and cooled with the furnace, resulting in minimal overall plastic deformation of the welded part. The welded workpiece is generally not subjected to mechanical processing.
- It is possible to weld large section workpieces with relatively low welding pressure, so the tonnage of equipment required for large section welding is not high, making it easy to achieve.
- It can weld workpieces with complex structures, difficult to access joints, and significant thickness differences, and can simultaneously weld many joints in the assembled parts.
- **Fast cooling speed:** optional with a fast cooling system under a gas pressure of 2 bar to 10 bar, ensuring fast cooling and efficient operation of the workpiece after hot pressing;

APPLICATIONS

Diffusion welding is especially suitable for small parts that require vacuum sealing, equal strength of joints and base metals, and no deformation. It is the only way to manufacture vacuum-sealed, heat-resistant, vibration-resistant, and deform-free joints, so it is widely used in industrial production. Diffusion welding methods are used for the welding of metals and non-metals in electric vacuum equipment, and the welding of cemented carbide, ceramics, high-speed steel and carbonsteel in cutting tools.

Varioustitanium alloy components on supersonic aircraftare manufactured using the super plastic for ming-diffusion welding method.

The joint performance of diffusion welding can be the same as that of the base metal, and it is especially suitable for welding dissimilar metal materials, non-metallic materials such as graphite and ceramics, dispersion strengthened superalloys, metal matrix composites and porous sintered materials.

Diffusion welding has been widely used in the manufacture of reactorfuel elements, hydraulic pumpwear parts, drilling rig oil shoe parts, corrosion resistant parts, honeycomb structural plates, electrostatics, impellers, stamping dies, filtertubes, and electronic components.

D8MO14 Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Pressure (ton)	Operating Temperature (°C)	Punch Qty.	Cooling Gas	Applications
D4MO14	VHDBmo-40/40/60-1400	400×400×600	6.7×10^{-4}	30~300	1400	1/2	2-10Bar	Diffusion Welding
D6MO14	VHDBmo-60/60/60-1400	600×600×600	6.7×10^{-4}	50~500	1400	1/2	2-10Bar	Diffusion Welding
D8MO14	VHDBmo-80/60/80-1400	800×600×800	6.7×10^{-4}	200~1000	1400	2/4	2-10Bar	Diffusion Welding
D10MO14	VHDBmo-100/60/100-1400	1000×600×1000	6.7×10^{-4}	300~1000	1400	2/4	2-10Bar	Diffusion Welding

R8A10 Front View

ROTARY FURNACE (BATCH)

R Series

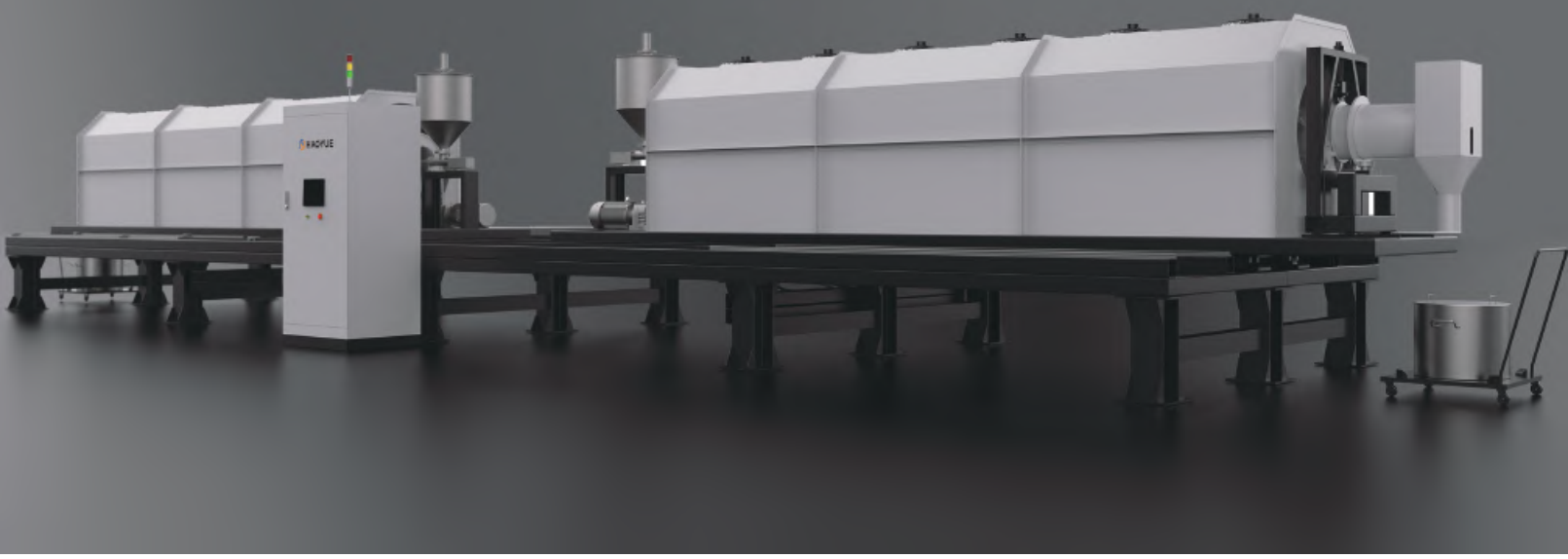
Good Temperature Uniformity
Fast Heating Speed
Convenient Operation
Good Safety Performance

BRIEF INTRODUCTION

This batch rotary kiln of HaoyueTechnology uses high-quality resistance wire asthe heating element and adoptsa double-layer shell junction structure, 30-stage programmed temperature control system, phase shift trigger, thyristor control,furnace using imported high-purity oxygen Aluminium polycrystalline ber material, double-layer furnace shell is equipped with an air cooling system,which can quickly raise and fall the temperature High-purity 310S stainless steeltube,the furnace has a balanced temperatureeld, low surface temperature, fast temperature rise and fall rate, Energy saving and other advantages.

The rotary kiln adopts international advanced technology and can open the rotary furnace type. It is mainly aimed at mixing powders. When the instrument is running, the furnace tube can rotate 360°, and the furnace body can be tilted, and the tilt angle can be reached 0.5-6°, which can increase the uniformity of powder sintering, so it is especially suitable for the sintering of lithium battery materials reaction sintering of other compounds, etc. The diameter of this rotary furnace is optional, and the heating zone can be customized.

R8A10 Isometric View



ADVANTAGES

- Compact structure, simple operation and easy maintenance;
- High precision of atmosphere control and auto matic temperature control;
- Adopt dynamic sintering method to greatly improve thermal eiciency;
- Complete exhaust gas treatment system;
- Special metal liner, corrosion resistant;
- PLC control, touch screen for human-computer interaction;
- Fully sealed structure, small amount of protective gas.

APPLICATIONS

Applicable materials: lithium battery cathode and anode materials, magnetic materials, nano materials and other powder materials. Special equipment for preparing graphite anode materials, which can be used as secondary ring equipment.

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Form	Tube Size (mm)	Operating Temperature (°C)	Tube Materia	Heating Power (KW)	Note
R2A10	VRSa-27.3/50-1000	Resistance Wires	Batch	Φ273×500	1000	SUS310S	18	Effective Volume: 6L; Speed: 0~10rpm; Gas flow: 20L/min
R4A10	VRSa-40/60-1000	Resistance Wires	Batch	Φ400×600	1000	SUS310S	27	Effective Volume: 6L; Speed: 0~10rpm; Gas flow: 6m³/h
R8A10	VRSa-80/600-1000	Resistance Wires	Batch	Φ800×6000	1000	SUS310S	157	Effective Volume: 20L; Speed: 0~10rpm; Gas flow: 20m³/h

R6CA9.5 Isometric View

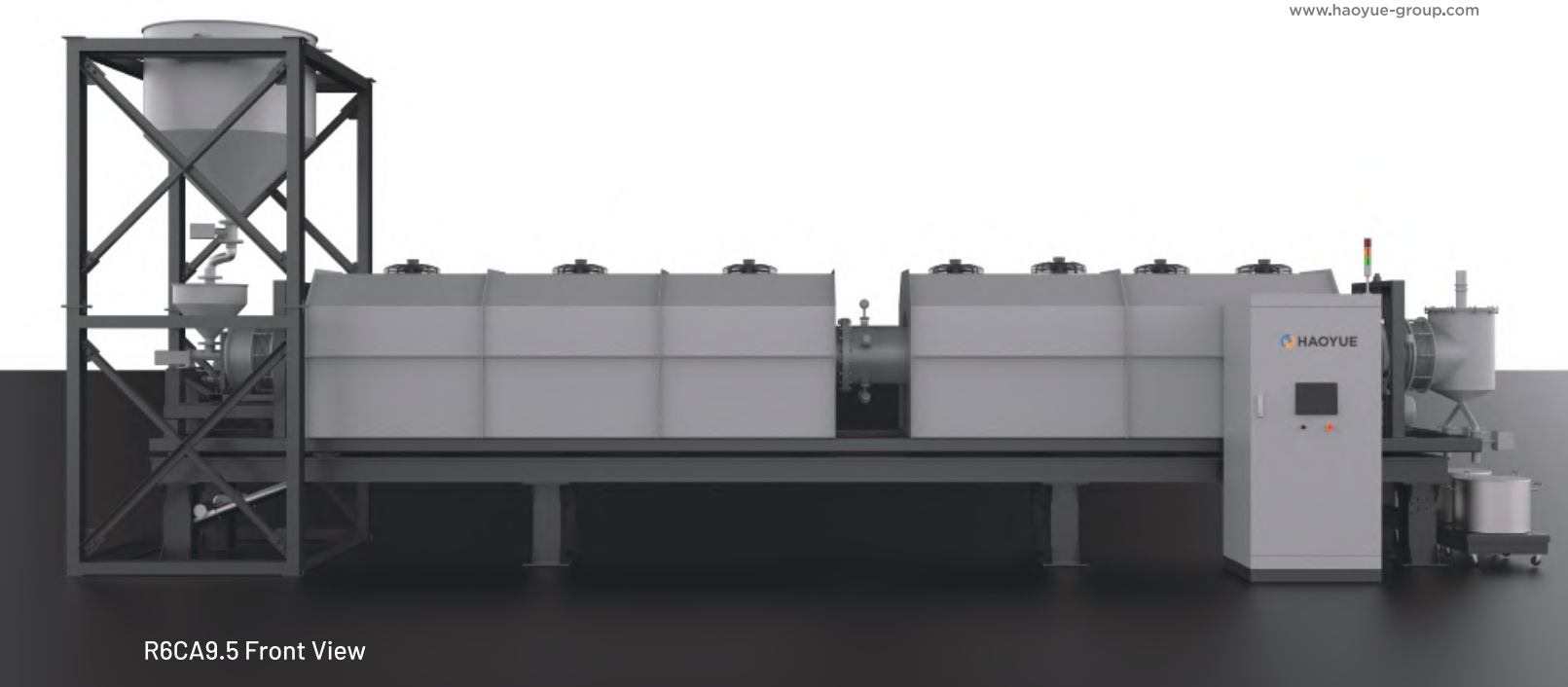
CONTINUOUS ROTARY FURNACE R Series

Good Temperature Uniformity
Fast Heating Speed
High Production Efficiency
Good Safety Performance

BRIEF INTRODUCTION

This continuous rotary furnace of HaoyueTechnology uses high-quality resistancewire as the heating element, adopts double-layer shell structure, 30-stage programmed temperature control system, phase shifttrigger,thyristor control, the furnace is made of imported high-purity alumina polycrystallineber material, and the double-layer furnace shell is equipped with an air-cooling system, which can quickly raise and fall the temperature, and adopts high-purity 310s stainless steeltube, which has the advantages of balanced temperatureeld, low surface temperature, fast temperature rise and fall rate, and energy saving.

The rotary kiln adopts international advanced technology, mainly for the mix edring of powder, the furnace tube can rotate 360° when the instrument is running, and the furnace body can betilted, the inclination angle can reach 0.5-6°, which can increasethe uniformity of powder sintering, so it is especially suitable for the sintering ofl ithium battery materials and the reaction sintering of other compounds.The diameter of this rotary furnace is optional, and the heating zone can be customized.



R6CA9.5 Front View

ADVANTAGES

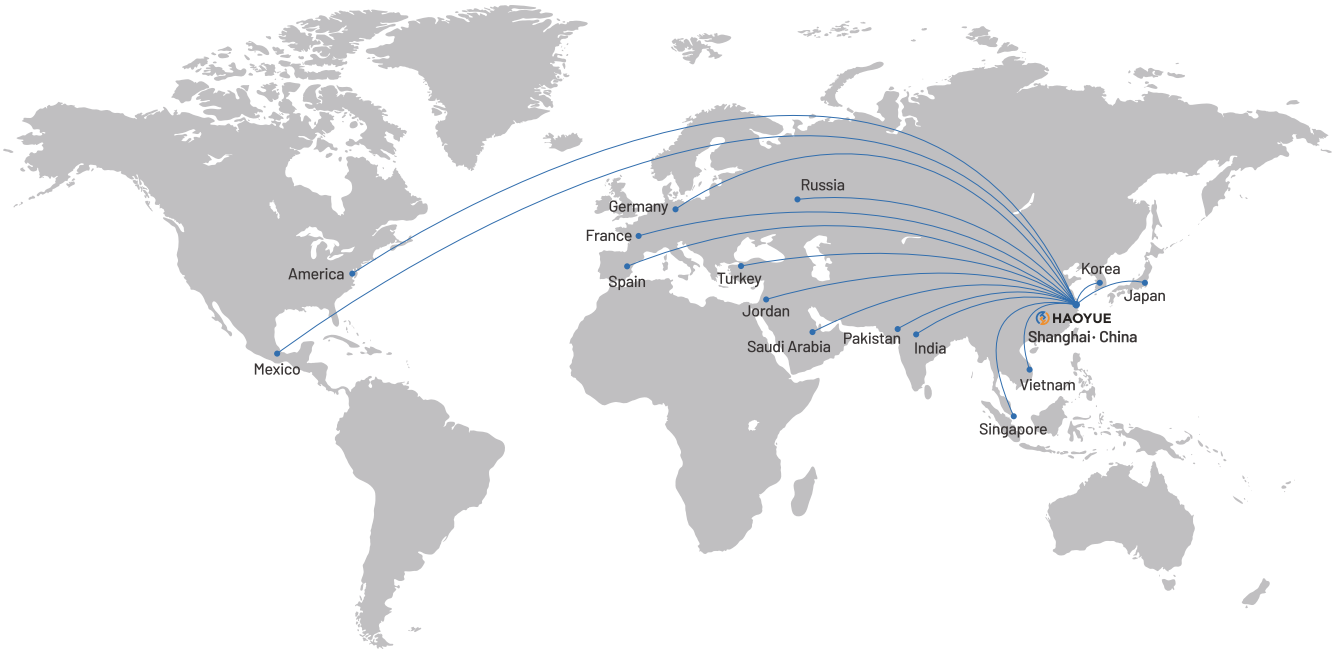
- Compact structure, simple operation and easy maintenance;
- High precision atmosphere control, automatic temperature control;
- Adopting dynamic sintering method to significantly improve thermal efficiency;
- Specially made metal liner, corrosion-resistant;
- PLC control and touch screen for human-machine interaction;
- Fully sealed structure, low amount of protective gas used;
- Continuous production and significant increase in production capacity;
- Adopting dynamic sintering method, there is no over burning or entrainment phenomenon;
- High automation program: If an automatic loading and unloading system is selected, all processes can be fully automated, digitized, intelligent, and without the need for manual intervention.

APPLICATIONS

The sintering process has been widely used in many industrial industries such as steel industry, metallurgical industry, ceramic industry, etc., such as cemented carbide, ceramics, refractories, powder metallurgy, ultra-high temperature materialring, etc..

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Device Form	Chamber Size (mm)	Operating Temperature (°C)	Tube Material	Heating Power (KW)	Note
R2CA9.5	ACSa-27.3/240-950	Resistance Wires	Continuous	Φ273×2400	950	SUS310S	27	Effective capacity: 8L/h; Speed: 0~5rpm; Gas flow: 20m³/h
R4CA9.5	ACSa-40/550-950	Resistance Wires	Continuous	Φ400×5500	950	SUS310S	90	Capacity: 24kg/h(Specific gravity: 0.5t/m³); Speed: 0~3rpm; Gas flow: 20L/min
R6CA9.5	ACSa-60/600-950	Resistance Wires	Continuous	Φ600×6000	950	Nickel-based alloys	160	Capacity: 80kg/h(Specific gravity: 0.5t/m³); Speed: 0~3rpm; Gas flow: 200m³/min
R13CA9.5	ACSa-130/1300-950	Resistance Wires	Continuous	Φ1300×13000	950	SUS321	330	Capacity: 1500kg/h(Specific gravity: 0.5t/m³); Speed: 0~5rpm; Gas flow: 120m³/h



SHANGHAI HAOYUE TECHNOLOGY CO.,LTD

Office Add: Building B2, No.7301, Jiasong North Road, Jiading District, Shanghai

Factory Add: No.1, Jufeng Science and Technology Industrial Park, Tongzhou District, Nantong, Jiangsu

Tel: 86-21-51095287 Fax: 86-21-51095281

E-mail: sales@haoyue-group.com