HAOYUE

BE AN

EXPLORER & PIONEER & LEADER

IN THE FIELD OF ADVANCED SINTERING

www.haoyue-group.com

HY-2025-EI

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 7000㎡ 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 1500 ㎡. 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 System (SPS+Induction) 03

S series Semi-continuous Type Spark Plasma Sintering 05

S series Continuous SPS Plasma Sintering Furnace 07

V series Vacuum Furnace (Graphite) 09

V series Vacuum Furnace (Moly) 11

V series Vacuum Furnace (Tungsten) 13

V series Vacuum Furnace (Induction) 15

V series Continuous Vacuum Furnace 17

I series Hot Isostatic Pressing Series 19

P series Vacuum Hot Pressing Furnace 21

P series Vacuum Hot Pressing Furnace 23

P series Continuous Hot Pressing Furnace 25

G series Gas Pressure Sintering Furnace 27

G series Gas Pressure Sintering Furnace 29

H series Hydrogen Furnace 31

C series Chemical Vapor Deposition Furnace (CVD/CVI) 33

D series Vacuum Diffusion Welding 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 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 usedto prepare metal materials, ceramic materials, composite materials, as well as nano bulk materials, amorphous bulk materials, gradient materials, etc.

S-150 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}.

S-150 Front View

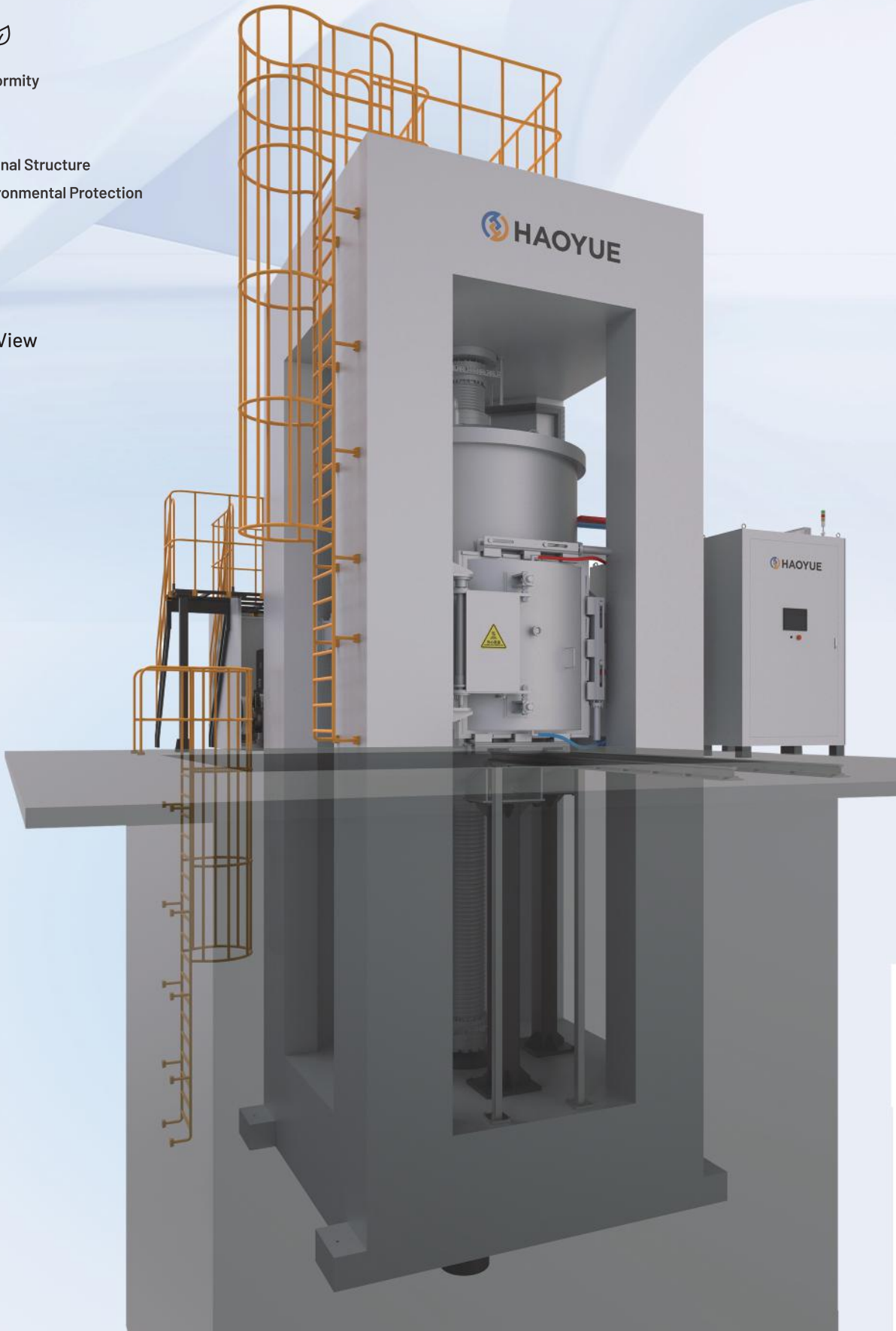
SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
S-150	VHPsp-25/60-2200	Φ250×600	Φ150	100	5	2200
S-200	VHPsp-35/60-2200	Φ350×600	Φ200	200	5	2200
S-300	VHPsp-40/80-2200	Φ400×800	Φ300	300	5	2200
S-400	VHPsp-60/80-2200	Φ600×800	Φ400	400	5	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 (°C)
S-200D	VHPsp-35/60-2200	Φ350×600	Φ200	200	5	2200
S-300D	VHPsp-40/80-2200	Φ400×800	Φ300	300	5	2200
S-400D	VHPsp-60/80-2200	Φ600×800	Φ400	400	5	2200

S SERIES SEMI-CONTINUOUS TYPE SPARK PLASMA SINTERING

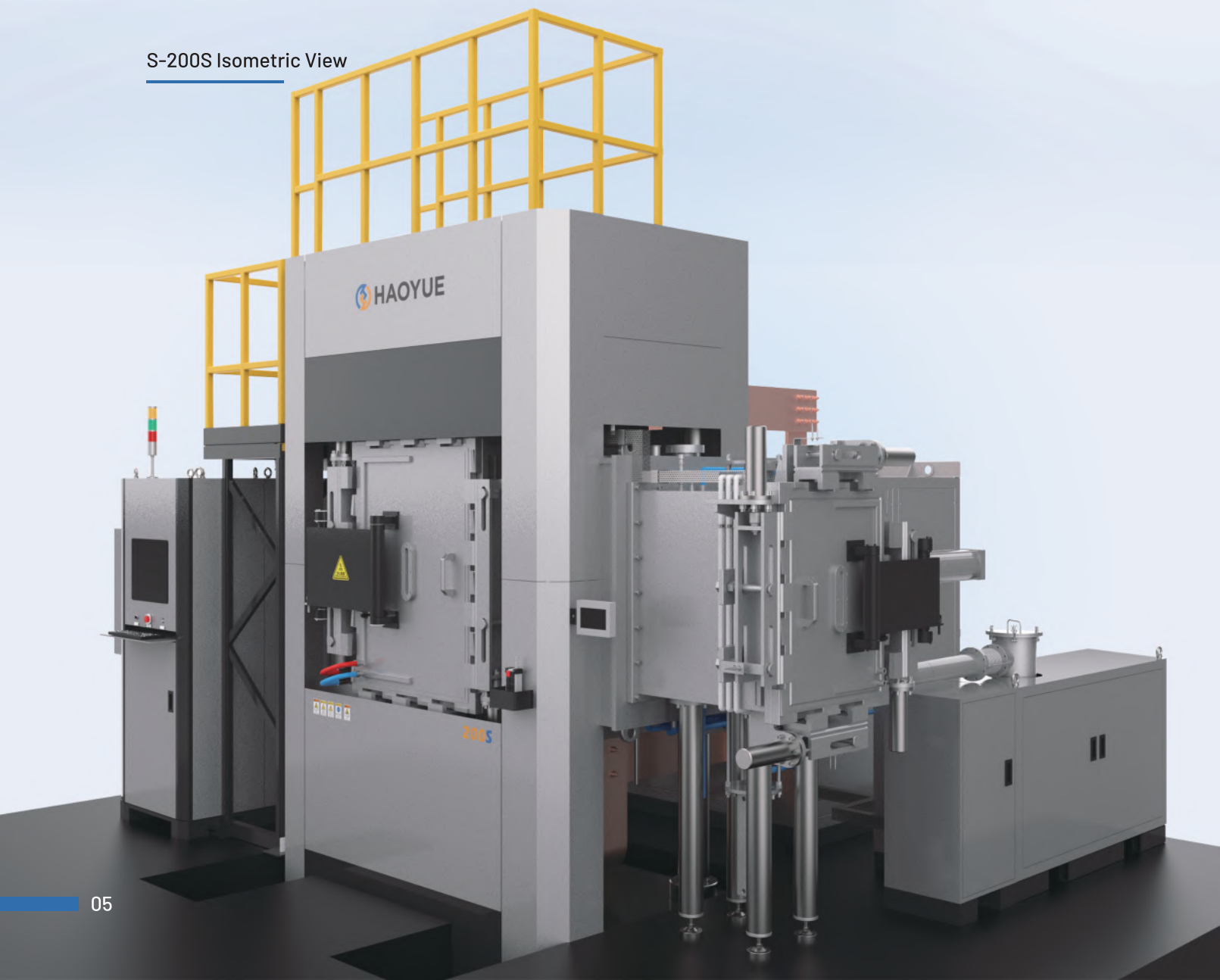
S Series

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.

S-200S 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}.

S-200S Front View

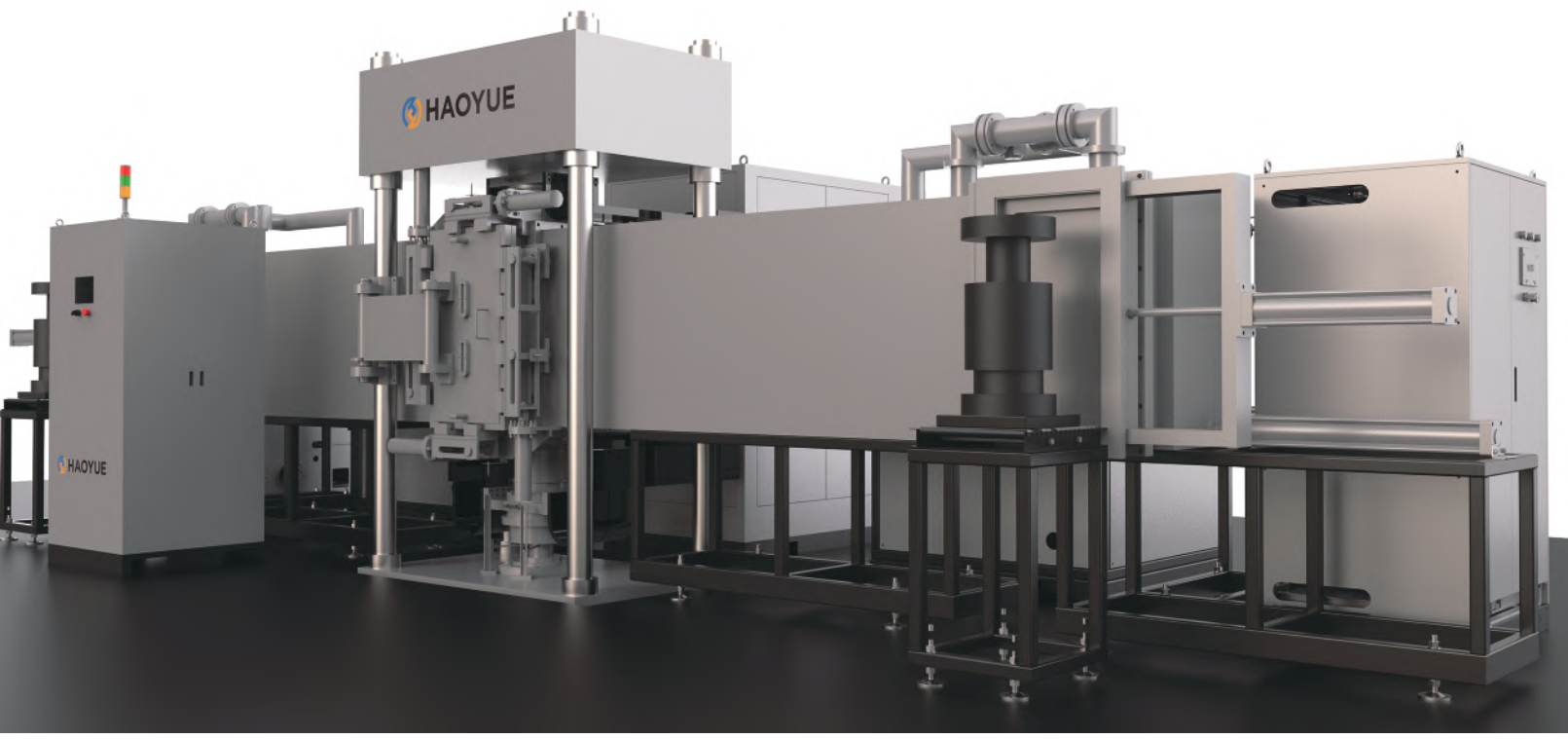
SPECIFICATIONS & PARAMETERS

Numbering	Model	Device form	Sample Dia. (mm)	Pressure (ton)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
S-150S	VSPsp-25/60-2200	Semi-continuous (Two chamber)	Φ150	100	10	2200
S-200S	VSPsp-35/60-2200	Semi-continuous (Two chamber)	Φ200	200	10	2200

CONTINUOUS SPS PLASMA SINTERING FURNACE

S Series

S-150C 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.

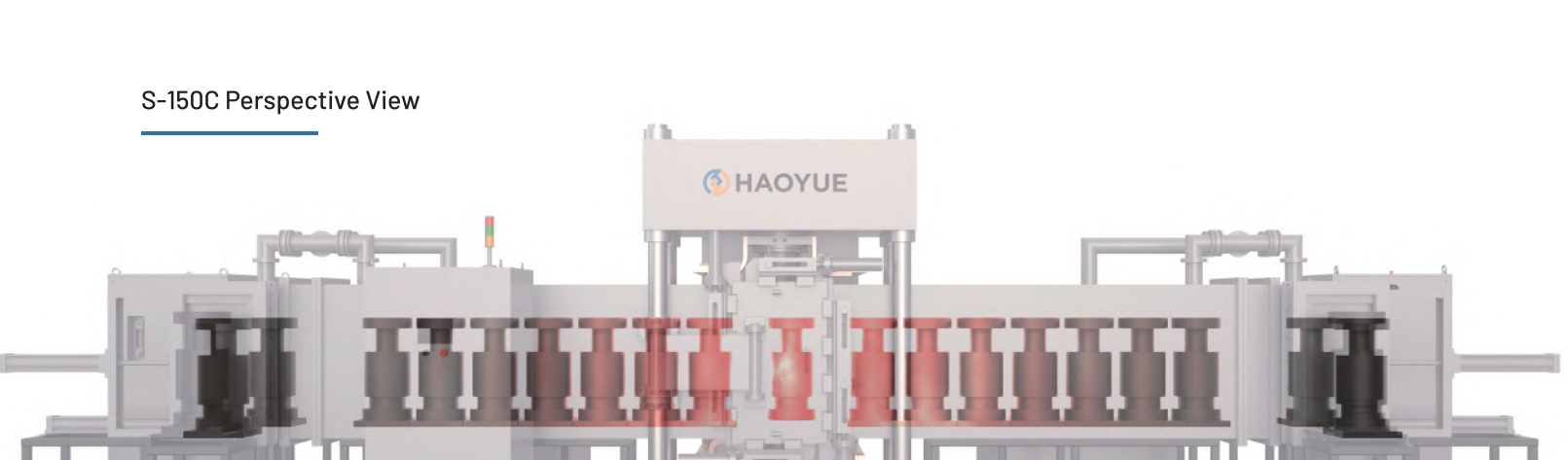
APPLICATIONS

- **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)
S-150C	VCPsp-25/60-2200	Continuous	Φ150	100	10	2200
S-200C	VCPsp-35/60-2200	Continuous	Φ200	200	10	2200

S-150C Perspective View



VACUUM FURNACE (GRAPHITE)

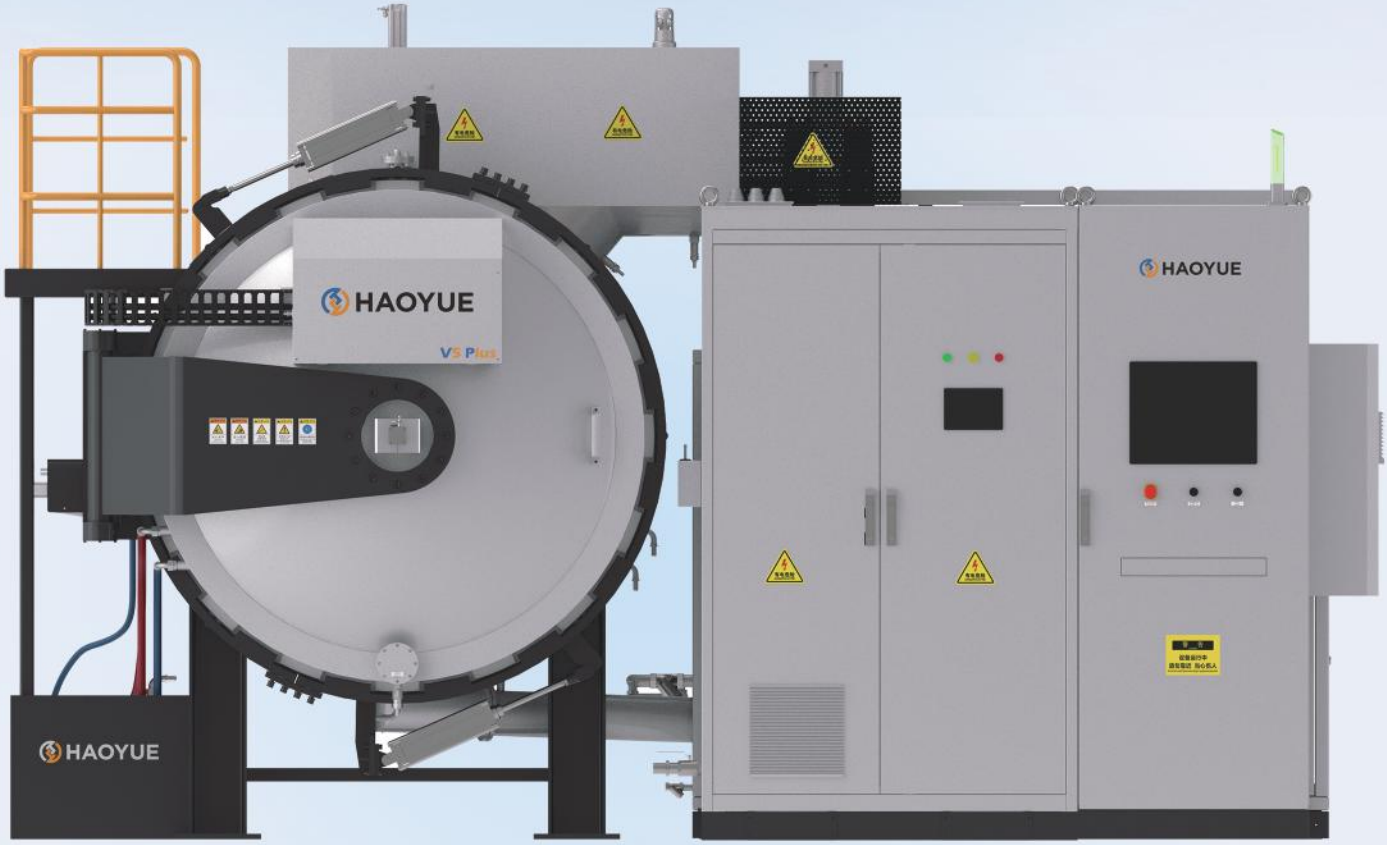
V Series

High Stability
Good Temperature Uniformity
High Cleanliness of Furnace
Fast Heating Rate
Good Safety Performance
Fast Cooling Speed
Strong Scalability

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.

V5-Plus Front 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 programmable tempereture 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.

V5-Plus Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V4GR24	VHSgr-40/40/60-2400	400×400×600	5	2000/2400	Sintering/Annealing/Degreasing
V6GR24	VHSgr-60/60/90-2400	600×600×900	5	2000/2400	Sintering/Annealing/Degreasing
V7GR24	VHSgr-70/70/100-2400	700×700×1000	5	2000/2400	Sintering/Annealing/Degreasing
V8GR24	VHSgr-80/80/120-2400	800×800×1200	5	2000/2400	Sintering/Annealing/Degreasing

VACUUM FURNACE (MOLY)

V Series

- High Stability
- Good Temperature Uniformity
- High Cleanliness of Furnace
- Fast Heating Rate
- Good Safety Performance
- Fast Cooling Speed
- Strong Scalability

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.

V10M013 Front View

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 programmable tempereture 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.

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.

V10MO13 Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V6MO13	VHSmo-60/60/90-1300	600×600×900	6.7×10^{-4}	1000/1300	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V7MO13	VHSmo-70/70/100-1300	700×700×1000	6.7×10^{-4}	1000/1300	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V8MO13	VHSmo-80/80/120-1300	800×800×1200	6.7×10^{-4}	1000/1300	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing
V10MO13	VHSmo-100/100/140-1300	1000×1000×1400	6.7×10^{-4}	1000/1300	Sintering/Annealing/Hydrogen/Degreasing/ Brazing/Degassing

VACUUM FURNACE (TUNGSTEN)

V Series

- High Stability
- Good Temperature Uniformity
- High Cleanliness of Furnace
- Fast Heating Rate
- Good Safety Performance
- Fast Cooling Speed
- Strong Scalability

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.

V4W20 Isometric View

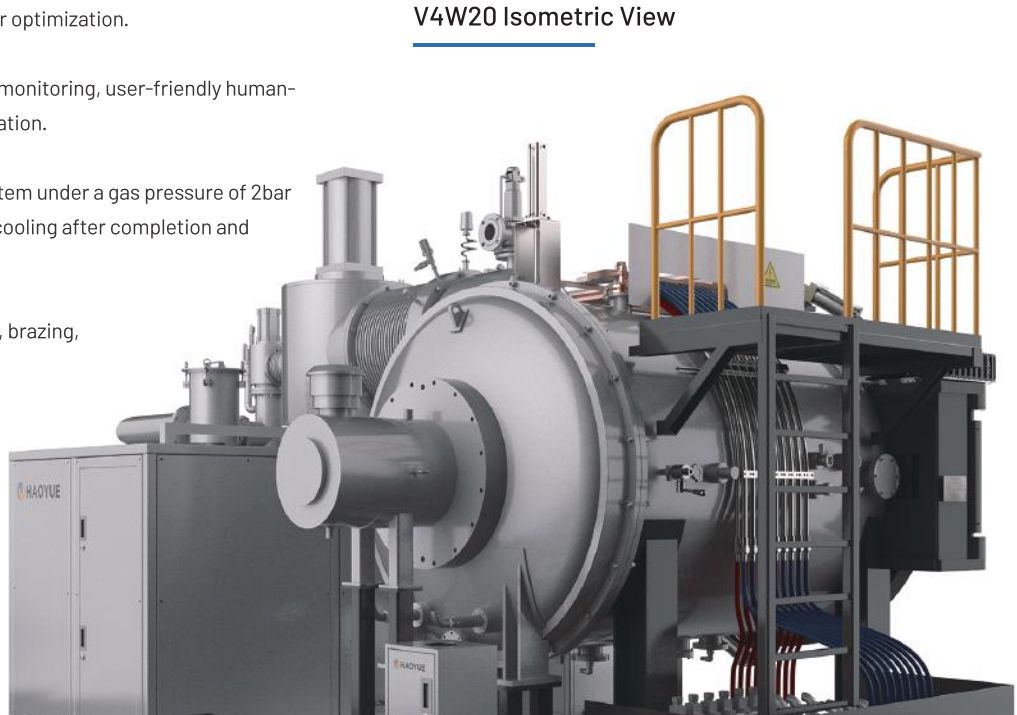
ADVANTAGES

- **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 programmable tempereture 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..

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.

V4W20 Isometric View



SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V3W20	VHSw-30/30/40-2000	300×300×400	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V4W20	VHSw-40/40/60-2000	400×400×600	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V5W20	VHSw-50/50/70-2000	500×500×700	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing
V6W20	VHSw-60/60/90-2000	600×600×900	6.7×10^{-4}	1800/2000	Sintering/Annealing/Degreasing/ Brazing/Degassing

VACUUM FURNACE (INDUCTION)

V Series

- High Stability
- Good Temperature Uniformity
- High Cleanliness of Furnace
- Fast Heating Rate
- Good Safety Performance
- Fast Cooling Speed
- Strong Scalability

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

V8C024 Isometric View

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 programmable tempereture 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..

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.

V6CO24 Isometric View

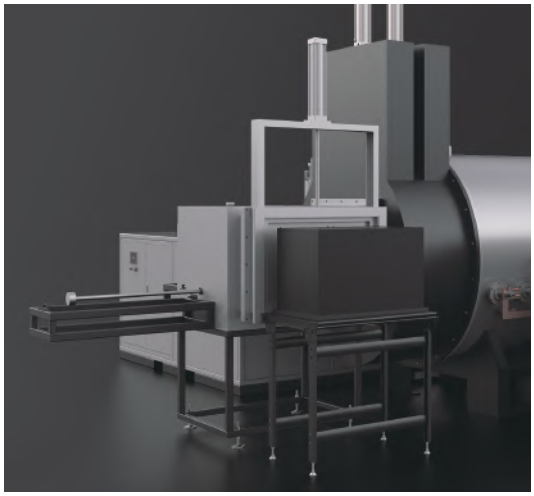
SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)	Applications
V6CO24	VHSco-60/60/90-2400	600×600×900	5	2000/2400	Sintering/Annealing/ Degreasing/Hydrogen
V8C024	VHSco-80/80/120-2400	800×800×1200	5	2000/2400	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

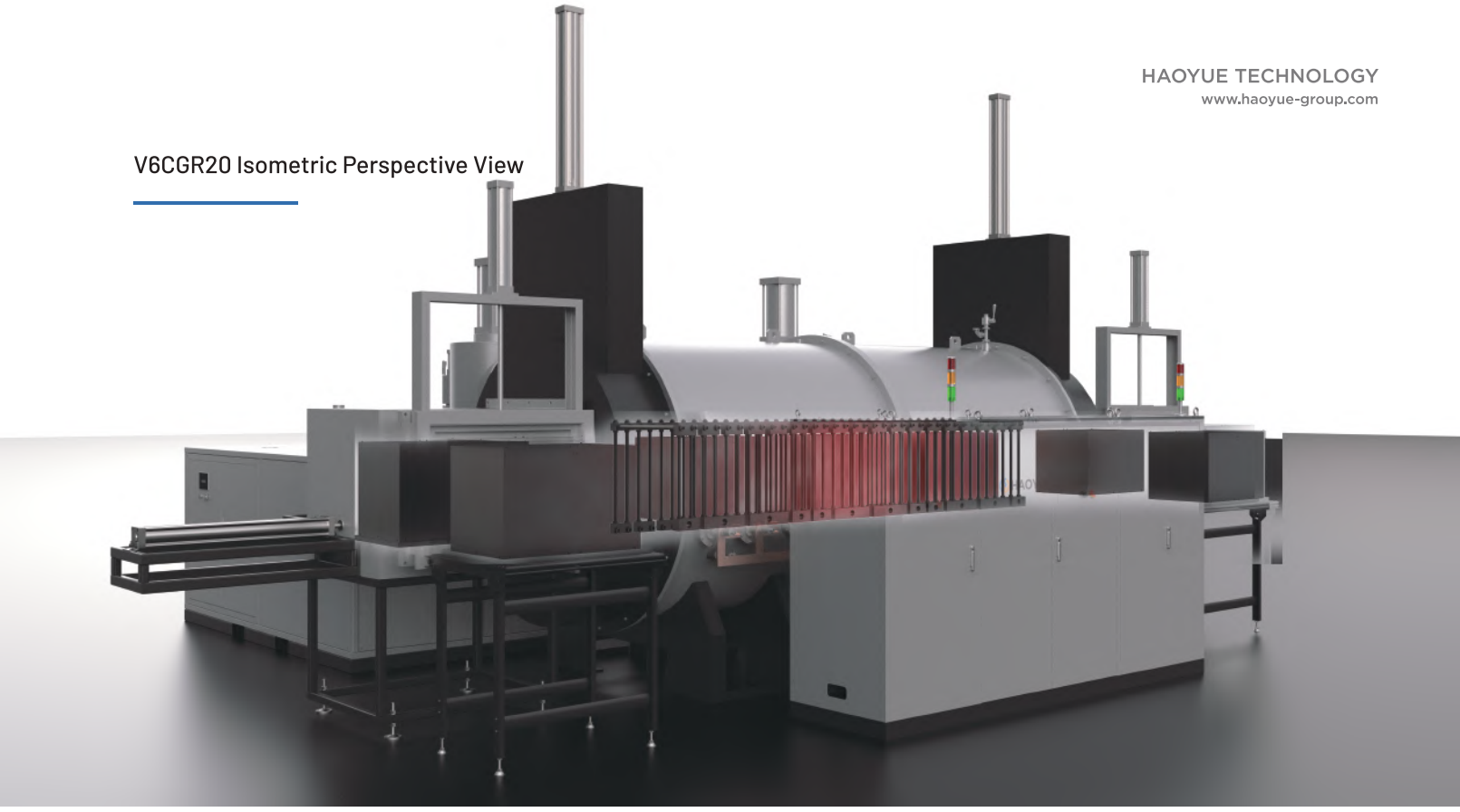


BRIEF INTRODUCTION

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	10	2000	Sintering / Annealing
V8CGR20	VCSgr-80/80/120-2000	800×800×1200	10	2000	Sintering / Annealing

HOT ISOSTATIC PRESSING SERIES

I Series

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

BRIEF INTRODUCTION

Hot Isostatic Pressing (HIP) is a special heat treatment process for metal or ceramic materials, which is an important means to prepare high-performance materials. This process technology can be used for powder metallurgy, moldings or densification of formed castings (titanium alloys, high-temperature alloys, aluminum alloys and other base shrinkage hole castings), using inert gas as the pressure transfer medium, the same pressure acts uniformly on the surface of the parts from all directions, eliminating the inherent internal defects of the product process, such as porosity, internal cracks, local porosity, etc., so as to improve the overall mechanical properties of the parts, especially the fatigue properties, while reducing costs and improving energy efficiency. After HIP treatment, the wear resistance, corrosion resistance and mechanical properties of the material will be greatly improved, and the fatigue life can be increased by 10-100 times.

I10CC20 Isometric View

ADVANTAGES

Versatile uses:

HIP: powder metallurgy, densification, diffusion bonding.

HIP powder metallurgy:

- **Design flexibility:** design to almost the same shape as the final product, reducing raw material waste, machining procedures, and transportation time.
- **The grain is fine and uniform, and it has isotropic material properties** -wear resistance, corrosion resistance, improved mechanical properties, and long life.
- **Uniform internal density** - no effect from ultrasonic testing.
- **No liquid phase** - minimizes segregation and improves material corrosion resistance.
- **Ingot blanks can be prepared from two different metals** - the bimetal can still be forged and extruded.

Densification:

- Elimination of internal defects, elimination of shrinkage porosity, shrinkage porosity, and segregation.
- Greatly improve fatigue life, 10-100 times.
- Improved ductility and fracture toughness.
- The product can reach theoretical density.
- Wear resistance, corrosion resistance is greatly improved.
- Relieves internal stresses in the material.

Diffusion Connection:

- Used to connect parts with complex shapes on the contact surface and achieve metallurgical connection.
  Multiple homogeneous or dissimilar materials can be joined in one process.
- Large-area connections can be quickly realized.
- It can make brittle metals that cannot be connected by conventional welding methods, or metals with large melting points with large melting point differences, realize solid-state connection.
- Due to the high and uniform isostatic pressure acting on the part, the microscopic porosity or cracks on the outside of the connection zone are reduced and eliminated.
- There are no defects such as welds, heat-affected zones, surface porosity, inclusions, undercuts, cracks and other defects generated in the traditional welding process.

APPLICATIONS

High-temperature alloys, titanium alloys, aluminum alloys, copper alloys, refractory metals, cemented carbides, stainless steel, corrosion-resistant alloys, ceramics, composite materials, electronic materials, functional materials, etc.

I5M014 Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Max. Temperature (°C)	Gas Pressure (MPa)	Ultimate Vacuum (Pa)	Applications
I5CC20	IVScc-50/100-2000	C/C	Vertical	Top Loading	Φ500x1000mm	2000	100/150/200	10	Hot Isostatic Sintering
I10MO14	IVSmo-100/200-1400	MO	Vertical	Top Loading	Φ1000x2000mm	1400	100/150/200	10	Hot Isostatic Sintering

VACUUM HOT PRESSING FURNACE 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

- **Vertical/horizontal, side-opening structure:** High precision in mold loading and unloading, easy to operate.
- **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.
- **Fast heating:** Heating rate of 1~10°C/minute (≤ 1600°C), heating rate of 1~5°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 2 hour before detection).
- **High pressure accuracy:**
  Using a hydraulic control system, the pressure accuracy is ≤±3‰.
- **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.
- **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.

P5HGR22 Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Structure	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	UltimateVacuum (Pa)	Operating Temperature (°C)	Applications
P5VGR22	VVPgr-50/70-2200	Vertical	Φ500×700	Φ300	300	5	2200	Hot Pressing/Sintering/ Diffusion Welding
P7VGR22	VVPgr-70/90-2200	Vertical	Φ700×900	Φ420	600	5	2200	Hot Pressing/Sintering/ Diffusion Welding
P5HGR22	VHPgr-50/50-2200	Horizontal	Φ500×500	Φ300	300	6.7×10^{-3}	2200	Hot Pressing/Sintering/ Diffusion Welding
P7HGR22	VHPgr-70/60-2200	Horizontal	Φ700×600	Φ420	600	6.7×10^{-3}	2200	Hot Pressing/Sintering/ Diffusion Welding

VACUUM HOT PRESSING FURNACE P Series

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

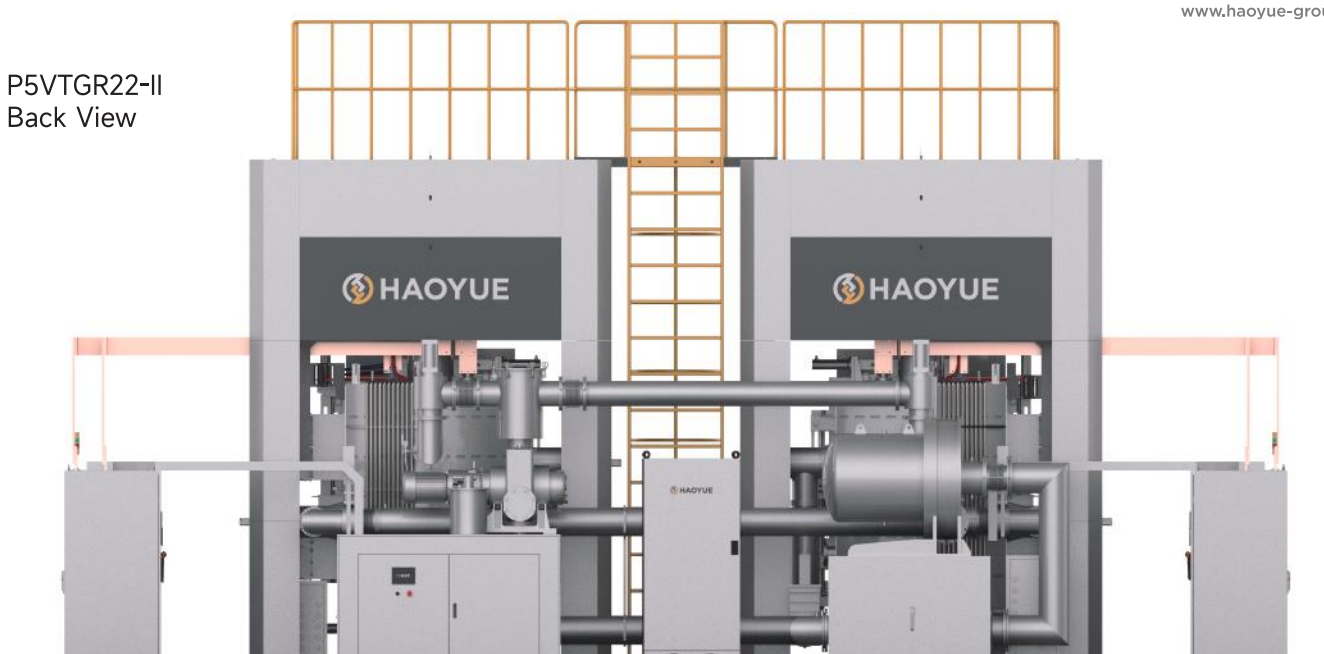
BRIEF INTRODUCTION

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, there by compressing the material into shape.

It can be designed as one to two, double press and double furnace body, one set of control system, and one set of vacuum system, which occupies a small area, has low cost and high efficiency.

P7VTGR22-II Front View

P5VTGR22-II
Back View



ADVANTAGES

- **Adopting a vertical and upward opening structure:** high precision for loading and unloading molds, easy to operate.
- **Fast heating:** heating rate of 1~15°C/minute (<1600°C), heating rate of 1~10°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

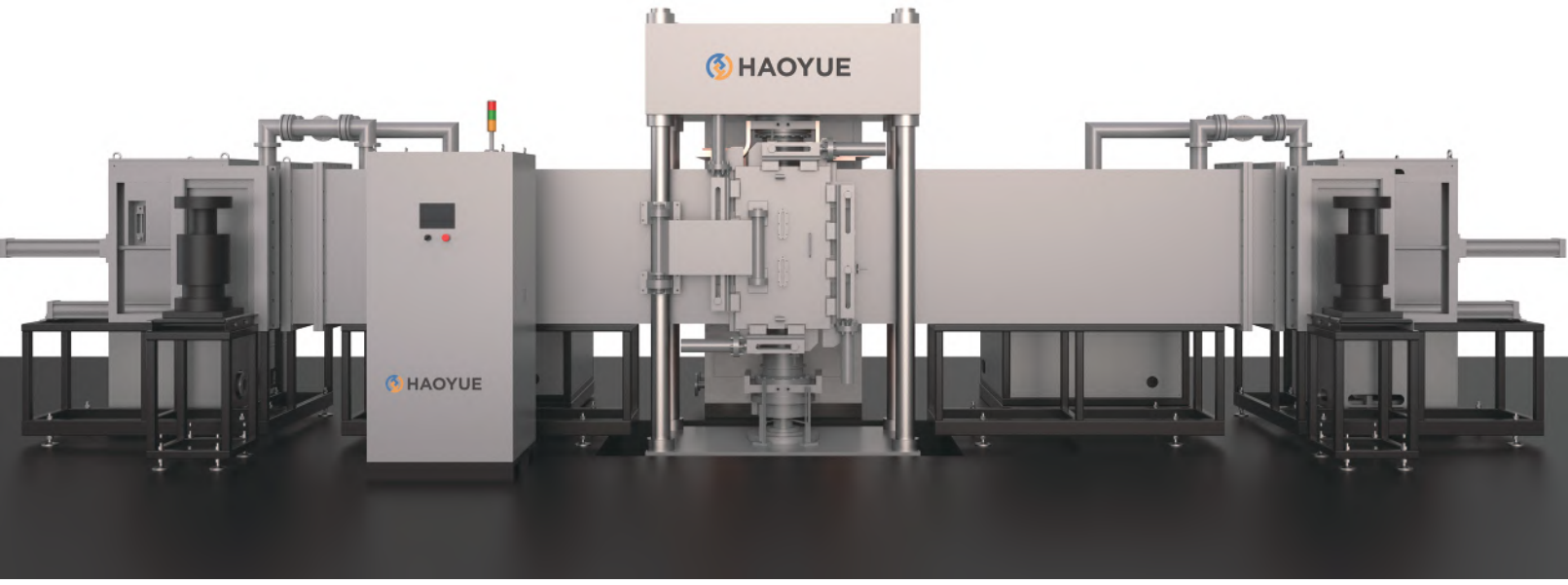
Suitable for ceramic materials such as niobium oxide, silicon carbide, boron carbide, boron nitride, or graphene carbon, High temperature pressure sintering and densification powder metallurgy of fiber and high-temperature alloy metal powder materials,High temperature hot forming of new materials such 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	Structure	Chamber Size (mm)	Sample Dia. (mm)	Pressure (ton)	UltimateVacuum (Pa)	Operating Temperature (°C)	Applications
P5VTGR22-II	VTPgr-50/70-2200-II	Double Chambers	Φ500×700	Φ250	300	5	2200	Hot Pressing/Sintering/ Diffusion Welding
P7VTGR22-II	VTPgr-70/90-2200-II	Double Chambers	Φ700×900	Φ420	600	5	2200	Hot Pressing/Sintering/ Diffusion Welding

P7CGR22 Front View



CONTINUOUS HOT PRESS FURNACE P Series

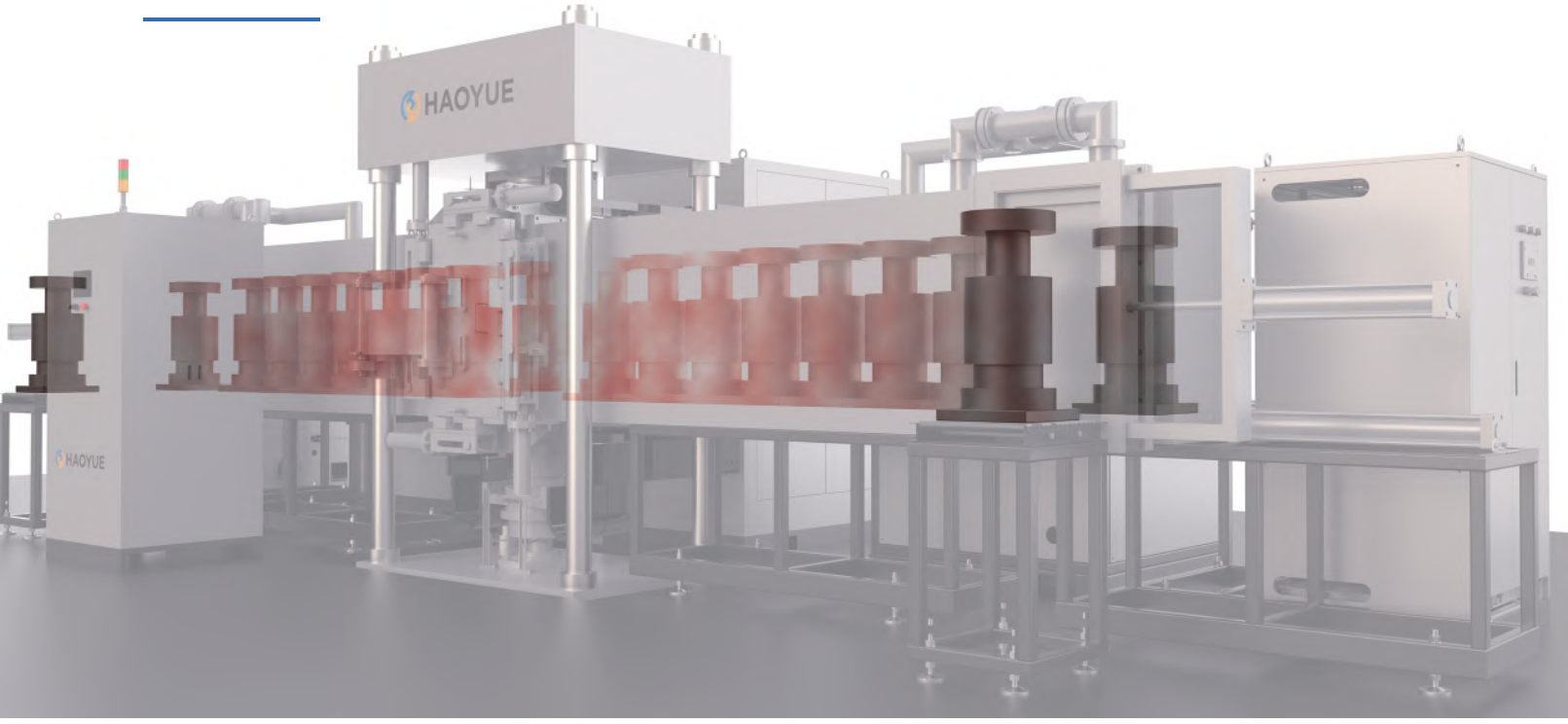
Good Design Optimization
Temperature Uniformity
Fast Heating Speed
High Pressure Accuracy
Good Safety Performance

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)
P5CGR22	VCPgr-50/50-2200	Φ500×500	Continuous	Φ300	200	10	2200
P7CGR22	VCPgr-70/60-2200	Φ700×600	Continuous	Φ420	600	10	2200

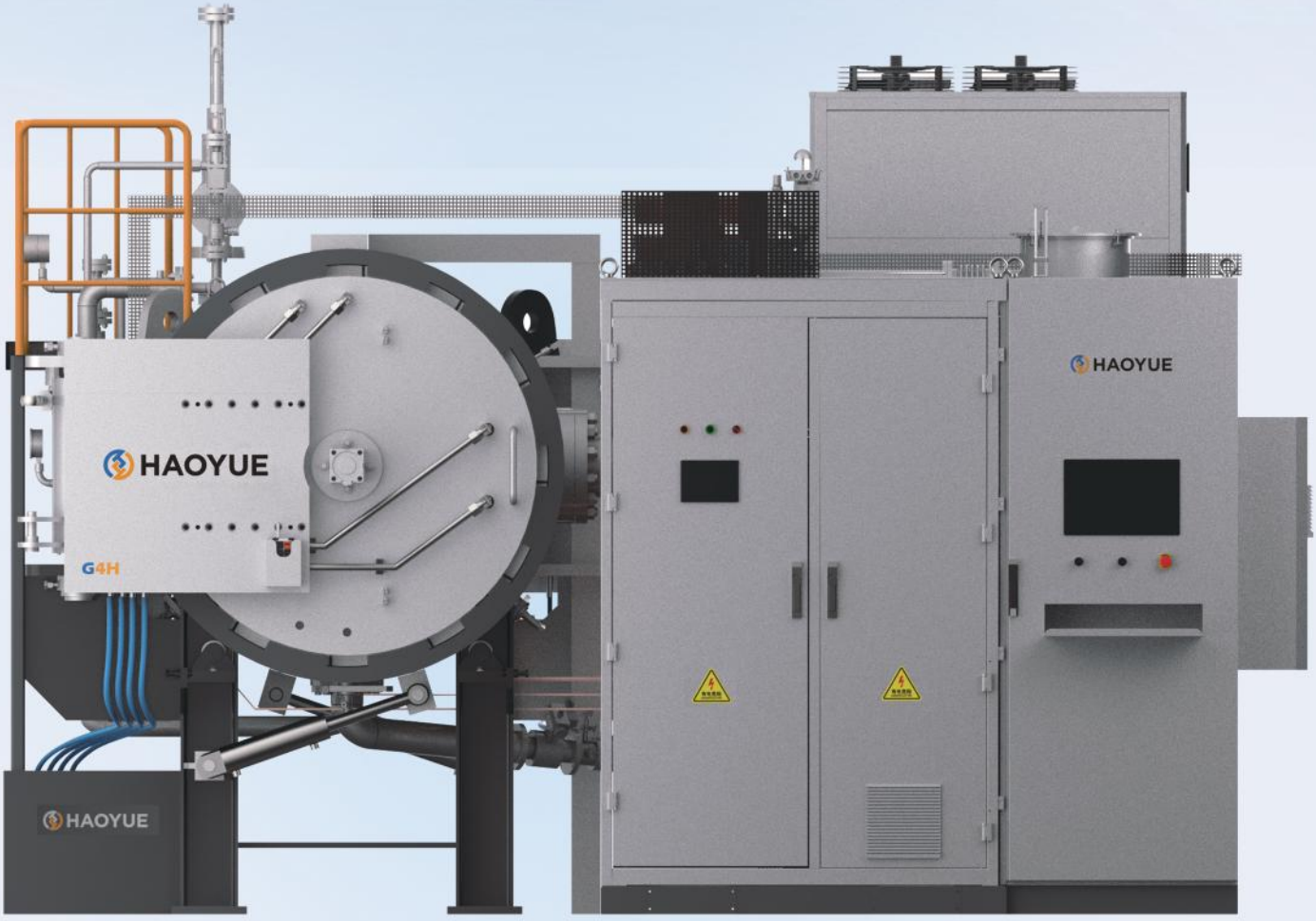
GAS PRESSURE SINTERING FURNACE G Series

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.

G4H 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.

G4H Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Operating Temperature (°C)	Gas Pressure (MPa)	Ultimate Vacuum (Pa)	Applications
G4H	PHSgr-40/40/120-2000	GR	Horizontal	Side Loading	400×400×1200	1600/2000	6/10	10	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G5H	PHSgr-50/50/180-2000	GR	Horizontal	Side Loading	500×500×1800	1600/2000	6/10	10	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen

GAS PRESSURE SINTERING FURNACE 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.

G5V Isometric View

ADVANTAGES

- Vertical 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.

G3V Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Operating Temperature (°C)	Gas Pressure (MPa)	Ultimate Vacuum (Pa)	Applications
G3V	PHSgr-30/50-2000	GR	Vertical	Bottom Loading	Φ300×500	1600/2000	6/10	10	Gas Pressure Sintering/ Partial Pressure Sintering/ Degreasing/Hydrogen
G5V	PHSgr-50/100-2000	GR	Vertical	Bottom Loading	Φ500×1000	1600/2000	6/10	10	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

HV65/120V Isometric 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

H8M013 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

H65/320V Front View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Heater	Structure	Loading	Chamber Size (mm)	Ultimate Vacuum (Pa)	Operating Temperature (°C)
H65/120V	VVSmo-65/120-1300	MO	Vertical	Bottom Loading	Φ650×1200	6.7×10^{-1}	1000/1300
H65/320V	VVSmo-65/320-1300	MO	Vertical	Top Loading	Φ650×3200	6.7×10^{-1}	1000/1300
H6MO13	VHSmo-60/60/90-1300	MO	Horizontal	Side Loading	600×600×900	6.7×10^{-1}	1000/1300
H7MO13	VHSmo-70/70/100-1300	MO	Horizontal	Side Loading	700×700×1000	6.7×10^{-1}	1000/1300
H8MO13	VHSmo-80/80/120-1300	MO	Horizontal	Side Loading	800×800×1200	6.7×10^{-1}	1000/1300

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 programmable tempereture 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-50/60-1600	Φ500×600	5	1600	CVD/CVI
C6VGR16	VVCgr-80/90-1600	Φ800×900	5	1600	CVD/CVI
C7VGR16	VVCgr-100/100-1600	Φ1000×1000	5	1600	CVD/CVI
C8VGR16	VVCgr-110/120-1600	Φ1100×1200	5	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.

D5M014 Front 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.

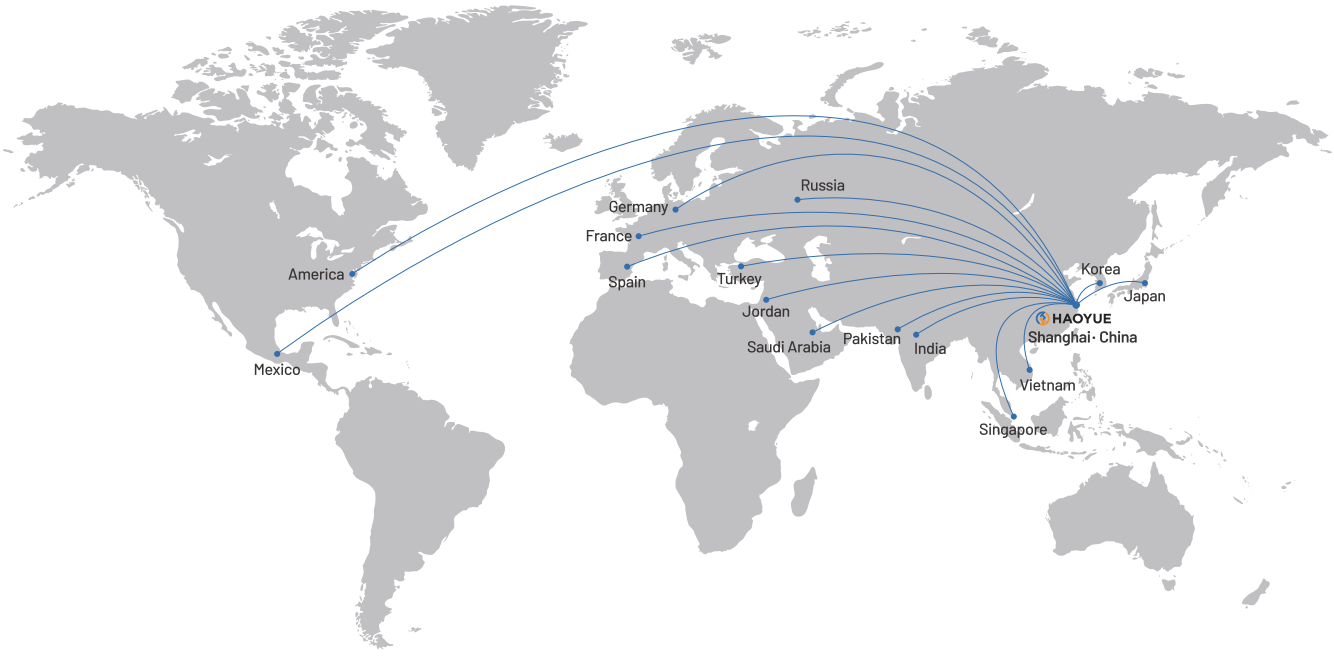
The joint performance of diffusion welding can be the same as that of the base metal, and it is especially suitable for welding dissimilar metal materials, non-metallic materials such as graphite and ceramics, dispersion strengthened superalloys, metal matrix composites and porous sintered materials.

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.

D5MO14 Isometric View

SPECIFICATIONS & PARAMETERS

Numbering	Model	Chamber Size (mm)	Ultimate Vacuum (Pa)	Pressure (ton)	Operating Temperature (°C)	Punch Qty.	Cooling Gas	Applications
D5MO14	VHDBmo-50/50/70-1400	500×500×700	6.7×10^{-4}	30~300	1400	1/2	2-10Bar	Diffusion Welding
D6MO14	VHDBmo-60/60/90-1400	600×600×900	6.7×10^{-4}	50~500	1400	1/2	2-10Bar	Diffusion Welding
D7MO14	VHDBmo-70/70/100-1400	700×700×1000	6.7×10^{-4}	200~1000	1400	2/4	2-10Bar	Diffusion Welding
D8MO14	VHDBmo-80/80/120-1400	800×800×1200	6.7×10^{-4}	300~1000	1400	2/4	2-10Bar	Diffusion Welding



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