

Hot Presses

Standard Model Series

A variety of models with enhanced functions for diversified needs.



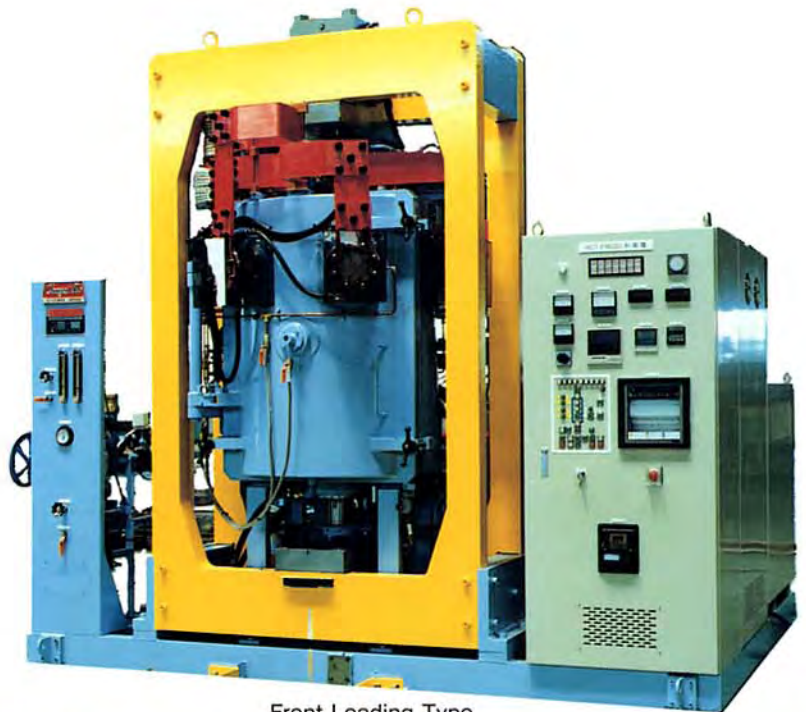
CHUGAI RO CO., LTD.

Manufacturing technology for new materials created from our outstanding high temperature furnace technology and unique press engineering.

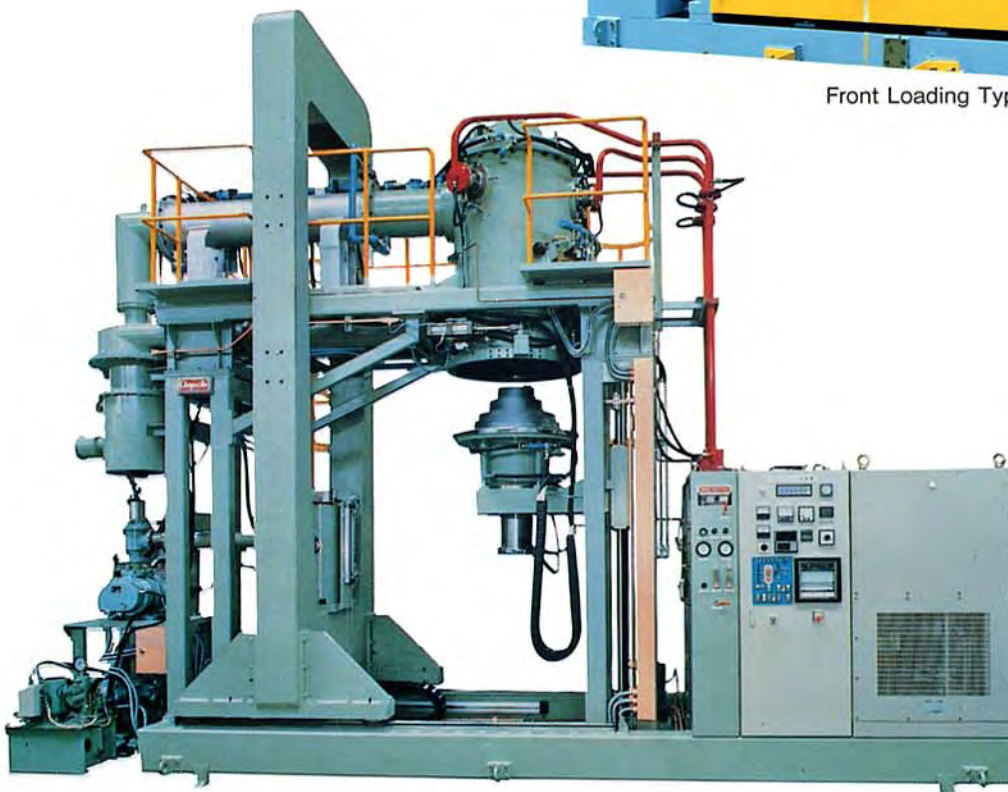
Chugai Ro high temperature furnaces offer the experience and reputation for excellent reliability under high temperature and high pressure operations.

Based on high temperature furnace engineering, this superior hot press was created by enhancing the operating capabilities that originated in Chugai Ro's innovative press engineering.

A variety of models are available to meet the diversified needs for new materials.

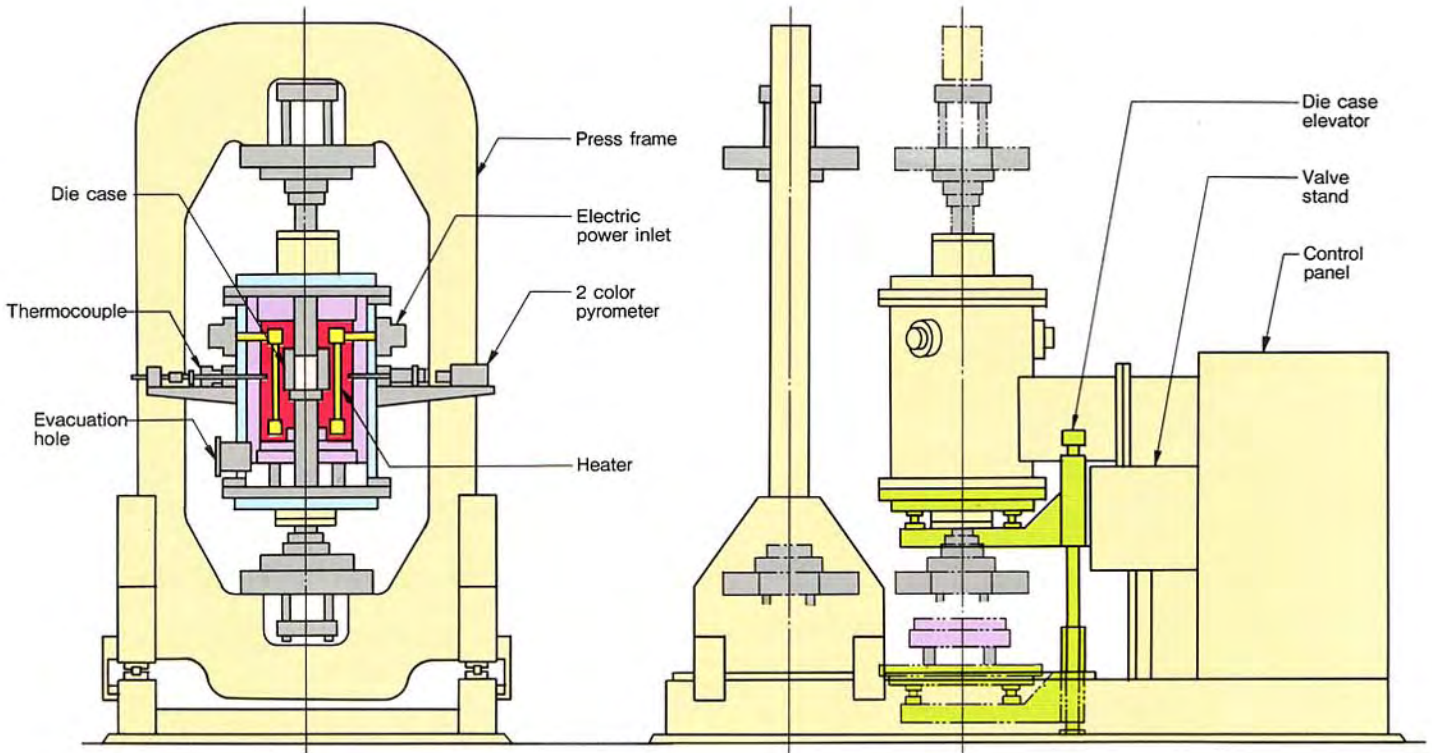


Front Loading Type



Bottom Loading Type

Construction



Designation

Chugai Ro hot presses are available in three types depending on the atmosphere gas used; an inert gas atmosphere hot press (Type G) for non-oxide base ceramics, graphite, etc.; using N₂, Ar, He etc.; oxidation atmosphere hot press (Type A) for oxide base ceramics using atmosphere air, oxygen, etc.; and high vacuum atmosphere hot press (Type M) which press-forms target material using high vacuum, hydrogen, high purity inert gas, etc.

You can select the optimum press for the intended application, by combining factors of the inside furnace dimensions, the maximum operating temperature, the atmosphere gas pressure, the press pressure, and the furnace type.

G 30×30 MT — B — GP HP100

Symbol	Atmosphere Gas Used	Symbol	Work Space (D×Hmm)	Symbol	Max. Operating Temperature (°C)	Symbol	Loading Position	Symbol	Max. Operating Gas Pressure (MPa)	Symbol	Max. Pressure (kN)
G	N ₂ , Ar, He, etc.	20×20	200φ×200	LT	below 2000	B	Bottom Loading	—	below 0.2	HP25	250
		30×30	300φ×300							HP50	500
A	Atmosphere air, Oxygen	40×40	400φ×400	MT	2000~2500	F	Front Loading	GP	0.2~1.0	HP100	1000
M	High vacuum, Hydrogen, High purity inert gas	50×50	500φ×500	HT	2500~					HP150	1500
		70×70	700φ×700			HP300	3000				

Note 1. When type A or type M is selected, the maximum operating temperature is less than 1500°C depending on the material of the die case.

2. For selection of the 2 chamber type and 3 chamber type, refer to the hot presses on page 4.

3. The standard ultimate vacuum level is 0.5Pa (3.7×10⁻³Torr) in Type G, A and 0.01Pa (7.5×10⁻⁵Torr) in Type M.

4. For the operating atmosphere gas and the maximum operating temperature, please inform us as to the kind and purity of gas used and the operating temperature.

5. Hot presses based on specifications other than the above are also available upon request.

Standard Specifications

● Inert Gas Atmosphere Hot Press (Type G)

Model	Work Space (D×Hmm)	Max. Operating Temperature (°C)	Max. Operating Gas Pressure (MPa)	Vacuum Level (Pa)	Max. Pressure (kN)
G20×20MT-B-HP 25	200φ×200	2400	0.19	0.5 (3.7×10 ⁻³ Torr)	250
G30×30MT-B-HP 50	300φ×300				500
G40×40MT-B-HP100	400φ×400				1000
G50×50MT-B-HP100	500φ×500				1500
G70×70MT-B-HP300	700φ×700				3000

● Oxidation Atmosphere Hot Press (Type A)

Model	Work Space (D×Hmm)	Max. Operating Temperature (°C)	Max. Operating Gas Pressure (MPa)	Vacuum Level (Pa)	Max. Pressure (kN)
A20×20LT-B-HP 25	200φ×200	1500	0.19	0.5 (3.7×10 ⁻³ Torr)	250
A30×30LT-B-HP 50	300φ×300				500
A40×40LT-B-HP100	400φ×400				1000
A50×50LT-B-HP150	500φ×500				1500
A70×70LT-B-HP300	700φ×700				3000

● High-vacuum Atmosphere Hot Press (Type M)

Model	Work Space (D×Hmm)	Max. Operating Temperature (°C)	Max. Operating Gas Pressure (MPa)	Vacuum Level (Pa)	Max. Pressure (kN)
M20×20LT-B-HP 25	200φ×200	1500	0.19	0.01 (7.5×10 ⁻⁵ Torr)	250
M30×30LT-B-HP 50	300φ×300				500
M40×40LT-B-HP100	400φ×400				1000
M50×50LT-B-HP150	500φ×500				1500
M70×70LT-B-HP300	700φ×700				3000

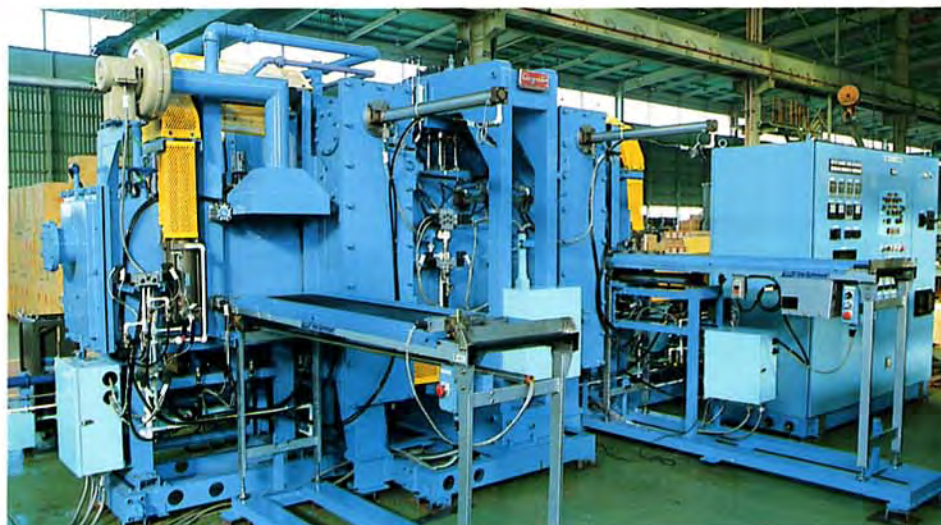
Note) 1. The above specifications are given as parts of a complete unit.
In addition, many models are available as combinations of various specifications.
2. Refer to page 3 "Designation" for model selection.

Continuous Hot Press (Patent Pending)

The continuous hot press processes a plurality of workpieces at a time in an atmosphere up to 2,000°C. This greatly increases production. A workpiece is pressed by each individual cylinder, where by the density of the sintered products is very uniform.

● Example of Specifications

Work Space	250mmW×300mmL×350mmH
Capacity	1.0MPa per pallet
Weight of Workpieces	Pulverulent
Heating Temperature	200°C maximum
Heating Element	Graphite
Operating Atmosphere	Vacuum and N ₂
Cycle Time	8~20 minutes
Press Capacity	Upper press 68kN×4 cylinder Lower press 343kN×1 cylinder
Zoning	No.1 zone:1,300°C (preheat) No.2 zone:1,600°C (press) No.3 zone:1,600°C(hold) No.4 zone:1,300°C (hold)



Features

1. High Performance Press Frame (Patent Pending)

This high precision frame is a one piece slab. The pressure driving surface and the pressure bearing surface are integrated into the frame to provide high pressure consistent with the theoretically calculated values without any distortion or changes resulting from ageing and deformation. In addition, on-site installation is easy because of the simple assembly. The separation and independence of the press frame and the die case mechanism as well as the horizontal movement of the frame itself, provide an ideal situation for ease of operation and safety. One press unit can also be joined to the operation of two furnaces.

2. Resistance Heating System

Each model uses the resistance heating system for uniform temperature distribution in the high temperature range, controllability, and heating efficiency. In addition, the heating rate is equivalent to the induction heating system to insure rapid heating. The use of the non-inductive die case also allows treatment of oxidized ceramics that could not be treated by an induction heating system.

3. Two Step Pressure Control System

The two step system controls high pressure and low pressure independently. This ease of control enables precise selection of the pressure suitable for an intended application.

4. High Pressure Atmosphere Available

Each type furnace can use high pressure atmosphere of 0.99 MPa. max.

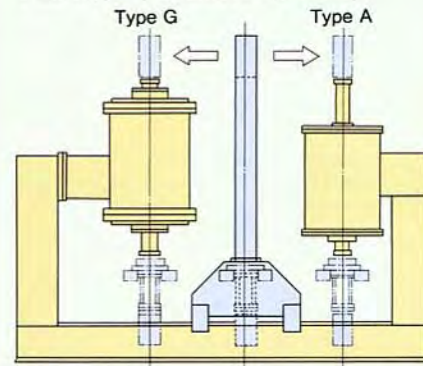
5. Hot Knock Out Mechanism

This mechanism removes the workpiece from the die case while it is still hot. This prevents damage to the die case or seizure of the workpiece which can be caused by the differences in cooling rate between the die case and the workpiece. This mechanism is especially effective for large furnaces and can be mounted as an option.

6. Process Automation and Safety Features

Complex processes such as temperature, atmosphere, pressure, etc. can be entirely automated. In addition, carefully designed safety features assure safe operation under both high temperature and high pressure.

● Example of 2 furnace 1 press operation

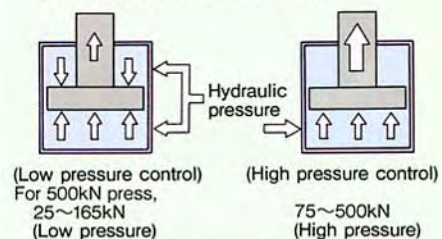


● Comparison of resistance heating system with induction heating system

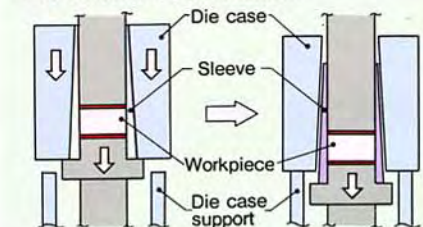
System	Resistance heating	Induction heating
Incoming capacity	330kVA	650kVA
Heating efficiency	97%	68%
Heating rate	1 hour up to 2000°C	
Cooling water for electric power	Not required	300 l/min
Installation space	Small space for step down transformer and power control thyristor	Large space for thyristor inverter panel and aligning panel

*The above comparison is subject to furnace effective dimension of 700mm diameter by 700mm height.

● Two step pressure control system

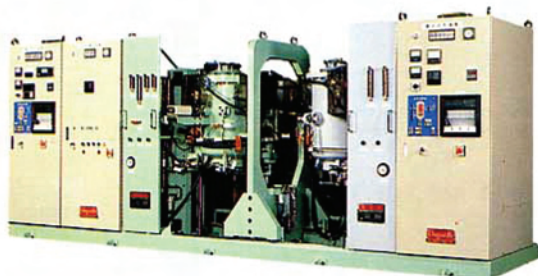


● Hot knock out mechanism



Laboratory Units

For laboratory use, too a variety of hot press models and sizes are available. Those models include "Twin Hot Press" which consists of an oxidizing furnace, an atmosphere furnace and a moving press frame, "Single Hot Press" consisting of a furnace and a press and "Box Type Hot Press" of the front loading design using a fixed press frame.



Twin Hot Press



Single Hot Press



Box Type Hot Press

Options

1. High Strength Die Case

Made of carbon fiber-C/C composite material for high strength. It is recommended for high pressure and large size workpieces.

2. Atmosphere Gas Recirculation

An external, high efficiency cooler to control the workpiece cooling rate by reducing the temperature of the atmosphere gas.

3. Hot Knock Out Mechanism

Refer to "Features", Item 5 on page 5.

4. Displacement Control Mechanism

Controls the displacement velocity during the hot press operation.

5. Workpiece Transfer

Ensures smooth loading and unloading of a workpiece.

6. Hydrogen Gas Safety Control Burner

Necessary when hydrogen gas is used as atmosphere gas.

7. Gas Booster

Necessary when gas supply pressure is not sufficient for the operating pressure.

8. High Vacuum Exhaust System

Required when the inert gas atmosphere, and the oxidized atmosphere hot press use a vacuum level above the standard model.

※ This catalog uses SI units which can be calculated from the following formula.

● 1kgf/cm² = 0.1MPa, 1ton = 10kN

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● The descriptions and specifications are subject to change without notice.