

# PRODUCT

## INFORMATION



Series 3600 Model 1614-1600-150T Vacuum Hot Press for advanced ceramics.

## VACUUM HOT PRESS SERIES 3600 VACUUM/CONTROLLED ATMOSPHERE HOT PRESS FURNACE

Centorr/Vacuum Industries Vacuum/Controlled atmosphere hot presses are used for a variety of Powder Compaction and Diffusion Bonding Applications.

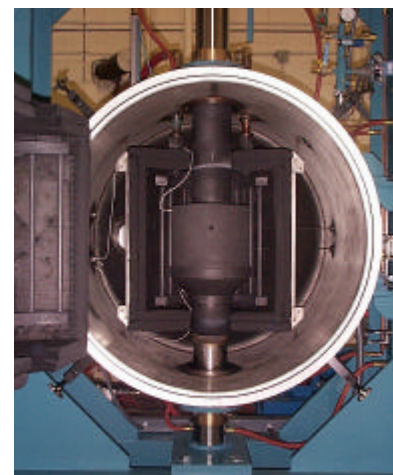
The simultaneous application of compacting pressure, high temperatures, and vacuum and/or controlled atmospheres offer the user improved densities, hardness, and other desired mechanical / electrical / thermal properties.

Major components include the press frame, upper and lower graphite hot rods, water-cooled stainless steel cold rods, graphite or metal hot zone, hydraulic pump and cylinder, vacuum pumping system, inert gas system, and control cabinet.

While designed primarily for vacuum hot pressing, the system may be used for general high temperature sintering by retracting the rams and removing the die platen, leaving an unobstructed cold-wall chamber.

### KEY FEATURES AND BENEFITS

- ✓ Cold Wall Vacuum furnace design with stainless steel inner jacket with baffled water cooling.
- ✓ Operation to 2300°C with temperature uniformity to +/- 10°C in uniform effective hot zone.
- ✓ Ability to press compacts from 3" dia. to 20" diameters from partial pressures of 10<sup>-6</sup> torr up to 1-2 psig positive pressures.
- ✓ Electric motor driven Hydraulic pumps designed to generate up to 3000 psig pressure for pressing forces from 100 ton up to 1500 ton.
- ✓ Large rugged 'H-Frame' design with uprights on each side and heavy cross-beams at top and bottom with stiffening gussets for pressing at max pressures with minimal deflection.
- ✓ Rectangular or Split Cylindrical hot zones available - Graphite hot zones include felt, Carbon Fiber Composite linings with rigidized felt, or hard graphite boards. Metal Hot Zones use Molybdenum, Tungsten, or Tantalum depending on temperature or process.
- ✓ Moog brand directional control valves with pressure transducers and a proprietary C/VI "FC-2 Force Control" digital PC card ensures "stepless" accurate pressing force for either "force" or "position" control (Load cell systems also available).
- ✓ PLC with Industrial Programmable Controller or PC system using Intellution™ FIX32 HMI software customized by Centorr/Vacuum Industries for Hot Press furnaces, with extensive data acquisition, and remote operation capabilities.
- ✓ Single or Double-acting rams available with option for "hot ejection" - the hot compact can be ejected from the die to reduce the cooling time by up to 50% and minimize die sticking or scoring.
- ✓ System designed for quick and easy access to the furnace hot zone for repairs and preventative maintenance.



Internal Graphite Hot Zone showing hot rods and graphite platen.

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# HOT PRESS

## Vacuum/Controlled Atmosphere Furnace

- ✓ **Highest Product Consistency** is assured by uniform and consistent pressures using either "force" or "position" control.
- ✓ **Safe Operation** is ensured by the triple O-ring sealed sliding shaft seals.
- ✓ **Productivity** is advanced by the fast heat up and cool down cycles with optional fan cooling or hot ejection.
- ✓ **Minimum Maintenance Cost** is assured by the heavy duty construction and ease of access to all components of the furnace.



Series 3600 Model 191919-2300-300T with steel dogbone for testing ram force.

FEATURES	STD MODEL*
Uniform Effective Hot Zone W x H x L in (mm)	12" dia x 12"h to 36" dia x 48"h and 12" x 12" x 12" to 24" x 24" x 48"
Molybdenum Hot Zone	1550°C (2822°F)
Tungsten Hot Zone	2000°C (3630°F)
Graphite Hot Zone	2500°C (4532°F)
Inert Gas Flow (slpm)	Approx. 80
Power Supply Size Range (KVA)	25 to 750
Water Requirements gpm (liters)	7 (26) to 130 (500)

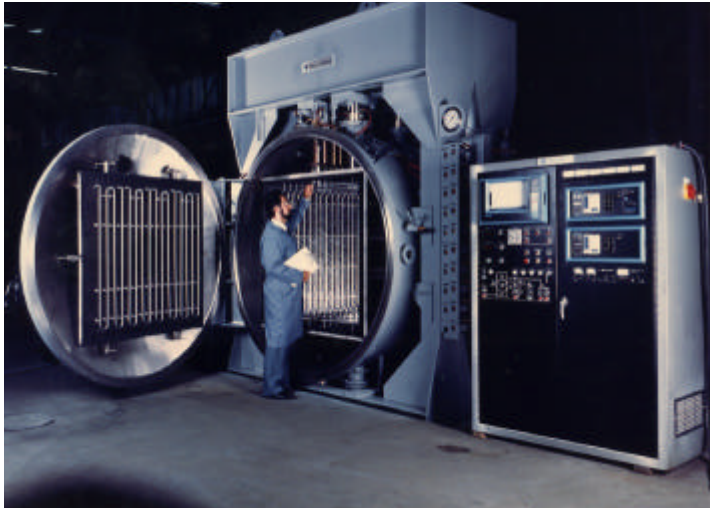
\* Custom sizes available upon request.

### MISC. / OPTIONAL FEATURES

- ✓ CE / VDE / TÜV / CSA approvals and other non-U.S. standards for compliance.
- ✓ Pyrolytic Graphite spacers between hot and cold rods to reduce conductive heat transfer between the hot/cold rams reducing heat loss and energy costs.
- ✓ Gas fan recirculation system with integral heat exchangers available.
- ✓ Optional Binder Removal Systems consist of thermal oxidizer or Vacuum Sweepgas™ method for low cost efficient binder removal.



Hydraulic power supply, fan cooling system and diffusion pumping system.



Series 3600 Model 424225 Diffusion Bonding Hot Press rated for 250 Tons at 1315°C with double acting bottom rams and 42" square press platen

### MATERIALS AND APPLICATIONS

- ✓ Refractory Metals
- ✓ SiC, Si<sub>3</sub>N<sub>4</sub>
- ✓ AlN, BN
- ✓ ZnS
- ✓ WC, Composites
- ✓ Powder Compaction
- ✓ Diffusion Bonding
- ✓ Semiconductor tooling
- ✓ Solid State Diffusion

### FURNACE APPROVALS

Centorr/Vacuum Industries furnaces are designed to our own internal quality standards developed over our 45 year history, and are built to the following industry standards:

ASTM NFPA 86D FM (for G-10503A Hydrogen Systems)



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