

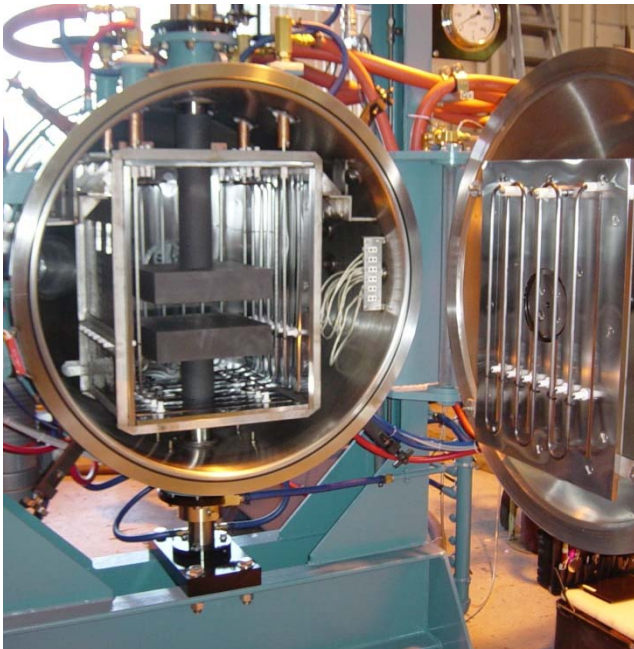
SERIES 3520 – Diffusion Bonding Vacuum Hot Press

Description

The Centorr Vacuum Industries Diffusion Bonding Hot Press is a packaged system able to press up to 24" (610mm) size workpieces to 100 tons force at temperatures from 1315°C to 1700°C in high vacuum or controlled atmosphere.

Assemblies which must be joined by simultaneous application of high temperature, high unit area pressure and high vacuum or inert atmosphere may be processed. While designed primarily for pressure-diffusion bonding work the system may be used as a general purpose high temperature furnace by removing the press platens and retracting the rams. A double-acting ram, stationary ram platens and hot zone are contained in the horizontal stainless steel chamber. The external press frame supports the chamber, vacuum pumping system and controls. A separate power supply provides low voltage power through water cooled bus to the power feedthroughs and heating elements, while a hydraulic power supply provides uniform and repeatable pressure to the internal press rams for control via force and/or position.

Standard Furnace instrumentation includes a programmable controller with PLC for process control. Name brand vacuum sensors and gauges are available on all systems as well as analog/ digital chart recorders. The Hot Press line is available with high-vacuum or low vacuum pumping systems and can include Diffusion pumps, Turbomolecular pumps, or Cryogenic pumping systems, with or without refrigerated baffles. A variety of processing environments are available including high/low vacuum and partial and/or positive pressures of Ar, He, and N₂ gases, or H₂ process gas with our G-10503A gas system.



Applications

When two parts are held in close contact and heated in a clean environment, diffusion bonding occurs. Solid state diffusion of atoms across the interface produces a 100% metallurgical bond. The process is superior to brazing because no lower melting metal is introduced and superior to welding because no localized high stresses are produced, distortion is eliminated, and inaccessible surfaces can be joined. Major industries include Aerospace frame and engine manufacturers, electronics, and nuclear parts producers.

Key Features and Advantages

- Temperatures from 1315°C to 1700°C, 10^{-6} torr vacuum or special atmospheres, with pressures from 30 – 100 tons of compacting force.
- Cold Wall Vacuum furnace design with stainless steel inner jacket with baffled water cooling.
- High and low vacuum pumping systems including diffusion, cyrogenic, and turbomolecular.
- Replaceable and/or interchangeable press platens fabricated from graphite or refractory metals.
- General purpose high temperature heating facility suitable for heat treating finished parts after bonding.
- Heavy duty rod elements used instead of thin strip or foil elements which can be easily damaged.



Specifications

Chamber Horizontal front loading design constructed of stainless steel with full opening hinged front door.

Press & Frame Hydraulic press, double-acting with electro-hydraulic pump with force/pressure regulator and reversing valve. Includes pressure gauges, ram high/low sensors and water-cooled cold rods with graphite or refractory metal hot rods and platens.

Vacuum rough vacuum and high vacuum available with a choice of diffusion, turbomolecular, or cryogenic high-vacuum systems.

Hot Zone Moly or Tungsten refractory metal hot zones as well as graphite hot zones available.

Power Suply SCR style power supplies with linear power control and analog volt and ammeters.

Controls PLC with Industrial Programmable Controller or PC system using Specview® or HMI software customized by CVI for vacuum furnaces, with extensive data acquisition, and remote operation capabilities. Graphic control panel shows location of vacuum pumps and system status, and provides for manual operation of the furnace.

Gas Systems G-10504A Partial Pressure control system (1-1000 microns) available for suppression of low vapor pressure materials, and gas backfill system. Optional positive pressure inert and Hydrogen gas available.

Accessories Available options include cold traps, thermocouple survey ports, and fan cooling system with optional water-cooled heat exchanger.