CENTORR Vacuum Industries

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SERIES 3800 – Vertical Top/Bottom Load Furnaces for CVD, CVI, Graphite Purification and Graphitization

Description

Centorr Vacuum Industries high temperature, low pressure CVD furnaces provide stable, repeatable conditions for production of high performance materials from vapor phase feedstocks involving reaction temperatures up to 2200°C.

Our line of ultra-high temperature furnaces for graphite purification and graphitization are rated for use up to 2900°C. Operation in vacuum inert gas, or Chlorine gas is available.

Furnaces are available as complete systems arranged to handle feedstock gases, provide control of the reaction environment and capture effluents safely and effectively.

Key Features

- Cold Wall Vacuum furnace design with stainless steel inner and outer jackets with baffled water cooling, designed for easy loading and unloading.
- Graphite resistance heated hot zones withstand harsh CVD environments. Induction heating available for Carbon CVI applications or ultra-high temperatures.
- Vertical top and bottom loading furnaces available as well as horizontal rectangular configurations depending on workpiece size, shape, and quantity.
- Operation to 2900°C utilizing state of the art induction heating power supplies. Resistance heated systems for lower temperatures.
- Vacuum pumping systems include mechanical pumps/blowers, and optional liquid ring or dry pumping systems operating in conjunction with feedback loop controlled throttling valves providing constant pressure over a wide capacity range. Particulate filters protect against abrasion.
- PLC with Industrial Programmable Controller or PC system using Intellution™ HMI software customized by Centorr/Vacuum Industries for vacuum furnaces, with extensive data acquisition, and remote operation capabilities.
- Inert and process gas systems utilizing electronic mass flow control provide accuracy, reproducibility, and flexibility for critical CVD applications. Multiple injection nozzle locations allow for adjusting flow patterns depending on the workload.
- Optical Pyrometers available to minimize thermocouple exposure. Corrosion resistant heated manometers provide absolute pressure sensing, independent of gas composition.

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- **Highest Product Consistency** is assured by the close temperature gradients and automatic temperature control of each step in the process.
- **Lowest Cost Operation** is provided by the rapid heatup step, unattended operation, fast cooldowns.
- **Flexibility** is provided by the programmable controls which allow different materials and part sizes to be successfully processed without time-consuming adjustment of furnace conditions.
- **Minimum Maintenance Cost** is assured by the heavy construction and ease of access to all components of the furnace.

SPECIFICATIONS

STD MODEL*	8820	2424	2436	2448	84120
Uniform Effective Hot Zone W x H x L or Dia x H in (mm)	8 x 8 x 20 (200 x 200 x 500)	24 x 24 (610 x 610)	24 x 36 (610 x 914)	24 x 48 (610 x 1200)	84 x 120 (2133 x 3050)
Workload Volume ft^3 (liters)	0.75 (21)	6 (169)	9.5 (270)	12.5 (354)	385 (10,900)
Approx. Power Supply Size KVA	45	150	400	450	750
Water Requirements gpm (liters)	7 (26)	30 (114)	70 (261)	75 (283)	125 (473)

CVD Inert and Process gas cabinet with Mass Flow Controllers.

Series 3800 Model 8820-1600 SiC CVD reactor for advanced ceramics work.

Optional Features

- Powered Cover lift for top loading models, and Elevator Hearth for bottom loaders.
- Effluent capture including scrubbers or liquid ring pumps / dry pumps.
- Inert and Process Gas Management and Distribution systems for MTS, BCl3, H2, CH4, and C3H8.
- Graphite Retort for containment of process coating, with differential pumping. Work Rotation devices and Gas Injection lances available.
- Vacuum pump oil filtration systems and vacuum inert gas purge lines.

FURNACE APPROVALS
Centorr/Vacuum Industries furnaces are designed to our own internal quality standards developed over our 60 year history, and are built to the following industry standards:
ASTM NFPA 86 NEC (NFPA70)