

## SERIES 4300 – Vertical Top/Bottom Load Furnaces for CVI, Graphite Heat Treatment, and Graphitization

### Description

Centorr Vacuum Industries high temperature, vacuum-rated Induction 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.

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



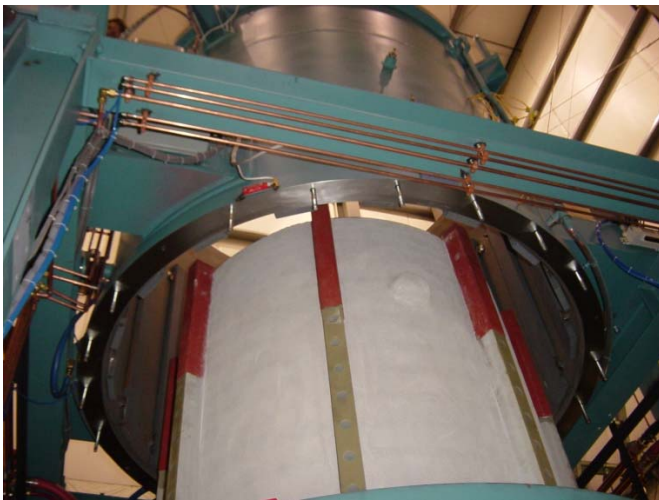
### Key Features

- Cold Wall Vacuum furnace design with stainless steel inner and outer jackets with baffled water cooling, designed for easy loading and unloading.
- Graphite induction heated hot zones withstand harsh CVI environments, containing H<sub>2</sub> gases.
- Conventional Vertical top loading designs available as well as CVI-proprietary bottom loading design with head-within-a-head feature allowing servicing of induction coil separate from the loading/unloading function.
- Operation to 2900°C utilizing state of the art induction heating power supplies.
- 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 Chemical Vapor Infiltration applications. Multiple injection nozzle locations and gas plenums 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.

- **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*	2436	5080	84120
Uniform Effective Hot Zone W x H x L or Dia x H in (mm)	24 x 36 (610 x 914)	50 x 80 (1270 x 2030)	84 x 120 (2133 x 3050)
Workload Volume ft <sup>3</sup> (liters)	9.5 (270)	90 (2548)	385 (10,900)
Approx. Power Supply Size KVA	450	675	1000
Water Requirements gpm (liters)	65 (246)	185 (700)	125 (473)



### 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 H<sub>2</sub>, CH<sub>4</sub>, and C<sub>3</sub>H<sub>8</sub>.
- Graphite Susceptor for containment of process, with differential pumping. Gas Injection lances or gas plenums 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)

Series 43000 SiC CVD reactor for advanced ceramics work.

