



CONTINUOUS VACUUM FURNACES

*RELIABILITY, EXPERTISE,
SERVICE & SELECTION*

The Gasbarre “CV” Continuous Vacuum Series belongs to a family of vacuum furnaces comprised of modules including loading, heating, and quenching. The modular, and, in this case, continuous premise is to index small lots in a continuous, automatic fashion that combines high production with superior product quality. Processing of small lots allows for tighter temperature uniformity within the work area, as well as similar thermal profiles within the work lot- center to edge. To further increase part quality, the heat chamber module of the “CV” is not thermally cycled. It remains at temperature and under vacuum during production, not exposed to room air except for routine maintenance needs. The modular heat chamber is consequently an extremely pure environment that contributes to the part quality.

Designs of the modular “CV” vacuum furnace can produce up to 1500 lbs/hr (680kg/hr) reaching temperatures up to 2600°F (1427°C). The “CV” furnace is capable of many processes, including annealing, brazing, hardening, carburizing, and sintering.

Load/Evacuation Module

The load/evacuation module is positioned in front of the heating module. It is designed to receive work at atmospheric pressure and then pull a vacuum. Once this module reaches the same vacuum level as the heating module, an internal door is opened to allow a transfer of the work to occur. The load module is mounted to

a structural steel frame supported on wheels, which allows access to the heating chamber for ease of maintenance.

Heating Module

The heating module can be provided with multiple work positions typically ranging from one to four. High purity graphite material backed by high purity ceramic material form the actual heating chamber. This module is designed to remain under vacuum and at process temperature during production mode. Alternatively, when not in production mode, the heating module may be turned off though kept under vacuum. Service life and part quality are consequently maximized.

Quench Module—Pressure or Oil

The quench module may be designed for gas cooling of parts, and/or it may be designed for oil cooling of parts. The gas is recirculated within the module by a high-powered fan that pulls the gas through the workload and past an internal heat exchanger. As the quench module is isolated from the heating module by an internal sealed door, only the workload is cooled. Alternatively, an oil quench module may be provided. It includes an elevator mechanism, directional oil agitation surrounded by a water-jacketed cylindrical tank.

Heating Elements

The heating module is provided with solid graphite resistive elements. The elements, located above and below the work area, are machined to a matched resistance and provide for optimum heating and temperature uniformity. They may be arranged to create one to four zones of temperature control.

Vacuum Pumping System

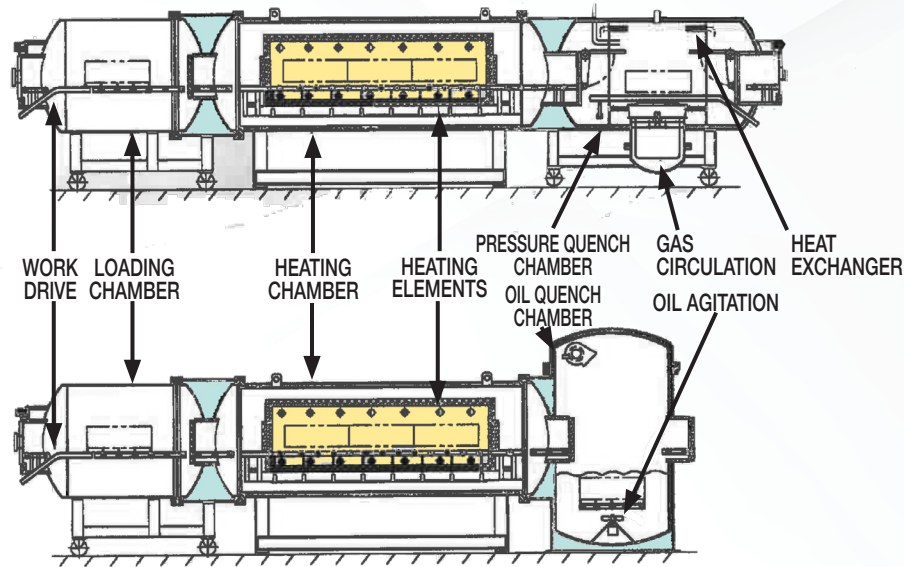
On account of the high purity level and low dewpoint attainable within the isolated graphite heating module, a single rough pump is typically all that is required to produce high quality work. Each module has its own vacuum value that allows its pressure or vacuum level to be independently regulated.

Work Automation System

Work is transferred through the furnace modules on high strength roller rails via hydraulic pusher and puller mechanisms. The work is carried on either mechanical cast or fabricated grids, dependent upon whether the process requires gas or oil quenching.

Control and Graphical Interface

The coordination of the work transfer, zone temperatures, furnace sequencing and data collection is by an integrated control system. It consists of a logic controller (PLC), and a GCI operator touchscreen from which recipe downloading, data acquisition, trending and system diagnostics can occur.



MODELS

	CV-060842	CV-091824	CV-091896	CV-202436	CV-2024144
Heat Chamber Work Size (H x W x L)	6" x 8" x 42" 152mm x 203mm x 1066mm	9" x 18" x 24" 228mm x 457mm x 609mm	9" x 18" x 96" 228mm x 457mm x 2184mm	20" x 24" x 36" 508mm x 609mm x 914mm	20" x 24" x 144" 508mm x 609mm x 3657mm
No. Tray Positions	3	1	4	1	4
Net Production¹	100 lb/hr (50 kg/hr)	150 lb/hr (65 kg/hr)	560 lb/hr (255 kg/hr)	280 lb/hr (130 kg/hr)	1000 lb/hr (455 kg/hr)
M.O.T.	Up to 2600°F (1427°C)	Up to 2600°F (1427°C)	Up to 2600°F (1427°C)	Up to 2600°F (1427°C)	Up to 2600°F (1427°C)
Uniformity²	25°F (14°C)	25°F (14°C)	25°F (14°C)	25°F (14°C)	25°F (14°C)
Element Power³	51 kw	60 kw	120 kw	120 kw	300 kw
Auxiliary Power³	10 kw	42 kw	66 kw	75 kw	75 kw
Cooling Water⁴	17 GPM (65 LPM)	21 GPM (80 LPM)	42 GPM (160 LPM)	42 GPM (160 LPM)	100 GPM (379 LPM)
N² Backfill: Load Chamber	20 ft ³ (0.6m ³)	60 ft ³ (1.7m ³)	60 ft ³ (1.7m ³)	200 ft ³ (5.7m ³)	200 ft ³ (5.7m ³)
Quench Chamber⁵	25 ft ³ (0.7 m ³)	90 ft ³ (2.6 m ³)	90 ft ³ (2.6 m ³)	300 ft ³ (8.5 m ³)	300 ft ³ (8.5 m ³)
Approx. Floor Space (H x W x L)	6' x 7' x 25' (1.8m x 2.1m x 7.6m)	8' x 11' x 32' (2.5m x 3.4m x 9.8m)	8' x 11' x 42' (2.5m x 3.4m x 12.8m)	10' x 14' x 40' (3.1m x 4.3m x 12.2m)	10' x 14' x 60' (3.1m x 4.3m x 18.3m)

¹ Typical based on 60 min. dwell time in heat chamber

⁴ Average GPM at 80°F with a rise of 20°F (Average LPM at 27°C with a rise of 11°C)

² Maximum spread: 1600°F (871°C - 1427°C)

⁵ Quality at atmospheric pressure (1BAR)

³ 460 Volts, 3-Phase, 60 Cycle with single point connector