

# SERIES 3530 – WORKHORSE®

## Horizontal Front Loading High Vacuum Furnace



### Description

The Workhorse® is Centorr Vacuum Industries production-oriented offering for a variety of heat treatment, brazing, hardening, and sintering operations. The basic design comprises of three standard hot zone sizes in four different temperature ranges (1000°C, 1315°C, 1650°C, and 2000°C), with a long list of optional equipment that makes this one of the most versatile custom-designed furnaces available today. The furnace chamber is mounted on legs for a compact and highly efficient design and is a "front-loading" orientation which offers better ergonomics and temperature uniformity compared with vertical top/bottom loaders or round hot zones.

Unlike laboratory or smaller research furnaces, the Workhorse® contains features only found on high-end heat treat furnaces, such as a stainless steel interior vacuum chamber with manual door clamps; heavy duty Molybdenum or Tungsten rod heating elements; and all-metal Tungsten, Molybdenum, or SS radiation shield hot zone for fast heating and cooling, and excellent process cleanliness. You won't find any refractory ceramic insulation or graphite felt/board in this hot zone.

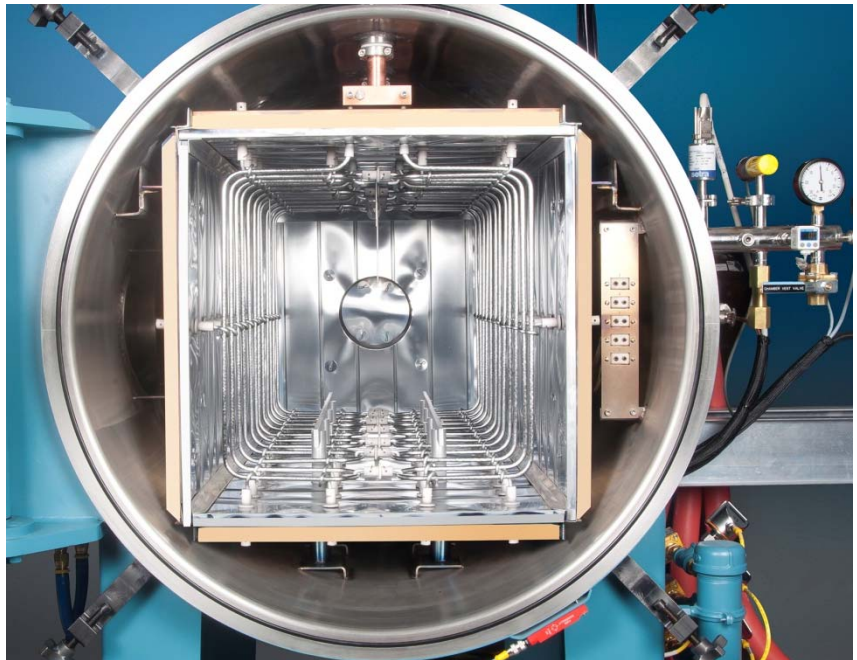
Standard Furnace instrumentation includes a programmable controller with PLC for process control. Name brand vacuum sensors and gauges are available on all systems as well as analog/ digital chart recorders. CVI's "one-button start" control system initiates a complete cycle including pumping, heating, and cooling modes. A full complement of program interlocks and safeties ensures safe and efficient furnace operation and reduces the chance of operator vacuum pumping errors, with our unique "keylock" override design.

The Workhorse® furnace 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 cold traps and refrigerated baffles. A variety of processing environments are available including high/low vacuum and partial and/or positive pressures of Ar, He, and N<sub>2</sub> gases, or H<sub>2</sub> process gas with our G-10503A gas system.

### Key Features

- Cold Wall Vacuum furnace design with stainless steel inner jacket and outer jackets with baffled water cooling.
- No epoxy coated surfaces on chamber interiors results in higher vacuum integrity.
- High and low vacuum pumping systems including diffusion, cryogenic, and turbomolecular.
- Water cooled power cables for efficient power capacity instead of low cost welding cables.
- Integrated water cooling piping with color-coded hoses.
- Ammeters and Voltmeters on control cabinet for each leg of the power supply for operator feedback

- Heavy duty rod elements used instead of thin strip or foil elements which can be easily damaged. Hot zones use a 30° rule to ensure proper radiation on all sides.
- Operation to 2600°C with two- or four-sided heating elements in partial pressures from 10<sup>-3</sup> torr up to 1-3 psig positive pressures of Argon, Nitrogen, Helium, and Hydrogen.
- PLC with Industrial Programmable Controller or PC system using Specview® or Intellution™ iFIX HMI software customized by CVI for vacuum furnaces, with extensive data acquisition; and remote operation capabilities.
- G-10504A Partial Pressure control system (1-1000 microns) available for suppression of low vapor pressure braze compounds, and our G-10503A positive pressure Hydrogen gas system built to NFPA 86 standards.
- Graphic control panel shows location of vacuum pumps and system status using indicator lamps, and provides for manual operation of the furnace.



STD MODEL*	USABLE SIZE (cu. ft /liters).	EFFECT HOT ZONE WxHxD (in / mm)
I - 3024	1 (28)	12 x 12 x 12 (300 x 300 x 300)
II - 3040	2 (57)	12 x 12 x 24 (300 x 300 x 610)
III - 3056	3 (85)	12 x 12 x 36 (300 x 300 x 914)
4060	4.5 (127)	18 x 18 x 24 (457 x 457 x 610)
4873	12 (340)	24 x 18 x 48 (610 x 457 x 1220)
5273	16 (453)	24 x 24 x 48 (610 x 610 x 1220)
9060	48 (1360)	48 x 48 x 48 (1220 x 1220 x 1220)

\* Custom sizes available upon request

#### 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)

#### ALLOYS PROCESSED

Stainless Steels

Ferrous and Non-Ferrous

Alloys

Tool Steels

High Speed Steels

Ti, Nickel, and Superalloys

