

# Performer Series™ Vacuum Furnace System

## Performance Beyond your Expectations.

For the greatest load capacity with the tightest tolerances the T-M Vacuum Performer Series high temperature, high vacuum furnace system will satisfy all of your heat treating requirements.

The Performer's vast twelve cubic foot all stainless steel chamber allows you to braze, temper, harden, stress relieve, austenitize, anneal, sinter, bond and perform many other custom heat treating processes on the largest of loads. With our three-zone heat control and electro-pneumatically operated "heat pack" door shield assembly, a precision heating environment is created that can attain a consistent temperature uniformity of  $\pm 5^{\circ}\text{C}$ .

Equipped with our specially designed pumping system, the Performer vacuum furnace reaches high vacuum quicker, maximizing your productivity and quality with a cleaner work zone. With its inert gas on board quick cool system the metallurgical gas quench increases your cycle times by rapidly cooling the chamber and increasing your product output. Configured with our controlled cooling package the Performer vacuum furnace system can produce a controlled cooling environment as precise as you need. The Performer can also be configured to accept multiple inert process gases.

The Performer Series Vacuum Furnace is a cost cutting machine. With its Thermal Pro control system utilizing full PC, PLC and HMI, it is a completely automated control and data acquisition system software requiring an operator to simply load and unload the chamber and press the start button.

The Performer Series Vacuum furnace is completely contained unit. This saves you valuable floor space and is a clean presentation in your facility. The Performer also allows for simple and fast maintenance with its fully removable hot zone.

If the Performer Series work zone is not large enough for your application see our Heat Treat Series Vacuum Furnace System.



Above: The Performer Series 24/36-13



Above: The Performer Series 24" W x 24" H x 36"D all Molybdenum Hot Zone



Left: Full PC control system



HIGH-TEMPERATURE | HIGH-VACUUM SYSTEMS

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**T-M Vacuum Products, Inc.**

### Temperature Capabilities and Controllability

10 series	1000°C (1832°F)
13 series	1315°C (2400°F)
14.5 series	1415°C (2650°F)
16.5 series	1650°C (3000°F)
20 series	2000°C (3632°F)

- +/- 1 degree controllability
- +/- 5°C temperature uniformity\*
- SCR Power Supply regulation
- 3-zone heat control with independent PID loop control

### Vacuum Pumping System

- Standard pump down time\*
  - To 0.1 Torr 7 minutes
  - 10<sup>-5</sup> Torr Scale 15 minutes
- High-Vacuum Valve: T-M 20" Right Angle Poppet Valve
- 500mm diffusion pump – net pumping speed: 12,000 l/s
- 200 cfm mechanical roughing & backing pump
- 700 cfm mechanical pump booster blower
- 11 cfm mechanical hold pump

**Available:**

- Upgraded pumping systems – Mechanical, dry, diffusion, cryogenic, and turbo-molecular
- Mechanically refrigerated, optically-dense, cold trap in roughing line or liquid nitrogen cryotrap in high-vacuum line (for prevention of hydrocarbon contamination)

### Inert Gas and Quick Cool System

- 50 HP blower – 15,000 cfm free air displacement
- Gas/water heat exchanger
- 40 flow channels directing quick-cool gas onto workload
- Integral with furnace chamber, no externally mounted components

**Available:**

- Multiple process gas capability
- Controlled cooling capability

### System Controls

- The system has state-of-the-art full computer control as standard, enabling automatic control of all system functions. System operation is defined by user created recipes which are stored on the system. More than 30 user friendly screens display all set points and operating data. Process parameter can be accessed and stored on the system in real time for historical reference or as customer required documentation. Operating parameters are displayed on the system's 17" flat panel touch screen for the operator's ready reference. Full data logging with print capability out is standard.
- Over-temperature control
- Digital vacuum display
- Center of load thermocouple standard
- Emergency Stop

**Available:**

- Multiple-survey thermocouples
- Multiple mass flow controller
- 100% Hydrogen partial pressure operation
- Controlled cooling

### Operating Pressure Range

- High-vacuum to 2 bar (higher pressures available)
- Working pressure at maximum temperature: high-vacuum to 1 torr (higher pressures at temperature available)
- Capable of pressures between atmosphere and 2 bar (for quick cool use)
- 6 bar quench available

### Hot Zone Construction

- Usable work zone 24" W x 24" H x 36" D
- Usable work zone volume of 12 cubic feet (16 cubic feet available)
- Work load capacity 1000 lbs (higher capacity available)
- Round, horizontally-mounted hot zone comprised of six (6) high temp/low resistance molybdenum 4" band heater elements
- Heat shielding is composed of molybdenum layers backed by stainless steel layers in stainless steel containment and an electro-pneumatically operated "Heat Pack" door shield assembly
- Complete hot zone is easily removable as a unit for fast maintenance and less down time
- Molybdenum hearth assembly is 24" W x 36" or 48" D

**Available:**

- Tungsten insulation in Moly Containment
- Graphite and tungsten heating elements
- Graphite insulation in stainless steel containment

### Chamber

- All stainless steel construction including head-end closure and water-jacketing
- Dual-wall chamber configuration designed to allow complete water-to-surface contact
- Stainless steel dual-wall, water-cooled door
- Water cooling for power feed-thru is external to vacuum chamber, eliminating the possibility of water leaking into the chamber
- Eight clamp over center pneumatic clamp/locking door
- Working pressure: Full vacuum to 2-bar (6-bar available)

### Safety Features

All T-M Vacuum Products, Inc. products are equipped with standard safety features to ensure safe operation.

**Please consult T-M Vacuum Products, Inc. at (856) 829-2000 for availability and pricing of these or any other option requirements.**

\*All times on pressure and temperature capability, based on current, steady state conditions. Pressure and temperature capability on maximum times on pressure and temperature capability are not applicable.

