INDUCTION ATMOSPHERES

Innovative Heating Solutions

Vacuum Furnace

Model VF-40

- Small Footprint Fits Your Mfg. Cell
- Heats To 1900°F *(1038°C)* In Less Than 15 Minutes With Rapid Cool Down
- Utilizes Quick, Clean Induction Heat
- For Brazing & General Purpose Heating
- Facilitates Continuous Flow Manufacturing
- Operates At High Vacuum or Partial Pressure Of Inert Gas
- Built-In Water-To-Water Recirculation System

Our VF-40 Vacuum Furnace is designed to heat parts of virtually any shape in a high temperature, high vacuum environment. Although the compact 7' x 7' *(2134 x2134 mm)* footprint fits easily into your manufacturing cell, our furnace can reach temperatures as high as 2100°F *(1149°C)*. The chamber has a typical ultimate vacuum of $5x10^{-6}$ Torr with a leak rate of less than 3 microns per hour.

With the VF-40's quick, clean induction heating system, 1900°F *(1038°C)* can be reached in less than 15 minutes. Cool down to 1200°F *(649°C)* from maximum temperature can be achieved in less 5.5 minutes. Temperature uniformity is rated at ±25°F at 2000°F *(+/- 14°C at 1093°C)*.

The most common applications for vacuum furnaces include heating small lot sizes, brazing parts of unusual shapes, repairing "orphans" from other heating processes, and other applications which benefit from whole part heating. It's easy to set up a continuous manufacturing flow, run various processes throughout the day and realize up to 90% improvement in overall cycle time.

To permit easy loading, the furnace's part handling mechanism opens at the base of the system, then automatically raises up to 110 lbs. *(49.9 kg)* of parts into the vacuum chamber and heating coil, and finally lowers the parts back down to base level for unloading.

The standard hot zone of the VF-40 has a 12" *(305 mm)* ID, 17" *(432 mm)* height and volume of 1.11 cu. ft *(0.0314 m^3)*. The chamber is mounted on a heavy duty aluminum extruded frame that houses all the required equipment for vacuum, atmospheric and system control, as well as the induction heating station.

With the VF-40's efficient induction heating system, the furnace reduces overall cost of ownership over a 14-year life by 75% when compared to traditional vacuum furnace technology. The typical operating cost is just $5.13 per hour, based on $0.15/kwh and $0.40/cu ft *($0.40/0.283m^3)* Ar.

Real time monitoring and SPC are a snap with the optional LAN interface or digital chart recorder; data may be stored and sent directly to your desktop. The standard thermocouple controls record all chamber temperatures; individual part temperatures may be controlled and monitored with the optional optical pyrometer.

VF-40 Vacuum Furnace

HOT ZONE

Work Zone Size:	12” ID x 17” Height *(305 mm x 432 mm)* [customizable]
Temperature Range:	100° F to 2100° F +/- 25° F *(37.7°C to 1149°C +/- 14°C)*
Time-to-Temperature:	Less than 15 minutes to 1900° F *(1038°C)*
Heating Elements:	Graphite

CONTROLS

Light Tree:	Provides system status notification
PLC:	GE Fanuc VersaMax
Temperature:	Honeywell UDC 3700 Temperature Controller
Thermocouples:	Type-S for control and over-temperature latch and (5) Type-K workload
Recorder:	Honeywell DPR 250
Vacuum Gauge:	Televac UDC 1000 Digital Controller with convection & cold cathode sensors; MKS Capacitance Gauge
Over-Temperature:	Honeywell 300 Temperature Controller

VACUUM PUMPING SYSTEM

Mechanical Pump:	Pfeiffer 42m^3 / MR
Pump:	Heat Treat: Osaka Turbo Pump - 800 L/sec Brazing: Varian Diffusion Pump VHS-4 1500 L/sec

CHAMBER

Design:	Heavy duty, double-walled stainless steel, water-cooled vessel
Door:	Pneumatically operated, bottom load
Ports:	All required ports; includes spare ports

Operator Safety Features

- E-stop
- Fully-isolated heating system
- Chamber access interlocks
- Over-temperature safety latch

Options & Accessories

- Viewport
- Residual Gas Analyzer
- Tilt and Pour
- Quench System
- Optical Pyrometer (for individual part temperature measurement with closed loop control)
- Digital Data Recorder (sends real time process data to your network)
- Paper Chart Recorder
- LAN Interface for data exchange
- Thermocouple Calibration system
- Calibration by independent testing lab

Protected under US Patent 6,649,887 and 7724045. Other patents pending.

UTILITY REQUIREMENTS

Electrical:	480 VAC, 3-Phase, 150 Amp service
Water:	30 GPM @ 40 PSI *(113.6 lpm @117 kg/sq cm.)*, heat load of 40 kW
Air:	80 psi *(234 kg/sq cm)*
Inert Gas:	30 psi *(87.5 kg/sq cm),* 30 CFH (backfilling only), <-50°F *(10°C)* dew point

PHYSICAL

Dimensions:	7’ W x 7’ D x 9’ H *(2134 x 2134 x 2743 mm)*
Shipping Weight:	3300 - 3500 lbs. *(1497-1588 kg)*

OPTIONAL COOLING SYSTEM

Gas Blowers:	800 cfm, rated to recirculate a partial pressure of inert gas
Heat Exchanger:	Water-to-air fin and tube
Cooling Rate:	Full chamber load from 2000°F to 1200°F (1093°C to 649°C) in less than six minutes (depending on part mass and material)

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