

Internal Quench HFL-IQ SERIES



Vacuum Heat Treating & Brazing Furnace

Energy Efficient

Graphite Insulation

2500°F

Max Temperature

2400°F

Max Operating Temperature

±10°F

Temperature Uniformity
(1000°F-2100°F)

2 Bar up to 20 Bar

Gas Quench Pressure

SolarVac®

Automation and
Control Systems

One Year Warranty

Factory Start-up and Testing



The new HFL-IQ Series is a horizontal, front loading, internal quench vacuum heat treating furnace designed for high production commercial and captive heat treating shops. It is a high temperature, high vacuum, batch-type furnace with electrical resistance heating elements. All aspects of form, fit and function are designed for easy maintenance and minimal downtime.

For a detailed price proposal with equipment specification, contact Sales at sales@solarmfg.com or call 267-384-5040.

 PROUDLY MADE IN THE USA

THE BRIGHTEST SOLUTIONS THROUGH INGENUITY

HFL-IQ Series

Specifications



Features and Benefits

Work Zone Sizes Available (Typical):

Model HFL-2624-IQ:

18"W x 14"H x 24"D, 500 pound capacity

Model HFL-3836-IQ:

24"W x 24"H x 36"D, 2000 pound capacity

Model HFL-5748-IQ:

36"W x 36"H x 48"D, 5000 pound capacity

Model HFL-6660-IQ:

42"W x 42"H x 60"D, 5000 pound capacity

Model HFL-7472-IQ:

48"W x 48"H x 72"D, 7500 pound capacity

Other configurations and weight capacities are available.

- Uniformity of $\pm 10^{\circ}\text{F}$ throughout hot zone to comply with AMS 2750E
- Super energy efficient graphite insulated hot zone for max temperatures up to 2500°F
- Segmented graphite resistance heating elements for uniform radiant heat up
- High performance internal gas quenching systems provide high velocity, 2 bar cooling of large workloads
- Stokes/Varian combination pumping system for reliable vacuum performance year after year
- SolarVac® Essentials or Polaris programmable industrial automation & controls
- Manual or powered loading/unloading systems to provide safe, handling of heavy workloads and fixtures
- Designed for long life, easy maintenance, minimal downtime, and low cost of operation
- Comprehensive factory start-up and testing with customer visit prior to shipment
- Full one (1) year warranty

Hot Zone

At the heart of every one of our vacuum furnaces is a robust, energy efficient graphite insulated hot zone.

Operating temperature: 2400°F¹

Maximum temperature: 2500°F¹

Temperature uniformity: $\pm 10^{\circ}\text{F}$

AMS 2750E compliant

Survey temp points:

1000°F / 1500°F / 2100°F

Ring Insulation²: four layers of 0.5" thick high purity rayon graphite felt

Door & Rear Head Insulation²:

five layers of 0.5" thick high purity rayon graphite felt

Hot Face: one layer of 0.075" thick CFC³

Heating elements: rugged segmented graphite⁴

Hearth: molybdenum support pins and graphite rails⁵

Support Structure: insulation and heating elements mounted on a heavy duty 0.090" thick 304 stainless steel fabrication

Zoned trim controls:

Multiple digital trims for uniform heating

¹ Higher temperature rated hot zones available

² Refractory metal radiation shielded hot zones are available

³ Other hot face provided for higher temperature ratings

⁴ Continuous ML Molybdenum bands are available for higher temperature ratings

⁵ Other hearth configuration is available: molybdenum support pins, caps and rails

Vacuum Chamber

Our horizontal front loading vacuum chamber is fabricated for many years of dependable service. It is double-walled for water cooling and designed to operate in deep vacuum as well as safely quench at positive pressures from 2 bar (or 15 PSIG) and up to 20 bar (or 290 PSIG). The front door is hinged for convenient, unobstructed loading/unloading of workloads and fixtures. The pneumatically operated, door closure mechanism is an autoclave-type, rotating locking ring to ensure safe and convenient operation. Oversized water inlets and outlets allow maximum water flow and ease of drainage.

Gas Quenching System

The new and improved, high performance, internal gas quench system provides the lowest resistance, highest efficiency gas flow in the industry for rapid cooling at pressures up to 20 bar (or 290 PSIG). The quench motor⁶ drives a high-speed, balanced fan to recirculate the quench gas straight through the water-to-gas heat exchanger and then into the hot zone at high velocity. The unique tapered graphite gas nozzles are positioned throughout the hot zone to direct quench gas at the work load for optimal cooling. A Variable Frequency Drive (VFD) is an available option on most models in place of across-the-line motor starter to reduce motor speed when conditions require.

⁶ Motor horsepower ratings will vary dependent upon the model and the desired heat treat process results.

Vacuum Pumping System

A dedicated roughing port prevents damage to the high vacuum valve seal.

Mechanical Pump: Edwards Stokes Microvac rotary piston

Booster Blower: Edwards Stokes direct drive

Diffusion Pump: Varian/Agilent

Holding Pump: Alcatel

High Vacuum Valve: Pneumatically operated, right angle poppet valve

Hot Zone Power Supply

Magnetic Specialties, Inc.⁷ SCR Zero-angle fired power supply. Air cooled for reduced maintenance.

Rated 460 volt /3 phase /60 Hertz

⁷ MSI is an affiliate of the Solar Atmospheres Family of companies

Automation and Controls Instrumentation

The SolarVac[®] automation and controls system enable the operator to program, control, monitor, record, and display information graphically to quickly understand the status of the furnace. The industrial instrumentation is housed in a NEMA 12 enclosure.

SolarVac[®] Essentials

Programmable Logic Controller:

Allen-Bradley CompactLogix PLC (1 MB)

HMI Operator Interface: Industrial PC with a 18.5" HD color touch display; Intel Atom CPU and Windows[®] 7 utilizing Wonderware InTouch supervisory-level HMI software package

Graphic Recorder: Eurotherm Model 6100A, with 18 channels utilizing a 12" color touch display

Vacuum Controller: Televac MX200 for measuring, monitoring, and controlling the vacuum pressure

Temperature Controller: Honeywell Model UDC3500

Overtemperature Controller: Honeywell Model UDC2500

Control & Over Temp Thermocouples: Type "S" with ceramic protection tube

Work Thermocouples: Type "K" Refrasil insulated, compensated wire

Optional Automation and Controls Instrumentation available:

SolarVac[®] Polaris

Programmable Logic Controller:

Allen Bradley CompactLogix PLC (2 MB)

HMI Operator Interface: Industrial PC with a 21.5" HD color touch display; Intel i5 CPU and Windows[®] 7 utilizing Wonderware InTouch supervisory-level HMI software package

Graphic Recorder: Eurotherm Model 6180A, with 48 channels utilizing a 12" color touch display

Vacuum Controller: Televac MM200 or MC300

Temperature Controller: Honeywell Model UDC3500

Overtemperature Controller: Honeywell Model UDC2500

Remote Access: Proprietary mobile app allows supervisory level personnel to remotely monitor recipes and alarms, receive real-time notifications, and manage system operation

Team Viewer: Allows Solar Manufacturing to provide remote support when situations require troubleshooting, analysis, or upload modifications

Equipment and Energy-Saving Options

SolarVac[®] Polaris Automation and Controls Dedicated rail guided load truck; manual or powered

Hunterdon Transformer VRT hot zone power supply

ConserVac[®] energy-saving control system

ElementGuard off-line heating element protection system

Variable Frequency Drive for quench motor

Gas backfill reservoir

Recirculating Water Cooling systems

RA330 and molybdenum work grids



HORIZONTAL
CAR BOTTOM

HCB

VERTICAL
BOTTOM LOADING

VBL

INTERNAL
QUENCH

IQ

EXTERNAL
QUENCH

EQ

THE MENTOR

MIO

Process Applications

Hardening | Stress Relieving | Normalizing | Brazing | Annealing
Tempering | Carburizing | Nitriding | Sintering | Hydriding/De-hydriding

Industries Served

Aerospace | Commercial Heat Treating | Power Gen | Aircraft Engines
Heat Transfer | Powdered Metals | Automotive | Medical | Tool & Die



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🌐 solarmfg.com



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