



VAC AERO
INTERNATIONAL INC.

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Furnace Manufacturing Division
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VACUUM GAS QUENCH FURNACES AUXILIARY SYSTEMS



VAV Series Vertical Bottom-loading Vacuum Furnaces

IG GAS SUPPLY SYSTEMS:

In vacuum furnace applications where rapid gas quenching is required (for example, heat treating of air hardening tool steels or high speed steel) it is important that the furnace chamber be backfilled very rapidly with inert gas. It is also important that this gas be supplied to the furnace without contamination. When the product processed in a vacuum furnace is discoloured or contaminated it is often a result of contaminated quench gas.

The IG Gas Supply Systems built by VAC AERO are sized to supply quench gas to the furnace chamber so that it can be backfilled in 30 seconds or less. The system also includes back flow, purge and safety devices to ensure the purity of the quench gas.

The system is designed to be supplied from high pressure bulk gas storage or liquid storage (cold converter) sources.

The IG tank is an ASME approved receiver, which at an internal gas pressure of 120 psig will supply a sufficient volume of quench gas to back fill the chamber to two bar in 30 seconds or less. The tank can be supplied in vertical or horizontal configurations.

DUAL LOOP FURNACE COOLING SYSTEM:

The optional Dual Loop Furnace Cooling System is designed to protect the furnace chamber and other critical components from corrosion and lime build-up that may cause clogging or hot spots. The system provides an economical, low maintenance supply of coolant while occupying minimum floor area.

One side of the system consists of a closed loop that delivers treated coolant to the furnace. The other side is an open loop that uses raw water to remove heat from the furnace coolant through a plate/frame heat exchanger. The Dual Loop Furnace Cooling System is available in several sizes with capacities designed to accommodate VAC AERO's complete line of furnaces.

The principle of operation is as follows; (please refer to Figure on the other side):

- 1) Coolant from the furnace reservoir is pumped in a closed loop through one side of a liquid/liquid heat exchanger and into the furnace.
- 2) Heated coolant from the furnace is returned to the furnace reservoir.
- 3) Cooling water from the remote sump reservoir is pumped through the other side of the liquid/liquid heat exchanger where it extracts heat from the furnace coolant. The heated cooling water is pumped to a cooling tower where it is cooled by evaporation. The cooling water is then returned to the remote sump reservoir through a gravity feed.
- 4) A float valve maintains a constant level in the remote sump reservoir by periodically inletting make up water to offset evaporative losses.
- 5) A thermostatic control prevents the water temperature from dropping lower than a preset temperature by turning on the cooling tower blower only when required.

The major components of the Dual Loop Furnace Cooling System consist of the following:

- Ready-to-install Furnace Cooling Package with reservoir, pump, heat exchanger, valves and gauges mounted and connected on a single structural steel base. Optional air or natural gas powered back-up pumps are available.
- Remote Sump Package including reservoir, tower pump, valves and gauges.
- Evaporative cooling tower with corrosion-resistant shell.
- Electrical Control Package in NEMA 12 enclosure for operation of entire cooling system. Controls can be configured to operate with 480V/3Ph/60Hz, 575V/3Ph/60Hz or 380V/3Ph/50Hz.



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