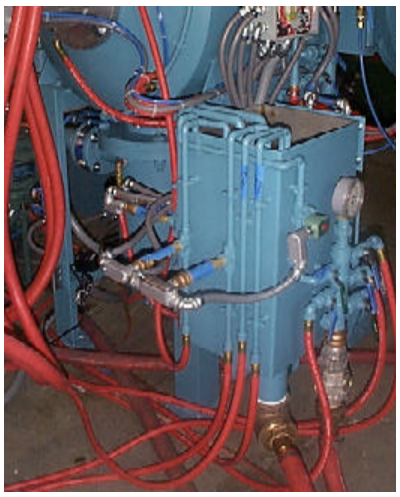
Centorr/Vacuum Industries Water Systems

All Centorr/Vacuum Industries furnaces use water for cooling the chamber, doors, busswork, electrodes, power supply, and vacuum pumping system. There are two basic type of water systems: Open Drain and Closed Loop.

Depending on the type of furnace and process desired, the system may be plumbed with cold water only, or a combination of hot and cold water to facilitate binder removal. The basic systems are

Open Drain Systems

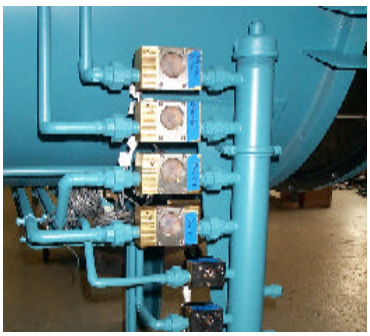
- Single point water entry
- Temp/Pressure Gauge
- Multi-valved distribution manifold
- Exit through stainless steel drain bosh.



Photograph of open drain water system with drain bosh.

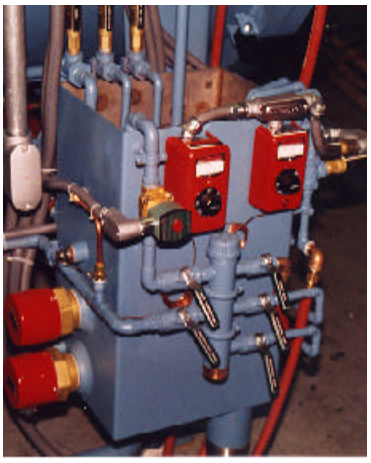
Closed Drain Systems

- Single point water entry
- Temp/Pressure Gauge
- Multi-valved distribution manifold
- Exit through individual flow indicator/flow switches (or electronic Malemas) to single outlet manifold to customer's in-house water system



Photograph of closed loop system with Malema flow sensors and integrated flow indicators.

Photograph of closed loop system with common dial flow indicators and flowtek switches.



Photograph of open drain system with hot water option.

detailed below:

Hot and Cold water systems

- Recirculation Pump
- Automatic overtemp water discharge
- Cold water switchover and make-up
- Exit to open stainless steel drain bosh/closed loop
- Chromallox heater system

REV:010209

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C/VI Standard Water System Offerings

- Inexpensive Open Drain or Closed Loop systems
- Designed for easy to meet incoming water specifications
- Hot water systems available for debinding systems
- Low cost flow indicators / flow alarms indicators, or state of the art digital flow sensors
- Available temperature alarm monitoring of all water flows

System Descriptions

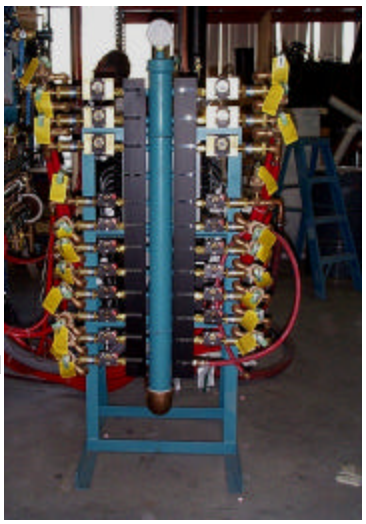
Water System (Open Drain)

Open-Drain Water distribution and manifold system includes combination temperature/pressure gauge on water inlet/outlet with recirculation pump, automatic overtemperature water discharge, cold water switchover and make-up. Water circuits exit through individual flow indicators and flow switches on *all* circuits for alarm interlock to an open stainless steel drain bosh.

Water System (Closed Drain)

Closed-Drain Water System with a single point water entry with combination temperature/pressure gauge, leading to a multi-valved distribution manifolds. Water circuits exit through single manifold with combination temperature/pressure gauge, and individual flow indicators and flow switches on *all* circuits for alarm interlock to a single outlet manifold for single point connection to customer's existing in-house water system.

Water System (Model NFNY)



Model NFNY Closed-Drain Water System with a single point water entry with combination temperature/pressure gauge leading to a multi-valved distribution manifold. All water circuits exit through a single drain manifold with combination temperature/pressure gauge, Malema combination flow indicators/flow switches with alarm flow setpoint (and optional GPM output that can be enabled for redundant flow alarms), with indicator light display for alarm interlock; with type J thermocouples (with one or two temperature setpoints for water temperature alarm interlock [warning and full alarm], and pressure relief valves on both feed and drain lines, with check valves on each circuit, into an outlet manifold for single point connection to customer's existing in-house water system. A single type J thermocouple is plumbed in the incoming primary water manifold and drain manifold for monitoring incoming/outgoing water temperatures. Display of water temperatures on the chart recorder or PC system, and display of water flow (gpm) on computer.

Hot Water Debinding Systems

The wax condenser is water traced/jacketed to maximize condensation of wax vapors, and can be stripped of wax after the heating cycle by running a hot water flush. (Initiated by a button on the control cabinet and/or and event on the PLC). As an option, additional three-way valves on the water system can be added to initiate a hot water stripping cycle immediately after the debind phase, via a pushbutton on the control cabinet, or by an event on the PLC.

To further enhance total wax collection, the water flow to the chamber jacket and doors are plumbed to a hot and cold water supply to maintain the jacket and doors at a temperature above wax melting point during the dewax cycle. This liquifies any wax that may have condensed on the inner wall of the chamber. The liquid wax flows to the bottom of the chamber.

Hot and cold water recirculation system includes recirculation pump, automatic overtemperature water discharge, cold water switchover, and make-up, and Chromallox hot water immersion heaters. There is a "hot/cold" water switch on the control cabinet to initiate a hot water cycle on the chamber after a cycle is complete, or it can be programmed as an event on the PLC. Water distribution manifold empties to an open stainless steel drain bosch, or closed loop water return.

Customer is responsible for providing an emergency water supply. Centorr/Vacuum Industries recommends a system with safety valves which will automatically open in the event of loss of the primary water supply.

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