Typical Water Cooling Configurations and Emergency Water Options

Description:

All of our furnace proposals and quotations state that the 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.

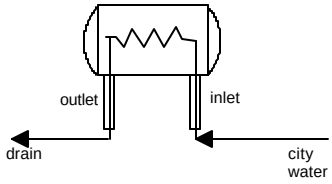
In order to help the customer design the best system for their particular needs, the following examples are given.

A

Basic Setup - OPEN DRAIN (aka - City Water)

Customer uses city water with outlet into an open drain bosh or closed loop outlet manifold going to the facility's drain.

No emergency backup system



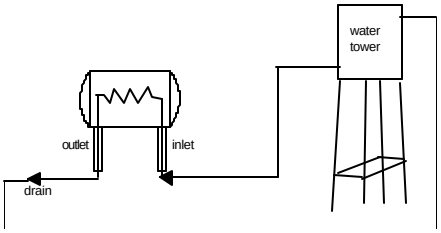
- Inefficient
- Typically for small R&D/Lab furnaces
- Only able to use untreated water

B

Closed Loop Water In-House Water System

Customer uses in-house water system feeding closed loop design.

No emergency backup system



- Allows use of glycol solution or treated water for rust prevention.
- Uncovered water towers pose debris plugging issues
- Can run hotter temperatures in summer months.

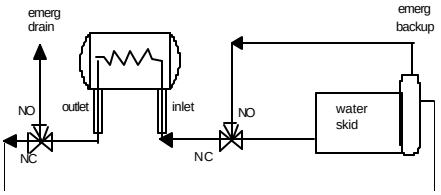
C

Closed Loop Water Skid with Emergency Backup

Customer uses in-house water to maintain a cooling water skid.

Water skid available with built-in emergency water system using LP-operated backup pump, or Gas operated Diaphragm pump in the event of power loss/low water flow.

System is *not* tied into C/VI control cabinet.

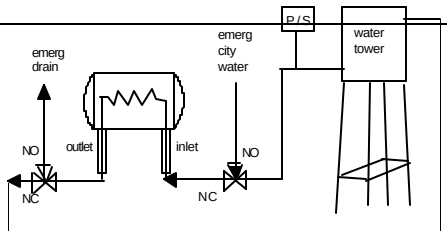


- Allows use of glycol solution or treated water for rust prevention.
- Great for areas with high mineral content.
- Water-to-water; Air-to-water; Evaporative style heat exchangers.
- Safe and reliable
- Some units come with emergency generator in case of power loss.

D

Closed Loop Water with Emergency City Water Backup

Customer uses in-house water with three-way valves on inlet and drain to automatically switch over to city water in the event of low water flow or power loss. Includes pressure sensor to switch over in case of low flow of primary water.



- Same as above C but with emergency "city water" backup.
- When control power is off, system automatically uses city water.
- In the event of power loss, glycol solution will go to drain (possible contamination issues).

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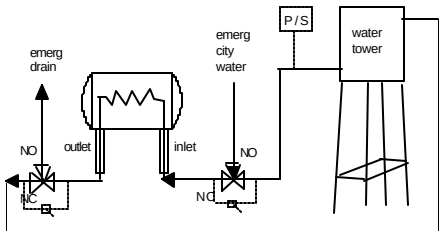
E Closed Loop Water with Emergency City Water Backup and Bypass

Customer uses in-house water with three-way valves on inlet and drain to automatically switch over to city water in the event of low water flow or power loss. Includes pressure sensor to switch over in case of low flow of primary water. Bypass around emergency line allows customer to flow house water when control cabinet power is off.

System is *not* tied into C/VI control cabinet.



- Same as D but with bypass around emergency line.
- When control power is off, system automatically uses city water.
- In the event of power loss, glycol solution will go to drain (possible contamination issues).
- Bypass allows customer to use in-house water, *but this defeats all safeties.*

Emergency Backup System Description

Centorr/Vacuum Industries' emergency water backup systems are designed for simplicity and complete reliability in the event of loss of primary water or power loss.

The system uses electric or air-operated "normally open" (NO) and "normally closed" (NC) three-way valves which fail to their normal position via a spring-loaded return. The inlet "house water" valve is normally closed (power to open). Upon startup, the control cabinet power tells the water inlet (and outlet) valve to open allowing house water to flow through the chamber.

In the event of a power loss, the NO inlet valve will close, allowing city water to enter the chamber providing continuous cooling. The only disadvantage here, is that a small quantity of the glycol mixture in the chamber and manifolding will go down the customer's drain. CVI uses an environmentally friendly glycol substitute which is safe for disposal. The customer should be sure to check with their local authority to ensure compliance of their chosen cooling fluid with city/state regulations.

For added safety, CVI adds a pressure switch to the main inlet line. In the event of loss of primary water (or a flow reading below the setpoint), a relay will automatically shut the NC valve and open the NO emergency "city water" valve.

In the event of loss of compressed air (which actuates the solenoids), all CVI emergency water valves are also designed with spring-loaded returns, which forces the valves to their "normal" state even if there is insufficient electrical power or compressed air.

Costs and Options

Option	Price Ranges
Emergency NO/NC 3-way valves on inlet and drain with pressure switch and relays	$1,250.00 - $2,250.00
"House / Emergency" water selector switch on CVI control cabinet	$225.00 - $1,000.00

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