WATER TREATMENT AND CHEMICAL CLEANING

UNIVERSITY CONTACT:

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DESIGN REQUIREMENTS:

GENERAL:

Provide chemical cleaning and install water treatment equipment for the following systems:

1. Hot water closed heating systems
2. Chilled water closed systems
3. Open recirculating cooling water systems (Cooling Towers)
4. Steam generating systems
5. Glycol systems

Provide complete water treatment equipment, piping, electrical work and chemical cleaning for open recirculating, steam generating and closed systems. Type of chemical, storage and feed rates shall be supplied from the University's water treatment contractor. Design and selection of systems may be made from the Universities water treatment Contractor. That company can provide the installation assistance of the chemical feed & control equipment and procedures for pipe flushing cleaning and passivation. All equipment and chemical selections shall be issued as submittals for approval. All pipe flushing, cleaning and passivation written procedures shall be issued as submittals for approval.

SYSTEM CLEANING:

The installation contractor shall be responsible for insuring that all pipe systems, for which they are responsible, remain clean and free from all corrosion during testing, filling, or draining operations. Under no circumstances shall untreated water be introduced into piping system and be allowed to remain in place for more than one week. Upon completion of piping construction, and following a thorough forced flush using pumping and start-up strainers, the system shall be cleaned by the installation contractor using appropriate chemicals as specified by the University's water treatment contractor. The cleaning operation shall be completed when agreed upon and may be inspected by representative of the University.

HYDROSTATIC TESTING CORROSION INHIBITOR:

If sections of piping system are hydrostatically tested after cleaning and test water will remain in the piping for more than one week, the system must be treated with an appropriate corrosion inhibitor. It is the responsibility of the contractor to coordinate the treatment with University's water treatment contractor.

CHEMICAL TREATMENT OF ALL SYSTEMS:

After the University accepts the clean piping systems, the University's water treatment contractor will provide the water treatment chemicals and services.

CORROSION RACKS:

The installation contractor shall furnish a corrosion rack for all open recirculating systems on cooling water, hot water & chilled water systems. The rack shall include the following as the minimum:

1. Inlet and outlet shut off valves
2. Wye Strainer
3. Corrosion probe connection fittings
4. Corrosion coupon holders
5. Flowmeter

OPEN RECIRCULATING COOLING WATER EQUIPMENT:

The following equipment is required for open recirculating cooling water systems:

1. Control/Power Panel
   1) Completely wired for 120 VAC power/control.
   2) 120 VAC receptacles dedicated for chemical feed pump power cords
   3) Main power switch and indicating lamp
   4) Manual/auto/off switch for bleed off and chemical feed pumps
   5) Selector switch to feed inhibitor based on makeup, bleed off or time
   6) Indicating conductivity meter
   7) Control of feed for two biocides with seven day programmable timers
   8) Biocide pre-bleed and lockout
   9) Flow switch
   10) Audible and visual alarm

2. Day tank or pump from bulk drum w/ secondary containment.

3. Diaphragm type chemical feed pumps of proper size and pressure for application.

4. Water meter with electric contacting head;

Under 500 tons	3/4"(100 gallon contact)
500-900 tons	1" (150 gallon contact)
900-1500 tons	1-1/2" (300 gallon contact)
1500-2000 tons	2" (500 gallon contact)
2000-3000 tons	3" (750 gallon contact)
Over 3000 tons	as recommended by the University

5. Solenoid bleed-off valve
   1) Install piping to sanitary sewer
   2) Wired to controller

Installation of the above equipment shall be completed as described below:

1. Water shall be diverted from the discharge side of circulating pump, through conductivity sensor of the controller, through the coupon rack, and then return to suction side of circulating pump. Ball valves shall be installed at inlet and outlet taps. Piping shall be steel or circulating pump. Ball valves shall be installed at inlet and outlet taps. Piping shall be steel or PVC.

2. Chemical injection piping shall be independent to the controller loop described above the tap shall be immediately downstream of the controller loop. Injection points will be one foot apart and made at six o'clock position on pipe. Full port ball valves shall be installed at injection taps. Piping shall be PVC or other type plastic.

3. Bleed off piping shall be installed on return piping to the cooling tower.

4. **All** equipment shall be installed at working level.

CLOSED HOT AND CHILLED WATER EQUIPMENT:

Installation contractor shall install a five gallon Neptune shot feeder including a funnel (or two inch wide mouth), relief vent, air vent and drain. The feeder shall be able to accept filters. The feeder shall be installed around the circulating pump. A corrosion rack shall be installed upstream of feeder. Piping shall be steel.

STEAM GENERATING SYSTEM EQUIPMENT:

The following equipment is required for steam generating systems:

1. Two water softeners appropriately sized for the anticipated make-up requirements. Water softeners shall be alternating, fully automatic, programmable, with regeneration based on throughput. Water softeners should be of corrosion resistant design.

2. One 50 gallon chemical feed tank with agitator and positive displacement pump. The unit shall be piped to the deaerator or feedwater tank storage. A shutoff valve is required at this location. Deaerator shall be internally piped to provide proper chemical distribution.

3. One 50 gallon chemical day tank with agitator and positive displacement pump shall be provided for each boiler. The chemical feed shall be piped to inject chemical into the feedwater line just before entering the boiler. A shutoff valve is required at this location.

4. One **automatic** conductivity controller shall be installed on each boiler continuous blowdown line. The installation contractor shall provide a blowdown controller that includes a conductivity sensor and motor operated ball valve. A shutoff valve is required upstream of the sensor and motor operated valve to allow equipment to be serviced.

GLYCOL LOOP SYSTEM EQUIPMENT:

1. For volumes up to 5000 gallons – A Neptune FTF-5, five gallon bypass feeder/filter with stainless steel dissolving basket, standard ¾ in connections, 4 in fill cap, 10 gauge steel, 200 psi max working pressure, 5 micron filter bags.

2. For system over 5000 gallons – An automatic glycol feed system containing the following:

   a. A completely mounted and wired 115 volt control panel w/ hand-off-auto switch for pump motor, pump "on" indicator light, "low" tank level indicator light w/ audible alarm, and electric plug in cord.

   b. A 50-gallon polyethylene tank mounted in a steel frame which is primed and painted.

   c. A 3 gpm pump (@100 psi) with internal relief valve mounted underneath tank.

   d. A suction assembly including PVC tubing and fittings, a PVC ball valve, and PVC "Y" strainer.

   e. A discharge assembly including schedule 80 PVC pipe and fittings, PVC ball valve, PVC check valve and PVC relief valve with return to the tank.

   f. A float switch mounted in the tank for low level pump shut off and alarm.

   g. A 0-100 psi pressure gauge.

   h. A pressure switch.

APPROVED MANUFACTURERS:

Open recirculating cooling water control systems
LMI, Pulsatrol, Lakewood

Diaphragm type chemical feed pumps
Pulsafeeder, LMI, Prominent

Soleniod bleed-off valves
ASCO or equal

Blowdown controllers
Walchem, Pulsafeeder or equal

– END OF SECTION–