SECTION 23 25 00

HVAC WATER TREATMENT

1.0 GENERAL

1. DESCRIPTION
   1. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.
   2. This Section 23 25 00 and the accompanying drawings cover the provisions of all labor, equipment, appliances, chemicals and materials and performing all operations in connection with the construction and installation of the water treatment systems as specified herein and as shown. These systems include, but are not limited to, the following:
      1. Condenser water treatment (open loop)
      2. Loop water treatment (closed loop)
      3. \*\*Heating hot water treatment
2. INTENT
   1. It is the intent of this Section of the specifications to provide complete water treatment systems as shown and specified, which are installed neatly into the spaces allotted.
3. ACCEPTABLE WATER TREATMENT COMPANIES
   1. All chemical treatment systems shall be provided by Nalco Company, Garratt - Callahan Co., Technical Specialties Co., or approved Company.
4. WATER ANALYSIS TEST AND REPORT
   1. Provide electronic copies of the water analysis tests and the Treatment Company's conclusions for and recommendations for the particular chemicals proposed for each system.
5. CHEMICALS

* 1. All chemicals utilized for water treatment shall be non-polluting and conform to all government regulations. All chemicals shall be EPA registered and biodegradable. Material safety data sheets shall be submitted to the Owner prior to use.

1. INSURANCE
   1. Water Treatment Company shall provide an insurance certificate to the Owner as proof of a minimum two million dollars ($2,000,000.00) in liability insurance on systems treated.

2.0 PRODUCTS

1. CONDENSER WATER SYSTEM (OPEN) CHEMICAL TREATMENT
   1. System shall consist of chemical tanks, chemical feed pumps, and automatic feed and bleed equipment.
   2. Interlock with building controls. Coordinate with Controls SubContractor.
   3. All chemical feed piping shall be chemical-resistant plastic tubing.
   4. Injection nozzles for connecting the chemical feed tubing to the condenser water piping shall have threaded male connections.
   5. Pumps shall be self-priming, resistant to the chemicals being utilized and complete with anti-syphon check valve and internal pressure relief by-pass valve.
   6. Water meters shall be brass body and have a minimum working pressure of 125 psig. The meter registers shall be calibrated in gallons. A magnetic type contactor shall be provided between the makeup water meter body and register, which shall generate a pulse when a given volume of water passes through the meter.
   7. Bleed valves shall be low-voltage solenoid pilot operated, globe-type and shall have a brass body with a minimum working pressure of 125 psig. Valve shall be fitted with a diaphragm, which provides an adjustable flow rate. The valve shall be serviceable without removing it from the system piping.
   8. Chemical feed control panel shall be 120 volts, 1 phase, complete with cord and plug, an internal or external conductivity sensor and the following face-mounted devices:
      1. Bleed "ON" pilot light
      2. Feed "ON" pilot light
      3. Total dissolved solids (TDS) meter
      4. pH meter
      5. Pilot light test button
   9. Timers shall be 24-hour, seven-day, analog type with spring carryover for power failures.
   10. Corrosion Test Coupon Assembly: Provide a corrosion coupon rack equal to Advantage Controls Model ACR.
       1. Constructed of PVC, complete with piping, valves, and mild steel and copper coupons. Locate copper coupon downstream from mild steel coupon in the test coupon assembly. Include isolation and ball valves and a visual water flow balancing device. Entire assembly shall be mounted on a polyethylene panel suitable for wall mounting. Provide 4 station coupon rack.
   11. Chemicals (note that the application and quantity of each chemical is a function of the water analysis, which shall be taken into account prior to bidding or pricing) shall be as follows:
       1. Corrosion inhibitors shall be phosphate-free, with no heavy metal content, and be of the organic polymeric type. The inhibitor shall be effective in pH of 7.0 - 9.0.
       2. Biocides shall be non-foaming, operational in pH of 6.5 - 9.5. Chlorine shall not be acceptable as a biocide.
       3. Provide, where dictated by the water analysis, pH control. The pH control treatment shall be an inhibited, powdered acid type. Muriatic acid shall not be acceptable.
2. LOOP, AND \*\*HEATING HOT WATER (CLOSED) SYSTEMS
   1. Chemicals:
      1. The chilled, loop, and heating hot water (closed) systems treatment shall be the nitrite-borate type. The residual as nitrite shall be maintained at 1000-1200 ppm in \*\* the heating hot water systems \*\* and at 800-1000 ppm in the chilled and loop water systems.

3.0 EXECUTION

1. FLUSHING AND CLEANOUT
   1. All HVAC piping systems shall be thoroughly cleaned, flushed and tested until the system water quality equals the raw water makeup quality. If it does not, the system shall be flushed and cleaned until this quality of water is attained.
   2. No HVAC equipment shall be operated until the associated piping system has been flushed, cleaned and the water quality established, and the chemicals have been added.
   3. HVAC coils shall be isolated during initial flush-out and included in subsequent flush-outs.
   4. Prior to flush-out, submit a proposed flush-out procedure for review by the Owner.
2. CONDENSER WATER CHEMICAL TREATMENT (BLEED & FEED) SYSTEMS
   1. The systems shall provide automatic bleed of the condenser water based on conductivity due to TDS.
   2. Automatic make-up shall be provided to maintain the minimum cooling tower basin level as sensed by an electric sensor(s). See specification Section 23 65 00.
   3. The conductivity sensor, together with its control panel, shall measure the total dissolved solids (TDS) in the water by conductivity. When the conductivity reaches the set point the solenoid bleed valve shall open. When the conductivity falls below the set point, the solenoid bleed valve shall close. Set points shall be adjustable.
   4. Water meters with registers shall be installed in both the makeup water line and bleed line. The makeup meter shall also contain a magnetic type contactor, which generates an electric pulse after a given volume of water passes through the water meter. The pulse shall be received by the inhibitor pump controller, which in turn energizes the associated chemical feed pump for a preset (adjustable) period of time.
   5. A programmable time clock shall be provided to inject the biocides into the system and interlocked with the automatic bleed to temporarily stop the bleed and permit circulation of the biocide.
      1. There shall be two biocides provided and they shall be alternated monthly.
   6. The bleed and feed systems shall be interlocked to the condenser water pumps such that no bleed-off or chemical feed occurs when these pumps are off.
   7. Provide all interlock wiring required to accomplish the sequences outlined herein. The only power required shall be taken from the nearest 120 volt receptacle, in coordination with Division 26 to not cause a trip hazard.
3. CLOSED SYSTEMS
   1. These chemicals shall be manually fed into their systems through their air separators or bypass pot feeders.
4. FOLLOW-UP
   1. Provide the first twelve (12) months’ supply of all chemicals. The instructions for handling, storage and mixing of the chemicals and dosage requirements for this specific installation shall also be provided. All chemicals shall be provided by the same Water Treatment Company.
   2. The Water Treatment Company shall provide test kits, reagents, and training for the Owner’s personnel to monitor the water treatment program. Log sheets shall also be provided. The systems will be operated at the optimum cycles of concentration to facilitate only the minimum amount of bleed and feed that is necessary.
   3. The Water Treatment Company shall have a qualified Technician supervise the equipment installation startup and system cleanout. Provide service calls every two weeks for the first two months, then no less than once per month during the remainder of the first year’s operation. A written report shall be provided to the Owner to provide system status water quality and recommend any necessary changes in the program after each onsite analysis.
5. Interlock chemical treatment system with EMS. Coordinate with Controls Contractor for any required interlocks, control cards, etc. to be provided under this scope.

END OF SECTION