

SECTION 23 2500
HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Materials.
 - 1. Closed system treatment (water).
 - 2. Steam system treatment.
 - 3. Condenser water system treatment (cooling towers).
 - 4. Open system treatment (humidifiers, air washers, evaporative condensers, small cooling towers, liquid coolers).
- B. By-pass (pot) feeder.
- C. Solution metering pump.
- D. Solution tanks.
- E. Agitator.
- F. Liquid level switch.
- G. Conductivity controller.
- H. Water meter.
- I. Solenoid valves.
- J. Timers.
- K. Water softeners.
- L. Test equipment.
- M. Side-stream filtration equipment.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Owner furnished treatment equipment.
- B. Section 01 6000 - Product Requirements: Owner furnished treatment equipment.
- C. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- D. Section 23 2113 - Hydronic Piping.
- E. Section 23 2114 - Hydronic Specialties.
- F. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Indicate placement of equipment in systems, piping configuration, and connection requirements.
- D. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.
- E. Certificate: Submit certificate of compliance from Authority Having Jurisdiction indicating approval of chemicals and their proposed disposal.
- F. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.
- G. Operation and Maintenance Data: Include data on chemical feed pumps, agitators, and other equipment including spare parts lists, procedures, and treatment programs. Include step by step instructions on test procedures including target concentrations.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.
- B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. AmSolv-Amrep, Inc; _____: www.amsolv.com.
- B. GE Water & Process Technologies; _____: www.gewater.com.
- C. Nalco, an Ecolab Company; _____: www.nalco.com.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Closed System Treatment (Water):
 - 1. Manufacturers:
 - a. AmSolv-Amrep, Inc; _____: www.amsolv.com.
 - b. GE Water & Process Technologies; _____: www.gewater.com.
 - c. Nalco, an Ecolab Company; _____: www.nalco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Steam System Treatment:
 - 1. Manufacturers:
 - a. AmSolv-Amrep, Inc; _____: www.amsolv.com.
 - b. GE Water & Process Technologies; _____: www.gewater.com.
 - c. Nalco, an Ecolab Company; _____: www.nalco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Condenser Water System Treatment (Cooling Towers):
 - 1. Manufacturers:
 - a. AmSolv-Amrep, Inc; _____: www.amsolv.com.
 - b. GE Water & Process Technologies; _____: www.gewater.com.
 - c. Nalco, an Ecolab Company; _____: www.nalco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- D. Open System Treatment (Humidifiers, Air Washers, Evaporative Condensers, Small Cooling Towers, Liquid Coolers):
 - 1. Manufacturers:
 - a. AmSolv-Amrep, Inc; _____: www.amsolv.com.
 - b. GE Water & Process Technologies; _____: www.gewater.com.
 - c. Nalco, an Ecolab Company; _____: www.nalco.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.03 BY-PASS (POT) FEEDER

- A. Manufacturers:
 - 1. Griswold Controls; _____: www.griswoldcontrols.com.
 - 2. J. L. Wingert Company; _____: www.jlwingert.com.
 - 3. Neptune, a brand of the Dover Company; _____: www.neptune1.com.

4. Substitutions: See Section 01 6000 - Product Requirements.

2.04 SOLUTION METERING PUMP

- A. Manufacturers:
 1. J. L. Wingert Company; _____: www.jlwingert.com.
 2. Dover Corporation; _____: www.neptune1.com.
 3. Pulsafeeder Engineered Products; _____: www.pulsa.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Positive displacement, diaphragm pump with adjustable flow rate, thermoplastic construction, continuous-duty fully enclosed electric motor and drive, and built-in relief valve.

2.05 SOLUTION TANKS

- A. 30 gallon capacity, polyethylene, self-supporting, 1 gallon graduated markings; molded fiberglass cover with recess for mounting pump, agitator, and liquid level switch.

2.06 AGITATOR

- A. Totally enclosed electric motor, cast iron clamp and motor mount, 1/2 inch diameter coated Type 316 stainless steel propeller.

2.07 LIQUID LEVEL SWITCH

- A. Polypropylene housing with integrally mounted PVC air trap, receptacles for connection to metering pump, and low level alarm.

2.08 CONDUCTIVITY CONTROLLER

- A. Manufacturers:
 1. Envirocare International; _____: www.envirocare.com.
 2. JENCO Instruments Incorporated; _____: www.jencoi.com.
 3. Omega Engineering, Inc; _____: www.omega.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Packaged monitor controller with solid state circuiting, five percent accuracy, linear dial adjustment, built-in calibration switch, on-off switch and light, control function light, output to control circuit and recorder.

2.09 WATER METER

- A. Displacement type cold water meter with sealed, tamper-proof magnetic drive, impulse contact register, single pole, double throw dry contact switch.

2.10 SOLENOID VALVES

- A. Forged brass body globe pattern, normally open or closed as required, explosion-proof and watertight solenoid enclosure, and continuous duty coil.

2.11 TIMERS

- A. Electronic timers, infinitely adjustable over full range, 150 second and five minute range, mounted together in cabinet with hands-off-automatic switches and status lights.

2.12 WATER SOFTENERS

- A. Manufacturers:
 1. Culligan International Company; _____: www.culligan.com.
 2. Sterling Water Treatment; _____: www.sterlingwatertreatment.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Performance:
 1. See schedules on drawings

2.13 TEST EQUIPMENT

- A. Provide white enamel test cabinet with local and fluorescent light, capable of accommodating 4 - 10 ml zeroing titrating burettes and associated reagents.

2.14 SIDE-STREAM FILTRATION SYSTEM

- A. System: Flow indicator, filter housing with cartridge filter, shut-off valves, and flow control valve.
- B. Hot Water and Glycol Filter Housing: Glass reinforced nylon plastic suitable for 220 degrees F and 200 psi operating conditions.
- C. Chilled Water Filter Housing: Reinforced polypropylene plastic housing suitable for 125 degrees F and 125 psi operating conditions.
- D. Cartridges: 30 micron for start-up and 5 micron for system operation.

PART 3 EXECUTION

3.01 PREPARATION

- A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.
- B. Place terminal control valves in open position during cleaning.
- C. Verify that electric power is available and of the correct characteristics.

3.02 CLEANING SEQUENCE

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.04 CLOSED SYSTEM TREATMENT

- A. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.
- B. Introduce closed system treatment through bypass feeder when required or indicated by test.
- C. Provide 3/4 inch water coupon rack around circulating pumps with space for 4 test specimens.

3.05 STEAM SYSTEM TREATMENT

- A. Provide bypass feeder on feed water line to each boiler.
- B. Activate solution pumps when feed water pumps are running.
- C. Provide conductivity controller to sample boiler water and operate solenoid blowdown valve. Provide timer activated sampling with solenoid valve, balancing valve, and conductivity probe. Pipe to blowdown tank.
- D. Provide 3/4 inch water coupon rack on each feed water pump with space for 4 test specimens.
- E. Provide liquid level switch in each solution tank to deactivate solution pump and agitator and sound local alarm bell.

3.06 OPEN SYSTEM TREATMENT (HUMIDIFIERS)

- A. Provide conductivity controller to sample sump water and operate bleed-off solenoid valve. Activate with pump. Pipe to drain.

3.07 CONDENSER WATER SYSTEMS (COOLING TOWERS)

- A. Provide solution pumps to feed sequestering agent and corrosion inhibitor from solution tank into condenser water supply to tower. Provide agitator as required.
- B. Provide conductivity controller to sample condenser water and operate 1 inch solenoid bleed valve and solution pumps. Provide 1/4 inch solenoid valve and piping to blowdown controller sampler wired to open when condensing water pump is operating.
- C. Provide solution pump to feed diluted acid from solution tank into condenser water supply to tower.
- D. Introduce algicide to tower by intermittent slug feed.
- E. Provide water meter in make-up water line to tower, to activate solution pumps for preset time when condenser water pumps are running.

- F. Provide liquid level switch in each solution tank to deactivate solution pump and agitator and sound local alarm bell.

3.08 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's personnel on operation and maintenance of chemical treatment system.
 - 1. Provide minimum of two hours of instruction for two people.
 - 2. Have operation and maintenance data prepared and available for review during training.
 - 3. Conduct training using actual equipment after treated system has been put into full operation.

END OF SECTION 23 2500

