

SECTION 23 25 00

HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. System cleaner.
2. Closed system treatment (water).
3. Chemical feeder equipment including associated feeders, pumps, tanks, controls, meters and valves.

B. Related Sections:

1. Division 26 - Equipment Wiring Connections: Execution requirements for electrical connections specified by this section.

1.02 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 PERFORMANCE REQUIREMENTS

A. Provide system to treat water available at project site to control the following characteristics of water in closed, systems:

1. Hardness
2. Iron
3. Total Dissolved Solids
4. Total Alkalinity
5. Silica
6. pH

1.04 SUBMITTALS

A. Division 01 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

C. Product Data: Submit chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Submit placement of equipment in systems, piping configuration, and connection requirements.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

F. Manufacturers Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

- G. Wiring Diagrams: Provide manufacturer's electrical requirements to electrical installer for power supply wiring to water treatment equipment. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
- 1.05 CLOSEOUT SUBMITTALS
- A. Division 01 - Execution and Closeout Requirements: Closeout products.
 - B. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.
 - C. Operation and Maintenance Data: Submit 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.
- 1.06 QUALITY ASSURANCE
- A. UL and NEMA Compliance: Provide electrical components required as part of condenser water treatment equipment, which are UL listed and labeled and comply with NEMA standards.
 - B. NEC Compliance: Comply with National Electrical Code as applicable to installation, electrical connections, and ancillary electrical components of condenser water treatment equipment.
 - C. Chemical Standards: Provide only chemical products which are acceptable under state and local pollution control regulations.
- 1.07 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience, and with service facilities within 100 miles of Project with water analysis laboratories and full time service personnel.
 - B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.
- 1.08 PRE-INSTALLATION MEETINGS
- A. Division 01 - Administrative Requirements: Pre-installation meeting.
 - B. Convene minimum eight weeks prior to commencing work of this section.
- 1.09 FIELD MEASUREMENTS
- A. Verify field measurements prior to fabrication.
- 1.10 WARRANTY
- A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.
 - B. Furnish five year manufacturer warranty for pumps, valves and water meters.
- 1.11 MAINTENANCE SERVICE
- A. Division 01 - Execution and Closeout Requirements: Maintenance service.

- B. Furnish monthly technical service visits, for one years starting at Date of Substantial Completion, to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements and corrective actions needed. Submit two copies of field service report after each visit.
- C. Furnish laboratory and technical assistance services during this maintenance period.
- D. Furnish on site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

1.12 MAINTENANCE MATERIALS

- E. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.
- F. Furnish chemicals for treatment and testing during warranty period.

PART 2 PRODUCTS

2.01 SYSTEM CLEANER

- A. Product Description: Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.
- B. Biocide; chlorine release agents including sodium hypochlorite or calcium hypochlorite, or microbiocides including quaternary ammonia compounds, tributyl tin oxide, methylene bis (thiocyanate), or isothiazolones.

2.02 CLOSED SYSTEM TREATMENT (WATER)

- A. Sequestering agent to reduce deposits and adjust pH.
- B. Corrosion inhibitors.
- C. Conductivity enhancers.

2.03 BY-PASS (POT) FEEDER

- A. Equipment and Chemical Requirements:
 1. Shot Feeder: Provide shot feeders of 5 gallon capacity or otherwise as indicated, constructed of cast iron or steel for introducing chemicals into closed circulating system. Provide funnel with shutoff valve on top, air release valve on top, drain valve on bottom, and recirculating shutoff valves on side. Construct for 125 psi working pressure.
 2. Water Sample Test Kit: Furnish kit, including carrying case and spare reagents, recommended by water treatment system manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

- A. Operate, fill, start and vent systems prior to cleaning. Use water meter to record capacity in each system. Place terminal control valves in open position during cleaning.

3.02 CLEANING

- A. Concentration:
 - 1. As recommended by manufacturer.
 - 2. One pound per 100 gallons of water contained in the system.
 - 3. One pound per 100 gallons of water for hot systems and one pound per 50 gallons of water for cold systems.
- B. Hot Water Heating Systems:
 - 1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
 - 2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
 - 3. Circulate for 6 hours at design temperatures, then drain.
 - 4. Refill with clean water and repeat until system cleaner is removed.
- C. Chilled Water Systems:
 - 1. Circulate for 48 hours then drain systems as quickly as possible.
 - 2. Refill with clean water, circulate for 24 hours, then drain.
 - 3. Refill with clean water and repeat until system cleaner is removed.
- D. Steam Systems:
 - 1. Apply heat, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
 - 2. Cool, then drain as quickly as possible.
 - 3. Refill with clean water, drain, refill and check for sludge.
 - 4. Repeat until system is free of sludge.
 - 5. Apply heat to produce steam for piping system and maintain for 8 hours minimum. Bypass traps and waste condensate.
- E. Use neutralizer agents on recommendation of system cleaner supplier and acceptance of the County's Representative.
- F. Flush open systems with clean water for one hour minimum. Drain completely and refill.
- G. Remove, clean, and replace strainer screens.
- H. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.
- I. The servicemen and the company they represent will be held responsible for the safe application of cleaning compounds and safe operation of equipment during the cleaning, flushing and recharging of the above system and shall inform the proper representative if any unsafe conditions arise while the systems are being cleaned.

3.03 CLOSED SYSTEM TREATMENT

- A. Provide one bypass feeder on each system. Install isolating and drain valves and interconnecting piping. Install around balancing valve downstream of circulating pumps.
- B. Introduce closed system treatment through bypass feeder when required or indicated by test.
- C. Install 3/4 inch water coupon rack around circulating pumps with space for 12 test specimens.

3.04 DEMONSTRATION

- A. Division 01 - Execution and Closeout Requirements: Requirements for demonstration and training.
- B. Furnish eight hour training course for operating personnel, instruction to include installation, care, maintenance, testing, and operation of water treatment systems. Arrange course at start up of systems.

END OF SECTION