

15189 HVAC Water Treatment

Part 1: General

- 1.01 This section sets forth the minimum requirements for HVAC WATER TREATMENT used on University building renovations or new construction.
- 1.02 This section includes water-treatment systems for the following:
- Heating, hot water piping (closed-loop system).
 - Chilled-water piping (closed- loop system).
 - Heating, steam and condensate piping).
 - Condenser water piping (open system).

Part 2: Design Guidelines

2.01 CHEMICAL FEED DESCRIPTION

A. Closed-Loop System: One bypass feeder on each system with (5 gallon size on all systems with > 1, 000 gallon volume) isolating and drain valves at circulating pumps, unless otherwise indicated.

B. Closed- Loop Heating Steam and Condensate Piping: Lead-lag switch controls the sequence of boilers and introduces the chemical to the boiler through an appropriate chemical feed system.

C. Open- Loop Condenser Water Piping: Chemical feed and bleed control systems with integrated inhibitor and dual biocide feed

2.02 PERFORMANCE REQUIREMENTS

The water treatment program includes boiler systems, cooling towers, hot water loops, and chilled water loops. The contractor will provide all chemical products (currently consisting of oxygen scavenger, scale inhibitor, organic dispersant, alkalinity adjustment, condensate treatment, fuel oil treatment, combination scale/corrosion inhibitor with dispersants, non-oxidizing Biocide A&B closed water treatment, and lay-up treatment as required), along with equipment, and professional consulting services to accomplish the following:

A. Produce clean heat transfer surfaces which are substantially free of scale, sludge, deposits, corrosion, pitting and biological growth when treatment is administered in accordance with vendors directions and recommendations.

B. Reduce fuel and electrical consumption through improved heat transfer efficiency, by minimizing scale, corrosion, fouling and microbiological growth which create deposits on heat transfer surfaces.

C. Minimize repair and maintenance costs associated with replacement and cleaning of equipment due to scale, corrosion, fouling or microbiological activity.

D. Provide professional, knowledgeable and involved sales/service personnel to ensure program success.

E. Accurately monitor program results and communicate appropriate recommendations with quantifiable business oriented justifications.

F. Provide Training to University personnel on the implementation and control of the program.

2.03 SUBMITTALS

A. Product Data: Include rated capacities; water-pressure drops; shipping, installed, and operating weights; and furnished products listed below:

- Pumps
- Chemical feed and bleed control systems with integrated inhibitor and dual biocide feed tank.
- Chemical bypass feeders
- Chemical water treatment program and MSDS
- Test equipment
- Filters

2.04 QUALITY ASSURANCE

Installer Qualifications: Provide an experienced installer who is directed by an authorized representative of the chemical treatment supplier for both installation and maintenance of chemical treatment equipment.

3.01 PRODUCTS

A. MANUFACTURERS

Manufacturers: Subject to compliance with requirements and in conjunction with the existing contracted University HVAC Water Treatment Program, provide products by the current Chemical Treatment Vendor for the University:

Contact Facilities Operation to obtain the current contracted Vendor.

Every effort must be made to maintain a level of uniformity in chemical formulation to insure a line of continuity. Deviation from existing formulations that are applied across the University shall be avoided.

Provisions should be made for the removal for any unused chemicals. In addition, provisions must be provided for the proper disposal of all empty containers.

B. CHEMICAL TREATMENT TEST EQUIPMENT

- Test Kit: Furnish all necessary manufacturer recommended equipment and chemicals for testing and controlling the water treatment. Provide a program for testing pH, bio-count, chloride, alkalinity, total hardness, and inhibitor.
- Corrosion Test Coupon Assembly: Constructed of corrosion resistant material, complete with piping, valves, mild steel and copper coupons. Insure 6 gpm flow across the coupons. Locate copper coupon downstream from mild steel coupon

in the test coupon assembly. Analysis of the coupons each 90 days will be performed at no additional cost to the University.

C. CHEMICALS

Furnish chemicals recommended by water treatment system manufacturer that are compatible with piping system components and connected equipment.

- System Cleaner: Liquid compounds with emulsifying agents and detergents to remove grease and petroleum products. The formulation must be compatible with the system components.
- Biocides: Two alternate non-oxidizing micro-biocides with different kill mechanisms.
- Closed- Loop, Water piping Chemicals: Contain sequestering agents to reduce deposits, chemicals to adjust pH , and corrosion inhibitors to protect system metals.
- Heating Steam and Condensate Piping Chemicals: Liquid formulations to prevent deposits, adjust pH and alkalinity, scavenge oxygen, and protect condensate system components.
- Open-Loop, Condenser Water Piping Chemicals: Deposit dispersants and penetrants to inhibit scaling, corrosion inhibitors, and micro-biocides.

3.02 EXECUTION

A. WATER ANALYSIS

Perform an analysis of supply water to determine the type and quantities of chemical treatment needed to protect from corrosion, deposition, and fouling.

B. Installation

Install treatment equipment level and plumb.

Perform chemical cleaning as recommended by the water treatment supplier. The water treatment supplier must test and certify in writing that the systems are clean and free of organic and inorganic contaminants.

3.03 FIELD QUALITY CONTROL

Engage a water treatment service representative to perform startup service.

Inspect field- assembled components and equipment installation, including piping and electrical connections. Report results in writing.

Inspect piping and equipment to determine that systems and equipment have been thoroughly chemically cleaned, rinsed, and filled with water, and are fully operational before introducing chemicals for water treatment system.

Place HVAC water treatment system into operation and calibrate controls during the preliminary phase of HVAC systems startup procedures.

Test chemical feed piping as follows:

- Do not enclose, cover, or put piping into operation until it is tested and satisfactory test results are achieved.
- Test for leaks and defects. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

- Leave uncovered and unconcealed new, altered, extended, and replaced water piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved.
- Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow test pressure to stand for four hours. Leaks and loss in test pressure constitute defects.
- Repair leaks and defects with new materials and retest piping until satisfactory results are obtained.
- Prepare test reports, including require corrective action.

3.04 DEMONSTRATION

- A. Engage a qualified water treatment service representative to train owner's maintenance personnel to adjust, operate, and maintain HVAC water treatment systems and equipment.
- B. Furnish a one-year service program by a qualified service person, performing service on a full-time basis. Service calls will be scheduled on a twice a month schedule coordinate with the University as to the day of the month that service will be performed. Upon arriving on campus, the service person will contact the University representative. Upon completion of the service call, a copy of the service report shall be given to the University's representative. Response to emergency service calls shall be less than 24 hours. The University shall make the equipment available/ accessible to the service person so as not to cause delays.
- C. Train Owner's maintenance personnel on procedures and schedules for starting and stopping troubleshooting, servicing, and maintaining equipment and schedules.
- D. Review manufacturer's safety data sheets for handling of chemicals.
- E. Schedule at least 8 hours of training with Owner with at least seven days' advance notice.