PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Chemicals and test equipment.

B. Chemical feeding equipment.

1.02 REFERENCE STANDARDS

A. ASHRAE Guideline 12, Managing the Risk of Legionellosis Associated with Building Water Systems.

B. ASHRAE Standard 188, Legionellosis: Risk Management for Building Water Systems.

C. FM (AG) – FM Approval Guide.

D. ITS (DIR) – Directory of Listed products.

E. UL (DIR) – Online Certifications Directory.

1.03 SUBMITTALS

A. Submit in accordance with conditions of Contract and Division 01 submittal procedures.

B. Product Data: Submit product cutsheets, materials, accessories, chemicals, and equipment, including electrical characteristics and connection requirements, rated capacities, water-pressure drops, shipping, installed, and operating weights for the water treatment system.

C. Shop Drawings: Indicate system schematic, equipment locations, controls schematics, and electrical characteristics. Detail equipment assemblies indicating dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Detail power and control wiring and differentiate between manufacturer-installed and field-installed wiring.

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

E. Water Analysis: Submit a copy of the water analysis to illustrate water quality available at Project site.

F. 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 to confirm compliance with performance requirements.

G. Certificate: Submit certificate of compliance from Authority Having Jurisdiction indicating approval of chemicals and their proposed disposal.

H. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.

I. 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. Include in maintenance manuals specified in Division 1.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Sufficient chemicals for treatment and testing during required maintenance period.

K. Warranty and maintenance agreement.

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: An experienced installer who is an authorized representative of the chemical treatment manufacturer for both installation and maintenance of chemical treatment equipment required for this Project.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.05 WARRANTY

A. Warranty: Submit written warranty, signed by Manufacturer and countersigned by Installer and Contractor, agreeing to adjust or replace system or portions thereof, as required to achieve required performances, during 1-year period following final start-up for continued operation of condenser water system.

B. Agreement to Maintain: Prior to time of final acceptance, manufacturer of water treatment system shall submit 4 copies of "Agreement for Continued Service and Maintenance" for water treatment system for Owner's possible acceptance. Offer terms and conditions for furnishing chemicals and providing continued testing and servicing, and including replacement of materials and equipment, for one-year with option for renewal of Agreement by Owner.

1.06 SPARE PARTS

A. Chemicals, Water Treatment: Furnish 6 month supply of chemicals recommended by water treatment system manufacturer for treating water to meet specified water quality.

1. Ascertain from water piping system Installer, what materials are used for pump seals. Provide only chemicals that are compatible with these materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. General: The following manufacturers of water treatment systems are acceptable. Manufacturers shall provide chemical feed equipment that meet the requirements specified herein.

1. AmSolv Total Water Management
2. Aquanomics
3. Kurita
4. MAC Water Technologies
5. Nalco, an Ecolab Company.
6. Suez Water Technologies.

7. Water Treatment Vendor that is listed under Association of Water Technologies (ATW) with a Certified Water Technician (CWT).

2.02 CHEMICALS AND TEST EQUIPMENT

A. General: Furnish chemicals of type and quantity as recommended by water-treatment system manufacturer that are compatible with piping system components and connected equipment.

B. Antifreeze: Propylene glycol with corrosion inhibitors and environmental-stabilizer additives for mixing with water to protect the hydronic system and connected equipment from physical damage from freezing or corrosion.

C. System Cleaner:

1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.
2. For closed systems, provide nonoxidizing biocide treatment if needed to meet biological parameters from water test performed after system is cleaned..

D. Closed System Treatment (Water):

1. Sequestering agent to reduce deposits and adjust Ph.
2. Corrosion inhibitors.
3. Conductivity enhancers.

E. Test Equipment:

1. Manufacturer recommended equipment and chemicals, in a carrying case, for testing pH, total dissolved solids, sodium sulfite for dissolved oxygen, biocount, chloride, and total alkalinity and for calcium hardness field tests.
2. Corrosion Test Coupon Assembly: Constructed of corrosion material, complete with piping, valves, and mild steel and copper coupons. Locate copper coupon downstream from mild steel coupon in the test coupon assembly.

    a) Two station rack for closed-loop systems.
    b) Four station rack for open condenser water systems.

2.03 CHEMICAL FEEDING EQUIPMENT

A. Bypass (Pot) Feeder: Cast iron or steel, for introducing chemicals into system; with funnel shutoff valve on top, air-release valve on top, drain valve on bottom, and recirculating shutoff valves on sides.

1. Capacity: 5 gal. for working pressure of 150 psig.

PART 3 - EXECUTION

3.01 PERFORMANCE REQUIREMENTS

A. Provide a water treatment system sized and equipped to treat raw make-up water available at project site.

B. Maintain water quality for HVAC systems that controls corrosion and build-up of scale and biological growth for maximum efficiency of installed equipment without posing a hazard to operating personnel or the environment.

C. Base chemical treatment performance requirements on quality of water available at Project site, HVAC system equipment material characteristics and functional performance characteristics, operating personnel capabilities, and requirements and guidelines of authorities having jurisdiction.

D. Coordinate the use of oxidizing agents supplemented with non-oxidizers sequentially to ensure organisms do not become immune to treatment per ASHRAE Guideline 12-2000.

E. Except as otherwise indicated, provide water treatment system manufacturer's standard materials and components as indicated by published product information, and as recommended by manufacturer for application indicated.

F. Comply with applicable codes for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

G. Perform work in accordance with local health department regulations.

3.02 PREPARATION

A. Perform an analysis of supply water to determine the type and quantities of chemical treatment needed to maintain the water quality as specified.

B. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

C. Place terminal control valves in open position during cleaning.

D. Verify that electric power is available and of the correct characteristics.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install treatment equipment level and plumb.

C. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

D. Install piping adjacent to equipment to allow service and maintenance.

E. Electrical Coordination:

1. Coordinate applicable electrical requirements in Division 26 sections for connecting and grounding electrical equipment.
2. Coordinate electrical connectors and terminals are tightened according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

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 2 test specimens.

3.05 FIELD QUALITY CONTROL

A. Engage a factory-authorized service representative to perform startup service.

1. Inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
2. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational before introducing chemicals for water-treatment system.
3. Place HVAC water-treatment system into operation and calibrate controls during the preliminary phase of HVAC systems' startup procedures.

B. Test chemical feed piping as follows:

1. Do not enclose, cover, or put piping into operation until it is tested and satisfactory test results are achieved.
2. 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.
3. 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.
4. Cap and subject piping to static water pressure of 50 psig (345 kPa) 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.
5. Repair leaks and defects with new materials and retest piping until satisfactory results are obtained.
6. Prepare test reports, including required corrective action.

C. Fluid Testing:

1. Coordinate with the testing requirements specified in Division 23 Section “Hydronic Piping”

3.06 ADJUSTING

A. Sample boiler water at one-week intervals after boiler startup for a period of five weeks, and prepare certified test report for each required water performance characteristic. Where applicable, comply with ASTM D 3370 and the following standards:

1. Silica: ASTM D 859.
2. Acidity and Alkalinity: ASTM D 1067.
3. Iron: ASTM D 1068.
4. Water Hardness: ASTM D 1126.

B. Occupancy Adjustments: Within 12 months of Substantial Completion, perform two separate water analyses to prove that automatic chemical feed systems are

maintaining water quality within performance requirements specified in this Section. Perform analyses at least 60 days apart. Submit written reports of water analysis.

3.07 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation and maintenance of chemical treatment system.

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC water-treatment systems and equipment.

C. Provide overview of the system and /or equipment as it relates to the facility as a whole.

D. Review operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention.

E. Review manufacturer's safety data sheets for handling of chemicals.

F. Review data in maintenance manuals, especially data on recommended parts inventory and supply sources and on availability of parts and service. Refer to Division 1 and Division 23 Section "General Mechanical Requirements."

G. Provide minimum of two hours of training with Owner with at least seven days advance notice.

H. Have operation and maintenance data prepared and available for review during training.

I. Conduct training using actual equipment after treated system has been put into full operation.

J. Certification: Contractor shall submit to the Engineer a certification letter stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The certification letter shall be signed by the Contractor and the Owner's representative indicating agreement that the training has been provided.

K. Submit certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

3.08 MAINTENANCE

A. Provide a separate maintenance contract for specified maintenance service.

B. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the equipment manufacturer or original installer.

C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of Owner.

D. Provide monthly technical service visits 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.

E. Provide laboratory and technical assistance services during this maintenance period.

F. Analyses and reports of all chemical items concerning safety and compliance with government regulations.

G. Provide 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.

END OF SECTION

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