PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cooling tower.
B. Controls.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - Plumbing Piping.
B. Section 23 0513 - Common Motor Requirements for HVAC Equipment.
C. Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
D. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.
E. Section 23 2113 - Hydronic Piping.
F. Section 23 2123 - Hydronic Pumps.
G. Section 23 6416 - Centrifugal Water Chillers.
H. Section 23 6426 - Rotary-Screw Water Chillers.
I. Section 23 6429 - Modular Water Chillers.
J. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

1.03 REFERENCE STANDARDS

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015.
E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
J. NEMA MG 1 - Motors and Generators; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide rated capacities, dimensions, weights and point loadings, accessories, required clearances, electrical requirements and wiring diagrams, and location and size of field connections. Submit schematic indicating capacity controls.
C. Shop Drawings: Indicate suggested structural steel supports including dimensions, sizes, and locations for mounting bolt holes.
D. Manufacturer's Certificate: Certify that cooling tower performance, based on ASME PTC 23 meets or exceeds specified requirements and submit performance curve plotting leaving water temperature against wet bulb temperature.
E. Manufacturer's Instructions: Submit manufacturer's complete installation instructions.
F. Operation and Maintenance Data: Include start-up instructions, maintenance data, parts lists, controls, and accessories.

G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

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.

1.06 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Factory assemble entire unit. For shipping, disassemble into as large as practical sub-assemblies so that minimum amount of field work is required for re-assembly.

B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide a five year warranty to include coverage for corrosion resistance of cooling tower structure labor only.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooling Towers:


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

2.02 MANUFACTURED UNITS

A. Provide units for outdoor use, factory assembled, sectional, counterflow, vertical discharge, blow through design, with fan assemblies built into pan and casing.

2.03 COMPONENTS

A. Pan and Casing: Galvanized steel, 12 gage, 0.1046 inch for casing and 8 gage, 0.1644 inch for reinforcing angles and channels with access doors at both ends of tower to air plenum.

B. Fans: Multi blade, cast aluminum, axial type, with belt drive, bearings with ABMA STD 9 or ABMA STD 11 L-10 life at 30,000 hours, with extended grease fittings.

C. Motor: Single speed (1800/900 rpm) mounted on adjustable steel base. Refer to Section 23 0513.

D. Fan Guard: Welded steel rod and wire guard, hot dipped galvanized after fabrication.

E. Safety: Safety railings, and ladder with safety cage from grade to fan deck.

F. Distribution Section: Polyvinyl chloride piping header and branches with ABS plastic spray nozzles.

G. Fill:

1. Self-supporting fluted polyvinyl chloride plastic with flame spread index of 5 or less, when tested in accordance with ASTM E84.
2. Fungal Resistance: No growth when tested according to ASTM G21.

H. Drift Eliminators: Two or three pass hot dipped galvanized steel, drift loss limited to 0.7 percent of total water circulated.

I. Float Valves: Brass or bronze balanced piston type make-up valve with plastic or copper float.

J. Hardware: Galvanized steel nuts, bolts, washers, and nails; assembled with phenolic epoxy coated, corrosion resistant washer head fasteners.

K. Galvanized Steel Sheet Components: Hot-dipped galvanized, ASTM A653/A653M, with G210/Z600 coating, and finished with zinc chromated aluminum paint.

L. Steel Angles, Plates, Bars, and Shapes: Galvanized after fabrication in accordance with ASTM A123/A123M, Coating Thickness Grade 100.

2.04 ACCESSORIES

A. Electric Immersion Heaters: In pan suitable to maintain temperature of water in pan at 42 degrees F when outside temperature is 0 degrees F and wind velocity is 15 mph; immersion thermostat and float control operate heaters on low temperature when the pan is filled.

B. Electric Temperature Controller: In pan; with sensor to cycle fans.

C. Time Delay Relay: Limits fan motor starts to not more than six per hour.

D. Capacity Control with Scroll Damper and Modulating Electronic Damper Motor: Controlled by temperature controller, sensor in pan.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide the services of the manufacturer's field representative to supervise rigging, hoisting, and installation, allowing for minimum of one eight hour day per tower.

C. Install tower on structural steel beams as instructed by manufacturer.

D. Connect condenser water piping with flanged connections to tower. Pitch condenser water supply to tower and condenser water suction away from tower. Refer to Section 23 2113.

E. Connect make-up water piping with flanged or union connections to tower. Pitch to tower. Refer to Section 22 1005.

F. Connect overflow, bleed, and drain, to floor drain.

3.02 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Provide the services of the manufacturer's field representative to inspect tower after installation and submit report prior to start-up, verifying installation is in accordance with specifications and manufacturer's recommendations.

3.03 SYSTEM STARTUP

A. Start-up tower in presence of and instruct Owner's operating personnel.

END OF SECTION 23 6513