

**SECTION 23 6513**  
**FORCED-DRAFT COOLING TOWERS**

**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.
- B. ABMA STD 11 - Load Ratings and Fatigue Life for Roller Bearings; 1990 (Reapproved 2008).
- C. ASME PTC 23 - Atmospheric Water Cooling Equipment; 2003.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 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.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- H. CTI ATC-105 - Acceptance Test Code; 2000.
- I. CTI STD-201 - Standard for the Certification of Water Cooling Tower Thermal Performance; 2011.
- 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:
- B. Baltimore Aircoil Company; \_\_\_\_\_: [www.baltimoreaircoil.com](http://www.baltimoreaircoil.com).
- C. EVAPCO, Inc; \_\_\_\_\_: [www.evapco.com](http://www.evapco.com).
- D. SPX Cooling Technologies/Marley; \_\_\_\_\_: [www.spxcooling.com](http://www.spxcooling.com).
- 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**

