

SECTION 15710  
COOLING TOWER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mechanical induced draft Cooling Tower.
- B. Controls.
- C. Ladder and handrails.

1.2 REFERENCES

- A. ANSI/AFBMA 9 - Load Rating and Fatigue Life for Ball Bearings.
- B. ANSI/AFBMA 11 - Load Rating and Fatigue Life for Roller Bearings.
- C. ASME PTC-23 - Atmospheric Water-Cooling Equipment.
- D. Cooling Tower Institute (CTI) ATC-105 - Acceptance Test Code for Water Cooling Towers.
- E. Cooling Tower Institute (CTI) - Certification Standard STD-201.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit shop drawings indicating suggested structural concrete supports including dimensions, sizes, and locations for mounting boltholes using manufacturer's recommendations.
- C. Submit product data under provisions of Section 01300.
- D. Submit product data indicating 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.
- E. Certify performance, based on CTI STD-201, and submit performance curve plotting leaving water temperature against entering air wet-bulb temperature.
- F. Submit manufacturer's installation instructions under provisions of Section 01300.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Section 01700.
- B. Include start-up instructions, maintenance data, parts lists, controls, and accessories.
- C. Submit maintenance data under provisions of Section 01700.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01600.
- B. Factory assemble entire unit. For shipping, disassemble into as large as practical sub-assemblies so that minimum amount of fieldwork is required for re-assembly.
- C. Store and protect products under provisions of Section 01600.
- D. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

1.6 WARRANTY

- A. Provide five-year warranty under provisions of Section 01700.

- B. Warranty: Include coverage for cooling tower package, labor and materials.

## 1.7 EXTRA MATERIALS

- A. Provide one set of matched fan belts, three spray nozzles for each cell, and water make-up valve assembly.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. BAC, stainless steel.
- B. Tri-Thermal Inc., stainless steel.
- C. Marley Quadraflow, stainless steel.
- D. Evapco, Stainless steel.
- E. Berg, stainless steel.
- F. Tower-Tech Series, stainless steel.
- G. Engineer and Owner approved equal; refer to Section 01600.

### 2.2 MANUFACTURED UNITS

- A. Provide cross-flow type units for outdoor use, factory assembled, sectional, with gravity operated hot deck distribution system, vertical discharge, mechanical induced draft type, with sump, surface sections, drift eliminators, fan, motor, and drive assembly.
- B. Provide one cooling tower per chiller having thermal capacity to cool the required flow (GPM) of condenser water from 95°F to 85°F at a design entering air wet-bulb temperature of 80° FWB, certified in accordance with 1.3.E.

### 2.3 COMPONENTS

- A. Framework and Casing: Total Stainless Steel construction.
- B. Louvers: Stainless Steel material, sight tight spaced to minimize air resistance and splash out.
- C. Fan: Multi blade, cast aluminum, fixed axial vertical discharge type, with stainless steel shaft, multi-grooved neoprene/polyester belt drive, bearings with ANSI/AFBMA 9 or ANSI/AFBMA11 L-10 life expectancy of 30,000 hours, with extended copper grease fittings.
- D. Motor: Single speed, VFD inverter duty rated, totally enclosed air over (TEAO) type with special moisture protection, mounted on welded stainless steel frame in fan deck. Refer to Section 15170. Cooling tower manufacturer to provide VFD fan motor drive with manual bypass, all in NEMA type 4X enclosure.
- E. Belt Drive: Designed for minimum 150% motor nameplate power.
- F. Fan Cylinder: One-piece, welded stainless steel fan assembly.
- G. Fan Guard: One-piece, welded steel rod and wire guard, Stainless Steel material.
- H. Access: Large access doors at both ends of tower to eliminators and air plenum.
- I. Safety: Safety railings, and ladder from grade to fan deck, aluminum construction.
- J. Distribution Basin: Open, gravity type distribution basin utilizing weirs and plastic metering orifices, with flow control balancing valves at each hot deck inlet.
- K. Fill: Vertical sheets of polyvinyl chloride plastic hung from stainless steel supports.
- L. Drift Eliminators: Two or three-pass polyvinyl chloride plastic, to limit drift loss to 0.7% of total water circulated.

- M. Collection Basin: Self cleaning stainless steel with depressed center section, designed to support tower, with cleanout and drain fitting, 8 gage, 1/4" stainless steel mesh strainer, bottom outlet or side outlet sump, with separate overflow connection.
- N. Overflow: Stainless steel pipe and fittings.
- O. Float Valves: Brass or bronze make-up valve with plastic or copper float (electronic not acceptable).
- P. Hardware: Nuts, bolts, and washers shall be stainless steel.
- Q. Finish: For Stainless Steel components non-required.
- R. Optional Component: If required provide fan cylinder extension (in stainless steel) to elevate fan discharge, prevent moist air recirculation and to mitigate noise.

## 2.4 ACCESSORIES

- A. Temperature Controller: Located in mechanical room with sensor in conditioned water return to control fans (one per tower).
- B. Time Delay Relay: Limits fan motor starts to not more than six per hour (not required if VFD fan drive is used).
- C. Capacity Control: For stable operation down to 10% of rated cooling at specified wet bulb temperature.
- D. Control Panel: In NEMA type 4X enclosure and containing:
  - 1. Unfused disconnect switch.
  - 2. Interlocks and relays.
  - 3. Pilot lights and push buttons.
- E. Provide water meter for make-up water.
- F. Provide backflow preventer for make-up water line.
- G. Provide vibration switch, one per each tower.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install one tower per water-cooled chiller. Do not use dual cell, common sump towers. Design condenser water piping system so that any tower can be isolated and can serve any chiller. Install cooling towers in accordance with manufacturer's instructions.
- B. Provide 8 ft masonry screen walls, louvered walls or corrosion resistant fence around perimeter of tower compound with a minimum clearance of 10' from tower to screen walls or fence. Elevate tower to maintain maximum positive suction head on condenser water pump.
- C. For vibration isolation refer to Section 15240.
- D. Provide a 115 V duplex receptacle in the cooling tower compound. 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 15510.
- E. Provide hose bib on make-up water supply in tower. Connect make-up water piping with brass flanged or union connections to tower. Refer to Section 15410.
- F. Provide full flow makeup water bypass with valve to fill sump. Connect bleed to floor drain.
- G. Tower compound floor to be concrete under tower with rock between tower and fence. Rock depth to be specified by Architect.
- H. Provide one water treatment system per cooling tower. Refer to Section 15801.

### 3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.

- B. Test under actual operating conditions in accordance with CTI ATC-105 and verify specified performance.

### 3.3 MANUFACTURER'S FIELD SERVICES

- A. Prepare and start systems under provisions of Section 01600.
- B. Inspect tower after installation and submit report prior to start-up, verifying installation is in accordance with specifications and manufacturer's recommendations. If tower fails to meet field performance, then it shall be up-sized at no cost to Owner.
- C. Supervise rigging, hoisting, and installation.
- D. Start-up and instruction of Owners operating personnel to Owner's satisfaction.
- E. Cooling tower shall not operate until water treatment has been initiated.

### 3.4 SCHEDULE

- A. Provide equipment schedule on the drawings to include the following data:
  - 1. Manufacturer
  - 2. Model Number
  - 3. Cooling Capacity
  - 4. Water Flow Rate
  - 5. Entering Water Temperature
  - 6. Leaving Water Temperature
  - 7. Entering Air WB Temperature
  - 8. External Static Pressure
  - 9. Number of fans, Motors
  - 10. Motor size, speed, horsepower, volts, phase, and frequency
  - 11. VFD manufacturer, size and type and operating range.

END OF SECTION