

## SECTION 23 65 00

### COOLING TOWERS

#### **PART 1 GENERAL**

##### **1.01 COMPLIANCE**

- A. Comply with Colorado Department of Health Regulation 15 and all applicable EPA rules and regulations regarding the purchase, disposal and handling of refrigerants.

##### **1.02 SUBMITTALS**

- A. Product Data:
  - 1. Component and accessories list.
    - a) Include mounting information.
  - 2. Ratings and nameplate information.
    - a) Include unit capacity, entering and leaving water temperatures, ambient air temperature, electrical connection requirements, clearances, unit weight.
- B. Quality Assurance Data:
  - 1. Certified production test reports or mill test reports.
  - 2. Test reports for previous design, and documentation showing previous design ratings and configurations.
- C. Project Record Documents:
  - 1. Shop Drawings:
    - a) Certified elevation and outline drawings with dimensions.
    - b) Certified plan view drawings with dimensions.
    - c) Wiring and termination drawings.
- D. Operation and Maintenance Data:
  - 1. Operating and maintenance procedures.
  - 2. Complete set of manufacturers drawings.
  - 3. Complete documentation of inspections and tests performed, including any logs, curves, and certificates. Documentation shall note any replacement of equipment or components that failed during testing.
  - 4. Spare parts lists.
  - 5. Data sheets updated to reflect field installation conditions.

##### **1.03 WARRANTY**

- A. Provide compressor warranty information.

##### **1.04 COMMISSIONING**

- A. Require that a factory representative be employed for start-up of chiller.

#### **PART 2 PRODUCTS**

##### **2.01 COOLING TOWER (INDUCED DRAFT, VERTICAL DISCHARGE)**

- A. Acceptable Manufacturers:
  - 1. Tower-Tech
  - 2. Baltimore Aircoil
  - 3. Evapco
  - 4. Marley

5. CCT
- B. Capacity rating in accordance with CTI Standards. Include altitude effects.
- C. Cooling Towers:
  1. Specify the following for induced-draft towers:
    - a) Fiberglass-reinforced polyester (or equivalent) or galvanized steel throughout.
    - b) A propeller-type fan, on which blade pitch can be adjusted.
    - c) A gear reducer drive for anything beyond 10 HP, if applicable.
    - d) Motors situated outside the tower's humid airstream.
    - e) Fill manufactured of fire-retardant PVC material (minimum 15 mil. thickness).
    - f) Hot return water basin covers.
    - g) Safety railings and ladder to fan deck.
    - h) Safety cage on ladder.
    - i) Oversized sump outlet for gravity flow to inside remote sump.
    - j) Extended lube and oil fill lines with sight glass or dipstick.
    - k) Stainless steel hardware, and brass or stainless steel fittings, within wet area.
    - l) Vibration switch.

## **2.02 COOLING TOWERS (FORCED DRAFT)**

- A. Acceptable Manufacturers:
  1. Tower-Tech
  2. Baltimore Aircoil
  3. Evapco
  4. Marley
  5. CCT
- B. Provide the following for forced-draft towers:
  1. "Baltibond" (Baltimore Air Coil trademark) or equivalent coating.
  2. Galvanized steel sump with blow-through prevention kit.
- C. If installed indoors, relief dampers shall have stainless steel "knuckles."

## **2.03 REMOTE SUMP TANK**

- A. Furnish and install welded stainless steel or fiberglass sump tank of size and capacity shown on Drawings.
- B. Remote sump tank. Incorporate the following requirements in sump tank design:
  1. Allow minimum water level of four (4) feet of suction head under operating conditions, or greater if required to meet NPSH of pump. And provide redundant (stand-by) condenser water pump.
  2. Provide a minimum of 150 percent of drain down storage capacity in addition to the above operating level.
  3. Drain down capacity to consist of volume of cooling tower water retention plus all piping exposed to freeze conditions.
  4. Design vortex breaker and screen at suction outlet.
  5. Provide taps on tank for sump filtration cleaning system.
  6. Include inspection ladder on tank to monitor water conditions.
- C. Provide adequate ventilation in sump room to control humidity.

## **2.04 COOLING TOWER SUMP FILTRATION SYSTEM**

- A. Acceptable Manufacturers:
  1. Submit recommendations.
  2. For sand-type filtration, consider PEP Model SMF-24.
- B. Description: pumped recirculation of water from cooling tower sump or drain down sump through filter and back to sump as shown on drawings. Include use of distribution piping to sweep floor of tower sump towards the outlet.
- C. Cooling Tower Sump Filtration System:
  1. To improve and maintain good water conditions in condenser water, specify and show on drawings a pumped system to re-circulate water from sump through a filter and back to sump.
  2. Sand filters or cyclone filters are preferred, sized to filter entire system volume each hour or at 10 percent of tower flow rate, whichever is greater. Verify that floor drain can handle flow rate of backwash.
- D. Factory-wired control panel in accordance with NEC.
- E. Connect to Integrated Building Automation System. Refer to Section 25 50 00 - Intelligent Building Automation System (IBAS) for interface requirements.

**2.05 VALVES**

- A. Isolation valves shall be provided by manufacturer in order to allow servicing of major refrigerant components (e.g., compressor, receiver, condenser, filter-dryer, expansion valve) with no loss of refrigerant; the filter dryer shall have a three-valve arrangement with bypass.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Cooling Towers:
  1. Install cooling towers on concrete base.
  2. Vibration Isolation: Mount water cooling towers on a vibration isolation equipment base as specified in Specification Section 15240 Mechanical Sound and Vibration Control.
  3. Maintain manufacturer's recommended clearances for service and maintenance.
- B. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.
- C. Engage a factory-authorized service representative to perform startup service.

**3.02 STARTUP SERVICE**

- A. Engage a factory-authorized service representative to perform startup service.
- B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.
- C. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
  1. Verify that pumps are installed and functional.
  2. Verify that thermometers and gages are installed.
  3. Check bearing lubrication and oil levels.
  4. Verify proper motor rotation.
  5. Verify static deflection of vibration isolators, including deflection during water chiller startup and shutdown.
  6. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.
- D. Prepare a written startup report that records results of tests and inspections.
- E. Occupancy Adjustments: when requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose.

**3.03 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain cooling towers. Refer to Division 1 Section Demonstration and Training.

**END OF SECTION 23 65 00**