

## SECTION 23 65 00

### COOLING TOWERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes factory assembled and tested, open circuit mechanical induced-draft vertical discharge cooling tower.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.
- B. Shop Drawings: Complete set of manufacturer's prints of evaporative equipment assemblies, control panels, sections and elevations, and unit isolation. Include the following:
  - 1. Assembled unit dimensions.
  - 2. Weight and load distribution.
  - 3. Required clearances for maintenance and operation.
  - 4. Sizes and locations of piping and wiring connections.
  - 5. Wiring Diagrams: For power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.
- C. Operation and Maintenance Data: Each unit to include, operation, and maintenance manual.

##### 1.4 QUALITY ASSURANCE

- A. Verification of Performance:
  - 1. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by a Certified CTI Thermal Testing Agency. The Evaporative Heat Rejection Equipment shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.
  - 2. Unit Sound Performance ratings shall be tested according to CTI ATC-128 standard. Sound ratings shall not exceed specified ratings.
- B. Unit shall meet or exceed energy efficiency per ASHRAE 90.1

##### 1.5 WARRANTY

- A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.
  - 1. Fan Motor/Drive System: Warranty Period shall be Five (5) years from date of unit shipment from Factory (fan motor(s), fan(s), bearings, mechanical support, sheaves, bushings and belt(s)).
  - 2. The Entire Unit shall have a comprehensive one (1) year warranty against defects in materials and workmanship from startup, not to exceed eighteen (18) months from shipment of the unit.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide cooling towers manufactured by one of the following:
  - 1. EVAPCO Model \_\_\_\_\_
  - 2. Approved Substitute

## 2.2 THERMAL PERFORMANCE

- A. Each unit shall be capable to cool \_\_\_\_\_ GPM of water entering at \_\_\_\_\_ ° F leaving at \_\_\_\_\_ ° F at a design wet bulb of \_\_\_\_\_ ° F.

## 2.3 IBC COMPLIANCE

- A. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) for: IP = \_\_\_\_\_, SDS = \_\_\_\_\_, P = \_\_\_\_\_ psf.

## 2.4 COMPONENTS

- A. Description: Factory assembled and tested, induced draft, crossflow cooling tower complete with fan, fill, louvers, accessories and rigging supports

### B. Materials of Construction

1. The cold water basin shall be constructed of heavy gauge mill hot-dip galvanized steel panels and structural members. The basin area under the fill shall be sloped toward the center section to facilitate cleaning.
2. Casing panels and upper structural members shall be constructed of heavy gauge mill hot-dip galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.

### C. Fan(s):

1. Fan(s) shall be high efficiency axial propeller type with aluminum wide chord blade construction. Each fan shall be dynamically balanced and installed in a closely fitted cowl with venturi air inlet for maximum fan efficiency.

### D. Drift Eliminators

1. Drift eliminators shall be constructed of Polyvinyl Chloride (PVC) and integral to the fill and limit the carryover to a maximum of 0.002% of the recirculating water rate.

### E. Water Distribution System

1. The hot water distribution basins shall be open and gravity fed constructed of heavy-gauge G-235 hot-dip galvanized steel. The basins shall be accessible from outside the unit and serviceable during tower operation. Lift off distribution covers shall be constructed of G-235 hot-dip galvanized steel and designed to withstand a 50 psf live load or 200 pound concentrated load. Gravity flow nozzles shall be large orifice, snap in type for easy removal.

### F. Heat Transfer Media

1. Fill media and integral drift eliminators shall be constructed of Polyvinyl Chloride (PVC) and suitable for inlet water temperatures up to 120° F. The bonded block fill and integral drift eliminators shall be bottom supported to prevent sag and allow for at least a 3" space between the bottom of the fill and the pan bottom to facilitate cleaning. Fill and integral drift eliminators shall be self-extinguishing, have a flame spread of 5 under A.S.T.M. designation E-84-81a, and shall be resistant to rot, decay and biological attack.

### G. Air Inlet Louvers

1. The air inlet louver screens shall be integral with the fill media and prevent water splash out during fan cycling. The air inlet louver screens shall be constructed from UV inhibited Polyvinyl Chloride (PVC).

### H. Make up Float Valve Assembly

1. Make up float assembly shall be a mechanical brass valve with an adjustable plastic float.

### I. Pan Strainer

1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.

## 2.5 MOTORS AND DRIVES

- A. General requirements for motors are specified in Division 23 Section "Motors"

### B. Fan Motor

1. Fan motor(s) shall be totally enclosed ball bearing type electric motor(s) suitable for moist air

service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.

C. Fan Drive

1. The fan drive shall be multigroove, solid back V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Fan and motor sheave shall be aluminum alloy construction.

D. Fan Shaft Bearings

1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on motor mounting plate. Bearings shall be designed for a minimum L-10 life of 100,000 hours.

2.6 MAINTENANCE ACCESS

A. Basin Section

1. Two oversized hinged access doors shall be provided for access into the plenum section.

2.7 ACCESSORIES

A. Piping Connections

1. Unit shall have dual top inlet connections.