

SECTION 23 65 00

CLOSED CIRCUIT COOLERS

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, closed circuit mechanical induced-draft vertical discharge closed circuit cooler.

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.
 - 3. Heat Transfer Coil: Warranty Period shall be One (1) year from date of unit shipment from Factory.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide closed circuit coolers 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 with a pressure drop across the coil not to exceed _____ psi.

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 counter flow closed circuit cooler complete with fan, coil, louvers, accessories and rigging supports

B. Materials of Construction

1. All cold water basin components including vertical supports, air inlet louver frames and panels up to rigging seam shall be constructed of heavy gauge mill hot-dip galvanized steel.

2. Upper Casing, channels and angle supports shall be constructed of heavy gauge mill hot-dip galvanized steel. Fan cowl and guard shall be constructed of 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 entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate.

E. Water Distribution System

1. Spray nozzles shall be zero-maintenance precision molded ABS with large 1-1/4" diameter orifice threaded into branch piping with internal sludge ring to eliminate clogging. Spray header, branches, and riser shall be Schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance.

F. Heat Transfer Media

1. Heat transfer coil shall be elliptical tubes of prime surface steel, encased in steel framework with entire assembly hot-dip galvanized after fabrication. The coil assembly shall be designed with sloping tubes for liquid drainage. Coil shall have design pressure of 300 psi and shall be in compliance with ANSI/ASME B31.5, Refrigeration Piping and Heat Transfer Components. The coil assembly shall be strength tested in accordance with ANSI/ASME B31.5 and subsequently leak tested using air under water."

G. Pump

1. Unit shall have EISA close-coupled centrifugal pump with mechanical seal. The pump shall be installed in a vertical position so that water will drain from the pump when the cold water basin is emptied. Pump motor shall be totally enclosed with protective canopy for outdoor operation.

H. Bleed-off

1. Unit shall have a waste water bleed line with a manual adjustable valve provided.

I. Air Inlet Louvers

1. The air inlet louver screens shall be constructed from UV inhibited polyvinyl chloride (PVC) and incorporate a framed interlocking design that allows for easy removal of louver screens for access to the entire basin area for maintenance. The louver screens shall have a minimum of two changes in air direction and shall be of a non-planar design to prevent splash-out and block direct sunlight & debris from entering the basin.

J. Make up Float Valve Assembly

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

K. 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.

2. Fan motor(s) shall include strip-type space heaters with separate leads brought to the motor conduit box. 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 sheave shall be aluminum alloy construction. Belt adjustment shall be accomplished from the exterior of the unit. D.

Fan Shaft

1. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.

E. 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 access door frame. Bearings shall be designed for a minimum L-10 life of 100,000 hours.

2.6 MAINTENANCE ACCESS

A. Fan Section

1. Access door shall be hinged and located in the fan section for fan drive and water distribution system access. Swing away motor cover shall be hinged for motor access.

B. Basin Section

1. Framed removable louver panels shall be on all four (4) sides of the unit for pan and sump access.

C. Internal Working Platform

1. Internal working platform shall provide easy access to the fans, belts, motors, sheaves, bearings, all mechanical equipment and complete water distribution system. The coil surface shall be an acceptable means of accessing these components.