SECTION 23 65 00

#  EVAPORATIVE CONDENSERS

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, cross flow evaporative condenser.

1.3 SUBMITTALS

1. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.
2. 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.
3. Operation and Maintenance Data: Each unit to include, operation, and maintenance manual.

1.4 QUALITY ASSURANCE

A. Verification of Performance:

* 1. Each unit shall be designed, constructed and assembled in accordance with ANSI / ASHRAE 15-2013, Safety Standard for Mechanical Refrigeration and ANSI/IIAR 2-2016 standard for Ammonia Refrigeration.
	2. Unit Sound Performance ratings shall be tested according to CTI ATC 128 standard, Test Code for Measurement of Sound from Water-Cooling Towers, by an Independent CTI-licensed sound test agency. Sound ratings shall not exceed specified ratings.

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) month 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 evaporative condensers manufactured by one of the following:

* 1. EVAPCO Model \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Approved Substitute

2.2 THERMAL PERFORMANCE

A. Each unit shall be capable of \_\_\_\_\_\_\_\_\_\_\_ (MBH) at \_\_\_\_\_\_\_° F Condensing and 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 counter flow evaporative condenser complete with fan, fill, coil, accessories and rigging supports B. 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.

1. 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. Drift eliminators shall be self-extinguishing, have a flame spread of less than 25 under ASTM E84, and shall be resistant to rot, decay and biological attack.

1. Heat Transfer Media

1. Heat transfer coil shall be heavy wall 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 ASME/ANSI B31.5, Refrigeration Piping and Heat Transfer Components. The coil assembly shall be strength tested in accordance with ASME/ANSI B31.5 and subsequently leak tested using air under water.

2. The heat transfer coil shall be evacuated and charged with low pressure nitrogen prior to shipment.

3. 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 less than 25 under ASTM E84, and shall be resistant to rot, decay and biological attack.

1. Make up Float Valve Assembly

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

1. 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

1. General requirements for motors are specified in Division 23 Section “Motors”
2. 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 Shaft

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

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

2.6 MAINTENANCE ACCESS