SECTION 15682

AIR COOLED WATER CHILLERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Chiller package.

B. Charge of refrigerant and oil.

C. Controls and control connections.

D. Chilled water connections.

E. Starters.

1.2 RELATED SECTIONS

A. Section 15510: Hydronic Piping.

C. Section 15990: Testing, Adjusting, and Balancing.

1.3 REFERENCES

A. ASHRAE 15: Safety Code for Mechanical Refrigeration.

B. ASHRAE 90A: Energy Conservation in New Building Design.

C. ASME SEC 8: Boiler and Pressure Vessel Code.

D. NEMA MG 1: Motors and generators.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300: Submittals: Procedures for submittals.

B. Shop Drawings: Indicate components, assembly, dimensions, weights and loading, required clearances, and location and size of field connections. Indicate valves, field connections, sensors, strainers, and thermostatic valves required for complete system.

C. Product Data: Provide rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01300: Submittals: Procedures for submittals.

B. Submit manufacturer's installation instructions.

C. Manufacturer's Certificate; certify that components of package not furnished by manufacturer have been selected in accordance with manufacturer's requirements.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01700: Contract Closeout: Procedures for submittals.

B. Operation and Maintenance Data: Included start-up instructions, maintenance data, parts lists, controls, and accessories. Include troubleshooting guide.

1.7 QUALITY ASSURANCE: Manufacturer's Qualifications - Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.8 REGULATORY REQUIREMENTS: Provide certification of inspection for conforming authority having jurisdiction. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600: Material and Equipment: Transport, handle, store, and protect products.

B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

C. Protect units from physical damage.

1.10 WARRANTY

A. Warranty: Include coverage for complete assembly including materials and labor for five years.

B. Provide factory start-up of chiller.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Provide factory assembled and tested, outdoor, air-cooled liquid chillers consisting of compressors, condenser, evaporator, thermal expansion valve, refrigeration accessories, and control panel. Construction, testing, and ratings shall be in accordance with ARI 590 B. Conform to UL code for construction of rotary water chillers and provide UL label.

B. Conform to ASME SEC 8 Boiler and Pressure Vessel Code for construction and testing of reciprocating water chillers.

C. Conform to ASHRAE 15 code for construction and operation of water chillers.

2.2 AIR COOLED CHILLER UNITS

A. General: Units shall have refrigerating compressor, chiller, air cooled condenser, fan, sub-cooling coil, microprocessor controls, liquid receiver, internal compressor isolation and protective screens on fan and full height architectural screens over coils and compressor portions. Entire unit shall be designed for outdoor installation on a single frame with single point electrical power connection (plus a separate 120V circuit for the internal heater).

B. Refrigerant Compressor: Rotary screw type with sound mufflers, internal thermostats and crankcase heaters, designed for quiet efficient operation. Compressor shall be provided with an approved oil level-indicating device. Compressor speed at full load shall not exceed 3600 RPM. Compressor shall be directly driven by squirrel-cage, induction type motor, suction gas cooled, conforming to NEMA code. Compressor shall unload 4 steps to 25% of capacity. Furnish minimum of two compressors. Lock out one compress or on emergency power and run only one compress or on emergency power,

C. Condenser: Aluminum or copper tubes and fins. Condenser fan shall be statically and dynamically balanced propeller type, permanently lubricated. Provide wire mesh guard for fan, motor, condenser coil, and drive. Fan motors shall be permanently lubricated with built-in thermal overload protection.

D. Casing: Steel or aluminum and shall be adequately braced. Steel parts shall be zinc coated or rust proofed with the equivalent of two coats of aluminum paint applied over a suitable primer and phosphate treatment. Provide access door to all operating parts.

E. Shell and Tube with Removable Heads: With 2 independent refrigerant circuits; built-in accordance with ASME code. Insulate chiller, suction lines, and all parts that will condense moisture from the air in the gulf south environment with minimum of 3/4 inch closed cell foamed plastic (K=0.28): furnish electric heater cable and outdoor air thermostat for chiller with connection for piping cable.

F. Refrigerant Piping: Factory assembled, tested and insulated. Furnish filter dryer, suction, liquid valves, moisture indicator and sight glass. Unit shall include two (2) separate refrigerant circuits.

G. Controls:

1. Provide unit with controls for automatic operation, on/off switch, 115 volt convenience outlet, magnetic type wye-delta motor starters, with all phases protected, high-low pressure cut out switches, microprocessor, refrigerant pressure gauges, oil pressure control, thermostat, freeze thermostat, 5 minute time delay between stop and start up, dehydration, suction and discharge pressure gauges with manual shut off, ground current protection for each compressor, and all adjuncts required for quiet, efficient and continuous operation.

2. Each unit shall be equipped with automatic compressor lead-lag and pump out at beginning and end of each on/off cycle. Each compressor shall not exceed six (6) cycles per hour.

3. Provide protection against phase loss or reversal, phase imbalance, incorrect phase sequence and low voltage.

4. Provide alarm package consisting of pilot lights at unit indicating low water flow, loss of charge, low oil pressure, chiller freeze protection, high or low suction super heat, compressor malfunction, power on, and compressor on. Alarm shall be capable of indicating which safety control operated and caused the failure.

5. Chiller manufacturer shall provide a factory installed integration panel. Panel shall allow the chiller control panel information to be remotely read from the Facility Management System operator workstation. Include software, hardware, programming, and installation for a complete system and to permit remote enable and disable and chilled water temperature reset.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.

B. Furnish full charge of refrigerant and oil per manufacturer’s instructions.

C. Mount the chiller frame on Type 2 rubber mounts. Mounts shall be secured to the concrete.

3.2 START-UP AND TESTING

A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of guarantee period.

B. Charge system with refrigerant and test entire system for leaks after completion of in installation. Repair leaks, put system into operation, and test equipment performance.

C. Shut down system if initial start-up and testing place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.

END OF SECTION