SECTION 23 64 23.1
AIR COOLED MODULAR CHILLER

PART 1 - **GENERAL**

1.1 WORK INCLUDED

A. Work Included: The air-cooled modular chiller system shall consist of individual chiller module that shall be completely factory wired, and tested prior to shipment. The chiller module shall include a compressor, evaporator, air-cooled condenser, and controls.

B. Related Work Specified Elsewhere: General Requirements of Division One and Section 15010 “Basic Mechanical Requirements” pertain to and are hereby made part of the work of this Section of the specifications.

1.2 QUALITY ASSURANCE

A. Chiller Module shall be constructed in accordance with the UL 1995 and NEC standards and be UL or ETL listed.

B. Chiller Module shall be rated and tested in accordance with ARI 550/590 – Standard for Fluid Chilling Packages.

C. Chiller Module shall meet the safety standards of ANSI/ASHRAE 15 – Safety Standard for Refrigerated Systems.

1.3 SUBMITTALS

A. Submit complete drawings including cabinet dimensional details and anchor point locations, required clearances, location and sizes of field connections, performance data, electrical wiring diagrams, dry and operation weights, and all required electrical data.

B. Submit manufacturer’s installation instructions, including any remote panel installation instructions.

C. Operating and Maintenance manuals: provide two copies of current commercial manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s installation instructions for rigging, unloading, and transporting Chiller Modules.

B. Protect Chiller Modules on site from physical damage after unloading.

1.5 WARRANTY

A. All Modules: one year parts. Compressor: five years parts.

PART 2 - **PRODUCTS**

2.1 ACCEPTABLE MANUFACTURERS

A. ArctiChill, Multistack, GeoClima, ClimaCool

2.2 CHILLER MODULE

A. General: The chiller module shall be assembled on an integral epoxy coated welded channel steel frame, shall be enclosed with epoxy painted aluminum panels and shall be shipped as an individual module and assembled on site with the free cooling module and tank and pump module. The chiller module shall be fully charged with refrigerant and factory tested for capacity and controller functions prior to shipment. A single point power supply shall be provided to a central distribution.

B. Frame: Frame shall be constructed of welded structural channel steel and be epoxy powder coated with an oven baked finish.

C. Cabinet: Epoxy coated aluminum panels on welded steel frame. The cabinet enclosures shall include easily removable access panels for service. Access panels shall be removable via stainless steel fasteners and retaining clips. The chiller module shall not require access via sheet metal screws or protruding threaded fasteners.

D. Compressors: Hermetically sealed scroll compressor on each refrigeration circuit each with rotalock connections, crankcase heater, oil level sight glass, suction gas-cooled motor with solid-state sensors in the windings for overload protection, and in-line circuit breaker. There shall be two, independent compressors and refrigerant circuits with the lead compressor having a variable speed drive for close temperature control and unloading down to 30%. Compressors shall be mounted to the heavy gauge steel frame with rubber-in-shear isolators.

E. Evaporator: Dual circuit, brazed plate evaporator constructed of 316 stainless steel plates and copper brazing. The supply and return fluid piping connections shall include manual isolation valves to allow servicing. The fluid connections shall use roll grooved couplings for service convenience and ease of installation. Evaporator shall be insulated with ¾" closed cell insulation. The minimum working pressure shall be 650 psi. Evaporator piping fluid velocity shall not exceed 10 fps at any point in the system.

F. Filters: A 40-mesh industrial grade filter strainer shall be factory installed between the header system and the evaporator inlet. The strainer shall be serviceable by individual manual isolation valves on the.

G. Condenser fan motors: The condenser fan motors shall have double sealed ball bearings rated for thrust duty with slingers. The motors shall be rated for high ambient operation with a minimum rating of 60 °C.

H. Condenser Coil: Aluminum fins mechanically bonded to copper tubes with integral subcooling circuits. Fin spacing shall not exceed 12 fins per inch. The coils shall be sized to provide full heat of rejection at jobsite elevation above sea level, at a maximum 25 degree F temperature difference between the condensing temperature and ambient air temperature. The coils shall be factory tested to a minimum of 600 psig.

I. Refrigerant piping: Piping shall be Type L seamless copper, and shall have an insulated suction line using closed cell pipe insulation, compressor rotalock service valves, solenoid valves for compressor pumpdown, and Schrader service valves in the suction, discharge, and liquid lines.

J. Fluid Piping: The fluid piping shall be Schedule 40 steel, and be insulated using closed cell pipe insulation to prevent condensation and to maintain fluid temperature..

K. Controls: The chiller module shall incorporate the microprocessor controller. Chiller controls shall include operational switches for each compressor; high and low pressure transmitters to provide indication of refrigeration pressures in each circuit; high and low refrigeration pressure alarms including shutting shut down the responsible compressor(s); anti-short cycling compressor timers; minimum compressor run timers; connection to Building Automation System.

L. Microprocessor: The microprocessor shall provide the following minimum functions and alarms:

1. Adjustable fluid temperature set point
2. Multiple stage compressor control, including compressor rotation to provide even compressor usage and wear.
3. High and low fluid temperature alarm set points
4. Fluid inlet and outlet temperature
5. Suction and discharge refrigeration pressures
6. Compressor run status

7. Current alarm status
8. Demand load
9. Compressor run hours
10. Alarm logging with minimum of previously 100 logged alarms with time and date of each occurrence
11. Remote start stop input
12. Dry contact for general alarm

M. Interface Panel: A remote operator interface panel shall be provided to allow operator adjustment of user set points, and alarm monitoring. The remote interface panel shall be installed in the operator's control room. The wiring between the chiller and the remote panel shall be provided and installed by the electrical contractor. The wiring shall be 6-conductor wiring with straight-through connections

PART 3 - **EXECUTION**

3.1 INSTALLATION

A. Module shall be installed in accordance with the Manufacturer's recommendations where shown on the drawings and other provided installation documents.

3.2 PIPING FLUSHING PROCEDURE

A. Prior to connecting the chiller to the building chilled fluid loop, the piping shall be flushed with a detergent and hot fluid (110-130 F) mixture to remove previously accumulated dirt and other organic residue. In old piping systems with heavy encrustation of inorganic materials, consult a fluid treatment specialist for proper passivation and/or removal of these contaminants.

B. Prior to flushing, install a 30 mesh or finer Y-type strainer or equivalent in the system piping. During the flushing process, examine and clean the strainer periodically as necessary to remove collected residue. The flushing process shall take not less than 6 hours or until the strainers, when examined after each flushing, are clean. Old systems with heavy encrustation shall be flushed for a minimum of 24 hours or until the strainers run clean. Detergent and acid concentrations shall be used in strict accordance with the respective chemical manufacturer's instructions. After flushing with detergent and/or dilute acid concentrations, the system loop shall be purged with clean fluid for at least one hour to ensure that all residual cleaning chemicals have been flushed out.

3.3 REFRIGERATION SYSTEM START-UP AND TESTING

A. Factory-supervised start-up and checkout with start-up report shall be provided for each module. Owner training by factory representative shall be provided.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK