

SECTION 23 6429
MODULAR WATER CHILLERS

PART 2 PRODUCTS

1.01 CHILLER APPLICATIONS

- A. Chiller CH-1: Air-Cooled.
 - 1. Evaporator:
 - 2. Packaged Air-Cooled Condenser:

1.02 CHILLERS

- A. Chillers: Factory assemble and test module consisting of compressor(s), compressor motor(s), evaporator, condenser, enclosure, refrigeration circuits(s) and specialties, interconnecting piping, water circuit isolation valves, starters, and microprocessor-based controls.
 - 1. Rating: AHRI 550/590.
 - 2. Safety: UL 1995 and ASHRAE Std 15.
 - 3. Machinery Sound Testing: AHRI 575.
 - 4. Construction & Testing: ASME BPVC-VIII-1 if applicable for construction type.
 - 5. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the Authority Having Jurisdiction as suitable for the purpose specified and indicated.
 - 6. Energy Efficiency: ASHRAE Std 90.1.
 - 7. Enclosures:
 - a. Frame:
 - 1) Heavy gage steel.
 - 2) Factory painted finish.
 - b. Steel Chiller Cabinets:
 - 1) Factory baked on enamel finish.
 - c. Electrical Equipment: NEMA 250 or UL 1995 as applicable.
 - 8. Motors: UL 984. See Section 23 0513 for additional requirements.

1.03 COMPRESSORS AND EVAPORATOR

- A. Compressors: Hermetic scroll type.
 - 1. Module: Fully hermetic with two, direct drive compressors, adequate valve types and specialties required for operation and servicing in accordance with manufacturer's recommendations.
 - 2. Vibration Control: Factory installed internal rubber-in-shear isolators.
 - 3. Oil Lubrication System: Initial oil charge, oil pump, oil level sight glass, and oil charging valve.
 - 4. Capacity Reduction System: Compressor staging with duty cycling based on run time.
 - 5. Motor: 3600 rpm, suction gas-cooled, with overload protection.
- B. Evaporator: Brazed plate type.
 - 1. Plate Material: 316 stainless steel.
 - 2. Refrigerant Working-Side Pressure Rating: 650 psig minimum.
 - 3. Water Working-Side Pressure Rating: 285 psig minimum.
 - 4. Provide with flanged connections.
 - 5. Insulation for all cold surfaces.
 - a. Insulation is factory or field installed on evaporator, connections, and suction piping.
 - b. 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or Armaflex II insulation with a maximum k value of 0.28.
 - 6. Provide factory or field installed vents and water drain connections on evaporator or piping.
 - 7. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.

1.04 AIR-COOLED CONDENSER AND FANS

- A. Provide finned-tube type.

1. Mechanically bond aluminum fins to copper tubing and protect with corrosion resistant materials or coatings.
 2. Clean, dehydrate and test.
 3. Leak Test: 650 psig minimum.
- B. Coil Guards: Provide corrosion proof, heavy gage wire panels, factory installed. Provide coil protection for shipping by enclosing entire condenser coil with heavy plastic to prevent coil damage during shipping or rigging.
- C. Fans and Motors:
1. Fans: Dynamically balance propeller, shrouded-axial, or airfoil type fans of reinforced polymer or glass fiber reinforced composite corrosion resistant construction equipped with sealed, permanently lubricated ball bearings.
 2. Discharge Fan Guards: Corrosion resistant, heavy gage, steel wire.
 3. Discharge Direction: Vertical.
 4. Motors: Direct drive, totally enclosed for outdoor use with current overload protection.

1.05 REFRIGERATION CIRCUITS

- A. Provide two independent refrigeration circuits with one compressor per circuit.
- B. Provide liquid line shut-off valve, filter-drier, thermal expansion valve, refrigerant relief device, and compressor discharge check valve for each independent circuit.

1.06 INTEGRATED MICROPROCESSOR BASED DDC CONTROLS PACKAGE

- A. Pre-wire, assemble, factory mount, and test operating and safety control system consisting of a digital display or gages, on-auto-off switch, motor starting contactors, disconnect switches, power and control wiring. Provide controls, monitoring, programmable set-points, alarms, and BAS as defined below:
 1. Automatic Adjustable Operating Controls:
 - a. Allow system start-up and system operation at all outdoor air temperatures down to _____ degrees F.
 - b. Temperature of chilled water leaving chiller.
 - c. Number of compressor circuits required to operate based on set-points and system load.
 - d. Compressor short-cycling prevention.
 - e. Lead/lag operation for compressors. New lead compressor selected every 24 hours to equalize run time.
 - f. Automatic reset on power source failure.
 - g. Load limiting.
 - h. Sequencing of condenser fans.
 2. Normal Operation Monitoring and Open Cover-less Displays:
 - a. Hours of operation.
 - b. Suction and discharge refrigerant pressures.
 - c. Automatic diagnostics.
 - d. Number of starts.
 - e. On/off compressor status.
 - f. Entering and leaving chilled water temperatures.
 - g. Status of operation.
 - h. Compressor winding temperature.
 - i. Suction temperature.
 - j. Oil pressure.
 3. Set-Points:
 - a. Leaving chilled water temperature.
 - b. Date/time.
 4. Automatic Chiller Shut-Down Safety Controls and Alarm:
 - a. Automatic Reset:
 - 1) Chilled water flow interlock.

- 2) Voltage protection (over/under).
- 3) Phase reversal protection.
- b. Manual Reset:
 - 1) Low suction pressure.
 - 2) High motor winding temperature.
 - 3) Low chilled water temperature.
 - 4) Low chilled water flow.
 - 5) High condenser refrigerant discharge pressure.
 - 6) Motor current overload and phase loss.
 - 7) Low oil flow.
- c. Remote Alarm: Activate remote, audible bell upon safety shutdown of chiller.
- 5. Building Automation System (BAS) Communications via Shielded Cable:
 - a. Minimum Data Transmission to BAS:
 - 1) All system operating conditions.
 - 2) Capacity control information.
 - 3) Safety shutdown conditions.
 - b. Minimum Operating Commands from BAS:
 - 1) Remote unit start/stop.
 - 2) Remote chilled water reset.

END OF SECTION 23 6429

