

## SECTION 23 8124

### COMPUTER ROOM AIR CONDITIONERS - FLOOR MOUNTED

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Air conditioning units.
- B. Controls and control panels.

##### 1.02 RELATED REQUIREMENTS

- A. Section 09 6900 - Access Flooring.
- B. Section 21 2200 - Clean-Agent Fire-Extinguishing System: Interlock with fire suppression system.
- C. Section 22 3000 - Plumbing Equipment: Cooling condensate removal pumps.
- D. Section 23 0513 - Common Motor Requirements for HVAC Equipment: Evaporator and condenser fan motors.
- E. Section 23 6313 - Air Cooled Refrigerant Condensers.
- F. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

##### 1.03 REFERENCE STANDARDS

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.
- B. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

##### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate manufactured products and assemblies. Indicate water, drain, refrigeration, rough-in connections, and electrical characteristics and connection requirements.
- D. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
- E. Manufacturer's Field Reports: Indicate conditions at initial start-up including date, and initial set points.
- F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.
- G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

##### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.
- C. Comply with NFPA 90A for the installation of computer room air conditioning units.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## 1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Warranty: Include coverage of refrigeration compressors.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Liebert, a brand of Vertiv Co; \_\_\_\_\_: [www.vertivco.com/#sle](http://www.vertivco.com/#sle).

### 2.02 PERFORMANCE REQUIREMENTS

- A. Cooling:
  - 1. Capacity: \_\_\_\_\_ Btuh.
  - 2. Air Flow: \_\_\_\_\_ cfm.
  - 3. Air Entering Evaporator: \_\_\_\_\_ degrees F DB and \_\_\_\_\_ degrees F WB.
  - 4. Air Leaving Evaporator: \_\_\_\_\_ degrees F DB and \_\_\_\_\_ degrees F WB.
  - 5. Number of Evaporator Fans: One.
  - 6. Evaporator Fan Motors: \_\_\_\_\_ hp.
- B. Water Cooled:
  - 1. Condenser Water Flow: \_\_\_\_\_ gpm.
  - 2. Condenser Entering Water: \_\_\_\_\_ degrees F.
  - 3. Number of Condenser Fans: One.
  - 4. Condenser Fan Motors: \_\_\_\_\_ hp.
- C. Humidifier:
  - 1. Total Capacity: \_\_\_\_\_ lb/hr.
  - 2. Input: \_\_\_\_\_ W.

### 2.03 AIR CONDITIONING UNITS

- A. Description: Packaged, water cooled, factory assembled, pre-wired and pre-piped unit, consisting of cabinet, fans, filters, humidifier, and controls. To be installed in all IS rooms.
- B. Assembly: Up-flow air delivery, in draw-through configuration.
- C. Energy Efficiency:
  - 1. Air-Cooled Unit Capacity: Greater than or equal to 65 kBtu/h and less than 135 kBtu/h:
    - a. Energy Efficiency Ratio: 8.90.
    - b. Coefficient of Performance: 3.02.
  - 2. Air-Cooled Unit Capacity: Greater than or equal to 135 kBtu/h and less than 240 kBtu/h:
    - a. Energy Efficiency Ratio: 8.50.
    - b. Coefficient of Performance: 2.84.
  - 3. Water -Cooled Unit Capacity: Less than or equal to 17 kBtu/h:
    - a. Energy Efficiency Ratio: 12.1.
  - 4. Water-Cooled Unit Capacity: Greater than or equal to 17 kBtu/h and less than 65 kBtu/h:
    - a. Energy Efficiency Ratio: 12.1.
    - b. Coefficient of Performance: 3.35.
  - 5. Water-Cooled Unit Capacity: Greater than or equal to 65 kBtu/h and less than 135 kBtu/h:
    - a. Energy Efficiency Ratio: 11.5.
    - b. Coefficient of Performance: 3.37.
  - 6. Water -Cooled Unit Capacity: Greater than or equal to 135 kBtu/h and less than 240 kBtu/h:
    - a. Energy Efficiency Ratio: 9.6.
    - b. Coefficient of Performance: 3.22.

### 2.04 CABINET AND FRAME

- A. Structural Frame: 10 gage, 0.1345 inch welded steel suitably braced for rigidity, capable of supporting compressors and other mechanical equipment and fittings with welded tubular steel floor stand with adjustable legs and vibration isolation pads.

- B. Doors and Access Panels: 18 gage, 0.0478 inch galvanized steel with polyurethane gaskets, hinges to allow removal of panels, and concealed fastening devices.
- C. Insulation: Thermally and acoustically line cabinet interior with 1 inch thick acoustic duct liner.
- D. Finish of Exterior Surfaces: Baked-on textured vinyl enamel; \_\_\_\_ color.

## **2.05 EVAPORATOR FANS AND MOTORS**

- A. Fans: Double inlet, forward curved centrifugal fans, statically and dynamically balanced, directly driven.
- B. Motor: Refer to Section 23 0513.

## **2.06 COMPRESSORS**

- A. Type: Semi-hermetic with suction gas cooled motors, vibration isolators, thermal overloads, oil sight glass, manual reset high pressure switch, pump down low pressure switch, suction line strainer, reversible oil pumps, 1750 rpm.
- B. Compressors: Individually serviceable without dismantling other components or removing unit from service.
- C. Refrigeration Circuits: Two, each with hot gas mufflers, thermal expansion valve with external equalizer, liquid line solenoid valve, liquid line filter-drier, refrigerant sight glass with moisture indicator, service shut-off valves and charging valves and accumulator sized for liquid seal under light load.

## **2.07 EVAPORATOR COILS**

- A. Alternate row circuits, direct expansion cooling coils of seamless copper tubes expanded into aluminum fins in A-frame configuration.
- B. Mount coil assembly in stainless steel drain pan.

## **2.08 CONDENSERS**

- A. Water Cooled: Shell and tube type to ASME BPVC-VIII-1 with liquid line stop valve and head pressure actuated water regulating valve. Terminate outside cabinet for easy external connections. Size to be able to run on elevated water temperatures.
- B. Air Cooled Refrigerant Condenser:
  1. Corrosion resistant cabinet.
  2. Copper tube aluminum fin coils arranged for two circuits.
  3. Multiple direct drive propeller fans with permanently lubricated ball bearings.
  4. Single phase motors with internal overload protection.
  5. Refer to Section 23 0513 - Common Motor Requirements for HVAC Equipment.
  6. Refer to Section 23 6313 - Air Cooled Refrigerant Condensers.
  7. Provide capacity control by cycling fans.

## **2.09 FILTERS**

- A. Media: Pleated, lofted, non-woven, reinforced cotton fabric; supported and bonded to welded wire grid; enclosed in cardboard frame; 2 inch nominal thickness.
- B. Minimum Efficiency Reporting Value (MERV): 13, when tested in accordance with ASHRAE Std 52.2.
- C. Rating, ASHRAE Std 52.2:
  1. Weight arrestance: 90-92 percent.
  2. Initial resistance at 500 FPM face velocity: 0.30 inch WG.
  3. Recommended final resistance: 1.0 inch WG.

## **2.10 HUMIDIFIER**

- A. Electrode Steam Type:
  1. Type: Self contained, replaceable cylinder, microprocessor controlled electrode steam generating unit.
  2. Cylinders: Disposable, polypropylene plastic with field adjustable steel electrodes.

3. Plumbing Components and Valve Bodies: Plastic, linked by flexible rubber hosing, with water fill with air gap and solenoid valve incorporating built-in strainer, pressure reducing and flow regulating orifice, and drain with integral air gap on drain.
4. Cabinet: Steel, 16 gage, 0.0598 inch with enamel finish, with hinged and lockable access door.
5. Control: Fully modulating control to provide gradual 0 to 100 percent capacity with field adjustable maximum capacity; high water probe.
6. Drain Cycle: Field adjustable drain duration and drain interval.
7. Steam Distributor: Stainless steel steam dispersion tube.

### **2.11 ELECTRICAL PANEL**

- A. Control Cabinet: NEMA 250; Type 2 enclosure, UL listed, with piano hinged door, grounding lug, combination magnetic starters with overload relays, circuit breakers and cover interlock, and fusible control circuit transformer.
- B. Disconnect Switch: Non-automatic molded case circuit breaker with handle accessible with panel closed and capable of preventing access until switched to "off" position.

### **2.12 MICROPROCESSOR CONTROL SYSTEM**

- A. Logic Circuitry: Microprocessor shall continuously monitor operation of process cooling system; continuously digitally display room temperature and room relative humidity; sound alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, display fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to display fault until reset.
- B. Malfunctions: Power Loss, Loss of Air Flow, Clogged Air Filter, High Room Temperature, Low Room Temperature, High Humidity, Low Humidity, Smoke/Fire, Compressor No. 1 - Overload, Compressor No. 1 - Low Pressure, Compressor No. 1 - High Pressure, Compressor No. 2 - Overload, Compressor No. 2 - Low Pressure, Compressor No. 2 - High Pressure, Water-Under-Floor, and Supply Fan Overload.
- C. Light Emitting Diodes Display: Control Power On, System On, Humidification, De-humidification taking place, Compressor No. 1 operating, Compressor No. 2 operating, Heat or Reheat operating, Economy Cooling.
- D. Push Buttons: Provide to STOP process cooling system, START process cooling system, SILENCE audible alarm, push-to-test LED indicators, and display room relative humidity.
- E. Remote Signalling: Provide termination for remote signalling of system status and alarms.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that flooring system is ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that proper power supply is available and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate installation of computer room air conditioning units with computer room raised floor installer.

### **3.03 FIELD QUALITY CONTROL**

- A. Provide the services of the manufacturer's field representative to start and adjust systems and equipment and instruct operating personnel.

### **3.04 SYSTEM STARTUP**

- A. Prepare and start systems. Set initial temperature and humidity set points.

**END OF SECTION 23 8124**