SECTION 23 81 23 - COMPUTER-ROOM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes air conditioning units, controls and control panels.

1.2 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute

1. ARI 210/240 - Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment.
2. ARI 340/360 - Performance Rating of Commercial and Industrial Unitary Air-Conditioning & Air-Source Heat Pump Equipment.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

C. American Society of Mechanical Engineers:

1. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

D. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s literature and data indicating water, drain, refrigeration, and electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Submit procedures for rigging and making service connections.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

D. Manufacturer's Field Reports: Indicate conditions at initial start-up including date, and initial set points.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years

1.5 WARRANTY

A. Furnish five-year manufacturer's warranty.

1.6 MAINTENANCE SERVICE

A. Furnish service and maintenance of units for one year from Date of Substantial Completion.

B. Examine unit components monthly. Clean, adjust, and lubricate equipment.

C. Include systematic examination, adjustment, and lubrication of unit, and controls checkout and adjustments. Repair or replace parts in accordance with manufacturer's operating and maintenance data. Use parts produced by manufacturer of original equipment.

D. Perform work without removing units from service during building normal occupied hours.

E. Provide emergency call back service at all hours for this maintenance period.

F. Maintain locally, near Place of the Work, adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure fulfillment of this maintenance service without unreasonable loss of time.

G. Perform maintenance work using competent and qualified personnel under supervision of manufacturer or original installer.

H. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of LAWA.

1.7 EXTRA MATERIALS

A. Furnish one set of spare filters for each unit.

PART 2 - PRODUCTS

2.1 FLOOR MOUNTED AIR CONDITIONING UNITS

A. Manufacturers:

See the IT Design Guidelines section of the LAWA Guide Specifications.

B. Product Description: Packaged, water or air cooled, factory assembled, pre-wired and pre-piped unit, consisting of cabinet, fans filters, humidifier and controls, reheat and heating coils. Refrigerant shall be R407C or R410A.

C. Cabinet and Frame:

1. Structural Frame: 14 gauge 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.

2. Doors and Access Panels: 20 gauge galvanized steel with polyurethane gaskets, hinges to allow removal of panels, and concealed fastening devices.

3. Insulation: Thermally and acoustically line cabinet interior with 1 inch thick acoustic duct liner.

4. Finish of Exterior Surfaces: Shop coated with 4.0 mils epoxy primer and 6.0 mils topcoat phenolic baked coating for a total of 10.0 mils. Coating shall withstand 5,000 hour of salt spray test in accordance with ASTM B117.

D. Evaporator Fans and Motors:

1. Fans: Double inlet, forward curved centrifugal fans, statically and dynamically balanced.

2. Motor: Drip proof, permanently lubricated ball bearing motor with built-in current and overload protection.

3. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed, variable and adjustable pitch motor sheave, minimum of two matched belts, drive rated minimum 2.0 times nameplate rating of motor.

E. Compressors:

1. Type: Hermetic with resilient suspension system, oil strainer, crankcase sight glass, internal motor protection, low pressure switch, manual reset high pressure switch.

2. Compressors: Individually serviceable without dismantling other components or removing unit from service.

3. 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.

F. Evaporator Coils:

1. Direct expansion cooling coils of seamless copper tubes expanded into copper fins.

2. Mount coil assembly in stainless steel drain pan.

G. Condensers:

1. Water Cooled: Shell and tube type ASME Section VIII or Coaxial tube in tube type with liquid line stop valve and head pressure actuated water regulating valve. Terminate outside cabinet for easy external connections.

2. Air Cooled: Corrosion resistant cabinet, copper tube copper fin coils arranged for two circuits, multiple direct drive propeller fans with permanently lubricated ball bearing single phase motors with internal overload protection. Furnish capacity control by cycling fans.

H. Water Coil:

1. Seamless copper tubes expanded into copper fins with control valve and strainer.

I. Filters:

1. Media: Pleated, lofted, non-woven, reinforced cotton fabric; supported and bonded to welded wire grid; enclosed in cardboard frame; 2 inch nominal thickness.
2. Rating, ASHRAE 52.1:
    a. Dust spot efficiency: 25-30 percent.
    b. Weight resistance: 90-92 percent.
    c. Initial resistance at 500 fpm face velocity: 0.30 inch WG.
    d. Recommended final resistance: 1.0 inch WG.

J. Refrigerant Reheat Coil:

1. Hot gas refrigerant coil of seamless copper tubes expanded into copper fins with three-way solenoid valve on first stage refrigerant circuit.

K. Reheat/heating Coils:

1. Heating Coils: Enclosed fin electrical elements arranged for minimum of two stages.
2. Circuit Protection: Primary and secondary thermal cutouts, differential air pressure switch, and manual reset overload protection and branch circuit overcurrent protection.
3. Hot water heating coil of seamless copper tubes expanded into copper fins.

L. Humidifier:

1. Infrared Type: High intensity quartz lamps mounted above stainless steel evaporator pan, serviceable without disconnecting water, drain, or electrical connections; pre-piped and utilizing condensate water from cooling coils with stainless steel or brass float valve mechanism; located in bypass air stream.

M. 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.

N. Disconnect Switch: Non-automatic molded case circuit breaker with handle accessible with panel closed and capable of preventing access until switched to "off" position.

O. Electronic Control System:

1. Solid state with start button, stop button, temporary loss of power indicator, manual reset circuit breakers, temperature control humidity control, and monitor panel.
2. Monitor Panel: Back lighted with no visible indicator lights until operating function is activated; indicators include cooling, humidification, loss of air flow, change filters, high temperature, low temperature, high humidity, low humidity, high head pressure (each compressor), and low suction pressure (each compressor).
3. Temperature and Humidity Control Modules: Solid state plug-in with adjustable set point, "push-to-test" calibration check button, and built-in visual indicators to indicate mode of operation.
4. Location: Through hinged door in front of unit; isolated from conditioned air stream to allow service while system is operating.

P. Outdoor Unit Casing Coating

1. Zinc chromate, iron oxide, shop coated with 4.0 mils epoxy primer and 6.0 mils topcoat phenolic baked coating for a total of 10.0 mils. Coating shall withstand 5,000 hour of salt spray test in accordance with ASTM B117.

2. Finish exceeds 5000 hour salt spray test in accordance with ASTM B117.

Q. Outdoor Unit Coil Coating.

1. All coils shall be coated with minimum 1.0 mil. aluminum impregnated polyurethane coating by Blygold PoluAl XT or approved equal. Coating shall withstand 4,000 hours in both salt spray test per ASTM B117 and acid salt spray test per ASTM D5339. Finned-tube coils applied coating shall have 5 year warranty.

R. Leak Detection.

1. Provide underfloor leak detection system for the raised floor installations.

2.2 AIR CONDITIONING UNITS

A. Manufacturers:

See the IT Design Guidelines section of the LAWA Guide Specifications.

B. Product Description: Self-contained air cooled, factory assembled, pre-wired and pre-piped unit, consisting of cabinet, fan, filters, humidifier, controls.

C. Assembly: For horizontal ceiling mounting to fit 24 x 48 inches T-bar ceiling opening.

D. Cabinet: 14 gauge welded steel with baked enamel finish, and lined with 1/2 inch thick acoustic duct liner.

E. Provide condensate pump integrated with unit.

F. Evaporator Fan: Forward curved centrifugal, directly driven by two-speed motor.

G. Compressor: Hermetic with resilient suspension system, oil strainer, internal motor overload protection, low pressure switch, manual reset high-pressure switch.

H. Evaporator Coil: Direct expansion cooling coil of seamless copper tubes expanded into aluminum fins, with thermal expansion valve with external equalizer, liquid line filter-drier, service shut-off valves and charging valves. Mount coil assembly in stainless steel drain pan.

I. Air Cooled Condenser: Integral copper tube copper fin coil sized for scheduled capacity.

J. Outdoor Unit Coil Casing Coating

1. Zinc chromate, iron oxide, shop coated with 4 mils epoxy primer and 6 mils topcoat phenolic baked coating for a total of 10 mils. Coating shall withstand 5,000 hour of salt spray test in accordance with ASTM B117.

2. Finish exceeds 5000 hour salt spray test in accordance with ASTM B117.

K. Outside Coil Coating

1. All coils shall be coated with minimum 1.0 mil. aluminum impregnated polyurethane coating by Blygold PoluAl XT or approved equal. Coating shall withstand 4,000 hours in both salt spray test per ASTM B117 and acid salt spray test per ASTM D5339. Finned-tube coils applied coating shall have 5 year warranty.

L. Filter: 1 inch thick disposable glass fiber media.

M. Heating Coils: Nichrome wire electric elements with contactor, dehumidification relay, and high temperature limit switch.

N. Evaporative Pan Type: Stainless steel pan and cover, with stainless steel or brass float valve mechanism, electric heating coil with low water cut-off switch, flush cycle timer and solenoid drain valve.

O. Control System:

1. Unit Mounted: Main fan contactor, compressor and condenser fan contactor, compressor start capacitor, controls transformer with circuit breaker, solid state temperature and humidity control modules.

2. Solid state wall mounted with start/stop switch, adjustable humidity setpoint, adjustable temperature setpoint to interface with unit mounted controls.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate installation of computer room air conditioning units with computer room raised floor. Floor mounted units shall be on level stand with 2” deflection spring isolators and seismic restraints. Units hung from above shall have 2” spring isolation hangers and seismic restraints.

B. Coordinate installation of air conditioning unit with computer room ceiling.

C. Install drainage piping connections for humidifier flushing system.

D. Install hot water heating piping connections to reheat coils. Install shut-off valves in hot water heating inlet and outlet piping.

E. Install refrigerant piping connections to air-cooled condensing units.

F. Install accessories furnished loose for field mounting.

G. Install electrical devices furnished loose for field mounting.

H. Install control wiring between control panel and field mounted control devices.

I. Provide connection to electrical service.

3.2 MANUFACTURER'S FIELD SERVICES

A. Furnish services of factory trained representative for minimum of one days to start-up, calibrate controls, and instruct a minimum of 8 LAWA personnel for 16 hours, 8 hours shall be classroom training and 8 hours shall be hands on training on operation and maintenance.

B. Set initial temperature and humidity set points.

3.3 TRAINING

A. Train LAWA Maintenance personnel on the system operations and verify specified performance.

B. Provide minimum of 16 hours each (3 shifts), 8 hours of classroom and 8 hours of hands on training to LAWA Maintenance personnel.

END OF SECTION 23 81 23