

SECTION 23 81 23
ELEVATOR MACHINE ROOM AIR-CONDITIONER

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies air cooled air conditioning unit for Elevator Machine Room, Lower Level.
- B. Definitions:
 - 1. Energy Efficiency Ratio (EER): A ratio calculated by dividing the cooling capacity in Btuh by the power input in watts at any given set of rating conditions, expressed in Watts (Btu/h) per watt.
 - 2. Unitary (ARI): Consists of one or more factory-made assemblies, which normally include an evaporator or cooling coil, a compressor and condenser combination, and may include a heating function.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
- B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION: General mechanical requirements and items, which are common to more than one section of Division 23.
- D. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT: Requirements for vibration isolators and room noise level.
- E. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION: Requirements and for ducts and piping insulation.
- F. Section 23 23 00, REFRIGERANT PIPING: Requirements for field refrigerant piping.
- G. Section 23 21 13, HYDRONIC PIPING and Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING: Requirements for condensate piping and fittings.
- H. Section 23 31 00, HVAC DUCTS AND CASINGS: Requirements for sheet metal ducts and fittings.
- I. Section 23 40 00, HVAC AIR CLEANING DEVICES: Requirements for filters including efficiency.
- J. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Requirements for controls and instrumentation.
- K. Section 23 05 93: TESTING, ADJUSTING, AND BALANCING FOR HVAC: Requirements for testing, adjusting and balancing of HVAC system.

1.3 QUALITY ASSURANCE

Refer to specification Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

1.4 SUBMITTALS

- A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data, rated capacities operating characteristics, required specialties and accessories.
 - 1. Indoor Air Conditioning Unit
 - 2. Air Cooled Condenser
- C. Submit detailed equipment assemblies with dimensions, operating weights, required clearances.
- D. Submit wiring diagrams for power, alarm and controls.
- E. Certification: Submit, simultaneously with shop drawings, a proof of certification:
 - 1. That air-conditioning unit have been certified by ARI.
 - 2. That air-conditioning unit, accessories and components will withstand seismic forces as per specification Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.
- F. Performance Rating: Submit catalog selection data showing equipment ratings and compliance with required sensible-to-heat-ratio, energy efficiency ratio (EER) and coefficient of performance (COP).

1.5 GUARANTEE

The unit shall be guaranteed against all mechanical defects in material, arts or workmanship and shall be repaired or replaced at the Contractor's expense within the period of one year from final acceptance. Contractor shall adhere to a four hour service response time to troubles during the guarantee period.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed Spec):
 - 00-A-374C-95.....Air-Conditioners with Remote Condensing Units or Remote Air-cooled and Water-Cooled Condenser Units, Unitary
 - TT-C-490D-94.....Cleaning Methods for Ferrous Surfaces and Pretreatments for Organic Coatings
- C. Air-Conditioning and Refrigeration Institute (ARI) Standards:
 - 210/240-06.....Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment
 - 410-01.....Forced-Circulation Air-Cooling and Air-Heating Coils

- 460-2005.....Remote Mechanical-Draft Air-Cooled Refrigerant
Condensers
- 520-04.....Positive Displacement Condensing Units
- ARI-DCPP.....Directory of Certified Product Performance -
Applied Directory of Certified Products
- D. Air Movement and Control Association (AMCA):
 - 210-99.....Laboratory Methods of Testing Fans for
Aerodynamic Performance Rating (ANSI)
 - 410-96.....Recommended Safety Practices for Users and
Installers of Industrial and Commercial Fans
- E. American Society of Heating, Refrigerating, and Air-Conditioning
Engineers Inc. (ASHRAE):
 - 15-04.....Safety Standard for Refrigeration Systems (ANSI)
 - 90.1-04.....Energy Standard for Buildings except Low-Rise
Residential Buildings (ANSI Approved; IESNA Co-
sponsored)
 - 2004 Handbook.....HVAC Systems and Equipment
 - 2006 Handbook.....Refrigeration
 - 52.1-92.....Gravimetric and Dust-Spot Procedures for Testing
Air-Cleaning Devices used in General Ventilation
for Removing Particulate Matter
- F. American Society of Testing and Materials (ASTM):
 - B117-03.....Standard Practice for Operating Salt Spray (Fog)
Apparatus
- G. National Electrical Manufacturer's Association (NEMA):
 - MG 1-06.....Motors and Generators (ANSI)
- H. National Fire Protection Association (NFPA) Publications:
 - 70-05.....National Electrical Code
 - 90A-02.....Standard for the Installation of Air-
Conditioning and Ventilating Systems

PART 2 - PRODUCTS

2.1 FLOOR MOUNTED UNIT

I. GENERAL

Units shall be an packaged indoor vertical air cooled unit as
manufactured by United Coolair or approved VA equal.

II. COMPRESSOR(S)

The compressor(s) shall be a high efficiency heavy duty heat pump, fully
hermetic scroll compressors. The compressor(s) shall be thermally
protected from over-heating. Compressor shall be vibration isolated with
external spring mounting.

III. EVAPORATOR COILS

All evaporator coils shall be of blow-thru airflow design. The coil(s) shall be made with 3/8" O.D. heavy wall seamless copper tubes. Tubing shall be mechanically expanded to aluminum fin with drawn self spacing collars. All collars shall have no cracks or defects. The airflow will be 400 cfm for comfort cooling and 500 cfm for precision cooling. All evaporator coils shall be fed by an adjustable thermostatic expansion valve with external equalizer.

IV. CONDENSER COILS

The condenser coil shall be of draw-thru airflow design. The coil shall be made with 3/8" O.D. heavy wall seamless copper tubes. Tubing shall be mechanically expanded to aluminum fins with drawn self spacing collars. All collars shall have no cracks or defects.

V. BLOWER ASSEMBLY

The blower assembly shall be belt driven with the ability to deliver up to 0.25" ESP with the use of the standard motor. The blower housing shall be a heavy duty gauge steel double inlet and painted to prevent it from contaminates. The blower wheel shall be mounted on a solid steel keyed shaft. The shaft shall be mounted on resiliently mounted permanently lubricated ball bearings. The blower pulley shall be of cast iron construction and keyed to the blower shaft.

VI. MOTOR ASSEMBLY

The motor shall be resiliently mounted with internal protection from over-heating. Motor shall have permanently lubricated ball bearings. The motor shall be mounted to an adjustable motor frame positioned behind the blower assembly bolted to the bottom pan. No motor shall be mounted upon a blower housing. Motor pulley shall be cast iron, keyed, and variable pitch design to allow for field adjustment of specific air flow and static requirements.

VII. ELECTRICAL

The unit shall have single electrical control panel in the condenser section of the unit. All components (fan motors, compressors) shall have their own definite purpose contactor. Compressor(s) shall be protected by non-adjustable high and low pressure controls with auto reset and lock out relay in each refrigeration circuit. The unit(s) shall incorporate an air pressure differential switch. This shall enable the unit(s) to shut down in the event of an evaporator motor, blower or belt failure.

A low voltage transformer with integral protection shall be provided to supply 24 VAC to the control circuit. Clearly labeled low voltage terminal strips will be provided for field wiring of thermostat. Terminal blocks shall be provided on the electrical control box for power wiring. Ground lugs shall be affixed in both the evaporator and condenser control panels. All controls are easily -accessible.

VIII. REFRIGERATION CIRCUIT

The refrigeration circuit shall include high and low side Schrader access valves, sightglass with integral moisture indicator, muffler, filter-drier, high/lo pressure switches all located in the condenser section of the unit and are easily accessible. The refrigeration circuit shall be field splittable with reusable quick-connects to prevent loss of factory charge when split in the field.

IX. CABINET

The cabinet shall be constructed of heavy duty cold rolled steel and painted to prevent it from contaminates.

X. SERVICE ACCESS

The unit shall be accessible from the sides and the front only. Access doors shall be held in place by sheet metal screws. Access to the motor(s) shall be on one side of the unit. Access to the refrigeration circuit including compressor and sightglass shall be on the sides or the front of the unit.

XI. INSULATION

Acoustical insulation shall be a minimum density of 5 lbs. and be installed on the interior top, side and bottom pans and panels. Insulation must meet NFPA 90A and 90B/ASTM-C1071/Federal Specification HH-1-545B/R2:1 requirements.

XII. Included Options

XIII.

Low ambient control package:

- A. The unit shall come with low ambient control via flooded condenser down to -20 degrees F.,
- B. Hot gas bypass control.
- C. Low pressure switch bypass for cold start.

Acoustical sound package

- A. Double wall construction with perforated inner wall for both evaporator and condenser section.
- B. Compressor sound jackets.

XIV. FACTORY TESTING

All components shall be individually factory tested prior to installation, the unit shall be factory run-tested. A dielectrical withstand test shall also be done.

2.2 FAN MOTORS

- A. Default motor characteristics are specified in Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT.
- B. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT.
- C. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- D. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

2.3 SPECIAL TOOLS

If any part of equipment furnished under these specifications requires a special tool for assembly, adjustment, setting, or maintenance and the tool is not readily available from the commercial tool market, furnish the necessary tools with equipment as a standard accessory

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Handle and install refrigeration units and accessories in accordance with the instructions and recommendations of the manufacturer.
- B. Coordinate installation of Computer room Air Conditioning Units with Computer room access flooring installer.
- C. Field Refrigerant Piping: As specified in specification Section 23 23 00, REFRIGERANT PIPING.
- D. Field Piping: Glycol Piping, Hot water Piping, Steam and Condensate Piping, as specified in specification Section 23 21 13, HYDRONIC PIPING and Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING.
- E. Electrical System Connections and Equipment Ground: As specified in Division 26 Sections.

3.2 CONNECTIONS

- A. Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

- B. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- C. Install piping adjacent to machine to allow service and maintenance.
- D. Refrigerant Piping: Comply with applicable requirements in Section 23 23 00, REFRIGERANT PIPING. Provide shutoff valves and piping.

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 - 2. After installing computer-room air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. After startup service and performance test, change filters and flush humidifier.

3.4 INSTRUCTIONS

Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of computer room air conditioning equipment.

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