

**San Pasqual Valley Unified School District**  
**676 Baseline Road, Winterhaven, CA 92833**  
**May 20, 2019**

**REQUEST FOR BIDS**

The San Pasqual Valley Unified School District (“District”) is requesting the submission of bids for the following projects in compliance with California Proposition 39 requirements:

- 14 ROOFTOP PACKAGE HEATING VENTILATION AND AIR CONDITIONING UNITS

Interested firms are invited to submit their bids to:

**Kish Curtis, Chief Business Official**  
**San Pasqual Valley Unified School District**  
**676 Baseline Road, Winterhaven, CA 92833**

Questions regarding this process may be directed to Kish Curtis at 760-572-0222 or [kcurtis@spvUSD.org](mailto:kcurtis@spvUSD.org). **All Bids must be received on or before May 29, 2019, no later than 4:00 p.m.**

## SECTION 23 0000 GENERAL MECHANICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Drawings and general provisions of the Subcontract apply to this Section.
- B. Review these documents for coordination with additional requirements and information that apply to work under this Section.

#### 1.2 SCOPE

- A. Basic mechanical requirements specifically applicable to Division 23 Sections.
- B. Work includes but is not necessarily limited to the following:

Labor, materials, services, equipment, and appliances required for completion of tasks as indicated in specification or as inherently necessary to prepare spaces and systems for new installations as follows:

- a. Heating, ventilating, and air conditioning systems and equipment
- b. Testing, adjusting, and balancing

#### 1.3 DRAWINGS AND SPECIFICATIONS

- A. The Contractor shall furnish mechanical plans/drawings showing the scope of the project.
- B. Specifications shall identify quality and grade of installation and where equipment and hardware is not particularly specified, Contractor shall provide submittals for all products and install them per manufacturers' recommendations, and in a first-class manner.
- C. Examine Specifications for elements in connection with this Work; determine existing and new general construction conditions and be familiar with all limitations caused by such conditions.
- D. Plans are intended to show general arrangement and extent of Work contemplated. Exact location and arrangement of parts shall be determined after the Owner has reviewed equipment, as Work progresses, to conform in best possible manner with surroundings, and as directed by the Owner.
- E. Where job conditions require minor changes or adjustments in the indicated locations or arrangement of the Work, such changes shall be made without change in the Contract amount.
- F. Follow dimensions without regard to scale. Where no figures or notations are given, the Plans shall be followed.

#### 1.4 UTILITIES

- A. Location and sizes of electrical, mechanical, and plumbing service facilities are shown in accordance with data secured from existing record drawings and site observations.



Data shown are offered as an estimating guide without guarantee of accuracy. Check and verify all data given, and verify exact location of all utility services pertaining to Work prior to excavation or performing Work.

#### 1.5 APPLICABLE REFERENCE STANDARDS, CODES, AND REGULATIONS

- A. Meet requirements of all state codes having jurisdiction.
- B. State of California Code of Regulations:

Title 8, Industrial Relations

Title 19, State Fire Marshal Regulations

2016 California Building Code, Title 24, Part 2

2016 California Electrical Code, Title 24, Part 3

2016 California Mechanical Code, Title 24, Part 4

2016 California Plumbing Code, Title 24, Part 5

2016 California Fire Code, Title 24, Part 9

2016 California Standards Code, Title 24, Part 12

2016 California Title 24, Energy Conservation Standards

- C. Additional Reference Standards:

AABC – Associated Air Balance Council

AMCA – Air Moving and Conditioning Association

AHRI – Air Conditioning, Heating and Refrigeration Institute

ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers

ASME – American Society of Mechanical Engineers

ASTM – American Society of Testing Materials

NEMA – National Electrical Manufacturer's Association

NFPA – National Fire Protection Association Standards

PDA – Plumbing and Drainage Institute

UL – Underwriters Laboratories

- D. Codes and ordinances having jurisdiction over Work are minimum requirements; but, if Contract Documents indicate requirements, which are in excess of those minimum requirements, then requirements of the Contract Documents shall be followed. Should there be any conflicts between Contract Documents or codes or any ordinances having jurisdiction, report these to the Owner.
- E. Obtain permits and request inspections from authority having jurisdiction.

#### 1.6 PROJECT AND SITE CONDITIONS

- A. Structural supports, housekeeping pads, piping connections, and adjacent equipment may have to be altered to accommodate the equipment provided. No additional payment will be made for such revisions or alterations.
- B. Examine Specifications to be fully cognizant of all work required under this Division.
- C. Examine site related work and surfaces before starting work of any Section.



- D. Prepare revised shop drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from the Owner before proceeding.
- E. Beginning work of any Section constitutes acceptance of conditions.

#### 1.7 COOPERATION WITH WORK UNDER OTHER DIVISIONS

- A. Cooperate with other trades to facilitate general progress of Work. Allow all other trades every reasonable opportunity for installation of their work.
- B. Work under this Division shall follow general building construction closely. Set pipe sleeves and inserts and verify that openings for chases and pipes are provided.
- C. Work with other trades in determining exact location of outlets, pipes, and pieces of equipment to avoid interference with lines required to maintain proper installation of Work.
- D. Make such progress in the Work to not delay work of other trades.
- E. Mechanical Work shall have precedence over the other in the following sequence:

Soil and waste piping

Hydronic piping

Ductwork

Fire sprinkler piping

Domestic water piping

#### 1.8 DISCREPANCIES

- A. Where requirements and Specifications conflict, the more restrictive provisions shall apply. Also, see Contract General Conditions.
- B. If any part of the Specifications appears unclear or contradictory, apply to Owner for interpretation and decision as early as possible, including during bidding period. Beginning work of any Section constitutes acceptance of conditions.

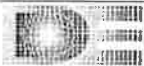
#### 1.9 CHANGES

- A. The Contractor shall be responsible to make and obtain approval from the Owner for all necessary adjustments in piping and equipment layouts as required to accommodate the relocations of equipment and/or devices, which are affected by any approved authorized changes or Product substitutions. All changes shall be clearly indicated on the "Record" drawings.

#### 1.10 SUBMITTALS

- A. Refer to Division 01 for additional requirements.
- B. The manufacturer, contractor, or supplier shall include a written statement that the submitted equipment, hardware, or accessory complies with the requirement of that particular specification section.

The manufacturer shall resubmit the specification section showing compliance with each respective paragraph and specified items and features in that particular specification section.



All exceptions shall be clearly identified by referencing respective paragraph and other requirements along with proposed alternative.

- C. Note that prior to acceptance of shop drawings for review, a submittal schedule shall be submitted to the Owner.
- D. Submit all Division 23 shop drawings and product data grouped and referenced by the specification technical section numbers in one complete submittal package.
- E. Shop Drawings:

Provide all shop drawings in latest version of AutoCAD format. FTP upload is acceptable. Drawings shall be a minimum of 8.5 inches by 11 inches in size with a minimum scale of ¼ inch per foot, except as specified otherwise.

Include installation details of equipment indicating proposed location, layout and arrangement, accessories, piping, and other items that must be shown to assure a coordinated installation. Indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.

If equipment is disapproved, revise drawings to show acceptable equipment and resubmit.

- F. Whenever more than one manufacturer's product is specified, the first named product is the basis of design used in the Work and the use of alternate named manufacturer's products or substitutes may require modifications in that design.
- G. Proposed Products List: Include Products as required by the individual section in this Division.
- H. The Contractor shall be responsible for all equipment ordered and/or installed prior to receipt of shop drawings returned from the Owner bearing a stamp of "Reviewed." All corrections or modifications to the equipment as noted on the shop drawings shall be performed and equipment be removed from the job site at the request of the Owner without additional compensation.
- I. Manufacturer's Data: For each manufactured item, provide current manufacturer's descriptive literature of cataloged products, certified equipment drawings, diagrams, performance and characteristic curves if applicable, and catalog cuts.
- J. Standard Compliance: When materials or equipment provided by the Contractor must conform to the standards of organizations such as American National Standards Institute (ANSI) or American Water Works Association (AWWA), submit proof of such conformance to the Owner for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified. In lieu of the label or listing, submit a certificate from an independent testing organization, which is competent to perform acceptance testing and is approved by the Owner. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard.
- K. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in individual sections shall be submitted for approval.



- L. Certificates of Compliance or Conformance: Submit manufacturer's certifications as required on products, materials, finish, and equipment indicated in the technical sections. Certifications shall be documents prepared specifically for this Contract. Pre-printed certifications and copies of previously submitted documents will not be acceptable. The manufacturer's certifications shall name the appropriate products, equipment, or materials and the publication specified as controlling the quality of that item. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as," or "achieve the same end use and results as materials formulated in accordance with the referenced publications," or "equal or exceed the service and performance of the specified material." Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance or conformance.
- 1.11 **PRODUCT ALTERNATIVES OR SUBSTITUTIONS**
- A. Refer to General Conditions and Division 01 for additional requirements
- 1.12 **POSTED OPERATING INSTRUCTIONS**
- A. Furnish approved operating instructions for systems and equipment indicated in the technical sections for use by operation and maintenance personnel.
- B. The operating instructions shall include control diagrams, and control sequence for each principal system and equipment. Print or engrave operating instructions and frame under glass or in approved laminated plastic. Post instructions as directed. Attach or post operating instructions adjacent to each principal system and equipment. Provide weather-resistant materials or weatherproof enclosures for operating instructions exposed to the weather. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.
- 1.13 **MANUFACTURER'S RECOMMENDATION**
- A. Where installation procedures or any part thereof are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.
- 1.14 **DELIVERY AND STORAGE**
- A. Refer to Division 01 for additional requirements.
- B. Handle, store, and protect equipment and materials in accordance with the manufacturer's recommendations. Replace damaged or defective items with new items.
- 1.15 **EXTRA MATERIALS**
- A. Refer to Division 01 for additional requirements.



- B. Unless otherwise specified, spare parts, wherever required by detailed specification sections, shall be stored in accordance with the provisions of this paragraph. Spare parts shall be tagged by project equipment number and identified as to part number, equipment manufacturer, and subassembly component (if appropriate). Spare parts subject to deterioration, such as ferrous metal items and electrical components, shall be properly protected by lubricants or desiccants and encapsulated in hermetically sealed plastic wrapping. Spare parts with individual weights less than 50 pounds and dimensions less than 2 feet wide, or 18 inches high, or 3 feet in length shall be stored in a wooden box with a hinged wooden cover and locking hasp. Hinges shall be strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words "spare parts." A neatly typed inventory of spare parts shall be taped to the underside of the cover.

## PART 2 - PRODUCTS – Not Applicable



## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Obtain and pay for all permits and inspections, including any independent testing required to verify standard compliance, and deliver certificates for same to the Owner.

### 3.2 WORK RESPONSIBILITIES

- A. The Mechanical Drawings indicate diagrammatically the desired locations or arrangement of piping, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference with structural conditions
- B. The Contractor is responsible for the correct placing of Work and the proper location and connection of Work in relation to the work of other trades. Advise appropriate trade as to locations of access panels.
- C. In the event that changes in the indicated locations or arrangements are necessary due to developed conditions in the building construction or rearrangement of furnishings or equipment, such changes shall be made without extra cost, providing the change is ordered before the ductwork, piping, etc., and work directly connected to same is installed and no extra materials are required.
- D. Where equipment is furnished by others, verify dimensions and the correct locations of this equipment before proceeding with the roughing-in of connections.
- E. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any work, carefully check and verify all dimensions, sizes, etc., with the drawings to see that the equipment will fit into the spaces provided without violation of applicable codes.
- F. Should any changes to the Work indicated on the Drawings or described in the Specifications be necessary in order to comply with the above requirements, notify the Owner immediately and cease work on all parts of the contract, which are affected until approval for any required modifications to the construction has been obtained from the Owner.
- G. Be responsible for any cooperative work, which must be altered due to lack of proper supervision or failure to make proper provisions in time. Such changes shall be under direction of the Owner and shall be made to his satisfaction. Perform all Work with competent and skilled personnel.
- H. All work, including aesthetic as well as mechanical aspects of the Work, shall be of the highest quality consistent with the best practices of the trade.
- I. Replace or repair, without additional compensation, any Work which, in the opinion of the Owner, does not comply with these requirements.



### 3.3 PAINTING

#### A. Factory Applied:

Mechanical equipment shall have factory applied painting systems which shall, at a minimum, meet the requirements of NEMA ICS 6 corrosion resistance test.

Refer to individual sections of this Division for more stringent requirements.

#### B. Field Applied:

Paint all mechanical equipment as required to touch up, to match finish on other equipment in adjacent spaces or to meet safety criteria

END OF SECTION 23 0000



## SECTION 23 8143 AIR SOURCE UNITARY HEAT PUMPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Related Documents:

Drawings and general provisions of the Subcontract apply to this Section.  
Review these documents for coordination with additional requirements and information that apply to work under this Section.

##### B. Section Includes:

Wall Mount Air Source Heat Pumps.  
Roof Mount Air Source Heat Pumps.

##### C. Related Sections:

Division 01 Section, General Requirements.  
Division 01 Section, Special Procedures.  
Division 23 Section, Common HVAC Requirements.  
Division 23 Section, Instrumentation and Control Devices for HVAC.  
Division 23 Section, Hydronic Piping for condensate piping.  
Division 23 Section, HVAC Insulation.

#### 1.2 REFERENCES

##### A. General:

The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

Refer to Division 01 Section, General Requirements for the list of applicable regulatory requirements.

Division 13 Section, Seismic Restraint Requirements for Non-Structural Components.

Refer to Division 23 Section, Common Results for HVAC for codes and standards, and other general requirements.

- B. Code of Federal Regulations 29 CFR 1910.7 Definitions and Requirements for a Nationally Recognized Testing Laboratory (NRTL).
- C. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality.

AHSRAE/IES 90.1 Energy Standard for Building Except Low Rise Residential Buildings.



ASHRAE 15 Safety Standard for Refrigeration Systems.

- D. Air Conditioning, Heating and Refrigeration Institute (AHRI)

AHRI 210 Performance of Unitary Air Conditioning Equipment.

AHRI 270 Sound Performance Rating of Outdoor Unitary Equipment.

- E. American Society of Testing and Materials (ASTM)

ASTM B117.

ASTM A653.

- F. ANSI – American National Standards Institute:

ANSI/NFPA 101 – Life Safety Code.

ANSI/NFPA 70 – National Electrical Code.

- G. National Electrical Manufacturers Association (NEMA) Publications.

- H. California Title 24, Non-Residential: Section 120 (Mechanical).

### 1.3 SUBMITTALS

- A. Submit under provisions of Division 23 Section, Common Results for HVAC and Division 01 Section, General Requirements.
- B. Product Data: Manufacturer's installation instructions, descriptive literature, operating instructions, and maintenance and repair data.
- C. Performance Rating: Submit catalog selection data showing equipment ratings and compliance with required cooling and heating capacities EER and HSPF values as applicable.
- D. Manufacturer Seismic Certification: certification that equipment, accessories, and components will withstand seismic forces defined in Division 23 Section, Vibration and Seismic Controls for HVAC including items as defined in Division 23 Section, Common Work Results for HVAC.
- E. Submit warranty documentation.

### 1.4 QUALITY ASSURANCE

- A. Equipment shall be listed or labeled by a Nationally Recognized Testing Laboratory (NRTL) recognized under 29 CFR 1910.7.
- B. Test and rate cooling systems in accordance with AHRI 210.
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2016 Section 5, Systems and Equipment and Section 7, Construction and Startup.
- D. ASHRAE/IESNA 90.1-2016 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2016 Section 6, Heating, Ventilating, and Air Conditioning.
- E. Comply with ASHRAE Standard 15-2013, Safety Standard for Refrigeration Systems.
- F. Unit sound performance rating in accordance with AHRI 270.



- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- 1.5 WARRANTY
- A. Warranty of materials and workmanship as outlined in Division 23 Section, Common HVAC Requirements and Division 01 Section, General Requirements.
  - B. Provide five year Refrigerant Compressor warranty and one year Parts warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Mavair (Wall Mount Units)
- B. Bard (Wall Mount Units)
- C. EuBank (Wall Mount Units)
- D. Carrier (Roof Mount Units)
- E. Trane (Roof Mount Units)
- F. Substitutions: Under provisions of Division 01 Section, General Requirements

### 2.2 AIR SOURCE UNITARY HEAT PUMPS

- A. General: Heat pump units shall be type, size, and configuration indicated. Designed for outdoor wall mount installation.
- B. Unitary heat pumps shall bear the United States Environmental Protection Agency, and Energy Star label. The new heat pump (5 Ton or less) shall have a minimum Coefficient of Performance (COP) of 3.0, a minimum Energy Efficiency Ratio (EER) of 11, at full load; and shall feature minimum of 2 stage compressor and minimum integrated part load value (IPLV) of 14. The new heat pump (with capacity equal or greater than 65,000 Btu/h and lower than 135,000 Btu/h) shall have a minimum Coefficient of Performance (COP) of 3.3, a minimum Energy Efficiency Ratio (EER) of 11, at full load; and shall feature minimum of 2 stage compressor and minimum integrated part load value (IPLV) of 14.
- C. The exterior cabinet shall be constructed of 20 gauge zinc-coated, galvanized G60 steel with a satin beige polyester finish and shall meet the corrosion protection requirements of ASTM standard A653. The finish shall be highly resistant to abrasion, metal marking, staining, pressure mottling, and require minimal maintenance. The cabinet shall include a sloped top and built-in mounting flanges. The conditioned air section shall be insulated with 1/2 inch, 2 pound dual density fiberglass.
- D. Filters: One inch filament spun glass type filter shall be mounted internally, factory supplied, and accessible through an external panel.
- E. Compressor and Refrigerant Circuit: The compressor shall be a hermetic scroll type with vibration isolation. The refrigeration circuit shall contain a filter dryer and a fixed metering device. The refrigeration circuit shall include a high pressure switch and a loss of charge switch with a lockout relay. The compressor motor shall be protected by



an internal line break thermostat. Electrical wiring connections at the compressor shall be protected by molded plug.

F. Outdoor Section:

The outdoor coil shall be constructed of aluminum plate fins mechanically bonded to seamless copper tubes.

Outdoor fan shall be direct driven, propeller type for quiet operation. The outdoor motor shall be equipped with a thermal protector. The condenser shall be horizontal discharge design with a heavy duty vinyl coated wire coil guard.

G. Indoor Section:

The indoor coil shall be constructed of aluminum plate fins mechanically bonded to seamless copper tubes.

The indoor blower motor shall be an electronically commutated type motor. The motor's control shall be encapsulated to prevent water from reaching its electronic components. The motor shall automatically deliver constant airflow over a wide range of external static pressures by changing its torque and speed without external sensors. The motor shall be factory programmed to slowly ramp up the speed to eliminate the abrupt change in sound when the motor starts.

The evaporator drain pan shall be sloped for proper drainage.

H. Accessories (Economizer for units 5 Ton or more in capacity):

Economizer shall be field / factory installed; and shall include fully modulating 0-100 percent motor and dampers, barometric relief, and dry bulb and/or enthalpy controls. Economizer cycle (temperature controlled) shall be utilized on all systems for areas requiring year-round cooling. For all systems utilizing economizer cycles a separate return or exhaust fan must be utilized to provide positive relief and also standby capacity in the event of supply fan failure.

When free cooling is available, the outdoor air damper is modulated by the economizer control module to provide a 50 °F (10 °C) to 55 °F (13 °C) mixed air temperature into the zone. As the mixed air temperature fluctuates above 55 °F (13 °C) or below 50 °F (10 °C) dampers will be modulated (open or close) to bring the mixed air temperature back within control.

The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper setpoint.

Economizer control module shall provide indications when in free cooling mode or the exhaust fan contact is closed.

- I. Accessories (Fire Alarm Panel): Any new fire alarm system equipment/controls (if any) shall match and work with existing fire alarm panels. This includes manual and automatic local fire alarm system, including initiating devices, indicating/notification devices and transmitters, components, appurtenances and accessories, as required. Also included is wiring and connections, including connections to water flow and valve supervisory switches, smoke management, and existing signaling system. The



contractor will inspect and provide smoke alarm and fire alarm controls and accessories where required (HVAC systems and associated ducts).

### 2.3 OPERATING CONTROLS

- A. Provide low voltage, adjustable thermostat input point to control heating/cooling operation and supply fan to maintain temperature setting.

Include system selector switch HEAT/COOL/OFF and fan control switch ON/AUTO.

Locate thermostat in room.

- B. Provide remote mounted fan control switch ON/AUTO.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Examine areas and conditions under which units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION (WALL MOUNT UNITS)

- A. Install in accordance with manufacturer's instructions.
- B. Provide adequate bracing and vibration isolation in accordance with seismic code requirements.
- C. Provide adequate drainage connections and routing for condensate.
- D. Contact manufacturer to review installation procedures for all field installed accessories.
- E. Line and control voltage connections shall be made to the appropriate terminals within the heat pump's control box.
- F. All external control devices shall be wired to the appropriate terminals within the heat pump's control box.

### 3.3 INSTALLATION (ROOF MOUNT UNITS)

- A. Install equipment per industry standards, applicable codes, and manufacturer's instructions.
- B. Do not use the units for temporary heating, cooling or ventilation prior to complete inspection and startup performed per this specification.
- C. Install the units on a concrete pad, roof curb, or structural steel base, as shown on drawings.
- D. Install the units with manufacturer's recommended clearances for access, coil pull, and fan removal.
- E. Provide one complete set of filters for testing, balancing, and commissioning. Provide second complete set of filters at time of transfer to owner.
- F. Install unit plumb and level. Connect piping and ductwork according to manufacturer's instructions.
- G. Install seismic restraints and anchors per applicable local building codes.
- H. Insulate plumbing associated with drain pan drains and connections.



- I. Install insulation on all staggered coil piping connections, both internal and external to the unit
- J. For roof mounted units, confirm that the unit's operating weight and the dimensions are equal or lower than the existing equipment. If not, the cost for potential foundation/structural analysis and selective demolition and reconstruction required to accommodate new unit will be done by the successful bidder.

### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory authorized service representative to inspect, test, and adjust field assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:

Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- C. Remove and replace malfunctioning units and retest as specified above.

## PART 4 - MATERIAL SCHEDULE

### 4.1 ECM 4: WALL-MOUNT HEAT PUMPS

- A. Mavair Wall Mount Heat Pumps (HVPA Series or equivalent)

Cooling System Capacity, Efficiency and Airflow Ratings

- a. Cooling Capacity: 47,000 BTUH
- b. EER 2<sup>nd</sup> Stage Operation: 11.50
- c. Airflow: 1,750 CFM

Heating Capacity, Efficiency and Airflow Ratings

- d. High Temperature Heating Capacity: 42,000 BTUH
- e. High Temperature COP: 3.25
- f. Airflow: 1,750 CFM

Outdoor Fan Motor

- g. RPM: 825
- h. FLA: 2.8
- i. HP: 1/2

Indoor Blower Motor



- j. RPM: 1,500
- k. FLA: 4.3
- l. HP: 3/4

B. Bard Wall Mount Heat Pumps (T48S1 Series or equivalent)

Cooling System Capacity, Efficiency and Airflow Ratings

- a. Cooling Capacity: 46,500 BTUH
- b. EER 2 Stage Operation: 11.0
- c. IPV: 14.0
- d. Airflow: 1,550 CFM

Heating Capacity, Efficiency and Airflow Ratings

- e. High Temperature Heating Capacity: 43,000 BTUH
- f. High Temperature COP: 3.50
- g. Airflow: 1,550 CFM

4.2 ECM 4: ROOF HEAT PUMPS

A. Carrier Roof Mount Heat Pumps (Weathermaster 50HCQ or equivalent)

Cooling System Capacity, Efficiency and Airflow Ratings

- a. Cooling Capacity: 3 Tons to 10 Tons
- b. Efficiency: 12.10

Heating Capacity, Efficiency and Airflow Ratings

- c. High Temperature Heating Capacity: 18,400 to 65,000 BTUH
- d. High Temperature COP: 3.25

B. Trane Roof Mount Heat Pumps (Precedent DHC Series or equivalent)

Cooling System Capacity, Efficiency and Airflow Ratings

- a. Cooling Capacity: 3 to 10 Tons
- b. EER 2 Stage Operation: 12.5

Heating Capacity, Efficiency and Airflow Ratings

- c. High Temperature Heating Capacity: 20,000 – 65,000 BTUH
- d. High Temperature COP: 3.50

END OF SECTION 23 8143

