

PART I – GENERAL

WORK SPECIFIED HEREIN

- All heating, ventilating and air conditioning equipment, specialties, etc., required.
- Supply, and exhaust equipment, etc. as required.
- All hangers, supports, and bases (not concrete) required for the installation of specified equipment herein.
- Tests, balance, and adjustments.
- All equipment requiring electrical power shall be U.L.C. Listed and be provided with U.L.C. Label.

SUBSTITUTIONS

- This is a Required Vendor. No substitutions allowed.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

EXHAUST FANS

- *General:* Provide roof caps, wall caps, flashings, bases, speed switches integral inlet grilles, backdraft dampers and duct connections as indicated or specified.
- Provide internal disconnecting means and overload protection on all units 1/2 HP and smaller and/or 120 volt single phase.
- Provide Captive Air exhaust fans with approved internal vibration isolators as indicated or specified.
- All belt driven exhaust fans shall have adjustable motor pulleys for fan speed control. Rate belts for 150% of motor rates HP.
- All fans shall be AMCA certified and approved.
- Sound levels shall not exceed those indicated.

AIR CONDITIONING UNITS (ROOF TOP-GAS)

Contractor to contact: Lennox Industries, Inc.

For Pricing: Jane Gunter (905) 497-6869

(This is a Required Vendor)

For Delivery: Jane Gunter (905) 497-6869

For Start-Up Support: Jane Gunter (905) 497-6869

Unit shall be combination heating and cooling units complete including:

- Units shall be a one-piece air-cooled electric cooling, gas-heating unit.
- Heating capacity of units shall be as shown on the drawings.
- Multiple hermetic/scroll compressors shall be resiliently mounted, have overload protection, internal pressure relief, compressor monitor, and crankcase heater. Compressors shall be protected with 5 minute time delay.
- Compressor warranty shall be five (5) year parts only.
- Indoor and outdoor coils shall be of nonferrous construction with aluminum fins bonded to seamless copper tubes with all joints brazed.
- Indoor Centrifugal supply blowers shall have permanently lubricated ball bearings and adjustable belt drive. Motor mount base shall be slide out design (ENERGENCE series) to permit ease of motor changeover and belt tension adjustment.
- Outdoor direct drive fan motors shall be totally enclosed, permanently lubricated and inherently protected. Fans shall have safety guards with rain shield.
- The cooling system shall be protected with expansion valves, high capacity drier, high pressure switches, and loss of charge switches. Factory installed freezestat to prevent evaporator coil freeze up during low ambient operation. Independent refrigerant circuits provide staging control to fit varying cooling needs.
- Heat exchanger shall be tubular in design and constructed of corrosion resistant aluminized steel. Heat exchangers shall carry a full 10 year parts warranty.
- Heating controls shall consist of direct spark ignition with a redundant dual gas valve for two stage operation. Flame roll out switch shall be provided.
- Bottom power entry for electrical wiring shall be provided through unit roof mounting curb and unit bottom.
- Roof mounting curb shall be provided by unit manufacturer. Curb shall be minimum height of 14 inches.
- Economizers with barometric relief shall be on each unit.
- Electrical convenience package: Unit mounted disconnect (factory wired), Electrical Contractor is to bring power to disconnect, dual 120V GFI Service outlet (field wired), and hinged box cover.
- Smoke detectors will be factory installed by manufacturer where required. See Mechanical Drawings for locations and units.
- The installing contractor shall be responsible for coordinating release of units for delivery with Lennox. Contractor shall coordinate with Lennox and the General Contractor so that the HVAC units may be hoisted directly from the truck to the roof.

- Packaged rooftop units shall include factory installed Lennox Logic controls. Lennox ETM-2051.

Controls shall include:

- Wall Temperature Sensor shall be provided for field mounting below unit. (Required Vendor) Lennox.
- Prodigy M2 Unit Controller:
 1. Provides control function for Emergence roof-top unit.
 2. Includes a user interface consisting of a dot matrix display, navigation arrow buttons, as select button and a USB port.
 3. Provides status and diagnostic information for troubleshooting.
 4. Allows adjustment of time delays and setpoints that enable advanced features.
 5. Is controlled by a standard room thermostat, direct digital controller (DDC) or a zone sensor.
 6. Can be configured as a device on the network when daisy-chained to the L Connection Network.
 7. May be connected to a PC which has been loaded with Unit Controller software.
 8. Accepts add-on boards to build variations according to application or equipment type.
 9. USB verification.
- Lennox/RSI series 570 Duct and Diffuser package consisting of supply duct, return duct, return duct grill and four-way supply stepdown diffuser. All components to be field installed by mechanical contractor.

EQUIPMENT OPERATIONAL CHECK

- After the Mechanical Contractor completes the HVAC installation and start-up, as per the manufacturer's instructions, Lennox authorized personnel shall inspect the equipment and its operation. The Equipment Operational Check (EOC) shall provide for a check to ensure system operation and proper unit installation by Mechanical Contractor.
- The Mechanical Contractor shall schedule the EOC with Lennox at least three (3) weeks prior to desired date. Contact: Jane Gunter (905) 497-6869.
- Weather seals shall be provided at all units.

ELECTRICAL WIRING

- Mechanical equipment having electrical motors shall be furnished with all necessary control devices for the protection of each motor and for automatic and manual control, under this Section of these Specifications.

- All control and low voltage wiring for automatic controls and labor for installation shall be included in this Section of these Specifications.
- All electrical temperature control devices, thermostats, relays, switches, pushbuttons, hand-off-auto switches, pilot lights, etc., will be furnished under this Section of Specifications.
- All motor starters and controllers which are integral with the equipment must be furnished under this Section of these Specifications and installed under the Electrical Section.
- Mechanical contractor shall verify site/system voltage prior to ordering HVAC equipment.
- All starters, controls, relays, and wiring must conform to the NEC.

BALANCING OF AIR SYSTEMS

- The General Contractor shall be responsible for scheduling the testing, adjusting, and balancing directly with National Vendor, see drawing F2.0 at least 4 weeks in advance.
- This work shall be performed after the HVAC system start-up and 1 week before turnover to Operations. Gas and electric power must be turned on, all doors and windows installed, and ceiling tiles in place.
- Testing, adjusting, and balancing the HVAC system shall ensure optimal performance, comfort, and energy efficiency.
- This service covers the testing, adjusting, and balancing of all heating and air-conditioning and exhaust ventilation systems. A certified report shall be submitted to the Owner within 1-2 weeks of completion.
- The Testing, adjusting, and balancing work shall be completed in accordance with the following checklist:
 1. Inquire about any design, equipment, and installation problems or deviations and/ or changes from "Bid Set/Construction Set" of Mechanical Drawings.
 2. Compare installed system to mechanical plans.
 3. Document design specifications for report.
 4. Ensure all fans are running for balance.
 5. Measure initial building pressure.
 6. Inspect units and document any deficiencies.
 7. Record unit nameplate data.

8. Check thermostats for proper wiring and settings.
9. Check for correct fan rotation (include condenser fans).
10. Check conditions of filters and coils.
11. Check position of outside air dampers.
12. Check gas lines and condensate lines.
13. Check belt tension and pulley alignment.
14. Check disconnect switches and covers.
15. Check any fan noise and vibration.
16. Check heating/cooling modes of RTU's.
17. Measure RTU supply and return airflows.
18. Adjust RPM as necessary to achieve design.
 - a. Check actual amps versus motor FLA.
 - b. Note adjustments made on pulleys.
 - c. Measure final RPM's.
19. Damper at branch takeoffs first and at diffusers second.
20. Check for drafts and hot/cold spots.
21. Ensure slightly positive building pressure.
 - a. Fine tune position of OA dampers.
 - b. Measure final building pressure.
22. Review report and data for completeness.
23. Discuss findings and results with superintendent and PETSMART Construction Manager
24. Submit certified report along with recommendations to Owner. This document is to also be uploaded to the "PETSMART Construction Website"
- Air quantities shall be balanced to within +/-10% of design as a general rule. However, in some cases, the air quantities may need to be adjusted differently in order to ensure acceptable comfort levels, proper hood capture, positive building pressure, etc.
- Balancer shall notify the superintendent and PETSMART Construction Manager of any deficiencies needing immediate attention, and the G.C. shall have the mechanical and electrical contractors available on call to promptly correct any such problems (i.e. replace burned out motors, failed thermostats, incorrect wiring, bad circuit breakers and starters, dirty filters, missing dampers, undersized RTU outside air intakes).
- In the event Balancer needs to reschedule a follow up visit to test and balance any equipment not ready on the originally

scheduled T & B date, the G.C. shall be responsible for the additional cost involved, including travel.

CLEANING AND REPAIRS

At the completion of the Work, all exposed equipment, piping, apparatus, and material shall be thoroughly cleaned of oil, grease, dirt, rust, cement, plaster, etc. All cracks and corners shall be scraped out clean; finished surfaces shall be cleaned and polished; confirm all fins are combed and straight.

All damage to glass or the finish or structure of adjacent work shall be properly repaired or replaced. All unused construction material in or about the building construction and all dirt and rubbish caused by the work under this section shall be removed. The premises shall be left in a neat, clean, unable condition to the complete satisfaction of the Professional of Record.

NOTE: After completion of all final cleaning, all filters must be changed and all grilles must be cleaned throughout the building at time of punchlist/turnover of the store.

INSPECTION AND TESTS

Test shall be made before the rough work is covered. The system may be tested in parts, if approved by Professional of Record.

When the tests of inspections show the work is in any way defective, material or equipment shall be removed from the premises, and replace with acceptable new material.

TESTING OUT

- It shall be the responsibility of the contractor to check out and test operate all equipment installed under this Section of these specifications, including a check of all work performed under the electrical, and plumbing sections in conjunction with the equipment installed under this Section.
- The Contractor shall check the electrical work to see that the power is properly supplied to all electrical motors and that all electrical controls are properly hooked up in the control circuits.
- The Contractor shall make sure that each unit is ran for at least one hour, in order to properly burn off the oil from units. It is recommended that the blower fan is disconnected and the unit runs until the high temperature switch shuts unit off.
- The Contractor shall check all of his own work and see that all controls are in good working order and properly adjusted. After the equipment has been properly checked and adjusted, the Contractor shall start up and run all equipment enough to determine that the installation is complete.
- When the tests or inspections show that the Work is in any way defective or at a variance with these specification requirements, the contractor shall immediately make all changes necessary to correct the work and remedy the defects to the satisfaction of the Professional of Record. Any defective material or equipment shall be removed

from the premises. In the event the contractor does not remedy all defects and make all the changes required by the Professional of Record within a reasonable time, the right is reserved to have the defects remedied or changes made and to charge the cost of the work against the account of the contractor.

- The contractor shall furnish all appliances, equipment, and labor for the tests and shall meet all the expense of the tests.

FINAL TESTS

Before acceptance and final payment and at a time designated, a complete test shall be made to demonstrate that the air qualities are balanced for even temperatures throughout, that all controls are adjusted and that, in general, the system is placed into proper operation. A skilled operation engineer shall be furnished for a period of at least four days, at a time or times required designated by the Owner, to instruct the Owner's representative in the operation and maintenance of the system.

INSTALLATION MANUAL

See section 15000.

FORMS FOR CLOSEOUT MANUAL

Subcontractor is to arrange to have a formal Test & Balance report completed and incorporated/included in the closeout documents.

Subcontractor is to label each unit with a 3" size reflective number for easy visibility from the side ladder, and should use this number in the "HVAC Equipment List" (see below).

The form titled "HVAC Equipment List," located in "HVAC" of the drop-down list in the "PM Files" tab at the top of each project on the construction website, must be filled out by the General Contractor after compiling the needed information from the HVAC subcontractor after installation. It must then be posted under the appointed store project for appropriate parties' general information.

NOTE: Retainage will not be paid until all this HVAC form is completed and posted on the website.

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END OF SECTION