SECTION 238100

DECENTRALIZED UNITARY HVAC EQUIPMENT

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 2 Specification with primarily editable text; therefore, most of the text can be edited, but there is some required text which is noted within the Section with a “Note to Specifier.” Do not revise these paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
   1. SUMMARY
      1. Packaged Rooftop air handling units.
   2. SUBMITTALS
      1. Product Data: Required.
      2. Shop Drawings: Required.
   3. QUALITY ASSURANCE
      1. Qualifications:
         1. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.
      2. Reference Standards:
         1. Air Movement and Control Association International (AMCA)
         2. Underwriters Laboratories (UL) Standard 705
         3. Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
         4. U.S. EPA Final Rule 21 (40 CFR Part 82 – 81 FR 86778)National Environmental Balancing Bureau (NEBB)
      3. Regulatory Requirements:
         1. ASHRAE Standard 15-2016 for safety codes for mechanical refrigeration.
         2. ASHRAE Standard 34-2016 for safety classifications of refrigerants based on toxicity and flammability data.
         3. ASHRAE Standard 147-2013 for refrigerant leaks, recovery, and handling and storage requirements.
         4. Comply with U.S. EPA Final Rule 21 (40 CFR Part 82 – 81 FR 86778) for acceptability status of substitute refrigerants.
         5. Comply with any state, fire marshal, building code or other local authority prohibitions or regulations related to flammable refrigerants.
2. PRODUCTS

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**NOTE TO SPECIFIER**

**REQUIRED**: Do not modify manufacturers or product requirements listed below, except where noted, without an approved deviation.

Verify manufacturer information, product numbers, and availability at time of Project Manual preparation for Project.

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* 1. ROOFTOP AIR HANDLING UNITS
     1. Units shall be of light industrial grade construction, suitable for the scheduled duty requirements, as manufactured by AAON, Carrier, Lennox, Daikin/McQuay, York (Johnson Controls, Inc.) or Trane (includes American Standard brand as manufactured by Trane). No substitutions permitted without an approved deviation. Units to be AMCA and AHRI certified.
     2. Refrigerant: Only R-134Aor R-410A refrigerants are permitted.
        1. Note: As of this update, EPA has not designated a schedule for phase out of R-134A or R-410A in RTUs. System must comply with U.S. EPA’s Significant New Alternatives Policy (SNAP) program for acceptable substitute refrigerants. If/when EPA deems R-134A and R-410A unacceptable, new generation equipment utilizing lower Global Warming Potential (GWP) hydrofluoroolefin (HFO) refrigerants and blends should be considered.
        2. Refrigerant Compatibility: Parts exposed to refrigerants shall be fully compatible with refrigerants, and pressure components shall be rated for refrigerant pressures.
     3. Units consist of fans, heating (natural gas or propane) and cooling (Direct Expansion) coils, filters, mixing plenums, 100% modulating economizer, relief/exhaust section, access sections, refrigerant compressors, condensers and refrigerant piping.
     4. Condenser coil coating shall be one of the following:
        1. Surface treatment on aluminum fin on copper tubing or solid aluminum micro channel coils shall have a factory dipped process flexible epoxy polymer e-coat uniformly applied to all coil surface areas without material bridging between fins or channels. Coating process shall ensure complete coil encapsulation and a uniform dry film thickness from 0.8 – 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and a cross-hatch adhesion of 4B-5B per ASTM B3359-93. Impact resistance shall be up to 160 in/lb per ASTM D2794-93. Humidity and water immersion resistance shall be up to a minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to no less than 5,000 hours salt spray per ASTM B117-97.
        2. Surface treatment shall be ambient air temperature cured, inorganic film structures and shall not act as an insulating barrier to the substrate, which would inhibit or degrade heat transfer coefficients or increase energy consumption of the condenser. The dry film thickness shall be no greater than 8 microns. Pass ASTM G-21, with a zero (0) microbial spore growth development rating. The standard ASTM G-21 test must have been conducted by an accredited, third party, independent laboratory. Surface treatment shall meet or exceed 6,000 hours of corrosion protection using ASTM B117 testing protocols and conducted by an accredited, third party, independent laboratory.
     5. Unit casings: Double wall insulated with 1 inch thick and 1- ½” pcf density fiberglass and perforated sheet metal lining. Provide with hail guards to protect condenser coils in hail prone locations.
     6. Unit Efficiency: Unit Energy Efficiency Ratio (EER) and Integrated Part Load Value (IPLV) shall exceed ASHRAE 90.1 by minimum of 20%. This requirement may be reduced if there is no commercially available standard product of the type and capacity required that meets this requirement. If approved by the USPS, commercially available equipment shall be provided with the maximum efficiency available.
     7. Fans shall be double-width, double-inlet type with backwardly inclined or air foil blades.
     8. Sound Levels: Units shall be selected to provide acceptable level of HVAC generated noise within the facility.
     9. Condensate Pan: Provide under all cooling coil, humidifier, and fan sections; stainless steel, IAQ type.
     10. Access Doors: Provide an 18" wide, minimum, access door in each section of the unit.
     11. Filters: Prefilters: 2 inch thick, pleated type, 25 to 30% average efficiency (MERV 5).  
         Final Filters: 6 or 12 inch thick, cartridge type, 60 to 65% average efficiency (MERV 11).
     12. Antimicrobial treatment for filters in high humidity regions. High humidity regions are defined as regions where one or both of the following conditions occur:
         1. A 67° F. or higher wet-bulb temperature for 3000 or more hours during the warmest six consecutive months of the year.
         2. A 73° F. or higher wet-bulb temperature for 1500 hours or more during the warmest six consecutive months of the year.
     13. Controls: Native BACnet controller with room temperature sensor/control. Space sensors shall be located in the spaces served and shall be provided with a tamper proof covers.
         1. Economizer Control: For variable air volume systems, monitor and actively control amount of ventilation air provided to space.
         2. Low Ambient Controller: Cycles condenser fan to permit operation down to low temperature observed in project location.
         3. Dampers: Motorized, ultra low leakage with gasketing to seal to a maximum leakage rate of 1 percent of nominal airflow at 1 inch WC.
         4. Equipment Manufacturer shall furnish and install a direct digital control (DDC) and building automation system (BAS) controller as specified in Sections 250504, 251404, 251004, and 251504. The controller shall utilize electronic sensing and microprocessor-based digital control to perform the functions specified. The BAS and digital control and communications components installed shall be an integrated distributed processing system utilizing BACnet communication requirements as defined by ASHRAE/ANSI 135-2004 for all communication. System components shall communicate using native BACnet in accordance with the Standard and all current addenda and annexes, including all building controllers and application specific controllers. Gateways to other communication protocols are not acceptable. The following requirements apply:
            1. BACnet Building Controller Requirements:
     14. The BC(s) shall support all BIBBs defined in the BACnet Building Controller (B-BC) device profile as defined in the BACnet standard.
     15. BCs shall communicate over the BACnet Building Controller LAN.
     16. Each BC shall be connected to the BACnet Building Controller LAN communicating to/from other BCs.
         + 1. BACnet AAC(s) and ASC(s) Requirements:

1. The AAC(s) and ASC(s) shall support all BIBBs defined in the BACnet Building Controller (B-AAC and B-ASC) device profile as defined in the BACnet standard.
2. AAC(s) and ASC(s) shall communicate over the BACnet Building Controller LAN or the ASC LAN or sub-LAN.
3. Each AAC(s) and ASC(s) shall be connected to the BACnet Building Controller communicating to/from other BCs over a BACnet Building Controller LAN.
   * 1. Convenience Outlet: Provide one weather-proof 120-volt GFI convenience outlet mounted to the exterior of each unit.
     2. 3-Phase rooftop air handling units shall be provided with a Voltage Phase Monitor. Phase monitor shall provide 100% protection for motors and compressors against problems caused by phase loss, phase imbalance, and phase reversal. Phase monitor is equipped with an LED that provides an ON or FAULT indicator.
4. EXECUTION
   1. INSTALLATION
      1. Install in accordance with manufacturer’s instructions.

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**NOTE TO SPECIFIER**

Retain paragraphs below for RTUs requiring wind or seismic restraints.

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* + 1. Install wind and seismic restraints according to manufacturer's written instructions.
    2. Mechanical equipment, appliances, and supports that are exposed to wind shall be designed and installed to resist the wind pressures determined in accordance with the local Building Code.
    3. For High-Velocity Hurricane Zones, all rooftop equipment and supports shall be secured to the structure in compliance with the loading requirements of the local Building Code.

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**NOTE TO SPECIFIER**

Verify condensate drainage requirements of authorities having jurisdiction.

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* + 1. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain, roof leader, roof scupper, or area drain.
    2. Install flexible connections between fan inlet and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.
    3. Provide sheaves required for final air balance.
    4. Install backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.
    5. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.
  1. FIELD QUALITY CONTROL
     1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
     2. Tests and Inspections:
        1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
        2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
        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.
     3. Remove and replace malfunctioning units and retest as specified above.
  2. CLEANING AND ADJUSTING
     1. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022