

SECTION 23 74 00**PACKAGED OUTDOOR HVAC EQUIPMENT****PART 1 - DESIGN DIRECTIVES****1.1 DESIGN CRITERIA**

- A. Dartmouth College does not have natural gas on campus. All units requiring gas shall be Liquefied Petroleum (LP) gas.
- B. Mechanical consultant shall coordinate with the structural consultant, generally it is the intent that the roof curb be supplied by the unit manufacturer or an independent roof curb manufacturer that specializes in the manufacture of custom roof curbs.
- C. Where practical for the application, the consultant shall include the economizer option.
- D. In critical applications, provide units with hot gas bypass controls.

1.2 QUALITY ASSURANCE

- A. Gas-fired furnace section construction shall be in accordance with AGA safety standards. Furnace section shall bear the AGA label.
- B. Comply with the latest applicable ARI standards, and ASHRAE Standard 15 "Safety Code for Mechanical Refrigeration".
- C. Provide packaged heating and cooling units that are UL-listed and labeled.
- D. Electrical components, devices and accessories listed and labeled as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.
- E. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 – Systems and Equipment and Section 7 – Construction Startup.

1.3 SCHEDULING AND SEQUENCING

- A. Coordinate installation of roof mounting curb with roof structure.
- B. Coordinate roof opening locations and for mechanical and electrical connections.

1.4 SPECIAL WARRANTY

- A. Provide 5 years written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, motors/compressors with inadequate or defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only and does not include labor for removal and reinstallation.

PART 2 - PRODUCTS**2.1 ROOFTOP UNITS**

- A. Subject to compliance with requirements, provide rooftop units of one of the following manufacturers:
 - 1. AAON, Inc.
 - 2. Carrier Corp
 - 3. McQuay International
 - 4. York International Corp.
- B. Units shall be factory-assembled and tested, designed for roof or slab installation, and consisting of compressors, condensers, evaporator coils, condenser and evaporator fans, refrigeration and temperature controls, filters, and dampers.
- C. Manufacturer's standard casing construction, having corrosion protection coating, and exterior finish. Casings shall have removable panels or access doors for inspection and access to internal parts, a minimum of 1" thick thermal insulation, knockouts for electrical and piping connections and an exterior condensate drain connection and lifting lugs.
- D. Roof curbs shall be manufacturer's standard construction, insulated and having corrosive protective coating, complete with factory-installed pressure treated wood nailer.
- E. Evaporator fans shall be belt-driven, centrifugal fans with adjustable sheaves.
- F. For smaller units, typically <3500 CFM and/or 2" of external static pressure, filter section shall include the following:
 - 1. Fans shall be designed to handle Filter section with MERV 13 even if it may be used with MERV 8.
- G. For larger units, typically >3500 CFM and/or >2" of external static pressure, filter section shall include the following:
 - 1. Fans shall be designed to handle Pre-filter section with MERV 8 and Final-filter section with MERV 13.
- H. Condenser fans shall be propeller-type, direct-driven fans with permanently lubricated bearings.
- I. Refrigerant cooling coils shall have an equalizing-type vertical distributor to ensure each coil circuit receives the same amount of refrigerant. Coils shall be leak tested (300 psig) with air pressure under water, then cleaned, dehydrated, and sealed with a holding charge of nitrogen.
- J. Compressors shall be serviceable, semi-hermetic or scroll type, complete with integral vibration isolators and crankcase heaters. Manual reset type safety controls for low-pressure cutout, high pressure cutout, compressor motor overload protection, and five-minute anti recycling time delay. Provide cylinder unloaders when available.

- K. Provide manufacturer's standard construction for gas-fired heat exchangers and burners. Controls shall include redundant gas valve, intermittent pilot ignition, electronic spark ignition system, high limit cutout, and forced draft proving switch.
- L. Economizer control shall consist of return and outside air dampers, fully modulating electric control system with enthalpy control, and adjustable mixed air thermostat. System shall have 100% outside air capability. Provide automatic changeover through adjustable enthalpy control device or through the ATC system.
- M. All units shall have ambient control designed to operate at temperatures down to 0° F.
- N. For smaller units, typically <3500 CFM and/or 2" of external static pressure, filter section shall include the following:
 - 1. Final filters shall be MERV 8, based on ASHRAE 52-76 and ASHRAE Standard 52.2 test procedure.
 - 2. Filter section shall be capable of handling MERV 13, based on ASHRAE 52-76 and ASHRAE Standard 52.2 test procedure.
- O. For larger units, typically >3500 CFM and/or >2" of external static pressure, filter section shall include the following:
 - 1. Pre-filters shall be MERV 8, based on ASHRAE 52-76 and ASHRAE Standard 52.2 test procedure.
 - 2. Final filters to have an average efficiency of MERV 13, as measured by ASHRAE Standard 52-68 and ASHRAE Standard 52.2. Initial resistance not greater than 0.65" of W.G. at 500 feet per minute face velocity.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Rig rooftop units to comply with manufacturer's rigging and installation instructions for unloading rooftop units and moving them to final location.

3.3 INSTALLATION

- A. Install and secure rooftop units on curbs and coordinate roof penetrations and flashing and in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.
- B. Refer to DC Standards, section 25 0510 "HVAC Basic Mechanical Materials and Methods" for filter installation requirements.

3.4 EXTRA MATERIAL

- A. Furnish to Owner, with receipt, ONE set of matched fan belts for each belt-driven fan and ONE set filters for each unit.

END OF SECTION 23 74 00