SECTION 23 74 33

DEDICATED OUTDOOR-AIR UNITS

1.0 GENERAL

1. DESCRIPTION
   1. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.
   2. This Section 23 74 33 and the accompanying drawings cover the provision of all labor, equipment, appliances and materials, and performing all operations in connection with the construction and installation of the air handling units as specified herein and as shown. This work includes, but is not limited to, the following:
      1. Factory-assembled outdoor air handling unit including curbs and accessories.
      2. Matched motor.
   3. Air handling units shall be completely factory-assembled and rooftop curb mounted. Only one electrical power connection shall be required for each unit.
   4. Units shall be UL listed and certified in accordance with AHRI 430.
2. INTENT
   1. It is the intent of this Section of the specifications to provide complete, operable, adjusted outdoor air handling units, as shown and specified, which operate efficiently and automatically, and are free of leaks, excessive noise and vibration.
3. SUBMITTALS
   1. Product Data: Submit manufacturer's technical product data for each scheduled piece of equipment. Product data shall be clearly marked to indicate which model is being submitted. Product data shall include the following:
      1. Dimensions
      2. Operational and service clearances required
      3. Operational and shipping weights
      4. Furnished options and accessories
      5. Control diagrams clearly differentiating between portions of controls that are factory-furnished and/or installed and controls that are field-furnished and/or installed.
      6. Electrical wiring diagram clearly differentiating between portions of factory and field wiring.
      7. Installation instructions
      8. Start-up instructions
4. QUALITY ASSURANCE
   1. Codes and Standards:
      1. Dedicated outside air units must be AHRI Certified, bear the AHRI Certification symbol, and be listed in the AHRI 1060 directory of Certified Air-to-Air Energy Recovery Ventilation Equipment. Ratings “in accordance with AHRI 1060” or “ratings independently certified” without AHRI Certification are not acceptable.
      2. Dedicated outside air units shall bear the AMCA Certified Ratings Seal for air performance.
      3. Dedicated outside air units be designed, manufactured, and tested in accordance with UL requirements and listed by UL or ETL and have UL o ETL label as a unit.
      4. Insulation shall meet NFPA 90A and 90B and ASTME 84 requirements for flame spread of 25 or less and smoke development of 50 or less.
      5. \*\*Coils shall be Recognized Components for ANSI/UL 1995, CAN/CSA C22.2 No 236.05. DX and water coils shall be AHRI Certified per Standard 410-2001.
5. DELIVERY, STORAGE, AND HANDLING
   1. Handle equipment and components to prevent damage. Replace damaged equipment or components with new.
   2. Store equipment and components in clean dry location, off the ground and protect from weather, water, and physical damage.
   3. Rig and place equipment in accordance with manufacturer's instructions.
6. COORDINATION
   1. Coordinate roof opening locations and installation of roof mounting curb with structural.
   2. Coordinate electrical connections with Electrical Contractor.
7. WARRANTY
   1. Dedicated outside air units shall be warranted to be free from defects in material and workmanship for a period of one (1) year from the purchase date. The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of five (5) years from the purchase date. \*\*Coils and heat exchangers are warranted to be free from defects in material and workmanship for a period of one (1) year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at Manufacturer’s option by their factory, transportation prepaid. The Motor Manufacturer warrants motors for a period of one (1) year. Should motors furnished by the Manufacturer prove defective during this period, they should be returned to the nearest Authorized Motor Service Station. The Manufacturer will not be responsible for any removal or installation costs.
8. SPARE PARTS
   1. Furnish to Owner, with receipt, the following spare parts for each energy recovery unit (place in a location determined by the Owner):
      1. One set of matched fan belts for each belt-driven fan.
      2. One set of wheel belts for each energy recovery wheel.
      3. One set of replacement filters.

2.0 PRODUCTS

1. ACCEPTABLE MANUFACTURERS
   1. The basis of design is as scheduled. Acceptable substitute manufacturers include Greenheck, Valent, AnnexAir, Trane, Daikin, Addison, RenewAire, and Captive-Aire, provided all substitution requirements are met.
2. OUTSIDE AIR UNITS
   1. General Description: Units shall be UL listed and bear the UL label. Energy transfer ratings shall be AHRI Certified. Ventilators shall bear the AMCA Certified Rating Seals for air performance. Performance shall be as scheduled on plans. Outdoor air shall not mix with exhaust air in a common plenum. Exhaust discharge and outside air intake shall not be located on the same side of the roof top units.
   2. Casing and Frames: Unit shall be of internal frame type construction of galvanized steel. Frame and panels shall be G90 galvanized steel. All panels exposed to the weather shall be a minimum of 18 gauge galvanized steel. Where top panels are joined there shall be an overlapping, standing seam to insure positive weather protection. All metal-to-metal seams shall be factory-sealed, requiring no caulking at job Site. Finish shall be standard paint as selected by the Architect. Finish shall have 2,500 hour salt-spray rating per ASTM B117 and ASTM D610 with no observable signs of rust or blistering. Unit base to be designed for curb mounting. Unit base shall over hang the curb for a positive seal against water run-off.
   3. Weatherhoods: Weatherhoods shall be of the same finish as the unit. Outdoor air weatherhood shall incorporate a louvered design and moisture eliminator. Weatherhoods shall be tested in accordance with AMCA Standard 500-L to prevent water penetration up to 3 in/hr at 29 mph.
   4. Access Doors: All components shall be easily accessible through removable doors for supply, filter and damper compartments. Access doors shall be insulated and hinged or removable. Access doors shall be minimum of 18 gauge, galvanized G90 steel or painted galvannealed steel.
   5. Insulation: Unit casing to be insulated with 2-inch R-13 fiberglass or foam. Insulation shall meet requirements of NFPA 90A and tested to meet UL 181 erosion requirements. Insulation to be enclosed in double wall construction. Insulation shall provide full coverage of entire exterior including walls, roof, unit base, doors, etc. Insulation shall meet NFPA 90A and 90B, and comply with UL 181.
   6. Roof Curbs: Roof curb to be supplied by Unit Manufacturer for field assembly. Curb shall consist of die formed galvanized steel sections. Curb shall be full perimeter type with gasketing provided for field installation between curb and unit base.
   7. Fans Sections: \*\*Centrifugal fans to be double width, double inlet, single fan forward curved type. \*\*Fan shall be direct drive, airfoil plenum type. All fans shall be statically and dynamically balanced. Fans shall be factory-tested for flow rate, pressure, power, air density, rotation speed, and efficiency in accordance with AMCA 210. Ground and polished steel fan shafts shall be mounted in permanently lubricated, sealed ball bearing pillow blocks. Bearing shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged operating speeds. Separate motors for exhaust and supply blowers shall be provided. Adjustable sheaves on belt-driven fans with motors less than 10 HP shall allow independent balancing of exhaust and supply airflows. Fan and motor assemblies are mounted to unit base with neoprene isolators as standard.
   8. Motors and Drives: Motors shall be NEMA Premium, complying with EPACT standards, for single speed ODP and TE enclosures. Motors shall be permanently lubricated, heavy-duty type, matched to the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast type, keyed and securely attached to the fan wheel and motor shafts; 10 horsepower and less shall be supplied with an adjustable drive pulley. Energy wheel motors and direct drive motors shall have integral overload protection.
   9. Filters: Unit shall have permanent aluminum mesh filters located in the outside air intake and shall be accessible from the exterior of the unit. Supply and exhaust filters shall be \*\*2 inch thick pleated fiberglass, 30% efficient and tested to meet UL Class 2. Filter racks shall be die formed galvanized steel. \*\*MERV 13 minimum.
   10. \*\*Cooling Coil: Direct expansion (DX) and chilled water coils shall be factory-tested and rated in accordance with AHRI 410. Coils shall have copper tubes with permanently expanded aluminum fins, 12 fpi or less. DX coils shall be equipped with distributors to receive expansion valves at the liquid connections. DX coils shall include stainless steel drain pan. Dual circuit cooling shall have intertwined face evaporator coil. The refrigerant compressor(s) shall be \*\*digital hermetic \*\*scroll-type and shall be equipped with liquid line filter drier, TXV(s), manual reset high pressure and low pressure cutouts, and all appurtenant sensors, service ports, and safety devices. Refrigerant system shall be fully charged with R-410A refrigerant. Each compressor shall be factory-equipped with an electric crankcase heater.
   11. \*\*Electric Heat: Electric heat shall be UL listed and circuit fused per NEC over 48 amps. Heater shall be multi-step control, factory-wired and installed. Control will be 24 volt with class 2 transformer. Standard air flow switch to shut down heater if air ceases to flow across heater.
   12. \*\*Gas Furnace: Furnace shall be indirect fired. Furnace shall be ETL Certified as a component of the unit and for installation downstream of cooling coil. Furnace shall have fault sensors, tubular heat exchanger constructed of Type 409 stainless steel and installed on the vest plate by means of swaged assembly. Welded connections between the tubes and vest plate are not acceptable. Tubes shall be supported and also permit expansion and contraction. Furnace shall be \*\*12:1 modulating.
   13. Electrical: All internal electrical components shall be factory-wired for single point power connection. All electrical components shall be UL Listed, Approved or Classified where applicable and wired in compliance with the National Electrical Code.
   14. Accessories: Provide powered 115 volt GFI receptacle, factory-provided. Coordinate with Division 26.
   15. Outside Air Damper: A motor-operated outside air damper, interlocked to the unit operation, shall be provided and installed in the outside air intake ductwork.
   16. Controls: \*\*Unit shall function as a stand-alone system controlled by factory-supplied controllers, thermostats, and sensors. The unit shall be controlled by a factory-installed microprocessor programmable controller. Unit shall have an intergral LCD screen, built-in keypad to access read-outs without ancillary equipment, devices, or software. Controllers that require equipment of software that is not factory-installed is not acceptable. Setpoints, alarms, etc. shall be accessible via LCD screen and keypad.
   17. Controls: \*\*Unit shall be controlled by the building EMS. Provide and install appropriate control card, sensors, etc. as required. Controls for this unit as needed shall be part of this scope.

3.0 EXECUTION

1. INSTALLATION, EXAMINATION AND COORDINATION
   1. The outside air unit and associated controls shall be installed in strict accordance with the manufacturer's recommendations. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.
   2. Automatic shutdown controls shall be provided to meet local codes (or NFPA 90A as a minimum) and shall consist of firestats and/or duct-mounted smoke detectors interlocked to the unit for shutdown on the detection of fire or smoke. Units having airflows of over 15,000 CFM shall be provided with smoke dampers on the entering side of the filter section to close on unit shutdown.
   3. The associated control system shall be completely wired under this Division 23. Wiring shall be in accordance with the NEC and shall meet all requirements for this installation.
   4. \*\*The coil vent shall be provided with a manual, valved vent and the coil drain shall be provided with a blow-down valve with male hose threads.
   5. The condensate drain piping shall be complete with a drain trap constructed with sufficient head (vertical distance between inlet and outlet of trap) to drain throughout the units' operating range.
2. CONNECTIONS
   1. Install piping and ductwork to allow service and maintenance.
3. CLEANING
   1. After completing system installation and testing, inspect exposed finishes. Clean and remove burrs and construction debris; repair damaged finishes. Comb any flattened or bent coils.
   2. Vacuum equipment interior to remove foreign material and construction dirt and dust. Vacuum clean fan wheel, fan cabinet, and coils.
4. FIELD QUALITY CONTROL AND TESTING
   1. Operational Test: Upon completion of inspection, testing, and startup, test system for proper operation and system capacity. Repair malfunctions and/or replace components. Re-test equipment until proper operation is achieved. All testing scheduling shall be coordinated with the Owner and Commissioning Agent. Provide testing documentation to Owner and Commissioning Agent.
   2. \*\*Modular units shall have field-pressure test performed by the Manufacturer at substantial completion of the equipment installation. Pressure test shall meet the Manufacturer’s requirements and shall be submit with the close-out information.
5. START-UP
   1. Provide services of a factory-trained Representative to start-up equipment. Contractor shall assist and cooperate with factory Representative as required. Coordinate start-up with TAB & Controls SubContractors. Start-up equipment in accordance with manufacturer's instructions. Refer to Division 23, "HVAC Test and Balance" for additional start-up procedures.
   2. Insure filters are installed prior to initial start-up; do not start-up or operate equipment without filters in-place. Filters shall remain in place through the duration of construction.
   3. Provide and install new filters upon turn-over to Owner.
   4. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
6. TRAINING
   1. Provide services of Manufacturer's Service Representative to instruct Owner's personnel in operation and maintenance of rooftop air handling units. Training to include start-up and shut-down, servicing and preventative maintenance schedules and procedures, and troubleshooting procedures, and procedures for obtaining replacement parts and technical assistance. Review operating and maintenance data contained in the Operating and Maintenance Manuals specified in Division One. Schedule 4 hours of training with Owner; schedule at least 7-days prior notice.
7. DEMONSTRATION
   1. After completion of inspections, installation, and testing, Contractor shall perform the following demonstration inspections and tests in the presence of the Owner and Commissioning Agent. Refer to Division 23, "Basic Mechanical Materials and Methods", for scheduling and coordination of demonstrations.
      1. Verification of proper installation
      2. System functional and safety tests
      3. System operational tests

END OF SECTION