

23 70 00 Central HVAC Equipment

Revision 01/04/2019

Purpose:

The Architect and/or Engineer shall incorporate the Rice specific requirements indicated in this standard's section into their design. The Architect and/or Engineer shall further produce project specifications in line with industry standards that are updated to reflect these Rice specific requirements.

1. General Design Standards

- a. Interior Unit Construction: Draw-Thru Thru with mixing box, filters, coils, access sections, Dual Direct Drive Fans, pre-filters, discharge plenum with factory cut openings, 6" minimum high base rails and a note that the design TSP "WG must be coordinated with base rail concrete housekeeping pad and unit duct connections, and overall height of unit within indoor space.
- b. Exterior Unit Construction: With mixing box, filters, coils, access sections, fans, pre filters, discharge plenum, weather tight piping vestibules for each exterior piping connection e.g., pre-heat, cooling or reheat coil and/or humidifier connections as scheduled, 14" high insulated roof curb, weatherized construction with sloped roof and drip lip edges, rain tight doors, OA intake hood with bird screen, mist eliminators, modulating dampers, weatherproof electrical components and conduit, Unless Noted Otherwise; Specification notes for interior units apply to exterior units.
- c. Outdoor design temperature shall be most recent edition of ASHRAE weather data for Hobby Airport with 99% heating and 1% cooling categories used. Indoor temperature shall be per 01 05 00 Environmental Standards.
- d. New building construction shall be configured to allow for replacing the entire central station air handlers (in section break) without major demolition and new work.
- e. Hot Deck/Cold Deck systems are not permitted.
- f. Use variable flow rate systems. If special circumstances warrant constant flow, then attain Rice Project Manager's approval prior to the initiation of design work.
 - i. Variable flow shall be attained through the use of variable frequency drives on the fan motors.
- g. Fusible disconnect switches shall not be used on any system or unit. Circuit breaker only.
- h. Casing should be supported by structural steel rails.
- i. Units shall be double walled, 3" thick with painted 16 GA external casing metal gauge. G-90 Galvanized, 20 GA internal casing metal gauge (solid panel). Perforated finish 22 GA in Fan sections for attenuation.
 - i. Internally insulated air units shall have fully cleanable internal surfaces.
 - ii. All casing penetrations must be factory cut. No field cut penetrations allowed.

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- j. Cooling and Heating Coils
 - i. All Coil tubes shall be seamless copper, 5/8" nominal OD with 0.035" wall thickness minimum.
 - ii. Cooling Coil Construction:
 - 1. Casing - 16 GA, 316 stainless steel
 - 2. Fins – 0.0008" fin thickness, aluminum (max of 8 FPI)
 - iii. Heating Coil Construction:
 - 1. Casing – 16 GA Galvanized Steel
 - 2. Fins – 0.0008" fin thickness, aluminum (max of 8 FPI)
 - iv. Where multiple coils are used in air units, ensure that 24" minimum access section is employed between coils. Each side of coils will be accessible through hinged doors.
- k. Air Quality
 - i. Units shall have stainless steel drain pans, coil housings and filter racks.
 - ii. UVC lights are required
 - 1. Manual switch on exterior of unit in addition to door interlocks
- l. Floor units wider than sixty inches should be reinforced for "walk-in" accessibility.
 - i. Access space between coils should be increased based on unit width. "True walk-in" units should have internal LED lights.
 - ii. Walking surface to be aluminum diamond plating.
- m. Unit structure must be un-effected when the coil or modular section is removed.
- n. Air units designed for exterior or ventilated mechanical room applications must have "no through metal" design to prevent condensation on unit exterior.
- o. Rice prefers larger buildings to have dedicated outdoor air handling units that serve the buildings' air handling units
 - i. Outside air handling units must have
 - 1. Freeze stats with alarming to BMS
 - 2. A method to assure freeze protection
 - a. Non-lab buildings - automated inlet dampers which are hardwired to the freeze thermostat and motor starter. Dampers will provide feedback proof of open to start fan
 - b. Lab Buildings – control to cause full flow to preheat and/or chilled water coils.
- p. Central station air handlers will have temperature sensors prior to the first coil and after every subsequent coil and on the discharge.
- q. Drain Pans
 - i. Drain pans to be provided in filter sections (only required for Outside Air Handlers. This shall be a "Wash Down" floor with up-turned edges and shall have a "floor drain"), heating coil and cooling coils.
 - ii. Minimum drain pan gauge: 16 GA
 - iii. Galvanized drain pans for heating coils only, 316 Stainless Steel drain pans in all cooling coil sections.

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- iv. Provide overflow switch in pan connected to alarm in BMS
- r. Fans
 - i. Shall be direct drive, draw-thru type plenum fans. Minimum two fans per unit. Fan wheels shall be Class 3, aluminum construction with welded blades.
 - ii. Fan redundancy shall be N+1 with one fan off, the remaining fan or fans shall produce at least 70% of design air flow at the reduced static pressure per "fan laws".
 - iii. Fan isolation shall include rubber isolation pads and fan balance to AMCA 204-96 Category BV-5.
 - iv. Fan Accessories: Backdraft Dampers (Two Position motorized or net-zero system effect) except on fans with vertical inlets which will require standard electrically operated dampers and actuators. Spare fan/wheel assembly per unit size, integral fan discharge silencer, Air Flow Monitoring Station in Fan Inlet (single probe), tapered hub connection to motor shaft (set screws are not acceptable) and powder coated or aluminum fan inlet cones (no galvanized or painted metal.)
 - v. FanWall systems acceptable upon Rice approval.
- s. VFDs
 - i. BAS Communication Card (BACnet)
 - ii. Line Filters
 - iii. Single VFD per Fan Array
 - iv. Factory Mounted and Wired with start-up service and 1-year labor warranty.
 - v. Current sensors with remote output signal.
 - vi. See section 26 29 23 Variable Frequency Motor Controllers for more information.
- t. Motors
 - i. Shall be premium efficiency (inverter duty), VFD rated and Totally Enclosed Air-Over (TEAO), or Totally Enclosed Fan-Cooled (TEFC)
 - ii. Shaft grounding system factory installed with full-size independent ground wire for each motor run to motor overload panel.
 - iii. All motors to be factory wired to J-Box or motor overload panel on exterior of unit.
- u. Access Doors
 - i. Installed on all sections (one side only)
 - ii. Min 24" door with 20" clear opening. 72" high or full height of unit.
 - iii. Min 10"x10" viewing window with UV rated safety glass.
 - iv. Double gaskets on all doors, adjustable stainless steel hinges (3 planes). No piano hinges allowed.
 - v. Stainless steel latches with operable internal handles.
- v. Motor bearing lube lines shall be copper and extended to exterior of units.