

FAN COIL UNITS

DESIGN & INSTALLATION

1. Summary

a. Section Includes:

- Laboratory Fan Coil Units
- Small AHUs
- Office Fan Coil Units

2. Design Requirements

- a. Design Fan Coil units to be installed above corridor ceilings if at all possible.
- b. Include in contract documents a requirement for contractor to provide a mock up on an installation of a fan coil unit prior to installation of all units for facilities to review before moving forward
- c. Access
 - Project shall be designed such that there is a minimum of 30 inches clearance on one side of the fan coil unit for maintenance access and filter changing. Fan coil maintenance access shall not be located above lab benches, equipment, etc.
 - Drawings shall indicate the location of service clearance and shall illustrate that the clearance requirements to be maintained.
 - Access doors and panels that are removable without tools shall be provided at all maintenance access points.
 - Fan coils shall not be installed:
 1. More than 2 feet above ceiling.
 2. Above sensitive lab equipment.
 3. Above piping, duct, sprinkler heads, communication racks, electrical conduit, etc., if any part of the unit requires access from the bottom of the unit.
 - Fan coil unit VFD's
 1. Shall be accessible.
 2. If VFD's are to be installed on fan coil to be used as disconnecting means. If installed remote, VFD's to include auxiliary contacts to shut down if fan coil disconnect is de-energized.
 - Filters
 1. Standard 20x20 and/or 24x24 filters shall be included. If deviated from this size, they shall be another standard size and discussed with facilities during design. Provide an external filter rack if necessary to allow for standard filter sizing.
 2. All filter removal/replacement access shall be coordinated in the ceiling and approved by facilities.

3. Filter racks shall be slide out type. "L" bend sheet metal where filters are lifted up and out are not allowable.
 4. Filter return grilles are acceptable and should be discussed with facilities during design.
- d. Fans
- Provide fans with direct drives.
 - Direct drive fans with variable speed drives for capacity control are preferred.
 - Variance from this requirement must be approved in writing by the University.
 - Belt driven fans are not allowable.
 - ECM motors are not allowable.
- e. Fan coil unit cooling coils shall have stainless steel frames and tube supports. Heating and cooling coils shall have fin spacing no greater than 10 fins per inch.
- f. Fan coil unit casings shall be double wall insulated, minimum.
- g. Controls
- Building automation via direct digital control shall be provided for laboratory fan coil units.
 - Fan coil controls shall include:
 1. Fan start/stop
 2. Fan speed command
 3. Fan status (via current transducer)
 4. Modulating cooling valve command
 5. Modulating heating valve command (where applicable)
 6. Discharge air temperature.
 - Shall have 2-way control valves.
 1. See also DDC controls section.
 2. Access to valves shall be coordinated.
 3. Valves shall be located such that there are no piping or valves over the fan coil control panel or other electrical equipment.
 4. The use of threaded ball valves with stainless steel ball to be used on the supply and return.
 5. Ball valve needs to be located on the upstream side of the circuit setter.
- h. Condensate
- Provide vent and drain at high and low point respectively.
 - Coil shall be guaranteed to drain.
 - Drain shall include a hose end connection.

- Condensate alarms and shutdown to be included where fan coil located above ceilings or sensitive equipment. Fan coils shall not have condensate pumps. These are only allowable if approved by facilities.
 - Include level sensor in unit condensate pan with remote audible/visual alarms to indicate failure and shutdown unit. Where units serve critical spaces, provide two elevations of sensors so that the first elevation can alarm facilities before there is an overflow shutdown(if allowable)
 - Condensate drain location and material shall be confirmed on a project basis.
 - Minimum size of condensate drains is $\frac{3}{4}$ ".
 - Condensate drain shall not be routed exposed except where approved.
- i. Noise criteria of the fan coil shall be evaluated for each application. The spaces near the fan coils shall not have greater than 35NC from the radiated sound or the discharge sound thru the duct.
- j. Piping
- All piping, valves and other specialties shall be fully insulated up to the fan coil units. Drain pans are not to be used in lieu of insulation. See also Insulation section.
 - Flexible piping connections to fan coils are allowable. The flexible piping shall be insulated. Piping Valve packages by Nexus are allowable for connections at fan coil units. All piping, valves and flexible piping shall be insulated.
 - Any valve packages with flex hoses shall have piping supports at the hose and pipe connection so when hose is disconnected, piping remains supported and free of movement.

3. Related sections

- a. Variable Frequency Drives
- b. Insulation
- c. Identification

EQUIPMENT and PRODUCT REQUIREMENTS

1. Manufacturers

- a. Approved Manufacturers subject to compliance:
- Daikin
 - Trane
 - Johnson Controls
 - MagicAire
 - Temtrol (Custom units may be required on retrofit applications where size and access need to be flexible)

2. Unit Casings

- a. General Fabrication Requirements for Casings:

- Forming: Form walls, roofs, and floors with at least two breaks at each joint.
 - Casing Joints: Sheet metal screws or pop rivets.
 - Sealing: Seal all joints with water-resistant sealant.
 - Factory Finish for Steel or Galvanized-Steel Casings: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 - Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- b. Casing Insulation and Adhesive:
- Units shall be double wall. Perforated liner not allowable.
 - Materials: Exterior casing shall be minimum 18 Ga G90 galvanized sheet metal. Interior casing shall be minimum 20 Ga G90 galvanized sheet metal. Insulation shall be 1-1/2 lb per cubic feet density high density fiberglass or foam insulation.
- c. Inspection and Access Panels and Access Doors:
- Panel and Door Fabrication: Formed and reinforced double-wall and insulated panels of same materials and thicknesses as casing.
 - Inspection and Access Panels:
 1. Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against air-pressure differential.
 2. Gasket: Neoprene, applied around entire perimeters of panel frames.
 3. Size: Large enough to allow inspection and maintenance of air-handling unit's internal components.
 - Access Doors:
 1. Hinges: A minimum of two ball-bearing hinges or stainless-steel piano hinge and two wedge-lever-type latches, operable from outside. Arrange doors to be opened against air-pressure differential.
 2. Gasket: Neoprene, applied around entire perimeters of panel frames.
- d. Condensate Drain Pans:
- Fabricated with two percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers and to direct water toward drain connection.
 - Double-wall, stainless-steel sheet with space between walls filled with foam insulation and moisture-tight seal.
 - Drain Connection:
 1. Located at lowest point of pan and sized to prevent overflow.
 2. Terminate with threaded nipple on one end of pan.
3. Fans

a. Refer to Fans Design Guide

4. Coil Section

a. General Requirements for Coil Section:

- Comply with ARI 410.
- Fabricate coil section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
- Cooling coils shall be provided with stainless steel frames and tube supports.
- Coil fin spacing shall not exceed 10 fins per inch.

5. Air Filtration Section

a. General Requirements for Air Filtration Section:

- Comply with NFPA 90A.
- Provide minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
- Filters shall be disposable filters, minimum of nominal 2" thickness, MERV 8, no less than 15 pleats per foot.
- Provide filter holding frames arranged for flat orientation, with access door on one side of unit.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK