

237000 Centralized HVAC Equipment

Sections Included In This Standard:

1.1 AIR HANDLING UNITS WITH COILS

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A. GENERAL

1. Intent of Standard: The intent of this standard is to minimize required maintenance, provide access for maintenance, ensure compatibility with central chiller plants, promote energy efficiency and provide long-lasting equipment.
2. Design Calculations: Provide engineering calculations to the UF Project Manager on size of unit selected when requested.
3. Acceptable Manufacturers: Carrier, Trane, York, Temtrol, and McQuay.
4. UV Lights: All new air handlers are required to be equipped with appropriately sized UV lights. Any exception to the installation of UV lights is at the Facilities Services discretion and needs to be approved in writing. Safety interlock power switches to automatically disengage power to UV lamps shall be installed on all air handler panels or doors accessing the UV lights-section when the panel or door is opened; install identifying labels at the safety interlock switches. If the dedicated breaker is more than 15 feet from the air handler unit, a power disconnect shall be installed and labeled with air handler (#UV Light Disconnect). This shall be in plain view and within sight of the air handler unit. Label disconnect with all connecting circuits. Install signage on all entries to air handlers where openings contain UV lights stating "this unit contains UV lighting system – disconnect all power sources before opening or entering" and the location of electrical power disconnect and corresponding numbers representing breaker panels and breaker numbers that are associated with the dedicated UV light circuit. Each lamp/ballast shall have a corresponding number and location schedule posted on the air handler to identify lamp/ballast placement within the unit and it will provide warranty dates. Each lamp/ballast shall be warranted to produce UVC light at a wavelength of 200-280 Nanometer within its warranty period. It is recommended that each Lamp Ballast be mounted on the outside of the AHU, inside of an approved enclosure for ease of access for replacement.
5. Fan **arrays walls** are preferred over units with one single large fan.
 - a. Preferred motor size for fan **arrays walls** is no more than 10 hp
6. Internal hoist rails shall be installed in all AHU's with motors 10 hp or more.

B. ACCESS TO AIR HANDLING UNITS

1. Service Clearance: Adequate clearance shall be provided for all service, repairs and component replacement. For new buildings, the unit shall be placed such that the

service personnel can freely walk to at least three sides of the unit. For renovations the unit arrangement shall be reviewed with Facilities Services.

2. Access Panels and Doors: All components (such as filters, motors, belts) requiring regular service shall be accessible without disassembly of the unit. Provide hinged access panels for filter and motor access. Hinged doors shall be able to fully open. Captive fasteners are acceptable for flat filter access. Provide hinged doors (with windows) for coils, fan, and air plenum that are large enough for easy access.
3. Devices: Each section of an Air Handling Unit meant for access by service personnel shall be provided with at least one light fixture, switch and receptacle. Circuiting for such devices should be separate from other building loads. Switches should be external or other means provided to indicate lamps are left on.
4. Floors: Floor spaces inside the AHU between coils and filter banks shall be aluminum or stainless steel diamond plate to prevent rusting and a safe non-skid area.

C. AIR HANDLING UNIT CASING

1. Casing Material: Casings shall be galvanized sheet steel.
2. Casing Construction: Units shall have double wall construction and with an inner steel liner. All galvanized, stainless, or approved coating.

D. AIR HANDLING UNIT INSULATION

1. Type: Provide fiberglass insulation complying with NFPA 90A, a minimum of one inch thick and 1 1/2 pcf.
2. All components, including zone damper sections, require insulation.

E. COILS AT AIR HANDLING UNITS: Below are specific requirements relating to air coils at air handling units.

1. Preheat Coils: Provide preheat coils on all units with more than 30% outdoor air, and elsewhere as required and protected by a freeze stat.
2. Requirements for Cleaning:
 - a) Provide a minimum of 2 feet of clearance between coil faces of both heating and cooling coils for steam cleaning access.
 - b) All construction shall be double wall with access doors to each section for access to power clean both sides of the coils.
 - c) Install all hard surfaces in air handlers and duct systems to accommodate mechanical cleaning and biocide treatment.
 - d) A potable water hose bib, 208 volt single phase 20 amp power supply and a 110 volt single phase outlet shall be located within 50 feet of the coils to accommodate a pressure cleaner and other equipment.

3. Air Velocity Across Coils: Coil face air velocities must be limited to 450 FPM; this shall allow an increase in airflow without replacing the coils (or the entire air handling unit).
4. Coiling Coils Design: Refer to Division 230500, section 2A for Local Outdoor weather design conditions.

F. AIR HANDLING UNIT DRAIN PANS

1. Provide stainless steel, double wall, insulated drain pans that are sloped for positive drainage.
2. Provide pans under coil, fan, and humidifier sections.
3. Provide intermediate pans and copper drop tubes for stacked coils.
4. Drain pans shall be drained by a trapped, insulated copper drainpipe that remains the full size (diameter) of the drain pan connection to the sanitary sewer system connection. Connection to the storm water system is not allowed. PVC drains are not acceptable.
5. Drain pans shall be designed for easy access and maintenance.
6. Drain pan shall extend from upstream of the coil face continuously to 3 feet downstream of the coil.
7. Cooling coil drain pans shall be positively sloped with multiple drain connections and piping.

G. AIR HANDLING UNIT FANS AND DRIVES

Fan **Array wall** technology shall be considered wherever continuous operation, ease of maintenance, energy-savings and size of air handlers justify the use of fan wall technology. Difference in life-cycle cost between fan wall technology and non-fan wall technology shall be developed using 10-year basis when fan wall technology is not recommended by the Consulting Engineer.

1. Airfoil fans or backward curve fans are preferred. Select fans for high efficiency.
2. Provide high efficiency, inverter duty motors. (Refer to Section 262000 for the requirements relating to electric motors.)
3. **Larger fan sets, (when approved) shall include heavy-duty belts and sheaves selected for a 1.5 safety factor. The use of synchronous belts Polychain drives** requires Facilities Services approval.
4. Provide externally accessible lubrication fittings.
5. Provide 200,000-hour bearings.
6. Provide spring type vibration isolation.

- a. For fan array applications where motors are 5 hp or less non spring type vibration isolation can be considered.
7. Provide variable frequency drive on 3 Horsepower and larger motors.
 - a. For fan array applications (any air handler where there are 2 or more fan motors) it is preferred to have a vfd per fan motor. At a minimum there must be 2 separate vfd's to provide redundancy.
8. Drives shall be mounted to a wall or stand.
 - a. Mounting to the interior of the AHU is not allowed.
 - b. Mounting to the exterior of the AHU is allowed when the VFD's are integral to the AHU and were shipped from the factory that way.
- H. AIR HANDLING UNIT HUMIDIFIERS: Refer to Section 238000.
- I. AIR HANDLING UNIT AIR FILTERS: Baseline requirements for air filters are given in Section 234000. The following are supplemental requirements applicable only to installations of air handling units with coils:
 1. Select filters according to project requirements, but not less than 90% dust spot efficiency as per ASHRAE Standards for central station AHUs.
 2. Final filters shall be bag type. Cartridge filters are not acceptable unless approved by Facilities Services.
 3. Provide 2" thick pleated pre-filters with a minimum 30% efficiency.
 4. Standard filter sizes are 16x20; 20x20; 20x25; 16x25.
- J. AIR HANDLING UNIT CONTROLS
 1. Provide all Building Automated Systems (BAS) monitoring and control points required. Refer to Division 25 of the UF Design and Construction standards. Section 253000/255000.
 2. Direct Digital Controls (DDC) are required. Refer to Section 253000/255000.
 3. Provide two-way chilled water control valves when units are served by Campus central chilled water plants.
 4. Cooling coil controls shall be sequenced to allow dehumidification to be performed by one part of the coil before the entire coil is activated. This allows proper dehumidification during partial load operation.
 5. Design space relative humidity to less than 60 percent.
 6. Control valves for air handling unit coils selected with the following fail position:
 - (a) CHW coil control valves fail open.
 - (b) HHW coil control valves fail closed.

- (c) Preheat coil control valve fail open.
- (d) Precool coil control valves fail open.

~~(e) For the Health Science Center:~~

- ~~i. Steam coil control valves fail open.~~
- ~~ii. HHW coil control valves fail open.~~

K. INSTALLATION OF AIR HANDLING UNITS

1. Locate AHUs in mechanical rooms, never above ceilings.
2. Mechanical rooms for AHUs shall be full height.
3. No rooftop AHUs are allowed without written permission from Facilities Services.
4. Provide sufficient space for pulling coils and shafts.
5. Mechanical rooms for AHUs shall not be vented or mechanically ventilated with outdoor air.
 - a. It is preferred AHU's be placed in conditioned spaces.
6. Floor drains are not allowed in return air plenums.
7. Mount AHUs on concrete pads or galvanized steel stands at least 6" above finished floor.
 - a. AHU's that are supplied with a skirt installed will have to be elevated up off of the concrete service pad by installing 1-inch Isomode Pads between the frame and service pad so air can move freely under the AHU.
 - b. AHU's that come with a frame or installed on a frame will require 1-inch Isomode Pads between the frame/frame legs and the concrete flooring.
8. Provide a flow measuring device for each chilled water and heating hot water coil.
- ~~9. Provide pressure taps (with cocks) and thermometers for each chilled water and heating hot water coil on both the supply and return. Provide drains at lowest point and air vents at highest point for all coils.~~
 - ~~a. The valves for the drains and vents need to be accessible. [ME1]~~
10. Electrical safety switches and/or magnetic starters shall not be mounted on AHU casings.
11. Provide electronic temperature sensor (RTD or thermistor in thermal well) connected to the building EMCS in each air-handling unit's chilled water return piping.

END OF SECTION