

233000 HVAC Air Distribution

Sections Included In This Standard:

- 1.1 General Requirements
- 1.2 Ductwork
- 1.3 Ductwork Accessories
- 1.4 Air Terminal Units
- 1.5 Air Outlets and Inlets

1.1 GENERAL

A. DESIGN REQUIREMENTS

1. The air handling equipment and air distribution systems described within this section shall be designed by a Florida-licensed professional engineer.
2. All ductwork shall conform to the requirements of the Architectural Sheet Metal Manual by the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

B. INSULATION: Distribution system components shall be externally insulated.

C. OUTDOOR AIR REQUIREMENTS

1. Ventilation shall be in accordance with the latest version of ASHRAE Standard 62. Where applicable, outside air shall be provided in accordance with latest version of ASHRAE 62 for ventilation based on area and people. This outdoor air shall be dehumidified such that it does not create moisture problems. Dedicated Outside Air Systems (DOAS) and Preconditioned Outside Air Units are preferred.
2. Modulated damper systems for outside air shall be provided with mechanical stops if needed to provide ASHRAE minimum outside air during occupied hours. Mechanical stops are not required for systems that incorporate DDC modes that close off the outside air dampers during unoccupied and dehumidification modes.

D. VENTILATION REQUIREMENTS

1. The building pressure differential shall be slightly positive condition in relation to the outside atmosphere. This should be tested during Commissioning using the mechanical equipment in place on the building. Step one is to determine the minimum amount of outside air it takes to positively pressure the building with no exhaust. Step two is to turn on minimum exhaust amount required by ASHRAE Standard 62, Step three is to determine the amount of outside air it takes to make the building positive with the minimum exhaust level.
2. Rooms or spaces utilized for lunch/break rooms, lounges, reprographics areas and kitchen areas shall be provided with exhaust air of adequate quantity as per the latest ASHRAE standards.
3. All spaces, which are provided with exhaust ventilation, shall be maintained at a lower overall pressure than the surrounding areas (i.e. 0.01" w.g.).

4. Any area that is designed to be only exhausted shall be isolated (disconnected) from the return air system.
5. Local exhaust ventilation systems shall be designed utilizing the most recent version of the American Conference of Governmental Industrial Hygienists' Industrial Ventilation, a Manual of Recommended Practice.
6. Exhaust stack discharge height shall be in accordance with Chapter 5 of the American Conference of Governmental Industrial Hygienists' Industrial Ventilation, a Manual of Recommended Practice (most recent version).

1.2 DUCTWORK

A. GENERAL

1. Air Plenums: The cavity space above ceiling tiles and below the deck of the roof or floor above shall not be utilized as an air supply or return distribution plenum.
2. Ductwork Construction:
 - a) Ductwork utilized for supply and return air shall have a hard surface with no internal lining.
 - b) The supply and return duct system must be constructed in a manner to be considered a sealed duct with a leakage rate of less than 3%.

B. METAL DUCTWORK: HVAC duct shall be fabricated from metal. ~~Flexible duct may be used only for short runs of 6' or less to air outlets.~~

C. NONMETAL DUCTWORK: Duct board is not an acceptable material for ductwork.

D. FLEXIBLE DUCTWORK:

1. Use of long runs of flexible duct with sharp bends is prohibited (i.e. greater than 6 feet and greater than 45 degrees).
2. Shall be used for end of run connections only (metal duct to air outlet)
3. Shall be supported by metal band clamps that are a minimum of 1" wide.

E. FUME HOOD EXHAUST DUCTWORK AND CONNECTIONS: Fume hood exhaust ductwork shall be 316 stainless steel, 304 stainless steel, fiberglass or internally-coated galvanized steel. Where stainless steel material is used, connections shall all be welded. Where fiberglass material is used, connections shall comply with duct manufacturer's recommendations. In all cases, connections at manufacturer's equipment, connections shall comply with equipment manufacturer's recommendations. Mechanical clamps shall not be used. Mechanical flanges are acceptable where recommended by duct or equipment manufacturers.

1.3 DUCTWORK ACCESSORIES

A. DAMPERS: Damper controls located on supply and return ducts that are utilized for balancing the system shall be locked or fixed in place and marked with indelible ink or paint after final balance. Access to fusible links, and damper operation shall be provided.

- B. FLEXIBLE DUCT CONNECTORS: Shall meet Specification Form DDFCD-1199, NFPA 90A, NFPA 90B, and only be installed between the ahu and the ductwork.

1.4 **AIR TERMINAL UNITS**

- A. GENERAL: A licensed professional HVAC engineer shall calculate the number, design and location of these devices. All air terminal units shall be above the ceiling preferably in hallways or corridors only.
- B. VARIABLE AIR VOLUME (VAV) TERMINAL BOXES
 - 1. TYPE
 - a) Heating coils shall be Heating hot water (HHW) unless HHW is not available. Then electric coils would be allowed.
 - b) If HHW coils are used, adhere to guidance above in Fan Coil Unit section re: auxiliary drain pans.
 - 2. PIPING: Factory-assembled piping packages are acceptable.
 - 3. ACCESS
 - a) Adequate clearance shall be provided for service, repairs, and component replacement.
 - 1. Coil Access through duct work, via a door
 - b) Provide access panels as needed to service integral electric / heating hot water coils.
 - c) Need access to the coil from both the upstream and downstream side of the ductwork.
 - 4. CONTROLS: VAV boxes shall use electric actuation for all control valves and shall be connected to the Building Automation System.

1.5 **AIR OUTLETS AND INLETS**

- A. DIFFUSERS
 - 1. Diffusers shall be installed such that they are easily removed and replaced for cleaning and service. Diffusers shall be aluminum.
 - 2. Troffer type diffusers at the diffuser/light fixture interface are prohibited. Any system that is known to produce gross short-circuiting between supply and return systems is prohibited.
 - 3. Diffusers (supply or return) shall not be located on the end of a duct run. Branches are permitted near the end of a run.
 - 4. Directional control system shall not be in the top of the diffuser where the duct connects.

5. The air flow through and style of diffusers needs to be considered for the space in which they are being installed to keep noise at an acceptable level for that space.

B. OUTSIDE AIR INTAKES

1. Consideration shall be given to the location of fresh air intakes to prevent introduction of pollutants to the building's air supply. Maximal distance from pollutant sources is ideal. At minimum, fresh air intakes shall be at least 12 feet from all exhaust, & vent outlets (vertically and horizontally) and at least 10 feet above the ground. Loading docks, parking garages, and garbage storage areas or dumpsters shall be located at least 50 feet from any air intake (vertically or horizontally).
2. Outside air intakes shall be protected from rain entrapment through the use of louvers, mist eliminators or rain hoods. Outside air intakes shall be covered with bird screening with openings between $\frac{1}{4}$ and $\frac{1}{2}$ inch, and with insect screening.

END OF SECTION