**Section 264.2850 Heating, Ventilating and Air-Conditioning Systems (HVAC)**

a) General

1) Mechanical System Design

A) Efficiency. The mechanical system shall be designed for overall efficiency and appropriate life-cycle cost.

i) Recognized engineering procedures shall be followed for the most economical and effective results.

ii) Client care or safety shall not be sacrificed for conservation.

iii) If possible, the birth center shall include provisions for recovery of waste cooling and heating energy (e.g., ventilation, exhaust, water and steam discharge, cooling towers, incinerators, etc.).

iv) Use of recognized energy-saving mechanisms such as variable-air-volume (VAV) systems, and use of natural ventilation shall be considered, site and climatic conditions permitting.

v) Birth center design considerations shall include site, building mass, orientation, configuration, fenestration, and other features relative to passive and active energy systems.

B) Air-handling Systems

i) These shall be designed with an economizer cycle, where appropriate to use outside air. (Use of mechanically-circulated outside air does not reduce the need for filtration.)

ii) VAV Systems. The energy-saving potential of variable-air-volume systems is recognized, and the standards in this Section are intended to maximize appropriate use of those systems. Any system used for occupied areas must include provisions to avoid air stagnation in interior spaces where thermostat demands are met by temperatures of surrounding areas.

iii) Noncentral air-handling systems (i.e., individual room units used for heating and cooling purposes, such as fan-coil units, heat pump units, etc.) may be used as recirculating units only. All outdoor air requirements shall be met by a separate central air-handling system with proper filtration, as noted in Section 2.1-8.2.1.2 of the AIA Guidelines.

C) System Valves. Supply and return mains and risers for cooling, heating, and steam systems shall be equipped with valves to isolate the various sections of each system. Each piece of equipment shall have valves at the supply and return ends.

D) Renovation. If system modifications affect greater than 10 percent of the system capacity, designers shall use pre-renovation water/air flow rate measurements to verify that sufficient capacity is available and that renovations have not adversely affected flow rates in non-renovated areas.

2) Ventilation and Space Conditioning Requirements. All rooms and areas used for client care shall have provisions for ventilation.

A) Ventilation Rates. The ventilation systems shall be designed and balanced, as a minimum, according to the requirements shown in Section 2.1-8.2.1.2 and the applicable notes of the AIA Guidelines. The ventilation rates shown in Section 2.1-8.2.1.2 do not preclude the use of higher rates.

B) Temperature and Humidity. Space temperature and relative humidity shall be as indicated in Section 2.1-8.2.1.2 of the AIA Guidelines.

C) Air Movement Direction. To maintain asepsis control, airflow supply and exhaust shall generally be controlled to ensure movement of air from "clean" to "less clean" areas, especially in critical areas.

D) Mechanical Ventilation. Although natural ventilation for non-sensitive areas and client rooms (via operable windows) shall be permitted, mechanical ventilation shall be considered for all rooms and areas in the birth center.

3) Testing and Documentation

A) Upon completion of the equipment installation contract, the owner shall be furnished with a complete set of manufacturers' operating, maintenance, and preventive maintenance instructions, parts lists, and complete procurement information, including equipment numbers and descriptions. Required information shall include energy ratings as needed for future conservation calculations. This information shall be always kept by and at the birth center.

B) Operating staff persons shall also be provided with written instructions for proper operation of systems and equipment.

b) Requirements for Specific Locations

1) Birth Rooms

A) Air Supply

i) Air supply for birth rooms shall be from non-aspirating ceiling diffusers with a face velocity in the range of 25 to 35 fpm (0.13 to 0.18 m/s), located at the ceiling above the center of the work area. Return air shall be near the floor level, at a minimum. Return air shall be permitted high on the walls, in addition to the low returns.

ii) Each birth room shall have at least two return-air inlets located as far from each other as practical.

iii) Turbulence and other factors of air movement shall be considered to minimize the fall of particulates onto clean surfaces.

B) Temperature. Temperature shall be individually controlled for each birth room.

C) Ventilation Rates

i) Birth room ventilation systems shall always operate, except during maintenance and conditions requiring shutdown by the building's fire alarm system.

ii) During unoccupied hours, birth room air change rates may be reduced, provided that the positive room pressure is maintained as required in Section 2.1-8.2.1.2 of the AIA Guidelines.

2) Fuel-fired Equipment Rooms. Rooms with fuel-fired equipment shall be provided with sufficient outdoor air to maintain equipment combustion rates and to limit workstation temperatures.

3) Clean workrooms or clean holding rooms and soiled workrooms or soiled holding rooms shall comply with ventilation requirements per Section 2.1-8.2.1.2 of the AIA Guidelines.

c) HVAC Air Distribution

1) Return Air Systems. For client care areas, return air must be by means of ducted systems.

2) HVAC Ductwork. See Section 1.6-2.2.2.1 of the AIA Guidelines. Exception: The use of lined ductwork is not permitted to serve any client area in the birth center.

3) Exhaust Systems − General

A) To enhance the efficiency of recovery devices required for energy conservation, combined exhaust systems shall be permitted.

B) Local exhaust systems shall be used whenever possible in place of dilution ventilation to reduce exposure to hazardous gases, vapors, fumes, or mists.

C) Fans serving exhaust systems shall be located at the discharge end and shall be readily serviceable.

4) Air Outlets and Inlets – Fresh Air Intakes

A) Fresh air intakes shall be located at least 25 feet (7.62 meters) from exhaust outlets of ventilating systems, combustion vents (including those serving rooftop air handling equipment), medical-surgical vacuum systems, plumbing vents, or areas that may collect vehicular exhaust or other noxious fumes. (Prevailing winds and/or proximity to other structures may require greater clearances.)

B) Plumbing vents that terminate at a level above the top of the air intake may be located as close as 10 feet (3.05 meters).

C) The bottom of outdoor air intakes serving central systems shall be as high as practical, but at least 6 feet (1.83 meters) above ground level, or, if installed above the roof, 3 feet (91.44 centimeters) above roof level.

d) HVAC Filters

1) Filter Efficiencies

A) All central ventilation or air conditioning systems shall be equipped with filters with efficiencies equal to, or greater than, those specified Section 2.1-8.2.1.2 of the AIA Guidelines.

B) Noncentral air-handling systems shall be equipped with permanent (cleanable) or replaceable filters with a minimum efficiency of Minimum Efficiency Reporting Value (MERV) 3.

C) Filter efficiencies, tested in accordance with ASHRAE 52.2 (ASHRAE Handbook of Fundamentals), shall be average.

2) Filter Bed Location. Where two filter beds are required, filter bed no. 1 shall be located upstream of the air conditioning equipment and filter bed no. 2 shall be downstream of any fan or blowers.

3) Filter Frames. Filter frames shall be durable and proportioned to provide an airtight fit with the enclosing ductwork. All joints between filter segments and enclosing ductwork shall have gaskets or seals to provide a positive seal against air leakage.

4) Filter Housing Blank-off Panels. Filter housing blank-off panels shall be permanently attached to the frame and constructed of rigid materials and shall have sealing surfaces equal to or greater than the filter media installed in the filter frame.

5) Filter Manometers. A manometer shall be installed across each filter bed having a required efficiency of 75 percent or more, including hoods requiring HEPA filters. Provisions shall be made to allow access to the manometer for field testing.

e) Steam and Hot Water Systems. See Section 2.1-8.2.1.2 of the AIA Guidelines.