



# Ventilation of Funeral Home Preparation Rooms

## Guidelines and Calculations

Division of Epidemiology, Environmental and Occupational Health

### VENTILATION GUIDELINES

Ventilation requirements for funeral home preparation rooms are not specifically addressed in current existing guidelines. However, the National Mechanical Code of the Building Officials and Code Administrators (BOCA) and the Heating, Ventilation, and Air-Conditioning Handbook of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) specify ventilation criteria for autopsy rooms. These criteria for autopsy rooms can serve as useful guidelines for effectively ventilating funeral home preparation rooms.

**BOCA** requires a minimum of **12 air changes per hour** for autopsy rooms. The BOCA Code also requires that the **air shall be exhausted to the outdoors**, at an approved location on the exterior of the building.

**ASHRAE** recommends a minimum of **12 air changes per hour** be supplied to autopsy rooms, and that **at least two of the air changes per hour be outdoor air**. ASHRAE also specifies that the room be negatively pressurized in relation to adjacent areas.

**The New Jersey Funeral Directors Association** recommends, as an accepted industry practice, **10-15 air changes per hour** for preparation rooms.

A source of makeup air should also be provided in preparation rooms to prevent excessive negative pressurization and to improve air mixing within the room.

### CALCULATIONS

**AIR CHANGES PER HOUR (ACH)** - To determine the number of air changes per hour occurring in an existing preparation room.

- ① Calculate Volume of preparation room:

$$\text{length (ft)} \times \text{width (ft)} \times \text{height (ft)} = \text{room volume (ft}^3\text{)}$$

- ② Calculate exhaust vent area in ft<sup>2</sup>:

$$\text{if rectangular: length (in)} \times \text{width (in)} = \text{vent area (in}^2\text{)}$$

$$\text{if circular: } 3.141 \times [\text{radius (in)}]^2 = \text{vent area (in}^2\text{)}$$

$$\text{vent area (in}^2\text{)} \times 0.00694^* = \text{vent area (ft}^2\text{)}$$

(\* = factor for converting in<sup>2</sup> to ft<sup>2</sup>)

- ③ Calculate Volumetric Airflow of exhausted air in Cubic Feet per Minute (CFM):

[NOTE: This will require airflow measurements using a velometer or equivalent instrument to determine average air velocity in feet per minute (ft/min) across the face area of the preparation room exhaust vent. More sophisticated measurement methods, such as duct static pressure, may also be used. Alternatively, a volumetric airflow hood can be used to directly obtain CFM.]

$$\text{air velocity (ft/min)} \times \text{vent area (ft}^2\text{)} = \text{CFM (ft}^3\text{/min)}$$

- ④ Convert CFM to Cubic Feet per Hour (CFH):

$$\text{CFM (ft}^3\text{/min)} \times 60 \text{ (min/hr)} = \text{CFH (ft}^3\text{/hr)}$$

- ⑤ Calculate Air Changes per Hour (ACH):

$$\text{CFH (ft}^3\text{/hr)} \div \text{room volume (ft}^3\text{)} = \text{ACH (air changes per hour)}$$

#### Sample calculation for air changes per hour (ACH)

Preparation room is 30 ft. long x 20 ft. wide x 10 ft. high with an 18-inch-diameter circular exhaust fan vent having an average face velocity of 860 FPM.

$$\text{ROOM VOLUME} = 30 \text{ ft} \times 20 \text{ ft} \times 10 \text{ ft} = 6,000 \text{ ft}^3$$

$$\text{VENT AREA} = 3.141 \times (9 \text{ in})^2 = 254.4 \text{ in}^2 \times 0.00694 = 1.77 \text{ ft}^2$$

$$\text{CFM} = 860 \text{ FPM} \times 1.77 \text{ ft}^2 = 1,522 \text{ CFM (ft}^3\text{/min)}$$

$$\text{CFH} = 1,522 \text{ CFM} \times 60 \text{ min/hr} = 91,320 \text{ CFH (ft}^3\text{/hr)}$$

$$\text{ACH} = 91,320 \text{ CFH} \div 6,000 \text{ ft}^3 = 15.2 \text{ ACH}$$

**VENTILATION SYSTEM CAPACITY** - To determine the ventilation system capacity in cubic feet per minute necessary to obtain a desired number of air changes per hour.

- ① Calculate Volume of preparation room:

$$\text{length (ft)} \times \text{width (ft)} \times \text{height (ft)} = \text{room volume (ft}^3\text{)}$$

- ② Calculate Cubic Feet per Hour (CFH) needed:

$$\text{VOLUME (ft}^3\text{)} \times \text{ACH (desired)} = \text{CFH (needed)}$$

- ③ Convert to Cubic Feet per Minute (CFM) needed:

$$\text{CFH} \div 60 \text{ (min/hr)} = \text{CFM (needed)}$$

#### Sample calculation for ventilation system capacity

Preparation room is 26 ft. long x 18 ft. wide x 9 ft. high and it is necessary to determine the number of cubic feet per minute that must be exhausted to obtain 15 air changes per hour.

$$4,212 \text{ ft}^3 \times 15 \text{ ACH} = 63,180 \text{ CFH (ft}^3\text{/hr)}$$

$$63,180 \text{ CFH} \div 60 \text{ min/hr} = 1,053 \text{ CFM (ft}^3\text{/min)}$$

Calculation of the outside supplied air changes recommended by ASHRAE can be performed in the same manner as those for exhausted air.