

design assumptions and calculations related to the impact on indoor air quality shall be included in the design documents.

6.2.2 Zone Calculations. Ventilation zone parameters shall be determined in accordance with Sections 6.2.2.1 through 6.2.2.3 for ventilation zones served by the ventilation system.

6.2.2.1 Breathing Zone Outdoor Airflow. The outdoor airflow required in the breathing zone (V_{bz}) of the occupiable space or spaces in a ventilation zone shall be not less than the value determined in accordance with Equation 6.2.2.1.

$$V_{bz} = R_p \times P_z + R_a \times A_z \quad (6.2.2.1)$$

where

A_z = zone floor area, the net occupiable floor area of the ventilation zone, ft² (m²)

P_z = zone population, the number of people in the ventilation zone during use

R_p = outdoor airflow rate required per person as determined from Table 6.2.2.1

Informative Note: These values are based on adapted occupants.

R_a = outdoor airflow rate required per unit area as determined from Table 6.2.2.1

Informative Note: Equation 6.2.2.1 accounts for people-related sources and area-related sources independently in the determination of the outdoor air rate required at the breathing zone. The use of Equation 6.2.2.1 in the context of this standard does not necessarily imply that simple addition of outdoor airflow rates for different sources can be applied to any other aspect of indoor air quality.

6.2.2.1.1 Design Zone Population. Design zone population (P_z) shall equal the largest (peak) number of people expected to occupy the ventilation zone during typical use.

Exceptions:

1. Where the number of people expected to occupy the ventilation zone fluctuates, zone population equal to the average number of people shall be permitted, provided such average is determined in accordance with Section 6.2.6.2.
2. Where the largest or average number of people expected to occupy the ventilation zone cannot be established for a specific design, an estimated value for zone population shall be permitted, provided such value is the product of the net occupiable area of the ventilation zone and the default occupant density listed in Table 6.2.2.1.

6.2.2.2 Zone Air Distribution Effectiveness. The zone air distribution effectiveness (E_z) shall be not greater than the default value determined using Table 6.2.2.2.

Informative Note: For some configurations, the default value depends upon space and supply air temperature.

6.2.2.3 Zone Outdoor Airflow. The zone outdoor airflow (V_{oz}) provided to the ventilation zone by the supply air distribution system shall be determined in accordance with Equation 6.2.2.3.

$$V_{oz} = V_{bz}/E_z \quad (6.2.2.3)$$

6.2.3 Single-Zone Systems. For ventilation systems wherein one or more air handlers supply a mixture of outdoor air and recirculated air to only one ventilation zone, the outdoor air intake flow (V_{ot}) shall be determined in accordance with Equation 6.2.3.

$$V_{ot} = V_{oz} \quad (6.2.3)$$

6.2.4 100% Outdoor Air Systems. For ventilation systems wherein one or more air handlers supply only outdoor air to one or more ventilation zones, the outdoor air intake flow (V_{ot}) shall be determined in accordance with Equation 6.2.4.

$$V_{ot} = \sum_{all\ zones} V_{oz} \quad (6.2.4)$$

6.2.5 Multiple-Zone Recirculating Systems. For ventilation systems wherein one or more air handlers supply a mixture of outdoor air and recirculated air to more than one ventilation zone, the outdoor air intake flow (V_{ot}) shall be determined in accordance with Sections 6.2.5.1 through 6.2.5.4.

6.2.5.1 Primary Outdoor Air Fraction. Primary outdoor air fraction (Z_{pz}) shall be determined for ventilation zones in accordance with Equation 6.2.5.1.

$$Z_{pz} = V_{oz}/V_{pz} \quad (6.2.5.1)$$

where V_{pz} is the zone primary airflow to the ventilation zone, including outdoor air and recirculated air.

- a. For VAV-system design purposes, V_{pz} is the lowest zone primary airflow value expected at the design condition analyzed.
- b. In some cases, it is permitted to determine these parameters for only selected zones as outlined in Normative Appendix A.

6.2.5.2 System Ventilation Efficiency. The system ventilation efficiency (E_v) shall be determined in accordance with Table 6.2.5.2 or Normative Appendix A.

6.2.5.3 Uncorrected Outdoor Air Intake. The uncorrected outdoor air intake (V_{ou}) flow shall be determined in accordance with Equation 6.2.5.3.

$$V_{ou} = D \sum_{all\ zones} (R_p \times P_z) + \sum_{all\ zones} (R_a \times A_z) \quad (6.2.5.3)$$

6.2.5.3.1 Occupant Diversity. The occupant diversity ratio (D) shall be determined in accordance with Equation 6.2.5.3.1 to account for variations in population within the ventilation zones served by the system.

$$D = P_s / \sum_{all\ zones} P_z \quad (6.2.5.3.1)$$

where the system population (P_s) is the total population in the area served by the system.

Exception: Alternative methods to account for occupant diversity shall be permitted, provided the resulting V_{ou} value is not less than that determined using Equation 6.2.5.3.

Informative Note: The uncorrected outdoor air intake (V_{ou}) is adjusted for occupant diversity, but it is not corrected for system ventilation efficiency.