**Dormitory outdoor air flow rate calculation by using CO2 method**

Each dorm room is one simple bedroom, which can be treated as a single zone. The individual step increase of CO2 concentration (Δc) between two measurements performed with time interval of Δτ in a point is described by the instantaneous flow rate equation as follows,

 (1)

Where,

F is the emission rate of CO2 (m3/s), which depends on the level of activity (M, MET), height (H, m), weight (W, kg) and respiratory quotient (R, 0.83) of occupants.

 (2)

Q is the out-to indoor air flow rate (L/s);

c1 is the CO2 concentration measured at the beginning of the time interval Δτ (ppm);

cout is the outdoor CO2 concentration (ppm).

The CO2 concentration at the end of the time interval (c2) can be computed as a sum of the initial concentration (c1) and the unit increase of concentration (Δc). The calculation can be repeated for each successive time interval so that a theoretical exponential curve can be constructed. This theoretical curve is fitted to the measured data using least squares. For this, the production rate of CO2 is set within a range of minimum and maximum values based on the weights and heights of occupants. This iterating process gives the best fitting air flow and emission rates for CO2are found.