IMPLEMENTATION

To comply with this regulation, project teams must incorporate DCV using Carbon Dioxide (CO_2) sensing or by other means to measure occupancy in all densely occupied spaces with the following criteria:

- Building space is larger than 100 m^2
- Occupant density of that space has more than 25 people / 100 m^2

Examples for spaces that are typically considered densely occupied are: conference room, meeting room, lecture hall, ballroom, retail establishment, break room, cafeteria, sport facility, prayer hall, health club etc.

Space carbon dioxide (CO_2) sensing is the most common method in demand control ventilation. With CO_2 sensor in a DCV system, the ventilation rate differs in line with the number of people in the space. People breathe out CO_2, and hence the more people in the space and the sensor increases the ventilation rate.

Design ventilation rates are determined by including both the area and people ventilation rates from ASHRAE Standard 62.1/62.2. Design ventilation rates also consider the peak occupancy rate for that space. Minimum outdoor air rate in accordance with area component of ASHRAE Standard 62.1/62.2, must be supplied for the space.

In a HVAC system, the important elements of a CO_2 based DCV system are:

- CO_2 sensor – monitors the concentration of CO_2
- Ventilation flow logic controller – receives signal from sensor, determines the quantity of outdoor air required and triggers the ventilation system accordingly.
- Conventional ventilation system, usually an air distribution system – incorporates dampers to regulate the amount of outdoor air as per the command received from ventilation flow logic controller.

CO_2 sensors should be positioned in the room between 1m and 1.8m above the floor, to most accurately determine the quality of the air breathed by the occupants (breathing zone). Alternatively, the sensor may be installed in the return air duct of the monitored room. CO_2 concentration set-point should be kept below 800 ppm. CO_2 sensors will determine the occupancy levels in the space and then the sensor further sends signal to the ventilation system through the controller to increase the ventilation from area rate to either full rate or a rate between area rate and full rate. Whenever CO_2 levels rises above 1000 ppm, an alarm must be triggered. This alarm can either be automatically monitored by a central control system, if available, or give a local audible or visual indication when activated. The ventilation system should not be shut down when the alarm is activated.

DCV systems using CO_2 sensors is most effective if the spaces are served by single zone system (as shown in fig. 502.02(1) and fig. 502.02(2)). If it is served by multiple zone systems, it would require integration with central control and monitoring system (CCMS). This would dynamically check CO_2 concentrations based on individual zone airflow rates and design occupancy on a periodic basis.