

Demand Control Ventilation - DCV

DCV in general

CO₂ (carbon dioxide) measurement makes it possible to control individual fans, dampers, valves, etc. which can create a better indoor environment while contributing to energy savings. DCV is a common method of controlling air quality in rooms as the demand on the air changes with varying numbers of people. The practice is common in spaces where people congregate such as in offices, classrooms, cinemas and auditoriums. The ventilation control is based on temperature and CO₂.

Why the need to measure CO₂?

The primary source of CO₂ in office buildings is the exhalation of the building occupants. CO₂ concentration in office buildings typically ranges from 350 to 2500 ppm.

Today there are laws enforcing measurement of CO (carbon monoxide) where the maximum allowed value is 35 ppm. Laws or rules enforcing measurement of CO₂ do not exist in spite of the fact that it can be just as dangerous as CO.

The threshold limit value for an 8-hour time weighted average exposures to CO₂ is 5000 ppm. The American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) recommends a minimum ventilation rate for offices of 10 liters per second per



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person. This rate is determined based on a corresponding steady state indoor concentration of 870 ppm which is further based on the assumption that outdoor CO₂ concentration is 350 ppm and indoor CO₂ generation rate is 0.31 liters per minute per person.

Sick Building Syndrome (SBS) is used to describe a set of symptoms with unidentified aetiology frequently reported by workers in office buildings. The individuals

who suffer from SBS report that the symptoms occur when they spend time indoors, particularly in office buildings and that the symptoms lessen while away from the building. Common health problems caused by SBS are upper respiratory and mucous membrane (MM) symptoms (i.e., irritated eyes, nose, sinus, or throat), and lower respiratory irritation (i.e., cough, tight chest, wheeze, or difficult breathing).

continued

Why the need to measure CO₂? continued

How does it work?

In order to have optimum ventilation it is important to use an affordable and stable sensor technology to measure CO₂ concentrations. The sensor should be able to determine the correct level of fresh

air (as defined by the level of CO₂) in a zone. Proper CO₂ measurement in a space makes it possible to control the level by injecting fresh air to the space at any given moment.

As the sensor detects an increasing level of CO₂, a signal is sent a control system that manages the main ventilation system.

Depending on the signal, a fan may be activated or the speed may adjust to bring in fresh air.

In addition, complete air-handling and air-conditioning units help us create a better indoor environment as well as facilitate energy savings.