Outdoor Carbon Dioxide Measurements for Demand Controlled Ventilation

The outdoor CO_2 level serves as a baseline for comparison to indoor CO_2 concentration. If the outdoor CO_2 concentration level is 500 ppm, it is rarely lower indoors. Selecting a stable outdoor CO_2 instrument is crucial for monitoring outdoor levels.

Demand controlled ventilation (DCV) helps to maintain good indoor air quality while optimizing energy consumption. In a typical set-up only indoor CO_2 levels are measured. Ventilation controls are operated based on the assumed outdoor CO_2 level of 400 ppm. However, locally elevated CO_2 levels occur due to CO_2 emissions from transportation, energy production and industrial manufacturing.

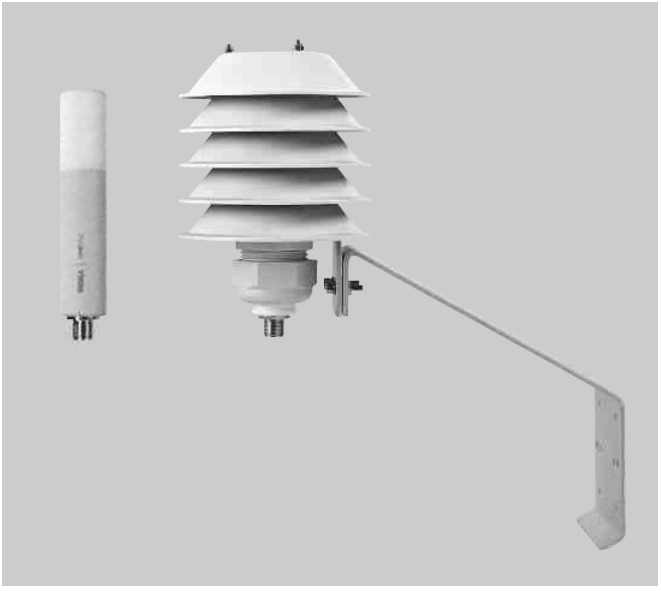
Ventilation guidelines, such as ASHRAE, recommend indoor CO_2 levels not to exceed the surrounding outdoor concentration by 600 ppm. Also, LEED guidelines suggest providing an alarm when the indoor CO_2 level exceeds the outdoor level by 530 ppm, or 1,000 ppm absolute. Reliable correlation between indoor and outdoor CO_2 levels can only be achieved by measuring both.

Measuring CO_2 Outdoors

Knowing outdoor CO_2 levels helps when assessing indoor conditions. During periods when the outdoor CO_2 level exceeds 400 ppm the space may be over-ventilated. In order to truly optimize energy consumption, outdoor CO_2 concentration should be measured. The real time differential between indoor and outdoor CO_2 concentration can be used as a control parameter.

As there are large diurnal and seasonal variations in outdoor temperature, the outdoor CO_2 instrument should automatically compensate for temperature variations.

Outdoor CO_2 sensors need to operate in varying conditions. They have to tolerate rain, hail, snow, solar radiation, dirt and dust, as well as temperature extremes between -40 and +60 °C (-40 ... +140 °F).



Radiation shield DTR250A (right) with GMP252 probe

GMP343 for outdoor measurements

Vaisala Radiation Shield DTR250 Series:

- GMP252 inside the radiation shield is an ideal solution for dynamically measuring outdoor CO_2 levels
- Meets the specifications of Section 6.2.7 in the ASHRAE Green Buildings Standard 62.1
- Two options: DTR250 for support bars and DTR250A for pole masts

GMP252 probe features:

- Wide operating temperature range of -40 … +60 °C (-40 ... +140 °F)
- Integrated temperature sensor for continuous compensation
- Sensor head heated to prevent condensation
- Traceable calibration (certificate included)

Vaisala CARBOCAP® Carbon Dioxide Probe GMP343 for Outdoor Measurements:

Vaisala CARBOCAP® Carbon Dioxide Probe GMP343 has been specially designed for high accuracy outdoor measurements:

- Accuracy of ±(3 ppm + 1 % of reading) at 25 °C (77 °F)
- IP65/IP66 housing classification for harsh environments
- Operating temperature range -40 ... +60 °C (-40 ... +140 °F)
- Low maintenance need due to highly stable CARBOCAP® sensor with built-in reference measurement
- Automatic compensation of CO_2 readings for temperature variations
- Possibility to compensate for pressure (site elevation)

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