Just a Thought
By Kevin Delahunt

Carbon Dioxide (CO_2) is a colorless and odorless gas that is naturally occurring and over time has increased in concentration in our atmosphere to approximately 400 ppm, greatly due to the burning of carbon-based fuels. Elevated levels of CO_2 in a building are considered a direct consequence of an inadequate supply of outside air (ventilation). CO_2 has, therefore, been used in the HVAC industry as a tracer or surrogate gas for ventilation and as an indicator of Indoor Air Quality. The thought process being that by maintaining the concentration of CO_2 to an acceptable level in a building (ASHRAE recommends 700 ppm above outdoor air levels) you would provide adequate ventilation and control other gaseous contaminants that might be harmful to the health of the building occupants.

Recently there has been discussion that CO_2 be considered a pollutant and not just a surrogate gas. In controlled Research by Satish et al. from Upstate Medical University, State University of New York a case was presented that there are direct adverse effects of CO_2 on human cognitive performance that may be economically important.

A more recent research by Allen et al. from Environmental Health Perspectives concurred with the earlier findings. They found statistically significant declines in cognitive performance when CO_2 concentrations were present at levels that are common in building occupied spaces. These declines in performance were measured at levels that would be considered acceptable per ASHRAE standard 62 Ventilation for Acceptable IAQ.

A third study by MacNaughton et al. published in the International Journal of Environmental Research and Public Health evaluated the economic implications of enhanced Ventilation in office buildings. The study looked at the energy consumption per building occupant in 7 U.S. cities. They estimated that by doubling the ventilation rate from the ASHRAE minimum over all 7 locations would cost $40 per person per year. This $40 investment, with the doubling of the ventilation rate, was estimated to improve workers' productivity by 8%, equivalent to $6500 per employee per year. Not a bad return on investment!

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