



Building Air Quality

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Carbon Monoxide and Indoor Air Quality

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas. It is caused by the incomplete oxidation of carbon in combustion. Hence, some of the most common sources in commercial office spaces or light-industrial facilities include: unvented kerosene and gas space heaters; back-drafting from gas fired boilers or furnaces, gas water heaters, and even automobile exhaust which is mistakenly brought into a building with the outside air supplies. Carbon monoxide is also a byproduct of tobacco smoke, so second-hand exposure to the particles and gases from smoke can also lead to an increased exposure to carbon monoxide.

Currently there are no standards for CO exposure, which have been agreed upon for indoor air. The U.S. National Ambient Air Quality Standards for outside air are 9 ppm (parts per million) for 8 hours, and 35 ppm for 1 hour.

The Comfort and Health Effects of Carbon Monoxide

Acute effects are due to the formation of carboxyhemoglobin in the blood, which inhibits oxygen intake. At low concentrations, fatigue may be experienced by healthy people and chest pain may be evident in people with heart disease. At moderate concentrations, angina, impaired vision and reduced brain function may result. At higher concentrations, impaired vision and coordination; headaches; dizziness; confusion; and nausea can occur.

Exposure to carbon monoxide can cause flu-like symptoms that clear up after leaving the effected space. Exposure to carbon monoxide can be fatal at very high concentrations.

What Levels Can Be Expected

Average levels in homes without gas stoves vary from 0.5 to 5 parts per million (ppm). Levels near properly adjusted gas stoves are often 5 to 15 ppm and those near poorly adjusted stoves may be 30 ppm or higher.

Average levels in hi-rise office buildings have shown to vary from 0.5 to 3 parts per million. Often though, when the outside air deliveries are taken from the street level of the building, the mere presence of heavy traffic (during rush hour) or the presence of an idling delivery vehicle can cause indoor levels to rise as high as 15 to 20 ppm. Many office buildings are now installing carbon monoxide detectors on the outside air delivery air handler units, which are designed to identify the presence of CO and reduce or eliminate air deliveries while it is present.

Steps to Reduce Exposure to CO in an office environment

- Ensure that outside air intakes are not located near sources (loading docks, busy intersections).
- Prohibit smoking and idling of vehicles from occurring near the building's outside air intakes.
- Consider the installation of carbon monoxide warning devices on outside air supply units. This will ensure that an alarm or other notification occurs if carbon monoxide levels exceed a defined point.

Have a trained professional inspect, clean, and tune-up the building's gas-fired boilers annually. Repair any leaks promptly.