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Carbon Dioxide (CO₂) Leak in Soda Machines

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Carbon dioxide, also known as CO₂, is a very well known gas type but not everyone knows how deadly it is. Most people know it as a gas that humans exhale but commercially, it is manufactured and shipped as a liquefied compressed gas or is used as dry ice in its solid form.

A common use of CO₂ gas is in soda fountain machines to carbonate soft drinks by pressurizing the CO₂ gas into the liquid syrup. Without the carbonation or fizziness, it is no different than flavored syrup. Worldwide, fountain soft drinks are served in restaurants, sports arenas, fast food chains, cafeterias, public events, etc. Accidental incidences of CO₂ leak from the compressed cylinders storing CO₂ gas are common but preventable.

Some examples of accidental cases that have been reported by the media include, but not limited to:

- The Mi Ranchito restaurant in Lenexa, Kansas in August 2009 had caused two dozen people to become ill due to back flow problems with the soda machine. The carbonated water was coming into contact with copper lines, poisoning customers.
- A McDonald's restaurant in Phoenix, Arizona in June 2011 had to evacuate everyone in the restaurant because of a leaking soda machine in the building's basement. A pregnant employee ended up collapsing due to the fumes. Other staff members experienced lightheadedness and dizziness. Fortunately, no one was seriously ill and was able to get immediate medical attention.
- A fast food restaurant in Yorkshire in the United Kingdom in June 2011 had to evacuate everyone due to a leaky CO₂ cylinder. Emergency service people had to wear breathing apparatuses in order to enter the restaurant to disconnect the cylinder. No one was injured in this case.
- A McDonald's restaurant in Savannah, Georgia in September 2011 had sickened ten people, including the death of a woman found unconscious in a restroom. This was due to a leaky gas line between the walls caused the gas to build up a week ago.

All restaurants mentioned had their licenses suspended but after fixing the problem, were allowed to re-open again. No criminal charges were given to any of the restaurants as it's considered an accident. By definition from dictionary.com, an accident is "an undesirable or unfortunate happening that occurs unintentionally and usually results in harm, injury, damage, or loss." It's true that the situation is "undesirable" and "unfortunate" but can be prevented if proper measures were taken by the owners.

In order to prevent accidents like this from happening in the future, employers and staff members need to know the risks associated from working with CO₂ gas, be able to identify early symptoms, and be protected by a fixed gas monitoring system.

Based on the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, common symptoms of CO₂ exposure include dizziness, headache, poor sleep, lassitude, anxiety, ocular changes, coronary heart disease, gastritis, kidney and liver damage, eye and skin burns, and dermatitis. These symptoms will occur only if the NIOSH standard's recommended exposure limit (REL) and / or Occupational Safety & Health Administration (OSHA) standard's permissible exposure limit (PEL) exceed 5,000 ppm.

CO₂ is an odorless and colorless gas; therefore, humans will not be able to detect it. In order to detect and determine the level of CO₂, a gas detection system needs to be installed. Fixed gas detection systems should be installed in rooms where the CO₂ gas is being installed and where the soda machine is situated. Since CO₂ gas is heavier than air, it is recommended that the fixed gas detectors should be installed at breathing zone which is 4 to 6 feet above the floor. Portable gas detectors are great for those delivering the gas cylinders from different venues in case there's no fixed gas detection system in place. Installing a gas detection system can ensure staff members and customers are safe and risks are lowered.

For suggestions on fixed or portable gas detectors, please visit www.critical-environment.com (<https://www.critical-environment.com/>).

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