



Worksite: _____ Instructor: _____ Date/Time: _____

Topic C177: Carbon Monoxide

Introduction: What is *Carbon Monoxide (CO)*? *CO* is an odorless, colorless, poisonous gas created when any fuel such as gasoline, kerosene, propane, acetylene, or wood is burned. Dangerous situations can develop when combustion by-products such as carbon monoxide are not properly vented to the outside atmosphere, where they would quickly dissipate.

Carbon Monoxide is the number one cause of poisoning deaths in the United States. Anyone is susceptible, but experts agree that people with anemia, heart disease, emphysema, chronic bronchitis or other respiratory problems are especially vulnerable to even minimal exposure to *CO* and are at the greatest risk for serious injury.

When one breathes Carbon Monoxide, it enters the bloodstream through the lungs and attaches to red blood cells. These red blood cells, called hemoglobin, carry oxygen throughout your body. *CO* molecules attach to the red blood cells 200 times faster than oxygen, thereby blocking and preventing the flow of oxygen to the heart, brain, and other vital organs. As *CO* accumulates in the bloodstream, the body becomes starved for oxygen.

Breathing high concentrations of CO can be lethal in minutes. Breathing low concentrations over time is dangerous as well. Long-term exposure to low levels of *CO* has a cumulative effect and can cause permanent heart and brain damage. According to OSHA, 50 Parts per Million is the maximum allowable concentration of *CO* for continuous exposure for healthy adults in any 8 hour period.

Quickly remove a person suspected of CO poisoning from where they are found and to an area of fresh air.

Become familiar with the symptoms and understand the effects of CO exposure; early symptoms are often mistaken for the flu:

- Mild Exposure Symptoms: Slight headache, dizziness, weakness, fatigue, nausea, sleepiness, and confusion (flu-like symptoms).
- Medium Exposure Symptoms: Throbbing frontal headache, drowsiness, confusion, and fast heart rate.
- Extreme Exposure Symptoms: Convulsions, unconsciousness, and heart and lung failure which can cause brain damage and death.

In many of the reported cases of severe *CO* poisoning, victims were aware they were not well and in trouble, but had become so disoriented that they were unable to save themselves by calling for assistance or exiting out to fresh air.

In the workplace, CO can originate from any fuel burning equipment operated in a closed environment:

- Gas powered generators and compressors operated in a closed building.
- Space heaters used during cold weather inside closed buildings.
- Gas welding and cutting or other burning operations can generate large quantities of *CO*.
- Exhaust from vehicles and equipment that are left running within close proximity can drift into confined spaces.
- Hot-roof tar kettles are significant *CO* producers and are frequently set-up close to the building being roofed. *CO* easily drifts into adjacent areas.
- When working in basements or any other confined spaces while using fuel burning equipment, powered ventilation is required.
- Remember that if exhaust can be smelled, *CO* is present in the atmosphere.

If it is suspected that a person has succumbed to *CO* poisoning, they must be quickly removed from where they were found and taken immediately to an area where fresh air is available. *CO* poisoning and oxygen deprivation is a life threatening situation. The affected person should be immediately taken to the nearest medical treatment facility. A simple blood test that confirms suspected *CO* poisoning is available, but must be administered shortly after exposure in order to be accurate.

Conclusion: It is important to recognize and be aware of the warning signs of *CO* poisoning. One must also understand how dangerous *CO* concentrations originate and accumulate so that hazardous conditions can be avoided altogether. Under all circumstances, fuel burning operations must be well ventilated in order to maintain a safe breathing atmosphere. Follow these guidelines to keep the workplace safe from *Carbon Monoxide*.

Employee Attendance: (Names or signatures of personnel who are attending this meeting)

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

These guidelines do not supersede local, state, or federal regulations and must not be construed as a substitute for, or legal interpretation of, any OSHA regulations.