



# Carbon Monoxide Safety

## Low Level Measurement Guide



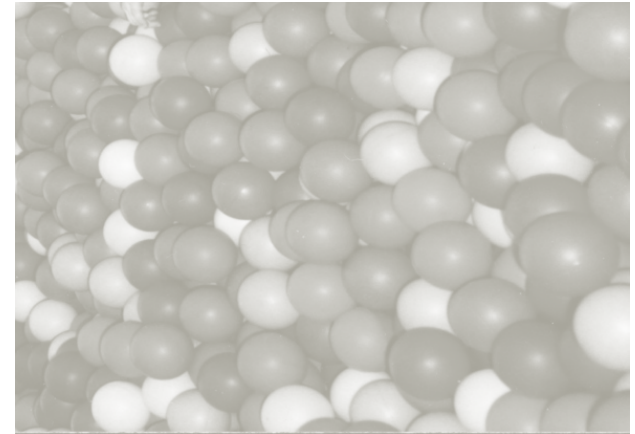
- Carbon monoxide is known by the symbol CO and as a poisonous gas that can hurt or kill. Carbon monoxide (CO) is best detected and responded to at levels before illness symptoms begin. CO must be measured.
- This is a guide for those who choose low level, personal CO protection for home, work or anywhere early detection and protection is desired. This is serious, there is a test.

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# Carbon Monoxide is a Poison

**Identified by chemical symbol CO and represents one Carbon and one Oxygen molecule bound together.**

- A tasteless, odorless, invisible poison measured in air in units of PPM or Parts Per Million
- Representing the number of CO molecules measured within a million molecules of the air where the testing device sensor is sampling or located
- The best home low level CO protection alarms can be easily verified to respond to a known quantity, test gas sample. Do you provide the best to your family? Do you “test” and verify that your current CO alarm actually alerts you to the presence of carbon monoxide?



**TPI Model 780 Low Level CO Monitor with Check Gas Kit (digital display begins at 7 PPM)**





# Two Circumstances make CO a Hazard

- It is produced in enough concentration to hurt some one.
- It has a way to reach people.



Never warm cars up inside a garage, even if large doors are open. Take your low level CO monitor with you if you want to see where you can measure CO and how much there is.

# Carbon Monoxide News Headlines

Posts updated frequently—COA—[www.cosafety.blogspot.com](http://www.cosafety.blogspot.com)

Every day of the year CO news reports from around the world underline the prevalence and common occurrences of accidental poisonings. Often these deaths and illnesses could have been prevented if the people affected were more aware or better educated in the realities of this deadly gas. Perhaps if the building had a carbon monoxide alarm the injury could have been avoided. But there is more than just the alarm we need to know about.

**2 police, 2 paramedics in Bethlehem overcome by carbon monoxide**

Allentown Morning Call

**Hotel reopens after evacuation**

Greenville Daily Reflector

**Toxic fumes close Hallan School in New Rochelle**

News 12 Westchester

**Brothers die from carbon monoxide poisoning**

KING5.com

**East Deer couple rushed to hospital; CO detected in house**

WTAE Pittsburgh

**Carbon Monoxide Fills Church**

St. James Plaindealer

**2 Newton restaurants evacuated after carbon monoxide alarm goes off; no one hurt**

The Republic

**Carbon monoxide chases family from rental home**

KOIN.com

**Gas fitter jailed over carbon monoxide deaths**

RTE.ie

**2 children hospitalized after carbon monoxide incident in Columbia**

Lancaster Newspapers

**Every Breath You Take**

Daily News & Analysis

**Couple Found Dead In Apparent Carbon Monoxide Poisoning At KOA**

NewsChannel5.com - NASHVILLE, Tenn.

# Carbon Monoxide News Headlines

Posts updated frequently—COsa—[www.cosafety.blogspot.com](http://www.cosafety.blogspot.com)

## **Harsh Winter Results in Large CO Poisoning Spike**

NBC 10 Philadelphia

## **Carbon monoxide nearly kills mother, unborn son**

WFSB

## **A Normal Life: A Sister's Odyssey Through Brain Injury**

WAMC

Lyrissa Smith's sister, Molly, got a severe brain injury from carbon monoxide poisoning. Her husband died lying next to her in the hotel bed. After nine days in a coma, Molly emerged. But not the Molly that Lyrissa knew...

## **Carbon monoxide scare at a seniors home**

660 News

## **Legal Sea Foods reopens after fatal CO leak**

Newsday

The Walt Whitman Shops restaurant closed last month by carbon-monoxide poisoning that killed its general manager and sickened dozens of patrons ...

## **Daycare reports carbon monoxide scare**

Post-Bulletin

## **Chief praises paramedics for response to carbon monoxide emergency**

Worcester Telegram

More than a dozen kindergartners, a teacher and a high school intern were sent to hospital with elevated blood levels of carbon monoxide after an oil ...

## **Carbon monoxide closes Carrboro post office, workers treated**

News & Observer

## **House overcome by carbon monoxide**

Winona Post

## **Suffolk Walmart closed after carbon monoxide detected**

WTKR.com

## **Carbon monoxide leak hospitalizes 19 in VA**

W\*USA 9 - MCLEAN, VA

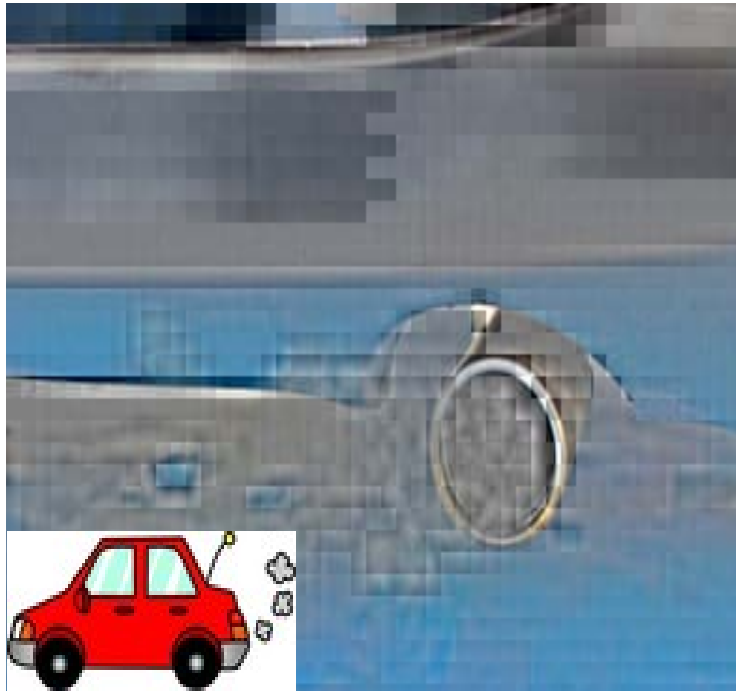
## **Carbon monoxide leak forces daycare evacuation**

Innisfail Province - A Penhold daycare was evacuated last week following the release of high levels of carbon monoxide coming from the building's furnace...

## **Watertown Apartment Building Evacuated**

WWNY TV 7

We may be exposed to CO while inside a car with the motor running, , even though it “looks” as if the exhaust system is outside of the interior. Prevailing winds can blow the exhaust beneath the car while parked or idling. This allows exhaust gases to penetrate up through the undercarriage to the inside. A car or recreational vehicle next to you could poison you.



Exhaust can also enter the trunk of a car and get inside through the back seat or hatch door even while the vehicle is being normally driven. Snow or mud blocking the exhaust can also result in exhaust gas penetration inside the vehicle.

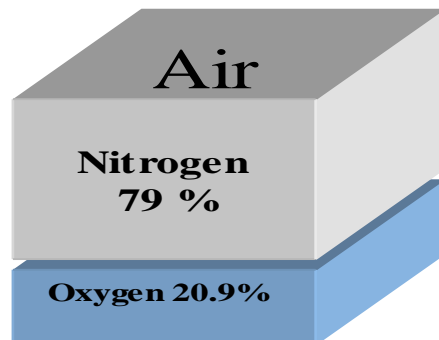
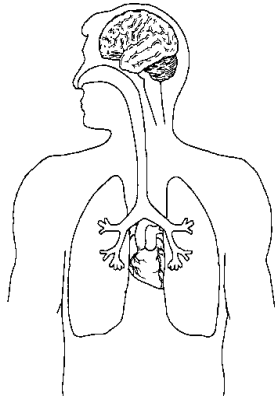
**It is always recommended you measure CO while in a motor vehicle. How else would you know if you were exposed?**



# How does Carbon Monoxide harm you?

- When carbon monoxide is inhaled into the lungs, it bonds with hemoglobin in blood. This bonding is referenced as *Carboxyhemoglobin (COHb)*, and affects all major organs and muscles.
- This displacement of oxygen in your blood is poisonous and can cause heart stresses in compensation for the loss. CO can also harm your central nervous system.
- Quite simply, carbon monoxide prevents oxygen from being used by your body. Symptoms could begin with tiredness, headache, dizziness, slow reaction time and perhaps other “common” health experiences.

**Aerobic organisms can only live in the presence of oxygen. We breathe in air - Hemoglobin in our blood has 4 binding sites that carries oxygen to every cell in our body. Carbon monoxide has a greater affinity and is over 200 times stronger than oxygen. CO displaces oxygen.**



Our air is approximately 79% Nitrogen and 20.9% Oxygen

# Who is at risk to be CO poisoned?

- **Everyone is at risk** of being poisoned by CO. However, individuals with existing health problems such as heart & lung disease and often times the elderly are especially vulnerable to lower levels. Infants, children and pregnant women are also at risk.
- **Health effects of carbon monoxide; Long-term Exposure:** The health effects of CO are related to the concentration and length of exposure. New studies indicate that chronic, low level exposure can have serious health consequences and may be misdiagnosed.
- **Ask your health care provider** about carbon monoxide.





**Recognizable symptoms of CO exposure include reactions that mimic or have similarity to many other conditions.**

**PICK A SYMPTOM**

**FOOD POISONING, FLU, HEADACHE, NAUSEA, TIREDNESS, DEPRESSION, WEAKNESS, DISORIENTATION, SEIZURES, COMPLICATED ANGINA, BLURRY VISION, RAPID HEART BEAT, PARKINSONISM, MULTIPLE SCLEROSIS & ALZHEIMER SYMPTOMS, TO NAME A FEW.**

**How many sufferer's are treated medicinally with prescription, home remedy , over the counter or other?**

**Don't guess with CO. Begin low level CO detection today and everyday and maybe prevent feeling poorly or worse.**

# When you measure low level CO

- If you are using a carbon monoxide alarm device that loudly alerts you to levels above 10 PPM you may be startled and at times even annoyed. **Remember**, some of us live, work or visit spaces where combustion gas is prevalent in the air and we are unaware of it unless we measure for it. Some lifestyle habits contribute to the concentration of CO in air.
- Fire and emergency response personnel use devices that sound at 35 PPM or lower and when they would wear their safety air packs.

# Understanding Low Levels of CO

Due to uncertain health circumstances, any concentration of carbon monoxide inhaled may be hazardous. We are not all healthy people.

- **1-9 PPM** - It may be difficult to avoid those often occurring spikes in transient or chronic CO levels without life-style changes.
- **9 PPM** – This is a recommendation by ASHRAE (American Society of Heating, Refrigeration & Air-conditioning Engineers) for a TWA (time weighted average) in a 24 hour continuous indoor exposure. This level is also an EPA 8 hour TWA outside air standard. (This concentration is often measured around busy city streets & intersections.)
- **10–35 PPM** - Marginal for small children, elderly, and those suffering respiratory or heart problems are cautioned if these concentrations are constant exposures; may increase heart stresses. Your low level CO alarm should alert you when the CO levels are within these concentrations.

# Understanding Low Levels of CO

**Your low level CO monitor could alert you at the onset of a small structural fire emitting CO as it smolders, before intensifying.**

- **10–35 PPM** - Breathing apparatus & civilian evacuations begin or are completed by Fire Departments when levels are within this range. Find out what the breathing apparatus and evacuation levels are for carbon monoxide in your community.
- **10-35 PPM** is also the range of CO where visual and audible alarm notifications should begin on your low level CO monitor. If that alarm sounds, know your sources and respond accordingly; or suffer some consequences.
- **25 PPM** is an 8 hour TWA (time weighted average) limit as recorded by ACGIH (American Conference Of Governmental Industrial Hygienists).
- **35 PPM** is an 8 hour exposure limit in a TWA (time weighted average) as recorded by NIOSHA (National Institute of the Occupational Safety and Health Administration) of the CDC (Center for Disease Control).
- **50 PPM** is the maximum average level for continuous exposure in an 8 hour workday per federal law (U.S.) OSHA



# Understanding High Levels of CO

The following U.L. 2034 Listed carbon monoxide alarms 3 test points are the only concentration-to-alarm requirement to be verified before listing, labeling, manufacturing and sales to the public. 70 PPM is the lowest required alarm.

- **70 PPM** If CO is at this level for 4 hours, UL 2034 Listed alarm should be sounding. The UL Listing requires that to be eligible as a high level CO alarm, it must resist alarming for at least one hour when above this level but must alarm before 4 hours. (Over 70 PPM and under 150 PPM). This is unhealthy air. (10 PPM to 70 PPM is very unhealthy air.)
- **150 PPM** UL Listed 2034 CO alarms must respond within range of 10 to 50 minutes at this level or higher. Must resist first 10 minutes. (Over 150 PPM and under 400 PPM). This is unhealthy air.
- **400 PPM** - Frontal headaches within 1-2 hours; life threatening within 3 hours; UL 2034 alarms should sound within 15 minutes. Cannot alarm during the first 4 minutes when above this level. (Over 400 PPM and could be in the thousands of PPM and the UL 2034 Listed, high level carbon monoxide alarm must wait 4 minutes.

Due to mandatory delays in alarming requirements, UL 2034 Listed CO alarms are not easily verified in the field to respond to the CO alarm concentrations they are manufactured to respond to.

# Understanding High Levels of CO

- **200 PPM** - NIOSH (National Institute for Occupational Safety & Health Administration) states that a worker will not be exposed to more than this amount.

The following concentrations are health impacts on healthy people.

- **400 PPM** - Frontal headaches within 1-2 hours; life threatening within 3 hours
- **800 PPM** - Nausea and convulsions – death within 2 hours
- **1,600 PPM** - Nausea within 20 minutes, death within 1 hour
- **12,000 PPM** - Death within 1 – 3 minutes

You have made a wise choice in owning a low level home and travel CO alarm monitor. Carbon monoxide poisoning occurs far too often with terrible outcomes. Get that early warning and stay safe.

# TPI Model 780 Low Level CO Monitor



780 with Check Gas Cup and Certified CO Gas and placed in a common area at home. See TPI Model 780 instruction sheet that comes with each unit. Read them carefully.

# Carbon Monoxide Safety Begins At Home (This is the test!)

- Measurement is the best educator when it comes to carbon monoxide safety. COSA encourages each consumer to make a checklist of anything in your home that can produce carbon monoxide, including garages, outdoor barbeques and other systems that burn fuels for power or use. When your low level CO monitor alarms, note which system or systems are operating.

Visit [www.cosafety.blogspot.com](http://www.cosafety.blogspot.com) Contact [bobdwyer@cosafety.org](mailto:bobdwyer@cosafety.org)

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