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100% Effective Natural Hormone Treatment
Menopause, Andropause And Other Hormone Imbalances
Impair Healthy Healing In People Over The Age Of 30!

Industrial ppm CO measurements

By Scott Cowe of Dover Gas Technologies

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It is a well known and heavily publicized fact that carbon monoxide is a dangerous gas even at low exposure levels. While measurement solutions for residential applications are fairly simple, industrial and commercial applications require a much more sophisticated instrument. Problems with the accuracy of many measurement devices arise due to zero instability and cross sensitivity to other gasses on the sensors especially in industrial situations where temperature changes and the presence of other process gasses are an ongoing part of everyday life.

Upper exposure limits for CO in the work place are normally set to provide alarms or warnings at 25-50ppm, sensor inaccuracies often cause alarms to be triggered when in fact no actual carbon monoxide danger exists.

When higher levels of CO **are** present, proper safety procedure calls for the halt of production and the evacuation of all personnel from the area until the levels can be verified, reduced and the source identified. These precautions taken against this potentially deadly gas show responsibility on the part of the employer and can save the lives of many who work to make the company profitable. The resulting down time can however have many detrimental effects including, employee stress, safety concerns from outside agencies, and reduced production, it is therefore vitally important that we ensure that CO alarms are set off only by actual increased levels of carbon monoxide. In an effort to reach this goal there are a number of considerations to be looked at, the following information is provided for that purpose.

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The most common types of detectors used for Carbon Monoxide measurements are,

1) NDIR or infra-red which although is very specific to the gas being measured requires a warm-up time, is fairly large, can consume larger amounts of power making it unsuitable for small or portable instruments, and is more expensive. For ranges of CO measurement in industrial uses other than Low ppm this technology is by

far the number one choice.

2) Solid State, while this technology is small and cost effective it is not selective enough for CO only measurements and usually has higher temperature drift making the zero unstable.

3) and Electrochemical which is the primary choice for the majority of Carbon Monoxide analyzers on the market today due to it's many benefits which include, size, weight, power, cost, and proven performance.

The remainder of this article will deal only with the electrochemical sensor.

There are a number of electrochemical sensor manufacturers worldwide and each of these has a number of sensors designed for carbon monoxide measurements in different applications, choosing the right one is the key to success. The output from most of these sensors is very low, (pico amps per parts per million) so even subtle changes or correction procedures must be dealt with using extreme care in order to preserve the integrity of the signal.

Sensors designed for higher concentrations of CO have a lower output per ppm which can cause it to have a

higher temperature coefficient, this leads to zero instability making it unsuitable for our task.

Carbon and chemical filters are often attached to the face of the sensor or added in the sample stream to diminish

the effects of cross interference to many of the commonly encountered such as H₂S, SO₂, NO_x, etc..

This filter, it's efficiency and life span can be an important consideration when measuring CO in the 0-50ppm

range.

In a number of applications background levels of Hydrogen given off by nearby processes have been found to

cause major problems with accurate low level carbon monoxide measurements and alarms. While it is possible

for hydrogen levels to cause safety concerns that should be reported, the limit is magnitudes higher than what

causes the CO alarms to trigger on most instruments. A hydrogen level of as little as 60ppm can trip

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the CO alarms of many analyzers. The lower explosive limit (lel) for hydrogen is 4%, ten percent of that i.e.l. would be 4000ppm, so we see that the 60ppm is insignificant to personnel safety but remains problematic to the carbon monoxide measurement. This cross interference can not be easily overcome with chemical filters and therefore required a different approach. It has been found that by measuring the hydrogen separately and using

that signal in conjunction with the mixed CO/H₂ signal the majority of the interference can be nulled out, again manufactures deal with this differently with varying results. The use of two separate sensors can create a compensation lag time and there may be temperature coefficient differences between the sensors, either of which will cause errors in the readings and provide false alarms. Similar temperature problems can be found with units that use a single sensor but do the electronic nulling and temperature compensation remote of the sensor itself.

There are sensors now available that have separate electrodes for the H₂ and CO/H₂ signals with the nulling and temperature compensation circuit attached directly to the rear of the sensor itself. The output of this surface mount board is in the millivolt range making it less susceptible to interference and change from wiring, connectors and temperature effects. Each sensor and attached PCB come completely pre-calibrated for H₂ cross interference and relative CO output. Only a single calibration gas is required over the life of the sensor (2 years) with no need for re calibration of the hydrogen signal nulling found in any of the units put into service. In addition, the internal chemical filter provides excellent reduction of cross interference due to other common gasses found. This customer replaceable sensor has proven itself over time to provide consistently accurate results in demanding applications against competitors instruments.

Dover Gas Technologies Inc. www.dovergas.com incorporates such a sensor, we believe it best suits the needs addressed above and use it in many of our portable, transmitter, and monitor products for low level ppm CO measurement.

President and operations manager of Dover Gas since 1991 with 8 years of prior experience in the gas analysis field.

Carbon Monoxide Levels – How Much is too Much?

By Alexandria Haber

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What is carbon monoxide?

Carbon monoxide or CO is a colorless, odorless and tasteless gas. Due to this fact, it is very hard to detect the presence of CO in your environment. It is, however, imperative that the CO levels in your home are carefully monitored. Even at relatively low levels, CO is poisonous because it rapidly accumulates in the blood thereby depleting its ability to carry oxygen. Extreme cases of CO poisoning result in death.

Where does carbon monoxide come from?

CO is a common by product of the combustion of fossil fuels. When properly installed and maintained, most fuel burning equipment (natural gas, propane or oil) will produce insignificant amounts of CO.

At what level does carbon monoxide become toxic?

For healthy adults, CO becomes toxic when it reaches a level higher than 50 ppm (parts per million) with continuous exposure over an eight hour period.. When the level of CO becomes higher than that, a person will suffer from symptoms of exposure. Mild exposure over a few hours (a CO level between 70 ppm and 100 ppm) include flu-like symptoms such as headaches, sore eyes and a runny nose. Medium exposure (a CO level between 150 ppm to 300 ppm) will produce dizziness, drowsiness and vomiting. Extreme exposure (a CO level of 400 ppm and higher) will result in unconsciousness, brain damage and death.

How to avoid carbon monoxide poisoning

- have a qualified technician install and regularly inspect all fuel burning appliances
- regularly inspect fireplaces and chimneys to insure proper ventilation
- never use a gas or charcoal barbeque indoors
- never start a car or gas run lawnmower or snow blower in a closed garage.
- install a carbon monoxide detector in your home.

Alexandria Haber is a freelance writer and is the head researcher and content manager for

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