RedWave TECHNOLOGY

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CO CROSS-SENSITIVITY AND XPLORIR

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Carbon Monoxide electrochemical sensors are commonly installed in 4 or 5-gas air monitors and are calibrated using CO at 50ppm. The issue with these and many other electrochemical sensors is that there are many cross-sensitive gases and vapors that can either give false readings or inhibit the accurate measurement of the target gas.

The only way for an operator to know that the readings on a CO sensor are accurate is to locate and identify the source of CO. Unfortunately, many inexperienced operators have a tendency to believe that if a reading is obtained on a CO sensor, then CO must be present. This is not the case and sometimes can be a dangerous assumption for both the responder and any future occupants of the structure.

Each manufacturer provides a list of known cross-sensitivities to their electrochemical sensors. One example is TN-114 from Honeywell RAE. This tech note lists 20 gases and vapors that are cross-sensitive on a CO sensor with varying responses for each. For example, Acetylene has a 1:1 response on a CO sensor and NO2 can actually have a negative response. Many alcohol vapors are also considered cross-sensitive and can potentially inhibit a CO sensor. While correction factors are available for many electrochemical cells, they tend to have high rates of error due to the non-linear response of many cross-sensitivities. Therefore, care should be taken when using the calculated concentrations, always erring on the side of safety. It is prudent for an operator to investigate the actual source of any readings that are obtained so that appropriate actions may be taken.

Cross-Sensitivity Data, CO Sensor

Gas	Concentration	Response w/o Filter[1]	Response w/ Filter[2]
Acetylene	250 ppm	250 ppm	NT[3]
Butane	100 ppm	1 ppm	1 ppm
CL_2	10 ppm	0 to 1 ppm	NT
Ethanol	200 ppm	0 ppm	0 ppm
Ethylene	100 ppm	16 ppm	NT
Ethylene oxide	125 ppm	≥40 ppm	NT
H_2	100 ppm	40 ppm	40 ppm
H_2S	10 ppm	0 ppm	0 ppm
HCl	10 ppm	0 ppm	0 ppm
Hexane	500 ppm	0 ppm	0 ppm
Isobutylene	100 ppm	9 ppm	4 ppm
Isobutylene	1,000 ppm	30 ppm	22 ppm
MEK	100 ppm	0 ppm	0 ppm
NH_3	100 ppm	0 ppm	0 ppm
Nitrogen	100%	0 to 4 ppm	NT
NO	35 ppm	0 ppm	0 ppm
NO_2	5 ppm	0 ppm	0 ppm
Propane	100 ppm	0 ppm	0 ppm
SO_2	5 ppm	0 ppm	0 ppm
TCE	100 ppm	25 ppm	15 ppm

Source: Honeywell RAE - Technical Note TN-114

The RedWave XplorIR would be a logical pairing with a CO sensor to identify the source of the readings and ensure that appropriate actions are taken. The XplorIR can identify Carbon Monoxide if it is present, but also identify all but one of the listed cross-sensitive gases, that being H2 due to the fact that it is a homonuclear diatom.

As long as the operator is using a 4-gas monitor with a Methane calibrated LEL sensor, H2 has a 1.0 correlation factor and the operator will see LEL readings well before danger is encountered. This means that an XplorIR paired with a 4 or 5-gas air monitor will increase the effectiveness and safety of a responder and the public.

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