Sensor Description

Manufacturer/Model: UniTec SENS-IT CO
Pollutant: CO
Measurement Range: 0 - 80 ppm
Type: Metal Oxide
Time Resolution: 1-min

Evaluation Summary

- High intra-model variability was observed among the three Sens-IT units at different CO concentrations.
- The three Sens-IT CO units showed low accuracy compared to the FRM CO monitor, for a concentration range between 0 to 23 ppm.
- Units demonstrated good precision in most of the tested environmental conditions (CO conc., T and RH). However, the Sens-IT units were susceptible to weather conditions (e.g. high temperature & RH).
- Data recovery from the three Sens-IT units was 100%.
- Sens-IT CO units showed weak correlations with the FRM CO in the field ($R^2$: 0.33-0.43) and strong correlations in the lab ($R^2 > 0.90$).

Field Evaluation Highlights

- Deployment period 07/01/2015–07/31/2015: the three Sens-IT units had a modest correlation with the FRM instrument.
- Data recovery from the Sens-It units was greater than 99%

Coefficient of Determination ($R^2$) quantifies how the three sensors followed the CO concentration change by FRM. An $R^2$ approaching the value of 1 reflects a near perfect agreement, whereas a value of 0 indicates a complete lack of correlation.
Accuracy was evaluated by a concentration ramping experiment at 20 °C and 40%. The sensor's readings at each ramping steady state are compared to the reference instrument.

Negative % means sensors’ overestimation by more than two fold. The higher the positive value (close to 100%), the higher the sensor’s accuracy.

Sensor’s ability of generating precise measurements of CO concentration at low, medium, and high pollutant levels were evaluated under 9 combinations of T and RH, including extreme weather conditions like cold and humid (5 °C and 65%), hot and humid (35 °C and 65%), cold and dry (5 °C and 15%), and hot and dry (35 °C and 15%).

The Sens-IT units showed very strong correlations with the corresponding FRM data ($R^2 = 0.99$) at 20 °C and 40% RH.

Climate Susceptibility (linear correlation $R^2$)

From the laboratory studies, low temperature and low humidity had a negative effect on the SensIT CO’s linear correlation with FRM instrument.

**Observed Interferents**

Low and high temperature and humidity.