

AQ-SPEC

Air Quality Sensor Performance Evaluation Center

Evaluation Summary

Sensor Description

Manufacturer/Model:
Oizom/Polludrone Smart

Pollutants:
CO, O₃, NO, NO₂

Time Resolution:
1-min

Type: Electrochemical



- Overall, the accuracy of the Oizom Polludrone Smart sensors ranged from 13.6% to 63.2% and decreased as CO conc. increased over the tested concentration range. The sensors underestimated the CO measurements from FRM T300U in the laboratory experiments at 20 °C and 40% RH. The sensor's readings plateaued at 5 ppm.
- The Oizom Polludrone Smart sensors exhibited high precision for all T/RH combinations and all CO concentrations.
- The Oizom Polludrone Smart sensors (IDs: 0001, 0002, 0003) showed low intra-model variability in both the field and laboratory evaluations.
- Data recovery was ~95% - 100% from all units in both field and laboratory evaluations.
- The Oizom Polludrone Smart sensors showed moderate to strong correlations ($0.63 < R^2 < 0.72$, 5-min mean) with the corresponding FRM data in the field evaluation and weak correlations with the FRM T300U in the laboratory evaluations ($R^2 \sim 0.35$).
- The same three Oizom Polludrone Smart units were tested both in the field (1st stage of testing) and in the laboratory (2nd stage of testing).

Field Evaluation Highlights

- Deployment period 07/31/2021 to 09/29/2021 : the three Oizom Polludrone Smart sensors showed moderate to strong correlations with the corresponding FRM CO data.
- The units exhibited low intra-model variability and data recovery for CO measurements was ~95-99% from all units.

Additional Information

Field evaluation report:

<http://www.aqmd.gov/aq-spec/evaluations/field>

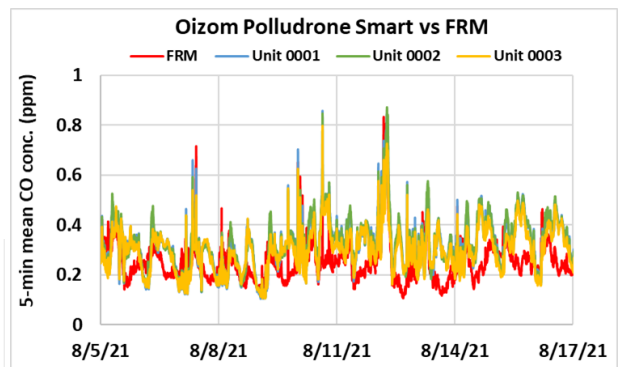
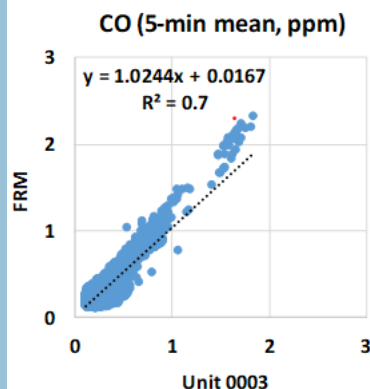
Lab evaluation report:

<http://www.aqmd.gov/aq-spec/evaluations/laboratory>

AQ-SPEC website:

<http://www.aqmd.gov/aq-spec>

5-min mean
 $0.63 < R^2 < 0.72$



Coefficient of Determination (R^2) quantifies how the three sensors followed the CO concentration change by the reference instruments.

An R^2 approaching the value of 1 reflects a near perfect agreement, whereas a value of 0 indicates a complete lack of correlation.

Laboratory Evaluation Highlights

Accuracy (CO)

$$A (\%) = 100 - \frac{|\bar{X} - \bar{R}|}{\bar{R}} * 100$$

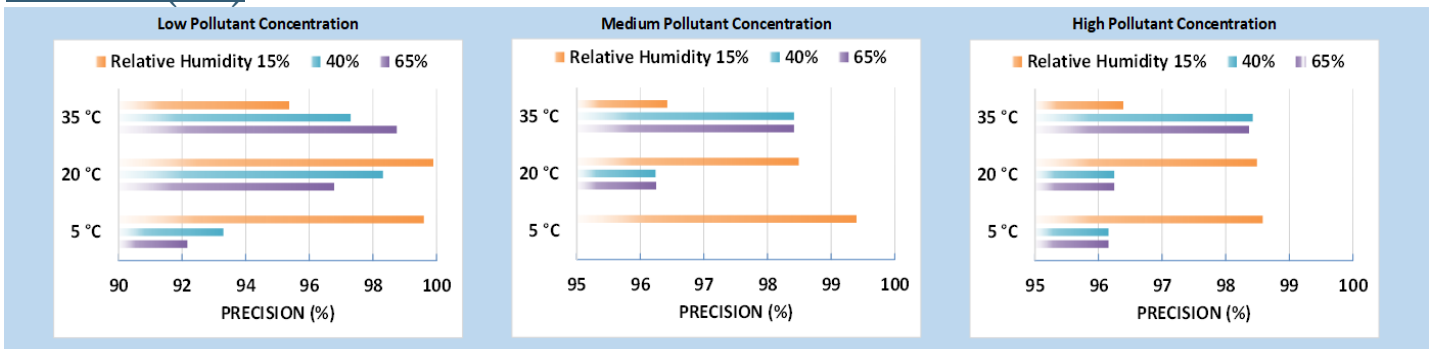
Steady State (#)	Sensor Mean (ppm)	FRM T300U (ppm)	Accuracy (%)
1	1.1	2.0	54.1
2	4.8	7.6	63.2
3	4.8	15.2	31.7
4	4.8	25.3	19.0
5	4.8	35.4	13.6

Accuracy was evaluated by a concentration ramping experiment at 20 °C and 40% RH. The sensor's readings at each ramping steady state are compared to the reference instrument.

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



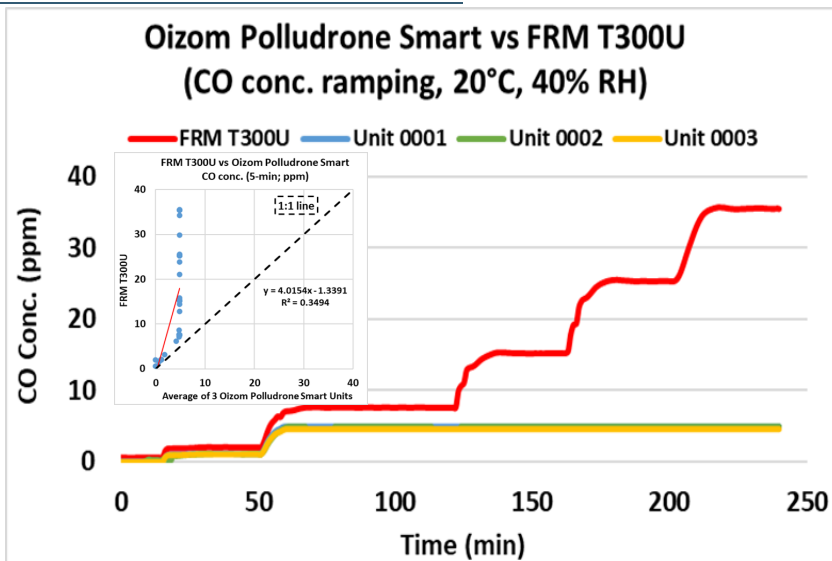
Precision (CO)



100% represents high precision.

Sensor's ability to generate 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 dry (5 °C and 15%) cold and humid (5 °C and 65%), hot and humid (35 °C and 65%), or hot and dry (35 °C and 15%).

Coefficient of Determination



The Oizom Polludrone Smart sensors showed very strong correlations with the corresponding FRM T300U CO data ($R^2 \sim 0.35$) at 20 °C and 40% RH.

Climate Susceptibility

From the laboratory studies, temperature and relative humidity had minimal effect on the Oizome Polludrone Smart sensors; However, the sensor's readings plateaued at 5 ppm in all conditions tested.

Observed Interferents

N/A



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