Manufacturer/Model: 2B Technologies POM (FEM EQOA–0815–227)
Pollutant: Ozone
Linear Dynamic Range: 2 ppb - 10 ppm
Type: UV Absorption
Time Resolution: 10-second to 1-hour

Overall, the three POM units showed high accuracy, compared to the FRM ozone monitor, for a concentration range between 0 to 400 ppb.

The three POM units exhibited high precision during almost all tested environmental conditions (ozone conc., T and RH). POM 1122 experienced some instability at 5 °C, 40% RH and 20 °C, 65% RH.

The three POM units showed low intra-model variability (~13%), as well as good data recovery (> 90%).

They showed very strong correlations with the FRM instrument from both the field (R² > 0.99) and laboratory studies (R² > 0.99).

Field Evaluation Highlights:

Deployment period 07/29/2015 - 09/09/2015: the three POM units followed the ozone concentration change as monitored by FRM instrument.

POM 1043, 1105, and 1106 had 99%, 92%, and 91% data recovery, respectively.

The units have low intra-model variability (+/- 10%).

Coefficient of Determination (R²) quantifies how the three sensors followed the ozone concentration change by FRM. An R² 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

\[ A(\%) = 100 - \frac{|\bar{X} - R|}{R} \times 100 \]

<table>
<thead>
<tr>
<th>Steady State (#)</th>
<th>Sensor mean (ppb)</th>
<th>FRM (ppb)</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>37.1</td>
<td>41.0</td>
<td>90.5</td>
</tr>
<tr>
<td>2</td>
<td>73.8</td>
<td>82.1</td>
<td>89.9</td>
</tr>
<tr>
<td>3</td>
<td>107.1</td>
<td>120.8</td>
<td>88.6</td>
</tr>
<tr>
<td>4</td>
<td>212.7</td>
<td>235.0</td>
<td>90.5</td>
</tr>
<tr>
<td>5</td>
<td>296.8</td>
<td>330.9</td>
<td>89.7</td>
</tr>
</tbody>
</table>

Three brand new POMs were used in the lab testing.

Accuracy was evaluated in a concentration ramping experiment at 20 °C and 40% RH. The sensor’s readings at each ramping steady state were 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.

Precision

Sensor’s ability of generating precise measurements of ozone 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%).

Coefficient of Determination

The three POM units showed very strong correlations with the corresponding FRM data \( R^2 > 0.99 \) at 20 °C and 40% RH.

Climate Susceptibility (\( R^2 \))

<table>
<thead>
<tr>
<th></th>
<th>5 °C</th>
<th>20 °C</th>
<th>35 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>40%</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>65%</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
</tbody>
</table>

From the laboratory studies, temperature and humidity did not affect 2B POM’s linear correlations with FRM instrument.

Observed Interferents

None.

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