

2B Technologies, Inc.

An InDevR Company

Technical Note No. 016

Recommended Calibration Procedure for Model 306 Ozone Calibration Source™

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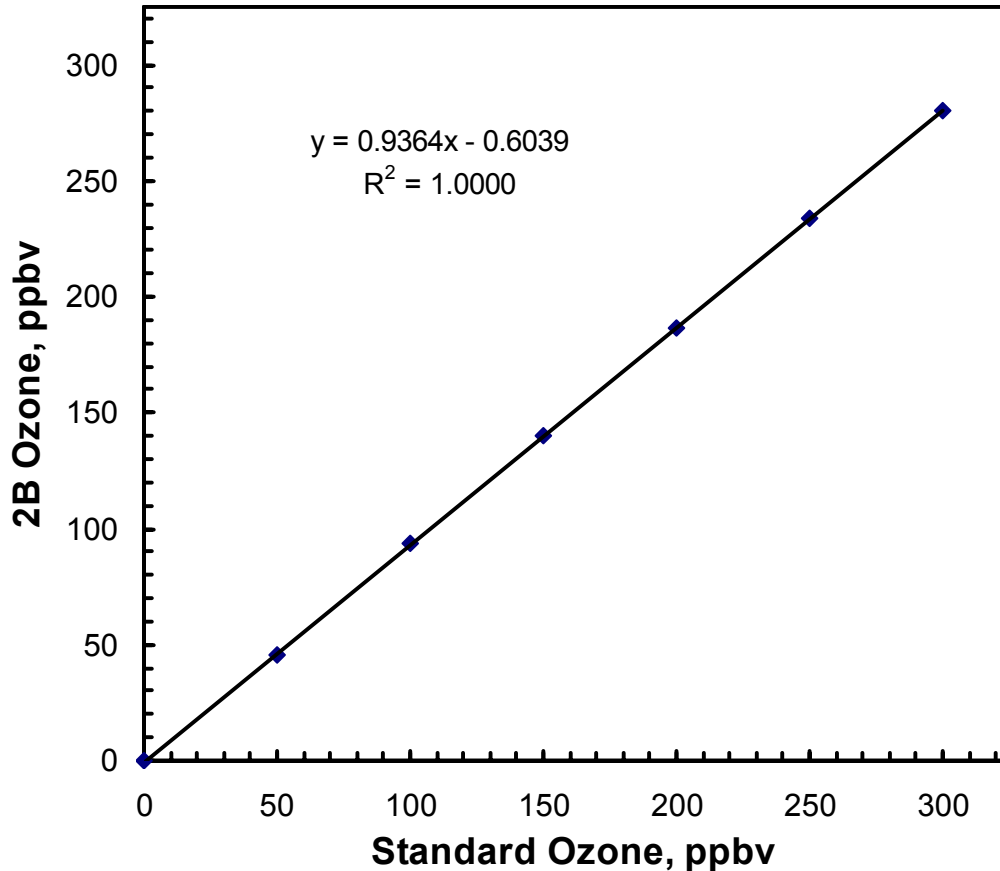
- 1.** Enter the instrument menu and make a note of the calibration parameters, Z and S, that are in use in the instrument. These parameters may be useful for correcting recent data obtained with the instrument. Also, it is useful to compare the new calibration parameters to the old ones in order to diagnose any problem with the instrument. Now set the calibration parameters to $Z = 0$ and $S = 1.00$.
- 2.** Attach the outlet of the Ozone Calibration Source™ to a calibrated ozone monitor that has been properly zeroed by use of an external ozone scrubber.
- 3.** Check the instrument offset (zero) by collecting data points with the Ozone Calibration Source™ set to output zero. Allow sufficient time for the Ozone Calibration Source™ to reach zero concentration. It may take a few minutes for the measurement to stabilize as the ozone scrubber internal to the Ozone Calibration Source™ equilibrates with ambient conditions. Average a minimum of 10 data points after the reading has stabilized. If the measured ozone concentration is not in the range -1 to +1 ppb, then the Ozone Calibration Source™ is either not completely scrubbing out ambient ozone or is contaminated. You may need to change the internal ozone scrubber and/or clean the flow path of the Ozone Calibration Source™ with methanol in order to obtain zero ozone output.
- 4.** Measure the output of at least two ozone concentrations. At 2B Technologies, we use nominal values of 50, 100, 150, 200, 250 and 300 ppb. At each output concentration, you should wait until the concentration measurement is stable, and then average a minimum of 10 measurements.

Plot the data with true concentration on the x axis and measured concentration on the y axis in a program such as Microsoft Excel. Now fit the data with a linear regression, making sure that the program provides you with the equation of the least squares line. The calibration parameters are given by

$$S = 1/m \quad \text{and} \quad Z = -b$$

where m is the slope and b is the y intercept of the equation $y = mx + b$.

The following is an example of calibration data:



In this example, the calibration parameter S would be $1/0.9364 = 1.068$, and the calibration parameter Z would be $+0.6$.

Note: This procedure differs from calibrating an ozone monitor. For an Ozone Calibration Source™, it is important to make sure that the instrument outputs zero ozone when set to zero. Any offset parameter, Z , is only applied by the instrument when the ozone source is turned on, so it does not affect the zero output but does affect the ozone output at non zero concentrations.

5. Enter the calibration parameters into the instrument menu. As a check, it is a good idea to then measure zero and one or more other ozone output concentrations to make sure that your calibration is accurate.

If Z is outside the range -5 to +5 ppb, the instrument probably needs to be cleaned or repaired. The S parameter typically can be any value in the range 0.50 to 1.50.