TELEDYNE
INSTRUMENTS
Advanced Pollution Instrumentation
A Teledyne Technologies Company
9480 Carroll Park Drive, San Diego, CA 92121-2251
Phone (858) 657-9800 Fax: (858) 657-9818 Toll Free 1800 324-5190
E-mail: api-customerservice@teledyne.com http://www.teledyne-api.com

Service Note

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SELECTING CALIBRATION GASES

I. PURPOSE:

To help our customers select the calibration gases for their analyzers. It has come to our attention that, with the release of our new high concentration SO_2 analyzer, some of our customers are having a hard time deciding what concentration and matrix of calibration gasses they should buy for their analyzers. We are trying to provide some guidelines for our customers to help them when selecting calibration gasses and zero air for our Ambient and Stack Analyzers.

II. TOOLS:

N/A

III. PARTS:

N/A

IV. PROCEDURE:

M100A- Ambient

1. When selecting calibration gasses for your ambient analyzers, please keep in mind that 100% N_2 will cause erroneous readings in the M100A analyzer or any other UV fluorescent analyzer. The issue is that O2 in your sample quenches the UV fluorescence of SO2, causing a reduced reading (the analyzer can appear to be non linear or have an offset). When the analyzer is calibrated on zero air, the O2 in the zero air matches the quenching affect of O2 in the sample & the readings are not affected by it. When the analyzer is calibrated on N2 the quenching affect is NOT calibrated out Because of this effect we recommend that you use ultra-pure air or Activated charcoal (as Teledyne API sells for our IZS option), as your zero air source. If you use N_2 you will have a positive offset that will make the analyzer read negative when you go back to ambient air.
2. Span Gas: If you are going to take the span gas right out of the bottle (not using a dilution calibrator), we recommend that you buy your SO_2 with a balance of air. If you have a balance of N_2 you are going to see the quenching error mentioned in item one above.
3. If you are going to use a dilution style calibrator you can buy your gas with a balance of N_2. When you dilute the bottle gas with air the N_2 quenching will not be a factor to the analyzer, as you are using air that has O2 in it.

M100AH- Stack

1. If your calibration gas for your M100AH analyzer has NO in the bottle & your balance gas is N_2, you are going to have to make sure that the bottle also has CO_2 in it. The reason is that the NO in the bottle will fluoresce strongly in the presence of pure N_2. By adding CO_2 to the bottle, the NO fluorescence will be reduced significantly. We would recommend that you add approximately 10% CO_2 to your cylinder, a more accurate value of NO to put in your bottle would be the actual concentration of NOx that you are going to see in the stack while the analyzer is on line. This means that ALL the bottles are going to have to have the NO in it, not just the span bottle.

2. As the actual stack gas is going to have both CO_2 and air in the sample the NO is not going to be an interferent as the SO_2 has a rejection ratio for NO of 150/1.

M200AH & M252H Stack

1. If you are using a high level concentrate cylinder to do high level NO_x calibrations and are going through a dilution calibrator, there is an issue with the diluent gas. If you use air as your diluent, some of the NO will titrate to NO2 before it gets to the analyzer. When you calibrate the analyzer upper point, the calibration will be okay, but when you select a lower conc. of gas for your linearity point the analyzer will look non-linear. The reason for this is that you will get different amounts of titration with different amounts of cal gas. To remedy this problem, use N_2 instead of air as your diluent gas. This will ensure that you don't titrate any of the NO to NO_2 when you are going through your calibration, and the analyzer will be linear.
2. If you are using separate bottles of gas for your calibration & linearity checks you will not see this, as all the bottles are going to be in N_2.
3. Another thing to keep in mind is that, CO_2 will quench NO Chemiluminescence. What this means is that when you select your bottle you should have the amount of CO_2 in your bottle that you are going to have in your stack.