

# Technical Note: MRK-D-0303 AQM 65 Ozone calibration procedure using 2B Tech Model 306 ozone calibration source

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This procedure describes the process of AQM65 ozone module span calibration using the 2B Tech Model 306 ozone calibration source. Ozone module calibration can be carried out as part of a calibration of multiple AQM65 modules.

## Before you begin

- Aeroqual recommends that all 2B Tech ozone calibration sources, whether supplied by Aeroqual or directly from 2B Tech are 'run in' to ensure they generate stable concentrations of ozone. This process should be carried out on first receipt of the 2B Tech ozone calibration source, and only needs to be done once.
  - o The 2B Tech ozone calibration source should be set to deliver 200 ppb and run for 12hrs before first use to calibrate AQM65 modules. Ensure that the output of the 2B Tech ozone calibration source is vented appropriately through a fume hood or similar extraction device.
- The 2B Tech ozone calibration source does not have a scrubber for removing VOC. Consider this when deciding where and when to calibrate your AQM65 module. Laboratory, factory environments and some outdoor environments may have high VOC which will impact calibration accuracy. Aeroqual can advise you before beginning calibration if needed.

## Materials Required

- Run in and calibrated 2B Tech ozone calibration source (Model 306).
- Source of zero air (Aeroqual Air Cal 1000).
- Length of ¼" OD Teflon tubing with Swagelok fittings on each end.
- Swagelok 3 way Tee fitting
- Swagelok blocking cap.
- 2 x 9/16<sup>th</sup> or 2 x 14mm spanner for tightening ¼" Swagelok fittings
- Factory Calibration certificate and gains for 2B Tech ozone calibration source.
- AQM65 calibration procedure and field sheet.

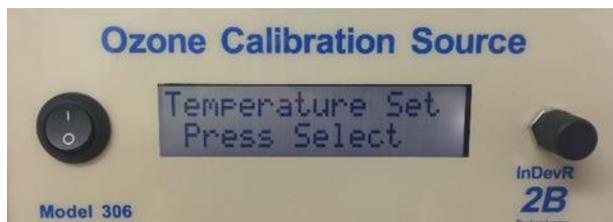
## Assumptions

- This procedure assumes that the calibration technician is familiar with the AQM65 calibration procedure and the 2B Tech Model 306 ozone source. See the user manual located here: [http://www.twobtech.com/docs/manuals/model\\_306\\_revD.pdf](http://www.twobtech.com/docs/manuals/model_306_revD.pdf)
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**Note:** 2B Tech provides 2 calibration gain settings for each instrument. Ensure you have selected the appropriate gain setting and programmed this into the instrument. Details of these settings are available in the user's guide and the calibration gain settings are found on the calibration certificate from 2B Tech.

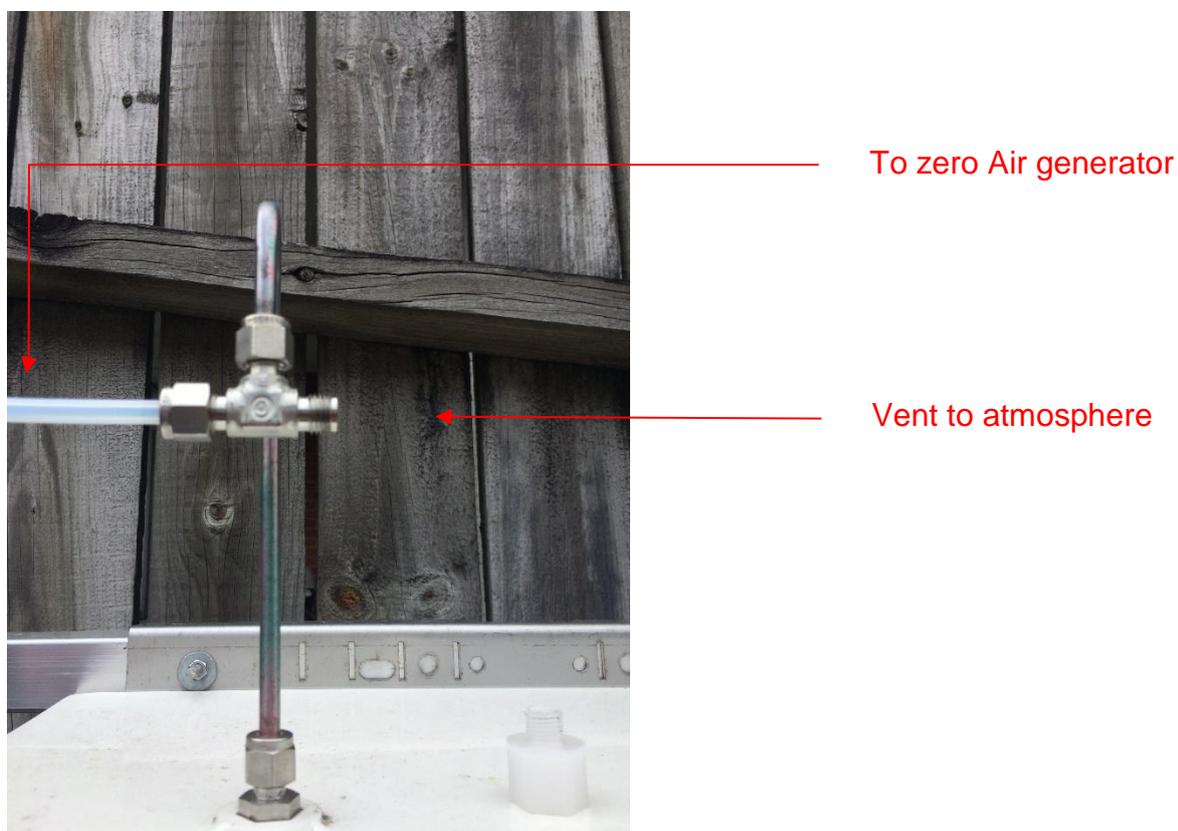
## Procedure

1. Place ozone source beside AQM65 on a flat surface. Shade from direct sun. Turn on to warm up. The instrument will display “temperature set” as below when stable.



Picture 1: 2B Tech ozone calibration source displaying temperature

2. Remove the inlet mesh filter from the AQM65 inlet. Connect a 3 way tee to the inlet. Connect your zero air generator to one side of the tee and leave the other port open to atmosphere as shown below.



Picture 2: Example intake connection for zero air source to AQM65

## Zero calibration

**While the ozone calibration source warms up, perform zero calibration on AQM65 modules!**

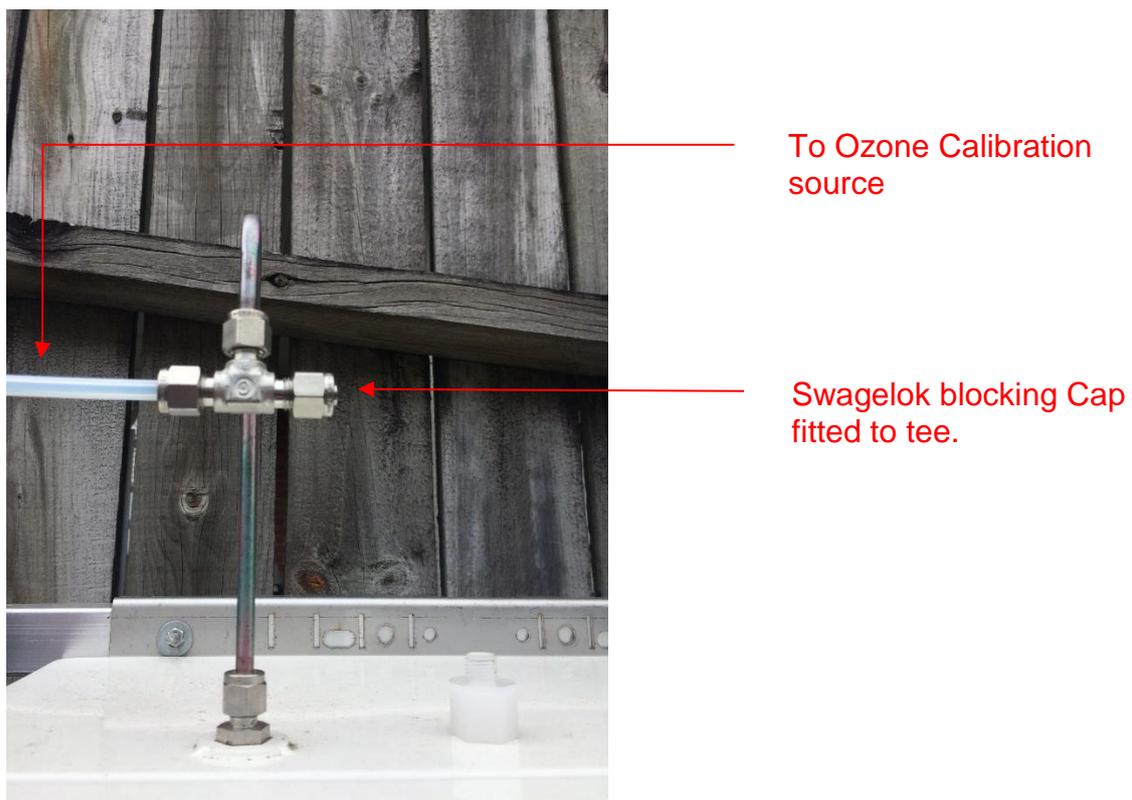
3. Allow the AQM65 to sample zero air from your zero air generator. Allow the AQM65 to sample zero air until readings on the AQM65 are stable.
4. If the readings are stable then record the stabilised values in the calibration form from the 10 minute average.

5. If the values are stable and within the accepted range then write pass in the last column, and move on to next module.
6. If the values are stable but outside the acceptance range then calculate a new offset
7. If the calculated offset is within acceptable limits upload the new offset.
8. If the required offset is outside the recommend limits do not upload the offset, write fail in the last column.
9. If an offset was uploaded then record the readings after the new offset has been uploaded (10 minute average). Confirm the readings are within acceptable limits, if yes then pass, and move on to next module.

## Span Calibration

10. Disconnect the ¼ inch tubing from your zero air generator and connect to the outlet of the ozone calibration source to the inlet of the AQM. Block the open port on the tee fitting, as below.

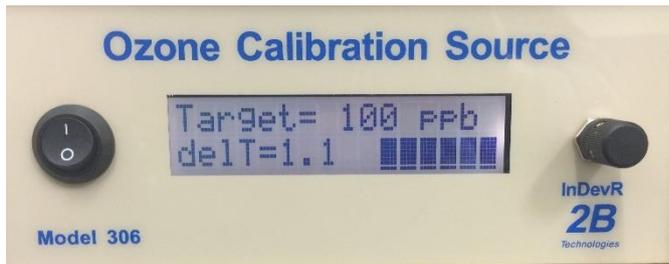
**NOTE: The 2B Tech 306 has an internal tee that vents excess span flow so if a tee is used on the AQM65 inlet its outlet must be capped off so that the AQM65 is directly sampling the outlet of the 306.**



Picture 3: Example connection of ozone calibration source to AQM65

11. Stop flowing zero air and select the concentration of the span you wish to generate.
12. Allow the instrument to stabilise. The instrument will show on its display (as below) when the lamp intensity is in the correct range to generate the desired concentration.

Allow the 2B Tech ozone calibration source to run for an additional 30 minutes to ensure the span concentration is stable.



Picture 4: Stable ozone concentration on 2B Tech ozone calibration source

13. Allow the AQM65 to sample the ozone span, until readings are stable.
14. If the readings are stable then record the stabilised values in the calibration form from the 10 minute average.
15. If the values are stable and within the accepted range then write pass in the last column, and move on to next module.
16. If the values are stable but outside the acceptance range then calculate a new gain.
17. If the calculated gain is within acceptable limits upload the new Gain.
18. If the required gain is outside the recommend limits do not upload the gain, write **fail** in the last column.
19. If a gain was uploaded then record the readings after the new gain has been uploaded (10 minute average). Confirm the readings are within acceptable limits, if yes then pass, and move on to next module.
20. Stop flowing the ozone span, and switch to zero air from the 2B Tech Ozone Source to purge ozone from the ozone calibration source and sample lines. Flow zero air for 10 minutes, then switch off the calibration source and remove Teflon tube and connections.
21. Replace mesh filter on sample inlet.