



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711
OFFICE OF AIR QUALITY PLANNING AND STANDARDS

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Technical Note:

Secondary Calibration Source Use for Ethylene Oxide Analysis in the National Air Toxics Trends Stations Network

Ethylene oxide (EtO) is a volatile organic compound (VOC) that was recently updated in the Integrated Risk Information System (IRIS). EtO has not been a standard analyte in the suite of VOCs that are measured as part of the ongoing National Air Toxics Trends Sites (NATTS) program. However, based on the revised IRIS value as well as the results from local ambient monitoring studies conducted in CO, IL, and MI, an EPA priority now includes the addition of EtO to the NATTS Tier I compound list for analysis using TO-15.

In the NATTS analytical community, there is concern regarding the stability of EtO standards in cylinders that are to be used as primary or secondary source standards using the TO-15 method. Communications from NATTS laboratories beginning EtO analysis have indicated that there may be varying degrees of degradation inside the cylinder creating difficulty in meeting the secondary source calibration verification (SSCV) of $\pm 30\%$ recovery of the nominal or mean initial calibration (ICAL) relative response factor (RFF). OAQPS has developed this memo to provide clarification and guidance on the procurement and use of the primary and secondary source standards in supporting the EtO monitoring work in the NATTS.

When analyzing a Tier I compound, the NATTS Technical Assistance Document (TAD) requires the use of a secondary standard in the TO-15 method. Section 4.2.8.3.2 states the following:

“4.2.8.3.2 Secondary Source Calibration Standards. Secondary source stock calibration gases must be procured from a separate supplier and meet the criteria listed above in Section 4.2.10.3.1. A standard prepared with a different lot of source material from the same supplier as the primary calibration stock is only acceptable if it is unavailable from another supplier. As with the calibration stock gases, the secondary source stock must be recertified annually.”

In analyzing EtO, OAQPS considers the term “unavailable” to be equivalent to “unacceptable” if the gas standard is not of sufficient quality for use. Therefore, in cases where EtO stability has been a concern with a standard, a laboratory may purchase a secondary standard from the same supplier **only if it is from a different source material**, or lot, from the primary standard as described above.

When purchasing EtO standards, the standards must include a certification date with a tolerance over the certification period. If a standard’s concentration decreases over time outside of that tolerance, the standard is then considered unacceptable at such time. Understanding the EtO stability concern in the standards, laboratories should exercise additional vigilance in observing and reviewing the recovery of the SSCV to detect drift over time. Corrective action should include investigating standards preparation, comparing measurements against the certificates of analysis (COA), and possibly procuring a new standard. If drift is observed from the COA, the laboratories are highly encouraged to inform the vendors of the drift and return the cylinders.

Over the next year, OAQPS will be working with both the NATTS laboratories and the gas vendors to determine where issues exist and to find solutions to improve EtO stability in calibration standards. At this time, OAQPS has limited data on EtO stability in cylinders from various gas vendors. The following attachment provides the vendor(s) that have initially demonstrated success producing EtO standards that retain stability within the measurement tolerance for a year. EPA does not endorse or recommend any vendors on this attachment, rather the list is intended to reflect the best available information at this time. As vendors demonstrate the capability to produce stable EtO standards, they will be added to the list. OAQPS will also continue to provide updates to the NATTS analytical community on EtO and related topics.

Doris Chen
US EPA, OAQPS
AQAD/AAMG
Research Triangle Park, NC
chen.xi@epa.gov

Greg Noah
US EPA, OAQPS
AQAD/AAMG
Research Triangle Park, NC
noah.greg@epa.gov

Ethylene Oxide Calibration Gas Standard Vendors (Updated as of August 22, 2019)

Vendor	Concentration Level	Tolerance Level	Certification Duration
Apel-Riemer	1 ppm	±5%	One year