6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 50

[EPA-HQ-OAR-2022-0007; FRL 9344-01-OAR]

RIN 2060-AV63

Reference Measurement Principle and Calibration Procedure for the Measurement of Ozone in the Atmosphere (Chemiluminescence Method)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to update the current ozone absorption cross-section to the recommended consensus-based cross-section value of 1.1329×10^{-17} cm^2 $molecule^{-1}$ or 304.39 atm^{-1} cm^{-1}, with an uncertainty of 0.94 atm^{-1} cm^{-1}. The new value is 1.2% lower than the current value of 308 atm^{-1} cm^{-1}, and reduces the uncertainty in the value to 0.31%. The adoption of this updated ozone absorption cross-section could result in increases in measured ozone concentrations but given the existing sources of potential variability in monitoring data, it is unlikely that there would be any consistent measurable and predictable effect on reported data. The EPA is also proposing to update the dates of publication for two references, add a new reference for the updated cross-section value, and move the figures inadvertently placed in Section 6.0 *References* to a new Section 7.0 *Figures*.

DATES: Comments must be received on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Public hearing: If requested by **[INSERT DATE 5 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA will hold a virtual public hearing on **[INSERT DATE 21 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Please refer to the **SUPPLEMENTARY INFORMATION**

section for additional information on the public hearing.

ADDRESSES: *Comments.* You may send your comments, identified by Docket ID No. EPA-HQ-OAR-2022-0007, by any of the following methods:

- Federal eRulemaking Portal: *https://www.regulations.gov/* (our preferred method). Follow the online instructions for submitting comments.
- E-mail: *a-and-r-Docket@epa.gov.* Include Docket ID No. EPA-HQ-OAR-2022-0007 in the subject line of the message.
- Mail: U.S. Environmental Protection Agency, EPA Docket Center, Air and Radiation Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.
- Hand Delivery or Courier (by scheduled appointment only): EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m. - 4:30 p.m., Monday - Friday (except Federal Holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov/*, including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the "Public Participation" heading of the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Ms. Joann Rice, Office of Air Quality Planning and Standards, Air Quality Assessment Division, Ambient Air Monitoring Group (C304-06), Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number: (919) 541-3372; email address: *rice.joann@epa.gov*.

SUPPLEMENTARY INFORMATION:

The supplementary information in this preamble is organized as follows:

I. Public Participation
A. Written Comments
B. Participation in Virtual Public Hearing
II. Background and Proposal
III. Statutory and Executive Orders Reviews
A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review
B. Paperwork Reduction Act (PRA)
C. Regulatory Flexibility Act (RFA)
D. Unfunded Mandates Reform Act (UMRA)
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments
G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks
H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use
I. National Technology Transfer and Advancement Act (NTTAA)
J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

I. Public Participation

A. Written Comments

Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2022-0007, at *https://www.regulations.gov* (our preferred method), or the other methods identified in the **ADDRESSES** section. Once submitted, comments cannot be edited or removed from the docket. The EPA may publish any comment received to its public docket. Do not submit to EPA's docket at *https://www.regulations.gov* any information you consider to be Confidential Business Information (CBI), Proprietary Business Information (PBI), or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.*, on the web, cloud, or other file sharing system). Please visit *https://www.epa.gov/dockets/commenting-epa-dockets* for additional

submission methods; the full EPA public comment policy; information about CBI, PBI, or multimedia submissions; and general guidance on making effective comments.

B. Participation in Virtual Public Hearing

The EPA will begin pre-registering speakers for the hearing upon publication of this document in the *Federal Register.* To register to speak at the virtual hearing, please contact Ms. Joann Rice at (919) 541-3372 or *rice.joann@epa.gov*. The last day to pre-register to speak at the hearing will be **[INSERT DATE 14 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. On **[INSERT DATE 20 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, the EPA will post a general agenda for the hearing that will list pre-registered speakers in approximate order at: *https://www.epa.gov/amtic*.

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically by emailing it to *rice.joann@epa.gov*. The EPA also recommends submitting the text of your oral comments as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral comments and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing are posted online at *https://www.epa.gov/amtic*. While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact Ms. Joann Rice at (919) 541-3372 or *rice.joann@epa.gov* to determine if there are any updates. The EPA does not

intend to publish a document in the *Federal Register* announcing updates.

II. Background and Proposal

In 1961, the ozone absorption cross-section was measured to be 1.1476 x10^{-17} cm^2 $molecule^{-1}$ or 308.3 atm^{-1} cm^{-1} with a reported relative standard uncertainty of 1.4% (Hearn, 1961). In the 1980s, the National Institute of Standards and Technology (NIST), in collaboration with the EPA, developed the Standard Reference Photometer (SRP), which is the international standard for the measurement of ozone. The SRP is based on ultraviolet (UV) photometry and uses this cross-section value as the reference value for UV ozone measurements. To establish and maintain traceability, the readings of an ozone analyzer are compared through a hierarchy of standards to a NIST-made ozone SRP. Efforts to improve the accuracy of the ozone absorption cross-section have continued over several years and rigorous assessment of the bias and uncertainty in the value became a high priority.

The Gas Analysis Working Group of the Consultive Committee for Metrology in Chemistry and Biology (CCQM-GAWG) of the Bureau of Weights and Measures in France (BIPM) convened a task group in 2016 to review all published measurements of the ozone cross-section since 1950. This task group was also charged with recommending a consensus-based cross-section value and associated uncertainty to be adopted in standard UV photometric instruments, including the SRP, for measurements of ozone concentrations (Hodges et al., 2019).

After publication in Hodges et al., 2019, the CCQM-GAWG[1] convened an international group of stakeholders in October 2020 to discuss adopting and implementing a globally coordinated change in the cross-section value for surface ozone monitoring. This group, representing several international and national metrology institutes, NIST, and environmental agencies including EPA, agreed to adopt and

[1] *https://www.bipm.org/en/committees/cc/ccqm/wg/ccqm-gawg-ozone-tg*.

implement the new cross-section value as it represents a more accurate value with less uncertainty and is an advancement and improvement in the UV photometer measurement method.

40 CFR part 50, Appendix D, “Reference Measurement Principle and Calibration Procedure for the Measurement of Ozone in the Atmosphere,” currently provides EPA’s ozone calibration procedure with a stated value of 308 ± 4 atmosphere atm^{-1} cm^{-1}. The proposed revision would change the ozone absorption cross-section and amend relevant references to align internationally with the BIPM CCQM-GAWG’s updated cross-section value of 304.39 atm^{-1} cm^{-1} with an uncertainty of 0.94 atm^{-1} cm^{-1} at standard temperature and pressure of 0°C and 1 atmosphere. The EPA agrees that the new cross-section value would result in an improvement in the accuracy of surface ozone monitoring measurements by reducing uncertainty and is seeking comment on our proposed change from the UV absorption cross-section value in Appendix D of Part 50 to this more accurate consensus value.

The new value would reduce the uncertainty to 0.31% from the current 1.4%. The new value would also be 1.2% lower than the current value, a change that could result in increases in measured ozone concentrations. However, there are several factors that EPA believes would make it unlikely that this change would have a measurable, predictable influence on any particular set of ozone monitoring data.

Design Values, the metric used to compare ambient ozone concentrations measured at a monitor to the National Ambient Air Quality Standard (NAAQS) to determine compliance, are determined using the data reporting, data handling, and computation procedures provided in 40 CFR part 50, Appendix U, “Interpretation of the Primary and Secondary National Ambient Air Quality Standards for Ozone.” Multiple factors can contribute to variability in monitoring data, including but not limited to the precision of the monitoring method, the acceptance criteria for Standard

Reference Photometer (SRP) calibration and verification, the acceptance criterion for bench and field standards used to calibrate ozone monitors in the field, how agencies perform calibration and adjust analyzer response, the precision and bias acceptance criteria in EPA's Quality Assurance (QA) Handbook,[2] data handling and computation procedures in Appendix U, and meteorology.

The inherent precision (variability) of the measurements from analyzers used to measure ozone is about ±1 ppb, or ±0.001 ppm. The variability in the measurement in either the positive or negative direction should be considered relative to the change in monitoring data due to the new cross-section value.

When the new cross-section value is implemented, all SRPs maintained by BIPM, NIST, and the EPA will be updated to incorporate the new value. The update would be achieved through software/firmware modification and would not require any hardware changes. The EPA is proposing to modify the EPA SRPs simultaneously, versus through a phased approach, to minimize disruption of the SRP network. To establish and maintain traceability, the readings of an ozone analyzer are compared through a hierarchy of standards to a NIST ozone SRP. The process of using NIST-traceable standards to verify the ozone concentrations is implemented for all regulatory network ozone analyzers used for comparison to the NAAQS. There are 12 SRPs within the EPA's network: three at EPA's Office of Research and Development (ORD) and nine at various EPA Regional offices and the California Air Resources Board (CARB). One of ORD's SRPs is sent to NIST to be re-verified against the NIST SRP annually. That SRP serves as the reference for the two other ORD SRPs. Each SRP in the U.S. is re-verified against one of ORD's three SRPs annually. Under normal verification operations, implementing the ozone standards traceability process for the entire SRP

[2] Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, EPA-454/B-17-001, Jan. 2017, available at: *https://www.epa.gov/sites/default/files/2020-10/documents/final_handbook_document_1_17.pdf*.

network could take two or more years starting from when the SRP software/firmware is updated. During this time, the implementation progress and monitoring data collected with the new cross-section would need to be tracked.

The acceptance criteria used in comparing the SRPs (Level 1 standards) to each other is a slope of 1.00 ± 0.01 (or 1%) and an intercept 0.00 ± 1 ppb. Field and bench standards (Level 2 standard) used to calibrate ozone analyzers in the field have acceptance criteria for the slope of 1.00 ± 0.03 (or 3%) and an intercept of 0 ± 3 ppb. The 1.2% change in cross-section value is well within the 3% acceptance for Level 2 standards.

The goal for measurement uncertainty for ozone in 40 CFR part 58, "Ambient Air Quality Surveillance," for an annual measurement uncertainty is an upper 90 percent confidence limit for the coefficient of variation of 7% for precision and for bias an upper 95 percent confidence limit of 7%. Bias and precision estimates are determined using data obtained from the comparison of the ozone analyzer response to one point Quality Control (QC) checks using a Level 2 calibration standard. The 1.2% change in cross-section value is well within the bias and precision goal of 7%. Data reported to the EPA's Air Quality System by state, local, and tribal monitoring agencies is used to assess bias and precision. The 2021 national average precision for all ozone analyzers in the U.S. is 2.3% and the national average bias is 1.6%.[3] The 1.2% change is, therefore, within the national precision and less than the national bias.

The QA Handbook, Volume II, Appendix D Validation Template[4] also specifies critical criteria for monitoring organizations to maintain the integrity and evaluate the quality of the data collected by the analyzer. The critical criteria are a one-point QC

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[3] Data obtained on 9/1/2022 from EPA's Ozone Data Quality Dashboard: *https://sti-r-shiny.shinyapps.io/ozone_dashboard/*.

[4] Appendix D, Measurement Quality Objectives and Validation Templates: *https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf.*

check (every 14 days at a minimum) < ±7.1% difference or < ±1.5 ppb difference, whichever is greater; zero drift < ± 3.1 ppb (over a 24-hour period) or < ±5.1 ppb (> 24 hours and up to 14 days); and span check drift over a 14-day period of < ±7.1%. Any change to monitoring data due to the new cross-section is also well within the 7.1% acceptance criteria. Monitoring organizations may manually adjust the analyzer response and others may institute automated adjustment through use of a data acquisition or data handling system. Automated adjustments to the ozone analyzer data are not recommended because the monitoring agency may not know if the standard being used for monitor comparison, or the analyzer, has degraded or drifted.

Ozone analyzers are calibrated or verified every 182 days if one-point zero and span checks are performed every 14 days, and every 365 days if one-point zero and span checks are done daily. The acceptance criteria for multi-point calibration is all points < ±2.1% or ≤ ±1.5 ppb difference of the best fit straight line, whichever is greater, and a slope of 1 ± 0.05 or 5%. The 1.2% change is also well within this acceptance criteria for calibration.

Design values are the 3-year average of the annual 4^{th} highest daily maximum 8-hour value measured at each monitoring site. If the proposed cross-section value is timely adopted, design values for 2026 will have all three years (2024-2026) of monitoring data generated with the new cross-section value. Design values for 2024 will have one year based on the new value, and design values for 2025 will have two years of monitoring data generated with the new value. Appendix U provides for three levels of truncation for the hourly, daily 8-hour maximum, and design value calculations. Hourly averaged ozone monitoring data are to be reported in ppm to the third decimal place, with additional digits to the right truncated (*e.g.*, 0.070 ppm).

In assessing how and if this proposed change may affect ozone design values, it is important to note that other factors, including meteorology, can also influence design

values. The effects of meteorology on hourly ozone concentrations can contribute to an increase or decrease in design values for a site because formation of ozone is heavily dependent on meteorological conditions. Interannual meteorological variations are known to affect daily and seasonal average ozone concentrations. Therefore, while we do not have reason to believe this proposal will significantly increase design values, meteorology would be a confounding factor in determining the effect of today's proposal on 3-year design values.

Taking these factors into consideration, EPA believes it is unlikely that the proposed cross section change will have a measurable, predictable influence on any given ozone design value or monitoring data set.

Because the EPA believes that adoption of the new cross-section would improve the accuracy of measured ozone values, but would be unlikely to have a measurable, predictable influence on any given monitor or design value, the EPA supports and proposes to revise the current ozone absorption cross-section to the recommended international consensus-based cross-section value of 304.39 atm^{-1} cm^{-1}, with an uncertainty of 0.94 atm^{-1} cm^{-1}.

II. Statutory and Executive Orders Reviews

Additional information about these statutes and Executive Orders can be found at https://www.epa.gov/laws-regulations/laws-and-executive-orders**.**

A. *Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review*

This action is not a significant regulatory action and was, therefore, not submitted to the Office of Management and Budget (OMB) for review.

B. *Paperwork Reduction Act (PRA)*

This action does not impose an information collection burden under the PRA. This

action proposes to revise the ozone absorption cross-section and revise and amend relevant references. It does not contain any information collection activities.

C. *Regulatory Flexibility Act (RFA)*

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the EPA concludes that the impact of concern for this rule is any significant adverse economic impact on small entities and that the agency is certifying that this rule will not have a significant economic impact on a substantial number of small entities if the rule has no net burden on the small entities subject to the rule. This proposed action would update the ozone absorption cross-section value for surface ozone monitoring under 40 CFR part 50, and we anticipate that there will be minimal costs associated with this change. We have, therefore, concluded that this action will have no net regulatory burden for all directly regulated small entities.

D. *Unfunded Mandates Reform Act (UMRA)*

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538 and does not significantly or uniquely affect small governments. This action imposes no enforceable duty on any state, local, or tribal governments, or the private sector.

E. *Executive Order 13132: Federalism*

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. *Executive Order 13175: Consultation and Coordination with Indian Tribal Governments*

This action does not have tribal implications as specified in Executive Order 13175. This action proposes updates to a reference measurement principle and calibration procedure for the measurement of ambient ozone under 40 CFR part 50. Thus, Executive Order 13175 does not apply to this action.

G. *Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks*

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of "covered regulatory action" in section 2-202 of the Executive Order. This action is not subject to Executive Order 13045 because it does not concern an environmental health risk or safety risk.

H. *Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use*

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

I. *National Technology Transfer and Advancement Act (NTTAA)*

This rulemaking involves technical standards. The EPA used voluntary consensus standards in the preparation of this measurement principle and procedure; it is the benchmark against which all ambient ozone monitoring methods are compared. This action is simply updating the reference measurement principle in light of updated information.

J. *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

Executive Order 12898 (59 FR 7629, Feb.16, 1994) directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations (people of color) and low-income populations.

The EPA believes that this type of action does not concern human health or environmental conditions and, therefore, cannot be evaluated with respect to potentially disproportionate and adverse effects on people of color, low-income populations and/or indigenous peoples. This regulatory action is an update to a previously promulgated analytical method and does not have any impact on human health or the environment.

References

Hearn A. G. (1961). Absorption of ozone in ultra-violet and visible regions of spectrum *Proc. Phys. Soc.* 78 932-40

Hodges, J.T., Viallon, J., Brewer, P.J., Drouin, B.J., Gorshelev, V., Janssen, C., Lee, S., Possolo, A., Smith, M.A.H., Walden, and Wielgosz, R.I. (2019). Recommendation of a consensus value of the ozone absorption cross-section at 253.65 nm based on a literature review, *Metrologia,* 56, 034001. https://doi.org/10.1088/1681-7575/ab0bdd.

List of Subjects 40 CFR Part 50

Environmental protection, Air pollution control, Ozone.

Michael S. Regan,
Administrator.

For the reasons set forth in the preamble, the EPA proposes to amend 40 CFR part 50 as follows:

PART 50—NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS

1. The authority citation for part 50 continues to read as follows:

   Authority: 42 U.S.C. 7401, *et seq.*

2. Amend Appendix D to part 50 by:

   a. In Section 4.0, revising paragraphs 4.1 and 4.5.3.10;

   b. In Section 6.0, revising references 12 and 14, removing figures 1, 2 and 3, adding reference 15; and

   c. Adding new Section 7.0.

The revisions and addition read as follows.

Appendix D to Part 50 - Reference Measurement Principle and Calibration Procedure for the Measurement of Ozone in the Atmosphere (Chemiluminescence Method)

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4.0 Calibration Procedure.

4.1 *Principle.* The calibration procedure is based on the photometric assay of O_3 concentrations in a dynamic flow system. The concentration of O_3 in an absorption cell is determined from a measurement of the amount of 254 nm light absorbed by the sample. This determination requires knowledge of (1) the absorption coefficient (α) of O_3 at 254 nm, (2) the optical path length (l) through the sample, (3) the transmittance of the sample at a nominal wavelength of 254 nm, and (4) the temperature (T) and pressure (P) of the sample. The transmittance is defined as the ratio I/I_0, where I is the intensity of light which passes through the cell and is sensed by the detector when the cell contains an O_3 sample, and I_0 is the intensity of light which passes through the cell and is sensed by the detector when the cell contains zero air. It is assumed that all conditions of the system, except for the contents of the absorption cell, are identical

during measurement of I and I_0. The quantities defined above are related by the Beer-Lambert absorption law,

$$\text{Transmitance} = \frac{I}{I_0} = e^{-\alpha c l} \quad (1)$$

Where:

α = absorption coefficient of O_3 at 254 nm = 304.39 atm^{-1} cm^{-1}, with an uncertainty of 0.94 atm^{-1} cm^{-1} at 0 °C and 1 atm. [1, 2, 3, 4, 5, 6, 7, 15]

c = O_3 concentration in atmospheres, and

l = optical path length in cm.

A stable O_3 generator is used to produce O_3 concentrations over the required calibration concentration range. Each O_3 concentration is determined from the measurement of the transmittance (I/I_0) of the sample at 254 nm with a photometer of path length l and calculated from the equation,

$$c(\text{atm}) = -\frac{1}{\alpha l}\left(\ln\frac{I}{I_0}\right) \quad (2a)$$

or

$$c(\text{ppm}) = -\frac{10^6}{\alpha l}\left(\ln\frac{I}{I_0}\right). \quad (2b)$$

The calculated O_3 concentrations must be corrected for O_3 losses, which may occur in the photometer, and for the temperature and pressure of the sample.

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4.5.3.10. Calculate the O_3 concentration from equation 4. An average of several determinations will provide better precision.

$$[O_3]_{OUT} = \left(\frac{-1}{\alpha l}\ln\frac{I}{I_0}\right)\left(\frac{T}{273}\right)\left(\frac{760}{P}\right)\times\frac{10^6}{L} \quad (4)$$

Where:

$[O_3]_{OUT}$ = O_3 concentration, ppm

α = absorption coefficient of O_3 at 254 nm = 304.39 atm^{-1} cm^{-1} at 0 °C and 1 atm

l = optical path length, cm

T = sample temperature, K

P = sample pressure, torr

L = correction factor for O_3 losses from 4.5.2.5 = (1−fraction of O_3 lost).

Note:

Some commercial photometers may automatically evaluate all or part of equation 4. It is the operator's responsibility to verify that all of the information required for equation 4 is obtained, either automatically by the photometer or manually. For “automatic” photometers which evaluate the first term of equation 4 based on a linear approximation, a manual correction may be required, particularly at higher O_3 levels. See the photometer instruction manual and Reference 13 for guidance.

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6.0 *References*.

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12. Transfer Standards for Calibration of Ambient Air Monitoring Analyzers for Ozone, EPA publication number EPA-454/B-22-003, December 2022.

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14. QA Handbook for Air Pollution Measurement Systems - Volume II. Ambient Air Quality Monitoring Program. EPA-454/B-17-001, January 2017.

15. Hodges, J.T., Viallon, J., Brewer, P.J., Drouin, B.J., Gorshelev, V., Janssen, C., Lee, S., Possolo, A., Smith, M.A.H., Walden, and Wielgosz, R.I., Recommendation of a consensus value of the ozone absorption cross-section at 253.65 nm based on a literature review, *Metrologia,* 56 (2019) 034001. [Available at *https://doi.org/10.1088/1681-7575/ab0bdd*.]

7.0 *Figures*

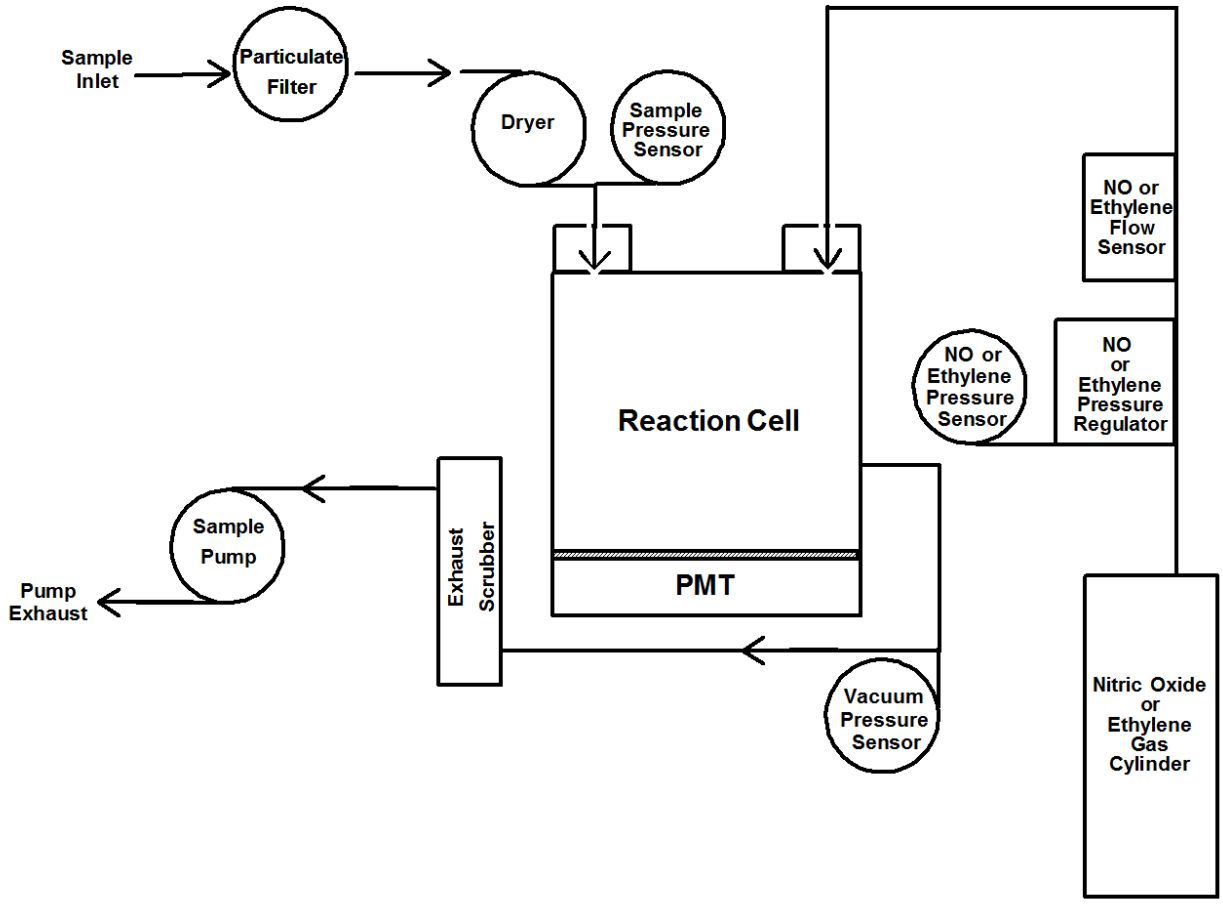

Figure 1 of Section 7 to Appendix D of Part 50 - Gas-phase chemiluminescence analyzer schematic diagram, where PMT means photomultiplier tube.

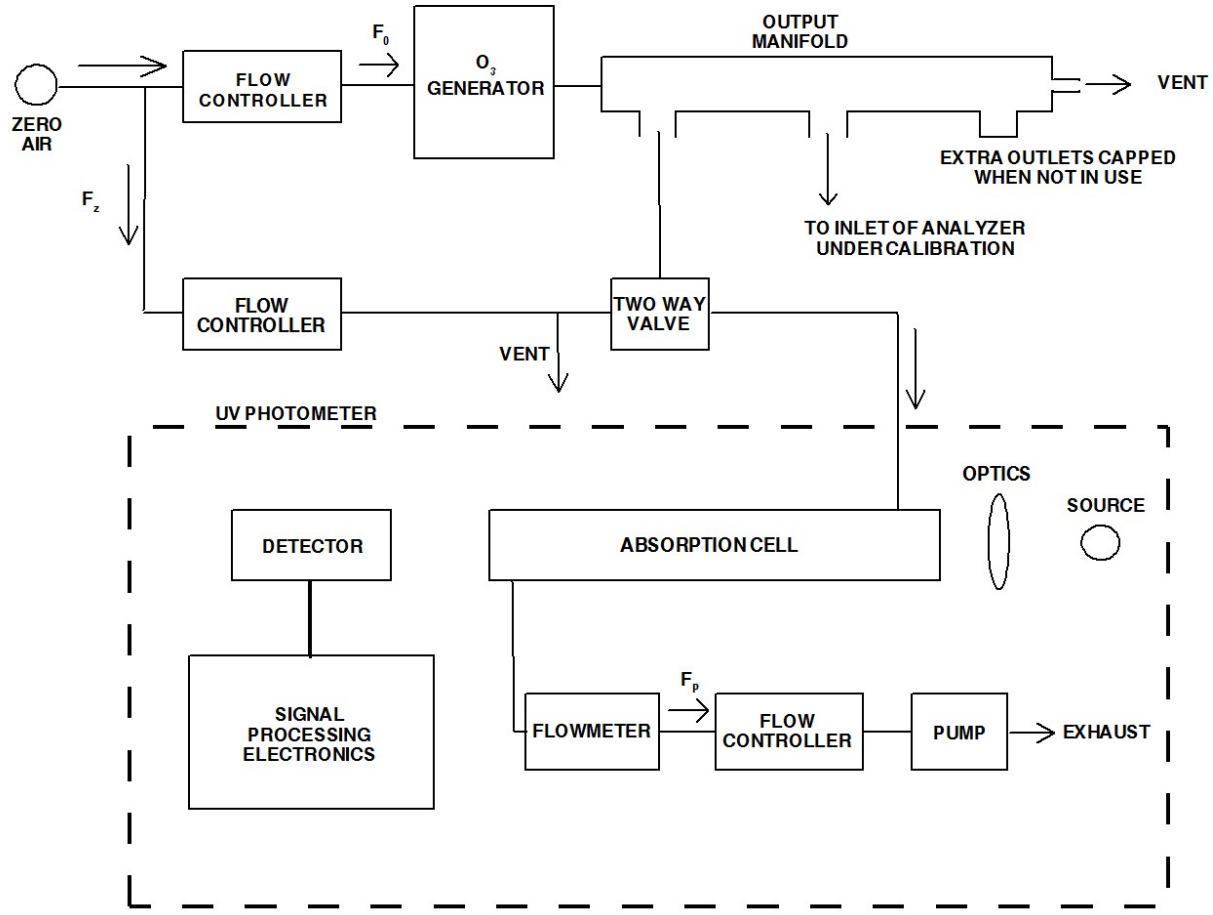

Figure 2 of Section 7 to Appendix D of Part 50 - Schematic diagram of a typical UV photometric calibration system.

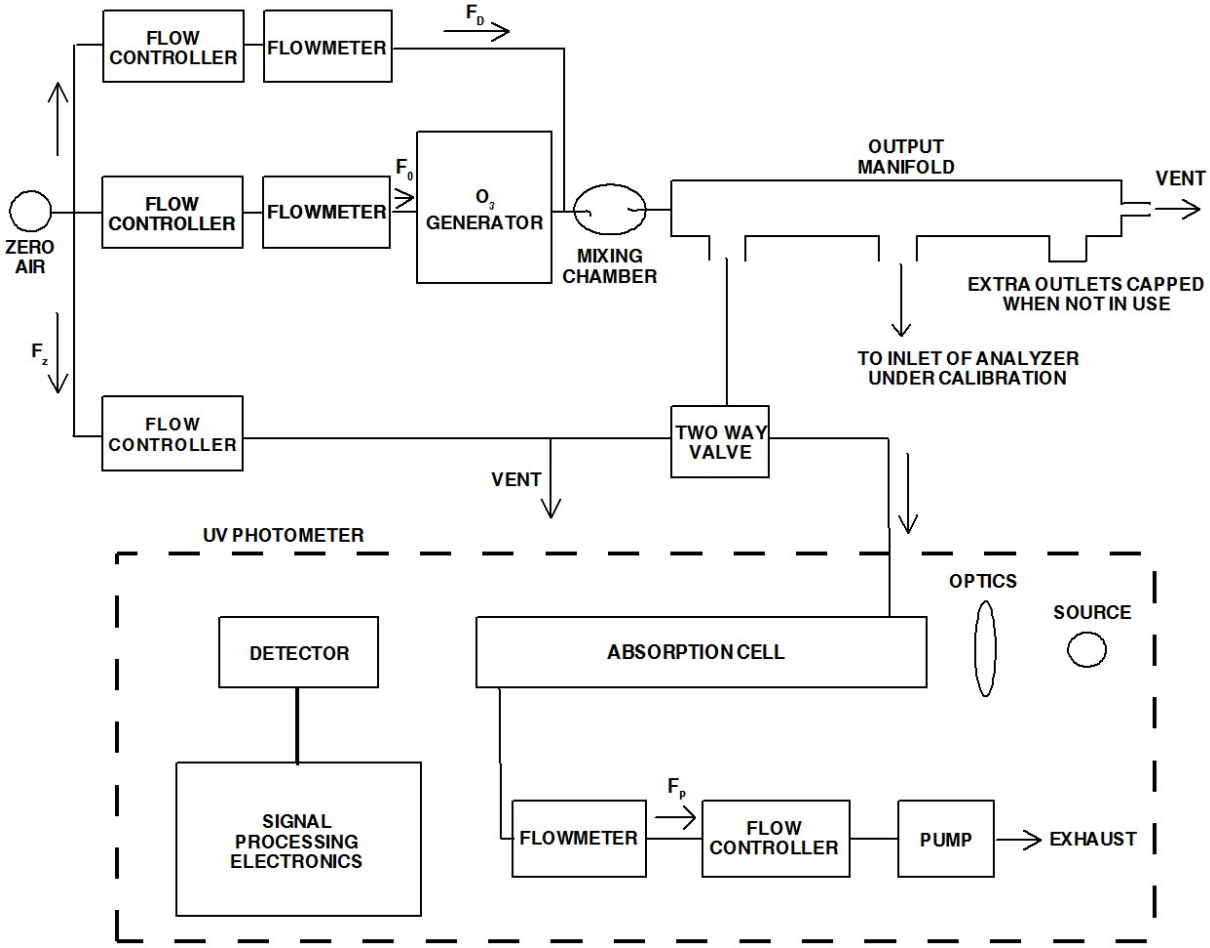

Figure 3 of Section 7 to Appendix D of Part 50 - Schematic diagram of a typical UV photometric calibration system (Option 1).

[FR Doc. 2023-03578 Filed: 2/23/2023 8:45 am; Publication Date: 2/24/2023]