**Critical Criteria – Ozone**

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement (O3)** | **Frequency** | **Acceptable Range** | **Review Comments** |
| **Monitor** | *NA* | *Meets requirements listed in FRM/FEM designation* |  |
| **One-Point QC Check**  **Single analyzer** | *Every 14 days* | *< ± 7.1% (percent difference) or < ± 1.5 ppb difference whichever is greater* |  |
| **Zero/Span Check** | *Every 14 days* | *Zero drift (24-hr) < ± 3.1 ppb*  *Zero drift (>24hr-14 day) < ± 5.1 ppb*  *Span drift < ± 7.1%* |  |

**Operational Criteria – Ozone**

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| --- | --- | --- | --- |
| **Requirement (O3)** | **Frequency** | **Acceptable Range** | **Review Comments** |
| **Shelter Temperature Range** | *Daily*  *(hourly values)* | *20 to 30° C (hourly avg.)*  *or*  *per manufacturers specification if designated to a wider temp. range* |  |
| **Shelter Temperature Control** | *Daily (hourly values)* | *< 2.1° C SD over 24 hours* |  |
| **Shelter Temperature Device Check** | *Every 182 days and 2/calendar year* | *< ± 2.1° C of standard* |  |
| **Annual Performance Evaluation Single Analyzer (SLAMS/NCORE)** | *Every site every 365 days and 1/calendar year within period of monitor operation* | *Percent difference of audit levels 3-10 < ±15.1%,*  *Audit levels 1 & 2 < ± 1.5 ppb difference or < ±15.1%* |  |
| **Annual Performance Evaluation Single Analyzer (PSD)** | *Quarterly* | *Percent difference of audit levels 3-10 < ±15.1%,*  *Audit levels 1 & 2 < ± 1.5 ppb difference or < ±15.1%* |  |
| **Federal Audit (NPAP)**  **(SLAMS/NCORE)** | *20% of sites audited in calendar year* | *Audit levels 1 & 2 < ± 1.5 ppb difference, all other levels percent difference < ±10.1%* |  |
| **Verification / Calibration** | *Upon receipt/adjustment/repair/installation/moving and/or recalibration of higher level transfer standard*  *Every 182 days and 2/calendar year if manual biweekly zero/span checks, or*  *Every 365 days and 1/calendar year if continuous daily zero/span checks* | *All points < ± 2.1% or ≤ ±1.5 ppb difference of best-fit straight line, whichever is greater,*  *and Slope 1 ± .05* |  |
| **Zero Air / Zero Air Check** | *Every 365 days and 1/calendar year* | *Concentration below LDL* |  |

**Ozone Level 2 Standard**

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| --- | --- | --- | --- |
| ***Certification/recertification to Standard Reference Photometer (Level 1)*** | *Every 365 days and 1/calendar year* | *Single point difference < ± 3.1%* |  |
| ***Level 2 and greater transfer standard precision*** | *Every 365 days and 1/calendar year* | *Standard Deviation less than 0.005 ppm or 3.0% whichever is greater* |  |
| *(if recertified via a transfer standard)* | *Every 365 days and 1/calendar year* | *Regression slope = 1.00 ± 0.03 and two intercepts are 0 ±3 ppb* |  |

**Ozone Transfer standard (Level 3 and greater)**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Qualification*** | *Upon receipt of transfer standard* | *< ± 4.1% or < ±4 ppb (whichever is greater)* |  |
| ***Certification*** | *After qualification and upon receipt/ adjustment/repair* | *RSD of six slopes ≤ 3.7%*  *Std. Dev. of 6 intercepts ≤ 1.5* |  |
| ***Recertification to higher level standard*** | *Beginning and end of O3 season or every 182 days and 2/calendar year whichever less* | *New slope = ± 0.05 of previous and RSD of six slopes ≤ 3.7%*  *Std. Dev. of 6 intercepts 1.5* |  |

**Detection (FEM/FRMs)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Noise** | *Every 365 days and 1/calendar year* | *≤ 0.0025 ppm (standard range)*  *≤ 0.001 ppm (lower range)* |  |
| **Lower detectable level** | *Every 365 days and 1/calendar year* | *≤ 0.005 ppm (standard range)*  *≤ 0.002 ppm (lower range)* |  |

**SYSTEMATIC CRITERIA – O3**

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| --- | --- | --- | --- |
| **Requirement (O3)** | **Frequency** | **Acceptable Range** | **Review Comments** |
| **Standard Reporting Units** | *All data* | *ppm (final units in AQS)* |  |
| **Rounding convention for data reported to AQS** | *All data* | *3 places after decimal with digits to right truncated* |  |
| **Completeness (SLAMS/NCORE)** | *3-year Comparison* | *≥ 90% (avg.) daily max available in ozone season with min of 75% in any one year* |  |
| **Completeness (SLAMS/NCORE)** | *8-hour Average* | *≥ if at least 6 of the hourly concentrations for the 8-hour period are available* |  |
| **Completeness (SLAMS/NCORE)** | *Valid Daily Max* | *≥ if valid 8-hour averages are available for at least 13 of the 17 consecutive 8-hour periods starting from 7:00 a.m. to 11:00 p.m.* |  |
| **Completeness**  **(PSD)** | *1-year* | *≥ 80% of each year* |  |
| **Completeness**  **(PSD)** | *8-hour Average* | *≥ if at least 6 of the hourly concentrations for the 8-hour period are available* |  |
| **Completeness**  **(PSD)** | *Valid Daily Max* | *≥ 75% of the 24, 8-hour averages (18 of 24, 8-hour averages)* |  |
| **Sample Residence Time Verification** | *Every 365 days and 1/calendar year* | *≤ 20 seconds* |  |
| **Sample Probe, Inlet, Sampling train** | *All sites* | *Borosilicate glass,(e.g. Pyrex®) or Teflon® (FEP/TFE)* |  |
| **Data Acquisition Systems** | *Digital or analog recording devices* | *Collection of continuous data*  *(minimum of 1-minute values)* |  |
| **System Clock Verification** | *1 / month* | *≤ ± 1 minute* |  |
| **Siting** | *Every 365 days and 1/calendar year* | *Meeting siting criteria or waiver documented, (PSD per approved QAPP)* |  |
| **EPA Standard Ozone Reference Photometer (SRP) Recertification (Level 1)** | *Every 365 days and 1/calendar year* | *Regression sloe = 1.00 ± 0.01 and intercept < 0.003 ppm* |  |
| **Precision (using 1-point QC Checks) (SLAMS/NCore)** | *Calculated annually and as appropriate for design value estimates* | *90% CL CV < 7.1%* |  |
| **Precision (using 1-point QC Checks) (PSD)** | *Calculated Quarterly* | *90% CL CV < 7.1%* |  |
| **Bias (using 1-point QC Checks) (SLAMS/NCore)** | *Calculated annually and as appropriate for design value estimates* | *95% CL < ± 7.1%* |  |
| **Bias (using 1-point QC Checks) (PSD)** | *Calculated Quarterly* | *95% CL < ± 7.1%* |  |
| **Technical Systems Audits**  **(SLAMS/NCore)** | *1 / 3 years* | *Confirmation of adherence to FRM/FEM, SOPs, and QAPP or documented waiver* |  |
| **Technical Systems Audits**  **(PSD)** | *Annually*  *(within 1 month of startup and annually thereafter)* | *Confirmation of adherence to FRM/FEM, SOPs, and QAPP or documented waiver* |  |
| **Annual PE Primary QA Organization (PQAO) Evaluation** | 1 / year | 95% of audit percent difference fall within the 1-point QC check 95% probability intervals at PQAO level of aggregation |  |