**Critical Criteria – SO2**

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement (SO2)** | **Frequency** | **Acceptable Range** | **Review Comments** |
| **Sampler/Monitor** | *NA* | *Meets requirements listed in FRM/FEM designation* |  |
| **One-Point QC Check**  **Single analyzer** | *Every 14 days* | *< ± 10.1% (percent difference) or < ± 1.5 ppb difference whichever is greater* |  |
| **Zero/Span Check** | *Every 14 days* | *Zero drift < ± 3.1 ppb (24-hr),*  *< ± 5.1 ppb (>24hr-14 days)*  *Span drift < ± 10.1%* |  |

**Operational Criteria – SO2**

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement (SO2)** | **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* | *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 < ± 15.1%* |  |
| **Verification / Calibration** | *Upon receipt/adjustment/ repair/installation/moving*  *Every 182 days and 2/calendar year if manual biweekly zero/span checks*  *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* |  |
| **Gaseous Standards** | *All gas cylinders* | *NIST Traceable*  *(e.g. EPA Protocol Gas)* |  |
| **Zero Air / Zero Air Check** | *Every 365 days and 1/calendar year* | *Concentration below LDL*  *< 0.1 ppm aromatic hydrocarbons* |  |
| **Gas Dilution Systems** | *Every 365 days and 1/calendar year or after failure of 1-point QC check or performance evaluation* | *Accuracy < ± 2.1%* |  |
| **Detection (FEM/FRMs)** |  |  |  |
| **Noise** | *Every 365 days and 1/calendar year* | *≤ 0.001 ppm (standard range)*  *≤ 0.0005 ppm (lower range)* |  |
| **Lower detectable level** | *Every 365 days and 1/calendar year* | *≤ 0.002 ppm (standard range)*  *≤ 0.001 ppm (lower range)* |  |

**SYSTEMATIC CRITERIA – SO2**

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| --- | --- | --- | --- |
| **Requirement (SO2)** | **Frequency** | **Acceptable Range** | **Review Comments** |
| **Standard Reporting Units** | *All data* | *ppb (final units in AQS)* |  |
| **Rounding convention for data reported to AQS** | *All data* | *1 place after decimal with digits to right truncated* |  |
| **Completeness (SLAMS/NCORE)** | *1-hour standard* | *Hour – 75% of hour*  *Day – 75% of hourly values*  *Quarter – 75% of complete days*  *Year – 4 consecutive quarters*  *5-min value reported only for valid hours* |  |
| **Completeness (PSD)** | *1-hour standard* | *Hour – 75% of hour*  *Day – 75% of hourly values*  *Quarter – 80% of complete days*  *Year – 4 consecutive quarters*  *5-min value reported only for valid hours* |  |
| **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)* |  |
| **Pneumatic fittings** | *All tubing connections/valves* | *Teflon® (FEP/TFE), 316 stainless steel* |  |
| **Gas Regulators** | *All gas cylinders* | *2-stage 316 stainless steel* |  |
| **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)* |  |
| **Precision (using 1-point QC Checks) (SLAMS/NCORE)** | *Calculated Annually and as appropriate for design value estimates* | *90% CL CV < 10.1%* |  |
| **Precision (using 1-point QC Checks) (PSD)** | *Calculated Quarterly* | *90% CL CV < 10.1%* |  |
| **Bias (using 1-point QC Checks) (SLAMS/NCORE)** | *Calculated Annually and as appropriate for design value estimates* | *95% CL < 10.1%* |  |
| **Bias (using 1-point QC Checks) (PSD)** | *Calculated Quarterly* | *95% CL < 10.1%* |  |
| **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 |  |