STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF MOLYBDATE REACTIVE SILICA (SiO_2)

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This document is effective upon final approval

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NELAC CERTIFICATION # E46077

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1.0 Identification of Test Method

1.1 This method is the Standard Operating Procedure for the determination of Silica in the laboratory of the South Florida Water Management District. This method is identified by the method number SFWMD-LAB-SOP-3120-006 and is effective date upon final approval.

1.2 Silica analysis is conducted on a highly automated flow injection instrument called a Flow Injection Analyzer (FIA).

1.3 Silica is based on Standard Methods SM4500SiE. This method has been modified for use in the SFWMD laboratory based on the instrument manufacturer's recommendations. The following reagents have different concentrations than those prescribed in the reference method.

1.3.1 Silica is determined by using an automated flow injection instrument called a Flow Injection Analyzer (FIA) in place of a Segmented Flow Analyzer.
1.3.2 Wavelength used for SiO2 determination is 820 nm as per instrument manufacturer (Lachat) specifications as compared to 660 nm in standard methods SM4500SiE.
1.3.3 Ascorbic Acid is used as the reducing agent in place of 1-amino-2-naphthol-4-sulfonic acid, $NaSO_3$ solution

1.4 This revision reflects administrative changes.

2.0 Applicable Matrix or Matrices

2.1 This method can be applied to the determination of Silica in surface, rain, ground and salt waters collected within the South Florida Water Management District.

3.0 Detection Limit

3.1 The detection limit for this method is determined using the procedure outlined in 40 CFR Part 136, Appendix B.

3.2 The applicable detection limit for Silica was determined to be 0.05 mg/L.

3.3 The MDL is reviewed annually by the QA officer and is subject to change. The current MDL is noted on the Test Control Parameters sheet and is available from the QA officer.

4.0 Scope and Application

4.1 The method is used for determining Silica in surface, ground, salt, and rain waters.

4.2 This method is applicable for ranges from the minimum detection limit (MDL) to 50.00 mg/L. Making suitable dilutions of the samples can extend the upper range.

5.0 Summary of Test Method

5.1 In the Silica analysis, silicate reacts with the molybdate forming, B-molybdosilicic acid at pH of 1.0-1.8. The B-molybdosilicic acid is reduced by ascorbic acid to form molybdenum blue, which is measured at 820 nm on a Lachat Flow Injection Analyzer (FIA).

6.0 Definitions

6.1 A comprehensive listing of terms and definitions in common use in the SFWMD laboratory can be found in the Laboratory Quality Manual glossary. All acronyms are defined upon first use in this document. Only terms specific to this procedure are defined in this section.

7.0 Interferences

7.1 Known Silica interferences are tannins and lignins, these are eliminated by the use of oxalic acid. Orthophosphate reacts with molybdate to form a blue compound which absorbs in the 820 nm wavelength. This interference if minimized by controlling the pH using oxalic acid which inhibits the formation of molybdophosphoric acid. Colors absorbing at the analytical wavelength will also interfere.

8.0 Safety

8.1 Wear safety glasses and a full length, long sleeved laboratory coat.

8.2 Latex or polyethylene gloves (non-powdered) may be worn when handling samples.

8.3 All personnel conducting this method should be familiar with the SFWMD Chemical Hygiene Plan and should have reviewed all applicable Material Safety Data Sheets.

8.4 The disposal of samples can be done in the sink, flushing with ample amounts of water.

8.5 Preparation of reagents containing sulfuric acid should be conducted in the fume hood. The reagents should be prepared by slow addition of concentrated acid to laboratory reagent water. Use an acid resistant bottle carrier when carrying glass containers of hydrochloric acid.

8.6 Before starting any run all lines connecting the instrument and the reagents should be checked and tightened if necessary. In case of a leak into the electrical system, the power should be disconnected before conducting any repairs and supervisor assistance.

8.7 The electrical power should be disconnected before conducting any repairs inside the instrument or controllers, electrical wiring, or any other components near electrical sources.

8.8 In case of concentrated sulfuric acid spills it should be first treated with an appropriate spill kit and the contaminated absorbent should be collected and placed into adequate storage containers for disposal.

9.0 Equipment and supplies

9.1 Lachat Flow Injection Analyzer (FIA), Model 8500 consisting of:
- 9.1.1 Lachat 8500 autosampler (XYZ)
- 9.1.2 Lachat 8500 peristaltic pump
- 9.1.3 Lachat 8500 detector
- 9.1.4 Lachat SiO_2 manifold
- 9.1.5 Lachat 8500 heater

9.2 Personal Computer equipped with Lachat Omnion 3.0 software

9.3 Class A volumetric glassware (pipettes and volumetric flasks).

9.3 Eppendorf 1000 µL adjustable pippetor.

9.4 Eppendorf 5000 µL adjustable pippetor

9.5 Rainin 20 mL adjustable auto-pippetor

10.0 Reagents and Standards

Note: all reagents, standard and LCS stocks must be Analytical Reagent Grade (ARG) or better.

10.1 **Oxalic acid:** 10% w/v: Dissolve 50 g of oxalic acid ($C_2H_2O_4$) in approximately 490 g of laboratory reagent waterin a 500 mL plastic container. Store the reagent at 2-6°C. This reagent is stable for 1 year.

10.2 **Ascorbic Acid reagent:** In a 200 mL container, mix together 20 g of ascorbic acid and 200 mL laboratory reagent water. This reagent should be prepared fresh daily.

10.3 **Ammonium Molybdate reagent:** Dissolve 20 g of ammonium molybdate in approximately 400 mL of laboratory reagent water in a 500 mL volumetric flask. Add 8 mL of sulfuric acid. Add 5 mL of Dowfax 2A1 to the final solution. This reagent should be prepared fresh daily.

10.4 **Carrier** – laboratory reagent water

10.5 **Sodium Hydroxide (NaOH) 0.5 N:** In a 200 mL class A volumetric flask containing 150 ml of laboratory reagent water, pipette 2.5 mL of 50% w/w NaOH (note: this will generate heat. Complete this step in an ice bath.). Once this has cooled dilute to the mark with laboratory reagent water. Cap the flask and mix well

NOTE: Immediately after mixing, the standards should be poured into labeled, clean 175 mL plastic containers to avoid Silica leaching from the glass volumetrics. All standards and LCS's must be prepared fresh weekly and recorded in LIMS (see SFWMD-LAB- SOP-5000-002)

Silica stock standard: NIST standard solution or traceable stock, 1000 mg/L SiO_2 (1mL = 1 mg SiO_2).

10.6 **Standard 1 (50.00 mg/L):** In a 100 mL class A volumetric flask, pipette 5 mL of Silica stock standard and dilute to the mark with laboratory reagent water. Cap the flask and mix well.

10.7 **Standard 2 (20.00 mg/L):** In a 100 mL class A volumetric flask, pipette 2 mL of Silica stock standard and dilute to the mark with laboratory reagent water. Cap the flask and mix well.

10.8 **Standard 3 (10.00 mg/L):** In a 200 mL class A volumetric flask, pipette 2 mL of Silica stock standard and dilute to the mark with laboratory reagent water. Cap the flask and mix well.

10.9 **Standard 4 (5.00 mg/L):** In a 100 mL class A volumetric flask, pipette 50 mL of standard 3 and dilute to the mark with laboratory reagent water. Cap the flask and mix well.

10.10 **Standard 5 (2.00 mg/L):** In a 100 mL class A volumetric flask, pipette 10 mL of standard 2 and dilute to the mark with laboratory reagent water. Cap the flask and mix well

10.11 **Standard 6 (0.50 mg/L):** In a 100 mL class A volumetric flask, pipette 5 mL of standard 3 and dilute to the mark with laboratory reagent water. Cap the flask and mix well

10.12 **Standard 7 (0.20 mg/L):** In a 100 mL class A volumetric flask, pipette 4 mL of standard 4 and dilute to the mark with laboratory reagent water. Cap the flask and mix well

10.13 **Standard 8 (0.00 mg/L):** Laboratory reagent water only.

NOTE: LCS's must be prepared monthly and are prepared from a separate source than that of the calibration curve

10.14 **Silica LCS stock:** NIST standard solution or traceable stock, 1000 mg/L SiO_2 (1 mL = 1 mg SiO_2).

10.15 **LCS5 (0.200mg/L):** In a 100 mL volumetric flask add 40 mL of LCS2 solution and dilute to mark with laboratory reagent water. Cap the flask and mix well.

10.16 **LCS2 (0.500 mg/L):** In a 200 mL volumetric flask add 2.5 mL of LCS1 solution and dilute to mark with laboratory reagent water. Cap the flask and mix well.

10.17 **LCS1 (40.0 mg/L):** In a 100 mL volumetric flask add 4 mL of LCS stock solution and dilute to mark with laboratory reagent water. Cap the flask and mix well.

10.18 All Standard stocks and LCS stocks "Certificates of Analysis" or product assays must be scanned into LIMS using the procedure described in SFWMD-LAB-SOP-5510.

10.19 All working standard, reagent and LCS containers must be properly labeled as per Quality Manual (sec. 8.4).

11.0 Sample Collection, Preservation, Shipment and Storage

11.1 Samples are collected using the procedures outlined in the SFWMD Field Collection Manual or the Department of Environmental Protection SOP.

11.2 Samples that are method are filtered through a 0.45µm membrane filter and are placed in a HDPE bottle. Samples are transported to the lab in coolers containing wet ice or other devices to maintain the temperature of the sample at $\leq 6^{o}C$ until delivery to the SFWMD laboratory.

11.3 Samples are stored in the laboratory in a cooler that is maintained at ≤ 6C° and are not to be frozen.

11.4 Samples must be analyzed within 28 days (SM4500SiE).

12.0 Quality Control

12.1 The Silica standard recoveries are checked (see the acceptance criterion in Section 18.0) by the analyst before conducting sample analyses.

12.2 The Silica standard (STD2) is rerun every 20 samples and at the end of the run to check continuing calibration (CCV).

12.3 LCS1, LCS2, and the Laboratory Blank are analyzed at beginning of each run.

12.4 LCS2 and the Laboratory Blank are rerun every 20 samples. LCS2 is also analyzed at the end of the run.

12.5 A matrix spike duplicate analysis (MSD) should be conducted at the beginning of every 20 sample bracket. The relative percent difference (RPD) of the duplicate set is determined using formula in section 15.0, and noted on the LCS sheet. The values must be within quality control limits as specified in the Laboratory Quality Manual (current version). Currently the default limits for relative percent difference is <10 %. If the duplicate is not within the current limit, reanalyze it immediately. If it fails to fall within the current limit twice, all samples run in that sample batch must be reanalyzed. Select another sample from the batch to duplicate. If the duplicate fails to fall within range stop the analysis. Evaluate procedure and rerun samples in affected batch once duplication is resolved.

12.6 A matrix spike analysis (MS) should be conducted for every 20 samples analyzed. The matrix spike recovery is determined (using the formula in section 15.0).

12.7 All quality control data must be within the current established limits outlined in the SOP. Quality control data not within the established limits should not be submitted to LIMS, unless it is known to be an outlier due to incorrect preparation, contamination, instrument malfunction or any other factor not part of normal operation.

12.8 The LCS2, CCV and MB are repeated after each 20-sample batch. The values must be within quality control limits as specified in the Laboratory Quality Manual (current version. If LCSs values fall outside the currently established acceptance limits, see section 24.1.

12.9 One method blank must be analyzed at the beginning of each 20-sample batch. The values must be within quality control limits as specified in the Laboratory Quality Manual (current version). Currently the limits are < MDL.

13.0 Calibration and Standardization

13.0 The calibration curve is poured in the order of the highest concentration standard to the lowest concentration standard and consists of 8 calibration points.

13.1 The correlation coefficient must be ≥0.998.

13.2 Matrix spikes are prepared by adding 0.1 mL of **Stock Solution (1000 mg/L SiO_2)** to a sample selected at random in a 10 mL Class A volumetric flask and diluting to the mark with sample.

13.3 All LCS's must be within established limits.

13.4 Laboratory Blanks must be less than the Method Detection Limit.

13.5 SiO_2 quantitation is based on peak area.

13.6 Peak areas are calculated using the Omnion software "brackish" window option. This option forces the software to integrate the refractive dip the chromatogram that is caused by brackish and saline samples insuring the proper peak integration of low concentration, blank and saline samples.

14.0 Procedure

14.1 Create an analytical batch for the samples to be analyzed. Refer to the SFWMD-LAB-SOP-5000 and Horizon user help.

14.3 Turn on Lachat 8500 FIA (autosampler, detectors and heaters).

14.4 Connect all reagent lines to their perspective containers. See analytical diagrams (Section 24.6 SiO_2) for proper placements of reagent lines with reagents.

14.5 Latch platens and turn on Lachat peristaltic pump module.

14.6 Open **Omnion** on the computer by selecting its icon on the Windows desktop and open SiO_2 sample table template.

14.7 To create SiO_2 sample table in **Omnion**, load the SiO_2 template and enter the sample numbers that were grouped in the batch created in LIMS.

14.8 When sample table is completed, print the sample tray by clicking on the run pull down menu and selecting export worksheet data. When the run is started the software will automatically assign an ID number (OM_date_time.OMN).

14.9 Click on the preview icon in **Omnion.**

14.10 Begin pouring the working standards, LCS samples, and the first 20 matrix samples.

14.11 When the baselines are stable and smooth click **Start** to begin data collection. Click **Spectra** icon to monitor data collection.

14.12 Observe that the standards appear linear and that peaks do not have spikes or any unusual shape to them. Spikes and noise in the baseline are caused by air bubbles in the flowcell, clogged lines and/or expired or contaminated reagents.

14.13 Once the peaks for the calibration curve and LCS samples appear, verify that the correlation coefficient is ≥ 0.998 and all LCS recoveries fall within LCS limits.

14.14 Pour the next 20 samples, once the matrix spike sample for the 2nd group of 20 samples is analyzed, resume pouring the next group and so on.

14.15 When the run is completed enter the batch number in the "run description" under the run tab and save the run as the batch number. Then click on the tools bar at the top of the page and select the custom report then print a report. (the download of data to LIMS also uses the custom report function see SFWMD-LAB-SOP-5000-002)

14.16 Clean analytical cartridges by placing the lines in laboratory reagent water. Follow by placing the lines in 0.5N NaOH for 5 minutes, and finish the cleaning process by placing the lines back in laboratory reagent water for 5 more minutes.

14.17 Turn off the Omnion peristaltic pump module and unlatch platens.

14.18 Turn off Omnion 8500 autosampler, detectors and heaters.

14.19 Pump tubes and transmission lines should be changed as needed.

14.20 Consult your supervisor before making any major changes, adjustments, and/or repairs to the instrumentation

15.0 Calculations

15.1 The recovery of the CCV is calculated as follows:

$$\%\text{Recovery} = \frac{ObservedValue}{10} \times 100$$

15.2 The recovery of the matrix spike is calculated as follows:

$$\%\text{Recovery} = \frac{(SpikeObservedValue \times 1.01) - SampleValue)}{10.101} \times 100$$

Note: Spike recovery calculation uses a dilution correction of 1.01 and a spike concentration of 10.101 ppm

15.3 The percent relative standard deviation (RPD) is calculated as follows:

$$RPD = \frac{|Value1 - Value2|}{(Value1 + Value2)/2} \times 100$$

15.4 The recoveries of the LCS's are calculated as follows:

$$\%\text{Recovery} = \frac{ObservedValue}{TrueValue} \times 100$$

16.0 Method performance

16.1 This procedure was validated during method development to assure performance equivalent to the referenced method. Additional quality controls have been incorporated to assure consistent performance. Method performance is further validated through semi-annual blind performance testing and performance evaluation studies.

17.0 Pollution Prevention

17.1 All reagents, standards and sample used in this method pose little threat to the environment and can be disposed down the sink with ample amounts of water.

17.2 Standards and reagents should be prepared in volumes consistent with laboratory use to minimize the volume of expired standards and reagents to be disposed.

18.0 Data Assessment and Acceptance Criteria for Quality Control Measures

18.1 After the analytical run is complete, check each quality control value to be sure it falls within acceptable limits.

18.2 Make any edits required to the sample table by first right clicking on the data peak and selecting “edit peak items” and make your corrections. Then make the same corrections in the data table and save the file as the batch number.

18.4 Print an analytical result report by clicking the “tools” tab and selecting “custom report”. Then click the printer icon and a report will print on the local printer.

18.5 To send the data to LIMS see SFWMD-LAB-SOP-5000 (current version).

18.6 Verify the correctness/acceptability of the results (lab and field QC criteria). Note any discrepancies on the general chemistry checklist.

18.7 Fill out all logbooks and submit data package to your supervisor.

19.0 Corrective Actions for Out of Control Situations

19.1 See the Table 24.1 for corrective actions.

20.0 Contingencies for Handling Out of Control or Unacceptable Data

20.1 If the out-of-control situation cannot be resolved by the corrective actions described in Section 19.0, the sample result(s) should be flagged with the appropriate qualifier code. Notify your supervisor regarding any out of control conditions so that appropriate qualifiers will be applied.

20.2 It may be necessary to obtain technical service to make repairs to instruments that are producing unacceptable data. See your supervisor for assistance in obtaining this service.

21.0 Waste Management

21.1 It is the laboratory's responsibility to comply with all federal, state, and local regulations governing waste management, particularly the hazardous waste identification rules and land disposal restrictions, and to protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Compliance with all sewage discharge permits and regulations is also required.

21.2 No hazardous wastes are generated by this method. All reagents and standards can be disposed in the sink with running water.

21.3 The samples collected for analysis by this method are not hazardous. They are disposed according to SFWMD-LAB-SOP-5030.

22.0 Instrument Maintenance

22.1 A maintenance logbook for each piece of instrumentation identified in this procedure shall be maintained by the analyst. The maintenance logbook must include the following items:

1. The name or laboratory designation of the instrument and the associated software;
2. The manufacturer's name, type identification, serial number or other unique identification, and the SFWMD inventory control number;
3. Initial calibration records or other checks to confirm that the instrument complies with the method requirements;
4. The current location of the instrument;
5. Manufacturer's instructions, owner's manuals, or reference to their location;
6. Dates, results and copies of reports and certificates of all calibrations, adjustments, acceptance criteria, and the due date of the next calibration;
7. The maintenance plan as appropriate, and documentation of all maintenance carried out to date, including all routine and non-routine maintenance activities and reference material verifications;
8. Records of any damage, malfunction modification or repair to the instrument; The date received and condition when first placed into service

23.0 References

23.1 Standard Methods for the Examination of Water and Wastewater, 21st edition SM4500SiE.

23.2 SFWMD-LAB-SOP-5000 (current version)

23.3 SFWMD Chemistry Quality Manual, (current version)

23.4 Lachat Omnion tutorial manual 3.0.

23.5 Lachat Omnion QuikChem 8500 Manual.

23.6 Lachat QuikChen method 30-114-27-1-B

23.7 NELAC 2003 Standards

23.8 SFWMD-LAB-SOP-5030 (current version)

24.0 Tables, Diagrams, Flowcharts and Validation Data

24.1 Corrective actions for out-of control laboratory quality controls.

LCS Activity	Acceptance Criteria	Recommended Corrective Action
Initial Instrument Blank Method Reagent Blank	<MDL response & value	Trouble shoot the instrument and determine cause of error (reagents, calibration standards, environment, equipment failure, etc), correct the problem, then reanalyze.
Initial Calibration Standards	Correlation coefficient ≥0.998 for all analyses	Re-analyze standards. If same response is obtained, trouble shoot the instrument & re-start analysis. If same response is obtained, prepare new standards & re-start analysis.
Quality Control or Check Standards	Accuracy within established limits. See Quality Manual	Re-analyze LCS check standard. If same response is obtained, trouble shoot the instrument & re-analyze. If same response is obtained, prepare new LCS & re-start analysis.
Continuing Calibration Standard	Accuracy within established limits	Re-analyze CCV. If same response is obtained, trouble shoot the instrument & re-start analysis. If same response is obtained, prepare new standards & re-start analysis.
Matrix Spikes	Accuracy within established limits. See Quality Manual	Re-analyze and re-make. If problem persists, notify your supervisor.
Replicate/Duplicate Sample	Precision within established limits. See Quality Manual	Re-analyze sample. If problem persists, notify your supervisor.

Note: The recommended corrective actions in Table 24.1 are intended as general guidelines to initiate the analytical trouble shooting process. In all cases, if the out-of-control condition persists beyond the second step in troubleshooting, notify your supervisor of the condition and request assistance.
Confirm all non-conformities with your supervisor.

24.2 Corrective actions for out-of-control field quality control samples.

LCS Check	Acceptance Criteria	Recommended Corrective Action
Equipment Blank(EB) Trip Blank(TB)	<MDL or less than established limits	Laboratory should re-analyze positive field blanks to confirm results.
Field Duplicates (FD) Replicate Samples (RS) Split Samples (SS)	Precision within limits See Quality Manual (only if values >PQL)	Laboratory should re-analyze failing field QC samples to confirm results.

24.4 Standards Preparation Table:

STANDARD	CONCENTRATION (SIO_2)mg/L	VOLUME & SOLN.	FINAL VOLUME mL
SIO_2 STOCK	1000 mg/L		
STANDARD 1	50.00 mg/L	5 mL of Stock	100
STANDARD 2	20.00 mg/L	2 mL of Stock	100
STANDARD 3	10.00 mg/L	2 mL of Stock	200
STANDARD 4	5.00 mg/L	50 mL of STD 3	100
STANDARD 5	2.00 mg/L	10 mL of STD 2	100
STANDARD 6	0.500 mg/L	5 mL of STD 3	100
STANDARD 7	0.200 mg/L	4 mL of STD 4	100
STANDARD 8	0.00 mg/L	-	LABORATORY REAGENT WATER

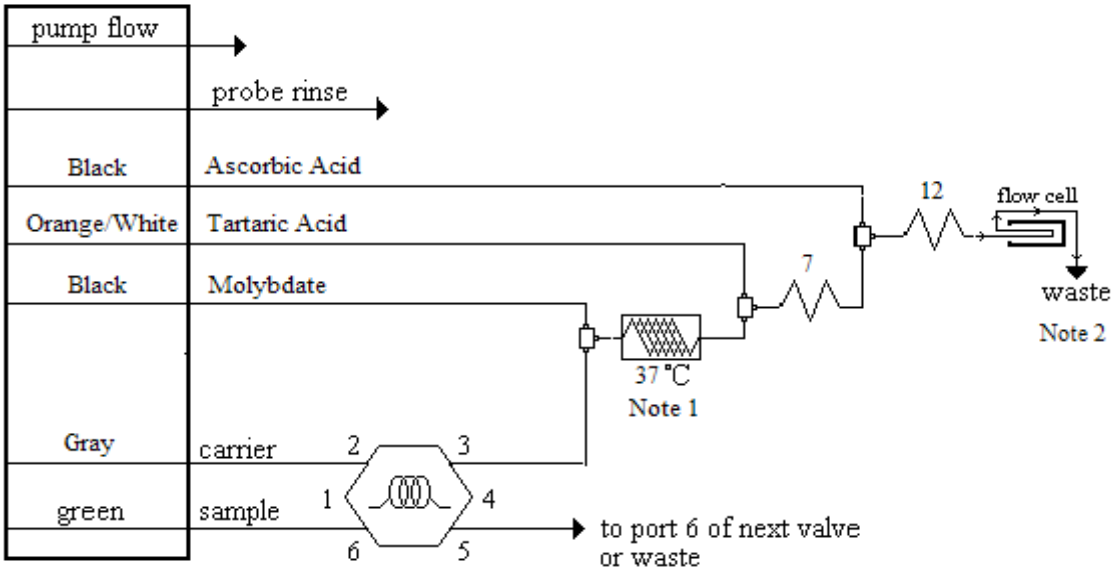
24.5 LCS Preparation Table:

STANDARD	CONCENTRATION mg/L(SIO_2)	VOLUME &SOLUTION	FINAL VOLUME mL
SiO_2 stock	1000 mg/L		
LCS1	40.0 mg/L	4 mL LCS stock solution	100
LCS2	0.50 mg/L	2.5 mL LCS1 solution	200
LCS5	0.20 mg/L	40 mL LCS2	100

24.6 Data system parameters (Omnion Software):
Note: All timing is approximate and will vary between manifold and instrument.

Tab	Item	Setting
Racks	Racks	ASX60
Timing - Run	Method cycle period	60
	Sample period	15
	Probe in wash	45
	Pump standby	Off
	Use minutes	Off
	Channel in minutes	Off
	Analyte in minutes	Off
	Pump idol before standby	10
	Pump speed before analysis	10
Timing – Channel 3	Load period	12
	Inject period	15
	Time to valve	32
	Use retention time	Off
Timing – SiO_2	Expected inject peak start	19
	Expected peak base width	67
	Brackish shutter offset	1
	Brackish shutter width	56
Analytes – Channel 3	Channel	Off
	Method	FIA
Analytes – SiO_2	Analyte name	SiO_2
	Concentration units	mg/L
	Calibration fit	Second order
	Clear calibration	On
	Force through zero	Off
	Calibration weighing	1/X
	Auto dilution trigger	Off
	% high standard	110
	Chemistry	Brackish
	Calibration by height	Off

24.7 Analytical Cartridge Diagram for SIO_2:



Carrier:	Laboratory reagent water
Manifold Tubing:	0.8 mm (0.032 in) i.d.
QC8500 Sample Loop:	15 cm 0.5 mm (0.022 in) i.d.
Interference Filter:	820 nm
Apparatus:	An injection valve, a 10 mm path length flow cell, and a colorimetric detector module is required.
7:	135 cm of 0.8 mm tubing on a 2 cm coil support
12:	255 cm of 0.8 mm i.d. tubing on a 12 cm coil support
Note 1:	175 cm 0.8 mm i.d. tubing on heater
Note 2:	Waste line is 0.8 mm i.d. tubing

24.0 Attachments

CHECKLIST

Parameter / SOP #
Analysis Date
ANALYSIS HBN #
PREP HBN #

Analyst Review	ANALYST YES	ANALYST NO	SPVR YES	SPVR NO
Initial Calibration and Quality Control criteria met				
Continuing Quality Control and Calibration criteria met				
Sample Analysis				
Sample holding times met				
Reported Data readings within the calibration range				
Samples analyzed out of designated bottle set (if not note in comments)				
Other				
Required forms completed and submitted				
Above cited SOP read and followed				
All reagents and standards documented as required				
Electronic Content				
Post Run Annotations				
All required documents printed / scanned into LIMS				
All stability infromation entered into the proper spreadsheet				

Comments: _____

Analyst: _____ **Date:** _____

Supervisor: _____ **Date:** _____

QA: _____ **Date:** _____

Lachat 8000

Asset #:E34722 Serial #: A83000-1383

Received New Date in Service: 6/15/05

MONTH _____ YEAR _____

		DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
		INITIALS																															
Daily	Empty waste containers																																
	Clean all surfaces																																
	Dispose of sample cups																																
	Clean manifold with DI & NaOH																																
Weekly	Change pump tubes																																
	Clean pump rollers																																
Monthly	Clean Worm gear on autosampler																																
6 Months	Clean unions and tees																																
	Replace all tubing																																
Lachat Service																																	

Notes/Service: _____

25.0 **SOP Addendums and Changes**

26.0 Document History

Document Version	Date Issued	Description	Author
3120.1 rev 4.1	1/10/08	New revision of SOP	Joel Nichols SFWMD
3120-005	3/3/10	New revision of SOP	Joel Nichols SFWMD
3120-006	7/31/13	Administrative changes	Joel Nichols SFWMD