



Certificate of Analysis

Page 1 of 3

Client:		Lab No:	2014363	FSASWPv1
Contact:		Date Received:	12-Jul-2018	
		Date Reported:	18-Jul-2018	
		Quote No:	91644	
		Order No:	5500024675	
		Client Reference:	Batch # M090/18 Q2 Composite	
		Add. Client Ref:	Date of Manufacture: 11/07/2018	
		Submitted By:		

Sample Type: Fluorosilicic Acid					
Sample Name:		HFA Batch # M090/18 Q2 Composite 11-Jul-2018		Specifications	Outside Limit
Lab Number:		2014363.1			
Fluorosilicic Acid					
Apparent Hazen Colour	Hazen units	35	maximum of 200	No	
Turbidity	NTU	0.26	< 20 NTU.	No	
Fluorosilicic acid (H ₂ SiF ₆)	%	22.4	21.0 - 23.0%	No	
Free Acidity (as HF)	%	0.23	< 1.0% w/w	No	
Total Suspended Solids	g/m ³	< 60	< 1,000 g/m ³	No	
Specific Gravity	20°C/20°C	1.20	1.20 - 1.23	No	
Aluminium	mg/kg as rcvd	9.4	-	-	
Antimony	mg/kg as rcvd	< 0.09	-	-	
Arsenic	mg/kg as rcvd	< 0.5	-	-	
Barium	mg/kg as rcvd	0.32	-	-	
Beryllium	mg/kg as rcvd	< 0.05	-	-	
Cadmium	mg/kg as rcvd	0.02	-	-	
Chromium	mg/kg as rcvd	0.3	-	-	
Copper	mg/kg as rcvd	< 0.3	-	-	
Iodine	mg/kg as rcvd	10.9	< 50 mg/kg	No	
Iron	mg/kg as rcvd	18	-	-	
Lead	mg/kg as rcvd	< 0.05	-	-	
Manganese	mg/kg as rcvd	1.3	-	-	
Mercury	mg/kg as rcvd	< 0.05	-	-	
Molybdenum	mg/kg as rcvd	< 0.09	-	-	
Nickel	mg/kg as rcvd	0.5	-	-	
Phosphorus	mg/kg as rcvd	158	< 1,000 mg/kg	No	
Selenium	mg/kg as rcvd	< 0.5	-	-	
Silver	mg/kg as rcvd	< 0.05	-	-	
Thallium	mg/kg as rcvd	< 0.03	-	-	
Tin	mg/kg as rcvd	< 0.3	-	-	
Uranium	mg/kg as rcvd	0.050	-	-	
Zinc	mg/kg as rcvd	< 0.5	-	-	

The Specification limits were supplied by the customer.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Fluorosilicic Acid			
Test	Method Description	Default Detection Limit	Sample No
TMAH Digestion	Tetramethylammonium hydroxide micro digestion, filtration. P.A.Fecher, I.Goldman and A.Nagengast. Journal of Analytical Atomic Spectrometry, 1998, 13, 977-982.	-	1

Sample Type: Fluorosilicic Acid			
Test	Method Description	Default Detection Limit	Sample No
Sample dilution for ICP-MS analysis	Dilution of sample in preparation for ICP-MS analysis.	-	1
Apparent Hazen Colour	Determined on original sample without filtration or centrifugation, determination by Lovibond colorimeter. APHA 2120 B (modified) 22 nd ed. 2012.	5 Hazen units	1
Turbidity	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 22 nd ed. 2012.	0.05 NTU	1
Fluorosilicic acid (H ₂ SiF ₆)	Titration of ionizable hydrogen in a chilled solution from which the fluorosilicate ions have been precipitated as potassium fluorosilicate. ANSI / AWWA B703-11.	0.10 %	1
Free Acidity (as HF)	Titration of hot solution from Fluorosilicic acid titration with standard sodium hydroxide to the neutral point of bromothymol blue. ANSI / AWWA B703-11.	0.10 %	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) 22 nd ed. 2012.	3 g/m ³	1
Specific Gravity	Calculation: weight of sample / weight of equivalent volume of water at ambient temperature (approx. 20°C), gravimetry (measuring cylinder).	0.01 20°C/20°C	1
Aluminium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.05 mg/kg as rcvd	1
Antimony	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.004 g/m ³	1
Antimony	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.004 mg/kg as rcvd	1
Arsenic	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.02 g/m ³	1
Arsenic	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.016 mg/kg as rcvd	1
Barium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.11 g/m ³	1
Barium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0016 mg/kg as rcvd	1
Beryllium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.002 g/m ³	1
Beryllium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0016 mg/kg as rcvd	1
Cadmium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0010 g/m ³	1
Cadmium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0008 mg/kg as rcvd	1
Chromium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.010 g/m ³	1
Chromium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.008 mg/kg as rcvd	1
Copper	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.010 g/m ³	1
Copper	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.008 mg/kg as rcvd	1
Total Iodine	Sample digestion with aqueous TMAH at 90°C. Analysis by ICP-MS. APHA 3125 B 22 nd ed. 2012.	0.0010 g/m ³	1
Iodine	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0008 mg/kg as rcvd	1
Iron	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.4 g/m ³	1
Iron	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.4 mg/kg as rcvd	1
Lead	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.002 g/m ³	1
Lead	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0016 mg/kg as rcvd	1
Manganese	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.010 g/m ³	1
Manganese	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.008 mg/kg as rcvd	1
Mercury	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.002 g/m ³	1
Mercury	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0016 mg/kg as rcvd	1

Sample Type: Fluorosilicic Acid			
Test	Method Description	Default Detection Limit	Sample No
Molybdenum	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.004 g/m ³	1
Molybdenum	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.004 mg/kg as rcvd	1
Nickel	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.010 g/m ³	1
Nickel	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.008 mg/kg as rcvd	1
Phosphorus	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.4 g/m ³	1
Phosphorus	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.4 mg/kg as rcvd	1
Selenium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.02 g/m ³	1
Selenium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.016 mg/kg as rcvd	1
Silver	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.002 g/m ³	1
Silver	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0016 mg/kg as rcvd	1
Thallium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0010 g/m ³	1
Thallium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0008 mg/kg as rcvd	1
Tin	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.010 g/m ³	1
Tin	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.008 mg/kg as rcvd	1
Uranium	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0004 g/m ³	1
Uranium	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.0004 mg/kg as rcvd	1
Zinc	Analysed as received (after acid preservation, if required), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.02 g/m ³	1
Zinc	Analysed as received (following dilution), ICP-MS, screen level. APHA 3125 B 22 nd ed. 2012.	0.016 mg/kg as rcvd	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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