



Test Report: Dust Fallout Monitoring

Prepared for

Saldanha Bay Municipality

AQ0344

Test dates: June 2021 to March 2022

EXECUTIVE SUMMARY

Dust fallout sampling was conducted at seven (7) sites in the Saldanha Bay Municipal area, commencing Feb 2015 and collected on a monthly basis.

This is the first report in a new three (3) year contract that commenced 1st March 2022 and sampling equipment is being evaluated and will be repaired or replaced as necessary.

There was valid data for five (5) of the seven (7) samples collected, resulting in 71% data capture for the period under review. The SBM-04 and SBM-05 samplers are damaged by corrosion and replacement samplers are being procured. This report covers the period 19th June 2021 to 8th March 2022 as there was no contract operational between July 2021 and end February 2022 as mentioned above.

There were no exceedances of the South African National Dust Control Regulations residential limit of 600mg/m²/day *only*.

There were no exceedances of the South African National Dust Control Regulations residential limit of 1200mg/m²/day.

Results for lead were evaluated against US EPA Federal Register (40 CFR Part 745: Lead; identification of dangerous levels of lead; Final Rule). This regulation establishes:

“hazard standards for residential dust and soil lead. As stated in Unit II.F.3. Today’s rule establishes two hazard standards for bare residential soil; 400ppm for play grounds and an average of 1200ppm for the rest of the yard.”

This represents a cautionary approach in estimating worst-case scenarios for exposure to the general public.

Lead levels for the “rest of the yard” (1200ppm) and the “playground areas” (400ppm) were not exceeded during the review period. Care must be taken in evaluating the “concentrations” figures when dust fallout mass is low. A table of “net lead (Pb) mass in mg”, Table 4.2, has been added for information purposes.

Net lead masses were low and ranged between 8µg and 32µg over the period under review (Table 4.2) of June 21 / March 22, and these are possibly a better measure than concentration when assessing “heavy metal” levels in dust fallout.

No meteorological data was available for the period under review..

REPORT DETAILS

REFERENCE	AQ0344/202106/202203
REPORT TITLE	Dust Fallout Monitoring, June 2021 to March 2022
DATE SUBMITTED	12 April 2022
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STATUS	Final
NOTICE	

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ABBREVIATIONS

BDL	Below Detection Limit
DEAT	Department of Environment Affairs and Tourism
EPA	See US EPA
ℓ/min	Litres per minute
m.s ⁻¹	Metres per second
m ³	Cubic metres
Max	Maximum
mg/m ³	milligrams per cubic metre
Min	Minimum
PM ₁₀	Particulate matter of aerodynamic diameter less than 10mm
ppm	Parts per million
SABS	South African Bureau of Standards
SW	South West
US EPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WHO	World Health Organisation

1 INTRODUCTION

ARGOS SCIENTIFIC was contracted by Saldanha Bay Municipality to perform dust fallout monitoring and heavy metals (Iron, lead, zinc, manganese and copper) measurements at various sites in the Saldanha Bay Municipal Area

A dust fallout and metals contamination impact assessment will be performed using this data.

1.1 *Scope of Work*

ARGOS SCIENTIFIC's understanding of the scope of work is as follows:

- To measure dust fallout rates at seven (7) sampling points for 12 months.
- Monthly collection of samples for duration of 12 months.
- Monthly sample analysis as follows: Seven (7) gravimetric samples per month.
- Elemental sample analysis as follows: Iron, lead, zinc, manganese and copper.
- Monthly results to client in electronic format.
- Data interpretation and reporting will be submitted electronically.

2 METHODOLOGY

2.1 Sample Location

Dust fallout sampling was conducted the following seven sites sites:

Vredenburg Electricity Dept.: SBM-06	32° 54' 27.2" S	17° 59' 13.7" E
Vredenburg Reservoir: SBM-05	32° 54' 56.1" S	17° 59' 12.9" E
Juffroushoogte: SBM07	32° 56' 13.8" S	18° 04' 33.6" E
Airport: SBM-01	32° 57' 34.5" S	17° 58' 12.5" E
Saldanha AQM Station: SBM-02	33° 00' 41.0" S	17° 56' 18.5" E
Blue Water Bay: SBM-04	32° 59' 43.8" S	17° 58' 24.7" E
Curro School: SBM-03	33° 02' 16.2" S	18° 02' 59.9" E

Sites selected had to be:

- Along the prevailing wind vector for the area.
- Distributed evenly within the Saldanha Bay Municipality Area and near areas of possible contamination.

Figure 2.1.1: Location of dust fallout samplers for Saldanha Bay Municipality



2.2 Dust fallout

Dust fallout samplers were deployed in Sept 2015 and samples are collected on a monthly basis. Distilled water was added to minimise sample loss, particularly during high wind speed episodes. Each series of samples were analysed at a SANS 17025 accredited facility.

Total insoluble dust fallout was determined in accordance with ASTM D 1739: 1970 or demonstrable equivalent, a requirement in terms of the SA National Standards (SANS 1929:2005 - Edition 1.1).

3 GUIDELINES AND AIR QUALITY STANDARDS

3.1 Dust fallout

In terms of the *Government Gazette* Volume 476, No. 27318, the South African Air Quality Act 39 of 2004 was promulgated in 2005. The South African National Dust Control Regulations describes the proposed guidelines for dust fallout, an extract of which is discussed briefly below.

A standard for the acceptable dustfall rate is set out in Table 3.1. The target, action and alert thresholds are shown in Table 3.2.

Table 3.1: Evaluation criteria for Dust Fallout

Restriction Areas	Dust fall rate (D) mg/m ² /day (30 day average)	Comment
Residential	D < 600	Permissible for residential and light commercial
Non-Residential	600 < D < 1200	Permissible for heavy commercial and industrial

For heavy commercial and industrial regions, the new guidelines state that monthly average dust fallout concentrations below 1200mg/m²/day “are permissible”. For residential regions, monthly average dust fallout concentrations not exceeding 600mg/m²/day “are permissible”.

Table 3.2: Acceptable Dust Fall Rates

Restriction Areas	Dust fallout rate (D) mg/m ² /day (30 day average)	Averaging period	Permitted frequency of exceeding dust fall rate
residential	D<600	30 days	2 within a year, not sequential months
Non-residential	600<D<1200	30 days	2 within a year, not sequential months

The target annual average dust fallout concentration is 300mg/m²/day. This is an ultimate goal set to achieve “ongoing improvement”, even in areas where compliance with all other guidelines can be demonstrated. The monthly average “action level” for residential regions is 600mg/m²/day and for industrial regions 1200mg/m²/day.

Exceptions are granted where elevated concentrations arise on a regional scale from adverse meteorological conditions. Background dust monitoring sites can be used to identify and monitor impacts of such exceptions. Access to historical and current meteorological information, particularly wind conditions, can be used to distinguish between “adverse” and “normal” meteorological conditions.

4 RESULTS

4.1 Dust fallout and heavy metal results

Table 4.1 Dust fallout and heavy metal results for April/May 2021. Exceedance of Dust Fallout Industrial Standards in **Red**

Sampling Site	Sampling Start Date	Sampling End Date	Net Mass (g)	No. of Days	Dust Fall rate (mg/m ² /day)	Lead (ppm)	Copper (ppm)	Zinc (ppm)	Iron (ppm)	Manganese (ppm)	Comments
SBM-01-11	18-Jun-21	04-Mar-22	3.049	259	519	6	36	62	1738	56	
SBM-02-11	18-Jun-21	04-Mar-22	0.430	259	73	26	605	233	8605	279	
SBM-03-11	18-Jun-21	04-Mar-22	1.056	259	180	10	199	189	4354	151	
SBM-04-11	18-Jun-21	04-Mar-22	0.000	259	-	-	-	-	-	-	Corroded / Broken
SBM-05-11	18-Jun-21	04-Mar-22	0.000	259	-	-	-	-	-	-	Corroded / Broken
SBM-06-11	18-Jun-21	04-Mar-22	0.228	259	39	141	435	1054	22408	1450	
SBM-07-11	18-Jun-21	04-Mar-22	0.474	259	81	17	61	129	10137	993	

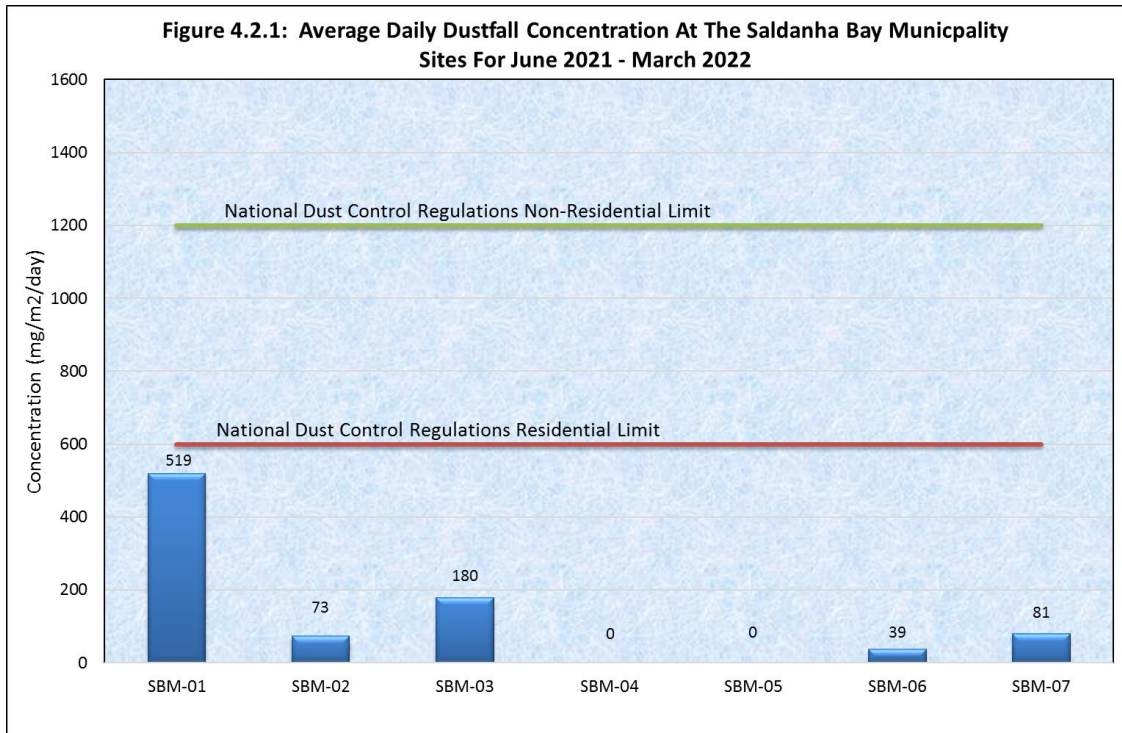
*BDL – Below Detectable Limit

Table 4.2 Lead content (net mass, mg) in dust fallout, December 2019 – April/May 2021

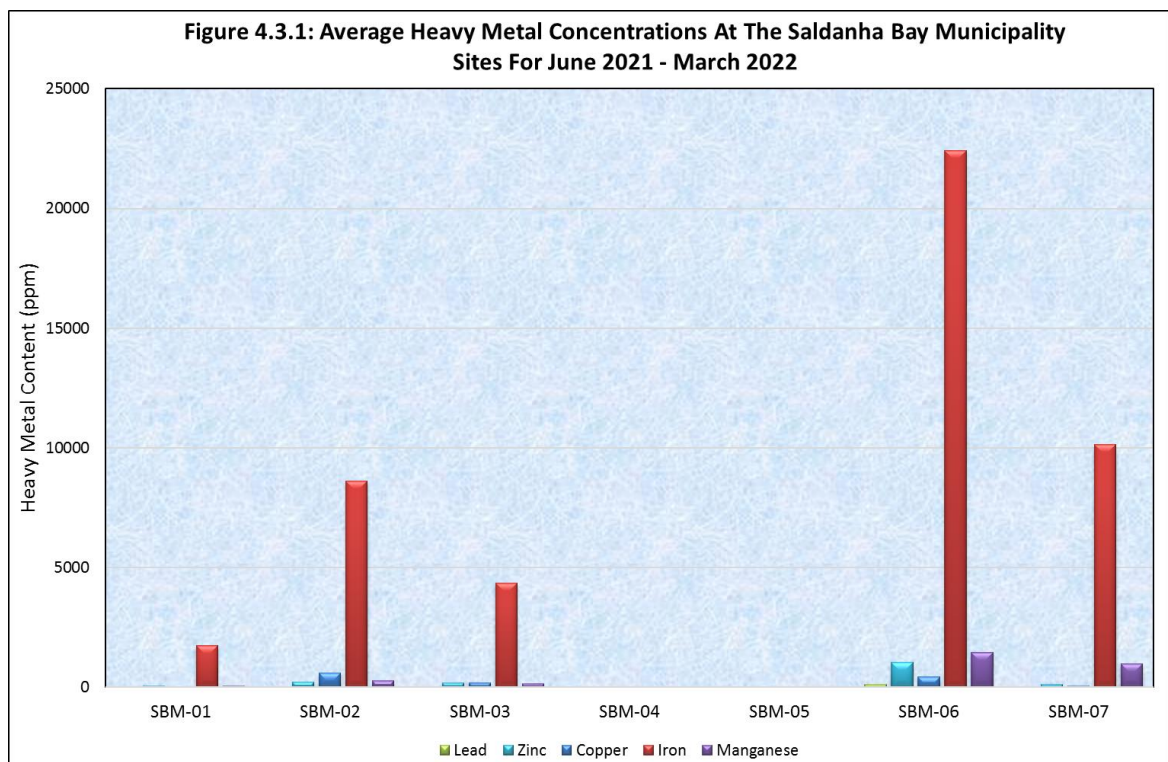
Site/Period	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar - Apr 20	May-20	Oct-20	6th Nov 20 - 19th Mar 21	Mar-21	21st April - 19th May 2021	19th May - 18th June	18th June - 4th Mar
SBM-01	0.005	0.002	0.002	0.002	0.003	0.004	0.004	0.007	0.004	N/A	0.002	N/A	0.018
SBM-02	0.003	0.003	0.002	0.005	0.003	0.002	0.002	0.002	0.010	<0.001	0.010	0.002	0.011
SBM-03	0.004	0.001	<0.001	0.002	N/A	N/A	0.001	0.001	0.002	0.004	0.004	0.002	0.011
SBM-04	0.005	0.004	0.002	0.010	0.004	0.002	0.003	0.002	N/A	N/A	N/A	N/A	N/A
SBM-05	0.015	0.012	0.006	0.019	0.020	0.009	0.003	0.004	0.032	0.012	0.009	0.007	N/A
SBM-06	0.013	0.008	0.006	0.044	0.014	0.023	0.002	0.017	0.021	0.018	0.006	0.006	0.032
SBM-07	0.002	0.003	0.002	0.004	0.002	0.003	0.003	0.006	0.012	0.006	0.060	0.013	0.008

N/A Corroded / Broken or contaminated

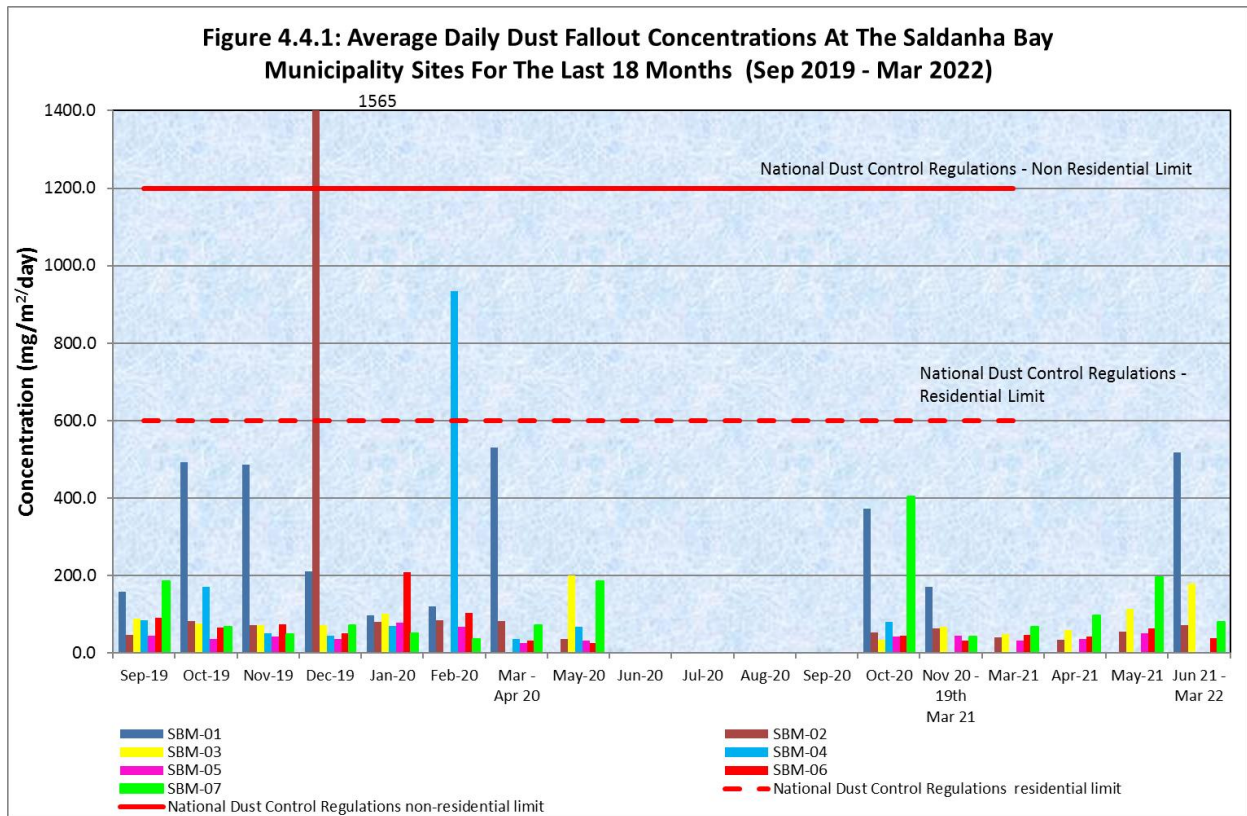
4.2 Dust fallout concentration



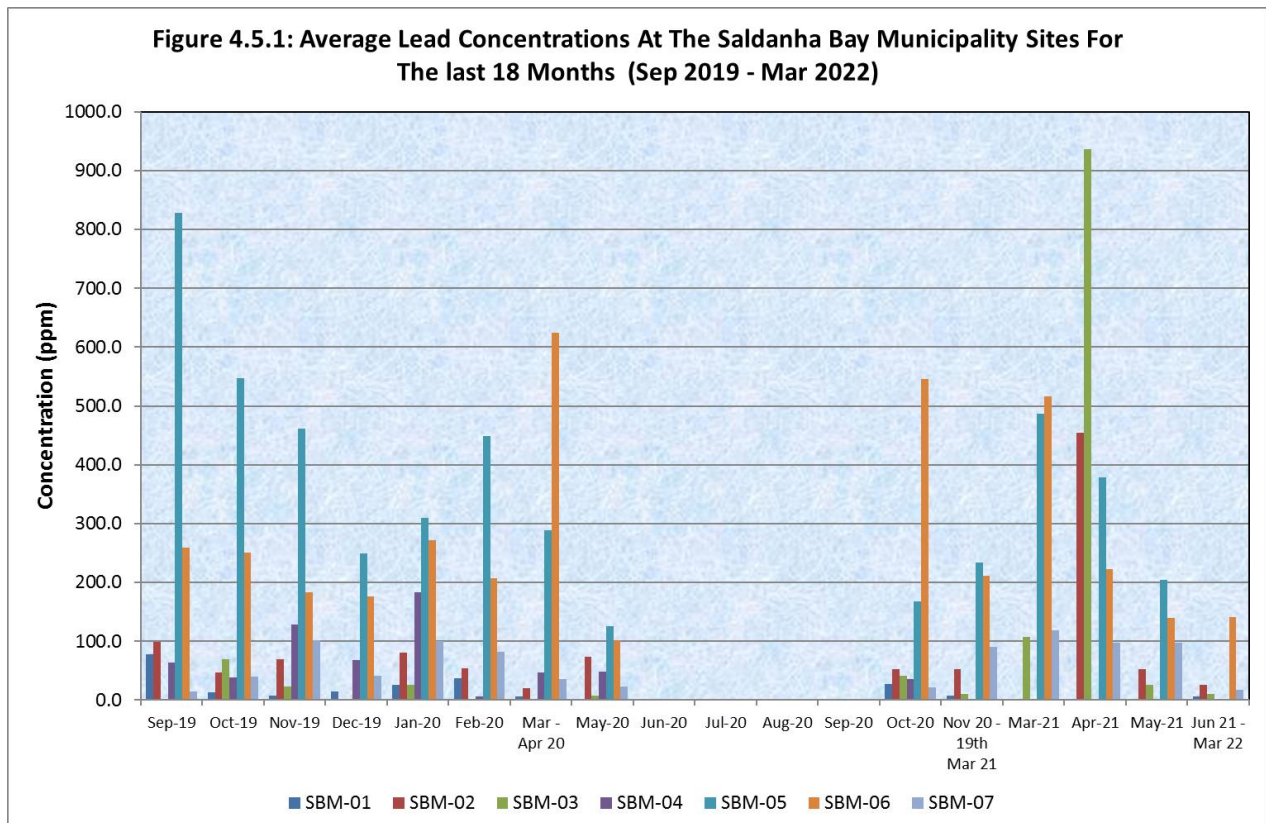
4.3 Heavy metal concentration



4.4: Average Historical Daily Dust fallout concentrations



4.5: Average Historical Lead fallout concentrations



4.6 Wind Roses for Saldanha Bay Municipality

No Wind Rose for June 2021 – March 2022

5 CONSULTANT'S OBSERVATIONS AND CONCLUSIONS

There was valid data for five (5) of the seven (7) samples collected, resulting in 71% data capture for the period under review. The SBM-01 sample was contaminated with bird droppings and the SBM-04 sampler is damaged. This report covers the period 21st April to the 19th May 2021

There were no exceedances of the South African National Dust Control Regulations residential limit of 600mg/m²/day only.

There were no exceedances of the South African National Dust Control Regulations residential limit of 1200mg/m²/day.

Results for lead were evaluated against US EPA Federal Register (40 CFR Part 745: Lead; identification of dangerous levels of lead; Final Rule). This regulation establishes:

“hazard standards for residential dust and soil lead. As stated in Unit II.F.3. Today’s rule establishes two hazard standards for bare residential soil; 400ppm for play grounds and an average of 1200ppm for the rest of the yard.”

This represents a cautionary approach in estimating worst-case scenarios for exposure to the general public.

Lead levels for the “rest of the yard” (1200ppm) and for the “playground areas” (400ppm) was not exceeded during the review period.

Care must be taken in evaluating “concentrations” figures when dust fallout mass is low. A table of “net lead (Pb) mass in mg”, Table 4.2, has been added for information purposes. Net lead masses were low and ranged between 8µg and 32µg over the period under review (Table 4.2) of April/May 2021, and these are possibly a better measure than concentration when assessing “heavy metal” levels in dust fallout.

No meteorological data was available for the period under review.

5.1 SANAS Accredited Certificates of Analysis for Dust Fallout



Laboratory Test Results
AQ344 SBM Dustfall Results June 2021 - March 2022

Prepared for
Argos Scientific

Sampling period: 18/24 June 2021 - 04 March 2022

Report date - 04/04/2022

JHB Office: 2 Samantha Street, Strijdom Park, Randburg, 2194, Johannesburg

DBN Office: Ninian Westmead Estate, Unit 2, Building 4, 33 Henry Pennington (Richmond) Road, Westmead,
3610.

Page 1 of 3

REFERENCE	AQ344
CLIENT REFERENCE	
REPORT TITLE	AQ344 SBM Dustfall Results June 2021 - March 2022
DATE SUBMITTED:	Report date - 04/04/2022
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NOTICE	<p><i>The Technical Signatory hereby declares that, to the best of his/her knowledge, the analytical data was checked for completeness, the results presented in this report are accurate and legible, and analysis was conducted in accordance with the methods in the approved protocol.</i></p> <p>WARNING: the sample(s) to which the findings herein (the "Findings") relate was(were) drawn and or provided by the client or by a third party acting at the client's direction. The Findings constitute no warranty of the samples representativity of all the goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted. Any unauthorised alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the full extent of the law.</p>



AQ344 SBM

June 2021 - March 2022

Start	Start	End	End	No.	Site	Site	Mass Before			Average	Mass after		
Date	Time	Date	Time	Days	Description	No.				before (g)			
2021/06/18	17:30	2022/03/04	15:30	259.00	Site 1	1	59653	59653	59653	5.9653	90143	90144	90143
2021/06/18	16:35	2022/03/04	16:30	259.00	Site 2	2	59604	59605	59604	5.9604	63903	63904	63905
2021/06/18	15:30	2022/03/04	16:50	259.00	Site 3	3	59616	59617	59617	5.9617	70179	70181	70182
				0.00	Site 4	4				0.0000			
				0.00	Site 5	5				0.0000			
2021/06/24	15:45	2022/03/04	14:50	253.00	Site 6	6	59613	59614	59613	5.9613	61888	61889	61891
2021/06/18	18:15	2022/03/04	14:00	259.00	Site 7	7	59703	59703	59704	5.9703	64438	64438	64439
					BLANK		59693	59694	59693	5.9693	59695	59696	59695

CLIENT DETAILS

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Order Number AQ344 June 21
Samples 5
Sample matrix AIR

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Laboratory Manager Mrs Tasneem Tagari
Lab Reference JBX22-11501
Report Number 0000041143
Date Received 05/04/2022 13:05
Date Started 7/04/2022 14:31
Date Reported 07/04/2022 15:19

The document is issued in accordance with SANAS's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. SANAS accredited laboratory T0775.



Samples recieved at ambient temp good condition.

SIGNATORIES

Tasneem Tagari

General Manager/Technical Signatory

TEST REPORT

Sample Number	JBX22-11501.001	JBX22-11501.002	JBX22-11501.003	JBX22-11501.004
Sample Name	SBM1-06	SBM2-06	SBM3-06	SBM6-06

Parameter Units LOR

Metals on Filters Method: ME-AN-027

Copper	mg/filter	0.002	0.11	0.26	0.21	0.099
Iron	mg/filter	0.005	5.3	3.7	4.6	5.1
Manganese	mg/filter	0.001	0.17	0.12	0.16	0.33
Lead	mg/filter	0.001	0.018	0.011	0.011	0.032
Titanium	mg/filter	0.0005	0.045	0.036	0.080	0.049
Zinc	mg/filter	0.001	0.19	0.10	0.20	0.24

Sample Number	JBX22-11501.005
Sample Name	SBM7-06

Parameter Units LOR

Metals on Filters Method: ME-AN-027

Copper	mg/filter	0.002	0.029
Iron	mg/filter	0.005	4.8
Manganese	mg/filter	0.001	0.47
Lead	mg/filter	0.001	0.008
Titanium	mg/filter	0.0005	0.045
Zinc	mg/filter	0.001	0.061

METHOD SUMMARY

METHOD

METHOD SUMMARY

ME-AN-027

Filters are digested with a mixture of nitric and hydrochloric acids. The digest is then analysed for metals, excluding Hg, by inductively coupled plasma optical emission spectrometry (ICP-OES). Based on NIOSH methods 7300 and 7301.

FOOTNOTES

IS	Insufficient sample for analysis.	-	The sample was not analysed for this analyte
LNR	Sample listed, but not received.	*	Results marked "Not SANAS Accredited" in this report are not included in the SANAS Schedule of Accreditation for this laboratory / certification body / inspection body".
^	Performed by outside laboratory.		
LOR	Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Unless otherwise indicated, samples were received in containers fit for purpose.

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