



**REPORT NUMBER R009674**

**Emission Testing Report  
Astron Sustainability, Seven Hills**

## Document Information

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Template Version: 030620

Client Name: Astron Sustainability  
Report Number: R009674  
Date of Issue: 29 September 2020  
Attention: Grant McNally  
Address: 30-32 Powers Rd  
Seven Hills NSW 2147  
Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

## Report Authorisation

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NATA Accredited Laboratory  
No. 14601

**Steven Cooper**  
Client Manager

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

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*Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo's terms of NATA accreditation. This does not include comments, conclusions or recommendations based upon the results. Refer to 'Test Methods' for full details of testing covered by NATA accreditation.*

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## 1 EXECUTIVE SUMMARY

### 1.1 Background

Ektimo was engaged by Astron Sustainability to perform emission testing at their Seven Hills plant. Testing was carried out in accordance with Environmental Protection Licence 124.

### 1.2 Project Objectives

The objectives of the project were to conduct a monitoring programme to quantify emissions from the afterburner discharge stack and characteristics of the ingress flow at the cooling air vent as required by Astron Sustainability's licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Afterburner Discharge Stack	12 August 2020	Solid particles Carbon dioxide, oxygen, carbon monoxide, nitrogen oxides Sulfuric acid mist and sulfur trioxide (as SO <sub>3</sub> ) Hydrogen sulfide Total fluoride, hydrochloric acid (HCl), chlorine Volatile organic compounds (VOCs) Metals (type 1 substances Sb, As, Cd, Pb, Hg) Dioxins and furans Dry gas density, molecular weight
EPA 2 – Cooling Air Vent		Dry gas density, molecular weight

\* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

The cooling air vent (EPA 2) consists of an open slot around the entire 4555mm circumference of the waste air duct stemming from the afterburner. The width of this slot is variable. Fresh ambient air is drawn through the slot under venturi. On the day of sampling the slot was open to a width of 200mm. Velocity measurements were taken with an anemometer at three accessible locations around the circumference. All calculations assume that the cooling air vent flow into the afterburner waste air duct is consistent and uniform across the entire width and circumference of the slot.

### 1.3 Licence Summary

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per Environmental Protection Licence 124 (last amended on 7 July 2020).

EPA	Parameter	Units	Licence limit	Detected values at STP 12-Aug-20	Detected values Corrected to 11% O <sub>2</sub>	Detected values Corrected to 3% O <sub>2</sub>	Detected values Corrected to 12% CO <sub>2</sub>
1 - Afterburner Discharge Stack	Dioxins and furans	ng/m <sup>3</sup>	0.1	0.0018	0.018	-	-
	Hydrogen sulfide	mg/m <sup>3</sup>	5	<0.008	-	<0.1	-
	Volatile organic compounds	mg/m <sup>3</sup>	40	0.27	-	4.6	-
	Nitrogen oxides	mg/m <sup>3</sup>	2000	12	-	200	-
	Mercury	mg/m <sup>3</sup>	3	<0.0004	-	<0.007	-
	Chlorine	mg/m <sup>3</sup>	200	<0.01	-	<0.3	-
	Cadmium	mg/m <sup>3</sup>	3	<0.0005	-	<0.009	-
	Hydrochloric acid (HCl)	mg/m <sup>3</sup>	400	0.5	-	9.1	-
	Total fluoride	mg/m <sup>3</sup>	50	0.37	-	6.7	-
	Solid particles	mg/m <sup>3</sup>	250	1.5	-	-	36
	Sulfuric acid mist and sulfur trioxide (as SO <sub>3</sub> )	mg/m <sup>3</sup>	100	0.15	-	2.5	-
	Type 1 substances	mg/m <sup>3</sup>	10	≤0.02	-	≤0.33	-

Please note that the measurement uncertainty associated with the test results was not considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

## 2 RESULTS

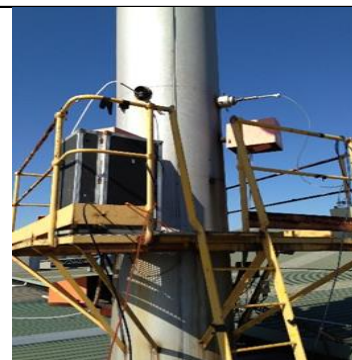
### 2.1 EPA 1 – Afterburner Discharge Stack

Date	12/08/2020	Client	Astron Sustainability
Report	R009674	Stack ID	EPA 1 - Afterburner Discharge Stack
Licence No.	124	Location	Seven Hills
Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		

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#### Sampling Plane Details

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m <sup>2</sup>
Sampling port size, number	4" BSP (x2)
Access & height of ports	Step ladder 8 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 7 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Compliant but non-ideal



#### Comments

The sampling plane is deemed to be non-ideal due to the following reasons:  
 The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

#### Stack Parameters

Moisture content, %v/v	1.5	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)
% Oxygen correction & Factor	3 %	17.15
% Carbon dioxide correction & Factor	12 %	23.32

#### Gas Flow Parameters

Flow measurement time(s) (hhmm)	0740 & 1115
Temperature, °C	138
Temperature, K	411
Velocity at sampling plane, m/s	34
Velocity at exit plane, m/s	34
Volumetric flow rate, actual, m <sup>3</sup> /s	28
Volumetric flow rate (wet STP), m <sup>3</sup> /s	19
Volumetric flow rate (dry STP), m <sup>3</sup> /s	18
Mass flow rate (wet basis), kg/hour	87000

Hydrogen Sulfide	Sampling time	Results		
		Concentration	Corrected to	Mass Rate
			1045-1145	
			3% O <sub>2</sub>	
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
Hydrogen sulfide		<0.008	<0.1	<0.009

Isokinetic Results	Sampling time	Results		
		Concentration	Corrected to	Mass Rate
			0942-1110	
			12% CO <sub>2</sub>	
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
Solid particles		1.5	36	1.7
			3% O <sub>2</sub>	
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
Sulfur trioxide and/or sulfuric acid (as SO <sub>3</sub> )		0.15	2.5	0.16
<b>Isokinetic Sampling Parameters</b>				
Sampling time, min		80		
Isokinetic rate, %		100		
Velocity difference, %		-3		

Date	12/08/2020	Client	Astron Sustainability
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Licence No.	124	Location	Seven Hills
Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		

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### Sampling Plane Details

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m <sup>2</sup>
Sampling port size, number	4" BSP (x2)
Access & height of ports	Step ladder 8 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 7 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Compliant but non-ideal



### Comments

The sampling plane is deemed to be non-ideal due to the following reasons:  
 The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

### Stack Parameters

Moisture content, %v/v	1.5	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)
% Oxygen correction & Factor	3 %	18.27

### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1246 & 1425
Temperature, °C	143
Temperature, K	416
Velocity at sampling plane, m/s	34
Velocity at exit plane, m/s	34
Volumetric flow rate, actual, m <sup>3</sup> /s	28
Volumetric flow rate (wet STP), m <sup>3</sup> /s	19
Volumetric flow rate (dry STP), m <sup>3</sup> /s	18
Mass flow rate (wet basis), kg/hour	86000

### Isokinetic Results

Sampling time	Results		
	1250-1417		
	Corrected to		
	Concentration mg/m <sup>3</sup>	3% O <sub>2</sub> mg/m <sup>3</sup>	Mass Rate g/min
Hydrochloric acid (HCl)	0.5	9.1	0.55
Chlorine	<0.01	<0.3	<0.02
Total fluoride (as HF)	0.37	6.7	0.4

### Isokinetic Sampling Parameters

Sampling time, min	80
Isokinetic rate, %	90
Velocity difference, %	-3

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Licence No.	124	Location	Seven Hills
Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		

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#### Sampling Plane Details

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m <sup>2</sup>
Sampling port size, number	4" BSP (x2)
Access & height of ports	Step ladder 8 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 7 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Compliant but non-ideal



#### Comments

The sampling plane is deemed to be non-ideal due to the following reasons:

The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

#### Stack Parameters

Moisture content, %v/v	1.5	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)
% Oxygen correction & Factor	3 %	16.91

#### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1115 & 1246
Temperature, °C	142
Temperature, K	415
Velocity at sampling plane, m/s	34
Velocity at exit plane, m/s	34
Volumetric flow rate, actual, m <sup>3</sup> /s	28
Volumetric flow rate (wet STP), m <sup>3</sup> /s	19
Volumetric flow rate (dry STP), m <sup>3</sup> /s	18
Mass flow rate (wet basis), kg/hour	86000

#### Isokinetic Results

Sampling time	Results		
	1120-1244		
	Corrected to		
	Concentration mg/m <sup>3</sup>	3% O <sub>2</sub> mg/m <sup>3</sup>	Mass Rate g/min
Antimony	<0.005	<0.09	<0.006
Arsenic	<0.002	<0.04	<0.002
Cadmium	<0.0005	<0.009	<0.0006
Lead	0.011	0.19	0.013
Mercury	<0.0004	<0.007	<0.0004
Total Type 1 Substances	≤0.02	≤0.33	≤0.022

Isokinetic Sampling Parameters	
Sampling time, min	80
Isokinetic rate, %	100
Velocity difference, %	-3

#### Total VOCs (as n-Propane)

Sampling time	Results		
	1155-1255		
	Corrected to		
	Concentration mg/m <sup>3</sup>	3% O <sub>2</sub> mg/m <sup>3</sup>	Mass Rate g/min
Total	0.27	4.6	0.3

#### VOC (specified)

Sampling time	Results		
	1155-1255		
	Corrected to		
	Concentration mg/m <sup>3</sup>	3% O <sub>2</sub> mg/m <sup>3</sup>	Mass Rate g/min
Detection limit <sup>(1)</sup>	<0.06	<1	<0.06
Toluene	0.24	4.1	0.27
Acetone	0.21	3.5	0.23

(1) Unless otherwise reported, the following target compounds were found to be below detection:

Ethanol, Isopropanol, 1,1-Dichloroethene, Dichloromethane, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Carbon tetrachloride, Butanol, 1-Methoxy-2-propanol, Trichloroethylene, 1,1,2-Trichloroethane, Tetrachloroethene, Chlorobenzene, Ethylbenzene, m + p-Xylene, Styrene, o-Xylene, 2-Butoxyethanol, 1,1,2,2-Tetrachloroethane, Isopropylbenzene, Propylbenzene, 1,3,5-Trimethylbenzene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, Pentane, Acrylonitrile, Methyl ethyl ketone, n-Hexane, Ethyl acetate, Cyclohexane, 2-Methylhexane, Isopropyl acetate, 2,3-Dimethylpentane, 3-Methylhexane, Heptane, Ethyl acrylate, Methyl methacrylate, Propyl acetate, Methylcyclohexane, Methyl Isobutyl Ketone, 2-Hexanone, Octane, Butyl acetate, 1-Methoxy-2-propyl acetate, Butyl acrylate, Nonane, Cellosolve acetate, α-Pinene, β-Pinene, Decane, 3-Carene, D-Limonene, Undecane, Dodecane, Tridecane, Tetradecane



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Licence No.	124	Location	Seven Hills
Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		

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**Sampling Plane Details**

Sampling plane dimensions	1035 mm
Sampling plane area	0.841 m <sup>2</sup>
Sampling port size, number	4" BSP (x2)
Access & height of ports	Step ladder 8 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 7 D
Upstream disturbance	Change in diameter 3 D
No. traverses & points sampled	2 16
Sample plane compliance to AS4323.1	Compliant but non-ideal



**Comments**

The sampling plane is deemed to be non-ideal due to the following reasons:  
 The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

**Stack Parameters**

Moisture content, %w/v	1.5	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)
% Oxygen correction & Factor	3 %	17.33
% Oxygen correction & Factor	11 %	9.58

**Gas Flow Parameters**

Flow measurement time(s) (hhmm)	0740 & 1425
Temperature, °C	140
Temperature, K	413
Velocity at sampling plane, m/s	34
Volumetric flow rate, actual, m <sup>3</sup> /s	28
Volumetric flow rate (wet STP), m <sup>3</sup> /s	19
Volumetric flow rate (dry STP), m <sup>3</sup> /s	18
Mass flow rate (wet basis), kg/hour	86000
Velocity difference, %	-2

Gas Analyser Results	Sampling time	Average 0912 - 1321			Minimum 0912 - 1321			Maximum 0912 - 1321		
		Corrected to			Corrected to			Corrected to		
		Concentration mg/m <sup>3</sup>	3% O2 mg/m <sup>3</sup>	Mass Rate g/min	Concentration mg/m <sup>3</sup>	3% O2 mg/m <sup>3</sup>	Mass Rate g/min	Concentration mg/m <sup>3</sup>	3% O2 mg/m <sup>3</sup>	Mass Rate g/min
<b>Combustion Gases</b>										
Nitrogen oxides (as NO <sub>2</sub> )		12	200	13	8.2	140	9.1	21	360	23
Carbon monoxide		2.8	49	3.1	<2	<40	<3	5	87	5.5
		Corrected to			Corrected to			Corrected to		
		Concentration	3% O2	Mass Rate	Concentration	3% O2	Mass Rate	Concentration	3% O2	Mass Rate
		ppm	ppm	g/min	ppm	ppm	g/min	ppm	ppm	g/min
Carbon monoxide		2.2	39	3.1	<2	<30	<3	4	69	5.5
		Concentration			Concentration			Concentration		
		%v/v			%v/v			%v/v		
Carbon dioxide		0.5			0.4			0.6		
Oxygen		19.9			19.3			20.2		

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Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		

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Dioxins & Furans (PCDDs & PCDFs)	Sampling time	Results		
		0750 - 1355		
		Concentration ng/m <sup>3</sup>	Corrected to 11% O2 ng/m <sup>3</sup>	Mass Rate ng/min
2,3,7,8-TCDF		0.00041	0.004	0.46
2,3,7,8-TCDD		<0.0005	<0.005	<0.6
1,2,3,7,8-PeCDF		0.000041	0.00039	0.045
2,3,4,7,8-PeCDF		0.00034	0.0033	0.38
1,2,3,7,8-PeCDD		<0.0003	<0.002	<0.3
1,2,3,4,7,8-HxCDF		0.000065	0.00062	0.071
1,2,3,6,7,8-HxCDF		0.000067	0.00064	0.074
2,3,4,6,7,8-HxCDF		<0.00002	<0.0002	<0.02
1,2,3,7,8,9-HxCDF		<0.00003	<0.0002	<0.03
1,2,3,4,7,8-HxCDD		<0.00002	<0.0002	<0.02
1,2,3,6,7,8-HxCDD		<0.00002	<0.0002	<0.02
1,2,3,7,8,9-HxCDD		<0.00002	<0.0002	<0.02
1,2,3,4,6,7,8-HpCDF		0.000015	0.00015	0.017
1,2,3,4,7,8,9-HpCDF		<0.000002	<0.00002	<0.002
1,2,3,4,6,7,8-HpCDD		0.000019	0.00018	0.021
OCDF		0.00000032	0.000003	0.00035
OCDD		0.0000038	0.000036	0.0042
Total TCDF isomers		0.11	1.1	130
Total TCDD isomers		0.0093	0.089	10
Total PeCDF isomers		0.026	0.25	28
Total PeCDD isomers		0.0044	0.042	4.8
Total HxCDF isomers		0.0052	0.05	5.7
Total HxCDD isomers		0.0031	0.03	3.4
Total HpCDF isomers		0.0019	0.018	2.1
Total HpCDD isomers		0.0041	0.04	4.6
Total PCDDs + PCDFs		0.18	1.7	200
<b>WHO05-TEQ</b>				
Lower Bound		0.00097	0.0093	1.1
Middle Bound		0.0014	0.013	1.6
Upper Bound		0.0018	0.018	2

Abbreviations and definitions	
WHO05-TEQ	
Lower Bound	Defines values reported below detection as equal to zero.
Middle Bound	Defines values reported below detection are equal to half the detection limit.
Upper Bound	Defines values reported below detection are equal to the detection limit.

TEQs are calculated by multiplying the quantified result for each toxic compound by its corresponding toxic equivalency factor.

Isokinetic Sampling Parameters	Results
<b>Dioxins &amp; Furans</b>	
Sampling time, min	360
Isokinetic rate, %	102
Velocity difference, %	-2

## 2.2 EPA 2 – Cooling Air Vent

Date	12/08/2020	Client	Astron Sustainability
Report	R009674	Stack ID	EPA 2 - Cooling Air Vent
Licence No.	124	Location	Seven Hills
Ektimo Staff	Steven Cooper & Adnan Latif	State	NSW
Process Conditions	Please refer to client records.		200805

### Sampling Plane Details

Sampling plane dimensions	4555 x 200 mm
Sampling plane area	0.911 m <sup>2</sup>
Sampling port size, number & depth	, 0 mm
Access & height of ports	Stairs 3 m
Duct orientation & shape	Horizontal Rectangular
Downstream disturbance	Change in diameter 0 D
Upstream disturbance	Change in diameter 0 D
No. traverses & points sampled	3 3
Sample plane compliance to AS4323.1	Non-compliant



### Comments

Slot width is 200mm this year  
 The number of points sampled is less than the requirement

### The sampling plane is deemed to be non-ideal due to the following reasons:

The downstream disturbance is <1D from the sampling plane  
 The upstream disturbance is <2D from the sampling plane

### Stack Parameters

Moisture content, %v/v	1.6	
Gas molecular weight, g/g mole	28.8 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)

### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1302
Temperature, °C	35
Temperature, K	308
Velocity at sampling plane, m/s	14
Volumetric flow rate, actual, m <sup>3</sup> /s	12
Volumetric flow rate (wet STP), m <sup>3</sup> /s	11
Volumetric flow rate (dry STP), m <sup>3</sup> /s	11
Mass flow rate (wet basis), kg/hour	51000

### 3 PLANT OPERATING CONDITIONS

Unless otherwise stated, the plant operating conditions were normal at the time of testing. See Astron Sustainability's records for complete process conditions.

The Open Head Incinerator Afterburner was indicating a combustion zone temperature of 960°C during the sampling period.

### 4 TEST METHODS

All sampling and analysis performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	NSW TM-1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	NSW TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW TM-22	NSW TM-22	8%	✓	✓
Molecular weight	NA	NSW TM-23	not specified	NA	✓
Dry gas density	NA	NSW TM-23	not specified	NA	✓
Carbon dioxide	NSW TM-24	NSW TM-24	13%	✓	✓
Carbon monoxide	NSW TM-32	NSW TM-32	12%	✓	✓
Nitrogen oxides	NSW TM-11	NSW TM-11	12%	✓	✓
Oxygen	NSW TM-25	NSW TM-25	13%	✓	✓
Hydrogen sulfide	NSW TM-5	NSW TM-5	not specified	✓	✓ <sup>†</sup>
Speciated volatile organic compounds (VOC's)	NSW TM-34 <sup>d</sup>	Ektimo 344	19%	✓	✓ <sup>†</sup>
Chlorine	NSW TM-7	Ektimo 235	14%	✓	✓ <sup>†</sup>
Dioxins and furans (PCDD's and PCDF's)	NSW TM-18	NMI AUTL_02	16%	✓	✓ <sup>¶</sup>
Fluorine	NSW TM-9	ALS Method QWI-EN/EA144C & Ektimo 240	25%	✓	✓ <sup>#,†</sup>
Hydrogen chloride	NSW TM-8	Ektimo 235	14%	✓	✓ <sup>†</sup>
Solid particles (total)	NSW TM-15	NSW TM-15 <sup>††</sup>	3%	✓	✓
Sulfuric acid mist and/or sulfur trioxide	NSW TM-3	Ektimo 235	16%	✓	✓ <sup>†</sup>
Type 1 substances (Sb, As, Cd, Pb, Hg)	NSW TM-12	Envirolab inhouse Metals-006, Metals-022, Metals-021	15%	✓	✓ <sup>‡</sup>

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\* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

<sup>†</sup> Analysis conducted at the Ektimo Mitcham, VIC laboratory, NATA accreditation number 14601. Results were reported on 14 August 2020 in report number R009674-H2S  
 20 August 2020 in report number R009674-SOx.  
 31 August 2020 in report number R009674-ISE F.  
 31 August 2020 in report number R009674-Halides\_Halogens.  
 1 September 2020 in report number R009674\_SVOCs.

<sup>††</sup> Gravimetric analysis conducted at the Ektimo Unanderra, NSW laboratory, NATA accreditation number 14601.

<sup>‡</sup> Analysis performed by Envirolab, NATA accreditation number 2901. Results were reported to Ektimo on 25 August 2020 in report number 249230.

<sup>¶</sup> Analysis performed by Australian Government National Measurement Institute, NATA accreditation number 198. Results were reported to Ektimo on 16 September 2020 in report number DAU\_257.

<sup>#</sup> Analysis (solid fluoride only) performed by Australian Laboratory Services Pty Ltd, NATA accreditation number 825. Results were reported to Ektimo on 24 August 2020 in report number EN2005680.

<sup>d</sup> Excludes recovery study as specified in section 8.4.3 of USEPA Test Method 18.

## 5 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website [www.nata.com.au](http://www.nata.com.au).

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

## 6 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D <sub>50</sub>	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D <sub>50</sub> method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D <sub>50</sub> of that cyclone and less than the D <sub>50</sub> of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM <sub>10</sub>	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
PM <sub>2.5</sub>	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity Difference	The percentage difference between the average of initial flows and afterflows.
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result is outside this range.

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