

**Ingal Civil Products, Minto Plant  
Emission Testing Report  
Report Number R012689**

---

## Document Information

Template Version 300522

Client Name: Ingal Civil Products  
Report Number: R012689  
Date of Issue: 28 June 2022  
Attention: Amit Gupta  
Address: 57-65 Airs Road  
Minto NSW 2566  
Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

## Report Authorisation



**Aaron Davis**  
**Senior Air Monitoring**  
**Consultant**

NATA Accredited Laboratory  
No. 14601

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.

This document is confidential and is prepared for the exclusive use of Ingal Civil Products and those granted permission by Ingal Civil Products.  
The report shall not be reproduced except in full.

*Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo's terms of NATA accreditation as described in the Test Methods table. This does not include calculations that use data supplied by third-parties, comments, conclusions, or recommendations based upon the results. Refer to 'Test Methods' for full details of testing covered by NATA accreditation.*

## Table of Contents

---

1	Executive Summary .....	4
1.1	Background .....	4
1.2	Project Objective.....	4
1.3	Licence Comparison .....	5
2	Results .....	6
2.1	EPA 1 – Baghouse Stack .....	6
2.2	EPA 2 – Galvanising Area Boiler .....	10
2.3	EPA 3 – Kettle Stack .....	11
3	Plant Operating Conditions .....	12
4	Test Methods.....	12
5	Quality Assurance/Quality Control Information .....	13
6	Definitions .....	13
7	Appendix 1: Site Photos .....	14
8	Appendix 2: Envirolabs Metals/Ammonia.....	15

## 1 Executive Summary

### 1.1 Background

Ektimo was engaged by Ingal Civil Products to perform emission monitoring as part of the annual requirement stipulated in their NSW EPA Environment Protection Licence (12593).

### 1.2 Project Objective

The objective of the project was to conduct a monitoring programme to quantify emissions from three discharge points to determine compliance with Ingal Civil Products' Environmental Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – Baghouse Stack	7 June 2022	Solid particles Hydrogen chloride Metals (type 1 & 2 substances including cadmium) + zinc Ammonia x 2 Odour x 2
EPA 2 – Galvanising Area Boiler		Solid particles Nitrogen oxides (NO <sub>x</sub> as NO <sub>2</sub> ), oxygen (O <sub>2</sub> )
EPA 3 - Kettle Stack		Nitrogen oxides (NO <sub>x</sub> as NO <sub>2</sub> ), oxygen (O <sub>2</sub> )

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

All results are reported on a dry basis at STP (except odour wet – STP).

Plant operating conditions have been noted in the report.

### 1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per licence 12593 (last amended on 1 February 2021).

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 3% O <sub>2</sub> )
EPA 1 - Baghouse Stack	Type 1 & 2 substances in aggregate	mg/m <sup>3</sup>	0.08	≤0.04	-
	Ammonia and ammonium compounds (Run 1)	mg/m <sup>3</sup>	10	4.5	-
	Ammonia and ammonium compounds (Run 2)	mg/m <sup>3</sup>	10	3.3	-
	Odour	odour units	520	300	-
	Zinc and zinc compounds	mg/m <sup>3</sup>	5	0.0057	-
	Hydrogen chloride	mg/m <sup>3</sup>	5	<0.02	-
	Cadmium	mg/m <sup>3</sup>	0.04	<0.0007	-
	Solid particles	mg/m <sup>3</sup>	5	<2	-
EPA 2 - Galvanising Area Boiler	Solid particles	mg/m <sup>3</sup>	11	<3	<3
	Nitrogen oxides	mg/m <sup>3</sup>	170	92	110
EPA 3 - Kettle Stack	Nitrogen oxides	mg/m <sup>3</sup>	150	140	140

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 – Baghouse Stack

Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

<b>Sampling Plane Details</b>	
Sampling plane dimensions	1200 mm
Sampling plane area	1.13 m <sup>2</sup>
Sampling port size, number	2" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 12
Sample plane conformance to AS4323.1 (2021)	Ideal sampling plane

<b>Stack Parameters</b>	
Moisture content, %v/v	0.88
Gas molecular weight, g/g mole	28.9 (wet)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)
Gas density at discharge conditions, kg/m <sup>3</sup>	1.15
<b>Gas Flow Parameters</b>	
Flow measurement time(s) (hhmm)	1052 & 1202
Temperature, °C	29
Temperature, K	303
Velocity at sampling plane, m/s	8.2
Volumetric flow rate, actual, m <sup>3</sup> /s	9.2
Volumetric flow rate (wet STP), m <sup>3</sup> /s	8.3
Volumetric flow rate (dry STP), m <sup>3</sup> /s	8.2
Mass flow rate (wet basis), kg/hour	38000

<b>Isokinetic Results</b>	<b>Results</b>	
	1058-1159	
	Concentration	Mass Rate
	mg/m <sup>3</sup>	g/min
Solid Particles	<2	<1
Chloride (as HCl)	<0.02	<0.01
<b>Isokinetic Sampling Parameters</b>		
Sampling time, min	60	
Isokinetic rate, %	101	
Gravimetric analysis date (total particulate)	09-06-2022	

Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

<b>Sampling Plane Details</b>	
Sampling plane dimensions	1200 mm
Sampling plane area	1.13 m <sup>2</sup>
Sampling port size, number	2" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 12
Sample plane conformance to AS4323.1 (2021)	Ideal sampling plane

<b>Stack Parameters</b>	
Moisture content, %v/v	1.3
Gas molecular weight, g/g mole	28.9 (wet)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)
Gas density at discharge conditions, kg/m <sup>3</sup>	1.16
<b>Gas Flow Parameters</b>	
Flow measurement time(s) (hhmm)	0935 & 1052
Temperature, °C	29
Temperature, K	302
Velocity at sampling plane, m/s	8.6
Volumetric flow rate, actual, m <sup>3</sup> /s	9.7
Volumetric flow rate (wet STP), m <sup>3</sup> /s	8.7
Volumetric flow rate (dry STP), m <sup>3</sup> /s	8.6
Mass flow rate (wet basis), kg/hour	40000

Isokinetic Results		Results	
Sampling time		0944-1045	
		Concentration mg/m <sup>3</sup>	Mass Rate g/min
Antimony		<0.007	<0.003
Arsenic		<0.002	<0.001
Beryllium		<0.0008	<0.0004
<b>Cadmium</b>		<b>&lt;0.0007</b>	<b>&lt;0.0003</b>
Chromium		0.0022	0.0011
Cobalt		<0.0008	<0.0004
Lead		0.0093	0.0048
Manganese		<0.002	<0.0009
Mercury		<0.002	<0.001
Nickel		<0.002	<0.001
Selenium		<0.006	<0.003
Tin		<0.003	<0.002
Vanadium		<0.001	<0.0007
<b>Zinc</b>		<b>0.0057</b>	<b>0.0029</b>
<b>Type 1 &amp; 2 Substances</b>			
<b>Upper Bound</b>			
Total Type 1 Substances		≤0.021	≤0.011
Total Type 2 Substances		≤0.018	≤0.0093
Total Type 1 & 2 Substances		≤0.04	≤0.02
<b>Isokinetic Sampling Parameters</b>			
Sampling time, min		60	
Isokinetic rate, %		101	

Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

#### Sampling Plane Details

Sampling plane dimensions	1200 mm
Sampling plane area	1.13 m <sup>2</sup>
Sampling port size, number	2" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 12
Sample plane conformance to AS4323.1 (2021)	Ideal sampling plane

#### Stack Parameters

Moisture content, %v/v	1.1	
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m <sup>3</sup>	1.16	

#### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1202 & 1310
Temperature, °C	29
Temperature, K	302
Velocity at sampling plane, m/s	8
Volumetric flow rate, actual, m <sup>3</sup> /s	9.1
Volumetric flow rate (wet STP), m <sup>3</sup> /s	8.2
Volumetric flow rate (dry STP), m <sup>3</sup> /s	8.1
Mass flow rate (wet basis), kg/hour	38000

#### Isokinetic Results

Sampling time	Test 1	
	1205-1305	
	Concentration mg/m <sup>3</sup>	Mass Rate g/min
Ammonia	4.5	2.2
<b>Isokinetic Sampling Parameters</b>		
Sampling time, min	60	
Isokinetic rate, %	104	



Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

<b>Sampling Plane Details</b>	
Sampling plane dimensions	1200 mm
Sampling plane area	1.13 m <sup>2</sup>
Sampling port size, number	2" BSP (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 12
Sample plane conformance to AS4323.1 (2021)	Ideal sampling plane

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/m³	1.29 (wet)	1.29 (dry)
Gas density at discharge conditions, kg/m³	1.15	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1310 & 1420	
Temperature, °C	30	
Temperature, K	303	
Velocity at sampling plane, m/s	8.4	
Volumetric flow rate, actual, m³/s	9.5	
Volumetric flow rate (wet STP), m³/s	8.5	
Volumetric flow rate (dry STP), m³/s	8.4	
Mass flow rate (wet basis), kg/hour	39000	

Odour	Sampling time	Average		Test 1 1315 - 1325		Test 2 1330 - 1340	
		Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate	Concentration	Odourant Flow Rate
		ou	oum <sup>3</sup> /min	ou	oum <sup>3</sup> /min	ou	oum <sup>3</sup> /min
<b>Results</b>		300	150000	340	170000	260	130000
Lower uncertainty limit		230		240		180	
Upper uncertainty limit		380		470		360	
Hedonic tone				Neutral		Neutral	
Odour character				Metallic, Industrial spray paint		Gas, Metallic	
Analysis date & time				08/06/22, 0900 - 1000		08/06/22, 0900 - 1000	
Holding time				20 hours		20 hours	
Dilution factor				1		1	
Bag material				Nalophan		Nalophan	
Butanol threshold (ppb)		62					
Laboratory temp (°C)		22					
Last calibration date		October 2021					

<b>Isokinetic Results</b>		Test 2	
Sampling time		1312-1413	
		Concentration	Mass Rate
		mg/m³	g/min
	Ammonia	3.3	1.7
<b>Isokinetic Sampling Parameters</b>			
Sampling time, min		60	
Isokinetic rate, %		103	

## 2.2 EPA 2 – Galvanising Area Boiler

Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 2 - Galvanising Area Boiler
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

<b>Sampling Plane Details</b>	
Sampling plane dimensions	260 mm
Sampling plane area	0.0531 m <sup>2</sup>
Sampling port size, number	4" BSP (x2)
Access & height of ports	Elevated work platform 4 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 4
Sample plane conformance to AS4323.1 (2021)	Ideal sampling plane

<b>Stack Parameters</b>		
Moisture content, %v/v	5.3	
Gas molecular weight, g/g mole	29.1 (wet)	29.8 (dry)
Gas density at STP, kg/m³	1.30 (wet)	1.33 (dry)
Gas density at discharge conditions, kg/m³	0.83	
% Oxygen correction & Factor	3 %	1.24
<b>Gas Flow Parameters</b>		
Flow measurement time(s) (hhmm)	1235 & 1355	
Temperature, °C	152	
Temperature, K	425	
Velocity at sampling plane, m/s	4.6	
Volumetric flow rate, actual, m³/s	0.25	
Volumetric flow rate (wet STP), m³/s	0.16	
Volumetric flow rate (dry STP), m³/s	0.15	
Mass flow rate (wet basis), kg/hour	730	

Gas Analyser Results	Sampling time	Average			Minimum			Maximum		
		1250 - 1350			1250 - 1350			1250 - 1350		
		Corrected to			Corrected to			Corrected to		
		Concentration	3% O <sub>2</sub>	Mass Rate	Concentration	3% O <sub>2</sub>	Mass Rate	Concentration	3% O <sub>2</sub>	Mass Rate
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
<b>Combustion Gases</b>										
Nitrogen oxides (as NO <sub>2</sub> )		92	110	0.82	<4	<5	<0.04	120	150	1.1
		Concentration			Concentration			Concentration		
		% v/v			% v/v			% v/v		
Oxygen		6.4			0.8			21.2		

Isokinetic Results	Sampling time	Results		
		1240-1340		
		Corrected to		
		Concentration	3% O <sub>2</sub>	Mass Rate
		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
Solid Particles		<3	<3	<0.02
<b>Isokinetic Sampling Parameters</b>				
Sampling time, min		60		
Isokinetic rate, %		107		
Gravimetric analysis date (total particulate)		09-06-2022		

## 2.3 EPA 3 – Kettle Stack

Date	7/06/2022	Client	Ingal Civil Products
Report	R012689	Stack ID	EPA 3 - Kettle Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Adnan Latif / Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

220530

### Sampling Plane Details

Sampling plane dimensions	450 mm
Sampling plane area	0.159 m <sup>2</sup>
Sampling port size, number	1" BSP (x2)
Access & height of ports	Elevated work platform 5 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Bend >6 D
No. traverses & points sampled	2 8
Sample plane conformance to AS4323.1 (2021)	Non-conforming

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

The differential pressure at one or more sampling points is less than 5 Pa

### Stack Parameters

Moisture content, %v/v	6.5	
Gas molecular weight, g/g mole	29.2 (wet)	30.0 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.30 (wet)	1.34 (dry)
Gas density at discharge conditions, kg/m <sup>3</sup>	0.81	
% Oxygen correction & Factor	3 %	0.96

### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1100 & 1215
Temperature, °C	164
Temperature, K	438
Velocity at sampling plane, m/s	<2
Volumetric flow rate, actual, m <sup>3</sup> /s	<0.3
Volumetric flow rate (wet STP), m <sup>3</sup> /s	<0.2
Volumetric flow rate (dry STP), m <sup>3</sup> /s	<0.2
Mass flow rate (wet basis), kg/hour	<900

Gas Analyser Results	Sampling time	Average			Minimum			Maximum		
		1106 - 1206			1106 - 1206			1106 - 1206		
Combustion Gases		Corrected to			Corrected to			Corrected to		
		Concentration	3% O <sub>2</sub>	Mass Rate	Concentration	3% O <sub>2</sub>	Mass Rate	Concentration	3% O <sub>2</sub>	Mass Rate
Nitrogen oxides (as NO <sub>2</sub> )		mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	mg/m <sup>3</sup>	g/min
		140	140	<2	140	130	<1	150	140	<2
Oxygen		Concentration			Concentration			Concentration		
		% v/v			% v/v			% v/v		
		2.2			1.6			3.9		

### 3 Plant Operating Conditions

See Ingal Civil Products records for complete process conditions.

### 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
Sampling points - Selection	NSW EPA TM-1 (USEPA Method 1)	NA	NA	✓	NA
Flow rate, temperature and velocity	NSW EPA TM-2 (USEPA Method 2)	NSW EPA TM-2 (USEPA Method 2)	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22 (USEPA Method 4)	NSW EPA TM-22 (USEPA Method 4)	8%	✓	✓
Molecular weight	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23 (USEPA Method 3)	not specified	NA	✓
Carbon dioxide	NSW EPA TM-24 (USEPA Method 3A)	NSW EPA TM-24 (USEPA Method 3A)	13%	✓	✓
Nitrogen oxides	NSW EPA TM-11 (USEPA Method 7E)	NSW EPA TM-11 (USEPA Method 7E)	12%	✓	✓
Oxygen	NSW EPA TM-25 (USEPA Method 3A)	NSW EPA TM-25 (USEPA Method 3A)	13%	✓	✓
Solid particles (total)	NSW EPA TM-15 (AS 4323.2)	NSW EPA TM-15 (AS 4323.2)	3%	✓	✓ <sup>††</sup>
Total (gaseous & particulate) metals (Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mn, Ni, P, Pb, Sb, Se, Ti, Zn)	USEPA Method 29	EnviroLab in-house methods Metals-006, Metals-022, Metals-021	15%	✓	✓ <sup>‡</sup>
Type 1 substances (As, Cd, Hg, Pb, Sb)	NSW EPA TM-12 (USEPA Method 29)	EnviroLab in-house methods Metals-006, Metals-022 & Metals-021	15%	✓	✓ <sup>‡</sup>
Type 2 substances (Be, Cr, Co, Mn, Ni, Se, Sn, V)	NSW EPA TM-13 (USEPA Method 29)	EnviroLab in-house methods Metals-006, Metals-022 & Metals-021	15%	✓	✓ <sup>‡</sup>
Ammonia	USEPA CTM 027	EnviroLab in-house methods Inorg-093 & Inorg-057	18%	✓	✓ <sup>‡</sup>
Hydrogen chloride	NSW EPA TM-8 (USEPA Method 26)	Ektimo 235	14%	✓	✓ <sup>†</sup>
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓ <sup>¥</sup>

220308

\* Uncertainties cited in this table are estimated using typical values and are calculated at the 95% confidence level (coverage factor = 2).

† Analysis conducted at the Ektimo Mitcham, VIC laboratory, NATA accreditation number 14601. Results were reported on 21 June 2022 in report LV-003000.

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

¥ Odour analysis conducted at the Unanderra, NSW laboratory by forced choice olfactometry, NATA accreditation number 14601. Results were reported on 8 June 2022 in report ON-00140.

‡ Analysis performed by EnviroLab, NATA accreditation number 2901. Results were reported to Ektimo on 16 June 2022 in report 297591.

## 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 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 APAC (Asia Pacific Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through mutual recognition arrangements with 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
AS	Australian Standard
CEM/CEMS	Continuous emission monitoring/Continuous emission monitoring system
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
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.
EPA	Environment Protection Authority
FTIR	Fourier transform infra-red
ISC	Intersociety Committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
ITE	Individual threshold estimate
Lower bound	When an analyte is not present above the detection limit, the result is assumed to be equal to zero.
Medium bound	When an analyte is not present above the detection limit, the result is assumed to be equal to half of the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NT	Not tested or results not required
OM	Other approved method
OU	Odour unit. One OU is that concentration of odorant(s) at standard conditions that elicits a physiological response from a panel equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
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.
TM	Test method
USEPA	United States Environmental Protection Agency
XRD	X-ray diffractometry
Upper bound	When an analyte is not present above the detection limit, the result is assumed to be 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.

## 7 Appendix 1: Site Photos



*EPA 1 – Baghouse Stack*



*EPA 2 – Galvanising Area Boiler*



*EPA 3 - Kettle Stack*

## 8 Appendix 2: Envirolabs Metals/Ammonia

Ektimo Reference	Date Tested	Ingal Location	Ektimo Lab Description
N16584	7 June 2022	EPA 1	Blank Solution (metals)
N16582	7 June 2022	EPA 1	Blank Filter (metals)
N16586	7 June 2022	EPA 1	Blank Solution (Hg)
N16583	7 June 2022	EPA 1	Filter (metals)
N16585	7 June 2022	EPA 1	Impinger A + B (metals)
N16587	7 June 2022	EPA 1	Impinger A + B (Hg)
N16590	7 June 2022	EPA 1	Blank Solution (NH <sub>3</sub> )
N16591	7 June 2022	EPA 1	Test 1 Imp A (NH <sub>3</sub> )
N16592	7 June 2022	EPA 1	Test 1 Imp B (NH <sub>3</sub> )
N16593	7 June 2022	EPA 1	Test 1 P/W (NH <sub>3</sub> )
N16594	7 June 2022	EPA 1	Test 2 Imp A (NH <sub>3</sub> )
N16595	7 June 2022	EPA 1	Test 2 Imp B (NH <sub>3</sub> )
N16596	7 June 2022	EPA 1	Test 2 P/W (NH <sub>3</sub> )
N16597	7 June 2022	EPA 1	Blank P/W Solution (NH <sub>3</sub> )



## **CERTIFICATE OF ANALYSIS 297591**

### **Client Details**

<b>Client</b>	Ektimo (Unanderra)
<b>Attention</b>	Adnan Latif
<b>Address</b>	1/251 Princes Hwy, Unanderra, NSW, 2526

### **Sample Details**

<b>Your Reference</b>	<b><u>R012689</u></b>
<b>Number of Samples</b>	2 Filter, 12 Liquid
<b>Date samples received</b>	09/06/2022
<b>Date completed instructions received</b>	09/06/2022

### **Analysis Details**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

**Please refer to the last page of this report for any comments relating to the results.**

### **Report Details**

<b>Date results requested by</b>	15/06/2022
<b>Date of Issue</b>	15/06/2022
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### **Results Approved By**

Diego Bigolin, Inorganics Supervisor  
Giovanni Agosti, Group Technical Manager

#### **Authorised By**



Nancy Zhang, Laboratory Manager



Metals on filters			
Our Reference		297591-1	297591-2
Your Reference	UNITS	N 16582	N 16583
Type of sample		Filter	Filter
Date prepared	-	14/06/2022	14/06/2022
Date analysed	-	14/06/2022	14/06/2022
Antimony	µg/filter	<5	<5
Arsenic	µg/filter	<2	<2
Cadmium	µg/filter	<0.5	<0.5
Lead	µg/filter	<1	<1
Mercury	µg/filter	<0.2	<0.2
Beryllium	µg/filter	<0.5	<0.5
Chromium	µg/filter	<0.5	<0.5
Cobalt	µg/filter	<0.5	<0.5
Manganese	µg/filter	<0.5	0.6
Nickel	µg/filter	<1	<1
Selenium	µg/filter	<5	<5
Vanadium	µg/filter	<1	<1
Tin	µg/filter	<2	<2
Zinc	µg/filter	3	5

Metals in water - mass units					
Our Reference		297591-3	297591-4	297591-5	297591-6
Your Reference	UNITS	N 16584	N 16585	N 16586	N 16587
Type of sample		Liquid	Liquid	Liquid	Liquid
Volume	mL	118	190	116	163
Antimony	µg	<0.5	<0.5	[NA]	[NA]
Arsenic	µg	<0.5	<0.5	[NA]	[NA]
Cadmium	µg	<0.05	<0.05	[NA]	[NA]
Lead	µg	<0.5	8.3	[NA]	[NA]
Mercury	µg	<10	<10	<1	<0.5
Beryllium	µg	<0.5	<0.5	[NA]	[NA]
Chromium	µg	0.9	3	[NA]	[NA]
Cobalt	µg	<0.5	<0.5	[NA]	[NA]
Manganese	µg	<3	<3	[NA]	[NA]
Nickel	µg	<0.5	1	[NA]	[NA]
Selenium	µg	<0.5	<0.5	[NA]	[NA]
Vanadium	µg	<0.5	<0.5	[NA]	[NA]
Tin	µg	2	3	[NA]	[NA]
Zinc	µg	<0.5	3	[NA]	[NA]
Date prepared	-	14/06/2022	14/06/2022	14/06/2022	14/06/2022
Date analysed	-	14/06/2022	14/06/2022	14/06/2022	14/06/2022
Antimony-Dissolved	µg/L	<1	<1	[NA]	[NA]
Arsenic-Dissolved	µg/L	<1	<1	[NA]	[NA]
Cadmium-Dissolved	µg/L	<0.1	0.2	[NA]	[NA]
Lead-Dissolved	µg/L	<1	43	[NA]	[NA]
Mercury-Dissolved	µg/L	<1	<1	<0.1	0.18
Beryllium-Dissolved	µg/L	<0.5	<0.5	[NA]	[NA]
Chromium-Dissolved	µg/L	8	15	[NA]	[NA]
Cobalt-Dissolved	µg/L	<1	<1	[NA]	[NA]
Manganese-Dissolved	µg/L	<5	<5	[NA]	[NA]
Nickel-Dissolved	µg/L	3	6	[NA]	[NA]
Selenium-Dissolved	µg/L	<1	<1	[NA]	[NA]
Vanadium-Dissolved	µg/L	<1	<1	[NA]	[NA]
Tin-Dissolved	µg/L	14	14	[NA]	[NA]
Zinc-Dissolved	µg/L	2	17	[NA]	[NA]

**Miscellaneous Inorganics**

Our Reference		297591-7	297591-8	297591-9	297591-10	297591-11
Your Reference	UNITS	N 16590	N 16591	N 16592	N 16593	N 16594
Type of sample		Liquid	Liquid	Liquid	Liquid	Liquid
Date prepared	-	14/06/2022	14/06/2022	14/06/2022	14/06/2022	14/06/2022
Date analysed	-	14/06/2022	14/06/2022	14/06/2022	14/06/2022	14/06/2022
Volume	mL	150	90	80	110	90
Ammonia as N in impinger	mg	<0.01	3.0	0.06	0.02	2.2
Ammonia as N in water	mg/L	<0.005	33	0.76	0.19	25

**Miscellaneous Inorganics**

Our Reference		297591-12	297591-13	297591-14
Your Reference	UNITS	N 16595	N 16596	N 16597
Type of sample		Liquid	Liquid	Liquid
Date prepared	-	14/06/2022	14/06/2022	14/06/2022
Date analysed	-	14/06/2022	14/06/2022	14/06/2022
Volume	mL	90	160	140
Ammonia as N in impinger	mg	0.03	<0.01	<0.01
Ammonia as N in water	mg/L	0.29	0.037	0.011

Method ID	Methodology Summary
<b>Inorg-057</b>	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
<b>Inorg-093</b>	Ammonia in impingers/filter pads using Discrete Analyser.
<b>Metals-020/021/022</b>	Determination of various metals on filters by ICP-AES/MS and or CV/AAS. Note - air volume measurements are not covered by Envirolab's NATA accreditation.
<b>Metals-021</b>	Determination of Mercury by Cold Vapour AAS.
<b>Metals-022</b>	Determination of various metals by ICP-MS.

QUALITY CONTROL: Metals on filters					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Antimony	µg/filter	5	Metals-020/021/022	<5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Arsenic	µg/filter	2	Metals-020/021/022	<2	[NT]	[NT]	[NT]	[NT]	106	[NT]
Cadmium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	104	[NT]
Lead	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Mercury	µg/filter	0.2	Metals-020/021/022	<0.2	[NT]	[NT]	[NT]	[NT]	111	[NT]
Beryllium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	103	[NT]
Chromium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	105	[NT]
Cobalt	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	104	[NT]
Manganese	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	110	[NT]
Nickel	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Selenium	µg/filter	5	Metals-020/021/022	<5	[NT]	[NT]	[NT]	[NT]	98	[NT]
Vanadium	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Tin	µg/filter	2	Metals-020/021/022	<2	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: Metals in water - mass units					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	[NT]
Antimony	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Arsenic	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cadmium	µg	0.05	Metals-022	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Lead	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Mercury	µg	0.5	Metals-021	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Beryllium	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chromium	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cobalt	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Manganese	µg	3	Metals-022	<3	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Nickel	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Selenium	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vanadium	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tin	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Zinc	µg	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Date prepared	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	103	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	102	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	89	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Vanadium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Date analysed	-			14/06/2022	[NT]	[NT]	[NT]	[NT]	14/06/2022	[NT]
Ammonia as N in impinger	mg	0.01	Inorg-093	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	[NT]	[NT]	100	[NT]

**Result Definitions**

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<b>&lt;</b>	Less than
<b>&gt;</b>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported



## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

## Report Comments

The PQL for Hg has been raised due to the sample matrix requiring dilution.

# Ektimo

[ektimo.com.au](http://ektimo.com.au)

1300 364 005

**MELBOURNE** (Head Office)

26 Redland Drive  
Mitcham  
VIC 3132  
AUSTRALIA

**SYDNEY**

6/78 Reserve Road,  
Artarmon  
NSW 2064  
AUSTRALIA

**WOLLONGONG**

1/251 Princes Highway  
Unanderra  
NSW 2526  
AUSTRALIA

**PERTH**

52 Cooper Road  
Cockburn Central  
WA 6164  
AUSTRALIA

**BRISBANE**

3/109 Riverside Place  
Morningside  
QLD 4170  
AUSTRALIA