

**Ingal Civil Products, Minto Plant
Emission Testing Report 2023
Report Number R014696**

Document Information

Template Version 130223

Client Name: Ingal Civil Products
Report Number: R014696
Date of Issue: 7 June 2023
Attention: Amit Gupta
Address: 57-65 Airlds Road
Minto NSW 2566
Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation



Graham Edwards
Senior Air Monitoring
Consultant

NATA Accredited Laboratory
No. 14601

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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 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.

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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 & Overview

The objective of the project was to conduct a monitoring programme to quantify emissions from two 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	11 May 2023	Solid particles Metals (type 1 & 2 substances including cadmium) + zinc Hydrogen chloride Ammonia x 2 Odour x 2
EPA 2 – Galvanising Area Boiler		Solid particles Nitrogen oxides (NO _x as NO ₂), oxygen (O ₂)

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

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

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 ₂)
EPA 1 - Baghouse Stack	Type 1 & 2 substances in aggregate	mg/m ³	0.08	<0.03	-
	Ammonia and ammonium compounds (Run 1)	mg/m ³	10	5.8	-
	Ammonia and ammonium compounds (Run 2)	mg/m ³	10	8.0	-
	Odour	odour units	520	110	-
	Zinc and zinc compounds	mg/m ³	5	0.0045	-
	Hydrogen chloride	mg/m ³	5	<0.00003	-
	Cadmium	mg/m ³	0.04	<0.0009	-
	Solid particles	mg/m ³	5	2.4	-
EPA 2 - Galvanising Area Boiler	Solid particles	mg/m ³	11	<2	<2
	Nitrogen oxides	mg/m ³	170	110	110

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	11/05/2023	Client	Ingal Civil Products
Report	R014696	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Zoe Parker & Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

230508

Sampling Plane Details			
Sampling plane dimensions	1200 mm		
Sampling plane area	1.13 m ²		
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 AS 4323.1	Ideal sampling plane		

Stack Parameters			
Moisture content, %v/v	0.64		
Gas molecular weight, g/g mole	28.9 (wet)	29.0 (dry)	
Gas density at STP, kg/m ³	1.29 (wet)	1.29 (dry)	
Gas density at discharge conditions, kg/m ³	1.18		
Gas Flow Parameters			
Flow measurement time(s) (hhmm)	0945 & 1105		
Temperature, °C	31		
Temperature, K	304		
Velocity at sampling plane, m/s	8.3		
Volumetric flow rate, actual, m ³ /s	9.4		
Volumetric flow rate (wet STP), m ³ /s	8.6		
Volumetric flow rate (dry STP), m ³ /s	8.5		
Mass flow rate (wet basis), kg/hour	40000		

Isokinetic Results		Results	
	Sampling time	0958-1100	
		Concentration mg/m ³	Mass Rate g/min
Solid Particles		2.4	1.2
Antimony		<0.006	<0.003
Arsenic		<0.003	<0.001
Beryllium		<0.0007	<0.0004
Cadmium		<0.0009	<0.0005
Chromium		<0.0009	<0.0004
Cobalt		<0.0009	<0.0004
Lead		<0.001	<0.0008
Manganese		<0.002	<0.001
Mercury		<0.0005	<0.0003
Nickel		<0.001	<0.0008
Selenium		<0.006	<0.003
Tin		<0.003	<0.001
Vanadium		<0.001	<0.0008
Zinc		0.0045	0.0023
Type 1 & 2 Substances			
Upper Bound			
Total Type 1 Substances		<0.01	<0.006
Total Type 2 Substances		<0.02	<0.008
Total Type 1 & 2 Substances		<0.03	<0.01
Isokinetic Sampling Parameters			
Sampling time, min		60	
Isokinetic rate, %		100	
Gravimetric analysis date (total particulate)		15-05-2023	

Date	11/05/2023	Client	Ingal Civil Products
Report	R014696	Stack ID	EPA 1 - Baghouse Stack
Licence No.	12593	Location	Minto
Ektimo Staff	Zoe Parker & Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		230508

Sampling Plane Details	
Sampling plane dimensions	1200 mm
Sampling plane area	1.13 m ²
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 AS 4323.1	Ideal sampling plane

Stack Parameters		
Moisture content, %v/v	1.2	
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	1.16	
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1105 & 1216	
Temperature, °C	33	
Temperature, K	306	
Velocity at sampling plane, m/s	8.6	
Volumetric flow rate, actual, m³/s	9.7	
Volumetric flow rate (wet STP), m³/s	8.8	
Volumetric flow rate (dry STP), m³/s	8.7	
Mass flow rate (wet basis), kg/hour	41000	

Odour	Sampling time	Average		Test 1 1240 - 1249		Test 2 1253 - 1302	
		Concentration ou	Odourant Flow Rate oum ³ /min	Concentration ou	Odourant Flow Rate oum ³ /min	Concentration ou	Odourant Flow Rate oum ³ /min
Results		110	60000	120	64000	100	55000
Lower uncertainty limit		90		89		76	
Upper uncertainty limit		140		170		140	
Hedonic tone				Neutral		Neutral	
Odour character				Metallic, ammonia		Metallic, ammonia	
Analysis date & time				12/05/23, 1000 - 1030		12/05/23, 1000 - 1030	
Holding time				22 hours		21 hours	
Dilution factor				1		1	
Bag material				Nalophan		Nalophan	
Butanol threshold (ppb)		38					
Laboratory temp (°C)		22					
Last calibration date		October 2022					

Isokinetic Results	Sampling time	Test 1 1111-1213		Test 2 1227-1329	
		Concentration mg/m ³	Mass Rate g/min	Concentration mg/m ³	Mass Rate g/min
Ammonia		5.8	3	8	4.2
Hydrogen chloride		<0.00003	<0.00001	-	-
Isokinetic Sampling Parameters					
Sampling time, min		60		60	
Isokinetic rate, %		100		100	

2.2 EPA 2 – Galvanising Area Boiler

Date	11/05/2023	Client	Ingal Civil Products
Report	R014696	Stack ID	EPA 2 - Galvanising Area Boiler
Licence No.	12593	Location	Minto
Ektimo Staff	Zoe Parker & Scott Woods	State	NSW
Process Conditions	Routine galvanising operations		

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Sampling Plane Details	
Sampling plane dimensions	260 mm
Sampling plane area	0.0531 m ²
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 AS 4323.1	Ideal sampling plane

Stack Parameters		
Moisture content, %v/v	6.4	
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	0.87	
% Oxygen correction & Factor	3 %	1.08
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1405 & 1510	
Temperature, °C	141	
Temperature, K	414	
Velocity at sampling plane, m/s	5.6	
Volumetric flow rate, actual, m³/s	0.3	
Volumetric flow rate (wet STP), m³/s	0.2	
Volumetric flow rate (dry STP), m³/s	0.19	
Mass flow rate (wet basis), kg/hour	930	

Gas Analyser Results	Sampling time	Average			Minimum			Maximum		
		1407 - 1506			1407 - 1506			1407 - 1506		
		Corrected to 3%			Corrected to 3%			Corrected to 3%		
		Concentration	O ₂	Mass Rate	Concentration	O ₂	Mass Rate	Concentration	O ₂	Mass Rate
		mg/m ³	mg/m ³	g/min	mg/m ³	mg/m ³	g/min	mg/m ³	mg/m ³	g/min
Combustion Gases										
Nitrogen oxides (as NO ₂)		110	110	1.2	18	20	0.21	130	140	1.4
		Concentration			Concentration			Concentration		
		% v/v			% v/v			% v/v		
Carbon dioxide		9.6			1.1			11.5		
Oxygen		4.3			1.1			19.1		

Isokinetic Results		Results		
		1407-1509		
		Corrected to 3%		
		Concentration	O ₂	Mass Rate
		mg/m ³	mg/m ³	g/min
Solid Particles		<2	<2	<0.02
Isokinetic Sampling Parameters				
Sampling time, min		60		
Isokinetic rate, %		106		
Gravimetric analysis date (total particulate)		23-05-2023		

3 Plant Operating Conditions

From information received from the site operator, unless otherwise noted it is our understanding that samples were collected during normal plant operations. Unless otherwise noted all samples were collected in compliance with Ektimo's QA/QC standards.

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 (AS 4323.1)	NA	NA	✓	NA
Flow rate, temperature & 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 (USEPA Method 17)	NSW EPA TM-15 (USEPA Method 17)	3%	✓	✓ ^{††}
Total (gaseous & particulate) metals & metallic compounds	NSW EPA TM-12, NSW EPA TM-13, NSW EPA TM-14 (USEPA Method 29)	EnviroLab in-house methods Metals-020/021/022	15%	✓	✓ [‡]
Type 1 substances (As, Cd, Hg, Pb, Sb)	NSW EPA TM-12 (USEPA Method 29)	EnviroLab in-house methods Metals-020/021/022	15%	✓	✓ [‡]
Type 2 substances (Be, Cr, Co, Mn, Ni, Se, Sn, V)	NSW EPA TM-13 (USEPA Method 29)	EnviroLab in-house methods Metals-020/021/022	15%	✓	✓ [‡]
Ammonia	USEPA CTM 027	EnviroLab in-house methods Inorg-093 & Inorg-057	18%	✓	✓ [‡]
Hydrogen chloride	NSW EPA TM-8 (USEPA Method 26A)	Ektimo 235	14%	✓	✓ ^{†i}
Odour	NSW EPA OM-7 (AS 4323.3)	NSW EPA OM-7 (AS 4323.3)	refer to results	✓	✓ [‡]
Odour characterisation	NA	direct observation	NA	NA	✗

170523

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

[‡] Odour analysis conducted at the Ektimo NSW EPA laboratory by forced choice olfactometry. Results were reported to Ektimo on 12 May 2023 in report ON-00200.

[†] Analysis performed by Ektimo. Results were reported to Ektimo on 18 May 2023 in report LV-004404.

[‡] Analysis performed by EnviroLab, NATA accreditation number 2901. Results were reported to Ektimo on 23 May 2023 in report 323226 and 29 May 2023 in report 323656.

ⁱ Includes analysis of chlorine/chloride by Ektimo 235 which uses the same principle as USEPA Method 26/26A.

4.1 Deviations to Test Methods

NSW TM-12, 13 TYPE 1 & 2 SUBSTANCES

Zinc has been sampled and analysed according to USEPA Method 29. Although not a listed analyte under the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (NSW EPA) (2022) TM-12 (Type 1 Substances) or TM-13 (Type 2 Substances), it is an approved analyte listed within USEPA Method 29.

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.

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
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
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
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 Appendices

7.1 Appendix 1. Site Photos

7.2 Appendix 2. Chains of Custody

7.3 Appendix 3. Laboratory Results

Appendix 1: Site Photos



EPA 1 – Baghouse Stack



EPA 2 – Galvanising Area Boiler

Appendix 1. Chain(s) of Custody

Ektimo

Checked at Ektimo Dispatch by: 15-5-23
Sign/Date

Samples received in good order: OM. 22/5
Sign/Date

Sample ID	Job No.	Analysis Required	Units Required	Analytical Lab	Purchase Order No.	Ektimo Contact	Notes	TAT Required (days)
N 18113	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Blank Solution	
N 18114	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Blank Probiotic	
N 18115	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Imp A	
N 18116	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Imp B	
N 18117	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Probiotic	
N 18118	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Imp A	
N 18119	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Imp B	
N 18120	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Probiotic	

17/05/23
HB Chatswood
Ph: (02) 9910 6200
Date Received: 22/5/23
Time Received: 10:30
Received By: OM
Temp. Control: Ambient
Cooling: Yes
Security: Yes

Ektimo

Checked at Ektimo Dispatch by: 15-5-23
Sign/Date

Samples received in good order: OM. 16/5
Sign/Date

Sample ID	Job No.	Analysis Required	Units Required	Analytical Lab	Purchase Order No.	Ektimo Contact	Notes	TAT Required (days)
N 18107	R014696	Metals - Type 1 & 2 substances (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V, Sn) + Zn	ug/sample	EnviroLab	W011245	Zoe Parker	Blank Filter	
N 18108	R014696	Metals - Type 1 & 2 substances (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V, Sn) + Zn	ug/litre	EnviroLab	W011245	Zoe Parker	Filter A	
N 18109	R014696	Metals - Type 1 & 2 substances (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V, Sn) + Zn	ug/litre	EnviroLab	W011245	Zoe Parker	Blank Solution	
N 18110	R014696	Metals - Type 1 & 2 substances (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V, Sn) + Zn	ug/litre	EnviroLab	W011245	Zoe Parker	Imp A+B	
N 18111	R014696	Hg	ug/litre	EnviroLab	W011245	Zoe Parker	Blank Solution	
N 18112	R014696	Hg	ug/litre	EnviroLab	W011245	Zoe Parker	Imp A+B	

EnviroLab Services
12 Ashley St
Chatswood NSW 2007
Ph: (02) 9910 6200

Job No: 323226
Date Received: 16/5/23
Time Received: 11:15
Received By: OM
Temp. Control: Ambient
Cooling: Ice Pack
Security: Intact/Broken/None

logged
APL
16/05/23

Ektimo

Checked at Ektimo Dispatch by: 15-5-23
Sign/Date

Samples received in good order: OM. 16/05/23
Sign/Date

Sample ID	Job No.	Analysis Required	Units Required	Analytical Lab	Purchase Order No.	Ektimo Contact	Notes	TAT Required (days)
N 18113	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Blank Solution	
N 18114	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Blank Probiotic	
N 18115	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Imp A	
N 18116	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Imp B	
N 18117	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 1 Probiotic	
N 18118	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Imp A	
N 18119	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Imp B	
N 18120	R014696	Ammonia	ug/litre	EnviroLab	W011244	Zoe Parker	Test 2 Probiotic	



Appendix 2. Laboratory Results

CERTIFICATE OF ANALYSIS 323226

Client Details

Client	Ektimo (Unanderra)
Attention	Zoe Parker
Address	1/251 Princes Hwy, Unanderra, NSW, 2526

Sample Details

Your Reference	<u>R014696</u>
Number of Samples	2 Filter, 4 Liquid
Date samples received	16/05/2023
Date completed instructions received	16/05/2023

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

Date results requested by	23/05/2023
Date of Issue	23/05/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Hannah Nguyen, Metals Supervisor
Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Metals on filters			
Our Reference		323226-1	323226-2
Your Reference	UNITS	N 18107	N 18108
Type of sample		Filter	Filter
Date prepared	-	23/05/2023	23/05/2023
Date analysed	-	23/05/2023	23/05/2023
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	<0.5
Nickel	µg/filter	<1	<1
Selenium	µg/filter	<5	<5
Vanadium	µg/filter	<1	<1
Tin	µg/filter	<2	<2
Zinc	µg/filter	<1	2

Metals in water - mass units					
Our Reference		323226-3	323226-4	323226-5	323226-6
Your Reference	UNITS	N 18109	N 18110	N 18111	N 18112
Type of sample		Liquid	Liquid	Liquid	Liquid
Volume	mL	213	216	255	197
Antimony	µg	<0.5	<0.5	[NA]	[NA]
Arsenic	µg	<0.5	<0.5	[NA]	[NA]
Cadmium	µg	<0.05	0.3	[NA]	[NA]
Lead	µg	<0.5	<0.5	[NA]	[NA]
Mercury	µg	<10	<10	<1	<1
Beryllium	µg	<0.5	<0.5	[NA]	[NA]
Chromium	µg	0.7	0.7	[NA]	[NA]
Cobalt	µg	<0.5	<0.5	[NA]	[NA]
Manganese	µg	<3	<3	[NA]	[NA]
Nickel	µg	1	2	[NA]	[NA]
Selenium	µg	<0.5	<0.5	[NA]	[NA]
Vanadium	µg	<0.5	<0.5	[NA]	[NA]
Tin	µg	1	1	[NA]	[NA]
Zinc	µg	<0.5	2	[NA]	[NA]
Date prepared	-	19/05/2023	19/05/2023	19/05/2023	19/05/2023
Date analysed	-	19/05/2023	19/05/2023	19/05/2023	19/05/2023
Antimony-Dissolved	µg/L	<1	<1	[NA]	[NA]
Arsenic-Dissolved	µg/L	<1	<1	[NA]	[NA]
Cadmium-Dissolved	µg/L	<0.1	1.3	[NA]	[NA]
Lead-Dissolved	µg/L	<1	<1	[NA]	[NA]
Mercury-Dissolved	µg/L	<1	<1	<0.1	0.1
Beryllium-Dissolved	µg/L	<0.5	<0.5	[NA]	[NA]
Chromium-Dissolved	µg/L	3	3	[NA]	[NA]
Cobalt-Dissolved	µg/L	<1	<1	[NA]	[NA]
Manganese-Dissolved	µg/L	<5	<5	[NA]	[NA]
Nickel-Dissolved	µg/L	7	7	[NA]	[NA]
Selenium-Dissolved	µg/L	<1	<1	[NA]	[NA]
Vanadium-Dissolved	µg/L	<1	<1	[NA]	[NA]
Tin-Dissolved	µg/L	6	5	[NA]	[NA]
Zinc-Dissolved	µg/L	2	10	[NA]	[NA]

Method ID	Methodology Summary
Metals-020/021/022	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.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	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	-			23/05/2023	[NT]	[NT]	[NT]	[NT]	23/05/2023	[NT]
Date analysed	-			23/05/2023	[NT]	[NT]	[NT]	[NT]	23/05/2023	[NT]
Antimony	µg/filter	5	Metals-020/021/022	<5	[NT]	[NT]	[NT]	[NT]	89	[NT]
Arsenic	µg/filter	2	Metals-020/021/022	<2	[NT]	[NT]	[NT]	[NT]	94	[NT]
Cadmium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Lead	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Mercury	µg/filter	0.2	Metals-020/021/022	<0.2	[NT]	[NT]	[NT]	[NT]	126	[NT]
Beryllium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Chromium	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Cobalt	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Manganese	µg/filter	0.5	Metals-020/021/022	<0.5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Nickel	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Selenium	µg/filter	5	Metals-020/021/022	<5	[NT]	[NT]	[NT]	[NT]	91	[NT]
Vanadium	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Tin	µg/filter	2	Metals-020/021/022	<2	[NT]	[NT]	[NT]	[NT]	90	[NT]
Zinc	µg/filter	1	Metals-020/021/022	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]

QUALITY CONTROL: Metals in water - mass units					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[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	-			19/05/2023	[NT]	[NT]	[NT]	[NT]	19/05/2023	[NT]
Date analysed	-			19/05/2023	[NT]	[NT]	[NT]	[NT]	19/05/2023	[NT]
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[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]	118	[NT]
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	96	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[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]	97	[NT]
Tin-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]

Result Definitions

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

Quality Control Definitions

Blank	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.
Duplicate	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.
Matrix Spike	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.
LCS (Laboratory Control Sample)	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.
Surrogate Spike	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.

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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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

Metals in water - mass units - The PQL for Hg has been raised due to the sample matrix requiring dilution.

CERTIFICATE OF ANALYSIS 323656

Client Details

Client	Ektimo (Unanderra)
Attention	Administration Email
Address	1/251 Princes Hwy, Unanderra, NSW, 2526

Sample Details

Your Reference	<u>R014696</u>
Number of Samples	8 Liquid
Date samples received	22/05/2023
Date completed instructions received	22/05/2023

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.

Report Details

Date results requested by	29/05/2023
Date of Issue	29/05/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Miscellaneous Inorganics

Our Reference		323656-1	323656-2	323656-3	323656-4	323656-5
Your Reference	UNITS	N18113	N18114	N18115	N18116	N18117
Type of sample		Liquid	Liquid	Liquid	Liquid	Liquid
Date prepared	-	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Date analysed	-	24/05/2023	24/05/2023	24/05/2023	24/05/2023	24/05/2023
Ammonia as N in impinger	mg	<0.01	<0.01	3.4	0.18	0.44
Ammonia as N in water	mg/L	<0.005	0.006	33	1.7	6.1
Volume	mL	114	82	103	105	73

Miscellaneous Inorganics

Our Reference		323656-6	323656-7	323656-8
Your Reference	UNITS	N18118	N18119	N18120
Type of sample		Liquid	Liquid	Liquid
Date prepared	-	24/05/2023	24/05/2023	24/05/2023
Date analysed	-	24/05/2023	24/05/2023	24/05/2023
Ammonia as N in impinger	mg	5.0	0.09	0.49
Ammonia as N in water	mg/L	47	0.86	9.5
Volume	mL	105	108	51

Method ID	Methodology Summary
Inorg-057	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.
Inorg-093	Ammonia in impingers/filter pads using Discrete Analyser.

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			24/05/2023	1	24/05/2023	24/05/2023		24/05/2023	[NT]
Date analysed	-			24/05/2023	1	24/05/2023	24/05/2023		24/05/2023	[NT]
Ammonia as N in impinger	mg	0.01	Inorg-093	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	<0.005	<0.005	0	96	[NT]

Result Definitions

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NA	Test not required
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PQL	Practical Quantitation Limit
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RPD	Relative Percent Difference
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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.

CERTIFICATE OF ANALYSIS

Testing Laboratory: Ektimo
26 Redland Drive
Mitcham, VIC 3132
Report Number: LV-004404
Job Number: R014696
Date of Issue: 18/05/2023
Attention: Ingal Civil Products

Date samples received: 16/05/2023
Number of samples received: 3
Date samples analysed: 17/05/2023
No of samples analysed: 3

Test method(s) used: Ektimo 235

Comments

QC Acceptance Criteria:	Parameter	Criteria	Pass/Fail
	Standard Curve	$R^2 > 0.99$	Pass
	Range	All samples <110% of highest standard	Pass
	Repeat samples	Between 80% - 120%	Pass
	Method Blanks	All method blanks < PQL	Pass
	QC sample	2 standard deviations of theoretical	Pass
	Chemical Expiry	All chemicals within expiry date	Pass

This report supersedes any previous report(s) with this reference. Sample(s) have been analysed as received.

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.

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 APAC (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 world-wide.

A formal Quality Control program is in place at Ektimo to monitor analyses performed in the laboratory and sampling conducted in the field. The program is designed to check where appropriate; the sampling reproducibility, analytical method, accuracy, precision and the performance of the analyst. The Laboratory Manager is responsible for the administration and maintenance of this program.

REPORT AUTHORISATION

Version 230420



Cappi Tuffery
Laboratory Chemist



Daniel Balaam
Senior Laboratory Chemist



NATA Accredited Laboratory 14601

Ektimo PTY LTD • ABN 86 600 381 413

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Mitcham, VIC 3132

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Sydney, NSW
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Artarmon, NSW 2064

Wollongong, NSW
1/251 Princes Highway,
Unanderra, NSW 2526

Brisbane, QLD
3/109 Riverside Place,
Morningside, QLD 4170

Report No. LV-004404

Job No. R014696

Client Name: Ingal Civil Products

Parameter	Analyte	Units	N 18113 Ingal Minto EPA 1 Baghouse Stack Blank Solution (HCl)	N 18115 Ingal Minto EPA 1 Baghouse Stack Test 1 Imp A	N 18116 Ingal Minto EPA 1 Baghouse Stack Test1 Imp B
Sample Volume		mL	114	104	106
Hydrogen chloride (HCl)	Cl ⁻	mg/L	<0.1	<0.1	<0.1
PQL	<	mg/L	0.1	0.1	0.1

CERTIFICATE OF ANALYSIS

Testing Laboratory: Ektimo ABN 86 600 381 413
Laboratory Location: 1/251 Princes Hwy, Unanderra NSW, 2526
Report Number: ON-00200
Job Number: R014696
Date of Issue: 12 May 2023

Attention: Ingal Civil Products
Date Samples Received: 11 May 2023
Number of samples received: 2
No of samples analysed: 2

Test Method(s) Used: Odour Analysis: AS4323.3 (NATA accredited)
 Hedonic Tone and Odour Character: Direct observation (Not NATA accredited)

Olfactometer Calibration Date: October 2022

Comments

Nil

QUALITY CONTROL / QUALITY ASSURANCE INFORMATION

QC Acceptance Criteria:	Parameter	Criteria	Result	Pass/Fail
	Panel Butanol Threshold	20-80 ppb	37.7	PASS
	r	≤ 0.477	0.196	PASS
	10'	≤ 3.00	1.569	PASS
	A	< 0.217	0.128	PASS
	Max Room Temperature	< 25°C	22	PASS
	Temperature Variation	< 3°C	1	PASS

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REPORT AUTHORISATION



Zoe Parker

Olfactometer Operator



Tom Manton

Ektimo Signatory



NATA Accredited Laboratory 14601

RESULTS

Report no. ON-00200

Date and time of analysis: 12 May 2023, 1000 - 1030
Date of last calibration: October 2022

Sample ID	Sample Location	Dilution ratio			Odour concentration (ou)	Confidence Interval (ou)	Hedonic Tone	Odour Character
		Pre	Post	Total				
131	EPA 1 Baghouse Stack	-	-	-	120	89 - 170	neutral	Metallic, ammonia
2	EPA 1 Baghouse Stack	-	-	-	100	76 - 140	neutral	Metallic, ammonia

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

A dash '-' in the dilution columns represents no dilution (dilution ratio = 1).

The pre dilution ratio has been supplied by the client and taken into account when calculating odour concentration results. **No pre dilution has been assumed if the pre dilution was not stated.**

If post dilution ratio has been reported, this was done by Ektimo to bring samples within the working range of the olfactometer and taken into account when calculating odour concentration results.

DEFINITIONS

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

~	Approximately
<	Less than
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to
ND	Not determined
Odour Emission Rate	The product of the odour level of the waste discharged and the volume rate of the discharge (in wet cubic metres per minute referred to a temperature of 0°C and a pressure of 101.325 kilopascals). Emission rate is expressed as Odour Unit Volumes per Minute, ouv/min.
Odour Threshold	The concentration of a substance, or of a mixture of substances, which is distinguished from odourless air at 50% panel response. By definition, the odour threshold corresponds to an odour concentration of 1 odour unit per m ³ .
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).
Dilution ratio	Dilution ratio = (Volume sample gas + Volume dilution gas) / Volume sample gas. Pre-dilution values received from the client are assumed to be calculated in this manner for the purposes of calculating reported the sample odour concentrations.
r	Precision, expressed as repeatability; implies that the factor that expresses the difference between two single measurements, performed on the same testing material in one laboratory under repeatability conditions, will not be larger than a factor of 3 in 95% of cases.
A	Accuracy of the odour concentration measurement. The accuracy is a reflection of trueness (expressed as bias) and the precision (r).
ITE	Individual Threshold Estimate: The detection threshold applying to an individual estimated on the basis of one dilution series.



NATA Accredited Laboratory 14601

Panelists were used and the number of dilution series for each sample was increased to achieve comparable calculated uncertainty and meet the minimum ITE requirement (8) of



Ektimo

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