

**Clingcast Metals, Kirrawee  
Emission Testing Report  
Report Number R012579**

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## Document Information

Template Version 211117

Client Name: Clingcast Metals  
Report Number: R012579  
Date of Issue: 11 April 2022  
Attention: Paul Clingan  
Address: 98 Bath Rd  
Kirrawee NSW 2232  
Testing Laboratory: Ektimo Pty Ltd, ABN 86 600 381 413

## Report Authorisation



**Zoe Parker**  
Air Monitoring Consultant

NATA Accredited Laboratory  
No. 14601

**Aaron Davis**  
Ektimo Signatory

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 Clingcast Metals to perform emission testing at their Kirrawee plant. Testing was carried out in accordance with Environmental Protection Licence 21514.

### 1.2 Project Objective

The objective of the project was to quantify emissions from one discharge point to determine compliance with Clingcast Metals' Environmental Protection Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
Baghouse Stack	10 March 2022	Solid particles Carbon dioxide, oxygen Metals type 1 & 2 substances (Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn, V) Speciated volatile organic compounds (VOCs) Odour and character

\* 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.

### 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 21514 (last amended on 5 May 2021).

Location Description	Pollutant	Units	Licence Limit	Detected values 10 March 2022
Baghouse Stack	Total solid particles	mg/m <sup>3</sup>	5	<3
	Type 1 & 2 substances in aggregate	mg/m <sup>3</sup>	0.1	≤0.032
	Volatile organic compounds (as n-propane)	mg/m <sup>3</sup>	5	2.1

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 Baghouse Stack

Date	10/03/2022	Client	Clingcast Metals
Report	R012579	Stack ID	Baghouse Stack
Licence No.	21514	Location	Kirrawee
Ektimo Staff	Zoe Parker & Scott Woods	State	NSW
Process Conditions	Process conditions were normal and testing was completed during iron and copper alloy pours		

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#### Sampling Plane Details

Sampling plane dimensions	1355 mm
Sampling plane area	1.44 m <sup>2</sup>
Sampling port size, number	4" Flange (x2)
Access & height of ports	Fixed ladder 12 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 1.5 D
Upstream disturbance	Centrifugal fan 8 D
No. traverses & points sampled	2 16
Sample plane conformance to AS4323.1 (2021)	Conforming but non-ideal

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

The highest to lowest gas velocity ratio exceeds 1.6:1

The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

#### Stack Parameters

Moisture content, %v/v	<0.4	
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>	1.14	

#### Gas Flow Parameters

Flow measurement time(s) (hhmm)	1413 & 1550
Temperature, °C	36
Temperature, K	309
Velocity at sampling plane, m/s	8.3
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	49000

#### Gas Analyser Results

	Average	Minimum	Maximum
Sampling time	1436 - 1535	1436 - 1535	1436 - 1535
	Concentration	Concentration	Concentration
	% v/v	% v/v	% v/v
Carbon dioxide	<0.1	<0.1	<0.1
Oxygen	20.8	20.8	20.9

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Odour	Results
Sampling time	1448 - 1458
	Odourant Flow
	Concentration Rate
	ou oum <sup>3</sup> /min
Results	370 230000
Lower uncertainty limit	260
Upper uncertainty limit	520
Analysis date & time	11/03/22, 1102-1120
Holding time	20 hours
Dilution factor	1
Bag material	Nalophan
Butanol threshold (ppb)	47.9
Laboratory temp (°C)	23.55
Last calibration date	October 2021

Isokinetic Results	Results
Sampling time	1426-1548
	Concentration Mass Rate
	mg/m <sup>3</sup> g/min
Solid Particles	<3 <2
Antimony	<0.005 <0.003
Arsenic	<0.002 <0.001
Beryllium	<0.0006 <0.0004
Cadmium	<0.0006 <0.0004
Chromium	<0.0007 <0.0004
Cobalt	<0.0007 <0.0004
Lead	0.0097 0.0061
Manganese	0.0033 0.0021
Mercury	<0.0004 <0.0002
Nickel	<0.001 <0.0008
Selenium	<0.005 <0.003
Tin	<0.002 <0.001
Vanadium	<0.001 <0.0007
Type 1 & 2 Substances	
Upper Bound	
Total Type 1 Substances	≤0.018 ≤0.011
Total Type 2 Substances	≤0.014 ≤0.0091
Total Type 1 & 2 Substances	≤0.032 ≤0.02
Isokinetic Sampling Parameters	
Sampling time, min	80
Isokinetic rate, %	99
Gravimetric analysis date (total particulate)	21-03-2022

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Total VOCs (as n-Propane)	Sampling time	Results	
		1444-1544	
		Concentration mg/m <sup>3</sup>	Mass Rate g/min
Total		2.1	1.3

VOC (speciated)	Sampling time	Results	
		1444-1544	
		Concentration mg/m <sup>3</sup>	Mass Rate g/min
Detection limit <sup>(1)</sup>		<0.08	<0.05
Benzene		2.5	1.6
Toluene		0.61	0.39
m + p-Xylene		0.25	0.16
1,3,5-Trimethylbenzene		0.18	0.11
Acetone		0.33	0.21

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

Dichloromethane, Ethanol, Isopropanol, 1,1-Dichloroethene, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, Butanol, 1-Methoxy-2-propanol, Trichloroethylene, 1,1,2-Trichloroethane, Tetrachloroethene, Chlorobenzene, Ethylbenzene, Styrene, o-Xylene, 2-Butoxyethanol, 1,1,2,2-Tetrachloroethane, Isopropylbenzene, Propylbenzene, tert-Butylbenzene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, Pentane, Acrylonitrile, Methyl ethyl ketone, n-Hexane, Ethyl acetate, Cyclohexane, Isopropyl acetate, 2-Methylhexane, 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, alpha-Pinene, beta-Pinene, Decane, 3-Carene, D-Limonene, Undecane, Dodecane, Tridecane, Tetradecane

### 3 Plant Operating Conditions

See Clingcast Metals records for complete process conditions.

**10 March 2022**

Cast Iron Furnace operating normally (charging)

Copper Furnace operating normally (charging)

### 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	NA	NA	✓	NA
Flow rate, temperature and velocity	NSW EPA TM-2	NSW EPA TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22	NSW EPA TM-22	19%	✓	✓
Molecular weight	NA	NSW EPA TM-23	not specified	NA	✓
Dry gas density	NA	NSW EPA TM-23	not specified	NA	✓
Carbon dioxide	NSW EPA TM-24	NSW EPA TM-24	13%	✓	✓
Oxygen	NSW EPA TM-25	NSW EPA TM-25	13%	✓	✓
Speciated volatile organic compounds (VOCs)	NSW EPA TM-34 <sup>d</sup>	Ektimo 344	19%	✓	✓ <sup>†</sup>
Solid particles (total)	NSW EPA TM-15	NSW EPA TM-15	3%	✓	✓ <sup>††</sup>
Total (gaseous and particulate) metals and metallic compounds	NSW EPA TM-12, NSW EPA TM-13, NSW EPA TM-14	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	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	EnviroLab in-house methods Metals-006, Metals-022 & Metals-021	15%	✓	✓ <sup>‡</sup>
Odour	NSW EPA OM-7	NSW EPA OM-7	refer to results	✓	✓ <sup>¥</sup>
Odour characterisation	NA	direct observation	NA	NA	✗

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\* 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 31 March 2022 in report LV-002558.

†† 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 11 March 2022 in report ON-00120.

‡ Analysis performed by EnviroLab, NATA accreditation number 2901. Results were reported to Ektimo on 30 March 2022 in report 291718.

d Excludes recovery study as specified in section 8.4.3 of USEPA Test Method 18.



## 5 Quality Assurance/Quality Control Information

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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 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
BSP	British standard pipe
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
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, 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
Velocity difference	The percentage difference between the average of initial flows and after flows.
VOC	Volatile organic compound. A carbon-based chemical compound with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the given conditions of use. VOCs may contain oxygen, nitrogen and other elements. VOCs do not include carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
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 Location Photo

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Baghouse Stack

# Ektimo

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