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**Report Number R002842r**

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**Emission Testing Report**  
**Wormall**  
**Kewdale, Western Australia**

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## Document Information

Client Name: Wormall  
 Report Number: R002842r  
 Date of Issue: 10 June 2016  
 Attention: Besim Kqiku  
 Address: 6 Kingscote Street  
 Kewdale WA 6105  
 Testing Laboratory: Ektimo (ETC) ABN 74 474 273 172

## Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R002842	25/05/2016	NBo	AHa	ETu
Revised Report	R002842r	10/06/2016	NBo	ETu	

Template Version: 160330

## Amendment Record

Document Number	Initiator	Report Date	Section	Reason
Nil	-	-	-	-

## Report Authorisation



**Eric Tujek**  
Director

NATA Accredited Laboratory  
No. 14601

Accredited for compliance with ISO/IEC 17025. 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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## 1 EXECUTIVE SUMMARY

Ektimo was engaged by Wormall to perform emission testing at the Roto Moulding Oven Stack located in Kewdale, Western Australia. Ektimo performed sampling on 24 May 2016.

Emission testing at the Roto Moulding Stack was conducted for combustion gases and speciated volatile organic compounds.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
Roto Moulding Oven Stack	24 May 2016	Volatile organic compounds, nitrogen oxides, carbon monoxide, carbon dioxide & oxygen

\* Flow rate, velocity, temperature and moisture were determined unless otherwise stated

The methodologies chosen by Ektimo are those recommended by the WA Department of Environment Regulation.

All results are reported on a dry basis at STP. Unless otherwise indicated, the methods cited in this report have been performed without deviation.

## 2 RESULTS

### 2.1 Roto Moulding Oven Stack

Date	24-05-2016	Client	Wormall
Report	R002842	Stack ID	Roto Moulding Oven Stack
Licence No.	-	Location	Kewdale
Ektimo Staff	ETu/LMa		State WA

#### Sampling Plane Details

Sampling plane dimensions	300 mm
Sampling plane area	0.0707 m <sup>2</sup>
Sampling port size, number & depth	1" hole (x2), 2 mm
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit >2 D
Upstream disturbance	Axial fan >6 D
No. traverses & points sampled	2 8
Compliance of sample plane to AS4323.1	Ideal

#### Stack Parameters

Moisture content, %v/v	4
Gas molecular weight, g/g mole	28.7 (wet) 29.1 (dry)
Gas density at STP, kg/m <sup>3</sup>	1.28 (wet) 1.30 (dry)

#### Gas Flow Parameters

Measurement time (hhmm)	1210
Temperature, °C	273
Velocity at sampling plane, m/s	6.2
Volumetric flow rate, discharge, m <sup>3</sup> /min	26
Volumetric flow rate (wet STP), m <sup>3</sup> /min	13
Volumetric flow rate (dry STP), m <sup>3</sup> /min	13
Mass flow rate (wet basis), kg/hour	1000

Gases	Average		Minimum		Maximum	
	1220-1310		1220-1310		1220-1310	
Sampling time	Concentration	Mass Rate	Concentration	Mass Rate	Concentration	Mass Rate
	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	g/min
Nitrogen oxides (as NO <sub>2</sub> )	25	0.32	<3	<0.04	91	1.2
Carbon monoxide	61	0.79	7.6	0.097	140	1.9
	Concentration		Concentration		Concentration	
	%		%		%	
Carbon dioxide	1.7		<0.3		5.1	
Oxygen	18		12.1		20.8	

VOC's (speciated)	Average		Test 1		Test 2	
	1220-1310		1220-1310		1220-1310	
Sampling time	Concentration	Mass Rate	Concentration	Mass Rate	Concentration	Mass Rate
	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	g/min	mg/m <sup>3</sup>	g/min
Detection limit <sup>(2)</sup>	<0.2	<0.003	<0.2	<0.003	<0.2	<0.003

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

Ethanol, Isopropanol, Isobutanol, Butanol, 1-Methoxy-2-propanol, Cyclohexanol, Pentane, Hexane, Heptane, Octane, Nonane, Decane, Dodecane, Tridecane, Tetradecane, Tetradecane 11, Cyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, 3-Methylhexane, Isooctane, Methylcyclohexane, beta-Pinene, d-Limonene, 3-Carene, 3-Carene 11, Acetone, Methyl ethyl ketone, Ethyl acetate, Isopropyl acetate, Propyl acetate, MIBK, Butyl acetate, 1-Methoxy-2-propyl acetate, Cyclohexanone, Cyclohexanone, 2-Butoxyethyl acetate, Ethyldiglycol acetate, Diacetone alcohol, Isophorone 16, Benzene, Toluene, Ethylbenzene, m+p-Xylene, Styrene, o-Xylene, Propylbenzene, 1,3,5-Trimethylbenzene, alpha-Methylstyrene, alpha-Methylstyrene, 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, m-Diethylbenzene, o-Diethylbenzene, p-Diethylbenzene 17, Dichloromethane, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Carbon tetrachloride, 1,1-Dichloroethene, Trichloroethene, Tetrachloroethene, Tetrachloroethene, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Fluorobenzene 15

### 3 TEST METHODS

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

Parameter	Sampling Method	Analysis Method	Method Detection Limit	Uncertainty*	NATA Accredited	
					Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	-	-	✓	NA
Moisture	USEPA Alt-008	USEPA Alt-008	0.4%	19%	✓	✓
Velocity	USEPA 2	NA	2ms <sup>-1</sup>	7%	✓	NA
Nitrogen oxides	USEPA 7E	USEPA 7E	4mg/m <sup>3</sup>	12%	✓	✓
Carbon monoxide	USEPA 10	USEPA 10	2.5mg/m <sup>3</sup>	12%	✓	✓
Carbon dioxide	USEPA 3A	USEPA 3A	0.1%	13%	✓	✓
Oxygen	USEPA 3A	USEPA 3A	0.1%	13%	✓	✓
Speciated volatile organic compounds	USEPA 18	USEPA SW-846 8260	0.33mg/m <sup>3</sup>	19%	✓	✓

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

### 4 QUALITY ASSURANCE/ QUALITY CONTROL INFORMATION

Ektimo (EML) and Ektimo (ETC) are 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 (EML) and Ektimo (ETC) are accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025. – General Requirements for the Competence of Testing and Calibration Laboratories. ISO/IEC 17025 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 Compliance Manager.

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 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.

## 5 DEFINITIONS

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

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.
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.
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.
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
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>2.5</sub>	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PM <sub>10</sub>	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
BSP	British standard pipe
NT	Not tested or results not required
NA	Not applicable
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.
D	Duct diameter or equivalent duct diameter for rectangular ducts
<	Less than
>	Greater than
≥	Greater than or equal to
~	Approximately
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
DER	WA Department of Environment & Regulation
DECC	Department of Environment & Climate Change (NSW)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra Red
NATA	National Association of Testing Authorities
RATA	Relative Accuracy Test Audit
AS	Australian Standard
USEPA	United States Environmental Protection Agency
Vic EPA	Victorian Environment Protection Authority
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
CARB	Californian Air Resources Board
TM	Test Method
OM	Other approved method
CTM	Conditional test method
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
NIOSH	National Institute of Occupational Safety and Health
XRD	X-ray Diffractometry



**ChemCentre**  
Inorganic Chemistry Section  
Report of Examination

OCM031.8/04/18



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**Attention: Jaydon Walker**

**Report on: 1 sample received on 17/01/2018**

<u>LAB ID</u>	<u>Material</u>	<u>Client ID and Description</u>
17S2869 / 001	water	Smart Stream from machine

<b>LAB ID</b>	001
<b>Client ID</b>	Smart Stream
<b>Sampled</b>	17/01/2018

Analyte	Method	Unit	
Alkalinity as CaCO <sub>3</sub>	iALK1WATI	mg/L	97
Aluminium	iMET1WCICP	mg/L	0.021
Arsenic	iMET1WCMS	mg/L	<0.001
Barium	iMET1WCICP	mg/L	0.11
Bicarbonate	iALK1WATI	mg/L	121
Boron	iMET1WCICP	mg/L	0.54
Cadmium	iMET1WCMS	mg/L	0.0001
Calcium	iMET1WCICP	mg/L	32.4
Carbonate	iALK1WATI	mg/L	<1
Chloride	iCO1WCDA	mg/L	196
Chromium	iMET1WCICP	mg/L	0.001
Cobalt	iMET1WCICP	mg/L	<0.005
Copper	iMET1WCICP	mg/L	0.030
Electrical Conductivity	iEC1WZSE	mS/m	85.0
Hardness, total	iHTOT2WACA	mg/L	110
Iron	iMET1WCICP	mg/L	0.054
Lead	iMET1WCMS	mg/L	0.0004
Magnesium	iMET1WCICP	mg/L	6.7
Manganese	iMET1WCICP	mg/L	0.003
Mercury	iMET1WCMS	mg/L	<0.0001
Molybdenum	iMET1WCMS	mg/L	0.002
Nickel	iMET1WCMS	mg/L	0.001
Nitrate	iNTA1WFIA	mg/L	0.93
pH	iPH1WASE		8.1
Potassium	iMET1WCICP	mg/L	5.7
Selenium	iMET1WCMS	mg/L	<0.001
Sodium	iMET1WCICP	mg/L	121
Sulphate (from S)	iMET1WCICP	mg/L	33.1
TDS (calculated)	iSOL1WDCA	mg/L	470
Vanadium	iMET1WCICP	mg/L	<0.005



LAB ID 001  
 Client ID Smart Stream

Sampled 17/01/2018

Analyte	Method	Unit	
Zinc	iMET1WCICP	mg/L	0.023

Method	Method Description
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iALK1WATI	Alkalinity (as CaCO <sub>3</sub> ) and constituents by acid titration.
iCO1WCDA	Colourimetric analysis by DA (Discrete Autoanalyser).
iEC1WZSE	Electrical conductivity in water compensated to 25C.
iHTOT2WACA	Total Hardness as mg/L CaCO <sub>3</sub> by calculation from calcium and magnesium.
iMET1WCICP	Total dissolved metals by ICPAES.
iMET1WCMS	Total dissolved metals by ICPMS.
iNTA1WFIA	Nitrate in water by FIA expressed as Nitrate.
iPH1WASE	pH in water by pH meter.
iSOL1WDCA	Total Dissolved Solids (TDS) calculated (ECond * 5.5)

Analysis of the pH was outside the holding time of six hours. The results should be used as reference only.

Attached is a comparison of drinking water guidelines and the sample(s) submitted.

These results apply only to the sample(s) as received. Unless arrangements are made to the contrary, these samples will be disposed of after 30 days of the issue of this report.

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**Hanna May**  
 Team Leader  
 SSD Inorganic Chemistry  
 30-Jan-2018

ChemCentre ID	17S2869/001	NH&MRC Drinking water guideline values		
Client ID	Smart Stream	Health	Aesthetic	
Sampled on	17/01/2018			
Aluminium	mg/L	0.021	c	0.2
Alkalinity	mg/L	97	none given	none given
Arsenic	mg/L	<0.001	0.01	none given
Boron	mg/L	0.54	4	none given
Barium	mg/L	0.11	2	none given
Carbonate	mg/L	<1	none given	none given
Calcium	mg/L	32.4	none given	none given
Cadmium	mg/L	0.0001	0.002	none given
Chloride	mg/L	196	c	250
Cobalt	mg/L	<0.005	none given	none given
Chromium	mg/L	0.001	0.05	none given
Copper	mg/L	0.03	2	1
Conductivity	mS/m	85	none given	none given
Iron	mg/L	0.054	c	0.3
Bicarbonate	mg/L	121	none given	none given
Hardness	mg/L	110	Not necessary	200
Mercury	mg/L	<0.0001	0.001	none given
Potassium	mg/L	5.7	none given	none given
Magnesium	mg/L	6.7	none given	none given
Manganese	mg/L	0.003	0.5	0.1
Molybdenum	mg/L	0.002	0.05	none given
Nitrate	mg/L	0.93	50	none given
Sodium	mg/L	121	Not necessary	180
Nickel	mg/L	0.001	0.02	none given
Lead	mg/L	0.0004	0.01	none given
Sulphate	mg/L	33.1	500	250
Selenium	mg/L	<0.001	0.01	none given
Total Soluble salts	mg/L	470	Not necessary	600
Vanadium	mg/L	<0.005	none given	none given
Zinc	mg/L	0.023	c	3
pH		8.1	c	6.5-8.5

c; Insufficient data to set a guideline value based on health considerations

**Reference:** Australian Drinking Water Guidelines, NH&MRC 2011

**Health Related Guideline;** Concentration that based on present knowledge does not result in any significant risk to the health of the consumer over a lifetime of consumption

**Aesthetic Guideline:** Concentration that is associated with good quality water.

Where no guideline value is given there is either insufficient data to set a value or it may be below the limit of determination.