Ektimo

REPORT NUMBER R009084

Emission Testing Report
ABC Tissue Products Pty Ltd, Wetherill Park

Document Information

Template Version; 030620

Client Name:	ABC Tissue Products Pty Ltd
Report Number:	R009084
Date of Issue:	12 January 2021
Attention:	Brandon Ly
Address:	34-36 Redfern St WETHERILL PARK NSW 2164
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Steven Cooper
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.

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 ABC Tissue Products Pty Ltd to perform emission testing at their Wetherill Park plant. Testing was carried out in accordance with Environment Protection Licence 12530.

1.2 *Project Objectives*

The objectives of the project were to conduct a monitoring programme to quantify emissions from four discharge points to determine compliance with their Environment Protection Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 1 – A Hood Burner Stack	13 October 2020	Total solid particles, particulate matter < 10µm (PM_{10}), coarse particulates Nitrogen oxides, carbon dioxide, oxygen
EPA 2 – B Dry End Dust Scrubber		Total solid particles, particulate matter < 10µm (PM_{10}), coarse particulates Carbon dioxide, oxygen
EPA 3 – C Wet End Scrubber Stack		Odour Carbon dioxide, oxygen
EPA 4 – D 10 MW Boiler Stack		Total solid particles, particulate matter < 10µm (PM_{10}), coarse particulates Nitrogen oxides, carbon dioxide, oxygen

* 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 12530 (last amended on 15/06/2017).

EPA No.	Location Description	Pollutant	Units	Licence limit	Detected values 13/10/2020
1	A - Hood Burner Stack	Total Solid Particles	mg/m^3	50	1.8
		Nitrogen Oxides	mg/m^3	290	33
2	B - Dry End Dust Scrubber	Total Solid Particles	mg/m^3	50	2.4
3	C - Wet End Scrubber Stack	Odour	OU	TBA	220
4	D - 10 MW Boiler	Total Solid Particles	mg/m^3	50	<2
		Nitrogen Oxides	mg/m^3	150	45

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 – A Hood Burner Stack*

Date	13/10/2020	**Client**	ABC Tissue Products Pty Ltd
Report	R009084	**Stack ID**	EPA 1 - "A" Hood Burner Stack
Licence No.	12530	**Location**	Wetherill Park
Ektimo Staff	Steven Cooper, Hamish Proust & Joel Micale-David	**State**	NSW
Process Conditions	Please refer to client records.		*200928*

Sampling Plane Details		
Sampling plane dimensions	1150 mm	
Sampling plane area	1.04 m²	
Sampling port size, number	4" Flange (x2)	
Access & height of ports	Stairs & fixed ladder	40 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Junction	1 D
Upstream disturbance	Junction	8 D
No. traverses & points sampled	2	16
Sample plane compliance to AS4323.1	Compliant but non-ideal	

Comments
The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	32	
Gas molecular weight, g/g mole	25.7 (wet)	29.3 (dry)
Gas density at STP, kg/m³	1.14 (wet)	1.31 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1102 & 1315	
Temperature, °C	253	
Temperature, K	526	
Velocity at sampling plane, m/s	9.2	
Volumetric flow rate, actual, m³/s	9.5	
Volumetric flow rate (wet STP), m³/s	5	
Volumetric flow rate (dry STP), m³/s	3.3	
Mass flow rate (wet basis), kg/hour	20000	

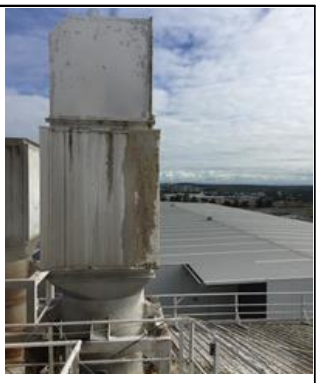
Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	1129 - 1229		1129 - 1229		1129 - 1229	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	33	6.6	19	3.9	59	12
	Concentration %v/v		Concentration %v/v		Concentration %v/v	
Carbon dioxide	4		3.6		4.4	
Oxygen	13.8		13.2		14.4	

Isokinetic Results	Results	
Sampling time	1129-1252	1129-1252 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid particles	1.8	0.37
Fine particulates (PM10)	<3	<0.6
Coarse particulates	1.8	0.37
D50 cut size, 10µm	9.5	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	80	80
Isokinetic rate, %	90	119
Velocity difference, %	-3	-3

2.2 *EPA 2 – B Dry End Dust Scrubber*

Date	13/10/2020	**Client**	ABC Tissue Products Pty Ltd
Report	R009084	**Stack ID**	EPA 2 - "B" Dry End Dust Scrubber
Licence No.	12530	**Location**	Wetherill Park
Ektimo Staff	Steven Cooper, Hamish Proust & Joel Micale-David	**State**	NSW
Process Conditions	Please refer to client records.		*200928*

Sampling Plane Details		
Sampling plane dimensions	1150 mm	
Sampling plane area	1.04 m²	
Sampling port size, number	4" Flange (x2)	
Access & height of ports	Stairs & fixed ladder	40 m
Duct orientation & shape	Horizontal	Circular
Downstream disturbance	Junction	1 D
Upstream disturbance	Junction	8 D
No. traverses & points sampled	2	16
Sample plane compliance to AS4323.1	Compliant but non-ideal	



Comments
The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	3.1	
Gas molecular weight, g/g mole	28.7 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.28 (wet)	1.29 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1035 & 1234	
Temperature, °C	28	
Temperature, K	301	
Velocity at sampling plane, m/s	13	
Volumetric flow rate, actual, m³/s	13	
Volumetric flow rate (wet STP), m³/s	12	
Volumetric flow rate (dry STP), m³/s	12	
Mass flow rate (wet basis), kg/hour	56000	

Gas Analyser Results	Average
Sampling time	1102 - 1202
	Concentration %v/v
Carbon dioxide	<0.3
Oxygen	20.9

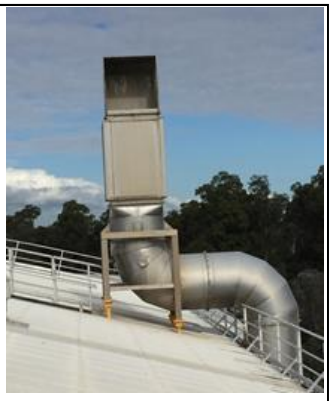
Isokinetic Results	Results	
Sampling time	1100-1222	1100-1222 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid particles	2.4	1.7
Fine particulates (PM10)	<2	<2
Coarse particulates	2.4	1.7
D50 cut size, 10µm	10.1	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	80	80
Isokinetic rate, %	99	100
Velocity difference, %	-8	-8

2.3 *EPA 3 – C Wet End Scrubber Stack*

Date	13/10/2020	**Client**	ABC Tissue Products Pty Ltd
Report	R009084	**Stack ID**	EPA 3 - "C" Wet End Scrubber Stack
Licence No.	12530	**Location**	Wetherill Park
Ektimo Staff	Steven Cooper, Hamish Proust & Joel Micale-David	**State**	NSW
Process Conditions	Please refer to client records.		*200928*

Sampling Plane Details

Sampling plane dimensions	1350 mm
Sampling plane area	1.43 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Stairs & fixed ladder 40 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Junction 1 D
Upstream disturbance	Bend 0.5 D
No. traverses & points sampled	2 20
Sample plane compliance to AS4323.1	Non-compliant



Comments

The sampling plane is deemed to be non-compliant due to the following reasons:
The upstream disturbance is <2D from the sampling plane
The sampling plane is too near to the downstream disturbance but is greater than or equal to 1D

Stack Parameters		
Moisture content, %v/v	3.2	
Gas molecular weight, g/g mole	28.7 (wet)	29.0 (dry)
Gas density at STP, kg/m³	1.28 (wet)	1.29 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1155 & 1310	
Temperature, °C	36	
Temperature, K	309	
Velocity at sampling plane, m/s	10	
Volumetric flow rate, actual, m³/s	14	
Volumetric flow rate (wet STP), m³/s	13	
Volumetric flow rate (dry STP), m³/s	12	
Mass flow rate (wet basis), kg/hour	59000	
Velocity difference, %	<1	

Gas Analyser Results	Average
Sampling time	1204 - 1304
	Concentration %v/v
Carbon dioxide	<0.3
Oxygen	20.9

Odour	Results	
Sampling time	1241 - 1246	
	Concentration ou	Mass Rate oum³/min
Results	220	170000
Lower uncertainty limit	98	
Upper uncertainty limit	480	
Hedonic tone	Neutral	
Odour character	Musty, water	
Analysis date & time	14/10/20, 1543	
Holding time	27 hours	
Dilution factor	2	
Bag material	Nalophan	
Butanol threshold (ppb)	710	
Laboratory temp (℃)	22	
Last calibration date	October 2019	

2.4 *EPA 4 – D 10MW Boiler Stack*

Date	13/10/2020	**Client**	ABC Tissue Products Pty Ltd
Report	R009084	**Stack ID**	EPA 4 - "D" 10MW Boiler Stack
Licence No.	12530	**Location**	Wetherill Park
Ektimo Staff	Steven Cooper, Hamish Proust & Joel Micale-David	**State**	NSW
Process Conditions	Please refer to client records.		*200928*

Sampling Plane Details	
Sampling plane dimensions	700 mm
Sampling plane area	0.385 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Stairs 30 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 20 D
Upstream disturbance	Junction 4 D
No. traverses & points sampled	2 12
Sample plane compliance to AS4323.1	Compliant but non-ideal

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

Stack Parameters		
Moisture content, %v/v	12	
Gas molecular weight, g/g mole	28.3 (wet)	29.8 (dry)
Gas density at STP, kg/m³	1.26 (wet)	1.33 (dry)
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	0920 & 1110	
Temperature, °C	123	
Temperature, K	396	
Velocity at sampling plane, m/s	4.3	
Volumetric flow rate, actual, m³/s	1.7	
Volumetric flow rate (wet STP), m³/s	1.1	
Volumetric flow rate (dry STP), m³/s	1	
Mass flow rate (wet basis), kg/hour	5200	

Gas Analyser Results	Average		Minimum		Maximum	
Sampling time	0951 - 1052		0951 - 1052		0951 - 1052	
	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min	Concentration mg/m³	Mass Rate g/min
Combustion Gases						
Nitrogen oxides (as NO_2)	45	2.7	35	2.1	53	3.2
	Concentration %v/v		Concentration %v/v		Concentration %v/v	
Carbon dioxide	9.3		8.8		9.6	
Oxygen	4.3		3.8		4.7	

Isokinetic Results	Results	
Sampling time	0948-1050	0948-1050 (PM10)
	Concentration mg/m³	Mass Rate g/min
Solid particles	<2	<0.1
Fine particulates (PM10)	<3	<0.2
Coarse particulates	<2	<0.1
D50 cut size, 10µm	9.0	
Isokinetic Sampling Parameters	Isokinetic	PM10
Sampling time, min	60	60
Isokinetic rate, %	107	97
Velocity difference, %	6	6

3 PLANT OPERATING CONDITIONS

See ABC Tissue Products Pty Ltd 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
Sample plane criteria	NSW TM-1	NA	NA	✓	NA
Flow rate, temperature and velocity	NA	NSW TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW TM-22	NSW TM-22	8%	✓	✓
Molecular weight	NA	NSW TM-23	not specified	NA	✓
Carbon dioxide	NSW TM-24	NSW TM-24	13%	✓	✓
Nitrogen oxides	NSW TM-11	NSW TM-11	12%	✓	✓
Oxygen	NSW TM-25	NSW TM-25	13%	✓	✓
Coarse particulates	NSW OM-9	NSW OM-9††	not specified	✓	✓
Solid particles (total)	NSW TM-15	NSW TM-15††	5%	✓	✓
Particulate matter (PM_{10})	NSW OM-5	NSW OM-5††	6%	✓	✓
Odour	NSW OM-7	NSW OM-7¥	Refer to results	✓	✓
Odour Characterisation	NA	direct observation	NA	NA	×

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

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

¥ Odour analysis conducted at The Odour Unit Pty Ltd, NATA accreditation number 14974. Results were reported on 19 October 2020 in report number W006080.

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

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

6 DEFINITIONS

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

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

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