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ABC Tissue Products Pty Ltd
34-36 Redfern St
Wetherill Park NSW 2164

Emission Testing – October 2013
DP 1, 2, 3, 4

Dear Mr Brandon Ly,

Tests were performed 9 October 2013 to determine emissions to air from 4 locations at the Wetherill Park plant of ABC Tissue Products Pty Ltd.

Yours faithfully
Emission Testing Consultants

David Corbett BA/BCom
Client Manager

dc@emission.com.au

NATA Accredited Laboratory Number: 14601
This document is issued in accordance with NATA's accreditation requirements.

LICENCE COMPARISON

EPA No.	Location Description	Pollutant	Unit of measure	Licence limit	Detected values
1	A - Hood Burner Stack	Total Solid Particles	milligrams per cubic meter (mg/m^3)	50	<2
		Nitrogen Oxides	milligrams per cubic meter (mg/m^3)	290	50
2	B - Dry End Dust Scrubber	Total Solid Particles	milligrams per cubic meter (mg/m^3)	50	3.7
3	C - Wet End Scrubber Stack	Odour	odour units (ou)	TBA	120
4	D - 10MW Boiler	Total Solid Particles	milligrams per cubic meter (mg/m^3)	50	<2
		Nitrogen Oxides	milligrams per cubic meter (mg/m^3)	150	7.1

Note: All analytes highlighted in green are below the Licence Limit set by the NSW EPA as per licence EP12530 (last amended on 7 November 2012).

EXECUTIVE SUMMARY

Emission Testing Consultants (ETC) was engaged by ABC Tissue Products Pty Ltd to perform emission monitoring pursuant to NSW EPA Licence 12530. Monitoring was performed for the following parameters:

Discharge point	Selection of sampling positions	Flow rate	Velocity	Temperature	Moisture	**Odour**	**Solid particles**	Dry gas Density	Molecular weight	**Carbon dioxide (CO2)**	**Oxygen (O2)**	**Nitrogen oxides (NOx) as NO2**	**PM10**
EPA 1 "A" Hood Burner Stack	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
EPA 2 "B" Dry End Dust Scrubber	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓
EPA 3 "C" Wet End Scrubber Stack	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		
EPA 4 "D" Boiler Stack	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

The methodologies chosen by ETC are those recommended by NSW EPA. There were no technical issues in terms of sampling on the days of testing. Plant operating conditions have been noted in the report.

RESULTS

DP 1 – A Hood Burner Stack

9 October 2013

Flow Results	Measured MW	EPA 1"A" Hood Burner Stack 130294	
Date and time of flow test		9/10/2013 10:15	
Date and time of flow test		9/10/2013 11:25	
Stack dimensions at sampling plane		1150	mm
Velocity at sampling plane		10.0	m/s
Average temperature		275	°C
Moisture content	Method4	29	% v/v
Flow rate at discharge conditions		620	m³/min
Flow rate at wet NTP conditions		310	m³/min
Flow rate at dry NTP conditions		220	m³/min

Continuous Analyser Results	EPA 1"A" Hood Burner Stack 130294 220	**Sampling Times**	**Concentration at NTP**		**Mass rate**	
Oxygen (dry basis)		1017-1116	15.4	% v/v	-	
Carbon dioxide (dry basis)		1017-1116	3.1	% v/v	800	kg/hour
Dry gas density		1017-1116	1.3	kg/m3	-	
Molecular weight of stack gas, dry basis		1017-1116	29	g/g-mole	-	
Nitrogen oxides as NO_2		1017-1116	50	mg/m3	11	g/min

Isokinetic Sampling Results	EPA 1"A" Hood Burner Stack 130294 220	**Sampling Times**	**Concentration at NTP**			**Mass rate**		
Solid particles		1020-1122	<	2	mg/m3	<	0.5	g/min
PM10 (M201A)		1020-1122	<	3	mg/m3	<	0.6	g/min
No. of sampling points					*12*			
Length of sampling, min					*60*			
Stack gas molecular weight, g/g-mole (wet)					*25.9*			
Stack gas density, at wet NTP					*1.16*			

Refer to "SAMPLING PLANE OBSERVATIONS" on page 7.

DP 2 – B Dry End Dust Scrubber

9 October 2013

Flow Results	Ambient air MW	EPA 2 "B" Dry End Dust Scrubber 130294	
Date and time of flow test		9/10/2013 8:40	
Date and time of flow test		0/01/1900 10:10	
Stack dimensions at sampling plane		1150	mm
Velocity at sampling plane		14	m/s
Average temperature		25	°C
Moisture content	Method4	6.5	% v/v
Flow rate at discharge conditions		900	m³/min
Flow rate at wet NTP conditions		830	m³/min
Flow rate at dry NTP conditions		780	m³/min

Continuous Analyser Results	EPA 2 "B" Dry End Dust Scrubber 130294 780	**Sampling Times**	**Concentration at NTP**		**Mass rate**	
Oxygen (dry basis)		850-950	20.9	% v/v	-	
Carbon dioxide (dry basis)		850-950	< 0.3	% v/v	< 300	kg/hour
Dry gas density		850-950	1.3	kg/m3	-	
Molecular weight of stack gas, dry basis		850-950	29	g/g-mole	-	

Isokinetic Sampling Results	EPA 2 "B" Dry End Dust Scrubber 130294 780	**Sampling Times**	**Concentration at NTP**		**Mass rate**	
Solid particles		845-1008	3.7	mg/m3	2.9	g/min
PM10 (M201A)		845-1010	2.7	mg/m3	2.1	g/min
No. of sampling points			*16*			
Length of sampling, min			*80*			
Stack gas molecular weight, g/g-mole (wet)			*28.2*			
Stack gas density, at wet NTP			*1.26*			

DP 3 – C Wet End Scrubber Stack

9 October 2013

Flow Results	Ambient air MW	EPA 2 "C" Wet End Scrubber 130294	
Date and time of flow test		9/10/2013 12:40	
Date and time of flow test		9/10/2013 13:00	
Stack dimensions at sampling plane		1350	mm
Velocity at sampling plane		10	m/s
Average temperature		28	°C
Moisture content	Method4	4.1	% v/v
Flow rate at discharge conditions		900	m³/min
Flow rate at wet NTP conditions		820	m³/min
Flow rate at dry NTP conditions		790	m³/min

Continuous Analyser Results	EPA 2 "C" Wet End Scrubber 130294 790	**Sampling Times**	**Concentration at NTP**		**Mass rate**	
Oxygen (dry basis)		1240-1340	20.9	% v/v	-	
Carbon dioxide (dry basis)		1240-1340	< 0.3	% v/v	< 300	kg/hour
Dry gas density		1240-1340	1.3	kg/m3	-	
Molecular weight of stack gas, dry basis		1240-1340	29	g/g-mole	-	

Odour Results	EPA 2 "C" Wet End Scrubber 130294 790	**Sampling Times**	**Concentration at NTP Wet**		**Mass rate**	
Odour		1250-1300	120	ou	97,000	ouv/min

DP 4 – D 10MW Boiler

9 October 2013

Flow Results	Measured MW	EPA 4 "D" 10MW Boiler Stack 130294	
Date and time of flow test		9/10/2013 11:30	
Date and time of flow test		9/10/2013 12:35	
Stack dimensions at sampling plane		700	mm
Velocity at sampling plane		4.6	m/s
Average temperature		123	°C
Moisture content	Method4	15	% v/v
Flow rate at discharge conditions		110	m³/min
Flow rate at wet NTP conditions		73	m³/min
Flow rate at dry NTP conditions		62	m³/min

Continuous Analyser Results	EPA 4 "D" 10MW Boiler Stack 130294 62	**Sampling Times**	**Concentration at NTP**		**Mass rate**	
Oxygen (dry basis)		1131-1230	16.2	% v/v	-	
Carbon dioxide (dry basis)		1131-1230	2.7	% v/v	200	kg/hour
Dry gas density		1131-1230	1.3	kg/m3	-	
Molecular weight of stack gas, dry basis		1131-1230	29	g/g-mole	-	
Nitrogen oxides as NO_2		1131-1230	7.1	mg/m3	0.44	g/min

Isokinetic Sampling Results	EPA 4 "D" 10MW Boiler Stack 130294 62	**Sampling Times**	**Concentration at NTP**			**Mass rate**		
Solid particles		1135-1237	<	2	mg/m3	<	0.1	g/min
PM10 (M201A)		1135-1237	<	3	mg/m3	<	0.2	g/min
No. of sampling points		*12*						
Length of sampling, min		*60*						
Stack gas molecular weight, g/g-mole (wet)		*27.5*						
Stack gas density, at wet NTP		*1.23*						

SAMPLING PLANE OBSERVATIONS

DP1 – A Hood Burner Stack

The sampling plane had 2 x 4 inch flange ports. The location was determined to be “non-ideal” as per AS4323.1. It was 1 duct diameter less than the required 2 duct diameters upstream from the exit. It was 5.5 duct diameters less than the required 6 duct diameters downstream from a junction. The number of sampling points was increased as per AS4323.1. The sampling plane passed the flow assessment (items (a) to (f) of AS4323.1) and was therefore “compliant”.

DP2 – B Dry End Dust Scrubber

The sampling plane had 2 x 4 inch flange ports. The location was determined to be “non-ideal” as per AS4323.1. It was 1 duct diameter less than the required 2 duct diameters upstream from a junction. It was more than the required 6 duct diameters downstream from a junction. The number of sampling points was increased as per AS4323.1. The sampling plane passed the flow assessment (items (a) to (f) of AS4323.1) and was therefore “compliant”.

DP3 – C Wet End Scrubber Stack

The sampling plane had 2 x 4 inch flange ports. The location was determined to be “non-ideal” as per AS4323.1. It was 1 duct diameter less than the required 2 duct diameters upstream from a junction. It was 5.5 duct diameters less than the required 6 duct diameters downstream from a bend. The number of sampling points was increased as per AS4323.1. The sampling plane passed the flow assessment (items (a) to (f) of AS4323.1) and was therefore “compliant”.

DP4 – D 10MW Boiler

The sampling plane had 2 x 4 inch flange ports. The location was determined to be “non-ideal” as per AS4323.1. It was 2 duct diameters less than the required 6 duct diameters downstream from a junction. It was more than the required 2 duct diameters upstream from the exit. The number of sampling points was increased as per AS4323.1. The sampling plane passed the flow assessment (items (a) to (f) of AS4323.1) and was therefore “compliant”.

PLANT OPERATING CONDITIONS

Plant operating conditions were supplied by ABC Tissue Products Pty Ltd personnel and were considered normal for the duration of the sampling programme.

ODOUR SAMPLING AND ANALYSIS PARAMETERS

Technique: 130294		**AS4323.3 - Forced Choice**	
Date and time of analysis:		10/10/2013 , 1600-1640	
Sample pre-dilution ratio:	N0465	**Nil ,** *All sample gas*	
Quality Requirements		**Acceptance**	**Current value**
n-Butanol threshold value (ppb)		20-80	59
Repeatability "r"		≤0.477	0.327
Repeatability "10r"		≤3.00	2.12
Accuracy "A"		<0.217	0.137

TEST METHODS

The following methods are accredited with the National Association of Testing Authorities (NATA) and are approved for the sampling and analysis of gases unless otherwise stated. Specific details of the methods are available on request.

All sampling and analysis conducted in accordance with test methods (TM) prescribed for the purposes of the New South Wales Protection of the Environment Operations (Clean Air) Regulation 2002, or other approved methods (OM) unless otherwise stated.

All parameters are reported adjusted to dry **(wet for odour only)** NTP conditions unless otherwise stated.

Parameter	Sampling			Analysis		
	NATA	NSW TM Method	Sampling Method	NATA	Analytical Laboratory	Analytical Method
Selection of sampling positions	Yes	TM-1	AS4323.1	Yes	NA	NA
Flow rate	Yes	TM-2	USEPA 2	Yes	NA	NA
Velocity	Yes	TM-2	USEPA 2	Yes	NA	NA
Temperature	Yes	TM-2	USEPA 2	Yes	NA	NA
Moisture	Yes	TM-22	USEPA 4	Yes	NA	NA
Odour	Yes	OM-7	AS4323.3	Yes	Emission Testing Consultants	AS4323.3
Solid particles	Yes	TM-15	AS4323.2	Yes	Emission Testing Consultants	AS4323.2
Dry gas Density	Yes	TM-23	USEPA 3A	Yes	Emission Testing Consultants	USEPA 3A
Molecular weight	Yes	TM-23	USEPA 3A	Yes	Emission Testing Consultants	USEPA 3A
Carbon dioxide (CO_2)	Yes	TM-24	USEPA 3A	Yes	Emission Testing Consultants	USEPA 3A
Oxygen (O_2)	Yes	TM-25	USEPA 3A	Yes	Emission Testing Consultants	USEPA 3A
Nitrogen oxides (NO_x) as NO_2	Yes	TM-11	USEPA 7E	Yes	Emission Testing Consultants	USEPA 7E
PM_{10}	Yes	OM-5	USEPA 201A	Yes	Emission Testing Consultants	USEPA 201A

DEFINITIONS

The following symbols and abbreviations are used in test reports:

BSP	British standard pipe.
Concentration	Mass of analyte per cubic metre expressed at NTP dry conditions (ng, µg or mg/m^3).
Dioxins & furans	2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans) PCDF
Dioxin & furan TEQ values	Toxic equivalent. The TEQ values have been calculated using the toxicity equivalence factors (TEF) according to the World Health Organisation (2005)
Flow rate at discharge conditions	Volume of gas flow per unit time expressed at discharge temperature, pressure and moisture content (m^3/min).
Flow rate at wet NTP conditions	Volume of gas flow per unit time expressed at 0°C, an absolute pressure of 101.325 kPa and discharge moisture content (m^3/min).
Flow rate at dry NTP conditions	Volume of gas flow per unit time expressed at 0°C, an absolute pressure of 101.325 kPa and 0% moisture content (m^3/min).
Lowerbound	(Lower) results do not include any limit of detection values (< values).
Mass rate	Mass of analyte per unit time (µg, mg or g/min).
Mediumbound	(Medium) results include half limit of detection values (< values).
Moisture content	Percentage of gaseous moisture in the gas expressed on a volume / volume percentage basis. This does not include moisture in the gas stream that is in the liquid phase (free moisture).
NA	Not applicable.
NTP	Normal temperature and pressure. Gas volumes and concentrations are expressed on a dry **(wet in the case of odour only)** basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
Odour concentration	Number of odour units (ou).
Odour flux rate	Odour emission rate per unit surface area per unit time (ou/m^2/min).

Odour mass rate	Odour emission rate per unit time (ou/min).
Odour unit	One odour unit (ou) is that concentration of odorant(s) at standard concentrations that elicits a physiological response from a panel (detection threshold) equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
PAH's	Polycyclic aromatic hydrocarbons.
PAH's TEQ values	The TEQ values have been calculated using the toxicity equivalence factors (TEF's) relative to Benzo(a)pyrene, as reported by Larsen & Larsen (1998) (TEF factors reported in the 2003 World Health Organisation (WHO) report E78963 - HEALTH RISKS OF PERSISTENT ORGANIC POLLUTANTS FROM LONG-RANGE TRANSBOUNDARY AIR POLLUTION).
ppm	Parts per million expressed on a volume / volume wet basis.
Sampling plane	Location at which measurements were conducted.
TOC	Total Organic Compounds. Total gaseous organic concentration of vapours consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons) The concentration can be expressed in terms of propane, hexane (or other appropriate organic calibration gas) or in terms of methane.
Velocity	Gas velocity expressed at discharge temperature, pressure and moisture content (m/s)
VOC	Any chemical compound based on carbon in the boiling range 36 to 126°C, with a vapour pressure of at least 0.010kPa at 25°C (or having a corresponding volatility under the particular conditions of use) that adsorb onto activated charcoal and desorb into CS_2, or that can be collected in a tedlar bag and be quantitatively recovered, and that are detected by GCMS. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are CO, CO_2, carbonic acid, metallic carbides and carbonate salts.
>	Greater than.
<	Less than the minimum limit of detection using the specified method.
~	Approximately.

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