EMISSIONS MONITORING SURVEY

Prepared for:

Linx Printing Technologies
Burrell Road
St Ives
Cambridgeshire
PE27 3LA

Guidance Note:	: PG6/44(04)
Job Number:	: P141
Report Number:	: R001
Report Issue Date:	: 3rd March 2009
Survey Dates:	: 27th January 2009

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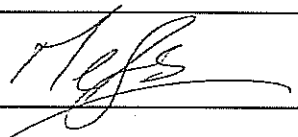
		Signature:	
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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

The monitoring at this installation was carried out in accordance with our quotation reference **PC/P141/Q001**, for compliance check monitoring of emissions to air. The substances requested for monitoring at each emissions point are listed below:

Substances to be monitored	Emission Point Identification
	Ink Manufacture – Main Stack
Particulates	• U
Total Organic Carbon (TOC)	• U

• Denotes the substances to be monitored.

U Denotes UKAS accreditation is held for monitoring that substance.

Special Requirements: *"Test VOC for 8 hours."*

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2499

1.1 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
Ink Manufacture Main Stack	Particulates	20	1.16	$mg.m^{-3}$	64 %	& wet gas	27/01/09	09:00 – 10:00	BS EN 13284-1 (MID)	UKAS / MCERTS	Normal
	Particulates	20	1.72	$mg.m^{-3}$	42 %	& wet gas		10:10 – 11:10	BS EN 13284-1 (MID)	UKAS / MCERTS	
	VOCs as Carbon	150	113.7	$mgC.m^{-3}$	6 %	& wet gas		08:00 – 16:00	BS EN 13526	UKAS / MCERTS	

Notes

Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value.
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval.
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency.
Accreditation for use of Method	The details indicate the accreditation for the use of the complete monitoring method, e.g. MCERTs, UKAS. If use of the method is not accredited " **NA**" is stated.
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring.
s	Chemical Analysis on sample reagents was performed by an External Laboratory as detailed in Section 3.0
NU	UKAS Accreditation Held but UKAS Accreditation cannot be claimed for the test as sampling did not comply with the Standard Reference Method (SRM), see section 3.0 & 4.0
NA	Method is NOT UKAS Accredited.

1.2 Operating Information

Emission Point Reference	Date	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results			
								Substance	CEMS Results	Periodic Monitoring Results	Units
Main Stack	27/01/09	Batch	Various and Varied	n/a	n/a	Dry Filters	Normal	-	-	-	-

Notes:

Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the normal load, throughput or rating of the plant

2.0 INTRODUCTION

Environmental Compliance Ltd (ECL) was commissioned by **Linx Printing Technologies Limited** to undertake an emission monitoring survey at their **Plant in St Ives.** This report presents the findings of the study.

The emissions monitoring survey was carried out by the site sampling team detailed in the table below at the request of **Mr Martin Swindells** in accordance with quotation reference **PC/P141/Q001**.

Site Sampling Team

Names of Site Team	Dates on Site	MCERTS No.	LEVEL	Technical Endorsements
Andy Barnes	27th January 2009	MM 03 235	2	TE1, TE2, TE3, TE4

Report Reviewer

Name	MCERTS No.	LEVEL	Technical Endorsements
Mike Smith	MM 03 211	2	TE1, TE2, TE3, TE4

Technical Endorsement Key:-

TE1 – **Isokinetic** Particulates, Temperature & Velocity Profiles
TE2 – **Isokinetic** Extractive Pollutants:- Metals, Dioxin & Furans, PAHs, PCBs, HCL, HF
TE3 – **Non-Isokinetic** Extractive Pollutants:- Speciated VOCs, HF, HCL, Cyanide.
TE4 – **Continuous Analysers** (Combustion Gases):- VOCs, CO, NOx, SO2, O2

2.1 Objectives

The objective of the survey was to measure the concentrations of pollutants from the processes / locations as detailed in the Executive Summary. This survey meets the requirements of the relevant **Process Guidance Note: PG6/44(04)** where UKAS and MCERTS accreditation has and could be claimed for the testing in the monitoring results table.

2.2 Scope of Work

There were no deviations from the original and agreed emissions monitoring schedule, as detailed in the Executive Summary.

3.0 SAMPLING PROTOCOLS / METHODOLOGIES

3.1 VOCs as Carbon

Testing was carried out using a Signal 3030PM FID and heated gas transport system with reference to the manufacturer's operation handbook, **BS EN 13526** and in-house technical procedure **ECL/TPD/032**. The analyser was calibrated pre and post the sample period using span gas and zero scrubbed air. Data was corrected by molecular weight to VOCs as total carbon.

Data was recorded as 14 second averages over each test period. The averaged data is presented in the Figures & Tables Section.

3.2 Particulates

As the stack gas was above the dew point and close to ambient temperatures, testing was carried out using an unheated sampling system, with in-stack filtration, in accordance with **BS EN 13284-1, MID 1** and In-house technical procedure **ECL/TPD/027.**

Isokinetic particulate sampling is achieved when the velocity of gas entering the sampling nozzle is exactly equal to the velocity of the approaching gas stream within the stack. A measured volume of sample gas is withdrawn from the stack isokinetically through a sampling nozzle, through a heated sampling probe (where required), and then through a pre-weighed filter positioned in a housing (heated where required), where the particles are collected on the filter.

Following testing all internal surfaces of the sample train upstream of the filter are rinsed to remove any particulate matter which, may have impacted on the surfaces during testing.

The filters and rinses are subsequently analysed to determine the amount of particulate matter captured. Analysis of filters are performed by ECL who are UKAS accredited. Analysis of the probe washes are performed by RPS, located in Manchester, who are UKAS accredited.

In addition to the survey samples, a daily field blank is submitted as part of the technical procedure.

4.0 SAMPLE POINT DESCRIPTION

The sample location that was monitored is detailed below:-

4.1 Ink Manufacture – Main Stack

The sampling plane is in long straight vertical section of the emissions stack.

The diameter at the sample plane is 0.5m.

The flow characteristics meet the ***requirements*** of the standard.

2 x 2" ports are available and are located as per the requirements of BS EN 13284.

5.0 RESULTS

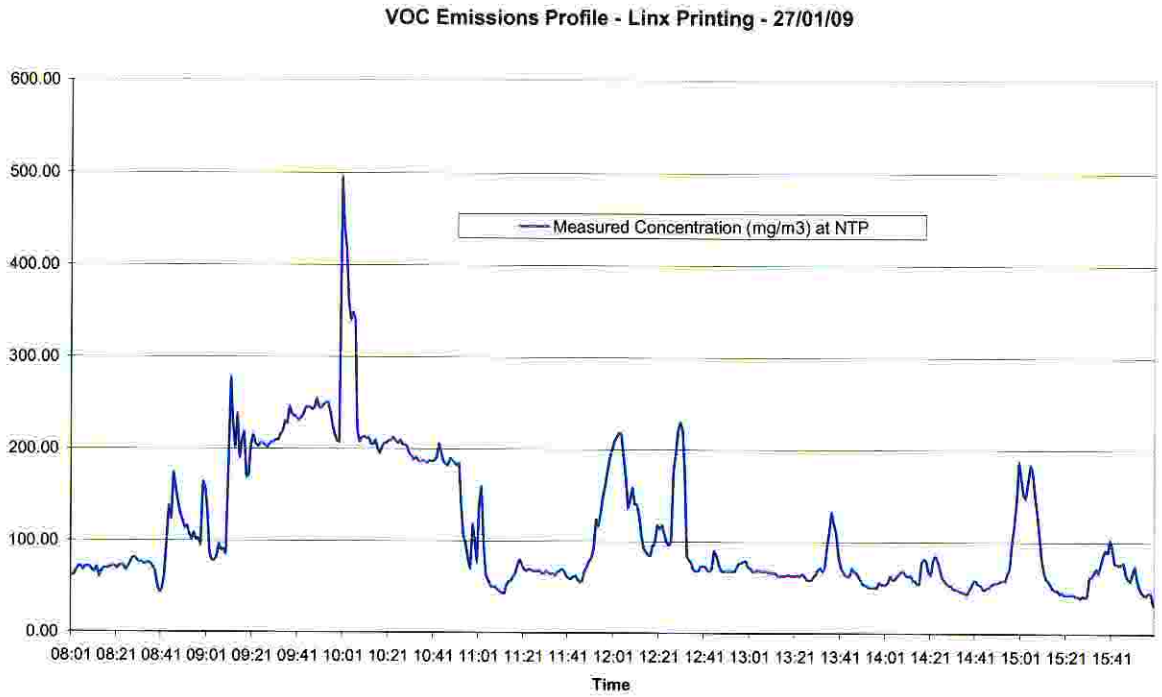
The results of the survey are presented in the Figure and Tables Section.

5.1 Emissions Limit Comparisons

All pollutants measured were below their respective authorised emission limit values.

FIGURES

Figure 1


VOC Emissions Profile - Linx Printing - 27/01/09
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Measured Concentration (mg/m3) at NTP
08:01 08:21 08:41 09:01 09:21 09:41 10:01 10:21 10:41 11:01 11:21 11:41 12:01 12:21 12:41 13:01 13:21 13:41 14:01 14:21 14:41 15:01 15:21 15:41
Time

TABLES

Table 1
Data Recorded from Main Stack
Sample Period: 08:00 – 16:00 on the 27th January 2009

Volumetric Flowrate (Reference Conditions) = **2.55** m^3/sec *

	Minimum	Maximum	Average	Emission Rate
	mg/m^3	mg/m^3	mg/m^3	Kg/hr
VOCs (as carbon)	38.8	496.4	113.7	1.044

Data expressed at (273K, 101.3 kPa & Wet Gas)

Table 2
Particulate Data Recorded from Ink Manufacture - Main Stack – Test 1

Emission Parameter	Units	Test 1	Blank
Stack Diameter	metres	0.50	...
			...
Area of Sample Plane	m^2	0.196	...
Stack Temperature	°C	16	...
Gas Velocity (at Stack Conditions)	m/sec	13.85	...
Gas Velocity (Reference Conditions)	m/sec*	12.99	...
Volumetric Flowrate (Stack Conditions)	m^3/sec*	2.72	...
Volumetric Flowrate (Reference Conditions))	m^3/sec*	2.55	...
Sample Date	...	27/01/2009	...
Sample Period	...	09:00 - 10:00	...
Sample Volume (as measured)	m^3	1.44	...
Sample Volume (reference Conditions)	m^3*	1.34	1.34
Isokinetic Sampling Rate	%	99.77	...
Sample Reference (ECL ID)	ECL/09	187 & 190	189 & 192
Mass of Particulate Matter Collected	mg	1.56	0.60
Concentration of Particulate Matter	mg/m^3*	**1.16**	0.45
Emission Rate of Particulate Matter	g/hr	10.68	...
Expanded Uncertainty (% Relative)	%	64	...
Emission Limit Value (ELV)	mg/m^3*	20	...
Blank Concentration as Percentage of ELV	%	...	2.24

*Reference Conditions (273K, 101.3kPa, Wet Gas)

Table 3

Particulate Data Recorded from Ink Manufacture - Main Stack – Test 2

Emission Parameter	Units	Test 2	Blank
Stack Diameter	metres	0.50	...
			...
Area of Sample Plane	m^2	0.196	...
Stack Temperature	°C	15	...
Gas Velocity (at Stack Conditions)	m/sec	13.83	...
Gas Velocity (Reference Conditions)	m/sec*	13.00	...
Volumetric Flowrate (Stack Conditions)	m^3/sec*	2.71	...
Volumetric Flowrate (Reference Conditions))	m^3/sec*	2.55	...
Sample Date	...	27/01/2009	...
Sample Period	...	10:10 - 11:10	...
Sample Volume (as measured)	m^3	1.54	...
Sample Volume (reference Conditions)	m^3*	1.40	1.40
Isokinetic Sampling Rate	%	103.86	...
Sample Reference (ECL ID)	ECL/09	188 & 191	189 & 192
Mass of Particulate Matter Collected	mg	2.41	0.60
Concentration of Particulate Matter	mg/m^3*	**1.72**	0.43
Emission Rate of Particulate Matter	g/hr	15.85	...
Expanded Uncertainty (% Relative)	%	42	...
Emission Limit Value (ELV)	mg/m^3*	20	...
Blank Concentration as Percentage of ELV	%	...	2.15

*Reference Conditions (273K, 101.3kPa, Wet Gas)

VELOCITY TRAVERSE PROFILES

Environmental Compliance Limited	Traverse Data Profoma	Date of Measurement	27/01/2009

Company	Linx Printing	Stack Diameter (mm)	500	Pitot tube coefficient	1
Site	St Ives	Port Length (mm)	50	Pitot ID	488
Location	Ink Manufacture	Duct Length (mm) A		Thermocouple ID	466
Stack	Main Stack	Duct width (mm) B		Thermocouple Reader ID	431
Job No	P141	Barometric Pressure (mb)	1006	Barometer Id	361
Operators	AB	Static Pressure (mm H_2O)	0.5	Manometer ID	357

	Distance to Point (mm)	Port	Temp. (°C)	(ΔP) (Pa)	Swirl Test ° From Reference	Port	Temp (°C)	(ΔP) (Pa)	Swirl Test ° From Reference
	25	A	15.0	60.0	5	B	15.0	110.0	5
	75	A	15.0	80.0	5	B	15.0	115.0	5
	125	A	15.0	95.0	5	B	15.0	126.0	5
	175	A	15.0	105.0	5	B	15.0	125.0	5
	225	A	15.0	110.0	5	B	15.0	130.0	5
	275	A	15.0	125.0	5	B	15.0	130.0	5
	325	A	15.0	130.0	5	B	15.0	120.0	5
	375	A	15.0	145.0	5	B	15.0	115.0	5
	425	A	15.0	160.0	5	B	15.0	110.0	5
	475	A	15.0	155.0	5	B	15.0	100.0	5
Total			150				150		
Max			15	[illegible]			[illegible]	[illegible]	
Min			15	60.0			[illegible]	100.0	
Average			15.0	116.5			15.00	118.00	

Average temp (K)	288

Suitability of Sampling Position	Actual Stack Conditions
Permitted highest:lowest flow pressure ratio <9:1	2.68:1
Average deviation of flow from axis < 15°	<5
X-sectional area for stacks= πr^2	0.20 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	Yes

Stack Moisture		%
Measured Oxygen		%
Measured Carbon Dioxide		%
Dry Gas Molecular Weight	28	g/g mole

Gas Velocity (as Measured)	14.02	m/sec
Gas Velocity (Reference Conditions)	13.19	m/sec*
Volumetric Flowrate (as Measured)	2.75	m^3/sec
Volumetric Flowrate (Reference Conditions)	2.59	m^3/sec*

*Reference Conditions, 273K, 101.3kPa, Wet Gas

Diagram of Cross Section of Stack/Duct

Comments

No Issues

	Type	Distance m
Nearest downstream disturbance	Exit	[illegible]
Nearest upstream disturbance	Fan	[illegible]

Disturbances are classed as bends, fans or diameter variations