037

Permit Number: PPC 037

ALcontrol Laboratories
Saxon House
Saxon Way
Fordbridge
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B37 5AY

REPORT FOR THE PERIODIC MONITORING

OF

EMISSIONS TO AIR FROM COATING PROCESSES

at

LTI LIMITED
HOLYHEAD ROAD
COVENTRY
WARWICKSHIRE
CV5 8JJ

PART 1: EXECUTIVE SUMMARY

REPORT NO:	4499	**CLIENT REF:**	Purchase Order: 085615
DATE OF VISIT:	11 & 13 April 2006	**CONTACT ON SITE:**	Mr Carl Richardson
DATE OF REPORT:	17 May 2006		

TABLE OF CONTENTS

2 MONITORING RESULTS

2.1 Emission Point Reference: Tack Booth

Date of Monitoring	13/04/06	**Reference Conditions**	NTP
Process Status		**Normal – See Section 3**	

Substances To Be Monitored	**Emission Limit Value**	**Average Emission Concentration**	**Sampling Method Reference**	**Sampling Times**
Total Particulate Matter	10 $mg.m^{-3}$	0.4 $mg.m^{-3}$	BS EN 13284	09:08 – 10:10
VOC	50 $mg.m^{-3}$	16.6 $mg.m^{-3}$	BS EN 13526	08:53 – 09:53

2.2 Emission Point Reference: Base Booth Stack 1

Date of Monitoring	13/04/06	**Reference Conditions**	NTP
Process Status		**Normal – See Section 3**	

Substances To Be Monitored	**Emission Limit Value**	**Average Emission Concentration**	**Sampling Method Reference**	**Sampling Times**
Total Particulate Matter	10 $mg.m^{-3}$	1.6 $mg.m^{-3}$	BS EN 13284	09:00 – 10:11
VOC	50 $mg.m^{-3}$	5.6 $mg.m^{-3}$	BS EN 13526	10:16 – 11:16

2.3 Emission Point Reference: Base Booth Stack 2

Date of Monitoring	13/04/06	**Reference Conditions**	NTP
Process Status		**Normal – See Section 3**	

Substances To Be Monitored	**Emission Limit Value**	**Average Emission Concentration**	**Sampling Method Reference**	**Sampling Times**
Total Particulate Matter	10 $mg.m^{-3}$	2.5 $mg.m^{-3}$	BS EN 13284	10:17 – 11:22
VOC	50 $mg.m^{-3}$	6.4 $mg.m^{-3}$	BS EN 13526	11:24 – 12:24

2.7 Emission Point Reference: Combi Booth 1 (Rectification)

Date of Monitoring	11/04/06	**Reference Conditions**	NTP
Process Status		**Normal – See Section 3**	

Substances To Be Monitored	**Emission Limit Value**	**Average Emission Concentration**	**Sampling Method Reference**	**Sampling Times**
Total Particulate Matter	10 $mg.m^{-3}$	0.3 $mg.m^{-3}$ 0.3 $mg.m^{-3}$	BS EN 13284	11:20 – 11:30 & 1310 – 13:28 (Spray) & 13:33 – 14:03 (Bake)
VOC	50 $mg.m^{-3}$	5.1 $mg.m^{-3}$	BS EN 13526	11:18 – 11:31 & 13:10 – 13:55

2.8 Emission Point Reference: Combi Booth 2 (PDI)

Date of Monitoring	11/04/06	**Reference Conditions**	NTP
Process Status		**Normal – See Section 3**	

Substances To Be Monitored	**Emission Limit Value**	**Average Emission Concentration**	**Sampling Method Reference**	**Sampling Times**
Total Particulate Matter	10 $mg.m^{-3}$	7.1 $mg.m^{-3}$ 0.4 $mg.m^{-3}$	BS EN 13284	09:11 – 09:26 (Spray) & 09:27 – 09:57 (Bake)
VOC	50 $mg.m^{-3}$	8.6 $mg.m^{-3}$	BS EN 13526	08:58 – 09:51

5 DISCUSSION

5.1 Sampling Locations

Whilst the sampling planes for the combi booths, oven and tack booth stacks did not have sampling locations in straight sections of ductwork long enough to meet the ***recommendations*** given in BS EN 13284, all locations had flow profiles which met the ***requirements*** of the standard. As such sampling was to the requirements of the standard.

5.2 Particulate Matter

The permit states an emission limit for particulate matter, applicable from the permit issue date (January 2005) as follows:

Particulate Matter – Emission limit is 10 $mg.m^{-3}$.

All points monitored yielded average results within the above limit.

5.3 Volatile Organic Compounds

The permit states emission limits for VOC as follows:

VOC – Emission limit is 50 $mg.m^{-3}$.

(2-minute averages during spraying and 15 minute averages during stoving).

For the Tack Booth, neither spraying nor baking takes place, so only an hourly average has been provided; the result was below the limit.

For Base Booth stacks 1 & 2, all two minute averages were well below the limit.

For Lacquer Booth stacks 3 & 4, a significant number of two minute averages were above the limit. The hourly averages were below the limit.

For the Curing Oven stack, the rolling 15 minute averages were above the limit, for a period of around 25 minutes. The hourly average was also above the limit.

For combi booth 1 all two and fifteen minute averages were well below the limits.

For combi booth 2 a small number of two minute averages were above the limit all fifteen minute averages were well below the limits.

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PART 2: SUPPORTING INFORMATION

REPORT NO:	4499	**CLIENT REF:**	Purchase Order: 085615
DATE OF VISIT:	11 & 13 April 2006	**CONTACT ON SITE:**	Mr Carl Richardson
DATE OF REPORT:	17 May 2006		

TABLE OF CONTENTS

8 APPENDIX II

8.1 Particulate & Flowrate Calculation Spreadsheets

This Appendix contains 8 pages.

Plant Identification	Oven	Stack Area (m²)	0.126
Job Number	095 E02	Ambient Temp (C)	25
Client Name	LTI	Stack Diameter (cm)	40
Date	11-Apr-06	Pitot Factor	1.00
		Pitot Factor (sqrt)	1.00
		Stack Pressure (Pa)	11
		Ambient Pressure (kPa)	101.3

PITOT SURVEY

Traverse Point	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*5*	*10*	*15*	*18*	*25*	*38*	*46*	*77*	*99*	*115*
Temperature (°C)	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*
Duct Velocity (m/s)	3.2	4.5	5.6	6.1	7.2	8.9	9.8	12.6	14.3	15.4
Traverse Point	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*10*	*14*	*21*	*38*	*40*	*45*	*65*	*70*	*72*	*77*
Temperature (°C)	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*	*92*
Duct Velocity (m/s)	4.5	5.4	6.6	8.9	9.1	9.7	11.6	12.0	12.2	12.6

Absolute Mean Duct Velocity (m/s)	**9.0**
Absolute Flow Rate (m³/hr)	**4078**
Normalised Flow Rate (Nm³/hr)	**3051**

Plant Identification	Lacquer Booth Stack 4	Stack Area (m^2)	1.440
Job Number	095 E02	Meter Temp (C)	30
Client Name	LTI	Stack Dimensions (cm)	120 x 120
Date	13-Apr-06	Pitot Factor	1.00
		Pitot Factor (sqrt)	1.00
		Stack Pressure (Pa)	140
		Ambient Pressure (kPa)	101.3
		Nozzle Size (mm)	6

PITOT SURVEY

Traverse Point	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Distance From Near Wall (D)	0.065	0.125	0.250	0.375	0.450	0.550	0.625	0.750	0.875	0.935
Pitot Reading (Pa)	*20*	*25*	*30*	*42*	*51*	*52*	*42*	*30*	*25*	*22*
Temperature (°C)	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*
Duct Velocity (m/s)	5.8	6.5	7.1	8.4	9.2	9.3	8.4	7.1	6.5	6.1
Traverse Point	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Distance From Near Wall (D)	0.065	0.125	0.250	0.375	0.450	0.550	0.625	0.750	0.875	0.935
Pitot Reading (Pa)	*20*	*28*	*30*	*44*	*53*	*51*	*44*	*30*	*28*	*25*
Temperature (°C)	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*	*22*
Duct Velocity (m/s)	5.8	6.8	7.1	8.6	9.4	9.2	8.6	7.1	6.8	6.5

Absolute Mean Duct Velocity (m/s)	**7.5**
Absolute Flow Rate (m^3/hr)	**38930**
Normalised Flow Rate (Nm^3/hr)	**36076**

Sampling Run 1 **Time: 10:52 - 11:25**

Sampling Point	A3	A8	B3	B8
Sampling Rate (l/min)	*11.0*	*11.0*	*11.0*	*11.0*
Sampling Duration (mins)	*8*	*8*	*8*	*9*
Filter No	*K288*			
Volume Sampled (m^3)	Meter 0.360		Expected 0.363	

Initial Meter Reading (l)	69540
Final Meter Reading (l)	69900
Volume Sampled (l)	360
Isokineticity Error (%)	-0.8
(Maximum Allowed Error = -5 to +15%)	

Corrected Volume = 0.32 Nm^3 (at NTP)

Sampling Run 2 **Time: 11:26 - 11:59**

Sampling Point	A3	A8	B3	B8
Sampling Rate (l/min)	*11.0*	*11.0*	*11.0*	*11.0*
Sampling Duration (mins)	*8*	*8*	*8*	*9*
Filter No	*K286*			
Volume Sampled (m^3)	Meter 0.356		Expected 0.363	

Initial Meter Reading (l)	69900
Final Meter Reading (l)	70256
Volume Sampled (l)	356
Isokineticity Error (%)	-1.9
(Maximum Allowed Error = -5 to +15%)	

Corrected Volume = 0.32 Nm^3 (at NTP)

		FILTER WEIGHTS		WASHINGS WEIGHTS		
Test Number	Filter No	Pre-Weight (mg)	Post-Weight (mg)	Pre-Weight (mg)	Post-Weight (mg)	Gain (mg)
1	K288	94.70	95.90	0.00	0.00	1.20
2	K286	91.40	91.90	0.00	0.00	0.50

TEST RESULTS

	Test 1	Test 2	Mean
Particulate Concentration(mg/Nm^3)	**3.7**	**1.6**	**2.6**
Mass Emission (g/hr)	**133.5**	**56.2**	**94.9**

Plant Identification	Combi Booth 2 (PDI)	Stack Area (m^2)	0.503
Job Number	095 E02	Meter Temp (C)	17
Client Name	LTI	Stack Diameter (cm)	80
Date	11-Apr-06	Pitot Factor	1.00
		Pitot Factor (sqrt)	1.00
		Stack Pressure (Pa)	95
Fan switches off for bake cycle.		Ambient Pressure (kPa)	101.3
		Nozzle Size (mm)	5

PITOT SURVEY

Traverse Point	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*30*	*45*	*65*	*75*	*90*	*92*	*78*	*66*	*45*	*38*
Temperature (°C)	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*
Duct Velocity (m/s)	7.1	8.7	10.4	11.2	12.2	12.4	11.4	10.5	8.7	8.0
Traverse Point	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*35*	*45*	*66*	*80*	*95*	*92*	*85*	*70*	*45*	*40*
Temperature (°C)	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*
Duct Velocity (m/s)	7.6	8.7	10.5	11.5	12.6	12.4	11.9	10.8	8.7	8.2

Absolute Mean Duct Velocity (m/s)	**10.2**
Absolute Flow Rate (m^3/hr)	**18402**
Normalised Flow Rate (Nm^3/hr)	**17104**

Sampling Run 1 (Spray) **Time: 09:11 - 09:26**

Sampling Point	A2	A9	B2	B9
Sampling Rate (l/min)	*10.2*	*10.2*	*10.2*	*10.2*
Sampling Duration (mins)	*4*	*4*	*4*	*3*
Filter No	*K066*			
Volume Sampled (m^3)	Meter	0.150	Expected	0.153

Initial Meter Reading (l)	39007
Final Meter Reading (l)	39157
Volume Sampled (l)	150
Isokineticity Error (%)	-2.0
(Maximum Allowed Error = -5 to +15%)	

Corrected Volume = 0.14 Nm^3 (at NTP)

Sampling Run 2 (Bake) **Time: 09:27 - 09:57**

Sampling Point	A2	A9	B2	B9
Sampling Rate (l/min)	*10.2*	*10.2*	*10.2*	*10.2*
Sampling Duration (mins)	*7.5*	*7.5*	*7.5*	*7.5*
Filter No	*K199*			
Volume Sampled (m^3)	Meter	0.300	Expected	0.306

Initial Meter Reading (l)	39157
Final Meter Reading (l)	39457
Volume Sampled (l)	300
Isokineticity Error (%)	-2.0
(Maximum Allowed Error = -5 to +15%)	

Corrected Volume = 0.28 Nm^3 (at NTP)

		FILTER WEIGHTS		WASHINGS WEIGHTS		
Test Number	Filter No	Pre-Weight (mg)	Post-Weight (mg)	Pre-Weight (mg)	Post-Weight (mg)	Gain (mg)
1	K066	95.60	96.60	0.00	0.00	1.00
2	K199	93.00	93.10	0.00	0.00	0.10

TEST RESULTS

	Test 1	Test 2	Mean
Particulate Concentration(mg/Nm^3)	**7.1**	**0.4**	**3.7**
Mass Emission (g/hr)	**121.1**	**6.1**	**63.6**

Plant Identification	Base Booth Stack 2	Stack Area (m²)	1.131
Job Number	095 E02	Meter Temp (C)	25
Client Name	LTI	Stack Diameter (cm)	120
Date	13-Apr-06	Pitot Factor	1.00
		Pitot Factor (sqrt)	1.00
		Stack Pressure (Pa)	70
		Ambient Pressure (kPa)	101.3
		Nozzle Size (mm)	5

PITOT SURVEY

Traverse Point	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*30*	*40*	*45*	*50*	*58*	*60*	*50*	*46*	*40*	*28*
Temperature (°C)	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*
Duct Velocity (m/s)	7.1	8.2	8.7	9.1	9.8	10.0	9.1	8.8	8.2	6.8
Traverse Point	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Distance From Near Wall (D)	0.065	0.150	0.250	0.350	0.450	0.550	0.650	0.750	0.850	0.935
Pitot Reading (Pa)	*33*	*40*	*46*	*52*	*56*	*62*	*52*	*44*	*40*	*33*
Temperature (°C)	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*	*21*
Duct Velocity (m/s)	7.4	8.2	8.8	9.3	9.7	10.2	9.3	8.6	8.2	7.4

Absolute Mean Duct Velocity (m/s)	**8.6**
Absolute Flow Rate (m³/hr)	**35168**
Normalised Flow Rate (Nm³/hr)	**32679**

Sampling Run 1	**Time:**		**10:17 - 10:47**	
Sampling Point	A2	A9	B2	B9
Sampling Rate (l/min)	*10.0*	*10.0*	*10.0*	*10.0*
Sampling Duration (mins)	*7.5*	*7.5*	*7.5*	*7.5*
Filter No	*K246*			
Volume Sampled (m³)	Meter	0.300	Expected	0.300
Corrected Volume =	0.27	Nm³ (at NTP)		

Initial Meter Reading (l)	52546
Final Meter Reading (l)	52846
Volume Sampled (l)	300
Isokineticity Error (%)	0.0
(Maximum Allowed Error = -5 to +15%)	

Sampling Run 2	**Time:**		**10:52 - 11:22**	
Sampling Point	A2	A9	B2	B9
Sampling Rate (l/min)	*10.0*	*10.0*	*10.0*	*10.0*
Sampling Duration (mins)	*7.5*	*7.5*	*7.5*	*7.5*
Filter No	*K 077*			
Volume Sampled (m³)	Meter	0.300	Expected	0.300
Corrected Volume =	0.27	Nm³ (at NTP)		

Initial Meter Reading (l)	52846
Final Meter Reading (l)	53146
Volume Sampled (l)	300
Isokineticity Error (%)	0.0
(Maximum Allowed Error = -5 to +15%)	

		FILTER WEIGHTS		**WASHINGS WEIGHTS**		
Test Number	Filter No	Pre-Weight (mg)	Post-Weight (mg)	Pre-Weight (mg)	Post-Weight (mg)	Gain (mg)
1	K246	93.40	93.50	0.00	0.00	0.10
2	K 077	92.10	93.40	0.00	0.00	1.30

TEST RESULTS

	Test 1	**Test 2**	**Mean**
Particulate Concentration(mg/Nm³)	**0.4**	**4.7**	**2.5**
Mass Emission (g/hr)	**11.9**	**154.6**	**83.2**

TOC Monitoring:- Flame Ionisation Detector
BS EN 12619: 1999 & BS EN 13526:2002

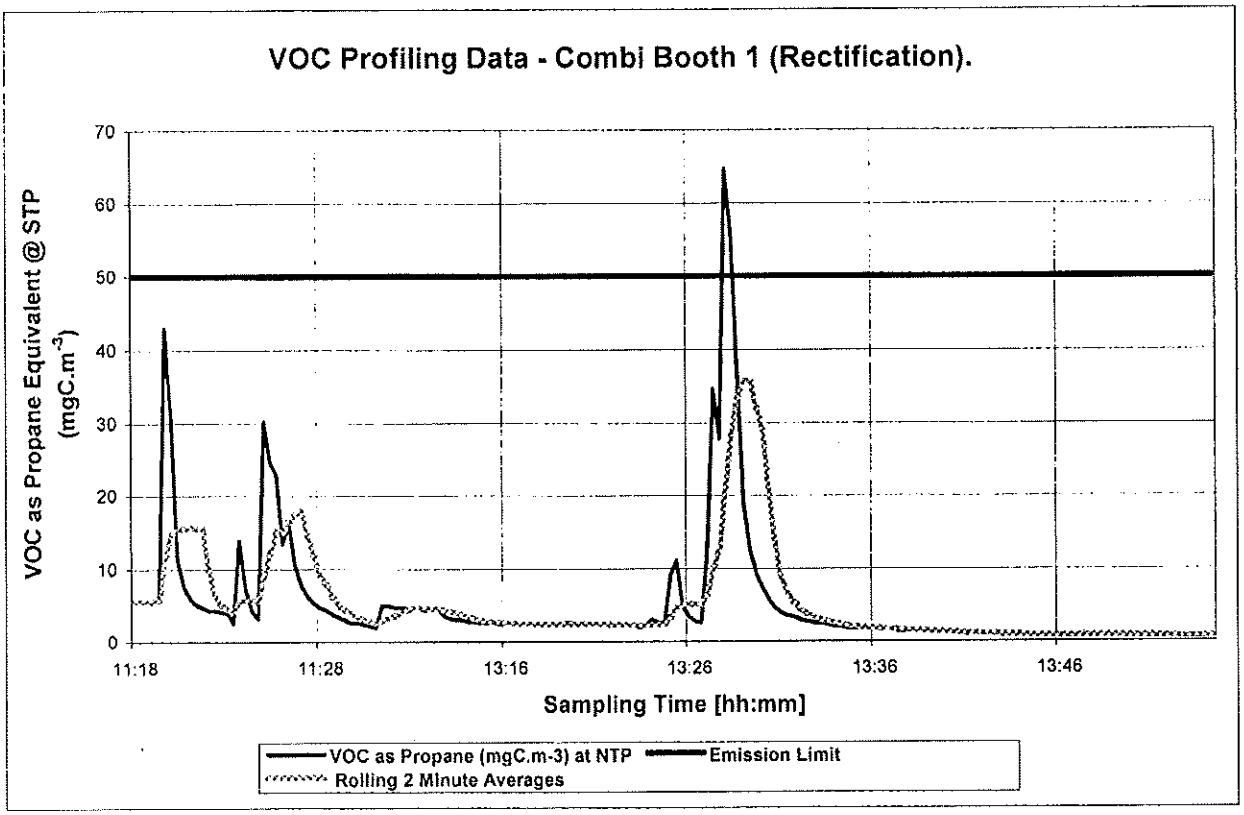
Job Number	095 E02	Date of Testing	11 April 2006
Client	LTI	Consultant	AB
Plant Identification	Combi Booth 1 (Rectification)		
Ambient temperature (°C)	15	FID Identification	VC 08
Atmospheric Pressure (pa)	101.3	Detector Type	FID
Stack Pressure (pa)	75	Calibration Gas	Propane
Stack Temperature (°C)	23	Instrument Range	100.0
Logging Rate	00:00:20	Percent Carbon	82%
Emission Limit	50	Measurement Range (ppm)	800

Instrument Calibration

		Calibration Cylinder Identification	Actual (ppm)	Instrument (v)
Initial Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06
Final Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06

Span gas concentration should be +/- 80% of the measurement range **PASS**

Sampling Time	11:18 - 11:31 & 13:10 - 13:55	VOC Reading (ppm)	VOC as Propane (mgC.m^{-3}) at NTP
		3.2	**5.1**



TOC Monitoring:- Flame Ionisation Detector
BS EN 12619: 1999 & BS EN 13526:2002

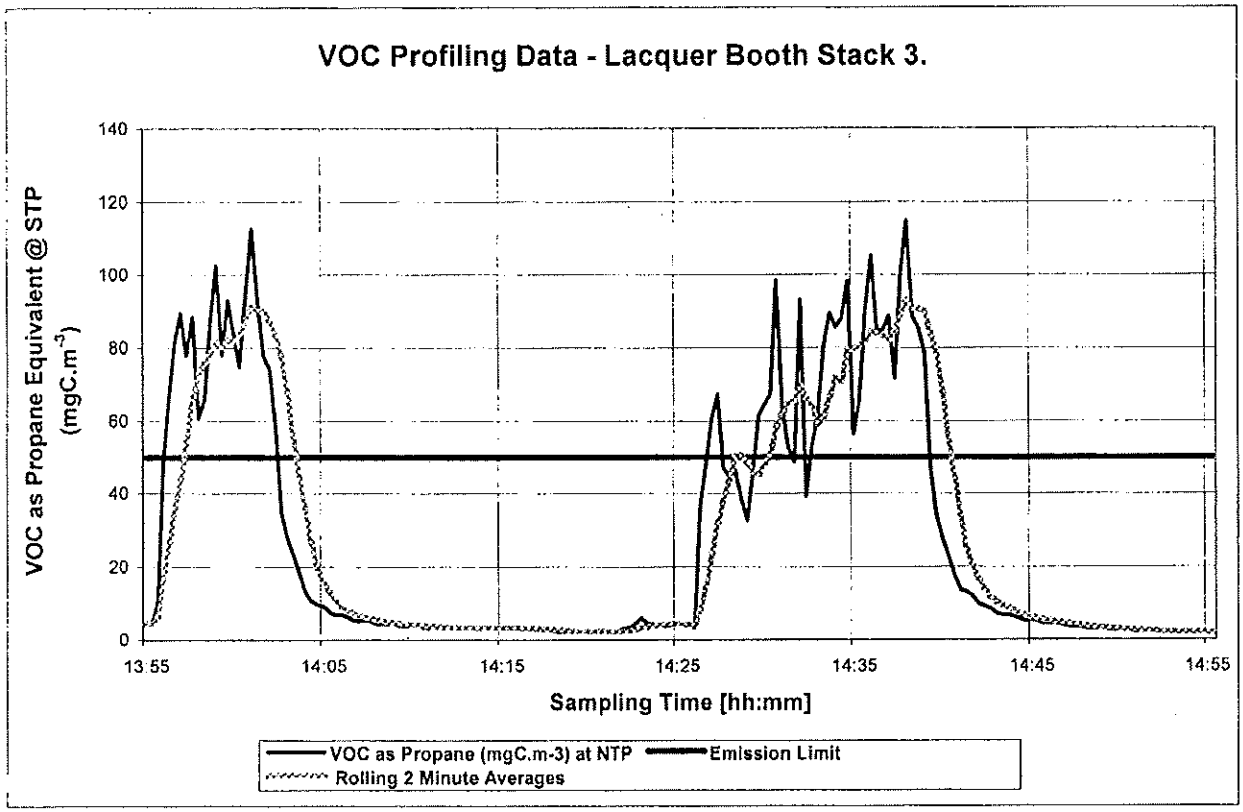
Job Number	095 E02	Date of Testing	11 April 2006
Client	LTI	Consultant	AB
Plant Identification	Lacquer Booth - Stack 3		
Ambient temperature (°C)	15	FID Identification	VC 08
Atmospheric Pressure (pa)	101.3	Detector Type	FID
Stack Pressure (pa)	100	Calibration Gas	Propane
Stack Temperature (°C)	22	Instrument Range	100.0
Logging Rate	00:00:20	Percent Carbon	82%
Emission Limit	50	Measurement Range (ppm)	800

Instrument Calibration

		Calibration Cylinder Identification	Actual (ppm)	Instrument (v)
Initial Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06
Final Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06

Span gas concentration should be +/- 80% of the measurement range **PASS**

Sampling Time	13:55 - 14:56	VOC Reading (ppm)	VOC as Propane ($mgC.m^{-3}$) at NTP
		17.4	**27.9**



TOC Monitoring:- Flame Ionisation Detector
BS EN 12619: 1999 & BS EN 13526:2002

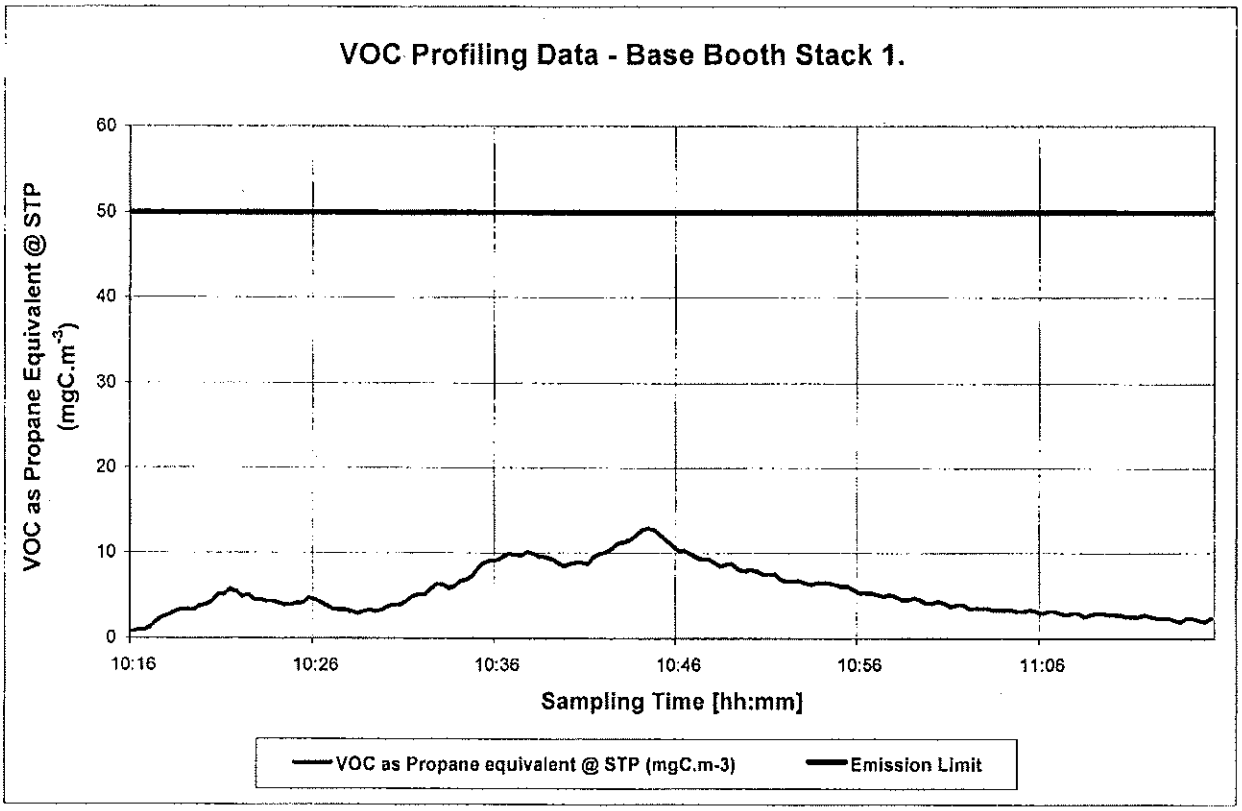
Job Number	095 E02	Date of Testing	13 April 2006
Client	LTI	Consultant	AB
Plant Identification	Base Booth - Stack 1		
Ambient temperature (°C)	15	FID Identification	VC 08
Atmospheric Pressure (pa)	101.3	Detector Type	FID
Stack Pressure (pa)	15	Calibration Gas	Propane
Stack Temperature (°C)	20	Instrument Range	100.0
Logging Rate	00:00:20	Percent Carbon	82%
Emission Limit	50	Measurement Range (ppm)	800

Instrument Calibration

		Calibration Cylinder Identification	Actual (ppm)	Instrument (v)
Initial Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06
Final Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06

Span gas concentration should be +/- 80% of the measurement range **PASS**

Sampling Time	10:16 - 11:16	VOC Reading (ppm)	VOC as Propane (mgC.m^{-3}) at NTP
Mean		3.5	5.6



TOC Monitoring:- Flame Ionisation Detector
BS EN 12619: 1999 & BS EN 13526:2002

Job Number	095 E02	Date of Testing	13 April 2006
Client	LTI	Consultant	AB
Plant Identification	Tack Booth		
Ambient temperature (°C)	15	FID Identification	VC 08
Atmospheric Pressure (pa)	101.3	Detector Type	FID
Stack Pressure (pa)	8	Calibration Gas	Propane
Stack Temperature (°C)	21	Instrument Range	100.0
Logging Rate	00:00:20	Percent Carbon	82%
Emission Limit	50	Measurement Range (ppm)	800

Instrument Calibration

		Calibration Cylinder Identification	Actual (ppm)	Instrument (v)
Initial Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06
Final Calibration	Zero	Air	0	0.00
	Span	5982	706	7.06

Span gas concentration should be +/- 80% of the measurement range **PASS**

Sampling Time	08:53 - 09:53	VOC Reading (ppm)	VOC as Propane ($mgC.m^{-3}$) at NTP
Mean		**10.3**	**16.6**