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November 2002

REPORT ON MONITORING OF ATMOSPHERIC EMISSIONS FROM THE BROWNS LANE PLANT

A Report For

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Project No. 166110102/EB/R1/Rev0 November, 2002

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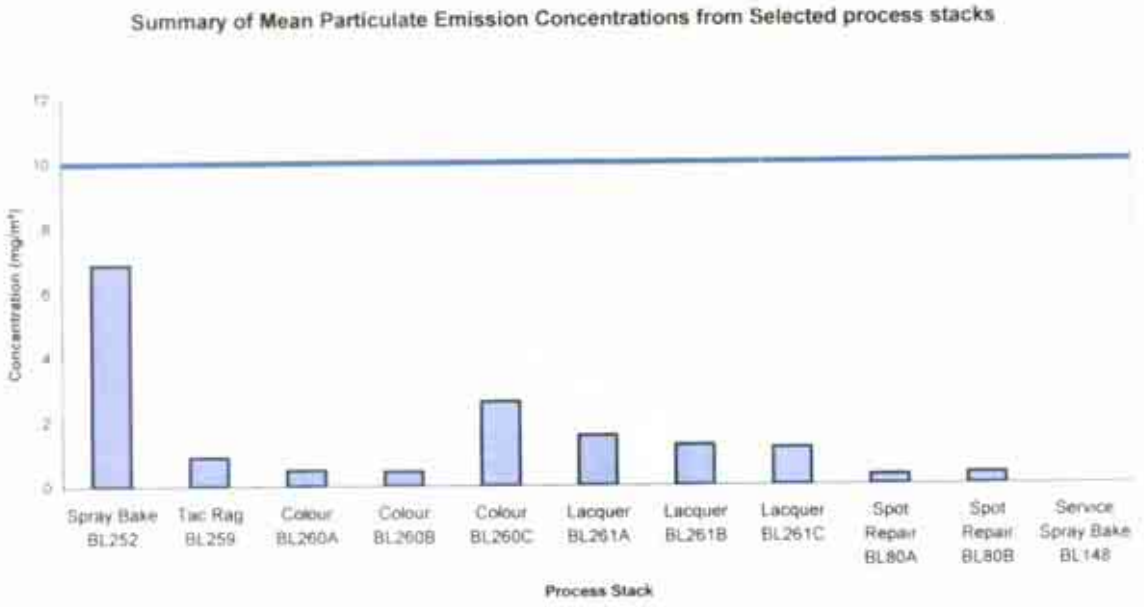
CONTENTS

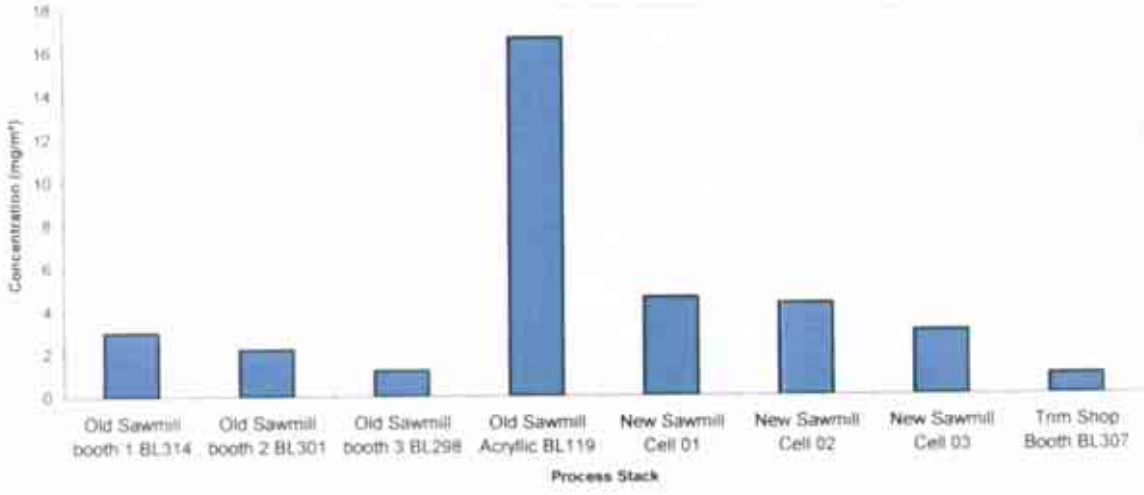
Executive Summary

Casella Stanger carried out stack emission monitoring for Jaguar Cars Limited at the Browns Lane site between the 25th October and the 15th November 2002. The parameters monitored in the survey were Volatile Organic Compounds, Total Particulate Matter, Total Isocyanates, Oxides of Nitrogen and Carbon Monoxide.

The results are summarised graphically below:

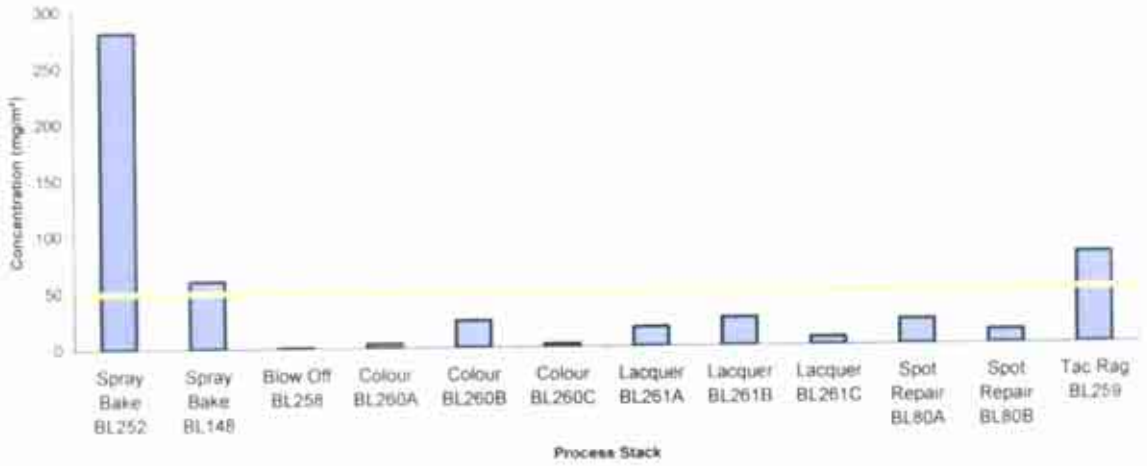


The Particulate Emission concentrations for the COB Repair, Sopt Repair and Service Repair Booths were below the limit of 10mg/m³ (blue line) as specified in PG6/34(97) - Respraying of Road Vehicles.



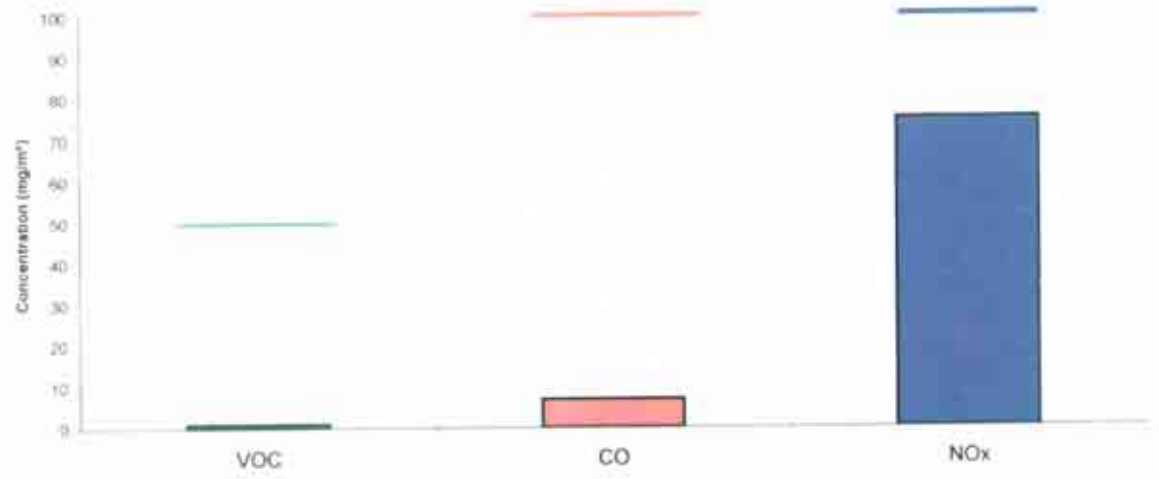
The particulate emission concentrations for the Old Sawmill, New Sawmill and Trim Shop Booths were below the limit of 50mg/m³ as specified in PG6/32(97) - Adhesive Coating and PG6/33(97) - Wood Coating.

Summary of Maximum 2 Minute Mean VOC Concentrations from Selected Process Stacks



The VOC emission concentrations for the majority of the exhausts monitored were below the limit of 50mg/m³ detailed in PG6/34(97), with the exception of Spray Bake BL252, Spray Bake BL148 and Tac Rag BL259. Tac Rag BL259 was the only exhaust in which Non compliant paint was used.

Summary of Mean Emissions from COB Incinerator BL001



All emission concentrations from the COB Repair Incinerator BL001 were all below the respective emissions limit (coloured lines) as detailed in PG6/34(97) - Respraying of Road Vehicles.

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1.0 INTRODUCTION

Jaguar Cars Limited commissioned Casella Stanger to conduct monitoring of atmospheric emissions from selected process stacks at the Browns Lane Site.

The scope of services provided by Casella Stanger is described in the proposal (Ref.:T3911v1CMB) which includes details of the terms and conditions under which the work was performed. The specification was reduced from previous years as compliant coatings are now used in some areas.

1.1 Objective

The objective of the survey was to provide information to support authorisation under the Environmental Protection Act 1990.

1.2 Scope of Survey

The emissions from the exhausts were monitored under normal operating conditions for the following parameters as specified by Jaguar Cars.

1.2.1 Wood Coating

Old Sawmill

Reference	Location	No. of Exhausts	Parameters
BL314	Spray Booth No.1	1	Particulate, Isocyanate
BL301	Spray Booth No.2	1	Particulate, Isocyanate
BL298	Spray Booth No.3	1	Particulate, Isocyanate
BL371	Spray Booth No.4	1	Not in use during survey
BL119	Spray Booth (Acrylic)	1	Particulate
-	Black Out Booth	1	Not in Use during survey

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1.2.1 Scope of Survey (Continued...)

New Sawmill

Reference	Location	No. of Exhausts	Parameters
Cell 01	Spray Booth S1	1	Particulate, Isocyanate
Cell 02	Spray Booth S2	1	Particulate, Isocyanate
Cell 03	Spray Booth S3	1	Particulate, Isocyanate

1.2.2 Trim Shop

Reference	Location	No. of Exhausts	Parameters
BL307	Spray Booth	1	Particulate

1.2.3 COB Repair Paint Shop

Reference	Location	No. of Exhausts	Parameters
BL001	Incinerator	1	VOC, CO, NO_x
BL252	Spray Bake	1	Particulate, VOC, Isocyanate
BL258	Blow Off Booth	1	VOC
BL259	Tac Rag Booth	1	Particulate, VOC
BL260	Colour Booths	3	Particulate, VOC
BL261	Lacquer Booths	3	Particulate, VOC, Isocyanate

1.2.4 No.1 Shop

Reference	Location	No. of Exhausts	Parameters
BL80	Spray Booth - Track 5	2	Particulate, VOC

1.2.5 Service Paint Shop

Reference	Location	No. of Exhausts	Parameters
BL148	Spray Bake	1	Particulate, Isocyanate

Two sample runs per process stack were carried out. The duration of each sampling run was approximately forty minutes.

The site work was carried out between 24th October and 15th November 2002, under the overall supervision of Mr. P. Hutchings of Jaguar Motors Limited.

2.0 PLANT OPERATION

A detailed description of the various processes was outside the scope of this survey. As far as was reasonably practicable, Casella Stanger checked that each process was operating under normal conditions whilst it was monitored.

During VOC monitoring the processes were observed and a time log of spraying and other activity within the area was made.

Sampling was scheduled to avoid relief breaks on the production lines.

2.1 Operating Conditions

At several locations it was not possible to monitor under normal conditions for the required length of time. Operating conditions for the various processes were as follows:

2.1.1 Sawmill Spraybooths 1-4

Spraying was constant during sampling for spraybooths 1-3. Spraybooth 4 was not operating due to low production.

2.1.2 Blackout Booth

No sampling as this booth is no longer used.

2.1.3 Trim Shop Spray Booth

Constant spraying of adhesive coating in operation during the short duration sample runs.

2.1.4 Paint Repair Shop Incinerator

See production details for Paint Repair Shop in Appendix 4.

2.1.5 Paint Repair Shop Spray Bake

During both runs a number of mirrors and bumpers were sprayed and allowed to flash off.

2.1.6 Paint Repair Shop Tac Rag Booth

See production details for Paint Repair Shop in Appendix 4.

2.1.7 Colour Booths and Lacquer Booths

See production details for Paint Repair Shop in Appendix 4.

2.1.8 No. 1 Shop Spray Booth Track 5 – BL80

Continuous production during monitoring schedule.

2.1.9 Service Paint Shop Spray Bake

Approximately 26 centre stowage during first run and 26 side stowage during second run.

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2.2 Site Observations

Sampling locations were limited by the existing physical dimensions of the exhaust ducts.

The monitoring locations on several stacks did not conform to BS3405 (particulate monitoring standard) in that the ratio of highest: lowest velocity pressure reading exceeded 9:1. Therefore the accuracy inherent in this standard of ±25% cannot be applied to the particulate results for these stacks. The stacks in question are as follows:

Process Reference	Ratio of Highest : Lowest Velocity Pressure Reading
Saw Mill - BL 301	65
Saw Mill - BL 298	83
No.1 Shop – BL80A	20
No.1 Shop – BL80B	98

The following stacks had a ratio of highest : lowest pressure velocity reading of less than 9:1, however the sampling port locations were less than 4 duct diameters from a fan.

Process Reference	Ratio of Highest : Lowest Velocity Pressure Reading
Saw Mill - BL 119	1.6
COB Repair – 260A	1.6
COB Repair – 260B	1.8
COB Repair – 260C	1.5

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3.0 SUMMARY OF RESULTS

Detailed results are given as follows:

Appendix 1A	Wood Coating (Old sawmill & New Sawmill)
Appendix 1B	Trim Shop
Appendix 1C	COB Repair Paint Shop
Appendix 1D	No.1 Shop
Appendix 1E	Service Paint Shop

3.1 Summary of Results

Results are expressed to reference conditions of Temperature 273K, Pressure 101kPa. The VOC results given are the maximum 15 minute averages.

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3.1.1 Wood Coating – PG6/33(97) Wood Coating Processes

Old Sawmill

Location	Run No.	Flow at 273k (m^3/s)	Temp (^oC)	Particulate concentration (mg/m^3)	Isocyanates concentration as NCO (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spray Booth No.1 BL314	1			4.2		
	2			1.8	<0.01	50
	Mean	14.0	19	3.0		
Spray Booth No.2 BL301	1			2.5		
	2			1.9	<0.01	50
	Mean	4.6	15	2.2		
Spray Booth No.3 BL298	1			1.5		
	2			0.9	<0.01	50
	Mean	7.4	16	1.2		
Acrylic Spray Booth BL119	1			10.0		
	2			23.3	N/A	50
	Mean	1.4	20	16.65		

New Sawmill

Location	Run No.	Flow at 273k (m^3/s)	Temp (^oC)	Particulate concentration (mg/m^3)	Isocyanates concentration as NCO (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spray Booth Cell 01 (S1)	1			6.7		
	2			2.5	<0.01	50
	Mean	2.3	18	4.6		
Spray Booth Cell 02 (S2)	1			4.2		
	2			4.4	<0.01	50
	Mean	1.8	17	4.3		
Spray Booth Cell 03 (S3)	1			4.0		
	2			2.0	<0.01	50
	Mean	0.8	17	3.0		

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3.1.2 Trim Shop – PG6/32(97) Adhesive Coating Processes

Location	Run No.	Flow at 273k (m^3/s)	Temp (^0C)	Particulate concentration (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spray Booth	1			<0.01	
BL307	2			1.9	50
	Mean	2.0	18	0.95	

3.1.3 Service Paint Shop – PG6/34(97) Respraying of Road Vehicles

Location	Run No.	Flow at 273k (m^3/s)	Temp (^0C)	Particulate concentration (mg/m^3)	Isocyanates Concentration as NCO (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spraybake	1			<0.01		
BL148	2			<0.01	<0.01	10
	Mean	8.3	17	<0.01		

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3.1.4 COB Repair Paint Shop – PG6/34(97) Respraying of Road Vehicles

Location	Run No.	VOC as C highest 2 minute mean concentration (mg/m^3)	CO Conc. (mg/m^3)	NOx as NO_2 Conc. (mg/m^3)	VOC Emission Limit (mg/m^3)
Incinerator	Min	0	7	65	
BL001	Max	1	7	87	50
	Mean	1	7	75	

Location	Run No.	Flow at 273k (m^3/s)	Temp (°C)	Particulate Concentration Filter & Probe Wash mg/m^3	VOC as C Highest 2 Minute Mean Concentration (mg/m^3)	Isocyanates Concentration as NCO (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spray	1			6.7			
Bake	2			7.0	281	<0.01	10
BL252	Mean	3.4	32	6.85			
Blow Off	1						
Booth	2			N/A	1.0	N/A	N/A
BL258	Mean	5.3	28				
Tac Rag	1			1.0			
Booth	2			0.8	80	N/A	10
BL259	Mean	3.7	21	0.9			

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3.1.4 COB Repair Paint Shop (continued)

Location	Run No.	Flow at (m/s)	Temp (°C)	Particulate Concentration Filter & Probe Wash mg/m³	VOC as C Highest 2 Minute Mean Concentration (mg/m³)	Isocyanates Concentration as NCO (mg/m³)	Particulate Emission Limit (mg/m³)
Colour	1			0.8			
Booth	2			0.2	4.0	N/A	10
260A	Mean	18.8	18	0.5			
Colour	1			0.6			
Booth	2			0.3	24.0	N/A	10
260B	Mean	13.4	20	0.45			
Colour	1			4.9			
Booth	2			0.3	3.0	N/A	10
260C	Mean	17.5	20	2.6			
Lacquer	1			1.5			
Booth	2			1.6	17.0	<0.01	10
261A	Mean	11.9	20	1.55			
Lacquer	1			0.3			
Booth	2			2.2	25.0	<0.01	10
261B	Mean	3.9	17	1.25			
Lacquer	1			1.0			
Booth	2			1.3	7.0	<0.01	10
261C	Mean	21.6	18	1.15			

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3.1.5 No.1 Shop – PG6/34(97) Respraying of Road Vehicles

Location	Run No.	Flow at 273k (m^3/s)	Temp (°C)	Particulate concentration (mg/m^3)	VOC as C Highest 2 Minute Mean Concentration (mg/m^3)	Particulate Emission Limit (mg/m^3)
Spray Booth	1			<0.01		
Track 5	2			0.6	22.0	10
BL80A	Mean	3.1	22	0.3		
Spray Booth	1			0.4		
Track 5	2			0.3	12.0	10
BL80B	Mean	2.0	22	0.35		

APPENDIX 1

DETAILED RESULTS OF SAMPLING AND ANALYSIS

APPENDIX 1A

WOOD COATING (New & Old Sawmill)

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Table 1

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Old Sawmill**
Test Position	**Acrylic Spray Booth BL119**
Date of Measurement	**11/11/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.035	0.28	27.5		0.26	26	
0.081	0.28	28		0.28	28	
0.135	0.27	27		0.28	28	
0.189	0.27	27		0.27	27	
0.243	0.28	27.5	20	0.28	27.5	20
0.297	0.27	27		0.28	28	
0.351	0.26	26		0.29	29	
0.405	0.23	23		0.27	27	
0.459	0.20	20		0.26	26	
0.505	0.18	18		0.20	20	

Mean Pv=	25.8	
Highest pitot-static reading (Pa	29	
Lowest pitot-static reading (Pa)	18	
Ratio highest/lowest=	1.6	(Maximum permitted ratio= 9:1)

Mean Gas Temperature (K)	293			
Permitted range of Gas Temperature (°C)=		-9.3	to	49.3
Duct Diameter (m)	0.54	Duct Area (m^2)		0.23

Velocity (m/s) at Gas Temperature **6.5**

Flowrate (m^3/s) at Gas Temperature **1.5**

Flowrate (m^3/s) at Temperature 273K **1.4**

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Table 1A

Atmospheric Emission of Total Particulate Matter from Old Sawmill Acrylic Spray Booth BL119 on the 11th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-931	1	11:28-11:48	197.1	1.00	5.1
M-927	2	11:56-12:15	189.2	2.10	11.5

Probe Washings

Sample Reference		Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-931	(W)	1	11:28-11:48	0.9
M-927	(W)	2	11:56-12:15	2.1

Probe Washing and Filter Combined

Sample Reference		Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-931	+	1	11:28-11:48	197.1	1.90	10.0
M-931	W					
M-927	+					
M-927	W	2	11:56-12:15	189.2	4.20	23.3
M-927	W					

Mean temperature in duct at sampling point(°C) 20

Sample volume measurement temperature (°C)

Run 1 10
Run 2 14

**** point sampling along single axis

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Table 2

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Old Sawmill**
Test Position	**Spray Booth 3 BL298**
Date of Measurement	**11/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.084	0.30	30		0.00	0	
0.194	0.30	30		0.40	40	
0.323	0.73	72.5		0.63	62.5	
0.452	0.73	72.5		0.73	72.5	
0.581	0.83	82.5	16	0.63	62.5	16
0.710	0.60	60		0.60	60	
0.839	0.25	25		0.33	32.5	
0.968	0.00	0		0.00	0	
1.097	0.00	0		0.00	0	
1.206	0.00	0		0.00	0	

Mean Pv=	22.0		
Highest pitot-static reading (Pa)	83		
Lowest pitot-static reading (Pa)	1		
Ratio highest/lowest=	82.5	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	289		
Permitted range of Gas Temperature (°C)=		-12.9 to	44.9
Duct Diameter (m)	1.29	Duct Area (m^2)	1.31

Velocity (m/s) at Gas Temperature **6.0**

Flowrate (m^3/s) at Gas Temperature **7.8**

Flowrate (m^3/s) at Temperature 273K **7.4**

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Table 2A

Atmospheric Emission of Total Particulate Matter from Old Sawmill Spray Booth 3 BL298 on the 11th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-761	1	10:20-11:20	480.4	0.00	0.0
M-870	2	11:30-12:30	456.0	0.00	0.0

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-761 (W)	1	10:20-11:20	0.7
M-870 (W)	2	11:30-12:30	0.4

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-761 + M-761 W	1	10:20-11:20	480.4	0.70	1.5
M-870 + M-870 W	2	11:30-12:30	456.0	0.40	0.9

Mean temperature in duct at sampling point(°C) 16

Sample volume measurement temperature (°C)

Run 1 8
Run 2 10

**** point sampling along single axis

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Table 2B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL298 Old Sawmill Spray Booth 3 on the 11th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/41	1	10:15-12:20	125	< 0.20	< 0.0017

Mean temperature in duct at sampling point (°C) = 16

Sample volume measurement temperature (°C) = 16

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 3

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Old Sawmill**
Test Position	**Spray Booth 2 BL301**
Date of Measurement	**11/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.085	0.00	0		0.33	33	
0.197	0.00	0		0.45	45	
0.328	0.00	0		0.48	48	
0.459	0.00	0		0.35	35	
0.590	0.00	0	14.7	0.01	1	15
0.721	0.00	0		0.00	0	
0.852	0.45	45		0.00	0	
0.983	0.54	54		0.00	0	
1.114	0.58	58		0.00	0	
1.225	0.65	65		0.00	0	

Mean Pv=	7.8	
Highest pitot-static reading (Pa)	65	
Lowest pitot-static reading (Pa)	1	
Ratio highest/lowest=	65.0	(Maximum permitted ratio= 9:1)

Mean Gas Temperature (K)	287.85			
Permitted range of Gas Temperature (°C)=		-13.935	to	43.635
Duct Diameter (m)	1.31	Duct Area (m^2)		1.35

Velocity (m/s) at Gas Temperature **3.6**

Flowrate (m^3/s) at Gas Temperature **4.8**

Flowrate (m^3/s) at Temperature 273K **4.6**

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Table 3A

Atmospheric Emission of Total Particulate Matter from Old Sawmill Spray Booth 2 BL301 on the 12th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-936	1	10:19-11:19	375.2	0.20	0.6
M-978*	2	11:29-12:29	398.2	0.01	0.03

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-936 (W)	1	10:19-11:19	0.7
M-978* (W)	2	11:29-12:29	0.7

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-936 + M-936 W	1	10:19-11:19	375.2	0.90	2.5
M-978* + M-978* W	2	11:29-12:29	398.2	0.71	1.9

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 10
Run 2 12

* Damaged Filter
Four point sampling along single axis

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Table 3B

Atmospheric Emission of Total Isocyanates (as NCO)
from the BL301 Old Sawmill Spray Booth 2
on the 11th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m^3)
16611/40	1	10:15-12:19	111.6	< 0.20	< 0.0019

Mean temperature in duct at sampling point (°C) = 15

Sample volume measurement temperature (°C) = 15

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 4

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Old Sawmill**
Test Position	**Spray Booth 1 BL314**
Date of Measurement	**11/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.084	1.25	125				
0.194	1.28	128				
0.323	1.36	136				
0.452	1.26	126				
0.581	0.75	75	19			
0.710	0.62	62				
0.839	0.52	52				
0.968	0.54	54				
1.097	0.38	38				
1.206	0.45	45				

Mean sqrt Pv=	8.93		
Mean Pv=	79.8		
Highest pitot-static reading (Pa	136		
Lowest pitot-static reading (Pa)	38		
Ratio highest/lowest=	3.6	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	292		
Permitted range of Gas Temperature (°C)=		-10.2 to	48.2
Duct Diameter (m)	1.29	Duct Area (m^2)	1.31

Velocity (m/s) at Gas Temperature **11.5**

Flowrate (m^3/s) at Gas Temperature **15.0**

Flowrate (m^3/s) at Temperature 273K **14.0**

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Table 4A

Atmospheric Emission of Total Particulate Matter from Old Sawmill Spray Booth 1 BL314 on the 11th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-886	1	14:11-15:01	473.89	0.50	1.1
M-861	2	15:10-16:00	454.0	0.50	1.1

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-886 (W)	1	14:11-15:01	1.4
M-861 (W)	2	15:10-16:00	0.3

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-886 + M-886 W	1	14:11-15:01	473.9	1.90	4.2
M-861 + M-861 W	2	15:10-16:00	454.0	0.80	1.8

Mean temperature in duct at sampling point(°C) 19

Sample volume measurement temperature (°C)

Run 1 11
Run 2 12

Four point sampling along single axis

Table 4B

**Atmospheric Emission of Total Isocyanates (as NCO)
from the BL314 Old Sawmill Spary Booth 1
on the 11th November 2002**

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m^3)
16611/39	1	14:00-15:00	120	< 0.20	< 0.0018

Mean temperature in duct at sampling point (°C) = 19

Sample volume measurement temperature (°C) = 19

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

Table 5

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**New Sawmill**
Test Position	**Spray Booth Cell 01**
Date of Measurement	**24/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.05

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp (°C)	B-axis Reading	Pv (Pa)	Temp (°C)
0.040	0.88	44		0.87	43.5	
0.092	0.85	42.5		0.90	45	
0.153	0.83	41.5		0.89	44.5	
0.214	0.75	37.5		0.88	44	
0.275	0.90	45	18	0.90	45	18
0.336	0.72	36		0.94	47	
0.397	0.75	37.5		0.98	49	
0.458	0.76	38		0.95	47.5	
0.519	0.76	38		0.91	45.5	
0.570	0.65	32.5		0.78	39	

Mean Pv=	42.0		
Highest pitot-static reading (Pa)	49		
Lowest pitot-static reading (Pa)	33		
Ratio highest/lowest=	1.5	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	291		
Permitted range of Gas Temperature (°C)=		-11.1 to	47.1
Duct Diameter (m)	0.61	Duct Area (m²)	0.29

Velocity (m/s) at Gas Temperature **8.3**

Flowrate (m³/s) at Gas Temperature **2.4**

Flowrate (m³/s) at Temperature 273K **2.3**

Date	Notes	Code	Time	Comments	Officer

Sept 2001

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Table 5A

Atmospheric Emission of Total Particulate Matter from New Sawmill Spray Booth Cell 01 on the 24th October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-961	1	10:11-11:01	871.2	5.60	6.7
M-944	2	11:15-12:05	1009.8	2.40	2.5

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-961 (W)	1	10:11-11:01	0
M-944 (W)	2	11:15-12:05	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-961 + M-961 W	1	10:11-11:01	871.2	5.60	6.7
M-944 + M-944 W	2	11:15-12:05	1009.8	2.40	2.5

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 10
Run 2 16

Two point sampling along single axis

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Table 5B

Atmospheric Emission of Total Isocyanates (as NCO)
from the Cell 01 (S1) New Sawmill
on the 24th October 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/43	1	10:55-11:55	57	< 0.20	< 0.0037

Mean temperature in duct at sampling point (°C) = 18

Sample volume measurement temperature (°C) = 18

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 5c

VOC Emission Concentration by Charcoal Tube Sampling

Location	New Saw Mill			
Test Position	Cell 01			
Run Number	1			
Date of Sampling	24/10/02			
Sample Reference	22/91049 - 11661/15			
Sample Period	10:55 to 11:55			
Ambient Temp. (°C)	10			
Sample Volume (l)	34.50			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	1700	51.1	46.6	7.4
Xylene	340	10.2	9.2	1.5
Styrene	15500	465.7	426.3	67.1
C9 - C10Aromatics (Total)	80	2.4	2.3	0.3
Isopropanol	24	0.7	0.4	0.1
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	5400	162.3	88.4	23.4
n-Butyl acetate	48	1.4	0.9	0.2
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	23092	693.9	574.0	100
FID Calibration Factor (ppm to mg/m³ as C)	1.9			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Table 6

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**New Sawmill**
Test Position	**Spray Booth Cell 02**
Date of Measurement	**24/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.05

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.040	0.64	32		0.78	39	
0.092	0.90	45		0.88	44	
0.153	0.98	49		0.88	44	
0.214	0.97	48.5		0.85	42.5	
0.275	0.97	48.5	17	0.75	37.5	17
0.336	1.00	50		0.70	35	
0.397	1.05	52.5		0.69	34.5	
0.458	1.05	52.5		0.60	30	
0.519	0.99	49.5		0.66	33	
0.570	0.86	43		0.67	33.5	

Mean Pv=	41.9	
Highest pitot-static reading (Pa)	53	
Lowest pitot-static reading (Pa)	30	
Ratio highest/lowest=	1.8	(Maximum permitted ratio= 9:1)
Mean Gas Temperature (K)	290	
Permitted range of Gas Temperature (°C)=	-12 to	46
Duct Diameter (m)	0.61	Duct Area (m²) 0.29

Velocity (m/s) at Gas Temperature **8.3**

Flowrate (m³/s) at Gas Temperature **2.4**

Flowrate (m³/s) at Temperature 273K **2.3**

Date	Notes	Code	Time	Comments	Officer

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Table 6A

Atmospheric Emission of Total Particulate Matter from New Sawmill Spray Booth Cell 02 on the 24th October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-937	1	10:08-10:58	657.6	2.70	4.2
M-966	2	11:07-11:57	665.2	2.80	4.4

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-937 (W)	1	10:08-10:58	0
M-966 (W)	2	11:07-11:57	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-937 + M-937 W	1	10:08-10:58	657.6	2.70	4.2
M-966 + M-966 W	2	11:07-11:57	665.2	2.80	4.4

Mean temperature in duct at sampling point(°C) 17

Sample volume measurement temperature (°C)

Run 1 10
Run 2 15

Two point sampling along single axis

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Table 6B

Atmospheric Emission of Total Isocyanates (as NCO) from the Cell 02 (S2) New Sawmill on the 24th October 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/44	1	10:47-11:47	57	< 0.20	< 0.0037

Mean temperature in duct at sampling point (°C) = 17

Sample volume measurement temperature (°C) = 17

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 6c

VOC Emission Concentration by Charcoal Tube Sampling

Location	New Saw Mill			
Test Position	Cell 02			
Run Number	1			
Date of Sampling	24/10/02			
Sample Reference	22/91050 - 16611/16			
Sample Period	10:47 to 11:47			
Ambient Temp. (°C)	10			
Sample Volume (l)	42.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	3200	79.0	72.0	7
Xylene	790	19.5	17.6	2
Styrene	28300	698.5	639.3	66
C9 - C10Aromatics (Total)	80	2.0	1.9	0
Isopropanol	24	0.6	0.4	0
Methyl Ethyl Ketone	0	0.0	0.0	0
Methyl isobutyl ketone	0	0.0	0.0	0
Ethyl acetate	10600	261.6	142.5	25
n-Butyl acetate	130	3.2	2.0	0
Isobutyl acetate	0	0.0	0.0	0
Total VOC	43124	1064.4	875.7	100
FID Calibration Factor (ppm to mg/m³ as C)	2.0			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Table 7

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**New Sawmill**
Test Position	**Spray Booth Cell 03**
Date of Measurement	**24/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp (°C)	B-axis Reading	Pv (Pa)	Temp (°C)
0.040	0.50	50		0.45	45	
0.092	0.71	71		0.50	50	
0.153	0.70	70		0.53	53	
0.214	0.64	64		0.53	53	
0.275	0.56	56	17	0.55	55	17
0.336	0.56	56		0.68	68	
0.397	0.55	55		0.75	75	
0.458	0.55	55		0.72	72	
0.519	0.53	53		0.73	73	
0.570	0.50	50		0.60	60	

Mean Pv=	58.9		
Highest pitot-static reading (Pa)	75		
Lowest pitot-static reading (Pa)	45		
Ratio highest/lowest=	1.7	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	290		
Permitted range of Gas Temperature (°C)=		-12 to	46
Duct Diameter (m)	0.61	Duct Area (m²)	0.29
Velocity (m/s) at Gas Temperature		**9.8**	
Flowrate (m³/s) at Gas Temperature		**2.9**	
Flowrate (m³/s) at Temperature 273K		**2.7**	

Date	Notes	Code	Time	Comments	Officer

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Table 7A

Atmospheric Emission of Total Particulate Matter from New Sawmill Spray Booth Cell 03 on the 24th October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-967	1	13:14-14:04	631.8	2.40	4.0
M-968	2	14:07-14:58	632.9	1.20	2.0

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-967 (W)	1	13:14-14:04	0
M-968 (W)	2	14:07-14:58	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-967 + M-967 W	1	13:14-14:04	631.8	2.40	4.0
M-968 + M-968 W	2	14:07-14:58	632.9	1.20	2.0

Mean temperature in duct at sampling point(°C) 17

Sample volume measurement temperature (°C)

Run 1 17
Run 2 18

Four point sampling along single axis

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Table 7B

Atmospheric Emission of Total Isocyanates (as NCO) from theCell 03 (S3) New Sawmill on the 24th October 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/45	1	12:18-13:18	60	< 0.20	< 0.0035

Mean temperature in duct at sampling point (°C) = 17

Sample volume measurement temperature (°C) = 17

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 7c

VOC Emission Concentration by Charcoal Tube Sampling

Location	New Sawmill			
Test Position	Cell 03			
Run Number	1			
Date of Sampling	24/10/02			
Sample Reference	22/91051 - 16611/17			
Sample Period	12:18 to 13:18			
Ambient Temp. (°C)	10			
Sample Volume (l)	48.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	1900	41.0	37.4	6
Xylene	370	8.0	7.2	1
Styrene	19900	429.8	393.3	66
C9 - C10Aromatics (Total)	34	0.7	0.7	0
Isopropanol	37	0.8	0.5	0
Methyl Ethyl Ketone	0	0.0	0.0	0
Methyl isobutyl ketone	19	0.4	0.3	0
Ethyl acetate	7700	166.3	90.6	26
n-Butyl acetate	62	1.3	0.8	0
Isobutyl acetate	0	0.0	0.0	0
Total VOC	30022	648.4	530.9	100
FID Calibration Factor (ppm to mg/m³ as C)	2.0			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

APPENDIX 1B

TRIM SHOP

CASELLA STANGER

Table 8

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Trim Shop**
Test Position	**Spray Booth BL307**
Date of Measurement	**23/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.040	0.58	58		0.51	51	
0.093	0.70	70		0.52	52	
0.155	0.62	62		0.32	32	
0.217	0.30	30		0.22	22	
0.279	0.26	26	18	0.22	22	18
0.341	0.22	22		0.18	18	
0.403	0.20	20		0.16	16	
0.465	0.19	19		0.18	18	
0.527	0.17	17		0.22	22	
0.580	0.14	14		0.33	33	

Mean Pv=	29.2	
Highest pitot-static reading (Pa	70	
Lowest pitot-static reading (Pa)	14	
Ratio highest/lowest=	5.0	(Maximum permitted ratio= 9:1)

Mean Gas Temperature (K) 291
Permitted range of Gas Temperature (°C)= -11.1 to 47.1

Duct Diameter (m) 0.62 Duct Area (m^2) 0.30

Velocity (m/s) at Gas Temperature **6.9**

Flowrate (m^3/s) at Gas Temperature **2.1**

Flowrate (m^3/s) at Temperature 273K **2.0**

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Table 8A

Atmospheric Emission of Total Particulate Matter from Trim Shop Spray Booth BL307 on the 23rd October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-987	1	9:42-9:58	288.7	0.01	0.04
M-885	2	10:23-10:39	325.2	0.60	1.9

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-987 (W)	1	9:42-9:58	0
M-885 (W)	2	10:23-10:39	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-987 + M-987 W	1	9:42-9:58	288.7	0.01	0.04
M-885 + M-885 W	2	10:23-10:39	325.2	0.60	1.9

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 8
Run 2 10

Four point sampling along single axis

APPENDIX 1C

COB REPAIR PAINT SHOP

CASELLA STANGER

Table 9

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Incinerator BL001**
Date of Measurement	**15/11/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.05

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.026	1.98	99				
0.060	2.20	110				
0.100	2.15	107.5				
0.140	2.10	105				
0.180	2.05	102.5	296.3			
0.220	2.00	100				
0.260	1.95	97.5				
0.300	1.90	95				
0.340	1.80	90				
0.374	1.60	80				

Mean Pv=	98.5	
Highest pitot-static reading (Pa	110	
Lowest pitot-static reading (Pa)	80	
Ratio highest/lowest=	1.4	(Maximum permitted ratio= 9:1)

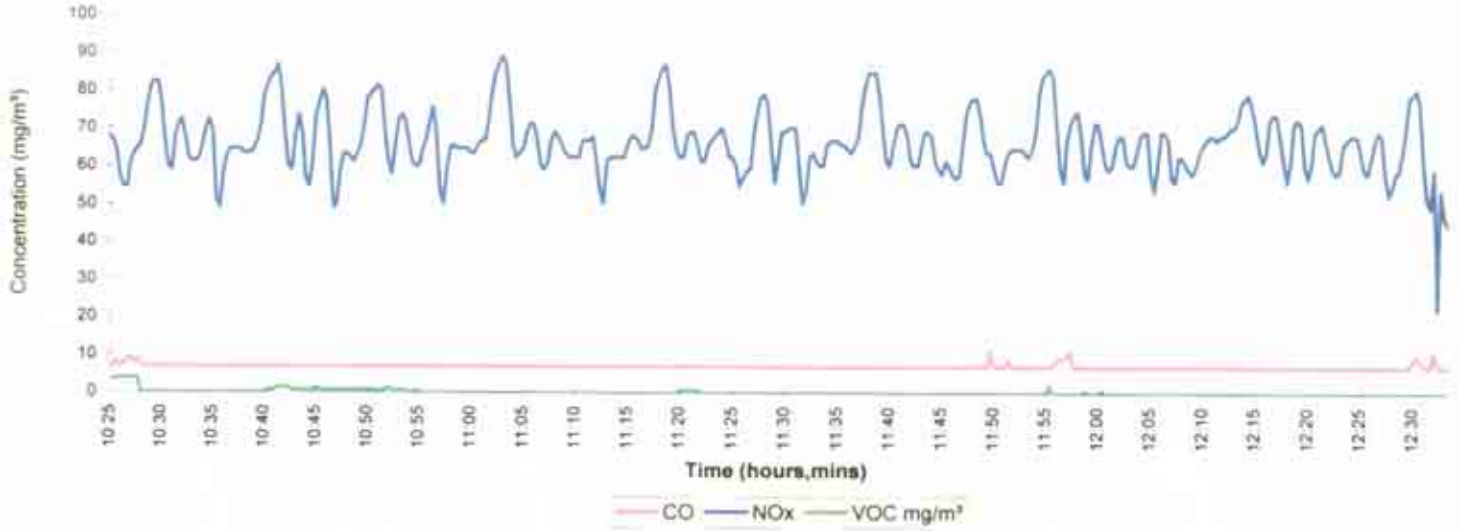
Mean Gas Temperature (K)	569.3			
Permitted range of Gas Temperature (°C)=		239.37	to	353.23
Duct Diameter (m)	0.4	Duct Area (m^2)		0.13

Velocity (m/s) at Gas Temperature **17.8**

Flowrate (m^3/s) at Gas Temperature **2.2**

Flowrate (m^3/s) at Temperature 273K **1.1**

Figure 1: Emissions of Carbon Monoxide, Oxides of Nitrogen and VOCs from the Paint Repair Shop Incinerator BL001 on 15th November 2002



2 min Averaging time			Mean Concentration (mg/m³)			Max Concentration (mg/m³)			Min Concentration (mg/m³)		
			CO	VOC	NOx	CO	VOC	NOx	CO	VOC	NOx
11:15	to	11:17	7	0	66	7	0	68	7	0	63
11:17	to	11:19	7	0	74	7	0	86	7	0	65
11:19	to	11:21	7	0	73	7	1	87	7	0	63
11:21	to	11:23	7	1	65	7	1	69	7	0	62
11:23	to	11:25	7	0	67	7	0	70	7	0	62
11:25	to	11:27	7	0	61	7	0	67	7	0	55
11:27	to	11:29	7	0	71	7	0	79	7	0	59
11:29	to	11:31	7	0	67	7	0	77	7	0	56
11:31	to	11:33	7	0	62	7	0	70	7	0	50
11:33	to	11:35	7	0	63	7	0	67	7	0	60
11:35	to	11:37	7	0	66	7	0	67	7	0	64
11:37	to	11:39	7	0	75	7	0	85	7	0	64
11:39	to	11:41	7	0	73	7	0	85	7	0	60
11:41	to	11:43	7	0	67	7	0	72	7	0	60
11:43	to	11:45	7	0	65	7	0	69	7	0	60
Average (mg/m³) over monitoring period			**7**	**0.2**	**67**						

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Table 10

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Spray Bake BL252**
Date of Measurement	**15/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.046	0.50	50		0.35	35	
0.107	0.56	56		0.42	42	
0.178	0.56	56		0.46	46	
0.249	0.59	59		0.49	49	
0.320	0.59	59	32	0.48	48	32
0.391	0.55	55		0.48	48	
0.462	0.55	55		0.49	49	
0.533	0.58	58		0.55	55	
0.604	0.62	62		0.54	54	
0.664	0.59	59		0.52	52	

Mean Pv=	52.1		
Highest pitot-static reading (Pa	62		
Lowest pitot-static reading (Pa)	35		
Ratio highest/lowest=	1.8	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	305		
Permitted range of Gas Temperature (°C)=		1.5 to	62.5
Duct Diameter (m)	0.71	Duct Area (m^2)	0.40

Velocity (m/s) at Gas Temperature **9.5**

Flowrate (m^3/s) at Gas Temperature **3.7**

Flowrate (m^3/s) at Temperature 273K **3.4**

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Table 10A

Atmospheric Emission of Total Particulate Matter from Paint repair Shop Spray Bake BL252 on the 14th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-772	1	8:45-9:05	288.6	1.00	3.5
M-813	2	9:35-9:55	348.7	1.40	4.1

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-772 (W)	1	8:45-9:05	0.9
M-813 (W)	2	9:35-9:55	1

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-772 + M-772 W	1	8:45-9:05	288.6	1.90	6.7
M-813 + M-813 W	2	9:35-9:55	348.7	2.40	7.0

Mean temperature in duct at sampling point(°C) 32

Sample volume measurement temperature (°C)

Run 1 3
Run 2 3

Two point sampling along single axis

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Table 10B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL252 Paint Repair Shop Spray Bake on the 15th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m^3)
16611/35	1	10:30-11:30	39	< 0.20	< 0.0054

Mean temperature in duct at sampling point (°C) = 32

Sample volume measurement temperature (°C) = 15

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 10c

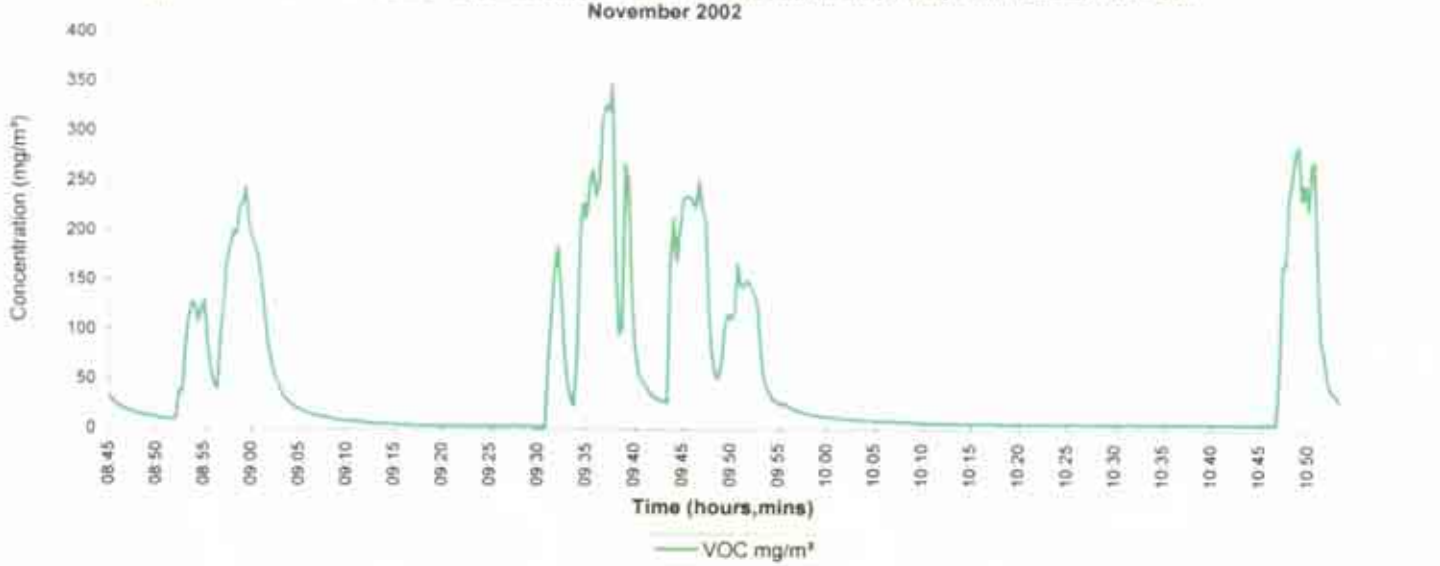
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL252			
Run Number	1			
Date of Sampling	15/11/02			
Sample Reference	23/5687 - 16611/24			
Sample Period	08:45 to 10:00			
Ambient Temp. (°C)	10			
Sample Volume (l)	37.50			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	48	1.3	1.2	1.2
Xylene	1600	44.2	40.0	38.9
C9 - C10Aromatics (Total)	310	8.6	8.1	7.5
Isopropanol	27	0.7	0.4	0.7
Isobutanol	32	0.9	0.5	0.8
Acetone	14	0.4	0.2	0.3
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	480	13.3	9.5	11.7
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	1600	44.2	27.4	38.9
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	4111	113.6	87.4	100
FID Calibration Factor (ppm to mg/m³ as C)	8.5			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 2: Emissions of Volatile Organic Compounds from Paint Repair Shop Spray Bake BL252 on the 15th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
09:30	to	09:32	144	77	345	185	6	3
09:32	to	09:34	157	84	345	185	45	24
09:34	to	09:36	394	211	490	263	153	82
09:36	to	09:38	525	281	652	349	318	170
09:38	to	09:40	296	159	501	268	155	83
09:40	to	09:42	94	50	155	83	62	33
09:42	to	09:44	142	76	398	213	52	28
09:44	to	09:46	405	217	441	236	318	170
09:46	to	09:48	358	192	471	252	144	77
09:48	to	09:50	156	84	218	117	97	52
09:46	to	09:48	263	141	313	168	210	113
09:48	to	09:50	172	92	273	146	69	37
09:50	to	09:52	53	29	69	37	44	24
09:52	to	09:54	37	20	44	24	31	17
09:54	to	09:56	28	15	31	17	25	13
09:56	to	09:58	23	12	25	13	21	11
09:58	to	10:00	20	11	21	11	19	10
Average VOC over monitoring period			90.15	ppm	48.29	mg/m³		

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Table 11

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Blow Off Booth**
Date of Measurement	**15/11/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.068	0.31	31		0.28	28	
0.158	0.29	29		0.15	15	
0.263	0.20	20		0.17	17	
0.368	0.15	15		0.16	16	
0.473	0.20	20	28	0.20	20	28
0.578	0.27	27		0.36	36	
0.683	0.33	33		0.30	30	
0.788	0.40	40		0.29	29	
0.893	0.32	32		0.41	41	
0.982	0.30	30		0.35	35	

Mean Pv=	26.6			
Highest pitot-static reading (Pa	41			
Lowest pitot-static reading (Pa)	15			
Ratio highest/lowest=	2.7	(Maximum permitted ratio= 9:1)		
Mean Gas Temperature (K)	301			
Permitted range of Gas Temperature (°C)=		-2.1	to	58.1
Duct Diameter (m)	1.05	Duct Area (m^2)		0.87

Velocity (m/s) at Gas Temperature **6.7**

Flowrate (m^3/s) at Gas Temperature **5.8**

Flowrate (m^3/s) at Temperature 273K **5.3**

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Table 11a

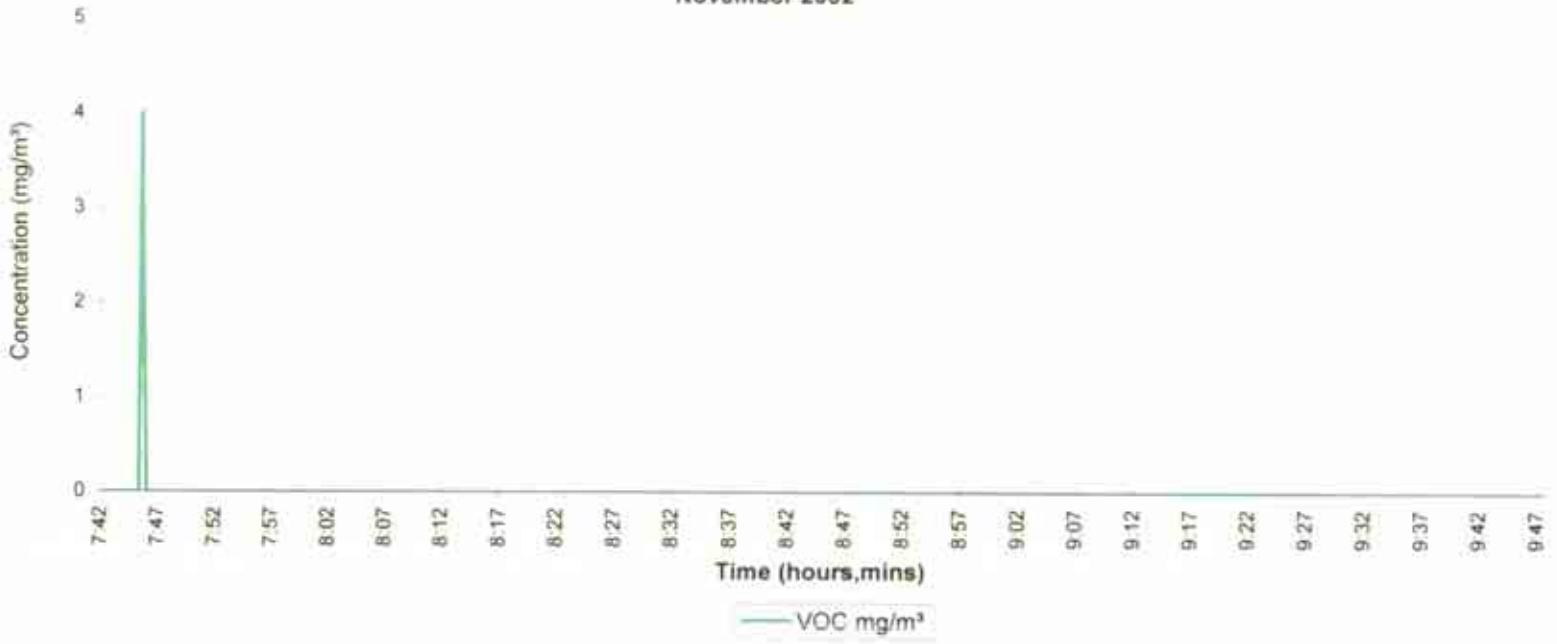
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	Bl.258			
Run Number	1			
Date of Sampling	15/11/02			
Sample Reference	23/5680 - 16611/17			
Sample Period	10:28 to 12:20			
Ambient Temp. (°C)	10			
Sample Volume (l)	11.20			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	35	3.2	3.0	11.7
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	25	2.3	1.4	8.3
Isobutanol	0	0.0	0.0	0.0
Acetone	240	22.2	13.8	80.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	300	27.8	18.1	100
FID Calibration Factor (ppm to mg/m³ as C)	5.0			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 3: Emissions of Volatile Organic Compounds from Paint Repair Shop Blow Off Booth BL258 on the 15th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
7:42	to	7:44	0	0	0	0	0	0
7:44	to	7:46	0	1	3	4	0	0
7:46	to	7:48	0	0	0	0	0	0
7:48	to	7:50	0	0	0	0	0	0
7:50	to	7:52	0	0	0	0	0	0
7:52	to	7:54	0	0	0	0	0	0
7:54	to	7:56	0	0	0	0	0	0
7:56	to	7:58	0	0	0	0	0	0
7:58	to	8:00	0	0	0	0	0	0
Average VOC over monitoring period			0.01	ppm	0.01	mg/m³		

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Table 12

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Tac Rag Booth BL259**
Date of Measurement	**13/11/02**
Instrument:	**CAE**
Serial Number:	**33445**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.052	0.10	10				
0.120	0.11	11				
0.200	0.11	11				
0.280	0.11	11				
0.360	0.11	11	21			
0.440	0.11	11				
0.520	0.12	12				
0.600	0.21	21				
0.680	0.22	22				
0.748	0.21	21				

Mean Pv=	13.7	
Highest pitot-static reading (Pa	22	
Lowest pitot-static reading (Pa)	10	
Ratio highest/lowest=	2.2	(Maximum permitted ratio= 9:1)

Mean Gas Temperature (K)	294			
Permitted range of Gas Temperature (°C)=		-8.4	to	50.4
Duct Diameter (m)	0.8	Duct Area (m^2)		0.50

Velocity (m/s) at Gas Temperature **4.8**

Flowrate (m^3/s) at Gas Temperature **2.4**

Flowrate (m^3/s) at Temperature 273K **2.2**

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Table 12A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Tac Rag Booth BL259 on the 13th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-965	1	11:13-11:58	417.2	0.20	0.5
M-896	2	13:07-13:57	284.9	0.00	0.0

Probe Washings

Sample Reference		Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-965	(W)	1	11:13-11:58	0.2
M-896	(W)	2	13:07-13:57	0.2

Probe Washing and Filter Combined

Sample Reference		Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-965	+	1	11:13-11:58	417.2	0.40	1.0
M-965	W					
M-896	+	2	13:07-13:57	284.9	0.20	0.7
M-896	W					0.737897137

Mean temperature in duct at sampling point(°C) 21

Sample volume measurement temperature (°C)

Run 1 10
Run 2 14

Two point sampling along single axis

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Table 12b

VOC Emission Concentration by Charcoal Tube Sampling

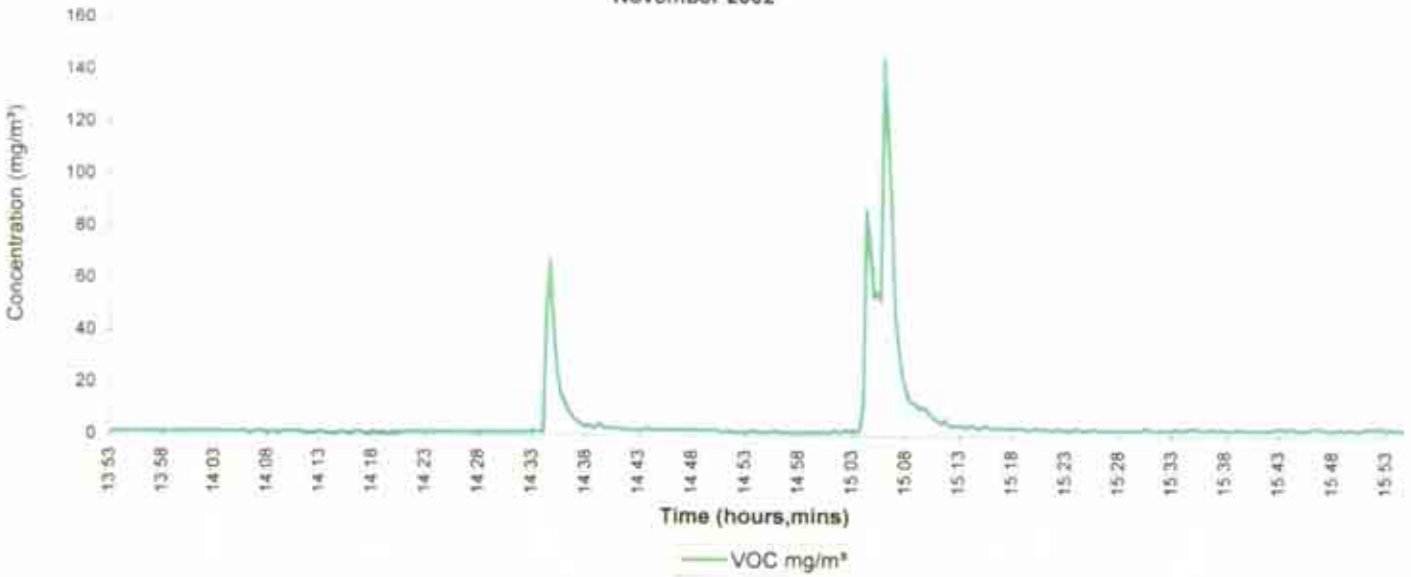
Location	Paint Repair Shop			
Test Position	BL259			
Run Number	1			
Date of Sampling	13/11/02			
Sample Reference	23/5681 - 16611/18			
Sample Period	14:17 to 15:24			
Ambient Temp. (°C)	11			
Sample Volume (l)	11.06			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	66	6.2	5.7	3.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	2100	197.6	122.5	97.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	2166	203.8	128.1	100
FID Calibration Factor (ppm to mg/m³ as C)	5.1			

NB There is a possibility that the tube has been contaminated by the acetone used to clean the sample probe as the result obtained for the VOC monitoring using the FID does not indicate a high VOC concentration from this exhaust

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 4: Emissions of Volatile Organic Compounds from Paint Repair Shop Tac Rag Booth BL259 on the 13th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
14:53	to	14:55	1	2	2	2	1	2
14:55	to	14:57	1	2	2	2	1	2
14:57	to	14:59	1	2	1	2	1	2
14:59	to	15:01	1	2	1	2	1	2
15:01	to	15:03	1	2	2	2	1	2
15:03	to	15:05	21	33	54	87	1	2
15:05	to	15:07	50	80	91	145	30	47
15:07	to	15:09	14	23	30	47	8	12
15:09	to	15:11	6	9	8	12	4	6
15:11	to	15:13	3	5	4	6	3	4
15:13	to	15:15	2	4	3	4	2	3
15:15	to	15:17	2	3	3	4	2	3
15:17	to	15:19	2	3	2	3	2	3
15:19	to	15:21	2	3	2	3	2	2
15:21	to	15:23	2	3	2	3	2	2
Average VOC over monitoring period			3.19	ppm	5.13	mg/m³		

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Table 13

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Colour Booth BL260A**
Date of Measurement	**13/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.087	1.10	110				
0.201	1.08	108				
0.335	1.32	132				
0.469	1.28	128				
0.603	1.13	113	18			
0.737	1.02	102				
0.871	1.10	110				
1.005	1.38	138				
1.139	1.68	168				
1.253	1.38	138				

Mean Pv=	124.0	
Highest pitot-static reading (Pa	168	
Lowest pitot-static reading (Pa)	102	
Ratio highest/lowest=	1.6	(Maximum permitted ratio= 9:1)
Mean Gas Temperature (K)	291	
Permitted range of Gas Temperature (°C)=	-11.1 to	47.1
Duct Diameter (m)	1.34	Duct Area (m^2) 1.41

Velocity (m/s) at Gas Temperature **14.2**

Flowrate (m^3/s) at Gas Temperature **20.1**

Flowrate (m^3/s) at Temperature 273K **18.8**

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Table 13A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Colour Booth BL260A on the 13th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-984	1	11:30-12:20	772.4	0.40	0.5
M-980	2	13:05-13:55	673.2	0.00	0.0

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-984 (W)	1	11:30-12:20	0.2
M-980 (W)	2	13:05-13:55	0.1

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-984 + M-984 W	1	11:30-12:20	772.4	0.60	0.8
M-980 + M-980 W	2	13:05-13:55	673.2	0.10	0.2

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 11
Run 2 12

Two point sampling along single axis

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Table 13b

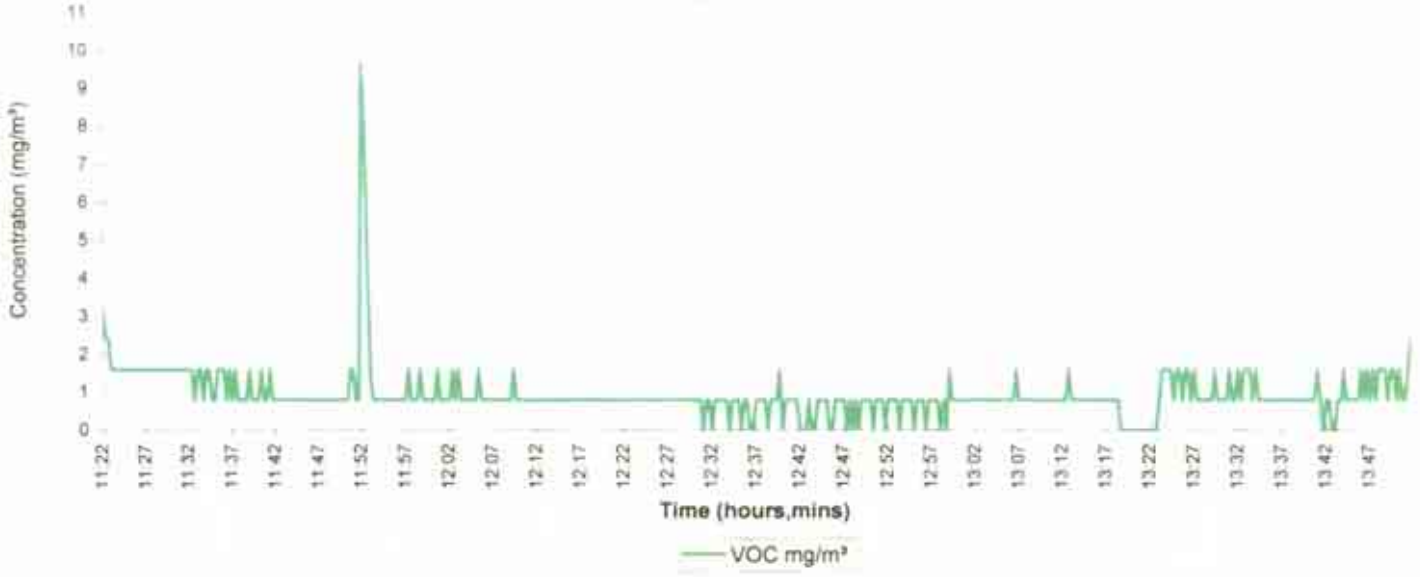
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL260A			
Run Number	1			
Date of Sampling	13/11/02			
Sample Reference	23/5682 - 16611/19			
Sample Period	14:24 to 15:16			
Ambient Temp. (°C)	12			
Sample Volume (l)	78.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	78	1.0	1.0	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	78	1.0	1.0	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 5: Emissions of Volatile Organic Compounds from Paint Repair Shop Colour Booth BL260A on the 13th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
11:32	to	11:34	1	1	1	2	1	1
11:34	to	11:36	1	1	1	2	1	1
11:36	to	11:38	1	1	1	2	1	1
11:38	to	11:40	1	1	1	2	1	1
11:40	to	11:42	1	1	1	2	1	1
11:42	to	11:44	1	1	1	2	1	1
11:44	to	11:46	1	1	1	1	1	1
11:46	to	11:48	1	1	1	1	1	1
11:48	to	11:50	1	1	1	1	1	1
11:50	to	11:52	1	1	1	2	1	1
11:52	to	11:54	2	4	6	10	1	1
11:54	to	11:56	1	1	1	1	1	1
11:56	to	11:58	1	1	1	2	1	1
11:58	to	12:00	1	1	1	2	1	1
12:00	to	12:02	1	1	1	2	1	1
Average VOC over monitoring period			0.57	ppm	0.92	mg/m³		

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Table 14

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Colour Booth BL260B**
Date of Measurement	**13/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.088	0.44	44		0.50	50	
0.203	0.49	49		0.55	55	
0.338	0.53	53		0.51	51	
0.473	0.62	62		0.62	62	
0.608	0.68	68	20	0.68	68	21
0.743	0.71	71		0.64	64	
0.878	0.75	75		0.68	68	
1.013	0.69	69		0.74	74	
1.148	0.61	61		0.77	77	
1.262	0.60	60		0.59	59	

Mean Pv=	61.7		
Highest pitot-static reading (Pa	77		
Lowest pitot-static reading (Pa)	44		
Ratio highest/lowest=	1.8	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	293.5		
Permitted range of Gas Temperature (°C)=		-8.85 to	49.85
Duct Diameter (m)	1.35	Duct Area (m²)	1.43

Velocity (m/s) at Gas Temperature **10.1**

Flowrate (m³/s) at Gas Temperature **14.4**

Flowrate (m³/s) at Temperature 273K **13.4**

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Table 14A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Colour Booth BL260B on the 13th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-890	1	14:14-15:04	771.8	0.20	0.3
M-855	2	15:20-16:10	797.6	0.10	0.1

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-890 (W)	1	14:14-15:04	0.2
M-855 (W)	2	15:20-16:10	0.1

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-890 + M-890 W	1	14:14-15:04	771.8	0.40	0.6
M-855 + M-855 W	2	15:20-16:10	797.6	0.20	0.3

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 17
Run 2 15

Two point sampling along single axis

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Table 14b

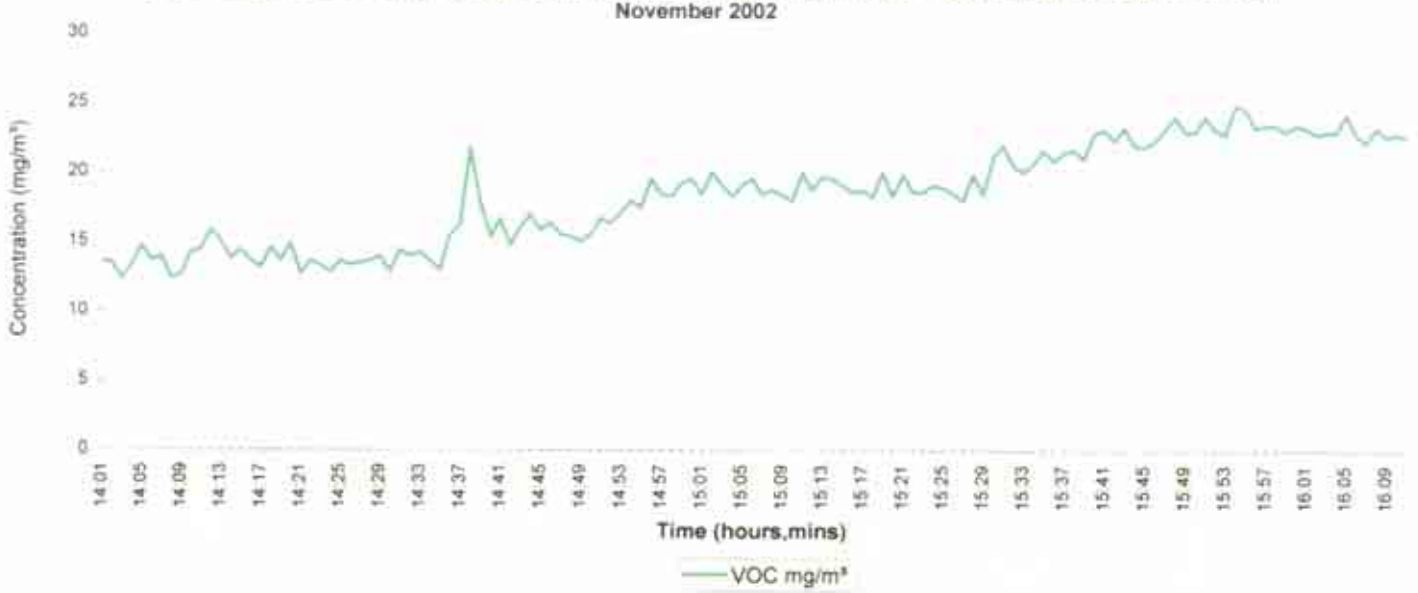
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL260B			
Run Number	1			
Date of Sampling	15/11/02			
Sample Reference	23/5683 - 16611/20			
Sample Period	14:45 to 15:45			
Ambient Temp. (°C)	10			
Sample Volume (l)	30.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	11	0.4	0.3	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	11	0.4	0.3	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 6: Emissions of Volatile Organic Compounds from Paint Repair Shop Colour Booth BL260B on the 14th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
15:29	to	15:31	13	21	14	22	12	18
15:31	to	15:33	13	21	14	22	13	20
15:33	to	15:35	13	21	14	22	13	20
15:35	to	15:37	13	21	14	22	13	21
15:37	to	15:39	13	21	14	22	13	21
15:39	to	15:41	14	22	14	23	13	21
15:41	to	15:43	14	23	15	23	14	22
15:43	to	15:45	14	22	15	23	14	22
15:45	to	15:47	14	22	14	23	14	22
15:47	to	15:49	15	23	15	24	14	23
15:49	to	15:51	15	23	15	24	14	23
15:51	to	15:53	15	23	15	24	14	23
15:53	to	15:55	15	24	16	25	14	23
15:55	to	15:57	15	24	15	25	15	23
15:57	to	15:59	15	23	15	23	14	23
Average VOC over monitoring period			11.45	ppm	18.40	mg/m³		

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Table 15

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Colour Booth BL260C**
Date of Measurement	**14/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.087	0.89	89				
0.201	1.16	116				
0.335	1.13	113				
0.469	1.32	132				
0.603	1.21	121	20			
0.737	0.99	99				
0.871	0.95	95				
1.005	1.10	110				
1.139	1.15	115				
1.253	0.89	89				

Mean Pv=	107.5			
Highest pitot-static reading (Pa	132			
Lowest pitot-static reading (Pa)	89			
Ratio highest/lowest=	1.5	(Maximum permitted ratio= 9:1)		
Mean Gas Temperature (K)	293			
Permitted range of Gas Temperature (°C)=		-9.3	to	49.3
Duct Diameter (m)	1.34	Duct Area (m^2)		1.41

Velocity (m/s) at Gas Temperature **13.3**

Flowrate (m^3/s) at Gas Temperature **18.8**

Flowrate (m^3/s) at Temperature 273K **17.5**

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Table 15A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Colour Booth BL260C on the 14th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-774	1	14:10-15:00	299.9	0.00	0.0
M-954	2	15:20-16:10	596.0	0.00	0.0

Probe Washings

Sample Reference		Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-774	(W)	1	14:10-15:00	1.4
M-954	(W)	2	15:20-16:10	0.2

Probe Washing and Filter Combined

Sample Reference		Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-774	+	1	14:10-15:00	299.9	1.40	4.9
M-774	W					
M-954	+	2	15:20-16:10	596.0	0.20	0.3
M-954	W					0.347868265

Mean temperature in duct at sampling point(°C) 20

Sample volume measurement temperature (°C)

Run 1 13
Run 2 10

**** point sampling along single axis

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Table 15b

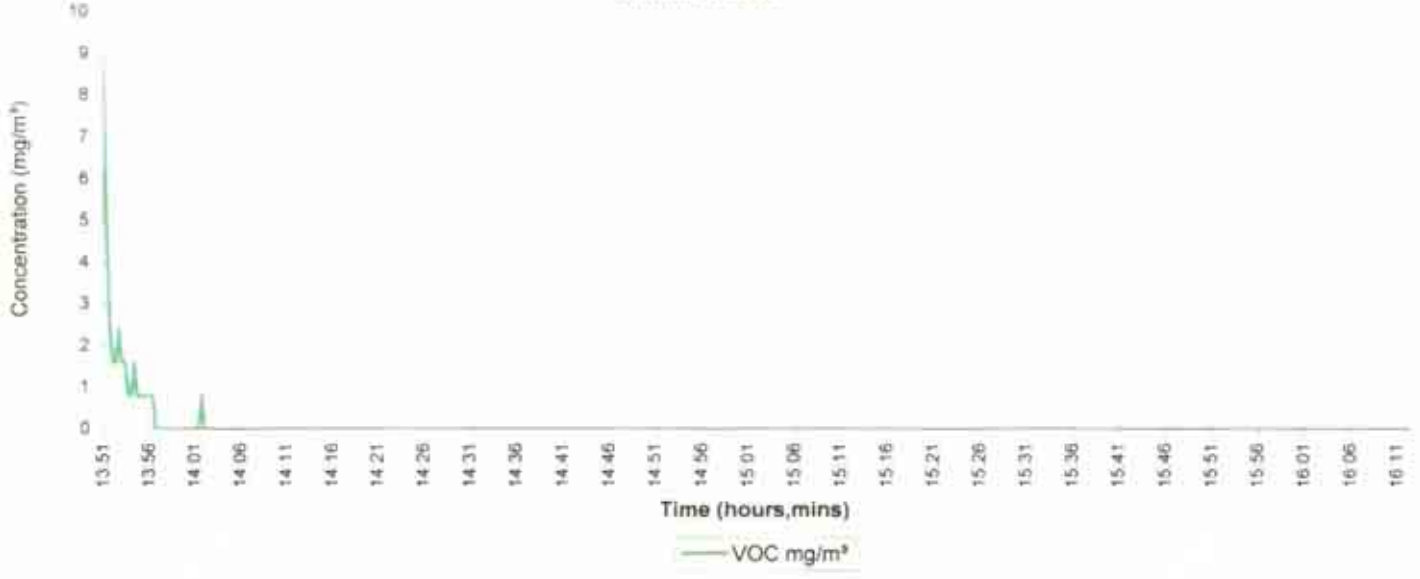
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL260C			
Run Number	1			
Date of Sampling	14/11/02			
Sample Reference	23/5690 - 16611/42			
Sample Period	13:20 to 14:20			
Ambient Temp. (°C)	11			
Sample Volume (l)	14.10			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	7	0.5	0.5	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	7	0.5	0.5	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 7: Emissions of Volatile Organic Compounds from Paint Repair Shop Colour Booth BL260C on the 14th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
13:51	to	13:53	2	3	6	9	1	2
13:53	to	13:55	1	1	1	2	1	1
13:55	to	13:57	0	1	1	1	0	0
13:57	to	13:59	0	0	0	0	0	0
13:59	to	14:01	0	0	0	0	0	0
14:01	to	14:03	0	0	1	1	0	0
14:03	to	14:05	0	0	0	0	0	0
14:05	to	14:07	0	0	0	0	0	0
14:07	to	14:09	0	0	0	0	0	0
14:09	to	14:11	0	0	0	0	0	0
14:11	to	14:13	0	0	0	0	0	0
14:13	to	14:15	0	0	0	0	0	0
14:15	to	14:17	0	0	0	0	0	0
14:17	to	14:19	0	0	0	0	0	0
14:19	to	14:21	0	0	0	0	0	0
Average VOC over monitoring period			0.05	ppm	0.1	mg/m³		

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Table 16

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Shop**
Test Position	**Lacquer Booth BL261A**
Date of Measurement	**24/10/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.088	0.40	40		0.56	56	
0.203	0.43	43		0.47	47	
0.338	0.41	41		0.50	50	
0.473	0.25	25		0.48	48	
0.608	0.22	22	20	0.53	53	20
0.743	0.31	31		0.49	49	
0.878	0.66	66		0.60	60	
1.013	0.77	77		0.51	51	
1.148	0.78	78		0.44	44	
1.262	0.80	80		0.32	32	

Mean Pv=	48.3			
Highest pitot-static reading (Pa	80			
Lowest pitot-static reading (Pa)	22			
Ratio highest/lowest=	3.6	(Maximum permitted ratio= 9:1)		
Mean Gas Temperature (K)	293			
Permitted range of Gas Temperature (°C)=		-9.3	to	49.3
Duct Diameter (m)	1.35	Duct Area (m^2)		1.43

Velocity (m/s) at Gas Temperature **8.9**

Flowrate (m^3/s) at Gas Temperature **12.8**

Flowrate (m^3/s) at Temperature 273K **11.9**

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Table 16A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Lacquer Booth BL261A on the 14th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-917	1	10:18-11:06	415.4	0.20	0.5
M-865	2	11:20-12:10	533.3	0.60	1.2

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-917 (W)	1	10:18-11:06	0.4
M-865 (W)	2	11:20-12:10	0.2

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-917 + M-917 W	1	10:18-11:06	415.4	0.60	1.5
M-865 + M-865 W	2	11:20-12:10	533.3	0.80	1.6

Mean temperature in duct at sampling point(°C) 16

Sample volume measurement temperature (°C)

Run 1 11
Run 2 13

Two point sampling along single axis

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Table 16B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL261A Paint Repair Shop Lacquer Booth on the 14th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m^3)
16611/36	1	13:08-14:08	108	< 0.20	< 0.0020

Mean temperature in duct at sampling point (°C) = 20

Sample volume measurement temperature (°C) = 20

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 16C

VOC Emission Concentration by Charcoal Tube Sampling

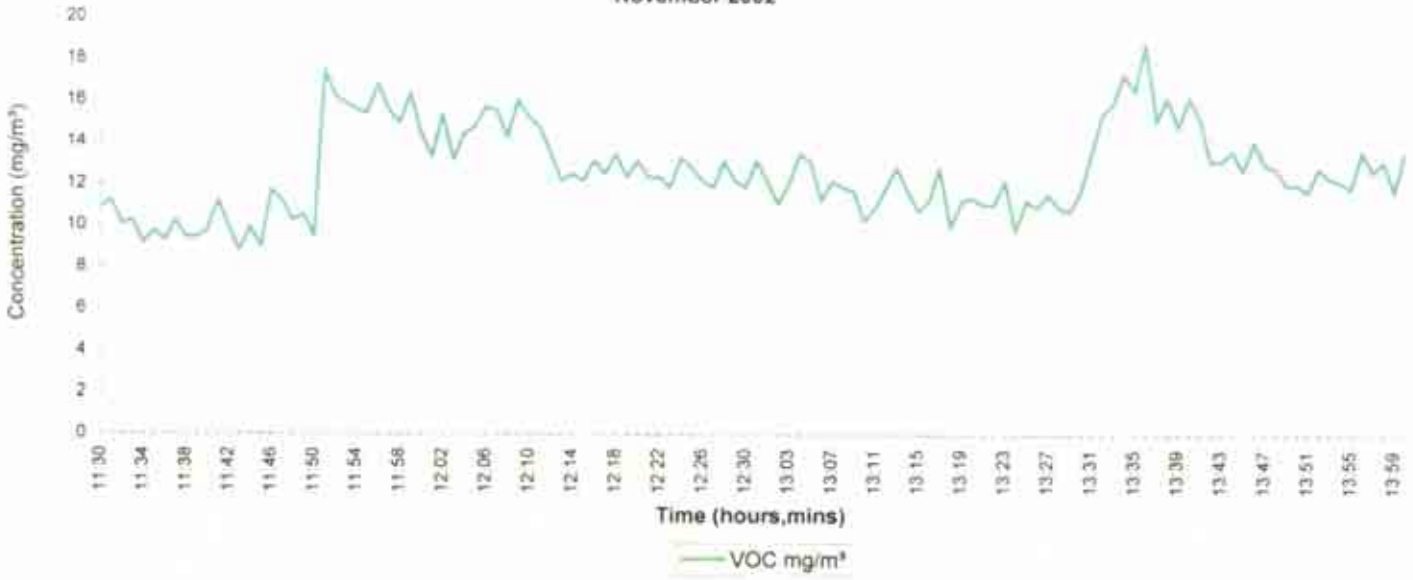
Location	Paint Repair Shop			
Test Position	BL261A			
Run Number	1			
Date of Sampling	14/11/02			
Sample Reference	23/5684 - 16611/21			
Sample Period	14:16 to 15:16			
Ambient Temp. (°C)	8			
Sample Volume (l)	11.70			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	60000	5278.5	4811.6	100.0
Xylene	18	1.6	1.4	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	60018	5280.1	4813.1	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

NB The charcoal tube has been contaminated by the Toluene used to store the Isocyanate samples.

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 8: Emissions of Volatile Organic Compounds from Paint Repair Shop Lacquer Booth BL261A on the 14th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
13:27	to	13:29	7	11	7	12	7	11
13:29	to	13:31	7	12	8	14	7	11
13:31	to	13:33	9	15	10	16	8	14
13:33	to	13:35	10	17	11	17	10	16
13:35	to	13:37	10	17	12	19	9	15
13:37	to	13:39	10	15	10	16	9	15
13:39	to	13:41	10	15	10	16	9	15
13:41	to	13:43	9	14	10	15	8	13
13:43	to	13:45	8	13	9	14	8	13
13:45	to	13:47	8	13	9	14	8	13
13:47	to	13:49	8	13	8	13	8	12
13:49	to	13:51	7	12	8	12	7	12
13:51	to	13:53	8	12	8	13	7	12
13:53	to	13:55	8	12	8	12	7	12
13:55	to	13:57	8	13	9	14	7	12
Average VOC over monitoring period			7.91	ppm	12.71	mg/m³		

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Table 17

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint repair Shop**
Test Position	**Lacquer Booth BL261B**
Date of Measurement	**14/11/02**
Instrument:	**CAE**
Serial Number:	**33186**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.052	0.40	40				
0.120	0.38	38				
0.200	0.30	30				
0.280	0.22	22				
0.360	0.21	21	17			
0.440	0.35	35				
0.520	0.44	44				
0.600	0.58	58				
0.680	0.60	60				
0.748	0.80	80				

Mean Pv=	41.1		
Highest pitot-static reading (Pa	80		
Lowest pitot-static reading (Pa)	21		
Ratio highest/lowest=	3.8	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	290		
Permitted range of Gas Temperature (°C)=		-12 to	46
Duct Diameter (m)	0.8	Duct Area (m^2)	0.50

Velocity (m/s) at Gas Temperature **8.2**

Flowrate (m^3/s) at Gas Temperature **4.1**

Flowrate (m^3/s) at Temperature 273K **3.9**

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Table 17A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Lacquer Booth BL261B on the 14th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-977	1	13:03-13:53	434.7	0.00	0.0
M-956	2	14:04-14:54	481.1	0.00	0.0

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-977 (W)	1	13:03-13:53	0.1
M-956 (W)	2	14:04-14:54	1

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-977 + M-977 W	1	13:03-13:53	434.7	0.10	0.2
M-956 + M-956 W	2	14:04-14:54	481.1	1.00	2.2

Mean temperature in duct at sampling point(°C) 17

Sample volume measurement temperature (°C)

Run 1 14
Run 2 16

Two point sampling along single axis

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Table 17B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL261B Paint Repair Shop Lacquer Booth on the 14th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/37	1	11:02-12:02	48	< 0.20	< 0.0043

Mean temperature in duct at sampling point (°C) = 18

Sample volume measurement temperature (°C) = 12

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 17c

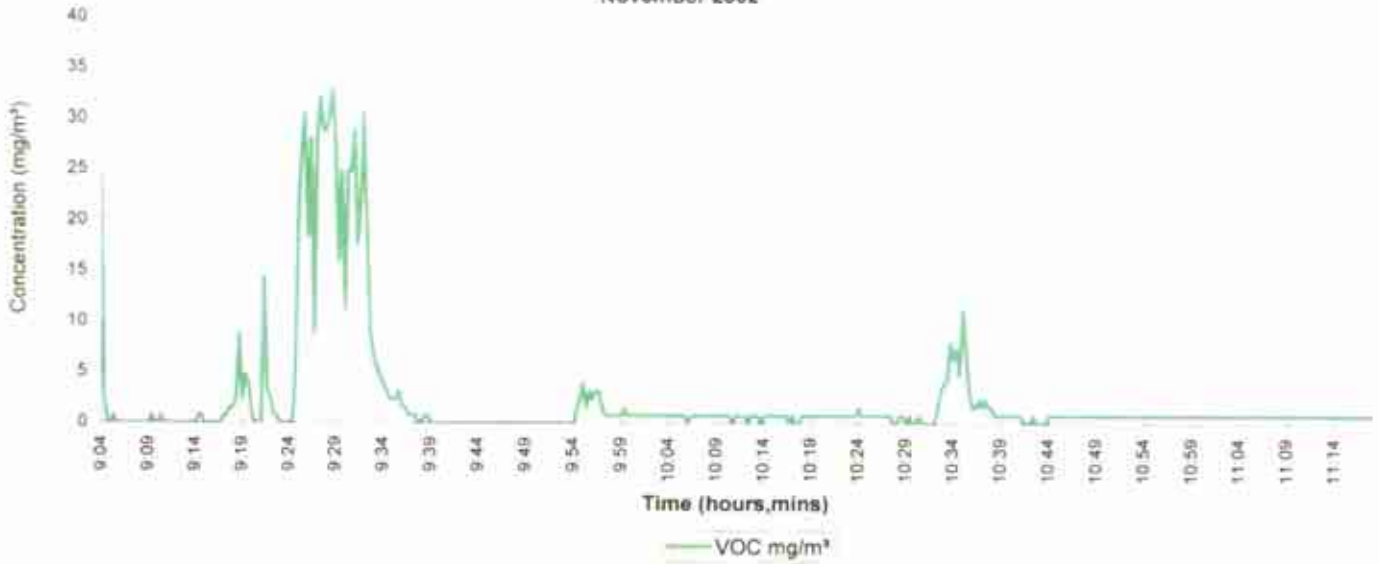
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL261B			
Run Number	1			
Date of Sampling	14/11/02			
Sample Reference	23/5685 - 16611/22			
Sample Period	14:20 to 15:30			
Ambient Temp. (°C)	12			
Sample Volume (l)	35.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	76	2.3	2.1	41.1
Xylene	18	0.5	0.5	9.7
C9 - C10Aromatics (Total)	49	1.5	1.4	26.5
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	42	1.3	0.8	22.7
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	185	5.5	4.7	100
FID Calibration Factor (ppm to mg/m³ as C)	6.6			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 9: Emissions of Volatile Organic Compounds from Paint Repair Shop Lacquer Booth BL261B on the 14th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
9:14	to	9:16	0	0	1	1	0	0
9:16	to	9:18	0	1	1	2	0	0
9:18	to	9:20	2	4	6	9	1	1
9:20	to	9:22	2	3	9	14	0	0
9:22	to	9:24	0	1	2	2	0	0
9:24	to	9:26	9	14	19	31	0	0
9:26	to	9:28	15	25	20	32	6	9
9:28	to	9:30	15	25	21	33	7	11
9:30	to	9:32	14	23	19	31	7	11
9:32	to	9:34	7	11	19	31	3	4
9:34	to	9:36	2	3	3	4	1	2
9:36	to	9:38	1	1	1	2	0	0
9:38	to	9:40	0	0	1	1	0	0
9:40	to	9:42	0	0	0	0	0	0
9:42	to	9:44	0	0	0	0	0	0
Average VOC over monitoring period			1.48	ppm	2	mg/m³		

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Table 18

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Paint Repair Booth**
Test Position	**Lacquer Booth BL261C**
Date of Measurement	**14/11/02**
Instrument:	**CAE**
Serial Number:	**33446**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.088	1.12	112				
0.204	1.15	115				
0.340	1.46	146				
0.476	1.98	198				
0.612	1.82	182	18			
0.748	1.72	172				
0.884	1.51	151				
1.020	1.34	134				
1.156	1.56	156				
1.272	1.78	178				

Mean Pv=	153.2		
Highest pitot-static reading (Pa	198		
Lowest pitot-static reading (Pa)	112		
Ratio highest/lowest=	1.8	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	291		
Permitted range of Gas Temperature (°C)=		-11.1 to	47.1
Duct Diameter (m)	1.36	Duct Area (m^2)	1.45

Velocity (m/s) at Gas Temperature **15.8**

Flowrate (m^3/s) at Gas Temperature **23.0**

Flowrate (m^3/s) at Temperature 273K **21.6**

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Table 18A

Atmospheric Emission of Total Particulate Matter from Paint Repair Shop Lacquer Booth BL261C on the 14th November 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-973 *	1	10:20-11:10	741.3	0.00	0.0
M-888	2	11:23-12:13	792.4	0.30	0.4

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-973 (W)	1	10:20-11:10	0.7
M-888 (W)	2	11:23-12:13	0.7

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-973 + M-973 W	1	10:20-11:10	741.3	0.70	1.0
M-888 + M-888 W	2	11:23-12:13	792.4	1.00	1.3

Mean temperature in duct at sampling point(°C) 18

Sample volume measurement temperature (°C)

Run 1 4
Run 2 5

Two point sampling along single axis
* Damaged filter

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Table 18B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL261C Paint Repair Shop Lacquer Booth on the 14th November 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m^3)
16611/38	1	13:04-14:04	120	< 0.20	< 0.0018

Mean temperature in duct at sampling point (°C) = 18

Sample volume measurement temperature (°C) = 18

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 18c

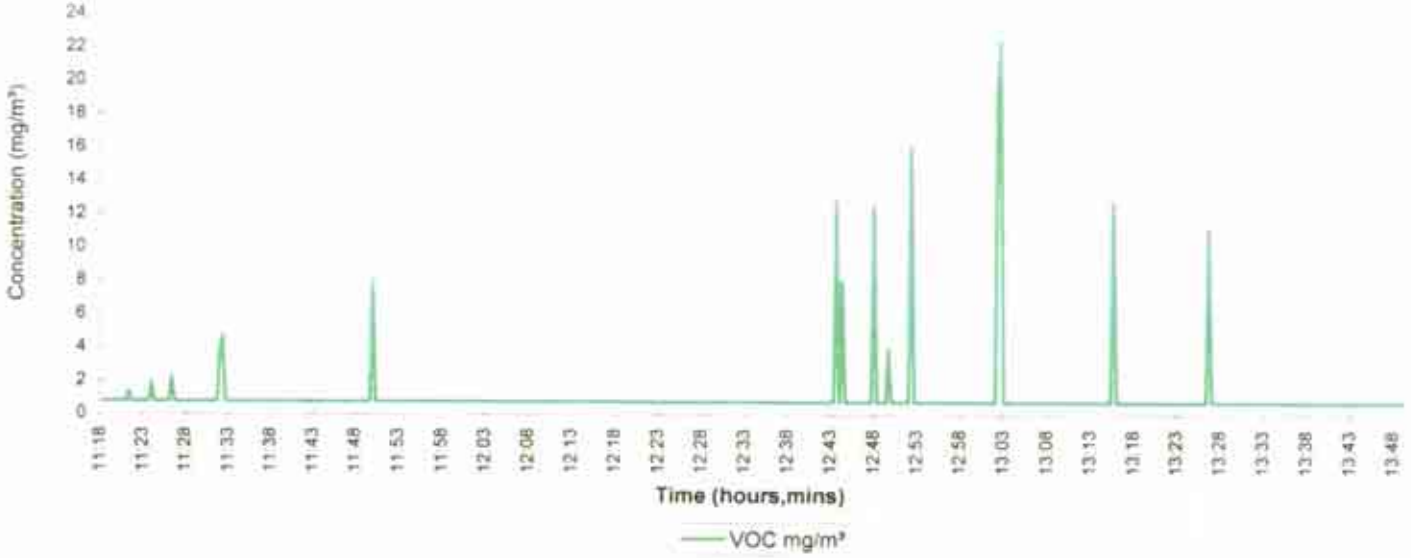
VOC Emission Concentration by Charcoal Tube Sampling

Location	Paint Repair Shop			
Test Position	BL261C			
Run Number	1			
Date of Sampling	14/11/02			
Sample Reference	23/5686 - 16611/23			
Sample Period	14:30 to 15:30			
Ambient Temp. (°C)	11			
Sample Volume (l)	30.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	20	0.7	0.6	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	20	0.7	0.6	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 10: Emissions of Volatile Organic Compounds from Paint Repair Shop Lacquer Booth BL261C on the 14th November 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
12:38	to	12:40	1	1	1	1	1	1
12:40	to	12:42	1	1	1	1	1	1
12:42	to	12:44	1	1	1	1	1	1
12:44	to	12:46	2	4	8	13	1	1
12:46	to	12:48	1	1	1	1	1	1
12:48	to	12:50	2	3	8	13	1	1
12:50	to	12:52	1	1	3	4	1	1
12:52	to	12:54	2	3	10	16	1	1
12:54	to	12:56	1	1	1	1	1	1
12:56	to	12:58	1	1	1	1	1	1
12:58	to	13:00	1	1	1	1	1	1
13:00	to	13:02	1	1	1	1	1	1
13:02	to	13:04	4	7	14	23	1	1
13:04	to	13:06	1	1	1	1	1	1
13:06	to	13:08	1	1	1	1	1	1
Average VOC over monitoring period			0.70	ppm	1	mg/m³		

APPENDIX 1D

No 1 SHOP

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Table 19

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Spot Repair No 1 Shop**
Test Position	**Spray Booth BL80A**
Date of Measurement	**25/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.05

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.049	1.80	90		0.25	12.5	
0.114	1.78	89		0.32	16	
0.190	1.30	65		0.10	5	
0.266	0.55	27.5		0.09	4.5	
0.342	0.30	15	22	0.70	35	22
0.418	0.10	5		1.10	55	
0.494	0.20	10		1.25	62.5	
0.570	0.45	22.5		1.34	67	
0.646	1.05	52.5		1.43	71.5	
0.711	0.35	17.5		1.45	72.5	

Mean Pv=	33.6		
Highest pitot-static reading (Pa)	90		
Lowest pitot-static reading (Pa)	5		
Ratio highest/lowest=	20.0	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	295		
Permitted range of Gas Temperature (°C)=		-7.5 to	51.5
Duct Diameter (m)	0.76	Duct Area (m^2)	0.45

Velocity (m/s) at Gas Temperature **7.5**

Flowrate (m^3/s) at Gas Temperature **3.4**

Flowrate (m^3/s) at Temperature 273K **3.1**

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Table 19A

Atmospheric Emission of Total Particulate Matter from Spot Repair Shop Spray Booth BL80A on the 25th October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-976	1	9:21-10:37	542.3	0.00	0.002
M-974	2	10:55-11:36	541.2	0.30	0.6

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-976 (W)	1	9:21-10:37	0
M-974 (W)	2	10:55-11:36	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m^3)
M-976 + M-976 W	1	9:21-10:37	542.3	0.001	0.002
M-974 + M-974 W	2	10:55-11:36	541.2	0.30	0.6

Mean temperature in duct at sampling point(°C) 22

Sample volume measurement temperature (°C)

Run 1 15
Run 2 16

Four point sampling along single axis

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Table 19b

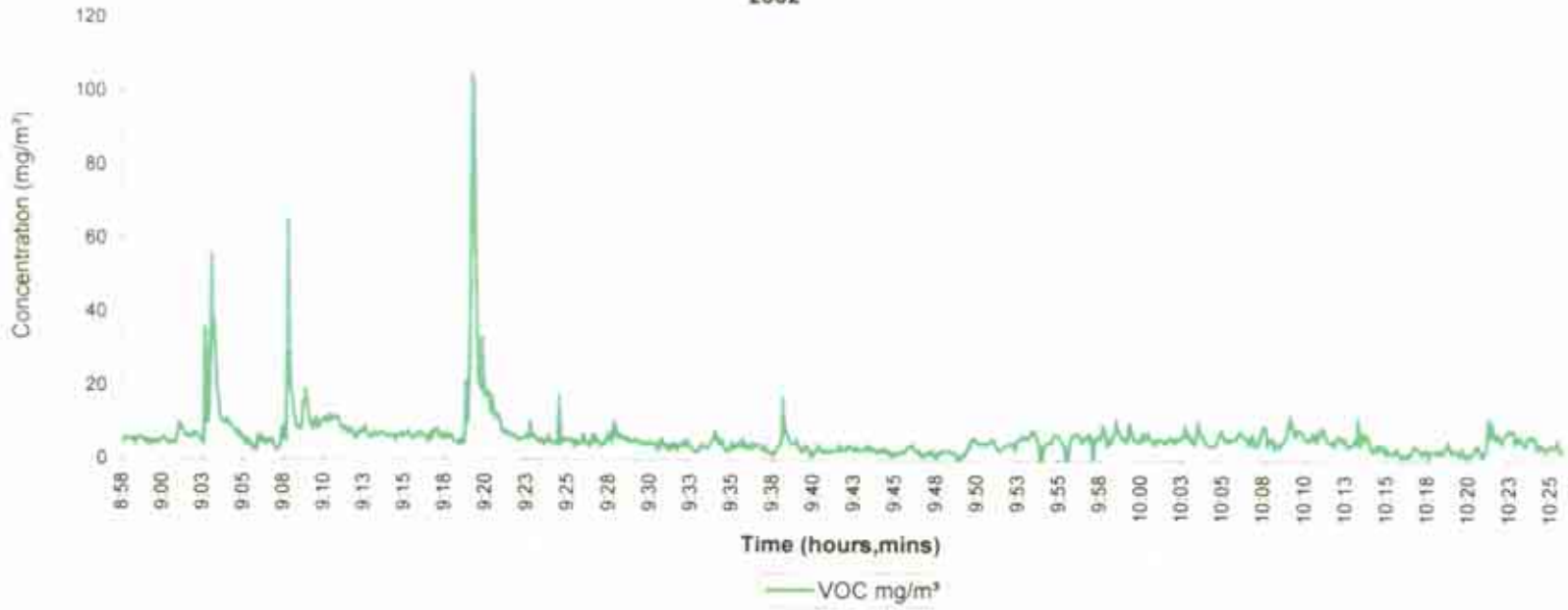
VOC Emission Concentration by Charcoal Tube Sampling

Location	No 1 Shop			
Test Position	BL80A			
Run Number	1			
Date of Sampling	25/10/02			
Sample Reference	23/5688 - 16611/25			
Sample Period	10:26 to 13:26			
Ambient Temp. (°C)	14			
Sample Volume (l)	36.00			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	31	0.9	0.8	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	31	0.9	0.8	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 11: Emissions of Volatile Organic Compounds from Spot Repair Shop Spray Booth BL80A on the 25th October 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
9:00	to	9:02	11	6	19	10	8	4
9:02	to	9:04	27	15	105	56	8	4
9:04	to	9:06	19	10	54	29	8	4
9:06	to	9:08	9	5	13	7	5	3
9:08	to	9:10	28	15	122	65	8	4
9:10	to	9:12	19	10	23	12	15	8
9:12	to	9:14	14	7	17	9	11	6
9:14	to	9:16	13	7	15	8	10	5
9:16	to	9:18	13	7	16	9	9	5
9:18	to	9:20	35	19	196	105	8	4
9:20	to	9:22	40	22	192	103	13	7
9:22	to	9:24	12	6	20	11	9	5
9:24	to	9:26	11	6	33	18	7	4
9:26	to	9:28	10	5	13	7	7	4
9:28	to	9:30	12	6	20	11	9	5
Average VOC over monitoring period			**11.73**	ppm	**6.28**	mg/m³		

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Table 20

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Spot Repair No 1 Shop**
Test Position	**Spray Booth BL80B**
Date of Measurement	**25/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.05

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.053	0.05	2.5		0.00	0	
0.122	0.00	0		0.00	0	
0.203	0.00	0		0.00	0	
0.284	0.55	27.5		0.48	24	
0.365	0.00	0	22	0.49	24.5	22
0.446	0.00	0		1.10	55	
0.527	0.00	0		1.20	60	
0.608	0.28	14		1.85	92.5	
0.689	0.54	27		1.95	97.5	
0.757	0.25	12.5		0.00	0	

Mean Pv=	10.2		
Highest pitot-static reading (Pa)	98		
Lowest pitot-static reading (Pa)	1		
Ratio highest/lowest=	97.5	(Maximum permitted ratio= 9:1)	
Mean Gas Temperature (K)	295		
Permitted range of Gas Temperature (°C)=		-7.5 to	51.5
Duct Diameter (m)	0.81	Duct Area (m^2)	0.52

Velocity (m/s) at Gas Temperature **4.1**

Flowrate (m^3/s) at Gas Temperature **2.1**

Flowrate (m^3/s) at Temperature 273K **2.0**

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Table 20A

Atmospheric Emission of Total Particulate Matter from Shop Repair Shop Spray Booth BL80B on the 25th October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-969	1	9:19-10:37	531.9	0.20	0.4
M-943	2	10:50-11:30	392.7	0.10	0.3

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-969 (W)	1	9:19-10:37	0
M-943 (W)	2	10:50-11:30	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-969 + M-969 W	1	9:19-10:37	531.9	0.20	0.4
M-943 + M-943 W	2	10:50-11:30	392.7	0.10	0.3

Mean temperature in duct at sampling point(°C) 22

Sample volume measurement temperature (°C)

Run 1 13
Run 2 15

Two point sampling along single axis

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Table 20b

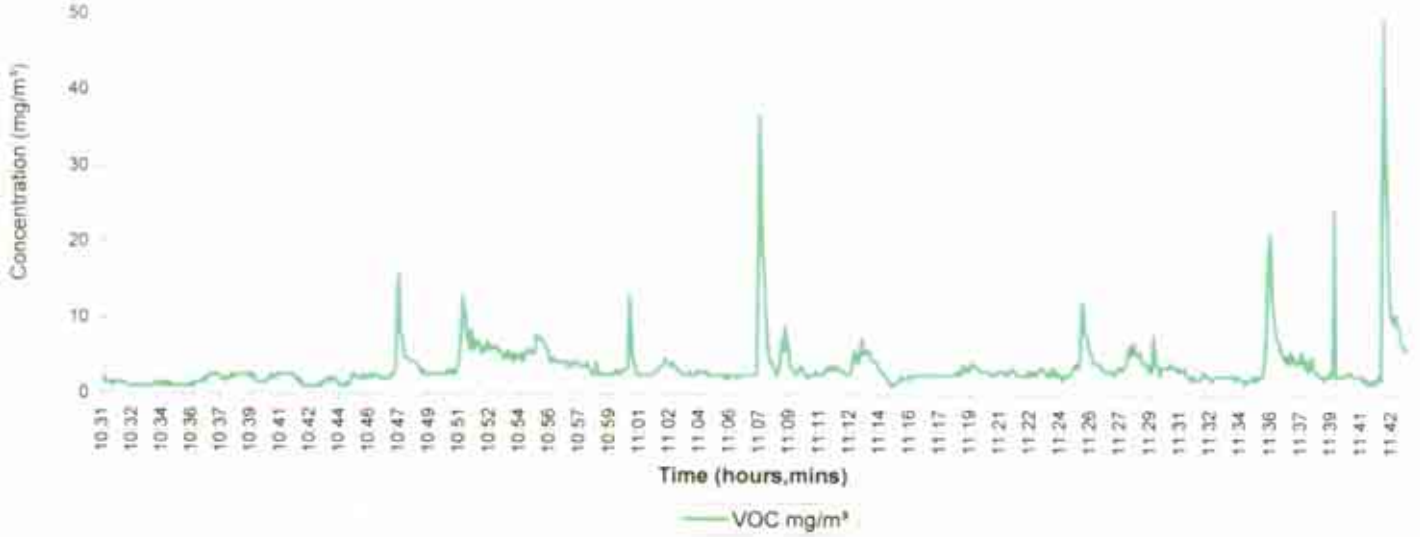
VOC Emission Concentration by Charcoal Tube Sampling

Location	No 1 Shop			
Test Position	BL80B			
Run Number	1			
Date of Sampling	25/10/02			
Sample Reference	23/5689 - 16611/26			
Sample Period	13:28 to 15:15			
Ambient Temp. (°C)	11			
Sample Volume (l)	21.40			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	46	2.2	2.0	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	46	2.2	2.0	100
FID Calibration Factor (ppm to mg/m³ as C)	2.74			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 12: Emissions of Volatile Organic Compounds from Spot Repair Shop Spray Booth BL80B on the 25th October 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
11:13	to	11:15	6	3	11	6	2	1
11:15	to	11:17	5	3	5	3	4	2
11:17	to	11:19	6	3	8	4	5	3
11:19	to	11:21	6	3	7	4	5	3
11:21	to	11:23	6	3	7	4	5	3
11:23	to	11:25	7	4	23	12	4	2
11:25	to	11:27	9	5	23	12	5	3
11:27	to	11:29	9	5	15	8	6	3
11:29	to	11:31	7	4	11	6	4	2
11:31	to	11:33	5	3	6	3	4	2
11:33	to	11:35	5	2	6	3	3	2
11:35	to	11:37	14	8	40	21	6	3
11:37	to	11:39	8	4	46	25	4	2
11:39	to	11:41	5	3	6	6	3	2
11:41	to	11:43	22	12	93	93	3	2
Average VOC over monitoring period			7.04	ppm	3.77	mg/m³		

APPENDIX 1E

SERVICE PAINT SHOP

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Table 21

Preliminary Gas Velocity and Temperature Measurement
Circular Duct

Location	**Service Paint Shop**
Test Position	**Spray Bake BL148**
Date of Measurement	**23/10/02**
Instrument:	**Air Flow Developments Type 5 Manometer**
Serial Number:	**33457**

Velocity Pressure Scale Factor: 0.10

Meas. pt. (m)	A-axis Reading	Pv (Pa)	Temp. (°C)	B-axis Reading	Pv (Pa)	Temp. (°C)
0.121	0.20	20				
0.243	0.18	18				
0.359	0.22	22				
0.485	0.65	65	17			
0.606	0.70	70				
0.728	0.55	55				
0.800	0.20	20				

Highest pitot-static reading (Pa) 70
Lowest pitot-static reading (Pa) 18
Ratio highest/lowest= 3.9 (Maximum permitted ratio= 9:1)

Mean Gas Temperature (K) 290
Permitted range of Gas Temperature (°C)= -12 to 46

Duct Diameter (m) 1.195 0.97 Duct Area (m^2) 1.16

Velocity (m/s) at Gas Temperature 7.6

Flowrate (m^3/s) at Gas Temperature 8.8

Flowrate (m^3/s) at Temperature 273K 8.3

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Table 21A

Atmospheric Emission of Total Particulate Matter from Service Paint Shop Spray Bake BL148 on the 23rd October 2002

Filter Only

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-972	1	13:54-14:09	188.5	0.00	0.01
M-938	2	14:24-14:39	234.2	0.00	0.005

Probe Washings

Sample Reference	Run	Sample Period	Residue after oven drying at 105°C for 2hrs (mg)
M-972 (W)	1	13:54-14:09	0
M-938 (W)	2	14:24-14:39	0

Probe Washing and Filter Combined

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (mg)	Concentration to Reference Conditions* (mg/m³)
M-972 + M-972 W	1	13:54-14:09	188.5	0.001	0.01
M-938 + M-938 W	2	14:24-14:39	234.2	0.001	0.005

Mean temperature in duct at sampling point(°C) 17

Sample volume measurement temperature (°C)

Run 1 15
Run 2 15

Single point sampling along single axis

Table 21B

Atmospheric Emission of Total Isocyanates (as NCO) from the BL148 Spray Bake Service Paint Shop on the 23rd October 2002

Sample Reference	Run	Sample Period	Sample Volume (litre)	Weight Recovered (µg)	Concentration to Reference Conditions* (mg/m³)
16611/42	1	13:31-14:51	76	< 0.20	< 0.0028

Mean temperature in duct at sampling point (°C) = 17

Sample volume measurement temperature (°C) = 17

*Reference Conditions: Temperature 273K, Pressure 101.3kPa, with no correction for water vapour

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Table 21c

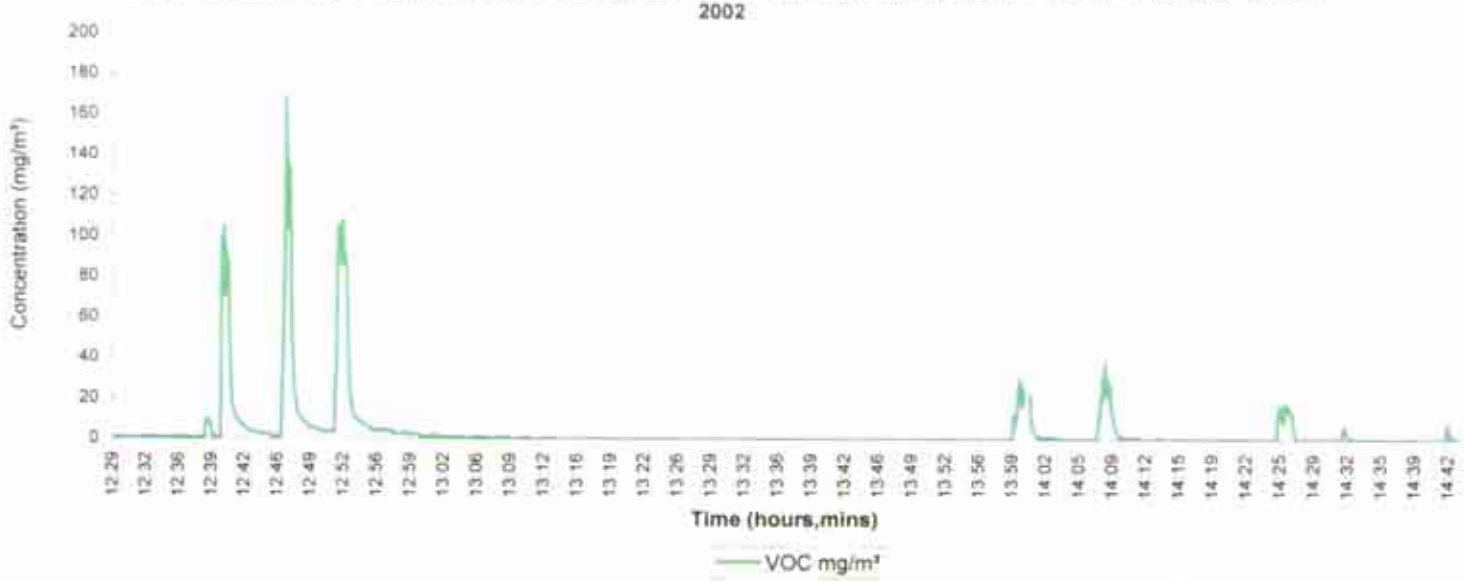
VOC Emission Concentration by Charcoal Tube Sampling

Location	Service Paint Shop			
Test Position	BL148			
Run Number	1			
Date of Sampling	23/10/02			
Sample Reference	23/5691 - 11661/43			
Sample Period	13:54 to 14:38			
Ambient Temp. (°C)	10			
Sample Volume (l)	41.80			
Compound	Wt. recovered (µg)	*Conc. (mg/Nm³)	*Conc. as C (mg/Nm³)	%
Toluene	15	0.4	0.3	100.0
Xylene	0	0.0	0.0	0.0
C9 - C10Aromatics (Total)	0	0.0	0.0	0.0
Isopropanol	0	0.0	0.0	0.0
Isobutanol	0	0.0	0.0	0.0
Acetone	0	0.0	0.0	0.0
Methyl Ethyl Ketone	0	0.0	0.0	0.0
Methyl isobutyl ketone	0	0.0	0.0	0.0
Ethyl acetate	0	0.0	0.0	0.0
n-Butyl acetate	0	0.0	0.0	0.0
Isobutyl acetate	0	0.0	0.0	0.0
Total VOC	15	0.4	0.3	100
FID Calibration Factor (ppm to mg/m³ as C)	2.7			

Note: 0 is equivalent to <5µg

*Concentrations expressed to Reference Conditions: Temperature 273K, Pressure 101.3kPa

Figure 13: Emissions of Volatile Organic Compounds from Service Paint Shop Spray Bake BL148 on the 23rd October 2002



2 min Averaging time			Mean Concentration (mg/m³)		Max Concentration (mg/m³)		Min Concentration (mg/m³)	
			ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
12:36	to	12:38	2	1	3	2	0	0
12:38	to	12:40	6	3	19	10	1	1
12:40	to	12:42	74	40	196	105	1	1
12:42	to	12:44	10	6	19	10	6	3
12:44	to	12:46	4	2	6	3	2	1
12:46	to	12:48	105	56	316	169	2	1
12:48	to	12:50	16	8	30	16	10	5
12:50	to	12:52	11	6	55	29	6	3
12:52	to	12:54	112	60	202	108	20	11
12:54	to	12:56	13	7	20	11	8	4
12:56	to	12:58	8	4	10	5	5	3
12:58	to	13:00	5	3	8	4	4	2
13:00	to	13:02	3	2	5	3	2	1
13:02	to	13:04	2	1	3	2	1	1
13:04	to	13:06	2	1	2	1	1	1
Average VOC over monitoring period			7.25	ppm	3.88	mg/m³		

APPENDIX 2

METHODS OF MEASUREMENT, SAMPLING, ANALYSIS AND CALIBRATION CERTIFICATES

PROJECT METHODS

Test Equipment and Procedures

i) Particulate Matter

The collection of particulate samples was carried out isokinetically. In accordance with BS3405 an in-stack sampler without heated sampling lines (US EPA Method 17) was used. Probe linings were washed with acetone and deposits collected to provide accurate results by taking into account the sticky nature of emissions from paint process exhausts.

The detection limit for particulate matter collected on the sampler filter is 0.1 mg/m^3 (for sample volume of 0.5 m^3).

Two sampling runs were carried out at each location. The duration of each sampling run was approximately 1 hour.

Filters were oven dried and weighed before and after sampling our laboratory in accordance with UKAS accredited documented procedures.

Four or eight point sampling was carried out along two-sample axis according to BS3405.

Gas Velocities

Velocity pressures were measured using an Airflow Developments Type 5 Manometer and Pitot tube. Ten points across each axis were monitored to provide a velocity survey. A copy of the calibration certificate is enclosed.

Temperature

Temperatures were measured using a digital thermometer.

ii) **Volatile Organic Compounds (VOC) – Stacks at or near ambient temperature and Incinerator Stacks**

Volatile organic compounds (USEPA method 25a)

Monitoring to determine VOC emission concentrations was in accordance with USEPA method 25a - *Determination of total gaseous organic concentration using a flame ionisation analyser.*

Volatile organic compound concentrations were measured using a Bernath 3006 portable heated VOC analyser or a Signal 3030PM. The analyser works by burning the gas sample in a hydrogen flame. This ionises any organic compounds present and the current produced across an electric field is proportional to the number of carbon atoms.

The analyser was zeroed and calibrated with a test gas (79 ppm propane) prior to each sampling run. It is possible to monitor & log any drift between the calibration procedures. No drift was noted, in addition to the calibration prior to use a 6 monthly linearity check is also carried out. VOC sampling was undertaken over a period of at least 60 minutes to cover any process variation

The accuracy of the above method is reported to be ± 5.8%

(iii) **Oxides of nitrogen - Horiba PG-250 Portable Gas Analyser**

Sampling to determine oxide of nitrogen concentrations was undertaken using a Horiba PG-250 portable gas analyser. This instrument incorporates Chemiluminescence capable of determining oxide of nitrogen concentrations within the range 0 to 5000ppm (at reference conditions).

Ozone is introduced to the sample gas, part of the nitrogen monoxide (NO) contained in the sample gas will react with the ozone, oxidise and become nitrogen dioxide (NO_2). Part of this generated NO_2 will be in an excited state (NO_2*), and when it returns to the normal state, it will radiate light. This phenomenon is called chemiluminescence.

The sampling period was approximately two hours, all results were logged onto a squirrel data logger. The estimated error using the above method is ± 3.8%.

Carbon Monoxide and Sulphur Dioxide- Horiba PG-250 Portable Gas Analyser

Sampling to determine Carbon monoxide and Sulphur dioxide concentrations was undertaken using a Horiba PG-250 portable gas analyser. This instrument incorporates Infrared technology capable of determining carbon monoxide and sulphur dioxide concentrations within the range 0 to 5000ppm (at reference conditions).

When there is a difference in the amount of infrared energy absorbed by the sample gas and reference gas in the measurement cell, the amount of energy absorbed in the optical analyser differs, and this difference creates an equivalent fluctuation in the form of a pressure difference in the membrane. This is then turned into an electric signal fluctuation, enlarged and then output.

The sampling period was approximately two hours, all results were logged onto a squirrel data logger. The estimated error using the above method is ± 3.8%.

(iv) Isocyanate

A stainless steel probe was inserted into the exhaust gas stream. A sample of the exhaust gas was removed non-isokinetically and the gas bubbled through impingers containing piperazine solution (the trapping reagent) using a portable sampling pump.

Upon completion of sampling all samples were placed in clean containers sealed, labelled and sent for analysis by one of our approved laboratories.

This method is based on the HSE method MDHS 25/2 Organic Isocyanates.

METHODS OF ANALYSIS

Total Particulate Matter (Filter)

Pre-weighed filters were returned to the laboratory where they were dried and re-weighed. Concentrations were then calculated from the known weights of deposit collected and known volume of exhaust air sampled.

Total Particulate Matter (Probe Washing)

The solvent used, acetone, was transferred to a pre-weighed container. It was evaporated to dryness and the container re-weighed using an analytical balance. Concentrations were then calculated from the known weights of residue and known volume of exhaust air sampled.

RPS Laboratories . Unit 12 . Waters Edge Business Park . Modwen Road . Salford . M5 3EZ
Tel: (0161) 872 2443 . Fax: (0161) 877 3959

Test Certificate

STANGER SCIENCE & ENVIRONMENT
WARD STREET
ETTINGSHELL
WOLVERHAMPTON

WV2 2PJ

Attn: NEIL KIRBY

CRT No 018655 : Issue 1
Ord No 21223

Date Tested 05/12/02
Date Reported 05/12/02

Item - 7 SOLUTIONS FOR MDI TDI HDI & IPDI

Specification- Not Applicable

202470 16611/35 252

Sample	Test Description	Specification	Result	Comments
01:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
02:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
03:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
04:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202471 16611/36 261A

Sample	Test Description	Specification	Result	Comments
05:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
06:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
07:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
08:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202472 16611/37 261B

Sample	Test Description	Specification	Result	Comments
09:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
10:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
11:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
12:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202473 16611/38 261C

Sample	Test Description	Specification	Result	Comments
13:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
14:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
15:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO

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Test Certificate

STANGER SCIENCE & ENVIRONMENT
7 SOLUTIONS FOR MDI TDI HDI & IPDI

CRT No 018655 : Issue 1

202473 16611/38 26 C

Sample	Test Description	Specification	Result	Comments
16:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202474 16611/39 31 C

Sample	Test Description	Specification	Result	Comments
17:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
18:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
19:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
20:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202475 16611/40 30 C

Sample	Test Description	Specification	Result	Comments
21:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
22:	IPDI as NCO	In-House Method I3	<0.2 ug	IPDI as NCO
23:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
24:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

202476 16611/41 29 C

Sample	Test Description	Specification	Result	Comments
25:	HDI as NCO	In-House Method I3	<0.2 ug	HDI as NCO
26:	IPDI as NCO	In-House Method I3	<0.2 ug	See Below
27:	MDI as NCO	In-House Method I3	<0.2 ug	MDI as NCO
28:	TDI as NCO	In-House Method I3	<0.2 ug	TDI as NCO

Item 26: IPDI as NCO

Cell 1 - 43
Cell 2 - 44
Cell 3 - 45

Certificate Comments

Date of sample receipt: 27/11/2002

If you have any queries regarding this analysis please do not hesitate to contact the Laboratory Manager, Joanne Dewhurst.

Analysis was carried out on the samples 'as received'.

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RPS Laboratories

RPS Laboratories

Test Certificate

STANGER SCIENCE & ENVIRONMENT
7 SOLUTIONS FOR MDI TDI HDI & IPDI

CRT No 018655 : Issue 1

Tested by Joanne Dewhurst

[redacted]

For and on authority of
RPS Laboratories

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Cas[redacted] Stanger
Ward Street
Ettingshall
Wolverhampton
WV2 2PJ

Our Ref: 02J1284 / 1
Your Ref: 166110102
Sample Ref: 22/91049 - 22/91051
Order Ref: 25748/ Neil Kirby
Date: 27 November 2002

LAW LABORATORIES LTD
Shady Lane,
Great Barr,
Birmingham B44 9ET
England
Tel: +44 (0)121 251 4000
Fax: +44 (0)121 251 4040
LAWLABS

Certificate of Analysis

We certify that we have examined the samples received on: 30 October 2002
Marked: as below
Taken: by Client on 29/10/2002
With the following results:

		22/91049 Cell 01 (S1) 16611/15	22/91050 Cell 02 (S2) 16611/16	22/91051 Cell 03 (S3) 16611/17
Toluene	µg	1700	3200	1900
Xylene	µg	340	790	370
* Styrene	µg	15500	28300	19900
* C9-C10 Aromatics	µg	80	80	34
* Isopropanol	µg	24	24	37
* Methyl Ethyl Ketone	µg	<5	<5	<5
* Methyl Isobutyl Ketone	µg	<5	<5	19
* Ethyl Acetate	µg	5400	10600	7700
* n-Butyl Acetate	µg	48	130	62
* Isobutyl Acetate	µg	<5	<5	<5

ALL TESTS ARE CARRIED OUT ACCORDING TO A UKAS SCHEDULE OF ACCREDITATION UNLESS MARKED * OR ‡.

R.P. Elliott D. Petford [redacted] R.M.P. Smith D.C. Lea A.C. Moore

UKCSI/RP/38300/4

UKAS TESTING
No 0730

Ca[redacted]a Stanger
Ward Street
Ettingshall
Wolverhampton
WV2 2PJ

Our Ref: 02L0419 / 1

Sample Ref: 23/5680 - 23/5691
Order Ref: 27270
Date: 10 January 2003

Certificate of Analysis

LAW LABORATORIES LTD
Shady Lane,
Great Barr,
Birmingham B44 9ET
England
Tel: +44 (0)121 251 4000
Fax: +44 (0)121 251 4040
LAWLABS

We certify that we have examined the samples received on: 10 December 2002
Marked: **Project Name: 166110102**
Taken: by Client on 09/12/02
With the following results:

		23/5680 BL 258 16611/17	23/5681 BL 259 16611/18	23/5682 BL 260A 16611/19	23/5683 BL 260B 16611/20	23/5684 BL 261A 16611/21	23/5685 BL 261B 16611/22
Toluene	µg	35	66	78	11	>60000	76
Xylene	µg	<5	<5	<5	<5	18	18
* C9-C10 Aromatics	µg	<5	<5	<5	<5	<5	49
* Isopropanol	µg	25	<5	<5	<5	<5	<5
* Isobutanol	µg	<5	<5	<5	<5	<5	<5
* Acetone	µg	240	2100	<5	<5	<5	<5
* Methyl Ethyl Ketone	µg	<5	<5	<5	<5	<5	<5
* Methyl Isobutyl Ketone	µg	<5	<5	<5	<5	<5	<5
* Ethyl Acetate	µg	<5	<5	<5	<5	<5	<5
* n-Butyl Acetate	µg	<5	<5	<5	<5	<5	42
* Isobutyl Acetate	µg	<5	<5	<5	<5	<5	<5

23/5684 showed considerable breakthrough to the rear section of the tube in addition to the front section.

ALL TESTS ARE CARRIED OUT ACCORDING TO UKAS SCHEDULE OF ACCREDITATION UNLESS MARKED * OR ‡.

[redacted] [redacted]

R.P. Elliott D. Petford K.E.Howe R.J.C. Barron R.M.P. Smith D.C. Lea A.C. Moore

No. 0730

Ca[redacted]a Stanger
Ward Street
Ettingshall
Wolverhampton
WV2 2PJ

Our Ref: 02L0419 / 1

LAW LABORATORIES LTD
Shady Lane,
Great Barr,
Birmingham B44 9ET
England
Tel: +44 (0)121 251 4000
Fax: +44 (0)121 251 4040
LAWLABS

Sample Ref: 23/5680 - 23/5691
Order Ref: 27270
Date: 10 January 2003

Certificate of Analysis

We certify that we have examined the samples received on: 10 December 2002
Marked: **Project Name: 166110102**
Taken: by Client on 09/12/02
With the following results:

		23/5686 BL 261C 16611/23	23/5687 BL 252 16611/24	23/5688 BL 80A 16611/25	23/5689 BL 80B 16611/26	23/5690 BL 260C 16611/42	23/5691 BL 148 16611/43
Toluene	µg	20	48	31	46	7	15
Xylene	µg	<5	1600	<5	<5	<5	<5
* C9-C10 Aromatics	µg	<5	310	<5	<5	<5	<5
* Isopropanol	µg	<5	27	<5	<5	<5	<5
* Isobutanol	µg	<5	32	<5	<5	<5	<5
* Acetone	µg	<5	14	<5	<5	<5	<5
* Methyl Ethyl Ketone	µg	<5	<5	<5	<5	<5	<5
* Methyl Isobutyl Ketone	µg	<5	480	<5	<5	<5	<5
* Ethyl Acetate	µg	<5	<5	<5	<5	<5	<5
* n-Butyl Acetate	µg	<5	1600	<5	<5	<5	<5
* Isobutyl Acetate	µg	<5	<5	<5	<5	<5	<5

23/5684 showed considerable breakthrough to the rear section of the tube in addition to the front section.

ALL TESTS ARE CARRIED OUT ACCORDING TO A UKAS SCHEDULE OF ACCREDITATION UNLESS MARKED * OR ‡.

[redacted] [redacted]

R.P. Elliott D. Petford K.E.Howe R.J.C. Barron R.M.P. Smith D.C. Lea A.C. Moore

UBCSL/RP/38300/4

UKAS TESTING No 0730

CryoServic
Blackpole Trading Estate East
Blackpole Road
Worcester WR3 8ZR
Telephone: 01905 754500
Fax: 01905 754060

Certificate of Analysis

Customer

*Casella Monitor Science & Environment Ltd.
(Inc.Monitor Environmental Conlts.)
Accounts Department
Regent House Wolseley Rd
Bedford
MK42 7JY

Certificate Number 0022976

Order Number	17708	Date	18/01/02
Our Reference Number	0025512	Cylinder Number	AA391978
Cylinder Description	2.0 3GM CYL BS3 RPV		
Analysis Method	Gravimetric	Cylinder Pressure	3000 PSI
Procedure Numbers	Gravimetric	Instrument Numbers	B/02
Traceable To	National Standards	UN Number	1956

We certify that the cylinder contains the following gas mixture

COMPONENT	NOMINAL CONCENTRATION	ACTUAL CONCENTRATION	ACCURACY %
Propane AIR	80.000 ppm BALANCE	79.200 ppm BALANCE	.96

Date 18.1.02

Signed: [redacted]

Scott Specialty Gases European Headquarters

Takkebijsters 48 4817 BL, Breda, The Netherlands Phone:076 5711828 Fax:076 5713267

CERTIFICATE OF ANALYSIS

Project #: 20-36 56-002
Cylinder #: COC1)055
P.O.#: 04043
Item #: 20024 :20 210L
Date: 27-08-)1

CASELLA
VICKI GAVIN
C/O STANGER
WARD STREET, ETTINGSHALL
WOLVERHAMPTON WV2 2PJ
UNITED KINGDOM

Analytical Accuracy: +/- 1%

COMPONENTS	CONCENTRATION REQUESTED (MOLES)		CONCENTRATION CERTIFIED (MOLES)	
CARBON DIOXIDE	16,	PCT	16,0	PCT
CARBON MONOXIDE	,016	PCT	161,	PPM
OXYGEN	20,	PCT	20,0	PCT
NITROGEN		BAL		BAL

VALVE CONNECTION: BS-4
FILL PRESSURE: 150 B/.R
Analytical Method: NDIR.PARAMAGN

CYLINDER SIZE: 10 LITRE

Mixture stability good through 27-08-2004

Analyst: [redacted] Approved By: [redacted]

CryoServic
Blackpole Trading Estate East
Blackpole Road
Worcester WR3 8ZR
Telephone: 01905 754500
Fax: 01905 754060

Certificate of Analysis

Customer

*Monitor Enviro Consultants(Nissan
Nissan Motor Manufacturing (UK) Ltd
Washington Road

Sunderland
Tyne & Wear
SR5 3NS

Certificate Number 0021495

Order Number	13362	Date	4/10/01
Our Reference Number	0024753	Cylinder Number	AA050771
Cylinder Description	2.0 SGM CYL BS3 RPV		
Analysis Method	Gravimetric	Cylinder Pressure	3000 PSI
Procedure Numbers	Gravimetric	Instrument Numbers	B/02
	G		
Traceable To	National Standards	UN Number	1956

We certify that the cylinder contains the following gas mixture

COMPONENT	NOMINAL CONCENTRATION	ACTUAL CONCENTRATION	ACCURACY %
Oxygen	20.950 %	20.849 %	.16
Nitrogen	BALANCE	BALANCE	

Date 4 10 01 Signed: [redacted]

Blackpole Trading Estate East
Blackpole Road
Worcester WR3 8ZR
Telephone: 01905 754500
Fax: 01905 754060

Certificate of Analysis

Customer

*Monitor Enviro Consultants(Nissan)
Nissan Motor Manufacturing (UK) Ltd
Washington Road

Sunderland
Tyne & Wear
SR5 3NS

Certificate Number 0021612

Order Number	133[illegible]6	Date	12/10/01
Our Reference Number	002[illegible]769	Cylinder Number	P2851ZMN8542
Cylinder Description	7.0 [illegible]GM CYL BS14		
Analysis Method	Gravimetric	Cylinder Pressure	3000 PSI
Procedure Numbers	Gravimetric	Instrument Numbers	B/02
Traceable To	National Standards	UN Number	1956

We certify that the cylinder contains the following gas mixture

COMPONENT	NOMINAL CONCENTRATION	ACTUAL CONCENTRATION	ACCURACY %
Sulphur Dioxide	80.000 ppm	79.300 ppm	.24
Nitrogen	BALANCE	BALANCE	

Date 12 . 10 . 01 Signed: [redacted]

CryoService Limited
Warndon Business Park
Worcester WR4 9RH
Telephone: 01905 754500
Fax: 01905 754060
www.cryoservice.co.uk

Certificate of Analysis

Customer

*Casella London Limited
Regent House
Wolseley Road
Kempston
Bedford

MK42 7JY

Certificate Number 0025424

Order Number	23930	Date	1/07/02
Our Reference Number	0129455	Cylinder Number	P2603L1754A
Cylinder Description	7.0 SGM CYL BS3 RPV		
Analysis Method	Gravimetric	Cylinder Pressure	3000 PSI
Procedure Numbers	Gravimetric	Instrument Numbers	B/02
Traceable To	National Standards	UN Number	1956

We certify that the cylinder contains the following gas mixture

COMPONENT	NOMINAL CONCENTRATION	ACTUAL CONCENTRATION	ACCURACY %
Carbon Monoxide	80.000 ppm	79.900 ppm	1.10
Nitrogen	BALANCE	BALANCE	

Date 1/7/02

Signed: [redacted]
Chemist

0005 /.02
TOTAL P.05

CryoServic
Blackpole Trading Estate East
Blackpole Road
Worcester WR3 8ZR
Telephone: 01905 754500
Fax: 01905 754060

Certificate of Analysis

Customer

*Casella London Limited
Regent House
Wolseley Road
Kempston
Bedford

MK42 7JY

Certificate Number 0023895

Order Number	1791 1	Date	18/03/02
Our Reference Number	002 469	Cylinder Number	P2602L2069A
Cylinder Description	7.0 GM CYL BS14		
Analysis Method	Gravimetric	Cylinder Pressure	3000 PSI
Procedure Numbers	Gravimetric	Instrument Numbers	B/02
Traceable To	National Standards	UN Number	1956

We certify that the cylinder contains the following gas mixture

COMPONENT	NOMINAL CONCENTRATION	ACTUAL CONCENTRATION	ACCURACY %
Nitric Oxide	80.000 ppm	79.500 ppm	.49
Total NOx	.000 ppm	82.500 ppm	.49
Nitrogen	BALANCE	BALANCE	

Date 18 MARCH 2002 Signed: [redacted]

Allowed Variance 2

CASELLA STANGER

CALIBRATION DETAILS

Instrument Type (e.g. Gas Analyser)	HEATED FID	Type of Calibration (e.g. Linearity Check, Single Point Check)		LINEARITY
Instrument Make/Model Number	BERNATH 3005	Date of Calibration		24/07/02
Type of Determination	METHANE (Range 3)	SSE Serial Numbers:	Instrument References	SSE 33440
Relevant TP Note	TP8, TP13			

nder nber	Reference Instrument Reading (Unit ppm)			Candidate Instrument Reading (Unit Volts)			Variance (+/- %)	Within Permissible Limits? (Y/N)
)16827	Oxygen	20.741%			0.00			
)401	Methane	102			0.495		-0.378%	Y
)389	Methane	500			2.445			

If multipoint linearity check

Linearity Variance (%) +/- 1%
Linearity in Tolerance Yes

Lab ambient Temperature (°C) 22
Thermocouple No SSE 33408
Temperature Indicator No SSE 33298

Carried Out By P.BUTLER Signature ..... [redacted] ..... (Authorised Operative)

14/01/2003 13:11 44-1902-385152 CASELLA PAGE 10

[redacted]

Instrument: Clean Air Engineering (CAE)

Serial Number: SSE 38446

Calibration Ref No.: CAE 921

Date of Calibration: 18/12/02

Leak Check: Satisfactory

Test Number	1	2	3	4	5	6	7	8	9	10	11	12
	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres
Initial DGM	2708.74	2734.91	2859.77	2970.76	3089.76	3227.9	3378.66	3537.99	3704.37	3884.61	4072.35	4264.54
Final DGM	2784.91	2859.77	2970.74	3082.46	3227.9	3366.41	3537.99	3698.35	3884.61	4068.17	4264.04	4457.07
Volume	76.17	124.86	110.97	111.72	138.14	138.51	162.33	160.36	180.24	180.56	192.19	192.53
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
Initial DGM temp (in/Out	16.75	17.5	19	20.25	22	23	24.75	25.5	26.5	27	27.5	28
Final DGM temp (in/out)	17.5	19	20.25	22	23	25	25.5	26.75	27.5	27.5	28.5	28.5
Mean DGM temp	17.125	18.25	19.625	21.125	22.5	24	25.125	26.125	27	27.25	28	28.25
Time (mins)	10	10	10	10	10	10	10	10	10	10	10	10
	mm H20	mm H20	mm H20	mm H20	mm H20	mm H20	mm H20	mm H20		mm H20	mm H20	mm H20
Orifice H	5	5	10	10	15	15	20	20	25	25	30	30
	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft	cu ft
Initial DGM	367.04	369.455	367.822	371.352	376.101	379.456	384.082	389.125	394.332	399.946	405.771	411.725
Final DGM	369.455	377.822	371.352	376.875	379.456	383.894	389.125	394.148	399.945	405.551	411.725	417.679
Volume	2.418	8.367	3.53	5.523	3.355	4.438	5.043	5.023	5.613	5.606	5.954	5.954
	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres	litres
Volume	68.3851927	67.0 5984	99.9584806	99.7602926	123.919662	125.67018	142.801875	142.226538	158.942479	158.744261	168.598525	168.598525
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
Initial DGM temp (in/Out	17.5	17.5	17.5	18	18.5	18.5	18.5	18.5	18.0	18.5	18.5	18.75
Final DGM temp (in/out)	17.5	17.5	17.75	18	18.5	18.25	18.5	18.5	18.5	18.5	18.75	19
Mean DGM temp	17.5	17.5	17.625	18	18.5	18.375	18.5	18.5	18.5	18.5	18.625	18.875
Ambient Temp	18	18	18	18	18	18	18	18	18	18	18	19.5
Pressure (m/bar)	997	997	997	997	997	997	997	997	997	997	999	998
Pressure (mm/Hg)	747.811498	747.8 1498	747.811498	747.811498	747.811498	747.811498	747.811498	747.811498	747.811498	747.811498	748.561599	748.561689
Vm(std)	75.7820979	74.19 0829	109.515436	109.693316	135.06922	134.74700	157.401179	154.971169	173.760292	173.528851	184.940483	185.113891
Vcr(std)	63.294943	62.98 2741	93.6994829	95.5895247	115.493406	117.745034	133.738977	133.206582	148.855221	148.669582	157.830757	157.09658
Yd	0.83443115	0.84 0006	0.85738126	0.8581926	0.85506828	0.87582304	0.8496695	0.85947009	0.85686995	0.85472698	0.85341992	0.8518841

#REF!

At least 2 test results must be within permitted range

Delta H @ (mm)	56.8453491	57.53 3467	52.0070916	52.6168352	52.0690132	50.8008426	52.233974	52.8271695	53.0350997	53.2127885	56.7420568	56.8865407
Mean Delta H @(mm)	53.8617339											
Mean Delta H @(mm)	2.12054071											
Run difference %	-4.6172279											

Mean Yd(within Range) 0.854 7512

Calibration Within Specification of 3%.

Signature: [redacted]

CASELLA

Dry Gas Meter Calibration (Using Rotameter)

Instrument: Clean Air Engineering (CAE)

Serial Number: SSE 33443

Monitor Ref No. CAE 768

Date of Calibration: 05/11/02

Leak Check: OK

Test Number	1	2	3	4	5	6	7	8	9
	litres	litres	litres	litres	litres	litres	litres	litres	litres
Initial DGM	9263.45	9335.81	9419.84	9511.38	9650.01	9787.64	0082.44	0279.71	0479.94
Final DGM	9335.81	9419.84	9502.87	9650.01	9787.64	9925.73	0279.71	0479.94	0681.37
Volume	82.36	84.03	83.03	138.63	137.63	138.09	197.27	200.23	201.43
		°C	°C	°C	°C	°C	°C	°C	°C
Initial DGM temp (in/Out)	18.5	19	20	21	23	23.5	25.5	26.75	27.75
Final DGM temp (in/out)	18.75	19.75	21	22.75	24.25	24.75	27.25	27.75	28
Mean DGM temp	18.625	19.375	20.5	21.875	23.625	24.125	26.375	27.25	27.875
Time Minutes	10	10	10	10	10	10	10	10	10
	mm H2O	mm H2O	mm H2O	mm H2O	mm H2O	mm H2O	mm H2O	mm H2O	mm H2O
Orifice H	7.75	7.75	7.75	20	20	20	41	41	41
	°C	°C	°C	°C	°C	°C	°C	°C	°C
Ambient Temp	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5
Pressure (m/bar)	1010	1010	1010	1010	1010	1010	1010	1010	1010
Pressure (mm/Hg)	757.5623	757.5623	757.5623	757.5623	757.5623	757.5623	757.5623	757.5623	757.5623
Flowrate (l/min)	8.5	8.5	8.5	14	14	14	20	20	20
Vm(std)	82.6036	84.0623	82.7435	137.6709	135.8714	136.0962	193.3530	195.6823	196.4461
Vcr(std)	79.3333	79.3333	79.3333	130.6667	130.6667	130.6667	186.6667	186.6667	186.6667
Yd	**0.9604**	**0.9437**	**0.9588**	**0.9491**	**0.9617**	**0.9601**	**0.9654**	**0.9539**	**0.9502**

At least 2 test results must be within permitted range

Delta H @ (mm)	55.87	55.73	55.52	52.69	52.38	52.29	52.34	52.19	52.08
Mean Delta H @(mm)	53.45								
Mean Delta H @(mm)	2.105								
Run difference %	2.3								
Mean Yd(within Range)		0.956							

Calibration Within Specification of 5%.

Signatur[redacted]

CASELLA STANGER

CASELLA STANGER

CALIBRATION DETAILS

Instrument Type (e.g. Gas Analyser)	Analyser	Type of Calibration (e.g. Linearity Check, Single Point Check)	Multipoint
Instrument Make/Model Number	Horiba PG250	Date of Calibration	01/08/02
Type of Determination	SO_2 Concentration	SSE Serial Numbers:	Instrument SSE33442 Gas Conditioner SSE33505
Relevant TP Note	TP24 - Air (W)	Gas Cylinders	5800204 SO2 P2851ZMN85 SO2 AB016827 O2
Range for Linearity Check	1000 ppm		

Reference Instrument Reading (Unit ppm)			Candidate Instrument Reading (Unit ppm)			Variance From Full Scale Deflection (+/- %)	Within Permissible Limits? (Y/N)
	79.3			80		-0.07	Y
	62.5			61		0.15	Y
	0			0		0.00	Y

If multipoint linearity check — Linearity Variance (%) 0.0; Linearity in Tolerance Yes

Lab ambient Temperature (°C) 23
Thermocouple No SSE33116
Temperature Indicator No SSE33119

Carried Out By P.Butler Signature ..... [redacted] ..... (Authorised Operative)

CASELLA STANGER

CASELLA STANGER

CALIBRATION DETAILS

Instrument Type (e.g. Gas Analyser)	Analyser	Type of Calibration (e.g. Linearity Check, Single Point Check)	Linearity
Instrument Make/Model Number	Horiba PG 250	Date of Calibration	31/07/02
Type of Determination	CO Concentration	SSE Serial Numbers:	Instrument SSE33442 Gas Conditioner SSE33505
Relevant TP Note	TP24 - Air (W)	Gas Cylinders	AB016827 Oxygen 5800424 CO PL2602L1754, CO
Range for Linearity Check	1000 ppm		

Reference Instrument Reading (Unit ppm)			Candidate Instrument Reading (Unit ppm)			Variance From Full Scale Deflection (+/- %)	Within Permissible Limits? (Y/N)
	79.9			80		-0.01	Y
	60.2			62		-0.18	Y
	0			0		0.00	Y

If multipoint linearity check

Linearity Variance (%) 0.1
Linearity in Tolerance Yes

Lab ambient Temperature (°C) 23
Thermocouple No SSE33316
Temperature Indicator No SSE33319

Carried Out By P.Butler

Signature ..... [redacted] ..... (Authorised Operative)

CASELLA STANGER

CALIBRATION DETAILS

Instrument Type (e.g. Gas Analyser)	Analyser	Type of Calibration (e.g. Linearity Check, Single Point Check)	Multipoint
Instrument Make/Model Number	Horiba PG 250	Date of Calibration	31/07/02
Type of Determination	NO Concentration	SSE Serial Numbers:	Instrument SSE33442 Gas Conditioner SSE33505
Relevant TP Note	TP24 - Air (W)	Gas Cylinders	AB016827 Oxygen 5800322 NO P2602L2069A NO
Range for Linearity Check	1000 ppm		

Reference Instrument Reading (Unit ppm)			Candidate Instrument Reading (Unit ppm)			Variance From Full Scale Deflection (+/- %)	Within Permissible Limits? (Y/N)
	79.5			78		0.15	Y
	29.2			28		0.12	Y
	0			0		0.00	Y

If multipoint linearity check	Linearity Variance (%) 0.1 Linearity in Tolerance Yes	Lab ambient Temperature (°C) Thermocouple No Temperature Indicator No	23 SSE33116 SSE33119

Carried Out By P.Butler Signature .... [redacted] ..... (Authorised Operative)

14/01/2003 13:11 44-1902-385152 CASELLA PAGE 06

CASELLA STANGER

CASELLA STANGER

CALIBRATION DETAILS

Instrument Type (e.g. Gas Analyser)	Analyser	Type of Calibration (e.g. Linearity Check, Single Point Check)	Linearity
Instrument Make/Model Number	Horiba PG 250	Date of Calibration	31/07/02
Type of Determination	NOx Concentration	SSE Serial Numbers:	Instrument SSE 33442 Gas Conditioner SSE 33505
Relevant TP Note	TP24 - Air (W)	Gas Cylinders	AB016827 Oxygen 5800322 NOx P2602L2069A NOx
Range for Linearity Check	1000 ppm		

Reference Instrument Reading (Unit ppm)			Candidate Instrument Reading (Unit ppm)			Variance From Full Scale Deflection (+/- %)	Within Permissible Limits? (Y/N)
	82.5			84		-0.15	Y
	30.9			30		0.09	Y
	0			0		0.00	Y

If multipoint linearity check

Linearity Variance (%) 0.1
Linearity in Tolerance Yes

Lab ambient Temperature (°C) 23
Thermocouple No SSE33116
Temperature Indicator No SSE33119

Carried Out By P.Butler

Signature [redacted] (Authorised Operative)

AIRFLOW

SPECIALISTS IN AIR MOVEMENT TECHNOLO

CERTIFICATE OF CALIBRATION

AIRFLOW DEVELOPMENTS LIMITED
Lancaster Road, Cressex Business Park,
High Wycombe, Buckinghamshire
HP12 3QP, England.
Telephone: (Int + 44) (UK 0) 1494 526252
Facsimile: (Int + 44) (UK 0) 1494 461073
e.mail: info@airflow.co.uk
http://www.airflow.co.uk

COMPANY CASELLA STANGER
WARD STREET
ETTINGSHALL
WOLVERHAMPTON
WV2 2PJ

INSTRUMENT Mk5 Man.Port. Pa.
SERIAL No. 74888
SPECIFICATION TP001-4

CERTIFICATE NUMBER 1AA04796/1P
DATE CERTIFIED 24/1/02
PART NUMBER H71519801

SERVICE No. A04796/1

CUST. REF. 17745

This Certificate is issued in accordance with QCS 023 "Standard Conditions of Acceptance for Calibration" as currently published by Airflow Developments Ltd.

The measurements were correct at the time of calibration.

Limb Position	Range	Multi-plier	Inst.Rdg kPa.	True Rdg Pa.
Bottom	0 to 125 Pa.	0.05	2.0	100
Mid	0 to 250 Pa.	0.10	2.0	201
Top	0 to 500 Pa.	0.20	2.0	401
Vertical	0 to 2500 Pa.	1.00	2.0	2002

Calibration temperature 17.8°C Barometric pressure 975.9mb.

This is to certify that the above item has been calibrated in accordance with our Specification and conforms to our published accuracy.

All measured parameters are traceable to BMT Fluid Mechanics Ltd or to National Standards where applicable - see overleaf for reference standards traceability.

It is recommended that this instrument should be re-calibrated annually.

CALIBRATED BY DH [redacted]

AD 110

AIRFLOW

SPECIALISTS IN AIR MOVEMENT TECHNOLO

CERTIFICATE OF CALIBRATION

AIRFLOW DEVELOPMENTS LIMITED
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e.mail: info@airflow.co.uk
http://www.airflow.co.uk

COMPANY CASELLA STANGER
WARD STREET
ETTINGSHALL
WOLVERHAMPTON
WV2 2PJ

INSTRUMENT Mk5 Man.Port. Pa.
SERIAL No. 55165
SPECIFICATION TP001-4

CERTIFICATE NUMBER 1AA04796/2P
DATE CERTIFIED 24/1/02
PART NUMBER H71519801

SERVICE No. A04796/2

CUST. REF. 17745

This Certificate is issued in accordance with QCS 023 "Standard Conditions of Acceptance for Calibration" as currently published by Airflow Developments Ltd.

The measurements were correct at the time of calibration.

Limb Position	Range	Multi-plier	Inst.Rdg kPa.	True Rdg Pa.
Bottom	0 to 125 Pa.	0.05	2.0	100
Mid	0 to 250 Pa.	0.10	2.0	201
Top	0 to 500 Pa.	0.20	2.0	400
Vertical	0 to 2500 Pa.	1.00	2.0	2002

Calibration temperature 20.7°C Barometric pressure 976.6mb.

This is to certify that the above item has been calibrated in accordance with our Specification and conforms to our published accuracy.

All measured parameters are traceable to BMT Fluid Mechanics Ltd or to National Standards where applicable - see overleaf for reference standards traceability.

It is recommended that this instrument should be re-calibrated annually.

CALIBRATED BY DH [redacted]

APPENDIX 3

PROCESS OPERATION

COB Repair Paint Shop Process Operation – 13th November 2002

Panels	Colour	Time Sprayed
Boot Lid	Midnight	10:30
Boot Lid	Quartz	10:45
N/S/R Wing	Midnight	11:20
O/S/R Wing	Platinum	15:15

COB Repair Paint Shop Process Operation – 14th November 2002

Panels	Colour	Time Sprayed
4	Platinum	08:50
1	BRG	09:25
1	Zircon	10:00
1	BRG	12:20
5	Adriatic	13:15
2	Quartz	13:45
1	Ebony	14:15
1	Pacific	15:00
6	Platinum	15:20

COB Repair Paint Shop Process Operation – 15th November 2002

Panels	Colour	Time Sprayed
2	Topaz	07:45
1	Ebony	08:45
1	Midnight	09:05
1	Onyx	09:50
2	Topaz	10:45