

AUGUST 2006

EMISSIONS MONITORING

BROWNS LANE

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Report Number P-RED06-031/EB/R1/Rev0

28th September 2006

PROJECT TEAM

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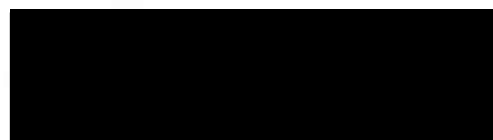
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Date:

28th September 2006

Report reviewed by:

Philip Butler



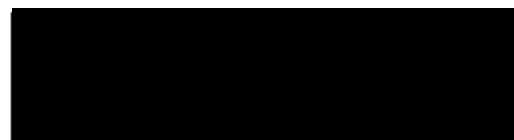
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28th September 2006

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Philip Butler



Signature:

Date:

28th September 2006

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EXECUTIVE SUMMARY

The following document details the emissions to air monitoring survey undertaken by Philip Butler and Vicki Gavin of Redwing Environmental Ltd at Jaguar Cars Ltd, Browns Lane during August 2006.

All results pertain to the dates monitored only; these dates include 15th, 16th and 17th August 2006

A summary of results is shown below:-

Emission point reference Stack N ^o	Total Particulate Matter range at reference conditions (mg/m ³)	Highest 30 minute VOC Concentrations at reference conditions (mg/m ³)	Isocyanate Concentrations at reference conditions (mg/m ³)	Velocity corrected to reference conditions (m/s)	Volume flow corrected to reference conditions (m ³ /hr)
VMC 3 Polyester Auto Cell 1	4.7 to 5.7	53.8 (47.5)	<0.001	7.2	8655
VMC 3 Polyester Auto Cell 2	1.2	48.7 (48.1)	<0.002	3.8	4555
VMC 3 Polyester Auto Cell 3	1.1 to 1.5	32.8 (31.6)	<0.002	9.4	11230
VMC 3 Manual Spray 1	0.1 to 0.5	6.5 (6.3)	<0.001	7.4	12030
VMC 3 Manual Spray 2	2.6 to 15.2	17.8 (15.8)	<0.007	7.8	12752
VMC 3 PU Auto	11.4 to 11.6	26.9 (23.3)	<0.001	9.6	13305

The figures in blue are the average concentrations obtained for the duration of the run

1.0 INTRODUCTION

The monitoring of the seven exhausts were monitored with respect to quotation Q-RED06-031/EB/v0 for the compliance check monitoring of emissions to air. The substances requested for monitoring at each emission point are listed below:

Monitoring Programme

Substances to be monitored	Emission Point Identification					
	VMC 3 Auto Cell 1	VMC 3 Auto Cell 2	VMC 3 Auto Cell 3	VMC 3 Manual 1	VMC 3 Manual 2	VMC 3 PU Auto
Total Particulate Matter	✓	✓	✓	✓	✓	✓
Volatile Organic Compounds	✓	✓	✓	✓	✓	✓
Isocyanates	✓	✓	✓	✓	✓	✓

Special requirements *Monitoring is only carried out during normal operations, no monitoring was carried out during scheduled or unscheduled breaks.*

- 1.1 The emission results will be compared to the results listed in the local authority permit.
- 1.2 The velocity and temperature profiles were within the required parameters of 9:1 (pascals) or 3:1 metres/second and $\pm 1\%$ for temperature profile. This information indicates that the sample ports are in ideal positions to collect the samples under representative conditions.

1.3 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
VMC 3 Polyester Auto Cell 1	Total Particulate Matter	50	4.7 to 5.7	mg/m ³	273, 101.3kPa	16/08/06	1137 – 1209 1215 - 1247	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	47.5	mg/m ³			1137 - 1301	BS EN 13526		
	Isocyanates	0.1	<0.001	mg/m ³			1137 - 1300	MDHS 25/3		
VMC 3 Polyester Auto Cell 2	Total Particulate Matter	50	1.2	mg/m ³	273, 101.3kPa	15/08/06	1156 – 1228 1300 - 1332	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	48.1	mg/m ³			1146 - 1300	BS EN 13526		
	Isocyanates	0.1	<0.002	mg/m ³			1153 - 1253	MDHS 25/3		
VMC 3 Polyester Auto Cell 3	Total Particulate Matter	50	1.1 to 1.5	mg/m ³	273, 101.3kPa	15/08/06	1036 – 1108 1116 - 1148	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	31.6	mg/m ³			1034 - 1500	BS EN 13526		
	Isocyanates	0.1	<0.002	mg/m ³			1034 - 1134	MDHS 25/3		

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
VMC 3 Manual Spray 1	Total Particulate Matter	50	0.1 to 0.50	mg/m ³	273, 101.3kPa	17/08/06	1023 – 1052 1130 - 1200	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	6.3	mg/m ³			1130 - 1230	BS EN 13526		
	Isocyanates	0.1	<0.001	mg/m ³			1022 - 1200	MDHS 25/3		
VMC 3 Manual Spray 2	Total Particulate Matter	50	2.6 to 15.2	mg/m ³	273, 101.3kPa	17/08/06	1210 – 1240 1305 – 1335	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	15.8	mg/m ³			1023 – 1123	BS EN 13526		
	Isocyanates	0.1	<0.001	mg/m ³			1207 - 1335	MDHS 25/3		
VMC 3 PU Auto	Total Particulate Matter	50	11.4 to 11.6	mg/m ³	273, 101.3kPa	16/08/06	1354 – 1426 1438 - 1510	ISO 9096	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	23.3	mg/m ³			1400 - 1500	BS EN 13526		
	Isocyanates	0.1	<0.001	mg/m ³			1350 - 1500	MDHS 25/3		

* Redwing Environmental Ltd are in the process of applying for UKAS accreditation, all site staff are certified to MCerts levels 1 and 2

2 Supporting Information (Held by Redwing Environmental Ltd)

2.1 General Information

2.1.1 Redwing Environmental Ltd staff details

Philip Butler – MCerts Level 2 – TE1 & TE4
Registration number MM 02 016

Vicki Gavin – MCerts Level 1
Registration number MM 02 018

2.2 Redwing Environmental Ltd method details

2.2.1 Test Methods

2.2.2 Particulate matter ISO 9096: 2003 (USEPA method 5 and method 17)

2.2.3 Total particulate matter was sampled using Zambelli isokinetic sampling system in accordance with USEPA method 5 - *Determination of particulate emissions from stationary sources* and USEPA method 17 - *Determination of particulate emissions from stationary sources (In-stack filtration method)*.

2.2.4 The Zambelli sampling system monitors temperature, static pressure and velocities within the duct using an S-type pitot tube and K-type thermocouple. The sampling rate was continuously monitored and adjusted relative to the duct velocity to ensure isokinetic-sampling conditions were maintained throughout the monitoring period.

2.2.5 Exhaust gases were drawn under isokinetic conditions from the exhaust points using the Zambelli sampling probe, particulate matter was then collected on a pre-weighed glass fibre filter (or most suitable filter for process) contained within the filter cassette holder, and the total particulate matter determined gravimetrically.

2.2.6 It was also necessary to wash the probe and nozzle out with water and then acetone between sampling and the weight of the probe washing added to that collected on the sample filter. Analysis of an acetone/water blank was carried out and the result corrected accordingly.

2.2.7 The sample positions were calculated with respect to ISO9096:2003 – Stationary source emissions – Manual determination of mass concentration of particulate matter.

2.2.8 There were no deviations from the method; therefore the uncertainty for the monitoring procedure is reported to be:

Uncertainty: $\pm 30\%$

2.3 Stack Velocity, Pressure and Temperature Measurements

- 2.3.1 The stack velocity, pressure and temperature were measured by full pitot traverses of the duct using the points provided. Measurements were taken at ten equally spaced points along each proposed sampling line, excluding the 5% of the effective flue diameter from the wall.

2.4 Volatile organic compounds (BS EN 13526: 2001)

- 2.4.1 Monitoring to determine VOC emission concentrations was in accordance with BS EN 13526: 2001.
- 2.4.2 Volatile organic compound concentrations were measured using a Signal 3030PM portable heated VOC analyser. 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.
- 2.4.3 The analyser and heated line were zeroed and calibrated with a test gas (80 ppm and 800ppm propane) prior to each sampling run. VOC sampling was undertaken over a period of at least 60 minutes to cover any process variation.
- 2.4.4 All data was logged onto a Grant Squirrel data logger set at 5 second logging intervals.
- 2.4.5 A list of response factors are available so that specific concentrations can be calculated for known solvents within the sample exhaust.
- 2.4.6 A heated line from the sample point to analyser was used to ensure that condensation did not occur leading to the loss of sample concentration.

2.5 Leak tests for extractive techniques

- 2.5.1 All extractive-sampling techniques were tested for leaks before sampling proceeded. Any leaks present were eliminated prior to sampling and will be reported.
- 2.5.2 Leak checks are carried out during the calibration procedure, as the concentration of the calibration gas is known it is easily noticed if air is entering the sample line and diluting the gas.

2.6 Isocyanates (MDHS 25/3)

- 2.6.1 There are several Isocyanates; these include TDI, MDI, HDI and IPDI. The isocyanate monitored was TDI (Toluene diisocyanate). All Isocyanates follow the same procedure for sampling and analysis.
- 2.6.2 Isocyanates can be sampled non-isokinetically following MDHS 25 or isokinetically following the draft US EPA Method 207-1.
- 2.6.3 The method used was the non-isokinetic method. A sample probe was placed inside the stack; the sample probe was then attached to two midjet impingers. The first impinger contained 10mls of 1,2 methoxy-phenyl piperazine and the second impinger was empty.

- 2.6.4 The impingers were then attached to a calibrated sample pump; the pump was left to run for approximately 30 minutes. The pump was then recalibrated and the total volume of the sample gas calculated. In the event of the solution evaporating, the sample volume is made up to 10mls using dry toluene.
- 2.6.5 The samples were then stored in brown glass bottles and submitted for analysis. The samples will then be 'blown down' to dryness using air and made upto 1ml using the most suitable matrix (usually acetonitrile). The sample will then be ready for analysis by HPLC (High Pressure Liquid Chromatography).

3.0 Quality Assurance

- 3.1 Redwing Environmental Ltd will always endeavour to follow the methods specified in the Environment Agency Technical Guidance M2. The methods followed will be listed as our Technical Procedures and will be put forward for UKAS accreditation.
- 3.2 Redwing Environmental Ltd are accredited to ISO 9001: 2000.

4.0 Disclaimer

- 4.1 Redwing Environmental Ltd confirm that in preparing this report all reasonable skill and care has been exercised.
- 4.1.1 Unless specifically assigned or transferred within the terms of the agreement, Redwing Environmental Ltd asserts and retains all copyright, and other Intellectual Property Rights, in and over the report and its contents.

APPENDIX 1

Particulate and Velocity Certificates

Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID		VMC 3 Polyester Auto Cell 1					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	G47/010806/18			G47/010806/19			
Date	16-Aug-06			16-Aug-06			
Sample Period	11:37	to	12:09	12:15	to	12:47	
Velocity (Nm/s)	7.25			7.25			
Volume (Nm ³ /hr)	8545			8545			
Average Stack Temp (°C)	22.00			18.00			
Permitted Temp Range (°C)	20.53	to	23.48	20.53	to	23.48	
Lowest Pitot Reading (pascals)	16.67			16.67			
Highest Pitot Reading (pascals)	76.47			76.47			
Pitot Ratio (less than 9:1)	4.59	:	1	4.59	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	419			412			
Corrected volume sampled (m ³)	0.366			0.360			
Particulate Concentration on Filter (mg/m ³)	4.65			4.73			
Particulate Concentration in Wash (mg/m ³)	1.1			<1.2			
Total Particulate Concentration (mg/m ³)	5.74			4.73			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.050			0.041			

Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID		VMC 3 Polyester Auto Cell 2					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	G47/010806/05			G47/010806/05			
Date	15-Aug-06			15-Aug-06			
Sample Period	11:56	to	12:28	13:00	to	13:32	
Velocity (Nm/s)	3.81			3.81			
Volume (Nm ³ /hr)	4738			4738			
Average Stack Temp (°C)	22.00			22.00			
Permitted Temp Range (°C)	20.53	to	23.48	20.53	to	23.48	
Lowest Pitot Reading (pascals)	4.90			4.90			
Highest Pitot Reading (pascals)	23.53			23.53			
Pitot Ratio (less than 9:1)	4.80	:	1	4.80	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	428			443			
Corrected volume sampled (m ³)	0.373			0.387			
Particulate Concentration on Filter (mg/m ³)	<0.2			<0.2			
Particulate Concentration in Wash (mg/m ³)	<1.2			1.0			
Total Particulate Concentration (mg/m ³)	<1.2			1.03			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	<0.005			0.005			

Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID		VMC 3 Polyester Auto Cell 3					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	G47/010806/02			G47/010806/03			
Date	15-Aug-06			15-Aug-06			
Sample Period	10:36	to	11:08	11:16	to	11:48	
Velocity (Nm/s)	9.40			9.40			
Volume (Nm ³ /hr)	10651			10651			
Average Stack Temp (°C)	20.00			20.00			
Permitted Temp Range (°C)	18.54	to	21.47	18.54	to	21.47	
Lowest Pitot Reading (pascals)	27.45			27.45			
Highest Pitot Reading (pascals)	110.78			110.78			
Pitot Ratio (less than 9:1)	4.04	:	1	4.04	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	563			567			
Corrected volume sampled (m ³)	0.490			0.494			
Particulate Concentration on Filter (mg/m ³)	1.47			1.1			
Particulate Concentration in Wash (mg/m ³)	<1.0			<1.0			
Total Particulate Concentration (mg/m ³)	1.47			1.1			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.017			0.012			

Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID	VMC 3 PU Automatic Spray					
	Jaguar Cars Ltd					
	RUN 1			RUN 2		
Filter Reference No	G47/010806/11			G47/010806/12		
Date	16-Aug-06			16-Aug-06		
Sample Period	13:54	to	14:26	14:38	to	15:10
Velocity (Nm/s)	9.60			9.60		
Volume (Nm ³ /hr)	13014			13014		
Average Stack Temp (°C)	23.00			23.00		
Permitted Temp Range (°C)	21.52	to	24.48	21.52	to	24.48
Lowest Pitot Reading (pascals)	65.69			65.69		
Highest Pitot Reading (pascals)	90.20			90.20		
Pitot Ratio (less than 9:1)	1.37	:	1	1.37	:	1
Moisture (%)	n/a			n/a		
Litres sampled	610			603		
Corrected volume sampled (m ³)	0.631			0.527		
Particulate Concentration on Filter (mg/m ³)	11.4			10.8		
Particulate Concentration in Wash (mg/m ³)	0.2			0.6		
Total Particulate Concentration (mg/m ³)	11.6			11.4		
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a		
Total Particulate Mass Emission (kg/hour)	0.154			0.152		

Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID		VMC 3 Manual Booth 1					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	G47/010806/08			G47/010806/09			
Date	17-Aug-06			17-Aug-06			
Sample Period	10:23	to	10:52	11:30	to	12:00	
Velocity (Nm/s)	7.37			7.37			
Volume (Nm ³ /hr)	12056			12056			
Average Stack Temp (°C)	25.00			25.00			
Permitted Temp Range (°C)	23.51	to	26.49	23.51	to	26.49	
Lowest Pitot Reading (pascals)	38.24			38.24			
Highest Pitot Reading (pascals)	49.02			49.02			
Pitot Ratio (less than 9:1)	1.28	:	1	1.28	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	465			461			
Corrected volume sampled (m ³)	0.409			0.407			
Particulate Concentration on Filter (mg/m ³)	0.10			0.49			
Particulate Concentration in Wash (mg/m ³)	<1.2			<1.2			
Total Particulate Concentration (mg/m ³)	0.10			0.49			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.001			0.006			

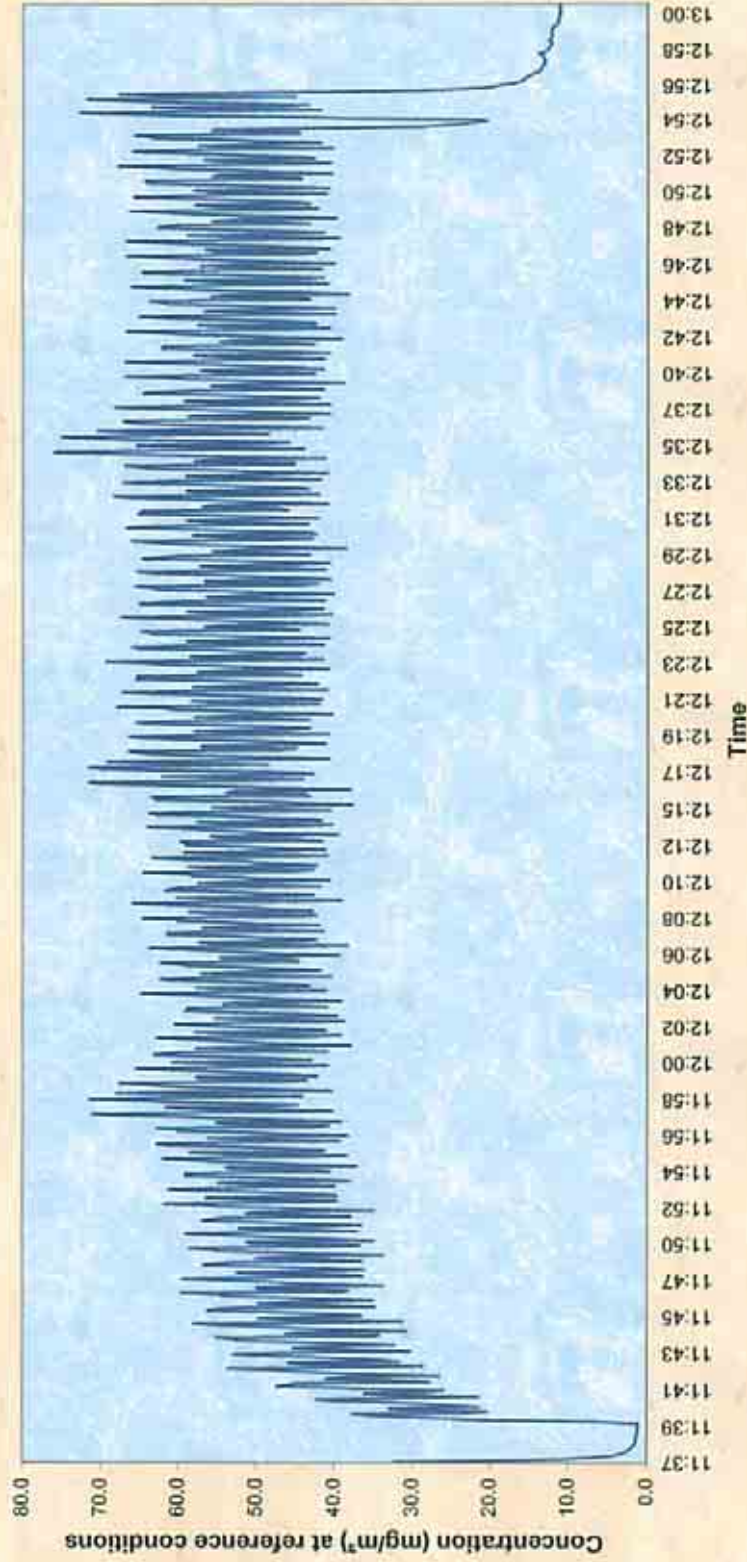
Certificate - Total Particulate Matter (TPM) & Velocity

Stack Reference ID		VMC 3 Manual Booth 2					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	G47/010806/14			G47/010806/15			
Date	17-Aug-06			17-Aug-06			
Sample Period	12:10	to	12:40	13:05	to	13:35	
Velocity (Nm/s)	10.90			10.90			
Volume (Nm ³ /hr)	1932			1932			
Average Stack Temp (°C)	25.00			25.00			
Permitted Temp Range (°C)	23.51	to	26.49	23.51	to	26.49	
Lowest Pitot Reading (pascals)	77.45			77.45			
Highest Pitot Reading (pascals)	120.59			120.59			
Pitot Ratio (less than 9:1)	1.56	:	1	1.56	:	1	
Molsture (%)	n/a			n/a			
Litres sampled	716			697			
Corrected volume sampled (m ³)	0.623			0.610			
Particulate Concentration on Filter (mg/m ³)	3.64			1.0			
Particulate Concentration in Wash (mg/m ³)	11.6			1.6			
Total Particulate Concentration (mg/m ³)	15.20			2.6			
Total Particulate Concentration corrected for molsture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.029			0.005			

APPENDIX 2

Volatile Organic Compound Charts

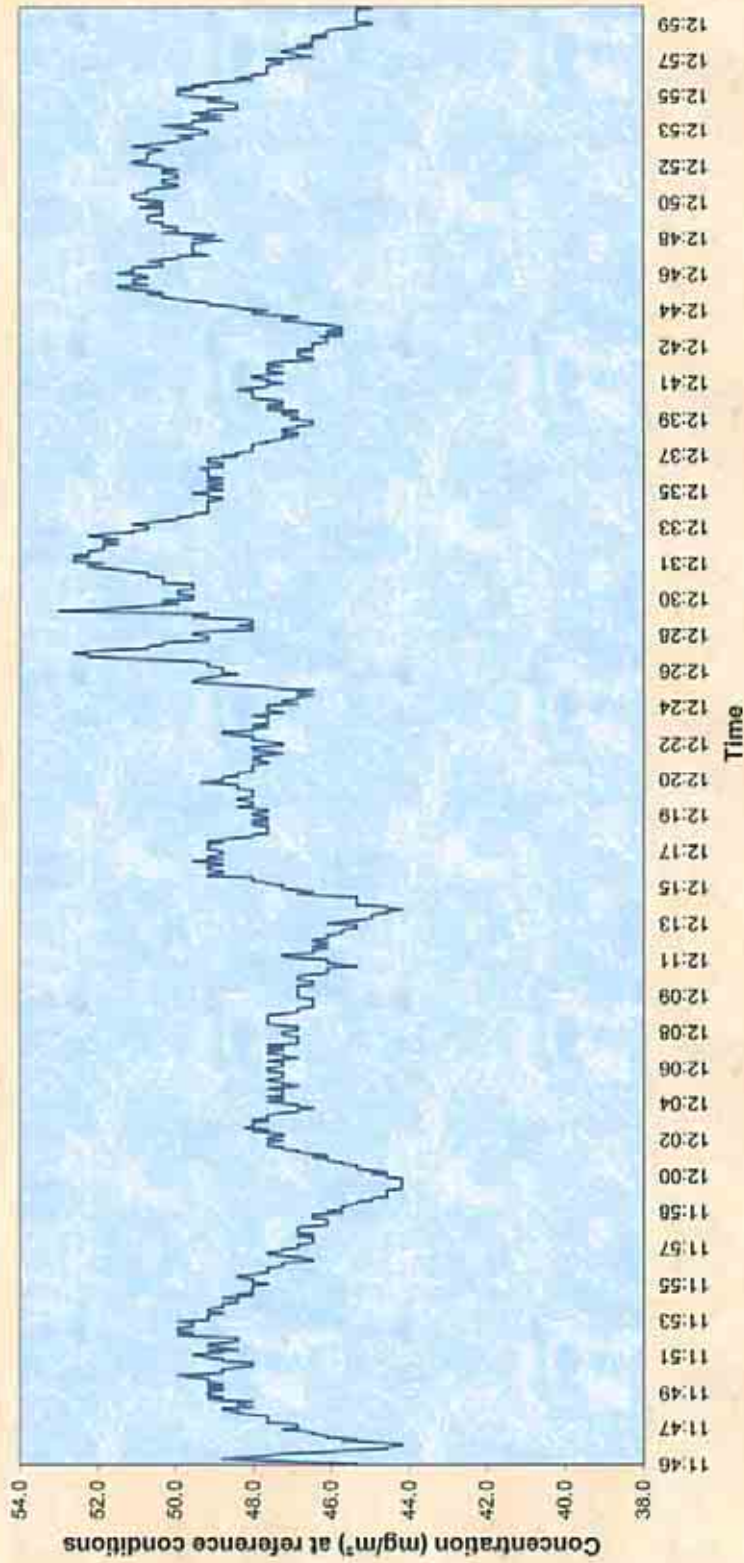
VMC 3 Polyester Automatic Cell 1 - VOC Monitoring (16/08/06)



Average Run Time		Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
		Mean	Max	Min	Mean	Max	Min
11:37	to	12:07	27.44	44.44	0.74	44.09	1.18
12:07	to	12:37	33.46	47.29	23.47	53.78	37.72

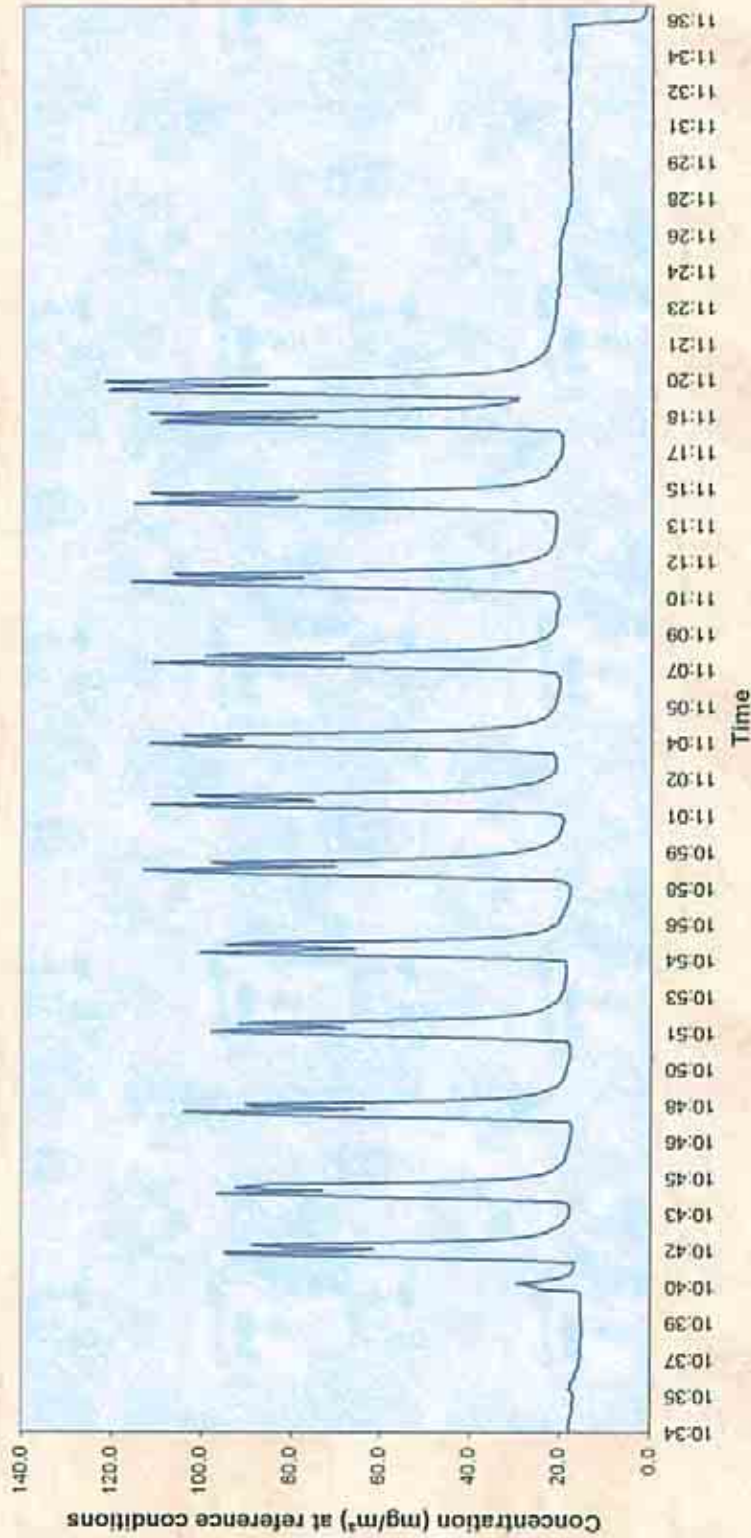
VMC 3 Polyester Automatic Cell 1 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
16-Aug-06	11:37:34	32.33	16-Aug-06	12:26:34	41.55
16-Aug-06	11:38:34	1.65	16-Aug-06	12:27:34	53.98
16-Aug-06	11:39:34	1.18	16-Aug-06	12:28:34	63.01
16-Aug-06	11:40:34	31.58	16-Aug-06	12:29:34	59.89
16-Aug-06	11:41:34	28.55	16-Aug-06	12:30:34	42.92
16-Aug-06	11:42:34	35.07	16-Aug-06	12:31:34	58.94
16-Aug-06	11:43:34	43.53	16-Aug-06	12:32:34	40.93
16-Aug-06	11:44:34	52.37	16-Aug-06	12:33:34	51.38
16-Aug-06	11:45:34	41.97	16-Aug-06	12:34:34	63.62
16-Aug-06	11:46:34	42.54	16-Aug-06	12:35:34	75.77
16-Aug-06	11:47:34	49.96	16-Aug-06	12:36:34	48.55
16-Aug-06	11:48:34	36.21	16-Aug-06	12:37:34	58.85
16-Aug-06	11:49:34	47.51	16-Aug-06	12:38:34	44.91
16-Aug-06	11:50:34	56.01	16-Aug-06	12:39:34	46.70
16-Aug-06	11:51:34	54.60	16-Aug-06	12:40:34	56.01
16-Aug-06	11:52:34	39.80	16-Aug-06	12:41:34	62.06
16-Aug-06	11:53:34	54.97	16-Aug-06	12:42:34	48.21
16-Aug-06	11:54:34	37.15	16-Aug-06	12:43:34	49.82
16-Aug-06	11:55:34	46.61	16-Aug-06	12:44:34	53.79
16-Aug-06	11:56:34	60.03	16-Aug-06	12:45:34	41.50
16-Aug-06	11:57:34	71.14	16-Aug-06	12:46:34	53.93
16-Aug-06	11:58:34	44.15	16-Aug-06	12:47:34	62.73
16-Aug-06	11:59:34	57.38	16-Aug-06	12:48:34	60.17
16-Aug-06	12:00:34	47.98	16-Aug-06	12:49:34	42.26
16-Aug-06	12:01:34	47.41	16-Aug-06	12:50:34	58.09
16-Aug-06	12:02:34	52.61	16-Aug-06	12:51:34	40.46
16-Aug-06	12:03:34	57.48	16-Aug-06	12:52:34	51.57
16-Aug-06	12:04:34	48.03	16-Aug-06	12:53:34	63.29
16-Aug-06	12:05:34	51.76	16-Aug-06	12:54:34	20.47
16-Aug-06	12:06:34	54.78	16-Aug-06	12:55:34	43.39
16-Aug-06	12:07:34	42.45	16-Aug-06	12:56:34	21.55
16-Aug-06	12:08:34	53.65	16-Aug-06	12:57:34	13.76
16-Aug-06	12:09:34	61.69	16-Aug-06	12:58:34	13.85
16-Aug-06	12:10:34	59.56	16-Aug-06	12:59:34	12.05
16-Aug-06	12:11:34	42.73	16-Aug-06	13:00:34	11.30
16-Aug-06	12:12:34	59.32			
16-Aug-06	12:13:34	39.56	Average		47.53
16-Aug-06	12:14:34	48.83			
16-Aug-06	12:15:34	62.96			
16-Aug-06	12:16:34	71.52			
16-Aug-06	12:17:34	48.55			
16-Aug-06	12:18:34	57.05			
16-Aug-06	12:19:34	45.52			
16-Aug-06	12:20:34	48.31			
16-Aug-06	12:21:34	55.64			
16-Aug-06	12:22:34	65.04			
16-Aug-06	12:23:34	51.00			
16-Aug-06	12:24:34	51.19			
16-Aug-06	12:25:34	54.97			

VMC 3 Polyester Automatic Cell 2 - VOC Monitoring (15/08/06)



Average Run Time		Volatile Organic Compound (ppm)		Volatile Organic Compound (mg/m³)	
		Mean	Max	Mean	Min
11:46	to	29.32	31.07	47.12	49.94
12:16	to	30.32	32.98	48.72	53.00
					44.20
					45.73

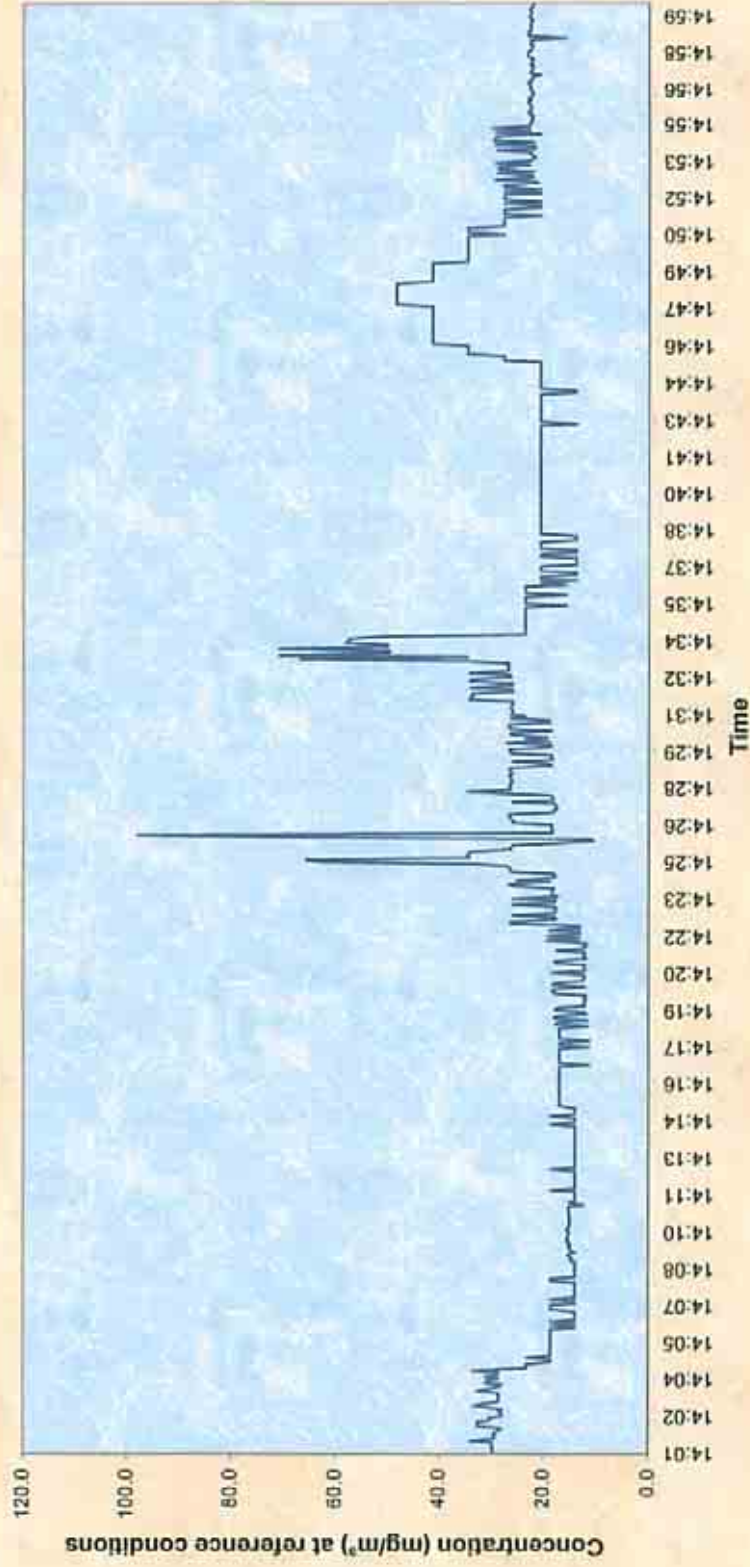
VMC 3 Polyester Automatic Cell 3 - VOC Monitoring (15/08/06)



Average Run Time		Volatile Organic Compound (ppm)		Volatile Organic Compound (mg/m³)	
		Mean	Max	Mean	Min
10:34	to	11:04	70.25	9.35	32.16
11:04	to	11:34	75.75	11.05	32.81
					112.90
					121.74
					15.03
					17.76

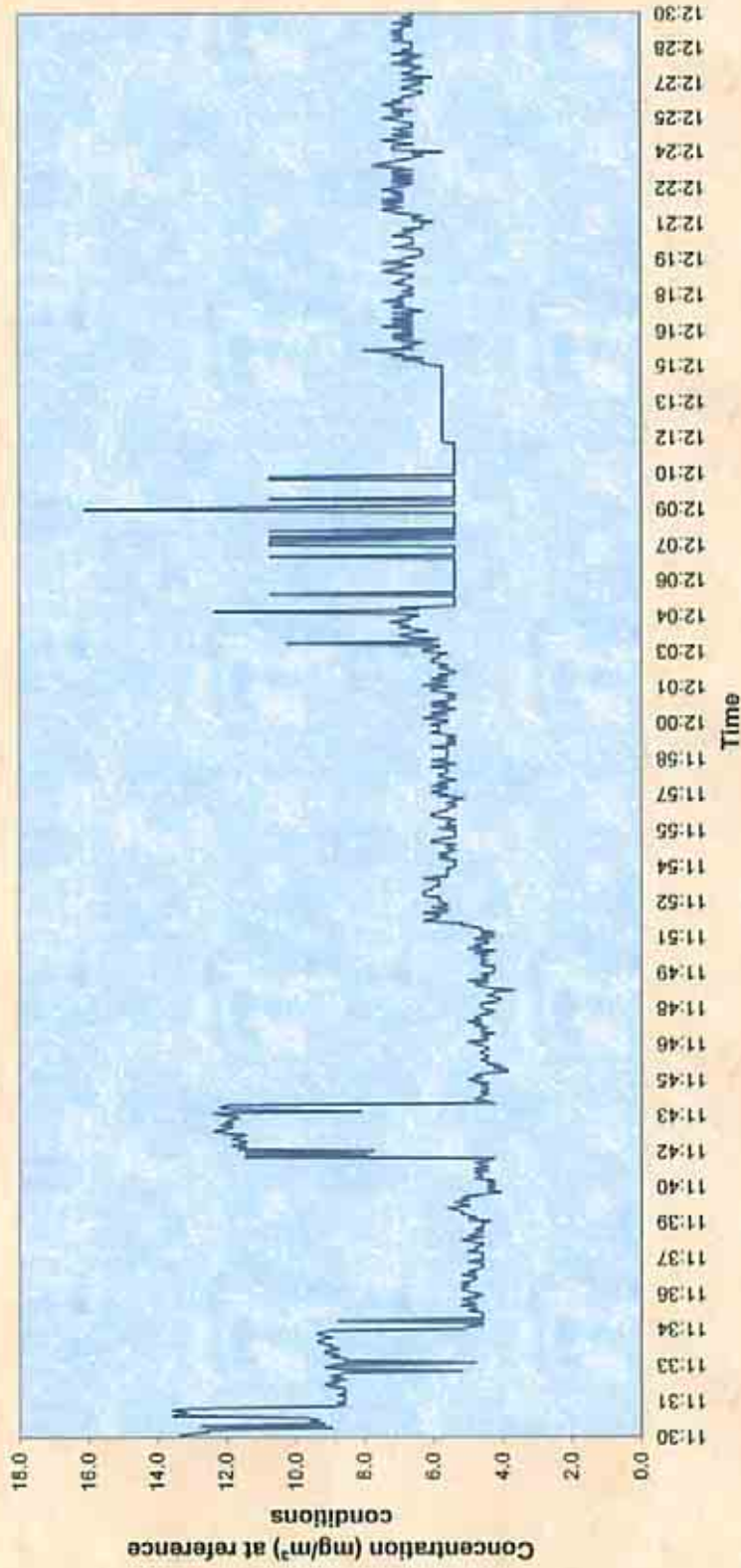
VMC 3 Polyester Automatic Cell 3 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
15-Aug-06	10:34:17	17.60	15-Aug-06	11:23:17	21.29
15-Aug-06	10:35:17	17.12	15-Aug-06	11:24:17	20.49
15-Aug-06	10:36:17	17.44	15-Aug-06	11:25:17	20.33
15-Aug-06	10:37:17	15.83	15-Aug-06	11:26:17	20.33
15-Aug-06	10:38:17	15.35	15-Aug-06	11:27:17	18.88
15-Aug-06	10:39:17	15.35	15-Aug-06	11:28:17	17.92
15-Aug-06	10:40:17	15.35	15-Aug-06	11:29:17	18.40
15-Aug-06	10:41:17	17.12	15-Aug-06	11:30:17	18.24
15-Aug-06	10:42:17	82.13	15-Aug-06	11:31:17	18.40
15-Aug-06	10:43:17	19.53	15-Aug-06	11:32:17	18.08
15-Aug-06	10:44:17	20.65	15-Aug-06	11:33:17	18.24
15-Aug-06	10:45:17	32.71	15-Aug-06	11:34:17	18.08
15-Aug-06	10:46:17	18.72			
15-Aug-06	10:47:17	17.60		Average	31.63
15-Aug-06	10:48:17	72.96			
15-Aug-06	10:49:17	21.13			
15-Aug-06	10:50:17	18.24			
15-Aug-06	10:51:17	18.24			
15-Aug-06	10:52:17	40.50			
15-Aug-06	10:53:17	19.69			
15-Aug-06	10:54:17	18.56			
15-Aug-06	10:55:17	77.14			
15-Aug-06	10:56:17	22.26			
15-Aug-06	10:57:17	18.40			
15-Aug-06	10:58:17	19.04			
15-Aug-06	10:59:17	52.63			
15-Aug-06	11:00:17	20.49			
15-Aug-06	11:01:17	22.74			
15-Aug-06	11:02:17	38.01			
15-Aug-06	11:03:17	20.97			
15-Aug-06	11:04:17	111.62			
15-Aug-06	11:05:17	25.15			
15-Aug-06	11:06:17	20.73			
15-Aug-06	11:07:17	20.97			
15-Aug-06	11:08:17	61.39			
15-Aug-06	11:09:17	21.62			
15-Aug-06	11:10:17	20.33			
15-Aug-06	11:11:17	107.28			
15-Aug-06	11:12:17	27.24			
15-Aug-06	11:13:17	21.29			
15-Aug-06	11:14:17	21.29			
15-Aug-06	11:15:17	83.41			
15-Aug-06	11:16:17	22.26			
15-Aug-06	11:17:17	19.69			
15-Aug-06	11:18:17	109.53			
15-Aug-06	11:19:17	30.13			
15-Aug-06	11:20:17	61.55			
15-Aug-06	11:21:17	24.35			
15-Aug-06	11:22:17	21.78			

VMC 3 PU Automatic Spray - VOC (16/08/06)



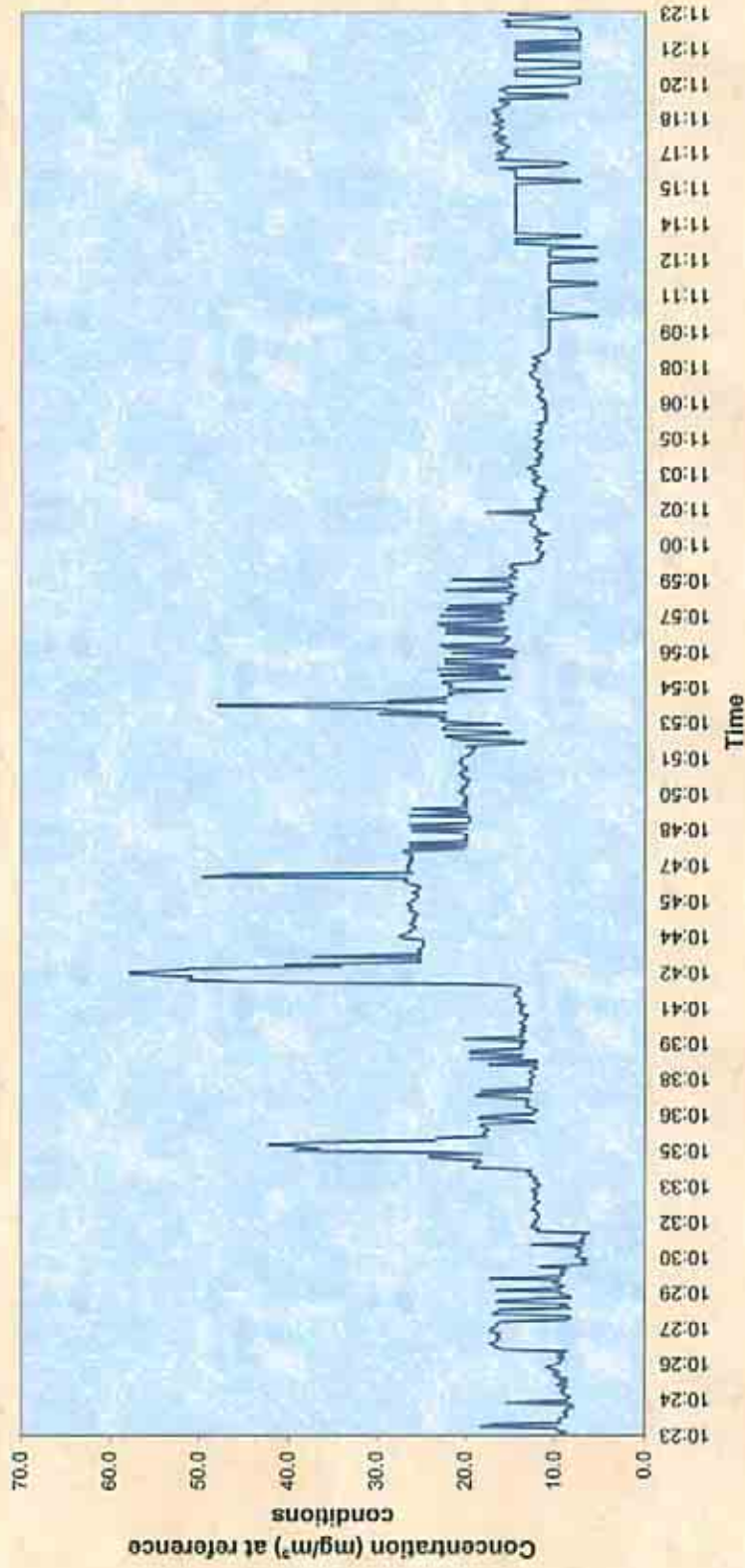
Average Run Time		Volatile Organic Compound (ppm)		Volatile Organic Compound (mg/m³)	
		Mean	Max	Mean	Max
14:01	to 14:31	12.32	61.01	19.80	98.04
14:31	to 15:01	16.71	44.10	26.86	70.88
					10.63
					13.82

VMC 3 Manual Spray Booth 1 - VOC Monitoring (17/09/06)



Average Run Time		Volatile Organic Compound (ppm)		Volatile Organic Compound (mg/m³)	
		Mean	Max	Mean	Min
11:30	to	3.85	8.43	6.19	3.70
12:00	to	4.03	10.02	6.47	5.36

VMC 3 Manual Spray Booth 2 - VOC Monitoring (17/08/06)



Average Run Time		Volatile Organic Compound (ppm)		Volatile Organic Compound (mg/m ³)	
		Mean	Max	Mean	Max
10:23	10:53	11.05	35.90	17.76	57.69
10:53	11:23	8.62	29.82	13.86	47.93
					6.19
					5.37

VMC 3 Manual Spray Booth 2 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
17-Aug-06	10:23:00	9.40	17-Aug-06	11:12:00	10.74
17-Aug-06	10:24:00	8.65	17-Aug-06	11:13:00	5.37
17-Aug-06	10:25:00	8.65	17-Aug-06	11:14:00	14.46
17-Aug-06	10:26:00	9.40	17-Aug-06	11:15:00	14.46
17-Aug-06	10:27:00	16.55	17-Aug-06	11:16:00	14.46
17-Aug-06	10:28:00	8.65	17-Aug-06	11:17:00	16.27
17-Aug-06	10:29:00	9.40	17-Aug-06	11:18:00	16.27
17-Aug-06	10:30:00	8.65	17-Aug-06	11:19:00	15.91
17-Aug-06	10:31:00	12.66	17-Aug-06	11:20:00	7.23
17-Aug-06	10:32:00	12.38	17-Aug-06	11:21:00	14.46
17-Aug-06	10:33:00	12.38	17-Aug-06	11:22:00	7.23
17-Aug-06	10:34:00	12.66	17-Aug-06	11:23:00	15.19
17-Aug-06	10:35:00	39.38			
17-Aug-06	10:36:00	18.28		Average	15.80
17-Aug-06	10:37:00	13.22			
17-Aug-06	10:38:00	12.66			
17-Aug-06	10:39:00	13.65			
17-Aug-06	10:40:00	13.34			
17-Aug-06	10:41:00	13.96			
17-Aug-06	10:42:00	20.16			
17-Aug-06	10:43:00	25.43			
17-Aug-06	10:44:00	27.61			
17-Aug-06	10:45:00	25.74			
17-Aug-06	10:46:00	25.43			
17-Aug-06	10:47:00	26.68			
17-Aug-06	10:48:00	19.85			
17-Aug-06	10:49:00	19.54			
17-Aug-06	10:50:00	20.47			
17-Aug-06	10:51:00	19.85			
17-Aug-06	10:52:00	19.94			
17-Aug-06	10:53:00	22.25			
17-Aug-06	10:54:00	22.59			
17-Aug-06	10:55:00	22.94			
17-Aug-06	10:56:00	14.38			
17-Aug-06	10:57:00	15.40			
17-Aug-06	10:58:00	15.06			
17-Aug-06	10:59:00	21.57			
17-Aug-06	11:00:00	11.81			
17-Aug-06	11:01:00	12.08			
17-Aug-06	11:02:00	11.54			
17-Aug-06	11:03:00	12.35			
17-Aug-06	11:04:00	11.81			
17-Aug-06	11:05:00	12.35			
17-Aug-06	11:06:00	11.27			
17-Aug-06	11:07:00	11.54			
17-Aug-06	11:08:00	12.08			
17-Aug-06	11:09:00	10.74			
17-Aug-06	11:10:00	10.74			
17-Aug-06	11:11:00	10.74			

APPENDIX 3

Velocity raw information

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED06-031/EB/R1/Rev0				
Date	16/08/2006	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Butler				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Polyester Auto Cell 1	Isokinetic Sampling Method			ISO 9096
Number of Stacks	1	Samples per Axis			2
Configuration (Round / Rectangular)	Round	Stack Area (m2)			0.332
Dimensions (mtrs)	0.65	Isokinetic Sample Points (cms)			
Outlet Diameter (if applicable) (mtrs/sec)		1	9.49	5	N/A
Number of Sample Ports	2	2	55.51	6	N/A
Number of Samples per Axis / Port	2	3	N/A	7	N/A
Nozzle Diameter (mm)	8.0	4	N/A	8	N/A
Nozzle Area (mm²)	50.272	Average Isokinetic Flow Rate (ltrs/min)		1 Axis	2 Axis
				21.58	22.13
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 05	
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)
					Atmos. Pressure (mbars)
1	4.2	0.66	22.0	0.77	22.0
2	9.8	0.76	22.0	0.78	22.0
3	16.3	0.45	22.0	0.43	22.0
4	22.8	0.43	22.0	0.44	22.0
5	29.3	0.45	22.0	0.47	22.0
6	35.8	0.41	22.0	0.56	22.0
7	42.3	0.34	22.0	0.41	22.0
8	48.8	0.33	22.0	0.35	22.0
9	55.3	0.34	22.0	0.24	22.0
10	61.8	0.22	22.0	0.17	22.0
Averages		0.44	22.0	0.46	22.0
					Static Pressure (cm H2O)
					1010
					-0.43
					1 Axis
					2 Axis
					Average Velocity Flow (m/s)
					7.25
					Average Volume Flow (Nm³/s)
					2.40
					Volume (m³/s)
					2.37
					2.43
					Velocity of flow (m/s)
					7.15
					7.34
					Reduced Exit Velocity (m/s)
					N/A
					N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2) + 273$ =					
295.00					
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273)$ =					
20.53 to 23.48					
Highest Pitot Static Reading (either sampling line) (cm H2O) =					
0.8					
Lowest Pitot Static Reading (either sampling line) (cm H2O) =					
0.2					
Ratio Highest/Lowest (Max permitted = 9:1)					
4.59 : 1					
On site Checklist					
Manometer Leak Check	ok	Instrument		Serial No:	
Range of Gas Temps	ok	Manometer	RED 0095		
Leak Check (l/min)	<0.10	Temp Indicator	RED 0086		
Leak Check 2% Vol (l/min)	0.43	Thermocouple	RED 0156		
Swirl Test (<15°)	ok	Pitot Tube	RED 0156		

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED06-031/EB/R1/Rev0				
Date	15/08/2006	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Butler				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Polyester Auto Cell 2	Isokinetic Sampling Method			ISO 9096
		Samples per Axis			2
Number of Stacks	1	Stack Area (m2)			0.332
Configuration (Round / Rectangular)	Round	Isokinetic Sample Points (cms)			
Dimensions (mtrs)	0.65	1	9.49	5	N/A
Outlet Diameter (if applicable) (mtrs/sec)		2	55.51	6	N/A
Number of Sample Ports	2	3	N/A	7	N/A
Number of Samples per Axis / Port	2	4	N/A	8	N/A
Nozzle Diameter (mm)	8.0			1 Axis	2 Axis
Nozzle Area (mm²)	50.272	Average Isokinetic Flow Rate (ltrs/min)		11.96	11.04
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 06	
				Atmos. Pressure (mbars)	
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)
					1010
					Static Pressure (cm H2O)
1	4.2	0.24	22.0	0.13	22.0
					-0.15
2	9.6	0.23	22.0	0.15	22.0
					1 Axis 2 Axis
3	16.3	0.21	22.0	0.08	22.0
					Average Velocity Flow (m/s)
4	22.8	0.16	22.0	0.08	22.0
					3.81
5	29.3	0.08	22.0	0.11	22.0
					Average Volume Flow (Nm³/s)
6	35.8	0.11	22.0	0.14	22.0
					1.27
7	42.3	0.1	22.0	0.12	22.0
					Volume (m³/s)
8	48.8	0.08	22.0	0.12	22.0
					1.32 1.21
9	55.3	0.09	22.0	0.12	22.0
					Velocity of flow (m/s)
10	61.6	0.05	22.0	0.1	22.0
					3.97 3.66
Averages		0.14	22.0	0.12	22.0
					Reduced Exit Velocity (m/s)
					N/A N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2 + 273) =$					
295.00					
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273) =$					
20.53 to 23.48					
Highest Pitot Static Reading (either sampling line) (cm H2O) =					
0.2					
Lowest Pitot Static Reading (either sampling line) (cm H2O) =					
0.1					
Ratio Highest/Lowest (Max permitted = 9:1)					
4.80 : 1					
On site Checklist					
Manometer Leak Check	ok			Instrument	Serial No:
Range of Gas Temps	ok			Manometer	RED 0095
Leak Check (l/min)	<0.10			Temp Indicator	RED 0096
Leak Check 2% Vol (l/min)	0.24			Thermocouple	RED 0166
Sweet Test (<15°)	ok			Pitot Tube	RED 0166

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED06-031/EE/R1/Rev01				
Date	15/08/2005	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Butler				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Polyester Auto Cell 3	Isokinetic Sampling Method			ISO 9096
Number of Stacks	1	Samples per Axis			2
Configuration (Round / Rectangular)	Round	Stack Area (m ²)			0.332
Dimensions (mtrs)	0.65	Isokinetic Sample Points (cms)			
Outlet Diameter (if applicable) (mtrs/sec)		1	9.49	5	N/A
Number of Sample Ports	2	2	55.51	6	N/A
Number of Samples per Axis / Port	2	3	N/A	7	N/A
Nozzle Diameter (mm)	6.0	4	N/A	8	N/A
Nozzle Area (mm ²)	28.278	Average Isokinetic Flow Rate (ltrs/min)		1 Axis	2 Axis
				15.13	16.77
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 06	
Position No.	Distance (cms)	Axis 1 (cm H ₂ O)	Temperature (C)	Axis 2 (cm H ₂ O)	Temperature (C)
1	4.2	0.48	20.0	0.57	20.0
2	9.8	0.61	20.0	1.09	20.0
3	16.3	0.63	20.0	1.13	20.0
4	22.8	0.62	20.0	0.98	20.0
5	29.3	0.7	20.0	0.8	20.0
6	35.8	0.92	20.0	0.76	20.0
7	42.3	0.93	20.0	0.83	20.0
8	48.8	0.97	20.0	0.77	20.0
9	55.3	0.73	20.0	0.63	20.0
10	61.8	0.28	20.0	0.58	20.0
Averages		0.69	20.0	0.64	20.0
				Atmos. Pressure (mbars)	
				1010	
				Static Pressure (cm H ₂ O)	
				-0.11	
				Average Velocity Flow (m/s)	
				9.40	
				Average Volume Flow (Nm ³ /s)	
				3.12	
				Volume (m ³ /s)	
				2.96 3.28	
				Velocity of flow (m/s)	
				8.92 9.88	
				Reduced Exit Velocity (m/s)	
				N/A N/A	
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2) + 273) =$					
293.00					
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273) =$					
19.54 to 21.47					
Highest Pitot Static Reading (either sampling line) (cm H ₂ O) =					
1.1					
Lowest Pitot Static Reading (either sampling line) (cm H ₂ O) =					
0.3					
Ratio Highest/Lowest (Max permitted = 9:1)					
4.04 : 1					
On site Checklist				Instrument Serial No:	
Manometer Leak Check	ok	Manometer	RED 0095		
Range of Gas Temps	ok	Temp Indicator	RED 0096		
Leak Check (l/min)	<0.10	Thermocouple	RED 0156		
Leak Check 2% Vol (l/min)	0.30	Pitot Tube	RED 0156		
Swirl Test (+15°)	ok				

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED06-031/EB/R1/Rev0				
Date	16/08/2006	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Buder				
Isokinetic Sampling Information					
Stack Reference	VMC 3 PU Automatic Spray	Isokinetic Sampling Method			ISO 9096
Number of Stacks	1	Samples per Axis			2
Configuration (Round / Rectangular)	Round	Stack Area (m²)			0.385
Dimensions (mtrs)	0.70	Isokinetic Sample Points (cms)			
Outlet Diameter (if applicable) (mtrs/sec)		1	10.22	5	N/A
Number of Sample Ports	2	2	59.78	6	N/A
Number of Samples per Axis / Port	2	3	N/A	7	N/A
Nozzle Diameter (mm)	6.0	4	N/A	8	N/A
Nozzle Area (mm²)	28.278	Average Isokinetic Flow Rate (ltrs/min)		15.94	16.65
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 2006	
Position No.	Distance (cms)	Axis 1 (cm H₂O)	Temperature (C)	Axis 2 (cm H₂O)	Temperature (C)
					Atmos. Pressure (mbars)
1	4.6	0.7	22.9	0.92	23.0
2	10.5	0.74	23.0	0.87	23.0
3	17.5	0.67	23.0	0.84	23.0
4	24.5	0.72	23.0	0.79	23.0
5	31.5	0.74	23.0	0.72	23.0
6	38.5	0.71	23.0	0.75	23.0
7	45.5	0.83	23.0	0.78	23.0
8	52.5	0.74	23.0	0.80	23.0
9	59.5	0.83	23.0	0.85	23.0
10	66.5	0.87	23.0	0.83	23.0
Averages		0.76	23.0	0.82	23.0
					Static Pressure (cm H₂O)
					1009
					0.16
					1 Axis 2 Axis
					Average Velocity Flow (m/s)
					9.60
					Average Volume Flow (Nm³/s)
					3.70
					Volume (m³/s)
					3.61 3.78
					Velocity of flow (m/s)
					9.39 9.81
					Reduced Exit Velocity (m/s)
					N/A N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2 + 273) =$					
296.00					
Permitted range of gas temperature readings (C) = $(0.995(p-273))$ to $(1.005(p-273)) =$					
21.62 to 24.48					
Highest Pitot Static Reading (either sampling line) (cm H₂O) =					
0.9					
Lowest Pitot Static Reading (either sampling line) (cm H₂O) =					
0.7					
Ratio Highest/Lowest (Max permitted = 9:1)					
1.37 : 1					
On site Checklist					
Manometer Leak Check	ok	Instrument		Serial No:	
Range of Gas Temps	ok	Manometer	RED 0095		
Leak Check (l/min)	<0.10	Temp Indicator	RED 0096		
Leak Check 2% Vol (l/min)	0.32	Thermocouple	RED 0156		
Swrl Test (<15°)	ok	Pitot Tube	RED 0156		

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED05-031/EB/R1/Rev0				
Date	17/08/2006	Port Depth (cm)			
Operator(s)	Philip Butler & Vicki Gavin				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Manual Booth 1	Isokinetic Sampling Method			ISO 9096
Number of Stacks	1	Samples per Axis			4
Configuration (Round / Rectangular)	Round	Stack Area (m2)			0.454
Dimensions (mtrs)	0.75	Isokinetic Sample Points (cms)			
Outlet Diameter (if applicable) (mtrs/sec)		1	5.09	5	N/A
Number of Sample Ports	2	2	19.00	6	N/A
Number of Samples per Axis / Port	4	3	57.00	7	N/A
Nozzle Diameter (mm)	6.0	4	70.91	8	N/A
Nozzle Area (mm ²)	28.278	Average Isokinetic Flow Rate (ltrs/min)		1 Axis	2 Axis
				12.52	12.47
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 06	
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)
1	4.9	0.45	25.0	0.44	25.0
2	11.4	0.44	25.0	0.43	25.0
3	19.0	0.45	25.0	0.45	25.0
4	26.6	0.46	25.0	0.43	25.0
5	34.2	0.5	25.0	0.45	25.0
6	41.8	0.49	25.0	0.47	25.0
7	49.4	0.5	25.0	0.48	25.0
8	57.0	0.5	25.0	0.49	25.0
9	64.6	0.45	25.0	0.48	25.0
10	72.2	0.39	25.0	0.47	25.0
Averages		0.46	25.0	0.45	25.0
				Atmos. Pressure (mbars)	
				1020	
				Static Pressure (cm H2O)	
				-0.15	
				1 Axis	
				2 Axis	
				Average Velocity Flow (m/s)	
				7.37	
				Average Volume Flow (Nm ³ /s)	
				3.34	
				Volume (m ³ /s)	
				3.35	
				3.33	
				Velocity of flow (m/s)	
				7.36	
				7.35	
				Reduced Exit Velocity (m/s)	
				N/A	
				N/A	
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2) \div 2) + 273$ =					
298.60					
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273)$ =					
23.51 to 28.49					
Highest Pitot Static Reading (either sampling line) (cm H2O) =					
0.5					
Lowest Pitot Static Reading (either sampling line) (cm H2O) =					
0.4					
Ratio Highest/Lowest (Max permitted = 9:1)					
1.28 : 1					
On site Checklist					
Manometer Leak Check	ok	Instrument		Serial No:	
Range of Gas Temps	ok	Manometer		RED 0095	
Leak Check (l/min)	<0.10	Temp Indicator		RED 0096	
Leak Check 2% Vol (l/min)	0.25	Thermocouple		RED 0156	
Swab Test (<15%)	ok	Pitot Tube		RED 0156	

Raw Data: VELOCITY PROFILE

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED06-031/EB/R1/Rev0				
Date	17/08/2006	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Butler				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Manual Booth 2	Isokinetic Sampling Method			ISO 9096
		Samples per Axis			2
Number of Stacks	1	Stack Area (m2)			0.049
Configuration (Round / Rectangular)	Round	Isokinetic Sample Points (cms)			
Dimensions (mtrs)	0.25	1	3.65	5	N/A
Outlet Diameter (if applicable) (mtrs/sec)		2	21.35	6	N/A
Number of Sample Ports	2	3	N/A	7	N/A
Number of Samples per Axis / Port	2	4	N/A	8	N/A
Nozzle Diameter (mm)	6.0			1 Axis	2 Axis
Nozzle Area (mm ²)	28.278	Average Isokinetic Flow Rate (ltrs/min)		18.55	18.44
Duct Survey					
Pitot Coefficient	0.82	Pitot Calibration Date		November 06	
				Atmos. Pressure (mbars)	
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)
					1010
					Static Pressure (cm H2O)
1	1.6	1.09	25.0	0.97	-0.41
2	3.8	1.05	25.0	1.01	25.0
3	6.3	1.14	25.0	1.12	25.0
4	8.8	1.18	25.0	1.07	25.0
5	11.3	1.23	25.0	1.05	25.0
6	13.8	1.07	25.0	0.97	25.0
7	16.3	0.8	25.0	0.54	25.0
8	18.8	0.97	25.0	0.93	25.0
9	21.3	0.79	25.0	0.90	25.0
10	23.8	0.83	25.0	1.01	25.0
Averages		1.02	25.0	1.00	25.0
					Reduced Exit Velocity (m/s)
					N/A
					N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2) + 273$ =					298.00
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273)$ =					23.51 to 26.49
Highest Pitot Static Reading (either sampling line) (cm H2O) =					1.2
Lowest Pitot Static Reading (either sampling line) (cm H2O) =					0.8
Ratio Highest/Lowest (Max permitted = 8:1)					1.56 : 1
On site Checklist					
Manometer Leak Check	ok			Instrument	Serial No:
Range of Gas Temps	ok			Manometer	RED 0095
Leak Check (l/min)	<0.10			Temp Indicator	RED 0096
Leak Check 2% Vol (l/min)	0.37			Thermocouple	RED 0156
Dwell Test (<15")	ok			Pitot Tube	RED 0156

APPENDIX 4

Isocyanate Results

CERTIFICATE OF SAMPLING AND ANALYSIS RESULTS

Client	Jaguar Cars Ltd
Site Address	Drowns Lane, Coventry
Job Number	P-RED06-031/EBR1/Rev.0
Date	15th, 16th and 17th August 2006
Operator(s)	Philip Butler & Vicki Gynn

Pump Reference	Sample ID	Location / Process / Operator	Pump Flow (ml/min)			Sample Duration (mins)			Total Volume (l)	Mass of Analyte (ug)	Concentration (mg/Nm3)
			Initial	2000.00	Start	Finish	Total	Start			
Yellow - 45	05/031BL/09	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 3 15th August 2006	Initial	2000.00	Start	10.34			120	<0.2	<0.002
			Final	2000.00	Finish	11.34					
			Average	2000.00	Total	60					
Yellow - 45	05/031BL/10	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 2 15th August 2006	Initial	2000.00	Start	11.53			120	<0.2	<0.002
			Final	2000.00	Finish	12.53					
			Average	2000.00	Total	60					
Yellow - 47	05/031BL/15	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 1 16th August 2006	Initial	2000.00	Start	11.37			165	<0.2	<0.002
			Final	2000.00	Finish	13.00					
			Average	2000.00	Total	83					
Yellow - 47	05/031BL/20	P.U. AUTOMATIC SPRAY CELL 16th August 2006	Initial	2000.00	Start	13.50			140	<0.2	<0.001
			Final	2000.00	Finish	15.00					
			Average	2000.00	Total	70					
Yellow - 47	05/031BL/25	VMC 3 MANUAL SPRAY 1 17th August 2006	Initial	2000.00	Start	10.72			190	<0.2	<0.001
			Final	2000.00	Finish	12.00					
			Average	2000.00	Total	66					

CERTIFICATE OF SAMPLING AND ANALYSIS RESULTS

Client	Jaguar Cars Ltd
Site Address	Browns Lane, Coventry
Job Number	P-RED06-031/EBN1/Rev0
Date	15th, 16th and 17th August 2006
Operator(s)	Philip Butler & Vicki Savitt

Pump Reference	Sample ID	Location / Process / Operator	Pump Flow (ml/min)			Sample Duration (mins)			Total Volume (l)	Mass of Analyte (ug)	Concentration (mg/m ³)
			Initial		Average	Start	Finish	Total			
Yellow - 47	06031B/J00	VMC 3 MANUAL SPRAY 2 17th August 2006	Initial	2000.00		Start	12.07		176	<0.2	<0.001
			Final	2000.00		Finish	13.35				
			Average	2000.00		Total	88				
N/A	06031B/J01	Blank	Initial	n/a		Start	n/a		n/a	<0.2	n/a
			Final	n/a		Finish	n/a				
			Average	n/a		Total	n/a				
			Initial			Start					
			Final			Finish					
			Average			Total					
			Initial			Start					
			Final			Finish					
			Average			Total					
			Initial			Start					
			Final			Finish					
			Average			Total					