

SEPTEMBER 2007

EMISSIONS MONITORING

BROWNS LANE

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Date:

5th November 2007

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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 September 2007.

All results pertain to the dates monitored only; these dates include 10th, 11th and 12th September 2007.

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	5.3 to 10.1	21.4 (18.2)	<0.007	6.2	7464
VMC 3 Polyester Auto Cell 2	1.2 to 4.5	41.9 (40.9)	<0.007	6.9	8250
VMC 3 Polyester Auto Cell 3	2.3 to 2.8	25.3 (17.2)	<0.005	7.8	9330
VMC 3 Manual Spray 1	1.9	3.2 (3.1)	<0.007	6.4	10536
VMC 3 Manual Spray 2	2.8 to 2.9	49.4 (47.7)	<0.007	7.6	1335
VMC 3 PU Auto	0.7 to 5.3	55.7 (39.1)	<0.007	5.5	7624

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

NOTE 1: Reference conditions are standard temperature (273K) and standard pressure (101.3kPa)

1.0 INTRODUCTION

The monitoring of the seven exhausts were monitored with respect to quotation Q-RED07-013/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 ± 10% 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	5.3 to 10.1	mg/m ³	273, 101.3kPa	10/09/07	1300 – 1332 1340 - 1212	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	18.2	mg/m ³		10/09/07	1342 - 1442	BS EN 13526		
	Isocyanates	0.1	<0.007	mg/m ³		11/09/07	1345 - 1415	MDHS 25/3		
VMC 3 Polyester Auto Cell 2	Total Particulate Matter	50	1.2 to 4.5	mg/m ³	273, 101.3kPa	12/09/07	1051 – 1123 1132 - 1204	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	40.9	mg/m ³		12/09/07	0934 - 1034	BS EN 13526		
	Isocyanates	0.1	<0.007	mg/m ³		11/09/07	1420 - 1450	MDHS 25/3		
VMC 3 Polyester Auto Cell 3	Total Particulate Matter	50	2.3 to 2.8	mg/m ³	273, 101.3kPa	12/09/07	0925 – 0957 1014 - 1046	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	17.2	mg/m ³		10/09/07	1047 - 1147	BS EN 13526		
	Isocyanates	0.1	<0.005	mg/m ³		12/09/07	0930 - 1007	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	1.9	mg/m ³	273, 101.3kPa	11/09/07	1349 – 1421 1425 - 1457	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	3.1	mg/m ³		10/09/07	1305 - 1405	BS EN 13526		
	Isocyanates	0.1	<0.007	mg/m ³		11/09/07	1308 - 1338	MDHS 25/3		
VMC 3 Manual Spray 2	Total Particulate Matter	50	2.8 to 2.9	mg/m ³	273, 101.3kPa	12/09/07	1415 – 1447 1450 - 1522	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	47.7	mg/m ³		11/09/07	1118 - 1212	BS EN 13526		
	Isocyanates	0.1	<0.007	mg/m ³		11/09/07	1145 - 1215	MDHS 25/3		
VMC 3 PU Auto	Total Particulate Matter	50	0.7 to 5.3	mg/m ³	273, 101.3kPa	11/09/07	1140 – 1212 1310 - 1342	BS EN 13284-1	* UKAS accreditation applied for	Normal
	Volatile Organic Compounds	50	39.1	mg/m ³			0959 - 1059	BS EN 13526		
	Isocyanates	0.1	<0.007	mg/m ³			1110 - 1140	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 BS EN 13284-1: 2002

2.2.3 Total particulate matter was sampled using a Zambelli isokinetic sampling system in accordance with BS EN 13284-1: 2002 – Determination of Low Range Mass Concentration of dust (< 50mg/m³).

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 is continuously monitored and adjusted relative to the duct velocity to ensure isokinetic-sampling conditions are 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 quartz filter (or most suitable filter for process) contained within the filter cassette holder, and the total particulate matter determined gravimetrically.

2.2.6 It is 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 will be carried out and the result corrected accordingly.

2.2.7 The sample positions were calculated with respect to BS EN 13284-1: 2002 – Stationary source emissions – Determination of Low Range Mass Concentration of dust.

2.2.8 Sampling may be carried out internally or externally, the method used will be reported and provided there are no deviations from the method the uncertainty for the monitoring procedure is reported to be within the requirements specified by the Hazardous Waste Directive (HWD) as stated in the Environment Agency Technical Document M2

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 up to 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.
- 3.3 All references made to MCerts are based on the certification held by the site personnel only.

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

Stack Reference ID		VMC 3 PU Automatic Spray					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/12			Q47/200807/14			
Date	11-Sep-07			11-Sep-07			
Sample Period	11:40	to	12:12	13:10	to	13:42	
Velocity (Nm/s)	5.50			5.50			
Volume (Nm ³ /hr)	7037			7037			
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)	13.73			13.73			
Highest Pitot Reading (pascals)	34.31			34.31			
Pitot Ratio (less than 9:1)	2.50	:	1	2.50	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	515			542			
Corrected volume sampled (m ³)	0.449			0.474			
Particulate Concentration on Filter (mg/m ³)	0.04			0.02			
Particulate Concentration in Wash (mg/m ³)	0.67			5.28			
Total Particulate Concentration (mg/m ³)	0.71			5.30			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.005			0.040			

Stack Reference ID		VMC 3 Polyester Auto Cell 1					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/21			Q47/200807/22			
Date	10-Sep-07			10-Sep-07			
Sample Period	13:00	to	13:32	13:40	to	14:12	
Velocity (Nm/s)	6.25			6.25			
Volume (Nm ³ /hr)	7430			7430			
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)	25.49			25.49			
Highest Pitot Reading (pascals)	43.14			43.14			
Pitot Ratio (less than 9:1)	1.69	:	1	1.69	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	705			669			
Corrected volume sampled (m ³)	0.617			0.586			
Particulate Concentration on Filter (mg/m ³)	3.91			0.05			
Particulate Concentration in Wash (mg/m ³)	6.16			5.29			
Total Particulate Concentration (mg/m ³)	10.06			5.34			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.075			0.040			

Stack Reference ID		VMC 3 Polyester Auto Cell 2					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/19			Q47/200807/20			
Date	12-Sep-07			12-Sep-07			
Sample Period	10:51	to	11:23	11:32	to	12:04	
Velocity (Nm/s)	6.91			6.91			
Volume (Nm ³ /hr)	8172			8172			
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)	23.53			23.53			
Highest Pitot Reading (pascals)	46.08			46.08			
Pitot Ratio (less than 9:1)	1.96	:	1	1.96	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	778			771			
Corrected volume sampled (m ³)	0.681			0.675			
Particulate Concentration on Filter (mg/m ³)	0.03			0.04			
Particulate Concentration in Wash (mg/m ³)	1.17			4.45			
Total Particulate Concentration (mg/m ³)	1.20			4.49			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.010			0.037			

Stack Reference ID		VMC 3 Polyester Auto Cell 3					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/17			Q47/200807/18			
Date	12-Sep-07			12-Sep-07			
Sample Period	9:25	to	9:57	10:14	to	10:46	
Velocity (Nm/s)	7.81			7.81			
Volume (Nm ³ /hr)	9376			9376			
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)	40.20			40.20			
Highest Pitot Reading (pascals)	57.84			57.84			
Pitot Ratio (less than 9:1)	1.44	:	1	1.44	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	902			894			
Corrected volume sampled (m ³)	0.787			0.781			
Particulate Concentration on Filter (mg/m ³)	0.05			0.03			
Particulate Concentration in Wash (mg/m ³)	2.80			2.30			
Total Particulate Concentration (mg/m ³)	2.85			2.33			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.027			0.022			

Stack Reference ID		VMC 3 Manual Booth 1					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/15			Q47/200807/16			
Date	11-Sep-07			11-Sep-07			
Sample Period	13:49	to	14:21	14:25	to	14:57	
Velocity (Nm/s)	6.45			6.45			
Volume (Nm ³ /hr)	10659			10659			
Average Stack Temp (°C)	26.00			26.00			
Permitted Temp Range (°C)	24.51	to	27.49	24.51	to	27.49	
Lowest Pitot Reading (pascals)	24.51			24.51			
Highest Pitot Reading (pascals)	50.00			50.00			
Pitot Ratio (less than 9:1)	2.04	:	1	2.04	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	741			739			
Corrected volume sampled (m ³)	0.646			0.648			
Particulate Concentration on Filter (mg/m ³)	0.05			0.03			
Particulate Concentration in Wash (mg/m ³)	1.86			1.85			
Total Particulate Concentration (mg/m ³)	1.90			1.88			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.020			0.020			

Stack Reference ID		VMC 3 Manual Booth 2					
	Jaguar Cars Ltd						
	RUN 1			RUN 2			
Filter Reference No	Q47/200807/23			Q47/200807/24			
Date	12-Sep-07			12-Sep-07			
Sample Period	14:15	to	14:47	14:50	to	15:22	
Velocity (Nm/s)	7.55			7.55			
Volume (Nm ³ /hr)	1341			1341			
Average Stack Temp (°C)	27.00			27.00			
Permitted Temp Range (°C)	25.50	to	28.50	25.50	to	28.50	
Lowest Pitot Reading (pascals)	38.24			38.24			
Highest Pitot Reading (pascals)	50.98			50.98			
Pitot Ratio (less than 9:1)	1.33	:	1	1.33	:	1	
Moisture (%)	n/a			n/a			
Litres sampled	839			796			
Corrected volume sampled (m ³)	0.732			0.698			
Particulate Concentration on Filter (mg/m ³)	0.01			0.04			
Particulate Concentration in Wash (mg/m ³)	2.73			2.87			
Total Particulate Concentration (mg/m ³)	2.75			2.91			
Total Particulate Concentration corrected for moisture (mg/m ³)	n/a			n/a			
Total Particulate Mass Emission (kg/hour)	0.004			0.004			

APPENDIX 2

Volatile Organic Compound Results

VMC 3 PU Automatic Spray - VOC					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
11-Sep-07	09:59:37	12.38	11-Sep-07	10:48:37	5.87
11-Sep-07	10:00:37	9.78	11-Sep-07	10:49:37	5.87
11-Sep-07	10:01:37	8.47	11-Sep-07	10:50:37	8.47
11-Sep-07	10:02:37	7.17	11-Sep-07	10:51:37	55.39
11-Sep-07	10:03:37	7.17	11-Sep-07	10:52:37	8.47
11-Sep-07	10:04:37	7.17	11-Sep-07	10:53:37	13.69
11-Sep-07	10:05:37	8.47	11-Sep-07	10:54:37	8.47
11-Sep-07	10:06:37	9.78	11-Sep-07	10:55:37	20.20
11-Sep-07	10:07:37	9.78	11-Sep-07	10:56:37	9.78
11-Sep-07	10:08:37	8.47	11-Sep-07	10:57:37	14.99
11-Sep-07	10:09:37	16.29	11-Sep-07	10:58:37	17.60
11-Sep-07	10:10:37	13.69			
11-Sep-07	10:11:37	21.51			
11-Sep-07	10:12:37	24.11			
11-Sep-07	10:13:37	22.81			
11-Sep-07	10:14:37	16.29			
11-Sep-07	10:15:37	35.84			
11-Sep-07	10:16:37	29.33			
11-Sep-07	10:17:37	25.42			
11-Sep-07	10:18:37	144.02			
11-Sep-07	10:19:37	145.33			
11-Sep-07	10:20:37	68.43			
11-Sep-07	10:21:37	95.80			
11-Sep-07	10:22:37	80.16			
11-Sep-07	10:23:37	77.55			
11-Sep-07	10:24:37	91.89			
11-Sep-07	10:25:37	85.37			
11-Sep-07	10:26:37	86.68			
11-Sep-07	10:27:37	77.55			
11-Sep-07	10:28:37	74.95			
11-Sep-07	10:29:37	67.12			
11-Sep-07	10:30:37	56.70			
11-Sep-07	10:31:37	51.48			
11-Sep-07	10:32:37	42.36			
11-Sep-07	10:33:37	33.89			
11-Sep-07	10:34:37	26.72			
11-Sep-07	10:35:37	21.51			
11-Sep-07	10:36:37	17.60			
11-Sep-07	10:37:37	14.99			
11-Sep-07	10:38:37	12.38			
11-Sep-07	10:39:37	12.38			
11-Sep-07	10:40:37	14.99			
11-Sep-07	10:41:37	20.20			
11-Sep-07	10:42:37	28.02			
11-Sep-07	10:43:37	20.85			
11-Sep-07	10:44:37	16.29			
11-Sep-07	10:45:37	11.08			
11-Sep-07	10:46:37	8.47			
11-Sep-07	10:47:37	7.17			
			Average		39.11

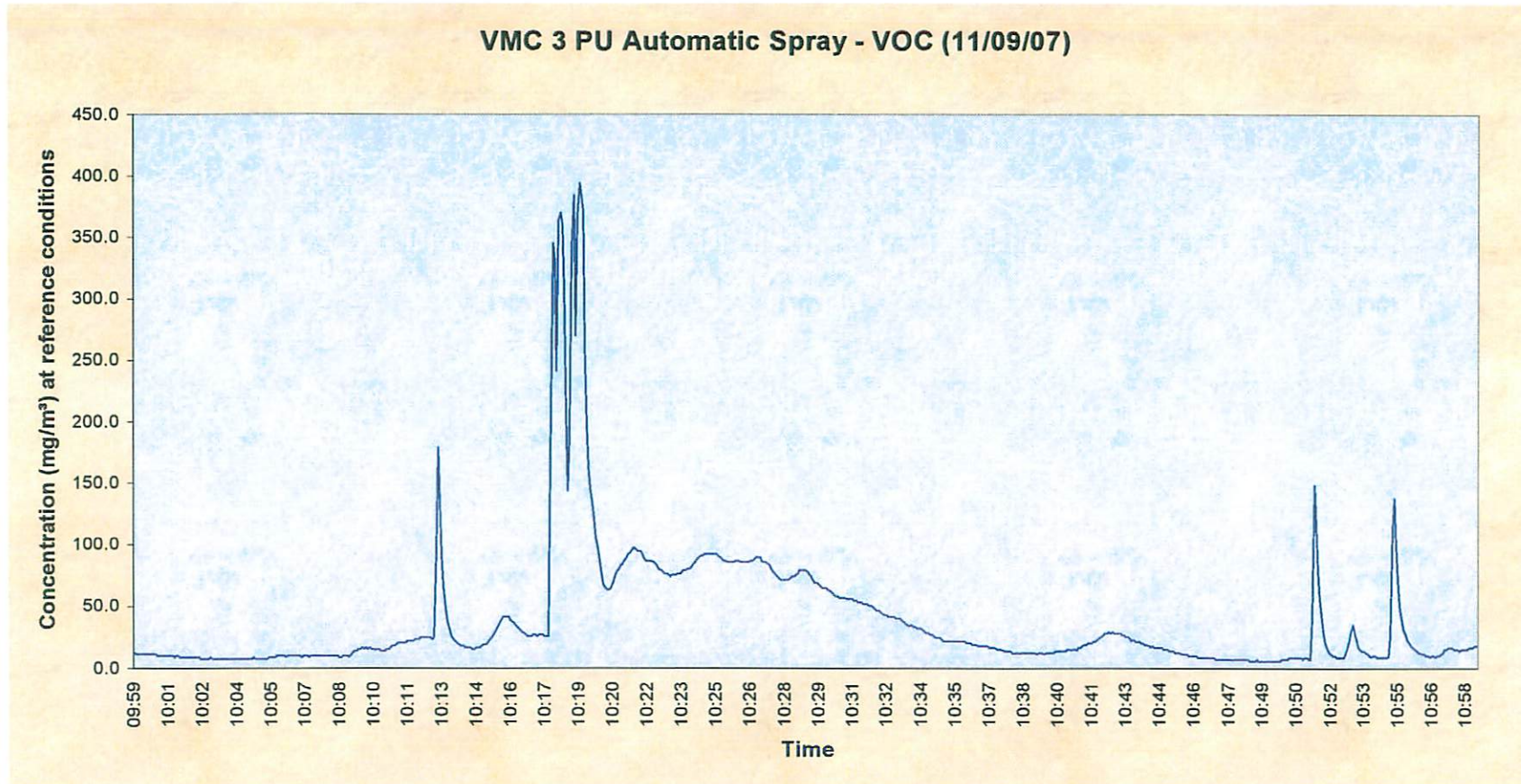
VMC 3 Polyester Automatic Cell 1 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
10-Sep-07	13:42:45	9.64	10-Sep-07	14:31:45	20.89
10-Sep-07	13:43:45	8.84	10-Sep-07	14:32:45	20.89
10-Sep-07	13:44:45	7.23	10-Sep-07	14:33:45	20.89
10-Sep-07	13:45:45	7.23	10-Sep-07	14:34:45	19.29
10-Sep-07	13:46:45	8.84	10-Sep-07	14:35:45	20.09
10-Sep-07	13:47:45	9.64	10-Sep-07	14:36:45	19.29
10-Sep-07	13:48:45	14.46	10-Sep-07	14:37:45	19.29
10-Sep-07	13:49:45	12.05	10-Sep-07	14:38:45	25.71
10-Sep-07	13:50:45	11.25	10-Sep-07	14:39:45	25.71
10-Sep-07	13:51:45	10.45	10-Sep-07	14:40:45	24.11
10-Sep-07	13:52:45	10.45	10-Sep-07	14:41:45	23.30
10-Sep-07	13:53:45	9.64			
10-Sep-07	13:54:45	9.64			
10-Sep-07	13:55:45	8.84			
10-Sep-07	13:56:45	8.84			
10-Sep-07	13:57:45	8.84			
10-Sep-07	13:58:45	8.84			
10-Sep-07	13:59:45	20.09			
10-Sep-07	14:00:45	20.09			
10-Sep-07	14:01:45	19.29			
10-Sep-07	14:02:45	20.09			
10-Sep-07	14:03:45	23.30			
10-Sep-07	14:04:45	21.70			
10-Sep-07	14:05:45	22.50			
10-Sep-07	14:06:45	21.70			
10-Sep-07	14:07:45	21.70			
10-Sep-07	14:08:45	21.70			
10-Sep-07	14:09:45	21.70			
10-Sep-07	14:10:45	20.89			
10-Sep-07	14:11:45	20.09			
10-Sep-07	14:12:45	20.09			
10-Sep-07	14:13:45	20.09			
10-Sep-07	14:14:45	20.09			
10-Sep-07	14:15:45	20.09			
10-Sep-07	14:16:45	20.09			
10-Sep-07	14:17:45	20.09			
10-Sep-07	14:18:45	19.29			
10-Sep-07	14:19:45	19.29			
10-Sep-07	14:20:45	16.88			
10-Sep-07	14:21:45	15.27			
10-Sep-07	14:22:45	25.71			
10-Sep-07	14:23:45	28.13			
10-Sep-07	14:24:45	26.52			
10-Sep-07	14:25:45	25.71			
10-Sep-07	14:26:45	22.50			
10-Sep-07	14:27:45	22.50			
10-Sep-07	14:28:45	22.50			
10-Sep-07	14:29:45	21.70			
10-Sep-07	14:30:45	20.89			
			Average		18.25

VMC 3 Polyester Automatic Cell 2 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
12-Sep-07	09:34:07	22.76	12-Sep-07	10:23:07	38.55
12-Sep-07	09:35:07	24.62	12-Sep-07	10:24:07	39.48
12-Sep-07	09:36:07	26.47	12-Sep-07	10:25:07	40.41
12-Sep-07	09:37:07	28.33	12-Sep-07	10:26:07	40.41
12-Sep-07	09:38:07	29.26	12-Sep-07	10:27:07	39.48
12-Sep-07	09:39:07	31.12	12-Sep-07	10:28:07	38.55
12-Sep-07	09:40:07	32.05	12-Sep-07	10:29:07	39.48
12-Sep-07	09:41:07	32.05	12-Sep-07	10:30:07	41.34
12-Sep-07	09:42:07	32.98	12-Sep-07	10:31:07	58.06
12-Sep-07	09:43:07	32.98	12-Sep-07	10:32:07	63.63
12-Sep-07	09:44:07	32.98	12-Sep-07	10:33:07	78.49
12-Sep-07	09:45:07	32.05	12-Sep-07	10:34:07	61.77
12-Sep-07	09:46:07	32.05			
12-Sep-07	09:47:07	32.05			
12-Sep-07	09:48:07	31.12			
12-Sep-07	09:49:07	31.12			
12-Sep-07	09:50:07	32.05			
12-Sep-07	09:51:07	32.98			
12-Sep-07	09:52:07	33.91			
12-Sep-07	09:53:07	72.46			
12-Sep-07	09:54:07	46.91			
12-Sep-07	09:55:07	46.91			
12-Sep-07	09:56:07	41.34			
12-Sep-07	09:57:07	39.48			
12-Sep-07	09:58:07	39.48			
12-Sep-07	09:59:07	41.34			
12-Sep-07	10:00:07	57.13			
12-Sep-07	10:01:07	50.63			
12-Sep-07	10:02:07	48.77			
12-Sep-07	10:03:07	42.27			
12-Sep-07	10:04:07	41.34			
12-Sep-07	10:05:07	39.48			
12-Sep-07	10:06:07	39.48			
12-Sep-07	10:07:07	38.55			
12-Sep-07	10:08:07	37.62			
12-Sep-07	10:09:07	37.62			
12-Sep-07	10:10:07	37.62			
12-Sep-07	10:11:07	38.55			
12-Sep-07	10:12:07	38.55			
12-Sep-07	10:13:07	37.62			
12-Sep-07	10:14:07	40.41			
12-Sep-07	10:15:07	40.41			
12-Sep-07	10:16:07	39.48			
12-Sep-07	10:17:07	38.55			
12-Sep-07	10:18:07	37.62			
12-Sep-07	10:19:07	38.55			
12-Sep-07	10:20:07	37.62			
12-Sep-07	10:21:07	37.62			
12-Sep-07	10:22:07	38.55			
			Average		40.87

VMC 3 Polyester Automatic Cell 3 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
10-Sep-07	10:47:48	48.21	10-Sep-07	11:36:48	6.43
10-Sep-07	10:48:48	122.14	10-Sep-07	11:37:48	6.43
10-Sep-07	10:49:48	54.64	10-Sep-07	11:38:48	6.43
10-Sep-07	10:50:48	38.57	10-Sep-07	11:39:48	6.43
10-Sep-07	10:51:48	28.93	10-Sep-07	11:40:48	6.43
10-Sep-07	10:52:48	25.71	10-Sep-07	11:41:48	6.43
10-Sep-07	10:53:48	22.50	10-Sep-07	11:42:48	9.64
10-Sep-07	10:54:48	22.50	10-Sep-07	11:43:48	6.43
10-Sep-07	10:55:48	22.50	10-Sep-07	11:44:48	6.43
10-Sep-07	10:56:48	25.71	10-Sep-07	11:45:48	9.64
10-Sep-07	10:57:48	25.71	10-Sep-07	11:46:48	6.43
10-Sep-07	10:58:48	22.50	10-Sep-07	11:47:48	9.64
10-Sep-07	10:59:48	22.50			
10-Sep-07	11:00:48	19.29		Average	17.17
10-Sep-07	11:01:48	19.29			
10-Sep-07	11:02:48	19.29			
10-Sep-07	11:03:48	19.29			
10-Sep-07	11:04:48	16.07			
10-Sep-07	11:05:48	16.07			
10-Sep-07	11:06:48	16.07			
10-Sep-07	11:07:48	19.29			
10-Sep-07	11:08:48	16.07			
10-Sep-07	11:09:48	16.07			
10-Sep-07	11:10:48	16.07			
10-Sep-07	11:11:48	16.07			
10-Sep-07	11:12:48	12.86			
10-Sep-07	11:13:48	19.29			
10-Sep-07	11:14:48	16.07			
10-Sep-07	11:15:48	16.07			
10-Sep-07	11:16:48	12.86			
10-Sep-07	11:17:48	12.86			
10-Sep-07	11:18:48	12.86			
10-Sep-07	11:19:48	12.86			
10-Sep-07	11:20:48	12.86			
10-Sep-07	11:21:48	9.64			
10-Sep-07	11:22:48	9.64			
10-Sep-07	11:23:48	9.64			
10-Sep-07	11:24:48	9.64			
10-Sep-07	11:25:48	9.64			
10-Sep-07	11:26:48	9.64			
10-Sep-07	11:27:48	9.64			
10-Sep-07	11:28:48	9.64			
10-Sep-07	11:29:48	6.43			
10-Sep-07	11:30:48	9.64			
10-Sep-07	11:31:48	9.64			
10-Sep-07	11:32:48	6.43			
10-Sep-07	11:33:48	9.64			
10-Sep-07	11:34:48	6.43			
10-Sep-07	11:35:48	6.43			

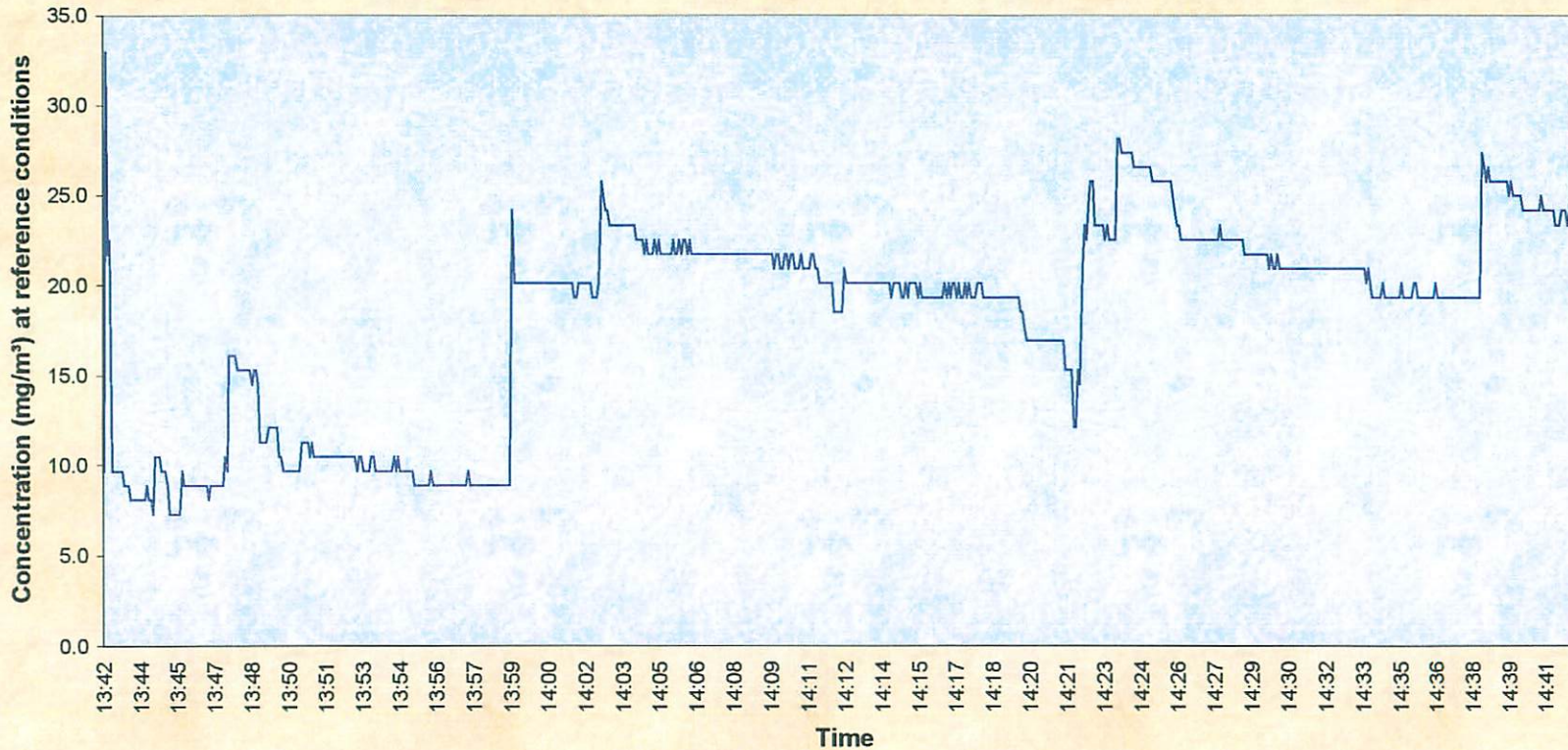
VMC 3 Manual Spray Booth 1 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
10-Sep-07	13:05:37	3.21	10-Sep-07	13:54:37	2.41
10-Sep-07	13:06:37	3.21	10-Sep-07	13:55:37	2.41
10-Sep-07	13:07:37	3.21	10-Sep-07	13:56:37	3.21
10-Sep-07	13:08:37	3.21	10-Sep-07	13:57:37	3.21
10-Sep-07	13:09:37	3.21	10-Sep-07	13:58:37	3.21
10-Sep-07	13:10:37	3.21	10-Sep-07	13:59:37	3.21
10-Sep-07	13:11:37	3.21	10-Sep-07	14:00:37	3.21
10-Sep-07	13:12:37	3.21	10-Sep-07	14:01:37	3.21
10-Sep-07	13:13:37	3.21	10-Sep-07	14:02:37	3.21
10-Sep-07	13:14:37	3.21	10-Sep-07	14:03:37	3.21
10-Sep-07	13:15:37	3.21	10-Sep-07	14:04:37	3.21
10-Sep-07	13:16:37	4.02	10-Sep-07	14:05:37	3.21
10-Sep-07	13:17:37	3.21			
10-Sep-07	13:18:37	3.21		Average	3.10
10-Sep-07	13:19:37	3.21			
10-Sep-07	13:20:37	3.21			
10-Sep-07	13:21:37	3.21			
10-Sep-07	13:22:37	3.21			
10-Sep-07	13:23:37	3.21			
10-Sep-07	13:24:37	3.21			
10-Sep-07	13:25:37	3.21			
10-Sep-07	13:26:37	3.21			
10-Sep-07	13:27:37	3.21			
10-Sep-07	13:28:37	3.21			
10-Sep-07	13:29:37	3.21			
10-Sep-07	13:30:37	3.21			
10-Sep-07	13:31:37	3.21			
10-Sep-07	13:32:37	3.21			
10-Sep-07	13:33:37	3.21			
10-Sep-07	13:34:37	3.21			
10-Sep-07	13:35:37	3.21			
10-Sep-07	13:36:37	3.21			
10-Sep-07	13:37:37	3.21			
10-Sep-07	13:38:37	3.21			
10-Sep-07	13:39:37	2.41			
10-Sep-07	13:40:37	3.21			
10-Sep-07	13:41:37	3.21			
10-Sep-07	13:42:37	3.21			
10-Sep-07	13:43:37	3.21			
10-Sep-07	13:44:37	3.21			
10-Sep-07	13:45:37	2.41			
10-Sep-07	13:46:37	3.21			
10-Sep-07	13:47:37	2.41			
10-Sep-07	13:48:37	3.21			
10-Sep-07	13:49:37	3.21			
10-Sep-07	13:50:37	3.21			
10-Sep-07	13:51:37	2.41			
10-Sep-07	13:52:37	2.41			
10-Sep-07	13:53:37	3.21			

VMC 3 Manual Spray Booth 2 - VOC Monitoring					
Date	Time	VOC mg/m ³	Date	Time	VOC mg/m ³
11-Sep-07	11:18:29	3.46	11-Sep-07	12:07:29	45.02
11-Sep-07	11:19:29	45.02	11-Sep-07	12:08:29	72.73
11-Sep-07	11:20:29	38.10	11-Sep-07	12:09:29	65.80
11-Sep-07	11:21:29	45.02	11-Sep-07	12:10:29	58.88
11-Sep-07	11:22:29	51.95	11-Sep-07	12:11:29	45.02
11-Sep-07	11:23:29	45.02			
11-Sep-07	11:24:29	38.10			
11-Sep-07	11:25:29	34.63			
11-Sep-07	11:26:29	45.02			
11-Sep-07	11:27:29	45.02			
11-Sep-07	11:28:29	34.63			
11-Sep-07	11:29:29	38.10			
11-Sep-07	11:30:29	38.10			
11-Sep-07	11:31:29	55.41			
11-Sep-07	11:32:29	58.88	Average		47.72
11-Sep-07	11:33:29	45.02			
11-Sep-07	11:34:29	58.88			
11-Sep-07	11:35:29	51.95			
11-Sep-07	11:36:29	48.49			
11-Sep-07	11:37:29	45.02			
11-Sep-07	11:38:29	45.02			
11-Sep-07	11:39:29	45.02			
11-Sep-07	11:40:29	58.88			
11-Sep-07	11:41:29	48.49			
11-Sep-07	11:42:29	58.88			
11-Sep-07	11:43:29	65.80			
11-Sep-07	11:44:29	58.88			
11-Sep-07	11:45:29	51.95			
11-Sep-07	11:46:29	51.95			
11-Sep-07	11:47:29	65.80			
11-Sep-07	11:48:29	86.58			
11-Sep-07	11:49:29	86.58			
11-Sep-07	11:50:29	58.88			
11-Sep-07	11:51:29	45.02			
11-Sep-07	11:52:29	38.10			
11-Sep-07	11:53:29	38.10			
11-Sep-07	11:54:29	51.95			
11-Sep-07	11:55:29	38.10			
11-Sep-07	11:56:29	31.17			
11-Sep-07	11:57:29	31.17			
11-Sep-07	11:58:29	38.10			
11-Sep-07	11:59:29	38.10			
11-Sep-07	12:00:29	51.95			
11-Sep-07	12:01:29	38.10			
11-Sep-07	12:02:29	38.10			
11-Sep-07	12:03:29	31.17			
11-Sep-07	12:04:29	31.17			
11-Sep-07	12:05:29	31.17			
11-Sep-07	12:06:29	31.17			



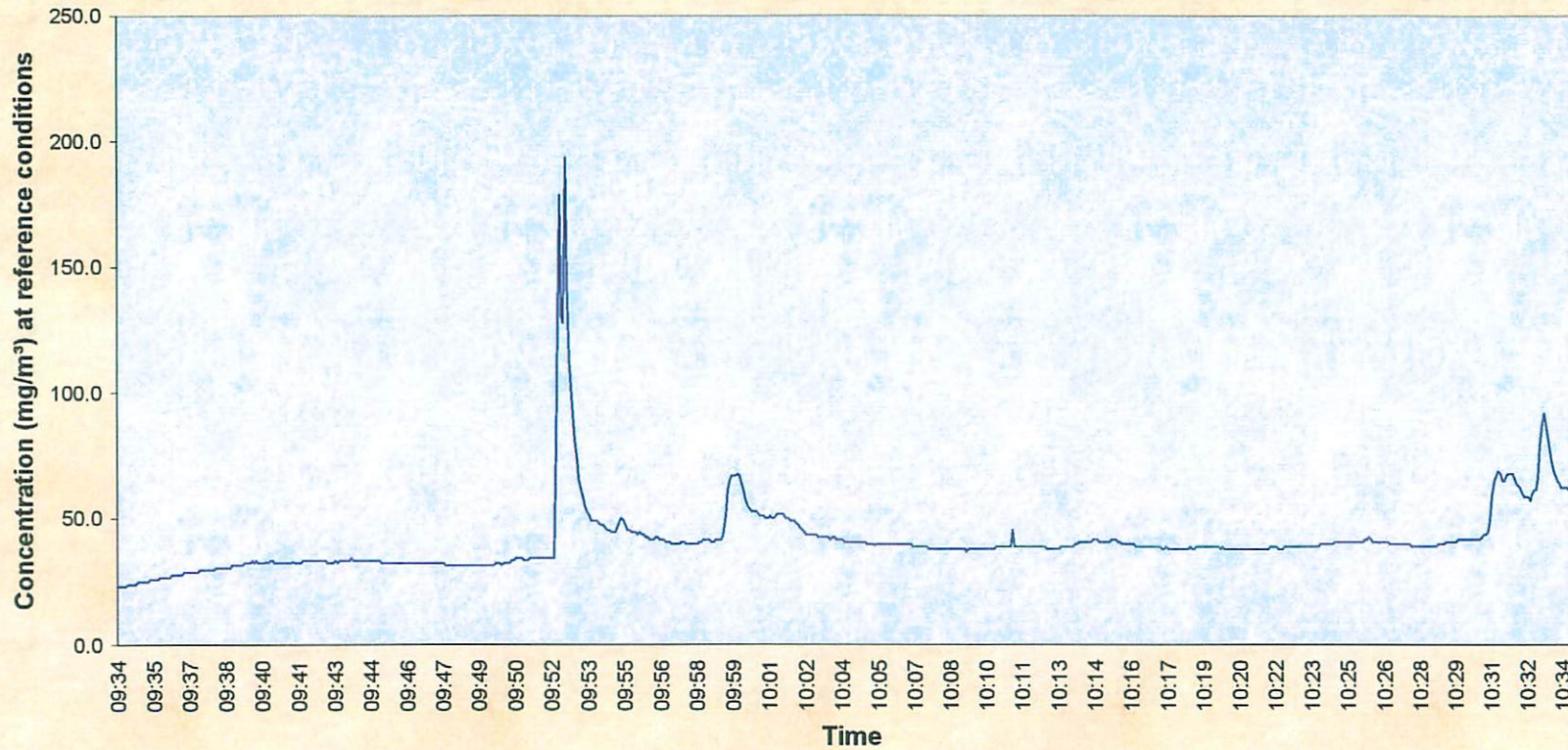
Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m ³)		
			Mean	Max	Min	Mean	Max	Min
9:59	to	10:29	34.63	244.92	4.46	55.66	393.62	7.17
10:29	to	10:59	13.93	92.05	3.24	22.39	147.94	5.21

VMC 3 Polyester Automatic Cell 1 - VOC Monitoring (10/09/07)



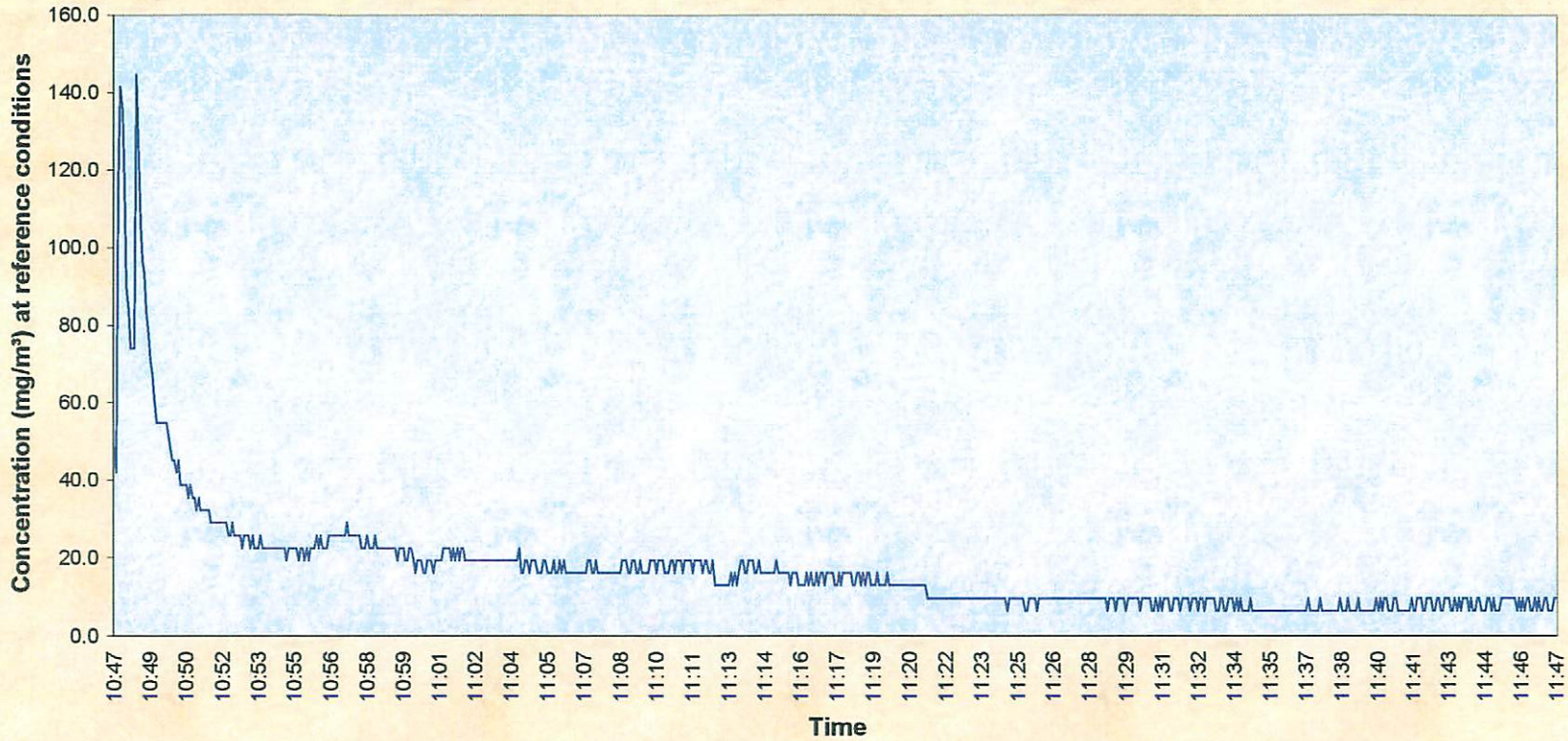
Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
			Mean	Max	Min	Mean	Max	Min
13:42	to	14:12	9.44	20.50	4.50	15.17	32.95	7.23
14:12	to	14:42	13.28	20.00	7.50	21.35	32.14	12.05

VMC 3 Polyester Automatic Cell 2 - VOC Monitoring (12/09/07)

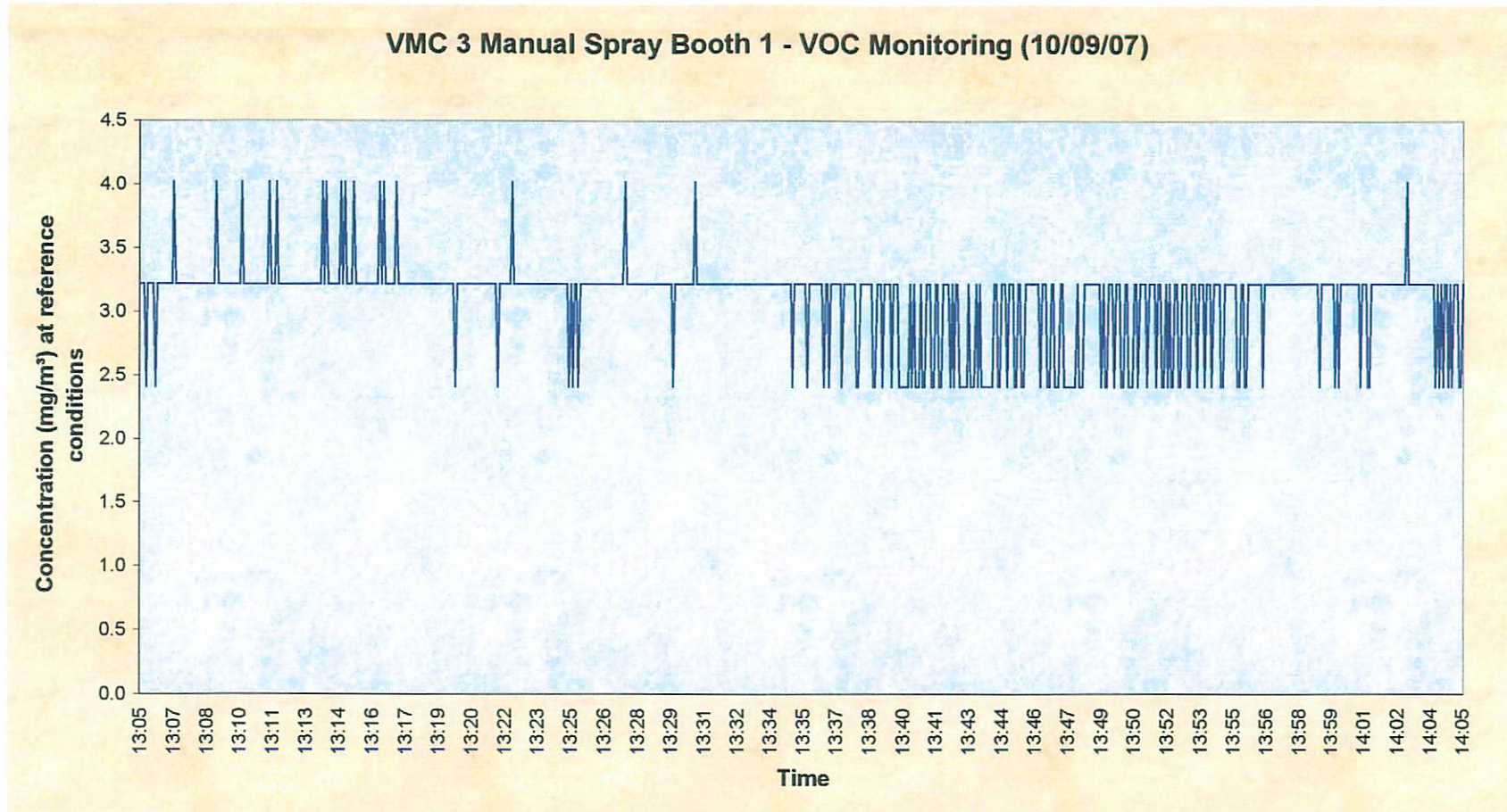


Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
			Mean	Max	Min	Mean	Max	Min
9:34	to	10:04	24.48	120.22	14.16	39.34	193.22	22.76
10:04	to	10:34	26.10	56.93	22.83	41.94	91.50	36.69

VMC 3 Polyester Automatic Cell 3 - VOC Monitoring (10/09/07)

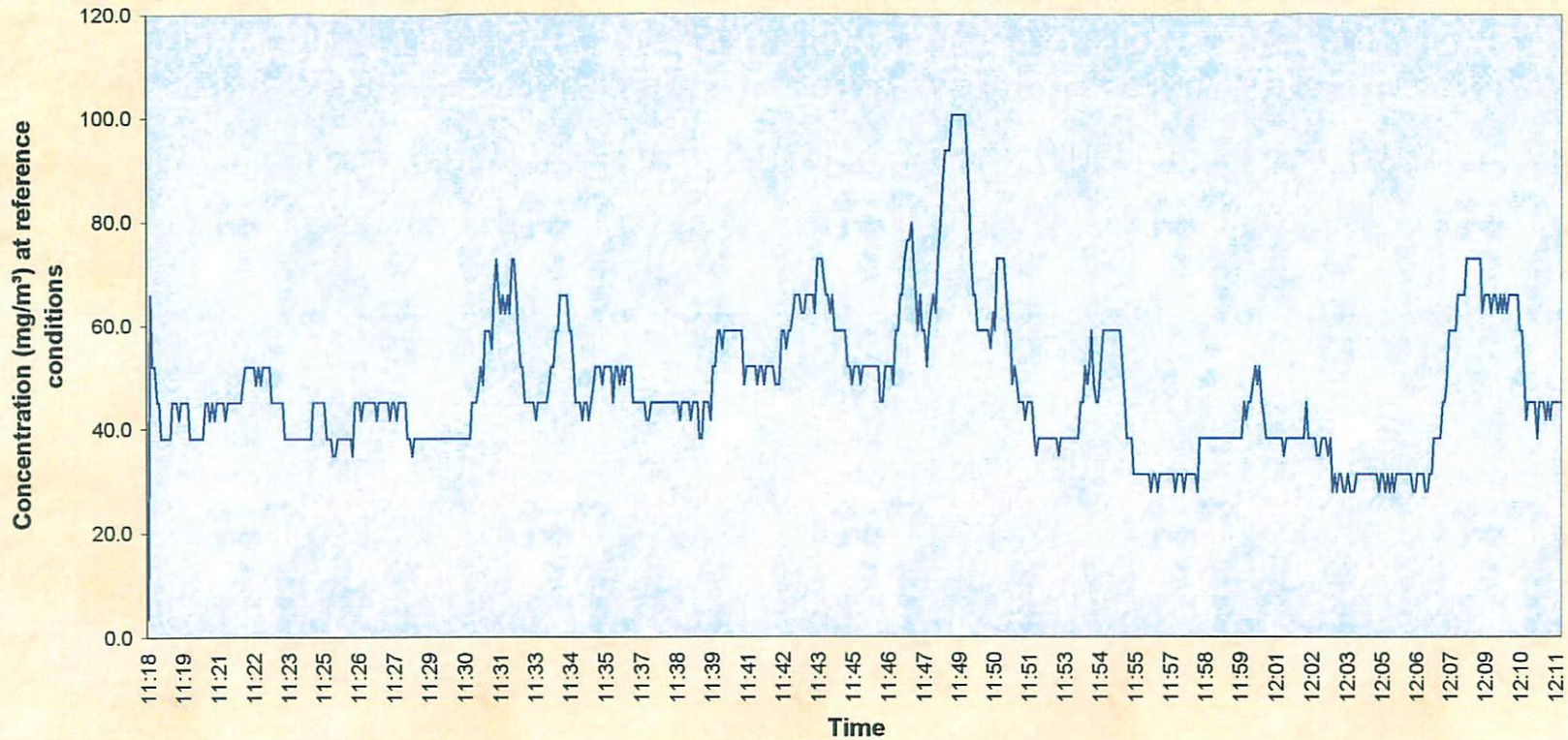


Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
			Mean	Max	Min	Mean	Max	Min
10:47	to	11:17	15.76	90.00	8.00	25.33	144.64	12.86
11:17	to	11:47	5.60	10.00	4.00	9.00	16.07	6.43



Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
			Mean	Max	Min	Mean	Max	Min
13:05	to	13:35	2.01	2.50	1.50	3.23	4.02	2.41
13:35	to	14:05	1.85	2.50	1.50	2.97	4.02	2.41

VMC 3 Manual Spray Booth 2 - VOC Monitoring (11/09/07)



Average Run Time			Volatile Organic Compound (ppm)			Volatile Organic Compound (mg/m³)		
			Mean	Max	Min	Mean	Max	Min
11:18	to	11:48	30.71	53.88	2.16	49.35	86.58	3.46
11:48	to	12:18	28.49	62.50	17.24	45.78	100.44	27.71

APPENDIX 3

Velocity raw information

Client	Jaguar Cars Ltd					
Site Address	Browns Lane, Coventry					
Job Number	P-RED07-013/EB/R1/Rev0					
Date	11/09/2007	Port Depth (cm)				
Operator(s)	Vicki Gavin & Philip Butler					
Isokinetic Sampling Information						
Stack Reference	VMC 3 PU Automatic Spray	Isokinetic Sampling Method				BS EN 13284-1
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)	8.0	4	N/A	8	N/A	
Nozzle Area (mm²)	50.272	Average Isokinetic Flow Rate (ltrs/min)		1 Axis	2 Axis	
				15.32	17.88	
Duct Survey						
Pitot Coefficient	0.83	Pitot Calibration Date		November 2007		Atmos. Pressure (mbars)
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)	1012
1	4.6	0.28	22.0	0.34	22.0	Static Pressure (cm H2O)
2	10.5	0.22	22.0	0.32	22.0	-15.00
3	17.5	0.2	22.0	0.28	22.0	1 Axis
4	24.5	0.19	22.0	0.32	22.0	2 Axis
5	31.5	0.22	22.0	0.35	22.0	Average Velocity Flow (m/s)
6	38.5	0.2	22.0	0.29	22.0	5.50
7	45.5	0.15	22.0	0.24	22.0	Average Volume Flow (Nm³/s)
8	52.5	0.25	22.0	0.27	22.0	2.12
9	59.5	0.28	22.0	0.23	22.0	Volume (m³/s)
10	66.5	0.14	22.0	0.26	22.0	1.95
Averages		0.21	22.0	0.29	22.0	Velocity of flow (m/s)
						5.08
						5.93
						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) =				0.4		
Lowest Pitot Static Reading (either sampling line) (cm H2O) =				0.1		
Ratio Highest/Lowest (Max permitted = 9:1)				2.50 : 1		
On site Checklist				Instrument		
Manometer Leak Check	ok			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)	0.31			Thermocouple	RED 0156	
Swirl Test (<15°)	ok			Pitot Tube	RED 0156	

Client	Jaguar Cars Ltd					
Site Address	Browns Lane, Coventry					
Job Number	P-RED07-013/EB/R1/Rev0					
Date	10/09/2007	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	
				18.76	18.93	
Duct Survey						
Pitot Coefficient	0.83	Pitot Calibration Date				November 07
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)	Atmos. Pressure (mbars)
						1012
1	4.2	0.42	22.0	0.44	22.0	Static Pressure (cm H2O)
2	9.8	0.4	22.0	0.35	22.0	-0.28
3	16.3	0.34	22.0	0.39	22.0	1 Axis
4	22.8	0.3	22.0	0.32	22.0	2 Axis
5	29.3	0.31	22.0	0.29	22.0	Average Velocity Flow (m/s)
6	35.8	0.33	22.0	0.35	22.0	6.25
7	42.3	0.28	22.0	0.3	22.0	Average Volume Flow (Nm³/s)
8	48.8	0.29	22.0	0.32	22.0	2.07
9	55.3	0.27	22.0	0.26	22.0	Volume (m³/s)
10	61.8	0.3	22.0	0.28	22.0	2.06
						2.08
						Velocity of flow (m/s)
						6.22
						6.28
Averages		0.32	22.0	0.33	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) =				0.4		
Lowest Pitot Static Reading (either sampling line) (cm H2O) =				0.3		
Ratio Highest/Lowest (Max permitted = 9:1)				1.69 : 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)	0.38			Pitot Tube	RED 0156	
Swirl Test (<15°)	ok					

Client	Jaguar Cars Ltd				
Site Address	Browns Lane, Coventry				
Job Number	P-RED07-013/EB/R1/Rev0				
Date	12/09/2007	Port Depth (cm)			
Operator(s)	Vicki Gavin & Philip Butler				
Isokinetic Sampling Information					
Stack Reference	VMC 3 Polyester Auto Cell 2	Isokinetic Sampling Method			BS EN 13284-1
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
				20.64	21.03
Duct Survey					
Pitot Coefficient	0.83	Pitot Calibration Date		November 07	
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)
					Atmos. Pressure (mbars)
1	4.2	0.41	22.0	0.4	22.0
2	9.8	0.44	22.0	0.43	22.0
3	16.3	0.47	22.0	0.44	22.0
4	22.8	0.39	22.0	0.4	22.0
5	29.3	0.38	22.0	0.42	22.0
6	35.8	0.24	22.0	0.37	22.0
7	42.3	0.35	22.0	0.35	22.0
8	48.8	0.45	22.0	0.41	22.0
9	55.3	0.44	22.0	0.45	22.0
10	61.8	0.35	22.0	0.4	22.0
Averages		0.39	22.0	0.41	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) = $(0.95T_p - 273)$ to $(1.005T_p - 273) =$				20.53 to 23.48	
Highest Pitot Static Reading (either sampling line) (cm H2O) =				0.5	
Lowest Pitot Static Reading (either sampling line) (cm H2O) =				0.2	
Ratio Highest/Lowest (Max permitted = 9:1)				1.96 : 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)	0.41			Pitot Tube	RED 0156
Swirl Test (<15°)	ok				

Client	Jaguar Cars Ltd					
Site Address	Browns Lane, Coventry					
Job Number	P-RED07-013/EB/R1/Rev0					
Date	12/09/2007	Port Depth (cm)				
Operator(s)	Vicki Gavin & Philip Butler					
Isokinetic Sampling Information						
Stack Reference	VMC 3 Polyester Auto Cell 3	Isokinetic Sampling Method			BSEN 13284-1	
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)	6.0	4	N/A	8	N/A	
Nozzle Area (mm²)	28.278	Average Isokinetic Flow Rate (ltrs/min)		13.32	13.19	
Duct Survey						
Pitot Coefficient	0.83	Pitot Calibration Date		November 07		Atmos. Pressure (mbars)
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)	1012
1	4.2	0.54	22.0	0.55	22.0	Static Pressure (cm H2O)
2	9.8	0.45	22.0	0.49	22.0	-0.19
3	16.3	0.55	22.0	0.5	22.0	1 Axis 2 Axis
4	22.8	0.54	22.0	0.52	22.0	Average Velocity Flow (m/s)
5	29.3	0.52	22.0	0.5	22.0	7.81
6	35.8	0.59	22.0	0.55	22.0	Average Volume Flow (Nm ³ /s)
7	42.3	0.41	22.0	0.51	22.0	2.59
8	48.8	0.53	22.0	0.48	22.0	Volume (m ³ /s)
9	55.3	0.55	22.0	0.47	22.0	2.60 2.58
10	61.8	0.48	22.0	0.49	22.0	Velocity of flow (m/s)
Averages		0.52	22.0	0.51	22.0	7.85 7.77
						Reduced Exit Velocity (m/s)
						N/A N/A
Mean Flue Gas Temp (In K) Tp = ((Mean T1 + Mean T2)/2)+273) =				295.00		
Permitted Range of gas temperature readings (C) = (0.995Tp-273) to (1.005Tp-273) =				20.53 to 23.48		
Highest Pitot Static Reading (either sampling line) (cm H2O) =				0.6		
Lowest Pitot Static Reading (either sampling line) (cm H2O) =				0.4		
Ratio Highest/Lowest (Max permitted = 9:1)				1.44 : 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)	0.27			Pitot Tube	RED 0156	
Swirl Test (<15°)	ok					

Client	Jaguar Cars Ltd					
Site Address	Browns Lane, Coventry					
Job Number	P-RED07-013/EB/R1/Rev0					
Date	11/09/2007	Port Depth (cm)				
Operator(s)	Philip Butler & Vicki Gavin					
Isokinetic Sampling Information						
Stack Reference	VMC 3 Manual Booth 1	Isokinetic Sampling Method			BS EN 13284-1	
Number of Stacks	1	Samples per Axis			4	
Configuration (Round / Rectangular)	Round	Stack Area (m2)			0.454	
Dimensions (mtrs)	0.76	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)	8.0	4	70.91	8	N/A	
Nozzle Area (mm²)	50.272	Average Isokinetic Flow Rate (ltrs/min)		1 Axis	2 Axis	
				19.69	19.23	
Duct Survey						
Pitot Coefficient	0.83	Pitot Calibration Date		November 07		Atmos. Pressure (mbars)
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)	1012
1	4.9	0.25	26.0	0.36	26.0	Static Pressure (cm H2O)
2	11.4	0.27	26.0	0.43	26.0	-0.34
3	19.0	0.34	26.0	0.36	26.0	1 Axis
4	26.6	0.51	26.0	0.33	26.0	2 Axis
5	34.2	0.42	26.0	0.31	26.0	Average Velocity Flow (m/s)
6	41.8	0.46	26.0	0.35	26.0	6.45
7	49.4	0.44	26.0	0.26	26.0	Average Volume Flow (Nm³/s)
8	57.0	0.32	26.0	0.28	26.0	2.93
9	64.6	0.26	26.0	0.32	26.0	Volume (m³/s)
10	72.2	0.25	26.0	0.36	26.0	2.96
Averages		0.35	26.0	0.34	26.0	2.89
						Velocity of flow (m/s)
						6.53
						6.38
						Reduced Exit Velocity (m/s)
						N/A
						N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2 + 273) =$				299.00		
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273) =$				24.51 to 27.49		
Highest Pitot Static Reading (either sampling line) (cm H2O) =				0.5		
Lowest Pitot Static Reading (either sampling line) (cm H2O) =				0.3		
Ratio Highest/Lowest (Max permitted = 9:1)				2.04 : 1		
On site Checklist				Instrument		
Manometer Leak Check	ok			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)	0.39			Thermocouple	RED 0156	
Swirl Test (<15°)	ok			Pitot Tube	RED 0156	

Client	Jaguar Cars Ltd					
Site Address	Browns Lane, Coventry					
Job Number	P-RED07-013/EB/R1/Rev0					
Date	12/09/2007	Port Depth (cm)				
Operator(s)	Vicki Gavin & Philip Butler					
Isokinetic Sampling Information						
Stack Reference	VMC 3 Manual Booth 2	Isokinetic Sampling Method			BS EN 13284-1	
Number of Stacks	1	Samples per Axis			2	
Configuration (Round / Rectangular)	Round	Stack Area (m2)			0.049	
Dimensions (mtrs)	0.25	Isokinetic Sample Points (cms)				
Outlet Diameter (if applicable) (mtrs/sec)		1	3.65	5	N/A	
Number of Sample Ports	2	2	21.35	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)		1 Axis	2 Axis	
				12.87	12.76	
Duct Survey						
Pitot Coefficient	0.83	Pitot Calibration Date		November 07		Atmos. Pressure (mbars)
Position No.	Distance (cms)	Axis 1 (cm H2O)	Temperature (C)	Axis 2 (cm H2O)	Temperature (C)	1012
1	1.6	0.42	27.0	0.4	27.0	Static Pressure (cm H2O)
2	3.8	0.49	27.0	0.48	27.0	-0.20
3	6.3	0.48	27.0	0.47	27.0	1 Axis
4	8.8	0.5	27.0	0.51	27.0	2 Axis
5	11.3	0.52	27.0	0.5	27.0	Average Velocity Flow (m/s)
6	13.8	0.51	27.0	0.52	27.0	7.55
7	16.3	0.49	27.0	0.48	27.0	Average Volume Flow (Nm³/s)
8	18.8	0.49	27.0	0.46	27.0	0.37
9	21.3	0.45	27.0	0.44	27.0	Volume (m³/s)
10	23.8	0.39	27.0	0.4	27.0	0.37
Averages		0.47	27.0	0.47	27.0	Velocity of flow (m/s)
						7.59
						7.52
						Reduced Exit Velocity (m/s)
						N/A
						N/A
Mean Flue Gas Temp (in K) $T_p = ((\text{Mean } T_1 + \text{Mean } T_2)/2 + 273) =$				300.00		
Permitted Range of gas temperature readings (C) = $(0.995T_p - 273)$ to $(1.005T_p - 273) =$				25.50 to 28.50		
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)				1.33 : 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)	0.26			Pitot Tube	RED 0156	
Swirl Test (<15°)	ok					

APPENDIX 4

Isocyanate Results

Client	Jaguar Cars Ltd
Site Address	Browns Lane, Coventry
Job Number	P-RED07-013/EB/R1/Rev0
Date	10th, 11th and 12th September 2007
Operator(s)	Philip Butler & Vicki Gavin

Pump Reference	Sample ID	Location / Process / Operator	Pump Flow (mls/min)		Sample Duration (mins)		Total Volume (l)	Mass of Analyte (ug)	Concentration (mg/m ³)
			Initial	Final	Start	Finish			
Yellow - 50	07/013/1/32	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 3 12th September 2007	1000.00	1000.00	9:30	10:07	37	<0.2	<0.005
			1000.00	1000.00	37				
			Average	1000.00	Total	37			
Yellow - 50	07/013/1/31	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 2 11th September 2007	1000.00	1000.00	14:20	14:50	30	<0.2	<0.007
			1000.00	1000.00	30				
			Average	1000.00	Total	30			
Yellow - 50	07/013/1/30	VMC 3 POLYESTER AUTOMATIC SPRAY CELL 1 11th September 2007	1000.00	1000.00	13:45	14:15	30	<0.2	<0.007
			1000.00	1000.00	30				
			Average	1000.00	Total	30			
Yellow - 50	07/013/1/27	P U AUTOMATIC SPRAY CELL 11th September 2007	1000.00	1000.00	11:10	11:40	30	<0.2	<0.007
			1000.00	1000.00	30				
			Average	1000.00	Total	30			
Yellow - 50	07/013/1/29	VMC 3 MANUAL SPRAY 1 11th September 2007	1000.00	1000.00	13:08	13:38	30	<0.2	<0.007
			1000.00	1000.00	30				
			Average	1000.00	Total	30			

Client	Jaguar Cars Ltd
Site Address	Browns Lane, Coventry
Job Number	P-RED07-013/EB/R1/Rev0
Date	10th, 11th and 12th September 2007
Operator(s)	Philip Butler & Vicki Gavin

Pump Reference	Sample ID	Location / Process / Operator	Pump Flow (mls/min)		Sample Duration (mins)		Total Volume (l)	Mass of Analyte (ug)	Concentration (mg/m ³)
			Initial	Average	Start	Total			
Yellow - 50	07/013/1/28	VMC 3 MANUAL SPRAY 2 11th September 2007	Initial	1000.00	Start	11:45	30	<0.2	<0.007
			Final	1000.00	Finish	12:15			
			Average	1000.00	Total	30			
N/A	07/013/1/33	Blank	Initial	n/a	Start	n/a	n/a	<0.2	<0.007
			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				