

Report for Periodic Monitoring of Emissions to Atmosphere

Part 1: **Executive Summary**

Permit Number: **EPR07/09**

Operator: **Todd Engineering**

Installation: **Rugeley**

Emission Point: **Spraybooth**

Monitoring Date: **5th April 2013**



Contract Reference: FTBS 25470

Operator: Todd Engineering

Address: Gregory Works
Armitage Road
Rugeley
Staffs
WS151PW

Monitoring Organisation: RPS Consultants

Address: Noble House, Capital Drive, Linford Wood,
Milton Keynes, MK14 6QP

Report Date: 25th April 2013

Report Approved By: Carl Redgrove

Position: Senior Consultant

MCERTS Registration Number: MM 03 173

MCERTS Certification Level: 2

Technical Endorsements: TE1, TE2, TE3, TE4

Signature:

A handwritten signature in black ink, appearing to read 'Carl Redgrove', enclosed in a rectangular box.

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Authorisation/Permit Number: EPR07/09

Visit number 1 of 1

Report Version: 1
Date of Issue: April 2013
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Monitoring Objectives

At the request of Adam Turner of Todd Engineering Ltd, RPS Consultants conducted stack emission monitoring at the Todd Engineering Ltd in April 2013.

The monitoring programme at this installation was carried out to provide data on emissions to atmosphere for comparison with the limits specified in the air emission criteria for this site.

The following tables detail the parameters requested for monitoring at each emission point and the actual monitoring conducted.

Table 1.1

Parameters Requested to be Monitored	Emission Point
	Spraybooth
Volatile Organic Compounds	
Total Particulate Matter	
Specific Requirements	Normal

Notes:

✓ Represents pollutants sampled

Monitoring Results

Table 2.1 Monitoring results for the Spraybooth, Carried out on 5th April 2013

Substance Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Uncertainty (Expressed expanded k=2)	Reference Conditions 273K, 101.3kPa	Sampling Date	Sampling Times	Monitoring Reference Method	Accreditation Status	Operating Status
Total Particulate Matter	10	0.71	mg/m ³	+/- 0.27	273K, 101.3kPa, Dry	05/04/2013	12:10 - 13:02	BS EN 13284-1:2002	MCERTS	Normal
Volatile Organic Compounds (as Carbon)	100	2.6	mg/m ³	+/- 1.6	273K, 101.3kPa, Dry	05/04/2013	12:10 - 13:04	BS EN 13526	MCERTS	Normal

Operating Information

Table 3.1 Operating conditions during the monitoring of the Spraybooth emission point, carried out on 5th April 2013

Parameter	Result
Sample Date	05/04/2013
Process Type	Batch
Process Duration	~ 1 Hour
If 'Batch', was monitoring carried out over the whole batch?	Yes
Abatement/Operational?	EU2/EU3 Glass Fibre-Synthetic/ Operational
Spraybooth Model	Olympian 1000 Series

Comparison of Operator CEM and Periodic Monitoring Results		
Substance	CEMs Results (mg/m ³)	Periodic Monitoring Results (mg/m ³)
No CEMS Installed/Data Available		

Monitoring Deviations

Table 4.1 Monitoring Deviations for Spraybooth Emission Point

Pollutant	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Total Particulate Matter & Volatile Organic Compounds	None	None	None

Report for Periodic Monitoring of Emissions to Atmosphere

Part 2: **Supporting Information**

Permit Number: **EPR07/09**

Operator: **Todd Engineering**

Installation: **Rugeley**

Emission Point: **Spraybooth**

Monitoring Date: **5th April 2013**



Contract Reference: FTBS 25470

Operator: Todd Engineering

Address: Gregory Works
Armitage Road
Rugeley
Staffs
WS151PW

Monitoring Organisation: RPS Consultants

Address: Noble House, Capital Drive, Linford Wood,
Milton Keynes, MK14 6QP

Report Date: 18th April 2013

Report Approved By: Carl Redgrove

Position: Senior Consultant

MCERTS Registration Number: MM 03 173

MCERTS Certification Level: 2

Technical Endorsements: TE1, TE2, TE3, TE4

Signature:

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APPENDIX 1: General Information

Monitoring Organisation Staff Details

Table 5.1 Sampling Personnel

Sampling Personnel	Position	MCERTS Level	Technical Endorsements & Expiries	MCERTS Registration Number
Richard Carter	Consultant	Level 2	TE1 – 13/06/13 TE2 – 03/12/13 TE3 – 03/12/14 TE4 – 18/03/15	MM 07 861
James Beechey	Technician	Level 1	TE1 – 12/02/18	MM 11 1144

Table 5.2 Report Author

Report Author	Position	MCERTS Level	Technical Endorsements & Expiries	MCERTS Registration Number
James Beechey	Technician	Level 1	TE1 – 12/02/18	MM 11 1144

Table 5.3 Report Reviewer

Report Reviewer	Position	MCERTS Level	Technical Endorsements & Expiries	MCERTS Registration Number
Carl Redgrove	Senior Consultant	Level 2	TE1 – 01/10/14 TE2 – 09/03/15 TE3 – 11/03/16 TE4 – 11/03/16	MM 07 861

Monitoring Organisation Method Details

Table 6.1 Monitoring Methods

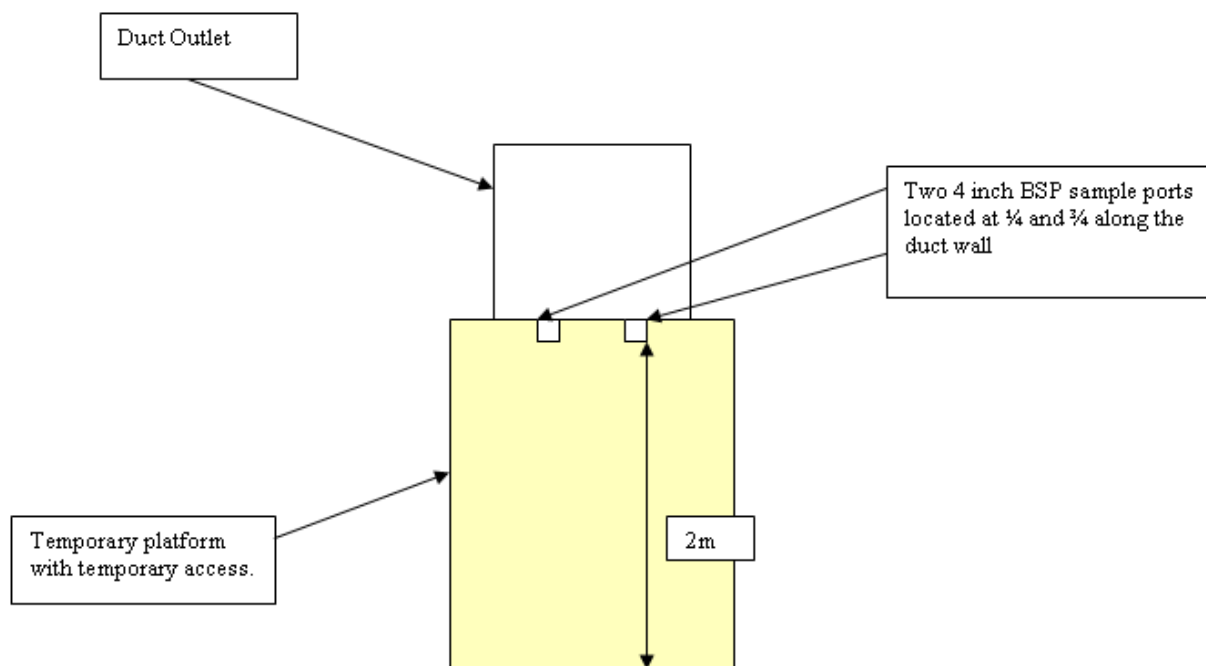
Emission Parameter	Standard Method	Monitoring Procedure No.	Monitoring Accreditation	Analysis	Analysis Procedure No.	Analytical Laboratory	Analysis Accreditation
Practical Considerations Prior to Monitoring	N/A	RPSCE/1/1	UKAS	N/A	N/A	N/A	N/A
Gas Flows	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Gas Temperatures	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Low Concentration Total Particulate Matter	BS EN 13284-1:2002	RPSCE/1/7c	MCERTS	Gravimetric	D9	RPS Laboratories	UKAS
TOCs at high concentrations	BS EN 13526	RPSCE/1/4c	MCERTS	Flame Ionisation Detector	N/A	N/A	N/A

Table 7.1 – Checklist Used

Equipment Checklist Used	File Location Address
FTBS25470 Checklist	FTBS25470 Electronic & Work File

APPENDIX 2: Spraybooth Sampling, Analysis & Uncertainty Data

Sampling Point Diagram



Company Name: Todd Engineering
Site Ref: Rugeley
Sampling Point Ref: SB 1
Project Ref: FTBS25470

Date: 05/04/13
Run: TPM

Project Ref: FTBS25470				Stack Width (m)		0.90
				Stack Depth (m)		0.86
Stack Static press mm H ₂ O:				Stack Area (m ²):		0.774
Traverse Point No.	Port A			Port B		
	Δ p, mm H ₂ O	Root Δ p	Stack Temp °C	Δ p, mm H ₂ O	Root Δ p	Stack Temp °C
1	7.2	2.683	12	4.2	2.049	12
2	5.6	2.366	12	1.6	1.265	12
3						
4						
5						
6						
7						
8						
9						
10						
Minimum	5.6	2.366	12	1.6	1.265	12
Maximum	7.2	2.683	12	4.2	2.049	12
Mean	6.4	2.525	12.0	2.9	1.657	12.0
Sum	12.8	5.050	24	5.8	3.314	24
Total Sum						

Max. pitot press. =	7.2
Min. pitot press. =	1.6
Ratio Max/Min =	4.5 : 1

Gas Data	
Oxygen %	21.0
CO ₂ %	0.04
CO %	

Oxygen Correction	
Required Correction Value	0
Actual Oxygen Factor	1
Enter 0 if correction is not required	

BS EN 13284-1 & M1 Sample Point Requirements	Requirement Met?
Duct gas flow: angle with regard to duct access <15°?	Y
Duct Gas Flow Negative Velocity: Not Permitted	Y
Duct Gas Flow: Ratio of max to min velocity <3:1?	Y
Working Area > 5m ² ?	N
Handrails with removable chains / self closing gates across the top of the ladder?	N
Handrails (approx 0.5 and 1.0 m high) and vertical baseboards (approx 0.25m high)?	Y
Scaffold Built to 'Heavy Duty' Scafftag Rating or at least 2.5kN/m ² loading	Y
Handrails not restricting access to ports?	Y
Room opposite sampling port equal or greater than the length of the sampling probe plus 1 metre?	N
Sufficient Power (Waterproof 110V BS4343 Standard) close or on the platform?	Y

Company Name: Todd Engineering In-stack Filter? ☐ Y Bar Press mm Hg 755 K Factor 9.636 Ambient Temp 14 Leak Rate (fin / %) 0
 Site Ref: Rugeley Outstack Filter? ☐ N Cp 0.824 Dr used 7.98 Start Time 12:10 Leak Rate (start / %) 0
 Sampling Point Ref: SB 1 Date: 05/04/13 Operators rcjb Bwis% 2 Nozzle No. Stop Time 13:02 Bcis/Probe setting 160 +/- 5 oC
 Run: TPM Project Ref: FTBS25470 Meter Correction / % 0.98

Sample Filter Weights

	Reference	Laboratory	Increase, mg
Filter	95549	RPS	0.24
Probe Washings	30002231	RPS	0.5

Sample Filter Blank Weighings

	Reference	Laboratory	Increase, mg
Filter	95548	RPS	0.04
Probe Wash	30002230	RPS	0.5

Impinger Weights

Weights	Initial	Final	Increase, g
Impinger 1			0.0
Impinger 2			0.0
Impinger 3			0.0
Impinger 4			0.0
Impinger 5			0.0
Silica Gel			0.0
Total			0.0

Sample Point	Clock Time min	Pilot Δ p, mm H ₂ O	Stack Temp, °C	Orifice Δ H, mm H ₂ O		Gas Meter Reading m ³	Temp at Gas Meter Outlet °C	Condenser Temp, °C	Filter Box Temp °C	Probe Temp °C	Pump Vacuum Inches Hg	Impinger Stem Temp, °C	Root Δ p,
				Desired	Actual								
	0	5.4	12	52.0	52.0	1168311	14	N/A	N/A	N/A	7	10	2.324
	6.25	4.8	12	48.3	48.3		15	N/A	N/A	N/A	7	11	2.191
	12.5	5.0	12	48.2	48.2		16	N/A	N/A	N/A	7	12	2.236
	18.75	5.0	12	48.2	48.2		17	N/A	N/A	N/A	7	14	2.236
Endpoint	25												
	0	5.0	12	48.2	48.2		19	N/A	N/A	N/A	7	16	2.236
	6.25	5.0	12	48.2	48.2		20	N/A	N/A	N/A	7	17	2.236
	12.5	5.0	12	48.2	48.2		21	N/A	N/A	N/A	7	17	2.236
	18.75	5.0	12	48.2	48.2		21	N/A	N/A	N/A	7	17	2.236
Endpoint	25					1169441.8							
	50.00	5.0	12.0	48.4	48.4	1.131	17.9	#DIV/0!	#DIV/0!	#DIV/0!	7.0	14.3	2.2

Company Name: Todd Engineering
Site Ref: Rugeley
Project Ref: FTBS25470

Date: 05/04/13

Sampling Point Ref: SB 1	Run: TPM
Meter Volume Sampled, acm	1.131
Sample Run Start Time	12:10
Sample Run End Time	13:02
Total Actual Sampling Time, min	50.0
Barometric Pressure, mm Hg	755.00
Stack Pressure, mm Hg	756.78
Average Stack Temp, °C	12.0
Meter Volume at STP, scm	1.038
Stack Moisture Content, %	0.0
Average Stack Velocity, m/sec	7.377
Stack Flow Rate, scms dry,STP	5.443
Nozzle Diameter, mm	7.98
% Isokinetic Variation	98.1
Total Mass of Particulate, mg	0.7
Percentage of Total Particulate Collected on Filter	32.4
Stack Particulate Concentration, mg/m³	0.7
Particulate Mass rate, kg/hour	0.014
Emission Limit value	10

Sample Train Blank Results	
Sample Blank Particulate Concentration, mg/m ³	0.5
Total Weight Gain, mg (Sample Train Blank)	0.5
Blank Result Less than 10% of Limit Value	Y

Uncertainty Calculation for Total Particulate Matter to BS EN 13284-1

Determined Concentration	0.7	mg/m ³ (at Reference Cond)
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Measured Values

Sampled Volume	1.1308	m ³
Sampled gas Temperature	280.875	K
Sampled gas Pressure	100.90	kPa
Sampled gas Humidity	0	% by volume
Oxygen content	21	% by volume
Mass	0.74	mg

Leak	0.00	%
Uncollected Mass	0	mg

Standard Uncertainties for Measured Values

Sampled Volume	0.001	m ³
Sampled gas Temperature	2	K
Sampled gas Pressure	1	kPa
Sampled gas Humidity	1	% by volume
Oxygen content	0.1	% by volume
Mass	0.14152395	mg

Uncertainty Calculation for Volume Correction				Uncertainty Calculation for Oxygen Correction			
Volume Correction Factor	0.935			Oxygen Correction Factor	1.0000		
	Sensitivity Coefficient		Uncertainty, U _v		Sensitivity Coefficient		Uncertainty, U _o
Sampled gas Temperature	0.0032		0.0084	Oxygen Measurement	N/A		N/A
Sampled gas Pressure	0.0093		0.0093				
Sampled gas Humidity	0.0093		0.0093				
	Sqrt (U _v) ²		0.0146				
	Total U _v		0.017		Total U _o		N/A

Uncertainty Contributions (Itemised)				Uncertainty Contribution	
	Value		Sensitivity coefficient	Concentration	%
Volume Correction	1.038	m ³	0.69	0.01 mg.m ⁻³	1.60 %
Mass (weighing)	0.74	mg	0.96	0.14 mg.m ⁻³	19.12 %
Oxygen Correction	N/A		0.00	0.00 mg.m ⁻³	0.00 %
System Leak	0.00	mg.m ⁻³	1.00	0.00 mg.m ⁻³	0.00 %
Uncollected Mass	0.00	mg	0.96	0.00 mg.m ⁻³	0.00 %
			Total Uncertainty	0.14 mg.m ⁻³	

Uncertainty Result:	(Uncertainty has been expanded with a coverage factor of 2 (k=2))				
	Expanded Uncertainty =	0.27	mg.m ⁻³		
	=>	38.38	% of Result		
	=>	0.00	% of ELV		

Company Name: Todd Eng
Site Ref: Rugeley
Stack Ref: SB 1

Date: 05/04/13
Run: VOC

	VOC (as Carbon) ppm	VOC (as Carbon) mg/m3	VOC (as Carbon) kg/h	VOC (as Toluene) mg/m3	VOC (as Toluene) kg/h	Oxygen %
Average	#DIV/0!	2.62	0.05	2.87	0.05	#DIV/0!
Max	0.00	21.69	0.39	23.75	0.43	0.00
Min	0.00	-0.16	0.00	-0.18	0.00	0.00
Emission Limit						
Moisture, %	2.0					
Oxygen Reference, %	0.0					

Stack Gas Volume Flow Rate, m3/s (scms Dry) O2 Corrected	4.988806023
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ISO 14956 Calculation Sheet - TOC (BS EN 13526)

Studied Concentration (mg/m ³ as C)	2.617707975
Range of Instrument (mg/m ³ as C)	161
Sampling Parameters to be met	Requirement Met?
Response Time < 60s	Yes
Operating temperature (5 - 45°C)	Yes
Atmospheric pressure (700 - 1240 mbar)	Yes
Relative Humidity (10 - 90%, non condensing)	Yes
Altitude (< 2000 m)	Yes
Zero Drift 2% of FS	Yes
Span Drift 4% of FS	Yes

Selected Performance Characteristic	Value of Performance Characteristic			Operating Conditions compared to calibration condition		
	%	Numerical	Units	Required	Variable due to sampling conditions	Units
Deviation from Linearity	1	0.01	% FS	0.01	1	% FS
Repeatability Standard Deviation	1	0.01	% FS	0.01	1	% FS
8 Hour Drift	2	0.02	%	0.02	1	%
Atmospheric Pressure Dependence	0.1	0.001	% kPa	0.001	1	% kPa
Temperature Dependence	0.2	0.002	%K	0.002	1	%K
Sum Interference	2	0.02	%	0.02	2	%
Voltage Supply	0.1	0.001	%V	0.001	1	%V
Uncertainty of Calibration Gas	2	0.02	%	0.02	1	%
Moisture Effect	1	0.01	%Vol H2O Error	0.01	2	%Vol H2O Error
Loss in sample line (Leaks)	2	0.02	%	0.02	2	%

Measurement Performance related to stationary conditions								
Performance Characteristic		Uncertainty Quantity	Value of Uncertainty Quantity					
			At Calibration Conditions			At Sampling Conditions		
			Units	U	U ²	Units	U	U ²
Deviation from Linearity		U _{FL}	% FS	1.61	2.592	% FS	1.61	2.592
Repeatability Standard Deviation		U _R	% FS	0.015	0.000	% FS	0.015	0.000
8 Hour Drift		U _{8H}	%	0.0302	0.001	%	0.030	0.001
Atmospheric Pressure Dependence		U _{Atm}	% / kPa	0.002	0.000	% / kPa	0.002	0.000
Temperature Dependence		U _{Temp}	% / K	0.003	0.000	% / K	0.003	0.000
Sum Interference		U _{Interference}	%	0.030	0.001	%	0.002	0.000
Voltage Supply		U _{Voltage}	% / V	0.002	0.000	% / V	0.002	0.000
Uncertainty of Calibration Gas		U _{Calibration gas}	%	0.030	0.001	%	0.030	0.001
Loss in sample line (Leaks)		U _{Losses, leak}	%	0.030	0.001	%	0.030	0.001
			Sum	1.752	2.596	Sum	1.754	2.596

Measurement Uncertainty at	2.617707975	mg/m ³ C
U _{tot}	1.612	mg/m ³ C
U _{int} ⁶	61.672	%
Pass	No	

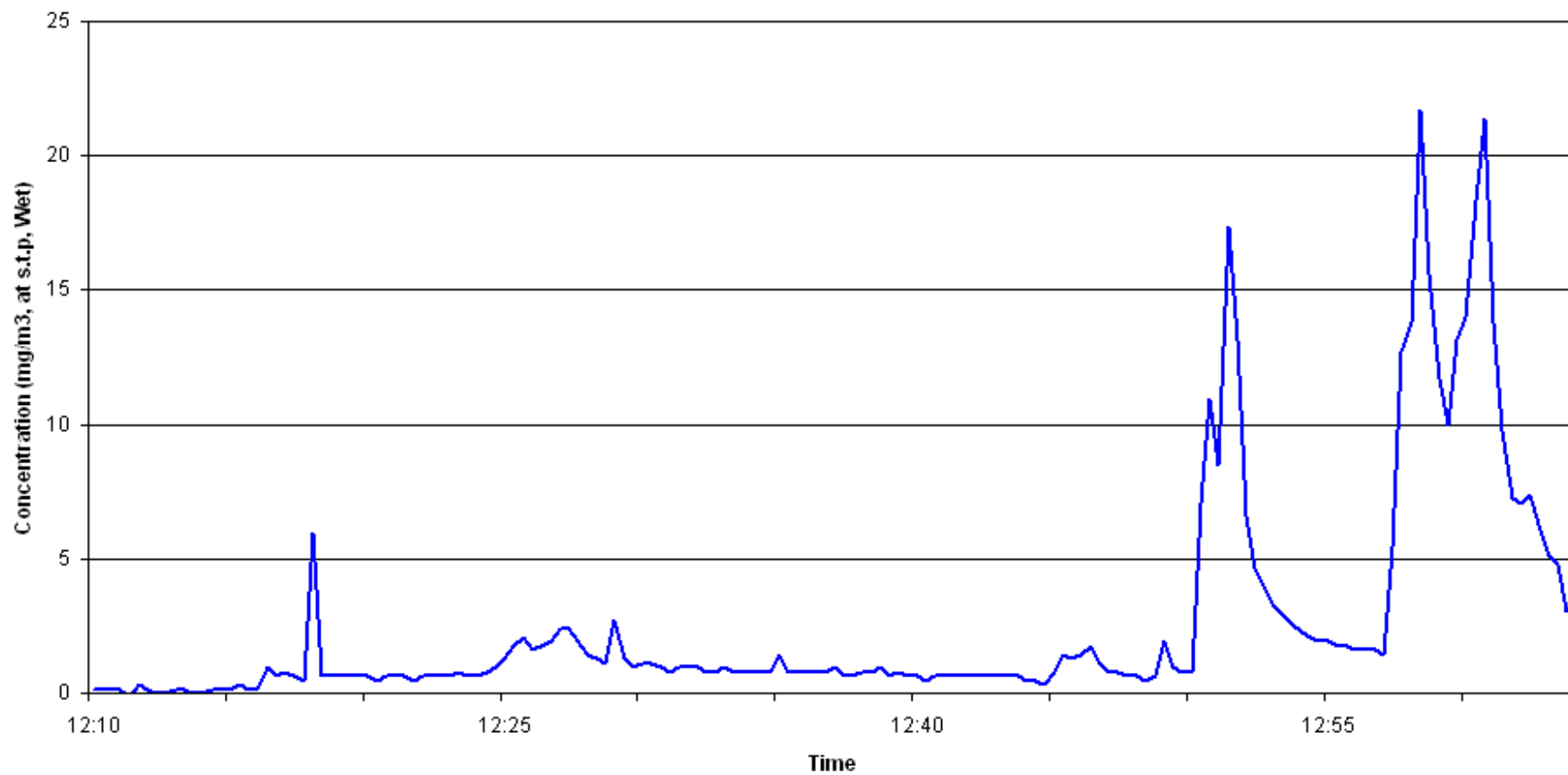
BS EN 13526:2001 Performance Requirements

Performance Characteristic	Minimum Performance Requirement
Detection Limit	5% of the emission limit value
Response Time	less than 1 minute
Linearity Deviation	permissible deviation 5% of emission limit
Response Factors	Permissible range
Methane	0.9 to 1.2
Aliphatic Hydrocarbons	0.9 to 1.1
Aromatic Hydrocarbons	0.8 to 1.1
Aliphatic alcohols	0.7 to 1.0
Esters	0.7 to 1.0
Ketones	0.7 to 1.0
Organic Acids	0.5 to 1.0
Oxygen Effect	permissible deviation 5% of emission limit

For more details on the above figures see BS EN 13526:2001.

Note: U_{int} is the percentage of the ELV value allowed for the uncertainty. In other words, if the ELV is 50 mg/m³, the U_{int} allowed is 15 mg/m³

**TOC Emissions Profile from the Spraybooth on 5th April 2013 at Todd Engineering Ltd,
Rugeley, for Todd Engineering, Rugeley .**





Test Certificate

Date 17/04/2013

Client	RPS Milton Keynes HSED	Order No.	FTBS 25470
	Noble House	Certificate No.	WK13-2190
	Capital Drive	Issue No.	1
	Linford Wood		
	Milton Keynes MK14 6QP		
Contact	James Beechey	Date Received	10/04/2013
Description	2 filters & 2 solutions for TPM	Technique	Gravimetric Stack

Sample No.	740079	095548	Method
Total particulate matter		<0.04 mg	D9(U)
Sample No.	740080	30002230	Method
Total particulate matter		<0.5 mg	D9(U)
Sample No.	740081	095549	Method
Total particulate matter		0.24 mg	D9(U)
Sample No.	740082	30002231	Method
Total particulate matter		<0.5 mg	D9(U)

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