Report for Periodic Monitoring of Emissions to Atmosphere

Part 1:	**Executive Summary**
Permit Number:	**PPC/193**
Operator:	**Covpress Ltd**
Installation:	**Coventry**
Emission Point:	**Burn Off Oven Exhaust**
Monitoring Date:	**22nd October 2013**

UKAS TESTING 1709

mCERTS

Contract Reference:	FTBS 27548
Operator:	Covpress Ltd
Address:	Burnsall Road Canley Coventry CV5 6RT
Monitoring Organisation:	RPS Consultants
Address:	Noble House, Capital Drive, Linford Wood, Milton Keynes, MK14 6QP
Report Date:	27th November 2013
Report Approved By:	Glyn Harrison
Position:	Operational Manager (Stack Emissions)
MCERTS Registration No.:	MM 03 228
MCERTS Certification Level:	2
Technical Endorsements:	TE1, TE2, TE3, TE4
Signature:	[redacted]

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Monitoring Objectives

At the request of Steve Cottom of Covpress Ltd, RPS Consultants conducted stack emission monitoring at the Coventry site in October 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
	Burn Off Oven Exhaust
Total Particulate Matter	✓
Volatile Organic Compounds	✓
Oxides of Nitrogen	✓
Carbon Monoxide	✓
Specific Requirements	Normal

Notes:
✓ *Represents pollutants sampled*

Monitoring Results

Table 2.1 Monitoring results for the Burn Off Oven Exhaust, Carried out on 22nd October 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
Carbon Monoxide	No Limit	270	mg/m^3	+/- 10	273K, 101.3kPa, Dry, 11% Oxygen	22/10/13	11:03 – 13:34	EN 15058:2006	MCERTS	Normal
	No Limit	0.15	kg/hr	-						
Oxides of Nitrogen	No Limit	92	mg/m^3	+/- 3.5	273K, 101.3kPa, Dry, 11% Oxygen	22/10/13	11:03 – 13:34	BS EN 14792:2005	MCERTS	Normal
	No Limit	0.050	kg/hr	-						
Total Particulate Matter	20	**25**	mg/m^3	+/- 1.0	273K, 101.3kPa, Dry, 11% Oxygen	22/10/13	11:03 – 13:34	BS EN 13284-1:2002	MCERTS	Normal
	No Limit	0.035	kg/hr	-						
Volatile Organic Compounds (as Carbon)	20	15	mg/m^3	+/- 0.44	273K, 101.3kPa, Dry, 11% Oxygen	22/10/13	11:03 – 13:34	BS EN 13526	MCERTS	Normal
	No Limit	0.0078	kg/hr	-						

Notes;

- Result in **bold type** has exceeded the Emission Limit Value

Operating Information

Table 3.1 Operating conditions during the monitoring of the Burn Off Oven Exhaust, carried out on 22nd October 2013

Parameter	Result
Sample Date	22/10/2013
Process Type	Batch
Process Duration	145 Minutes
If 'Batch', was monitoring carried out over the whole batch?	Yes
Abatement/Operational?	Not Installed
Load	Oven loaded with "sky" bars.

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 Burn Off Oven Exhaust Emission Point

Pollutant	Substance Deviations	Monitoring Deviations	Other Relevant Issues
Carbon Monoxide, Oxides of Nitrogen & Volatile Organic Compounds	None	None	None
Total Particulate Matter	None	Monitoring conducted from a single traverse line as only one sample port was made available. This was due to the health and safety concerns of cutting an additional open hole into a stack with a duct temperature of ~750 deg C.	None

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Part 2:	**Supporting Information**
Permit Number:	**PPC/193**
Operator:	**Covpress Ltd**
Installation:	**Coventry**
Emission Point:	**Burn Off Oven Exhaust**
Monitoring Date:	**22nd October 2013**

UKAS TESTING 1709

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APPENDIX 1: General Information

Monitoring Organisation Staff Details

Table 5.1 Sampling Personnel

Sampling Personnel	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Carl Redgrove	Senior Consultant	Level 2	TE1, TE2, TE3, TE4	MM 03 173
Adeniyi Shedowo	Trainee Technician	Trainee	None	MM 13 1236
William Doward	Trainee Technician	Trainee	None	MM 13 1249

Table 5.2 Report Author

Report Author	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Carl Redgrove	Senior Consultant	Level 2	TE1, TE2, TE3, TE4	MM 03 173

Table 5.3 Report Reviewer

Report Reviewer	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Glyn Harrison	Operations Manager (Stack Emissions)	Level 2	TE1, TE2, TE3, TE4	MM 03 228

Monitoring Organisation Method Details

Table 6.1 Monitoring Methods

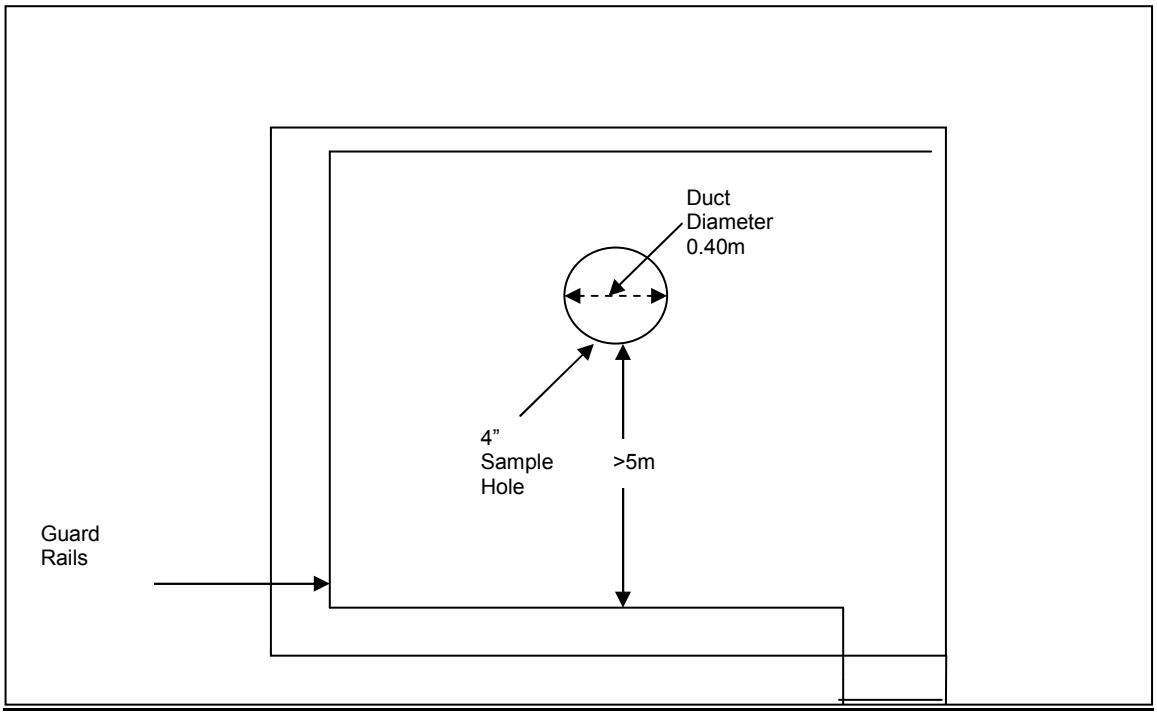
Emission Parameter	Standard Method	Monitoring Procedure No.	Monitoring Accreditation	Analysis	Analysis Procedure No.	Analytical Laboratory	Analysis Accreditation
Practical Considerations Prior to Monitoring	N/A	RPSCE/1/1	UKAS	N/A	N/A	N/A	N/A
Gas Flows	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Gas Temperatures	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Carbon Monoxide	EN 15058:2006	RPSCE/1/21h	MCERTS	NDIR	N/A	N/A	N/A
Oxides of Nitrogen	EN 14792:2005	RPSCE/1/21f	MCERTS	Chemiluminescence	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
FTBS27548 Checklist	FTBS27548 Electronic & Work File

APPENDIX 2:
Burn Off Oven Exhaust Sampling, Analysis & Uncertainty Data

Burn Off Oven Exhaust – Stack Diagram



Company Name: Covpress
Site Ref: Coventry
Stack Ref: Burn Off Oven

Date: 22/10/13
Run: Gases

Static Press, mm H_2O:	1.2	Stack Diamter (m)	0.40
Barometric press, mm Hg:	735	Pitot Tube Constant:	0.839

Traverse Point No.	Port A				Port B			
	Δ p, mmH2O	Conversion for pitot coefficient and to Pa	Root Δ p,	Stack Temp °C	Δ p, mmH2O	Conversion for pitot coefficient and to Pa	Root Δ p,	Stack Temp °C
1	0.8	5.6	2.373	700				
2	0.8	5.6	2.373	700				
3	0.8	5.6	2.373	700				
4	0.8	5.6	2.373	700				
5								
6								
7								
8								
9								
10								
Minimum	0.8	5.6	2.373	700.0	0.0	0.0	0.000	0.0
Maximum	0.8	5.6	2.373	700.0	0.0	0.0	0.000	0.0
Average	0.8	5.6	2.373	700.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sum	3.2	22.5	9.493	2800.0	0.0	0.0	0.000	0.0
Total Sum								
Max. pitot press. =			5.6		Max. Temp.=			700.0
Min. pitot press. =			5.6		Min. Temp.=			700.0
Ratio Max:Min =			1.0 :1		Mean Temp.=			700.0

Mean Root D p	2.373
Mean Stack Temperature, °C	700.00
Traverse Stack Velocity, m/s	5.552
Stack Area, m^2	0.126
Stack Gas Volume Flow Rate, m^3/s (acms)	0.698
Stack Gas Volume Flow Rate, m^3/s (scms wet)	0.189
Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.150
Moisture	10.6
Stack Pressure, mm Hg	735.09

Gas Data

Oxygen %	12.1510614
CO_2 %	5.27

Oxygen Correction

Required Correction Value (%)	11
Oxygen Factor	1.132
Enter 0 if correction is not required	

Barometric Pressure (mmHg)	
Min	
Max	

Ambient Temperature (C)	
Min	
Max	

Company Name: Covpress
Site Ref: Coventry
Stack Ref: Burn Off Oven

Date: 22/10/13
Run: Gases

	O_2 %	CO_2 %	CO mg/m^3	CO kg/hr	NO_x mg/m^3	NO_x kg/hr
Average	**12.15**	**5.27**	**269.85**	0.15	**92.06**	0.050
Max	**20.15**	**11.68**	**2936.51**	1.58	**165.99**	0.09
Min	**5.78**	**0.42**	**0.00**	0.00	**64.34**	0.03
Emission Limit			**N/A**		**N/A**	
Moisture, %	**10.6**		**Baromteric (mmHg) Start**			735
Oxygen Reference, %	**11.0**		**Baromteric (mmHg) End**			735

Stack Gas Volume Flow Rate, m3/s (scms DRY) O2 Corrected	0.149506

Calibrations	O_2 %	CO_2 %	CO ppm	NO ppm
Analyser - Start Zero	0.02	0.00	0.4	0.0
Analyser - Start Span	15.05	7.80	109.0	203.4
Analyser - Zero Check	0.02	0.03	0.3	0.2
System - Zero Check	0.1	0.05	0.6	-0.1
System - Span Check	15.05	7.74	108.3	202.5
System - End Zero Check	0.11	0.05	0.4	0.6
System - End Span Check	15.1	7.70	109.2	202.1
Span Value	15.02	7.79	108.3	203.7
Analyser Range (0 - X)	25	20	5000	250

Not in Use

Uncertainty calculation for Gaseous Measurement of Oxygen EN14789

Measured concentration	12.15	**%vol**
Range (Max Value)	25	**%vol**

Analyser Make/Model	Horiba PG250
ID Number	0955

Performance Characteristics		**Value**			**specification**
Response time		12	seconds		< 200 s
Logger sampling interval		15	seconds		
Measurement period		145	minutes		
Number of readings in measurement		580	Assuming 15 Second Readings over 2.41666666666667 hour period		
Repeatability at zero		0.02	% by volume	stdev	<0.2 % range
Repeatability at span level		0.02	% by volume	stdev	<0.4 % range
Deviation from linearity		0.14	% vol	+/-	<0.3 % volume
Zero drift (during measurement period)		0.0665779	% vol at zero level	+/-	<2% of volume / 24hr
Span drift (during measurement period)		0.3328895	% vol at span level	+/-	<2% volume/24hr
volume or pressure flow dependence		0	% of fs / 10l/h	+- 5 l/h	<1% range
atmospheric pressure dependence		0	% of fs/kPa	+- 2kPa	< 1.5 % range
ambient temperature dependence		-0.07	% by volume /10K	+- 15K	<0.3% volume 10 K
CO_2 (% vol)	10	0.1	% by volume per	10	
NO (mg/m3)	300	0	% by volume per	300	
NO_2 (mg/m3)	30	0	% by volume per	30	
Combined interference			% range		<2% range
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 0.1%vol /10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.081
Drift			u_{0dr}				0.194
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.069
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				0.14
Uncertainty of calibration gas			u_{calib}				0.14

Measurement Concentration	**12.15**	**%vol**	
Combined uncertainty	0.30	%vol	
% of value	2.44	%	
Coverage factor k = 2			
Expanded uncertainty	4.89	% of value	**(expressed with a level of confidence of 95%)**
Expanded uncertainty	**0.59**	**% vol**	

Uncertainty calculation for Gaseous Measurement of Carbon Monoxide EN 15058

Measured concentration - CO	269.9	**mg/m^3 (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	6250.0	**mg/m^3**	**ID Number**	0955

Performance Characteristics		**Value**			**specification**
Response time			seconds		< 200 s
Logger sampling interval		15	seconds		
Measurement period		145	minutes		
Number of readings in measurement		580	Assuming 15 Second Readings over 2.41666666666667 hour period		
Repeatability at zero		0	% of Range		< 1% Range
Repeatability at span level		0	% of Range		< 2% of Range
Deviation from linearity		0	% of Range		< 2% of Range
Zero drift (during measurement period)		-0.184672	% of Range		< 2% of Range
Span drift (during measurement period)		0.8310249	% of Range		< 2% of Range
volume or pressure flow dependence		0	% of fs / 10l/h		< 1% range
atmospheric pressure dependence		0	% of Range/kPa		< 1.5 % range
ambient temperature dependence		-0.07	% of Range /K		<0.3 % range /K
CO_2 (% vol)	15		% by volume per		
CH4 (mg/m^3)	57		mg/m^3		
N_2O (mg/m^3)	42		mg/m^3		
	Total	0	% of Range		< 4% of Range (Total)
Dependence on voltage		0.1	% by volume /10V	+- 5%	< 2% of Range/10 volt
Losses in the line (leak)		2	% of value		< 2% of value
Uncertainty of calibration gas		2	% of value		

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.000
Lack of fit			u_{fit}				0.000
Drift			u_{0dr}				1.007
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				3.12
Uncertainty of calibration gas			u_{calib}				3.12

Measurement Concentration	**269.85**	**mg/m^3**	
Combined uncertainty Coverage factor k = 2	4.52	**mg/m^3**	
Expanded uncertainty (as measured)	9.04	mg/m^3	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**10.23**	mg/m^3	

Uncertainty calculation for Gaseous Measurement of Oxides of Nitrogen BS EN 14792

Measured concentration - NOx	92.1	**mg/m³ (O_2 & H_2O uncorrected)**	**Analyser Make/Model**	Horiba PG250
Range (Max Value)	**513.4**	**mg/m³**	**ID Number**	**0955**

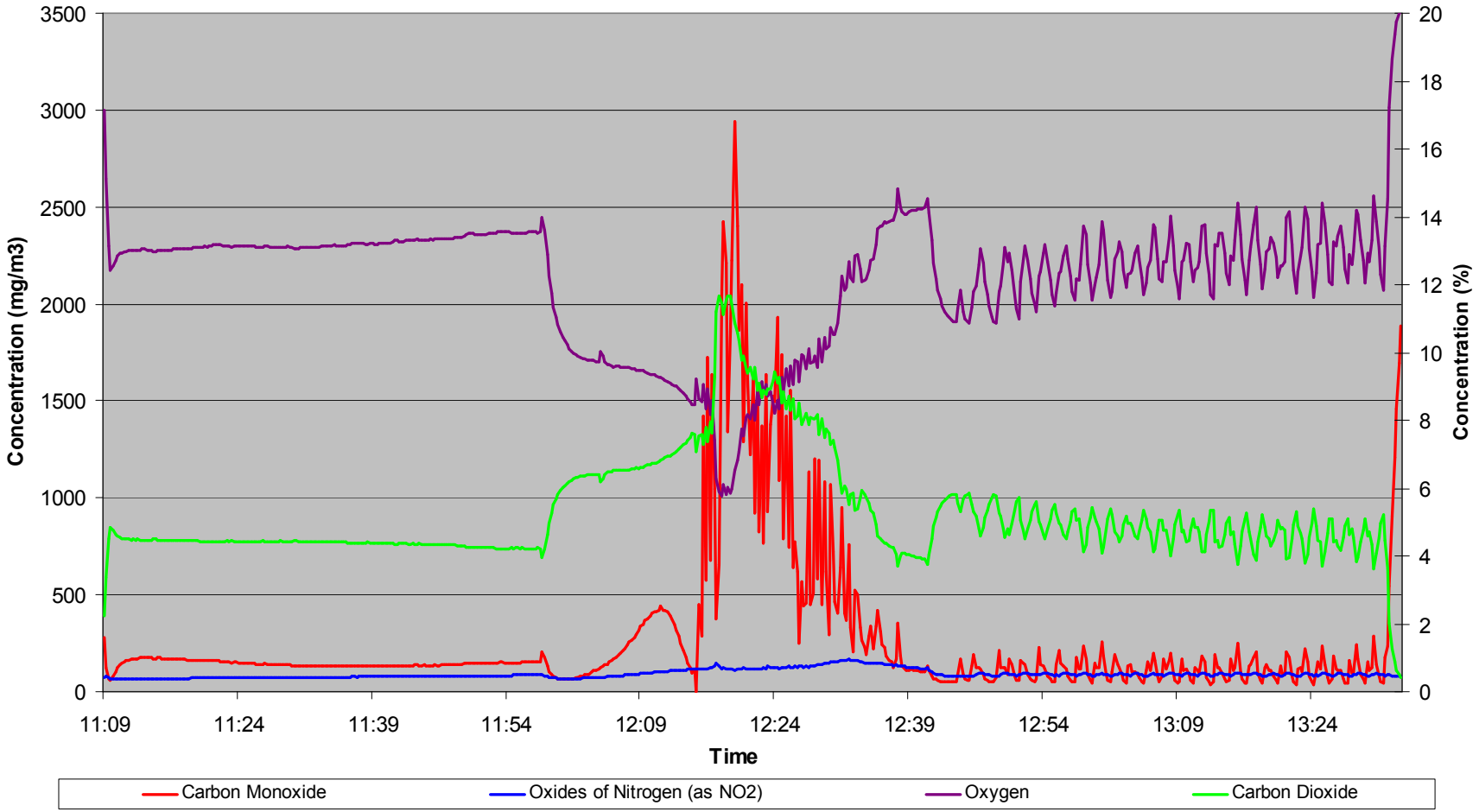
Performance Characteristics		**Value**			**specification**
Response time		13	seconds		< 180 s
Logger sampling interval		15	seconds		
Measurement period		145	minutes		
Number of readings in measurement		580	Assuming 15 Second Readings over 2.41666666666667 hour period		
Repeatability at zero		0.02	% full range		0.2
Repeatability at span level		0.02	% full range		2.0
Deviation from linearity		0.14	% of Value		2
Zero drift (during measurement period)		0.3436426	% full range		2
Span drift (during measurement period)		-0.196367	% full range		2
volume or pressure flow dependence		0	% of fs / kPa		0.033
atmospheric pressure dependence		0	% of fs/kPa		0.75
ambient temperature dependence		-0.07	% by volume /10K		0.3
CO_2 (% vol)	15		% by volume per		
CH_4 (mg/m³)	57		mg/m³		
NH_3 (mg/m³)	20		mg/m³		
Converter Efficiency		98.78	%		95%
Dependence on voltage		0.1	% by volume /10V		2% Full Scale /10 volt
Losses in the line (leak)		2	% of value		2% of value
Uncertainty of calibration gas		2	% of value		2% of value

Performance characteristic			**Uncertainty**	**Value of uncertainty quantity**			**% vol**
Standard deviation of repeatability at zero			u_{r0}		for mean		Only use rep at span
Standard deviation of repeatability at span level			u_{rs}		for mean		0.001
Lack of fit			u_{fit}				0.415
Drift			u_{0dr}				0.078
volume or pressure flow dependence			u_{spres}				0.000
atmospheric pressure dependence			u_{apres}				0.000
ambient temperature dependence			u_{temp}				0.000
CO_2							0.000
NO							0.000
NO_2							0.000
Converter Efficiency			u_{ceff}				0.01
dependence on voltage			u_{volt}				0.000
losses in the line (leak)			u_{leak}				1.06
Uncertainty of calibration gas			u_{calib}				1.06

Measurement Concentration (as measured)	**92.06**	**mg/m³**	
Combined uncertainty	1.56	mg/m³	
Coverage factor k = 2			
Expanded uncertainty (as measured)	3.12	mg/m³	**(expressed with a level of confidence of 95%)**
Expanded uncertainty (Corrected to Ref Conditions)	**3.53**	**mg/m³**	

Combustion Gas Emissions from the Burn Off Oven Exhaust at Covpress, Coventry on 22nd October 2013

reference conditions expressed as 273K, 101.3 kPa, 11% O2 and dry gas



Company Name: Covpress
Site Name: Coventry
Project Reference:FTBS27548
Date: 22/10/13
Run: TPM
Sampling Point Ref:Burn Off Oven

In-stack Filter?	No	Bar. Press.mm Hg	735	K Factor	8.997	Ambient Temp.		Leak Rate (fin / %)	0
Outstack Filter?	Yes	Cp	0.839	Dn used	10.8	Start Time	11:09	Leak Rate (start / %)	0
Operators	CR AS WD	Bws%	10.6	Nozzle No.		Stop Time	13:34	Box/Probe setting	160 +/- 5 °C
				Meter Correction Yd	0.946				

Sample Filter Weights

	Sample ID	Laboratory	Increase, mg
Filter	103209	RPS	21.7
Probe Washings	30004880	RPS	37.5

Sample Filter Blank Weighings

	Sample ID	Laboratory	Increase, mg
Filter	103205	RPS	0.1
Probe Wash	30004879	RPS	0.5

Impinger Weights

Weights	Initial	Final	Increase, g
Impinger 1	735.3	883	147.7
Impinger 2	729.4	790.7	61.3
Impinger 3	557.3	565.7	8.4
Impinger 4			0.0
Impinger 5			0.0
Silica Gel	848.9	885.1	36.2
		Total	253.6

Sample Point	Clock Time min	Pitot Δ p, mm H_2O	Stack Temp, °C	Orifice Δ H, mm H_2O		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	3.5	160	31.4895	31.4895	2406835.5	15		120	120	-1	12	1.871
	5	4	420	35.988	35.988		15		123	120	-1.5	12	2.000
	10	4.2	479	37.7874	37.7874		15		120	120	-1	13	2.049
	15	4.2	513	37.7874	37.7874		16		119	120	-1	15	2.049
	20	4.1	538	36.8877	36.8877		16		120	120	-2	16	2.025
	25	4.2	554	37.7874	37.7874		17		121	120	-1.5	17	2.049
	30	4.1	567	36.8877	36.8877		18		120	120	-2	18	2.025
	35	4.2	576	37.7874	37.7874		19		121	120	-2	19	2.049
	40	4.2	584	37.7874	37.7874		19		118	120	-2	19	2.049
	45	4.2	595	37.7874	37.7874		20		120	121	-2	19	2.049
	50	4.1	603	36.8877	36.8877		21		120	120	-2	18	2.025
	55	4.4	616	39.5868	39.5868		21		119	120	-2	19	2.098
	60	4.6	638	41.3862	41.3862		22		121	120	-2	19	2.145
	65	4.8	675	43.1856	43.1856		22		120	120	-2	20	2.191
	70	4.8	690	43.1856	43.1856		23		120	120	-3	21	2.191
	75	4.8	649	43.1856	43.1856		23		120	120	-3	22	2.191
	80	4.8	660	43.1856	43.1856		24		123	120	-3	19	2.191
	85	4.8	671	43.1856	43.1856		24		119	120	-3	18	2.191
	90	4.8	667	43.1856	43.1856		24		121	120	-3	19	2.191
	95	4.8	666	43.1856	43.1856		25		120	120	-3	19	2.191
	100	4.8	669	43.1856	43.1856		25		120	120	-3	19	2.191
	105	4.8	667	43.1856	43.1856		25		120	120	-3	18	2.191
	110	4.8	666	43.1856	43.1856		25		121	120	-3	18	2.191
	115	4.8	671	43.1856	43.1856		25		115	120	-3	18	2.191
	120	4.8	660	43.1856	43.1856		25		123	120	-3	17	2.191
	125	4.8	667	43.1856	43.1856		26		120	120	-3	18	2.191
	130	4.8	667	43.1856	43.1856		26		121	120	-3	18	2.191
	135	4.8	640	43.1856	43.1856		26		119	120	-3	18	2.191
	140	4.8	638	43.1856	43.1856		26		121	120	-3	18	2.191
Endpoint	145					2409971							
	145.00	**4.510**	**602.3**	**40.6**	**40.6**	**3.136**	**21.7**	**#DIV/0!**	**120.2**	**120.0**	**-2.4**	**17.8**	**2.1**

Company Name: Covpress
Site Name: Coventry
Project Reference:FTBS27548

Date: 22/10/13

Sampling Point Ref:Burn Off Oven	Run: TPM
Meter Volume Sampled, acm	3.136
Sample Run Start Time	11:09
Sample Run End Time	13:34
Total Actual Sampling Time, min	145.0
Barometric Pressure, mm Hg	735.00
Stack Pressure, mm Hg	735.09
Average Stack Temp, °C	602.3
Meter Volume at STP, scm	2.667
Stack Moisture Content, %	10.6
Average Stack Velocity, m/sec	12.806
Stack Flow Rate, scms dry,STP	0.383
Nozzle Diameter, mm	10.80
% Isokinetic Variation	**96.7**
Total Mass of Particulate, mg	59.2
Percentage of Total Particulate Collected on Filter	36.7
Stack Particulate Concentration, mg/m^3	**25.114**
Particulate Mass rate, kg/hour	0.035
Emission Limit value	**20**

Sample Train Blank Results	
Sample Blank Particulate Concentration, mg/m^3	0.23
Total Weight Gain, mg (Sample Train Blank)	0.60
Blank Result Less than 10% of Limit Value	Y

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

Determined Concentration	25.114	mg/m3 (at Reference Cond)

Measured Values

Sampled Volume	3.1355	m^3
Sampled gas Temperature	294.6551724	k
Sampled gas Pressure	98.01	kPa
Sampled gas Humidity	0	% by volume
Oxygen content	12.15	% by volume
Mass	59.2	mg

Leak	0.00	%
Uncollected Mass	0	mg

Standard Uncertainties for Measured Values

Sampled Volume	0.001	m3
Sampled gas Temperature	2	k
Sampled gas Pressure	1	kPa
Sampled gas Humidity	1	% by volume
Oxygen content	0.1	% by volume
Mass	0.14152385	mg

Uncertainty Calculation for Volume Correction

Volume Correction Factor	0.896		
	Sensitivity Coefficient		**Uncertainty, Uv**
Sampled gas Temperature	0.0030		0.0061
Sampled gas Pressure	0.0091		0.0091
Sampled gas Humidity	0.0090		0.0090
		Sqrt (Uv)^2	0.0142
		Total Uv	**0.044**

Uncertainty Calculation for Oxygen Correction

Oxygen Correction Factor	1.1314		
	Sensitivity Coefficient		**Uncertainty, Uo**
Oxygen Measurement	0.1284		0.0128
		Total Uo	**0.0128**

Uncertainty Contributions (Itemised)

	Value		Sensitivity coefficient	Uncertainty Contribution			
				Concentration		%	
Volume Correction	2.667	m3	9.42	0.42	$mg.m^{-3}$	1.67	%
Mass (weighing)	59.20	mg	0.42	0.06	$mg.m^{-3}$	0.24	%
Oxygen Correction	1.1314		22.20	0.29	$mg.m^{-3}$	1.14	%
System Leak	0.00	$mg.m^{-3}$	1.00	0.00	$mg.m^{-3}$	0.00	%
Uncollected Mass	0.00	mg	0.42	0.00	$mg.m^{-3}$	0.00	%
			Total Uncertainty	**0.51**	**$mg.m^{-3}$**		

Uncertainty Result (Uncertainty has been expanded with a coveragefactor of 2 (K=2))

Expanded Uncertainty =	**1.0202**	**$mg.m^{-3}$**
=>	**4.06**	**% of Result**
=>	**5.10**	**% of ELV**

Company Name: Covpress
Site Name: Coventry
Sampling Point Ref:Burn Off Oven

Date: 22/10/13
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	7.14	14.52	0.00781	15.90	0.00856	12.15
Max	84.80	172.48	0.09283	188.91	0.10167	12.15
Min	0.55	1.12	0.00060	1.23	0.00066	12.15
Emission Limit		20.00				
Moisture, %	10.6					
Oxygen Reference, %	11.0					

Stack Gas Volume Flow Rate, m3/s (scms Dry) O2 Corrected	0.149505654

Calibrations	ppm
Analyser - Start Zero	0.00
Analyser - Start Span	8.14
Analyser - Zero Check	0.00
System - Zero Check	-0.05
System - Span Check	8.16
System - End Zero Check	0.30
System - End Span Check	80.90
Span Value	81.40
Analyser Range (0 - X)	0-100

ISO 14956 Calculation Sheet - TOC (BS EN 13526)

Studied Concentration (mg/m^3 as C)	14.51840731
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								
			Value of Uncertainty Quantity					
			At Calibration Conditions			At Sampling Conditions		
Performance Characteristic	Uncertainty Quantity		Units	U	U^2	Units	U	U^2
Deviation form Linearity	U_{Fit}		% FS	1.61	2.592	% FS	0.1451841	0.021
Repeatability Standard Deviation	U_R		% FS	0.084	0.007	% FS	0.084	0.007
8 Hour Drift	U_{drift}		%	0.1676	0.028	%	0.168	0.028
Atmospheric Pressure Dependence	U_{Atmos}		% / kPa	0.008	0.000	% / kPa	0.008	0.000
Temperature Dependence	U_{Temp}		% / K	0.017	0.000	% / K	0.017	0.000
Sum Interference	$U_{Interference}$		%	0.168	0.028	%	0.008	0.000
Voltage Supply	$U_{Voltage}$		% / V	0.008	0.000	% / V	0.008	0.000
Uncertainty of Calibration Gas	$U_{Calibration\ gas}$		%	0.168	0.028	%	0.168	0.028
Loss in sample line (Leaks)	$U_{Losses,\ leak}$		%	0.168	0.028	%	0.335	0.112
			Sum	2.398	2.712	Sum	0.941	0.197

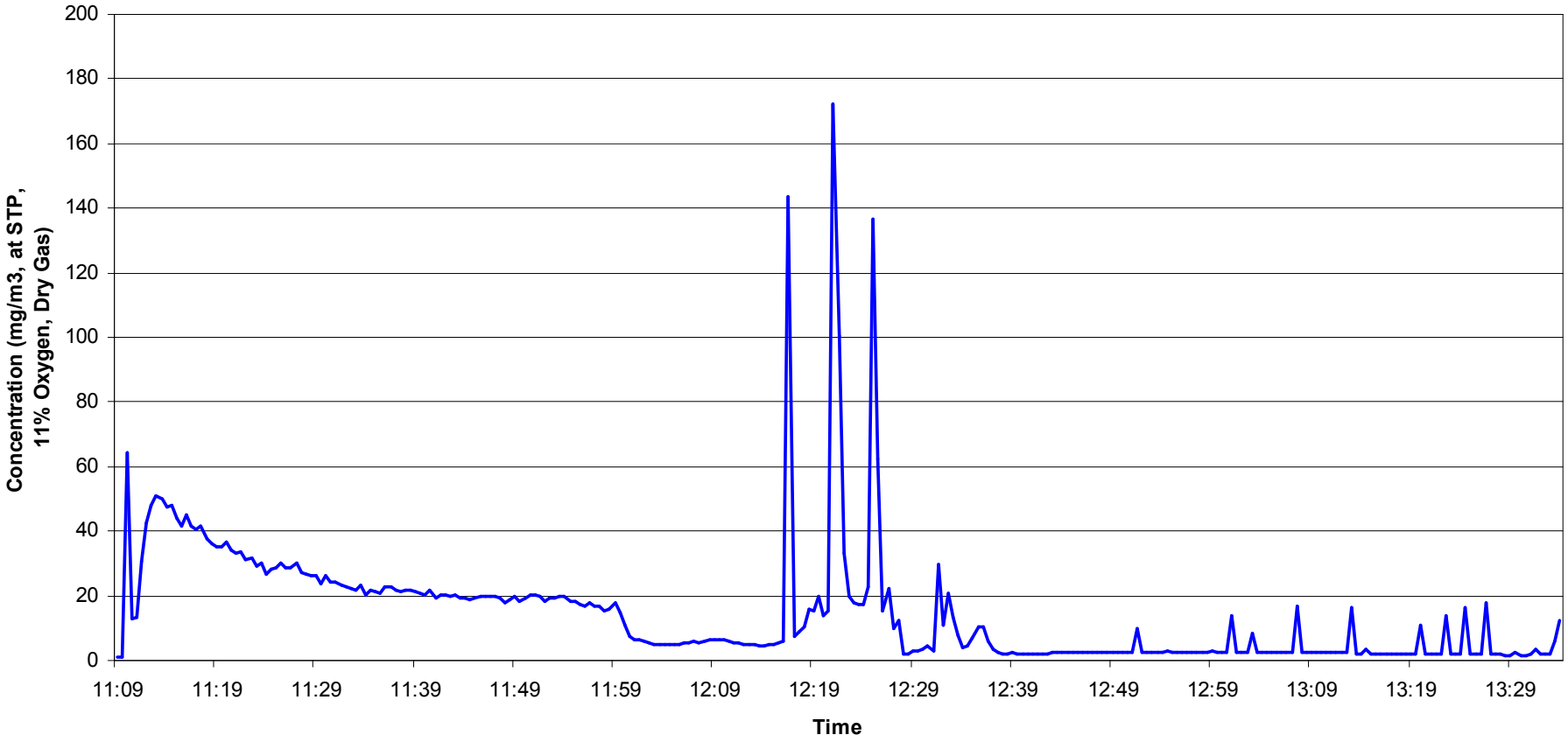
Measurement Uncertainty at	14.51840731	mg/m^3 C			
U_{tot}	0.444	mg/m^3 C			
U_{tot} /c	3.059	%	U_{limit}	30	%
Pass	Yes				

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 alchohols	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

TOC Emissions Profile from the Burn off Oven Exhaust on 22nd October 2013 at Covpress, Coventry

reference conditions expressed as 273K, 101.3 kPa,11 % O2 and dry gas



Certificate of Analysis

RPS

UKAS TESTING 0605

Test Certificate

Date 06/11/2013

Client	RPS Milton Keynes HSED Noble House Capital Drive Linford Wood Milton Keynes MK14 6QP	Order No.	FTBS 27548
		Certificate No.	WK13-6825
		Issue No.	1
Contact	Carl Redgrove	Date Received	29/10/2013
Description	2 filters & 2 solutions for TPM	Technique	Gravimetric Stack

Sample No.	765958	103205	Method
Total particulate matter	<0.1 mg		D9(U)
Sample No.	765959	30004879	Method
Total particulate matter	<0.5 mg		D9(U)
Sample No.	765960	103209	Method
Total particulate matter	21.7 mg		D9(U)
Sample No.	765961	30004880	Method
Total particulate matter	37.5 mg		D9(U)

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Tel: (0161) 872 2443 Fax: (0161) 877 3959

0605

Date 06/11/2013

Test Certificate

Client	RPS Milton Keynes HSED	Certificate No.	WK13-6825
		Issue No.	1

Tested By Kirstie Davenport Date 05/11/2013

Approved By [redacted] Date 06/11/2013

Joanne Dewhurst
Laboratory Manager

For and on authority of RPS Laboratories Ltd.

Method Symbols (U) Analysis is UKAS Accredited
(N) Analysis is not UKAS Accredited

Concentration values (mg/m3 and ppm) are provided to assist with interpretation only, they are not covered by the scope of UKAS accreditation.

Results stated as ml are refering to the sample volume.

RPS Laboratories terms and conditions apply - a copy is available on request.

Analysis carried out on samples 'as received'

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