Passionate about Particulate

PCME

13 October 2009

Darren Hughes
Clark-Drain Ltd
Station Rd
Yaxley
Peterborough
PE7 3EQ

Dear Mr Hughes

Please find enclosed a copy of the report for the Isokinetic testing recently carried out at your site.

If you have any queries regarding the calibration of your PCME equipment or any other questions please do not hesitate to contact me.

Yours sincerely

Mike Hill
Technical Services Manager

Enc

PCME Ltd
Clearview Building
60 Edison Road
St Ives Cambs UK
PE27 3GH

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PCME

PARTICULATE MONITORING SYSTEMS

CALIBRATION CERTIFICATE

Site: Clark-Drain Ltd

Calibration Date:	2nd September 2009	**PCME Job No:**	J29068837
Location:	Yaxley	**Testing House Job No:**	LAB 08738
Instrument:	DT373	**Channel Number:**	CH1
Channel ID:	Galvanising Bath		

All measurements at actual stack conditions

Stack Conditions	**Value**	**Units**		**Value**	**Units**
Stack Temperature	39	°c	Stack Oxygen Content	-	%
Stack Humidity	0.65	%	Stack Pressure	762	kPa

Calculations		
	Instrument Average (mg/m^3)	Iso Sampling Average (mg/m^3)
Run 1	3.8594	7.86
Run 2	4.0505	12.75
Run 3	4.2408	11.03
Averages	4.0502	10.55

Existing Cal Factor	1.00

New Cal Factor	**2.604**

New cal factor has been calculated using information obtained from isokinetic sample to BS EN13284-1 and corresponding instrument averages obtained via inbuilt stored data.

Recommended Recalibration Due	**2nd September 2010**

Signed:.....Mike Hill, Technical Services Manager

PCME Ltd, Clearview Building, 60 Edison Road, St Ives, Cambs, PE27 3GH
Tel: Int +44 (0)1480 468200 Fax: Int +44 (0)1480 463400 Email: sales@pcme.co.uk www.pcme.co.uk

AIR & EMISSIONS TESTING GROUP

52 Offerton Industrial Estate
Hempshaw Lane
Stockport
SK2 5TJ
Tel: 0161 477 3004
Fax: 0161 480 4642

Your contact at Scientifics:
Andrew Palliser
Business Manager
Tel: 0161 477 3004
Fax: 0161 480 4642
Email: andrew.palliser@scientifics.com

Stack Emissions Testing Report

Total Particulate Matter

Report Date / Version:	21st September 2009/ Version 1
Report By: MCERTS Number: MCERTS Level: Technical Endorsements:	Daniel Pryke MM 03 163 Level 2 TE1, TE2, TE3 & TE4
Report Approved By: MCERTS Number: Business Title: Technical Endorsements: Signature:	James Edmondson MM 05 664 Level 2 - Team Leader TE1, TE2, TE3 & TE4

PCME Limited

Clark Drain Limited

Galvanising Bath

Sampling Date/s:
2nd September 2009

Job Number:
LAB 08738

CONTENTS

EXECUTIVE SUMMARY (Page 1 of 7)

Stack Emissions Monitoring Objectives

Clark Drain Limited operates a galvanising process at Yaxley which is subject to a PPC Permit, under the Pollution Prevention & Control Regulations 2000.

Scientifics Limited were commissioned by PCME Limited to carry out stack emissions monitoring to determine the release of prescribed pollutants from the following Plant under Normal operating conditions.

The results of these tests shall be used to demonstrate compliance with a set of emission limit values for prescribed pollutants as specified in the Plant's PPC Permit, IPPC 12/92.

Plant

Galvanising Bath

Operator

PPC Permit: IPPC 12/92

PCME Limited
Clark Drain Limited
Station Road
Yaxley
Cambridgeshire
PE17 3EG

Stack Emissions Monitoring

Scientifics Limited - Stockport Laboratory
52 Offerton Industrial Estate
Hempshaw Lane
Stockport
Cheshire
SK2 5TJ
UKAS and MCERTS Number: 1015

Analytical Laboratory

Scientifics Limited
551 South Becquerel Avenue
Harwell International Business Centre
Didcot
Oxfordshire
OX11 0TD
UKAS Accreditation Number: 1015

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

EXECUTIVE SUMMARY (Page 2 of 7)

Emissions Summary

Yaxley, Clark Drain Limited
Galvanising Bath
2nd September 2009

Parameter	Units	Result	Uncertainty +/-	Limit
Total Particulate Matter	mg/m³	12	22	15
Particulate Emission Rate	g/hr	154	269	-
Moisture	%	0.65	0.06	-
Stack Gas Temperature	°C	39	-	-
Stack Gas Velocity	m/s	9.3	-	-
Gas Volumetric Flow Rate (Actual)	m³/hr	14406	-	-
Gas Volumetric Flow Rate (STP, Wet)	m³/hr	12387	-	-
Gas Volumetric Flow Rate (STP, Dry)	m³/hr	12285	-	-
Gas Volumetric Flow Rate at Reference Conditions	m³/hr	12387	-	-

where ND = None Detected

All results are mean values, with pollutant concentrations expressed at reference conditions.

Reference conditions are 273K, 101.3Pa, without correction for water vapour content

EXECUTIVE SUMMARY (Page 3 of 7)

Parameter	Sampling Date	Sampling Times	Sampling Duration
Total Particulate Matter Run 1	2nd September 2009	10:58 - 12:02	64 minutes
Total Particulate Matter Run 2	2nd September 2009	12:14 - 13:18	64 minutes
Total Particulate Matter Run 3	2nd September 2009	13:27 - 14:31	64 minutes

Process Details

Parameter	Process Details
Process Status	Normal
Continuous or Batch Process	Continuous
Feedstock (if applicable)	Metal
Abatement System	Bag Filter
Abatement System Running Status	On
Plume Appearance	None Visible

EXECUTIVE SUMMARY (Page 4 of 7)

Monitoring Methods

The selection of standard methods employed by Scientifics is determined, wherever possible by the hierarchy of method selection outlined in Environment Agency Technical Guidance Document (Monitoring) M2. i.e. CEN, ISO, BS, US EPA etc.

The tables below summarise the monitoring methods, techniques and technical procedures employed, and details any deviations from the aforementioned hierarchy:

Sampling Methods with Subsequent Analysis

Species	Standard Method	Scientifics Technical Procedure	UKAS Lab Number	MCERTS Accredited Method	Limit of Detection (LOD)	MU of Method +/- %	MU +/- %
TPM	BS EN 13284-1	AE 006	1015	Yes	0.38 mg/m³	30%	9%
H_2O [1]	BS EN 14790	AE 004	1015	Yes	0.1%	10%	-

1 - H_2O is measured concurrently with TPM testing.

EXECUTIVE SUMMARY (Page 5 of 7)

Analytical Methods

The following tables list the analytical methods employed together with the custody and archiving details:

Sampling Methods with Subsequent Analysis

Species	Analytical Technique	Analytical Procedure	UKAS Lab Number	UKAS Accredited Analysis	Laboratory	Sample Archive Location	Archive Period
TPM	Gravimetric	AE 006	1015	Yes	Stockport	Stockport	3 months
H_2O	Gravimetric	AE 004	1015	Yes	Stockport	N/A	N/A

EXECUTIVE SUMMARY (Page 6 of 7)

Sampling Location

Sampling Plane Validation Criteria	Value	Units	Requirement	Compliance	Method
Lowest Differential Pressure	64	Pa	> 5 Pa	Yes	All
Lowest Gas Velocity	9.1	m/s	-	-	-
Highest Gas Velocity	9.7	m/s	-	-	-
Ratio of Above	1.1	: 1	< 3 : 1	Yes	All
Mean Velocity	9.4	m/s	-	-	-
Angle of flow with regard to duct axis	0	°	< 15°	Yes	All
No local negative flow	-	-	-	Yes	All
Highly homogeneous flow stream / gas velocity	-	-	-	Yes	ISO 10396

Duct Characteristics

	Value	Units
Type	Circular	-
Depth	0.74	m
Width	-	m
Area	0.43	m^2
Port Depth	100	mm

Sampling Lines & Sample Points

	Isokinetic	Non-Iso
Sample Port Size	4 inch BSP	4 inch BSP
Number Used	1	1
Orientation	Horizontal	Horizontal
Number Points / Line	8	1
In Stack / Out Stack Filtration	In Stack	Out Stack

Sampling Platform

General Platform Information	
Permanent / Temporary Platform	Temporary
Inside / Outside	Outside

M1 Platform requirements	
Minimum Platform Area 5 m^2	No
Platform has 2 levels of handrails (approximately 0.5 m & 1.0 m high)	Yes
Platform has vertical base boards (approximately 0.25 m high)	Yes
Platform has removable chains / self closing gates at the top of ladders	Yes
Handrail / obstructions do not hamper insertion of sampling equipment	Yes
Depth of Platform = Minimum of 2m or Probe Length + 1m	No

Sampling Location / Platform Improvement Recommendations

In order to meet the requirements of BS EN 13284-1, it would be recommended that the sampling platform be increased in size to the minimum required of 5m², with a depth behind each port of 2m

EXECUTIVE SUMMARY (Page 7 of 7)

Sampling & Analytical Method Deviations

One Sampling Line

Only 1 sampling line was used as only one line was accesssible. However, the number of points was doubled on the available line to meet the requirements of the standard.

APPENDICES

CONTENTS

STACK EMISSIONS MONITORING TEAM

Environmental Team Leader	Daniel Pryke MCERTS Level 2, Technical Endorsements 1, 2, 3 & 4 MM 03 163 BSc (Hons) Environmental Studies
Environmental Technician	Ryan Murphy MCERTS Level 1 MM 07 826

APPENDIX 2 - Summaries, Calculations, Raw Data and Charts

TOTAL PARTICULATE MATTER SUMMARY

Clark Drain Limited, Yaxley
Galvanising Bath
2nd September 2009

Test	Sampling Times	Duration min	Concentration mg/m³	Emission Rate g/hr
Run 1	10:58 - 12:02	64	9.3	122
Run 2	12:14 - 13:18	64	15.1	176
Run 3	13:27 - 14:31	64	13.1	164
Mean	-	64	12.5	154

Reference conditions are 273K, 101.3Pa, without correction for water vapour content

Overall Blank Value mg/m³	Daily Emission Limit Value mg/m³	Weighing Uncertainty ± mg
0.54	15	0.29

Acetone Blank Value mg/l	Acceptable Value mg/l
5.0	10

ISOKINETIC SAMPLING EQUATIONS 1

Total Particulate Matter

Test	1	2	3	Units
Absolute pressure of stack gas, P_s				
Barometric pressure, P_b	746.3	746.3	746.3	mm Hg
Stack static pressure, P_{static}	15.3	15.3	15.3	mm H_2O
$P_s = P_b + \frac{(P_{static})}{13.6}$	747.4	747.4	747.4	mm Hg
Volume of water vapour collected, V_{wstd}				
Silica gel weight increase	9	11	11	g
Total volume of liquid collected, V_{lc}	9	11	11	ml
$V_{wstd} = (0.001246)(V_{lc})$	0.0108	0.0136	0.0136	m^3
Volume of gas metered dry, V_{mstd}				
Volume of gas sample through gas meter, V_m	1.6700	1.3440	1.4550	m^3
Gas meter correction factor, Y_d	1.0881	1.0881	1.0881	-
Average dry gas meter temperature, T_m	23.3	22.9	23.4	°C
Average pressure drop across orifice, ΔH	93.0	73.3	85.6	mm H_2O
$V_{mstd} = \frac{(0.3592)(V_m)(P_b+(\Delta H/13.6))(Y_d)}{T_m + 273}$	1.6589	1.3343	1.4437	m^3
Volume of gas metered wet, V_{mstw}				
$V_{mstw} = V_{mstd} + V_{wstd}$	1.6696	1.3479	1.4573	m^3
Volume of gas metered at O_2 Ref. Cond., $V_{mstd@X\%O2}$				
Is the process subject to WID or LCPD? *(If yes, no favourable oxygen correction)*	No	No	No	
% oxygen measured in gas stream, act%O_2	20.9	20.9	20.9	%
% oxygen reference condition *(21.0 denotes no O2 correction)*	21.0	21.0	21.0	%
O_2 Reference Factor O2 Ref = $\frac{21.0 - act\%O2}{21.0 - ref\%O2}$	No O2 Ref	No O2 Ref	No O2 Ref	
$V_{mstd@X\%oxygen} = (V_{mstd})\ (O_{2\ Ref})$	No O2 Ref	No O2 Ref	No O2 Ref	m^3
Moisture content, B_{wo}				
$B_{wo} = \frac{V_{wstd}}{V_{mstd} + V_{wstd}}$	0.006	0.010	0.009	m^3
	0.65	1.01	0.94	%
Molecular weight of dry gas stream, M_d				
CO_2	0.5	0.5	0.5	%
O_2	20.9	20.9	20.9	%
Total	21.4	21.4	21.4	%
N_2 (100 -Total)	78.6	78.6	78.6	%
$M_d = 0.44(\%CO_2)+0.32(\%O_2)+0.28(\%N_2)$	28.92	28.92	28.92	g/gmol
Molecular weight of stack gas (wet), M_s				
$M_s = M_d(1 - B_{wo}) + 18(B_{wo})$	28.85	28.81	28.81	g/gmol
Velocity of stack gas, V_s				
Pitot tube velocity constant, K_p	34.97	34.97	34.97	-
Velocity pressure coefficient, C_p	0.84	0.84	0.84	-
Average of velocity heads, ΔP_{avg}	7.75	6.11	7.13	mm H_2O
Average square root of velocity heads, $\sqrt{\Delta P}$	2.78	2.47	2.67	$\sqrt{}$mm H_2O
Average stack gas temperature, T_s	39	39	40	°C
$V_s = \frac{(K_p)(C_p)(\sqrt{\Delta P})(\sqrt{T_s} + 273)}{\sqrt{(M_s)(P_s)}}$	9.85	8.75	9.46	m/s

ISOKINETIC SAMPLING EQUATIONS 2

Total Particulate Matter

Test	1	2	3	Units
Actual flow of stack gas, Q_s				
Area of stack, A_s	0.43	0.43	0.43	m^2
$Q_s = (60)(A_s)(V_s)$	254.3	225.9	244.3	m^3/min
Dry total flow of stack gas, Q_{std}				
Conversion factor (K/mm.Hg)	0.3592	0.3592	0.3592	-
$Q_{std} = (Q_s)P_s(0.3592)(1-B_{ws})$ / $(T_s)+273$	217.3	192.2	207.7	m^3/min
Dry total flow of stack gas at X% O_2, Q_{stdO2}				
Conversion factor (K/mm.Hg)	0.3592	0.3592	0.3592	-
$Q_{stdO2} = (Q_s)P_s(0.3592)(1-B_{ws})(O_2REF)$ / $(T_s)+273$	No O2 Ref	No O2 Ref	No O2 Ref	m^3/min
Wet total flow of stack gas, Q_{stw}				
Conversion factor (K/mm.Hg)	0.3592	0.3592	0.3592	-
$Q_{stw} = (Q_s)P_s(0.3592)$ / $(T_s)+273$	218.7	194.2	209.6	m^3/min
Percent isokinetic, %I				
Nozzle diameter, D_n	7.90	7.90	7.90	mm
Nozzle area, A_n	49.02	49.02	49.02	mm^2
Total sampling time, θ	64	64	64	min
$\%I = (4.6398E6)(T_s+273)(V_{mstd})$ / $(P_s)(V_s)(A_n)(\theta)(1-B_{ws})$	104.7	95.2	95.3	%
Acceptable isokinetic range 95% to 115%	Yes	Yes	Yes	-
Particulate Concentration, C				
Mass of particulate collected on filter, M_f	0.0084	0.0084	0.0050	g
Mass of particulate collected in probe, M_p	0.0071	0.0119	0.0140	g
Mass of total particulate collected, M_n	0.0155	0.0203	0.0190	g
$C_{wet} = M_n / V_{mstw}$	9.30	15.07	13.06	mg/m^3
$C_{dry} = M_n / V_{mstd}$	9.36	15.23	13.18	mg/m^3
$C_{dry@X\%O2} = M_n / V_{mstd@X\%oxygen}$	No O2 Ref	No O2 Ref	No O2 Ref	mg/m^3
Particulate Emission Rates, E				
$E = [(C_{wet})(Q_{stw})(60)] / 1000$	122.0	175.7	164.2	g/hr
Weighing, Conditioning & Filtration Temperatures				
Pre-conditioning temperature	180	180	180	°C
Maximum filtration temperature	40	40	40	°C
Post-conditioning temperature	160	160	160	°C

TOTAL PARTICULATE MATTER QUALITY ASSURANCE CHECKLIST

Leak Test Results	Run 1	Run 2	Run 3	Units
Mean Sampling Rate	28.4	22.9	24.7	litre/min
Pre-sampling Leak Rate	0.04	0.05	0.04	litre/min
Post-sampling Leak Rate	0.05	0.06	0.06	litre/min
Acceptable Leak Rate	0.57	0.46	0.49	litre/min
Leak Tests Acceptable	Yes	Yes	Yes	-

Overall Blank Value	Value	Value	Value	Units
Overall Blank Value	0.54	0.54	0.54	mg/m^3
Daily Emission Limit Value	15	15	15	mg/m^3
Acceptable Blank Value	1.5	1.5	1.5	mg/m^3
Overall Blank Acceptable	Yes	Yes	Yes	-

Isokinetic Criterion Compliance	Value	Value	Value	Units
Isokinetic Variation	104.7	95.2	95.3	%
Acceptable Isokineticity	Yes	Yes	Yes	-

Total Particulate Matter Filters	Value	Value	Value	Units
Filter Material	GF	GF	GF	-
Filter Size	47	47	47	mm

APPENDIX 2 - Summaries, Calculations, Raw Data and Charts

PRELIMINARY STACK SURVEY

Clark Drain Limited, Yaxley
Galvanising Bath
2nd September 2009

Time of Survey	10:40 - 10:45
Velocity Measurement Device:	S-Type Pitot

Sampling Line A							
Traverse Point	Distance into duct (m)	ΔPpt mmH_2O	ΔPpt Pa	Temp °C	Velocity m/s	O_2 % Vol	Angle of Swirl °
1	0.04	7.5	74	38	9.7	-	0
2	0.11	7.0	69	38	9.4	-	0
3	0.19	7.5	74	38	9.7	-	0
4	0.26	6.5	64	38	9.1	-	1
5	0.33	7.0	69	38	9.4	-	0
6	0.41	7.5	74	38	9.7	-	0
7	0.48	6.5	64	38	9.1	-	1
8	0.56	7.0	69	38	9.4	-	0
9	0.63	6.5	64	38	9.1	-	0
10	0.70	6.5	64	38	9.1	-	0
Mean	-	7.0	68	38	9.4	-	

Sampling Line B							
Traverse Point	Distance into duct (m)	ΔPpt mmH_2O	ΔPpt Pa	Temp °C	Velocity m/s	O_2 % Vol	Angle of Swirl °
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	
3	-	-	-	-	-	-	
4	-	-	-	-	-	-	
5	-	-	-	-	-	-	
6	-	-	-	-	-	-	
7	-	-	-	-	-	-	
8	-	-	-	-	-	-	
9	-	-	-	-	-	-	
10	-	-	-	-	-	-	-
Mean	-	-	-	-	-	-	

APPENDIX 2 - Summaries, Calculations, Raw Data and Charts

PRELIMINARY STACK SURVEY

Clark Drain Limited, Yaxley
Galvanising Bath
2nd September 2009

Time of Survey	10:40 - 10:45
Velocity Measurement Device:	S-Type Pitot

Sampling Line A							
Traverse Point	Distance into duct (m)	ΔP pt mmH_2O	ΔP pt Pa	Temp °C	Velocity m/s	O_2 % Vol	Angle of Swirl °
1	0.04	7.5	74	38	9.7	-	0
2	0.11	7.0	69	38	9.4	-	0
3	0.19	7.5	74	38	9.7	-	0
4	0.26	6.5	64	38	9.1	-	1
5	0.33	7.0	69	38	9.4	-	0
6	0.41	7.5	74	38	9.7	-	0
7	0.48	6.5	64	38	9.1	-	1
8	0.56	7.0	69	38	9.4	-	0
9	0.63	6.5	64	38	9.1	-	0
10	0.70	6.5	64	38	9.1	-	0
Mean	-	7.0	68	38	9.4	-	

Sampling Line B							
Traverse Point	Distance into duct (m)	ΔP pt mmH_2O	ΔP pt Pa	Temp °C	Velocity m/s	O_2 % Vol	Angle of Swirl °
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	
3	-	-	-	-	-	-	
4	-	-	-	-	-	-	
5	-	-	-	-	-	-	
6	-	-	-	-	-	-	
7	-	-	-	-	-	-	
8	-	-	-	-	-	-	
9	-	-	-	-	-	-	
10	-	-	-	-	-	-	-
Mean	-	-	-	-	-	-	

STACK DIAGRAM

	Value	Units
Stack Depth	0.74	m
Stack Width	-	m
Area	0.43	m^2

Non-Isokinetic Sampling

Sampling Point	Distance (% of Depth)	Distance into Stack	Units
A	30	0.22	m

Isokinetic Sampling

Sampling Point	Distance (% of Depth)	Distance into Stack	Units
1	3.2	0.02	m
2	11	0.08	m
3	19	0.14	m
4	32.3	0.24	m
5	67.7	0.50	m
6	80.6	0.60	m
7	89.5	0.66	m
8	96.8	0.72	m

PLANT LAYOUT

APPENDIX 3 - Calibrateable Equipment Checklist & Calibration Gases

CALIBRATEABLE EQUIPMENT CHECKLIST

Extractive Sampling		Instrumental Analyser/s		Miscellaneous	
Equipment	Equipment I.D.	Equipment	Equipment I.D.	Equipment	Equipment I.D.
Control Box DGM	LAB 13-08	Horiba PG-250 Analyser	-	Laboratory Balance	0001/0652
Box Thermocouples	LAB 03-08	Horiba PG-200 Cooler	-	Tape Measure	LAB 0371
Meter In Thermocouple	LAB 10-08A	JCT JCC P-1 Cooler	-	Stopwatch	LAB 17-08
Meter Out Thermocouple	LAB 10-08B	Testo 350 Analyser	-	Protractor	LAB 1380
Control Box Timer	LAB 17-08	Testo 339 Cooler	-	Barometer	LAB 0836
Umbilical	LAB 03-29	FT-IR	-	Digital Micromanometer	LAB 0930
Oven Box	LAB 09-10	FT-IR Oven Box	-	Digital Temperature Meter	LAB 0933
Probe	LAB 11-17	Bernath 3006 FID	-	Stack Thermocouple	LAB 1010
S-Pitot	LAB 0738	Signal 3010 MINIFID	-	Drycal	-
L-Pitot	-	Signal 3030 FID	-	Mass Flow Controller	-
Site Balance	LAB 14-09	Servomex 570A	-	Mass Flow Control Box	-
Last Impinger Arm	-	JCT Heated Head Filter	-	1m Heated Line	-
Callipers	LAB 0215			5m Heated Line (1)	-
Small DGM	-			5m Heated Line (2)	-
				10m Heated Line (1)	-
				10m Heated Line (2)	-
				15m Heated Line (1)	-
				15m Heated Line (2)	-
				20m Heated Line	LAB 1202

NOTE: If the equipment I.D is represented by a dash (-), then this piece of equipment has not been used for this test.

MEASUREMENT UNCERTAINTY BUDGET - TOTAL PARTICULATE MATTER

	Value	Units
Limit value	15	mg/m³
Measured concentration	12.5	mg/m³
Reference oxygen	-	% by volume

Measured Quantities	Symbol	Value	Units
Sampled Volume	V_m	1.6589	m³
Sampled Gas Temperature	T_m	296	K
Sampled Gas Pressure	p_m	99.5	KPa
Sampled Gas Humidity	H_m	0.0	% by volume
Oxygen Content	$O_{2,m}$	20.9	% by volume
Mass of Particulate	m	15.5	mg
Leak	L	0.16	%
Uncollected Mass	UCM	0.90	mg

NOTE: Sampled Gas Temperature, Pressure and Humidity are at the Dry Gas Meter.

Standard Uncertainty	Symbol	Value	Units	Uncertainty as a %	Uncertainty Required	Uncertainty Met?
Sampled Volume	uV_m	0.033	m³	2.0	≤ 2%	Yes
Sampled Gas Temperature	uT_m	2.963	K	1.0	≤ 1%	Yes
Sampled Gas Pressure	up_m	0.995	KPa	1.0	≤ 1%	Yes
Sampled Gas Humidity	uH_m	0.000	% by volume	0.0	≤ 1%	Yes
Oxygen Content	$uO_{2,m}$	0.000	% by volume	0.0	≤ 10%	Yes
Mass of Particulate	um	0.290	mg	1.6	≤ 5% of ELV	Yes
Leak	-	-	-	0.2	≤ 2%	Yes
Uncollected Mass	-	-	-	1.2	≤ 10% of ELV	Yes

Parameter	Symbol	Value	Units	Uncertainty in Result	Units	Uncertainty as a %	Units
Volume (STP)	V	1.5011	m³	0.3274	mg/m³	2.62	%
Mass of Particulate	m	15.5	mg	0.2331	mg/m³	1.87	%
Leak	L	0.011	mg/m³	0.0114	mg/m³	0.09	%
Uncollected mass	UCM	0.52	mg	0.4177	mg/m³	3.35	%
Combined uncertainty				0.5798	mg/m³	4.65	%

Uncertainty expressed at a 95% confidence level (where k = 2)	1.1595	mg/m³	9.29	%

(k is a coverage factor which gives a 95% confidence in the quoted figures)