

# Report for the Periodic Monitoring of Emissions to Atmosphere

## Prysmian Cables and Systems Ltd

### A2 Vent - Machine 061 A03

Permit No: EPR/YP3732LZ  
Installation: Machine 061 A03  
Monitoring Dates: 5th of April 2024  
Site Address: Oak Road, Wrexham Industrial Estate, Wrexham, LL13 9PH

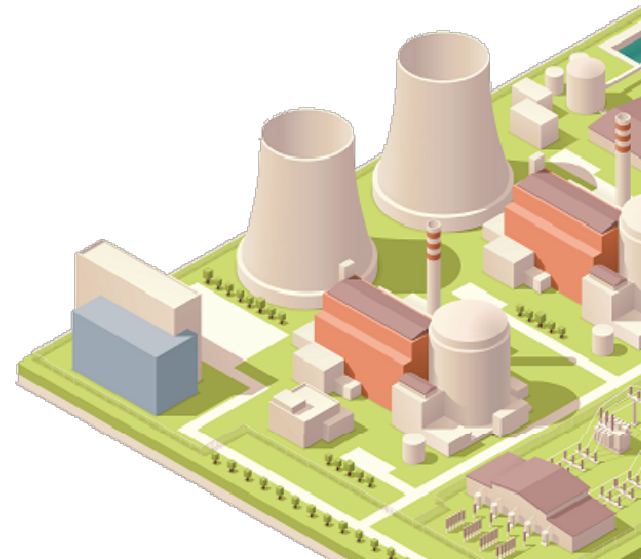
Report Number:	ES-1784	Version:	1	Visit:	1 in 2024
Date of Report:	1st May 2024				
Report Author:	Zak Hedges				
MCERTS No:	MM 21 1622	MCERTS Level:	2 (TE1, TE2, TE3, TE4)		
Approved By:	Ian Baggley	Function:	Training Manager		
MCERTS No:	MM 05 653	MCERTS Level:	2 (TE1, TE2, TE3, TE4)		

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# Executive Summary

## Monitoring Objectives

Envirocare Technical Consultancy were contracted by Prysmian Cables and Systems Ltd to carry out emissions monitoring, to determine the compliance of A2 Vent - Machine 061 A03 with the conditions specified in the operators permit (EPR/YP3732LZ) for emissions to atmosphere. The methodologies utilised and the results obtained form the basis of this report.

The substances requested for monitoring are listed below.

## Emission Point Identification

Substances to be Monitored	A2 Vent - Machine 061 A03
Total Particulate Matter	✓
Total Lead	✓
Water Vapour	✓
Volumetric Flow	✓

Special requirements: none

Opinions and interpretations expressed within this report are outside the scope of Envirocare Technical Consultancy's MCERTS and UKAS accreditation. Envirocare accepts no responsibility for information in this report that was provided by the client, the client's representative or employees of the client. Where such information has been provided by external sources this is identified in footnotes of the respective tables.

# Executive Summary

## Monitoring Results

where MU = Measurement Uncertainty associated with the result (95% Confidence)

Substance		Concentration			Reference Conditions	Mass Emission			Sampling Date	Sampling Times
		Limit (mg/m <sup>3</sup> )	Result (mg/m <sup>3</sup> )	Measurement Uncertainty (MU) +/-		Limit (g/hr)	Result (g/hr)	Measurement Uncertainty (MU) +/-		
Total Particulate Matter	R1	1	0.39	0.55	273k, 101.3kPa, Wet Gas	-	0.75	1.0	05/04/2024	10:40-11:44
Total VOC	R1	20	2.33	1.08		-	4.45	2.1	05/04/2024	11:23-12:23
Total Lead	R1	0.1	0.04	0.01		-	0.07	0.03	05/04/2024	12:34-13:38
Water Vapour	R1	-	1.2%	-	As Measured	-	-	-	-	-
Volumetric Flow (Actual)	R1	-	2,289 m <sup>3</sup> /h	104	As Measured	-	-	-	05/04/2024	10:21-10:27
Volumetric Flow (REF)	R1	-	1,909 m <sup>3</sup> /h	86	273k, 101.3kPa, Wet Gas	-	-	-	05/04/2024	10:21-10:27

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

# Supporting Information

## Appendix 1: General Information

### Operating Information

Parameter	Process Details
Process Type	Melting, including making of alloys
Continuous or Batch Process	Continuous
Operating Status	On
Feedstock	Metals
Normal Load, Throughput or Continuous Rating	Normal
Abatement System	N/A
Abatement System Status	N/A
Process Fuel	N/A
Plume Appearance	None

### Monitoring Deviations

Parameter	Run	Deviation
Total Lead	All	The absorption efficiency was less than the required 95%.

### Monitoring Organisation Staff Details

Personnel	Position	MCERTS Level	MCERTS Number
Mr Z Hedges	Team Leader	2 (TE1, TE2, TE3, TE4)	MM 21 1622
Mr M Gormley	Technician	Level 1	MM 23 1823

### Monitoring Methods

Pollutant Species	Standard	Technical Procedure	Testing MCERTS	Analysis Laboratory	Analytical Procedure	Analytical Technique	Analysis MCERTS
Volumetric Flow	BS EN ISO 16911-1	ETC-SE-24a	Yes	Pitot Tube and Thermocouple			
Total Particulate Matter	BS EN 13284-1	ETC-SE-01	Yes	Envirocare	ETC-AP-01	Gravimetric	Yes
Total VOC	BS EN 12619	ETC-SE-04	Yes	Flame Ionisation Detector by M&C Thermo FID or Sick 3006 FID			
Total Metals	BS EN 14385	ETC-SE-09	Yes	RPS	M31(U)	ICP-MS	Yes
Water Vapour	BS EN 14790	ETC-SE-11	Yes	ENV	ETC-SE-11	Gravimetric	Yes

Envirocare: 2522 | RPS Laboratories Ltd (RPS): 0605

## Equipment Checklist

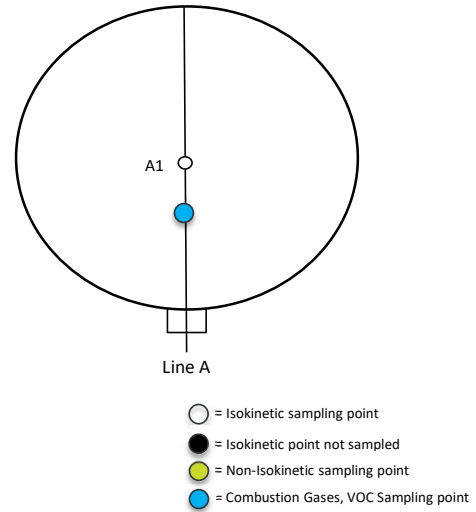
Extractive Sampling		Instrumental Analysers		Miscellaneous Items	
Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.
Control Box DGM	8.1	Horiba PG-250	-	Tape Measure	17.07
Box Thermocouples	2.10a	Horiba PG-250 SRM	-	Bevel Box	-
Box Thermocouple In	3.32	Horiba PG-350	-	Stopwatch	10.15
Box Thermocouple Out	3.33	JCT JCC Cooler	-	Barometer	11.02
Control Box Timer	10.14	MAK10 Cooler	-	Digital Manometer	24.04a
Umbilical	2.10b	Horiba PS200 Cooler	-	Digital Temperature Meter	24.04b
Oven Box	9.06	M&C PSS Gas Preparation	3.44b	Dual Channel Heat Controller	6.06
Heated Probe (1)	4.14	Gasmet DX4000 FTIR	-	1m Heated Line	-
Heated Probe (2)	4.12	Gasmet Sampling System	-	3m Heated Line	-
Stack Thermocouple (1)	1.14	SK-Thermo FID	13.11	5m Heated Line	-
Stack Thermocouple (2)	1.82	Bernath 3006 FID	-	10m Heated Line	5.08
S-Type Pitot (1)	NR4729	Testo 350XL	-	20m Heated Line	5.01
S-Type Pitot (2)	20.14S	M&C PSP 4000	7.08	30m Heated Line	-
L-Type Pitot	20.03L	Easylogger EN-EL-12 Bit	-	Impinger Arm Thermocouple (1)	3.10a
Site Balance	18.03	Hioki 5043 (V)	-	Impinger Arm Thermocouple (2)	3.07a
500g Check Weight	18.03a	Analysar Temperature Logger	-	Dioxins Kit Thermocouple	-
1KG Check Weight	18.03b	-	-	Sample Temperature Logger	29.06
Digital Callipers	16.05	-	-	Laboratory Balance	-

## Appendix 2: A2 Vent - Machine 061 A03 Results and Calculations

Picture of the sampling location



Sampling Points Diagram



### Duct Characteristics

Parameter	Units	Value
Type	-	Circular
Depth	m	0.30
Width	m	-
Area	m <sup>2</sup>	0.1
Port Depth	cm	10.0
Orientation of Stack / Duct	-	Vertical
Sampling Port Size	-	4" BSP
Number of Ports	-	1

Manual Sampling Points	Used / Required
Number of Sampling Lines	1/1
Number of Sampling Points	1/1
Instrumental Sampling Points	Used / Required
Number of Sampling Lines	1/1
Number of Sampling Points	1/1

Platform Type and Location	
Platform Type - Permanent / Temporary	Permanent
Location - Inside / Outside	Inside

EA Technical Guidance Note M1 Platform Requirements		
Load Baring Capacity	Load baring capacity of platform sufficient to fulfil the measurement objective	Yes
Position & Work Space	Sufficient work area to manipulate probe & operate the measurement instruments	Yes
	Depth of work area > internal diameter of stack and wall thickness plus 1.5m	Yes
	Ports on vertical ducts 1.2m to 1.5m above platform floor	Yes
	Platform has chains / self closing gates at top of ladders	Yes
Fall Prevention	Platform has adequate drainage to prevent accumulation of free-standing water	Yes
	Platform has 2 levels of handrails (approx. 0.5m & 1.0m high)	Yes
Access	Gaps between handrails not >0,5m	Yes
	Platform has vertical base boards (approx. 0.25m high)	Yes
	Access to sampling ports unhindered by obstructions	Yes
	Easy & safe access and egress available	Yes

### Sampling Location / Platform Recommendations

The Sampling location meets all the requirements specified in Environment Agency Guidance Note M1 and BS EN 15259, and no improvement actions are required.

## Flow Criteria Measurements

Duct Diameter (m)	Cross Sectional Area (m <sup>2</sup> )	Barometric Pressure (mbar)	Ambient Temperature (°C)	Mean Oxygen (%)	Mean Carbon Dioxide (%)	Mean Water Vapour (%)	Stack Gas Molecular mass (g/mol)	Pitot Coefficient
0.30	0.1	1014	21.0	18.0	3.0	1.2	29.1	0.853

Sample Line	Traverse Point	Position (cm)	Differential Pressure Reading (Pa)				Stack Velocity (m/s)	Stack Temp (°C)	Angle of Swirl
			1	2	3	Average			
A	A1	2.0	66.0	66.0	66.0	66.0	9.4	55	2
	A2	7.5	58.0	58.0	58.0	58.0	8.8	54	3
	A3	22.5	55.0	55.0	55.0	55.0	8.6	55	2
	A4	28.0	62.0	62.0	62.0	62.0	9.1	55	2

Parameter	Mean Duct Velocity	Velocity Ratio (Max:Min)	Mean Stack Temperature	Mean Stack Temperature	Stack Gas Volume Flow	Stack Gas Volume Flow (STP Wet)	Stack Gas Volume Flow (REF)
Value	9.0	1.1:1	55	328	2289	1909	1909
Units	m/s	-	°C	K	m <sup>3</sup> /hr	Nm <sup>3</sup> /hr	Nm <sup>3</sup> /hr

## Total Particulate Matter - Run 1 Calculations

Parameter	Value	Unit
Meter Box Number	8.1	-
Gas Meter Coefficient	1.057	-
Pitot Coefficient	0.841	-
Stack Gas Molecular Weight	29.0	g/mole
Static Pressure in Stack	-0.1	cmH <sub>2</sub> O

Parameter	Value	Unit
Nozzle Diameter	10.6	mm
Average Gas Meter Temperature	18.6	°C
Average Stack Temperature	49	°C
Average Stack Velocity	8.5	m/s
Isokineticity	100.4	%
Total Sampling Time	64	min
Gas Meter Difference	2418	L
Corrected Gas Meter Volume	2555	L
Mean Sampling Rate	39.9	L/min

Date	Operators
05/04/2024	ZH/MG

Parameter	Before	After	Unit
Barometric Pressure	1013	1013	mbar
Ambient Temperature	18.0	17.0	°C
Leak Check	0.23	-	L/min
Time	10:40	11:44	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	2.392	Nm <sup>3</sup>
Gas Meter Volume (REF)	2.421	Nm <sup>3</sup>
Stack Gas Water Vapour Content	1.2	% v/v
Stack Gas Oxygen Content	N/A	% v/v
TPM Concentration (REF)	0.4	mg/Nm <sup>3</sup>
TPM Mass Emissions (REF)	1	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas

## Total Particulate Matter - Analysis Results

Sampling Run Number	Filter Reference	Filter Type	Filter Mass	Probe Wash Mass (mg)	Total Mass Deposit (mg)
			Change (mg)		
Blank 1	47-6378	47mm GFA	0.17	< 0.25	0.42
1	47-6379	47mm GFA	0.25	0.70	0.95

Sampling Run Number	Measured	Impinger Mass (g)				Collected Mass (g)
		1	2	3	4	
1	Before	1454.0	1375.0	1165.6	1617.4	23.7
	After	1465.3	1382.0	1170.6	1617.8	

Parameter	Value	Unit
Emission Limit Value (ELV)	1	mg/m <sup>3</sup>
Overall Blank Value (OBV)	0.17	mg/m <sup>3</sup>
OBV <10% of ELV?	No	-

Analysis Details	
Date of Analysis	15/04/2024
Analytical Laboratory	Envirocare
Analytical Method	Gravimetric
Accreditation	MCERTS

## Instrumental Gas Analyser Calibrations

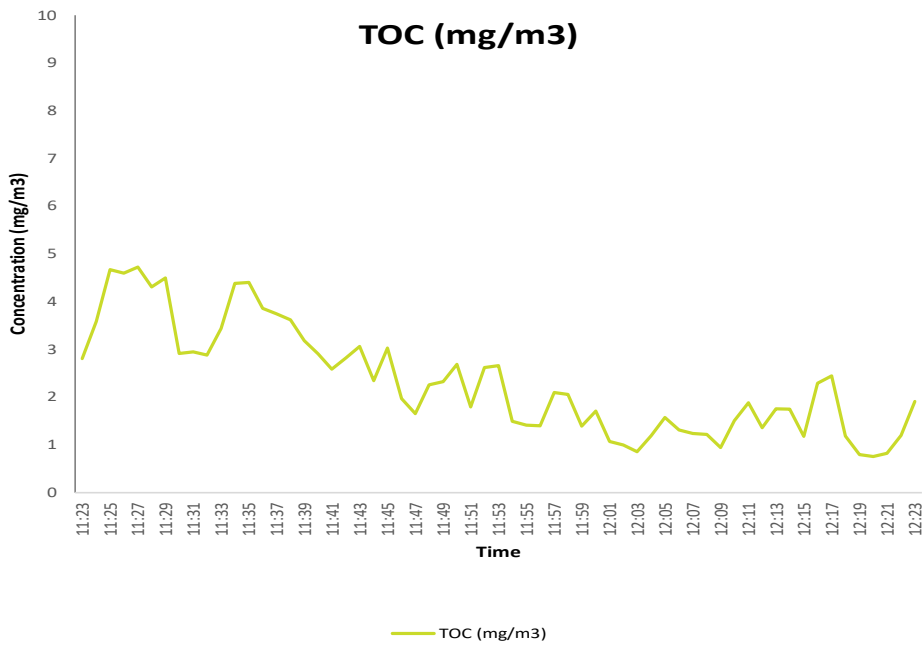
Date	Operators	Combustion Gas Analyser	Flame Ionisation Detector
05/04/2024	ZH/MG	-	13.11

Calibration Gas	Certified Concentration	Analyser Range	T90 Time	Analyser Span	Pre-sample Cal		Post-sample Cal		Zero Drift (%)	Span Drift (%)	Drift Acceptable
					Zero	Span	Zero	Span			
Propane	79.99ppm	100ppm	7	80.0	0.00	79.5	0.06	79.8	0.08	-0.31	Yes

## Instrumental Gas Analyser Results

Substance	Run	Corrected Concentration			Units	Basis	O <sub>2</sub> Correction
		Average	Max	Min			
Total VOC	1	2.33	4.73	0.76	mg/m <sup>3</sup>	VOC as C	-

## Instrumental Gas Analyser Chart - Run 1



## Total Metals - Run 1 Calculations

Parameter	Value	Unit
Meter Box Number	8.1	-
Gas Meter Coefficient	1.057	-
Pitot Coefficient	0.841	-
Stack Gas Molecular Weight	29.0	g/mole
Static Pressure in Stack	-0.1	cmH <sub>2</sub> O

Parameter	Value	Unit
Nozzle Diameter	10.6	mm
Average Gas Meter Temperature	27.1	°C
Average Stack Temperature	56	°C
Average Stack Velocity	5.3	m/s
Isokineticity	104.3	%
Total Sampling Time	64	min
Gas Meter Difference	1584	L
Corrected Gas Meter Volume	1673	L
Mean Sampling Rate	26.1	L/min

Date	Operators
05/04/2024	ZH/MG

Parameter	Before	After	Unit
Barometric Pressure	1013	1013	mbar
Ambient Temperature	16.0	17.0	°C
Leak Check	0.12	0.11	L/min
Time	12:34	13:38	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	1.522	Nm <sup>3</sup>
Gas Meter Volume (REF)	1.541	Nm <sup>3</sup>
Mass of Water Vapour Collected	1.4	g
Volume of Water Vapour Collected	1.7	NL
Stack Gas Water Vapour Content	1.2	% v/v
Stack Gas Oxygen Content	N/A	% v/v

Reference conditions (REF) are: 273k, 101.3kPa, Wet Gas.

Measured	Impinger Mass (g)					Collected Mass (g)	Parameter	Value	Unit
	1	2	3	4	5				
Before	918.1	777.5	779.1	668.2	-	1.4	Emission Limit Value	0.1	mg/Nm <sup>3</sup>
After	911.7	770.1	779.2	683.3	-		Overall Blank Value	0.002	mg/Nm <sup>3</sup>
							OBV <10% of ELV?	Yes	-

Metal	Run Filter (µg)	Run Rinse (µg)	Run Impingers (µg)				Run Total (µg)	Run Absorb Eff.	Run Emission (mg/m <sup>3</sup> )	Blank Total (µg)	Blank Emission (mg/m <sup>3</sup> )
			1+2	3	5	6					
Lead	3.1	40.6	11.76	3.72	-	-	59.2	93.7%	0.038	3.71	0.0024

## Uncertainty

### Uncertainty of Total Particulate Matter - Run 1

Parameter	Value	Unit	Parameter	Value	Unit
Emission Limit Value (ELV)	1	mg/m <sup>3</sup>	Mean Emission Concentration	0.4	mg/m <sup>3</sup>
Mean Sampling Rate	39.9	L/min	Monitoring Duration	64	min
Leak Rate	0.23	L/min	Console ID	8.1	-
Barometric Pressure	1013	mbar	Temperature Uncertainty	0.24	°C
Average Stack Temperature	49	°C	Gas Meter Uncertainty	0.37	%
Sampled Stack Gas Volume	2418	L	Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 13284-1		Envirocare Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u <sup>2</sup>
		Uncertainty Criteria	Max. Value					
Weighing Procedure	Std	5% of limit value	0.5	0.28	mg	2.8	0.28	0.08
Leak Rate	Rect	<2% of sampling rate	0.80	0.23	L/min	0.58	0.001	0.0000017
Time	Std	1sec in 1hour = 0.028%	2.0	1.1	sec	0.03	0.0001	0.00000001
Gasmeter Volume	Std	<2%	48.4	8.9	L	0.37	0.001	0.0000021
Temperature	Std	1% of value	0.5	0.24	°C	0.49	0.002	0.0000037
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.0004	0.0000002
<b>Total</b>								0.08
<b>Combined Standard Uncertainty [(sum u<sup>2</sup>)<sup>0.5</sup>]</b>								0.28
<b>Expanded Total Uncertainty as a % of emission conc. (95% confidence)</b>								139.9
<b>Expanded Total Uncertainty (mg/m<sup>3</sup>) (95% confidence)</b>								0.55
<b>Expanded Total Uncertainty as a % of emission limit value (95% confidence)</b>								54.9

### Uncertainty of Total VOC by FID - Run1

Parameter	Value	Unit	Cal Gas
Emission Limit Value (ELV)	20	mg/m <sup>3</sup>	C <sub>3</sub> H <sub>8</sub>
Reading	1.45	ppm	
Span Gas Certified Value	80.0	ppm	
Range	100	ppm	

Source of Uncertainty	Uncertainty Criteria	Probability Distribution	Divisor	Source Uncertainty u	Combined Uncertainty u <sup>2</sup>
Zero Drift/Lower limit of detection (ppm)	-0.06	Rectangular	1.73	-0.03	0.001
Span Drift (ppm)	-0.31	Rectangular	1.73	-0.18	0.032
Linearity (% of value)	0.2	Rectangular	1.73	0.002	0.000003
Setting Gas Divider (% of value)	0.35	Normal	1.00	0.005	0.000026
Noise (ppm)	0.10	Rectangular	1.73	0.06	0.003
Temperature Drift (% of value)	1.0	Rectangular	1.73	0.008	0.0001
Standard deviation of repeatability at zero point (% of range)	0.20	Rectangular	-	0.20	0.04
Standard deviation of repeatability at span point (% of range)	0.20	Rectangular	-	0.20	0.04
<b>Total</b>					0.12
<b>Combined Standard Uncertainty [(sum u<sup>2</sup>)<sup>0.5</sup>]</b>					0.34
<b>Expanded Total Uncertainty (ppm) (95% confidence)</b>					0.67
<b>Expanded Total Uncertainty as a % of emission conc. (95% confidence)</b>					46
<b>Expanded Total Uncertainty (mg/m<sup>3</sup>) (95% confidence)</b>					1.1
<b>Expanded Total Uncertainty as a % of emission limit value (95% confidence)</b>					5.4

Uncertainty of Total Metals - Run 1

Parameter	Value	Unit
Mean Sampling Rate	26.1	L/min
Leak Rate	0.12	L/min
Barometric Pressure	1013	mbar
Average Stack Temperature	56	°C
Sampled Stack Gas Volume	1584	L

Parameter	Value	Unit
Monitoring Duration	64	min
Console ID	8.1	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 14385		Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u <sup>2</sup>
		Uncertainty Criteria	Max. Value					
Leak Rate	Rect	<2% of sampling rate	0.52	0.12	L/min	0.44	0.0001	0.00000010
Time	Std	1sec in 1hour = 0.028%	2.0	1.07	sec	0.03	0.00001	0.000000001
Gasmeter Volume	Std	<2%	31.7	5.9	L	0.37	0.0001	0.00000020
Temperature	Std	1% of value	0.6	0.24	°C	0.43	0.0002	0.00000003
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.0000	0.00000001
<b>Total</b>								0.0000001

Metal	Analysis		Analysis Unc. U (mg)	Analysis u <sup>2</sup>	Sampling u <sup>2</sup>	Total sqrt(u <sup>2</sup> )	Measurement Uncertainty (95% Confidence) (mg/Nm <sup>3</sup> )	Expanded Total Uncertainty as a percentage of (95% Confidence)	
	(µg)	Unc (%)						Emissions Concentration	Emission Limit Value
Lead	59.2	9.4	0.0056	0.0000310	0.0000001	0.006	0.011	28.4	10.91

Uncertainty of Volumetric Flow - Run 1

Parameter	Value	Unit
Measured Volumetric Flow Rate Actual	2289	m <sup>3</sup> /hr
Performance Characteristics & Source Value		
Standard Uncertainty - Pitot tube Coefficient	0.005	-
Standard Uncertainty - Mean Local Dynamic Pressure	1.1	Pa
Standard Uncertainty - Molar Mass of Stack Gas	0.00003	-
Standard Uncertainty - Stack Gas Temperature	0.50	K
Standard Uncertainty - Absolute Pressure in Duct	176	Pa
Standard Uncertainty - Density of Stack Gas	0.010	-
Standard Uncertainty - Mean Velocity	0.07	m/s
<b>Expanded Uncertainty Mean Velocity (95% confidence)</b>	0.13	m/s
<b>Expanded Uncertainty Mean Velocity (95% Confidence), Relative</b>	1.5	%
<b>Standard Uncertainty - Volumetric Flow Rate</b>	53	-
<b>Standard Uncertainty - Volumetric Flow Rate (95% Confidence)</b>	104	m <sup>3</sup> /hr
<b>Standard Uncertainty - Volumetric Flow Rate (95% Confidence), Relative</b>	4.5	%
95% confidence interval factor - 1.96		

Document Version Number	Record of change within different version numbers
V1	Original version of the document issued to client.