

Report for the Periodic Monitoring of Emissions to Atmosphere

Stack Emissions Test Report Commissioned by: EMS

Sheffield Teaching Hospitals Foundation NHS Trust

Ruston Boiler 6

Permit No: Permit Application
Installation: Royal Hallamshire
Monitoring Dates: 1st August 2024
Site Address: Royal Hallamshire Boiler House, C Road, Sheffield, S10 2RX

Report Number: ES-18364 Version: 1 Visit: 2 in 2024
Date of Report: 30th August 2024
Report Author: Istvan Biczky
MCERTS No: MM 05 638 MCERTS Level: 2 (TE1, TE2, TE3, TE4)

Approved By: Ian Baggley Function: Training Manager
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Signed:



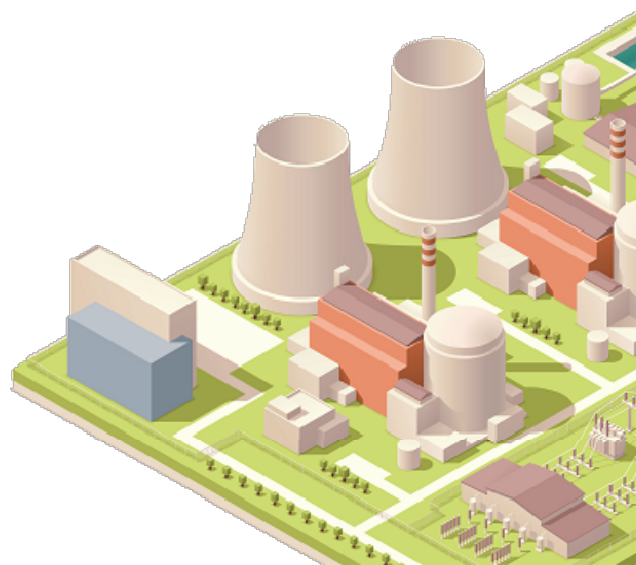
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Executive Summary

Monitoring Objectives

Envirocare Technical Consultancy were contracted by Sheffield Teaching Hospitals Foundation NHS Trust to carry out emissions monitoring, to determine the compliance of Ruston Boiler 6 with the conditions specified in the operators permit (Permit Application) 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	Ruston Boiler 6
Total Particulate Matter	✓
Carbon Monoxide	✓
Oxides of Nitrogen (as NO ₂)	✓
Oxygen	✓
Water Vapour	✓
Volumetric Flow	✓

Special requirements: none

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Executive Summary

Monitoring Results

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

		Concentration			Reference Conditions	Mass Emission			Sampling Date	Sampling Times
Substance		Limit (mg/m³)	Result (mg/m³)	Measurement Uncertainty (MU) +/-		Limit (g/hr)	Result (g/hr)	Measurement Uncertainty (MU) +/-		
Total Particulate Matter	R1	-	1.18	0.55	273k, 101.3kPa, Dry Gas, 3% O ₂	-	1.1	0.5	31/08/2024	10:45-11:45
Carbon Monoxide	R1	-	2.9	1.6		-	2.7	1.5	01/08/2024	10:47-11:49
Oxides of Nitrogen (as NO ₂)	R1	-	82	7.6		-	77	7.8	01/08/2024	10:47-11:49
Sulphur Dioxide	R1	-	0.1	0.0093		-	0.1	0.01	31/08/2024	10:45-11:45
Water Vapour	R1	-	2.6%	-	As Measured	-	-	-	-	-
Oxygen	R1	-	12.8%	0.14	As Measured, Dry Gas	-	-	-	01/08/2024	10:47-11:49
Volumetric Flow (Actual)	R1	-	2,685 m³/h	122	As Measured	-	-	-	01/08/2024	10:50-11:00
Volumetric Flow (REF)	R1	-	931 m³/h	42	273k, 101.3kPa, Dry Gas, 3% O ₂	-	-	-	01/08/2024	10:50-11:00

Reference conditions (REF) are: 273k, 101.3kPa, Dry Gas, 3% O₂.

Supporting Information

Appendix 1: General Information

Operating Information

Parameter	Process Details
Process Type	Boiler
Continuous or Batch Process	Continuous when in demand
Operating Status	Normal Operation
Feedstock	Water
Normal Load, Throughput or Continuous Rating	Low load/fire due to low demand. Max 6mW
Abatement System	None
Abatement System Status	N/A
Process Fuel	Natural Gas
Plume Appearance	No visible plume when running

Monitoring Deviations

Parameter	Run	Deviation
Sulphur Dioxide	All	The absorption efficiency was less than the required 95%, however, it should be noted that the results were of a low order.

Monitoring Organisation Staff Details

Personnel	Position	MCERTS Level	MCERTS Number
Mr I Biczyn	Team Leader	2 (TE1, TE2, TE3, TE4)	MM 05 638
Alessandro Pagliari	Technician	Trainee	tbc

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
Sulphur Dioxide	BS EN 14791	ETC-SE-14	Yes	RPS	C27(U)	IC	Yes
Carbon Monoxide	BS EN 15058	ETC-SE-10 (a/b)	Yes	NDIR by Horiba PG-250 or PG350E			
Oxides of Nitrogen	BS EN 14792	ETC-SE-10 (a/b)	Yes	Chemiluminescence by Horiba PG-250 or Horiba PG-350			
Oxygen	BS EN 14789	ETC-SE-10 (a/b)	Yes	Dry Zirconia Cell by Horiba PG-250 or Dry Paramagnetic by Horiba PG-350E			
Water Vapour	BS EN 14790	ETC-SE-11	Yes	ENV	ETC-SE-11	Gravimetric	Yes

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

Equipment Checklist

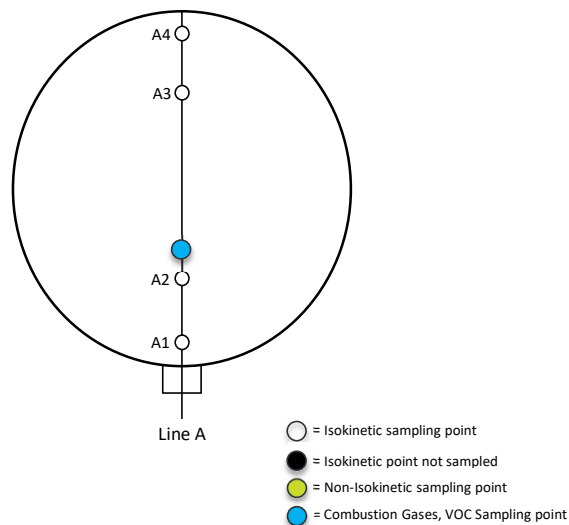
Extractive Sampling		Instrumental Analysers		Miscellaneous Items	
Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.
Control Box DGM	8.09	Horiba PG-250	-	Tape Measure	17.12
Box Thermocouples	2.01a	Horiba PG-250 SRM	-	Bevel Box	-
Box Thermocouple In	3.35	Horiba PG-350	12.14	Stopwatch	10.01
Box Thermocouple Out	3.36	JCT JCC Cooler	-	Barometer	11.1
Control Box Timer	10.01.a	MAK10 Cooler	-	Digital Manometer	24.04
Umbilical	2.01a	Horiba PS200 Cooler	-	Digital Temperature Meter	24.04
Oven Box	9.07	M&C PSS Gas Preparation	3.40B	Dual Channel Heat Controller	-
Heated Probe (1)	4.07	Gasmet DX4000 FTIR	-	1m Heated Line	-
Heated Probe (2)	4.22	Gasmet Sampling System	-	3m Heated Line	-
Stack Thermocouple (1)	1.07	SK-Thermo FID	-	5m Heated Line	-
Stack Thermocouple (2)	-	Bernath 3006 FID	-	10m Heated Line	5.34
S-Type Pitot (1)	20.27s	Testo 350XL	-	20m Heated Line	-
S-Type Pitot (2)	-	M&C PSP 4000	-	30m Heated Line	7.04
L-Type Pitot	20.05L	Easylogger EN-EL-12 Bit	-	Impinger Arm Thermocouple (1)	3.17A
Site Balance	18.17	Hioki 5043 (V)	-	Impinger Arm Thermocouple (2)	3.18A
500g Check Weight	18.17a	Analyser Temperature Logger	-	Dioxins Kit Thermocouple	-
1KG Check Weight	18.17b	-	-	Sample Temperature Logger	-
Digital Callipers	16.08	-	-	Laboratory Balance	-

Appendix 2: Ruston Boiler 6 Results and Calculations

Picture of the sampling location



Sampling Points Diagram



Duct Characteristics

Parameter	Units	Value
Type	-	Circular
Depth	m	0.70
Width	m	-
Area	m ²	0.4
Port Depth	cm	5.0
Orientation of Stack / Duct	-	Horizontal
Sampling Port Size	-	4" BSP
Number of Ports	-	1

Manual Sampling Points	Used / Required
Number of Sampling Lines	1/2
Number of Sampling Points	4/4
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	No
	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	N/A
	Platform has 2 levels of handrails (approx. 0.5m & 1.0m high)	Yes
	Gaps between handrails not >0.5m	Yes
Access	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

Although the platform does not meet the requirements specified in Environment Agency Guidance Note M1 and BS EN 15259, it is adequate for the monitoring specified in the Site Specific Protocol.

Water Vapour Measurements

Parameter	Value	Unit
Sampling Date	01/08/2024	-
Start Time	10:45	-
End Time	11:45	-
Barometric Pressure	1013	mbar

Parameter	Value	Unit
Stack Temperature	56.0	°C
Corrected Volume	1060.8	L
Collected Mass	23	g
Stack Gas Water Vapour Content	2.6	% v/v

Flow Criteria Measurements

Duct Diameter (m)	Cross Sectional Area (m²)	Barometric Pressure (mbar)	Ambient Temperature (°C)	Mean Oxygen (%)	Mean Carbon Dioxide (%)	Mean Water Vapour (%)	Stack Gas Molecular mass (g/mol)	Pitot Coefficient
0.70	0.4	1013	25.0	12.8	7.3	2.6	29.4	0.851

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	4.7	3.0	6.0	0.0	3.0	2.1	75	2
	A2	17.5	4.0	1.0	2.0	2.3	1.8	76	3
	A3	52.5	3.0	3.0	2.0	2.7	1.9	76	3
	A4	65.3	5.0	1.0	2.0	2.7	1.9	77	3

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	1.9	1.1:1	76	349	2685	2100	931
Units	m/s	-	°C	K	m³/hr	Nm³/hr	Nm³/hr

Total Particulate Matter - Run 1 Calculations

Parameter	Value	Unit
Meter Box Number	8.09	-
Gas Meter Coefficient	0.972	-
Pitot Coefficient	0.851	-
Stack Gas Molecular Weight	29.4	g/mole
Static Pressure in Stack	-0.5	cmH ₂ O

Parameter	Value	Unit
Nozzle Diameter	12.2	mm
Average Gas Meter Temperature	27.6	°C
Average Stack Temperature	74	°C
Average Stack Velocity	3.2	m/s
Isokineticity	104.4	%
Total Sampling Time	60	min
Gas Meter Difference	1203	L
Corrected Gas Meter Volume	1170	L
Mean Sampling Rate	19.5	L/min

Date	Operators
31/08/2024	IsB/AP

Parameter	Before	After	Unit
Barometric Pressure	1013	1013	mbar
Ambient Temperature	25.0	27.0	°C
Leak Check	0.20	-	L/min
Time	10:45	11:45	-

Parameter	Value	Unit
Gas Meter Volume (STP Dry)	1.062	Nm³
Gas Meter Volume (REF)	0.484	Nm³
Stack Gas Water Vapour Content	2.6	% v/v
Stack Gas Oxygen Content	12.8	% v/v
TPM Concentration (REF)	1.2	mg/Nm³
TPM Mass Emissions (REF)	1	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Dry Gas, 3% O₂

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	47-6553	47mm GFA	0.19	< 0.25	0.44
1	47-4387	47mm GFA	0.32	< 0.25	0.57

Sampling Run Number	Measured	Impinger Mass (g)				Collected Mass (g)
		1	2	3	4	
1	Before	709.6	699.6	711.0	570.4	22.9
	After	721.3	706.4	711.1	570.4	

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m³
Overall Blank Value (OBV)	0.91	mg/m³
OBV <10% of ELV?	-	-

Analysis Details	
Date of Analysis	15/08/2024
Analytical Laboratory	Envirocare
Analytical Method	Gravimetric
Accreditation	MCERTS

Instrumental Gas Analyser Calibrations

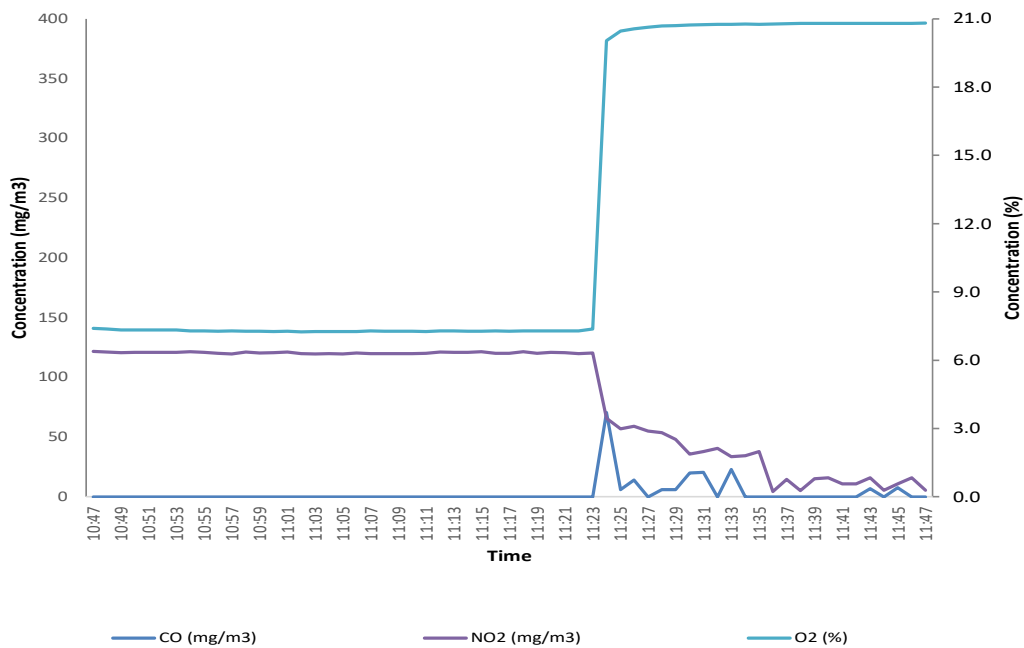
Date	Operators	Combustion Gas Analyser	Flame Ionisation Detector
01/08/2024	IsB	12.14	-

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			
Carbon Monoxide	162ppm	200ppm	45	162	0.20	162	-0.10	162	-0.06	-0.31	Yes
Nitrogen Monoxide	202ppm	500ppm	50	202	0.10	202	0.00	205	0.00	1.53	Yes
Oxygen	20.78%	25%	50	20.8	-0.01	20.8	-0.02	20.8	-0.10	0.10	Yes

Instrumental Gas Analyser Results

Substance	Run	Corrected Concentration			Units	Basis	O ₂ Correction
		Average	Max	Min			
Carbon Monoxide	1	2.86	70.6	0.00	mg/m ³	-	3%
Oxides of Nitrogen (as NO ₂)	1	82	122	4.5	mg/m ³	NO _x as NO ₂	3%
Oxygen	1	12.8	20.8	7.3	%	-	-

Instrumental Gas Analyser Chart - Run 1



Sulphur Dioxide - Run 1 Calculations

Sampling Details		
Meter Box Number	8.09	-
Gas Meter Coefficient	0.972	-
Pitot Coefficient	0.851	-
Stack Gas Molecular Weight	29.4	g/mole
Static Pressure in Stack	-0.5	cmH ₂ O

Analysis Details		
Collection Media	Hydrogen Peroxide	
1st Collector Reference	Imp AB	
1st Collector Concentration	29.81	µg
2nd Collector Reference	Imp C	
2nd Collector Concentration	25.894	µg
Has breakthrough occurred?	Yes	-
Overall Blank Value (OBV)	0.051	mg/Nm ³
OBV <10% of ELV?	-	-

Isokineticity Details		
Nozzle Diameter	12.2	mm
Average Gas Meter Temperature	27.6	°C
Average Stack Temperature	74	°C
Average Stack Velocity	3.2	m/s
Isokineticity	104.4	%

Date	Operators
31/08/2024	IsB/AP

Parameter	Before	After	Unit
Barometric Pressure	1013	1013	mbar
Ambient Temperature	25.0	27.0	°C
Leak Check	0.20	-	L/min
Time	10:45	11:45	-

Emissions Calculations		
Total Sampling Time	60	min
Gas Meter Difference	1203.0	L
Corrected Gas Meter Volume	1169.6	L
Mean Sampling Rate	19.5	L/min
Gas Meter Volume (STP Dry)	1.062	Nm ³
Gas Meter Volume (REF)	0.484	Nm ³
Stack Gas Water Vapour Content	2.6	% v/v
Stack Gas Oxygen Content	12.8	% v/v
Emission Limit Value	-	mg/Nm ³
Concentration (REF)	0.1	mg/Nm ³
Mass Emissions (REF)	0	g/hr

Reference conditions (REF) are: 273k, 101.3kPa, Dry Gas, 3% O₂

Uncertainty

Uncertainty of Total Particulate Matter - Run 1

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m³
Mean Sampling Rate	19.5	L/min
Leak Rate	0.20	L/min
Barometric Pressure	1013	mbar
Average Stack Temperature	74	°C
Sampled Stack Gas Volume	1203	L

Parameter	Value	Unit
Mean Emission Concentration	1.2	mg/m³
Monitoring Duration	60	min
Console ID	8.09	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 13284-1		Envirocare Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u²
		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	0.39	0.20	L/min	1.03	0.007	0.00005
Time	Std	1sec in 1hour = 0.028%	2.0	1.0	sec	0.03	0.0003	0.000001
Gasmeter Volume	Std	<2%	24.1	4.5	L	0.37	0.00	0.0000
Temperature	Std	1% of value	0.7	0.24	°C	0.32	0.004	0.00001
Pressure	Std	1% of value	10.1	1.0	mbar	0.10	0.001	0.00000
Total								0.08
Combined Standard Uncertainty $[(\sum u^2)^{0.5}]$								0.28
Expanded Total Uncertainty as a % of emission conc. (95% confidence)								46.6
Expanded Total Uncertainty (mg/m³) (95% confidence)								0.55
Expanded Total Uncertainty as a % of emission limit value (95% confidence)								-

Uncertainty of Carbon Monoxide by Horiba Gas Analyser - Run 1

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m³
Reading	2.3	ppm
Span Gas Certified Value	162	ppm
Range	200	ppm

Cal Gas
CO

Source of Uncertainty	Uncertainty Criteria	Probability Distribution	Divisor	Source Uncertainty u	Combined Uncertainty u²
Zero Drift/Lower limit of detection (ppm)	-0.60	Rectangular	1.73	-0.35	0.120
Span Drift (ppm)	0.6	Rectangular	1.73	0.35	0.12
Linearity (% of value)	0.40	Rectangular	1.73	0.00528	0.00003
Setting Gas Divider (% of value)	0.35	Normal	1.00	0.00801	0.00006
Interference (% of value)	-0.48	Rectangular	1.73	-0.00634	0.00004
Standard deviation of repeatability at zero point (% of range)	0.10	Rectangular	-	0.20	0.04
Standard deviation of repeatability at span point (% of range)	0.20	Rectangular	-	0.40	0.16
Total					0.44
Combined Standard Uncertainty $[(\sum u^2)^{0.5}]$					0.66
Expanded Total Uncertainty (ppm) (95% confidence)					1.3
Expanded Total Uncertainty as a % of emission conc. (95% confidence)					57
Expanded Total Uncertainty (mg/m³) (95% confidence)					1.6
Expanded Total Uncertainty as a % of emission limit value (95% confidence)					-

Uncertainty of Oxides of Nitrogen by Horiba Gas Analyser - Run 1

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m³
Reading	40.1	ppm
Span Gas Certified Value	202	ppm
Range	500	ppm

Cal Gas
NO

Source of Uncertainty	Uncertainty Criteria	Probability Distribution	Divisor	Source Uncertainty u	Combined Uncertainty u²
Zero Drift/Lower limit of detection (ppm)	0.20	Rectangular	1.73	0.12	0.013
Span Drift (ppm)	-3.10	Rectangular	1.73	-1.79	3.20
Linearity (% of value)	0.62	Rectangular	1.73	0.14	0.02
Setting Gas Divider (% of value)	0.35	Normal	1.00	0.14	0.02
Interference (% of value)	0.63	Rectangular	1.73	0.15	0.02
Standard deviation of repeatability at zero point (% of range)	0.00	Rectangular	-	0.000	0.000
Standard deviation of repeatability at span point (% of range)	0.10	Rectangular	-	0.50	0.25
Total					3.53
Combined Standard Uncertainty [(sum u²)^{0.5}]					1.88
Expanded Total Uncertainty (ppm) (95% confidence)					3.7
Expanded Total Uncertainty as a % of emission conc. (95% confidence)					9.2
Expanded Total Uncertainty (mg/m³) (95% confidence)					7.6
Expanded Total Uncertainty as a % of emission limit value (95% confidence)					-

Uncertainty of Oxygen by Horiba Gas Analyser - Run 1

Parameter	Value	Unit
Reading	12.8	%
Span Gas Certified Value	20.8	%
Range	25.0	%

Cal Gas
O₂

Source of Uncertainty	Uncertainty Criteria	Probability Distribution	Divisor	Source Uncertainty u	Combined Uncertainty u²
Zero Drift/Lower limit of detection (%vol)	0.09	Rectangular	1.73	0.05	0.0027
Span Drift (%vol)	0.00	Rectangular	1.73	0.00	0.00
Linearity (% of value)	0.33	Rectangular	1.73	0.02	0.00060
Setting Gas Divider (% of value)	0.35	Normal	1.00	0.04	0.0020
Interference (% of value)	0.00	Rectangular	1.73	0.000	0.000
Standard deviation of repeatability at zero point (% of range)	0.02	Rectangular	-	0.005	0.00003
Standard deviation of repeatability at span point (% of range)	0.02	Rectangular	-	0.005	0.00003
Total					0.005
Combined Standard Uncertainty [(sum u²)^{0.5}]					0.07
Expanded Total Uncertainty (%) (95% confidence)					0.14
Expanded Total Uncertainty as a % of emission conc. (95% confidence)					1.1

Uncertainty of Sulphur Dioxide - Run 1

Parameter	Value	Unit
Emission Limit Value (ELV)	-	mg/m³
Mean Sampling Rate	19.5	L/min
Leak Rate	0.20	L/min
Barometric Pressure	1013	mbar
Average Stack Temperature	74	°C
Sampled Stack Gas Volume	1203	L

Parameter	Value	Unit
Mean Emission Concentration	0.12	mg/m³
Monitoring Duration	60	min
Console ID	8.09	-
Temperature Uncertainty	0.24	°C
Gas Meter Uncertainty	0.37	%
Barometer Uncertainty	1.0	mbar

Source of Uncertainty	ASD*	BS EN 14791		Certified Value	Units	% Actual Value	Source Uncertainty u	Combined Uncertainty u²
		Uncertainty Criteria	Max. Value					
Analysis Procedure	Std	<2.5% of measured value	-	7.9	%	4.0	0.0046	0.0000215
Leak Rate	Rect	<2% of sampling rate	0.39	0.20	L/min	1.03	0.00068	0.0000004650
Time	Std	1sec in 1hour = 0.028%	2.0	1.00	sec	0.03	0.000032	0.00000001022
Gasmeter Volume	Std	<2% actual volume	24.1	4.5	L	0.37	0.00043	0.000000181
Temperature	Std	<1% absolute temperature	0.7	0.24	k	0.32	0.00037	0.0000001394
Pressure	Std	<1% absolute pressure	10.1	1.0	mbar	0.10	0.00011	0.0000000129
Total								0.0000223
Combined Standard Uncertainty $[(\sum u^2)^{0.5}]$								0.0047
Expanded Total Uncertainty as a % of emission conc. (95% confidence)								8.0
Expanded Total Uncertainty (mg/m³) (95% confidence)								0.0093
Expanded Total Uncertainty as a % of emission limit value (95% confidence)								-

Uncertainty of Volumetric Flow - Run 1

Parameter	Value	Unit
Measured Volumetric Flow Rate Actual	2685	m³/hr

Performance Characteristics & Source Value	Value	Units
Standard Uncertainty - Pitot tube Coefficient	0.005	-
Standard Uncertainty - Mean Local Dynamic Pressure	34.5	Pa
Standard Uncertainty - Molar Mass of Stack Gas	0.00004	-
Standard Uncertainty - Stack Gas Temperature	0.50	K
Standard Uncertainty - Absolute Pressure in Duct	176	Pa
Standard Uncertainty - Density of Stack Gas	0.007	-
Standard Uncertainty - Mean Velocity	0.01	m/s
Expanded Uncertainty Mean Velocity (95% confidence)	0.03	m/s
Expanded Uncertainty Mean Velocity (95% Confidence), Relative	1.4	%
Standard Uncertainty - Volumetric Flow Rate	62	-
Standard Uncertainty - Volumetric Flow Rate (95% Confidence)	122	m³/hr
Standard Uncertainty - Volumetric Flow Rate (95% Confidence), Relative	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.