



Element, Unit C6, Emery Court, The Embankment Business Park, Heaton Mersey, Stockport, SK4 3GL

Your Element Contact: [REDACTED]

E [REDACTED]

Stack Emissions Testing Report Commissioned by
Thalia AWRP ODC Ltd

Installation Name & Address
Thalia AWRP ODC Ltd
Allerton Park Quarry
Moor Lane
Knaresborough
HG5 0SD

EPR Permit: KP3808PN/V003

Stack Reference
A2 - Line 1

Dates of the Monitoring Campaign
13th - 14th November 2025

Job Reference Number
EMT14976

Report Written by
[REDACTED] Site Manager MCERTS Level 2 MM 13 1215 TE1 TE2 TE3 TE4

Report Approved by
[REDACTED] Technical Specialist MCERTS Level 2 MM 02 115 TE1 TE2 TE3 TE4

Report Date
26th November 2025

Version
Version 1

Signature of Report Approver
[REDACTED]

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Executive Summary

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MONITORING OBJECTIVES

Thalia AWRP ODC Ltd, Knaresborough

A2 - Line 1

13th - 14th November 2025

Overall Aim of the Monitoring Campaign

Element were commissioned by Thalia AWRP ODC Ltd to carry out stack emissions testing on the A2 - Line 1 at Knaresborough.

The aim of the monitoring campaign was to demonstrate compliance with a set of emission limit values (ELVs) as specified in the Site's Permit.

Special Requirements

There were no special requirements.

Target Parameters

Dioxins & Furans, PCBs

Executive Summary

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MONITORING RESULTS

Thalia AWRP ODC Ltd, Knaresborough

A2 - Line 1

13th - 14th November 2025

where MU = Measurement Uncertainty associated with the Result

Parameter	Concentration				Mass Emission			
	Units	Result	MU +/-	Limit	Units	Result	MU +/-	Limit
Dioxins & Furans Upper Limit (worst case where <LOD = LOD)								
Dioxins & Furans (NATO I-TEQ)	¹ ng/m ³	0.0089	0.0022	0.06	µg/hr	0.15	0.042	-
Dioxins & Furans (WHO TEQ Humans / Mammals)	¹ ng/m ³	0.0106	0.0027	-	µg/hr	0.18	0.050	-
Dioxins & Furans (WHO TEQ Fish)	¹ ng/m ³	0.0115	0.0029	-	µg/hr	0.20	0.054	-
Dioxins & Furans (WHO TEQ Birds)	¹ ng/m ³	0.0147	0.0037	-	µg/hr	0.25	0.070	-
Dioxins & Furans Lower Limit (best case where <LOD = 0)								
Dioxins & Furans (NATO I-TEQ)	¹ ng/m ³	0.0015	0.0004	-	µg/hr	0.03	0.007	-
Dioxins & Furans (WHO TEQ Humans / Mammals)	¹ ng/m ³	0.0015	0.0004	-	µg/hr	0.03	0.007	-
Dioxins & Furans (WHO TEQ Fish)	¹ ng/m ³	0.0007	0.0002	-	µg/hr	0.01	0.003	-
Dioxins & Furans (WHO TEQ Birds)	¹ ng/m ³	0.0007	0.0002	-	µg/hr	0.01	0.003	-
PCBs Upper Limit (worst case where <LOD = LOD)								
PCBs (WHO TEQ Humans / Mammals)	¹ ng/m ³	0.00042	0.00010	-	µg/hr	0.007	0.002	-
PCBs (WHO TEQ Fish)	¹ ng/m ³	0.00003	0.00001	-	µg/hr	0.0005	0.0001	-
PCBs (WHO TEQ Birds)	¹ ng/m ³	0.00410	0.00103	-	µg/hr	0.070	0.019	-
PCBs Lower Limit (best case where <LOD = 0)								
PCBs (WHO TEQ Humans / Mammals)	¹ ng/m ³	0.00022	0.000056	-	µg/hr	0.004	0.001	-
PCBs (WHO TEQ Fish)	¹ ng/m ³	0.00002	0.000004	-	µg/hr	0.0003	0.0001	-
PCBs (WHO TEQ Birds)	¹ ng/m ³	0.00391	0.000982	-	µg/hr	0.067	0.018	-
Oxygen	% v/v Dry	17.65	0.42					
Water Vapour	% v/v	7.95	0.40					
Stack Gas Temperature	°C	128						
Stack Gas Velocity	m/s	8.75	0.95					
Volumetric Flow Rate (ACTUAL)	m ³ /hr	80143	9391					
Volumetric Flow Rate (REF)	¹ m ³ /hr	17057	1999					

NOTE: VOLUMETRIC FLOW RATE & VELOCITY DATA TAKEN FROM AN AVERAGE OF ALL OF THE ISOKINETIC RUNS.

¹ Reference Conditions (REF) are: 273K, 101.3kPa, dry gas, 11% oxygen.

Executive Summary

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MONITORING DATE(S) & TIMES

Thalia AWRP ODC Ltd, Knaresborough

A2 - Line 1

13th - 14th November 2025

Parameter		Units	Concentration	Units	Mass Emission	Sampling Date(s)	Sampling Times	Duration mins
Dioxins & Furans (NATO)	R1	ng/m ³	0.009	µg/hr	0.15	13/11/2025	21:37 - 00:37, 00:39 - 03:39	360
PCBs	R1	ng/m ³	0.0004	µg/hr	0.007	13/11/2025	21:37 - 00:37, 00:39 - 03:39	360
Oxygen	R1	% v/v	17.65			13/11/2025	21:37 - 03:39	360
Velocity Traverse	R1					13/11/2025	20:45 - 21:00	

All results are expressed at the respective reference conditions.

Executive Summary

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PROCESS DETAILS

Thalia AWRP ODC Ltd, Knaresborough

A2 - Line 1

13th - 14th November 2025

Standard Operating Conditions

Parameter	Value
Process Status	Starting Up
Capacity (of 100%) and Tonnes / Hour	Initial Start Up - No Waste
Continuous or Batch Process	Continuous
Feedstock (if applicable)	Municipal Waste
Abatement System	Bag Filtration with Carbon and Lime Injection
Abatement System Running Status	On
Fuel	Natural Gas
Plume Appearance	No Plume Visible

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MONITORING & ANALYTICAL METHODS

Thalia AWRP ODC Ltd, Knaresborough

A2 - Line 1

13th - 14th November 2025

Parameter	Monitoring				Analysis				Overall Status	LOD (Average)
	Standard	Technical Procedure	Sampling Status	Testing Lab	Analytical Procedure	Analytical Technique	Analysis Status	Analysis Lab		
Dioxins & Furans	EN 1948	MD 007	MCERTS	EET	PM137, TM201	GC-HRMS	MCERTS	ELD	MCERTS	0.008 ng/m³
PCBs	EN 1948	MD 007	MCERTS	EET	PM137, TM201	GC-HRMS	MCERTS	ELD	MCERTS	0.00022 ng/m³
Water Vapour	EN 14790	MD 005	MCERTS	EET	MD 005	Gravimetric	MCERTS	EET	MCERTS	0.10 % v/v
Oxygen	EN 14789	MD 039	MCERTS	EET	Dry Paramagnetic Cell by Horiba PG-350E				MCERTS	0.1 %
Velocity & Vol. Flow Rate	EN 16911-1 (MID)	MD 041	MCERTS	EET	Pitot Tube and Thermocouple				MCERTS	1.8 m/s

ANALYSIS LABORATORIES

(with short name reference as appears in the table above)

Element (Stockport Lab - EET)	ISO 17025 Accreditation Number: UKAS 4279
Element (Deeside Lab - ELD)	ISO 17025 Accreditation Number: UKAS 4225

SUMMARY OF SAMPLING DEVIATIONS

Parameter	Run	Deviation
All Parameters	All	There are no deviations associated with the sampling employed.

Executive Summary

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SUITABILITY OF SAMPLING LOCATION

Duct Characteristics

Parameter	Units	Value
Type	-	Circular
Depth	m	1.80
Width	m	-
Area	m ²	2.54
Port Depth	cm	25
Orientation of Duct	-	Vertical
Number of Ports	-	2
Sample Port Size	-	5" Flange

Location of Sampling Platform

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

Platform Details

EA Technical Guidance Note M1 / EN 15259 Platform Requirements	Value
Sufficient working area to manipulate probe and operate the measuring instruments	Yes
Platform has 2 levels of handrails (approx. 0.5m & 1.0m high)	Yes
Platform has vertical base boards (approx. 0.25m high)	Yes
Platform has chains / self closing gates at top of ladders	N/A
There are no obstructions present which hamper insertion of sampling equipment	Yes
Safe Access Available	Yes
Easy Access Available	Yes

Sampling Location / Platform Improvement Recommendations

The sampling location meets all the requirements specified in EA Guidance Note M1 and EN 15259, and therefore there are no improvement recommendations.

EN 15259 Homogeneity Test Requirements

There is no requirement to perform a EN 15259 Homogeneity Test on this Stack.

Sampling Plane Validation Criteria (from EN 15259)

Criteria in EN 15259	Units	Traverse 1	Required	Compliant
Lowest Differential Pressure	Pa	41.2	> 5 Pa	Yes
Mean Velocity	m/s	8.40	-	-
Lowest Gas Velocity	m/s	8.13	-	-
Highest Gas Velocity	m/s	8.51	-	-
Ratio of Above	: 1	1.05	< 3 : 1	Yes
Maximum Angle of Swirl	°	8.00	< 15°	Yes
No Local Negative Flow	-	Yes	-	Yes

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PLANT PHOTOS

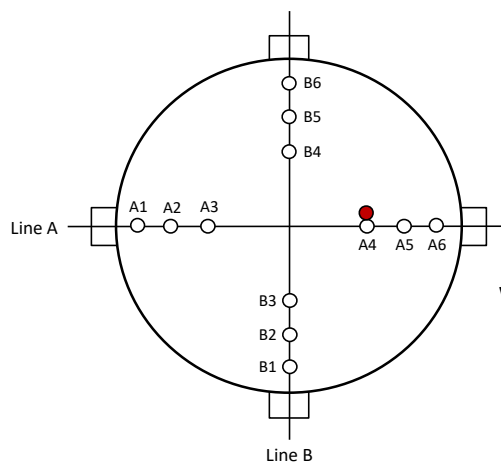
Photo 1



Photo 2



SAMPLE POINTS



where

- = isokinetic point sampled at
- = isokinetic point not sampled at
- = combustion gases sample point
- = non-isokinetic sample point

APPENDICES

APPENDIX CONTENTS

APPENDIX 1 - Stack Emissions Monitoring Personnel, List of Equipment & Methods and Technical Procedures Used

APPENDIX 2 - Summaries, Calculations, Raw Data and Charts

APPENDIX 1

STACK EMISSIONS MONITORING PERSONNEL

Position	Name	MCERTS Accreditation	MCERTS Number	Technical Endorsements
Team Leader	Ian Lamb	MCERTS Level 2	MM 13 1215	TE1 TE2 TE3 TE4
Technician	Richard Oxley	MCERTS Level 1	MM 22 1737	None

LIST OF EQUIPMENT

Extractive Sampling		Instrumental Analysers		Miscellaneous Items	
Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.	Equipment Type	Equipment I.D.
Control Box DGM (1)	CAT 7.170	Horiba PG-350E	CAT 39.3	Digital Manometer (1)	-
Control Box DGM (2)	-	Horiba PG-250	-	Digital Manometer (2)	-
Box Thermocouples (1)	CAT 3.70	Servomex 4900	-	Digital Temperature Meter	-
Box Thermocouples (2)	CAT 3.70a	Eco Physics CLD 822Mh	-	Stopwatch	CAT 14.53
Umbilical (1)	CAT 3.70	ABB AO2020-URAS26	-	Barometer	-
Umbilical (2)	-	Testo 350 XL	-	Stack Thermocouple (1)	-
Oven Box (1)	CAT 12.55	JCT JCC P1 Cooler	CAT 4.0031	Stack Thermocouple (2)	-
Oven Box (2)	-	Gasmeter DX4000	-	Stack Thermocouple (3)	CAT 4.1786
Heated Probe (1)	-	Gasmeter Sampling System	-	1m Heated Line (1)	-
Heated Probe (2)	-	Sick 3006	-	1m Heated Line (2)	-
Heated Probe (3)	CAT 5.41	M&C PSS	CAT 12.137	1m Heated Line (3)	-
S-Pitot (1)	CAT 21P.222	Mass Flow Controller (1)	CAT 6.67	5m Heated Line (1)	-
S-Pitot (2)	-	Mass Flow Controller (2)	CAT 6.68	15m Heated Line (1)	-
L-Pitot	-	Mass View (1)	-	20m Heated Line (1)	CAT 20.1019
Site Balance	A004599	Mass View (2)	-	20m Heated Line (2)	-
500g / 1Kg Check Weights	A004599	Hioki 5043 (V)	-	Dual Channel Heater Controller	-
Last Impinger Arm	-	Hioki 5043 (V)	-	Single Channel Heater Controller	-
Callipers	-	Bioaerosols Temperature Logger	-	Laboratory Balance	-
Tubes Kit Thermocouple	-	Electronic Refrigerator	-	Tape Measure	CAT 16.93

METHODS & TECHNICAL PROCEDURES USED

Parameter	Standard	Technical Procedure
Dioxins & Furans	EN 1948	MD 007
PCBs	EN 1948	MD 007
Water Vapour	EN 14790	MD 005
Oxygen	EN 14789	MD 039
Velocity & Vol. Flow Rate	EN 16911-1 (MID)	MD 041

PRELIMINARY STACK SURVEY: CALCULATIONS

General Stack Details

Stack Details (from Traverse)	Units	Value
Stack Diameter / Depth, D	m	1.80
Stack Width, W	m	-
Stack Area, A	m ²	2.54
Average Stack Gas Temperature, T _a	°C	120.0
Average Stack Gas Pressure	mmH ₂ O	4.5
Average Stack Static Pressure, P _{static}	kPa	-0.355
Average Barometric Pressure, P _b	kPa	103.2
Average Pitot Tube Calibration Coefficient, C _p	-	0.84

Stack Gas Composition & Molecular Weights

Component	Conc ppm	Conc Dry % v/v	Conc Wet % v/v	Volume Fraction r	Molar Mass M	Density kg/m ³ p	Conc kg/m ³ p _i
CO ₂ (Estimated)	-	1.62	1.49	0.0162	44.01	1.9635	0.03181
O ₂	-	17.65	16.25	0.1765	32.00	1.4277	0.25201
N ₂	-	80.73	74.31	0.8073	28.01	1.2498	1.00897
Moisture (H ₂ O)	-	-	7.95	0.0795	18.02	0.8037	0.06392

Where: $p = M / 22.41$

$p_i = r \times p$

Calculation of Stack Gas Densities

Determinand	Units	Result
Dry Density (STP), P _{STD}	kg/m ³	1.293
Wet Density (STP), P _{STW}	kg/m ³	1.254
Dry Density (Actual), P _{Actual}	kg/m ³	0.912
Average Wet Density (Actual), P _{ActualW}	kg/m ³	0.884

Where: P_{STD} = sum of component concentrations, kg/m³ (not including water vapour)

P_{STW} = sum of all wet concentrations / 100 x density, kg/m³ (including water vapour)

$P_{Actual} = P_{STD} \times (T_{STP} / (P_{STP})) \times ((P_{static} + P_b) / T_a)$

$P_{ActualW}$ (at each sampling point) = P_{STW} x (T_i / P_i) x (P_a / T_a)

Calculation of Stack Gas Volumetric Flowrate, Q

Duct gas flow conditions	Units	Actual	REF ¹
Temperature	°C	120.0	0.0
Total Pressure	kPa	102.8	101.3
Moisture	%	7.95	0.00
Oxygen (Dry)	%	17.7	11.0

Gas Volumetric Flowrate (from Traverse)	Units	Result
Gas Volumetric Flowrate (Actual)	m ³ /hr	76938
Gas Volumetric Flowrate (STP, Wet)	m ³ /hr	54260
Gas Volumetric Flowrate (STP, Dry)	m ³ /hr	49945
Gas Volumetric Flowrate REF ¹	m ³ /hr	16722

APPENDIX 2

PRELIMINARY STACK SURVEY: VELOCITY TRAVERSE TO EN 16911-1 (MID)

(1 of 1)

Parameter	Units	Value
Date of Survey	-	13/11/2025
Time of Survey	-	20:45 - 21:00
Atmospheric Pressure	kPa	103.2
Average Stack Static Pressure	Pa	-355
Result of Pitot Stagnation Test	-	Pass
Are Water Droplets Present?	-	No
Device Used	S-Type Pitot with Liquid Incline Manometer	

Parameter	Units	Value
Initial Pitot Leak Check	-	Pass
Final Pitot Leak Check	-	Pass
Orientation of Duct	-	Vertical
Pitot Tube, C_p	-	0.844
Number of Lines Available	-	2
Number of Lines Used	-	2

Sampling Line A							Sampling Line B				
Traverse Point	Depth m	ΔP mmH ₂ O	Temp °C	Wet Density kg/m ³	Velocity m/s	Swirl °	ΔP mmH ₂ O	Temp °C	Wet Density kg/m ³	Velocity m/s	Swirl °
STATIC (Units: Pa)		-355.0					-355.0				
Mean		4.4	120.0	0.884	8.29		4.6	120.0	0.884	8.51	
1	0.08	4.4	120.0	0.884	8.32	7.0	4.6	120.0	0.884	8.51	8.0
2	0.26	4.4	120.0	0.884	8.32	7.0	4.6	120.0	0.884	8.51	7.0
3	0.53	4.2	120.0	0.884	8.13	5.0	4.6	120.0	0.884	8.51	6.0
4	1.27	4.4	120.0	0.884	8.32	6.0	4.6	120.0	0.884	8.51	8.0
5	1.54	4.4	120.0	0.884	8.32	5.0	4.6	120.0	0.884	8.51	7.0
6	1.72	4.4	120.0	0.884	8.32	8.0	4.6	120.0	0.884	8.51	7.0

APPENDIX 2

PRELIMINARY STACK SURVEY: VELOCITY TRAVERSE TO EN 16911-1 (MID) - MEASUREMENT UNCERTAINTY (1 of 1)

Performance characteristics (Uncertainty Components)	Uncertainty	Value	Units
Standard Uncertainty on the coefficient of the Pitot Tube	$u(k)$	0.005	-
Standard Uncertainty associated with the mean local dynamic pressures	$u(\Delta p_i)$	1.707	Pa
- Resolution	$u(res)$	0.52154	
- Calibration	$u(cal)$	0.201	
- Drift	$u(drift)$	1.096	
- Lack of Fit	$u(fit)$	0.096	
- Overall corrections to dynamic measurements	$u(Cf)$	1.915	
Standard uncertainty associated with the molar mass of the gas	$u(M)$	0.00005	-
- $\phi_{O_2,w}$	-	16.248	
- $\phi_{CO_2,w}$	-	1.491	
- Oxygen, dry	$u(\phi_{O_2,d})$	0.540	
- Carbon Dioxide, dry	$u(\phi_{CO_2,d})$	0.050	
- Water Vapour	$u(\phi_{H_2O})$	0.406	
- Oxygen, wet	$u(\phi_{O_2,w})$	0.503	
- Carbon Dioxide, wet	$u(\phi_{CO_2,w})$	0.046	
Standard uncertainty associated with the stack temperature	$u(T_c)$	2.005	K
Standard uncertainty associated with the absolute pressure in the duct	$u(p_c)$	175.696	Pa
- Atmospheric Pressure	$u(p_{atm})$	175.692	
- Static Pressure	$u(p_{stat})$	1.207	
Standard uncertainty associated with the density in the duct	$u(\rho)$	0.00497	-
Standard uncertainty associated with the local velocities	$u(v_i)$	1.600	Pa
Standard uncertainty associated with the mean velocity	$u(\bar{v})$	0.463	m/s
Standard uncertainty associated with the mean velocity (95% Confidence)	$Uc(v)$	0.908	m/s
Standard uncertainty associated with the mean velocity (95% Confidence), relative	$Uc,rel(v)$	10.81	%
Standard uncertainty associated with the volume flow rate (95% Confidence)	$Uc(qV,w)$	9014.9	m ³ /hr
- $u^2(a)/a^2$	-	0.00053	
- $u^2(qV,w)/q^2V,w$	-	0.00357	
- $u^2(qV,w)$	-	21154923	
- $u(qV,w)$	-	4599.4	
Standard uncertainty associated with the volume flow rate (95% Confidence), relative	$Uc,rel(qV,w)$	11.72	%

APPENDIX 2

DIOXINS & FURANS: RESULTS SUMMARY

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Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ1 - UPPER LIMITS (worst case where <LOD = LOD)

Sample Runs (UPPER NATO I-TEQ)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0089	0.0089
Uncertainty	±ng/m ³	0.0022	0.0022
Mass Emission	µg/hr	0.15	0.15
Uncertainty	±µg/hr	0.042	0.042

Sample Runs (UPPER WHO TEQ Humans / Mammals)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0106	0.0106
Uncertainty	±ng/m ³	0.0027	0.0027
Mass Emission	µg/hr	0.18	0.18
Uncertainty	±µg/hr	0.050	0.050

Sample Runs (UPPER WHO TEQ Fish)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0115	0.0115
Uncertainty	±ng/m ³	0.0029	0.0029
Mass Emission	µg/hr	0.20	0.20
Uncertainty	±µg/hr	0.054	0.054

Sample Runs (UPPER WHO TEQ Birds)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0147	0.0147
Uncertainty	±ng/m ³	0.0037	0.0037
Mass Emission	µg/hr	0.25	0.25
Uncertainty	±µg/hr	0.070	0.070

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DIOXINS & FURANS: RESULTS SUMMARY

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Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ2 - LOWER LIMITS (best case where <LOD = 0)

Sample Runs (LOWER NATO I-TEQ)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0015	0.0015
Uncertainty	±ng/m ³	0.0004	0.0004
Mass Emission	µg/hr	0.03	0.03
Uncertainty	±µg/hr	0.007	0.007

Sample Runs (LOWER WHO TEQ Humans / Mammals)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0015	0.0015
Uncertainty	±ng/m ³	0.0004	0.0004
Mass Emission	µg/hr	0.03	0.03
Uncertainty	±µg/hr	0.007	0.007

Sample Runs (LOWER WHO TEQ Fish)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0007	0.0007
Uncertainty	±ng/m ³	0.0002	0.0002
Mass Emission	µg/hr	0.01	0.01
Uncertainty	±µg/hr	0.003	0.003

Sample Runs (LOWER WHO TEQ Birds)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0007	0.0007
Uncertainty	±ng/m ³	0.0002	0.0002
Mass Emission	µg/hr	0.01	0.01
Uncertainty	±µg/hr	0.003	0.003

APPENDIX 2

DIOXINS & FURANS: RESULTS SUMMARY

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Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ1 - UPPER LIMITS (worst case where <LOD = LOD)

Blank Runs (UPPER NATO I-TEQ)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.0025	0.0025

Blank Runs (UPPER WHO TEQ Humans / Mammals)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.0031	0.0031

Blank Runs (UPPER WHO TEQ Fish)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.0034	0.0034

Blank Runs (UPPER WHO TEQ Birds)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.0042	0.0042

TEQ2 - LOWER LIMITS (best case where <LOD = 0)

Blank Runs (LOWER NATO I-TEQ)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00002	0.00002

Blank Runs (LOWER WHO TEQ Humans / Mammals)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00002	0.00002

Blank Runs (LOWER WHO TEQ Fish)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00002	0.00002

Blank Runs (LOWER WHO TEQ Birds)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00002	0.00002

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DIOXINS & FURANS: RESULTS SUMMARY

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Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

Parameter	Units	Run 1	Mean
Water Vapour	% v/v	7.95	7.95
Uncertainty	±% v/v	0.40	0.40

General Sampling Information

Parameter	Value
Standard	EN 1948
Technical Procedure	MD 007
Name of Analytical Laboratory	ELD
Analytical Laboratory's Procedure	PM137, TM201
ISO 17025 Accredited Analysis?	MCERTS
Date of Sample Analysis	24/11/2025
Probe Material	Borosilicate Glass
Filter Housing Material	Borosilicate Glass
Glassware Material	Borosilicate Glass
Absorption Material	XAD-2
Positioning of Filter	Out Stack
Filter Size and Material	90mm Quartz Fibre
Number of Sampling Lines Used	2 / 2
Number of Sampling Points Used	12 / 12
Sample Point I.D.'s	A1 - A6, B1 - B6

FORMAT: Number Used / Number Required

FORMAT: Number Used / Number Required

Reference Conditions

Reference Conditions are: 273K, 101.3kPa, dry gas, 11% oxygen.

DIOXINS & FURANS: ISOKINETIC SAMPLING CALCULATIONS

Test	Units	Run 1	
Absolute pressure of stack gas, P_s			
Barometric pressure, P_b	mmHg	774.1	
Stack static pressure, P_{static}	mmH ₂ O	-36.2	
$P_s = (P_b + (P_{static} / 13.6))$	mmHg	771.4	
Volume of water vapour collected, V_{wstd}			
Total mass collected in impingers (liquid trap)	g	211.4	
Total mass collected in impingers (silica trap)	g	98.8	
Total mass of liquid collected, V_{lc}	g	310.2	
$V_{wstd} = (0.001246)(V_{lc})$	m ³	0.3865	
Volume of gas metered dry, V_{mstd}			
Volume of gas sample through gas meter, V_m	m ³	4.6990	
Gas meter correction factor, Y_d	-	0.9950	
Average dry gas meter temperature, T_m	°C	18.1	
Average pressure drop across orifice, ΔH	mmH ₂ O	18.5	
$V_{mstd} = ((0.3592)(V_m)(P_b + (\Delta H/13.6))(Y_d)) / (T_m + 273)$	m ³	4.4732	
Moisture content, B_{wo} & R_{wv}			
$B_{wo} = V_{wstd} / (V_{mstd} + V_{wstd})$	m ³	0.0795	
B_{wo} as a percentage	% v/v	7.95	
Reported Water Vapour, checked with Tables in EN 14790, R_{wv}	% v/v	7.95	
Volume of gas metered wet, V_{mstw}			
$V_{mstw} = (V_{mstd})(100/(100 - R_{wv}))$	m ³	4.8597	
Volume of gas metered at Oxygen Reference Conditions, $V_{mstd@x\%O_2}$ & $V_{mstw@x\%O_2}$			
IED & Incinerates Hazardous Material? (Yes = no positive O ₂ correction)	-	No	
% wet oxygen measured in gas stream, ACT%O _{2w}	% v/v	16.25	
% dry oxygen measured in gas stream, ACT%O _{2d}	% v/v	17.65	
% oxygen reference condition, REF%O ₂	% v/v	11.00	
O ₂ Reference Factor wet ($O_{2REFw} = (21 - REF\%O_2) / (21 - ACT\%O_{2w})$)	-	2.10	
O ₂ Reference Factor dry ($O_{2REFd} = (21 - REF\%O_2) / (21 - ACT\%O_{2d})$)	-	2.99	
$V_{mstw@x\%oxygen} = (V_{mstw}) / (O_{2REFw})$	m ³	2.3093	
$V_{mstd@x\%oxygen} = (V_{mstd}) / (O_{2REFd})$	m ³	1.4977	
Molecular weight of dry gas stream, M_d			
CO ₂ (Estimated)	% v/v	9.00	
O ₂	% v/v	17.65	
Total	% v/v	26.65	
N ₂	% v/v	73.35	
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	g/gmol	30.15	
Molecular weight of stack gas (wet), M_s			
$M_s = M_d(1 - (R_{wv}/100)) + 18(R_{wv}/100)$	g/gmol	29.18	
Velocity of stack gas, V_s			
Pitot tube velocity constant, K_p	-	34.97	
Velocity pressure coefficient, C_p	-	0.84	
Average of velocity heads, ΔP_{avg}	mmH ₂ O	4.93	
Average square root of velocity heads, $\sqrt{\Delta P}$	√mmH ₂ O	2.22	
Average stack gas temperature, T_s	°C	128.2	
$V_s = ((K_p)(C_p)(\sqrt{\Delta P})(T_s + 273)) / (V(M_s)(P_s))$	m/s	8.75	
Total flow of stack gas: Actual (Q_a), Wet (Q_{stw}), Dry (Q_{std}), Wet@O_{2REF} (Q_{stwO_2}), Dry@O_{2REF} (Q_{stdO_2})			
Area of stack, A_s	m ²	2.54	
$Q_a = (60)(A_s)(V_s)$	m ³ /min	1335.7	
Conversion factor (K/mm.Hg), C_f	-	0.3592	
$Q_{stw} = ((Q_a)(P_s)(C_f)) / ((T_s) + 273)$	m ³ /min	922.5	
$Q_{std} = ((Q_a)(P_s)(C_f)(1 - (R_{wv}/100))) / ((T_s) + 273)$	m ³ /min	849.1	
$Q_{stwO_2} = ((Q_a)(P_s)(C_f)) / ((T_s) + 273) / (O_{2REFw})$	m ³ /min	438.3	
$Q_{stdO_2} = ((Q_a)(P_s)(C_f)(1 - (R_{wv}/100))) / ((T_s) + 273) / (O_{2REFd})$	m ³ /min	284.3	
Percent isokinetic, %I			
Nozzle diameter, D_n	mm	7.00	
Nozzle area, A_n	mm ²	38.52	
Total sampling time, q	min	360	
$\%I = (4.6398E^6)((T_s+273)(V_{mstd}) / (P_s)(V_s)(A_n)(q)(1 - (R_{wv}/100)))$	%	96.7	

APPENDIX 2

DIOXINS & FURANS: SAMPLING DETAILS

RUN 1

Parameter	Units	Value
Sampling Times	-	21:37 - 00:37, 00:39 - 03:39
Sampling Dates	-	13/11/2025
Sampling Device	-	ISO
Volume Sampled (REF)	m ³	1.4977

Where: ISO stands for Manual Isokinetic Sampling Train

Parameter	Units	Result	DL	NATO I-TEQ		WHO Humans / Mammals		WHO Fish		WHO Birds		% Rec
				TEQ1	TEQ2	TEQ1	TEQ2	TEQ1	TEQ2	TEQ1	TEQ2	
2378-TCDD	ng	ND	0.00281	0.0028	0.0000	0.0028	0.0000	0.0028	0.0000	0.0028	0.0000	101
12378-PeCDD	ng	ND	0.00681	0.0034	0.0000	0.0068	0.0000	0.0068	0.0000	0.0068	0.0000	89
123478-HxCDD	ng	ND	0.00592	0.0006	0.0000	0.0006	0.0000	0.0030	0.0000	0.0003	0.0000	86
123678-HxCDD	ng	0.00886	0.00523	0.0009	0.0009	0.0009	0.0009	0.0001	0.0001	0.0001	0.0001	97
123789-HxCDD	ng	ND	0.00513	0.0005	0.0000	0.0005	0.0000	0.0001	0.0000	0.0005	0.0000	-
1234678-HPeCDD	ng	0.04132	0.00249	0.0004	0.0004	0.0004	0.0004	0.0000	0.0000	0.0000	0.0000	88
OCDD	ng	0.02616	0.00230	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	84
Total Dioxins	ng	0.0000	-	0.0086	0.0013	0.0120	0.0013	0.0128	0.0001	0.0106	0.0001	-
2378-TCDF	ng	ND	0.00500	0.0005	0.0000	0.0005	0.0000	0.0003	0.0000	0.0050	0.0000	85
12378-PeCDF	ng	ND	0.00441	0.0002	0.0000	0.0001	0.0000	0.0002	0.0000	0.0004	0.0000	102
23478-PeCDF	ng	ND	0.00406	0.0020	0.0000	0.0012	0.0000	0.0020	0.0000	0.0041	0.0000	84
123478-HxCDF	ng	ND	0.00280	0.0003	0.0000	0.0003	0.0000	0.0003	0.0000	0.0003	0.0000	89
123678-HxCDF	ng	ND	0.00291	0.0003	0.0000	0.0003	0.0000	0.0003	0.0000	0.0003	0.0000	86
234678-HxCDF	ng	0.00719	0.00320	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	84
123789-HxCDF	ng	ND	0.00421	0.0004	0.0000	0.0004	0.0000	0.0004	0.0000	0.0004	0.0000	98
1234678-HPeCDF	ng	0.02140	0.00181	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	84
1234789-HPeCDF	ng	ND	0.00219	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	91
OCDF	ng	0.02659	0.00197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	73
Total Furans	ng	0.0000	-	0.0047	0.0010	0.0038	0.0009	0.0045	0.0009	0.0115	0.0009	-
Totals	ng	0.0000	-	0.0134	0.0023	0.0158	0.0022	0.0172	0.0011	0.0220	0.0011	-
Total Concentration	ng/m ³	-	-	0.0089	0.0015	0.0106	0.0015	0.0115	0.0007	0.0147	0.0007	-
Limit of Detection	ng/m ³	-	-	0.0080	-	0.0097	-	0.0110	-	0.0142	-	-

Where: ND stands for Non Detected
DL stands for Analytical Detection Limit
TEQ1 refers to Non Detected Congeners at the Detection Limit
TEQ2 refers to Non Detected Congeners at Zero
% Rec stands for the Recovery Percentage of the Sample

APPENDIX 2

DIOXINS & FURANS: QUALITY ASSURANCE

(PAGE 1 OF 2)

Sample Runs

Leak Test Results	Units	Run 1	
Mean Sampling Rate	l/min	13.0	
Pre-Sampling Leak Rate	l/min	0.12	
Post-Sampling Leak Rate	l/min	0.10	
Allowable Leak Rate	l/min	0.65	
Leak Test Acceptable	-	Yes	
Water Droplets	Units	Run 1	
Are Water Droplets Present	-	No	
MU (Concurrent Water Vapour)	Units	Run 1	
Measurement Uncertainty (MU)	%	5.0	
Allowable MU	%	20.0	
MU Acceptable	%	Yes	
Silica Gel (Concurrent Water Vapour)	Units	Run 1	
Less than 50% Faded	%	Yes	
Isokinetic Criterion Compliance	Units	Run 1	
Isokinetic Variation	%	96.7	
Allowable Isokinetic Range	%	95 - 115	
Isokineticity Acceptable	-	Yes	
Filter Temperatures	Units	Run 1	
Maximum Filter Temperature	°C	120	
Maximum Allowable Temperature	°C	125	
Temperature Acceptable	-	Yes	
Condenser Exit Temperature	Units	Run 1	
Maximum Temperature Recorded	°C	18	
Maximum Allowable Temperature	°C	20	
Exit Temperature Acceptable	-	Yes	
Test Conditions	Units	Run 1	
Ambient Temperature Recorded?	-	Yes	

APPENDIX 2

DIOXINS & FURANS: QUALITY ASSURANCE

(PAGE 2 OF 2)

Blank Runs

Leak Test Results	Units	Blank 1	
Expected Sampling Rate	l/min	20.0	
Sampling Leak Rate	l/min	0.10	
Allowable Leak Rate	l/min	1.00	
Leak Test Acceptable	-	Yes	
Validity of NATO I-TEQ Blank vs ELV	Units	Blank 1	
Allowable Blank	ng/m ³	0.006	
Blank Acceptable	-	Yes	

Method Deviations

Nature of Deviation	Run Number	
(x = deviation applies to the associated run, wx = deviation also applies to the concurrent water vapour run)	1	
There are no deviations associated with the sampling employed.	wx	

DIOXINS & FURANS (NATO I-TEQ): MEASUREMENT UNCERTAINTY CALCULATIONS

Measured Quantities	Value		Standard uncertainty		
	Symbol	Run 1	Symbol	Units	Run 1
Sampled Volume (Actual)	V_m	4.6990	uV_m	m^3	0.0940
Sampled Gas Temperature	T_m	291.1	uT_m	K	2.00
Sampled Gas Pressure	p_m	102.9	up_m	kPa	0.50
Sampled Gas Humidity	H_m	0.00	uH_m	% v/v	1.00
Leak	L	0.77	uL	%	-
Laboratory Result	L_r	10.0	uL_r	%	-

Uncertainty as a Percentage				Requirement of Standard
Measured Quantities	Units	Run 1		
Sampled Volume (Actual)	%	2.00		≤2%
Sampled Gas Temperature	%	0.69		≤1%
Sampled Gas Pressure	%	0.49		≤1%
Sampled Gas Humidity	%	1.00		≤1%
Leak	%	0.77		≤5%
Laboratory Result	%	10.0		No Requirement

Uncertainty in Measurement Units				Sensitivity Coefficient	
Measured Quantities	Symbol	Units	Run 1	Run 1	
Sampled Volume (STP)	V_m	m^3	4.4732	0.002	
Leak	L	ng/ m^3	0.00004	1.00	
Laboratory Result	L_r	ng/ m^3	0.0009	1.00	

Uncertainty in Result		
Measured Quantities	Units	Run 1
Sampled Volume (STP)	ng/ m^3	0.0002
Leak	ng/ m^3	0.00004
Laboratory Result	ng/ m^3	0.0009

Oxygen Correction Part of MU Budget		
Measured Quantities	Units	Run 1
O ₂ Correction Factor	-	2.99
Stack Gas O ₂ Content	% v/v	17.65
MU for O ₂ Correction	-	0.45
Overall MU For O ₂ Measurement	%	14.93

Parameter	Units	Run 1
Combined uncertainty	ng/ m^3	0.0009
Expanded uncertainty (95% confidence), without Oxygen Correction	ng/ m^3	0.0018
Expanded uncertainty (95% confidence), with Oxygen Correction	ng/ m^3	0.0022
Expanded uncertainty (95% confidence), estimated with Method Deviations	ng/ m^3	0.0022
Reported Uncertainty	ng/ m^3	0.0022
Expanded uncertainty (95% confidence), without Oxygen Correction	%	20.2
Expanded uncertainty (95% confidence), with Oxygen Correction	%	25.1
Expanded uncertainty (95% confidence), estimated with Method Deviations	%	25.1
Reported Uncertainty	%	25.1
Reported Uncertainty as % of ELV	%	3.7

APPENDIX 2

PCBs: RESULTS SUMMARY

(PAGE 1 OF 4)

Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ1 - UPPER LIMITS (worst case where <LOD = LOD)

Sample Runs (UPPER WHO TEQ Humans / Mammals)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.00042	0.00042
Uncertainty	±ng/m ³	0.00010	0.00010
Mass Emission	µg/hr	0.007	0.007
Uncertainty	±µg/hr	0.002	0.002

Sample Runs (UPPER WHO TEQ Fish)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.00003	0.00003
Uncertainty	±ng/m ³	0.00001	0.00001
Mass Emission	µg/hr	0.0005	0.0005
Uncertainty	±µg/hr	0.0001	0.0001

Sample Runs (UPPER WHO TEQ Birds)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.0041	0.0041
Uncertainty	±ng/m ³	0.0010	0.0010
Mass Emission	µg/hr	0.070	0.070
Uncertainty	±µg/hr	0.019	0.019

APPENDIX 2

PCBs: RESULTS SUMMARY

(PAGE 2 OF 4)

Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ2 - LOWER LIMITS (best case where <LOD = 0)

Sample Runs (LOWER WHO TEQ Humans / Mammals)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.00022	0.00022
Uncertainty	±ng/m ³	0.00006	0.00006
Mass Emission	µg/hr	0.004	0.004
Uncertainty	±µg/hr	0.001	0.001

Sample Runs (LOWER WHO TEQ Fish)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.00002	0.00002
Uncertainty	±ng/m ³	0.000004	0.000004
Mass Emission	µg/hr	0.0003	0.0003
Uncertainty	±µg/hr	0.0001	0.0001

Sample Runs (LOWER WHO TEQ Birds)

Parameter	Units	Run 1	Mean
Concentration	ng/m ³	0.00391	0.00391
Uncertainty	±ng/m ³	0.00098	0.00098
Mass Emission	µg/hr	0.067	0.067
Uncertainty	±µg/hr	0.018	0.018

APPENDIX 2

PCBs: RESULTS SUMMARY

(PAGE 3 OF 4)

Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

TEQ1 - UPPER LIMITS (worst case where <LOD = LOD)

Blank Runs (UPPER WHO TEQ Humans / Mammals)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00012	0.00012

Blank Runs (UPPER WHO TEQ Fish)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00001	0.00001

Blank Runs (UPPER WHO TEQ Birds)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00034	0.00034

TEQ2 - LOWER LIMITS (best case where <LOD = 0)

Blank Runs (LOWER WHO TEQ Humans / Mammals)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.000001	0.000001

Blank Runs (LOWER WHO TEQ Fish)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.0000005	0.0000005

Blank Runs (LOWER WHO TEQ Birds)

Parameter	Units	Blank 1	Maximum
Concentration	ng/m ³	0.00018	0.00018

APPENDIX 2

PCBs: RESULTS SUMMARY

(PAGE 4 OF 4)

Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

Parameter	Units	Run 1	Mean
Water Vapour	% v/v	7.95	7.95
Uncertainty	±% v/v	0.40	0.40

General Sampling Information

Parameter	Value
Standard	EN 1948
Technical Procedure	MD 007
Name of Analytical Laboratory	ELD
Analytical Laboratory's Procedure	PM137, TM201
ISO 17025 Accredited Analysis?	MCERTS
Date of Sample Analysis	24/11/2025
Probe Material	Borosilicate Glass
Filter Housing Material	Borosilicate Glass
Glassware Material	Borosilicate Glass
Absorption Material	XAD-2
Positioning of Filter	Out Stack
Filter Size and Material	90mm Quartz Fibre
Number of Sampling Lines Used	2 / 2
Number of Sampling Points Used	12 / 12
Sample Point I.D.'s	A1 - A6, B1 - B6

FORMAT: Number Used / Number Required

FORMAT: Number Used / Number Required

Reference Conditions

Reference Conditions are: 273K, 101.3kPa, dry gas, 11% oxygen.

PCBs: ISOKINETIC SAMPLING CALCULATIONS

Test	Units	Run 1	
Absolute pressure of stack gas, P_s			
Barometric pressure, P_b	mmHg	774.1	
Stack static pressure, P_{static}	mmH ₂ O	-36.2	
$P_s = (P_b + (P_{static} / 13.6))$	mmHg	771.4	
Volume of water vapour collected, V_{wstd}			
Total mass collected in impingers (liquid trap)	g	211.4	
Total mass collected in impingers (silica trap)	g	98.8	
Total mass of liquid collected, V_{lc}	g	310.2	
$V_{wstd} = (0.001246)(V_{lc})$	m ³	0.3865	
Volume of gas metered dry, V_{mstd}			
Volume of gas sample through gas meter, V_m	m ³	4.6990	
Gas meter correction factor, Y_d	-	0.9950	
Average dry gas meter temperature, T_m	°C	18.1	
Average pressure drop across orifice, ΔH	mmH ₂ O	18.5	
$V_{mstd} = ((0.3592)(V_m)(P_b + (\Delta H/13.6))(Y_d)) / (T_m + 273)$	m ³	4.4732	
Moisture content, B_{wo} & R_{wv}			
$B_{wo} = V_{wstd} / (V_{mstd} + V_{wstd})$	m ³	0.0795	
B_{wo} as a percentage	% v/v	7.95	
Reported Water Vapour, checked with Tables in EN 14790, R_{wv}	% v/v	7.95	
Volume of gas metered wet, V_{mstw}			
$V_{mstw} = (V_{mstd})(100/(100 - R_{wv}))$	m ³	4.8597	
Volume of gas metered at Oxygen Reference Conditions, $V_{mstd@x\%O_2}$ & $V_{mstw@x\%O_2}$			
IED & Incinerates Hazardous Material? (Yes = no positive O ₂ correction)	-	No	
% wet oxygen measured in gas stream, ACT%O _{2w}	% v/v	16.25	
% dry oxygen measured in gas stream, ACT%O _{2d}	% v/v	17.65	
% oxygen reference condition, REF%O ₂	% v/v	11.00	
O ₂ Reference Factor wet ($O_{2REFw} = (21 - REF\%O_2) / (21 - ACT\%O_{2w})$)	-	2.10	
O ₂ Reference Factor dry ($O_{2REFd} = (21 - REF\%O_2) / (21 - ACT\%O_{2d})$)	-	2.99	
$V_{mstw@x\%oxygen} = (V_{mstw}) / (O_{2REFw})$	m ³	2.3093	
$V_{mstd@x\%oxygen} = (V_{mstd}) / (O_{2REFd})$	m ³	1.4977	
Molecular weight of dry gas stream, M_d			
CO ₂ (Estimated)	% v/v	9.00	
O ₂	% v/v	17.65	
Total	% v/v	26.65	
N ₂	% v/v	73.35	
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	g/gmol	30.15	
Molecular weight of stack gas (wet), M_s			
$M_s = M_d(1 - (R_{wv}/100)) + 18(R_{wv}/100)$	g/gmol	29.18	
Velocity of stack gas, V_s			
Pitot tube velocity constant, K_p	-	34.97	
Velocity pressure coefficient, C_p	-	0.84	
Average of velocity heads, ΔP_{avg}	mmH ₂ O	4.93	
Average square root of velocity heads, $\sqrt{\Delta P}$	√mmH ₂ O	2.22	
Average stack gas temperature, T_s	°C	128.2	
$V_s = ((K_p)(C_p)(\sqrt{\Delta P})(T_s + 273)) / (V(M_s)(P_s))$	m/s	8.75	
Total flow of stack gas: Actual (Q_a), Wet (Q_{stw}), Dry (Q_{std}), Wet@O_{2REF} (Q_{stwO_2}), Dry@O_{2REF} (Q_{stdO_2})			
Area of stack, A_s	m ²	2.54	
$Q_a = (60)(A_s)(V_s)$	m ³ /min	1335.7	
Conversion factor (K/mm.Hg), C_t	-	0.3592	
$Q_{stw} = ((Q_a)(P_s)(C_t)) / ((T_s) + 273)$	m ³ /min	922.5	
$Q_{std} = ((Q_a)(P_s)(C_t)(1 - (R_{wv}/100))) / ((T_s) + 273)$	m ³ /min	849.1	
$Q_{stwO_2} = ((Q_a)(P_s)(C_t)) / ((T_s) + 273) / (O_{2REFw})$	m ³ /min	438.3	
$Q_{stdO_2} = ((Q_a)(P_s)(C_t)(1 - (R_{wv}/100))) / ((T_s) + 273) / (O_{2REFd})$	m ³ /min	284.3	
Percent isokinetic, %I			
Nozzle diameter, D_n	mm	7.00	
Nozzle area, A_n	mm ²	38.52	
Total sampling time, q	min	360	
$\%I = (4.6398E^6)((T_s+273)(V_{mstd}) / (P_s)(V_s)(A_n)(q)(1 - (R_{wv}/100)))$	%	96.7	

APPENDIX 2

PCBs: SAMPLING DETAILS

RUN 1

Parameter	Units	Value
Sampling Times	-	21:37 - 00:37, 00:39 - 03:39
Sampling Dates	-	13/11/2025
Sampling Device	-	ISO
Volume Sampled (REF)	m ³	1.4977

Where: ISO stands for Manual Isokinetic Sampling Train

Parameter	Units	Result	DL	WHO Humans / Mammals		WHO Fish		WHO Birds		% Rec
				TEQ1	TEQ2	TEQ1	TEQ2	TEQ1	TEQ2	
PCB-81	ng	0.04293	0.00252	0.0000129	0.0000129	0.0000215	0.0000215	0.0042930	0.0042930	87
PCB-77	ng	0.03084	0.00225	0.0000031	0.0000031	0.0000031	0.0000031	0.0015420	0.0015420	89
PCB-123	ng	0.01646	0.00540	0.0000005	0.0000005	0.0000001	0.0000001	0.0000002	0.0000002	73
PCB-118	ng	0.04758	0.00506	0.0000014	0.0000014	0.0000002	0.0000002	0.0000005	0.0000005	71
PCB-114	ng	0.02418	0.00520	0.0000007	0.0000007	0.0000001	0.0000001	0.0000024	0.0000024	75
PCB-105	ng	0.02578	0.00597	0.0000008	0.0000008	0.0000001	0.0000001	0.0000026	0.0000026	65
PCB-126	ng	ND	0.00287	0.0002870	0.0000000	0.0000144	0.0000000	0.0002870	0.0000000	81
PCB-167	ng	0.00850	0.00596	0.0000003	0.0000003	0.0000000	0.0000000	0.0000001	0.0000001	67
PCB-156	ng	0.01250	0.00607	0.0000004	0.0000004	0.0000001	0.0000001	0.0000013	0.0000013	66
PCB-157	ng	0.00903	0.00675	0.0000003	0.0000003	0.0000000	0.0000000	0.0000009	0.0000009	62
PCB-169	ng	0.01052	0.00124	0.0003156	0.0003156	0.0000005	0.0000005	0.0000105	0.0000105	85
PCB-189	ng	0.00972	0.00176	0.0000003	0.0000003	0.0000000	0.0000000	0.0000001	0.0000001	73
Totals	ng	0.0000	-	0.000623	0.000336	0.000040	0.000026	0.006140	0.005853	-
Total Concentration	ng/m ³	-	-	0.000416	0.000224	0.000027	0.000017	0.004100	0.003908	-
Limit of Detection	ng/m ³	-	-	0.000218	-	0.000011	-	0.000438	-	-

Where: ND stands for Non Detected
DL stands for Analytical Detection Limit
TEQ1 refers to Non Detected Congeners at the Detection Limit
TEQ2 refers to Non Detected Congeners at Zero
% Rec stands for the Recovery Percentage of the Sample

APPENDIX 2

PCBs: QUALITY ASSURANCE

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Sample Runs

Leak Test Results	Units	Run 1	
Mean Sampling Rate	l/min	13.0	
Pre-Sampling Leak Rate	l/min	0.12	
Post-Sampling Leak Rate	l/min	0.10	
Allowable Leak Rate	l/min	0.65	
Leak Test Acceptable	-	Yes	
Water Droplets	Units	Run 1	
Are Water Droplets Present	-	No	
MU (Concurrent Water Vapour)	Units	Run 1	
Measurement Uncertainty (MU)	%	5.0	
Allowable MU	%	20.0	
MU Acceptable	%	Yes	
Silica Gel (Concurrent Water Vapour)	Units	Run 1	
Less than 50% Faded	%	Yes	
Isokinetic Criterion Compliance	Units	Run 1	
Isokinetic Variation	%	96.7	
Allowable Isokinetic Range	%	95 - 115	
Isokineticity Acceptable	-	Yes	
Filter Temperatures	Units	Run 1	
Maximum Filter Temperature	°C	120	
Maximum Allowable Temperature	°C	125	
Temperature Acceptable	-	Yes	
Condenser Exit Temperature	Units	Run 1	
Maximum Temperature Recorded	°C	18	
Maximum Allowable Temperature	°C	20	
Exit Temperature Acceptable	-	Yes	
Test Conditions	Units	Run 1	
Ambient Temperature Recorded?	-	Yes	

APPENDIX 2

PCBs: QUALITY ASSURANCE

(PAGE 2 OF 2)

Blank Runs

Leak Test Results	Units	Blank 1	
Expected Sampling Rate	l/min	20.0	
Sampling Leak Rate	l/min	0.10	
Allowable Leak Rate	l/min	1.00	
Leak Test Acceptable	-	Yes	
Validity of WHO TEQ H/M Blank vs ELV	Units	Blank 1	
Allowable Blank	ng/m ³	N/A	
Blank Acceptable	-	N/A	

Method Deviations

Nature of Deviation	Run Number	
(x = deviation applies to the associated run, wx = deviation also applies to the concurrent water vapour run)	1	
There are no deviations associated with the sampling employed.	wx	

PCBs (WHO TEQ HUMANS / MAMMALS): MEASUREMENT UNCERTAINTY CALCULATIONS

Measured Quantities	Value		Standard uncertainty		
	Symbol	Run 1	Symbol	Units	Run 1
Sampled Volume (Actual)	V _m	4.6990	uV _m	m ³	0.0940
Sampled Gas Temperature	T _m	291.1	uT _m	K	2.00
Sampled Gas Pressure	p _m	102.9	up _m	kPa	0.50
Sampled Gas Humidity	H _m	0.00	uH _m	% v/v	1.00
Leak	L	0.77	uL	%	-
Laboratory Result	L _r	10.0	uL _r	%	-

Uncertainty as a Percentage			
Measured Quantities	Units	Run 1	Requirement of Standard
Sampled Volume (Actual)	%	2.00	≤2%
Sampled Gas Temperature	%	0.69	≤1%
Sampled Gas Pressure	%	0.49	≤1%
Sampled Gas Humidity	%	1.00	≤1%
Leak	%	0.77	≤5%
Laboratory Result	%	10.0	No Requirement

Uncertainty in Measurement Units				Sensitivity Coefficient	
Measured Quantities	Symbol	Units	Run 1	Run 1	
Sampled Volume (STP)	V _m	m ³	4.4732	0.0001	
Leak	L	ng/m ³	0.000002	1.00	
Laboratory Result	L _r	ng/m ³	0.000042	1.00	

Uncertainty in Result		
Measured Quantities	Units	Run 1
Sampled Volume (STP)	ng/m ³	0.000010
Leak	ng/m ³	0.000002
Laboratory Result	ng/m ³	0.000042

Oxygen Correction Part of MU Budget		
Measured Quantities	Units	Run 1
O ₂ Correction Factor	-	2.99
Stack Gas O ₂ Content	% v/v	17.65
MU for O ₂ Correction	-	0.45
Overall MU For O ₂ Measurement	%	14.93

Parameter	Units	Run 1
Combined uncertainty	ng/m ³	0.00004
Expanded uncertainty (95% confidence), without Oxygen Correction	ng/m ³	0.00008
Expanded uncertainty (95% confidence), with Oxygen Correction	ng/m ³	0.00010
Expanded uncertainty (95% confidence), estimated with Method Deviations	ng/m ³	0.00010
Reported Uncertainty	ng/m ³	0.00010
Expanded uncertainty (95% confidence), without Oxygen Correction	%	20.2
Expanded uncertainty (95% confidence), with Oxygen Correction	%	25.1
Expanded uncertainty (95% confidence), estimated with Method Deviations	%	25.1
Reported Uncertainty	%	25.1
Reported Uncertainty as % of ELV	%	N/A

APPENDIX 2

OXYGEN: RESULTS SUMMARY

Thalia AWRP ODC Ltd, Knaresborough
A2 - Line 1

Sample Runs

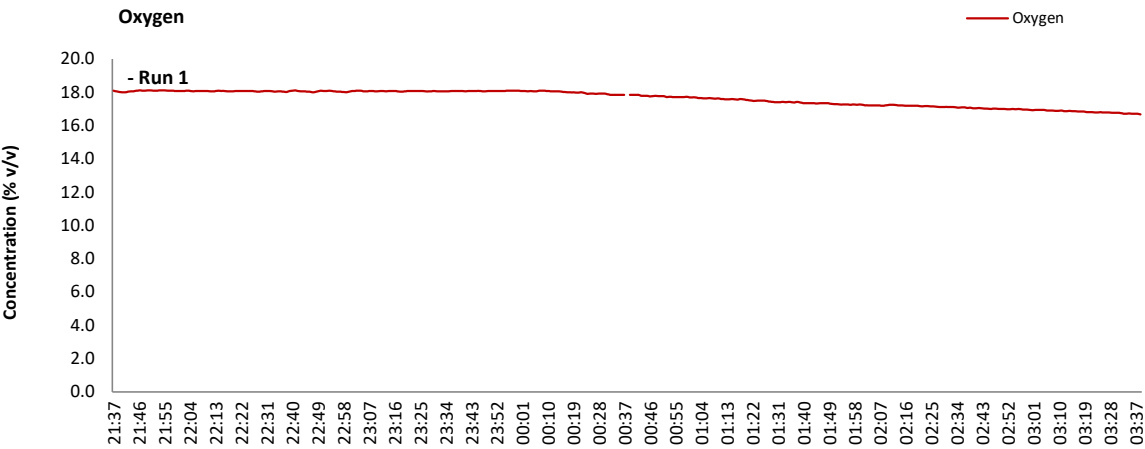
Parameter	Units	Run 1	Mean
Concentration	% v/v	17.65	17.65
Uncertainty	±% v/v	0.42	0.42

General Sampling Information

Parameter	Value	
Standard	EN 14789	
Technical Procedure	MD 039	
Probe Material	Titanium	
Filtration Type / Size	0.1µm Glass Fibre	
Heated Head Filter Used	Yes	
Heated Line Temperature	180°C	
Span Gas Type	Synthetic Air (5 Grade)	
Span Gas Reference Number	A009121	
Span Gas Expiry Date	05/08/1930	
Span Gas Start Pressure (bar)	60	
Gas Cylinder Concentration (% v/v)	21.49	NOTE: Dilution performed to achieve correct span value
Span Gas Uncertainty (%)	2	
Zero Gas Type	Nitrogen (5 Grade)	
Number of Sampling Lines Used	1 / 1	FORMAT: Number Used / Number Required
Number of Sampling Points Used	1 / 1	FORMAT: Number Used / Number Required
Sample Point I.D.'s	A4	

OXYGEN: DATA TREND

Graphical Trend of Data



APPENDIX 2

OXYGEN: SAMPLING DETAILS & QUALITY ASSURANCE

Sampling Details

Parameter	Units	Run 1
Sampling Times	-	21:37 - 03:39
Sampling Dates	-	13/11/2025
Instrument Range	% v/v	25.0
Span Gas Value	% v/v	21.5

Quality Assurance

	Conditioning Unit Temperature	Units	Run 1
	Average Temperature	°C	2.4
	Allowable Temperature	< °C	4.0
	Temperature Acceptable	-	Yes
CAL 1	Zero Drift	Units	Run 1
	Zero at Analyser (Pre)	% v/v	0.00
	Zero at Analyser (Post)	% v/v	0.00
	Zero Drift	% v/v	0.00
	Zero Drift	%	0.00
	Drift Correction Applied	2-5%	No
	Allowable Zero Drift	± %	5.00
	Zero Drift Acceptable	-	Yes
CAL 1	Span Drift	Units	Run 1
	Span at Analyser (Pre)	% v/v	21.49
	Span at Analyser (Post)	% v/v	21.40
	Span Drift	% v/v	-0.09
	Zero Adj. Span Drift	%	0.42
	Drift Correction Applied	2-5%	No
	Allowable Span Drift	± %	5.00
	Span Drift Acceptable	-	Yes
	Test Conditions	Units	Run 1
	Run Ambient Temperature Range	°C	9 - 15

Method Deviations

Nature of Deviation	Run Number
(x = deviation applies to the associated run)	1
There are no deviations associated with the sampling employed.	x

APPENDIX 2

OXYGEN: MEASUREMENT UNCERTAINTY CALCULATIONS

Performance characteristics	RUN 1		Units
Limit value	N/A		%vol
Allowable MU	6.0		%
Measured concentration	17.65		%vol
Range Used	25.0		%vol
Cal gas conc.	21.5		%vol

Performance characteristics	RUN 1		Units
Response time	41		seconds
Number of readings in measurement	360		-
Repeatability at zero	0.02		% full scale
Repeatability at span level	0.02		% full scale
Deviation from linearity	0.19		% of value
Zero drift	0.00		% full scale
Span drift	-0.42		% full scale
Volume or pressure flow dependence	0.10		% of full scale
Atmospheric pressure dependence	0.19		% of value/kPa
Ambient temperature dependence	-0.21		% full scale/10K
Combined interference	0.00		% range
Dependence on voltage	0.02		% full scale/10V
Losses in the line (leak)	0.14		% of value
Uncertainty of calibration gas	2.00		% of value

Performance characteristic	RUN 1		Units
Standard deviation of repeatability at zero	use rep at span		%vol
Standard deviation of repeatability at span level	0.00		%vol
Lack of fit	0.03		%vol
Drift	-0.04		%vol
Volume or pressure flow dependence	0.00		%vol
Atmospheric pressure dependence	0.01		%vol
Ambient temperature dependence	-0.03		%vol
Combined interference (from MCERTS Certificate)	0.00		%vol
Dependence on voltage	0.00		%vol
Losses in the line (leak)	0.01		%vol
Uncertainty of calibration gas	0.20		%vol

	RUN 1		Units
Measurement uncertainty	Result	17.65	%vol
Combined uncertainty		0.21	%vol
Expanded uncertainty	k = 1.96	0.42	%vol

	RUN 1		Units
Expanded uncertainty (no O ₂) - at 95% Confidence	2.37		% of Value
Result of Compliance with Uncertainty Requirement	COMPLIANT		-

Requirement for SRM is that Uncertainty should be 0.3% vol absolute or 6% relative whichever is the lower, on a dry gas basis. Source, EN 14789.

VERSION HISTORY

Version Number	Record of changes made within this version of the document
V1	The original document issued to the client