



Element, Unit C6, Emery Court, The Embankment Business Park, Heaton Mersey, Stockport, SK4 3GL  
Your Element Contact: Richard Carter (+44(0)7585 894 426)  
E: richard.carter@element.com

**Stack Emissions Testing Report Commissioned by**  
Duynie Ingredients

**Installation Name & Address**

Duynie Ingredients  
Coed Abden Road  
Wrexham Industrial Estate  
Wrexham  
LL13 9UH

**Stack Reference**

Dust Extractor 1

**Dates of the Monitoring Campaign**

25th - 26th September 2025

**Job Reference Number**

EMT14377

**Report Written by**

Stephen Taylor  
Team Leader  
MCERTS Level 2  
MM 23 1803  
TE1 TE3 & TE4

**Report Approved by**

Donal O Faogain  
Technical Report Writer  
MCERTS Level 2  
MM13 1259  
TE1 TE2 TE3 TE4

**Report Date**

8th October 2025

**Version**

Version 1

**Signature of Report Approver**



TITLE PAGE

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## Executive Summary

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### MONITORING OBJECTIVES

Duynie Ingredients , Wrexham

Dust Extractor 1

25th - 26th September 2025

#### Overall Aim of the Monitoring Campaign

Element were commissioned by Duynie Ingredients to carry out stack emissions testing on the Dust Extractor 1 at Wrexham.

The aim of the monitoring campaign was to perform testing, as requested by the customer, for a number of prescribed pollutants. There are no emission limits set for any of the pollutants at this time.

#### Special Requirements

There were no special requirements.

#### Target Parameters

Total Particulate Matter

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**MONITORING RESULTS**

Duynie Ingredients , Wrexham  
Dust Extractor 1  
25th - 26th September 2025

where MU = Measurement Uncertainty associated with the Result

Parameter	Concentration				Mass Emission			
	Units	Result	MU +/-	Limit	Units	Result	MU +/-	Limit
Total Particulate Matter <sup>1</sup>	mg/m <sup>3</sup>	1.5	0.31	-	g/hr	8.1	1.8	-
Water Vapour	% v/v	0.81	0.05					
Stack Gas Temperature	°C	33.0						
Stack Gas Velocity	m/s	23.6	1.0					
Volumetric Flow Rate (ACTUAL)	m <sup>3</sup> /hr	6004	376					
Volumetric Flow Rate (REF) <sup>1</sup>	m <sup>3</sup> /hr	5462	342					

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

<sup>1</sup> Reference Conditions (REF) are: 273K, 101.3kPa, without correction for water vapour content.

## Executive Summary

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### MONITORING DATE(S) & TIMES

Duynie Ingredients , Wrexham

Dust Extractor 1

25th - 26th September 2025

Parameter	Units	Concentration	Units	Mass Emission	Sampling Date(s)	Sampling Times	Duration mins
Total Particulate Matter	R1 mg/m <sup>3</sup>	1.5	g/hr	8.1	25/09/2025	14:25 - 15:25	60
Velocity Traverse	R1				25/09/2025	13:20 - 13:25	

All results are expressed at the respective reference conditions.

**Executive Summary**  
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**PROCESS DETAILS**

Duynie Ingredients , Wrexham  
Dust Extractor 1  
25th - 26th September 2025

**Standard Operating Conditions**

Parameter	Value
Process Status	Normal Operating Conditions
Capacity (of 100%) and Tonnes / Hour	Normal Operation
Continuous or Batch Process	Continuous
Feedstock (if applicable)	Extraction
Abatement System	N/A
Abatement System Running Status	N/A
Fuel	N/A
Plume Appearance	None Visible

**Executive Summary**  
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**MONITORING & ANALYTICAL METHODS**

Duynie Ingredients , Wrexham  
Dust Extractor 1  
25th - 26th September 2025

Parameter	Monitoring				Analysis				Overall Status	LOD (Average)
	Standard	Technical Procedure	Sampling Status	Testing Lab	Analytical Procedure	Analytical Technique	Analysis Status	Analysis Lab		
Total Particulate Matter	EN 13284-1	MD 001	MCERTS	EET	MD 103	Gravimetric	MCERTS	EET	MCERTS	0.15 mg/m <sup>3</sup>
Water Vapour	EN 14790	MD 005	MCERTS	EET	MD 005	Gravimetric	MCERTS	EET	MCERTS	0.10 % v/v
Velocity & Vol. Flow Rate	EN 16911-1 (MID)	MD 041	MCERTS	EET	Pitot Tube and Thermocouple				MCERTS	3.3 m/s

**ANALYSIS LABORATORIES**

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

Element (Stockport Lab - EET)	ISO 17025 Accreditation Number: UKAS 4279
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**SUMMARY OF SAMPLING DEVIATIONS**

Parameter	Run	Deviation
Total Particulate Matter	1	Only one out of two required sampling lines was available.

**SUITABILITY OF SAMPLING LOCATION**

**Duct Characteristics**

Parameter	Units	Value
Type	-	Circular
Depth	m	0.30
Width	m	-
Area	m <sup>2</sup>	0.07
Port Depth	cm	8
Orientation of Duct	-	Vertical
Number of Ports	-	1
Sample Port Size	-	4" BSP

**Location of Sampling Platform**

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

**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)	N/A
Platform has vertical base boards (approx. 0.25m high)	N/A
Platform has chains / self closing gates at top of ladders	N/A
There are no obstructions present which hamper insertion of sampling equipment	No
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)**

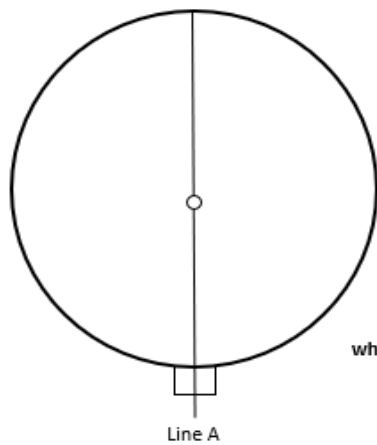
Criteria in EN 15259	Units	Traverse 1	Required	Compliant
Lowest Differential Pressure	Pa	359.0	> 5 Pa	Yes
Mean Velocity	m/s	20.73	-	-
Lowest Gas Velocity	m/s	20.73	-	-
Highest Gas Velocity	m/s	20.73	-	-
Ratio of Above	: 1	1.00	< 3 : 1	Yes
Maximum Angle of Swirl	°	9.00	< 15°	Yes
No Local Negative Flow	-	Yes	-	Yes

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**PLANT PHOTOS**



**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

**STACK EMISSIONS MONITORING PERSONNEL**

Position	Name	MCERTS Accreditation	MCERTS Number	Technical Endorsements
Team Leader	Stephen Taylor	MCERTS Level 2	MM 23 1803	TE1 TE3 & TE4
Technician	Tom Dixon	MCERTS Level 1	MM 23 1802	TE1

**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 7.95	Horiba PG-250	-	Digital Manometer 500	CAT 3.224
Control Box DGM (2)	-	Horiba PG-250	-	Digital Manometer 10000	-
Box Thermocouples (1)	CAT 3.31	Servomex 4900	-	Digital Temperature Meter	-
Box Thermocouples (2)	-	Eco Physics CLD 822Mh	-	Stopwatch	CAT 14.98
Umbilical (1)	CAT 3.31	ABB AO2020-URAS26	-	Barometer	CAT 13.62
Umbilical (2)	-	Testo 350 XL	-	Stack Thermocouple 0.5m	CAT 4.1901
Oven Box (1)	-	JCT JCC P1 Cooler	-	Stack Thermocouple 1.0m	-
Oven Box (2)	-	Gasmet DX4000	-	Stack Thermocouple 1.5m	-
Heated Probe 0.5m	CAT 5.18	Gasmet Sampling System	-	1m Heated Line (1)	-
Heated Probe 1.0m	-	Sick 3006	-	1m Heated Line (2)	-
Heated Probe 1.5m	-	M&C PSS	-	1m Heated Line (3)	-
S-Pitot (1)	CAT 21P.134	Mass Flow Controller (1)	-	5m Heated Line (1)	-
S-Pitot (2)	CAT 21S.71	Mass Flow Controller (2)	-	15m Heated Line (1)	-
L-Pitot - Coef. 993 (4.1931)	-	Mass View (1)	-	20m Heated Line (1)	-
Site Balance	CAT 17.108	Mass View (2)	-	20m Heated Line (2)	-
500g / 1Kg Check Weights	CAT 17.108	Hioki 5043 (V)	-	Dual Channel Heater Controller	-
Last Impinger Arm	-	Easylogger EN-EL-12 Bit	-	Single Channel Heater Controller	-
Callipers	CAT 23.53	Bioaerosols Temperature Logger	-	Laboratory Balance	CAT 1.18, 1.18a, 1.18b
Tubes Kit Thermocouple	-	Electronic Refrigerator	-	Tape Measure	CAT 16.58

**METHODS & TECHNICAL PROCEDURES USED**

Parameter	Standard	Technical Procedure
Total Particulate Matter	EN 13284-1	MD 001
Water Vapour	EN 14790	MD 005
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	0.30
Stack Width, W	m	-
Stack Area, A	m <sup>2</sup>	0.07
Average Stack Gas Temperature, T <sub>a</sub>	°C	33.1
Average Stack Gas Pressure	Pa	359.0
Average Stack Static Pressure, P <sub>static</sub>	kPa	0.412
Average Barometric Pressure, P <sub>b</sub>	kPa	102.8
Average Pitot Tube Calibration Coefficient, C <sub>p</sub>	-	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 <sup>3</sup> p	Conc kg/m <sup>3</sup> p <sub>i</sub>
CO <sub>2</sub> (Estimated)	-	0.06	0.06	0.0006	44.01	1.9635	0.00118
O <sub>2</sub> (Estimated)	-	20.80	20.63	0.2080	32.00	1.4277	0.29696
N <sub>2</sub>	-	79.14	78.50	0.7914	28.01	1.2498	0.98913
Moisture (H <sub>2</sub> O)	-	-	0.81	0.0081	18.02	0.8037	0.00654

Where:  $p = M / 22.41$   
 $p_i = r \times p$

**Calculation of Stack Gas Densities**

Determinand	Units	Result
Dry Density (STP), P <sub>STD</sub>	kg/m <sup>3</sup>	1.287
Wet Density (STP), P <sub>STW</sub>	kg/m <sup>3</sup>	1.283
Dry Density (Actual), P <sub>Actual</sub>	kg/m <sup>3</sup>	1.170
Average Wet Density (Actual), P <sub>ActualW</sub>	kg/m <sup>3</sup>	1.166

Where: P<sub>STD</sub> = sum of component concentrations, kg/m<sup>3</sup> (not including water vapour)  
P<sub>STW</sub> = sum of all wet concentrations / 100 x density, kg/m<sup>3</sup> (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) =  $P_{STW} \times (T_c / P_s) \times (P_a / T_a)$

**Calculation of Stack Gas Volumetric Flowrate, Q**

Duct gas flow conditions	Units	Actual	REF <sup>1</sup>
Temperature	°C	33.1	0.0
Total Pressure	kPa	103.2	101.3
Moisture	%	0.81	0.81

Gas Volumetric Flowrate (from Traverse)	Units	Result
Gas Volumetric Flowrate (Actual)	m <sup>3</sup> /hr	5274
Gas Volumetric Flowrate (STP, Wet)	m <sup>3</sup> /hr	4793
Gas Volumetric Flowrate (STP, Dry)	m <sup>3</sup> /hr	4754
Gas Volumetric Flowrate REF <sup>1</sup>	m <sup>3</sup> /hr	4793

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

(1 of 1)

Parameter	Units	Value
Date of Survey	-	25/09/2025
Time of Survey	-	13:20 - 13:25
Atmospheric Pressure	kPa	102.8
Average Stack Static Pressure	Pa	412
Result of Pitot Stagnation Test	-	Pass
Are Water Droplets Present?	-	No
Device Used	S-Type Pitot with KIMO MP 210 (10000Pa)	

Parameter	Units	Value
Initial Pitot Leak Check	-	Pass
Final Pitot Leak Check	-	Pass
Orientation of Duct	-	Vertical
Pitot Tube, C <sub>p</sub>	-	0.84
Number of Lines Available	-	1
Number of Lines Used	-	1

Sampling Line A						
Traverse Point	Depth m	ΔP Pa	Temp °C	Wet Density kg/m <sup>3</sup>	Velocity m/s	Swirl °
STATIC (Units: Pa)		412.0				
Mean		359.0	33.1	1.166	20.73	
1	0.15	359.0	33.1	1.166	20.73	9.0

**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	$u(\Delta p_i)$	9.877	Pa
- Resolution	$u(res)$	0.08677	
- Calibration	$u(cal)$	13.420	
- Drift	$u(drift)$	33.333	
- Lack of Fit	$u(fit)$	49.714	
- Overall corrections to dynamic measurements	$u(C_f)$	96.554	
Standard uncertainty associated with the molar mass of the gas	$u(M)$	0.00003	-
- $\varphi_{O_2,w}$	-	20.631	
- $\varphi_{CO_2,w}$	-	0.060	
- Oxygen, dry	$u(\phi_{O_2,d})$	0.637	
- Carbon Dioxide, dry	$u(\phi_{CO_2,d})$	0.002	
- Water Vapour	$u(\phi_{H_2O})$	0.042	
- Oxygen, wet	$u(\phi_{O_2,w})$	0.632	
- Carbon Dioxide, wet	$u(\phi_{CO_2,w})$	0.002	
Standard uncertainty associated with the stack temperature	$u(T_c)$	1.562	K
Standard uncertainty associated with the absolute pressure in the duct	$u(p_c)$	175.969	Pa
- Atmospheric Pressure	$u(p_{atm})$	175.692	
- Static Pressure	$u(p_{stat})$	9.877	
Standard uncertainty associated with the density in the duct	$u(\rho)$	0.00636	-
Standard uncertainty associated with the local velocities	$u(v_i)$	0.457	Pa
Standard uncertainty associated with the mean velocity	$u(\bar{v})$	0.457	m/s
Standard uncertainty associated with the mean velocity (95% Confidence)	$U_c(v)$	0.896	m/s
Standard uncertainty associated with the mean velocity (95% Confidence), relative	$U_{c,rel}(v)$	4.32	%
Standard uncertainty associated with the volume flow rate (95% Confidence)	$U_c(qV,w)$	330.0	m <sup>3</sup> /hr
- $u^2(a)/a^2$	-	0.00053	
- $u^2(qV,w)/q^2V,w$	-	0.00102	
- $u^2(qV,w)$	-	28354	
- $u(qV,w)$	-	168.4	
Standard uncertainty associated with the volume flow rate (95% Confidence), relative	$U_{c,rel}(qV,w)$	6.26	%

**TOTAL PARTICULATE MATTER: RESULTS SUMMARY**

Duynie Ingredients , Wrexham  
Dust Extractor 1

**Sample Runs**

Parameter	Units	Run 1	Mean
Concentration	mg/m <sup>3</sup>	1.5	1.5
Uncertainty	±mg/m <sup>3</sup>	0.31	0.31
Mass Emission	g/hr	8.1	8.1
Uncertainty	±g/hr	1.8	1.8

Parameter	Units	Run 1	Mean
Water Vapour	% v/v	0.81	0.81
Uncertainty	±% v/v	0.05	0.05

**Blank Runs**

Parameter	Units	Blank 1	Maximum
Concentration	mg/m <sup>3</sup>	0.15	0.15

NOTE: Where the Balance Uncertainty / Limit of Detection is higher than the Blank concentration, the Balance Uncertainty / Limit of Detection concentration has been reported.

**General Sampling Information**

Parameter	Value	
Standard	EN 13284-1	
Technical Procedure	MD 001	
Probe Material	Titanium	
Filter Housing Material	Titanium	
Positioning of Filter	Out Stack	
Filter Size and Material	47mm Glass Fibre	
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	A1	

**Reference Conditions**

Reference Conditions are: 273K, 101.3kPa, without correction for water vapour content.

**TOTAL PARTICULATE MATTER: ISOKINETIC SAMPLING CALCULATIONS**

Test	Units	Run 1	
<b>Absolute pressure of stack gas, P<sub>s</sub></b>			
Barometric pressure, P <sub>b</sub>	mmHg	771.8	
Stack static pressure, P <sub>static</sub>	mmH <sub>2</sub> O	42.0	
$P_s = (P_b + (P_{static} / 13.6))$	mmHg	774.9	
<b>Volume of water vapour collected, V<sub>wstd</sub></b>			
Total mass collected in impingers (liquid trap)	g	5.5	
Total mass collected in impingers (silica trap)	g	4.5	
Total mass of liquid collected, V <sub>lc</sub>	g	10.0	
$V_{wstd} = (0.001246)(V_{lc})$	m <sup>3</sup>	0.0125	
<b>Volume of gas metered dry, V<sub>mstd</sub></b>			
Volume of gas sample through gas meter, V <sub>m</sub>	m <sup>3</sup>	1.5527	
Gas meter correction factor, Y <sub>d</sub>	-	1.0500	
Average dry gas meter temperature, T <sub>m</sub>	°C	26.9	
Average pressure drop across orifice, ΔH	mmH <sub>2</sub> O	73.9	
$V_{mstd} = ((0.3592)(V_m)(P_b + (\Delta H/13.6))(Y_d)) / (T_m + 273)$	m <sup>3</sup>	1.5177	
<b>Moisture content, B<sub>w0</sub> &amp; R<sub>wv</sub></b>			
$B_{w0} = V_{wstd} / (V_{mstd} + V_{wstd})$	m <sup>3</sup>	0.0081	
B <sub>w0</sub> as a percentage	% v/v	0.81	
Reported Water Vapour, checked with Tables in EN 14790, R <sub>wv</sub>	% v/v	0.81	
<b>Volume of gas metered wet, V<sub>mstw</sub></b>			
$V_{mstw} = (V_{mstd})(100/(100 - R_{wv}))$	m <sup>3</sup>	1.5301	
<b>Volume of gas metered at Oxygen Reference Conditions, V<sub>mstd@X%O<sub>2</sub></sub> &amp; V<sub>mstw@X%O<sub>2</sub></sub></b>			
IED & Incinerates Hazardous Material? (Yes = no positive O <sub>2</sub> correction)	-	No	
% wet oxygen measured in gas stream, ACT%O <sub>2w</sub>	% v/v	N/A	
% dry oxygen measured in gas stream, ACT%O <sub>2d</sub>	% v/v	N/A	
% oxygen reference condition, REF%O <sub>2</sub>	% v/v	N/A	
O <sub>2</sub> Reference Factor wet (O <sub>2REFw</sub> ) = (21 - REF%O <sub>2</sub> ) / (21 - ACT%O <sub>2w</sub> )	-	N/A	
O <sub>2</sub> Reference Factor dry (O <sub>2REFd</sub> ) = (21 - REF%O <sub>2</sub> ) / (21 - ACT%O <sub>2d</sub> )	-	N/A	
$V_{mstw@X\%oxygen} = (V_{mstw}) / (O_{2REFw})$	m <sup>3</sup>	N/A	
$V_{mstd@X\%oxygen} = (V_{mstd}) / (O_{2REFd})$	m <sup>3</sup>	N/A	
<b>Molecular weight of dry gas stream, M<sub>d</sub></b>			
CO <sub>2</sub> (Estimated)	% v/v	0.06	
O <sub>2</sub> (Estimated)	% v/v	20.80	
Total	% v/v	20.86	
N <sub>2</sub>	% v/v	79.14	
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	g/gmol	28.84	
<b>Molecular weight of stack gas (wet), M<sub>s</sub></b>			
$M_s = M_d(1 - (R_{wv}/100)) + 18(R_{wv}/100)$	g/gmol	28.75	
<b>Velocity of stack gas, V<sub>s</sub></b>			
Pitot tube velocity constant, K <sub>p</sub>	-	34.97	
Velocity pressure coefficient, C <sub>p</sub>	-	0.85	
Average of velocity heads, ΔP <sub>avg</sub>	mmH <sub>2</sub> O	45.67	
Average square root of velocity heads, √ΔP	√mmH <sub>2</sub> O	6.76	
Average stack gas temperature, T <sub>s</sub>	°C	33.0	
$V_s = ((K_p)(C_p)(\sqrt{\Delta P})(T_s + 273)) / (V(M_s)(P_s))$	m/s	23.60	
<b>Total flow of stack gas: Actual (Q<sub>a</sub>), Wet (Q<sub>stw</sub>), Dry (Q<sub>std</sub>), Wet@O<sub>2REF</sub> (Q<sub>stwO<sub>2</sub></sub>), Dry@O<sub>2REF</sub> (Q<sub>stdO<sub>2</sub></sub>)</b>			
Area of stack, A <sub>s</sub>	m <sup>2</sup>	0.07	
$Q_a = (60)(A_s)(V_s)$	m <sup>3</sup> /min	100.1	
Conversion factor (K/mm.Hg), C <sub>f</sub>	-	0.3592	
$Q_{stw} = ((Q_a)(P_s)(C_f)) / ((T_s) + 273)$	m <sup>3</sup> /min	91.0	
$Q_{std} = ((Q_a)(P_s)(C_f)(1 - (R_{wv}/100))) / ((T_s) + 273)$	m <sup>3</sup> /min	90.3	
$Q_{stwO_2} = ((Q_a)(P_s)(C_f)) / ((T_s) + 273) / (O_{2REFw})$	m <sup>3</sup> /min	N/A	
$Q_{stdO_2} = ((Q_a)(P_s)(C_f)(1 - (R_{wv}/100))) / ((T_s) + 273) / (O_{2REFd})$	m <sup>3</sup> /min	N/A	
<b>Percent isokinetic, %I</b>			
Nozzle diameter, D <sub>n</sub>	mm	5.00	
Nozzle area, A <sub>n</sub>	mm <sup>2</sup>	19.66	
Total sampling time, q	min	60	
$\%I = (4.6398E^6)(T_s+273)(V_{mstd}) / (P_s)(V_s)(A_n)(q)(1 - (R_{wv}/100))$	%	100.7	

**TOTAL PARTICULATE MATTER: SAMPLING DETAILS**

**Sample Runs**

Parameter	Units	Run 1
Sampling Times	-	14:25 - 15:25
Sampling Dates	-	25/09/2025
Sampling Device	-	ISO
Volume Sampled (REF)	m <sup>3</sup>	1.5301
Filter I.D. Number	-	47-123091
Start Filter Mass	g	0.15048
End Filter Mass	g	0.15066
Total Mass on Filter	g	0.00018
Probe Rinse I.D. Number	-	PR-47-123091
Start Probe Rinse Mass	g	2.85381
End Probe Rinse Mass	g	2.85589
Total Mass in Probe Rinse	g	0.00208
Total Mass Collected	mg	2.26
Calculated Concentration	mg/m <sup>3</sup>	1.48
Balance Uncertainty / LOD	mg/m <sup>3</sup>	0.15

Where: ISO stands for Manual Isokinetic Sampling Train

**Blank Runs**

Parameter	Units	Blank 1
Blank Dates	-	25/09/2025
Average Volume Sampled (REF)	m <sup>3</sup>	1.5301
Filter I.D. Number	-	47-123101
Start Filter Mass	g	0.15125
End Filter Mass	g	0.15125
Total Mass on Filter	g	0.00000
Probe Rinse I.D. Number	-	PR-47-123101
Start Probe Rinse Mass	g	2.79560
End Probe Rinse Mass	g	2.79571
Total Mass in Probe Rinse	g	0.00011
Total Mass Collected	mg	0.11
Calculated Concentration	mg/m <sup>3</sup>	0.07
Balance Uncertainty / LOD	mg/m <sup>3</sup>	0.15

**TOTAL PARTICULATE MATTER: QUALITY ASSURANCE**

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**Sample Runs**

<b>Leak Test Results</b>	<b>Units</b>	<b>Run 1</b>
Mean Sampling Rate	l/min	27.2
Pre-Sampling Leak Rate	l/min	0.30
Post-Sampling Leak Rate	l/min	
Allowable Leak Rate	l/min	0.40
Leak Test Acceptable	-	Yes

<b>Water Droplets</b>	<b>Units</b>	<b>Run 1</b>
Are Water Droplets Present	-	No

<b>MU (Concurrent Water Vapour)</b>	<b>Units</b>	<b>Run 1</b>
Measurement Uncertainty (MU)	%	5.8
Allowable MU	%	20.0
MU Acceptable	%	Yes

<b>Silica Gel (Concurrent Water Vapour)</b>	<b>Units</b>	<b>Run 1</b>
Less than 50% Faded	%	Yes

<b>Isokinetic Criterion Compliance</b>	<b>Units</b>	<b>Run 1</b>
Isokinetic Variation	%	100.7
Allowable Isokinetic Range	%	95 - 115
Isokineticity Acceptable	-	Yes

<b>Weighing Uncertainty Criteria</b>	<b>Units</b>	<b>Run 1</b>
Overall Weighing Uncertainty	± mg	0.33
Overall Weighing Uncertainty	± mg/m <sup>3</sup>	0.21
ELV [Daily ELV for IED]	mg/m <sup>3</sup>	N/A
Allowable Weighing Uncertainty	mg/m <sup>3</sup>	N/A
Weighing Uncertainty Acceptable	-	N/A

<b>Filter Temperatures</b>	<b>Units</b>	<b>Run 1</b>
Pre-Conditioning Temperature	°C	180
Post-Conditioning Temperature	°C	160
Maximum Filter Temperature	°C	120

<b>Test Conditions</b>	<b>Units</b>	<b>Run 1</b>
Ambient Temperature Recorded?	-	Yes

**TOTAL PARTICULATE MATTER: QUALITY ASSURANCE**

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**Blank Runs**

Leak Test Results	Units	Blank 1
Expected Sampling Rate	l/min	20.0
Pre-Sampling Leak Rate	l/min	0.22
Post-Sampling Leak Rate	l/min	
Allowable Leak Rate	l/min	0.40
Leak Test Acceptable	-	Yes

Validity of Blank vs ELV	Units	Blank 1
Allowable Blank	mg/m <sup>3</sup>	N/A
Blank Acceptable	-	N/A

Acetone / Water Rinse Blank	Units	Blank
Acetone / Water Rinse Value	mg/l	2.7
Allowable Blank	mg/l	10
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
Only one out of two required sampling lines was available, however the number of sample points used on the available line were increased to the minimum required by the Standard	wx

**TOTAL PARTICULATE MATTER: MEASUREMENT UNCERTAINTY CALCULATIONS**

Measured Quantities	Value		Standard uncertainty		
	Symbol	Run 1	Symbol	Units	Run 1
Sampled Volume (Actual)	V <sub>m</sub>	1.5527	uV <sub>m</sub>	m <sup>3</sup>	0.0311
Sampled Gas Temperature	T <sub>m</sub>	299.9	uT <sub>m</sub>	K	2.00
Sampled Gas Pressure	p <sub>m</sub>	103.3	up <sub>m</sub>	kPa	0.50
Sampled Gas Humidity	H <sub>m</sub>	0.00	uH <sub>m</sub>	% v/v	1.00
Leak	L	1.10	uL	%	-
Mass of Particulate	m	2.26	um	mg	0.23
Uncollected Mass	UCM	0.11	uUCM	mg	-

Measured Quantities	Uncertainty as a Percentage		Requirement of Standard
	Units	Run 1	
Sampled Volume (Actual)	%	2.00	≤2%
Sampled Gas Temperature	%	0.67	≤1%
Sampled Gas Pressure	%	0.48	≤1%
Sampled Gas Humidity	%	1.00	≤1%
Leak	%	1.10	≤2%
Mass of Particulate	%	-	-
Uncollected Mass	%	-	-

Measured Quantities	Uncertainty in Measurement Units			Sensitivity Coefficient	
	Symbol	Units	Run 1	Run 1	
Sampled Volume (STP)	V <sub>m</sub>	m <sup>3</sup>	1.5177	0.97	
Leak	L	mg/m <sup>3</sup>	0.009	1.00	
Mass of Particulate	L <sub>r</sub>	mg	2.263	0.65	
Uncollected Mass	UCM	mg	0.06	0.65	

Measured Quantities	Uncertainty in Result	
	Units	Run 1
Sampled Volume (STP)	mg/m <sup>3</sup>	0.036
Leak	mg/m <sup>3</sup>	0.0094
Mass of Particulate	mg/m <sup>3</sup>	0.1503
Uncollected Mass	mg/m <sup>3</sup>	0.0402

Measured Quantities	Oxygen Correction Part of MU Budget	
	Units	Run 1
O <sub>2</sub> Correction Factor	-	N/A
Stack Gas O <sub>2</sub> Content	% v/v	N/A
MU for O <sub>2</sub> Correction	-	N/A
Overall MU For O <sub>2</sub> Measurement	%	N/A

Parameter	Units	Run 1
Combined uncertainty	mg/m <sup>3</sup>	0.16
Expanded uncertainty (95% confidence), without Oxygen Correction	mg/m <sup>3</sup>	0.31
Expanded uncertainty (95% confidence), with Oxygen Correction	mg/m <sup>3</sup>	N/A
Expanded uncertainty (95% confidence), estimated with Method Deviations	mg/m <sup>3</sup>	0.31
Reported Uncertainty	mg/m <sup>3</sup>	0.31
Expanded uncertainty (95% confidence), without Oxygen Correction	%	21.2
Expanded uncertainty (95% confidence), with Oxygen Correction	%	N/A
Expanded uncertainty (95% confidence), estimated with Method Deviations	%	21.2
Reported Uncertainty	%	21.2
Reported Uncertainty as % of ELV	%	N/A

### VERSION HISTORY

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