AIR DISPERSION MODELLING REPORT OF RELEASES FROM ALBUS ENVIRONMENTAL, ROCHESTER

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Appendix I Stack Emissions Monitoring Reports (2025)

ACRONYMS / TERMS USED IN THIS REPORT

ADMS	Atmospheric Dispersion Modelling System
Albus	Albus Environmental Limited
AQA	Air Quality Assessment
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQS	Air Quality Standard
AQSR	Air Quality Standards Regulations
CERC	Cambridge Environmental Research Consultants
EA	Environment Agency
ECL	Environmental Compliance Ltd
EP	Environmental Permit
EPUK	Environmental Protection UK
GLC	Ground Level Concentration
IAQM	Institute of Air Quality Management
LOD	Limit of Detection
Met data	Meteorological data
Met Office	Meteorological Office
Met year	Meteorological year
PC	Process Contribution
PEC	Predicted Environmental Concentration
PMR	Periodic Monitoring Result
$PM_{2.5}$	Particulate matter with a diameter of 2.5µm or less
PM_{10}	Particulate matter with a diameter of 10µm or less
TCA	Tolerable Concentrations in Air
The Site	212 Kingsnorth Industrial Estate, Hoo, Rochester, Kent, ME3 9NZ
TPM	Total Particulate Matter
TVOC	Total Volatile Organic Compounds
VOC	Volatile Organic Compounds
WCMY	Worst Case Meteorological Year
WHO	World Health Organisation

1. INTRODUCTION

1.1. The Study

1.1.1. Environmental Compliance Ltd ("ECL") have been commissioned by Albus Environmental Limited ("Albus") to undertake an air dispersion modelling assessment for emissions to air arising from their Healthcare Waste Treatment Installation at 212 Kingsnorth Industrial Estate, Hoo, Rochester, Kent, ME3 9NZ, hereafter referred to as "the Site".

1.1.2. It is understood that this assessment will be submitted to the Environment Agency ("EA") in support of an Environmental Permit ("EP") variation application (for EP reference: EPR/JB3604FF), as an additional emission point (to be designated A5) will be added as part of the proposed changes.

1.1.3. Consequently, this detailed air quality assessment ("AQA") has been carried out to determine the impact of emissions to air arising from the Site's A2 (shredder), A3 (steam auger steam vent) and A5 (sharps container treatment plant) emission points. The study was undertaken using the ADMS modelling package, which is one of the models recognised as being suitable for this type of study.

1.1.4. The location of the Site is circled in red on the Site Location Map, which is presented as Figure 1.

Figure 1: Site Location Map



1.2. Objectives of the Study

1.2.1. The objectives of this study are as follows:

- to determine the maximum ground level concentrations ("GLCs"), arising from the Site's A2, A3 and A5 emission points; all pollutants are assumed to be released at their existing Emission Limit Values ("ELVs") for A2 and A3 and the assumed ELVs for A5; and
- to assess the impact of emissions from the Site on existing local air quality in relation to human health at a range of potentially sensitive receptors by comparison with relevant Air Quality Standards ("AQSs").

1.3. Scope of the Study

1.3.1. Proposed emission point A5 will possess a very similar design to A2 and use the same type of abatement. Consequently, it is anticipated that the applicable ELVs for total particulate matter ("TPM") and total volatile organic compounds ("TVOCs") will be 5 mg/m^3 and 30 mg/m^3, respectively, and have therefore been used in this assessment to calculate the emission rates.

1.3.2. A review of the Site's existing monitoring requirements, as detailed in Table S3.1 of the Site's EP, has been carried out. As existing emission points A2 and A3 share common releases with proposed emission point A5, they have been included as part of this assessment; existing emission points A1 and A4 do not possess any monitoring requirements and have therefore been excluded.

1.3.3. For the purposes of this assessment, the following pollutants are assumed to be emitted to atmosphere from each of the following emission points:

- A2 and A5: TPM (assessed as particulate matter with diameters of 2.5µm or less ("$PM_{2.5}$") and 10µm or less ("PM_{10}")); and
- A2, A3 and A5: volatile organic compounds ("VOCs") (assessed as 100% benzene).

1.3.4. The effects of prevailing meteorological conditions, building downwash effects, local terrain and existing ambient air quality were also taken into account.

1.3.5. This report spans a number of guidance documents. The EA online guidance[1] was used for assessing if process contributions ("PCs") are insignificant. The Environmental Protection UK ("EPUK") and the Institute of Air Quality Management ("IAQM") guidance 2017[2] was used where applicable (i.e., where PCs exceeded the assessment criteria outlined in the EA online guidance).

1.3.6. The maximum predicted pollutant GLCs - also known as the process contributions ("PCs") - for releases were compared with the relevant AQSs. The maximum predicted pollutant GLCs at the specified potentially sensitive human receptor sites (refer to Table 1 of Section 2.4.) were also compared to the relevant AQSs.

[1] Available online via: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports
[2] Available online via: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

1.3.7. Medway Council currently has four active Air Quality Management Areas (“AQMAs”). However, as these have all been declared for nitrogen dioxide emissions, they are not relevant and will not need to be considered as part of this assessment.

2. METHOD STATEMENT

2.1. Choice of Model

2.1.1. The UK-ADMS model was developed jointly by Cambridge Environmental Research Consultants ("CERC"), Her Majesty's Inspectorate of Pollution (the EA's predecessor body), the Meteorological Office and National Power, with sponsorship from the UK Government and a number of commercial organisations. UK-ADMS is a computer-based model of dispersion from both point and non-point sources in the atmosphere and is one of the modelling packages that are suitable for this type of study. The current version is ADMS 6.

2.1.2. ADMS has been validated against a number of data sets in order to assess various configurations of the model such as flat or complex terrain, line/area/volume sources, buildings, dry deposition fluctuations and visible plumes. The model results have been compared to observational data or other model results if available.

2.1.3. ADMS is a new generation Gaussian plume air dispersion model, which means that the atmospheric boundary layer properties are characterised by two parameters:

- the boundary layer depth, and
- the Monin-Obukhov length,

rather than in terms of the single parameter Pasquill-Gifford class.

2.1.4. Dispersion under convective meteorological conditions uses a skewed Gaussian concentration distribution (shown by validation studies to be a better representation than a symmetrical Gaussian expression).

2.1.5. ADMS is therefore considered to be suitable for use in this assessment.

2.2. Key Assumptions

2.2.1. The study will be undertaken on the basis of a worst-case scenario. Consequently, the following assumptions have been made:

- the release concentration of the assessed pollutants will be based off the assumed ELVs; and that all will be released on a 24-hourly basis, 365 days of the year;
- the highest predicted pollutant GLCs for the five years of meteorological data for each averaging period (annual mean, hourly, etc.) have been used; and
- maximum predicted GLCs at any location, irrespective of whether a sensitive receptor is characteristic of public exposure, are compared against the relevant AQSs for each pollutant; in addition, the predicted maximum sensitive receptor GLC has also been assessed.

2.3. Ecological Receptors

2.3.1. It should be noted that there are no declared standards for the emitted pollutants for the protection of sensitive habitat sites and ecosystems. Consequently, the assessment of ecological sites is not relevant nor required for the modelling study.

2.4. Potentially Sensitive Human Receptors

2.4.1. In addition to predicting concentrations over a 4km by 4km grid, there are nine specified potentially sensitive human receptors considered in the assessment. Details of these are provided in Table 1 and a visual representation provided as Figure 2. All receptors are assumed to be at ground level.

Table 1: Potentially Sensitive Human Receptors

ADMS Ref.	Name	Easting (X)	Northing (Y)	Distance [(a)] (m)	Heading (°)
H1	Damhead Creek Power Station	580958	172740	175	156
H2	Kingsnorth Industrial Estate	580768	173060	199	324
H3	Industrial activites off James Swallow Way	580911	173363	464	3
H4	Residential property off Jacob's Lane (1)	580293	172413	767	231
H5	Residential property off Jacob's Lane (2)	580026	172714	880	258
H6	Residential property off Stoke Road (1)	580112	173375	908	302
H7	Business off Stoke Road	580387	173687	932	328
H8	Residential property east of Tunbridge Hill	580868	173923	1,023	359
H9	Residential property off Stoke Road (2)	579817	173321	1,149	291

Notes to Table 1

(a) The distance from Site is calculated as the crow flies from the approximate nearest point of the potentially sensitive human receptor location to on-site grid reference TQ 80886 72900.

Figure 2: Potentially Sensitive Human Receptors



Notes to Figure 2

The red circles are the approximate locations of the emission points assessed (refer to Section 2.7., for further details); and

The neon green squares with the red outline and yellow highlighted annotations are the locations of the potentially sensitive human receptor locations specified in Table 1.

2.5. Air Quality Standards for the Protection of Human Health

2.5.1. In this report, the generic term AQS is used to refer to guidelines set for the protection of human health and the management of local air quality. The values relevant to this study are detailed in Table 2.

Table 2: Air Quality Standards for the Protection of Human Health

Pollutant	Averaging Period	AQS ($\mu g/m^3$)	Comments
Particulates ($PM_{2.5}$)	Annual	20	Air Quality Standards Regulations ("AQSR") Limit Value
Particulates (PM_{10})	Annual	40	AQSR Limit Value
	24-hour	50	AQSR Limit Value, not to be exceeded more than 35 times per annum, equivalent to the 90.41st percentile of 24-hour means
VOC (as benzene)	Annual	5	AQSR Limit Value
	24-hour	30	Hazard characterisation method for determining tolerable concentrations in air ("TCA")

2.6. Background Air Quality

2.6.1. The predicted environmental concentrations ("PECs") – the sum of the pollutant PC and the existing pollutant background concentration from other sources – will be calculated where required.

2.7. Stack Emission Parameters and Emission Limit Values

2.7.1. The stack emission parameters used for the study, as well as the assumed emission rates, are presented in Table 3.

Table 3: Stack Emission Parameters

Parameter		A2 [a]	A3 [a]	A5 [b]
Stack Height (m)		5.4	4.4	5
Stack Exit Diameter (m)		0.25	0.15	0.25
Volumetric Flow Rate (actual) (m^3/s)		0.961	0.113	0.961
Discharge Velocity (actual) (m/s)		19.58	6.39	19.58
Discharge Velocity (modelled) (m/s)		0.02 [c]	0.02 [c]	0.02 [c]
Stack Gas Discharge Temperature (°C)		22	18	Ambient
Volumetric Flow Rate (Nm^3/s)		0.914 [d]	0.108 [d]	0.914 [d]
Stack Centre Coords.	(X)	580883	580884	580847
	(Y)	172891	172890	172881

Table 3: Stack Emission Parameters (cont.)

Parameter		A2 [a]	A3 [a]	A5 [b]
Emission Rate [d] (g/s)	TPM (ELV of 5 mg/m^3)	0.00457	N/A	0.00457
	TVOC (ELV of 30 mg/m^3)	0.0274	0.00338	0.0274

Notes to Table 5

(a) Stack emission parameters obtained from stack emissions monitoring data or confirmed by the client or their technology provider.

(b) As A5 is anticipated to possess a similar design and abatement to A2, A2's data has been used to inform A5. As A5 will be an ambient release, the exit temperature has been informed by the meteorological data.

(c) In line with CERC's recommendation, as these stacks discharge horizontally, the efflux velocity has been lowered to the minimum value the model will accept so that the initial vertical momentum is suppressed but buoyancy effects are still accounted for.

(d) 273K, 101.3kPa, Wet Gas.

2.8. Building Parameters

2.8.1. The building parameters utilised for the study are detailed in Table 4 and a visual representation is provided as Figure 3.

2.8.2. The 'auto' feature was selected in order for the model to automatically determine the 'main building' (i.e., when calculating which effective wind aligned building is likely to have the most effect on dispersion for each meteorological line of data run).

2.8.3. Factoring in modelling constraints, for the purposes of the modelling assessment the building layout has been simplified. The biofilter has been included as a building for completeness.

Table 4: Building Parameters

Building	X [a]	Y [a]	Angle (º) [b]	Height (m) [c]	Length (m) [c]	Width (m) [c]
Waste Reception	580862	172881	51	8	44	18
Offensive Tipping	580915	172925	51	7.4	12.5	12.5
Biofilter	580909	172918	51	1.2	2	2.5

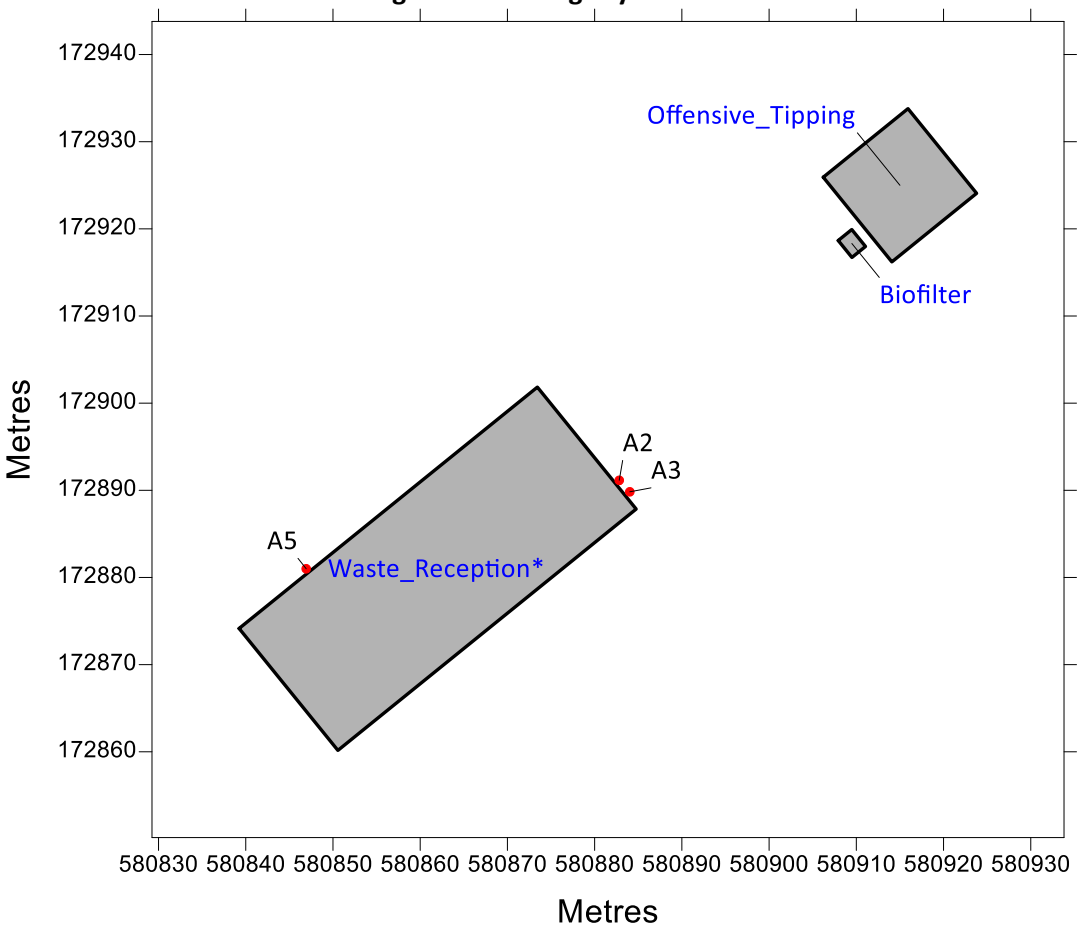
Notes to Table 4

(a) X(m), Y(m) denote the grid reference coordinates of the centre of the building.

(b) Angle denotes the angle between north and the side designated as length in the ADMS model.

(c) Approximate building dimensions obtained via a combination of Google Earth and site drawings.

Figure 3: Building Layout



2.9. Meteorological Data

2.9.1. ADMS has a meteorological pre-processing capability, which calculates the required boundary layer parameters from a variety of data. Meteorological data ("met data") can be utilised in its sequentially analysed form, which estimates the pattern of dispersion through 10° sectors from the source or as raw data.

2.9.2. The nearest suitable met data available from the Meteorological Office ("Met Office") is from Shoeburyness, Landwick weather station. This site is located approximately 21km northeast of the Site. Consequently, the assessment utilises five years (2020 – 2024) of hourly sequentially analysed data in sectors of 10° from this weather station.

2.9.3. Over the five years of meteorological data used (43,848 hours), ADMS reported that 1,256 hours contained inadequate data, 80 hours were calm and 1,304 hours were non-calm met data lines with a wind speed less than the minimum value (0.75 m/s). These represent 2.86%, 0.18% and 2.97% of the data, respectively.

2.9.4. Wind roses for the data are presented in Figure 4; these show that the prevailing winds are predominantly southwesterly.

Figure 4: Wind Roses

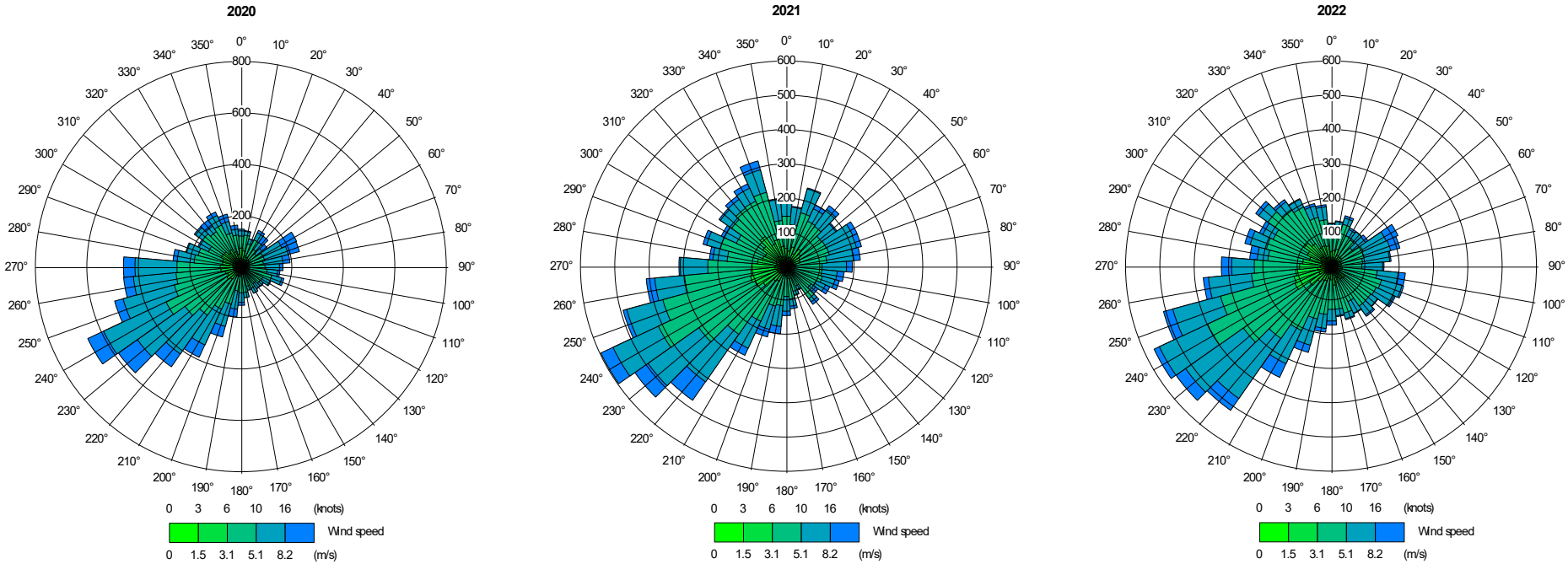
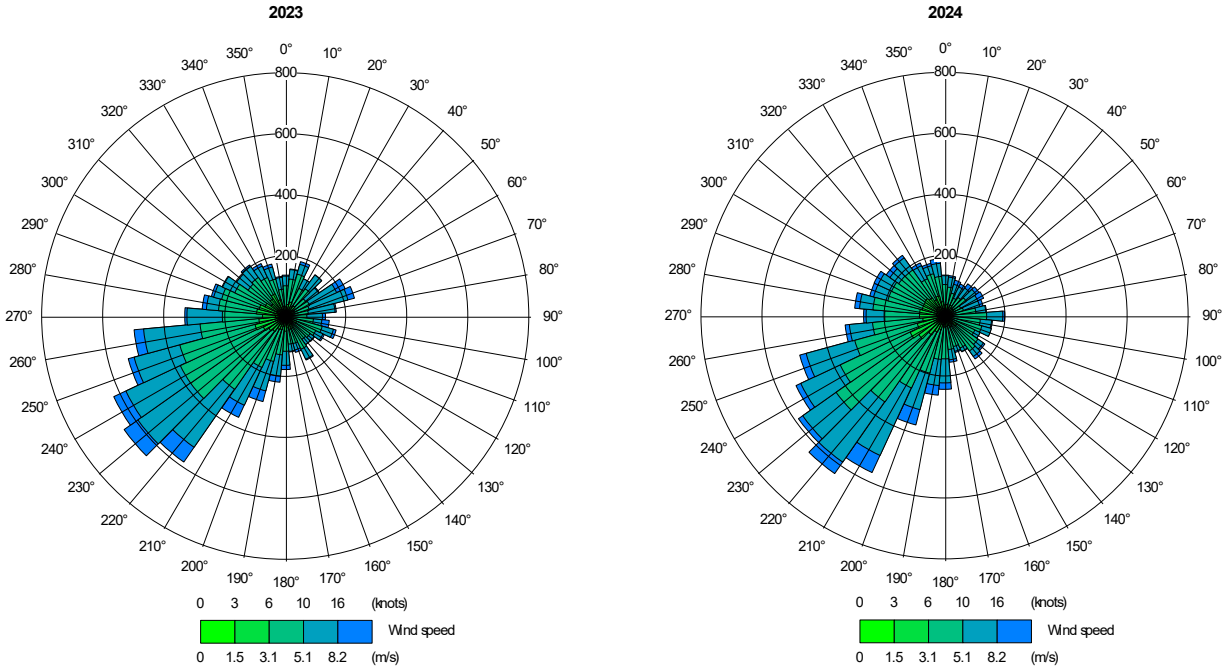


Figure 4: Wind Roses (cont.)



2.10. Surface Albedo

2.10.1. The surface albedo is the ratio of reflected to incident shortwave solar radiation at the surface of the earth[3]. ADMS allows the user to set this value between 0 and 1. A value of 0.40-0.95 would be considered representative of snow-covered ground where a large proportion of the light is reflected, soils from 0.05-0.40, agricultural crops 0.18-0.25, and grass would be 0.16 – 0.26 depending on length[4]. A value of 0.23 is an average value for non-snow-covered surfaces and is the default value used in the model. This value is considered appropriate for the setting of both the dispersion site and the met measurement sites.

2.11. Priestley-Taylor Parameter

2.11.1. The Priestly Taylor parameter is a parameter representing the surface moisture available for evaporation[13]. This parameter must be set between 0 and 3 where 0 would be classed as dry bare earth, 0.45 as dry grassland, 1 as moist grassland and a value of 3 is suggested for a saturated forest surrounded by forest[5]. The default value of 1 was considered to be appropriate for the setting of the dispersion and the met measurement sites and surrounding areas.

2.12. Minimum Monin-Obukhov Length

2.12.1. The Monin-Obukhov length provides a measure of the stability of the atmosphere. For example, in urban areas the air is affected by heat generated from buildings and traffic which prevents the atmosphere from becoming stable. In rural areas the atmosphere would be more stable. The minimum Monin-Obukhov length can be set between 1 and 200m. Typical values would be[13]:

- large conurbations >1 million = 100m;
- cities and large towns = 30m;
- mixed urban/industrial = 30m;
- small towns <50,000 = 10m; and
- rural areas = 1m.

2.12.2. A value of 30m was used for the dispersion site as this value is considered appropriate for the combination of industrial and residential land use experienced in the vicinity of the Site. A value of 1m was considered appropriate for the met measurement site.

2.13. Roughness Length

2.13.1. The surface nature of the terrain is defined in terms of Roughness Length (Z_o). The roughness length is dependent on the type of terrain and its physical properties. The ADMS model gives values to various types of terrain, for example, sea areas are classed as 0.0001m, parkland and open suburbia is classed as 0.5m and cities and large urban areas are classed as 1.5m.

[3] ADMS5 User Guide, CERC, V5, Nov 2012
[4] TR Oke, Buondary Layer Climates, 2nd Edition 1987
[5] J P Lhomme, A Theorestivl Basis for the Priestley-Taylor Coefficient, February 1997.

2.13.2. A surface roughness length of 0.5m was used for the 'dispersion site'. The surface roughness value chosen was considered suitable to reflect the mixture of industrial buildings, open green space and agricultural land in the wider site settings. Following previous discussions with CERC, reasonable model verification results were found when using a very similar surface roughness value for similar land use.

2.13.3. A surface roughness length of 0.3m was used for the 'met. measurement site' (indicative of agricultural areas (max)).

2.14. Terrain Data

2.14.1. ADMS has a terrain pre-processing capability, which calculates the required boundary layer parameters from a variety of data.

2.14.2. Terrain data was used for an area covering 5.5km by 5.5km. The terrain data used was of sufficient size to ensure that it would encompass the gridded output and all sensitive human receptors. The terrain file was created by compiling the data from the relevant Ordnance Survey tiles. The terrain data file was created using an ADMS terrain grid resolution of 64 x 64.

2.15. Model Output Parameters

2.15.1. The ADMS model calculates the likely pollutant GLCs at locations within a definable grid system pre-determined by a user. Output grids may be determined in terms of a Cartesian or Polar co-ordinate system. For the purpose of this study the Cartesian system was used.

2.15.2. A Cartesian grid is constructed with reference to an initial origin, which is taken to be the bottom left corner of the grid. The lines of the grid are inserted at regular pre-defined increments in both northerly and easterly directions. Pollutant GLCs are calculated at the intersection of these grid lines; they are calculated in this manner primarily to aid in the generation of pollutant contours.

2.15.3. For assessing the maximum point of impact, a grid resolution of 4km x 4km was utilised in order to capture values of the predicted pollutant GLCs arising from the model. The grid co-ordinates were X = 578892 to 582892 and Y = 170906 to 174906, with 101 nodes along each axis i.e., a grid spacing of 40m.

2.15.4. For assessing the impact of emissions on human health, the grid references were included as specified points within the ADMS model.

2.16. Scenarios Modelled

2.16.1. The following scenarios were modelled:

- impact assessment at the maximum point of impact; and
- impact assessment at the potentially sensitive human receptor locations.

2.17. Assessment of Significance of Impact Guidelines – Maximum GLC and Human Receptors

2.17.1. Both the EA online guidance and IAQM guidance have been used for the purposes of significance assessment, and this guidance details the guidelines upon which the assessment of the significance of impact can be established.

2.17.2. In the first instance, the EA online guidance indicates that PCs can be considered insignificant if:

- the long-term PC is <1% of the long-term environmental standard; and
- the short-term PC is <10% of the short-term environmental standard.

2.17.3. As outlined in the EA online guidance, there are no criteria to determine whether:

- PCs are significant; and
- PECs are insignificant or significant.
- Consequently, significance will be judged based on the site-specific circumstances and on the EPUK and IAQM methodology as described in the following Sections.

Long-Term Impacts

2.17.4. If the PCs exceed the long-term criteria outlined in the EA online guidance, the potential long-term effects on human receptors from the operation of the existing and proposed boilers will be assessed in accordance with the latest guidance produced by EPUK and IAQM in January 2017.

2.17.5. The guidance provides a basis for a consistent approach that could be used by all parties to professionally judge the overall significance of the air quality effects based on the severity of air quality impacts.

2.17.6. The following rationale is used in determining the severity of the air quality impacts at individual human receptors:

- the effects are provided as a percentage of the air quality assessment level ("AQAL");
- the absolute concentrations are also considered in terms of the AQAL and are divided into categories for long-term concentrations. The categories are based on the sensitivity of the individual receptor in terms of harmful potential. The degree of potential to change increases as absolute concentrations are close to or above the AQAL;
- severity of the effect is described as qualitative descriptors; negligible, slight, moderate or substantial by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQAL will have higher severity compared to a relatively large change at a receptor which is significantly below the AQAL, >75% AQAL;
- the effects can be adverse when the air quality concentration increases or beneficial when the concentration decreases as a result of development; and
- the judgement of overall significance of the effects is then based on severity of effects on all the individual receptors considered.

2.17.7. The impact descriptors for individual receptors are presented in Table 5.

Table 5: Impact Descriptors for Individual Receptors – Long-Term Concentrations

Long-term average concentration at receptor in assessment year	% Change in concentration relative to AQAL			
	1	2-5	6-10	>10
≤75% of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
≥ 110% of AQAL	Moderate	Substantial	Substantial	Substantial

Short-Term Impacts

2.17.8. As stated in EPUK / IAQM guidance, January 2017 (Land-Use Planning & Development Control: Planning for Air Quality') in Section 6.36, Page 27: *"For any point source, some consideration must also be given to the impacts resulting from short term, peak concentrations of those pollutants that can affect health through inhalation. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short-term impact. This is a reasonable value to take and this guidance also adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect. Background concentrations are less important in determining the severity of impact for short term concentrations, not least because the peak concentrations attributable to the source and the background are not additive."*

2.17.9. Short-term concentrations in the context laid out in the IAQM guidance are those averaged over periods of an hour or less. These exposures would be regarded as acute and occur when a plume from an elevated source affects airborne concentrations experienced by a receptor over an hour or less.

2.17.10. The IAQM guidance offers the following severity of impact descriptors for peak short-term concentrations from an elevated source:

- 11-20% of the relevant AQAL – the magnitude can be regarded as 'small';
- 21-50% of the relevant AQAL – the magnitude can be regarded as 'medium'; and
- 51% or more of the relevant AQAL – the magnitude can be regarded as 'large'.
- It is argued that this approach is intended to be a streamlined and pragmatic assessment procedure that avoids undue complexity.

2.18. Uncertainty and Sensitivity Analysis

2.18.1. The key assumptions for the modelling study are stated in Section 2.2. To address any uncertainties surrounding the model's predictions and the specific setup utilised, a worst-case scenario basis was adopted to help ensure the air quality impacts presented are more likely to be overpredicted than underpredicted.

2.18.2. Following a review of the site infrastructure, the building layout was simplified (See Section 2.8.) and the 'auto' feature was selected to help ensure the worst-case impact was considered.

2.18.3. To assess the suitability of the meteorological station utilised, discussions were held with the Met Office prior to undertaking the assessment to establish the site-specific meteorological data options for the site. Checks were then undertaken on both the distance and topography of the met station options to ascertain how these compare to the dispersion site's surrounding land use. The recommended five years' worth of data was used (as opposed to the minimum of three years) from a suitable meteorological station (see Section 2.9.) to help better account for any variability in specific weather conditions – particularly those that may result in poorer dispersion and higher predicted pollutant concentrations.

2.18.4. Given the numerous variables accounted for in the study, and the extensive ongoing validation of the ADMS software undertaken by CERC and its users, it was not deemed necessary to utilise additional modelling software alongside the ADMS 6 modelling package.

3. ASSESSMENT OF AIR QUALITY IMPACTS

3.1. Human Health Impacts at Maximum GLCs

3.1.1. The predicted PCs at the maximum point of impact are presented in Table 6 and compared to their respective AQSs.

3.1.2. In Table 6, any PCs that are above the significance criteria outlined in Section 2.17. are indicated in bold type.

Table 6: Comparison of Maximum PCs with AQSs

Pollutant	WCMY* (2020 – 2024)	Max PC (µg/m³)	Location of Max PC		AQS (µg/m³)	PC as % of AQS
			(X)	(Y)		
$PM_{2.5}$ (annual)	2024	**29.4**	580892	172906	20	**147%**
PM_{10} (annual)	2024	**29.4**	580892	172906	40	**74%**
PM_{10} (24-hour, 90.41st %ile)	2022	**69.3**	580892	172906	50	**139%**
VOC (as benzene) (annual)	2024	**188**	580892	172906	5	**3,756%**
VOC (as benzene) (24-hour, 100th %ile)	2021	**1,384**	580892	172906	30	**4,614%**

* WCMY = worst case meteorological year

3.1.3. It can be seen from the data in Table 6 that all the pollutants and averaging periods are potentially significant and require further assessment. In the first instance, as the maximum PCs all occur on-site, these can be excluded from the assessment as these are not representative locations of public exposure.

3.1.4. Consequently, the maximum off-site GLCs were obtained. The results of this assessment are shown in Table 7, with any potentially significant PCs indicated in bold.

Table 7: Comparison of Maximum Off-Site PCs with AQs

Pollutant	WCMY	Max PC (µg/m³)	Location of Max PC		AQS (µg/m³)	PC as % of AQS
			(X)	(Y)		
$PM_{2.5}$ (annual)	2024	**7.06**	580852	172906	20	**35%**
PM_{10} (annual)	2024	**7.06**	580852	172906	40	**18%**
PM_{10} (24-hour, 90.41st %ile)	2022	**22.4**	580852	172906	50	**45%**
VOC (as benzene) (annual)	2024	**43.0**	580852	172906	5	**860%**
VOC (as benzene) (24-hour, 100th %ile)	2021	**413**	580892	172866	30	**1,377%**

3.1.5. It can be seen in Table 7 that, when looking at the maximum off-site GLCs, whilst there is a significant reduction to the predicted pollutant concentrations, the impacts are all still potentially significant. Consequently, further assessment is required.

3.1.6. For the potentially significant short-term PCs shown in Table 7, the impacts have been further assessed against the IAQM severity of impact descriptors detailed in Section 2.17.10, as follows:

- 24-hour, 90.41st %ile PM_{10} – the impact can be regarded as 'medium'; and
- 24-hour 100th %ile VOC (as benzene) – the impact can be regarded as 'large'.

3.1.7. For the potentially significant long-term PCs shown in Table 7, the PECs will need to be calculated. Consequently, the relevant ambient background concentrations need to be sourced.

3.1.8. Of the pollutants relevant to this study, Medway Council undertake automatic monitoring for both $PM_{2.5}$ and PM_{10}. However, as the nearest automatic monitoring site is in excess of 4km from the Site, it has been discounted.

3.1.9. Annual $PM_{2.5}$, PM_{10} and Benzene data is available from the Department for Environment, Food and Rural Affairs ("DEFRA"), with the nearest mapped modelled concentrations to the Site displayed in Table 8 for the year 2024 (the latest available year at the time of writing).

Table 8: Nearest Background DEFRA Data to Site

ECL Ref.	UK Grid Code	2024 Annual Mean Concentration (µg/m³) [a]			Easting Coordinate (X) [a]	Northing Coordinate (Y) [a]	Distance (m) [b]	Heading (°)
		$PM_{2.5}$	PM_{10}	Benzene				
DEFRA1	777531	7.21	12.5	0.504	580500	173500	713	327
DEFRA2	777532	7.06	11.3	0.499	581500	173500	858	46
DEFRA3	778221	7.09	11.8	0.489	580500	172500	556	224
DEFRA4	778222	7.02	10.9	0.492	581500	172500	733	123

Notes to Table 8

(a) Information obtained from DEFRA's background pollution maps, available from: https://uk-air.defra.gov.uk/data/pcm-data. Distances are measured as the crow flies from the background source to on-site grid reference: TQ 80886 72900.

3.1.10. In the interest of a conservative assessment, of the four modelled DEFRA background locations encompassing the Site, the DEFRA background source with the highest concentration (i.e., DEFRA1) will be utilised.

3.1.11. The PEC assessment for the maximum off-site annual PCs displayed in Table 7 is presented in Table 9. The PECs have been compared with the relevant long-term AQSs, and the significance categorised adopting the IAQM guidance and impact descriptors shown in Table 5 of Section 2.17.

Table 9: Comparison of Maximum Off-Site Annual PCs with IAQM Impact Descriptors

Pollutant	WCMY	Max PC (µg/m³)	AQS (µg/m³)	PC as % of AQS	Location of Max PC		Background (µg/m³)	Max PEC (µg/m³)	PEC as % of AQS	Significance
					X Coord.	Y Coord.				
$PM_{2.5}$ (annual)	2024	**7.06**	20	**35%**	580852	172906	7.21 [(a)]	14.3	71%	**Moderate**
PM_{10} (annual)	2024	**7.06**	40	**18%**	580852	172906	12.5 [(a)]	19.6	49%	**Moderate**
VOC (as benzene) (annual)	2024	**43.0**	5	**860%**	580852	172906	0.504 [(a)]	43.5	870%	**Substantial**

Notes to Table 9

(a) Source of annual background concentration – DEFRA1 (2024 data). Refer to Table 8 for further details.

3.1.12. It can be seen from the data in Table 9, that the PECs of the annual off-site PCs can be considered 'moderate' for $PM_{2.5}$, PM_{10} and 'substantial' for VOC (as benzene).

3.1.13. It should be noted that the maximum GLCs have been calculated assuming that all the emission points assessed will operate concurrently and release at the assumed ELVs and that all VOC emissions will be 100% benzene. This represents an extremely conservative assumption as monitored particulate data for existing emission points A2 and A3 has demonstrated that particulate concentrations are well below the ELV (of 5 mg/m^3). Furthermore, speciated VOC sampling for A2 and A3 has demonstrated benzene emissions were below the laboratory's limit of detection ("LOD") (at < 0.24 mg/m^3). A copy of the latest two stack emissions monitoring reports for the year 2025 may be found in Appendix I, which detail the periodic monitoring results ("PMRs").

3.1.14. To help further demonstrate this, additional modelled runs were undertaken with A2 and A3's emission rates informed by the latest measured data (i.e. the PMRs as detailed in the Appendix I emissions monitoring reports). For A2, a TPM emission rate of 0.000886 g/s was calculated, making use of the highest measured PMR in 2025 (of 0.97 mg/m^3 – refer to the R001 report in Appendix I). For both A2 and A3, as benzene emissions were reported as being below the laboratory's LOD for all PMRs in 2025, emission rates of 0.000219 g/s and 0.0000271 g/s, respectively, were used. A5 was modelled concurrently with A2 and A3 making use of the emissions data assumptions detailed in Table 3 of Section 2.7. The results of this additional modelling are displayed in Table 10.

Table 10: Comparison of Maximum Off-Site PCs with IAQM Impact Descriptors – A2 and A3 at PMRs, A5 at ELVs

Pollutant	WCMY	Max PC (µg/m³)	AQS (µg/m³)	PC as % of AQS	Location of Max PC		Background (µg/m³)	Max PEC (µg/m³)	PEC as % of AQS	Significance
					X Coord.	Y Coord.				
$PM_{2.5}$ (annual)	2024	**0.847**	20	**4%**	580892	172866	7.21 [(a)]	8.06	40%	Negligible
PM_{10} (annual)	2024	**0.847**	40	**2%**	580892	172866	12.5 [(a)]	13.3	33%	Negligible
PM_{10} (24-hour, 90.41st %ile)	2024	2.74	50	5%	580892	172866		N/A (<10% of the AQS)		
VOC (as benzene) (annual)	2024	**0.236**	5	**5%**	580892	172866	0.504 [(a)]	0.740	15%	Negligible
VOC (as benzene) (24-hour, 100th %ile)	2021	**3.23**	30	**11%**	580892	172866		N/A		Small

Notes to Table 10

(a) Source of annual background concentration – DEFRA1 (2024 data). Refer to Table 8 for further details.

3.1.15. It can be seen from the results in Table 10 that, when measured data for A2 and A3 is utilised, the maximum off-site impacts are considerably less – with short-term PM_{10} screening out as insignificant, the impacts of short-term VOC (as benzene) described as 'small' and the impacts of long-term $PM_{2.5}$, PM_{10} and VOC (as benzene) all described as 'negligible'.

3.1.16. Furthermore, the release velocities for A2, A3 and A5 have been artificially lowered in the model to account for their release orientation (refer to the notes to Table 5 of Section 2.7 for further information). As the release momentum has had to be drastically reduced, this has led to significantly higher GLCs in close proximity to the modelled release points; greater emphasis should therefore be placed on the impact assessment at the potentially sensitive human receptor locations identified (see Section 4), as these are considered to be more representative of areas where public exposure is likely to occur.

3.1.17. As proposed emission point A5 will possess a similar design and abatement to A2, it is anticipated that the actual overall impact of TPM and VOC (as benzene) PCs arising from the Site will be considerably less during normal day to day operation.

3.2. Isopleths

3.2.1. Isopleths are presented as Figures 5 to 8 for the met year associated with the worst-case GLC for each averaging period.

Please note that as the predicted GLCs all appear to occur in a concentrated area covering the Site and just beyond its boundary, it is difficult to differentiate between the pollutant concentrations. However, the isopleths are useful at demonstrating that, overall, the extent of the predicted GLCs is only very small in the context of the output grid modelled.

Figure 5: Isopleth for Long-Term $PM_{2.5}$ and PM_{10} – 2024

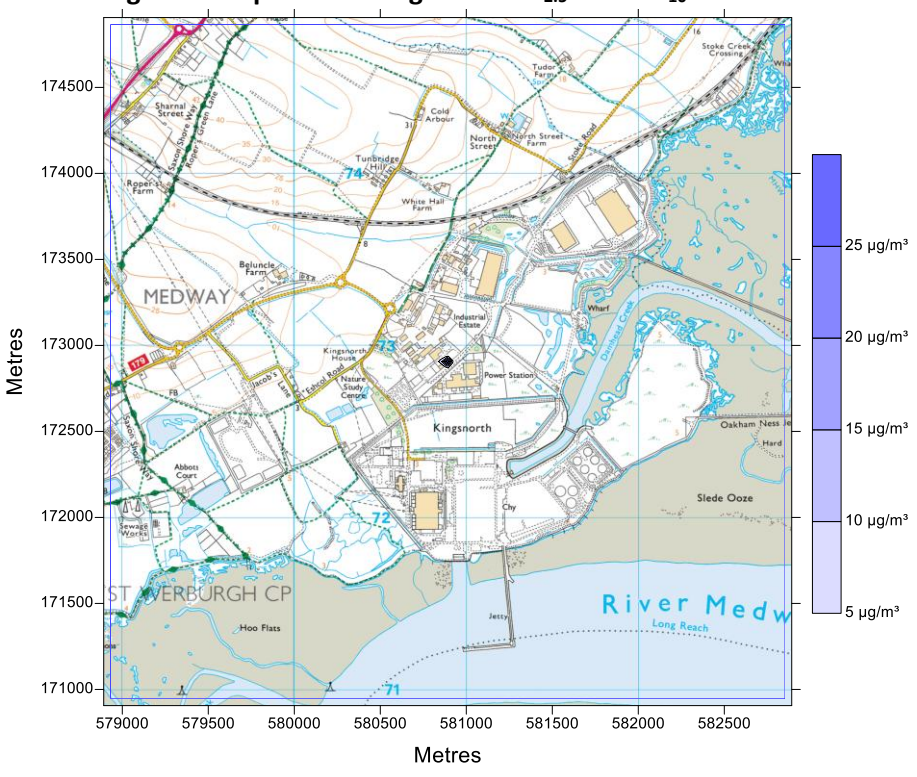


Figure 6: Isopleth for Short-Term PM_{10} (24-hour, 90.41st %ile) – 2022

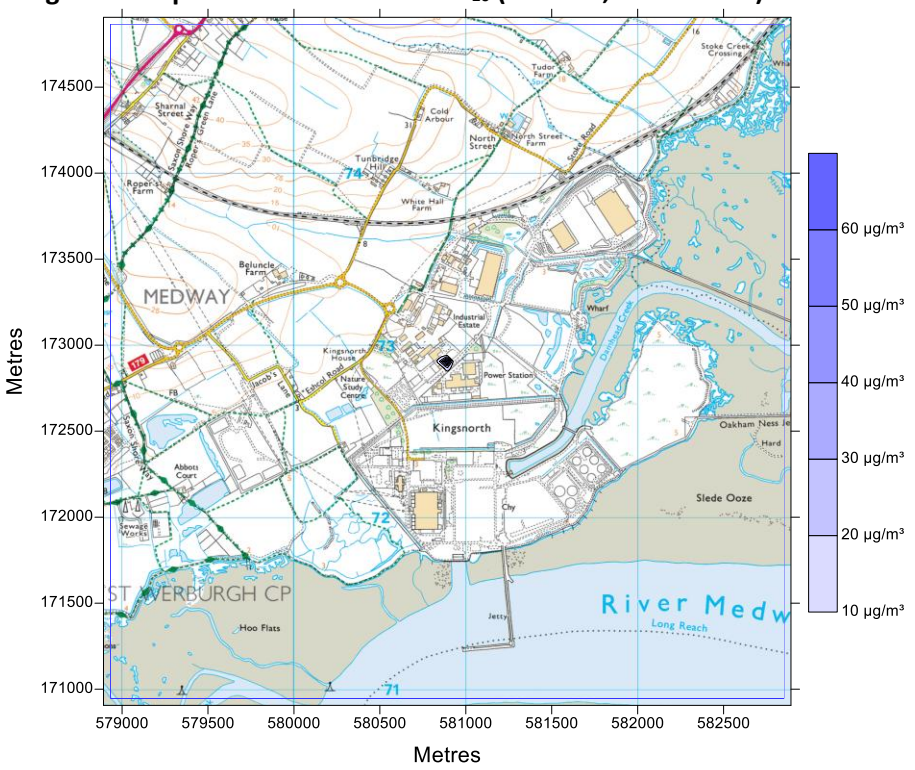


Figure 7: Isopleth for Long-Term VOC (as benzene) – 2024

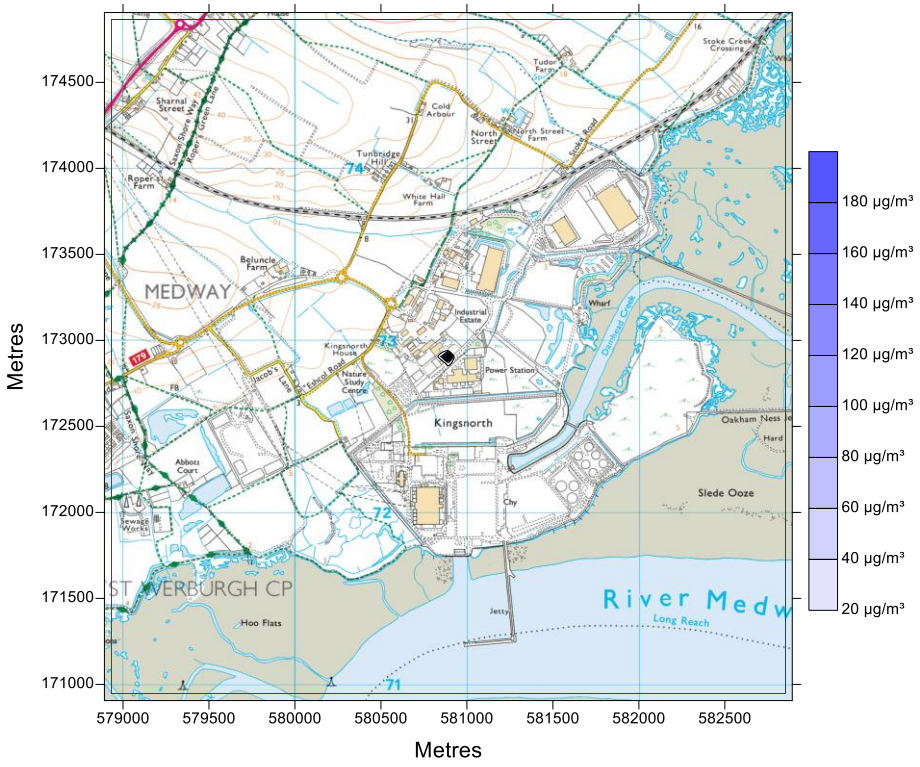
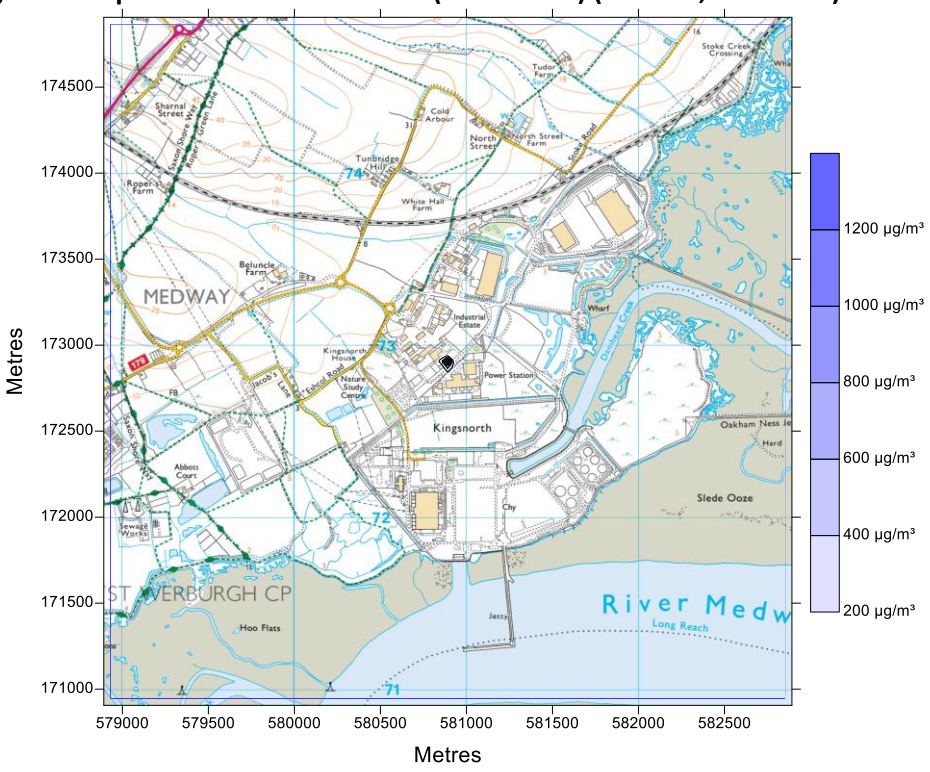


Figure 8: Isopleth for Short-Term VOC (as benzene) (24-hour, 100th %ile) – 2021



4. ASSESSMENT OF AIR QUALITY IMPACTS AT POTENTIALLY SENSITIVE HUMAN RECEPTOR LOCATIONS

4.1. Human Health Impacts at the Specified Receptors

4.1.1. This part of the assessment considers emissions from the Site at potentially sensitive human receptor locations.

4.1.2. The PCs from the Site for each sensitive receptor considered, for the worst case met year for each pollutant and averaging period, are presented in Table 11.

4.1.3. Any PCs that are above the significance criteria outlined in Section 2.17. are indicated in bold type.

Table 11: Comparison of Maximum PCs with AQSs at Sensitive Receptor Locations

	Pollutant	$PM_{2.5}$ (annual mean)	PM_{10} (annual mean)	PM_{10} (24-hour, 90.41st %ile)	VOC (as benzene) (annual)	VOC (as benzene) (24-hour, 100th %ile)
	AQS (µg/m³)	20	40	50	5	30
	Maximum PC (µg/m³)	0.0967	0.0967	0.332	0.618	6.71
	Max PC as % of AQS	0.48%	0.24%	0.66%	**12.36%**	**22.37%**
H1	Damhead Creek Power Station	0.0967	0.0967	0.332	**0.618**	**6.71**
H2	Kingsnorth Industrial Estate	0.0533	0.0533	0.183	**0.341**	**5.04**
H3	Industrial activites off James Swallow Way	0.0126	0.0126	0.0401	**0.0804**	0.910
H4	Residential property off Jacob's Lane (1)	0.00715	0.00715	0.0279	0.0455	0.585
H5	Residential property off Jacob's Lane (2)	0.00391	0.00391	0.0158	0.0249	0.274
H6	Residential property off Stoke Road (1)	0.00345	0.00345	0.0133	0.0220	0.316
H7	Business off Stoke Road	0.00299	0.00299	0.0103	0.0192	0.345
H8	Residential property east of Tunbridge Hill	0.00255	0.00255	0.00940	0.0162	0.204
H9	Residential property off Stoke Road (2)	0.00195	0.00195	0.00775	0.0124	0.210

4.1.4. It can be seen from the results in Table 11 that, with the exception of VOC (as benzene), the remaining impacts at all potentially sensitive human receptor locations can be considered not significant for both long-term and short-term pollutants for all met years.

4.1.5. For the potentially significant short-term (24-hour, 100th %ile) VOC (as benzene) PCs shown in Table 11, the IAQM impact can be regarded as follows:

- H1: PC = 22%, impact = 'medium'; and
- H2: PC = 17%, impact = 'small'.

4.1.6. For the potentially significant annual VOC (as benzene) PCs shown in Table 11 (i.e. for H1 – H3, inclusive), the PEC assessment is presented in Table 12. The PECs have been compared with the relevant long-term AQS, and the significance categorised adopting the IAQM guidance and impact descriptors shown in Table 5 of Section 2.17.

Table 12: Comparison of Maximum Long-Term VOC (as benzene) PCs with IAQM Impact Descriptors –Human Receptor Locations

ADMS Ref.	Pollutant	WCMY	Max PC (µg/m³)	AQS (µg/m³)	PC as % of AQS	Background (µg/m³)	Max PEC (µg/m³)	PEC as % of AQS	Significance
H1	VOC (as benzene) (annual)	2021	**0.618**	5	**12%**	0.504 [(a)]	1.12	22%	**Moderate**
H2		2022	**0.341**		**7%**		0.845	17%	Slight
H3		2024	**0.0804**		**2%**		0.584	12%	Negligible

Notes to Table 12

(b) Source of annual background concentration – DEFRA1 (2024 data). Refer to Table 8 in Section 3.1., for further details.

4.1.7. It can be seen from the results in Table 12 that the impacts of the PECs of long-term VOC (as benzene) for H1 – H3 (inclusive) can be described as 'moderate', 'slight' and 'negligible', respectively.

4.1.8. It should be reemphasised that the maximum GLCs have been calculated assuming the emission points assessed will concurrently release VOC as 100% benzene, which is considered very unlikely. It is therefore anticipated that the actual impact of VOC (as benzene) PCs arising from the Site will be considerably less (as demonstrated by the results in Table 10, where PMR data was used in the modelled runs for A2 and A3).

4.1.9. Furthermore, when using the EA online guidance for screening assessments for emissions to air, further detailed modelling is not required if PECs are less than 70% of the long-term AQS. Although not directly applicable to the detailed modelling stage, it is worth noting that the worst-case PECs shown in Table 12 would be considered not significant based on the screening criteria.

5. CONCLUSION

5.1.1. Detailed air quality modelling using the ADMS dispersion model has been undertaken to predict the impacts associated with emissions arising from Albus' Healthcare Waste Treatment Installation.

5.1.2. As a worst-case, emissions have been assumed to emit to atmosphere at the maximum concentrations assumed for the assessment, twenty-four hours a day, 365 days of the year. This represents a highly conservative assessment of the impact as it is considered highly unlikely the emission points assessed will all emit concurrently at the assumed worst-case emission rates, non-stop throughout the year. Emissions monitoring data for A2 and A3 support this and demonstrate the actual TPM and benzene emissions are considerably lower during normal day to day operation.

5.1.3. Where further screening was required for annual pollutants, further assessment at the maximum off-site GLCs demonstrated that the impacts could be described as 'moderate' for long-term $PM_{2.5}$ and PM_{10} and 'substantial' for VOC (as benzene) when assessed against the ELVs for all emission points. Additional modelled runs with A2 and A3 at PMR data demonstrated the maximum off-site long-term impacts could be described as 'negligible'.

5.1.4. Where further screening was required for short-term pollutants, further assessment at the maximum off-site GLCs demonstrated that the impacts could be described as 'medium' for short-term PM_{10} and 'large' for short-term VOC (as benzene). Additional modelled runs with A2 and A3 at PMR data demonstrated that the maximum off-site short-term impacts could be described as 'small' for short-term VOC (as benzene) – with short-term PM_{10} screening out as insignificant.

5.1.5. The assessment at the specified potentially sensitive human receptor locations demonstrated that, with the exception of VOC (as benzene), the remaining pollutants and receptor locations screened out as insignificant. Following further assessment of the impact for VOC (as benzene), the long-term impacts could be categorised as 'moderate', 'slight' and 'negligible' for H1, H2 and H3, respectively and the short-term impacts could be categorised as 'medium' and 'small' for H1 and H2, respectively.

5.1.6. In summary, therefore, it can be concluded that the predicted PCs associated with the operation of Albus' existing emission points (A2 and A3) and proposed emission point A5, will not have a detrimental impact on local air quality or human health.

APPENDIX I
STACK EMISSIONS MONITORING REPORTS (2025)

2499

EMISSIONS MONITORING SURVEY

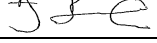
Prepared for:

Albus Environmental Ltd
212 Kingsnorth Industrial Estate
Hoo
Rochester
Kent
ME3 9NZ

Permit Number	**: EPR/JB3604FF**
Variation Number	**: V002**
Installation	**: A2 Shredder & A3 Steam Auger**
Visit Details	**: Compliance – June 2025**
Job Number	**: P6069**
Report Number	**: R001**
Report Issue Date	**: 7th July 2025**
Survey Dates	**: 9th – 10th June 2025**

Prepared by:

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Report Issue:		**FINAL**	
Report Prepared by:		**Report Reviewed & Approved by** **MCERTS Level Two** **Technical Endorsements TE1, TE2, TE3 & TE4**	
Name:	Scott Hackett	***Name:***	Andy Barnes
		MCERTS No:	MM 03 235
		Signature:	
Date:	7th July 2025	***Date:***	7th July 2025

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MCERTS requirements mean that comparison of results with emissions limit values is not permitted within this report.

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PART 1 - EXECUTIVE SUMMARY

1 Monitoring Objectives

Environmental Compliance Ltd (ECL) was commissioned by **Albus Environmental Ltd** to undertake an emission monitoring survey at their **Rochester** site. This report presents the findings of the study.

The monitoring at this installation was carried out in accordance with our quotation reference **AM/P6069/Q002**, for compliance check monitoring of emissions to air. The substances requested for monitoring at each emissions point are listed below:

Substances to be monitored	Emission Point Identification	
	A2	**A3**
	Shredder	Steam Auger Steam Vent
Velocity / Flowrate	● U	
Particulates	● U	
Total Organic Carbon (TVOC)	● U	● U
Top 10 Speciated VOCs	● U	● U
Toluene	● U	● U
Benzene	● U	● U
1,3 Butadiene	● U	● U
Formaldehyde	● U	● U

● Denotes the substances to be monitored.

U **Denotes UKAS accreditation is held for monitoring that substance, but does not mean that it has been claimed which will depend on whether the testing could be completed in accordance with the Standard Reference Method.**

Special Requirements: *"During Normal Operation."*

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

1.1 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Mass Emission	Expanded Uncertainty (as % of)			Reference Conditions 273 K,101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation Claimed for Test Result	Tick if non-conforming test (see Section 2)	Operating Status
						ELV	Span Value	Measured Value							
A2	Volumetric Flowrate	...	0.96143	m³/sec	...	...	...	8	Stack Conditions	09/06/2025	10:56- 11:07	BS EN 16911-1:2013 & MID	UKAS / MCERTS		Normal
	Volumetric Flowrate	...	0.91384	m³/sec	...	...	...	9	& Wet Gas			BS EN 16911-1:2013 & MID	UKAS / MCERTS		
	Particulates $	5	0.97	mg/m³	3.19 (g/hr)	8	...	44	& Wet Gas		11:35 – 12:20	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Particulates $	5	0.74	mg/m³	2.44 (g/hr)	8	...	57	& Wet Gas		12:32 – 13:17	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Particulates $	5	0.66	mg/m³	2.17 (g/hr)	8	...	64	& Wet Gas		13:30 – 14:15	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Average Particulates	5	0.79	mg/m³	2.60 (g/hr)	8	...	...	& Wet Gas		...	BS EN 13284-1:2017 & MID	...		
	TVOC as Carbon	30	**36.61**	mgC/m³	120.44 (g/hr)	7	1	2	& Wet Gas		14:15 – 14:44	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	**36.39**	mgC/m³	119.72 (g/hr)	7	1	3	& Wet Gas		14:45 – 15:14	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	**37.01**	mgC/m³	121.76 (g/hr)	7	1	3	& Wet Gas		15:15 – 15:44	BS EN 12619:2013	UKAS / MCERTS		
	Average TVOC as Carbon	30	**36.67**	mgC/m³	120.64 (g/hr)	7	1	2	& Wet Gas		14:15 – 15:44	BS EN 12619:2013	UKAS / MCERTS		
	Speciated VOC – Top 10 Screen $	...	5.33*	mg/m³	17.53 (g/hr)	...	...	21	& Wet Gas		15:00 – 15:30	CEN/TS 13649:2014	NU	✓	
	Target VOC – Toluene $	...	<0.12	mg/m³	<0.39 (g/hr)	...	...	>100	& Wet Gas		15:00 – 15:30	CEN/TS 13649:2014	UKAS / MCERTS		
	Target VOC – Benzene $	...	<0.24	mg/m³	<0.79 (g/hr)	...	...	>100	& Wet Gas		15:00 – 15:30	CEN/TS 13649:2014	UKAS / MCERTS		
	Target VOC – 1,3 Butadiene $	...	<0.24	mg/m³	<0.79 (g/hr)	...	...	>100	& Wet Gas		15:00 – 15:30	CEN/TS 13649:2014	NU	✓	
	Formaldehyde $	...	<0.012	mg/m³	<0.04 (g/hr)	...	...	>100	& Wet Gas		15:00 – 15:30	EA TGN M2 & CEN/TS 13649:2014	UKAS / MCERTS		

*** For individual compounds that were detected in the top 10 screen, please refer to tables section on Page 20**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

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Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Mass Emission	Expanded Uncertainty (as % of)			Reference Conditions 273 K,101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation Claimed for Test Result	Tick if non-conforming test (see Section 2)	Operating Status
						ELV	Span Value	Measured Value							
A3	TVOC as Carbon	30	**139.94**	mgC/m³	...	19	1	5	& Wet Gas	10/06/2025	09:00 – 09:29	BS EN 12619:2013	UKAS / MCERTS		Normal
	TVOC as Carbon	30	**238.44**	mgC/m³	...	19	1	4	& Wet Gas		09:30 – 09:59	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	**213.13**	mgC/m³	...	19	1	3	& Wet Gas		10:00 – 10:29	BS EN 12619:2013	UKAS / MCERTS		
	Average TVOC as Carbon	30	**197.17**	mgC/m³	...	19	1	5	& Wet Gas		09:00 – 10:29	BS EN 12619:2013	UKAS / MCERTS		
	Speciated VOC – Top 10 Screen $	...	33.50*	mg/m³	...	...	...	7	& Wet Gas		09:00 – 09:30	CEN/TS 13649:2014	NU	✓	
	Target VOC – Toluene $	...	<0.12	mg/m³	...	...	...	>100	& Wet Gas		09:00 – 09:30	CEN/TS 13649:2014	UKAS / MCERTS	✓	
	Target VOC – Benzene $	...	<0.24	mg/m³	...	...	...	>100	& Wet Gas		09:00 – 09:30	CEN/TS 13649:2014	UKAS / MCERTS	✓	
	Target VOC – 1,3 Butadiene $	...	<0.24	mg/m³	...	...	...	>100	& Wet Gas		09:00 – 09:30	CEN/TS 13649:2014	NU	✓	
	Formaldehyde $	...	<0.012	mg/m³	...	...	...	>100	& Wet Gas		09:00 – 09:30	EA TGN M2 & CEN/TS 13649:2014	UKAS / MCERTS	✓	

*** For individual compounds that were detected in the top 10 screen, please refer to tables section on Page 22**

Notes

The volumetric flowrate shown above is that from the initial pitot traverse.
Any other flow measurements made during isokinetic sampling and/ or repeat traverses are shown later in the tables section.

Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value.
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval. The Uncertainty results **DO NOT** take into account the effect of the sample location limitations.
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency.
Accreditation for use of Method	**The details indicate the accreditation for the use of the complete monitoring method, e.g. MCERTs, UKAS. If use of the method is not accredited " NA" is stated.**
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring.
$	Chemical Analysis on sample reagents was performed by an External Laboratory as detailed in Section 4
NU	UKAS Accreditation Held but UKAS Accreditation cannot be claimed for the test as sampling did not comply with the Standard Reference Method (SRM), see section 2 & 5
NA	**Method is NOT UKAS Accredited.**

1.2 Operating Information

Any operating information and CEMS data below has been supplied by the client.

Emission Point Reference	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results					
							Parameter	Date	Time	CEMS Results	Periodic Monitoring Results	Units
A2 Shredder	Batch	6 – 8 Hrs	…	Clinical Waste	HEPA & Carbon Filter	…	…	…	…	NP	…	…
A3 Steam Auger	Batch	6 – 8 Hrs	…	Clinical Waste	Condenser & Carbon Filter	…	…	…	…	NP	…	…

Notes:

Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the normal load, throughput or rating of the plant
CEMS Data	Enter this data for each CEM installed if it is has been provided by operator otherwise state “NP” (NOT PROVIDED)

2 Monitoring Deviations

The objective of the survey was to measure the concentrations of pollutants from the processes / locations as detailed in Section 1. This survey meets the requirements of the site's **PPC Permit Number: EPR/JB3604FF** where UKAS and MCERTS accreditation has and could be claimed for the testing in the monitoring results table.

There were modifications to the sampling procedures (TPDs) listed in section 4. These are as follows:

For Stack A2 - Due to high duct gas velocity, in order to maintain isokinetic sampling, it was necessary to use a nozzle with diameter smaller than the recommended minimum of 8mm minimum stated in BS EN 13284-1:2017. Note that there is no absolute minimum nozzle size stated in the standard, as long as the uncertainty of the nozzle area is <5%. **So this does not need to be described as a non-conforming test.**

There were no substance deviations from the original and agreed emissions monitoring schedule.

Non-conforming tests are as follows:

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

ECL holds UKAS/MCERTS accreditation for the sampling of **Top 10 Speciated VOCs** & **1,3 Butadiene**. However, our approved analysis laboratory does not hold accreditation for these determinands. Furthermore, a check of the UKAS website found no commercial laboratories in the UK that hold analytical accreditation for these determinands, so accreditation for these results CANNOT be claimed.

For **Stack A3**, due to the size of the sampling hole it was not possible to use an in-stack sinter at the front of the sampling probe for **Top 10 VOC Screen**, **Toluene**, **Benzene**, **1,3 Butadiene** and **Formaldehyde** sampling. This is contrary to CEN/TS 13649: 2014, which states a requirement to use a particulate filter ahead of the sorbent tube.

Homogeneity tests have not been completed for pollutants at the following locations: **A2** & **A3**. Such tests are not applicable to these locations (as the duct area is <1m^2) and were not requested by the client.

PART 2 – SUPPORTING INFORMATION

3 SAMPLING STAFF DETAILS

Site Sampling Team

Names of Site Team	Dates on Site	MCERTS No.	LEVEL	Technical Endorsements
Scott Hackett	9th – 10th June 2025	MM 07 889	2	TE1, TE2, TE3, TE4
Owen Haynes		MM 25 1883	Trainee	

Report Reviewer

Name	MCERTS No.	LEVEL	Technical Endorsements
Andy Barnes	MM 03 235	2	TE1, TE2, TE3, TE4

Technical Endorsement Key:-

TE1 – **Isokinetic** Particulates, Temperature & Velocity Profiles, Oxygen.
TE2 – **Isokinetic** Extractive Pollutants:- Metals, Dioxin & Furans, PAHs, PCBs, HCl, HF.
TE3 – **Non-Isokinetic** Extractive Pollutants:- Speciated VOCs, HF, HCl, Cyanide.
TE4 – **Continuous Analysers** (Combustion Gases):- TVOC, CO, NOx, SO2.

4 SAMPLING PROTOCOLS / METHODOLOGIES

Details of the substances monitored, the standard methods used and the Environmental Compliance Limited Technical Procedures used during this survey are shown in the table below. Detailed sampling protocols are included in a separate document which will be sent with the report.

In all cases, where analysis of collected samples was required, the analysis was by a subcontract laboratory. Details of the sub-contract laboratory are shown on the analysis certificates in this report. The UKAS/MCERTs accreditation status of the analysis is also indicated on the certificates.

Any required modifications to the Technical Procedure Documents (TPDs) specified below will be detailed in section 2 of this report.

Determinand	External Reference Method	ECL Technical Procedure Number
Velocity and Flowrate	BS EN 16911-1:2013 & MID	ECL/ TPD/ 022A
Particulates (Stackmite)	BS EN 13284-1:2017 & MID	ECL / TPD / 027A
TVOC (Sick F3006)	BS EN 12619: 2013	ECL / TPD / 032B
Speciated VOC	CEN/TS 13649:2014	ECL / TPD / 084
Formaldehyde	US EPA Method 316	Based on ECL/TPD/081

5 SAMPLE POINT DESCRIPTIONS

The homogeneity test is applicable to combustion processes, but may also be requested by the regulator for non-combustion processes.

Homogeneity testing has not been completed at these locations.

The test is not usually required for stacks with sampling plane areas of <1m^2 (below 1.13m in diameter for circular ducts).

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

The sample locations that were monitored are detailed below:

A2 - Shredder - HEPA & Carbon Filter Exhaust

The stack diameter is 0.25m and the sample platform width back from the sample port is >3m. One sample port is available and is located at a height of 1.95m above the floor. Sampling for Particulates was carried out using an in-stack filter system.

A3 - Steam Auger Steam Vent – Condenser & Carbon Filter Exhaust

The stack diameter is 0.10m and the sample platform width back from the sample port is 1m. One sample port is located at a height of 5m above the floor. The sample port is only suitable for gas monitoring, it is not possible to carry out a flow profile.

EQUIPMENT IDs
(Pre site checklist from SSP)

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

PRE SITE EQUIPMENT CHECKLIST/ EQUIPMENT USED

(Completed before departure to site and when on site in full)

Equipment	Equip. Type	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:
MST console/pump	E001								
MST Nozzle set									
MST "S" Type Pitot									
MST Probe									
MST Probe Thermocouple									
MST Hot Box									
MST Impinger Arm									
Barometer		628							
Site Balance									
Site Check weights									
Horiba	E002								
Heated Probe / Filter									
Chiller									
MFC									
Heated Line									
FID	E003	997							
Heated Line		1346	1347						
Heated Probe / Filter		1352							
Testo	E004								
FTIR	E005								
Heated Probe / Filter									
Heated Line									
Stackmite	E006	1283							
"L" Type Pitot		487							
Digital Manometer		1007							
Stack Thermocouple		1248							
Thermocouple Reader		1100							
Nozzle Set		1201							
Workhorse / Vapex Pumps	E007	1277	1278						
Stack Thermocouple		1248							
Tube Thermocouple		1031	1037						
Meter Thermocouple		1030	1032						
High Vac Gauge									
Dioxin Thermocouple									

Quantity of Ice Required / Used for Survey	Zero	Bags (2kg bags)

FIGURES

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

Figure 1 - TVOC

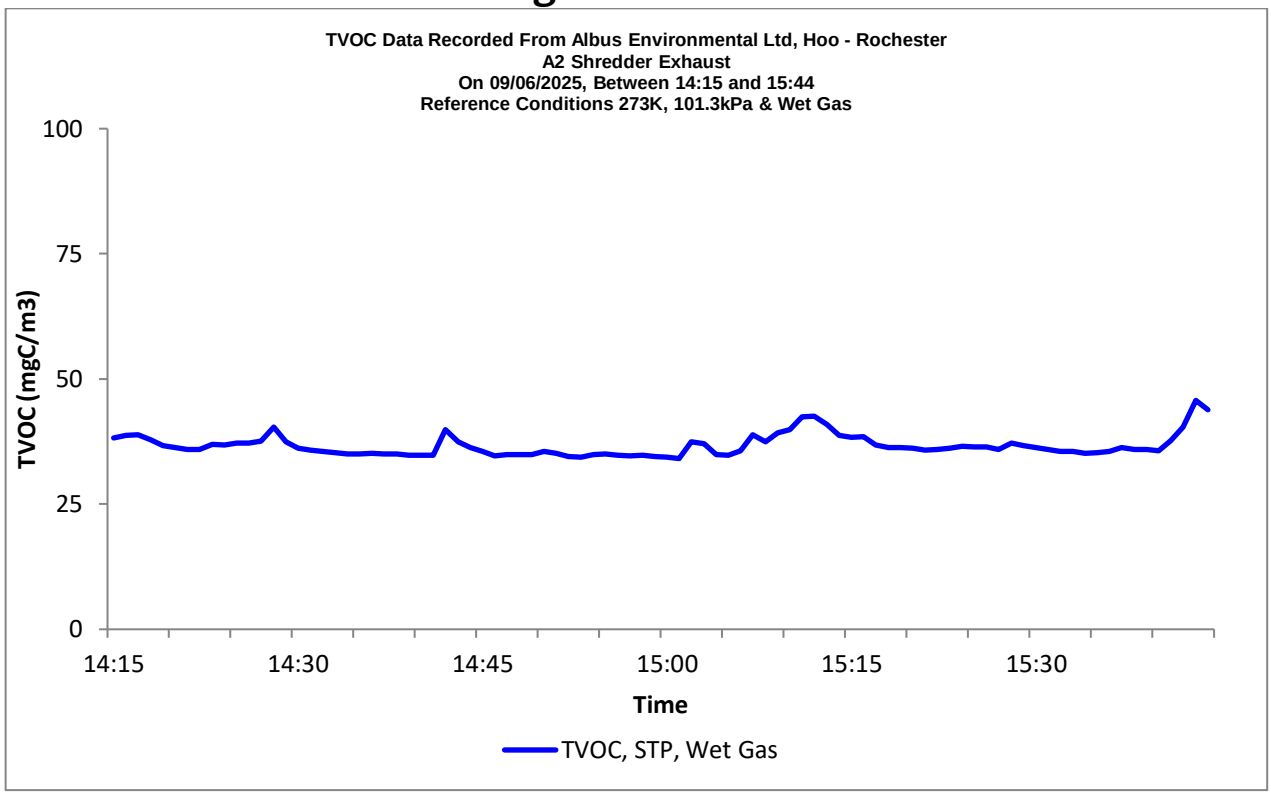
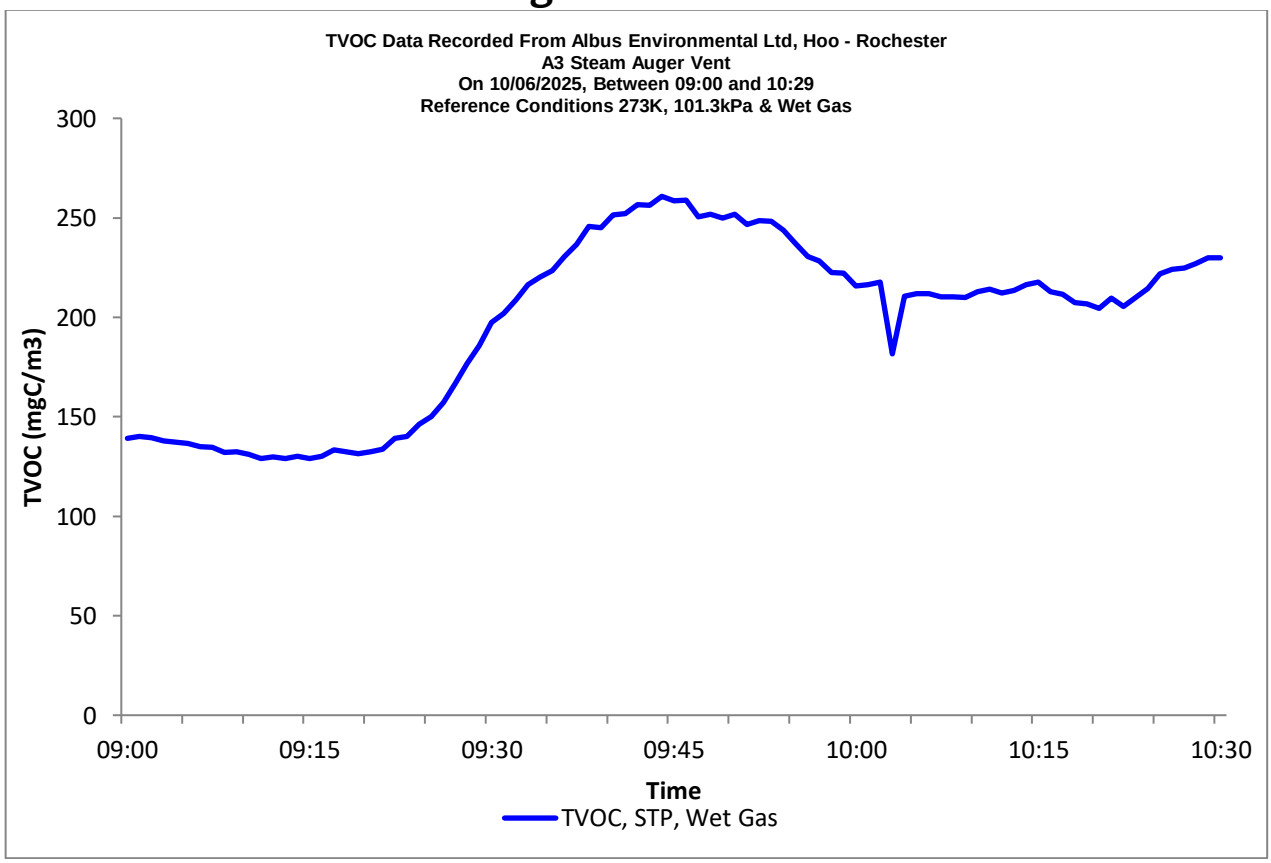


Figure 2 - TVOC



TABLES

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Table 1 – A2 Particulates Test 1

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM 1	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	^oC	19	…
Gas Velocity (at Stack Conditions)	m/sec	19.7687	…
Gas Velocity (Reference Conditions)	m/sec*	18.6546	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.9704	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.9157	…
Sample Date	…	09/06/2025	…
Sample Period	…	11:35 - 12:20	…
Sample Volume (at Stack)	m^3	1.28	…
Sample Volume (reference Conditions)	m^3*	1.210	1.210
Isokinetic Sampling Rate	%	113.9	...
Sample Reference (ECL ID)	ECL/25/	2449 & 2450	2455 & 2456
Mass of Particulate Matter Collected	mg	1.17	0.54
Concentration of Particulate Matter	mg/m^3*	**0.97**	0.45
Emission Rate of Particulate Matter	g/hr	3.19	…
Expanded Uncertainty (% Relative)	%	44	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	8.93

***Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Table 2 – A2 Particulates Test 2

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM 2	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	^oC	23	…
Gas Velocity (at Stack Conditions)	m/sec	19.9522	…
Gas Velocity (Reference Conditions)	m/sec*	18.6015	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.9794	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.9131	…
Sample Date	…	09/06/2025	…
Sample Period	…	12:32 - 13:17	…
Sample Volume (at Stack)	m^3	1.30	…
Sample Volume (reference Conditions)	m^3*	1.212	1.212
Isokinetic Sampling Rate	%	114.4	...
Sample Reference (ECL ID)	ECL/25/	2451 & 2452	2455 & 2456
Mass of Particulate Matter Collected	mg	0.90	0.54
Concentration of Particulate Matter	mg/m^3*	**0.74**	0.45
Emission Rate of Particulate Matter	g/hr	2.44	…
Expanded Uncertainty (% Relative)	%	57	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	8.91

***Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Table 3 – A2 Particulates Test 3

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM 3	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	^oC	23	…
Gas Velocity (at Stack Conditions)	m/sec	19.9578	…
Gas Velocity (Reference Conditions)	m/sec*	18.6068	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.9797	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.9134	…
Sample Date	…	09/06/2025	…
Sample Period	…	13:30 - 14:15	…
Sample Volume (at Stack)	m^3	1.30	…
Sample Volume (reference Conditions)	m^3*	1.212	1.212
Isokinetic Sampling Rate	%	114.3	...
Sample Reference (ECL ID)	ECL/25/	2453 & 2454	2455 & 2456
Mass of Particulate Matter Collected	mg	0.80	0.54
Concentration of Particulate Matter	mg/m^3*	**0.66**	0.45
Emission Rate of Particulate Matter	g/hr	2.17	…
Expanded Uncertainty (% Relative)	%	64	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	8.91

***Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Table 4 – A2 Top 10 VOC Screen

Albus Environmental Ltd
Hoo, Rochester Shredder A2

Emission Parameter	Units	Value
Stack Diameter	mm	250
Area of Sample Plane	m^2	0.049
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	19.00
StackTemperature	°C	22.00
Sample Date	…	09/06/2025
Sample Period	…	15:00 - 15:30
Sample Volume (as Measured)	m^3	0.0089
Sample Volume (reference Conditions)	m^3*	0.0084

Sample Tube Results		Top 10 VOC		Blank
Sample Reference ECL/25/2459	Units	Concentration*	Uncertainty	Concentration
Concentration of Ethanol	mg/m^3	1.19	50.30%	0.59
Concentration of Dimethyl ether	mg/m^3	0.64	90.17%	0.59
Concentration of Isopropanol	mg/m^3	0.94	70.22%	0.59
Concentration of Hexamethyl disiloxane	mg/m^3	2.56	11.41%	0.59
Total Top 10 VOC	mg/m^3	5.33	20.68%	…

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 5 – A2 Toluene

Albus Environmental Ltd
Hoo, Rochester Shredder A2

Emission Parameter	Units	Value
Stack Diameter	mm	250
Area of Sample Plane	m^2	0.049
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	19.00
StackTemperature	°C	22.00
Sample Date	…	09/06/2025
Sample Period	…	15:00 - 15:30
Sample Volume (as Measured)	m^3	0.0089
Sample Volume (reference Conditions)	m^3*	0.0084

Sample Tube Results		Toluene		Blank
Sample Reference ECL/25/2459	Units	Concentration*	Uncertainty	Concentration
Concentration of Toluene	mg/m^3	0.12	100.15%	0.12

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 6 – A2 Benzene

Albus Environmental Ltd
Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	19.00		
StackTemperature	°C	22.00		
Sample Date	…	09/06/2025		
Sample Period	…	15:00 - 15:30		
Sample Volume (as Measured)	m^3	0.0089		
Sample Volume (reference Conditions)	m^3*	0.0084		
Sample Tube Results		Benzene		Blank
Sample Reference ECL/25/2459	Units	Concentration*	Uncertainty	Concentration
Concentration of Benzene	mg/m^3	0.24	100.15%	0.24

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

Table 7 – A2 (1,3 Butadiene)

Albus Environmental Ltd
Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	19.00		
StackTemperature	°C	22.00		
Sample Date	…	09/06/2025		
Sample Period	…	15:00 - 15:30		
Sample Volume (as Measured)	m^3	0.0089		
Sample Volume (reference Conditions)	m^3*	0.0084		
Sample Tube Results		1,3-butadiene		Blank
Sample Reference ECL/25/2459	Units	Concentration*	Uncertainty	Concentration
Concentration of 1,3-butadiene	mg/m^3	0.24	100.15%	0.24

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

Table 8 – A2 Formaldehyde

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	19.00		
StackTemperature	°C	22.00		
Sample Date	…	09/06/2025		
Sample Period	…	15:00 - 15:30		
Sample Volume (as Measured)	m^3	0.0090		
Sample Volume (reference Conditions)	m^3*	0.0085		
Sample Tube Results		Formaldehyde		Blank
Sample Reference ECL/25/2461	Units	Concentration*	Uncertainty	Concentration
Concentration of Formaldehyde	mg/m^3	0.012	100.15%	0.012

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 9 – A3 Top 10 VOC Screen

Albus Environmental Ltd

Hoo, Rochester A3 Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	17.33		
StackTemperature	°C	18.00		
Sample Date	…	10/06/2025		
Sample Period	…	09:00 - 09:30		
Sample Volume (as Measured)	m^3	0.0089		
Sample Volume (reference Conditions)	m^3*	0.0084		
Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/2463	Units	Concentration*	Uncertainty	Concentration
Concentration of Isobutane	mg/m^3	1.03	70.22%	0.59
Concentration of Ethanol	mg/m^3	2.27	11.41%	0.59
Concentration of Acetone	mg/m^3	1.44	11.41%	0.59
Concentration of Isopropanol	mg/m^3	14.67	11.41%	0.59
Concentration of Hexamethyl disiloxane	mg/m^3	13.30	11.41%	0.59
Concentration of D-Limonene	mg/m^3	0.78	80.19%	0.59
Total Top 10 VOC	mg/m^3	33.50	7.39%	…

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 10 – A3 Toluene

Albus Environmental Ltd

Hoo, Rochester A3 Steam Auger Vent A3

Emission Parameter	Units	Value
Stack Diameter	mm	100
Area of Sample Plane	m^2	0.008
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	17.33
StackTemperature	°C	18.00
Sample Date	…	10/06/2025
Sample Period	…	09:00 - 09:30
Sample Volume (as Measured)	m^3	0.0089
Sample Volume (reference Conditions)	m^3*	0.0084

Sample Tube Results		Toluene		Blank
Sample Reference ECL/25/2463	Units	Concentration*	Uncertainty	Concentration
Concentration of Toluene	mg/m^3	0.12	100.15%	0.12

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

Table 11 – A3 Benzene

Albus Environmental Ltd

Hoo, Rochester A3 Steam Auger Vent A3

Emission Parameter	Units	Value
Stack Diameter	mm	100
Area of Sample Plane	m^2	0.008
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	17.33
StackTemperature	°C	18.00
Sample Date	…	10/06/2025
Sample Period	…	09:00 - 09:30
Sample Volume (as Measured)	m^3	0.0089
Sample Volume (reference Conditions)	m^3*	0.0084

Sample Tube Results		Benzene		Blank
Sample Reference ECL/25/2463	Units	Concentration*	Uncertainty	Concentration
Concentration of Benzene	mg/m^3	0.24	100.15%	0.24

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

Table 12 – A3 (1,3 Butadiene)

Albus Environmental Ltd

Hoo, Rochester A3 Steam Auger Vent A3

Emission Parameter	Units	Value
Stack Diameter	mm	100
Area of Sample Plane	m^2	0.008
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	17.33
StackTemperature	°C	18.00
Sample Date	…	10/06/2025
Sample Period	…	09:00 - 09:30
Sample Volume (as Measured)	m^3	0.0089
Sample Volume (reference Conditions)	m^3*	0.0084

Sample Tube Results		1,3-butadiene		Blank
Sample Reference ECL/25/2463	Units	Concentration*	Uncertainty	Concentration
Concentration of 1,3-butadiene	mg/m^3	0.24	100.15%	0.24

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

Table 13 – A3 Formaldehyde

Albus Environmental Ltd

Hoo, Rochester A3 Steam Auger Vent A3

Emission Parameter	Units	Value
Stack Diameter	mm	100
Area of Sample Plane	m^2	0.008
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	18.00
StackTemperature	°C	18.00
Sample Date	…	09/06/2025
Sample Period	…	09:30 - 10:00
Sample Volume (as Measured)	m^3	0.0090
Sample Volume (reference Conditions)	m^3*	0.0085

Sample Tube Results		Formaldehyde		Blank
Sample Reference ECL/25/2465	Units	Concentration*	Uncertainty	Concentration
Concentration of Formaldehyde	mg/m^3	0.012	100.15%	0.012

***Reference Conditions: 273 K, 101.3 kPa, Wet Gas**

VELOCITY TRAVERSE PROFILES

Environmental Compliance Limited

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

Environmental Compliance Limited	Traverse Data Profoma	Date of Measurement	09/06/2025

Company	Albus Environmental Ltd	Stack Diameter Port A (mm)	250	Average Stack Diameter (mm)	250	Pitot tube coefficient	1.00
Site	Hoo	Stack Diameter Port B (mm)		Port Length (mm)	70	Pitot Id	487
Location	Shredder	Duct Length Port A (mm)		Average Duct Length (mm) L		Stack Thermocouple ID	1248
Stack	A2	Duct Length Port B (mm)		Duct width (mm) B		Stack Temp Reader ID	1100
Job No	P6069	Duct Length Port C (mm)		Barometric Pressure. (mb)	1022	Manometer ID	1007
Operators	SH & OH	Duct Length Port D (mm)		Ave Static Press. (mm $H_2$0)	20.32	Barometer ID	628

Pre - Traverse Checks Carried Out	Time	Pass/ Fail
Pre - Traverse PITOT Visual Inspection	10:56:00	Pass
Pre - Traverse PITOT Leak Check	10:58:00	Pass

Smooth Walls

Static Pressure Readings (Pascals)			
Port A	Port B	Port C	Port D
199.30			

Port/ Point	Distance to Point (mm)	Time	Temperature Readings (°C)			(ΔP) Pitot Readings (Pa)			Average Temp. (°C)	Average (ΔP) (Pa)	Swirl Test ° From Reference
			1	2	3	1	2	3			
A1	125	11:00:00	17.0	17.0	18.0	223.0	245.0	239.0	17.3	235.7	10
Blockage Check @ A1 (L-Type Pitot Only)		11:02:00	18.0	18.0	18.0	237.0	239.0	241.0	17.3	235.7	Total
			Mean		18.0	Mean		239.0	17.3	235.7	Max
			Difference < 5% from Initial ?		0.23	Difference < 5% from Initial ?		1.41	17.3	235.7	Min
									17.3	235.7	Average

Stagnation Check (S-type Pitot Only)	Time	Reading
Static Pressure Via Positive Leg (Pa)		
Static Pressure Via Negative Leg (Pa)		
Difference (Pa) < 10Pa ?		

Post - Traverse Checks Carried Out	Time	Pass/ Fail
Post - Traverse Visual Inspection	11:05:00	Pass
Post - Traverse PITOT Leak Check	11:07:00	Pass

Average temp (K)	290.333

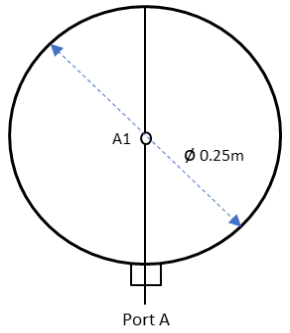
Suitability of Sampling Position	Actual Stack Conditions
Highest:lowest flow pressure ratio < 9:1?	1.06:1
Maximum deviation of flow from axis < 15° ?	10
X-sectional area for stacks= πr2	0.05 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	OK

Stack Moisture	1.66	%	Gas Velocity (as Measured) Adjusted for Smooth Walls	19.58616	m/sec
Measured Oxygen	20.90	%	Gas Velocity (Reference Conditions) Adjusted for Smooth Walls	18.61666	m/sec*
Measured Carbon Dioxide	0.04	%	Volumetric Flowrate (as Measured) Adjusted for Smooth Walls	0.96143	m^3/sec
Dry Gas Molecular Weight	28.84240	g/g mole	Volumetric Flowrate (Ref Cond) Adjusted for Smooth Walls	0.91384	m^3/sec*

* Reference Conditions: 273K, 101.3kPa, Wet Gas

NOTE: Velocity / volume flowrate calculations exclude contributions from the measurement point(s) where swirl > 15°

Diagram/ Description of Cross Section of Stack/Duct



Notes

Including expected or actual deviations from procedures / non-conformities

Compliance With Positional Requirements?

Height of sample ports from Platform	1.95m
Number of sample ports	1
Width of platform (port back to handrail)	> 3.0m

Nearest downstream disturbance	Bend	0.8m
Nearest upstream disturbance	Bend	3.0m
Disturbances are classed as bends, fans or diameter variations		

FIELD CALIBRATION AND SAMPLING DATA

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

TVOC Calibration Site Log
(A2 – 9th June 2025)

TVOC - FIELD DATA SHEET

Client	Albus Environmental Ltd		
Site	Hoo, Rochester		
Date	09/06/2025		
Location	A2		
Stack ID	A2 Shredder		
Stack Temp °C	18 - 22		
Ambient Temp (sampling)	1=24	2=24	3=23.8
Ambient Temp (sampling)	4=23.6	5=23.5	6=23.4
Job No	P6069		
Operators	SH & OH		

Barometric Pressure mb	1022	
Barometer ID	ECL/ID/ 628	
Analyser ID	ECL/ID/ 997	
Sonimix/ MFC ID	ECL/ID/ n/a	
Heated Line/ Controller ID	ECL/ID/ 1346 & 1347	
Heated Line Set Temp °C	180	YES
Heated Line Length	10	m
Heated Probe Filter ID	ECL/ID/ 1352	
Heated Filter Set Temp °C	180	YES
Logger ID	1005	

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/ 3178	…	…
Hydrogen Fuel	Gas/ 3200	…	…
Propane (In Air)	Gas/ 3135	92.35 ppm	1%

	Analyser Range	Span Gas value used
Propane	100 ppm	92.35 ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	12:09	12:12	12:14	12:17	12:18	12:21

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
24	23.8	Start Time	End Time	Start Time	End Time
ZERO / SPAN		12:24	12:27	12:28	12:31

Response Time SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
12:27:30	12:28:00	Y

	Start Time	End Time	Location	Production Details
Sample Period	14:15	15:45	A2 Shredder	Normal Operation
Sample Period				
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
23.3	23.4	Start Time	End Time	Start Time	End Time
ZERO / SPAN		15:48	15:51	15:52	15:55

Process Details / Comments

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

TVOC Calibration Summary (A2 – 9th June 2025)

		TVOC ppm
Analyser Range		100
Repeatability at Zero		2
Span Gas Concentration Applied		92.35
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	92.4
	Zero	0.07
Difference (Zero)		0.0728
< 2× Repeatability @ Zero?		YES
Pre Test (System)	Zero	0.15
	Span	92.5
Difference (Zero)		0.1456
< 2% Relative to Direct Span		YES
Difference (Span)		0.1951
< 2% Relative to Direct Span		YES
Post Test (System)	Zero	0.25
	Span	91.6
Difference (Zero)		0.1040
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		0.9389
Span Drift < 2% of Applied Span?		YES
Zero and Span Drift < 5% of Applied Span?		YES

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

TVOC Calibration Site Log
(A3 – 10th June 2025)

TVOC - FIELD DATA SHEET

Client	Albus Environmental Ltd		
Site	Hoo, Rochester		
Date	10/06/2025		
Location	A3		
Stack ID	A3 Steam Auger Vent		
Stack Temp °C	18		
Ambient Temp (sampling)	1=19	2=20	3=20
Ambient Temp (sampling)	4=21	5=21.5	6=22
Job No	P6069		
Operators	SH & OH		

Barometric Pressure mb	1015	
Barometer ID	ECL/ID/ 628	
Analyser ID	ECL/ID/ 997	
Sonimix/ MFC ID	ECL/ID/ n/a	
Heated Line/ Controller ID	ECL/ID/ 1346 & 1347	
Heated Line Set Temp °C	180	YES
Heated Line Length	10	m
Heated Probe Filter ID	ECL/ID/ 1352	
Heated Filter Set Temp °C	180	YES
Logger ID	1005	

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/ 3178	…	…
Hydrogen Fuel	Gas/ 3200	…	…
Propane (In Air)	Gas/ 2897	298.9 ppm	1%

	Analyser Range	Span Gas value used
Propane	400 ppm	298.9 ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	07:54	07:57	07:59	08:01	08:02	08:05

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
18.8	18.7	Start Time	End Time	Start Time	End Time
ZERO / SPAN		08:06	08:09	08:13	08:16

Response Time SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
08:12:15	08:12:30	Y

	Start Time	End Time	Location	Production Details
Sample Period	09:00	10:30	A3	Normal Operation
Sample Period				
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
22	22	Start Time	End Time	Start Time	End Time
ZERO / SPAN		10:32	10:35	10:36	10:39

Process Details / Comments

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

TVOC Calibration Summary (A3 – 10th June 2025)

		TVOC ppm
Analyser Range		1000
Repeatability at Zero		2
Span Gas Concentration Applied		298.9
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	298.9
	Zero	0.31
Difference (Zero)		0.3148
< 2× Repeatability @ Zero?		YES
Pre Test (System)	Zero	-0.05
	Span	295.0
Difference (Zero)		0.0525
< 2% Relative to Direct Span		YES
Difference (Span)		3.9350
< 2% Relative to Direct Span		YES
Post Test (System)	Zero	0.37
	Span	295.5
Difference (Zero)		0.4197
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		0.5247
Span Drift < 2% of Applied Span?		YES
Zero and Span Drift < 5% of Applied Span?		YES

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A2 Particulates – Test 1

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/06/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	11:35	End Time	12:20	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	487	Stack Thermocouple ID	1248	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1007	Stack Temp Reader ID	1100	SOL/	
Location	Shredder	Barometric Pressure (mb)	1022	Barometer ID	628	Meter Thermocouple ID	1287	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm H^20) (Pa/9.807)	20.322	DGM Yd	0.9662	Meter Temp Reader ID	1286	End Weight (g)	1.00
Test No.	TPM 1	Pitot coefficient	1.00	Nozzle ID	1201	Dry Gas Meter ID	1284	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.17	Timer ID	1288		
ECL Site Staff	SH & OH	Console ID	1283	Filter ID	3243	Rotameter ID	1285		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights MUST be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1003314.0
Final Volume	1004665.0
Total Volume	1351.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test.

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1061.56
	Actual Sample Volume	1208.83
1351.0	Isokinetic Percentage	113.87

Leak Check	Pre Sample
Measured Leak Rate* l/min	0
Set Sampling Rate* (l/min)	28
Time Of Leak Check	11:30
Leak % of set rate	0.0

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate				
	Measured O_2	20.90	Moisture	0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

DI Water SOL/	5405
Acetone SOL/	5378

TPD/27A is carried out with an unheated sampling system only.

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	241.00	239.00	247.00	229.00	238.00	244.00	239.00	237.00	239.3
Velocity at Stack (m/s)	19.87	19.79	20.12	19.40	19.78	20.06	19.86	19.81	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	25.4	25.3	25.9	25.0	25.7	26.1	26.0	26.0	25.7
Meter (Tm)	19	20	21	23	25	27	29	30	24.3
Stack Temp (Ts)	18	18	18	19	19	20	20	21	19.1

Original Flowrate Settings	
Tm	35
Ts	18
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	11:05
Pass ? (Y/N)	Y

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	244.00								244.0
Velocity at Stack (m/s)	20.13								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	26.5								26.5
Meter (Tm)	32								32.0
Stack Temp (Ts)	22								22.0

PRE-Sample PITOT Leak Check	
Time	11:07
Pass ? (Y/N)	Y

Post-Sample Blockage Check (L-type)	
Time	12:21
Reading (Pa)	235
Pass (<5%) ?	-2.5

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

POST-Sample PITOT Visual Inspection	
Time	12:23
Pass ? (Y/N)	Y

POST-Sample PITOT Leak Check	
Time	12:25
Pass ? (Y/N)	Y

A2 Particulates – Test 2

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/06/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	12:32	End Time	13:17	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	487	Stack Thermocouple ID	1248	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1007	Stack Temp Reader ID	1100	SOL/	
Location	Shredder	Barometric Pressure (mb)	1022	Barometer ID	628	Meter Thermocouple ID	1287	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm H^20) (Pa/9.807)	20.322	DGM Yd	0.9662	Meter Temp Reader ID	1286	End Weight (g)	1.00
Test No.	TPM 2	Pitot coefficient	1.00	Nozzle ID	1201	Dry Gas Meter ID	1284	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.17	Timer ID	1288		
ECL Site Staff	SH & OH	Console ID	1283	Filter ID	3242	Rotameter ID	1285		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights MUST be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1004750.0
Final Volume	1006142.0
Total Volume	1392.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test.

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1058.54
	Actual Sample Volume	1210.79
1392.0	Isokinetic Percentage	114.38

Leak Check	Pre Sample
Measured Leak Rate* l/min	0
Set Sampling Rate* (l/min)	28
Time Of Leak Check	12:30
Leak % of set rate	0.0

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate				
	Measured O_2	20.90	Moisture	0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

DI Water SOL/	5405
Acetone SOL/	5378

TPD/27A is carried out with an unheated sampling system only.

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	240.00	248.00	247.00	248.00	245.00	241.00	234.00	229.00	241.5
Velocity at Stack (m/s)	19.97	20.30	20.29	20.33	20.21	20.04	19.75	19.57	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	26.3	26.7	26.7	26.7	26.7	26.4	26.1	25.8	26.4
Meter (Tm)	32	32	33	33	34	34	34	35	33.4
Stack Temp (Ts)	22	22	23	23	23	23	23	24	22.9

Original Flowrate Settings	
Tm	35
Ts	18
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	12:23
Pass ? (Y/N)	Y

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	240.00								240.0
Velocity at Stack (m/s)	20.03								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	26.5								26.5
Meter (Tm)	36								36.0
Stack Temp (Ts)	24								24.0

PRE-Sample PITOT Leak Check	
Time	12:25
Pass ? (Y/N)	Y

Post-Sample Blockage Check (L-type)	
Time	13:18
Reading (Pa)	235
Pass (<5%) ?	-2.1

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

POST-Sample PITOT Visual Inspection	
Time	13:20
Pass ? (Y/N)	Y

POST-Sample PITOT Leak Check	
Time	13:22
Pass ? (Y/N)	Y

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A2 Particulates – Test 3

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/06/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	13:30	End Time	14:15	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	487	Stack Thermocouple ID	1248	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1007	Stack Temp Reader ID	1100	SOL/	
Location	Shredder	Barometric Pressure (mb)	1022	Barometer ID	628	Meter Thermocouple ID	1287	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm $H^2$0) (Pa/9.807)	20.322	DGM Yd	0.9662	Meter Temp Reader ID	1286	End Weight (g)	1.00
Test No.	TPM 3	Pitot coefficient	1.00	Nozzle ID	1201	Dry Gas Meter ID	1284	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.17	Timer ID	1288		
ECL Site Staff	SH & OH	Console ID	1283	Filter ID	3244	Rotameter ID	1285		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights MUST be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1006312.0
Final Volume	1007715.0
Total Volume	1403.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1058.86
	Actual Sample Volume	1210.71
1403.0	Isokinetic Percentage	114.34

Leak Check	Pre Sample
Measured Leak Rate* l/min	0
Set Sampling Rate* (l/min)	28
Time Of Leak Check	13:28
Leak % of set rate	0.0

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate				
	Measured O_2	20.90	Moisture	0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

TPD/27A is carried out with an unheated sampling system only.

DI Water SOL/	5405
Acetone SOL/	5378

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	244.00	241.00	247.00	236.00	243.00	239.00	241.00	234.00	240.6
Velocity at Stack (m/s)	20.20	20.07	20.32	19.83	20.12	19.96	20.01	19.71	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	26.6	26.5	26.9	26.3	26.7	26.5	26.7	26.3	26.6
Meter (Tm)	35	35	36	36	36	36	37	37	36.0
Stack Temp (Ts)	24	24	24	23	23	23	22	22	23.1

Original Flowrate Settings	
Tm	35
Ts	18
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	13:20
Pass ? (Y/N)	Y

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	248.00								248.0
Velocity at Stack (m/s)	20.30								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	27.1								27.1
Meter (Tm)	37								37.0
Stack Temp (Ts)	22								22.0

PRE-Sample PITOT Leak Check	
Time	13:22
Pass ? (Y/N)	Y

Post-Sample Blockage Check (L-type)	
Time	14:17
Reading (Pa)	235
Pass (<5%) ?	-3.7

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

POST-Sample PITOT Visual Inspection	
Time	14:19
Pass ? (Y/N)	Y

POST-Sample PITOT Leak Check	
Time	14:21
Pass ? (Y/N)	Y

A2 Speciated VOC

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)

Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1277
Site	Hoo, Rochester	Stack Diameter (mm)	250		
Location	Shredder				
Stack ID	A2	Stack Area (m^2)	0.049		
Test No	Top 10 VOC	Barometric Pressure (mb)	1022	Meter Yd	0.989
Job No	P6069	Stack Thermocouple ID	1248		
ECL Site Staff	SH & OH	Tube Thermocouple ID	1031		
Barometer ID	625	Meter Thermocouple ID	1030	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	Y		

Date of Test	09/06/2025
Sample Start Time	15:00
Sample End Time	15:30
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00
Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Meter Units ◉ litres

	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	14:30:00	Time	15:32:00	
Final Volume	9.01	Reading (ml/min)	20	Reading (ml/min)	21	
Total Volume	9.01	% Leak	4.4	% Leak	4.7	9.01
Sample Train Internal Volume	0.001	Litres				

Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%

Sample Point	A1	A1	A1	
Time/ point (mins)	0 - 10	10 - 20	20 - 30	
Tube Temp °C	19	21	22	
Stack Temp °C	22	22	22	
Meter Temp °C	18	19	20	
Pump Flowrate (ml/min)	300	300	300	

Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Silica	(IF USED)
<50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

Environmental Compliance Limited

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A2 Formaldehyde

Environmental Compliance Limited				SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)	
Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1278
Site	Hoo, Rochester	Stack Diameter (mm)	250		
Location	Shredder				
Stack ID	A2	Stack Area (m^2)	0.049		
Test No	Formaldehyde	Barometric Pressure (mb)	1022	Meter Yd	0.995
Job No	P6069	Stack Thermocouple ID	1248		
ECL Site Staff	SH & OH	Tube Thermocouple ID	1037		
Barometer ID	625	Meter Thermocouple ID	1032	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	Y		

Meter Units ◉ litres	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	14:35:00	Time	15:35:00	
Final Volume	9.02	Reading (ml/min)	19	Reading (ml/min)	20	
Total Volume	9.02	% Leak	4.2	% Leak	4.4	9.02
Sample Train Internal Volume	0.001	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			
Sample Point	A1	A1		A1		
Time/ point (mins)	0 - 10	10 - 20		20 - 30		
Tube Temp °C	19	21		22		
Stack Temp °C	22	22		22		
Meter Temp °C	18	19		20		
Pump Flowrate (ml/min)	300	300		300		

Sample Point					
Time/ point (mins)					
Tube Temp °C					
Stack Temp °C					
Meter Temp °C					
Pump Flowrate (ml/min)					

Sample Point					
Time/ point (mins)					
Tube Temp °C					
Stack Temp °C					
Meter Temp °C					
Pump Flowrate (ml/min)					

Date of Test	09/06/2025
Sample Start Time	15:00
Sample End Time	15:30
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00
Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Silica	(IF USED)
<50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

A3 Speciated VOC

Environmental Compliance Limited				SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)	
Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1277
Site	Hoo, Rochester	Stack Diameter (mm)	100		
Location	A3 Steam Auger Vent				
Stack ID	A3	Stack Area (m^2)	0.008		
Test No	Speciated VOC	Barometric Pressure (mb)	1015	Meter Yd	0.989
Job No	P6069	Stack Thermocouple ID	1248		
ECL Site Staff	SH & OH	Tube Thermocouple ID	1031		
Barometer ID	625	Meter Thermocouple ID	1030	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	N		

Meter Units ◉ litres	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	08:45:00	Time	09:33:00	
Final Volume	9.03	Reading (ml/min)	20	Reading (ml/min)	21	
Total Volume	9.03	% Leak	4.4	% Leak	4.7	9.03
Sample Train Internal Volume	0.001	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			
Sample Point	A1	A1		A1		
Time/ point (mins)	0 - 10	10 - 20		20 - 30		
Tube Temp °C	18	18		19		
Stack Temp °C	18	18		18		
Meter Temp °C	17	17		18		
Pump Flowrate (ml/min)	300	300		300		

Sample Point					
Time/ point (mins)					
Tube Temp °C					
Stack Temp °C					
Meter Temp °C					
Pump Flowrate (ml/min)					

Sample Point					
Time/ point (mins)					
Tube Temp °C					
Stack Temp °C					
Meter Temp °C					
Pump Flowrate (ml/min)					

Date of Test	10/06/2025
Sample Start Time	09:00
Sample End Time	09:30
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00
Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Silica	(IF USED)
<50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

A3 Formaldehyde

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)

Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1278	Date of Test	09/06/2025
Site	Hoo, Rochester	Stack Diameter (mm)	100			Sample Start Time	09:30
Location	A3 Steam Auger Vent					Sample End Time	10:00
Stack ID	A3	Stack Area (m^2)	0.008			Duration	30
Test No	Formaldehyde	Barometric Pressure (mb)	1022	Meter Yd	0.995	Measured O2	20.90
Job No	P6069	Stack Thermocouple ID	1248			O2 Uncertainty %Vol	1.25
ECL Site Staff	SH & OH	Tube Thermocouple ID	1037			Meter Start Time	0:00:00
Barometer ID	625	Meter Thermocouple ID	1032	Vapex Sampling Rate (ml/min)	300	Meter End Time	0:30:00
		In-Stack Sinter Used (Y/N)	N			Meter Elapsed Time	0:30:00

Meter Units ◉ litres

	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	09:25:00	Time	10:02:00	
Final Volume	9.02	Reading (ml/min)	21	Reading (ml/min)	20	
Total Volume	9.02	% Leak	4.7	% Leak	4.4	9.02
Sample Train Internal Volume	0.001	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			

Sample Point	A1	A1		A1		Impinger 1	None Used
Time/ point (mins)	0 - 10	10 - 20		20 - 30			
Tube Temp °C	17	18		19		Start Weight (g)	
Stack Temp °C	18	18		18			
Meter Temp °C	18	18		18		End Weight (g)	
Pump Flowrate (ml/min)	300	300		300		Total weight (g)	0

Sample Point						Impinger 2	
Time/ point (mins)							
Tube Temp °C						Start Weight (g)	
Stack Temp °C							
Meter Temp °C						End Weight (g)	
Pump Flowrate (ml/min)						Total weight (g)	0

Sample Point						Impinger3	
Time/ point (mins)							
Tube Temp °C						Start Weight (g)	
Stack Temp °C							
Meter Temp °C						End Weight (g)	
Pump Flowrate (ml/min)						Total weight (g)	0

Sample Point						Silica	(IF USED)
Time/ point (mins)						<50% Spent at end Y/N?	Yes
Tube Temp °C						Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes
Stack Temp °C							
Meter Temp °C							
Pump Flowrate (ml/min)							

LABORATORY ANALYSIS RESULTS

Laboratory analysis for **Particulates**, **Toluene**, **Benzene** & **Formaldehyde** was subcontracted to RPS laboratories, a UKAS Accredited Testing Laboratory, Number 0605.

RPS **DO** hold **UKAS & MCERTS** accreditation for this analysis.

As required by the MCERTS Performance Standard for Organisations, the analysis results are shown below.

Laboratory analysis for **Top 10 VOC Screen** & **1,3 Butadiene** was subcontracted to RPS laboratories, a UKAS Accredited Testing Laboratory, Number 0605.

RPS **DO NOT** hold **UKAS & MCERTS** accreditation for this analysis.

As required by the MCERTS Performance Standard for Organisations, the analysis results are shown below.

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R001

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – June 2025
Survey Dates : 9th – 10th June 2025
Report Issue Date : 7th July 2025

Customer Sample No						ECL/25/2449 - 003243	ECL/25/2450	ECL/25/2451 - 003242	ECL/25/2452	ECL/25/2453 - 003244	ECL/25/2454	ECL/25/2455 - 003238	ECL/25/2456
RPS Sample No						306613	306614	306615	306616	306617	306618	306619	306620
Sample Matrix						FILTER	SOLUTION	FILTER	SOLUTION	FILTER	SOLUTION	FILTER	SOLUTION
Sampling Date						09/06/2025	09/06/2025	09/06/2025	09/06/2025	09/06/2025	09/06/2025	09/06/2025	09/06/2025
Determinand	CAS No	Codes	SOP	RL	Units								
particulates		UM	D9	0.04	mg	0.67		0.40		0.30		< 0.04	
particulates		UM	D9	0.5	mg		< 0.5		< 0.5		< 0.5		< 0.5

Customer Sample No						ECL/25/2461	ECL/25/2462	ECL/25/2465	ECL/25/2466
RPS Sample No						306627	306628	306629	306630
Sample Matrix						TUBE	TUBE	TUBE	TUBE
Sampling Date						09/06/2025	09/06/2025	10/06/2025	10/06/2025
Determinand	CAS No	Codes	SOP	RL	Units				
formaldehyde FRONT	50-00-0	UM	A40	0.1	ug	< 0.1	< 0.1	< 0.1	< 0.1
formaldehyde BACK	50-00-0	UM	A40	0.1	ug	< 0.1	< 0.1	< 0.1	< 0.1

Customer Sample No						ECL/25/2459	ECL/25/2460	ECL/25/2463	ECL/25/2464
RPS Sample No						306623	306624	306625	306626
Sample Matrix						TUBE	TUBE	TUBE	TUBE
Sampling Date						09/06/2025	09/06/2025	10/06/2025	10/06/2025
Determinand	CAS No	Codes	SOP	RL	Units				
benzene FRONT	71-43-2	UM	O8	2	ug	< 2	< 2	< 2	< 2
toluene FRONT	108-88-3	UM	O8	1	ug	< 1	< 1	< 1	< 1
1,3-butadiene FRONT	106-99-0	N	G8	2	ug	< 2	< 2	< 2	< 2
GC-MS screen (10) FRONT		N	M109	5	ug	S/C	S/C	S/C	S/C

306623	ECL/25/2459	VOC Screen Front: Ethanol 10µg Dimethyl ether 5.4µg Isopropanol 7.9µg Hexamethyl disiloxane 21.5µg Back: VOCs <5µg
306624	ECL/25/2460	VOC Screen Front: VOCs <5µg Back: VOCs <5µg
306625	ECL/25/2463	VOC Screen Front: Isobutane 8.7µg Ethanol 19.1µg Acetone 12.1µg Isopropanol 123.4µg Hexamethyl disiloxane 111.9µg D-Limonene 6.6µg Back: VOCs <5µg
306626	ECL/25/2464	VOC Screen Front: VOCs <5µg Back: VOCs <5µg

UNCERTAINTY CALCULATIONS

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A2 - TVOC Measurement Uncertainty

A2 Shredder - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m³
Lack of fit(1)	u_{lof}	Rectangular (Divisor = √3)	2.00
Span drift(2)	$u_{d,s}$	Rectangular (Divisor = √3)	0.54
Repeatability Standard Deviation (span)(3)	u_r	Normal (Divisor = 1)	0.46
Losses / leakage in the sample system(4)	u_{loss}	Rectangular (Divisor = √3)	0.21
Temperature dependant span drift(5)	u_t	Rectangular (Divisor = √3)	2.40
Interferents(1)	u_i	Rectangular (Divisor = √3)	2.50
Uncertainty of Reference Gas(6)	u_{ref}	Rectangular (Divisor = √3)	1.48
Effect of Voltage Fluctuation(7)	u_v	Rectangular (Divisor = √3)	0.50
Effect of Oxygen Synergism(7)	u_{syn}	Rectangular (Divisor = √3)	4.73

* Sick F3006 FID

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of applied span value
4 Expressed as a percentage of applied span value
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³
7 Expressed as a percentage of the certified range

A2 Shredder - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	*TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.17
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.047
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	0.069
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	0.018
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max} - x_{adj})^2 + (x_{i,min} - x_{adj})(x_{i,max} - x_{adj}) + (x_{i,min} - x_{adj})^2}{3}}$	0.073
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.22
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	0.86
Effect of Voltage Fluctuation	u_v		0.043
Effect of Oxygen Synergism	u_{syn}		0.41
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	1.00
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	1.99
Applied Span Concentration			148.41
Measured Span Concentration, STP Dry Gas			148.17
Expanded measurement uncertainty as % of Applied Span			1.3 %
Expanded measurement uncertainty as % of ELV			6.6%

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
Variation No	**: V002**	**Survey Dates**	**: 9th – 10th June 2025**
Report Ref	**: P6069 : R001**	**Report Issue Date**	**: 7th July 2025**

A2 - TVOC Uncertainty of Measurement Results

A2 Shredder - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range TVOC 0 - 15 mgC/m³
Lack of fit[1]	u_{lof}	Rectangular	$\sqrt{3}$	2.00
Span drift[2]	$u_{d,s}$			0.54
Losses / leakage in the sample system[4]	u_{loss}			0.21
Temperature dependant span drift[5]	u_t			2.40
Interferents[1]	u_i			2.50
Effect of Voltage Fluctuation[7]	u_v			0.50
Effect of Oxygen Synergism[7]	u_{syn}			4.73

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,max} - x_{i,adj})^2 + (x_{i,min} - x_{i,adj})(x_{i,max} - x_{i,adj}) + (x_{i,min} - x_{i,adj})^2}{3}}$, when $\left|(x_{i,max} - x_{i,adj})\right| = \left|(x_{i,min} - x_{i,adj})\right|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.17
Span drift	$u_{d,s}$			0.047
Temperature dependant span drift	u_t			0.065
Interferents	u_i			0.22
Effect of Voltage Fluctuation (See Note)	u_v			0.043
Effect of Oxygen Synergism (See Note)	u_{syn}			0.41

A2 Shredder - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	TVOC 0 - 15 mgC/m³
Losses / leakage in the sample system	u_{loss}	09/06/25 14:15 - 14:44	0.08
		09/06/25 14:45 - 15:14	0.08
		09/06/25 15:15 - 15:44	0.08
Standard Error of Measured Value	u_{SE}	09/06/25 14:15 - 14:44	0.28
		09/06/25 14:45 - 15:14	0.46
		09/06/25 15:15 - 15:44	0.44

Effect on Uncertainty Caused by Oxygen

$$uCorr^{n}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})(20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

1.00

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.0000$$

$$uf_{O_2} = \frac{uCorr^{n}_{O_2}}{f_{O_2}} x100 = \quad 0.00 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

A2 Shredder - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	*TVOC 0 - 15 mgC/m³
Measured Concentration	09/06/25 14:15 - 14:44	36.61
Expanded Uncertainty as Percentage of Measured Concentration		2 %
Measured Concentration	09/06/25 14:45 - 15:14	36.39
Expanded Uncertainty as Percentage of Measured Concentration		3 %
Measured Concentration	09/06/25 15:15 - 15:44	37.01
Expanded Uncertainty as Percentage of Measured Concentration		3 %

Combined Standard Uncertainty

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the applied span concentration
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A3 - TVOC Measurement Uncertainty

A3 Steam Auger Vent - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m^3
Lack of fit[1]	u_{lof}	Rectangular (Divisor = √3)	2.00
Span drift[2]	$u_{d,s}$	Rectangular (Divisor = √3)	0.54
Repeatability Standard Deviation (span)[3]	u_r	Normal (Divisor = 1)	0.67
Losses / leakage in the sample system[4]	u_{loss}	Rectangular (Divisor = √3)	1.32
Temperature dependant span drift[5]	u_t	Rectangular (Divisor = √3)	2.40
Interferents[1]	u_i	Rectangular (Divisor = √3)	2.50
Uncertainty of Reference Gas[6]	u_{ref}	Rectangular (Divisor = √3)	4.80
Effect of Voltage Fluctuation[7]	u_v	Rectangular (Divisor = √3)	0.50
Effect of Oxygen Synergism[7]	u_{syn}	Rectangular (Divisor = √3)	4.73

* Sick F3006 FID

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of applied span value
4 Expressed as a percentage of applied span value
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m^3
7 Expressed as a percentage of the certified range

A3 Steam Auger Vent - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	*TVOC 0 - 15 mgC/m^3
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.17
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.047
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	0.10
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	0.11
Temperature dependant span drift	u_t	$u(x_i)=\frac{u_t}{100}\times R_i \times \sqrt{\frac{(x_{i,max}-x_{adj})^2+(x_{i,min}-x_{adj})(x_{i,max}-x_{adj})+(x_{i,min}-x_{adj})^2}{3}}$	0.34
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.22
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	2.77
Effect of Voltage Fluctuation	u_v		0.043
Effect of Oxygen Synergism	u_{syn}		0.41
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	2.84
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	5.69
Applied Span Concentration			480.33
Measured Span Concentration, STP Dry Gas			476.40
Expanded measurement uncertainty as % of Applied Span			1.2 %
Expanded measurement uncertainty as % of ELV			19.0%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A3 - TVOC Uncertainty of Measurement Results

A3 Steam Auger Vent - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range TVOC 0 - 15 mgC/m³
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	2.00
Span drift(2)	$u_{d,s}$			0.54
Losses / leakage in the sample system(4)	u_{loss}			1.32
Temperature dependant span drift(5)	u_{t}			2.40
Interferents(1)	u_{i}			2.50
Effect of Voltage Fluctuation(7)	u_{v}			0.50
Effect of Oxygen Synergism(7)	u_{syn}			4.73

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,max} - x_{i,adj})^2 + (x_{i,min} - x_{i,adj})(x_{i,max} - x_{i,adj}) + (x_{i,min} - x_{i,adj})^2}{3}}$, when $|(x_{i,max} - x_{i,adj})| = |(x_{i,min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.17
Span drift	$u_{d,s}$			0.047
Temperature dependant span drift	u_{t}			0.32
Interferents	u_{i}			0.22
Effect of Voltage Fluctuation (See Note)	u_{v}			0.043
Effect of Oxygen Synergism (See Note)	u_{syn}			0.41

A3 Steam Auger Vent - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	TVOC 0 - 15 mgC/m³
Losses / leakage in the sample system	u_{loss}	10/06/25 09:00 - 09:29	1.84
		10/06/25 09:30 - 09:59	3.14
		10/06/25 10:00 - 10:29	2.81
Standard Error of Measured Value	u_{SE}	10/06/25 09:00 - 09:29	2.58
		10/06/25 09:30 - 09:59	3.22
		10/06/25 10:00 - 10:29	1.57

Effect on Uncertainty Caused by Oxygen

$$uCorr^{n}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})(20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} = 1.00$$

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = 1.0000$$

$$uf_{O_2} = \frac{uCorr^{n}_{O_2}}{f_{O_2}} x100 = 0.00 \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

A3 Steam Auger Vent - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	*TVOC 0 - 15 mgC/m³
Measured Concentration	10/06/25 09:00 - 09:29	139.94
Expanded Uncertainty as Percentage of Measured Concentration		5 %
Measured Concentration	10/06/25 09:30 - 09:59	238.44
Expanded Uncertainty as Percentage of Measured Concentration		4 %
Measured Concentration	10/06/25 10:00 - 10:29	213.13
Expanded Uncertainty as Percentage of Measured Concentration		3 %

Combined Standard Uncertainty

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the applied span concentration
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A2 Particulates Uncertainty – Test 1

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K=2 Filter mg	LAB Method Uncert K=2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
			TPM 1					
Particulates	0.67	0.50	1.17	0.10	0.50	0.0500	0.25	0.25

	TPM 1			Standard Uncertainty @ 95%	
Sampled Volume (V_m)	1.35	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.97	...		...	...
Meter Temperature (T_m)	298.26	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	20.32	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure ρ_s	766.56	mmHg	$u\rho_s$	0.8	mmHg
Barometric Pressure ρ_b	766.75	mmHg	$u\rho_b$	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	105.46	mmH_2O	$u\Delta H$	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.10	% by volume	uH_2O	0.13	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i =uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = 0.902$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.47	0.47	0.0000447	0.0000112
$u\rho_b$	0.47	0.47	0.000608	0.00228
uT_m	0.47	0.47	0.000825	0.00124
H_2O	0.47	0.47	0.00472	0.000592

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00229$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 1.2188$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.22	1.22	1.35	0.00309
Effect of uV_m	1.22	1.22	0.90	0.000902

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.00426$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = 1.00$$

$$uCorr^n{}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x Uncertainty\ of\ O_2\ Measurement = 1.00$$

$$uf_{O_2} = \frac{uCorr^n{}_{O_2}}{f_{O_2}} x100 = 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{Oxy}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = 0.96$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	1.17	0.75	0.82	0.21
uV_{stp}	0.96	0.96	0.79	0.00335

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.21	0.42	0.96	43.6%	8.4%

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corr^n Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (*Ucombined*) %
Particulates	43.6	0.0	43.6

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
Variation No	**: V002**	**Survey Dates**	**: 9th – 10th June 2025**
Report Ref	**: P6069 : R001**	**Report Issue Date**	**: 7th July 2025**

A2 Particulates Uncertainty – Test 2

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K=2 Filter mg	LAB Method Uncert K=2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
			TPM 2					
Particulates	0.40	0.50	0.90	0.10	0.50	0.0500	0.25	0.25

	TPM 2			Standard Uncertainty @ 95%	
Sampled Volume (V_m)	1.39	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.97	...		...	...
Meter Temperature (T_m)	306.82	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	20.32	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure ρ_s	766.56	mmHg	$u\rho_s$	0.8	mmHg
Barometric Pressure ρ_b	766.75	mmHg	$u\rho_b$	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	105.48	mmH_2O	uΔH	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.10	% by volume	uH_2O	0.13	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i =uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = \quad 0.877$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.46	0.46	0.0000441	0.0000110
$u\rho_b$	0.47	0.46	0.000599	0.00225
uT_m	0.47	0.46	0.000800	0.00120
H_2O	0.46	0.46	0.00465	0.000583

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00217$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 1.2208$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.22	1.22	1.39	0.00302
Effect of uV_m	1.22	1.22	0.88	0.000877

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00428$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.00$$

$$uCorr^n{}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x Uncertainty\ of\ O_2\ Measurement = \quad 1.00$$

$$uf_{O_2} = \frac{uCorr^n{}_{O_2}}{f_{O_2}} x 100 = \quad 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{Oxy}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = \quad 0.74$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	0.95	0.53	0.82	0.21
uV_{stp}	0.74	0.73	0.60	0.00258

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.21	**0.42**	**0.74**	**56.7%**	**8.4%**

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corr^n Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (*Ucombined*) %
Particulates	**56.7**	**0.0**	**56.7**

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
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A2 Particulates Uncertainty – Test 3

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K=2 Filter mg	LAB Method Uncert K=2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
				TPM 3				
Particulates	0.30	0.50	0.80	0.10	0.50	0.0500	0.25	0.25

	TPM 3		Standard Uncertainty @ 95%		
Sampled Volume (V_m)	1.40	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.97	...		...	...
Meter Temperature (T_m)	309.26	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	20.32	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure ρ_s	766.56	mmHg	up_s	0.8	mmHg
Barometric Pressure ρ_b	766.75	mmHg	up_b	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	105.48	mmH_2O	uΔH	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.10	% by volume	uH_2O	0.13	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i=uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = \quad 0.870$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.46	0.46	0.0000439	0.0000110
up_b	0.46	0.46	0.000597	0.00224
uT_m	0.46	0.46	0.000794	0.00119
H_2O	0.46	0.46	0.00463	0.000580

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00214$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 1.2207$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.22	1.22	1.40	0.00301
Effect of uV_m	1.22	1.22	0.87	0.000870

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.00428$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.00$$

$$uCorr^n_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x Uncertainty\ of\ O_2\ Measurement = \quad 1.00$$

$$uf_{o_2} = \frac{uCorr^n_{o_2}}{f_{o_2}} x100 = \quad 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{Oxy}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = \quad 0.66$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	0.86	0.45	0.82	0.21
uV_{stp}	0.66	0.65	0.54	0.00230

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.21	0.42	0.66	63.7%	8.4%

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrⁿ Factor	Overall Measurement Uncertainty inc O_2 Corrⁿ factor ($U_{combined}$) %
Particulates	63.7	0.0	63.7

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
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A2 Top 10 VOC Screen Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

				Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m³	uV_m	0.0002	m³
Meter Correction Factor or ml/count	Yd	0.989	...	...	...	...
Meter Temperature	T_m	292.00	k	uT_m	1.5	k
Barometric Pressure	p_b	1022.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	Recovered Mass			Standard Uncertainty	
Ethanol	10.00	µg	uM	2.50	µg
Dimethyl ether	5.40	µg	uM	2.43	µg
Isopropano	7.90	µg	uM	2.77	µg
Hexamethyl disiloxane	21.50	µg	uM	1.08	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_, uT_ etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (u_{pb}), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
u_{p_b}	0.49	0.48	0.000477	0.00477
uT_m	0.95	0.94	0.00323	0.00485
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00618$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00840$$

	Maximum m³	Minimum m³	Sensitivity	Standard Uncertainty m³
Effect of uf_s	0.00846	0.00835	0.00891	0.0000550
Effect of uV_m	0.00861	0.00819	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Ethanol	0.0137	...
Dimethyl ether	0.00742	...
Isopropano	0.0109	...
Hexamethyl disiloxane	0.0295	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Ethanol	1.49	0.89	118.99	0.30
Dimethyl ether	0.93	0.35	118.99	0.29
Isopropano	1.27	0.61	118.99	0.33
Hexamethyl disiloxane	2.69	2.43	118.99	0.13
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Ethanol				
Dimethyl ether				
Isopropano				
Hexamethyl disiloxane				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Ethanol	1.22	1.16	141.68	0.0297
Dimethyl ether	0.66	0.63	76.50	0.0161
Isopropano	0.96	0.92	111.92	0.0235
Hexamethyl disiloxane	2.62	2.50	304.60	0.0639

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Ethanol	0.30	0.60	1.19	50.30
Dimethyl ether	0.29	0.58	0.64	90.17
Isopropano	0.33	0.66	0.94	70.22
Hexamethyl disiloxane	0.15	0.29	2.56	11.41

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
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A2 Toluene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	**Yd**	0.989	...	...	...	...
Meter Temperature	T_m	292.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1022.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Toluene	1.00	µg	**uM**	0.50	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component ($u\rho b$), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
$u\rho_b$	0.49	0.48	0.000477	0.00477
uT_m	0.95	0.94	0.00323	0.00485
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00618$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00840$$

	Maximum m^3	**Minimum m^3**	**Sensitivity**	**Standard Uncertainty m^3**
Effect of uf_s	0.00846	0.00835	0.00891	0.0000550
Effect of uV_m	0.00861	0.00819	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
Toluene	0.00137	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Toluene	0.18	0.0595	118.99	0.0595
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Toluene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Toluene	0.12	0.12	14.17	0.00297

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
Toluene	0.0596	0.12	0.12	100.15

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
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A2 Benzene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	**Yd**	0.989	...	...	...	...
Meter Temperature	T_m	292.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1022.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Benzene	2.00	µg	**uM**	1.00	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV.., uT.. etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component ($u\rho b$), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.49	0.48	0.000477	0.00477
uT_m	0.95	0.94	0.00323	0.00485
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00618$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00840$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00846	0.00835	0.00891	0.0000550
Effect of uV_m	0.00861	0.00819	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Benzene	0.00275	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene	0.36	0.12	118.99	0.12

Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene	0.24	0.23	28.34	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Benzene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
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A2 1,3 Butadiene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m³		uV_m	0.0002	m³
Meter Correction Factor or ml/count	**Yd**	0.989	...		...	...	...
Meter Temperature	T_m	292.00	k		uT_m	1.5	k
Barometric Pressure	ρ_b	1022.00	mBar			10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol		$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol		uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**			**Standard Uncertainty**	
1,3-butadiene	2.00	µg	**uM**	1.00	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV$_m$, uT$_m$ etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT$_m$) & measured moisture (uH$_2$O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up$_b$	0.49	0.48	0.000477	0.00477
uT$_m$	0.95	0.94	0.00323	0.00485
uH$_2$O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00618$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00840$$

	Maximum m³	**Minimum m³**	**Sensitivity**	**Standard Uncertainty m³**
Effect of uf$_s$	0.00846	0.00835	0.00891	0.0000550
Effect of uV$_m$	0.00861	0.00819	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
1,3-butadiene	0.00275	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to uM$_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene	0.36	0.12	118.99	0.12
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene				

Uncertainty in final measurement @ Reference Conditions due to uV$_{STD}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene	0.24	0.23	28.34	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
1,3-butadiene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
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A2 Formaldehyde Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00902	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	**Yd**	0.995	...	...	...	...
Meter Temperature	T_m	292.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1022.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Formaldehyde	0.10	µg	**uM**	0.0500	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV.., uT.. etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up_b	0.49	0.48	0.000477	0.00477
uT_m	0.95	0.94	0.00323	0.00485
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00618$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00846$$

	Maximum m^3	**Minimum m^3**	**Sensitivity**	**Standard Uncertainty m^3**
Effect of uf_s	0.00852	0.00841	0.00897	0.0000554
Effect of uV_m	0.00868	0.00825	0.94	0.000212

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000213$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
Formaldehyde	0.000136	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Formaldehyde	0.0177	0.00591	118.14	0.00591
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Formaldehyde				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Formaldehyde	0.0121	0.0115	1.40	0.000297

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
Formaldehyde	0.00592	0.0118	0.0118	100.15

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A3 Top 10 VOC Screen Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: A3 Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00903	m³	uV_m	0.0002	m³
Meter Correction Factor or ml/count	**Yd**	0.989	...	...	...	...
Meter Temperature	T_m	290.33	k	uT_m	1.5	k
Barometric Pressure	P_b	1015.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Isobutane	8.70	µg	**uM**	3.05	µg
Ethanol	19.10	µg	**uM**	0.96	µg
Acetone	12.10	µg	**uM**	0.61	µg
Isopropanol	123.40	µg	**uM**	6.17	µg
Hexamethyl disiloxane	111.90	µg	**uM**	5.60	µg
D-Limonene	6.60	µg	**uM**	2.64	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (up_b), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.95	0.94	0.00325	0.00487
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00841$$

	Maximum m³	**Minimum m³**	**Sensitivity**	**Standard Uncertainty m³**
Effect of uf_s	0.00847	0.00836	0.00893	0.0000557
Effect of uV_m	0.00862	0.00820	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
Isobutane	0.0119	...
Ethanol	0.0262	...
Acetone	0.0166	...
Isopropanol	0.17	...
Hexamethyl disiloxane	0.15	...
D-Limonene	0.00906	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Isobutane	1.40	0.67	118.86	0.36
Ethanol	2.38	2.16	118.86	0.11
Acetone	1.51	1.37	118.86	0.0719
Isopropanol	15.40	13.93	118.86	0.73
Hexamethyl disiloxane	13.97	12.64	118.86	0.67
D-Limonene	1.10	0.47	118.86	0.31
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Isobutane				
Ethanol				
Acetone				
Isopropanol				
Hexamethyl disiloxane				
D-Limonene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Isobutane	1.06	1.01	122.99	0.0258
Ethanol	2.33	2.22	270.02	0.0567
Acetone	1.48	1.40	171.06	0.0359
Isopropanol	15.04	14.31	1744.54	0.37
Hexamethyl disiloxane	13.64	12.98	1581.96	0.33
D-Limonene	0.80	0.77	93.31	0.0196

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
Isobutane	0.36	0.73	1.03	70.22
Ethanol	0.13	0.26	2.27	11.41
Acetone	0.0821	0.16	1.44	11.41
Isopropanol	0.84	1.67	14.67	11.41
Hexamethyl disiloxane	0.76	1.52	13.30	11.41
D-Limonene	0.31	0.63	0.78	80.19

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
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Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A3 Toluene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: A3 Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00903	m^3		uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.989	...		...	...	...
Meter Temperature	T_m	290.33	k		uT_m	1.5	k
Barometric Pressure	ρ_b	1015.00	mBar			10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol		$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol		uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
Toluene	1.00	µg	uM	0.50 µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.49	0.48	0.000478	0.00478
uT_m	0.95	0.94	0.00325	0.00487
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00841$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00847	0.00836	0.00893	0.0000557
Effect of uV_m	0.00862	0.00820	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Toluene	0.00137	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.18	0.0594	118.86	0.0594
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.12	0.12	14.14	0.00297

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Toluene	0.0595	0.12	0.12	100.15

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
Variation No	**: V002**	**Survey Dates**	**: 9th – 10th June 2025**
Report Ref	**: P6069 : R001**	**Report Issue Date**	**: 7th July 2025**

A3 Benzene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: A3 Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00903	m³	uV_m	0.0002	m³
Meter Correction Factor or ml/count	**Yd**	0.989	...	...	...	...
Meter Temperature	T_m	290.33	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1015.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Benzene	2.00	µg	**uM**	1.00	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV..., uT... etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (up_b), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.95	0.94	0.00325	0.00487
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00841$$

	Maximum m³	**Minimum m³**	**Sensitivity**	**Standard Uncertainty m³**
Effect of uf_s	0.00847	0.00836	0.00893	0.0000557
Effect of uV_m	0.00862	0.00820	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
Benzene	0.00275	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene	0.36	0.12	118.86	0.12
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene	0.24	0.23	28.27	0.00593

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
Benzene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
Permit No	**: EPR/JB3604FF**	**Visit Details**	**: Compliance – June 2025**
Variation No	**: V002**	**Survey Dates**	**: 9th – 10th June 2025**
Report Ref	**: P6069 : R001**	**Report Issue Date**	**: 7th July 2025**

A3 1,3 Butadiene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: A3 Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00903	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	**Yd**	0.989	**...**	**...**	**...**	**...**
Meter Temperature	T_m	290.33	**k**	uT_m	1.5	**k**
Barometric Pressure	ρ_b	1015.00	**mBar**		10.0	**mBar**
Oxygen content	$O_{2,m}$	20.90	**%Vol**	$uO_{2,m}$	1.25	**%Vol**
Moisture	H_2O	0.00	**%Vol**	uH_2O		**%Vol**

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
1,3-butadiene	2.00	µg	**uM**	1.00	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV..., uT... etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.95	0.94	0.00325	0.00487
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00841$$

	Maximum m^3	**Minimum m^3**	**Sensitivity**	**Standard Uncertainty m^3**
Effect of uf_s	0.00847	0.00836	0.00893	0.0000557
Effect of uV_m	0.00862	0.00820	0.93	0.000210

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000210$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
1,3-butadiene	0.00275	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene	0.36	0.12	118.86	0.12
Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
1,3-butadiene	0.24	0.23	28.27	0.00593

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
1,3-butadiene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – June 2025
Variation No	: V002	Survey Dates	: 9th – 10th June 2025
Report Ref	: P6069 : R001	Report Issue Date	: 7th July 2025

A3 Formaldehyde Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: A3 Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00902	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.995	...	...	...	...
Meter Temperature	T_m	291.00	k	uT_m	1.5	k
Barometric Pressure	p_b	1022.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	Recovered Mass		Standard Uncertainty		
Formaldehyde	0.10	µg	uM	0.0500	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.95$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.95	0.94	0.00325	0.00488
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00624$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00849$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00855	0.00844	0.00897	0.0000560
Effect of uV_m	0.00871	0.00828	0.94	0.000212

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000214$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Formaldehyde	0.000136	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0177	0.00589	117.74	0.00589
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0121	0.0115	1.39	0.000297

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Formaldehyde	0.00590	0.0118	0.0118	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
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Stack Reference A2

Measurement Uncertainty Calculations - Velocity at Stack Conditions

Contribution From	Standard u/c (Pa)	
Pitot Calibration Uncertainty Contribution	1.18	A
Manometer Calibration Uncertainty Contribution	1.178333333	B
Variation in Actual Pitot reading at sample points	11.00	C
Combined u/c (Pa) =	**Combined u/c (Pa)**	
SQRT $(A/\sqrt{3})^2 + (B/\sqrt{3})^2 + (C/\sqrt{3})^2$	6.42	
Expanded Uncertainty of Flow Measurements Pa	**12.85**	
	Standard u/c (K)	
Temperature Calibration (K)	1.45	D
Variation in Actual Temp reading at sample points	0.50	E
Combined u/c of Temp (K)	**Combined u/c (K)**	
SQRT $((D/\sqrt{3^2}) + (E/\sqrt{3})^2$	0.89	
Expanded Uncertainty of Temp Measurements (K)	**1.77**	
Measured Average Velocity (m/s) at Stack Conds	19.68	
Maximum Average Velocity (m/s) at Stack Conds	20.28	
Standard Uncertainty Velocity at Stack Conditions (%)	3.00	
Expanded Uncertainty Velocity (at Stack Conditions)	**6.00 (%)**	

Measurement Uncertainty Calculations - Flowrate at Stack Conditions

Contribution From	Standard u/c (m^2)	
Area (m2)	0.00049	
Measured Average Flowrate (m^3/s) at Stack Conds	0.97	
Maximum Average Flowrate (m^3/s) at Stack Conds	1.01	
Standard Uncertainty Flowrate (m^3/s) at Stack Conditions (%)	4.03	
Expanded Uncertainty Flowrate (m^3/s) at Stack Conditions	**8.07 (%)**	

Measurement Uncertainty Calculations - Flowrate at STP & Wet Gas

Contribution From	Standard u/c (%)	
Temperature Calibration (K)	0.5	
Barometer Calibration	0.5	
Measured Average Flowrate (m^3/s) at STP Wet	0.92	
Maximum Average Flowrate (m^3/s) at STP Wet	0.96	
Standard Uncertainty Flowrate (m^3/s) at STP Wet	4.52	
Expanded Uncertainty Flowrate (m^3/s) at STP Wet	**9.04 (%)**	

2499

EMISSIONS MONITORING SURVEY

Prepared for:

Albus Environmental Ltd
212 Kingsnorth Industrial Estate
Hoo
Rochester
Kent
ME3 9NZ

Permit Number	**: EPR/JB3604FF**
Variation Number	**: V002**
Installation	**: A2 Shredder & A3 Steam Auger**
Visit Details	**: Compliance – December 2025**
Job Number	**: P6069**
Report Number	**: R002**
Report Issue Date	**: 21st January 2026**
Survey Dates	**: 9th December 2025**

Prepared by:

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Tel: 01443 801215

Report Issue:		**FINAL**	
Report Prepared by:		**Report Reviewed & Approved by** **MCERTS Level Two** **Technical Endorsements TE1, TE2, TE3 & TE4**	
Name:	Scott Hackett	***Name:***	Andy Barnes
		MCERTS No:	MM 03 235
		Signature:	
Date:	13th January 2026	***Date:***	21st January 2026

This report is not to be used for contractual or engineering purposes unless this approval sheet is signed where indicated by the approver and the report is designated "FINAL".

This report has been prepared by Environmental Compliance Limited (ECL) in their professional capacity as Environmental Consultants. The contents of the report reflect the conditions that prevailed and the information available or supplied at the time of its preparation. The report, and the information contained therein, is provided by ECL solely for use and reliance by the Client in performance of ECLs duties and liabilities under its contract with the Client. Until ECL has received payment in full as detailed in the quotation or contract the contents of this report remain the legal property of ECL. The contents of the report do not, in any way, purport to include any manner of legal advice or opinion.

Any operating information and CEMS data used in this report has been supplied by the client.

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Should the Client wish to release this report to a Third Party for the party's reliance, Environmental Compliance Ltd may, at its discretion, agree to such release provided that:

- Environmental Compliance Ltd gives written agreement prior to such release and ECL has received payment in full for all works/services undertaken;
- By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against Environmental Compliance Ltd and, accordingly, Environmental Compliance Ltd assume no duties, liabilities or obligations to that Third Party;
- Environmental Compliance Ltd accepts no responsibility for any loss or damage incurred by the Client or for any conflict of Environmental Compliance Ltd interests arising out of the Clients' release of this report to the Third Party.

In the event that a report is revised and re-issued, the client shall ensure that any earlier versions of the report, and any copies thereof, are void and such copies should be marked with the words "superseded and revised".

Opinions and Interpretation expressed within this report are outside the scope of the UKAS accreditation.

MCERTS requirements mean that comparison of results with emissions limit values is not permitted within this report.

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PART 1 - EXECUTIVE SUMMARY

1 Monitoring Objectives

Environmental Compliance Ltd (ECL) was commissioned by **Albus Environmental Ltd** to undertake an emission monitoring survey at their **Rochester** site. This report presents the findings of the study.

The monitoring at this installation was carried out in accordance with our quotation reference **AM/P6069/Q002**, for compliance check monitoring of emissions to air. The substances requested for monitoring at each emissions point are listed below:

Substances to be monitored	Emission Point Identification	
	A2	**A3**
	Shredder	Steam Auger Steam Vent
Velocity / Flowrate	● U	
Particulates	● U	
Total Organic Carbon (TVOC)	● U	● U
Top 10 Speciated VOCs	● U	● U
Toluene	● U	● U
Benzene	● U	● U
1,3 Butadiene	● U	● U
Formaldehyde	● U	● U

● Denotes the substances to be monitored.

U **Denotes UKAS accreditation is held for monitoring that substance, but does not mean that it has been claimed which will depend on whether the testing could be completed in accordance with the Standard Reference Method.**

Special Requirements: *"During Normal Operation."*

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

1.1 Monitoring Results

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Mass Emission	Expanded Uncertainty (as % of)			Reference Conditions 273 K,101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation Claimed for Test Result	Tick if non-conforming test (see Section 2)	Operating Status
						ELV	Span Value	Measured Value							
A2	Volumetric Flowrate	...	0.85952	m³/sec	...	...	...	6	Stack Conditions	09/12/2025	09:45 – 09:59	BS EN 16911-1:2013 & MID	UKAS / MCERTS		Normal
	Volumetric Flowrate	...	0.79910	m³/sec	...	...	...	7	& Wet Gas			BS EN 16911-1:2013 & MID	UKAS / MCERTS		
	Particulates $	5	0.65	mg/m³	1.88.(g/hr)	8	...	61	& Wet Gas		10:35 – 11:20	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Particulates $	5	0.73	mg/m³	2.07.(g/hr)	8	...	54	& Wet Gas		12:00 – 12:45	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Particulates $	5	0.65	mg/m³	1.87.(g/hr)	8	...	61	& Wet Gas		13:40 – 14:25	BS EN 13284-1:2017 & MID	UKAS / MCERTS		
	Average Particulates	5	**0.68**	mg/m³	1.94.(g/hr)	8	...	59	& Wet Gas		...	BS EN 13284-1:2017 & MID	...		
	TVOC as Carbon	30	5.65	mgC/m³	16.25.(g/hr)	5	3	16	& Wet Gas		10:30 – 10:59	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	6.79	mgC/m³	19.53.(g/hr)	5	3	26	& Wet Gas		11:00 – 11:29	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	9.57	mgC/m³	27.53.(g/hr)	5	3	19	& Wet Gas		11:30 – 11:59	BS EN 12619:2013	UKAS / MCERTS		
	Average TVOC as Carbon	30	**7.34**	mgC/m³	21.12.(g/hr)	5	3	16	& Wet Gas		10:30 – 11:59	BS EN 12619:2013	UKAS / MCERTS		
	Speciated VOC – Top 10 Screen $	...	5.08*	mg/m³	14.61.(g/hr)	...	...	7	& Wet Gas		13:45 – 14:15	CEN/TS 13649:2014	NU	✓	
	Target VOC – Toluene $	...	<0.12	mg/m³	<0.35.(g/hr)	...	...	>100	& Wet Gas		13:45 – 14:15	CEN/TS 13649:2014	UKAS / MCERTS		
	Target VOC – Benzene $	...	<0.24	mg/m³	<0.69.(g/hr)	...	...	>100	& Wet Gas		13:45 – 14:15	CEN/TS 13649:2014	UKAS / MCERTS		
	Target VOC – 1,3 Butadiene $	...	<0.24	mg/m³	<0.69.(g/hr)	...	...	>100	& Wet Gas		13:45 – 14:15	CEN/TS 13649:2014	NU	✓	
	Formaldehyde $	...	0.036	mg/m³	0.10.(g/hr)	...	...	11	& Wet Gas		13:00 – 13:30	EA TGN M2 & CEN/TS 13649:2014	UKAS / MCERTS		

*** For individual compounds that were detected in the top 10 screen, please refer to tables section on Page 20**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Units	Mass Emission	Expanded Uncertainty (as % of)			Reference Conditions 273 K,101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation Claimed for Test Result	Tick if non-conforming test (see Section 2)	Operating Status
						ELV	Span Value	Measured Value							
A3	TVOC as Carbon	30	**77.27**	mgC/m³	...	5	3	4	& Wet Gas	09/12/2025	13:00 – 13:29	BS EN 12619:2013	UKAS / MCERTS		Normal
	TVOC as Carbon	30	**258.36**	mgC/m³	...	5	3	27	& Wet Gas		13:30 – 13:59	BS EN 12619:2013	UKAS / MCERTS		
	TVOC as Carbon	30	**196.09**	mgC/m³	...	5	3	5	& Wet Gas		14:00 – 14:29	BS EN 12619:2013	UKAS / MCERTS		
	Average TVOC as Carbon	30	**177.24**	mgC/m³	...	5	3	16	& Wet Gas		13:00 – 14:29	BS EN 12619:2013	UKAS / MCERTS		
	Speciated VOC – Top 10 Screen $	...	35.68*	mg/m³	...	...	...	8	& Wet Gas		15:20 – 15:50	CEN/TS 13649:2014	NU	✓	
	Target VOC – Toluene $	...	0.24	mg/m³	...	...	...	50	& Wet Gas		15:20 – 15:50	CEN/TS 13649:2014	UKAS / MCERTS	✓	
	Target VOC – Benzene $	...	<0.24	mg/m³	...	...	...	>100	& Wet Gas		15:20 – 15:50	CEN/TS 13649:2014	UKAS / MCERTS	✓	
	Target VOC – 1,3 Butadiene $	...	<0.24	mg/m³	...	...	...	>100	& Wet Gas		15:20 – 15:50	CEN/TS 13649:2014	NU	✓	
	Formaldehyde $	...	0.048	mg/m³	...	...	...	11	& Wet Gas		12:10 – 12:40	EA TGN M2 & CEN/TS 13649:2014	UKAS / MCERTS	✓	

*** For individual compounds that were detected in the top 10 screen, please refer to tables section on Page 22**

Notes

The volumetric flowrate shown above is that from the initial pitot traverse.
Any other flow measurements made during isokinetic sampling and/ or repeat traverses are shown later in the tables section.

Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value.
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval. The Uncertainty results **DO NOT** take into account the effect of the sample location limitations.
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency.
Accreditation for use of Method	**The details indicate the accreditation for the use of the complete monitoring method, e.g. MCERTs, UKAS. If use of the method is not accredited " NA" is stated.**
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring.
$	Chemical Analysis on sample reagents was performed by an External Laboratory as detailed in Section 4
NU	UKAS Accreditation Held but UKAS Accreditation cannot be claimed for the test as sampling did not comply with the Standard Reference Method (SRM), see section 2 & 5
NA	**Method is NOT UKAS Accredited.**

1.2 Operating Information

Any operating information and CEMS data below has been supplied by the client.

Emission Point Reference	Process Type	Process Duration	Fuel	Feedstock	Abatement	Load	Comparison of Operator CEMS and Periodic Monitoring Results					
							Parameter	Date	Time	CEMS Results	Periodic Monitoring Results	Units
A2 Shredder	Batch	6 – 8 Hrs	…	Clinical Waste	HEPA & Carbon Filter	…	…	…	…	NP	…	…
A3 Steam Auger	Batch	6 – 8 Hrs	…	Clinical Waste	Condenser & Carbon Filter	…	…	…	…	NP	…	…

Notes:

Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the normal load, throughput or rating of the plant
CEMS Data	Enter this data for each CEM installed if it is has been provided by operator otherwise state “NP” (NOT PROVIDED)

2 Monitoring Deviations

The objective of the survey was to measure the concentrations of pollutants from the processes / locations as detailed in Section 1. This survey meets the requirements of the site's **PPC Permit Number: EPR/JB3604FF** where UKAS and MCERTS accreditation has and could be claimed for the testing in the monitoring results table.

There were modifications to the sampling procedures (TPDs) listed in section 4. These are as follows:

For Stack A2 - Due to high duct gas velocity, in order to maintain isokinetic sampling, it was necessary to use a nozzle with diameter smaller than the recommended minimum of 8mm minimum stated in BS EN 13284-1:2017. Note that there is no absolute minimum nozzle size stated in the standard, as long as the uncertainty of the nozzle area is <5%. **So this does not need to be described as a non-conforming test.**

There were no substance deviations from the original and agreed emissions monitoring schedule.

Non-conforming tests are as follows:

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

ECL holds UKAS/MCERTS accreditation for the sampling of **Top 10 Speciated VOCs** & **1,3 Butadiene**. However, our approved analysis laboratory does not hold accreditation for these determinands. Furthermore, a check of the UKAS website found no commercial laboratories in the UK that hold analytical accreditation for these determinands, so accreditation for these results CANNOT be claimed.

For **Stack A3**, due to the size of the sampling hole it was not possible to use an in-stack sinter at the front of the sampling probe for **Top 10 VOC Screen**, **Toluene**, **Benzene**, **1,3 Butadiene** and **Formaldehyde** sampling. This is contrary to CEN/TS 13649: 2014, which states a requirement to use a particulate filter ahead of the sorbent tube.

Homogeneity tests have not been completed for pollutants at the following locations: **A2** & **A3**. Such tests are not applicable to these locations (as the duct area is <1m^2) and were not requested by the client.

PART 2 – SUPPORTING INFORMATION

3 SAMPLING STAFF DETAILS

Site Sampling Team

Names of Site Team	Dates on Site	MCERTS No.	LEVEL	Technical Endorsements
Harry Round	9th December 2025	MM 14 1278	2	TE1, TE2, TE3, TE4
Sumedha Madusanka		MM 24 1843	1	…

Report Reviewer

Name	MCERTS No.	LEVEL	Technical Endorsements
Andy Barnes	MM 03 235	2	TE1, TE2, TE3, TE4

Technical Endorsement Key:-

TE1 – **Isokinetic** Particulates, Temperature & Velocity Profiles, Oxygen.
TE2 – **Isokinetic** Extractive Pollutants:- Metals, Dioxin & Furans, PAHs, PCBs, HCl, HF.
TE3 – **Non-Isokinetic** Extractive Pollutants:- Speciated VOCs, HF, HCl, Cyanide.
TE4 – **Continuous Analysers** (Combustion Gases):- TVOC, CO, NOx, SO2.

4 SAMPLING PROTOCOLS / METHODOLOGIES

Details of the substances monitored, the standard methods used and the Environmental Compliance Limited Technical Procedures used during this survey are shown in the table below. Detailed sampling protocols are included in a separate document which will be sent with the report.

In all cases, where analysis of collected samples was required, the analysis was by a subcontract laboratory. Details of the sub-contract laboratory are shown on the analysis certificates in this report. The UKAS/MCERTs accreditation status of the analysis is also indicated on the certificates.

Any required modifications to the Technical Procedure Documents (TPDs) specified below will be detailed in section 2 of this report.

Determinand	External Reference Method	ECL Technical Procedure Number
Velocity and Flowrate	BS EN 16911-1:2013 & MID	ECL/ TPD/ 022A
Particulates (Stackmite)	BS EN 13284-1:2017 & MID	ECL / TPD / 027A
TVOC (Signal 3030PM)	BS EN 12619: 2013	ECL / TPD / 032A
Speciated VOC	CEN/TS 13649:2014	ECL / TPD / 084
Formaldehyde	CEN/TS 13649:2014 & TGN M2	ECL / TPD / 084

5 SAMPLE POINT DESCRIPTIONS

The homogeneity test is applicable to combustion processes, but may also be requested by the regulator for non-combustion processes.

Homogeneity testing has not been completed at these locations.

The test is not usually required for stacks with sampling plane areas of <1m^2 (below 1.13m in diameter for circular ducts).

The Uncertainty of the reported concentrations for these pollutant results DOES NOT take into account the effect of non-conformities or sample location limitations.

The sample locations that were monitored are detailed below:

A2 - Shredder - HEPA & Carbon Filter Exhaust

The stack diameter is 0.25m and the sample platform width back from the sample port is >3m. One sample port is available and is located at a height of 1.95m above the floor. Sampling for Particulates was carried out using an in-stack filter system.

A3 - Steam Auger Steam Vent – Condenser & Carbon Filter Exhaust

The stack diameter is 0.10m and the sample platform width back from the sample port is 1m. One sample port is located at a height of 5m above the floor. The sample port is only suitable for gas monitoring, it is not possible to carry out a flow profile.

EQUIPMENT IDs
(Pre site checklist from SSP)

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

PRE SITE EQUIPMENT CHECKLIST/ EQUIPMENT USED

(Completed before departure to site and when on site in full)

Equipment	Equip. Type	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:	ID No:
MST console/pump	E001								
MST Nozzle set									
MST "S" Type Pitot									
MST Probe									
MST Probe Thermocouple									
MST Hot Box									
MST Impinger Arm									
Barometer		1220							
Site Balance									
Site Check weights									
Horiba	E002								
Heated Probe / Filter									
Chiller									
MFC									
Heated Line									
FID	E003	516							
Heated Line		1350	1351						
Heated Probe / Filter		1348							
Testo	E004								
FTIR	E005								
Heated Probe / Filter									
Heated Line									
Stackmite	E006	1308							
"L" Type Pitot		1342							
Digital Manometer		1484							
Stack Thermocouple		1206							
Thermocouple Reader		466							
Nozzle Set		1216							
Workhorse / Vapex Pumps	E007	1276							
Stack Thermocouple		466							
Tube Thermocouple		1035							
Meter Thermocouple		1028							
High Vac Gauge									
Dioxin Thermocouple									

Quantity of Ice Required / Used for Survey	Zero	Bags (2kg bags)

FIGURES

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

Figure 1 - TVOC

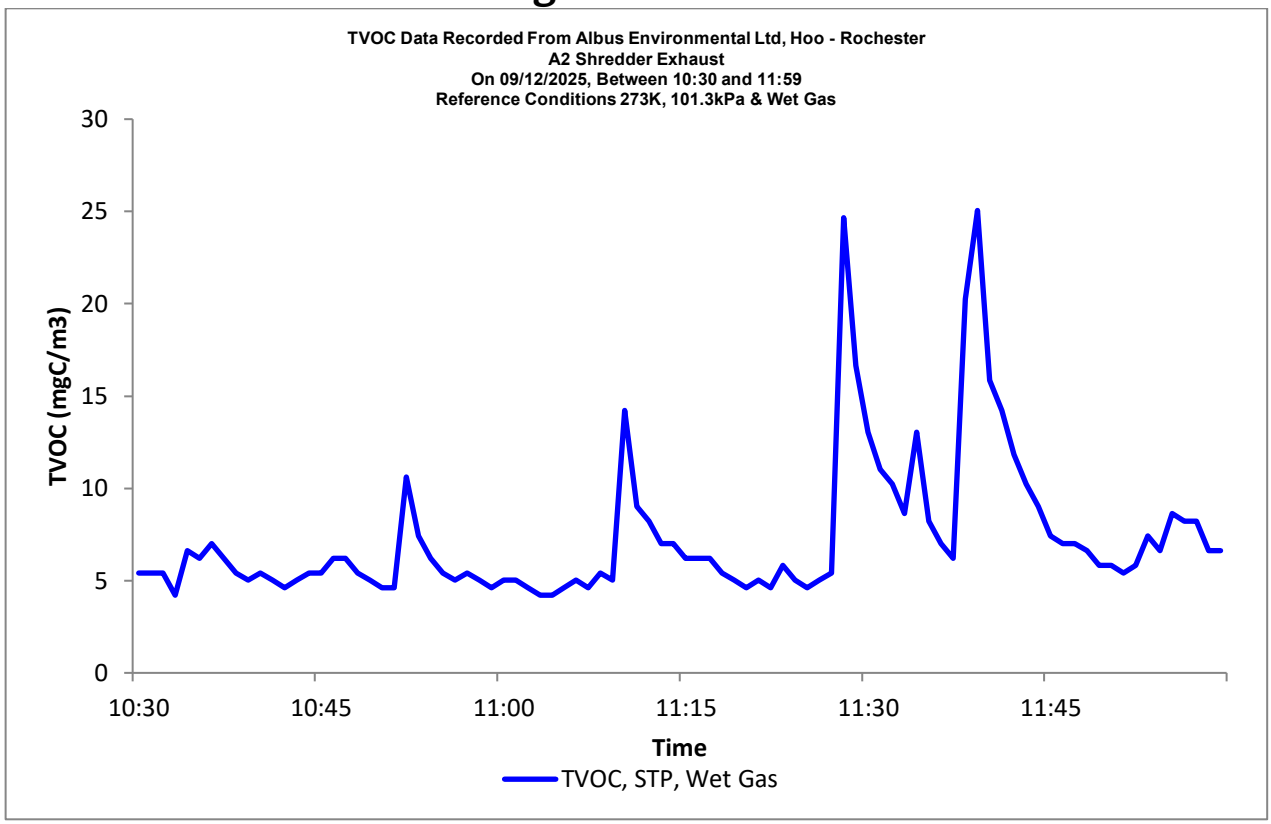
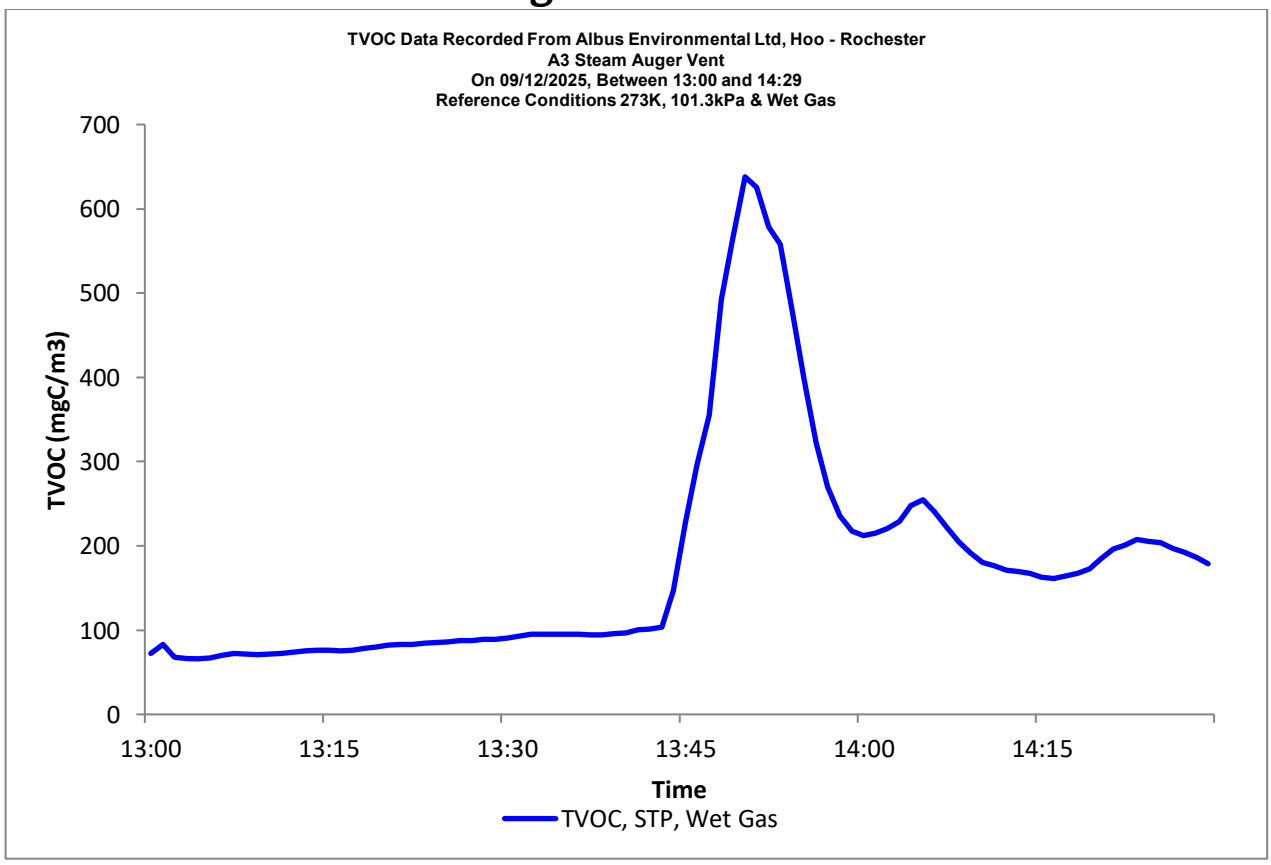


Figure 2 - TVOC



TABLES

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

Table 1 – A2 Particulates Test 1

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM T1	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	°C	21	…
Gas Velocity (at Stack Conditions)	m/sec	17.5005	…
Gas Velocity (Reference Conditions)	m/sec*	16.2703	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.8591	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.7987	…
Sample Date	…	09/12/2025	…
Sample Period	…	10:35 - 11:20	…
Sample Volume (at Stack)	m^3	1.38	…
Sample Volume (reference Conditions)	m^3*	1.288	1.288
Isokinetic Sampling Rate	%	103.9	...
Sample Reference (ECL ID)	ECL/25/	6356 & 6357	6358 & 6359
Mass of Particulate Matter Collected	mg	0.84	0.64
Concentration of Particulate Matter	mg/m^3*	**0.65**	0.50
Emission Rate of Particulate Matter	g/hr	1.88	…
Expanded Uncertainty (% Relative)	%	61	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	9.94

*** Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

Table 2 – A2 Particulates Test 2

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM T2	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	°C	21	…
Gas Velocity (at Stack Conditions)	m/sec	17.3553	…
Gas Velocity (Reference Conditions)	m/sec*	16.1231	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.8519	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.7914	…
Sample Date	…	09/12/2025	…
Sample Period	…	12:00 - 12:45	…
Sample Volume (at Stack)	m^3	1.39	…
Sample Volume (reference Conditions)	m^3*	1.291	1.291
Isokinetic Sampling Rate	%	105.1	...
Sample Reference (ECL ID)	ECL/25/	6360 & 6361	6358 & 6359
Mass of Particulate Matter Collected	mg	0.94	0.64
Concentration of Particulate Matter	mg/m^3*	**0.73**	0.50
Emission Rate of Particulate Matter	g/hr	2.07	…
Expanded Uncertainty (% Relative)	%	54	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	9.91

*** Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

Table 3 – A2 Particulates Test 3

Data Recorded from Shredder - A2

Emission Parameter	Units	TPM T3	Blank
Stack Diameter	metres	0.25	…
			…
Area of Sample Plane	m^2	0.049	…
Moisture Content	%	0.10	…
Oxygen Content	%	20.90	…
Stack Temperature	°C	22	…
Gas Velocity (at Stack Conditions)	m/sec	17.4722	…
Gas Velocity (Reference Conditions)	m/sec*	16.1890	…
Volumetric Flowrate (Stack Conditions)	m^3/sec	0.8577	…
Volumetric Flowrate (Reference Conditions)	m^3/sec*	0.7947	…
Sample Date	…	09/12/2025	…
Sample Period	…	13:40 - 14:25	…
Sample Volume (at Stack)	m^3	1.38	…
Sample Volume (reference Conditions)	m^3*	1.283	1.283
Isokinetic Sampling Rate	%	104.0	...
Sample Reference (ECL ID)	ECL/25/	6362 & 6363	6358 & 6359
Mass of Particulate Matter Collected	mg	0.84	0.64
Concentration of Particulate Matter	mg/m^3*	**0.65**	0.50
Emission Rate of Particulate Matter	g/hr	1.87	…
Expanded Uncertainty (% Relative)	%	61	…
Emission Limit Value (ELV)	mg/m^3*	5	…
Blank Concentration as Percentage of ELV	%	…	9.97

*** Reference Conditions (273K, 101.3kPa, Wet Gas)**

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

Table 4 – A2 Top 10 VOC Screen

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value
Stack Diameter	mm	250
Area of Sample Plane	m^2	0.049
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	18.00
StackTemperature	°C	22.00
Sample Date	…	09/12/2025
Sample Period	…	13:45 - 14:15
Sample Volume (as Measured)	m^3	0.0088
Sample Volume (reference Conditions)	m^{3*}	0.0082

Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6366	Units	Concentration*	Uncertainty	Concentration
Concentration of Isobutane	mg/m^3	2.16	11.37%	0.61
Concentration of Butane	mg/m^3	2.16	11.37%	0.61
Concentration of Ethanol	mg/m^3	0.76	11.37%	0.61
Total Top 10 VOC	mg/m^3	5.08	7.04%	…

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 5 – A2 Toluene

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value
Stack Diameter	mm	250
Area of Sample Plane	m^2	0.049
Measured Oxygen (Dry)	%Vol	20.90
Meter Temperature	°C	18.00
StackTemperature	°C	22.00
Sample Date	…	09/12/2025
Sample Period	…	13:45 - 14:15
Sample Volume (as Measured)	m^3	0.0088
Sample Volume (reference Conditions)	m^{3*}	0.0082

Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6366	Units	Concentration*	Uncertainty	Concentration
Concentration of Toluene	mg/m^3	0.12	100.15%	0.12

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 6 – A2 Benzene

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	18.00		
StackTemperature	°C	22.00		
Sample Date	…	09/12/2025		
Sample Period	…	13:45 - 14:15		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0082		
Sample Tube Results		**Speciated VOC**		**Blank**
Sample Reference ECL/25/6366	**Units**	**Concentration***	**Uncertainty**	**Concentration**
Concentration of Benzene	mg/m^3	0.24	100.15%	0.24

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 7 – A2 (1,3 Butadiene)

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	18.00		
StackTemperature	°C	22.00		
Sample Date	…	09/12/2025		
Sample Period	…	13:45 - 14:15		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0082		
Sample Tube Results		**Speciated VOC**		**Blank**
Sample Reference ECL/25/6366	**Units**	**Concentration***	**Uncertainty**	**Concentration**
Concentration of 1,3 Butadiene	mg/m^3	0.24	100.15%	0.24

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 8 – A2 Formaldehyde

Albus Environmental Ltd

Hoo, Rochester Shredder A2

Emission Parameter	Units	Value		
Stack Diameter	mm	250		
Area of Sample Plane	m^2	0.049		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	18.00		
StackTemperature	°C	22.00		
Sample Date	…	09/12/2025		
Sample Period	…	13:00 - 13:30		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0082		
Sample Tube Results		Formaldehyde		Blank
Sample Reference ECL/25/6367	Units	Concentration*	Uncertainty	Concentration
Concentration of Formaldehyde	mg/m^3	0.036	11.37%	0.024

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 9 – A3 Top 10 VOC Screen

Albus Environmental Ltd

Hoo, Rochester Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	17.00		
StackTemperature	°C	17.00		
Sample Date	…	09/12/2025		
Sample Period	…	15:20 - 15:50		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0083		
Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6368	Units	Concentration*	Uncertainty	Concentration
Concentration of Ethanol	mg/m^3	18.04	11.38%	0.61
Concentration of IPA	mg/m^3	11.58	11.38%	0.61
Concentration of Disiloxane, hexamethyl	mg/m^3	0.79	80.18%	0.61
Concentration of Ethylbenzene	mg/m^3	0.85	80.18%	0.61
Concentration of m+ p-Xylene	mg/m^3	3.03	11.38%	0.61
Concentration of o-Xylene	mg/m^3	0.73	80.18%	0.61
Concentration of D-Limonene	mg/m^3	0.68	100.15%	0.61
Total Top 10 VOC	mg/m^3	35.68	7.79%	…

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 10 – A3 Toluene

Albus Environmental Ltd

Hoo, Rochester Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	17.00		
StackTemperature	°C	17.00		
Sample Date	…	09/12/2025		
Sample Period	…	15:20 - 15:50		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0083		
Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6368	Units	Concentration*	Uncertainty	Concentration
Concentration of Toluene	mg/m^3	0.24	50.29%	0.12

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 11 – A3 Benzene

Albus Environmental Ltd

Hoo, Rochester Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	17.00		
StackTemperature	°C	17.00		
Sample Date	…	09/12/2025		
Sample Period	…	15:20 - 15:50		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0083		
Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6368	Units	Concentration*	Uncertainty	Concentration
Concentration of Benzene	mg/m^3	0.24	100.15%	0.24

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 12 – A3 (1,3 Butadiene)

Albus Environmental Ltd

Hoo, Rochester Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	17.00		
StackTemperature	°C	17.00		
Sample Date	…	09/12/2025		
Sample Period	…	15:20 - 15:50		
Sample Volume (as Measured)	m^3	0.0088		
Sample Volume (reference Conditions)	m^{3*}	0.0083		
Sample Tube Results		Speciated VOC		Blank
Sample Reference ECL/25/6368	Units	Concentration*	Uncertainty	Concentration
Concentration of 1,3 Butadiene	mg/m^3	0.24	100.15%	0.24

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

Table 13 – A3 Formaldehyde

Albus Environmental Ltd

Hoo, Rochester Steam Auger Vent A3

Emission Parameter	Units	Value		
Stack Diameter	mm	100		
Area of Sample Plane	m^2	0.008		
Measured Oxygen (Dry)	%Vol	20.90		
Meter Temperature	°C	16.00		
StackTemperature	°C	16.00		
Sample Date	…	09/12/2025		
Sample Period	…	12:10 - 12:40		
Sample Volume (as Measured)	m^3	0.0089		
Sample Volume (reference Conditions)	m^{3*}	0.0084		
Sample Tube Results		Formaldehyde		Blank
Sample Reference ECL/25/6369	Units	Concentration*	Uncertainty	Concentration
Concentration of Formaldehyde	mg/m^3	0.048	11.39%	0.024

*Reference Conditions: 273 K, 101.3 kPa, Wet Gas

VELOCITY TRAVERSE PROFILES

Environmental Compliance Limited

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

Environmental Compliance Limited	Traverse Data Proforma	Date of Measurement	09/12/2025

Company	Albus Environmental Ltd	Stack Diameter Port A (mm)	250	Average Stack Diameter (mm)	250	Pitot tube coefficient	1.01
Site	Hoo, Rochester	Stack Diameter Port B (mm)		Port Length (mm)	70	Pitot Id	1342
Location	Shredder	Duct Length Port A (mm)		Average Duct Length (mm) L		Stack Thermocouple ID	466
Stack	A2	Duct Length Port B (mm)		Duct width (mm) B		Stack Temp Reader ID	1206
Job No	P6069	Duct Length Port C (mm)		Barometric Pressure. (mb)	1011	Manometer ID	1484
Operators	HR / SM	Duct Length Port D (mm)		Ave Static Press. (mm H_20)	33.03	Barometer ID	1220

Pre - Traverse Checks Carried Out	Time	Pass/ Fail
Pre - Traverse PITOT Visual Inspection	09:45:00	Pass
Pre - Traverse PITOT Leak Check	09:47:00	Pass

Smooth Walls

Static Pressure Readings (Pascals)			
Port A	Port B	Port C	Port D
324.00			

Port/ Point	Distance to Point (mm)	Time	Temperature Readings (°C)			(ΔP) Pitot Readings (Pa)			Average Temp. (°C)	Average (ΔP) (Pa)	Swirl Test ° From Reference
			1	2	3	1	2	3			
A1	125	09:50:00	21.0	21.0	21.0	187.8	176.4	177.6	21.0	180.6	8
Blockage Check @ A1 (L-Type Pitot Only)		09:54:00	21.0	21.0	21.0	191.2	172.4	184.2	21.0	180.6	Total
			Mean		21.0	Mean		182.6	21.0	180.6	Max
			Difference < 5% from Initial ?		0.00	Difference < 5% from Initial ?		1.11	21.0	180.6	Min
									21.0	180.6	Average

Stagnation Check (S-type Pitot Only)	Time	Reading
Static Pressure Via Positive Leg (Pa)		
Static Pressure Via Negative Leg (Pa)		
Difference (Pa) < 10Pa ?		

Post - Traverse Checks Carried Out	Time	Pass/ Fail
Post - Traverse Visual Inspection	09:57:00	Pass
Post - Traverse PITOT Leak Check	09:59:00	Pass

Average temp (K)	294.000

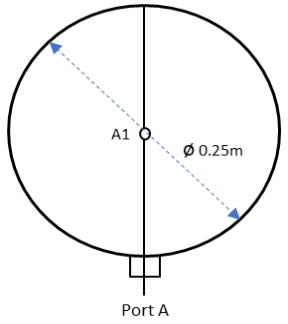
Suitability of Sampling Position	Actual Stack Conditions
Highest:lowest flow pressure ratio < 9:1?	1.04:1
Maximum deviation of flow from axis < 15° ?	8
X-sectional area for stacks= πr2	0.05 m^2
X-sectional area for ducts = L x B	m^2
Suitability of Position for Sampling	OK

Stack Moisture	1.66	%	Gas Velocity (as Measured) Adjusted for Smooth Walls	17.50992	m/sec
Measured Oxygen	20.9	%	Gas Velocity (Reference Conditions) Adjusted for Smooth Walls	16.27906	m/sec*
Measured Carbon Dioxide	0.04	%	Volumetric Flowrate (as Measured) Adjusted for Smooth Walls	0.85952	m^3/sec
Dry Gas Molecular Weight	28.84240	g/g mole	Volumetric Flowrate (Ref Cond) Adjusted for Smooth Walls	0.79910	m^3/sec*

* Reference Conditions: 273K, 101.3kPa, Wet Gas

NOTE: Velocity / volume flowrate calculations exclude contributions from the measurement point(s) where swirl > 15°

Diagram/ Description of Cross Section of Stack/Duct



Notes
Including expected or actual deviations from procedures / non-conformities

Compliance With Positional Requirements?

Height of sample ports from Platform	1.95m
Number of sample ports	1
Width of platform (port back to handrail)	> 3.0m

Nearest downstream disturbance	Bend	0.8m
Nearest upstream disturbance	Bend	3.0m

Disturbances are classed as bends, fans or diameter variations

FIELD CALIBRATION AND SAMPLING DATA

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

TVOC Calibration Site Log (A2 & A3)

TVOC - FIELD DATA SHEET

Client	Albus Environmental Ltd
Site	Hoo, Rochester
Date	09/12/2025
Location	Shedder / Steam Auger Vent
Stack ID	A2 / A3
Stack Temp °C	20 / 17
Ambient Temp (sampling)	1= 16 2= 16 3= 17
Ambient Temp (sampling)	4= 17 5= 17 6= 17
Job No	P6069
Operators	HR / SM

Barometric Pressure mb	1011	
Barometer ID	ECL/ID/1220	
Analyser ID	ECL/ID/516	
Sonimix/ MFC ID	ECL/ID/...	
Heated Line/ Controller ID	ECL/ID/1350/1351	
Heated Line Set Temp °C	180	YES
Heated Line Length	10	m
Heated Probe Filter ID	ECL/ID/1348	
Heated Filter Set Temp °C	180	YES
Logger ID	922	

Calibration Gas Details

Calibration Gas	Gas Bottle ID	Gas Value	Uncertainty of Gas (k=2)
Zero Gas (Synthetic Air)	Gas/3236	...	...
Hydrogen / Helium	Gas/3247	...	...
Propane (In Air)	Gas/3238	29.89ppm	1%

	Analyser Range	Span Gas value used
Propane	400ppm	29.89ppm

Analyser Range should be not less than the expected peak emissions.

Span Gas Values should be **either** *approximately the half-hourly ELV* **OR** ***50%*** *to* ***90%*** *of the Selected Analyser Range.*

	Direct Calibration (Rear of Analyser)					
	Zero Cal		Span Gas Cal		Zero Check	
	Start Time	End Time	Start Time	End Time	Start Time	End Time
ZERO /SPAN/ ZERO	10:02	10:04	10:07	10:09	10:11	10:13

NOTE: RESPONSE TIME

Response Time to be carried out at the same time as "Span Check" on system verification (via the sample probe)
Start Time = when gas turned on. 90% Time = when analyser displays 90% of span gas value used. Response must be within 200 seconds.

Pre-Cal Ambient Temp °C		PRE System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
15	15	Start Time	End Time	Start Time	End Time
ZERO / SPAN		10:17	10:19	10:21	10:23

Response Time SYSTEM Span Gas Cal		
Start Time	90% Time	less than 200s (Y/N)
10:20:10	10:20:30	Y

	Start Time	End Time	Location	Production Details
Sample Period	10:30	12:30	A2	Normal
Sample Period	12:50	15:00	A3	Normal
Sample Period				
Sample Period				
Sample Period				
Sample Period				

Post-Cal Ambient Temp °C		POST System Verification Check (Down Line)			
Max	Min	Zero Check		Span Check	
17	17	Start Time	End Time	Start Time	End Time
ZERO / SPAN		15:22	15:24	15:26	15:28

Process Details / Comments

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

TVOC Calibration Summary (A2 & A3)

		TVOC ppm
Analyser Range		400
Repeatability at Zero		2
Span Gas Concentration Applied		29.89
Zero Gas Concentration Applied		0
Direct Cal	Zero	0.00
	Span	29.9
	Zero	0.29
Difference (Zero)		0.2910
< 2× Repeatability @ Zero?		YES
Pre Test (System)	Zero	-0.29
	Span	29.6
Difference (Zero)		0.2910
< 2% Relative to Direct Span		YES
Difference (Span)		0.3326
< 2% Relative to Direct Span		YES
Post Test (System)	Zero	0.06
	Span	29.1
Difference (Zero)		0.3534
Zero Drift < 2% of Applied Span?		YES
Difference (Span)		0.4989
Span Drift < 2% of Applied Span?		YES
Zero and Span Drift < 5% of Applied Span?		YES

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

A2 Particulates – Test 1

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/12/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	10:35	End Time	11:20	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	1342	Stack Thermocouple ID	466	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1484	Stack Temp Reader ID	1206	SOL/	...
Location	Shredder	Barometric Pressure (mb)	1011	Barometer ID	1220	Meter Thermocouple ID	1312	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm $H^2$0) (Pa/9.807)	33.038	DGM Yd	0.9647	Meter Temp Reader ID	1311	End Weight (g)	1.00
Test No.	TPM T1	Pitot coefficient	1.01	Nozzle ID	1216	Dry Gas Meter ID	1309	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.98	Timer ID	1313		
ECL Site Staff	HR / SM	Console ID	1308	Filter ID	69	Rotameter ID	1310		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights **MUST** be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1330373.0
Final Volume	1331840.0
Total Volume	1467.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test.

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1238.86
	Actual Sample Volume	1286.66
1467.0	Isokinetic Percentage	103.86

Leak Check	Pre Sample
Measured Leak Rate* l/min	0.2
Set Sampling Rate* (l/min)	32
Time Of Leak Check	10:32
Leak % of set rate	0.6

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate				
	Measured O_2	20.90	Moisture	0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

TPD/27A is carried out with an unheated sampling system only.

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	177.20	175.20	181.40	184.60	178.20	188.30	188.40	180.60	181.7
Velocity at Stack (m/s)	17.38	17.28	17.58	17.74	17.43	17.92	17.92	17.55	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	29.7	29.5	30.1	30.5	30.0	30.9	30.9	30.4	30.3
Meter (Tm)	25	25	26	27	27	28	28	29	26.9
Stack Temp (Ts)	21	21	21	21	21	21	21	21	21.0

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	179.60								179.6
Velocity at Stack (m/s)	17.50								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	30.4								30.4
Meter (Tm)	30								30.0
Stack Temp (Ts)	21								21.0

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

Original Flowrate Settings	
Tm	30
Ts	21
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	09:57
Pass ? (Y/N)	Y
PRE-Sample PITOT Leak Check	
Time	09:59
Pass ? (Y/N)	Y
Post-Sample Blockage Check (L-type)	
Time	11:22
Reading (Pa)	181.2
Pass (< 5%) ?	2.3
POST-Sample PITOT Visual Inspection	
Time	11:24
Pass ? (Y/N)	Y
POST-Sample PITOT Leak Check	
Time	11:26
Pass ? (Y/N)	Y

DI Water SOL/	5505
Acetone SOL/	5459

A2 Particulates – Test 2

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/12/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	12:00	End Time	12:45	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	1342	Stack Thermocouple ID	466	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1484	Stack Temp Reader ID	1206	SOL/	...
Location	Shredder	Barometric Pressure (mb)	1011	Barometer ID	1220	Meter Thermocouple ID	1312	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm $H^2$0) (Pa/9.807)	33.038	DGM Yd	0.9647	Meter Temp Reader ID	1311	End Weight (g)	1.00
Test No.	TPM T2	Pitot coefficient	1.01	Nozzle ID	1216	Dry Gas Meter ID	1309	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.98	Timer ID	1313		
ECL Site Staff	HR / SM	Console ID	1308	Filter ID	71	Rotameter ID	1310		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights **MUST** be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1332140.0
Final Volume	1333636.0
Total Volume	1496.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test.

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1227.62
	Actual Sample Volume	1290.09
1496.0	Isokinetic Percentage	105.09

Leak Check	Pre Sample
Measured Leak Rate* l/min	0.2
Set Sampling Rate* (l/min)	32
Time Of Leak Check	11:57
Leak % of set rate	0.6

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate				
	Measured O_2	20.90	Moisture	0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

TPD/27A is carried out with an unheated sampling system only.

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	171.20	175.30	177.10	170.80	176.50	181.10	181.60	188.40	177.8
Velocity at Stack (m/s)	17.08	17.29	17.38	17.06	17.35	17.57	17.59	17.95	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	29.9	30.2	30.4	29.8	30.3	30.7	30.9	31.4	30.5
Meter (Tm)	32	32	32	32	32	32	33	33	32.3
Stack Temp (Ts)	21	21	21	21	21	21	21	22	21.1

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	183.40								183.4
Velocity at Stack (m/s)	17.71								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	31.0								31.0
Meter (Tm)	33								33.0
Stack Temp (Ts)	22								22.0

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

Original Flowrate Settings	
Tm	30
Ts	21
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	11:24
Pass ? (Y/N)	Y
PRE-Sample PITOT Leak Check	
Time	11:26
Pass ? (Y/N)	Y
Post-Sample Blockage Check (L-type)	
Time	12:47
Reading (Pa)	179.2
Pass (< 5%) ?	4.7
POST-Sample PITOT Visual Inspection	
Time	12:49
Pass ? (Y/N)	Y
POST-Sample PITOT Leak Check	
Time	12:51
Pass ? (Y/N)	Y

DI Water SOL/	5505
Acetone SOL/	5459

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A2 Particulates – Test 3

Environmental Compliance Limited	PARTICULATE DATA SAMPLING PROFORMA	Date of Measurement	09/12/2025

ECL/TPD/	27a	Time taken to change Ports?	0	Start Time	13:40	End Time	14:25	Duration (mins)	45

Client	Albus Environmental Ltd	Stack Profile	Circular	Pitot ID	1342	Stack Thermocouple ID	466	Impingers	None Used
Site	Hoo, Rochester	Stack Area (m^2)	0.05	Manometer ID	1484	Stack Temp Reader ID	1206	SOL/	...
Location	Shredder	Barometric Pressure (mb)	1011	Barometer ID	1220	Meter Thermocouple ID	1312	Start Weight (g)	0.00
Stack ID	A2	Stat Pres. (mm $H^2$0) (Pa/9.807)	33.038	DGM Yd	0.9647	Meter Temp Reader ID	1311	End Weight (g)	1.00
Test No.	TPM T3	Pitot coefficient	1.01	Nozzle ID	1216	Dry Gas Meter ID	1309	Total weight (g)	1.00
Job No	P6069	Balance ID	n/a	Nozzle Size (mm)	5.98	Timer ID	1313		
ECL Site Staff	HR / SM	Console ID	1308	Filter ID	72	Rotameter ID	1310		

If moisture was not measured and gas was dried before entering the gas meter, impinger weights must be included to produce the moisture concentration used in the isokinetic calculations. If the gas was not dried before it entered the gas meter then impinger weights MUST be included to produce a nominal 0.1% moisture value.

	Sample Volume
Start Volume	1333914.0
Final Volume	1335412.0
Total Volume	1498.0

Note that once the sample has started, no further SAMPLE TRAIN leak checks are allowed, neither when changing ports (even if disconnections are required) nor at the end of the test.

Total	Volume (litres) @ STP Dry	
	Expected Sample Volume	1232.63
	Actual Sample Volume	1282.04
1498.0	Isokinetic Percentage	104.01

Leak Check	Pre Sample
Measured Leak Rate* l/min	0
Set Sampling Rate* (l/min)	32
Time Of Leak Check	13:35
Leak % of set rate	0.0

* During sample train leak check, set the sample flowrate above the maximum EXPECTED sampling flowrate.

Maximum allowed leak rate is 2% of the set rate			Moisture	
	Measured O_2	20.90		0.10
	Measured CO_2 %	0.04	Ref O_2	n/a
	Measured CO ppm	0	Dry Gas Molecular Weight	28.84

Smooth Walls

TPD/27A is carried out with an unheated sampling system only.

Traverse Point	A1	A1	A1	A1	A1	A1	A1	A1	Total
Time Interval (mins)	5	5	5	5	5	5	5	5	
Time/Point (mins)	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	
ΔP (Pa)	177.40	174.60	181.20	182.50	184.40	188.50	182.00	175.20	180.7
Velocity at Stack (m/s)	17.42	17.28	17.61	17.67	17.76	17.96	17.64	17.31	
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	30.6	30.3	30.9	31.0	31.3	31.6	31.1	30.5	30.9
Meter (Tm)	34	34	34	34	35	35	35	35	34.5
Stack Temp (Ts)	22	22	22	22	22	22	22	22	22.0

Traverse Point	A1								Total
Time Interval (mins)	5								
Time/Point (mins)	40 - 45								
ΔP (Pa)	176.90								176.9
Velocity at Stack (m/s)	17.39								
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas	30.7								30.7
Meter (Tm)	36								36.0
Stack Temp (Ts)	22								22.0

Traverse Point									Total
Time Interval (mins)									
Time/Point (mins)									
ΔP (Pa)									
Velocity at Stack (m/s)									
Sample Rate (l/min) 101.3 mbar, Tm, Dry Gas									
Meter (Tm)									
Stack Temp (Ts)									

Original Flowrate Settings	
Tm	30
Ts	21
% moisture	0.1

Pitot Quality Control Checks	
PRE-Sample PITOT Visual Inspection	
Time	12:49
Pass ? (Y/N)	Y
PRE-Sample PITOT Leak Check	
Time	12:51
Pass ? (Y/N)	Y
Post-Sample Blockage Check (L-type)	
Time	14:27
Reading (Pa)	181.1
Pass (< 5%) ?	2.1
POST-Sample PITOT Visual Inspection	
Time	14:29
Pass ? (Y/N)	Y
POST-Sample PITOT Leak Check	
Time	14:31
Pass ? (Y/N)	Y

DI Water SOL/	5505
Acetone SOL/	5459

A2 Speciated VOC

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)

Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1276
Site	Hoo, Rochester	Stack Diameter (mm)	250		
Location	Shredder				
Stack ID	A2	Stack Area (m^2)	0.049		
Test No	Speciated VOC	Barometric Pressure (mb)	1011	Meter Yd	0.977
Job No	P6069	Stack Thermocouple ID	466		
ECL Site Staff	HR / SM	Tube Thermocouple ID	1035		
Barometer ID	1220	Meter Thermocouple ID	1028	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	Y		

Date of Test	09/12/2025
Sample Start Time	13:45
Sample End Time	14:15
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00

Meter Units ◉ litres

	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	13:42:00	Time	14:17:00	
Final Volume	9.02	Reading (ml/min)	19	Reading (ml/min)	21	
Total Volume	9.01	% Leak	4.2	% Leak	4.7	9.01
Sample Train Internal Volume	0.010	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			

Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Sample Point	A1	A1	A1	
Time/ point (mins)	0 - 10	10 - 20	20 - 30	
Tube Temp °C	19	19	19	
Stack Temp °C	22	22	22	
Meter Temp °C	18	18	18	
Pump Flowrate (ml/min)	300	300	300	

Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Silica	(IF USED)
< 50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

Environmental Compliance Limited

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A2 Formaldehyde

Environmental Compliance Limited				SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)	
Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1276
Site	Hoo, Rochester	Stack Diameter (mm)	250		
Location	Shredder				
Stack ID	A2	Stack Area (m^2)	0.049		
Test No	Formaldehyde	Barometric Pressure (mb)	1011	Meter Yd	0.977
Job No	P6069	Stack Thermocouple ID	466		
ECL Site Staff	HR / SM	Tube Thermocouple ID	1035		
Barometer ID	1220	Meter Thermocouple ID	1028	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	Y		

Meter Units ◉ litres	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	12:55:00	Time	13:33:00	
Final Volume	9.02	Reading (ml/min)	21	Reading (ml/min)	20	
Total Volume	9.01	% Leak	4.7	% Leak	4.4	9.01
Sample Train Internal Volume	0.010	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			

Sample Point	A1	A1	A1	
Time/ point (mins)	0 - 10	10 - 20	20 - 30	
Tube Temp °C	19	19	19	
Stack Temp °C	22	22	22	
Meter Temp °C	18	18	18	
Pump Flowrate (ml/min)	300	300	300	

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Date of Test	09/12/2025
Sample Start Time	13:00
Sample End Time	13:30
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00
Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Silica	(IF USED)
< 50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

A3 Speciated VOC

Environmental Compliance Limited				SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)	
Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1276
Site	Hoo, Rochester	Stack Diameter (mm)	100		
Location	Steam Auger Vent				
Stack ID	A3	Stack Area (m^2)	0.008		
Test No	Speciated VOC	Barometric Pressure (mb)	1011	Meter Yd	0.977
Job No	P6069	Stack Thermocouple ID	466		
ECL Site Staff	HR / SM	Tube Thermocouple ID	1035		
Barometer ID	1220	Meter Thermocouple ID	1028	Vapex Sampling Rate (ml/min)	300
		In-Stack Sinter Used (Y/N)	N		

Meter Units ◉ litres	Sample	Pre-test Leak Check		Post-test Leak Check		Total
Start Volume	0.00	Time	15:17:00	Time	15:52:00	
Final Volume	9.01	Reading (ml/min)	18	Reading (ml/min)	18	
Total Volume	9.00	% Leak	4.0	% Leak	4.0	9.00
Sample Train Internal Volume	0.010	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%			

Sample Point	A1	A1	A1	
Time/ point (mins)	0 - 10	10 - 20	20 - 30	
Tube Temp °C	17	17	17	
Stack Temp °C	17	17	17	
Meter Temp °C	17	17	17	
Pump Flowrate (ml/min)	300	300	300	

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Sample Point				
Time/ point (mins)				
Tube Temp °C				
Stack Temp °C				
Meter Temp °C				
Pump Flowrate (ml/min)				

Date of Test	09/12/2025
Sample Start Time	15:20
Sample End Time	15:50
Duration	30
Measured O2	20.90
O2 Uncertainty %Vol	1.25
Meter Start Time	0:00:00
Meter End Time	0:30:00
Meter Elapsed Time	0:30:00
Impinger 1	None Used
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger 2	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Impinger3	
Start Weight (g)	
End Weight (g)	
Total weight (g)	0
Silica	(IF USED)
< 50% Spent at end Y/N?	Yes
Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

A3 Formaldehyde

Environmental Compliance Limited	SAMPLE TUBE DATA SAMPLING PROFORMA (VAPEX ONLY)

Client	Albus Environmental Ltd	◉ Circular ○ Rectangular ○ Elipse		Vapex Pump ID	1276	Date of Test	09/12/2025
Site	Hoo, Rochester	Stack Diameter (mm)	100			Sample Start Time	12:10
Location	Steam Auger Vent					Sample End Time	12:40
Stack ID	A3	Stack Area (m^2)	0.008			Duration	30
Test No	Formaldehyde	Barometric Pressure (mb)	1011	Meter Yd	0.977	Measured O2	20.90
Job No	P6069	Stack Thermocouple ID	466			O2 Uncertainty %Vol	1.25
ECL Site Staff	HR / SM	Tube Thermocouple ID	1035			Meter Start Time	0:00:00
Barometer ID	1220	Meter Thermocouple ID	1028	Vapex Sampling Rate (ml/min)	300	Meter End Time	0:30:00
		In-Stack Sinter Used (Y/N)	N			Meter Elapsed Time	0:30:00
						Impinger 1	None Used

Meter Units ◉ litres	Sample	Pre-test Leak Check		Post-test Leak Check		Total		
Start Volume	0.00	Time	12:07:00	Time	12:42:00		Start Weight (g)	
Final Volume	9.10	Reading (ml/min)	19	Reading (ml/min)	18		End Weight (g)	
Total Volume	9.09	% Leak	4.2	% Leak	4.0	9.09	Total weight (g)	0
Sample Train Internal Volume	0.010	Litres	Pre and post test leak checks are mandatory. The pump must be set to 450 ml/min during leak checks. Pass rate in CEN TS 13649 is 5%					

Sample Point	A1	A1		A1		Impinger 2	
Time/ point (mins)	0 - 10	10 - 20		20 - 30			
Tube Temp °C	16	16		16		Start Weight (g)	
Stack Temp °C	16	16		16			
Meter Temp °C	16	16		16		End Weight (g)	
Pump Flowrate (ml/min)	300	300		300		Total weight (g)	0

Sample Point						Impinger3	
Time/ point (mins)							
Tube Temp °C						Start Weight (g)	
Stack Temp °C							
Meter Temp °C						End Weight (g)	
Pump Flowrate (ml/min)						Total weight (g)	0

Sample Point						Silica	(IF USED)
Time/ point (mins)						< 50% Spent at end Y/N?	Yes
Tube Temp °C						Sample train upstream of sorbent tube condensation free for entire sample (Y/N)	Yes
Stack Temp °C							
Meter Temp °C							
Pump Flowrate (ml/min)							

LABORATORY ANALYSIS RESULTS

Laboratory analysis for **Particulates**, **Toluene**, **Benzene** & **Formaldehyde** was subcontracted to RPS laboratories, a UKAS Accredited Testing Laboratory, Number 0605.

RPS **DOES** hold **UKAS & MCERTS** accreditation for this analysis.

As required by the MCERTS Performance Standard for Organisations, the analysis results are shown below.

Laboratory analysis for **Top 10 VOC Screen** & **1,3 Butadiene** was subcontracted to RPS laboratories, a UKAS Accredited Testing Laboratory, Number 0605.

RPS **DOES NOT** hold **UKAS & MCERTS** accreditation for this analysis.

As required by the MCERTS Performance Standard for Organisations, the analysis results are shown below.

Environmental Compliance Limited

Albus Environmental Ltd
Permit No : EPR/JB3604FF
Variation No : V002
Report Ref : P6069 : R002

Installation Name : A2 Shredder & A3 Steam Auger
Visit Details : Compliance – December 2025
Survey Dates : 9th December 2025
Report Issue Date : 21st January 2026

						ECL/5/6356 - 000069	ECL/5/6357	ECL/5/6358 - 000070	ECL/5/6359	ECL/5/6360 - 000071	ECL/5/6361	ECL/5/6362 - 000072	ECL/5/6363
					Customer Sample No								
					RPS Sample No	342569	342570	342571	342572	342573	342574	342575	342576
					Sample Matrix	FILTER	SOLUTION	FILTER	SOLUTION	FILTER	SOLUTION	FILTER	SOLUTION
					Customer Sampling Date	09/12/2025	09/12/2025	09/12/2025	09/12/2025	09/12/2025	09/12/2025	09/12/2025	09/12/2025
Determinand	**CAS No**	**Codes**	**SOP**	**RL**	**Units**								
particulates		UM	D9	0.04	mg	< 0.04		< 0.04		< 0.04		< 0.04	
particulates		UM	D9	0.5	mg		0.8		0.6		0.9		0.8

						ECL/25/6367	ECL/25/6369	ECL/25/6371
					Customer Sample No			
					RPS Sample No	342582	342583	342584
					Sample Matrix	TUBE	TUBE	TUBE
					Customer Sampling Date	09/12/2025	09/12/2025	09/12/2025
Determinand	**CAS No**	**Codes**	**SOP**	**RL**	**Units**			
formaldehyde FRONT	50-00-0	UM	A40	0.1	ug	0.3	0.4	0.2

						ECL/25/6366	ECL/25/6368	ECL/25/6370
					Customer Sample No			
					RPS Sample No	342579	342580	342581
					Sample Matrix	TUBE	TUBE	TUBE
					Customer Sampling Date	09/12/2025	09/12/2025	09/12/2025
Determinand	**CAS No**	**Codes**	**SOP**	**RL**	**Units**			
benzene FRONT	71-43-2	UM	O8	2	ug	< 2	< 2	< 2
toluene FRONT	108-88-3	UM	O8	1	ug	< 1	2	< 1
1,3-butadiene FRONT	106-99-0	N	G8	2	ug	< 2	< 2	< 2
GC-MS screen (10) FRONT		N	M109	5	ug	S/C	S/C	S/C

342579	ECL/25/6366	VOC Screen Front: Isobutane 17.8µg Butane 17.8µg Ethanol 6.3µg Back: VOCs <5µg
342580	ECL/25/6368	VOC Screen Front: Ethanol 149µg IPA 95.7µg Disiloxane, hexamethyl- 6.5µg Ethylbenzene 7.0µg m+p-Xylene 25.0µg o-Xylene 6.0µg D-Limonene 5.6µg Back: VOCs <5µg
342581	ECL/25/6370	VOC Screen Front: VOCs <5µg Back: VOCs <5µg

UNCERTAINTY CALCULATIONS

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A2 & A3 - TVOC Measurement Uncertainty

A2 / A3 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Min Certified Ranges TVOC 0 - 15 mgC/m³
Lack of fit(1)	u_{lof}	Rectangular (Divisor = √3)	0.73
Span drift(2)	$u_{d,s}$	Rectangular (Divisor = √3)	0.35
Repeatability Standard Deviation (span)(3)	u_r	Normal (Divisor = 1)	1.23
Losses / leakage in the sample system(4)	u_{loss}	Rectangular (Divisor = √3)	1.11
Temperature dependant span drift(5)	u_t	Rectangular (Divisor = √3)	0.30
Interferents(1)	u_i	Rectangular (Divisor = √3)	4.39
Uncertainty of Reference Gas(6)	u_{ref}	Rectangular (Divisor = √3)	0.48
Effect of Voltage Fluctuation(7)	u_v	Rectangular (Divisor = √3)	1.80
Effect of Oxygen Synergism(7)	u_{syn}	Rectangular (Divisor = √3)	4.60

* Signal 3030 FID

Note:

$$when\ \left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|, then\ u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$$

1 Expressed as a percentage of the certified range
2 Expressed as maximum drift per 24hr period as percentage of the certified range
3 Expressed as a percentage of applied span
4 Expressed as a percentage of applied span
5 Expressed as a percentage of the certified range per one degree centigrade
6 Expressed as standard uncertainty in units of measurement i.e. mg/m³
7 Expressed as a percentage of the certified range

A2 / A3 - TVOC - Measurement Uncertainty - Uncertainty Calculations Table 2

Performance Characteristics	Uncertainty	Value of Standard Uncertainty	* TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	$u(x_i) = \frac{u_{lof} \times R_i}{\sqrt{3}} =$	0.064
Span drift	$u_{d,s}$	$u(x_i) = \frac{u_{d,s} \times R_i}{\sqrt{3}} =$	0.031
Repeatability Standard Deviation (span)	u_r	$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} =$	0.18
Losses / leakage in the sample system	u_{loss}	$u(x_i) = \frac{u_{loss} \times R_i}{\sqrt{3}} =$	0.096
Temperature dependant span drift	u_t	$u(x_i) = \frac{u_t}{100} \times R_i \times \sqrt{\frac{(x_{i,max} - x_{adj})^2 + (x_{i,min} - x_{adj})(x_{i,max} - x_{adj}) + (x_{i,min} - x_{adj})^2}{3}}$	0.026
Interferents	u_i	$u(x_i) = \frac{u_i \times R_i}{\sqrt{3}} =$	0.38
Uncertainty of Reference Gas	u_{ref}	$u(x_i) = \frac{u_{ref}}{\sqrt{3}} =$	0.28
Effect of Voltage Fluctuation	u_v	$u(x_i) = \frac{u_v \times R_i}{\sqrt{3}} =$	0.16
Effect of Oxygen Synergism	u_{syn}	$u(x_i) = \frac{u_{syn} \times R_i}{\sqrt{3}} =$	0.40
Combined Standard Uncertainty		$u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2}$	0.67
Expanded measurement uncertainty (at 95% confidence)		$U_{EXP} = 2 \times u_c$	1.35
Applied Span Concentration			48.03
Measured Span Concentration, STP Dry Gas			47.42
Expanded measurement uncertainty as % of Applied Span			2.8 %
Expanded measurement uncertainty as % of ELV			4.5%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A2 - TVOC Uncertainty of Measurement Results

A2 - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range TVOC 0 - 15 mgC/m³
Lack of fit(1)	u_{lof}	Rectangular	$\sqrt{3}$	0.73
Span drift(2)	$u_{d,s}$			0.35
Losses / leakage in the sample system(4)	u_{loss}			1.11
Temperature dependant span drift(5)	u_{t}			0.30
Interferents(1)	u_{i}			4.39
Effect of Voltage Fluctuation(7)	u_{v}			1.80
Effect of Oxygen Synergism(7)	u_{syn}			4.60

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $\left|(x_{i,\max} - x_{i,adj})\right| = \left|(x_{i,\min} - x_{i,adj})\right|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.064
Span drift	$u_{d,s}$			0.031
Temperature dependant span drift	u_{t}			0.026
Interferents	u_{i}			0.38
Effect of Voltage Fluctuation (See Note)	u_{v}			0.16
Effect of Oxygen Synergism (See Note)	u_{syn}			0.40

A2 - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	TVOC 0 - 15 mgC/m³
Losses / leakage in the sample system	u_{loss}	09/12/25 10:30 - 10:59	0.063
		09/12/25 11:00 - 11:29	0.076
		09/12/25 11:30 - 11:59	0.11
Standard Error of Measured Value	u_{SE}	09/12/25 10:30 - 10:59	0.22
		09/12/25 11:00 - 11:29	0.80
		09/12/25 11:30 - 11:59	0.82

Effect on Uncertainty Caused by Oxygen

$$uCorr^{n}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured})(20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

1.00

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.0000$$

$$uf_{O_2} = \frac{uCorr^{n}_{O_2}}{f_{O_2}} x100 = \quad 0.00 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

A2 - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	*TVOC 0 - 15 mgC/m³
Measured Concentration	09/12/25 10:30 - 10:59	5.65
Expanded Uncertainty as Percentage of Measured Concentration		16 %
Measured Concentration	09/12/25 11:00 - 11:29	6.79
Expanded Uncertainty as Percentage of Measured Concentration		26 %
Measured Concentration	09/12/25 11:30 - 11:59	9.57
Expanded Uncertainty as Percentage of Measured Concentration		19 %

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the applied span concentration
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
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A3 - TVOC Uncertainty of Measurement Results

A3 - TVOC - Uncertainty of Measurement Results - Calculations Part 1

Performance Characteristics	Standard Uncertainty (% of Range)	Distribution	Divisor	Min Certified Range TVOC 0 - 15 mgC/m³
Lack of fit[1]	u_{lof}	Rectangular	$\sqrt{3}$	0.73
Span drift[2]	$u_{d,s}$			0.35
Losses / leakage in the sample system[4]	u_{loss}			1.11
Temperature dependant span drift[5]	u_{t}			0.30
Interferents[1]	u_{i}			4.39
Effect of Voltage Fluctuation[7]	u_{v}			1.80
Effect of Oxygen Synergism[7]	u_{syn}			4.60

Notes:

For rectangular distributions, $u(x_i) = \frac{u \times R_i}{\sqrt{3}}$

For $u(x_i) = \Delta x_i \sqrt{\frac{(x_{i,\max} - x_{i,adj})^2 + (x_{i,\min} - x_{i,adj})(x_{i,\max} - x_{i,adj}) + (x_{i,\min} - x_{i,adj})^2}{3}}$, when $|(x_{i,\max} - x_{i,adj})| = |(x_{i,\min} - x_{i,adj})|$, then $u(x_i) = \frac{\Delta x_i}{\sqrt{3}}$

Where $u(x_i) = \frac{\sigma}{\sqrt{n}}$ (See note 6 below), $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

Performance Characteristics	Uncertainty (Units of final measurement)	Distribution	Divisor	TVOC 0 - 15 mgC/m³
Lack of fit	u_{lof}	Rectangular	$\sqrt{3}$	0.064
Span drift	$u_{d,s}$			0.031
Temperature dependant span drift	u_{t}			0.026
Interferents	u_{i}			0.38
Effect of Voltage Fluctuation (See Note)	u_{v}			0.16
Effect of Oxygen Synergism (See Note)	u_{syn}			0.40

A3 - TVOC - Uncertainty of Measurement Results - Calculations Part 2

Performance Characteristics	Uncertainty (Units of final measurement)	Date & Time	TVOC 0 - 15 mgC/m³
Losses / leakage in the sample system	u_{loss}	09/12/25 13:00 - 13:29	0.860
		09/12/25 13:30 - 13:59	2.875
		09/12/25 14:00 - 14:29	2.18
Standard Error of Measured Value	u_{SE}	09/12/25 13:00 - 13:29	1.31
		09/12/25 13:30 - 13:59	35.36
		09/12/25 14:00 - 14:29	4.72

Effect on Uncertainty Caused by Oxygen

$$uCorr^{n}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) \times (20.9\% - O_{2,measured})} \text{ x Uncertainty of } O_2 \text{ Meas} =$$

1.00

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = \quad 1.0000$$

$$uf_{o_2} = \frac{uCorr^{n}_{o_2}}{f_{o_2}} x100 = \quad 0.00 \quad \%$$

The effect of oxygen on the overall uncertainties (below) is incorporated using the following equation:-

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Where oxygen or moisture correction is required, uncertainty based on the standard error of the measured peripheral value is converted to units of final measurement using a sensitivity coefficient C,

$\therefore u(x_i) = C_i u_i$ where $C_i = \frac{\partial f}{\partial x_i}$

A3 - TVOC - Uncertainty of Measurement Results - Calculations Part 3

Uncertainty	Date & Time	*TVOC 0 - 15 mgC/m³
Measured Concentration	09/12/25 13:00 - 13:29	77.27
Expanded Uncertainty as Percentage of Measured Concentration		4 %
Measured Concentration	09/12/25 13:30 - 13:59	258.36
Expanded Uncertainty as Percentage of Measured Concentration		27 %
Measured Concentration	09/12/25 14:00 - 14:29	196.09
Expanded Uncertainty as Percentage of Measured Concentration		5 %

Combined Standard Uncertainty $u_c = \sqrt{u_{lof}^2 + u_{d,s}^2 + u_r^2 + u_{loss}^2 + u_t^2 + u_i^2 + u_{ref}^2 + u_v^2 + u_{syn}^2}$

Expanded uncertainty (at 95% confidence) $U_{Exp} = 2 \times u_c$

1 Expressed as a percentage of the certified range
2 Expressed as a percentage of the certified range as maximum drift per 24hr period
3 Expressed as a percentage of the applied span concentration
4 Expressed as a percentage of the applied span concentration
5 Expressed as a percentage of the certified range per one degree centigrade
6 Where the uncertainty of moisture is taken from the manual extract test calculations.
7 Expressed as a percentage of the certified range
8 Where no uncertainty is presented above, the uncertainty is > 100%

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A2 Particulates Uncertainty – Test 1

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K= 2 Filter mg	LAB Method Uncert K= 2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
				TPM T1				
Particulates	0.0400	0.80	0.84	0.10	0.50	0.0500	0.25	0.25

	TPM T1			Standard Uncertainty @ 95%	
Sampled Volume (V_m)	1.47	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.96	…		…	…
Meter Temperature (T_m)	300.37	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	33.04	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure p_s	758.31	mmHg	up_s	0.8	mmHg
Barometric Pressure p_b	758.50	mmHg	up_b	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	103.57	mmH_2O	uΔH	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.0963	% by volume	uH_2O	0.12	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = 0.885$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.46	0.46	0.0000445	0.0000111
up_b	0.47	0.46	0.000605	0.00227
uT_m	0.46	0.46	0.000808	0.00121
H_2O	0.46	0.46	0.00464	0.000548

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00225$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 1.2978$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.30	1.29	1.47	0.00329
Effect of uV_m	1.30	1.30	0.88	0.000885

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.00489$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = 1.00$$

$$uCorr^n{}_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x Uncertainty\ of\ O_2\ Measurement = 1.00$$

$$uf_{o_2} = \frac{uCorr^n{}_{o_2}}{f_{o_2}} x 100 = 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{Oxy}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = 0.65$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	0.84	0.45	0.77	0.20
uV_{stp}	0.65	0.64	0.50	0.00244

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.20	0.39	0.65	60.7%	7.9%

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrⁿ Factor	Overall Measurement Uncertainty inc O_2 Corrⁿ factor (*Ucombined*) %
Particulates	60.7	0.0	60.7

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A2 Particulates Uncertainty – Test 2

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K= 2 Filter mg	LAB Method Uncert K= 2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
			TPM T2					
Particulates	0.0400	0.90	0.94	0.10	0.50	0.0500	0.25	0.25

	TPM T2			Standard Uncertainty @ 95%	
Sampled Volume (V_m)	1.50	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.96	...		...	...
Meter Temperature (T_m)	305.48	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	33.04	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure ρ_s	758.31	mmHg	up_s	0.8	mmHg
Barometric Pressure ρ_b	758.50	mmHg	up_b	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	103.52	mmH_2O	uΔH	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.0960	% by volume	uH_2O	0.12	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = 0.870$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.46	0.46	0.0000441	0.0000110
up_b	0.46	0.46	0.000600	0.00225
uT_m	0.46	0.46	0.000794	0.00119
H_2O	0.46	0.46	0.00460	0.000541

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00218$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 1.3014$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.30	1.30	1.50	0.00326
Effect of uV_m	1.30	1.30	0.87	0.000870

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.00493$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{O_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = 1.00$$

$$uCorr^n{}_{O_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x\, Uncertainty\ of\ O_2\ Measurement = 1.00$$

$$uf_{O_2} = \frac{uCorr^n{}_{O_2}}{f_{O_2}} x100 = 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{O2}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = 0.72$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	0.92	0.53	0.77	0.20
uV_{stp}	0.73	0.72	0.56	0.00274

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.20	0.39	0.72	54.3%	7.8%

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{O_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corrⁿ Factor	Overall Measurement Uncertainty inc O₂ Corrⁿ factor (*Ucombined*) %
Particulates	54.3	0.0	54.3

Albus Environmental Ltd
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A2 Particulates Uncertainty – Test 3

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder , Stack ID: A2

$$u_{mass} = \sqrt{\sum (u_{filter})^2 + (u_{solution})^2}$$

Determinand	Filter mg	Solution mg	Recovered Mass mg	LAB Method Uncert K= 2 Filter mg	LAB Method Uncert K= 2 Solution mg	Standard Uncertainty Filter mg	Standard Uncertainty Solution mg	Combined Uncertainty mg
				TPM T3				
Particulates	0.0400	0.80	0.84	0.10	0.50	0.0500	0.25	0.25

	TPM T3			Standard Uncertainty @ 95%	
Sampled Volume (V_m)	1.50	m^3	uV_m	0.001	m^3
Meter Correction Factor (Yd)	0.96	…		…	…
Meter Temperature (T_m)	307.82	k	uT_m	1.5	k
Static Pressure of Stack P_{static}	33.04	mmH_2O	uP_{static}	0.25	mmH_2O
Absolute Stack Pressure ρ_s	758.31	mmHg	up_s	0.8	mmHg
Barometric Pressure ρ_b	758.50	mmHg	up_b	3.8	mmHg
Average Differential Pressure (ΔP) + ρs	103.55	mmH_2O	$u\Delta H$	0.25	mmH_2O
Oxygen content ($O_{2,m}$)	20.90	% by volume	$uO_{2,m} = \sigma/\sqrt{n}$	0.00	% by volume
Moisture Content (H_2O)	0.0966	% by volume	uH_2O	0.12	% by volume

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i = uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured static pressure uncertainty component (uPstatic) & measured temperature of dry gas uncertainty component (uT_m)

$$f_s = \frac{273}{760} \times \frac{P_b + \frac{\Delta H}{13.6}}{T_m} \times Y_d = 0.863$$

	Maximum	Minimum	Sensitivity	ufstp
uΔH	0.46	0.46	0.0000439	0.0000110
up_b	0.46	0.46	0.000597	0.00224
uT_m	0.46	0.46	0.000788	0.00118
H_2O	0.46	0.46	0.00458	0.000543

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{\sqrt{(u\Delta H)^2 + (uP_s)^2}}{(P_m/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00215$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 1.2932$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty (m^3)
Effect of uV_{std}	1.30	1.29	1.50	0.00322
Effect of uV_m	1.29	1.29	0.86	0.000863

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uV_{std}}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.00488$$

Uncertainty of correction factor to reference oxygen due to measured oxygen uncertainty component (uf_{O2}) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$f_{o_2} = \frac{20.9\% - O_{2,ref}}{20.9\% - O_{2,measured}} = 1.00$$

$$uCorr^n{}_{o_2} = \frac{20.9\% - O_{2,ref}}{(20.9\% - O_{2,measured}) x (20.9\% - O_{2,measured})} x\, Uncertainty\ of\ O_2\ Measurement = 1.00$$

$$uf_{o_2} = \frac{uCorr^n{}_{o_2}}{f_{o_2}} x 100 = 0.00$$

Uncertainty in final measurement @ reference conditions due to mass uncertainty component (uM), oxygen correction uncertainty component (uf_{Oxy}) and STP volume uncertainty component (uVstp)

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}} = 0.65$$

	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	u mg/Nm³
uM	0.85	0.45	0.77	0.20
uV_{stp}	0.65	0.65	0.50	0.00245

Measurement Uncertainty of Determinand (excluding correction for oxygen)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration	Uncertainty as Percent of ELV
0.20	0.39	0.65	60.7%	7.9%

Measurement Uncertainty of Determinand (including correction for oxygen)

$$u_{combined} = \sqrt{\sum (uf_{o_2})^2 + (Uncertainty\ of\ Measurement\ of\ Determinand)^2}$$

Determinand	Measurement Uncertainty of Determinand	Measurement Uncertainty of Oxygen Corr^n Factor	Overall Measurement Uncertainty inc O_2 Corr^n factor (*Ucombined*) %
Particulates	60.7	0.0	60.7

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A2 Top 10 VOC Screen Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

				Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m³	uV_m	0.0002	m³
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	291.00	k	uT_m	1.5	k
Barometric Pressure	p_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	Recovered Mass		Standard Uncertainty		
Isobutane	17.80	µg	uM	0.89	µg
Butane	17.80	µg	uM	0.89	µg
Ethanol	6.30	µg	uM	0.32	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (up_b), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.94	0.93	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00617$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00824$$

	Maximum m³	Minimum m³	Sensitivity	Standard Uncertainty m³
Effect of uf_s	0.00830	0.00819	0.00880	0.0000543
Effect of uV_m	0.00845	0.00804	0.91	0.000206

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000202$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Isobutane	0.0249	...
Butane	0.0249	...
Ethanol	0.00883	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Isobutane	2.27	2.05	121.33	0.11
Butane	2.27	2.05	121.33	0.11
Ethanol	0.80	0.73	121.33	0.0382

Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Isobutane				
Butane				
Ethanol				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Isobutane	2.21	2.11	262.19	0.0530
Butane	2.21	2.11	262.19	0.0530
Ethanol	0.78	0.75	92.80	0.0187

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Isobutane	0.12	0.25	2.16	11.37
Butane	0.12	0.25	2.16	11.37
Ethanol	0.0435	0.0869	0.76	11.37

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
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A2 Toluene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	291.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	Recovered Mass			Standard Uncertainty	
Toluene	1.00	µg	uM	0.50	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_, uT_, etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component ($u\rho b$), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.94	0.93	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00617$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00824$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00830	0.00819	0.00880	0.0000543
Effect of uV_m	0.00845	0.00804	0.91	0.000206

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000202$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Toluene	0.00140	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.18	0.0607	121.33	0.0607
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.12	0.12	14.73	0.00297

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Toluene	0.0608	0.12	0.12	100.15

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A2 Benzene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	291.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
Benzene	2.00	µg	uM	1.00 µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i=uV_m, uT_m etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O)

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.49	0.48	0.000478	0.00478
uT_m	0.94	0.93	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00617$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00824$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00830	0.00819	0.00880	0.0000543
Effect of uV_m	0.00845	0.00804	0.91	0.000206

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000202$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Benzene	0.00280	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Benzene	0.36	0.12	121.33	0.12
Condensate Results	**Maximum mg/Nm³**	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Benzene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Benzene	0.25	0.24	29.46	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Benzene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
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A2 1,3 Butadiene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	291.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes					
Determinand	Recovered Mass		Standard Uncertainty		
1,3 Butadiene	2.00	µg	uM	1.00	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.94	0.93	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00617$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00824$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00830	0.00819	0.00880	0.0000543
Effect of uV_m	0.00845	0.00804	0.91	0.000206

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000202$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
1,3 Butadiene	0.00280	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
1,3 Butadiene	0.36	0.12	121.33	0.12
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
1,3 Butadiene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
1,3 Butadiene	0.25	0.24	29.46	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
1,3 Butadiene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
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A2 Formaldehyde Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Shredder, Stack ID:A2

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00901	m^3		uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...		...	...	...
Meter Temperature	T_m	291.00	k		uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar			10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol		$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol		uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
Formaldehyde	0.30	µg	uM 0.0150	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000478	0.00478
uT_m	0.94	0.93	0.00322	0.00483
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00617$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00824$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00830	0.00819	0.00880	0.0000543
Effect of uV_m	0.00845	0.00804	0.91	0.000206

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000202$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Formaldehyde	0.000420	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0382	0.0346	121.33	0.00182
Condensate Results	**Maximum mg/Nm³**	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Formaldehyde				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0373	0.0355	4.42	0.000892

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Formaldehyde	0.00207	0.00414	0.0364	11.37

Albus Environmental Ltd		**Installation Name**	**: A2 Shredder & A3 Steam Auger**
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A3 Top 10 VOC Screen Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00900	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	**Yd**	0.977	...	...	...	...
Meter Temperature	T_m	290.00	**k**	uT_m	1.5	**k**
Barometric Pressure	ρ_b	1011.00	**mBar**		10.0	**mBar**
Oxygen content	$O_{2,m}$	20.90	**%Vol**	$uO_{2,m}$	1.25	**%Vol**
Moisture	H_2O	0.00	**%Vol**	uH_2O		**%Vol**

Tubes					
Determinand	**Recovered Mass**		**Standard Uncertainty**		
Ethanol	149.00	µg	**uM**	7.45	µg
IPA	95.70	µg	**uM**	4.79	µg
Disiloxane, hexamethyl	6.50	µg	**uM**	2.60	µg
Ethylbenzene	7.00	µg	**uM**	2.80	µg
m+ p-Xylene	25.00	µg	**uM**	1.25	µg
o-Xylene	6.00	µg	**uM**	2.40	µg
D-Limonene	5.60	µg	**uM**	2.80	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ **where** C **is the sensitivity coefficient,** u **is the standard uncertainty and** i **is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.**

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (u_pb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	**Minimum**	**Sensitivity**	**ufstp**
up_b	0.49	0.48	0.000479	0.00479
uT_m	0.94	0.93	0.00324	0.00486
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00826$$

	Maximum m^3	**Minimum m^3**	**Sensitivity**	**Standard Uncertainty m^3**
Effect of uf_s	0.00832	0.00821	0.00879	0.0000548
Effect of uV_m	0.00847	0.00805	0.92	0.000207

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000203$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	**Condensate uL mg/Nm³**
Ethanol	0.21	...
IPA	0.13	...
Disiloxane, hexamethyl	0.00909	...
Ethylbenzene	0.00978	...
m+ p-Xylene	0.0349	...
o-Xylene	0.00839	...
D-Limonene	0.00783	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Ethanol	18.94	17.13	121.05	0.90
IPA	12.16	11.01	121.05	0.58
Disiloxane, hexamethyl	1.10	0.47	121.05	0.31
Ethylbenzene	1.19	0.51	121.05	0.34
m+ p-Xylene	3.18	2.87	121.05	0.15
o-Xylene	1.02	0.44	121.05	0.29
D-Limonene	1.02	0.34	121.05	0.34

Condensate Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Ethanol				
IPA				
Disiloxane, hexamethyl				
Ethylbenzene				
m+ p-Xylene				
o-Xylene				
D-Limonene				

Uncertainty in final measurement @ Reference Conditions due to uV_{stp}

Charcoal Tube Results				
	Maximum mg/Nm³	**Minimum mg/Nm³**	**Sensitivity**	**Standard Uncertainty mg/Nm³**
Ethanol	18.49	17.60	2184.54	0.44
IPA	11.88	11.31	1403.09	0.28
Disiloxane, hexamethyl	0.81	0.77	95.30	0.0193
Ethylbenzene	0.87	0.83	102.63	0.0208
m+ p-Xylene	3.10	2.95	366.53	0.0744
o-Xylene	0.74	0.71	87.97	0.0179
D-Limonene	0.69	0.66	82.10	0.0167

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	**Combined Uncertainty mg/Nm³**	**Expanded Uncertainty mg/Nm³**	**Measured Concentration mg/Nm³**	**Percent of Measured Concentration**
Ethanol	1.03	2.05	18.04	11.38
IPA	0.66	1.32	11.58	11.38
Disiloxane, hexamethyl	0.32	0.63	0.79	80.18
Ethylbenzene	0.34	0.68	0.85	80.18
m+ p-Xylene	0.17	0.34	3.03	11.38
o-Xylene	0.29	0.58	0.73	80.18
D-Limonene	0.34	0.68	0.68	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A3 Toluene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00900	m^3		uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...		...	...	...
Meter Temperature	T_m	290.00	k		uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar			10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol		$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol		uH_2O		%Vol

Tubes					
Determinand	Recovered Mass			Standard Uncertainty	
Toluene	2.00	µg	uM	0.50	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.49	0.48	0.000479	0.00479
uT_m	0.94	0.93	0.00324	0.00486
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00826$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00832	0.00821	0.00879	0.0000548
Effect of uV_m	0.00847	0.00805	0.92	0.000207

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000203$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Toluene	0.00280	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{\text{Recovered}}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.30	0.18	121.05	0.0605
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Toluene	0.25	0.24	29.32	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Toluene	0.0609	0.12	0.24	50.29

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A3 Benzene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00900	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	290.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
Benzene	2.00	µg	uM	1.00 µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u_i$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000479	0.00479
uT_m	0.94	0.93	0.00324	0.00486
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00826$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00832	0.00821	0.00879	0.0000548
Effect of uV_m	0.00847	0.00805	0.92	0.000207

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000203$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm^3	Condensate uL mg/Nm^3
Benzene	0.00280	...

$$Conc = \frac{M_{\text{Recovered}}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{\text{Recovered}}$

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Benzene	0.36	0.12	121.05	0.12
Condensate Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Benzene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
Benzene	0.25	0.24	29.32	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
Benzene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A3 1,3 Butadiene Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00900	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	290.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
1,3 Butadiene	2.00	µg	uM	1.00 µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = \quad 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component (upb), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = \quad 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
up_b	0.49	0.48	0.000479	0.00479
uT_m	0.94	0.93	0.00324	0.00486
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = \quad 0.00623$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = \quad 0.00826$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00832	0.00821	0.00879	0.0000548
Effect of uV_m	0.00847	0.00805	0.92	0.000207

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = \quad 0.000203$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm^3	Condensate uL mg/Nm^3
1,3 Butadiene	0.00280	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
1,3 Butadiene	0.36	0.12	121.05	0.12
Condensate Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
1,3 Butadiene				

Uncertainty in final measurement @ Reference Conditions due to uV_{STD}

Charcoal Tube Results				
	Maximum mg/Nm^3	Minimum mg/Nm^3	Sensitivity	Standard Uncertainty mg/Nm^3
1,3 Butadiene	0.25	0.24	29.32	0.00595

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm^3	Expanded Uncertainty mg/Nm^3	Measured Concentration mg/Nm^3	Percent of Measured Concentration
1,3 Butadiene	0.12	0.24	0.24	100.15

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
Variation No	: V002	Survey Dates	: 9th December 2025
Report Ref	: P6069 : R002	Report Issue Date	: 21st January 2026

A3 Formaldehyde Uncertainty

Note:
Results based on Charcoal Tubes Only!

Site: Albus Environmental Ltd, Hoo, Rochester
Location: Steam Auger Vent, Stack ID:A3

					Standard Uncertainty @ 95%		
Sampled Volume	V_m	0.00909	m^3	uV_m	0.0002	m^3
Meter Correction Factor or ml/count	Yd	0.977	...	...	...	...
Meter Temperature	T_m	289.00	k	uT_m	1.5	k
Barometric Pressure	ρ_b	1011.00	mBar		10.0	mBar
Oxygen content	$O_{2,m}$	20.90	%Vol	$uO_{2,m}$	1.25	%Vol
Moisture	H_2O	0.00	%Vol	uH_2O		%Vol

Tubes				
Determinand	Recovered Mass		Standard Uncertainty	
Formaldehyde	0.40	µg	uM 0.0200	µg

Note: In the following calculations, the sensitivity coefficient (C) is estimated using: $C_i = \frac{\partial f}{\partial x_i}$

For each factor, uncertainty is then calculated by $C_i u$ where C is the sensitivity coefficient, u is the standard uncertainty and i is the index identifying the contributing factor e.g. i= uV_m, uT_m etc.

Where results are required at wet conditions, the following correction factor is used to convert the data from the dry gas meter:

$$f_{s,wet} = \frac{100}{(100 - H_2O)} = 1.00$$

Uncertainty in correction factor to STP due to measured barometric pressure uncertainty component ($u\rho b$), measured temperature of dry gas uncertainty component (uT_m) & measured moisture (uH_2O) where required

$$f_s = \frac{273}{T_m} \times \frac{\rho}{101.3} = 0.94$$

	Maximum	Minimum	Sensitivity	ufstp
$u\rho_b$	0.49	0.48	0.000480	0.00480
uT_m	0.95	0.94	0.00326	0.00489
uH_2O	...	...	...	...

$$\frac{uf_s}{f_s} = \sqrt{\left(\frac{uP_b}{(P_b/101.3)}\right)^2 + \left(\frac{uT_m}{(T_m/273.15)}\right)^2 + \left(\frac{uH_2O}{100/(100 - H_2O)}\right)^2} = 0.00629$$

Uncertainty in volume @ STP due to volume correction factor uncertainty component (uVstd) & volume uncertainty component (uVm)

$$V_{std} = V_{measured} \times f_s = 0.00837$$

	Maximum m^3	Minimum m^3	Sensitivity	Standard Uncertainty m^3
Effect of uf_s	0.00843	0.00832	0.00888	0.0000558
Effect of uV_m	0.00858	0.00816	0.92	0.000209

$$\frac{uV_{std}}{V_{std}} = \sqrt{\left(\frac{uf_s}{f_s}\right)^2 + \left(\frac{uV_m}{V_m}\right)^2} = 0.000207$$

Uncertainty of correction factor to reference conditions (excluding oxygen contribution) & Uncertainty in final measurement @ reference conditions due to uncertainty component arrising from leak and/or loss (assumed 2% max) in the sample system (uL)

$$uL = \frac{Conc \times \frac{2}{100}}{\sqrt{3}}$$

	Tubes uL mg/Nm³	Condensate uL mg/Nm³
Formaldehyde	0.000552	...

$$Conc = \frac{M_{Recovered}}{V_m \times f_s \times f_{O_2}}$$

Uncertainty in final measurement @ Reference Conditions due to $uM_{Recovered}$

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0502	0.0454	119.44	0.00239
Condensate Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde				

Uncertainty in final measurement @ Reference Conditions due to uV_{std}

Charcoal Tube Results				
	Maximum mg/Nm³	Minimum mg/Nm³	Sensitivity	Standard Uncertainty mg/Nm³
Formaldehyde	0.0490	0.0466	5.71	0.00118

Combined Uncertainty (excluding Oxygen contribution)

$$u_{combined} = \sqrt{\sum (u_M)^2 + (u_L)^2 + (uV_{stp})^2}$$

Charcoal Tubes: Determinand	Combined Uncertainty mg/Nm³	Expanded Uncertainty mg/Nm³	Measured Concentration mg/Nm³	Percent of Measured Concentration
Formaldehyde	0.00272	0.00544	0.0478	11.39

Albus Environmental Ltd		Installation Name	: A2 Shredder & A3 Steam Auger
Permit No	: EPR/JB3604FF	Visit Details	: Compliance – December 2025
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Stack Reference A2

Measurement Uncertainty Calculations - Velocity at Stack Conditions

Contribution From	Standard u/c (Pa)	
Pitot Calibration Uncertainty Contribution	0.90	A
Manometer Calibration Uncertainty Contribution	0.903	B
Variation in Actual Pitot reading at sample points	5.70	C
Combined u/c (Pa) =	**Combined u/c (Pa)**	
SQRT $(A/\sqrt{3})^2 + (B/\sqrt{3})^2 + (C/\sqrt{3})^2$)	3.37	
Expanded Uncertainty of Flow Measurements Pa	**6.74**	
	Standard u/c (K)	
Temperature Calibration (K)	1.47	D
Variation in Actual Temp reading at sample points	0.00	E
Combined u/c of Temp (K)	**Combined u/c (K)**	
SQRT $((D/\sqrt{3^2}) + (E/\sqrt{3})^2$)	0.85	
Expanded Uncertainty of Temp Measurements (K)	**1.70**	
Measured Average Velocity (m/s) at Stack Conds	17.60	
Maximum Average Velocity (m/s) at Stack Conds	17.98	
Standard Uncertainty Velocity at Stack Conditions (%)	2.14	
Expanded Uncertainty Velocity (at Stack Conditions)	**4.29 (%)**	

Measurement Uncertainty Calculations - Flowrate at Stack Conditions

Contribution From	Standard u/c (m^2)	
Area (m2)	0.00049	
Measured Average Flowrate (m^3/s) at Stack Conds	0.86	
Maximum Average Flowrate (m^3/s) at Stack Conds	0.89	
Standard Uncertainty Flowrate (m^3/s) at Stack Conditions (%)	3.17	
Expanded Uncertainty Flowrate (m^3/s) at Stack Conditions	**6.33 (%)**	

Measurement Uncertainty Calculations - Flowrate at STP & Wet Gas

Contribution From	Standard u/c (%)	
Temperature Calibration (K)	0.5	
Barometer Calibration	0.5	
Measured Average Flowrate (m^3/s) at STP Wet	0.80	
Maximum Average Flowrate (m^3/s) at STP Wet	0.83	
Standard Uncertainty Flowrate (m^3/s) at STP Wet	3.64	
Expanded Uncertainty Flowrate (m^3/s) at STP Wet	**7.29 (%)**	