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Accreditation No. 14184.

# West Gate Tunnel Project

## Ambient Air Quality Monitoring

## Validated Report

## 1st February 2018 – 28th February 2018

Report No.: DAT12994

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Maintenance contract: MC2078

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## Executive Summary

Ecotech Pty Ltd is an independent company, contracted by Project Co to undertake continuous ambient air quality monitoring (AAQM) at a network of sites in Yarraville, Victoria, Australia. Monitoring is being conducted to inform environmental compliance requirements of the planned West Gate Tunnel Project.

The West Gate Tunnel Project consists of five AAQM stations. Ecotech commissioned the West Gate Tunnel Project stations as following:

- Station 1 on 19th July 2016.
- Station 2 on 26th August 2016.
- Station 4 on 3rd November 2016. BTEX sampling at Station 4 commenced on 21st November 2016.
- Station 5 on 17th January 2017.
- Station 3 on 25th January 2017.

This report presents the data for February 2018.

- The percentage of valid data capture for most of parameters at West Gate Tunnel Project network was above 85% for the reporting month.
- There was no recorded $PM_{10}$ readings over the exceedance limits at West Gate Tunnel Project network during the reporting month.

## Introduction

Ecotech Pty Ltd was commissioned by Transurban Limited (Principal) to provide monitoring and data reporting for the West Gate Tunnel Project (WGTP) network ambient air quality monitoring stations, located as detailed in Table 1. Ecotech commenced data collection at the Station 1 on the 19th July 2016, at Staton 2 on the 26th August 2016, and at Station 4 on the 3rd November 2016. BTEX sampling at Station 4 commenced on 21st of November 2016. Monitoring commenced at Station 5 and Station 3 on the 17th and 25th of January 2017 respectively.

This report presents the data for February 2018.

The data presented in this report:

- Describes air quality measurements;
- Compares monitoring results;
- Has been quality assured;
- Complies with NATA accreditation requirements, where applicable.

# 1.0 Monitoring and Data Collection

## 1.1. Siting Details

The WGTP network consists of five ambient air quality monitoring stations. The station's location and siting details are described below.

**Table 1: WGTP network monitoring locations**

| Site Name | Street Address | Geographical Coordinates | Height Above Sea Level (m) |
|---|---|---|---|
| Station 1 | Barbara Beyer Reserve, 2 Harris St, Yarraville | 37°48'43.20"S 144°54'0.00"E | 10m |
| Station 2 | 51-53 Francis Street, Yarraville | 37°49'15.59"S 144°53'38.41"E | 12m |

| Site Name | Street Address | Geographical Coordinates | Height Above Sea Level (m) |
|---|---|---|---|
| Station 3 | Railway Reserve, Woods St, Yarraville | 37°48'50.40"S 144°53'27.60"E | 17m |
| Station 4 | Primula Ave, Brooklyn | 37°49'27.28"S 144°50'45.72"E | 23m |
| Station 5 | Donald McLean Reserve, Spotswood | 37°49'35.28"S 144°52'55.25"E | 6m |

Siting audits were conducted to assess for compliance with *AS/NZS 3580.1.1:2007 "Methods for sampling and analysis of ambient air – guide to siting air monitoring equipment"*.

Siting audits performed at WGTP network as follows:

- Station 1 on 31st July 2017.
- Station 2 on 22nd September 2017.
- Station 3 on 4th February 2018.
- Station 4 on 1st November 2017.
- Station 5 on 8th February 2018.

The siting audits of these stations showed general compliance with the guidelines in AS/NZS 3580.1.1:2007. These stations are classified as peak stations according to AS/NZS 3580.1.1:2007. Please see details of any non-compliance in Section 1.3.1.

The meteorological monitoring siting audits were completed at WGTP network as follows:

- Station 1 on 31st July 2017.
- Station 2 on 22nd September 2017.
- Station 3 on 1st February 2018.
- Station 4 on 1st November 2017.
- Station 5 on 2nd February 2018.


**Figure 1: WGTP Monitoring Station Locations**

## 1.2. Monitored Parameters

Table 2 below details the parameters monitored and the instruments used at WGTP monitoring stations. Appendix 1 defines any abbreviated parameter names used throughout the report.

Sampling of all parameters is continuous, with the exception of BTEX. BTEX sampling is typically conducted by Ecotech on a one in six-day cycle at Station 4. BTEX samples are collected from 12:30 AM to 11:30 PM on the sampling day.

For meteorological sensors, the elevation given in the table on the next page is the height above ground level at the monitoring station.

**Table 2: Parameters measured at the WGTP monitoring stations**

| Station | Parameter Measured | Instrument and Measurement Technique |
|---|---|---|
| 1, 2, 3, 4 & 5 | $PM_{10}$ | Rupprecht & Patashnick / Thermo – TEOM (Tapered Element Oscillating Microbalance) |
| | $PM_{2.5}$ | Met One BAM 1020 – Beta ray attenuation |

| Station | Parameter Measured | Instrument and Measurement Technique |
|---|---|---|
| | Wind Speed (horizontal, elevation 10m) | Vaisala WS425 – ultrasonic |
| | Wind Direction (elevation 10m) | Vaisala WS425 – ultrasonic |
| Station 4 | Benzene, Toluene, Ethyl benzene, Xylene (BTEX) | Collected In Specially-Prepared Canisters And Analysed By Gas Chromatography/Mass Spectrometry (GC/MS) |
| | NO, $NO_2$, $NO_x$ | Ecotech EC9841 – gas phase chemiluminescence |
| | CO | Ecotech EC9830 – NDIR gas filter correlation infrared photometry |

## 1.3. Data Collection Methods

Table 3 below shows the methods used for data collection. Any deviations from the stated methods are detailed in sections 1.3.1. and 1.3.3.

**Table 3: Methods**

| Parameter Measured | Data Collection Methods Used | Description of Method |
|---|---|---|
| NO, $NO_2$, $NO_x$ | AS/NZS 3580.5.1-2011 | Methods for sampling and analysis of ambient air. Method 5.1: Determination of oxides of nitrogen – chemiluminescence method |
| | Ecotech Laboratory Manual | In-house method 6.1 Oxides of nitrogen by chemiluminescence |
| CO | AS/NZS 3580.7.1-2011 | Methods for sampling and analysis of ambient air. Method 7.1: Determination of carbon monoxide - direct reading instrumental method |
| | Ecotech Laboratory Manual | In-house method 6.3 Carbon monoxide by gas filter correlation spectrophotometry |

| Parameter Measured | Data Collection Methods Used | Description of Method |
|---|---|---|
| BTEX (Sampling only) | US EPA TO-15 | Method TO-15 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition. Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analysed By Gas Chromatography/Mass Spectrometry (GC/MS) |
| | Ecotech Laboratory Manual | In-house method 6.9 Volatile organic compounds in air collected in specially prepared canisters and analysed by gas chromatography/mass spectrometry |
| $PM_{10}$ (TEOM) | AS/NZ 3580.9.8-2008 | Methods for sampling and analysis of ambient air. Method 9.8: Determination of suspended particulate matter - $PM_{10}$ continuous direct mass method using a tapered element oscillating microbalance analyser. |
| | Ecotech Laboratory Manual | In-house method 7.3- Particulates - $PM_{2.5}$, $PM_{10}$ by TEOM |
| $PM_{2.5}$ (BAM 1020) | AS/NZS 3580.9.12 - 2013 | Methods of sampling and analysis of ambient air. Method 9.12: Determination of suspended particulate matter – $PM_{2.5}$ beta attenuation monitors |
| | Ecotech Laboratory Manual | In-house method 7.5 – Measurement of $PM_{10}$, $PM_{2.5}$ and TSP using Beta Attenuation Monitor. |
| Vector Wind Speed (Horizontal) | AS/NZS 3580.14 2014 | Methods for sampling and analysis of ambient air. Method 14: Meteorological monitoring for ambient air quality monitoring applications |
| | Ecotech Laboratory Manual | In-house method 8.1 Wind speed (Horizontal) by anemometer |
| Vector Wind Direction | AS/NZS 3580.14 2014 | Methods for sampling and analysis of ambient air. Method 14: Meteorological monitoring for ambient air quality monitoring applications |
| | Ecotech Laboratory Manual | In-house method 8.3 Wind direction by anemometer |

### 1.3.1. NATA Endorsement and Compliance with Standards

Unless stated below, parameters are monitored at the WGTP network according to the methods detailed in Table 3 above.

- Siting of all WGTP stations may not fully comply with the guidelines in *AS 3580.14- 2014 "Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring applications guidelines"*, due to possible air flow disturbances caused by nearby trees. Locating monitoring stations in urban areas often requires compromise due to a lack of clear space areas without obstructions as well as the availability of usable power supplies. Given the location, the site is fit for purpose while not fully compliant.

- AS/NZS 3580.1.1:2007 recommends a minimum distance between inlets and the roof of the supporting structure of 1.0m. However, all WGTP stations have inlets less than 1.0m above the roof. It is not thought this small difference will have any impact on measured concentrations.

- Ecotech's NATA scope of accreditation covers sampling only for BTEX parameters. Analysis and canister preparation is conducted by NATA accredited laboratories ALS as outlined in 1.3.3 below.

- Wind sensor at Station 3 was out of wind tunnel calibration from 18th January 2018. Ecotech will try to arrange the wind tunnel calibration at the next suitable maintenance visit.

### 1.3.2. Data Acquisition (Continuous Monitoring)

Data acquisition is performed using a PC based WinAQMS logger (using WinAQMS® Version 2.0) situated at each of the monitoring sites. Each logger is equipped with a 3G modem for remote data collection. The recorded data is remotely collected from the AQMS loggers on a daily basis (using Airodis™ version 5.1) and stored at Ecotech's Environmental Reporting Services (ERS) department in Melbourne, Australia. Data samples are logged in 5-minute intervals.

### 1.3.3. Sampling and analysis for BTEX

BTEX canister sampling was conducted by Ecotech field service technicians. ALS (NATA Accreditation No. 825) provided the canisters and laboratory analysis services according to method US EPA TO-15.

## 1.4. Data Validation and Reporting

### 1.4.1. Validation

The Ecotech ERS department performs daily data checks on continuously monitored parameters to ensure maximum data capture rates are maintained. Any equipment failures are communicated to the responsible field engineers for urgent rectification. Ecotech ERS maintains two distinct databases containing non-validated and validated data respectively.

The validated database is created by duplicating the non-validated database and then flagging data affected by instrument faults, calibrations and other maintenance activities. The data validation software requires the analyst to supply a valid reason (e.g. backed by maintenance notes, calibration sheets etc.) in the database for flagging any data as invalid.

Details of all invalid or missing data are recorded in the Valid Data Exception Tables.

Validation is performed by the analyst, and the validation is reviewed. Graphs and tables are generated based on the validated 5-minute data, while $PM_{2.5}$ is based on validated 1-hour data.

### 1.4.2. Reporting

The reported data for continuously monitored parameters is in a Microsoft Excel format file named "*Monthly Data Report_February 2018.xls*".

The Excel file consists of 5 Excel worksheets:

1. Cover
2. 5 Minute Data
3. 1 Hour Data
4. 1 Day Data
5. Valid Data Exception Table

The data contained in this report is based on Australian Eastern Standard Time.

Averages are based on a minimum of 75% valid readings within the averaging period. All averages are calculated from the 5-minute data, while $PM_{2.5}$ averages are calculated from 1-hour data.

Averaging periods of eight hours or less are reported for the end of the period, i.e. the hourly average 02:00am is for the data collected from 1:00am to 2:00am. For the purposes of calculating and reporting 4 and 8-hour averages, the first rolling average in a calendar day ends at 1.00 am, and includes hours from the previous calendar day. One-hour averages are calculated based on a clock hour. One day and one-year averages are calculated based on calendar days.

**Wind Data Reporting**

Wind speed and wind direction data associated with calm wind conditions are reported in accordance with the requirements of AS 3580.14-2014. Calm wind conditions are defined as wind speeds below the starting threshold of the wind speed / direction sensors. Sensor starting thresholds are given in Table 5 under "Measurement Range".

**BTEX Reporting**

Results will be provided to Ecotech by the analytical laboratory and summarised within this report. Full analytical results will be included as an Appendix 3 at the end of this report.

## 2.0 Air Quality Standards and Goals

The air quality standards for pollutants monitored at the WGTP monitoring network are based on

- State Environmental Protection Policy (Ambient Air Quality) Environmental Quality Objectives (SEPP (AAQ) EQO) for Station 1 (Yarraville Gardens), and
- State Environmental Protection Policy (Air Quality Management (AQM)) Schedule B for the remaining WGTP monitoring stations.

The air quality goals are shown in Tables 4 and 5 below.

**Table 4: Air Quality Standards for Station 1**

| Parameter | Time Period | Exceedance Level | Units | Maximum allowable exceedances |
|---|---|---|---|---|
| $PM_{10}$ | 1 day | 50 | µg/m³ | None (see note |
| $PM_{10}$ | 1 year | 20 | µg/m³ | None |
| $PM_{2.5}$ | 1 day | 25 | µg/m³ | None (see note) |
| $PM_{2.5}$ | 1 year | 8 | µg/m³ | None |

Note:

Exceptional events are excluded from this standard. As per the Ambient Air Quality NEPM, ***Exceptional event*** means a fire or dust occurrence that adversely affects air quality at a particular location and causes an exceedance of 1-day average standards in excess of normal historical fluctuations and background levels and is directly related to: bushfire; jurisdiction authorised hazard reduction burning; or continental scale windblown dust.

Ecotech will include any valid data identified as being associated with an exceptional event in all report tables and graphic representations. However, 1-day averages associated with exceptional events will not be counted as exceedances of the Air Quality standard.

**Table 5: Air Quality Standards and Air Toxic NEPM Goals for Stations 2, 3, 4 & 5**

| Parameter | Time Period | Exceedance Level | Units | Maximum allowable exceedances |
|---|---|---|---|---|
| CO | 1 hour | 29.0 | ppm | - |
| $NO_2$ | 1 hour | 140 | ppb | - |
| Benzene[1] | 1 year (based on 1-day averages) | 0.003 | ppm | 8-year goal is to gather sufficient data nationally to facilitate development of a standard. |
| Toluene[1] | 1 day | 1 | ppm | 8-year goal is to gather sufficient data nationally to facilitate development of a standard. |
| | 1 year (based on 1-day averages) | 0.1 | ppm | |
| Xylene [1] | 1 day | 0.25 | ppm | 8-year goal is to gather sufficient data nationally to facilitate development of a standard. |
| | 1 year (based on 1-day averages) | 0.2 | ppm | |
| $PM_{10}$ | 1 day | 60 | µg/m³ | - |
| $PM_{2.5}$ | 1 day | 36 | µg/m³ | - |

Note:

State Environmental Protection Policy (Air Quality Management (AQM)) Schedule B – Intervention levels for Class 1, 2 and 3 indicators:

> Intervention levels are used to assess the air quality monitoring data to determine whether the beneficial uses set out in Clause 9 of this Policy are being protected. Intervention levels are not used

[1] This value is monitoring investigation level of air pollution only, not limits according to Legislation F2011C00855 - National Environment Protection (Air Toxic) Measure 2011.

in the assessment of the design of individual sources. An intervention level is numerically greater than the design criteria for a given pollutant as it does not apply to an individual source but to all sources of the pollutant within a defined area.

# 3.0 Calibrations and Maintenance

## 3.1. Units and Uncertainties

The uncertainties for each parameter have been determined by the manufacturer's tolerance limits of the equipment's parameters, and by the data collection standard method.

The reported uncertainties are expanded uncertainties, calculated using coverage factors which give a level of confidence of approximately 95%.

**Table 6: Units and Uncertainties**

| Parameter | Units | Resolution | Uncertainty | Measurement Range[2] |
|---|---|---|---|---|
| NO, $NO_x$ (EC9841) | ppb | 1 ppb | ± 13 ppb or 10% of reading, whichever is the greater<br>K factor of 2.0 | 0 ppb to 500 ppb |
| $NO_2$ (EC9841) | ppb | 1 ppb | ± 17 ppb<br>K factor of 2.0 | 0 ppb to 500 ppb |
| CO (EC9830) | ppm | 0.1 ppm | ± 1 ppm or 10% of reading, whichever is the greater<br>K factor of 2.0 | 0 ppm to 50 ppm |
| $PM_{10}$ (TEOM) | µg/m³ | 0.1 µg/m³ | ±5.0 µg/m³ or 3.6% of reading, whichever is the greater<br>K factor of 2.0 | 0 µg/m³ to 1 g/m³ |
| $PM_{2.5}$ (BAM 1020) | µg/m³ | 1 µg/m³ | ±5.0 µg/m³ or 5.4% of reading, whichever is the greater<br>k factor of 2.0 | 5 to 1000 µg/m³ |

[2] Uncertainties may not be calculated based on the full measurement range. Uncertainty for CO by EC9830 is calculated based on a range of 0-10 ppm. Uncertainty for NO, $NO_2$ and $NO_x$ by EC 9841 are calculated based on a measurement range of 0-125 ppb.

| Parameter | Units | Resolution | Uncertainty | Measurement Range[2] |
|---|---|---|---|---|
| Vector Wind Speed | m/s | 0.1 m/s | ±0.4 m/s or 2.0% of reading, whichever is greater<br>K factor of 2.0 | 0 m/s to 30 m/s |
| Vector Wind Direction | Deg | 1 deg | ±4 deg<br>K factor of 2.0 | 0 deg to 360 deg<br>*Starting threshold:* 0 m/s |

## 3.2. Automatic calibration checks

Automatic span, zero and background checks occur each night for continuously monitored gaseous parameters. Data associated with these checks is invalidated and is not specifically referred to in the valid data exception reports. Table 7 displays the times for when these checks occur.

**Table 7: Automatic Span/Zero and Background Check Times**

| Parameter | Span/Zero | Background |
|---|---|---|
| CO | 01:00 to 01:25 | 23:45 to 23:55 |
| NO, $NO_2$, $NO_x$ | 01:00 to 01:25 | - |

## 3.3. Maintenance

### 3.3.1. Maintenance notes

### 3.3.2. Calibration & Maintenance Summary Tables

The last calibrations for the following parameters were performed on the indicated dates. Data supplied after this time is subject to further validation, to be performed at the next calibration cycle.

Note: Maintenance and calibration dates may differ, as calibrations may be less frequent than scheduled maintenance visits.

Tables 8 - 12 on the next pages indicate when the particulate, gas and meteorological equipment were last maintained / calibrated.

**Table 8: Station . Maintenance Table February 2018**

| Parameter | Date of Last Maintenance | Maintenance Type | Date of Last Calibration | Calibration Cycle |
|---|---|---|---|---|
| $PM_{10}$ | 02/02/18 | 6 Monthly | 02/02/18 | 6-Monthly |
| $PM_{2.5}$ | 02/02/18 | 6 Monthly | 02/02/18 | Yearly |
| Wind Speed | 02/02/18 | 6 Monthly | 04/05/16[3] | 2-Yearly |
| Wind Direction | 02/02/18 | 6 Monthly | 04/05/16[4] | 2-Yearly |

**Table 9: Station 2 Maintenance Table February 2018**

| Parameter | Date of Last Maintenance | Maintenance Type | Date of Last Calibration | Calibration Cycle |
|---|---|---|---|---|
| $PM_{10}$ | 01/02/18 | Monthly | 09/01/18 | 6-Monthly |
| $PM_{2.5}$ | 01/02/18 | Monthly | 13/11/17 | Yearly |
| Wind Speed | 01/02/18 | Monthly | 24/05/16[4] | 2-Yearly |
| Wind Direction | 01/02/18 | Monthly | 24/05/16[5] | 2-Yearly |

[3] Wind tunnel calibration performed on 04/05/2016 and installed at Station 1 on 22/07/2016. [4] Wind tunnel calibration performed on 24/05/2016 and installed at Station 2 on 12/09/2016.

**Table 10: Station 3 Maintenance Table February 2018**

| Parameter | Date of Last Maintenance | Maintenance Type | Date of Last Calibration | Calibration Cycle |
|---|---|---|---|---|
| $PM_{10}$ | 14/02/18 | Non-schedule | 04/01/18 | 6-Monthly |
| $PM_{2.5}$ | 14/02/18 | Non-schedule | 04/01/18 | Yearly |
| Wind Speed | 14/02/18 | Non-schedule | 18/01/16[5] | 2-Yearly |
| Wind Direction | 14/02/18 | Non-schedule | 18/01/16[6] | 2-Yearly |

**Table 11: Station 4 Maintenance Table February 2018**

| Parameter | Date of Last Maintenance | Maintenance Type | Date of Last Calibration | Calibration Cycle |
|---|---|---|---|---|
| $PM_{10}$ | 30/01/18 | Monthly | 30/01/18 | 6-Monthly |
| $PM_{2.5}$ | 30/01/18 | Monthly | 03/07/17 | Yearly |
| CO | 30/01/18 | Monthly | 30/01/18 | Monthly |
| NO, $NO_2$, $NO_x$ | 30/01/18 | Monthly | 30/01/18 | Monthly |
| BTEX | 30/01/18 | Weekly | Every sample | On supply of flow controller[6] |
| Wind Speed | 30/01/18 | Monthly | 21/10/16[7] | 2-Yearly |
| Wind Direction | 30/01/18 | Monthly | 21/10/16[8] | 2-Yearly |

[5] Wind tunnel calibration performed on 18/01/2016 and installed at Station 3 on 06/02/2017.

[6] Sampling flow orifice checks and calibrations performed by ALS for each orifice mass flow controller supplied. Records are held by Ecotech and available on request.

[7] Wind tunnel calibration performed on 21/10/2016 and installed at Station 4 on 22/11/2016.

**Table 12: Station 5 Maintenance Table February 2018**

| Parameter | Date of Last Maintenance | Maintenance Type | Date of Last Calibration | Calibration Cycle |
|---|---|---|---|---|
| $PM_{10}$ | 02/02/18 | Monthly | 19/01/18 | 6-Monthly |
| $PM_{2.5}$ | 02/02/18 | Monthly | 06/04/17 | Yearly |
| Wind Speed | 02/02/18 | Monthly | 15/04/16[8] | 2-Yearly |
| Wind Direction | 02/02/18 | Monthly | 15/04/16[9] | 2-Yearly |

# 4.0 Results

## 4.1. Valid Data Capture

Valid data capture refers to the amount of valid data collected during the report period. It is based on 5-minute data for all continuously monitored parameters, with the exception of $PM_{2.5}$. The $PM_{2.5}$ data is based on 1-hour data.

The percentage of valid data captured is calculated using the following equation:

*Percentage Valid Data capture = (Reported air quality data / Total data) x 100%*

Where:

- Reported air quality data = Number of samples (instrument readings) which have been validated through a quality assured process and excludes all data errors, zero data collection due to calibration, equipment failures, planned and unplanned maintenance.
- Total data = Total number of samples (instrument readings) expected for the sampling period. Total data is calculated based on the same averaging period as "reported air quality data" and the duration of the corresponding report period. e.g. for 5-minute data collected over a month of 31 days, the total data would be equal to 12 (5-minute samples in an hour) x 24 (hours in a day) x 31 (days in a month) = 8928 samples.

[8] Wind tunnel calibration performed on 15/04/2016 and installed at Station 5 on 27/01/2017.

Table 13 on below displays data capture statistics for February 2018. **Bold** values in the table indicates the of percentage valid data capture below 85%.

**Table 13: WGTP network Monthly Data Capture for February 2018**

| Parameter | Station 1 (%) | Station 2 (%) | Station 3 (%) | Station 4 (%) | Station 5 (%) |
|---|---|---|---|---|---|
| $PM_{10}$ | 99.4 | 99.7 | 95.9 | 100.0 | 99.4 |
| $PM_{2.5}$ | 99.4 | 99.9 | 95.7 | 99.3 | 85.7 |
| WS, WD | 99.8 | 100.0 | 96.6 | 100.0 | 100.0 |
| CO | - | - | - | 96.9 | - |
| NO, $NO_2$, $NO_x$ | - | - | - | 97.9 | - |
| BTEX | - | - | - | 100.0 | - |

## 4.2. Air Quality Monthly Summary

Tables 14 - 19 below include a summary of any air quality exceedances recorded at WGTP network during the report period.

**Table 14: Station 1 Exceedances recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| $PM_{10}$ | 1 day | 50 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 day | 25 µg/m³ | None recorded | - | - |
| $PM_{10}$ | 1 year | 20 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 year | 8 µg/m³ | None recorded | - | - |

**Table 15: Station 2 Exceedances recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| $PM_{10}$ | 1 day | 60 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 day | 36 µg/m³ | None recorded | - | - |

**Table 16: Station 3 Exceedances recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| $PM_{10}$ | 1 day | 60 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 day | 36 µg/m³ | None recorded | - | - |

**Table 17: Station 4 Exceedances recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| $PM_{10}$ | 1 day | 60 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 day | 36 µg/m³ | None recorded | - | - |
| CO | 1 hour | 29 ppm | None recorded | - | - |
| $NO_2$ | 1 hour | 140 ppb | None recorded | - | - |

**Table 18: Station 4 readings above Monitoring Investigation Level recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| Toluene | 1 day | 1 ppm | None recorded | - | - |
| Xylenes | 1 day | 0.25 ppm | None recorded | - | - |

**Table 19: Station 5 Exceedances recorded for February 2018**

| Parameter | Time Period | Exceedance Level | Number of exceedances | Value of Exceedance | End Date/Time of Exceedance |
|---|---|---|---|---|---|
| $PM_{10}$ | 1 day | 60 µg/m³ | None recorded | - | - |
| $PM_{2.5}$ | 1 day | 36 µg/m³ | None recorded | - | - |

## 4.3. BTEX Analytical Results Summary

Table 20 on the next page displays a summary of the analytical results for BTEX during the reporting period. Full analysis reports from ALS are included in Appendix 3. Results displayed as "<x ppb" indicated a reading below the lower detectable limit.

**Table 20: Station 4 BTEX Analytical Results for February 2018**

| Parameter | NEMP MIL | Units | Samples | | | | |
|---|---|---|---|---|---|---|---|
| **Canister Number** | | | C4981† | C12642† | C4985 | C12643 | C4778 |
| **Sample Date** | | | 02/02/18 | 08/02/18 | 14/02/18 | 20/02/18 | 26/02/18 |
| Final Vacuum | | inHg | 2 | 3 | 6 | 6 | 4 |
| Benzene | 3 (1 year) | ppb | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Toluene | 1000 (1 day) 100 (1 Year) | ppb | 1.5 | 1.6 | 0.9 | 1.5 | 0.7 |
| Ethyl benzene | - | ppb | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 |
| m,p-xylenes | 250 (1 day) | ppb | <1.0 | <1.0 | <1.0 | <1.0 | 1.2 |
| o-xylene | | ppb | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

†Sample flow may have decreased towards the end of the 24 hours sampling period. Therefore, the reported result may not be fully representative of the 24-hour average concentration.

## 4.4. Graphic Representations

Validated 5-minute data for NO, $NO_2$, $NO_x$, CO and $PM_{10}$, and validated 1-hour data for $PM_{2.5}$ were used to construct the following monthly graphic representations.

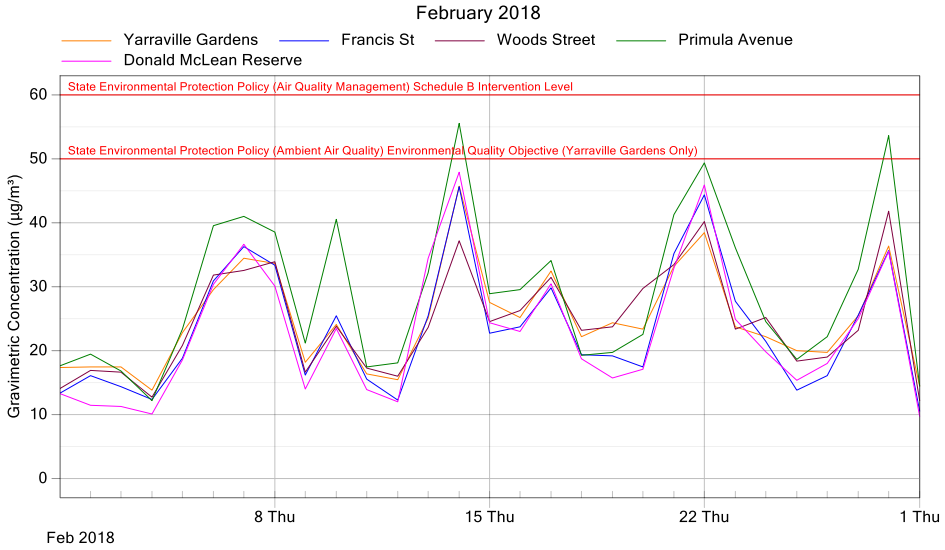



**Figure 2: $PM_{10}$ 1-day Averages for February 2018**

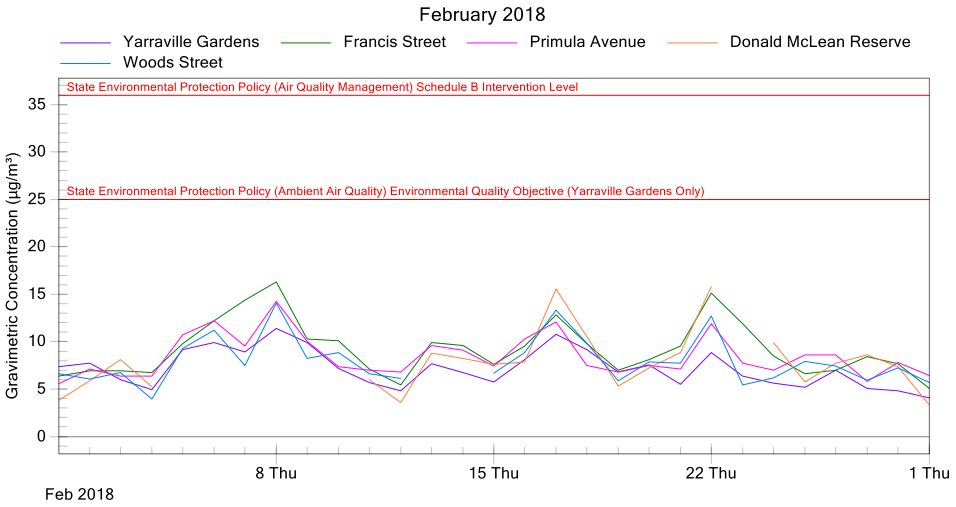



**Figure 3: $PM_{2.5}$ 1-day Averages for February 2018**

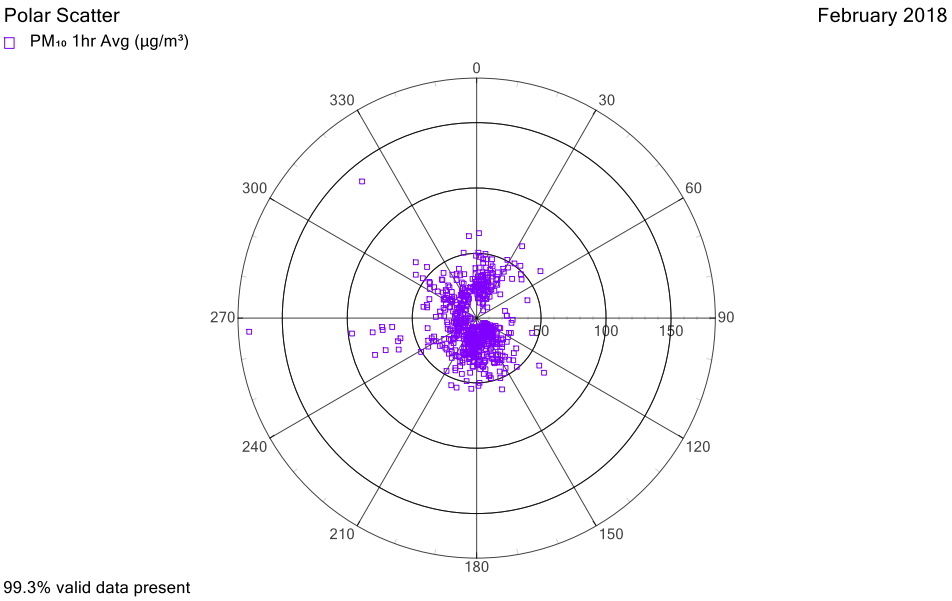



**Figure 4: Station 1 $PM_{10}$ 1-hour Averages scatter plot for February 2018**

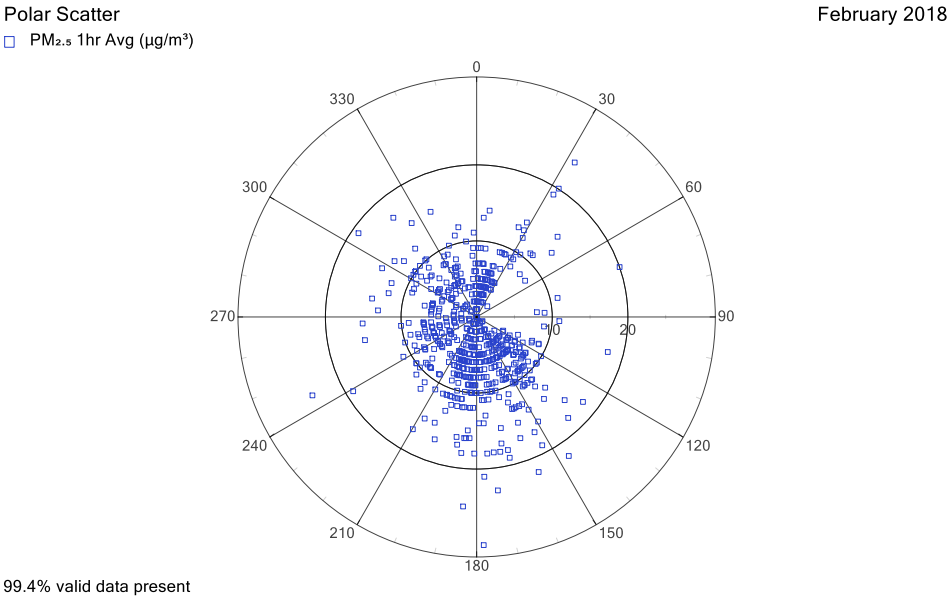



**Figure 5: Station $PM_{2.5}$ 1-hour Averages scatter plot for February 2018**

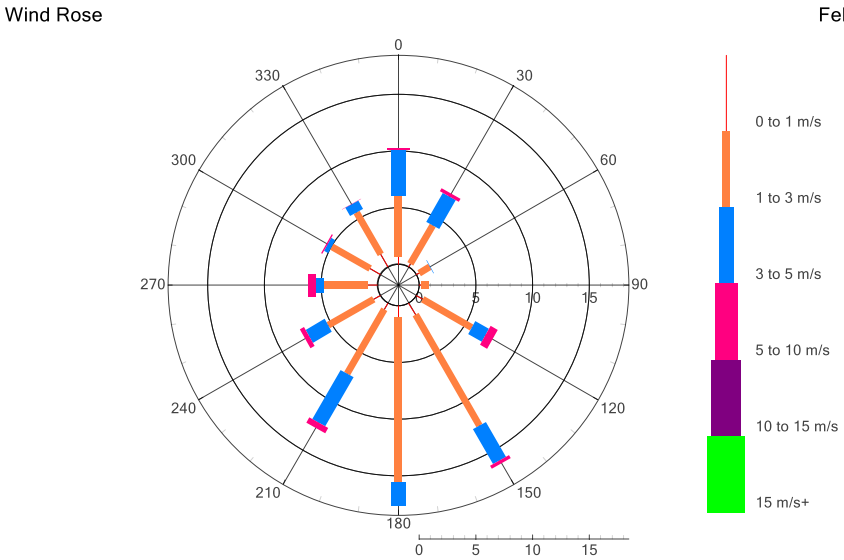



**Figure 6: Station 1 Monthly Wind Rose for February 2018**

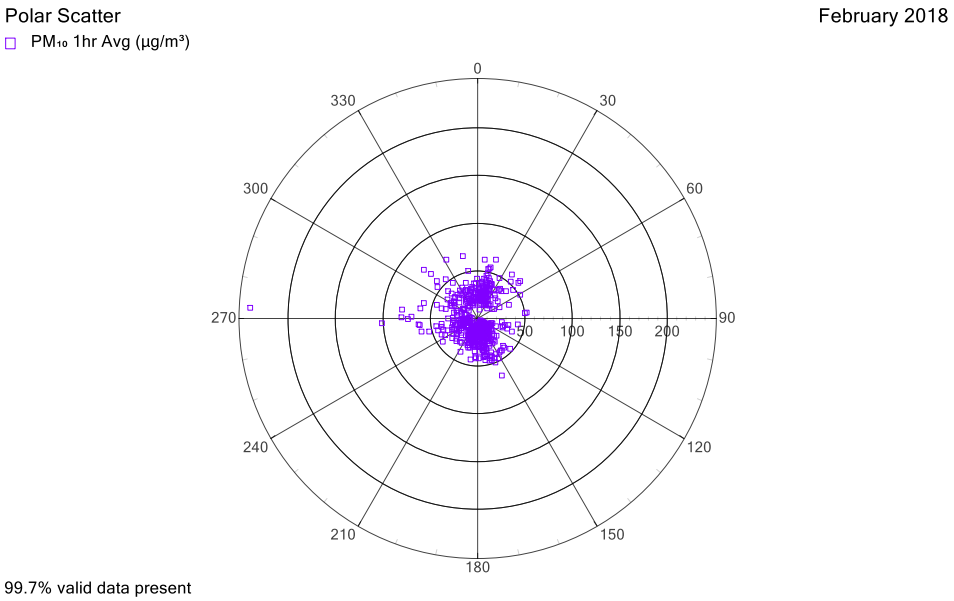



**Figure 7: Station 2 $PM_{10}$ 1-hour Averages scatter plot for February 2018**

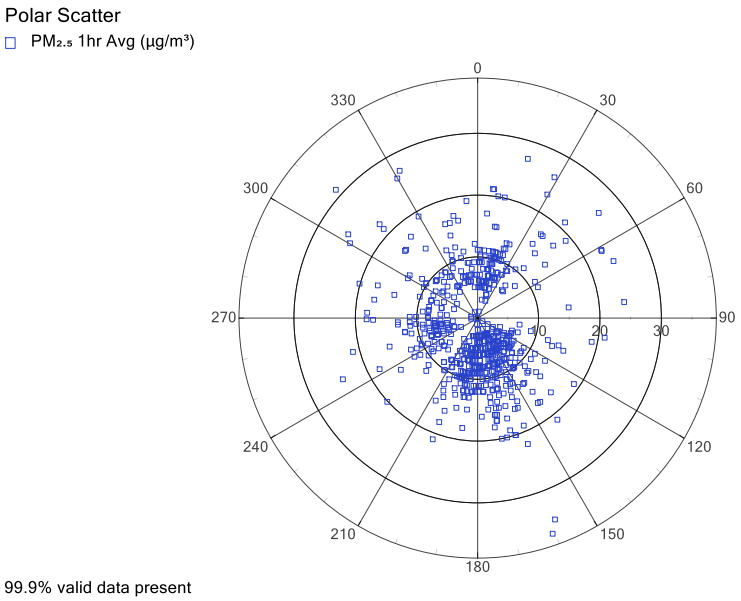



**Figure 8: Station 2 $PM_{2.5}$ 1-hour Averages scatter plot for February 2018**

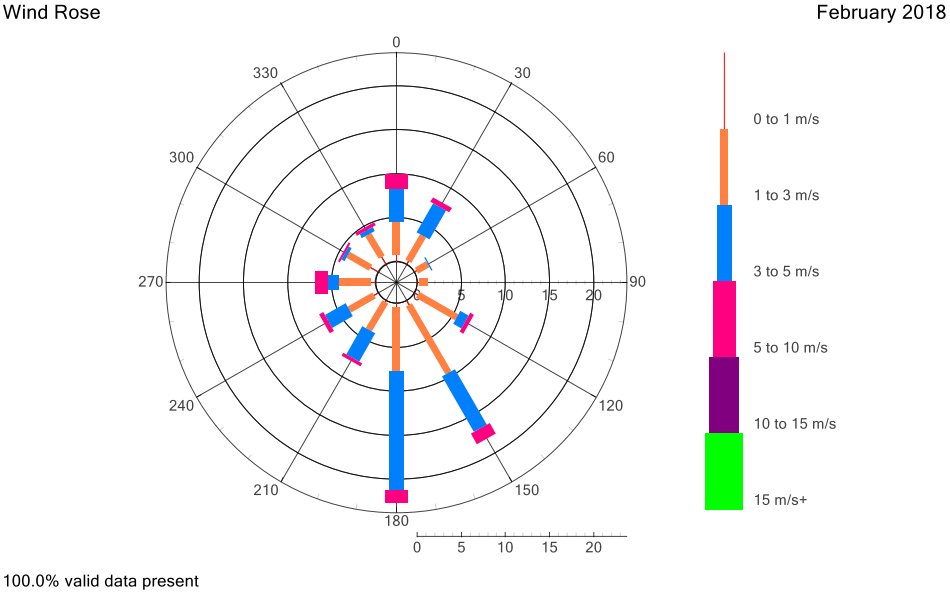



**Figure 9: Station 2 Monthly Wind Rose for February 2018**

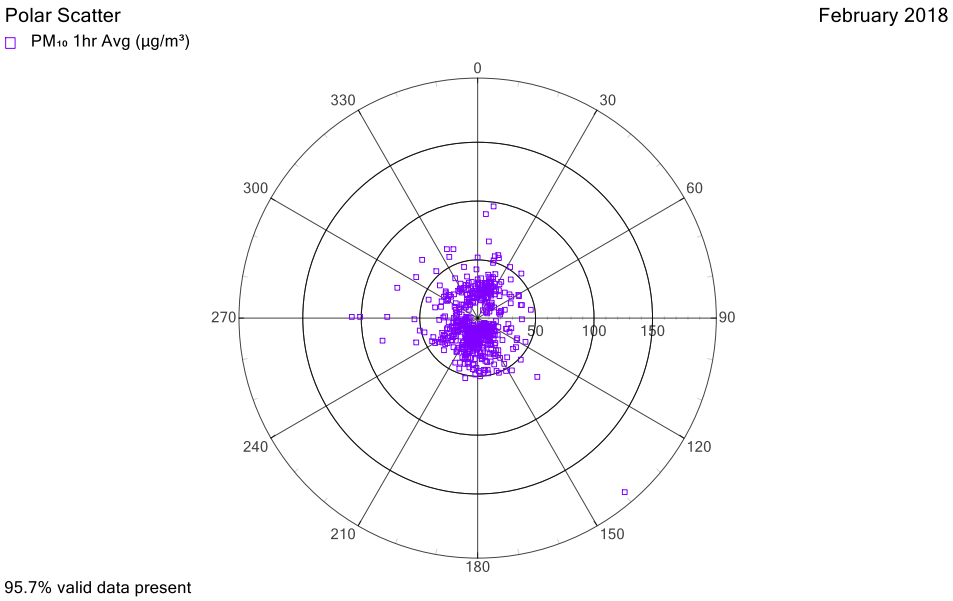



**Figure 10: Station 3 $PM_{10}$ 1-hour Averages scatter plot for February 2018**

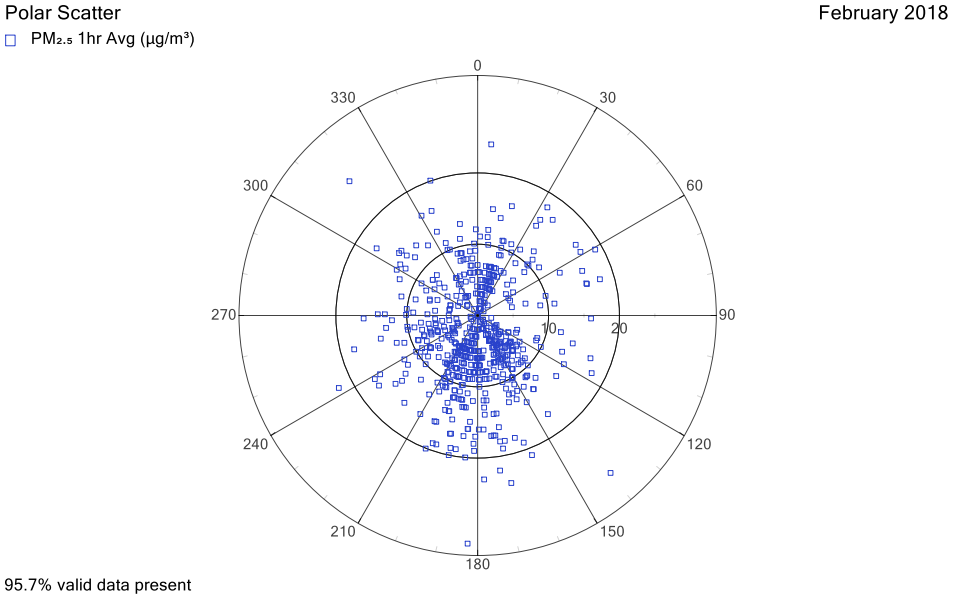



**Figure 11: Station 3 $PM_{2.5}$ 1-hour Averages scatter plot for February 2018**

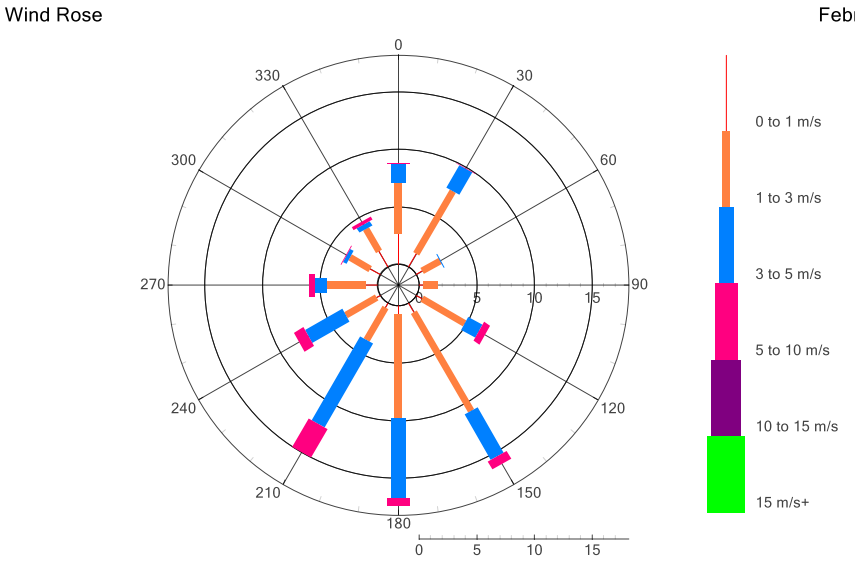



**Figure 12: Station 3 Monthly Wind Rose for February 2018**

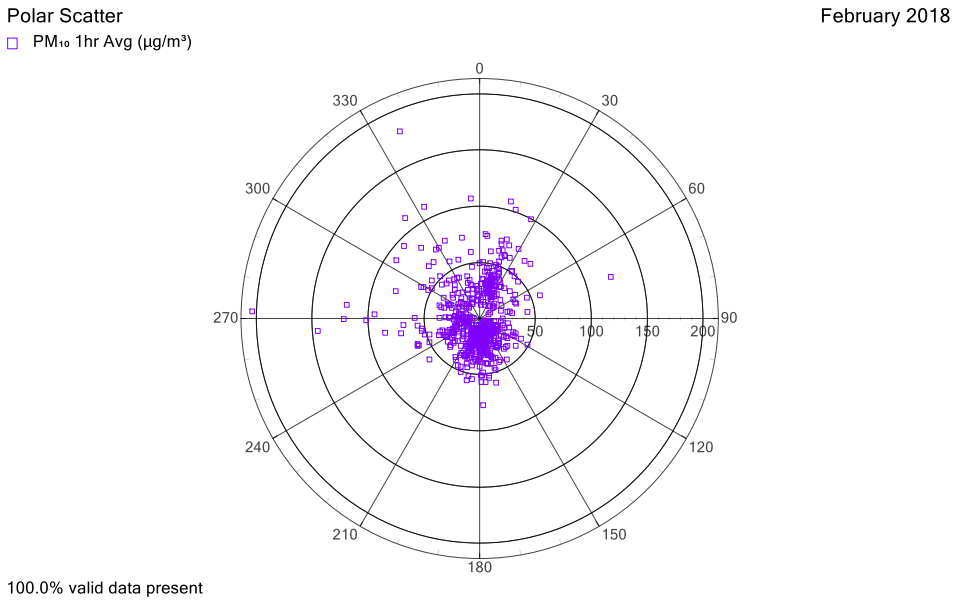



**Figure 13: Station 4 $PM_{10}$ 1-hour Averages scatter plot for February 2018**

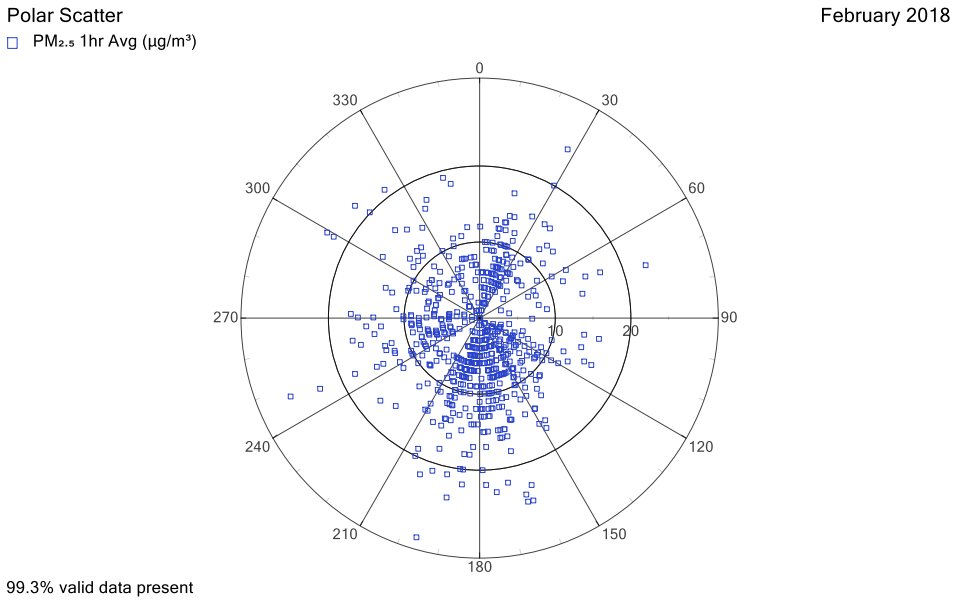



**Figure 14: Station 4 $PM_{2.5}$ 1-hour Averages scatter plot for February 2018**

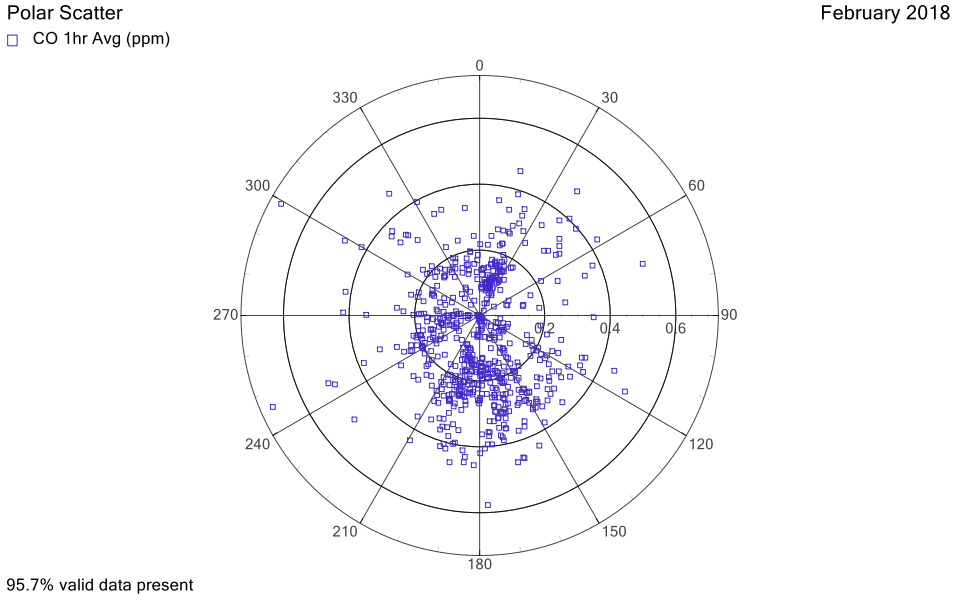



**Figure 15: Station 4 CO 1-hour Averages scatter plot for February 2018**

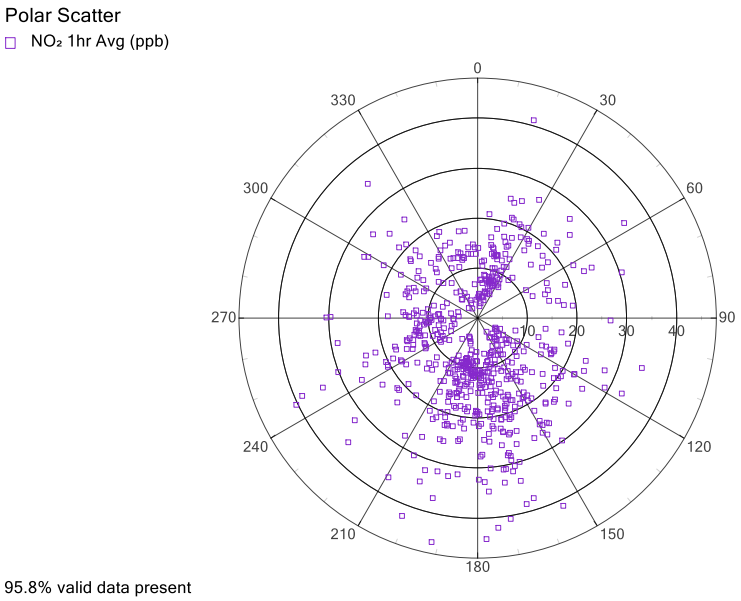



**Figure 16: Station 4 $NO_2$ 1-hour Averages scatter plot for February 2018**

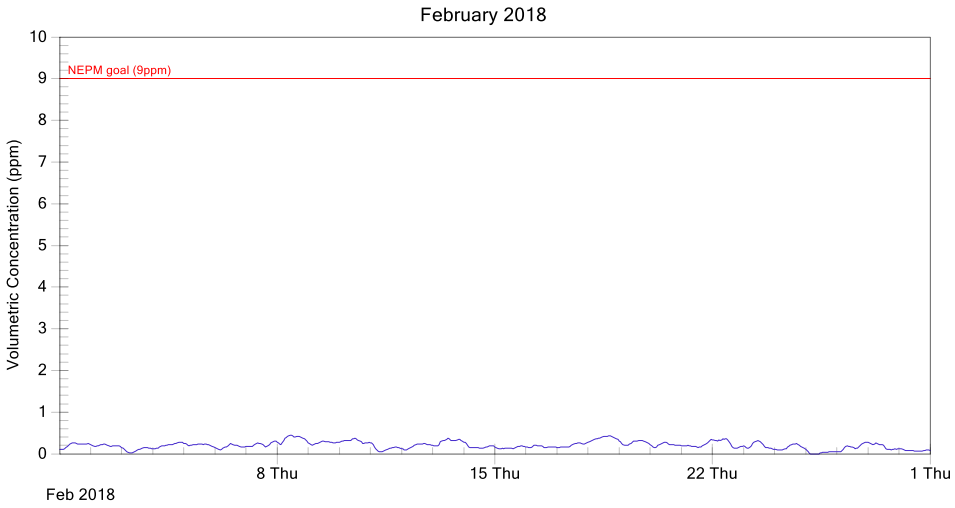



**Figure 17: Station 4 CO 8-hours rolling Averages for February 2018**

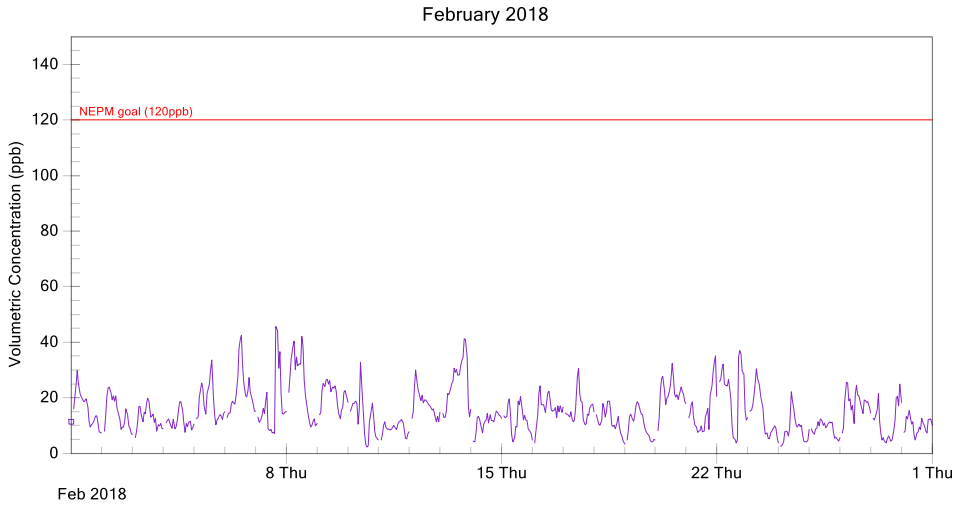



**Figure 18: Station 4 $NO_2$ 1-hour Averages for February 2018**

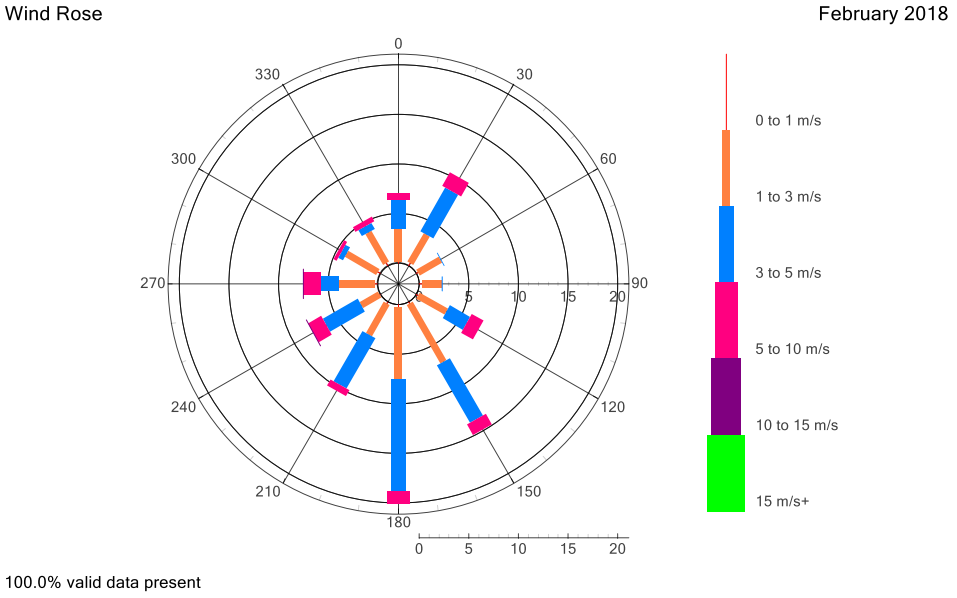



**Figure 19: Station 4 Monthly Wind Rose for February 2018**

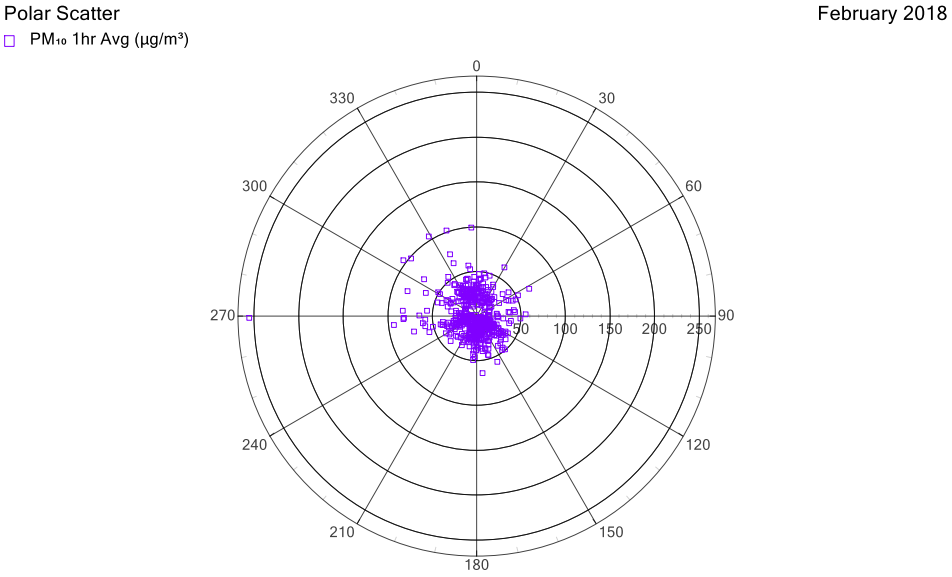



**Figure 20: Station 5 $PM_{10}$ 1-hour Averages scatter plot for February 2018**

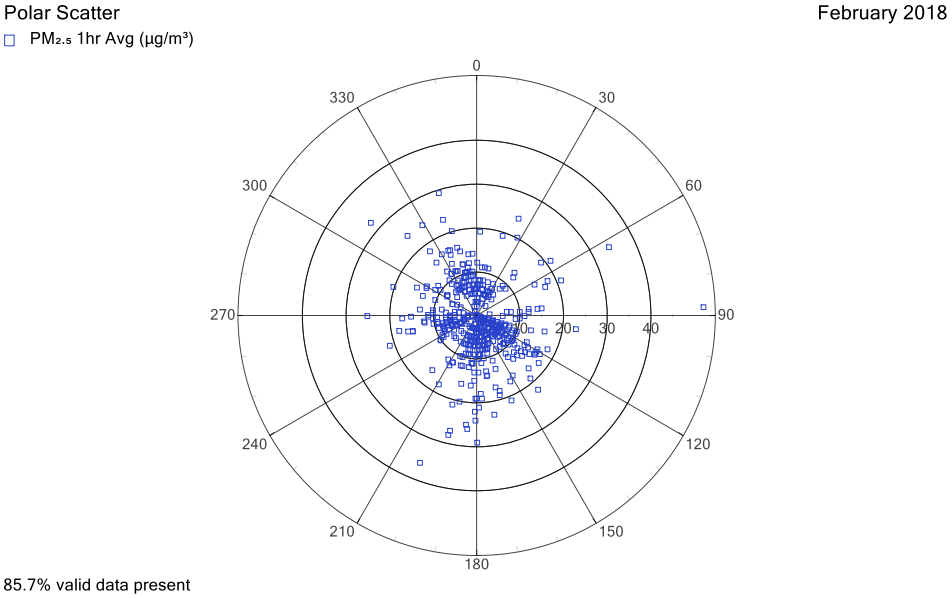



**Figure 21: Station 5 $PM_{2.5}$ 1-hour Averages scatter plot for February 2018**

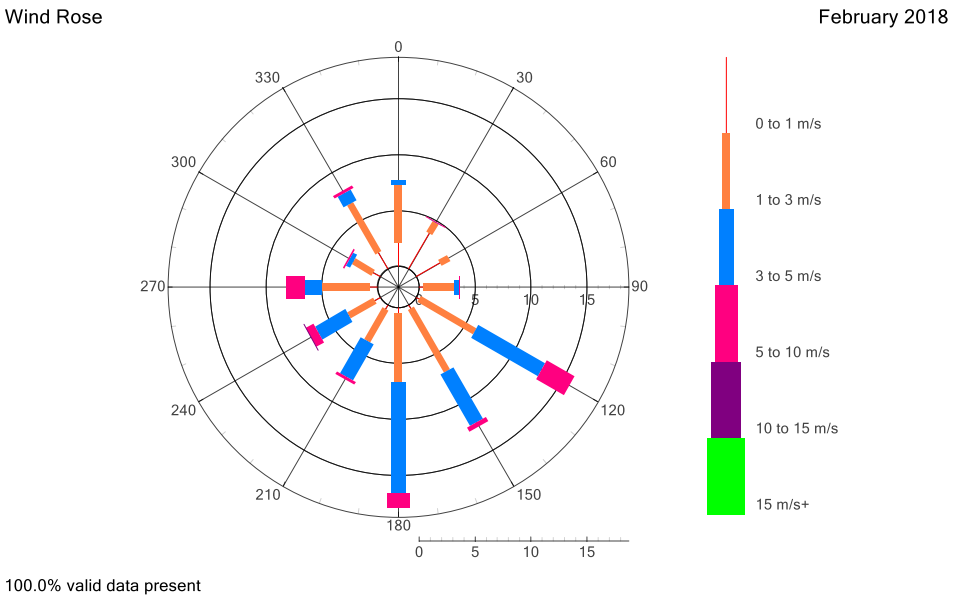



**Figure 22: Station 5 Monthly Wind Rose for February 2018**

## 5.0 Valid Data Exception Table

Tables 20 - 24 below detail all changes made to the raw data set during the validation process. An explanation of reasons given in the table can be found in Appendix 2.

**Table 21: Station 1 Valid Data Exception Table**

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 02/02/18 02:00 | 02/02/18 04:55 | Power interruption and subsequent instrument stabilisation | All parameters | DL | 21/03/18 |
| 02/02/18 12:00 | 02/02/18 13:45 | Scheduled 6 monthly maintenance | $PM_{2.5}$, $PM_{10}$ | DL | 21/03/18 |
| 15/02/18 13:35 | 15/02/18 14:20 | Brief power interruption and subsequent instrument stabilisation | WS, WD, $PM_{10}$ | DL | 21/03/18 |

**Table 22: Station 2 Valid Data Exception Table**

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 01/02/18 09:00 | 01/02/18 11:50 | Scheduled monthly maintenance | All parameters | DL | 21/03/18 |

**Table 23: Station 3 Valid Data Exception Table**

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 01/02/18 12:00 | 01/02/18 14:50 | Scheduled monthly maintenance | $PM_{2.5}$, $PM_{10}$ | DL | 21/03/18 |
| 12/02/18 01:00 | 12/02/18 03:30 | Power interruption and subsequent instrument stabilisation | All parameters | DL | 21/03/18 |
| 13/02/18 15:00 | 14/02/18 12:15 | Power interruption | All parameters | DL | 21/03/18 |
| 14/02/18 12:10 | 14/02/18 15:00 | Non-scheduled maintenance - Reset main circuit breaker and instrument stabilisation | $PM_{2.5}$, $PM_{10}$ | DL | 21/03/18 |

**Table 24: Station 4 Valid Data Exception Table**

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 02/02/18 00:30 | 02/02/18 23:30 | Sample C4981 flow final vacuum was low. Sample flow may have decreased towards the end of the 24 hours sampling period. Therefore, the reported result may not be fully representative of the 24 hours average concentration | BTX TO-15 | DL | 21/03/18 |
| 04/02/18 01:30 | 28/02/18 01:30 | Additional instrument stabilisation following the automatic span checks | CO | DL | 21/03/18 |
| 06/02/18 11:00 | 06/02/18 11:15 | Scheduled weekly maintenance - BTX TO-15 Canister changed over | No data affected | DL | 21/03/18 |

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 08/02/18 00:30 | 08/02/18 23:30 | Sample C12642 flow final vacuum was low. Sample flow may have decreased towards the end of the 24 hours sampling period. Therefore, the reported result may not be fully representative of the 24 hours average concentration | BTX TO-15 | DL | 21/03/18 |
| 09/02/18 23:00 | 09/02/18 23:35 | Brief power interruption and subsequent instrument stabilisation | $PM_{2.5}$, $PM_{10}$, CO, NO, $NO_2$, $NO_x$ | DL | 21/03/18 |
| 11/02/18 23:00 | 11/02/18 23:00 | Brief power interruption and subsequent instrument stabilisation | $PM_{2.5}$ | DL | 21/03/18 |
| 13/02/18 13:00 | 13/02/18 14:00 | Unrealistic data - Readings below the instrument range | $PM_{2.5}$ | DL | 21/03/18 |
| 13/02/18 16:00 | 13/02/18 16:00 | Scheduled weekly maintenance - BTX TO-15 Canister changed over | No data affected | DL | 21/03/18 |
| 19/02/18 12:00 | 19/02/18 12:00 | Scheduled weekly maintenance - BTX TO-15 Canister changed over | No data affected | DL | 21/03/18 |
| 23/02/18 16:00 | 23/02/18 16:00 | Scheduled weekly maintenance - BTX TO-15 Canister changed over | No data affected | DL | 21/03/18 |
| 28/02/18 09:30 | 28/02/18 10:00 | Scheduled weekly maintenance - BTX TO-15 Canister removed | No data affected | DL | 21/03/18 |

**Table 25: Station 5 Valid Data Exception Table**

| Start Date | End Date | Reason | Change Details | User Name | Change Date |
|---|---|---|---|---|---|
| 02/02/18 09:00 | 02/02/18 12:15 | Scheduled monthly maintenance | $PM_{2.5}$, $PM_{10}$ | DL | 21/03/18 |
| 03/02/18 07:10 | 03/02/18 07:10 | Unrealistic data - WS spike | WS & WD | DL | 21/03/18 |
| 04/02/18 18:00 | 24/02/18 18:00 | Intermittent unrealistic data - Data affected by interference from sample humidity due to shelter conditions | $PM_{2.5}$ | DL | 21/03/18 |
| 05/02/18 19:35 | 21/02/18 23:00 | Intermittent unrealistic data - Possible moisture interference | $PM_{10}$ | DL | 21/03/18 |

## 6.0 Report Summary

- The percentage of valid data capture for most of parameters at WGTP network was above 85% for the reporting month.

- The flow final vacuums of two canisters sampled during February 2018 were low. The sample flow may have decreased towards the end of the 24 hours sampling period. Therefore, the reported results may not be fully representative of the 24-hour average concentration. Refer to Table 20 for more details

- There was no recorded $PM_{10}$ readings over the exceedance limits at WGTP network during the reporting month.

----------END OF REPORT----------

## Appendix 1 - Definitions & Abbreviations

| | |
|---|---|
| µg/m³ | Micrograms per cubic metre at standard temperature and pressure (0°C and 101.3 kPa) |
| BTEX | Benzene, Toluene, Ethyl Benzene and Xylene *ortho-, meta-* and *para*-isomers |
| calm | Wind conditions where the wind speed is below the operating range of the wind sensor |
| CO | Carbon monoxide |
| deg | Degrees (True North) |
| m/s | Metres per second |
| NO | Nitric oxide |
| $NO_2$ | Nitrogen dioxide |
| $NO_x$ | Oxides of nitrogen |
| $PM_{10}$ | Particulate less than 10 microns in equivalent aerodynamic diameter |
| $PM_{2.5}$ | Particulate less than 2.5 microns in equivalent aerodynamic diameter |
| ppb | Parts per billion |
| ppm | Parts per million |
| Sigma | Sigma Theta is the standard deviation of the horizontal wind direction fluctuations over the averaging period. |
| WD | Vector Wind Direction |
| WS | Vector Wind Speed |

## Appendix 2 - Explanation of Exception Table

**Automatic background check** refers to when analyser samples zero air and measures the level of the concentration voltage. This voltage is taken as the zero signal level and this value is subtracted from any subsequent readings as an active zero compensation. This is the analyser's fine zero measurement.

**Beta count failure** refers to a fault in the functioning of the beta attenuation monitor.

**Calibration check outside tolerance** refers to when the calibration values are outside the tolerance limits set for the precision check.

**Calibration correction factor applied to data** refers to an offset or multiplier applied to the data. This operation may be performed for a number of reasons including: (a) when a clear trend / drift outside the tolerance limit can be demonstrated by repeated operation precision checks, (b) when a correction is required on previously logged data due to a calibration check being outside the allowable tolerance.

**Commissioning** refers to the initial setup and calibration of the instrument when it is first installed. For some instruments there may be a stabilisation period before normal operation commences.

**Data affected by environmental conditions – wind speed spike** refers to when a one-off high reading occurs due to a natural occurrence such as a bird sitting on the wind sensor, or some other event causing the readings to spike.

**Data transmission error** refers to a period of time when the instrument could not transmit data. This may be due to interference, or a problem with the phone line or modem.

**Equipment malfunction/instrument fault** refers to a period of time when the instrument was not in the normal operating mode and did not measure a representative value of the existing conditions.

**Gap in data/data not available** refers to a period of time when either data has been lost or could not be collected.

**Instrument Alarm** refers to an alarm produced by the instrument. A range of alarms can be produced depending on how operation of the instrument is being affected.

**Instrument out of service** refers to a lack of data due to an instrument being shut down for repair, maintenance, or factory calibration.

**Linear offset or multiplier** refers to when an offset or multiplier has been applied between two points where the values of the offset or multiplier are different and the correction is interpolated between the two points.

**Logger error** refers to when an error occurs and instrument readings are not correctly recorded by the logger.

**Maintenance** refers to a period of time when the logger / instrument was switched off due to maintenance.

**Overnight span/zero out of tolerance** refers to when the span/zero reading measured by the analyser during an automatic precision check falls outside of the expected concentration limits.

**Overnight zero out of tolerance** refers to when the automatic zero reading measured by the analyser falls outside the expected limits.

**Power Interruption** refers to no power to the station therefore no data was collected at this time.

**Remote Calibration** refers to when a technician remotely connects to the station and manually performs a span check.

**Static offset or multiplier** refers to when a single offset or multiplier has been applied to the data between two points either to increase or decrease the measured value.

**Tape break** refers to the breaking of the beta attenuation monitor sample tape during operation.

**Warm up after power interruption** refers to the start up period of an instrument after power has been restored.

## Appendix 3 – BTEX Analytical Results

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801676** | Page | : 1 of 4 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Feb-2018 09:00 |
| Order number | : 234215 | Date Analysis Commenced | : 21-Feb-2018 |
| C-O-C number | : ---- | Issue Date | : 22-Feb-2018 16:09 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Dale Semple | Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP101: Results reported in µg/m³ are calculated from PPBV results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa.
- CAN-001: Results for Pressure - As Received are measured under controlled conditions using calibrated laboratory gauges. These results are expressed as an Absolute Pressure. Equivalent gauge pressures may be calculated by subtracting the Pressure - Laboratory Atmosphere taken at the time of measurement.
- CAN-001: Results for Pressure - Gauge as Received are obtained from uncalibrated field gauges and are indicative only. These results may not precisely match calibrated gauge readings and may vary from field measurements due to changes in temperature and pressure

## Analytical Results

| Sub-Matrix: AIR (Matrix: AIR) | | | Client sample ID | 020218 C4981_S1617 | 080218 C12642_S1615 | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | 02-Feb-2018 00:00 | 08-Feb-2018 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | EN1801676-001 | EN1801676-002 | -------- | -------- | -------- |
| | | | | Result | Result | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15 (Calculated Concentration)** | | | | | | | | |
| **Benzene** | 71-43-2 | 1.6 | µg/m³ | <1.6 | <1.6 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 1.9 | µg/m³ | **5.6** | **6.0** | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 2.2 | µg/m³ | <2.2 | <2.2 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 4.3 | µg/m³ | <4.3 | <4.3 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 2.2 | µg/m³ | <2.2 | <2.2 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 2.6 | µg/m³ | <2.6 | <2.6 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 6.6 | µg/m³ | <6.6 | <6.6 | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | ppbv | **1.5** | **1.6** | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | ppbv | <1.0 | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 1.5 | ppbv | <1.5 | <1.5 | ---- | ---- | ---- |
| **Sampling Quality Assurance** | | | | | | | | |
| **Pressure - As received** | PRESSURE | 0.1 | kPaa | **95.7** | **101** | ---- | ---- | ---- |
| **Pressure - Gauge as Received** | ---- | 1 | Inches Hg | **-2** | **-3** | ---- | ---- | ---- |
| **Pressure - Laboratory Atmosphere** | ---- | 0.1 | kPaa | **102** | **102** | ---- | ---- | ---- |
| **Temperature as Received** | ---- | 0.1 | °C | **21.0** | **21.0** | ---- | ---- | ---- |
| **USEPA Air Toxics Method TO15r Surrogates** | | | | | | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | **101** | **99.9** | ---- | ---- | ---- |

## Surrogate Control Limits

| Sub-Matrix: **AIR** | | Recovery Limits (%) | |
|---|---|---|---|
| *Compound* | *CAS Number* | *Low* | *High* |
| **USEPA Air Toxics Method TO15r Surrogates** | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 60 | 140 |

ALS Environmental

# QUALITY CONTROL REPORT

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801676** | Page | : 1 of 3 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Feb-2018 |
| Order number | : 234215 | Date Analysis Commenced | : 21-Feb-2018 |
| C-O-C number | : ---- | Issue Date | : 22-Feb-2018 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report; Recovery and Acceptance Limits

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Dale Semple | Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **AIR**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Client sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Recovery Limits (%)* |
| **EP101: VOCs by USEPA Method TO15r (QC Lot: 1447668)** | | | | | | | | | |
| EN1801676-001 | 020218 C4981_S1617 | EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | 1.5 | 1.5 | 0.00 | No Limit |
| | | EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | <1.0 | <1.0 | 0.00 | No Limit |

## Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control terms Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) refers to certified reference materials, or known interference free matrices spiked with target analytes. The purpose of these QC parameters are to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS and DCS.

Sub-Matrix: **AIR**

| | | Method Blank (MB) Report | | | Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | | Recovery Limits (%) | | RPDs (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | DCS | Low | High | Value | Control Limit |
| **EP101: VOCs by USEPA Method TO15r (QCLot: 1447668)** | | | | | | | | | | | |
| EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | 100 ppbv | 94.8 | 95.9 | 77 | 114 | 25 | 25 |
| EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | <0.5 | 100 ppbv | 94.6 | 95.9 | 78 | 115 | 25 | 25 |
| EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | <0.5 | 100 ppbv | 96.0 | 96.5 | 82 | 121 | 25 | 25 |
| EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | <1.0 | 200 ppbv | 95.9 | 97.0 | 82 | 122 | 25 | 25 |
| EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | 100 ppbv | 91.4 | 92.1 | 83 | 122 | 25 | 25 |

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

# QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801676** | Page | : 1 of 4 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Feb-2018 |
| Site | : ---- | Issue Date | : 22-Feb-2018 |
| Sampler | : DANIEL RAYMOND | No. of samples received | : 2 |
| Order number | : 234215 | No. of samples analysed | : 2 |

**This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.**

Brief method summaries and references are also provided to assist in traceability.

## Summary of Outliers

### Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

### Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

### Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

# Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **AIR**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)**<br>020218 - C4981_S1617 | **02-Feb-2018** | **----** | ---- | ---- | **21-Feb-2018** | 04-Mar-2018 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)**<br>080218 - C12642_S1615 | **08-Feb-2018** | **----** | ---- | ---- | **21-Feb-2018** | 10-Mar-2018 | ✓ |
| **Sampling Quality Assurance** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)**<br>020218 - C4981_S1617 | **02-Feb-2018** | **----** | ---- | ---- | **21-Feb-2018** | 02-Feb-2019 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)**<br>080218 - C12642_S1615 | **08-Feb-2018** | **----** | ---- | ---- | **21-Feb-2018** | 08-Feb-2019 | ✓ |

# Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **AIR**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| *Analytical Methods* | *Method* | *QC* | *Regular* | ***Actual*** | ***Expected*** | *Evaluation* | |
| Duplicate Control Samples (DCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Duplicates (DUP) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **10.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |

## Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|---|---|---|---|
| Canister Sampling - Field Data | CAN-001 | AIR | In house: Referenced to USEPA TO14 / TO15 |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | AIR | In house: Referenced to USEPA TO15r Volatile Organic Compounds in Air by USEPA TO15. Aliphatic and Aromatic Hydrocarbons |
| Hydrocarbons in Air by USEPA TO15 (mass/volume) | EP101-H-MV | AIR | In house: Referenced to USEPA TO15r Hydrocarbons in Air by USEPA TO15 (Calculated Concentration) |

# AIR CANISTER CHAIN OF CUSTODY

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 129 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
ORANGE 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0300 E: townsville.environmental@alsglobal.com
WAGGA WAGGA 89 Kerry Street Wollongong NSW 2500 Ph: 02 6121 3125 E: wollongong@alsglobal.com

Toll: AP 1800 7572

*If sourced from an ALS Laboratory: please tick →*

*Client Supplied Canister(s)?* Y / N

| | | |
|---|---|---|
| CLIENT: ECOTECH | TURNAROUND REQUIREMENTS : (Standard TAT may be extended for multiple sequential analysis suites) | ☑ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date): |
| OFFICE: 1492 Ferntree Gully Rd, KNOXFIELD VIC | | |
| PROJECT: WD4 PRIMULA AVE | ALS QUOTE NO.: NE/070/17 | |
| PURCHASE ORDER NC 234215 | COUNTRY OF ORIGIN: | |
| PROJECT MANAGER: Lara Nicholas | CONTACT PH: 03 9370 7845 0417351053 | |
| SAMPLER: Daniel Raymond | SAMPLER MOBILE: 0419424932 | |
| COC Emailed to ALS? ( YES / NO) | EDD FORMAT (or default): | |
| Email Reports to (will default to PM if no other addresses are listed): lara.nicholas@ecotech.com | | |
| Email Invoice to (will default to PM if no other addresses are listed): naomi.dans@ecotech.com | | |

COC SEQUENCE NUMBER (Circle): COC: (1) 2 3 4 5 6 7 — OF: (1) 2 3 4 5 6 7

**LABORATORY USE ONLY (Circle)** *Receiver to initial and date/time*

Custody Seal Intact? Rec Lab Y / N NE Y / N N/A
Valves closed on Receipt? Rec Lab Y / N NE Y / N N/A
Canister/Sampler Complete and Not Damaged (Yes) No
Other comment: Temperature °C

| RELINQUISHED BY: | RELINQUISHED BY: | RELINQUISHED BY: | RELINQUISHED BY: |
|---|---|---|---|
| Signature and date/time | Signature and date/time | Signature and date/time | Signature and date/time |
| RECEIVED BY: | RECEIVED BY: | RECEIVED BY: | RECEIVED BY: |
| Signature and date/time | Signature and date/time | Signature and date/time | Signature and date/time |

16/2/17 9am

COMMENTS/SPECIAL HANDLING/REPLACEMENT OR RETURN INSTRUCTIONS:

## GAS SAMPLE CONTAINER INFORMATION

Canister Gauge Pressures (PSI) — Refer to Canister Verification Reports and COAs for pressures measured by the Lab

## ANALYSES REQUESTED

Suite Codes must be listed to attract suite price

## Additional Information

Comments on LORs required, potential hazards, likely contaminant levels, or samples requiring specific QC analysis etc. (LOR defaults to routine method LOR after dilution)

| ALS use only: LAB ID | CANISTER / SAMPLE DETAILS: CANISTER SERIAL NO. | FLOW CONTROLLER SERIAL NO. | CLIENT SAMPLE ID | DATE / TIME SAMPLED | MATRIX (eg Air, Soil Gas) | Pre-Sampling | Post Sampling | Reporting Requirements: LORs: Ambient Air | Soil Gas (NEPM) | Other / Indoor | Units: ppbv, µg/m³ | ppmv, mg/m³ | VI-V1 BTEXN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4981 | 1617 | 020218 | 02/02/18 00:30 - 23:30 | AIR | 30 | 4 | X | | | X | | X |
| 2 | 12642 | 1615 | 080218 | 08/02/18 00:30 - 23:30 | AIR | 30 | 4 | X | | | X | | X |

Environmental Division
Newcastle
Work Order Reference
EN1801676

Telephone : +61 2 4014 2500

*Job Specific Instructions: Ecotech Timers Sent with samples to be cleaned with nitrogen and returned with new canisters*

AIR SAMPLING EQUIPMENT — DISPATCH RECORD

*Inquiries: Client Services - Newcastle* **Phone: +61 (02) 4014 2500** E-mail: samples.newcastle@alsenviro.com

| Dispatch to: | | ALS Use ONLY | |
|---|---|---|---|
| Client / Office: | ECOTECH | | |
| Contact: | Lara Nicholas | Request Received By: | HW |
| Telephone: | 03 9730 7800 | Deliver By: | asap |
| ALS Quotation: | NE/070/17 | Dispatched By: | asap |
| Delivery Address: | 1492 Ferntree Gully Rd | Workorder: | |
| | Knoxfield VIC 3180 | Agreed Rent Free Period: | 14 days |

SPECIAL INSTRUCTIONS: **PLEASE EMAIL CLEAN CERTIFICATES TO LARA NICHOLAS ON DISPATCH**.....

# Air Sampling Equipment Request

## CANISTERS

| No. | Canister Type | Size | Gauge | Valve | Cap | Rental[1] | No. Returned | Analysts Initials & Date: Leak Checked | Certified OK |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Entech Silonite Canister (Summa™) | 6L | Yes | S | Yes | $200 ea | | VS | 24/1/18 |

## CONNECTORS AND FLOW CONTROL DEVICES

| No. | Equipment Type | Duration (hr) | Flow (ml/min) | T-Piece | Gauge | Certified | Sealed / Vacuum | Connection (Quick Connect S, Swagelok) | No. Returned | Rental[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Passive Sampler -TWA | 24hr | | No | Yes | Yes | Yes / No | S | | Incl Above |
| | Flow Sampler Caps | | | No | No | No | Yes / No | | | $20 ea. Replacement |
| | ECOTECH Autosampler | | | No | No | No | Yes / No | | | N/A |
| | ¼" Swagelok connectors and ferrules (spares) | - | - | - | - | - | - | | | $5 ea. Replacement |

☑ Other (specify) 3x ecotech sampling timers +3x male blocking nuts, + 3x female blocking nuts.

[1] *Refer to Acceptance of Terms*

| ALS use only | | | |
|---|---|---|---|
| Sampling Guide Included (Y / N) | Packed by: VS | Dispatch Time / Date | VS 24/1/18 |
| Number of Boxes: | 2 | Consignment Note Number: | 9802 1108 9316 |
| Courier / Dispatcher: | TNT | Consignment Dispatched by: | DBass |



AIR SAMPLING EQUIPMENT — DISPATCH RECORD

## ALS SUPPLIED EQUIPMENT

| Item | Quantity | Item Description | Serial Nos |
|---|---|---|---|
|  | 3 | 6L Silonite Summa™ canister | 4981 ✓<br>4985<br>12642 ✓<br>Rec'd 16/2/18. |
|  | 3 | Passive Sampler – TWA – 24hr | 1615 ✓<br>2824<br>2843 |

ENFMCDR1.1 11-05-11

RIGHT SOLUTIONS

Brisbane · Adelaide · Bendigo · Canberra · Geelong · Gladstone · Melbourne (Scoresby) · Melbourne (Springvale) · Mudgee · Newcastle · Nowra · Perth · Wollongong · Sydney · Townsville · Traralgon · Wangaratta

www.alsglobal.com

Canister Verification Report

# Canister No: 4981

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) Ambient Air | **Verification Date:** | 24-Jan-2018 ✓ |
| | | **Valid To (At least):** | 21-Feb-2018 ✓ |
| | | **Verification File:** | 180123_24.D |
| **Canister Type:** | Entech Silonite - Summa Style | **Last Stability Check:** | 22-Sep-2016 |
| **Canister Size:** | 6L | **Next Check Scheduled:** | 22-Sep-2018 |
| **Valve Type:** | Nupro | **Analyst:** | Dale Semple |
| **Dispatch Pressure:** | <0.01 psia | **Approved for Dispatch by:** | 24/1/18 |

## Canister Verification Protocol

Canisters are verified fit for purpose for the requested analytes and applications if known. For most applications, canisters are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to valves. Stability checks are performed after 5 years or if damage to the canister is suspected, then every two years, within the designated holding time to ensure each canister is capable of holding the target chemicals without significant degradation.

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | | 0.2 | <0.2 |
| Chloroform | Trichloromethane | | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| Dichloromethane | Methylene chloride | | 0.2 | <0.2 |
| m- & p-Xylene | 1,3 & 1,4 -Dimethylbenzene | | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | | 0.2 | <0.2 |
| Styrene | Vinyl benzene | | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | | 0.2 | <0.2 |
| Toluene | Methyl Benzene | | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | | 0.2 | <0.2 |
| Acetone | 2-Propanone | | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | | 0.2 | <0.2 |
| Bromoform | Tribromomethane | | 0.2 | <0.2 |
| Carbon disulfide | CS2 | | 0.2 | <0.2 |
| Cyclohexane | | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | | 0.2 | <0.2 |
| n-Heptane | | | 0.2 | <0.2 |
| n-Hexane | | | 0.2 | <0.2 |
| Propene | Propylene | | 0.2 | <0.2 |
| Tetrahydrofuran | THF | | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | | 0.2 | <0.2 |
| Benzyl chloride | o-Chlorotoluene | | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | | 0.2 | <0.2 |
| Acrolein | 2-Propenal | | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | | 0.2 | <0.2 |
| Methyl methacrylate | MMA | | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | | 0.2 | <0.2 |
| Naphthalene | | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

Sampler Verification Report

# Sampler No: 1617

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) | **Verification Date:** | 05-Jan-2018 |
| **LORs Required:** | Ambient Air | **Valid To (At least):** | 02-Feb-2018 |
| **Sampler Type:** | Passive Sampler | **Verification File:** | 180105_09.D |
| **Flow Rate Calibrated at:** | 3.5 ml/min | **Analyst:** | K. Gelderman |
| **Calibrated by:** | VJ 10/1/18 | **Approved for Dispatch by:** | VJ 12/1/18 |

**Summary Verification Protocol**

Samplers are generally verified fit for purpose for the suggested analyses and applications. For most applications, samplers are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to fittings.

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | 0.2 | <0.2 |
| Chloroform | Trichloromethane | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,1,2-trifluoroethane | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | 0.2 | <0.2 |

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| Dichloromethane | Methylene chloride | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | 0.2 | <0.2 |
| Styrene | Vinyl benzene | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | 0.2 | <0.2 |
| Toluene | Methyl Benzene | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | 0.2 | <0.2 |
| Acetone | 2-Propanone | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | 0.2 | <0.2 |
| Bromoform | Tribromomethane | 0.2 | <0.2 |
| Carbon disulfide | CS2 | 0.2 | <0.2 |
| Cyclohexane | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | 0.2 | <0.2 |
| n-Heptane | | 0.2 | <0.2 |
| n-Hexane | | 0.2 | <0.2 |
| Propene | Propylene | 0.2 | <0.2 |
| Tetrahydrofuran | THF | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | 0.2 | <0.2 |
| Acrolein | 2-Propenal | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | 0.2 | <0.2 |
| Methyl methacrylate | MMA | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | 0.2 | <0.2 |
| Naphthalene | | 0.2 | <0.2 |

Canister Verification Report

# Canister No: 12642

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) Ambient Air | **Verification Date:** | 22-Jan-2018 |
| | | **Valid To (At least):** | 19-Feb-2018 |
| | | **Verification File:** | 180122_06.D |
| **Canister Type:** | Entech Silonite - Summa Style | **Last Stability Check:** | 08-Nov-2016 |
| **Canister Size:** | 6L | **Next Check Scheduled:** | 08-Nov-2018 |
| **Valve Type:** | TDV | **Analyst:** | Dale Sample |
| **Dispatch Pressure:** | <0.01 psia | **Approved for Dispatch by:** | |

## Canister Verification Protocol

Canisters are verified 'fit for purpose' for the requested analytes and applications if known. For most applications, canisters are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to valves. Stability checks are performed after 1 year, or if damage to the canister is suspected, then every two years, within the designated holding time to ensure each canister is capable of holding the target chemicals without significant degradation.

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | | 0.2 | <0.2 |
| Chloroform | Trichloromethane | | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| Dichloromethane | Methylene chloride | | 0.2 | <0.2 |
| m- & p-Xylene | 1,3 & 1,4 -Dimethylbenzene | | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | | 0.2 | <0.2 |
| Styrene | Vinyl benzene | | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | | 0.2 | <0.2 |
| Toluene | Methyl Benzene | | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | | 0.2 | <0.2 |
| Acetone | 2-Propanone | | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | | 0.2 | <0.2 |
| Bromoform | Tribromomethane | | 0.2 | <0.2 |
| Carbon disulfide | CS2 | | 0.2 | <0.2 |
| Cyclohexane | | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | | 0.2 | <0.2 |
| n-Heptane | | | 0.2 | <0.2 |
| n-Hexane | | | 0.2 | <0.2 |
| Propene | Propylene | | 0.2 | <0.2 |
| Tetrahydrofuran | THF | | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | | 0.2 | <0.2 |
| Acrolein | 2-Propenal | | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | | 0.2 | <0.2 |
| Methyl methacrylate | MMA | | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | | 0.2 | <0.2 |
| Naphthalene | | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

Sampler Verification Report

# Sampler No: 1615

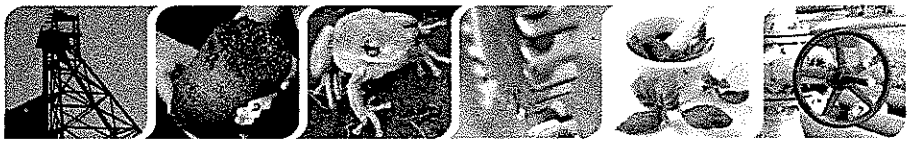
| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) | **Verification Date:** | 18-Jan-2018 |
| **LORs Required:** | Ambient Air | **Valid To (At least):** | 15-Feb-2018 |
| **Sampler Type:** | Passive Sampler | **Verification File:** | 180118_07.D |
| **Flow Rate Calibrated at:** | 3.5 ml/min | **Analyst:** | Dale Semple |
| **Calibrated by:** | VS 18/1/18. | **Approved for Dispatch by:** | VS 18/1/18 |

**Sampler Verification Protocol**

Samplers are generally verified fit for purpose for the requested analytes and applications. For most applications, samplers are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to fittings.

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | 0.2 | <0.2 |
| Chloroform | Trichloromethane | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,1,2-trifluoroethane | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | 0.2 | <0.2 |



| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| Dichloromethane | Methylene chloride | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | 0.2 | <0.2 |
| Styrene | Vinyl benzene | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | 0.2 | <0.2 |
| Toluene | Methyl Benzene | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | 0.2 | <0.2 |
| Acetone | 2-Propanone | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | 0.2 | <0.2 |
| Bromoform | Tribromomethane | 0.2 | <0.2 |
| Carbon disulfide | CS2 | 0.2 | <0.2 |
| Cyclohexane | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | 0.2 | <0.2 |
| n-Heptane | | 0.2 | <0.2 |
| n-Hexane | | 0.2 | <0.2 |
| Propene | Propylene | 0.2 | <0.2 |
| Tetrahydrofuran | THF | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | 0.2 | <0.2 |
| Acrolein | 2-Propenal | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | 0.2 | <0.2 |
| Methyl methacrylate | MMA | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | 0.2 | <0.2 |
| Naphthalene | | 0.2 | <0.2 |

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801845** | Page | : 1 of 4 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 28-Feb-2018 11:35 |
| Order number | : 234215 | Date Analysis Commenced | : 05-Mar-2018 |
| C-O-C number | : ---- | Issue Date | : 07-Mar-2018 13:45 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP101: Results reported in µg/m³ are calculated from PPBV results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa.
- CAN-001: Results for Pressure - As Received are measured under controlled conditions using calibrated laboratory gauges. These results are expressed as an Absolute Pressure. Equivalent gauge pressures may be calculated by subtracting the Pressure - Laboratory Atmosphere taken at the time of measurement.
- CAN-001: Results for Pressure - Gauge as Received are obtained from uncalibrated field gauges and are indicative only. These results may not precisely match calibrated gauge readings and may vary from field measurements due to changes in temperature and pressure

## Analytical Results

| Sub-Matrix: AIR (Matrix: AIR) | | | Client sample ID | 140218 C4985_S2843 | 200218 C12643_S2824 | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | 14-Feb-2018 00:00 | 20-Feb-2018 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | EN1801845-001 | EN1801845-002 | -------- | -------- | -------- |
| | | | | Result | Result | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15 (Calculated Concentration)** | | | | | | | | |
| **Benzene** | 71-43-2 | 1.6 | µg/m³ | <1.6 | <1.6 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 1.9 | µg/m³ | **3.4** | **5.6** | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 2.2 | µg/m³ | <2.2 | <2.2 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 4.3 | µg/m³ | <4.3 | <4.3 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 2.2 | µg/m³ | <2.2 | <2.2 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 2.6 | µg/m³ | <2.6 | <2.6 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 6.6 | µg/m³ | <6.6 | <6.6 | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | ppbv | **0.9** | **1.5** | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | ppbv | <1.0 | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 1.5 | ppbv | <1.5 | <1.5 | ---- | ---- | ---- |
| **Sampling Quality Assurance** | | | | | | | | |
| **Pressure - As received** | PRESSURE | 0.1 | kPaa | **83.4** | **84.5** | ---- | ---- | ---- |
| **Pressure - Gauge as Received** | ---- | 1 | Inches Hg | **-6** | **-6** | ---- | ---- | ---- |
| **Pressure - Laboratory Atmosphere** | ---- | 0.1 | kPaa | **101** | **101** | ---- | ---- | ---- |
| **Temperature as Received** | ---- | 0.1 | °C | **21.0** | **21.0** | ---- | ---- | ---- |
| **USEPA Air Toxics Method TO15r Surrogates** | | | | | | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | **104** | **105** | ---- | ---- | ---- |

## Surrogate Control Limits

Sub-Matrix: **AIR**

| Compound | CAS Number | Recovery Limits (%) Low | High |
|---|---|---|---|
| **USEPA Air Toxics Method TO15r Surrogates** | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 60 | 140 |

ALS Environmental

# QUALITY CONTROL REPORT

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801845** | Page | : 1 of 3 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 28-Feb-2018 |
| Order number | : 234215 | Date Analysis Commenced | : 05-Mar-2018 |
| C-O-C number | : ---- | Issue Date | : 07-Mar-2018 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report; Recovery and Acceptance Limits

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **AIR**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Client sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Recovery Limits (%)* |
| **EP101: VOCs by USEPA Method TO15r (QC Lot: 1472194)** | | | | | | | | | |
| EN1801845-001 | 140218 C4985_S2843 | EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | 0.9 | 0.9 | 0.00 | No Limit |
| | | EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | <1.0 | <1.0 | 0.00 | No Limit |

## Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control terms Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) refers to certified reference materials, or known interference free matrices spiked with target analytes. The purpose of these QC parameters are to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS and DCS.

Sub-Matrix: **AIR**

| | | Method Blank (MB) Report | | | Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | | Recovery Limits (%) | | RPDs (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | DCS | Low | High | Value | Control Limit |
| **EP101: VOCs by USEPA Method TO15r (QCLot: 1472194)** | | | | | | | | | | | |
| EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | 100 ppbv | 103 | 96.1 | 77 | 114 | 25 | 25 |
| EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | <0.5 | 100 ppbv | 106 | 102 | 78 | 115 | 25 | 25 |
| EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | <0.5 | 100 ppbv | 103 | 94.1 | 82 | 121 | 25 | 25 |
| EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | <1.0 | 200 ppbv | 106 | 95.2 | 82 | 122 | 25 | 25 |
| EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | 100 ppbv | 102 | 89.0 | 83 | 122 | 25 | 25 |

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

# QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1801845** | Page | : 1 of 4 |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 28-Feb-2018 |
| Site | : ---- | Issue Date | : 07-Mar-2018 |
| Sampler | : DANIEL RAYMOND | No. of samples received | : 2 |
| Order number | : 234215 | No. of samples analysed | : 2 |

**This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.**

Brief method summaries and references are also provided to assist in traceability.

## Summary of Outliers

### Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

### Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

### Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

# Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **AIR**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)**<br>140218 - C4985_S2843 | **14-Feb-2018** | **----** | ---- | ---- | **05-Mar-2018** | 16-Mar-2018 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)**<br>200218 - C12643_S2824 | **20-Feb-2018** | **----** | ---- | ---- | **05-Mar-2018** | 22-Mar-2018 | ✓ |
| **Sampling Quality Assurance** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)**<br>140218 - C4985_S2843 | **14-Feb-2018** | **----** | ---- | ---- | **05-Mar-2018** | 14-Feb-2019 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)**<br>200218 - C12643_S2824 | **20-Feb-2018** | **----** | ---- | ---- | **05-Mar-2018** | 20-Feb-2019 | ✓ |

# Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **AIR**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| *Analytical Methods* | *Method* | *QC* | *Regular* | ***Actual*** | ***Expected*** | *Evaluation* | |
| Duplicate Control Samples (DCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Duplicates (DUP) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **10.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 2 | **50.00** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |

## Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|---|---|---|---|
| Canister Sampling - Field Data | CAN-001 | AIR | In house: Referenced to USEPA TO14 / TO15 |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | AIR | In house: Referenced to USEPA TO15r Volatile Organic Compounds in Air by USEPA TO15. Aliphatic and Aromatic Hydrocarbons |
| Hydrocarbons in Air by USEPA TO15 (mass/volume) | EP101-H-MV | AIR | In house: Referenced to USEPA TO15r Hydrocarbons in Air by USEPA TO15 (Calculated Concentration) |

# AIR CANISTER CHAIN OF CUSTODY

ALS

*If sourced from an ALS Laboratory: please tick →*

*Client Supplied Canister(s)? Y / N*


ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 4971 9600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 3-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 129 Sydney Road Mudgee NSW Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/19 Asquith Street Mayfield West NSW 2304 Ph: 02 4968 9433 E: newcastle@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Garbutt QLD 4814 Ph: +61 7 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com


Toll

Parcels OffPeak

Item: APYG00762300

PEEL

| | | | |
|---|---|---|---|
| CLIENT: ECOTECH | TURNAROUND REQUIREMENTS : (Standard TAT may be extended for multiple sequential analysis suites) | ☐ Standard TAT (List due date): | LABORATORY USE ONLY (Circle) Received: to initial and date/time |
| OFFICE: 1492 Ferntree Gully Rd, KNOXFIELD VIC | | ☐ Non Standard or urgent TAT (List due date): | Custody Seal Intact? Rec Lab Y / N NE Y / N N/A |
| PROJECT: WD4 PRIMULA AVE | ALS QUOTE NO.: NE/070/17 | COC SEQUENCE NUMBER (Circle) | Valves closed on Receipt? Rec Lab Y / N NE Y / N N/A |
| PURCHASE ORDER NC 234215 | COUNTRY OF ORIGIN: | COC: 1 2 3 4 5 6 7 | Canister/Sampler Complete and Not Damaged Yes No |
| PROJECT MANAGER: Lara Nicholas | CONTACT PH: 03 9370 7845 0417351053 | OF: 1 2 3 4 5 6 7 | Other comment: Temperature °C |
| SAMPLER: Daniel Raymond | SAMPLER MOBILE: 0419424932 | RELINQUISHED BY: | RELINQUISHED BY: |
| COC Emailed to ALS? ( YES / NO) | EDD FORMAT (or default): | Signature and date/time | Signature and date/time |
| Email Reports to (will default to PM if no other addresses are listed): lara.nicholas@ecotech.com, daniel.raymond@ecotech.com | | RECEIVED BY: | RECEIVED BY: 28-2-18 11:35 |
| Email Invoice to (will default to PM if no other addresses are listed): naomi.dans@ecotech.com | | Signature and date/time | Signature and date/time |
| COMMENTS/SPECIAL HANDLING/REPLACEMENT OR RETURN INSTRUCTIONS: | | RELINQUISHED BY: Signature and date/time | RELINQUISHED BY: Signature and date/time |
| | | RECEIVED BY: Signature and date/time | RECEIVED BY: Signature and date/time |

## GAS SAMPLE CONTAINER INFORMATION

## Canister Gauge Pressures (PSI)

Refer to Canister Verification Reports and COAs for pressures measured by the Lab

## ANALYSES REQUESTED

Suite Codes must be listed to attract suite price

## Additional Information

| ALS USE ONLY | CANISTER / SAMPLE DETAILS | | | | | Pre-Sampling | Post Sampling | Reporting Requirements | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | LORs | | | Units | | | | | | | |
| LAB ID | CANISTER SERIAL NO. | FLOW CONTROLLER SERIAL NO. | CLIENT SAMPLE ID | DATE / TIME SAMPLED | MATRIX (eg Air, Soil Gas) | | | Ambient Air | Soil Gas (NEPM) | Other / Indoor | ppbv, µg/m³ | ppmv, mg/m³ | VI-V1 BTEXN | | | | | |
| 1 | 4985 | 2843 | 140218 | 14/02/18 00:30 - 23:30 | AIR | 30 | 4 | X | | | X | | X | | | | | |
| 2 | 12643 | 2824 | 200218 | 20/02/18 00:30 - 23:30 | AIR | 30 | 4 | X | | | X | | X | | | | | |
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Environmental Division
Newcastle
Work Order Reference
EN1801845

Telephone : +61 2 4014 2500

*Job Specific Instructions: Ecotech Timers Sent with samples to be cleaned with nitrogen and returned with new canisters*

AIR SAMPLING EQUIPMENT — DISPATCH RECORD

*Inquiries: Client Services - Newcastle* **Phone: +61 (02) 4014 2500** E-mail: samples.newcastle@alsenviro.com

| Dispatch to: | | ALS Use ONLY | |
|---|---|---|---|
| Client / Office: | ECOTECH | | |
| Contact: | Lara Nicholas | Request Received By: | HW |
| Telephone: | 03 9730 7800 | Deliver By: | asap |
| ALS Quotation: | NE/070/17 | Dispatched By: | asap |
| Delivery Address: | 1492 Ferntree Gully Rd | Workorder: | |
| | Knoxfield VIC 3180 | Agreed Rent Free Period: | 14 days |

SPECIAL INSTRUCTIONS: **PLEASE EMAIL CLEAN CERTIFICATES TO LARA NICHOLAS ON DISPATCH**.....

## Air Sampling Equipment Request

### CANISTERS

| Nos | Canister Type | Size | Gauge | Valve | Cap | Rental[1] | No Returned | Analysts Initials & Date: Leak Checked | Certified OK |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Entech Silonite Canister (Summa™) | 6L | Yes | S | Yes | $200 ea | | VB | 24/1/18 |

### CONNECTORS AND FLOW CONTROL DEVICES

| No | Equipment Type | Duration (hrs) | Flow (ml/min) | T-Piece | Gauge | Certified | Sealed / Vacuum | Connection Q Quick Connect S Swagelok | No Returned | Rental[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Passive Sampler -TWA | 24hr | | No | Yes | Yes | Yes / No | S | | Incl Above |
| | Flow Sampler Caps | | | No | No | No | Yes / No | | | $20 ea. Replacement |
| | ECOTECH Autosampler | | | No | No | No | Yes / No | | | N/A |
| | ¼" Swagelok connectors and ferrules (spares) | - | - | - | - | - | - | | | $5 ea. Replacement |

☑ Other (specify) 3x ecotech sampling timers +3x male blocking nuts, + 3x female blocking nuts.

[1] *Refer to Acceptance of Terms*

| ALS use only | | | |
|---|---|---|---|
| Sampling Guide Included (Y / N) | Packed by: VB | Dispatch Time / Date | VB 24/1/18 |
| Number of Boxes: | 2 | Consignment Note Number: | 9802 1108 9316 |
| Courier / Dispatcher: | TNT | Consignment Dispatched by: | D Bass |



AIR SAMPLING EQUIPMENT — DISPATCH RECORD

## ALS SUPPLIED EQUIPMENT

| Item | Quantity | Item Description | Serial Nos |
|---|---|---|---|
|  | 3 | 6L Silonite Summa™ canister | 4981 ✓<br>4985 ✓ Rec 28/12<br>12642 ✓<br>Recd 16/2/18. |
|  | 3 | Passive Sampler – TWA – 24hr | 1615 ✓<br>2824 ✓<br>2843 |

ENFMCDR1.1 11-05-11

RIGHT SOLUTIONS

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AIR SAMPLING EQUIPMENT DISPATCH RECORD

## Acceptance of Terms:

Acceptance and use of the accompanying ALS Air sampling equipment constitutes acceptance of the following terms:

1. This equipment remains the property of ALS Laboratory Group.
2. Subject to the conditions below and unless stated otherwise in the relevant quotation, the supply and use of this equipment is included the price of analysis.
3. No responsibility is accepted by ALS for equipment requirements that have been incorrectly or incompletely specified by the client. Interfacing of ALS equipment with other sampling equipment or structures is solely the client's responsibility.
4. Sampling equipment is configured and supplied based on client specified requirements. ALS will take all reasonable care to meet these specifications, but will not accept responsibility for changes in equipment calibration or failures during transit. Replacement equipment will be provided at no charge if required.
5. Equipment calibration and verification records are available for review on request. Verification reports are provided with equipment and electronic copies are available on request.
6. This air sampling equipment is provided solely for the use of the nominated client. Responsibility for ensuring the equipment is not damaged and for returning this equipment to ALS remains with the nominated client until all equipment is returned to the ALS Group.
7. Unless otherwise agreed in writing, if equipment is not returned within the agreed rent free period after dispatch, the quoted rental fees above will apply per week per unit thereafter. If equipment is returned unused, the cleaning fees quoted will apply (1 weeks rental charge). If sampling equipment return is delayed, please contact the laboratory prior to expiry of the rent free period to negotiate and extension.
8. Irreparably damaged equipment and any equipment not returned within 40 days will be charged to the client at a replacement cost per unit equal to the weekly rental costs already paid.
9. Cleaning costs will apply for equipment marked or defaced by the client. Please attach labels for

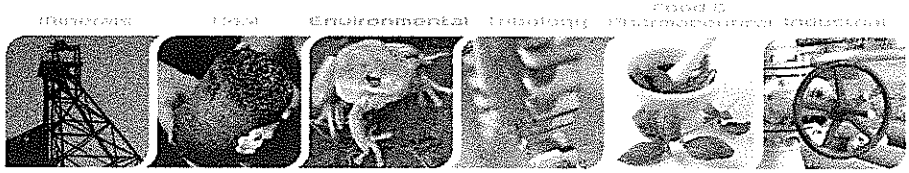
**If these conditions are not acceptable please return all equipment to ALS Newcastle immediately.**

## EQUIPMENT SUPPLY AND LOGISTICS

Additional air sampling equipment can be ordered through any ALS Environmental Laboratory and supplied direct to your site or office by courier. For the fastest turnaround, equipment should be returned direct to Newcastle Laboratory.

ALS Environmental, Newcastle
5/585 Maitland Road
Mayfield West, NSW 2304

Note that Dangerous Goods Transport Regulations may apply after sampling if the air cylinders are pressurised or contain hazardous materials.



Canister Verification Report

# Canister No: 4985

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) Ambient Air | **Verification Date:** | 24-Jan-2018 |
| | | **Valid To (At least):** | 21-Feb-2018 |
| | | **Verification File:** | 180123_23.D |
| **Canister Type:** | Entech Silonite - Summa Style | **Last Stability Check:** | 03-Jul-2017 |
| **Canister Size:** | 6L | **Next Check Scheduled:** | 03-Jul-2019 |
| **Valve Type:** | TOV2 | **Analyst:** | Dale Semple |
| **Dispatch Pressure:** | -0.01 psig | **Approved for Dispatch by:** | |

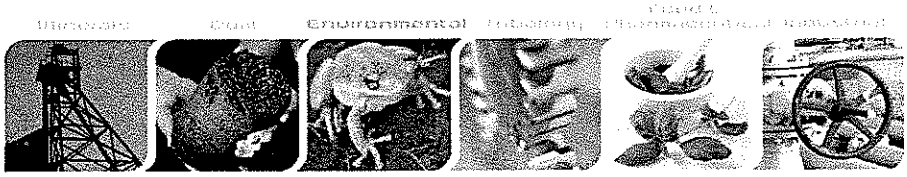
## Canister Verification Protocol

Canisters are verified fit for purpose for the requested analytes and applications (if known). For most applications, canisters are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to valves. Stability checks are performed after 5 years or if damage to the canister is suspected, then every two years, while the designated holding time to ensure each canister is capable of holding the target chemicals without significant degradation.

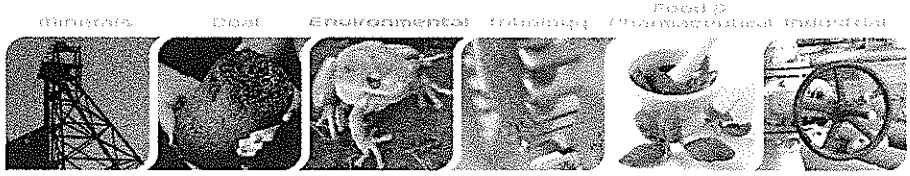
| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | | 0.2 | <0.2 |
| Chloroform | Trichloromethane | | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification



| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| Dichloromethane | Methylene chloride | | 0.2 | <0.2 |
| m- & p-Xylene | 1,3 & 1,4 -Dimethylbenzene | | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | | 0.2 | <0.2 |
| Styrene | Vinyl benzene | | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | | 0.2 | <0.2 |
| Toluene | Methyl Benzene | | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | | 0.2 | <0.2 |
| Acetone | 2-Propanone | | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | | 0.2 | <0.2 |
| Bromoform | Tribromomethane | | 0.2 | <0.2 |
| Carbon disulfide | CS2 | | 0.2 | <0.2 |
| Cyclohexane | | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | | 0.2 | <0.2 |
| n-Heptane | | | 0.2 | <0.2 |
| n-Hexane | | | 0.2 | <0.2 |
| Propene | Propylene | | 0.2 | <0.2 |
| Tetrahydrofuran | THF | | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | | 0.2 | <0.2 |
| Acrolein | 2-Propenal | | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | | 0.2 | <0.2 |
| Methyl methacrylate | MMA | | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | | 0.2 | <0.2 |
| Naphthalene | | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification



Sampler Verification Report

# Sampler No: 2843

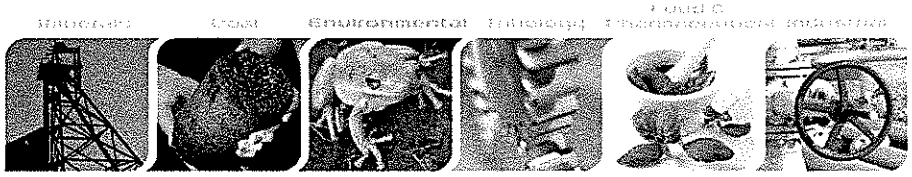
| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) | **Verification Date:** | 19-Jan-2018 |
| **LORs Required:** | Ambient Air | **Valid To (At least):** | 16-Feb-2018 |
| **Sampler Type:** | Passive Sampler | **Verification File:** | 180119_04.D |
| **Flow Rate Calibrated at:** | 3.5 ml/min | **Analyst:** | Dale Semple |
| **Calibrated by:** | VG 18/1/18 | **Approved for Dispatch by:** | VG 18/1/18 |

**Sampler Verification Protocol**

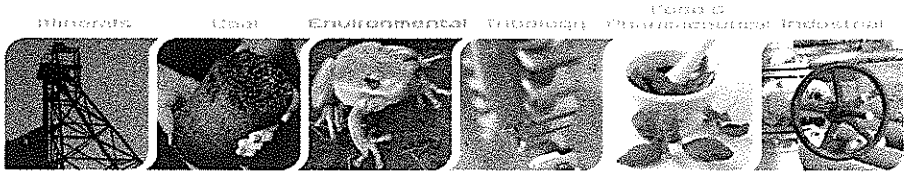
Samplers are generally verified for the purpose for the requested analytes and applications. For most applications, samplers are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to fittings.

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | 0.2 | <0.2 |
| Chloroform | Trichloromethane | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,1,2-trifluoroethane | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | 0.2 | <0.2 |



| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| Dichloromethane | Methylene chloride | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | 0.2 | <0.2 |
| Styrene | Vinyl benzene | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | 0.2 | <0.2 |
| Toluene | Methyl Benzene | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | 0.2 | <0.2 |
| Acetone | 2-Propanone | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | 0.2 | <0.2 |
| Bromoform | Tribromomethane | 0.2 | <0.2 |
| Carbon disulfide | CS2 | 0.2 | <0.2 |
| Cyclohexane | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | 0.2 | <0.2 |
| n-Heptane | | 0.2 | <0.2 |
| n-Hexane | | 0.2 | <0.2 |
| Propene | Propylene | 0.2 | <0.2 |
| Tetrahydrofuran | THF | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | 0.2 | <0.2 |
| Acrolein | 2-Propenal | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | 0.2 | <0.2 |
| Methyl methacrylate | MMA | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | 0.2 | <0.2 |
| Naphthalene | | 0.2 | <0.2 |



## Canister Verification Report

# Canister No: 12643

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) Ambient Air | **Verification Date:** | 02-Feb-2018 |
| | | **Valid To (At least):** | 02-Mar-2018 |
| | | **Verification File:** | 180202_19.D |
| **Canister Type:** | Entech Silonite - Summa Style | **Last Stability Check:** | 30-Jun-2016 |
| **Canister Size:** | 6L | **Next Check Scheduled:** | 30-Jun-2018 |
| **Valve Type:** | TOV | **Analyst:** | K. Gelderman |
| **Dispatch Pressure:** | <0.01 psia | **Approved for Dispatch by:** | 6/2/18 |

### Canister Verification Protocol

Canisters are verified fit for purpose for the requested analytes and applications if known. For most applications, canisters are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to valves. Stability checks are performed after 5 years or if damage to the canister is suspected, then every two years, within the designated holding time to ensure each canister is capable of holding the target chemicals without significant degradation.

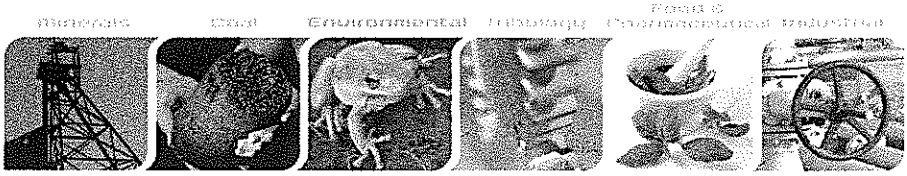
ALS Environmental - Brisbane

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | | 0.2 | <0.2 |
| Chloroform | Trichloromethane | | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| Dichloromethane | Methylene chloride | | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | | 0.2 | <0.2 |
| Styrene | Vinyl benzene | | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | | 0.2 | <0.2 |
| Toluene | Methyl Benzene | | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | | 0.2 | <0.2 |
| Acetone | 2-Propanone | | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | | 0.2 | <0.2 |
| Bromoform | Tribromomethane | | 0.2 | <0.2 |
| Carbon disulfide | CS2 | | 0.2 | <0.2 |
| Cyclohexane | | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | | 0.2 | <0.2 |
| n-Heptane | | | 0.2 | <0.2 |
| n-Hexane | | | 0.2 | <0.2 |
| Propene | Propylene | | 0.2 | <0.2 |
| Tetrahydrofuran | THF | | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | | 0.2 | <0.2 |
| Acrolein | 2-Propenal | | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | | 0.2 | <0.2 |
| Methyl methacrylate | MMA | | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | | 0.2 | <0.2 |
| Naphthalene | | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification



Sampler Verification Report

# Sampler No: 2824

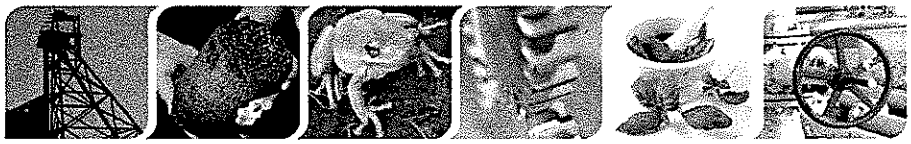
| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) | **Verification Date:** | 19-Jan-2018 |
| **LORs Required:** | Ambient Air | **Valid To (At least):** | 16-Feb-2018 |
| **Sampler Type:** | Passive Sampler | **Verification File:** | 180119_06.D |
| **Flow Rate Calibrated at:** | 3.5 ml/min | **Analyst:** | Dale Semple |
| **Calibrated by:** | VS 18/1/18 | **Approved for Dispatch by:** | VS 24/1/18 |

**Sampler Verification Protocol**

Samplers are generally verified fit for purpose for the requested analytes and applications. For most applications, samplers are verified clean according to the requirements of USEPA method TO15.

Each verification includes a check for contamination, leaks and damage to fittings.

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | 0.2 | <0.2 |
| Chloroform | Trichloromethane | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,1,2-trifluoroethane | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | 0.2 | <0.2 |



| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| Dichloromethane | Methylene chloride | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | 0.2 | <0.2 |
| Styrene | Vinyl benzene | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | 0.2 | <0.2 |
| Toluene | Methyl Benzene | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | 0.2 | <0.2 |
| Acetone | 2-Propanone | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | 0.2 | <0.2 |
| Bromoform | Tribromomethane | 0.2 | <0.2 |
| Carbon disulfide | CS2 | 0.2 | <0.2 |
| Cyclohexane | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | 0.2 | <0.2 |
| n-Heptane | | 0.2 | <0.2 |
| n-Hexane | | 0.2 | <0.2 |
| Propene | Propylene | 0.2 | <0.2 |
| Tetrahydrofuran | THF | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | 0.2 | <0.2 |
| Acrolein | 2-Propenal | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | 0.2 | <0.2 |
| Methyl methacrylate | MMA | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | 0.2 | <0.2 |
| Naphthalene | | 0.2 | <0.2 |

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1802096** | Page | : 1 of 4 |
| **Amendment** | : **1** | | |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Mar-2018 09:20 |
| Order number | : 234215 | Date Analysis Commenced | : 21-Mar-2018 |
| C-O-C number | : ---- | Issue Date | : 26-Mar-2018 13:21 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Amendment (26/03/2017): This report has been amended as a result of incorrect sampling dates being listed. All analysis results are as per the previous report
- EP101: Results reported in µg/m³ are calculated from PPBV results based on a temperature of 25°C and atmospheric pressure of 101.3 kPa.
- CAN-001: Results for Pressure - As Received are measured under controlled conditions using calibrated laboratory gauges. These results are expressed as an Absolute Pressure. Equivalent gauge pressures may be calculated by subtracting the Pressure - Laboratory Atmosphere taken at the time of measurement.
- CAN-001: Results for Pressure - Gauge as Received are obtained from uncalibrated field gauges and are indicative only. These results may not precisely match calibrated gauge readings and may vary from field measurements due to changes in temperature and pressure

## Analytical Results

| Sub-Matrix: AIR (Matrix: AIR) | | | Client sample ID | 260218 C4778_S2820 | 070318 C4987_S1621 | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | 26-Feb-2018 00:00 | 07-Mar-2018 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | EN1802096-001 | EN1802096-002 | -------- | -------- | -------- |
| | | | | Result | Result | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15 (Calculated Concentration)** | | | | | | | | |
| **Benzene** | 71-43-2 | 1.6 | µg/m³ | <1.6 | <1.6 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 1.9 | µg/m³ | **2.6** | <1.9 | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 2.2 | µg/m³ | **3.5** | <2.2 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 4.3 | µg/m³ | **5.2** | <4.3 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 2.2 | µg/m³ | <2.2 | <2.2 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 2.6 | µg/m³ | <2.6 | <2.6 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 6.6 | µg/m³ | <6.6 | <6.6 | ---- | ---- | ---- |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | ppbv | **0.7** | <0.5 | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | ppbv | **0.8** | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | ppbv | **1.2** | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Naphthalene** | 91-20-3 | 0.5 | ppbv | <0.5 | <0.5 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 1.5 | ppbv | <1.5 | <1.5 | ---- | ---- | ---- |
| **Sampling Quality Assurance** | | | | | | | | |
| **Pressure - As received** | PRESSURE | 0.1 | kPaa | **88.2** | **100** | ---- | ---- | ---- |
| **Pressure - Gauge as Received** | ---- | 1 | Inches Hg | **-4** | **0** | ---- | ---- | ---- |
| **Pressure - Laboratory Atmosphere** | ---- | 0.1 | kPaa | **102** | **102** | ---- | ---- | ---- |
| **Temperature as Received** | ---- | 0.1 | °C | **21.0** | **21.0** | ---- | ---- | ---- |
| **USEPA Air Toxics Method TO15r Surrogates** | | | | | | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | **105** | **103** | ---- | ---- | ---- |

## Surrogate Control Limits

Sub-Matrix: **AIR**

| Compound | CAS Number | Recovery Limits (%) Low | High |
|---|---|---|---|
| **USEPA Air Toxics Method TO15r Surrogates** | | | |
| **4-Bromofluorobenzene** | 460-00-4 | 60 | 140 |

ALS Environmental

# QUALITY CONTROL REPORT

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1802096** | Page | : 1 of 3 |
| **Amendment** | : **1** | | |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Contact | : Hayley Withers |
| Address | : 1492 FERNTREE GULLY ROAD<br>KNOXFIELD VICTORIA, AUSTRALIA 3180 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 03 9730 7800 | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Mar-2018 |
| Order number | : 234215 | Date Analysis Commenced | : 21-Mar-2018 |
| C-O-C number | : ---- | Issue Date | : 26-Mar-2018 |
| Sampler | : DANIEL RAYMOND | | |
| Site | : ---- | | |
| Quote number | : NE/070/17 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report ; Recovery and Acceptance Limits
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report; Recovery and Acceptance Limits

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Daniel Junek | Senior Air Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Air Analyst | Newcastle, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **AIR**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Client sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Recovery Limits (%)* |
| **EP101: VOCs by USEPA Method TO15r (QC Lot: 1512425)** | | | | | | | | | |
| EN1802096-001 | 260218 C4778_S2820 | EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | 0.7 | 0.6 | 0.00 | No Limit |
| | | EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | 0.8 | 0.7 | 0.00 | No Limit |
| | | EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | <0.5 | 0.00 | No Limit |
| | | EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | 1.2 | 1.1 | 0.00 | No Limit |

## Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control terms Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (DCS) refers to certified reference materials, or known interference free matrices spiked with target analytes. The purpose of these QC parameters are to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS and DCS.

Sub-Matrix: **AIR**

| | | Method Blank (MB) Report | | | Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | | Recovery Limits (%) | | RPDs (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | DCS | Low | High | Value | Control Limit |
| **EP101: VOCs by USEPA Method TO15r (QCLot: 1512425)** | | | | | | | | | | | |
| EP101-H: Benzene | 71-43-2 | 0.5 | ppbv | <0.5 | 100 ppbv | 94.8 | 94.9 | 77 | 114 | 25 | 25 |
| EP101-H: Toluene | 108-88-3 | 0.5 | ppbv | <0.5 | 100 ppbv | # 117 | # 118 | 78 | 115 | 25 | 25 |
| EP101-H: Ethylbenzene | 100-41-4 | 0.5 | ppbv | <0.5 | 100 ppbv | 108 | 109 | 82 | 121 | 25 | 25 |
| EP101-H: meta- & para-Xylene | 108-38-3<br>106-42-3 | 1 | ppbv | <1.0 | 200 ppbv | 108 | 108 | 82 | 122 | 25 | 25 |
| EP101-H: ortho-Xylene | 95-47-6 | 0.5 | ppbv | <0.5 | 100 ppbv | 111 | 112 | 83 | 122 | 25 | 25 |

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

# QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1802096** | Page | : 1 of 4 |
| **Amendment** | : **1** | | |
| Client | : **ECOTECH PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : LARA NICHOLAS | Telephone | : +612 4014 2500 |
| Project | : WD4 PRIMULA AVE | Date Samples Received | : 16-Mar-2018 |
| Site | : ---- | Issue Date | : 26-Mar-2018 |
| Sampler | : DANIEL RAYMOND | No. of samples received | : 2 |
| Order number | : 234215 | No. of samples analysed | : 2 |

**This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.**

Brief method summaries and references are also provided to assist in traceability.

## *Summary of Outliers*

### *Outliers : Quality Control Samples*

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

### *Outliers : Analysis Holding Time Compliance*

- **NO Analysis Holding Time Outliers exist.**

### *Outliers : Frequency of Quality Control Samples*

- **NO Quality Control Sample Frequency Outliers exist.**

## Outliers : Quality Control Samples

*Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes*

Matrix: **AIR**

| Compound Group Name | Laboratory Sample ID | Client Sample ID | Analyte | CAS Number | Data | Limits | Comment |
|---|---|---|---|---|---|---|---|
| **Laboratory Control Spike (LCS) Recoveries** | | | | | | | |
| EP101: VOCs by USEPA Method TO15r | QC-1512425-002 | ---- | **Toluene** | 108-88-3 | 117 % | 78-115% | **Recovery greater than upper control limit** |
| **Duplicate Control Spike (DCS) Recoveries** | | | | | | | |
| EP101: VOCs by USEPA Method TO15r | QC-1512425-003 | ---- | **Toluene** | 108-88-3 | 118 % | 78-115% | **Recovery greater than upper control limit** |

# Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **AIR**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EP101: VOCs by USEPA Method TO15r** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)** 070318 - C4987_S1621 | **07-Mar-2018** | **----** | ---- | ---- | **21-Mar-2018** | 06-Apr-2018 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (EP101-H)** 260218 - C4778_S2820 | **26-Feb-2018** | **----** | ---- | ---- | **21-Mar-2018** | 28-Mar-2018 | ✓ |
| **Sampling Quality Assurance** | | | | | | | |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)** 070318 - C4987_S1621 | **07-Mar-2018** | **----** | ---- | ---- | **21-Mar-2018** | 07-Mar-2019 | ✓ |
| **Summa style Canister - ALS Supplied Silonite (CAN-001)** 260218 - C4778_S2820 | **26-Feb-2018** | **----** | ---- | ---- | **21-Mar-2018** | 26-Feb-2019 | ✓ |

## Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **AIR**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| *Analytical Methods* | *Method* | *QC* | *Regular* | ***Actual*** | ***Expected*** | *Evaluation* | |
| Duplicate Control Samples (DCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 3 | **33.33** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Duplicates (DUP) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 3 | **33.33** | **10.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 3 | **33.33** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | 1 | 3 | **33.33** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |

## Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|---|---|---|---|
| Canister Sampling - Field Data | CAN-001 | AIR | In house: Referenced to USEPA TO14 / TO15 |
| Hydrocarbons in Air by USEPA TO15 | EP101-H | AIR | In house: Referenced to USEPA TO15r Volatile Organic Compounds in Air by USEPA TO15. Aliphatic and Aromatic Hydrocarbons |
| Hydrocarbons in Air by USEPA TO15 (mass/volume) | EP101-H-MV | AIR | In house: Referenced to USEPA TO15r Hydrocarbons in Air by USEPA TO15 (Calculated Concentration) |

# AIR CANISTER CHAIN OF CUSTODY


ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com


*If sourced from an ALS Laboratory: please tick →*

*Client Supplied Canister(s)? Y / N*

| | | |
|---|---|---|
| **CLIENT:** ECOTECH | **TURNAROUND REQUIREMENTS :** ☐ Standard TAT **(List due date):** | **LABORATORY USE ONLY (Circle)** *Receiver to initial and date/time* |
| **OFFICE:** 1492 Ferntree Gully Rd, KNOXFIELD VIC | (Standard TAT may be extended for multiple sequential analysis suites) ☐ Non Standard or urgent TAT **(List due date):** | Custody Seal Intact? Rec Lab Y / N NE Y / N N/A |
| **PROJECT:** WD4 PRIMULA AVE | **ALS QUOTE NO.:** NE/070/17 | Valves closed on Receipt? Rec Lab Y / N NE Y / N N/A |
| **PURCHASE ORDER NO** 234215 | **COUNTRY OF ORIGIN:** | Canister/Sampler Complete and Not Damaged Yes No |
| **PROJECT MANAGER:** Lara Nicholas | **CONTACT PH:** 03 9370 7845 0417351053 | Other comment: Temperature °C |
| **SAMPLER:** Daniel Raymond | **SAMPLER MOBILE:** 0419424932 | |
| **COC Emailed to ALS? ( YES / NO)** | **EDD FORMAT (or default):** | |
| **Email Reports to** (will default to PM if no other addresses are listed): lara.nicholas@ecotech.com, daniel.raymond@ecotech.com | | |
| **Email Invoice to** (will default to PM if no other addresses are listed): naomi.dans@ecotech.com | | |

**COC SEQUENCE NUMBER (Circle)**

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

| RELINQUISHED BY: | RELINQUISHED BY: | RELINQUISHED BY: | RELINQUISHED BY: |
|---|---|---|---|
| *Signature and date/time* | *Signature and date/time* | *Signature and date/time* | *Signature and date/time* |
| **RECEIVED BY:** | **RECEIVED BY:** | **RECEIVED BY:** | **RECEIVED BY:** |
| *Signature and date/time* | *Signature and date/time* | *Signature and date/time* | *Signature and date/time* |

**COMMENTS/SPECIAL HANDLING/REPLACEMENT OR RETURN INSTRUCTIONS:**

## GAS SAMPLE CONTAINER INFORMATION

## Canister Gauge Pressures (PSI)

Refer to Canister Verification Reports and COAs for pressures measured by the Lab

## ANALYSES REQUESTED

Suite Codes must be listed to attract suite price

## Additional Information

| ALS USE ONLY | CANISTER / SAMPLE DETAILS | | | | | Pre-Sampling | Post Sampling | Reporting Requirements | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | LORs | | | Units | | | | | | | | |
| LAB ID | CANISTER SERIAL NO. | FLOW CONTROLLER SERIAL NO. | CLIENT SAMPLE ID | DATE / TIME SAMPLED | MATRIX (eg Air, Soil Gas) | | | Ambient Air | Soil Gas (NEPM) | Other / Indoor | ppbv, µg/m³ | ppmv, mg/m³ | VI-V1 BTEXN | | | | | | Comments on **LORs required, potential hazards**, likely contaminant levels, or samples requiring specific QC analysis etc. (LOR defaults to routine method LOR after dilution) |
| | 4778 | 2820 | 260218 | 26/02/18 00:30 - 23:30 | AIR | 30 | 4 | X | | | X | | X | | | | | | |
| | 4987 | 1621 | 070318 | 07/03/18 00:30 - 23:30 | AIR | 30 | 1 | X | | | X | | X | | | | | | |
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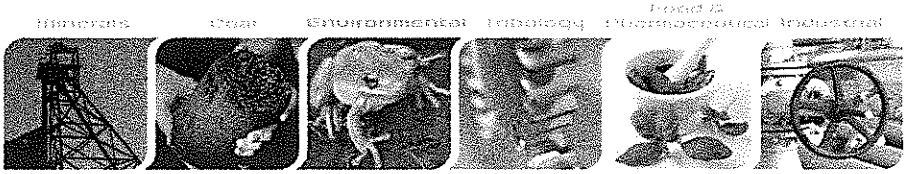
***Job Specific Instructions: Ecotech Timers Sent with samples to be cleaned with nitrogen and returned with new canisters***



## Canister Verification Report

# Canister No: 4778

| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) Ambient Air | **Verification Date:** | 03-Feb-2018 ✓ |
| | | **Valid To (At least):** | 03-Mar-2018 ✓ |
| | | **Verification File:** | 180202_24.D |
| **Canister Type:** | Entech Silonite - Summa Style | **Last Stability Check:** | 01-Nov-2016 |
| **Canister Size:** | 6L | **Next Check Scheduled:** | 01-Nov-2018 |
| **Valve Type:** | Nupro | **Analyst:** | K. Gelderman |
| **Dispatch Pressure:** | <0.01 psia | **Approved for Dispatch by:** | 6/2/18 |

### Canister Verification Protocol

Canisters are verified 'fit for purpose' for the requested analytes and applications if known. For new canisters, canisters are verified clean according to the requirements of USEPA method TO15.

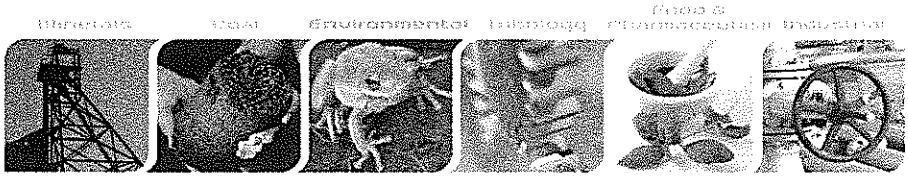
Each verification includes a check for contamination, leaks and damage to valves. Stability checks are performed after 3 years or if damage to the canister is suspected, then every two years within the designated holding time to ensure each canister is capable of holding the target chemicals without significant degradation.

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | | 0.2 | <0.2 |
| Chloroform | Trichloromethane | | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,2,2-trifluoroethane | | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification

| Target Compound | Alt. Name | Qualifiers | Verification Goal (<) ppbv | Result ppbv |
|---|---|---|---|---|
| Dichloromethane | Methylene chloride | | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | | 0.2 | <0.2 |
| Styrene | Vinyl benzene | | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | | 0.2 | <0.2 |
| Toluene | Methyl Benzene | | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | | 0.2 | <0.2 |
| Acetone | 2-Propanone | | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | | 0.2 | <0.2 |
| Bromoform | Tribromomethane | | 0.2 | <0.2 |
| Carbon disulfide | CS2 | | 0.2 | <0.2 |
| Cyclohexane | | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | | 0.2 | <0.2 |
| n-Heptane | | | 0.2 | <0.2 |
| n-Hexane | | | 0.2 | <0.2 |
| Propene | Propylene | | 0.2 | <0.2 |
| Tetrahydrofuran | THF | | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | | 0.2 | <0.2 |
| Benzyl chloride | α-Chlorotoluene | | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | | 0.2 | <0.2 |
| Acrolein | 2-Propenal | | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | | 0.2 | <0.2 |
| Methyl methacrylate | MMA | | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | | 0.2 | <0.2 |
| Naphthalene | | | 0.2 | <0.2 |

Qualifiers - F: Fails Stability Check, V: Fails Verification



Sampler Verification Report

# Sampler No: 2820

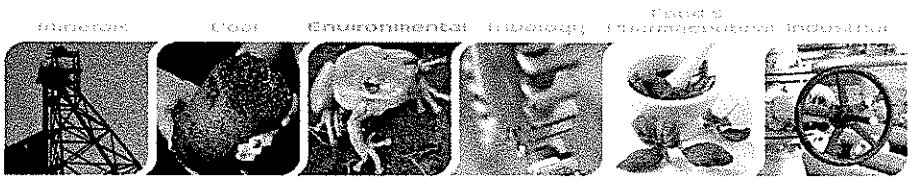
| | | | |
|---|---|---|---|
| **Specified Purpose:** | USEPA TO15 (Extended Suite) | **Verification Date:** | 29-Jan-2018 |
| **LORs Required:** | Ambient Air | **Valid To (At least):** | 26-Feb-2018 |
| **Sampler Type:** | Passive Sampler | **Verification File:** | 180129_01.D |
| **Flow Rate Calibrated at:** | 3.5 ml/min | **Analyst:** | K. Gelderman |
| **Calibrated by:** | 30/1/18 KS | **Approved for Dispatch by:** | KS 6/2/18 |

**Sampler Verification Protocol**

Samplers are generally verified fit for purpose for the requested analytes and applications. For metal applications, samplers are verified clean according to the requirements of USEPA method TO15.

Each verification involves a check for contamination, leaks and damage to fittings.

| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| 1,1,1-Trichloroethane | 1,1,1-TCA / Methyl chloroform | 0.2 | <0.2 |
| 1,1,2,2-Tetrachloroethane | R-130 / Acetylene tetrachloride | 0.2 | <0.2 |
| 1,1,2-Trichloroethane | Vinyl trichloride | 0.2 | <0.2 |
| 1,1-Dichloroethane | Ethylidene chloride | 0.2 | <0.2 |
| 1,1-Dichloroethene | 1,1-DCE / Vinylidene chloride | 0.2 | <0.2 |
| 1,2-Dichloroethane | Ethylene chloride | 0.2 | <0.2 |
| 1,2,4-Trimethylbenzene | Pseudocumene | 0.2 | <0.2 |
| 1,2-Dibromoethane | EDB / Ethylene dibromide | 0.2 | <0.2 |
| 1,2-Dichlorobenzene | o-Dichlorobenzene | 0.2 | <0.2 |
| 1,2-Dichloropropane | Propylene dichloride | 0.2 | <0.2 |
| 1,3,5-Trimethylbenzene | Mesitylene | 0.2 | <0.2 |
| 1,3-Dichlorobenzene | m-Dichlorobenzene | 0.2 | <0.2 |
| 1,4-Dichlorobenzene | p-Dichlorobenzene | 0.2 | <0.2 |
| Benzene | Cyclohexatriene | 0.2 | <0.2 |
| Bromomethane | Methyl bromide | 0.2 | <0.2 |
| Tetrachloromethane | Carbon tetrachloride | 0.2 | <0.2 |
| Chlorobenzene | Phenyl chloride | 0.2 | <0.2 |
| Chloroethane | Ethyl chloride | 0.2 | <0.2 |
| Chloroform | Trichloromethane | 0.2 | <0.2 |
| Chloromethane | Methyl chloride | 0.2 | <0.2 |
| cis-1,2-Dichloroethene | cis-1,2-Dichloroethylene | 0.2 | <0.2 |
| cis-1,3-Dichloropropene | cis-1,3-Dichloropropylene | 0.2 | <0.2 |
| Ethylbenzene | Phenyl ethane | 0.2 | <0.2 |
| Freon 12 | Dichlorodifluoromethane | 0.2 | <0.2 |
| Freon 11 | Trichlorofluoromethane | 0.2 | <0.2 |
| Freon 113 | 1,1,2-Trichloro-1,1,2-trifluoroethane | 0.2 | <0.2 |
| Freon 114 | 1,2-Dichlorotetrafluoroethane | 0.2 | <0.2 |
| Hexachlorobutadiene | Hexachloro-1,3-Butadiene | 0.2 | <0.2 |



| Target Compound | Alt. Name | Verified to ppbv | Result ppbv |
|---|---|---|---|
| Dichloromethane | Methylene chloride | 0.2 | <0.2 |
| m -& p-Xylene | 1,3 & 1,4 -Dimethylbenzene | 0.4 | <0.4 |
| o-Xylene | 1,2-Dimethylbenzene | 0.2 | <0.2 |
| Styrene | Vinyl benzene | 0.2 | <0.2 |
| Tetrachloroethene | PCE / Perchlorethylene | 0.2 | <0.2 |
| Toluene | Methyl Benzene | 0.2 | <0.2 |
| trans-1,3-Dichloropropene | trans-1,3-Dichloropropylene | 0.2 | <0.2 |
| Trichloroethene | TCE / Trichloroethylene | 0.2 | <0.2 |
| Vinyl chloride | Chloroethene | 0.2 | <0.2 |
| 1,2,4-Trichlorobenzene | | 0.2 | <0.2 |
| 1,3-Butadiene | Biethylene | 0.2 | <0.2 |
| 1,4-Dioxane | p-Dioxane | 0.2 | <0.2 |
| 2,2,4-Trimethylpentane | Isooctane | 0.2 | <0.2 |
| 4-Ethyltoluene | p-Ethyltoluene | 0.2 | <0.2 |
| Acetone | 2-Propanone | 0.2 | <0.2 |
| Allyl chloride | 3-Chloropropene | 0.2 | <0.2 |
| Bromodichloromethane | Dichlorobromomethane | 0.2 | <0.2 |
| Bromoform | Tribromomethane | 0.2 | <0.2 |
| Carbon disulfide | CS2 | 0.2 | <0.2 |
| Cyclohexane | | 0.2 | <0.2 |
| Dibromochloromethane | Chlorodibromoethane | 0.2 | <0.2 |
| Ethyl acetate | Acetic ester | 0.2 | <0.2 |
| Isopropyl alcohol | Isopropanol / 2-Propanol | 0.2 | <0.2 |
| Methyl butyl ketone | MBK / 2-Hexanone | 0.2 | <0.2 |
| Methyl ethyl ketone | MEK / 2-Butanone | 0.2 | <0.2 |
| Methyl isobutyl ketone | MIBK / 4-Methyl-2-pentanone | 0.2 | <0.2 |
| Methyl tert-butyl ether | MTBE | 0.2 | <0.2 |
| n-Heptane | | 0.2 | <0.2 |
| n-Hexane | | 0.2 | <0.2 |
| Propene | Propylene | 0.2 | <0.2 |
| Tetrahydrofuran | THF | 0.2 | <0.2 |
| trans-1,2-Dichloroethene | trans-1,2-Dichloroethylene | 0.2 | <0.2 |
| Vinyl acetate | Acetic acid vinyl ester | 0.2 | <0.2 |
| Bromoethene | Vinyl bromide | 0.2 | <0.2 |
| Benzyl chloride | o-Chlorotoluene | 0.2 | <0.2 |
| Ethanol | Ethyl alcohol | 0.2 | <0.2 |
| Acetonitrile | Methyl cyanide | 0.2 | <0.2 |
| Acrolein | 2-Propenal | 0.2 | <0.2 |
| Acrylonitrile | 2-Propenenitrile | 0.2 | <0.2 |
| tert-Butyl alcohol | TBA | 0.2 | <0.2 |
| 2-Chloroprene | 2-Chloro-1,3-butadiene | 0.2 | <0.2 |
| Diisopropyl Ether | DIPE | 0.2 | <0.2 |
| Ethyl tert-butyl ether | ETBE | 0.2 | <0.2 |
| tert-Amyl methyl ether | TAME | 0.2 | <0.2 |
| Methyl methacrylate | MMA | 0.2 | <0.2 |
| 1,1,1,2-Tetrachloroethane | R-130a / Acetylene trichloride | 0.2 | <0.2 |
| Isopropylbenzene | Cumene | 0.2 | <0.2 |
| 2-Chlorotoluene | o-Chlorotoluene | 0.2 | <0.2 |
| n-Propylbenzene | Phenyl propane | 0.2 | <0.2 |
| tert-Butylbenzene | 1,1-Dimethylethylbenzene | 0.2 | <0.2 |
| sec-Butylbenzene | 1-Methylpropylbenzene | 0.2 | <0.2 |
| 2-Isopropyltoluene | o-Cymene | 0.2 | <0.2 |
| n-Butylbenzene | Phenyl butane | 0.2 | <0.2 |
| Naphthalene | | 0.2 | <0.2 |