



OIL & GAS

TECHNOLOGIES

Vapour Recovery Unit EPA Compliance Test Report

Client: Quantem
Port Botany Terminal
Friendship Rd
Port Botany, NSW
2036
Australia

VRU ID: AA609-9-8

Test Reference Number: EPA-QBC-02

Sampling Date: 9th February 2023

Revision	Date	Checked by	Notes
0	22/02/2023	Mark Jones	

Authorised by

A handwritten signature in black ink that reads "Mark Jones". The signature is written over a horizontal line.

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1.0 Executive Summary

From the testing carried out at Quantem Port Botany Terminal, on 9th February 2023, the following has been concluded.

The average hydrocarbon concentration emitted as equivalent propane was determined to be: 0.02 % +/- MU

The total mass of unrecovered organic vapours emitted per litre was determined to be: 4.12 mg/l +/- MU

Total mass of unrecovered organic vapours emitted per liter of Volatiles loaded was determined to be: 4.12 mg/l +/-

The emissions rate of unrecovered organic vapours emitted was determined to be: 0.9 g/min +/- MU

2.0 Introduction

Oil & Gas Technologies Pty Ltd was contracted by Quantem to carry out hydrocarbon monitoring at the outlet of the carbon adsorption/absorption Vapour Recovery Unit (VRU) installed at their Port Botany Terminal; in order to allow the calculation of the total amount of hydrocarbon emissions from the VRU.

This test was performed in accordance with NSW Office of Environment and Heritage (as specified in the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales, January 2007)..

(Refer Appendix G)

This test was performed on 9th February 2023 at the Quantem, Port Botany Terminal.

3.0 Vapour Recovery Unit System

3.1 VRU Description

The Port Botany Terminal is equipped with an activated carbon adsorption / absorption Vapour Recovery Unit as follows.

The VRU is installed in line with the loading gantry via a vapour supply header. Vapour is displaced from the tank truck loading process at the loading gantry to the VRU; via the vapour supply header.

Vapour is processed in the VRU, with recovered vapour returned to the bulk storage tank and unrecovered vapours emitted to atmosphere.

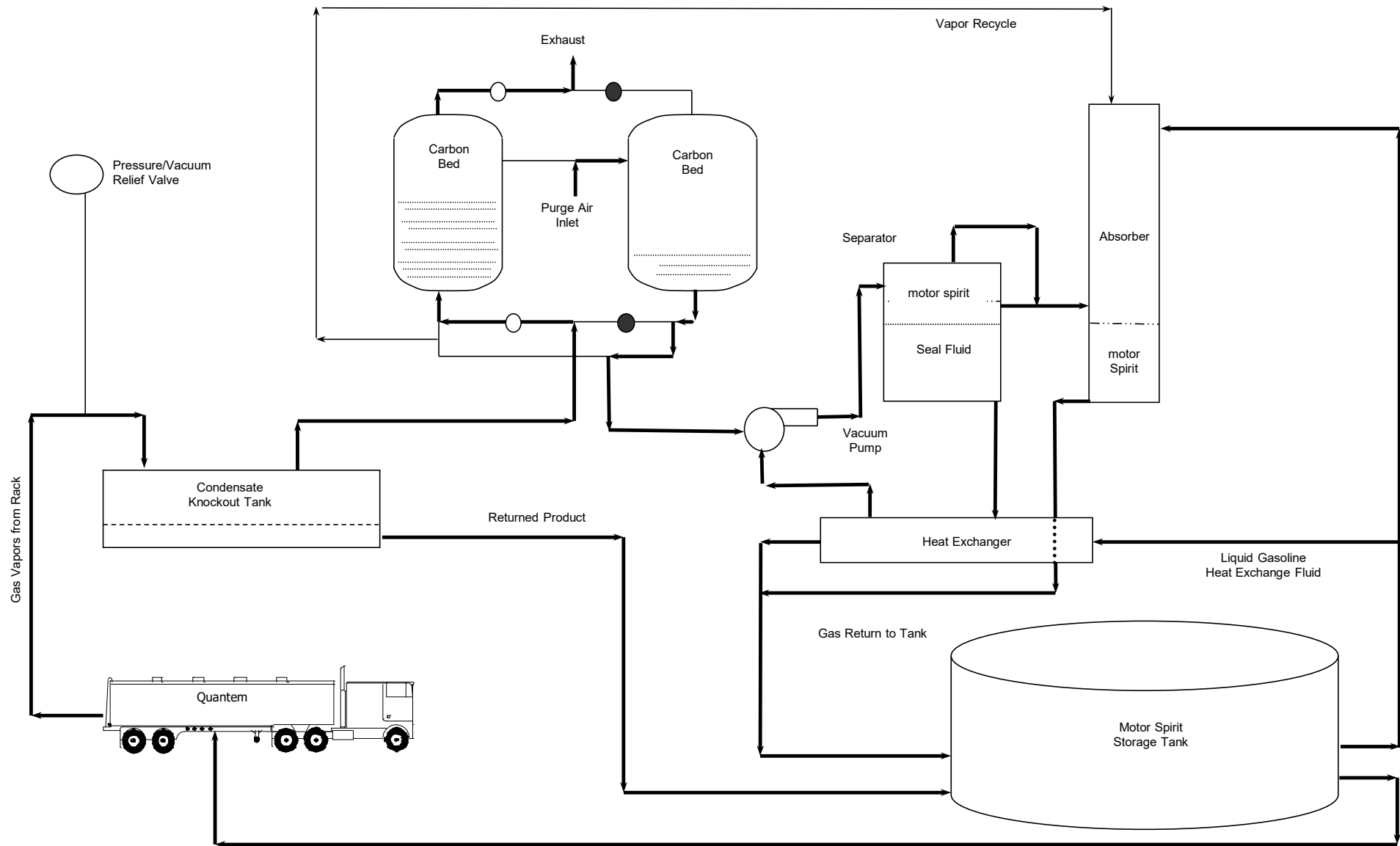
VRU Details:

Manufacturer	John Zink LRVP
Model Number	AA609-9-8
Year of Manufacture	2017

3.3 VRU Schematic

Typical Activated Carbon Adsorption / Absorption Vapour Recovery Unit. (VRU)

ACTIVATED CARBON VAPOUR RECOVERY UNIT - SIMPLIFIED SCHEMATIC



4.0 Test Methodology

The test methods used to quantify the amount of hydrocarbon vapours emitted by the Vapour Recovery Unit (VRU); in accordance with the EPA requirements for periodic testing and reporting of emissions from static sources.

Testing was performed in accordance with USEPA Method 25B.

4.1 Test Procedures

Testing is carried out in accordance with Oil & Gas Technologies Pty Ltd internal testing procedure, procedure number 'OGT-ET-001'.

In summary, inlet and outlet hydrocarbon concentrations are measured over a continuous four hour (minimum) period using a continuous hydrocarbon analyser and digital data logging system. Measurement of the outlet hydrocarbon concentration, outlet flow and outlet temperature are continuously recorded and saved to the data logger. Data is presented in this report as raw data and graphed; with the outlet concentrations shown as an average for the duration of the test. Calibration and calibration check values are not included in the averaged test results.

Calibration gas used is Propane in Nitrogen.

The hydrocarbon analysers are accurate to a maximum error of $\pm 2\%$ of full scale of the instrument, and are calibrated and verified on-site before and after performance of the test.

The specified gas mixture used to calibrate the Outlet analyser, ranged 0-10% vol, is a mixture approximating 3% Propane (balance of 97% Nitrogen).

All gas mixes are supplied with a NATA test report and subject to normal manufacturing tolerances.

Manufacturer's certificates of calibration gas mix verification are provided. (Refer appendix J)

The average ambient temperature is recorded for the four hour test period, atmospheric pressure is acquired from the Bureau of Meteorology website and recorded in the report.

Motor Spirit (petrol) and Distillate (Diesel and others) volumes loaded into tank trucks during the test period are recorded. This information is taken from the terminal inventory control system.

All values are averaged over the four-hour test period and corrected to 15°C and 101.3kPa.

4.2 Test Instrumentation

Outlet hydrocarbon concentrations are measured using a Non-dispersion type Infrared Gas analyser.

Manufacturer – Infrared Industries IR-208 ranged 0-10% volume.

The instruments are calibrated prior to the commencement of the test, and the calibration checked at the end of the test period. Any variance in reading is recorded (drift). Any drift outside of the acceptable limits of +/- 2% shall mean the test is aborted.

Analyser data is logged using a 4 channel analogue data logger.

Sample lines – PTFE and Stainless Steel construction.

Valves and fittings – Stainless Steel and PTFE construction.

The forgoing equipment is mounted in a fan cooled mobile test laboratory. All equipment is maintained in as new condition at all times.

5.0 Test Results

The test was carried out on 9th February 2023. The VRU was tested between 15:15 and 21:42.

The VRU was considered, by Quantem personnel, to be functioning normally during the period of the test.

5.1 Instrument Results

Zero and span checks were carried out at the start and end of the test period. Span calibration was checked using the gas mixtures identified above.

	%	ppm
Outlet Zero drift	0.00	0
Outlet Span drift	-0.05	-500

The calibration results are within the specified +/- 2% of instrument full range and therefore no adjustment or scaling was made.

5.2 Loading Volumes

The ratio of diesel loading to gasoline loading should be in the range of $\pm 15\%$ of what is normal for the duty period for the terminal.

The details of road tanker loaded volumes are given in Appendix A.

During the test period, loaded volumes consisted of :

85,163 litres of motor spirit

0 litres of distillate

Total volume loaded for the test period was 85,163 litres.

Volumes are corrected to 15°C.

This correlates to 0% distillate loading and 100% motor spirit loading.

5.3 VRU Test Summary

<i>Terminal Description</i>	Quantem Port Botany Terminal
<i>Vapour Control Unit Type</i>	Activated Carbon Adsorption / ULP Absorption
<i>Test Date</i>	9th February 2023
<i>Test Period</i>	15:15 and 21:42
<i>Average Ambient Temperature</i>	23.6 °C
<i>Average Barometric Pressure</i>	1010.2 hPa
<i>Average Outlet Stack Temperature</i>	24.94 °C
<i>Test Duration</i>	388 Minutes
<i>Average Outlet Emissions</i>	191.37 ppm
<i>Average Outlet Concentration (Y_{out})</i>	0.0191 %
<i>Total Petroleum Products Loaded ($V_{gin\ test\ corrected}$)</i>	85,163 Litres
<i>Total Motor Spirits Loaded ($V_{motor\ spirit}$)</i>	85,163 Litres
<i>Total Distillate Loaded ($V_{Distillate}$)</i>	0 Litres
<i>Stack Diameter</i>	200 mm
<i>Average Gas Exhaust Flow</i>	158.2 m ³ /hr
<i>Total Hydrocarbon emissions during test</i>	350,738 mg
<i>Average milligrams emitted per liter of Volatiles loaded was :</i>	4.12 mg/l
<i>Average Milligrams emitted / Litre</i>	4.12 mg/l
<i>Emission rate of VOC's emitted during test</i>	0.904 g/min

APPENDIX A

Pre-test Checklist

for test period 9th February 2023

Pre-Test & Site Checklist – CHL-ET001

2	Jan 2022	Issued with Accreditation Application	Mark Jones		
Rev	Date	Description	Author	Reviewed	Approved

Terminal Name and Location: Quantum Port Botany Tester: Zaine Morgan
 Terminal Representative: Xavier Colquhoun Test Date: 09/02/2023

Pre-site checklist

Has a suitable test time been arranged? Y N
 Required arrival time: 06:30am Test time between: 15:15 - 21:42
 Order / Test Number: EPA-06c-02 Ordered By: Xavier Colquhoun
 Re-confirm arrangements with site contact 48hrs prior to test. Confirmed:
 Calibration gases (3% and 30% mixes + zero air) are on hand. Confirmed:

Pre-test checklist

Has a suitable safe work permit been issued? Y N Permit number/s: _____
 Is a suitable set-up area available? eg/ 240V supply, restricted access, safe area Y N
 Is all emissions test equipment in good working order and free from defects? Y N
 Inlet Serial Number OGT-001 Outlet Serial Number OGT-002
 Has final set-up, including safety barricades, fire extinguishers and test equipment been sited by the terminal representative and approved? Y N

POWER MUST NOT BE SWITCHED ON & THE TEST STARTED UNTIL ALL OF THE ABOVE CHECK BOXES HAVE BEEN MARKED COMPLETE AND O.K.

Test and Pack-up checklist

Perform system leak check – as per VRU Emissions Testing Procedure; PROC-ET001. (Max allowable leak <0.05l/m after 2 minutes) YES.....
 Complete pre-test calibration check of instruments and record on sheet 2 of this checklist YES.....
 Is the pitot required for testing? Y / N. If required does the pitot show any sign of damage? Y/N
 Record measurements of pitot. Low pressure ___ & ___ mm. High Pressure ___ & ___ mm Serial Number - _____
 Collect Gantry Meter Totals Report. Ensure time on report matches datalogger YES.....
 Begin sampling and carry out test for a minimum of 4 hours. (test may be extended at the request of the terminal representative) YES.....
 Re-apply calibration gases upon completion of sampling and record on sheet 2 of this checklist YES.....
 Pack all equipment away and ensure site is left in a clean, tidy and safe condition YES.....
 Collect gantry through-put data (for test end time) from terminal representative YES.....
 Ensure all equipment is safely secured on the test vehicle and leave site N/A.....
 Does the sample point connection comply with good sampling practices Y N
 If No, Provide details: _____

Calibration details

Terminal: Quantum bot Botany

Date: 09/02/23

Inlet calibration gas:

Propane: 29.91 %
 Cylinder Number: _____
 Analysis Date: _____
 Expiry Date: N/A
 Cylinder Pressure: _____ KPa
 must be >700kPa

Outlet calibration gas:

Propane: 3.02 %
 Cylinder Number: 19834
 Analysis Date: 13/02/20
 Expiry Date: 13/02/25
 Cylinder Pressure: 2100 KPa
 must be >700kPa

Initial Calibration

Time	Inlet Reading
15:03:00	29.9
15:04:10	29.9
15:04:20	29.9
15:04:30	29.9
15:04:40	29.9
15:04:50	29.9
15:05:00	29.9
Average=	29.9 %

Time	Outlet Reading
15:07:20	3.02
15:07:30	3.02
15:07:40	3.02
15:07:50	3.02
15:08:00	3.02
15:08:10	3.02
15:08:20	3.02
Average=	3.02 %

Final Calibration

Time	Inlet Reading
Average=	%

Time	Outlet Reading
21:57:20	3.01
21:57:30	3.00
21:57:40	3.01
21:57:50	3.01
21:58:00	3.01
21:58:10	3.01
21:58:20	3.00
Average=	3.01 %

Note: Instruments must be set for calibration gas being used.

Initial calibration, and final calibration check, must be taken at 10 second intervals, for a period of at least 1 minute, only after the instrument reading has stabilised.

CHL-ET001 – Page 3 Gas bottle change over QA check

Terminal: QUANTUM POLE BOTANY

Date: 09/02/23

NOTE: Complete this section only if cylinders are changed.

Strike through sections that are not applicable with an N/A

Initial Bottles

Inlet calibration gas:
Propane: _____ %
Cylinder Number: _____
Analysis Date: _____
Expiry Date: _____
Cylinder Pressure: _____ kPa
must be >700kPa

Outlet calibration gas:
Propane: _____ %
Cylinder Number: _____
Analysis Date: _____
Expiry Date: _____
Cylinder Pressure: _____ kPa
must be >700kPa

Initial Calibration

Time	Inlet Reading
Average=	%

Time	Outlet Reading
Average=	%

Final Calibration

Time	Inlet Reading
Average=	%

Time	Outlet Reading
Average=	%

Are there any deviations, exclusions or additions from the test method? Y/N

If Yes, Provide details: _____

OGT Tester: (sign) B. Murtagh
(name) BEN MURTAGH
(time) 22:10

APPENDIX B
Site Data Record

for test period 9th February 2023

Oil & Gas Technologies (Australia) Pty Ltd - VRU Emission Test - Site Data Record.

Client Details

Client Contact Xavier Colquhoun
Billing Address Quantem
Street Address Port Botany Terminal
 Friendship Rd
Town, State Port Botany, NSW
Post Code 2036
Country Australia

Test Reference No. EPA-QBC-02

Site Details

Test Type EPA Test
Terminal Tested Port Botany Terminal
VRU # 1 Type John Zink LRVP

VRU Serial # AA609-9-8

Year of manufacture 2017

Date 2023
Arrival time 2:00 PM
Test Start Time 3:15 PM
Test End Time 9:42 PM

Ambient Conditions At Time of Test

Weather Conditions

Test start time 15:15
Ambient Temp C 21.55

Barometric Pressure 1010.5
Mid Point Time 18:28

Ambient Temp C 26.32
Barometric Pressure 1010.2
End Time 21:42
Ambient Temp C 23.03
Barometric Pressure 1010.0

Average Temp (T)= 23.63
Average Atmos (P) = 1010.2

Calibration Gas Details, Cylinder # and Spec's

Inlet Cal Gas SPAN 29.9% propane
Total HC = 70.1% nitrogen balance
Inlet Cal Gas ZERO 0% synthetic air
Outlet Cal Gas SPAN 3.02% propane
Total HC = 96.98% nitrogen balance
Outlet Cal Gas ZERO 0% synthetic air

Gas Supplier Coregas

Analysis Date 31st August 2021 Inlet span.
 13th February 2021 Outlet span.

Delivered to Williamstown, VIC

Cylinder #'s 17833 inlet span
 19834 outlet span

Start Cal Check % **End Cal Check %**

Inlet ZERO reading

0.000	1.000
-------	-------

Inlet SPAN reading

29.910	31.880
--------	--------

Outlet ZERO reading

0.000	0.000
-------	-------

Outlet SPAN reading

3.020	2.970
-------	-------

Inlet ZERO (Drift) PPM

10000	1.0000%
-------	---------

Inlet SPAN (Drift) PPM

19700	1.9700%
-------	---------

Outlet ZERO Drift PPM

0	0.0000%
---	---------

Outlet SPAN Drift PPM

-500	-0.0500%
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Notes / Comments

Tests carried out by Zaine Morgan of Oil & Gas Technologies Pty Ltd.

APPENDIX C

Tank truck loading data for test period 9th February 2023 Corrected to 15 degrees Celsius

Terminal Throughput during Test period

ADO	Ethanol	PULP 98	PULP 95	AVGAS	Jet A1
0	0	0	0	85163	0

All volumes in Litres corrected to 15 degrees Celsius

MOTOR SPIRIT THROUGHPUT	85,163	Litres
DISTILLATE THROUGHPUT	0	Litres
TOTAL THROUGHPUT	85,163	Litres
DISTILLATE AS % OF TOTAL	0.00%	

520 - Meter Thruput by Product Report

Report Generated at : 09/02/2023 15:15:42

Open Date: 08/02/2023 23:56:02

Close Date:

Start Folio Number: 20230209

End Folio Number To: 20230209

Unit of Measure Liters

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
10 JET A1													
	SC_B2_03		MTR_SC231	130542260	130542260	129839465	129839465	0	0	0	0	0	0
	SC_B2_04		MTR_SC241	101810619	101810619	101270666	101270666	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
11 AVGAS													
	SC_B2_05		MTR_SC251	99457038	99457038	98982813	98982813	0	0	0	0	0	0
	SC_B2_06		MTR_SC261	35332202	35332202	35177359	35177359	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
105 DIESEL													
	SC_B1_01		MTR_SC111	163279468	163279468	162587670	162587670	0	0	0	0	0	0
	SC_B1_02		MTR_SC121	131218087	131218087	130669572	130669572	0	0	0	0	0	0
	SC_B1_03		MTR_SC131	40301432	40301432	40072548	40072548	0	0	0	0	0	0
	SC_B2_01		MTR_SC211	114053362	114053362	113581229	113581229	0	0	0	0	0	0
	SC_B2_02		MTR_SC221	91166744	91166744	90776904	90776904	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
179 VRU SAC PETROL													
	SC_B1_03		MTR_SC132	1727542	1727542	1721780	1721780	0	0	0	0	0	0

520 - Meter Thruput by Product Report

Report Generated at : 09/02/2023 15:15:42

Open Date: 08/02/2023 23:56:02

Close Date:

Start Folio Number: 20230209

End Folio Number To: 20230209

Unit of Measure Liters

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
179 VRU SAC PETROL													
	SC_B1_04		MTR_SC141	31812589	31812589	31635483	31635483	0	0	0	0	0	0
	SC_B1_04		MTR_SC142	1280975	1280975	1276585	1276585	0	0	0	0	0	0
	SC_B2_03		MTR_SC232	5085919	5085919	5070574	5070574	0	0	0	0	0	0
	SC_B2_04		MTR_SC242	3756779	3756779	3747335	3747335	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
Liters Total								0	0	0	0	0	0

520 - Meter Thruput by Product Report

Report Generated at : 09/02/2023 15:15:42

Open Date: 08/02/2023 23:56:02

Close Date:

Start Folio Number: 20230209

End Folio Number To: 20230209

Unit of Measure Kilograms

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
1 OLEXOBIT S45R													
	ARM_BIT_03		MTR_B34	3220741	3220741	3220741	3220741	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
2 OLEXOBIT A15E / S25E													
	ARM_BIT_03		MTR_B33	7707182	7707182	7707182	7707182	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
78 VERY LOW SULPHUR FO													
	ARM_DSL_01		MTR_D11	133046784	133046784	132221545	132221545	0	0	0	0	0	0
	ARM_DSL_02		MTR_D21	132934997	132934997	132100605	132100605	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
170 BITUMEN C170													
	ARM_BIT_01		MTR_B13	158959646	159028012	158959646	159028012	68,366	68,052	314	68,366	68,052	314
	ARM_BIT_02		MTR_B21	253228880	253408109	253228880	253408109	179,229	178,851	378	179,229	178,851	378
	ARM_BIT_03		MTR_B31	53329	53329	53329	53329	0	0	0	0	0	0
	ARM_BIT_03		MTR_B32	830404	830404	830404	830404	0	0	0	0	0	0
Terminal Product Total								247,595	246,903	692	247,595	246,903	692
183 ETHANOL 95 HGNA													
	ARM_DSL_01		MTR_D12	7284906	7284906	7239001	7239001	0	0	0	0	0	0

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Unit of Measure Kilograms

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
183	ETHANOL 95 HGNA												
	ARM_DSL_02		MTR_D22	7537126	7537126	7489166	7489166	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
240	BITUMEN C240												
	ARM_BIT_01		MTR_B11	96364375	96383187	96364375	96383187	18,812	18,790	22	18,812	18,790	22
Terminal Product Total								18,812	18,790	22	18,812	18,790	22
320	BITUMEN C320												
	ARM_BIT_01		MTR_B14	82311718	82311718	82311718	82311718	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
450	BITUMEN AR450												
	ARM_BIT_01		MTR_B12	260676288	260803874	260676288	260803874	127,586	127,441	145	127,586	127,441	145
	ARM_BIT_02		MTR_B22	370664763	370777329	370664763	370777329	112,566	112,405	161	112,566	112,405	161
Terminal Product Total								240,152	239,846	306	240,152	239,846	306
1000	BITUMEN M10000												
	ARM_BIT_02		MTR_B23	7758475	7758475	7758475	7758475	0	0	0	0	0	0
	ARM_BIT_02		MTR_B24	1961804	1961804	1961804	1961804	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
Kilograms Total								506,559	505,539	1,020	506,559	505,539	1,020

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End Folio Number To: 20230209

Unit of Measure Liters

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
10 JET A1													
	SC_B2_03		MTR_SC231	130542260	130542260	129839465	129839465	0	0	0	0	0	0
	SC_B2_04		MTR_SC241	101810619	101810619	101270666	101270666	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
11 AVGAS													
	SC_B2_05		MTR_SC251	99457038	99473038	98982813	98998674	16,000	15,998	2	15,861	15,859	2
	SC_B2_06		MTR_SC261	35332202	35402212	35177359	35246667	70,010	70,008	2	69,308	69,304	4
Terminal Product Total								86,010	86,006	4	85,169	85,163	6
105 DIESEL													
	SC_B1_01		MTR_SC111	163279468	163279468	162587670	162587670	0	0	0	0	0	0
	SC_B1_02		MTR_SC121	131218087	131218087	130669572	130669572	0	0	0	0	0	0
	SC_B1_03		MTR_SC131	40301432	40301432	40072548	40072548	0	0	0	0	0	0
	SC_B2_01		MTR_SC211	114053362	114053362	113581229	113581229	0	0	0	0	0	0
	SC_B2_02		MTR_SC221	91166744	91166744	90776904	90776904	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
179 VRU SAC PETROL													
	SC_B1_03		MTR_SC132	1727542	1727542	1721780	1721780	0	0	0	0	0	0

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Unit of Measure Liters

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179 VRU SAC PETROL													
	SC_B1_04		MTR_SC141	31812589	31812589	31635483	31635483	0	0	0	0	0	0
	SC_B1_04		MTR_SC142	1280975	1280975	1276585	1276585	0	0	0	0	0	0
	SC_B2_03		MTR_SC232	5085919	5085919	5070574	5070574	0	0	0	0	0	0
	SC_B2_04		MTR_SC242	3756779	3756779	3747335	3747335	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
Liters Total								86,010	86,006	4	85,169	85,163	6

520 - Meter Thruput by Product Report

Report Generated at : 09/02/2023 21:42:03

Open Date: 08/02/2023 23:56:02

Close Date:

Start Folio Number: 20230209

End Folio Number To: 20230209

Unit of Measure Kilograms

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
1	OLEXOBIT S45R												
	ARM_BIT_03		MTR_B34	3220741	3220741	3220741	3220741	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
2	OLEXOBIT A15E / S25E												
	ARM_BIT_03		MTR_B33	7707182	7707182	7707182	7707182	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
78	VERY LOW SULPHUR FO												
	ARM_DSL_01		MTR_D11	133046784	133046784	132221545	132221545	0	0	0	0	0	0
	ARM_DSL_02		MTR_D21	132934997	132934997	132100605	132100605	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
170	BITUMEN C170												
	ARM_BIT_01		MTR_B13	158959646	159052525	158959646	159052525	92,879	92,536	343	92,879	92,536	343
	ARM_BIT_02		MTR_B21	253228880	253432417	253228880	253432417	203,537	203,133	404	203,537	203,133	404
	ARM_BIT_03		MTR_B31	53329	53329	53329	53329	0	0	0	0	0	0
	ARM_BIT_03		MTR_B32	830404	830404	830404	830404	0	0	0	0	0	0
Terminal Product Total								296,416	295,669	747	296,416	295,669	747
183	ETHANOL 95 HGNA												
	ARM_DSL_01		MTR_D12	7284906	7284906	7239001	7239001	0	0	0	0	0	0

520 - Meter Thruput by Product Report

Report Generated at : 09/02/2023 21:42:03

Open Date: 08/02/2023 23:56:02

Close Date:

Start Folio Number: 20230209

End Folio Number To: 20230209

Unit of Measure Kilograms

Terminal Code	Product Name	Preset	Meter	BOD Gross Totalizer	EOD Gross Totalizer	BOD Net Totalizer	EOD Net Totalizer	Actual Gross Thruput	Accounted Gross Thruput	Unaccounted Gross	Actual Net Thruput	Accounted Net Thruput	Unaccounted Net Thruput
183	ETHANOL 95 HGNA												
	ARM_DSL_02		MTR_D22	7537126	7537126	7489166	7489166	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
240	BITUMEN C240												
	ARM_BIT_01		MTR_B11	96364375	96406895	96364375	96406895	42,520	42,472	48	42,520	42,472	48
Terminal Product Total								42,520	42,472	48	42,520	42,472	48
320	BITUMEN C320												
	ARM_BIT_01		MTR_B14	82311718	82311718	82311718	82311718	0	0	0	0	0	0
Terminal Product Total								0	0	0	0	0	0
450	BITUMEN AR450												
	ARM_BIT_01		MTR_B12	260676288	260885700	260676288	260885700	209,412	209,173	239	209,412	209,173	239
	ARM_BIT_02		MTR_B22	370664763	370806343	370664763	370806343	141,580	141,389	191	141,580	141,389	191
Terminal Product Total								350,992	350,562	430	350,992	350,562	430
1000	BITUMEN M10000												
	ARM_BIT_02		MTR_B23	7758475	7782436	7758475	7782436	23,961	23,936	25	23,961	23,936	25
	ARM_BIT_02		MTR_B24	1961804	1961804	1961804	1961804	0	0	0	0	0	0
Terminal Product Total								23,961	23,936	25	23,961	23,936	25
Kilograms Total								713,889	712,639	1,250	713,889	712,639	1,250

APPENDIX D

Outlet measurement data including calibration data

for test period 9th February 2023

Corrected to 15 degrees Celsius

Date	Time	Outlet		Date	Time	Outlet		Date	Time	Outlet
9/02/2023	14:56	0.0183		9/02/2023	15:48	0.0184		9/02/2023	16:40	0.0184
9/02/2023	14:57	0.0183		9/02/2023	15:49	0.0185		9/02/2023	16:41	0.0185
9/02/2023	14:58	0.0182		9/02/2023	15:50	0.0186		9/02/2023	16:42	0.0184
9/02/2023	14:59	0.0183		9/02/2023	15:51	0.0186		9/02/2023	16:43	0.0185
9/02/2023	15:00	0.0182		9/02/2023	15:52	0.0185		9/02/2023	16:44	0.0185
9/02/2023	15:01	0.0182		9/02/2023	15:53	0.0185		9/02/2023	16:45	0.0185
9/02/2023	15:02	0.0183		9/02/2023	15:54	0.0185		9/02/2023	16:46	0.0184
9/02/2023	15:03	0.0183	Zero	9/02/2023	15:55	0.0185		9/02/2023	16:47	0.0185
9/02/2023	15:04	0.0184		9/02/2023	15:56	0.0185		9/02/2023	16:48	0.0184
9/02/2023	15:05	0.0188		9/02/2023	15:57	0.0185		9/02/2023	16:49	0.0185
9/02/2023	15:06	2.0632		9/02/2023	15:58	0.0185		9/02/2023	16:50	0.0185
9/02/2023	15:07	3.0216	Span	9/02/2023	15:59	0.0185		9/02/2023	16:51	0.0184
9/02/2023	15:08	0.8184		9/02/2023	16:00	0.0185		9/02/2023	16:52	0.0185
9/02/2023	15:09	0.2206		9/02/2023	16:01	0.0184		9/02/2023	16:53	0.0184
9/02/2023	15:10	2.2134		9/02/2023	16:02	0.0185		9/02/2023	16:54	0.0185
9/02/2023	15:11	0.0364		9/02/2023	16:03	0.0183		9/02/2023	16:55	0.0184
9/02/2023	15:12	0.0189		9/02/2023	16:04	0.0184		9/02/2023	16:56	0.0184
9/02/2023	15:13	0.0185		9/02/2023	16:05	0.0184		9/02/2023	16:57	0.0184
9/02/2023	15:14	0.0185		9/02/2023	16:06	0.0184		9/02/2023	16:58	0.0184
9/02/2023	15:15	0.0184	Test	9/02/2023	16:07	0.0184		9/02/2023	16:59	0.0184
9/02/2023	15:16	0.0184	Start	9/02/2023	16:08	0.0184		9/02/2023	17:00	0.0184
9/02/2023	15:17	0.0185		9/02/2023	16:09	0.0183		9/02/2023	17:01	0.0183
9/02/2023	15:18	0.0185		9/02/2023	16:10	0.0184		9/02/2023	17:02	0.0184
9/02/2023	15:19	0.0186		9/02/2023	16:11	0.0184		9/02/2023	17:03	0.0184
9/02/2023	15:20	0.0204		9/02/2023	16:12	0.0184		9/02/2023	17:04	0.0185
9/02/2023	15:21	0.0187		9/02/2023	16:13	0.0185		9/02/2023	17:05	0.0186
9/02/2023	15:22	0.0186		9/02/2023	16:14	0.0184		9/02/2023	17:06	0.0185
9/02/2023	15:23	0.0186		9/02/2023	16:15	0.0185		9/02/2023	17:07	0.0185
9/02/2023	15:24	0.0185		9/02/2023	16:16	0.0184		9/02/2023	17:08	0.0185
9/02/2023	15:25	0.0186		9/02/2023	16:17	0.0185		9/02/2023	17:09	0.0185
9/02/2023	15:26	0.0186		9/02/2023	16:18	0.0184		9/02/2023	17:10	0.0185
9/02/2023	15:27	0.0186		9/02/2023	16:19	0.0184		9/02/2023	17:11	0.0185
9/02/2023	15:28	0.0186		9/02/2023	16:20	0.0185		9/02/2023	17:12	0.0185
9/02/2023	15:29	0.0186		9/02/2023	16:21	0.0185		9/02/2023	17:13	0.0185
9/02/2023	15:30	0.0186		9/02/2023	16:22	0.0184		9/02/2023	17:14	0.0185
9/02/2023	15:31	0.0186		9/02/2023	16:23	0.0185		9/02/2023	17:15	0.0185
9/02/2023	15:32	0.0186		9/02/2023	16:24	0.0185		9/02/2023	17:16	0.0185
9/02/2023	15:33	0.0185		9/02/2023	16:25	0.0185		9/02/2023	17:17	0.0185
9/02/2023	15:34	0.0185		9/02/2023	16:26	0.0185		9/02/2023	17:18	0.0186
9/02/2023	15:35	0.0185		9/02/2023	16:27	0.0185		9/02/2023	17:19	0.0185
9/02/2023	15:36	0.0186		9/02/2023	16:28	0.0185		9/02/2023	17:20	0.0185
9/02/2023	15:37	0.0185		9/02/2023	16:29	0.0184		9/02/2023	17:21	0.0185
9/02/2023	15:38	0.0186		9/02/2023	16:30	0.0185		9/02/2023	17:22	0.0185
9/02/2023	15:39	0.0185		9/02/2023	16:31	0.0185		9/02/2023	17:23	0.0184
9/02/2023	15:40	0.0185		9/02/2023	16:32	0.0185		9/02/2023	17:24	0.0184
9/02/2023	15:41	0.0186		9/02/2023	16:33	0.0184		9/02/2023	17:25	0.0184
9/02/2023	15:42	0.0185		9/02/2023	16:34	0.0185		9/02/2023	17:26	0.0184
9/02/2023	15:43	0.0185		9/02/2023	16:35	0.0184		9/02/2023	17:27	0.0184
9/02/2023	15:44	0.0186		9/02/2023	16:36	0.0185		9/02/2023	17:28	0.0184
9/02/2023	15:45	0.0185		9/02/2023	16:37	0.0184		9/02/2023	17:29	0.0184
9/02/2023	15:46	0.0186		9/02/2023	16:38	0.0184		9/02/2023	17:30	0.0184
9/02/2023	15:47	0.0185		9/02/2023	16:39	0.0185		9/02/2023	17:31	0.0184

Date	Time	Outlet	Date	Time	Outlet	Date	Time	Outlet
9/02/2023	17:32	0.0184	9/02/2023	18:30	0.0181	9/02/2023	19:28	0.0186
9/02/2023	17:33	0.0184	9/02/2023	18:31	0.0182	9/02/2023	19:29	0.0186
9/02/2023	17:34	0.0184	9/02/2023	18:32	0.0182	9/02/2023	19:30	0.0186
9/02/2023	17:35	0.0184	9/02/2023	18:33	0.0181	9/02/2023	19:31	0.0186
9/02/2023	17:36	0.0184	9/02/2023	18:34	0.0182	9/02/2023	19:32	0.0186
9/02/2023	17:37	0.0184	9/02/2023	18:35	0.0181	9/02/2023	19:33	0.0186
9/02/2023	17:38	0.0183	9/02/2023	18:36	0.0182	9/02/2023	19:34	0.0186
9/02/2023	17:39	0.0184	9/02/2023	18:37	0.0181	9/02/2023	19:35	0.0186
9/02/2023	17:40	0.0184	9/02/2023	18:38	0.0182	9/02/2023	19:36	0.0186
9/02/2023	17:41	0.0184	9/02/2023	18:39	0.0182	9/02/2023	19:37	0.0186
9/02/2023	17:42	0.0184	9/02/2023	18:40	0.0182	9/02/2023	19:38	0.0186
9/02/2023	17:43	0.0184	9/02/2023	18:41	0.0182	9/02/2023	19:39	0.0187
9/02/2023	17:44	0.0184	9/02/2023	18:42	0.0182	9/02/2023	19:40	0.0186
9/02/2023	17:45	0.0183	9/02/2023	18:43	0.0182	9/02/2023	19:41	0.0186
9/02/2023	17:46	0.0184	9/02/2023	18:44	0.0183	9/02/2023	19:42	0.0186
9/02/2023	17:47	0.0184	9/02/2023	18:45	0.0183	9/02/2023	19:43	0.0186
9/02/2023	17:48	0.0184	9/02/2023	18:46	0.0183	9/02/2023	19:44	0.0186
9/02/2023	17:49	0.0184	9/02/2023	18:47	0.0183	9/02/2023	19:45	0.0187
9/02/2023	17:50	0.0184	9/02/2023	18:48	0.0183	9/02/2023	19:46	0.0186
9/02/2023	17:51	0.0184	9/02/2023	18:49	0.0183	9/02/2023	19:47	0.0186
9/02/2023	17:52	0.0184	9/02/2023	18:50	0.0183	9/02/2023	19:48	0.0186
9/02/2023	17:53	0.0184	9/02/2023	18:51	0.0183	9/02/2023	19:49	0.0186
9/02/2023	17:54	0.0184	9/02/2023	18:52	0.0183	9/02/2023	19:50	0.0187
9/02/2023	17:55	0.0185	9/02/2023	18:53	0.0184	9/02/2023	19:51	0.0186
9/02/2023	17:56	0.0185	9/02/2023	18:54	0.0183	9/02/2023	19:52	0.0186
9/02/2023	17:57	0.0185	9/02/2023	18:55	0.0184	9/02/2023	19:53	0.0186
9/02/2023	17:58	0.0185	9/02/2023	18:56	0.0184	9/02/2023	19:54	0.0186
9/02/2023	17:59	0.0185	9/02/2023	18:57	0.0184	9/02/2023	19:55	0.0187
9/02/2023	18:00	0.0185	9/02/2023	18:58	0.0184	9/02/2023	19:56	0.0187
9/02/2023	18:01	0.0185	9/02/2023	18:59	0.0184	9/02/2023	19:57	0.0186
9/02/2023	18:02	0.0185	9/02/2023	19:00	0.0185	9/02/2023	19:58	0.0187
9/02/2023	18:03	0.0186	9/02/2023	19:01	0.0184	9/02/2023	19:59	0.0186
9/02/2023	18:04	0.0185	9/02/2023	19:02	0.0185	9/02/2023	20:00	0.0187
9/02/2023	18:05	0.0185	9/02/2023	19:03	0.0184	9/02/2023	20:01	0.0187
9/02/2023	18:06	0.0185	9/02/2023	19:04	0.0185	9/02/2023	20:02	0.0186
9/02/2023	18:07	0.0185	9/02/2023	19:05	0.0184	9/02/2023	20:03	0.0195
9/02/2023	18:08	0.0186	9/02/2023	19:06	0.0185	9/02/2023	20:04	0.2254
9/02/2023	18:09	0.0186	9/02/2023	19:07	0.0184	9/02/2023	20:05	0.0327
9/02/2023	18:10	0.0187	9/02/2023	19:08	0.0185	9/02/2023	20:06	0.0188
9/02/2023	18:11	0.0186	9/02/2023	19:09	0.0185	9/02/2023	20:07	0.0188
9/02/2023	18:12	0.0186	9/02/2023	19:10	0.0185	9/02/2023	20:08	0.0188
9/02/2023	18:13	0.0186	9/02/2023	19:11	0.0185	9/02/2023	20:09	0.0188
9/02/2023	18:14	0.0187	9/02/2023	19:12	0.0185	9/02/2023	20:10	0.0187
9/02/2023	18:15	0.0186	9/02/2023	19:13	0.0186	9/02/2023	20:11	0.0188
9/02/2023	18:16	0.0187	9/02/2023	19:14	0.0185	9/02/2023	20:12	0.0188
9/02/2023	18:17	0.0186	9/02/2023	19:15	0.0186	9/02/2023	20:13	0.0188
9/02/2023	18:18	0.0187	9/02/2023	19:16	0.0186	9/02/2023	20:14	0.0188
9/02/2023	18:19	0.0186	9/02/2023	19:17	0.0186	9/02/2023	20:15	0.0188
9/02/2023	18:20	0.0186	9/02/2023	19:18	0.0186	9/02/2023	20:16	0.0188
9/02/2023	18:21	0.0186	9/02/2023	19:19	0.0186	9/02/2023	20:17	0.0187
9/02/2023	18:22	0.0184	9/02/2023	19:20	0.0186	9/02/2023	20:18	0.0188
9/02/2023	18:23	0.0185	9/02/2023	19:21	0.0186	9/02/2023	20:19	0.0188
9/02/2023	18:24	0.0185	9/02/2023	19:22	0.0186	9/02/2023	20:20	0.0188
9/02/2023	18:25	0.0185	9/02/2023	19:23	0.0186	9/02/2023	20:21	0.0188
9/02/2023	18:26	0.0185	9/02/2023	19:24	0.0186	9/02/2023	20:22	0.0188
9/02/2023	18:27	0.0185	9/02/2023	19:25	0.0186	9/02/2023	20:23	0.0187
9/02/2023	18:28	0.0182	9/02/2023	19:26	0.0186	9/02/2023	20:24	0.0188
9/02/2023	18:29	0.0182	9/02/2023	19:27	0.0186	9/02/2023	20:25	0.0188

Date	Time	Outlet
9/02/2023	20:26	0.0188
9/02/2023	20:27	0.0188
9/02/2023	20:28	0.0187
9/02/2023	20:29	0.0188
9/02/2023	20:30	0.0188
9/02/2023	20:31	0.0188
9/02/2023	20:32	0.0188
9/02/2023	20:33	0.0188
9/02/2023	20:34	0.0188
9/02/2023	20:35	0.0189
9/02/2023	20:36	0.0188
9/02/2023	20:37	0.0189
9/02/2023	20:38	0.0188
9/02/2023	20:39	0.0188
9/02/2023	20:40	0.0188
9/02/2023	20:41	0.0188
9/02/2023	20:42	0.0188
9/02/2023	20:43	0.0188
9/02/2023	20:44	0.0188
9/02/2023	20:45	0.0188
9/02/2023	20:46	0.0188
9/02/2023	20:47	0.0187
9/02/2023	20:48	0.0188
9/02/2023	20:49	0.0187
9/02/2023	20:50	0.0188
9/02/2023	20:51	0.0188
9/02/2023	20:52	0.0188
9/02/2023	20:53	0.0189
9/02/2023	20:54	0.0188
9/02/2023	20:55	0.0188
9/02/2023	20:56	0.0188
9/02/2023	20:57	0.0188
9/02/2023	20:58	0.0188
9/02/2023	20:59	0.0188
9/02/2023	21:00	0.0188

Date	Time	Outlet
9/02/2023	21:01	0.0188
9/02/2023	21:02	0.0188
9/02/2023	21:03	0.0188
9/02/2023	21:04	0.0188
9/02/2023	21:05	0.0188
9/02/2023	21:06	0.0188
9/02/2023	21:07	0.0188
9/02/2023	21:08	0.0188
9/02/2023	21:09	0.0188
9/02/2023	21:10	0.0188
9/02/2023	21:11	0.0188
9/02/2023	21:12	0.0188
9/02/2023	21:13	0.0188
9/02/2023	21:14	0.0188
9/02/2023	21:15	0.0188
9/02/2023	21:16	0.0188
9/02/2023	21:17	0.0188
9/02/2023	21:18	0.0188
9/02/2023	21:19	0.0189
9/02/2023	21:20	0.0188
9/02/2023	21:21	0.0188
9/02/2023	21:22	0.0188
9/02/2023	21:23	0.0188
9/02/2023	21:24	0.0188
9/02/2023	21:25	0.0189
9/02/2023	21:26	0.0188
9/02/2023	21:27	0.0188
9/02/2023	21:28	0.0188
9/02/2023	21:29	0.0188
9/02/2023	21:30	0.0188
9/02/2023	21:31	0.0187
9/02/2023	21:32	0.0188
9/02/2023	21:33	0.0188
9/02/2023	21:34	0.0188
9/02/2023	21:35	0.0188

Test
End

Zero

Span

Date	Time	Outlet
9/02/2023	21:36	0.0188
9/02/2023	21:37	0.0188
9/02/2023	21:38	0.0188
9/02/2023	21:39	0.0188
9/02/2023	21:40	0.0188
9/02/2023	21:41	0.0188
9/02/2023	21:42	0.0188
9/02/2023	21:43	0.0188
9/02/2023	21:44	0.0187
9/02/2023	21:45	0.0188
9/02/2023	21:46	0.0188
9/02/2023	21:47	0.0188
9/02/2023	21:48	0.0188
9/02/2023	21:49	0.0188
9/02/2023	21:50	0.0187
9/02/2023	21:51	0.0188
9/02/2023	21:52	0.0187
9/02/2023	21:53	0.0188
9/02/2023	21:54	0.0188
9/02/2023	21:55	0.1710
9/02/2023	21:56	2.8281
9/02/2023	21:57	2.9701
9/02/2023	21:58	0.3230
9/02/2023	21:59	0.0188
9/02/2023	22:00	0.0188
9/02/2023	22:01	0.0188
9/02/2023	22:02	0.0188
9/02/2023	22:03	0.0187
9/02/2023	22:04	0.0189

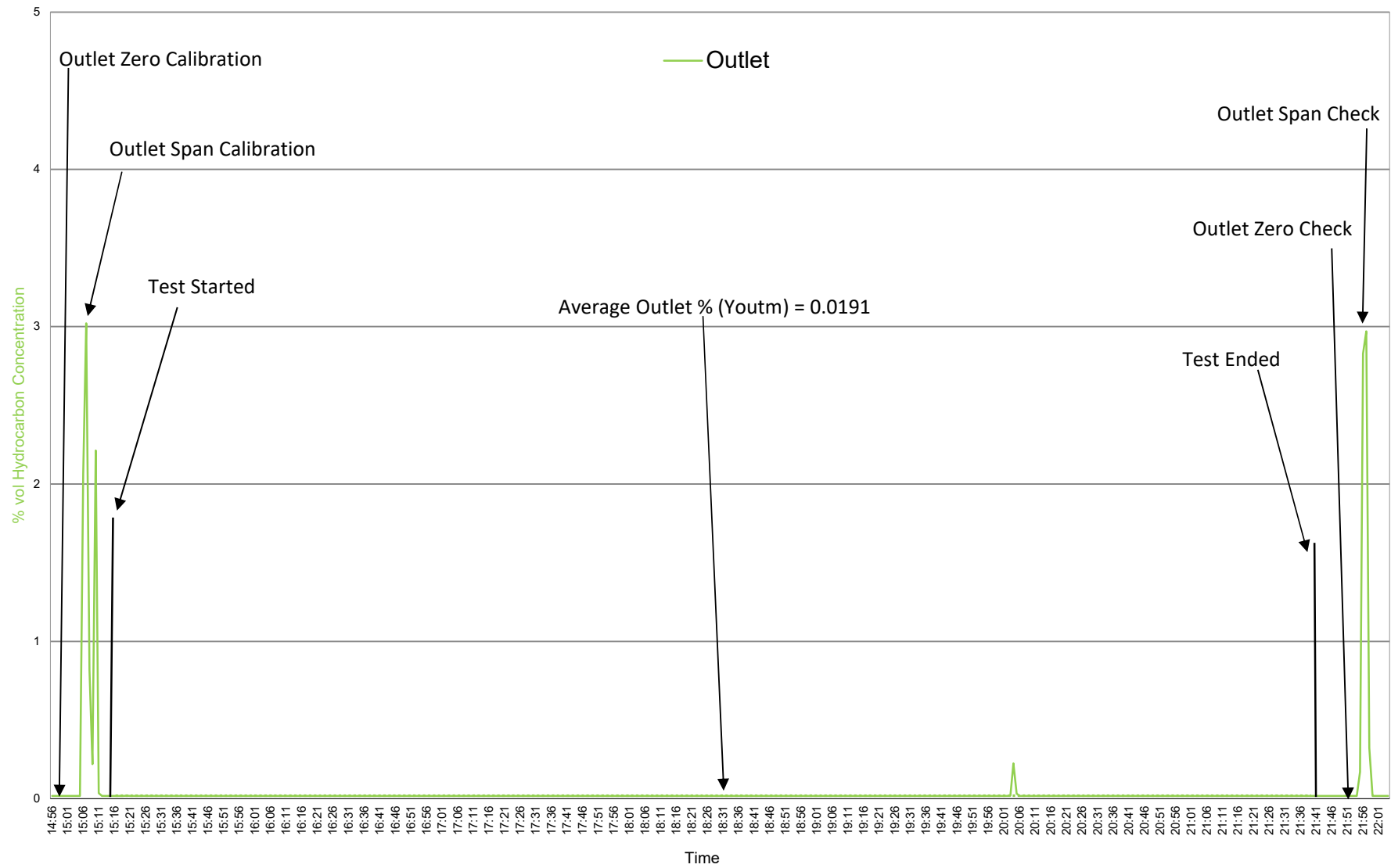
Averages

Outlet
0.0191

APPENDIX E

Representative chart recording of outlet data for test period 9th February 2023

Quantem VRU test - EPA-QBC-02



APPENDIX F

Calculations for determination of mass of unrecovered organic vapours for test period 9th February 2023

Calculation of mass of unrecovered organic vapours

Average Barometric Pressure was :	757.73	mm Hg
Average Ambient Temperature was :	24.24	Deg C
Average Outlet Concentration was :	0.0191	Vol. %
Total volume emitted was :	1023.06	cubic meters
Total Volume Emitted standardized was :	1001.60	cubic meters
Total milligrams emitted was :	350,738	mg
Total volatile Litres loaded was :	85,163	liters
Total Litres loaded was :	85,163	liters
Test duration:	388	minutes
Total milligrams emitted per liter of Volatiles loaded was :	4.1184	mg/L
Total milligrams emitted per liter loaded was :	4.1184	mg/L
Emission flow rate:	0.9040	g/min
Calculated Method Uncertainty +/-	0.591	

APPENDIX G

USEPA Method 25B (NDIR Technology)

**METHOD 25B - DETERMINATION OF TOTAL GASEOUS ORGANIC
CONCENTRATION USING A NONDISPERSIVE INFRARED ANALYZER**

NOTE: This method does not include all of the specifications (*e.g.*, equipment and supplies) and procedures (*e.g.*, sampling) essential to its performance. Some material is incorporated by reference from other methods in this part. Therefore, to obtain reliable results, persons using this method should have a thorough knowledge of at least the following additional test methods: Method 1, Method 6C, and Method 25A.

1.0 Scope and Application.

1.1 Analytes.

Analyte	CAS No.	Sensitivity
Total Organic Compounds	N/A	< 2% of span

1.2 Applicability. This method is applicable for the determination of total gaseous organic concentration of vapors consisting primarily of alkanes. Other organic materials may be measured using the general procedure in this method, the appropriate calibration gas, and an analyzer set to the appropriate absorption band.

1.3 Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.

2.0 Summary of Method.

A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a nondispersive infrared analyzer (NDIR). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

3.0 Definitions. Same as Method 25A, Section 3.0.

4.0 Interferences. [Reserved]

5.0 Safety.

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to performing this test method. The analyzer users manual should be consulted for specific precautions to be taken with regard to the analytical procedure.

5.2 Explosive Atmosphere. This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

6.0 Equipment and Supplies.

Same as Method 25A, Section 6.0, with the exception of the following:

6.1 Organic Concentration Analyzer. A nondispersive infrared analyzer designed to measure alkane organics and capable of meeting or exceeding the specifications in this method.

7.0 *Reagents and Standards.*

Same as Method 25A, Section 7.1. No fuel gas is required for an NDIR.

8.0 *Sample Collection, Preservation, Storage, and Transport.*

Same as Method 25A, Section 8.0.

9.0 *Quality Control.*

Same as Method 25A, Section 9.0.

10.0 *Calibration and Standardization.*

Same as Method 25A, Section 10.0.

11.0 *Analytical Procedure.*

The sample collection and analysis are concurrent for this method (see Section 8.0).

12.0 *Calculations and Data Analysis.*

Same as Method 25A, Section 12.0.

13.0 *Method Performance.* [Reserved]

14.0 *Pollution Prevention.* [Reserved]

15.0 *Waste Management.* [Reserved]

16.0 *References.*

Same as Method 25A, Section 16.0.

17.0 *Tables, Diagrams, Flowcharts, and Validation Data.*

[Reserved]

Appendix III: Test method 20 – Determination of total mass of unrecovered organic vapours from vapour recovery units

Sampling

Draw the exhaust gases through a sample line of PTFE or 316 stainless steel construction. Pass them to a hydrocarbon analyser (flame ionisation detector type).

Analysis

Set the analyser to zero with air that has a hydrocarbon concentration of less than 10 ppm by volume of propane. Calibrate the analyser with a gas of known propane concentration to give a deflection of between 20% and 90% of full scale on the range being used.

The average of the indicated concentration of hydrocarbons in the exhaust gases must lie between 30% and 90% of full-scale deflection of the analyser. The combined effects of carbon dioxide and carbon monoxide in the gases must not affect the reading by more than 2% of full-scale deflection. The deviation from linear response of the analyser shall not exceed 2.5% of full-scale deflection.

Calculation of mass of unrecovered organic vapours

The mass of unrecovered organic vapours emitted for each litre of organic liquid is:

$$(318 \times C \times A \times M \times P \times V) \div (L \times T) \text{ milligrams}$$

where:

C = the average concentration of hydrocarbons expressed as equivalent propane in ppm over the test period

A = the cross-sectional area of the exhaust duct at the plane where the measurements are made in m²

M = the total time for organic liquid to pass into the tank or out of the industrial plant in minutes

P = the atmospheric pressure in kPa

V = the average exhaust gas velocity in metres per second

L = the volume of organic liquid passing into the tank or out of the industrial plant in litres

T = the average exhaust gas temperature in kelvins (273 + temperature in °C)

318 = a conversion factor

APPENDIX H

Atmospheric data

for test period 9th February 2023

Atmospheric data

Average Ambient Temperature (°C) 24.24

Average Barometric Pressure (hPa) 1010.22

Average Barometric pressure (mm Hg) 757.73

Date	Time	Ambient Temperature	Pressure hPa	Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	15:15	21.5	1010.5	9/02/2023	15:57	21.7	1010.4
9/02/2023	15:16	21.6	1010.5	9/02/2023	15:58	21.8	1010.4
9/02/2023	15:17	21.6	1010.5	9/02/2023	15:59	21.8	1010.4
9/02/2023	15:18	21.7	1010.5	9/02/2023	16:00	21.9	1010.4
9/02/2023	15:19	21.7	1010.5	9/02/2023	16:01	22.0	1010.4
9/02/2023	15:20	21.6	1010.5	9/02/2023	16:02	22.0	1010.4
9/02/2023	15:21	21.5	1010.5	9/02/2023	16:03	22.1	1010.4
9/02/2023	15:22	21.5	1010.5	9/02/2023	16:04	22.2	1010.4
9/02/2023	15:23	21.5	1010.5	9/02/2023	16:05	22.2	1010.4
9/02/2023	15:24	21.5	1010.5	9/02/2023	16:06	22.3	1010.4
9/02/2023	15:25	21.4	1010.5	9/02/2023	16:07	22.3	1010.4
9/02/2023	15:26	21.4	1010.5	9/02/2023	16:08	22.4	1010.4
9/02/2023	15:27	21.3	1010.5	9/02/2023	16:09	22.4	1010.4
9/02/2023	15:28	21.3	1010.5	9/02/2023	16:10	22.5	1010.4
9/02/2023	15:29	21.3	1010.5	9/02/2023	16:11	22.5	1010.4
9/02/2023	15:30	21.3	1010.5	9/02/2023	16:12	22.6	1010.4
9/02/2023	15:31	21.3	1010.5	9/02/2023	16:13	22.6	1010.4
9/02/2023	15:32	21.3	1010.5	9/02/2023	16:14	22.7	1010.4
9/02/2023	15:33	21.3	1010.5	9/02/2023	16:15	22.8	1010.4
9/02/2023	15:34	21.2	1010.5	9/02/2023	16:16	22.8	1010.4
9/02/2023	15:35	21.2	1010.5	9/02/2023	16:17	22.9	1010.4
9/02/2023	15:36	21.2	1010.5	9/02/2023	16:18	23.0	1010.4
9/02/2023	15:37	21.2	1010.5	9/02/2023	16:19	23.1	1010.4
9/02/2023	15:38	21.2	1010.5	9/02/2023	16:20	23.1	1010.4
9/02/2023	15:39	21.2	1010.5	9/02/2023	16:21	23.2	1010.4
9/02/2023	15:40	21.3	1010.5	9/02/2023	16:22	23.3	1010.4
9/02/2023	15:41	21.3	1010.5	9/02/2023	16:23	23.3	1010.4
9/02/2023	15:42	21.3	1010.5	9/02/2023	16:24	23.4	1010.4
9/02/2023	15:43	21.3	1010.5	9/02/2023	16:25	23.4	1010.4
9/02/2023	15:44	21.3	1010.5	9/02/2023	16:26	23.4	1010.4
9/02/2023	15:45	21.4	1010.5	9/02/2023	16:27	23.5	1010.4
9/02/2023	15:46	21.4	1010.5	9/02/2023	16:28	23.5	1010.4
9/02/2023	15:47	21.4	1010.5	9/02/2023	16:29	23.5	1010.4
9/02/2023	15:48	21.4	1010.5	9/02/2023	16:30	23.5	1010.4
9/02/2023	15:49	21.5	1010.4	9/02/2023	16:31	23.5	1010.4
9/02/2023	15:50	21.5	1010.4	9/02/2023	16:32	23.5	1010.4
9/02/2023	15:51	21.5	1010.4	9/02/2023	16:33	23.6	1010.4
9/02/2023	15:52	21.5	1010.4	9/02/2023	16:34	23.5	1010.4
9/02/2023	15:53	21.6	1010.4	9/02/2023	16:35	23.5	1010.4
9/02/2023	15:54	21.6	1010.4	9/02/2023	16:36	23.5	1010.4
9/02/2023	15:55	21.6	1010.4	9/02/2023	16:37	23.5	1010.4
9/02/2023	15:56	21.7	1010.4	9/02/2023	16:38	23.5	1010.4

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	16:39	23.5	1010.4
9/02/2023	16:40	23.5	1010.4
9/02/2023	16:41	23.4	1010.4
9/02/2023	16:42	23.4	1010.4
9/02/2023	16:43	23.4	1010.4
9/02/2023	16:44	23.4	1010.4
9/02/2023	16:45	23.5	1010.4
9/02/2023	16:46	23.5	1010.4
9/02/2023	16:47	23.5	1010.4
9/02/2023	16:48	23.5	1010.4
9/02/2023	16:49	23.4	1010.4
9/02/2023	16:50	23.4	1010.4
9/02/2023	16:51	23.5	1010.4
9/02/2023	16:52	23.5	1010.4
9/02/2023	16:53	23.5	1010.4
9/02/2023	16:54	23.5	1010.4
9/02/2023	16:55	23.5	1010.3
9/02/2023	16:56	23.6	1010.3
9/02/2023	16:57	23.6	1010.3
9/02/2023	16:58	23.7	1010.3
9/02/2023	16:59	23.7	1010.3
9/02/2023	17:00	23.8	1010.3
9/02/2023	17:01	23.8	1010.3
9/02/2023	17:02	23.9	1010.3
9/02/2023	17:03	23.9	1010.3
9/02/2023	17:04	24.0	1010.3
9/02/2023	17:05	24.1	1010.3
9/02/2023	17:06	24.2	1010.3
9/02/2023	17:07	24.4	1010.3
9/02/2023	17:08	24.5	1010.3
9/02/2023	17:09	24.6	1010.3
9/02/2023	17:10	24.7	1010.3
9/02/2023	17:11	24.8	1010.3
9/02/2023	17:12	25.0	1010.3
9/02/2023	17:13	25.1	1010.3
9/02/2023	17:14	25.3	1010.3
9/02/2023	17:15	25.4	1010.3
9/02/2023	17:16	25.6	1010.3
9/02/2023	17:17	25.8	1010.3
9/02/2023	17:18	25.9	1010.3
9/02/2023	17:19	26.0	1010.3
9/02/2023	17:20	26.2	1010.3
9/02/2023	17:21	26.3	1010.3
9/02/2023	17:22	26.4	1010.3
9/02/2023	17:23	26.5	1010.3
9/02/2023	17:24	26.6	1010.3
9/02/2023	17:25	26.6	1010.3
9/02/2023	17:26	26.7	1010.3
9/02/2023	17:27	26.7	1010.3
9/02/2023	17:28	26.7	1010.3
9/02/2023	17:29	26.7	1010.3

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	17:30	26.7	1010.3
9/02/2023	17:31	26.8	1010.3
9/02/2023	17:32	26.8	1010.3
9/02/2023	17:33	26.9	1010.3
9/02/2023	17:34	26.9	1010.3
9/02/2023	17:35	27.0	1010.3
9/02/2023	17:36	27.0	1010.3
9/02/2023	17:37	27.0	1010.3
9/02/2023	17:38	27.0	1010.3
9/02/2023	17:39	27.0	1010.3
9/02/2023	17:40	27.1	1010.3
9/02/2023	17:41	27.1	1010.3
9/02/2023	17:42	27.1	1010.3
9/02/2023	17:43	27.1	1010.3
9/02/2023	17:44	27.2	1010.3
9/02/2023	17:45	27.1	1010.3
9/02/2023	17:46	27.1	1010.3
9/02/2023	17:47	27.1	1010.3
9/02/2023	17:48	27.0	1010.3
9/02/2023	17:49	27.0	1010.3
9/02/2023	17:50	26.9	1010.3
9/02/2023	17:51	26.9	1010.3
9/02/2023	17:52	26.9	1010.3
9/02/2023	17:53	26.9	1010.3
9/02/2023	17:54	26.8	1010.3
9/02/2023	17:55	26.8	1010.3
9/02/2023	17:56	26.6	1010.3
9/02/2023	17:57	26.6	1010.3
9/02/2023	17:58	26.5	1010.3
9/02/2023	17:59	26.5	1010.3
9/02/2023	18:00	26.5	1010.3
9/02/2023	18:01	26.5	1010.3
9/02/2023	18:02	26.4	1010.2
9/02/2023	18:03	26.4	1010.2
9/02/2023	18:04	26.4	1010.2
9/02/2023	18:05	26.3	1010.2
9/02/2023	18:06	26.3	1010.2
9/02/2023	18:07	26.2	1010.2
9/02/2023	18:08	26.1	1010.2
9/02/2023	18:09	26.1	1010.2
9/02/2023	18:10	26.1	1010.2
9/02/2023	18:11	26.1	1010.2
9/02/2023	18:12	26.0	1010.2
9/02/2023	18:13	26.0	1010.2
9/02/2023	18:14	26.0	1010.2
9/02/2023	18:15	26.0	1010.2
9/02/2023	18:16	26.0	1010.2
9/02/2023	18:17	26.0	1010.2
9/02/2023	18:18	26.0	1010.2
9/02/2023	18:19	26.1	1010.2
9/02/2023	18:20	26.1	1010.2

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	18:21	26.1	1010.2
9/02/2023	18:22	26.1	1010.2
9/02/2023	18:23	26.1	1010.2
9/02/2023	18:24	26.2	1010.2
9/02/2023	18:25	26.2	1010.2
9/02/2023	18:26	26.3	1010.2
9/02/2023	18:27	26.3	1010.2
9/02/2023	18:28	26.3	1010.2
9/02/2023	18:29	26.3	1010.2
9/02/2023	18:30	26.4	1010.2
9/02/2023	18:31	26.4	1010.2
9/02/2023	18:32	26.5	1010.2
9/02/2023	18:33	26.5	1010.2
9/02/2023	18:34	26.6	1010.2
9/02/2023	18:35	26.6	1010.2
9/02/2023	18:36	26.6	1010.2
9/02/2023	18:37	26.6	1010.2
9/02/2023	18:38	26.6	1010.2
9/02/2023	18:39	26.6	1010.2
9/02/2023	18:40	26.5	1010.2
9/02/2023	18:41	26.5	1010.2
9/02/2023	18:42	26.5	1010.2
9/02/2023	18:43	26.5	1010.2
9/02/2023	18:44	26.4	1010.2
9/02/2023	18:45	26.4	1010.2
9/02/2023	18:46	26.3	1010.2
9/02/2023	18:47	26.3	1010.2
9/02/2023	18:48	26.3	1010.2
9/02/2023	18:49	26.2	1010.2
9/02/2023	18:50	26.2	1010.2
9/02/2023	18:51	26.2	1010.2
9/02/2023	18:52	26.2	1010.2
9/02/2023	18:53	26.1	1010.2
9/02/2023	18:54	26.1	1010.2
9/02/2023	18:55	26.1	1010.2
9/02/2023	18:56	26.1	1010.2
9/02/2023	18:57	26.1	1010.2
9/02/2023	18:58	26.0	1010.2
9/02/2023	18:59	25.9	1010.2
9/02/2023	19:00	25.8	1010.2
9/02/2023	19:01	25.7	1010.2
9/02/2023	19:02	25.7	1010.2
9/02/2023	19:03	25.7	1010.2
9/02/2023	19:04	25.6	1010.2
9/02/2023	19:05	25.5	1010.2
9/02/2023	19:06	25.4	1010.2
9/02/2023	19:07	25.4	1010.2
9/02/2023	19:08	25.4	1010.2
9/02/2023	19:09	25.3	1010.2
9/02/2023	19:10	25.2	1010.2

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	19:11	25.2	1010.2
9/02/2023	19:12	25.2	1010.2
9/02/2023	19:13	25.1	1010.2
9/02/2023	19:14	25.1	1010.2
9/02/2023	19:15	25.1	1010.2
9/02/2023	19:16	25.0	1010.1
9/02/2023	19:17	25.0	1010.1
9/02/2023	19:26	24.8	1010.1
9/02/2023	19:27	24.8	1010.1
9/02/2023	19:39	24.6	1010.1
9/02/2023	19:40	24.6	1010.1
9/02/2023	19:41	24.6	1010.1
9/02/2023	19:42	24.5	1010.1
9/02/2023	19:43	24.5	1010.1
9/02/2023	19:44	24.5	1010.1
9/02/2023	19:45	24.5	1010.1
9/02/2023	19:46	24.5	1010.1
9/02/2023	19:47	24.5	1010.1
9/02/2023	19:48	24.5	1010.1
9/02/2023	19:49	24.4	1010.1
9/02/2023	19:50	24.4	1010.1
9/02/2023	19:51	24.4	1010.1
9/02/2023	19:52	24.4	1010.1
9/02/2023	19:53	24.4	1010.1
9/02/2023	19:54	24.4	1010.1
9/02/2023	19:55	24.4	1010.1
9/02/2023	19:56	24.3	1010.1
9/02/2023	19:57	24.3	1010.1
9/02/2023	19:58	24.3	1010.1
9/02/2023	19:59	24.3	1010.1
9/02/2023	20:00	24.3	1010.1
9/02/2023	20:01	24.3	1010.1
9/02/2023	20:02	24.2	1010.1
9/02/2023	20:03	24.2	1010.1
9/02/2023	20:04	24.2	1010.1
9/02/2023	20:05	24.1	1010.1
9/02/2023	20:06	24.1	1010.1
9/02/2023	20:07	24.0	1010.1
9/02/2023	20:08	24.0	1010.1
9/02/2023	20:09	23.9	1010.1
9/02/2023	20:10	23.9	1010.1
9/02/2023	20:11	23.9	1010.1
9/02/2023	20:12	23.8	1010.1
9/02/2023	20:13	23.8	1010.1
9/02/2023	20:14	23.8	1010.1
9/02/2023	20:15	23.7	1010.1
9/02/2023	20:16	23.7	1010.1
9/02/2023	20:17	23.7	1010.1
9/02/2023	20:18	23.7	1010.1
9/02/2023	20:19	23.7	1010.1

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	20:20	23.7	1010.1
9/02/2023	20:21	23.7	1010.1
9/02/2023	20:22	23.8	1010.1
9/02/2023	20:23	23.7	1010.1
9/02/2023	20:24	23.7	1010.1
9/02/2023	20:25	23.7	1010.1
9/02/2023	20:26	23.7	1010.1
9/02/2023	20:27	23.7	1010.1
9/02/2023	20:28	23.7	1010.1
9/02/2023	20:29	23.7	1010.1
9/02/2023	20:30	23.7	1010.1
9/02/2023	20:31	23.6	1010.1
9/02/2023	20:32	23.6	1010.1
9/02/2023	20:33	23.6	1010.1
9/02/2023	20:34	23.6	1010.1
9/02/2023	20:35	23.6	1010.1
9/02/2023	20:36	23.6	1010.0
9/02/2023	20:37	23.6	1010.0
9/02/2023	20:38	23.6	1010.0
9/02/2023	20:39	23.6	1010.0
9/02/2023	20:40	23.5	1010.0
9/02/2023	20:41	23.5	1010.0
9/02/2023	20:42	23.5	1010.0
9/02/2023	20:43	23.5	1010.0
9/02/2023	20:44	23.5	1010.0
9/02/2023	20:45	23.5	1010.0
9/02/2023	20:46	23.5	1010.0
9/02/2023	20:47	23.5	1010.0
9/02/2023	20:48	23.5	1010.0
9/02/2023	20:49	23.4	1010.0
9/02/2023	20:50	23.4	1010.0
9/02/2023	20:51	23.4	1010.0
9/02/2023	20:52	23.4	1010.0
9/02/2023	20:53	23.4	1010.0
9/02/2023	20:54	23.4	1010.0
9/02/2023	20:55	23.4	1010.0
9/02/2023	20:56	23.4	1010.0
9/02/2023	20:57	23.4	1010.0
9/02/2023	20:58	23.4	1010.0
9/02/2023	20:59	23.4	1010.0
9/02/2023	21:00	23.4	1010.0
9/02/2023	21:01	23.4	1010.0
9/02/2023	21:02	23.4	1010.0
9/02/2023	21:03	23.4	1010.0
9/02/2023	21:04	23.4	1010.0
9/02/2023	21:05	23.4	1010.0
9/02/2023	21:06	23.4	1010.0
9/02/2023	21:07	23.3	1010.0
9/02/2023	21:08	23.3	1010.0
9/02/2023	21:09	23.3	1010.0
9/02/2023	21:10	23.3	1010.0
9/02/2023	21:11	23.3	1010.0
9/02/2023	21:12	23.3	1010.0
9/02/2023	21:13	23.3	1010.0
9/02/2023	21:14	23.3	1010.0
9/02/2023	21:15	23.3	1010.0
9/02/2023	21:16	23.3	1010.0
9/02/2023	21:17	23.3	1010.0

Date	Time	Ambient Temperature	Pressure hPa
9/02/2023	21:18	23.3	1010.0
9/02/2023	21:19	23.3	1010.0
9/02/2023	21:20	23.3	1010.0
9/02/2023	21:21	23.3	1010.0
9/02/2023	21:22	23.3	1010.0
9/02/2023	21:23	23.3	1010.0
9/02/2023	21:24	23.3	1010.0
9/02/2023	21:25	23.3	1010.0
9/02/2023	21:26	23.3	1010.0
9/02/2023	21:27	23.3	1010.0
9/02/2023	21:28	23.3	1010.0
9/02/2023	21:29	23.3	1010.0
9/02/2023	21:30	23.2	1010.0
9/02/2023	21:31	23.3	1010.0
9/02/2023	21:32	23.3	1010.0
9/02/2023	21:33	23.2	1010.0
9/02/2023	21:34	23.1	1010.0
9/02/2023	21:35	23.0	1010.0
9/02/2023	21:36	23.0	1010.0
9/02/2023	21:37	23.1	1010.0
9/02/2023	21:38	23.1	1010.0
9/02/2023	21:39	23.0	1010.0
9/02/2023	21:40	23.0	1010.0
9/02/2023	21:41	23.1	1010.0
9/02/2023	21:42	23.0	1010.0

APPENDIX I
Stack Velocity and Temperature Data
for test period 9th February 2023

Average Stack Velocity (m/s) **1.34**

Average Stack Temperature (°C) **24.94**

Stack Diameter (mm) **200**

Average Stack Temperature (°K) **297.9**

Cross Sectional Area (m²) **0.031415927**

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	15:15	0.76	22.25
9/02/2023	15:16	0.59	22.30
9/02/2023	15:17	0.48	22.35
9/02/2023	15:18	0.34	22.39
9/02/2023	15:19	0.00	22.41
9/02/2023	15:20	0.34	22.35
9/02/2023	15:21	0.34	22.22
9/02/2023	15:22	0.34	22.23
9/02/2023	15:23	0.34	22.20
9/02/2023	15:24	0.00	22.16
9/02/2023	15:25	0.34	22.11
9/02/2023	15:26	0.34	22.08
9/02/2023	15:27	0.34	22.02
9/02/2023	15:28	0.34	22.01
9/02/2023	15:29	0.34	22.01
9/02/2023	15:30	0.34	21.99
9/02/2023	15:31	0.34	22.00
9/02/2023	15:32	0.34	21.99
9/02/2023	15:33	0.34	21.96
9/02/2023	15:34	0.34	21.94
9/02/2023	15:35	0.34	21.93
9/02/2023	15:36	0.34	21.91
9/02/2023	15:37	0.00	21.91
9/02/2023	15:38	0.00	21.93
9/02/2023	15:39	0.00	21.95
9/02/2023	15:40	3.91	21.97
9/02/2023	15:41	3.36	21.99
9/02/2023	15:42	2.56	22.00
9/02/2023	15:43	1.86	22.02
9/02/2023	15:44	1.31	22.04
9/02/2023	15:45	0.96	22.06
9/02/2023	15:46	0.68	22.08
9/02/2023	15:47	0.48	22.10
9/02/2023	15:48	0.34	22.13
9/02/2023	15:49	0.34	22.15
9/02/2023	15:50	0.3	22.17
9/02/2023	15:51	0.3	22.20
9/02/2023	15:52	0.5	22.22
9/02/2023	15:53	0.3	22.25
9/02/2023	15:54	0.3	22.29
9/02/2023	15:55	0.3	22.33
9/02/2023	15:56	0.3	22.38
9/02/2023	15:57	0.3	22.43
9/02/2023	15:58	0.3	22.48
9/02/2023	15:59	0.3	22.54
9/02/2023	16:00	0.3	22.59

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	16:01	0.3	22.65
9/02/2023	16:02	0.3	22.72
9/02/2023	16:03	0.3	22.79
9/02/2023	16:04	0.3	22.86
9/02/2023	16:05	0.3	22.92
9/02/2023	16:06	0.3	22.99
9/02/2023	16:07	0.0	23.04
9/02/2023	16:08	0.0	23.09
9/02/2023	16:09	0.9	23.13
9/02/2023	16:10	4.7	23.19
9/02/2023	16:11	3.2	23.23
9/02/2023	16:12	2.4	23.27
9/02/2023	16:13	2.3	23.32
9/02/2023	16:14	2.0	23.39
9/02/2023	16:15	1.6	23.46
9/02/2023	16:16	1.4	23.54
9/02/2023	16:17	1.3	23.63
9/02/2023	16:18	1.2	23.70
9/02/2023	16:19	1.1	23.78
9/02/2023	16:20	1.0	23.84
9/02/2023	16:21	0.5	23.91
9/02/2023	16:22	0.3	23.97
9/02/2023	16:23	0.3	24.02
9/02/2023	16:24	0.3	24.07
9/02/2023	16:25	0.3	24.10
9/02/2023	16:26	0.3	24.13
9/02/2023	16:27	0.3	24.16
9/02/2023	16:28	0.3	24.18
9/02/2023	16:29	0.5	24.21
9/02/2023	16:30	0.6	24.22
9/02/2023	16:31	1.4	24.23
9/02/2023	16:32	2.3	24.24
9/02/2023	16:33	2.1	24.26
9/02/2023	16:34	1.5	24.23
9/02/2023	16:35	1.4	24.23
9/02/2023	16:36	1.4	24.20
9/02/2023	16:37	0.0	24.17
9/02/2023	16:38	0.0	24.17
9/02/2023	16:39	1.3	24.16
9/02/2023	16:40	4.8	24.15
9/02/2023	16:41	3.5	24.14
9/02/2023	16:42	2.2	24.14
9/02/2023	16:43	1.5	24.14
9/02/2023	16:44	1.0	24.15
9/02/2023	16:45	0.8	24.15
9/02/2023	16:46	0.6	24.15

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	16:47	0.7	24.16
9/02/2023	16:48	1.6	24.16
9/02/2023	16:49	2.0	24.14
9/02/2023	16:50	2.6	24.14
9/02/2023	16:51	3.7	24.16
9/02/2023	16:52	4.5	24.17
9/02/2023	16:53	4.3	24.19
9/02/2023	16:54	3.4	24.21
9/02/2023	16:55	2.5	24.24
9/02/2023	16:56	1.9	24.28
9/02/2023	16:57	2.5	24.33
9/02/2023	16:58	2.0	24.38
9/02/2023	16:59	2.1	24.43
9/02/2023	17:00	2.0	24.47
9/02/2023	17:01	1.6	24.52
9/02/2023	17:02	0.8	24.58
9/02/2023	17:03	0.5	24.64
9/02/2023	17:04	0.5	24.72
9/02/2023	17:05	0.6	24.82
9/02/2023	17:06	0.8	24.94
9/02/2023	17:07	0.0	25.06
9/02/2023	17:08	0.8	25.18
9/02/2023	17:09	3.1	25.29
9/02/2023	17:10	5.9	25.40
9/02/2023	17:11	4.4	25.53
9/02/2023	17:12	3.1	25.68
9/02/2023	17:13	2.3	25.83
9/02/2023	17:14	1.4	25.97
9/02/2023	17:15	0.7	26.12
9/02/2023	17:16	0.5	26.29
9/02/2023	17:17	0.5	26.45
9/02/2023	17:18	0.3	26.60
9/02/2023	17:19	1.0	26.74
9/02/2023	17:20	1.6	26.90
9/02/2023	17:21	1.8	27.02
9/02/2023	17:22	1.7	27.13
9/02/2023	17:23	1.5	27.21
9/02/2023	17:24	0.0	27.27
9/02/2023	17:25	0.0	27.30
9/02/2023	17:26	1.3	27.37
9/02/2023	17:27	4.8	27.40
9/02/2023	17:28	3.5	27.40
9/02/2023	17:29	2.2	27.39
9/02/2023	17:30	1.5	27.44
9/02/2023	17:31	1.0	27.47
9/02/2023	17:32	0.8	27.50
9/02/2023	17:33	0.6	27.56
9/02/2023	17:34	0.7	27.64
9/02/2023	17:35	1.6	27.69

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	17:36	2.0	27.69
9/02/2023	17:37	2.6	27.67
9/02/2023	17:38	3.7	27.70
9/02/2023	17:39	4.5	27.73
9/02/2023	17:40	4.3	27.78
9/02/2023	17:41	3.4	27.80
9/02/2023	17:42	2.5	27.81
9/02/2023	17:43	1.9	27.85
9/02/2023	17:44	2.5	27.85
9/02/2023	17:45	2.0	27.84
9/02/2023	17:46	2.1	27.81
9/02/2023	17:47	2.0	27.77
9/02/2023	17:48	1.6	27.73
9/02/2023	17:49	0.8	27.67
9/02/2023	17:50	0.5	27.62
9/02/2023	17:51	0.5	27.61
9/02/2023	17:52	0.6	27.57
9/02/2023	17:53	0.8	27.56
9/02/2023	17:54	0.0	27.55
9/02/2023	17:55	0.8	27.47
9/02/2023	17:56	3.1	27.35
9/02/2023	17:57	5.9	27.25
9/02/2023	17:58	4.4	27.21
9/02/2023	17:59	3.1	27.22
9/02/2023	18:00	2.3	27.24
9/02/2023	18:01	1.4	27.20
9/02/2023	18:02	0.7	27.14
9/02/2023	18:03	0.5	27.12
9/02/2023	18:04	0.5	27.06
9/02/2023	18:05	0.3	26.99
9/02/2023	18:06	1.0	26.95
9/02/2023	18:07	1.6	26.91
9/02/2023	18:08	1.8	26.80
9/02/2023	18:09	1.7	26.77
9/02/2023	18:10	1.5	26.75
9/02/2023	18:11	1.1	26.76
9/02/2023	18:12	1.0	26.72
9/02/2023	18:13	0.7	26.69
9/02/2023	18:14	0.8	26.69
9/02/2023	18:15	1.1	26.70
9/02/2023	18:16	1.4	26.73
9/02/2023	18:17	1.9	26.74
9/02/2023	18:18	2.9	26.74
9/02/2023	18:19	3.9	26.75
9/02/2023	18:20	4.5	26.76
9/02/2023	18:21	4.3	26.75
9/02/2023	18:22	4.1	26.79
9/02/2023	18:23	3.5	26.82
9/02/2023	18:24	0.0	26.87

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	18:25	0.0	26.92
9/02/2023	18:26	3.3	26.97
9/02/2023	18:27	6.2	26.99
9/02/2023	18:28	5.2	27.02
9/02/2023	18:29	4.4	27.03
9/02/2023	18:30	3.6	27.07
9/02/2023	18:31	2.8	27.11
9/02/2023	18:32	2.4	27.16
9/02/2023	18:33	2.4	27.21
9/02/2023	18:34	2.3	27.26
9/02/2023	18:35	2.3	27.27
9/02/2023	18:36	1.9	27.29
9/02/2023	18:37	0.8	27.28
9/02/2023	18:38	0.3	27.30
9/02/2023	18:39	0.3	27.30
9/02/2023	18:40	0.3	27.22
9/02/2023	18:41	0.3	27.16
9/02/2023	18:42	0.3	27.17
9/02/2023	18:43	0.5	27.17
9/02/2023	18:44	0.5	27.13
9/02/2023	18:45	0.5	27.06
9/02/2023	18:46	0.3	27.02
9/02/2023	18:47	0.3	26.98
9/02/2023	18:48	0.5	26.95
9/02/2023	18:49	0.6	26.93
9/02/2023	18:50	1.3	26.94
9/02/2023	18:51	2.7	26.93
9/02/2023	18:52	3.5	26.90
9/02/2023	18:53	4.1	26.85
9/02/2023	18:54	0.0	26.79
9/02/2023	18:55	3.1	26.77
9/02/2023	18:56	5.1	26.76
9/02/2023	18:57	6.6	26.76
9/02/2023	18:58	4.7	26.72
9/02/2023	18:59	3.1	26.60
9/02/2023	19:00	2.2	26.53
9/02/2023	19:01	1.5	26.43
9/02/2023	19:02	1.4	26.41
9/02/2023	19:03	1.5	26.36
9/02/2023	19:04	1.8	26.28
9/02/2023	19:05	2.2	26.18
9/02/2023	19:06	2.1	26.12
9/02/2023	19:07	1.6	26.09
9/02/2023	19:08	0.6	26.05
9/02/2023	19:09	0.3	25.99
9/02/2023	19:10	0.3	25.94
9/02/2023	19:11	0.3	25.91
9/02/2023	19:12	0.3	25.86
9/02/2023	19:13	0.3	25.81
9/02/2023	19:14	0.3	25.78
9/02/2023	19:15	0.3	25.77
9/02/2023	19:16	0.3	25.75
9/02/2023	19:17	0.3	25.72

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	19:26	4.1	25.48
9/02/2023	19:27	6.3	25.45
9/02/2023	19:39	0.3	25.34
9/02/2023	19:40	0.3	25.31
9/02/2023	19:41	0.3	25.26
9/02/2023	19:42	0.3	25.24
9/02/2023	19:43	0.5	25.22
9/02/2023	19:44	0.3	25.20
9/02/2023	19:45	0.3	25.21
9/02/2023	19:46	0.3	25.20
9/02/2023	19:47	0.3	25.18
9/02/2023	19:48	0.3	25.15
9/02/2023	19:49	0.3	25.13
9/02/2023	19:50	0.3	25.13
9/02/2023	19:51	0.3	25.12
9/02/2023	19:52	0.5	25.10
9/02/2023	19:53	0.0	25.08
9/02/2023	19:54	0.0	25.08
9/02/2023	19:55	2.6	25.06
9/02/2023	19:56	3.2	25.03
9/02/2023	19:57	3.4	25.03
9/02/2023	19:58	3.3	25.01
9/02/2023	19:59	3.1	24.96
9/02/2023	20:00	2.6	24.96
9/02/2023	20:01	1.6	24.96
9/02/2023	20:02	1.0	24.94
9/02/2023	20:03	0.9	24.92
9/02/2023	20:04	1.4	24.85
9/02/2023	20:05	1.8	24.81
9/02/2023	20:06	2.1	24.77
9/02/2023	20:07	2.4	24.74
9/02/2023	20:08	2.7	24.65
9/02/2023	20:09	3.1	24.60
9/02/2023	20:10	2.9	24.55
9/02/2023	20:11	2.0	24.55
9/02/2023	20:12	0.8	24.52
9/02/2023	20:13	0.3	24.51
9/02/2023	20:14	0.3	24.47
9/02/2023	20:15	0.8	24.44
9/02/2023	20:16	1.1	24.44
9/02/2023	20:17	1.7	24.44
9/02/2023	20:18	1.9	24.43
9/02/2023	20:19	1.9	24.42
9/02/2023	20:20	1.0	24.43
9/02/2023	20:21	0.3	24.44
9/02/2023	20:22	0.3	24.45
9/02/2023	20:23	0.3	24.44
9/02/2023	20:24	0.3	24.44
9/02/2023	20:25	0.3	24.45
9/02/2023	20:26	0.0	24.44
9/02/2023	20:27	0.3	24.39
9/02/2023	20:28	0.9	24.36
9/02/2023	20:29	1.7	24.37

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	20:30	2.2	24.36
9/02/2023	20:31	2.3	24.33
9/02/2023	20:32	2.5	24.33
9/02/2023	20:33	2.4	24.34
9/02/2023	20:34	1.9	24.33
9/02/2023	20:35	1.1	24.31
9/02/2023	20:36	0.8	24.32
9/02/2023	20:37	0.3	24.33
9/02/2023	20:38	0.3	24.31
9/02/2023	20:39	0.3	24.29
9/02/2023	20:40	0.9	24.24
9/02/2023	20:41	1.6	24.24
9/02/2023	20:42	1.8	24.24
9/02/2023	20:43	1.7	24.23
9/02/2023	20:44	1.7	24.20
9/02/2023	20:45	1.6	24.18
9/02/2023	20:46	1.4	24.17
9/02/2023	20:47	0.7	24.17
9/02/2023	20:48	0.3	24.16
9/02/2023	20:49	0.3	24.13
9/02/2023	20:50	0.3	24.13
9/02/2023	20:51	0.3	24.13
9/02/2023	20:52	0.3	24.12
9/02/2023	20:53	0.0	24.11
9/02/2023	20:54	0.3	24.12
9/02/2023	20:55	0.3	24.12
9/02/2023	20:56	0.3	24.12
9/02/2023	20:57	0.3	24.09
9/02/2023	20:58	0.3	24.08
9/02/2023	20:59	0.3	24.09
9/02/2023	21:00	0.3	24.09
9/02/2023	21:01	0.3	24.09
9/02/2023	21:02	0.3	24.09
9/02/2023	21:03	0.3	24.09
9/02/2023	21:04	0.3	24.08
9/02/2023	21:05	0.3	24.07
9/02/2023	21:06	0.5	24.06
9/02/2023	21:07	1.4	24.05
9/02/2023	21:08	2.2	24.03
9/02/2023	21:09	2.5	24.01
9/02/2023	21:10	2.7	24.02
9/02/2023	21:11	2.5	24.00
9/02/2023	21:12	2.0	24.00
9/02/2023	21:13	1.6	24.01
9/02/2023	21:14	2.2	24.02
9/02/2023	21:15	2.6	24.03
9/02/2023	21:16	2.0	24.02
9/02/2023	21:17	1.9	24.00
9/02/2023	21:18	2.3	23.98
9/02/2023	21:19	0.3	23.98
9/02/2023	21:20	0.3	23.97
9/02/2023	21:21	0.7	23.99
9/02/2023	21:22	1.4	23.99

Date	Time	Velocity (m/s)	Stack Temp (°C)
9/02/2023	21:23	1.7	23.96
9/02/2023	21:24	1.9	23.97
9/02/2023	21:25	1.6	23.96
9/02/2023	21:26	1.1	23.96
9/02/2023	21:27	0.9	23.98
9/02/2023	21:28	1.2	23.99
9/02/2023	21:29	1.2	23.96
9/02/2023	21:30	1.0	23.94
9/02/2023	21:31	1.0	23.95
9/02/2023	21:32	1.0	23.96
9/02/2023	21:33	1.0	23.91
9/02/2023	21:34	0.9	23.80
9/02/2023	21:35	0.9	23.73
9/02/2023	21:36	1.0	23.73
9/02/2023	21:37	1.2	23.78
9/02/2023	21:38	1.6	23.77
9/02/2023	21:39	1.6	23.74
9/02/2023	21:40	1.4	23.74
9/02/2023	21:41	1.0	23.76
9/02/2023	21:42	0.8	23.73

APPENDIX J

**Calibration gas certificates
for test period 9th February 2023**

CERTIFICATE OF REFERENCE MATERIAL

Oregas Pty Ltd

Order No. LGP016938
Order Batch No. LGP016938-1
Order Serial No. 19834
Order Capacity 9.5 L
Customer No. : 10501530
Customer : OIL & GAS TECHNOLOGIES PTY LTD
Order No. : SO02184873

Certificate No. QCSPC023532
Date Certified 13/02/20
Analyst Name Kyall Davis
Mixture Type Gas
Cylinder Content 1.3 m3
Valve Type 20

Component	Required Concentration	Actual Concentration	Concentration Unit of Measure	Measurement Uncertainty	Method
oxygen	3	3.02	% mol	2% rel	8115 Gravimetric
		Balance			

concentrations are expressed on mole fraction basis.
 Certified values are traceable to Australian National Standards of mass and thus to the International System of Units (SI).
 Certified gas mixture is typically for calibration of instruments. Measurement Uncertainty is calculated using a coverage factor K=2, which gives 95% Confidence Interval.

Technical Note :

Filling Pressure	150	BAR
Min. Useable Pressure	5	BAR
Min. Storage Temperature	10	C
Period of Validity	5 Years	



ACCREDITED FOR
**TECHNICAL
COMPETENCE**

Accredited Reference Material Producer
Number: 12803
Site Number: 15135

Analyst



Kyall Davis
Chemist

NATA Signatory



Mark Qin
Manager Spec. Gas Lab

Accredited for compliance with ISO 17034.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.