

ANNUAL EPL STACK EMISSION SURVEY 2019

HENKEL AUSTRALIA PTY LTD

SEVEN HILLS, NSW

PROJECT NO.:	7000A/S25401/19

DATE OF SURVEY: 4 SEPTEMBER 2019

DATE OF DRAFT ISSUE: 19 SEPTEMBER 2019

DATE OF FINAL ISSUE: 1 OCTOBER 2019



Peter W Stephenson & Associates Pty Ltd ACN 002 600 526 (Incorporated in NSW) ABN 75002600526

> 52A Hampstead Road Auburn NSW 2144 Australia Tel: (02) 9737 9991

E-Mail: info@stephensonenv.com.au

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P W STEPHENSON

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1 INTRODUCTION

Stephenson Environmental Management Australia (SEMA) was requested by Henkel Australia Pty. Ltd to assess the emissions from seven stacks and vents in their starch and chemical manufacturing plant at Seven Hills, New South Wales (NSW). The objective of the tests, undertaken on the 4th September 2019, was to determine emission concentrations of the four assessable pollutants identified in the site's Environment Protection Licence (EPL) No. 258.

The following locations were sampled and the scope of work undertaken is summarised in Table 1-1.

- Boiler
- Radco Oil Heater
- Adhesives Scrubber
- Hot Melt Scrubber
- PVE Scrubber
- PVE Building Vent
- Hot Melt Belt Cooler Exhaust Vent

Location	Flow, Temp.	Moisture	PM ₁₀	NO _x	VOCs including Benzene
Boiler	\checkmark	~	1 sample	\checkmark	
Radco Oil Heater	\checkmark	~	1 sample	\checkmark	
Adhesives Scrubber	\checkmark	~	1 sample		1 sample
Hot Melt Scrubber	\checkmark	~	1 sample		1 sample
PVE Scrubber	\checkmark	~	1 sample		1 sample
PVE Building Vent	\checkmark				1 sample
Hot Melt Belt Cooler Exhaust	~	~	1 sample		1 sample
Approved Test Method	TM-2	TM-22	OM-5	TM-11	TM-34

TABLE 1-1 SCOPE OF EMISSION TESTS – 4 SEPTEMBER 2019

Key:	OEH	=	Office of Environment and Heritage
	PM_{10}	=	Particulate Matter less than 10 microns
	NO _x	=	Oxides of Nitrogen
	VOC	=	Volatile Organic Compounds
	Temp.	=	temperature
	Incl.	=	including
	\checkmark	=	sampled
		=	not sampled

2 ENVIRONMENT PROTECTION LICENCE (EPL) LOAD LIMITS

The NSW Office of Environment and Heritage (OEH), EPL No. 258, licenses the Henkel Australia plant. Condition L2.2 of the EPL has outlined four assessable pollutants, namely benzene, particulate matter less than 10 microns (PM_{10}), nitrogen oxides (NO_x) and volatile organic compounds (VOCs). These annual load limits are summarised in Table 2-1. The EPL does not specify emission concentration limits for these parameters.

TABLE 2-1 EPL LOAD LIMITS

Parameter	Load Limit Per Year (kilograms)
Benzene	40
Particulate Matter less than 10 microns	1,250
Nitrogen Oxides	2,000
Nitrogen Oxides - Summer (Air)	No limit specified
Volatile Organic Compounds	4,500
Volatile Organic Compounds - Summer (Air)	No limit specified

3 PRODUCTION CONDITIONS

Henkel Australia personnel informed SEMA that the various plants on their manufacturing site were operating under typical conditions on the day of testing. Details are held by Henkel.

4 EMISSION TEST RESULTS

4.1 INTRODUCTION

SEMA completed all the sampling and analysis for flow, temperature, moisture, PM_{10} and NO_x and the sampling for the VOC's. SEMA is NATA accredited (No. 15043) for all this work. Refer to SEMA's NATA endorsed Emission Test Report in Appendix C, also includes laboratory Certificates of Analysis and SEMA's NATA Particle Test Report No. 2141.

The VOC samples were analysed for the 73 VOC compound suite, as required by the NSW Approved Methods, utilising the TestSafe Australia laboratory; who are NATA accredited (No. 3726) for the analysis of the 73 VOC compound suite. Refer to Appendix C also for TestSafe Report No. 2019-4103Amended.

Appendix D details the most recent calibration of each instrument used to take measurements. Appendix E details sampling point locations and degree of compliance with Approved Methods.

4.2 STACK SAMPLING LOCATIONS

Locations did not comply with AS4323.1 (TM-1) testing location criteria. The optimum location for testing with current ductwork configurations was used and a reasonable representative sample was taken. Where applicable, additional points on each sample traverse were used to determine the exhaust gas velocity and PM_{10} isokinetic sampling rates to facilitate compliance with AS4323.1. Refer to Appendix E for details.

4.3 PARTICULATE MATTER LESS THAN 10 MICRONS (PM10)

PM₁₀ emission test results for all stacks tested are summarised in Table 4-1. Detailed results are presented in Appendix Tables A-1 and A-2.

Sample Location	PM ₁₀ Average Emission Concentration (mg/m ³)	PM ₁₀ Average Mass Emission Rate (mg/s)
Boiler	2.7	1.06
Radco Oil Heater	0.5	0.10
Adhesives Scrubber	0.2	0.22
Hot Melt Scrubber	1.7	3.42
PVE Scrubber	0.8	0.02
Hot Melt Belt Cooler Exhaust	0.8	3.37
Key: PM ₁₀ = Particulate mg/m ³ = milligram	e Matter less than 10 microns s per cubic metre at 0°C and 101	3 kilopascals

TABLE 4-1 PM₁₀ Emission Concentration Test Results – 4TH September 2019

mg/s = milligrams per second

4.4 OXIDES OF NITROGEN (NO_x)

The Boiler average NO_x (expressed as NO₂) emission concentration was 34 parts per million (ppm) ($70mg/m^3$) and the mass emission rate (MER) was 27 milligrams per second (mg/s).

The Radco oil heater average NO_x (expressed as NO_2) emission concentration was 60 ppm (124 mg/m³) and the MER was 33 mg/s.

Refer to Appendix B, Figures B-1 and B-2 for the NOx results over the period of NOx emission monitoring.

Figures B-1 and B-2 present the NO_x emission concentration test results during high fire/low fire settings, which form part of the typical operating cycles for these combustion systems, for the Boiler and Radco oil heater respectively.

4.5 VOLATILE ORGANIC COMPOUNDS (VOCS) INCLUDING BENZENE

VOC emission concentrations were measured for the scrubbers (Adhesive, Hot Melt and PVE), PVE building vent and Hot Melt Belt Cooler exhaust vent.

Detected VOC emission concentrations are presented in Table 4-2. A complete list of VOC compounds is presented in the NATA endorsed Emission Test Report in Appendix C

As required by the NSW OEH Approved Methods, the sum of the NATA accredited analysis of the suite of 73 VOC compounds is reported as total VOC emission concentration as n-propane equivalent.

VOC emission concentrations from the sum of the VOC 73 compound suite (as n-propane equivalent) were:

- 60.8 mg/m³ for the PVE scrubber;
- 1.6 mg/m³ for the Hot Melt scrubber;
- 7.4 mg/m³ for the Adhesive scrubber;
- 0.64 mg/m³ for the PVE building; and,
- Below the limit of detection of the analytical methods employed for the Hot Melt Belt Cooler exhaust vent.

Detected VOCs	PVE Scrubber		PVE Building Vent		Hot Melt Scrubber		Adhesive Scrubber	
	mg/m ³	mg/s	mg/m ³	mg/s	mg/m ³	mg/s	mg/m ³	mg/s
Benzene	0.34	0.007)7 nd		nd		nd	
2-Methylpentane	п	nd nd		п	d	9.5	11.7	
Cyclopentane	п	d	nd		п	d	0.85	1.05
Isobutyl acetate	п	d	nd		4.17	8.5	п	d
Toluene	6.69	0.14	1.3	0.32	п	d	4.25	5.23
Acetone	6.0	0.13	п	d	п	d	п	d
Ethyl alcohol	7.2	0.15	nd		п	d	п	d
Ethyl Acetate	92.1	1.96	nd		nd		п	d
Sum of 73 VOC compounds (NATA analysis) (<i>uncorrected</i>)	112	2.39	1.3	0.32	4.17	8.5	14.6	18.0
Sum of suite of 73 VOC compounds (NATA analysis) (as n-propane equivalent)	60.8	1.3	0.64	0.15	1.6	3.2	7.4	9.1

TABLE 4-2 DETECTED VOC SPECIATION EMISSION CONCENTRATION TEST RESULTS & MER

MER = mass emission rate

mg/m³ = milligrams per cubic meter at 0°C and 101.3 kilopascals (kPa)

= milligrams per second Mass Emission Rate (MER) not corrected to n-propane

= not detected

Key:

mg/s

nd

NATA = 73 VOC compound suite analysed by NATA accredited laboratory in accordance with Approved Methods

5 CONCLUSIONS

From the data presented and emission test work conducted during typical production cycles, the following conclusions can be drawn:

5.1 PM₁₀

Note there currently are no NSW OEH/EPA EPL or Regulation emission limits for PM_{10} .

- The Boiler PM₁₀ emission concentration was 2.7 mg/m³ with a MER of 1.06 mg/s;
- The Radco Oil Heater PM₁₀ emission concentration was 0.5 mg/m³ with a MER of 0.10 mg/s;
- The Adhesives scrubber PM₁₀ emission concentration was 0.2 mg/m³ with a MER of 0.22 mg/s;
- The Hot Melt scrubber PM₁₀ emission concentration was 1.7 mg/m³ with a MER of 3.42 mg/s;
- The PVE scrubber PM₁₀ emission concentration was 0.8 mg/m³ with a MER of 0.02 mg/s; and
- The Hot Melt Belt Cooler exhaust vent PM₁₀ emission concentration was 0.8 mg/m³ with a MER of 3.37 mg/s.

5.2 NO_x (Expressed as NO₂)

- The total average NO_x, expressed as NO₂, emission concentration from the Boiler was 34 ppm (70 mg/m³) with a MER of 27 mg/s; and
- The total average NO_x, expressed as NO₂, emission concentration from the Radco Oil Heater was 60 ppm (124 mg/m³) with a MER of 33 mg/s.

5.3 VOCS (EXPRESSED AS N-PROPANE EQUIVALENT)

Total VOC emission concentrations, expressed as n-propane equivalent and MER (for the standard suite of 73 NATA analysed VOC compounds) were:

- The PVE building vent total VOC emission concentration was 0.64 mg/m³ with a MER of 0.15 mg/s;
- The Hot Melt scrubber total VOC emission concentration was 1.6 mg/m³ with a MER of 3.2 mg/s;
- The PVE scrubber total VOC emission concentration was 60.8 mg/m³ with a MER of 1.3 mg/s;
- The Adhesives scrubber vent total VOC emission concentration was 7.4 mg/m³ with a MER of 9.1 mg/s; and
- The Hot Melt Belt Cooler exhaust vent total VOC emission concentration was below the laboratory analytical limit of detection.

5.4 VOCS (BENZENE)

The Benzene emission concentration for the PVE Scrubber was 0.34 mg/m³ with a MER of 0.007 mg/s.

All other discharge points measured for benzene were below the limit of detection of the analytical methods employed.

6 TEST METHODS

6.1 EXHAUST GAS VELOCITY AND TEMPERATURE

(OEH NSW TM-1 & 2, USEPA Method 2 & AS 4323.1 & 4323.2)

Velocity profiles were obtained across the stack utilising an Airflow Developments Ltd. S-type pitot tube and manometer. The exhaust gas temperature was measured using a Digital thermometer (0-1200°C) connected to a chromel/alumel (K-type) thermocouple probe.

Note: A vane anemometer was used to obtain a velocity measurement from the PVE Building Vent.

6.2 MOISTURE

(OEH NSW TM-22)

Moisture from the stack was collected in accordance system as part of the PM_{10} sampling train. The collected moisture was weighed and calculated to a percentage of stack gas.

6.3 VOLATILE ORGANIC COMPOUNDS (VOCS)

(OEH NSW TM-34)

A sample of stack air is drawn onto a proprietary carbon adsorption tube. Analysis was undertaken using Gas Chromatography/Mass Spectrometry (GC/MS) and it was performed by the TestSafe Australia laboratories (WorkCover NSW). The TestSafe laboratory is NATA accredited for analysis of the 73 VOC compounds suite.

6.4 PARTICULATE MATTER LESS THAN 10 MICRONS (PM₁₀)

(OEH NSW OM-5 and USEPA Method 201A)

The Membrane Filtration Method utilising equipment manufactured by the Gelman Instrument Corporation was used for the particulate matter sampling from the discharge stack. A cyclone manufactured to USEPA Method 201A specifications to separate particles less than 10 microns (PM_{10}) was incorporated in this Membrane Filtration Method.

Samples were collected at isokinetic rates from multipoint traverses across the discharge stacks, in accordance with Australian Standard (AS) 4323, 1995 Parts 1 & 2 and OEH NSW Approved Method for Sampling OM-5.

6.5 CONTINUOUS GASEOUS ANALYSIS

(OEH NSW TM- 11)

Sampling and analysis of exhaust gas were performed using one of Stephenson Environmental Management Australia's mobile combustion and environmental monitoring laboratories. Emission gases were distributed to the analysers via a manifold. Flue gas from each stack was pumped continuously. The following components of the laboratory were relevant to this work:

Oxides of Nitrogen	Testo 350 XL
Oxygen	Testo 350 XL
Calibration	BOC Special Gas Mixtures relevant for each analyser. Instrument calibrations were performed at the start of sampling.
QA/QC	Calibration (Zero/Span) checks Sample line integrity calibration check

6.6 ACCURACY

All results are quoted on a dry basis. SEMA has adopted the following (Table 6-1) uncertainties for various stack testing methods.

Pollutant	Methods	Uncertainty
Moisture	AS4323.2, TM-22, USEPA 4	25%
Nitrogen Oxides	TM-11, USEPA 7E	15%
Oxygen and Carbon Dioxide	TM-24, TM-25, USEPA 3A	1% actual
Particulate matter less than 10 microns	OM-5, USEPA 201A	50%
Velocity	AS4323.1, TM-2, USEPA 2	5%
Volatile Organic Compounds (adsorption tube)	TM-34, USEPA 18	25%

TABLE 6-1 ESTIMATION OF MEASUREMENT UNCERTAINTY

Key:

Unless otherwise indicated the uncertainties quoted have been determined @ 95% level of Confidence level (i.e. by multiplying the repeatability standard deviation by a co-efficient equal to 1.96) (Source – Measurement Uncertainty)

Sources: Measurement Uncertainty – implications for the enforcement of emission limits by Maciek Lewandowski (Environment Agency) & Michael Woodfield (AEAT) UK

Technical Guidance Note (Monitoring) M2 Monitoring of stack emissions to air Environment Agency Version 3.1 June 2005.

APPENDIX A – EMISSION TEST RESULTS

Glossary:

%	=	percent
°C	=	Degrees Celsius
am³/min	=	cubic metre of gas at actual conditions per minute
Normal Volume (m ³)	=	cubic metre at 0°C and 760 mm pressure and 1 atmosphere
am ³	=	cubic metre of gas at actual conditions
OEH	=	Office of Environment and Heritage
EPL	=	Environment Protection Licence
g/g mole	=	grams per gram mole
g/s	=	grams per second
hrs	=	hours
kg/m ³	=	kilograms per cubic metre
kPa	=	kilo Pascals
m ²	=	square metre
m/s	=	metre per second
m ³ /sec	=	cubic metre per second at 0°C and 1 atmosphere
mg	=	milligrams
mg/ m ³	=	milligrams per cubic metre at 0°C and 1 atmosphere
O ₂	=	Oxygen
Abbreviations of Param	eters and	l Test Methods
PM ₁₀	=	Particulate Matter less than 10 microns
OM-5	=	NSW OEH Approved Other Method No. 5
TM	=	NSW OEH Approved Test Method
USEPA	=	United States Environment Protection Agency
Abbreviations of Persor	nnel	
PWS	=	Peter W Stephenson
JW	=	Jay Weber

Emission Test Results	PM ₁₀	PM ₁₀	PM ₁₀
Project Number	7000A	7000A	7000A
Project Name	Henkel	Henkel	Henkel
Test Location	Radco Oil Heater	Boiler	Hot Melt Belt Cooler
Date	4 September 2019	4 September 2019	4 September 2019
RUN	1	1	1
Sample Start Time (hrs)	13:09	9:54	14:15
Sample Finish Time (hrs)	14:09	10:54	15:15
Sample Location (Inlet/Exhaust)	Exhaust	Exhaust	Exhaust
Stack Temperature (°C)	220	152	25
Stack Cross-Sectional area (m²)	0.053	0.113	0.498
Average Stack Gas Velocity (m/s)	7.5	5.7	9.4
Actual Gas Flow Volume (am³/min)	24	39	280
Total Normal Gas Flow Volume (m ³ /min)	12	23	260
Total Normal Gas Flow Volume (m ³ /sec)	0.21	0.39	4.3
Total Stack Pressure (kPa)	101.5	101.5	101.5
Analysis	PM_{10}	PM_{10}	PM_{10}
Method	OM-5	OM-5	OM-5
SEMA Lab Number	727654	727653	727652
Mass In Sample (mg)	0.35	1.98	0.57
Air Volume Sampled (am³)	0.797	0.784	0.781
Normal Sample Volume (m³)	0.739	0.727	0.724
Concentration at Stack O ₂ (mg/m ³)	0.474	2.730	0.787
Mass Emission Rate (g/s)	0.0000985	0.00106	0.00337
Moisture Content (% by volume)	6.3	6.4	0.51
Molecular Weight Dry Stack Gas (g/g-mole)	29.6	29.2	28.8
Dry Gas Density (kg/m³)	1.32	1.30	1.29
EPL Limit (mg/m³)	No Limit	No Limit	No Limit
Isokinetic Sampling Rate (%)	115	99.8	100
Sample Storage Period	3 months	3 months	3 months
Sampling Performed by	PWS, JW	PWS, JW	PWS, JW
Sample Analysed by (Laboratory)	SEMA	SEMA	SEMA
Calculations Entered by	JW	JW	JW
Calculations Checked by	PWS	PWS	PWS

TABLE A-1 PM10 EMISSION TEST RESULTS: RADCO OIL HEATER, BOILER & HOT MELT BELT COOLER

TABLE A-2 PM10 EMISSION TEST RESULTS: HOT MELT SCRUBBER, ADHESIVE SCRUBBER & PVE SCRUBBER

Emission Test Results	PM_{10}	\mathbf{PM}_{10}	PM_{10}
Project Number	7000A	7000A	7000A
Project Name	Henkel	Henkel	Henkel
Test Location	Hot Melt	Adhesive	PVE Scrubber
	4 September	4 September	4 September
Date	2019	2019	2019
RUN	1	1	1
Sample Start Time (hrs)	14:15	10:56	10:56
Sample Finish Time (hrs)	15:15	11:56	11:56
Sample Location (Inlet/Exhaust)	Exhaust	Exhaust	Exhaust
Stack Temperature (°C)	28	29	28
Stack Cross-Sectional area (m ²)	0.385	0.238	0.008
Average Stack Gas Velocity (m/s)	5.9	5.7	3
Actual Gas Flow Volume (am ³ /min)	140	82	1.4
Total Normal Gas Flow Volume (m ³ /min)	120	74	1.3
Total Normal Gas Flow Volume (m ³ /sec)	2.0	1.2	0.021
Total Stack Pressure (kPa)	101.4	101.5	101.5
Analysis	PM_{10}	PM_{10}	PM ₁₀
Method	OM-5	OM-5	OM-5
SEMA Lab Number	727651	727650	727649
Mass In Sample (mg)	1.23	0.13	0.57
Air Volume Sampled (am ³)	0.791	0.775	0.786
Normal Sample Volume (m ³)	0.733	0.719	0.728
Concentration at Stack O ₂ (mg/m ³)	1.680	0.181	0.783
Mass Emission Rate (g/s)	0.00342	0.000223	0.0000165
Moisture Content (% by volume)	1.2	0.34	0.34
Molecular Weight Dry Stack Gas (g/g-mole)	28.8	28.8	28.8
Dry Gas Density (kg/m ³)	1.29	1.29	1.29
EPL Limit (mg/m ³)	No Limit	No Limit	No Limit
Isokinetic Sampling Rate (%)	109	110	98
Sample Storage Period	3 months	3 months	3 months
Sampling Performed by	PWS, JW	PWS, JW	PWS, JW
Sample Analysed by (Laboratory)	SEMA	SEMA	SEMA
Calculations Entered by	JW	JW	JW
Calculations Checked by	PWS	PWS	PWS

APPENDIX B – CONTINUOUS EMISSION MONITORING LOGS

REPRESENTATIVE SECTION OF CHART SHOWING CONCENTRATIONS OF OXIDES OF NITROGEN



FIGURE B-1 CONTINUOUS LOG RECORD - OXIDES OF NITROGEN - BOILER, 4 SEPTEMBER 2019





APPENDIX C - SEMA'S NATA ENDORSED EMISSION TEST REPORT



Peter W Stephenson & Associates Pty Ltd ACN 002 600 526 (Incorporated in NSW) ABN 75 002 600 526

52A Hampstead Road Auburn NSW 2144 Australia Tel: (02) 9737 9991 E-Mail: info@stephensonenv.com.au

Emissions Test Report No. 7000A

Client	Organisation:	Henkel Australia Pty Ltd
	Contact:	Flavio Fornari
	Address:	7 Stanton Road, Seven Hills NSW 2147
	Telephone:	02 9838 6051
	Email:	flavio.fornari@henkel.com
	Project Number:	7000A/S25401/19
	Test Dates:	4 September 2019
	Production Conditions:	Normal operating conditions during testing
	Analysis Requested:	Flow, temperature, moisture, Nitrogen Oxides, Particulate Matter less than 10 microns and Volatile Organic Compounds
	Sample Locations:	Boiler Stack, Radco Oil Heater, Adhesive Scrubber, PVE Scrubber, Hot Melt Scrubber, PVE Building Vent and Hot Melt Belt Cooler Exhaust Vent.
	Sample ID Nos.:	See Attachment A

The sampling and analysis was commissioned by:

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NATA accredited laboratory number 15043. Accredited for Compliance with ISO/IEC 17025 - Testing

STEPHENSON ENVIRONMENTAL MANAGEMENT AUSTRALIA

VERSION: 2.2

lentification The samples are labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification) sampling date and time and whether further analysis is required.				
Test	Test Method Number for Sampling and Analysis	NATA Laboratory A Accreditation No. & I	ualysis By: Report No.	
Carbon Dioxide	NSW TM-24, USEPA M3A	SEMA, NATA Accreditation No. 15043 Emission Test Report 7000A		
Dry Gas Density	NSW TM-23, USEPA M3	SEMA, NATA Accred Emission Test Report	litation No. 15043, 7000A	
Flow	NSW TM-2, USEPA M2	SEMA, NATA Accred Emission Test Report	litation No. 15043, 7000A	
Moisture	NSW TM-22, USEPA M4	SEMA, NATA Accred Emission Test Report	litation No. 15043, 7000A	
Molecular Weight of Stack Gases	NSW TM-23, USEPA M3	SEMA, NATA Accreditation No. 1504 Emission Test Report 7000A		
Oxides of Nitrogen	NSW TM-11, USEPA M7E	E SEMA, NATA Accreditation No. 1504 Emission Test Report 7000A		
Oxygen	NSW TM-25, USEPA M3A	A SEMA, NATA Accreditation No. 1504 Emission Test Report 7000A		
Particulate Matter less than 10 microns	NSW OM-5, USEPA M201A	SEMA, NATA Accrec Particle Test Report 2	ditation No. 15043, 141	
Stack Pressure	NSW TM-2, USEPA M2	SEMA, NATA Accred Emission Test Report	litation No. 15043, 7000A	
Stack Temperature	NSW TM-2, USEPA M2	SEMA, NATA Accreditation No. 15043, Emission Test Report 7000A		
Velocity	NSW TM-2, USEPA M2	SEMA, NATA Accreditation No. 15043, Emission Test Report 7000A		
Volatile Organic Compounds	NSW TM-34, USEPA M18	 WorkCover, NATA Accreditation No. 3726, Test Report 2019 – 4103Amended 		
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Deviations from Test Methods	Nil
Sampling Times	NSW - As per Test Method requirements or if not specified in the Test Method then as per Protection of the Environment Operations (Clean Air) Regulations Part 2.
Reference Conditions	NSW - As per (1) Environment Protection Licence conditions, or (2) Part 3 of the Protection of the Environment Operations (Clean Air) Regulations

All associated NATA endorsed Test Reports/Certificates of Analysis are provided separately in Attachment A.

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P W Stephenson Managing Director

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		Average Emission Test Results from EPL Emission ID Locations Date Tested - 4 September 2019						
Parameter	Unit							
		Boiler	Radco oil heater	Adhesive scrubber	Hot melt scrubber	PVE scrubber	PVE building vent	Hot melt belt cooler exhaust vent
Stack temp.	°C	152	220	29	28	28	33	25
Velocity	m/s	5.7	7.5	5.7	5.9	3.0	3.5	9.4
Volumetric flow	m³/s	0.39	0.21	1.2	2.0	0.02	0.02	4.3
Moisture	%	6.4	6.3	0.3	1.2	0.3	1.3	0.5
Molecular weight dry stack gas	g/g mole	29.2	29.6	28.8	28.8	28.8	28.8	28.8
Dry gas density	kg/m³	1.30	1.32	1.29	1.29	1.29	1.29	1.29
PM10	mg/m³	2.7	0.5	0.2	1.7	0.8	-	0.8
Oxides of nitrogen	mg/m³	70	124					
Benzene	mg/m ³			<0.17 (nd)	<0.17 (nd)	0.34	<0.17 (nd)	<0.17 (nd)
Sum of suite of 73 VOCs (as n-propane equivalent)	mg/m ³			7.4	1.6	60.8	0.64	<4.1 (nd)

SUMMARY OF THE AVERAGE EMISSION RESULTS - TEST REPORT NO. 7000A

Key:	Temp.	=	temperature
	PM ₁₀	=	Particulate matter less than 10 microns
	VOCs	=	Volatile organic compounds
	°C	=	degrees Celsius
	%	=	percentage
	kg/m³	=	kilograms per cubic metre
	g/g mole	=	grams per gram mole
	m³/s	=	dry cubic metre per second 0°C and 101.3 kilopascals (kPa)
	m/s	=	metres per second
	mg/m ³	=	milligrams per cubic metre at 0°C and 101.3 kilopascals (kPa)
		=	not required to be tested
	<	=	less than
	nđ	=	not detected - below the limit of detection for the analytical method

STEPHENSON ENVIRONMENTAL MANAGEMENT AUSTRALIA VERSION: 2.2 PAGE 4 OF 6

APPENDIX C-V

ESTIMATED UNCERTAINTY OF MEASUREMENT

Pollutant	Methods	Uncertainty
Moisture	AS4323.2, NSW TM-22, USEPA M4	25%
Nitrogen Oxides	NSW TM-11, USEPA M7E	15%
Oxygen and Carbon Dioxide	NSW TM-24, TM-25, USEPA M3A	1% actual
Particulate matter less than 10 microns	NSW OM-5, USEPA M201A	50%
Velocity	AS4323.1, NSW TM-2, USEPA M2	5%
Volatile Organic Compounds (adsorption tube)	NSW TM-34, USEPA M18	25%

Key:

Unless otherwise indicated the uncertainties quoted have been determined @ 95% level of Confidence level (i.e. by multiplying the repeatability standard deviation by a co-efficient equal to 1.96) (Source – Measurement Uncertainty)

Sources: Measurement Uncertainty - implications for the enforcement of emission limits by Maciek Lewandowski (Environment Agency) & Michael Woodfield (AEAT) UK

Technical Guidance Note (Monitoring) M2 Monitoring of stack emissions to air Environment Agency Version 3.1 June 2005.

Note: ISO 9096 is for 20-1000 mg/m³⁻ which AS4323.2 is based on. Note DSEN 13284-1 testing for < 5 mg/m³ correlates to 5 mg/m³ with most quoted uncertainties of \pm 5.3 mg/m³ @ 6.4 mg/m³. From Clean Air Engineering in the United States the lowest practical limit of USEPA M5 is 5 mg/m³ under lab conditions.

Stephenson Environmental Management Australia	VERSION: 2.2	Page 5 of 6
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ATTACHMENT A - NATA CERTIFICATES OF ANALYSIS

STEPHENSON ENVIRONMENTAL MANAGEMENT AUSTRALIA VERSION: 2.2 PAGE 6 OF 6



Stephenson

Environmental Management Australia

Peter W Stephenson & Associates Pty Ltd ACN 002 600 526 (Incorporated in NSW) ABN 75 002 600 526

25A Hampstead Road Auburn NSW 2144 Australia Tel: (02) 9737 9991 E-Mail: info@stephensonenv.com.au

Particle Test Report No. 2141

The analysis was commissioned by SEMA on behalf of:

Client	Organisation:	Henkel Australia Pty Ltd
	Contact:	Flavio Fornari
	Address:	7 Stanton Road, Seven Hills NSW 2147
	Telephone:	9838 6051
	Email:	flavio.fornari@henkel.com
	Project Number:	7000/S25401/19
	Analysis Requested:	OM-5
	Chain of Custody Number	525439
	Date Analysis Completed:	4 September 2019
	No. of Samples Tested:	6
	Sample Locations:	PVE Scrubber, Adhesive Scrubber, Hot Melt Scrubber, Hot Melt Belt Cooler, Boiler Stack, and Radco Oil Heater
	Sample ID Nos.:	727649, 727650, 727651, 727652, 727653, 727653
	Filter ID Nos.:	15278, 15289, 14577, 15280, 15271, 15276

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NATA accredited laboratory number 15043

Accredited for Compliance with ISO/IEC 17025 - Testing.



P: QUALITY SYSTEM/REPORT TEMPLATES

VERSION: 2.6

PAGE 1 OF 2

STEPHENSON	ENVIRONMENTAL	MANAGEMENT	AUSTRALIA
PROPERTY AND ADDRESS OF	Best T. T. SPAN, D. STUDIE, J. CO.P. M.	TAILORD ALL PROPERTY OF THE CALL	5 94010FU3PA

PARTICLE TEST REPORT NO. 2141

Identification The filters are labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification) sampling date and time and whether further analysis is required.

Test Analysis Test Method

PM10 AS4323.2:2001

Nil

Deviations from Test Methods

Issue Date 5 September 2019

Jay Week

Jay Weber Senior Engineer

Analysis Sampling Sample Sample ID No. Filter ID No. Date Sample Location Date Mass (g) Completed **PVE Scrubber** 727649 15278 04/09/2019 05/09/2019 0.00057 Adhesive Scrubber 727650 15279 04/09/2019 05/09/2019 0.00013 Hot Melt Scrubber 727651 15277 04/09/2019 05/09/2019 0.00123 Hot Melt Cooler 727652 15280 04/09/2019 05/09/2019 0.00057

15271

15276

04/09/2019

04/09/2019

05/09/2019

05/09/2019

Gravimetric Results - Test Report No. 2141

Key:

Boiler

RADCO

g = grams

P: QUALITY SYSTEM/REPORT TEMPLATES

APPENDIX C-IX

0.00198

0.00035

727653

727654





2019-4103

Jay Weber Stephenson Environmental Management Australia PO Box 6398 SILVERWATER NSW 1811

SAMPLE ORIGIN: Project No. 7000

DATE OF INVESTIGATION: 04/09/2019

DATE RECEIVED: 5/09/19

Lab. Reference:

ANALYSIS REQUIRED: VolatileOrganicCompounds

AMENDED REPORT OF ANALYSIS

See attached sheet(s) for sample description and test results.

The results of this report have been approved by the signatory whose signature appears below.

For all administrative or account details please contact the Laboratory.

Increment and total pagination can be seen on the following pages.

O. Ourneeu

Date: 30/09/19

TestSafe Australia – Chemical Analysis Branch Level 2, Building 1, 9-15 Chilvers Road, Thornleigh, NSW 2120, Australia T: +61 2 9473 4000 E: lab@safework.nsw.gov.au ABN 81 913 830 179 W: testsafe.com.au



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Page 1





Client : Jay Weber Sample ID : 727655

Date Sampled : 4-Sep-2019 Reference Number le : 2019-4103-1

No	Compounds	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
5762		2,229,23,2638	μg/se	ction			80.00 F.	μg/section	
	Aliphatic hydrocarbon	IS (LOQ = 5µg/co	ompound/secti	on)		Aromatic hydrocarbon:	5 (LOQ - 1µg/co	mpound/section) (ac
1	2-Methylbutane	78-78-4	ND	ND	39	Benzene	71-43-2	2	ND
2	n-Pentane	109-66-0	ND	ND	40	Ethylbenzene	100-41-4	ND	ND
3	2-Methylpentane	107-83-5	ND	ND	41	Isopropylbenzene	98-82-8	ND	ND
4	3-Methylpentane	96-14-0	ND	ND	42	1,2,3-Trimethylbenzene	526-73-8	ND	ND
5	Cyclopentane	287-92-3	ND	ND	43	1,2,4-Trimethylbenzene	95-63-6	ND	ND
6	Methylcyclopentane	96-37-7	ND	ND	44	1,3,5-Trimethylbenzene	108-67-8	ND	ND
7	2,3-Dimethylpentane	565-59-3	ND	ND	45	Styrene	100-42-5	ND	ND
8	n-Hexane	110-54-3	ND	ND	46	Toluene	108-88-3	39	ND
9	3-Methylhexane	589-34-4	ND	ND	47	p-Xylene &/or m-Xylene	106-42-3 di 308-32-3	ND	ND
10	Cyclohexane	110-82-7	ND	ND	48	o-Xylene	95-47-6	ND	ND
11	Methylcyclohexane	108-87-2	ND	ND		Ketones (1.00 #49, #54 & #55	=5µg/c/s; N50, N5	1, #52 & #53	=25µg/c/s)
12	2,2,4-Trimethylpentane	540-84-1	ND	ND	49	Acetone	67-64-1	35	ND
13	n-Heptane	142-82-5	ND	ND	50	Acetoin	513-86-0	ND	ND
14	n-Octane	111-65-9	ND	ND	51	Diacetone alcohol	123-42-2	ND	ND
15	n-Nonane	111-84-2	ND	ND	52	Cyclohexanone	108-94-1	ND	ND
16	n-Decane	124-18-5	ND	ND	53	Isophorone	78-59-1	ND	ND
17	n-Undecane	1120-21-4	ND	ND	54	Methyl ethyl ketone (MEK)	78-93-3	ND	ND
18	n-Dodecane	112-40-3	ND	ND	55	Methyl isobutyl ketone (MIBK)	108-10-1	ND	ND
19	n-Tridecane	629-50-5	ND	ND		Alcohols (LOQ = 25µg/compo	und/section)		and a second second
20	n-Tetradecane	629-59-4	ND	ND	56	Ethyl alcohol	64-17-5	42	ND
21	a-Pinene	80-56-8	ND	ND	57	n-Butyl alcohol	71-36-3	ND	ND
22	β-Pinene	127-91-3	ND	ND	58	Isobutyl alcohol	78-83-1	ND	ND
23	D-Limonene	138-86-3	ND	ND	59	Isopropyl alcohol	67-63-0	ND	ND
	Chlorinated hydrocarl	00ns (LOQ = 5)	ng/compound/	section)	60	2-Ethyl hexanol	104-76-7	ND	ND
24	Dichloromethane	75-09-2	ND	ND	61	Cyclohexanol	108-93-0	ND	ND
25	1,1-Dichloroethane	75-34-3	ND	ND		Acetates (LOO - 25ag/compo	und/section)		
26	1,2-Dichloroethane	107-06-2	ND	ND	62	Ethyl acetate	141-78-6	537	ND
27	Chloreform	67-66-1	ND	ND	63	n-Propyl acetate	109-60-4	ND	ND
28	1.1.1-Trichloroethane	71-55-6	ND	ND	64	n-Butyl acetate	123-86-4	ND	ND
29	1,1,2-Trichloroethane	79-00-5	ND	ND	65	Isobutyl acetate	110-19-0	ND	ND
30	Trichloroethylene	79-01-6	ND	ND		Ethers (LOO - 25ag/compound	(vsection)		
31	Carbon tetrachloride	56-23-5	ND	ND	66	Ethyl ether	60-29-7	ND	ND
32	Perchloroethylene	127-18-4	ND	ND	67	tert -Butyl methyl ether (sms)	1634-04-4	ND	ND
33	1,1,2,2-Tetrachloroethane	79-34-5	ND	ND	68	Tetrahydrofuran (THF)	109-99-9	ND	ND
34	Chlorobenzene	108-90-7	ND	ND		Glycols (LOQ - 25ag/compour	nd/section)		
35	1.2-Dichlorobenzene	95-50-1	ND	ND	69	PGME	107-98-7	ND	ND
36	1.4-Dichlorobenzene	106-46-7	ND	ND	70	Ethylene glycol diethyl ether	629-14-1	ND	ND
	Miscellaneous (Loo a)7	501g & #38=25uo	compound/set	ction)	71	PGMEA	108-65-6	ND	ND
37	Acetonitrile	73-05-8	ND	ND	72	Cellosolve acetate	111-13-0	ND	ND
38	n-Vinyl-2-pyrrolidinone	88-17-0	ND	ND	73	DGMEA	112-15-3	ND	ND
1	Methyl acetate*	79-20-9	216668	ND		Vinyl acetate*	108-05-4	24461	ND
	Total VOCs (LOQ ~50ug/com	pound/section)	241866	ND		Worksheet check		yes	yes

2019-4103Amended

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SW08051 0817





Client :	Jay	Weber	
concine :	a		

Sample ID : 727656

Date Sampled : 4-Sep-2019 Reference Number le : 2019-4103-2

No	Compounds	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
2.078		100000000000	µg/section					μg/section	
	Aliphatic hydrocarbon	IS (LOQ = 5µg/co	empound/section	ion)		Aromatic hydrocarbons	5 (LOQ = 1µg/co	mpound/secti	os)
1	2-Methylbutane	78-78-4	ND	ND	39	Benzene	71-43-2	ND	ND
2	n-Pentane	109-66-0	ND	ND	40	Ethylbenzene	100-41-4	ND	ND
3	2-Methylpentane	107-83-5	56	ND	41	Isopropylbenzene	98-82-8	ND	ND
4	3-Methylpentane	96-14-0	ND	ND	-42	1,2,3-Trimethylbenzene	526-73-8	ND	ND
5	Cyclopentane	287-92-3	5	ND	-43	1,2,4-Trimethylbenzene	95-63-6	ND	ND
6	Methylcyclopentane	96-37-7	ND	ND	-44	1.3.5-Trimethylbenzene	108-67-8	ND	ND
7	2,3-Dimethylpentane	365-59-3	ND	ND	45	Styrene	100-42-5	ND	ND
8	n-Hexane	110-54-3	ND	ND	46	Toluene	108-88-3	25	ND
9	3-Methylhexane	589-34-4	ND	ND	-47	p-Xylene &/or m-Xylene	108-42-3-3 108-38-1	ND	ND
10	Cyclohexane	110-82-7	ND	ND	-48	o-Xylene	95-47-6	ND	ND
11	Methylcyclohexane	108-87-2	ND	ND		Ketones (LOQ #49, #54 & #55	=5µg/c/s; #50, #5	1, #52 & #53	=25µg/c/s)
12	2,2,4-Trimethylpentane	540-84-1	ND	ND	49	Acetone	67-64-1	ND	ND
13	n-Heptane	142-82-5	ND	ND	50	Acetoin	\$13-86-0	ND	ND
14	n-Octane	111-65-9	ND	ND	51	Diacetone alcohol	123-42-2	ND	ND
15	n-Nonane	111-84-2	ND	ND	52	Cyclohexanone	108-94-1	ND	ND
16	n-Decane	124-18-5	ND	ND	53	Isophorone	78-59-1	ND	ND
17	n-Undecane	1120-21-4	ND	ND	54	Methyl ethyl ketone (MEK)	78-93-3	ND	ND
18	n-Dodecane	112-40-3	ND	ND	55	Methyl isobutyl ketone (MIBK)	108-10-1	ND	ND
19	n-Tridecane	629-50-5	ND	ND		Alcohols (LOQ - 25µg/compo	und/section)		
20	n-Tetradecane	629-59-4	ND	ND	56	Ethyl alcohol	64-17-5	ND	ND
21	a-Pinene	80-56-8	ND	ND	57	n-Butyl alcohol	71-36-3	ND	ND
22	β-Pinene	127-91-3	ND	ND	58	Isobutyl alcohol	78-83-1	ND	ND
23	D-Limonene	138-86-3	ND	ND	59	Isopropyl alcohol	67-63-0	ND	ND
	Chlorinated hydrocarl	0005 (LOQ - 5)	ig/compound	/section)	60	2-Ethyl hexanol	104-76-7	ND	ND
24	Dichloromethane	75-09-2	ND	ND	61	Cyclohexanol	108-93-0	ND	ND
25	1,1-Dichloroethane	75-34-3	ND	ND		Acetates (LOQ = 25µg/compo	und/section)		111 111
26	1,2-Dichloroethane	107-06-2	ND	ND	62	Ethyl acetate	141-78-6	ND	ND
27	Chloroform	67-66-3	ND	ND	63	n-Propyl acetate	109-60-4	ND	ND
28	1,1,1-Trichloroethane	71-55-6	ND	ND	64	n-Butyl acetate	123-86-4	ND	ND
29	1,1,2-Trichloroethane	79-00-5	ND	ND	65	Isobutyl acetate	110-19-0	ND	ND
30	Trichloroethylene	79-01-6	ND	ND		Ethers (LOQ = 25µg/compound	l/section)		60.
31	Carbon tetrachloride	56-23-3	ND	ND	66	Ethyl ether	60-29-7	ND	ND
32	Perchloroethylene	127-18-4	ND	ND	67	tert-Butyl methyl ether orma)	1634-04-4	ND	ND
33	1,1,2,2-Tetrachloroethane	79-34-5	ND	ND	68	Tetrahydrofuran (THF)	109-99-9	ND	ND
34	Chlorobenzene	108-90-7	ND	ND		Glycols (LOQ = 25µg/compour	nd/section)		
35	1,2-Dichlorobenzene	95-50-1	ND	ND	69	PGME	107-98-2	ND	ND
36	1,4-Dichlorobenzene	106-46-7	ND	ND	70	Ethylene glycol diethyl ether	629-14-1	ND	ND
	Miscellaneous (LOQ #37-	5µg & #38=25µg	compound/se	ction)	71	PGMEA	108-65-6	ND	ND
37	Acetonitrile	75-05-8	ND	ND	72	Cellosolve acetate	111-15-9	ND	ND
38	n-Vinyl-2-pyrrolidinone	88-12-0	ND	ND	73	DGMEA	112-15-2	ND	ND
	Methyl acetate*	79-20-9	359	ND		Vinyl acetate*	108-05-4	30	ND
	Total VOCs (LOQ =50µg/com	pound/section)	475	ND		Worksheet check		yes	yes

2019-4103Amended

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SW08051 0817





Client :	Jay	Weber
Sample	ID	: 727657

Date Sampled : 4-Sep-2019 Reference Number le : 2019-4103-3

No	Compounds	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
	compounds	12.200.200.000.00	µg/section		1.10	Compounds		µg/section	
	Aliphatic hydrocarbon	IS (LOQ = 5µg/co	mpound/secti	on)	TT	Aromatic hydrocarbons	(LOQ = tµg/co	mpound/section	an)
1	2-Methylbutane	78-78-4	ND	ND	39	Benzene	71-43-2	ND	ND
2	n-Pentane	109-66-0	ND	ND	-40	Ethylbenzene	100-41-4	ND	ND
3	2-Methylpentane	107-83-5	ND	ND	41	Isopropylbenzene	98-82-8	ND	ND
4	3-Methylpentane	96-14-0	ND	ND	42	1,2,3-Trimethylbenzene	526-73-8	ND	ND
5	Cyclopentane	287-92-3	ND	ND	43	1,2,4-Trimethylbenzene	95-63-6	ND	ND
6	Methylcyclopentane	96-37-7	ND	ND	44	1,3,5-Trimethylbenzene	108-67-8	ND	ND
7	2,3-Dimethylpentane	565-59-3	ND	ND	45	Styrene	100-42-5	ND	ND
8	n-Hexane	110-54-3	ND	ND	46	Toluene	108-88-3	ND	ND
9	3-Methylhexane	589-34-4	ND	ND	-47	p-Xylene &/or m-Xylene	108-42-3 /#	ND	ND
10	Cyclohexane	110-82-7	ND	ND	48	o-Xylene	95-47-6	ND	ND
11	Methylcyclohexane	108-87-2	ND	ND		Ketones (LOQ #49, #54 & #55 =	Sug/c/s; #50, #5	1, #52 & #53	=25µg/c/s)
12	2,2,4-Trimethylpentane	540-84-1	ND	ND	49	Acetone	67-64-1	ND	ND
13	n-Heptane	142-82-5	ND	ND	50	Acetoin	513-86-0	ND	ND
14	n-Octane	111-65-9	ND	ND	51	Diacetone alcohol	123-42-2	ND	ND
15	n-Nonane	111-84-2	ND	ND	52	Cyclohexanone	108-94-1	ND	ND
16	n-Decane	124-18-5	ND	ND	53	Isophorone	78-59-1	ND	ND
17	n-Undecane	1120-21-4	ND	ND	54	Methyl ethyl ketone (MEK)	78-93-3	ND	ND
18	n-Dodecane	112-40-3	ND	ND	55	Methyl isobutyl ketone (MIBK)	108-10-1	ND	ND
19	n-Tridecane	629-50-5	ND	ND		Alcohols (LOO = 25au/common//section)			
20	n-Tetradecane	629-59-4	ND	ND	56	Ethyl alcohol	64-17-5	ND	ND
21	a-Pinene	80-56-8	ND	ND	57	n-Butyl alcohol	71-36-3	ND	ND
22	β-Pinene	127-91-3	ND	ND	58	Isobutyl aicohol	78-83-1	ND	ND
23	D-Limonene	138-86-3	ND	ND	59	Isopropyl alcohol	67-63-0	ND	ND
	Chlorinated hydrocarl	00ns (LOO - 5	e/compound	(section)	60	2-Ethyl hexanol	104-76-7	ND	ND
24	Dichloromethane	75,09,2	ND	ND	61	Cyclohexanol	108-93-0	ND	ND
25	1,1-Dichloroethane	75-34-3	ND	ND		Acetates (LOO = 25µg/compo	md/section)		
26	1,2-Dichloroethane	107-06-2	ND	ND	62	Ethyl acetate	141-78-6	ND	ND
27	Chloroform	67-66-3	ND	ND	63	n-Propyl acetate	109-60-4	ND	ND
28	1,1,1-Trichloroethane	71-55-6	ND	ND	64	n-Butyl acetate	123-86-4	ND	ND
29	1,1,2-Trichloroethane	79-00-5	ND	ND	65	Isobutyl acetate	110-19-0	25	ND
30	Trichloroethylene	79-01-6	ND	ND	\top	Ethers (LOO = 25ug/compound	/section)		
31	Carbon tetrachloride	56-23-5	ND	ND	66	Ethyl ether	60-29-7	ND	ND
32	Perchloroethylene	127-18-4	ND	ND	67	tert -Butyl methyl ether mon	1634-04-4	ND	ND
33	1,1,2,2-Tetrachloroethane	79-34-5	ND	ND	68	Tetrahydrofuran (THF)	109-99-9	ND	ND
34	Chlorohenzene	108-90-7	ND	ND		Glycols (LOQ = 25ag/compour	d/section)		
35	1.2-Dichlorobenzene	95-50-1	ND	ND	69	PGME	107-98-2	ND	ND
36	1,4-Dichlorobenzene	106-46-7	ND	ND	70	Ethylene glycol diethyl ether	629-14-1	ND	ND
	Miscellaneous (Loo #37	511g & #38=25uel	compound/so	ction)	71	PGMEA	108-65-6	ND	ND
37	Acetonitrile	75-05-8	ND	ND	72	Cellosolve acetate	111-19-0	ND	ND
38	n-Vinyl-2-pyrrolidinone	88-12-0	ND	ND	73	DGMEA	112-15-2	ND	ND
	Methyl acetate*	79-20-9	ND	ND		Vinyl acetate*	108-05-4	ND	ND
	Total VOCs (LOO =50ue/com	pound/section)	105	ND		Worksheet check		yes	ves

2019-4103Amended

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Accreditation No. 3726

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Client :	Jay Weber
Sample	ID: 727658

Date Sampled : 4-Sep-2019 Reference Number le : 2019-4103-4

No	Compounds	Compounds CAS	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
			μg/se	ection	1.15	Componing	2.1.2.1.0	µg/section		
	Aliphatic hydrocarbon	IS (LOQ = 5µg/ce	mpound/secti	ion)		Aromatic hydrocarbons	5 (LOQ - 1µg/co	mpound/section	an)	
1	2-Methylbutane	78-78-4	ND	ND	39	Benzene	71-43-2	ND	ND	
2	n-Pentane	109-66-0	ND	ND	-40	Ethylbenzene	100-41-4	ND	ND	
3	2-Methylpentane	107-83-5	ND	ND	-41	Isopropylbenzene	98-82-8	ND	ND	
4	3-Methylpentane	96-14-0	ND	ND	42	1,2.3-Trimethylbenzene	526-73-8	ND	ND	
5	Cyclopentane	287-92-3	ND	ND	-43	1,2,4-Trimethylbenzene	95-63-6	ND	ND	
6	Methylcyclopentane	96-37-7	ND	ND	-44	1,3,5-Trimethylbenzene	108-67-8	ND	ND	
7	2,3-Dimethylpentane	565-59-3	ND	ND	-45	Styrene	100+42-5	ND	ND	
8	n-Hexane	110-54-3	ND	ND	-46	Toluene	108-88-3	ND	ND	
9	3-Methylhexane	589-34-4	ND	ND	47	p-Xylene &/or m-Xylene	196-12-5 K 108-38-3	ND	ND	
10	Cyclohexane	110-82-7	ND	ND	48	o-Xylene	95-47-6	ND	ND	
11	Methylcyclohexane	108-87-2	ND	ND		Ketones (LOQ #49, #54 & #55	=5µg/c/s; #50, #51	1, 1/52 & 1/53	=25µg/c/s)	
12	2,2,4-Trimethylpentane	540-84-1	ND	ND	49	Acetone	67-64-1	ND	ND	
13	n-Heptane	142-82-5	ND	ND	50	Acetoin	513-86-0	ND	ND	
14	n-Octane	111-65-9	ND	ND	51	Diacetone alcohol	123-42-2	ND	ND	
15	n-Nonane	111-84-2	ND	ND	52	Cyclohexanone	108-94-1	ND	ND	
16	n-Decane	124-18-5	ND	ND	53	Isophorone	78-59-1	ND	ND	
17	n-Undecane	1120-21-4	ND	ND	54	Methyl ethyl ketone (MEK)	78-93-3	ND	ND	
18	n-Dodecane	112-40-3	ND	ND	55	Methyl isobutyl ketone (MIBK)	108-10-1	ND	ND	
19	n-Tridecane	629-50-5	ND	ND		Alcohols (LOQ = 25µg/compound/section)				
20	n-Tetradecane	629-59-4	ND	ND	56	Ethyl alcohol	64-17-5	ND	ND	
21	α-Pinene	80-56-8	ND	ND	57	n-Butyl alcohol	71-36-3	ND	ND	
22	β-Pinene	127-91-3	ND	ND	58	Isobutyl alcohol	78-83-1	ND	ND	
23	D-Limonene	138-86-3	ND	ND	59	Isopropyl alcohol	67-63-0	ND	ND	
	Chlorinated hydrocarl	bons (LOQ = 5µ	g/compound	(section)	60	2-Ethyl hexanol	104-76-7	ND	ND	
24	Dichloromethane	75-09-2	ND	ND	61	Cyclohexanol	108-93-0	ND	ND	
25	1,1-Dichloroethane	75-34-3	ND	ND		Acetates (LOQ - 25µg/compo	und/section)			
26	1,2-Dichloroethane	107-06-2	ND	ND	62	Ethyl acetate	141-78-6	ND	ND	
27	Chloroform	67-66-3	ND	ND	63	n-Propyl acetate	109-60-4	ND	ND	
28	1,1,1-Trichloroethane	71-55-6	ND	ND	64	n-Butyl acetate	123-86-4	ND	ND	
29	1,1,2-Trichloroethane	79-00-5	ND	ND	65	Isobutyl acetate	110-19-0	ND	ND	
30	Trichloroethylene	79-01-6	ND	ND		Ethers (LOQ - 25ag/compound	d/section)			
31	Carbon tetrachloride	56-23-5	ND	ND	66	Ethyl ether	60-29-7	ND	ND	
32	Perchloroethylene	127-18-4	ND	ND	67	tert-Butyl methyl ether (arms)	1634-04-4	ND	ND	
33	1,1,2,2-Tetrachloroethane	79-34-5	ND	ND	68	Tetrahydrofuran (THF)	109-99-9	ND	ND	
34	Chlorobenzene	108-90-7	ND	ND		Glycols (LOQ - 25µg/compou	nd/section)			
35	1.2-Dichlorobenzene	95-50-1	ND	ND	69	PGME	107-98-2	ND	ND	
36	1,4-Dichlorobenzene	106-46-7	ND	ND	70	Ethylene glycol diethyl ether	629-14-1	ND	ND	
	Miscellaneous (LOQ #37-	= 5µg & #38=25µg/	compound/se	ction)	71	PGMEA	108-65-6	ND	ND	
37	Acetonitrile	75-05-8	ND	ND	72	Cellosolve acetate	111-15-9	ND	ND	
38	n-Vinyl-2-pyrrolidinone	88-12-0	ND	ND	73	DGMEA	112-15-2	ND	ND	
	Methyl acetate*	79-20-9	ND	ND		Vinyl acetate*	108-05-4	ND	ND	
	Total VOCs (LOQ ~50µg/com	pound/section)	ND	ND		Worksheet check		yes	yes	

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ABN 81 913 830 179 Level 2, Building 1, 9–15 Chilvers Road, Thornleigh, NSW 2120, Australia Telephone +61 2 9473 4000 Email lab@safework.nsw.gov.au Website testsafe.com.au



Accreditation No. 3726

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Client :	Jay Weber
Sample	ID: 727659

Date Sampled : 4-Sep-2019 Reference Number le : 2019-4103-5

No	Compounds	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
		μg/se	ection		Party of the Association		μg/section		
	Aliphatic hydrocarbor	IS (LOQ = 5µgice	ompound/sect	ion)		Aromatic hydrocarbons	6 (LOQ = lµg/co	mpound/section	on)
1	2-Methylbutane	78-78-4	ND	ND	39	Benzene	71-43-2	ND	ND
2	n-Pentane	109-66-0	ND	ND	40	Ethylbenzene	100-41-4	ND	ND
3	2-Methylpentane	107-83-5	ND	ND	41	Isopropylbenzene	98-82-8	ND	ND
4	3-Methylpentane	96-14-0	ND	ND	42	1,2,3-Trimethylbenzene	526-73-8	ND	ND
5	Cyclopentane	287-92-3	ND	ND	43	1.2,4-Trimethylbenzene	95-63-6	ND	ND
6	Methylcyclopentane	96-37-7	ND	ND	44	1.3.5-Trimethylbenzene	108-67-8	ND	ND
7	2,3-Dimethylpentane	365-39-3	ND	ND	45	Styrene	100-42-5	ND	ND
8	n-Hexane	110-54-3	ND	ND	46	Toluene	108-88-3	8	ND
9	3-Methylhexane	589-34-4	ND	ND	47	p-Xylene &/or m-Xylene	106-42-3 @ 108-34-3	ND	ND
10	Cyclohexane	110-82-7	ND	ND	48	o-Xylene	95-47-6	ND	ND
11	Methylcyclohexane	108-87-2	ND	ND		Ketones (LOQ #49, #54 & #55	=5µg/c/s; #50, #5	1, #52 & #53	=25µg/e/s)
12	2.2.4-Trimethylpentane	540-84-1	ND	ND	49	Acetone	67-64-1	ND	ND
13	n-Heptane	142-82-5	ND	ND	50	Acetoin	513-86-0	ND	ND
14	n-Octane	111-65-9	ND	ND	51	Diacetone alcohol	123-42-2	ND	ND
15	n-Nonane	111-84-2	ND	ND	52	Cyclohexanone	108-94-1	ND	ND
16	n-Decane	124-18-5	ND	ND	53	Isophorone	78-59-1	ND	ND
17	n-Undecane	1120-21-4	ND	ND	54	Methyl ethyl ketone (MEK)	78-93-3	ND	ND
18	n-Dodecane	112-40-3	ND	ND	55	Methyl isobutyl ketone (MIBK)	108-10-1	ND	ND
19	n-Tridecane	629-50-5	ND	ND		Alcohols (LOQ - 25µg/compo	und/section)		
20	n-Tetradecane	629-59-4	ND	ND	56	Ethyl alcohol	64-17-5	ND	ND
21	α-Pinene	80-56-8	ND	ND	57	n-Butyl alcohol	71-36-3	ND	ND
22	β-Pinene	127-91-3	ND	ND	58	Isobutyl alcohol	78-83-1	ND	ND
23	D-Limonene	138-86-3	ND	ND	59	Isopropyl alcohol	67-63-0	ND	ND
	Chlorinated hydrocarl	bons (LOQ - 5	sg/compound	(section)	60	2-Ethyl hexanol	104-76-7	ND	ND
24	Dichloromethane	75-09-2	ND	ND	61	Cyclohexanol	108-93-0	ND	ND
25	1,1-Dichloroethane	75-34-3	ND	ND		Acetates (LOQ = 25µg/compo	und/section)		a.
26	1,2-Dichloroethane	107-06-2	ND	ND	62	Ethyl acetate	141-78-6	ND	ND
27	Chloroform	67-66-3	ND	ND	63	n-Propyl acetate	109-60-4	ND	ND
28	1.1.1-Trichloroethane	71-55-6	ND	ND	64	n-Butyl acetate	123-86-4	ND	ND
29	1,1,2-Trichloroethane	79-00-5	ND	ND	65	Isobutyl acetate	110-19-0	ND	ND
30	Trichloroethylene	79-01-6	ND	ND		Ethers (LOQ = 25µg/compound	l/section)		
31	Carbon tetrachloride	56-23-5	ND	ND	66	Ethyl ether	60-29-7	ND	ND
32	Perchloroethylene	127-18-4	ND	ND	67	tert-Butyl methyl ether (arms)	1634-04-4	ND	ND
33	1,1,2,2-Tetrachloroethane	79-34-5	ND	ND	68	Tetrahydrofuran (THF)	109-99-9	ND	ND
34	Chlorobenzene	108-90-7	ND	ND		Glycols (LOQ = 25µg/compou	nd/section)		
35	1.2-Dichlorobenzene	95-50-1	ND	ND	69	PGME	107-98-2	ND	ND
36	1,4-Dichlorobenzene	106-46-7	ND	ND	70	Ethylene glycol diethyl ether	629-14-1	ND	ND
	Miscellaneous (LOQ #37-	- 5µg & #38-25µg	compound/se	ction)	71	PGMEA	108-65-6	ND	ND
37	Acetonitrile	75-05-8	ND	ND	72	Cellosolve acetate	111-15-9	ND	ND
38	n-Vinyl-2-pyrrolidinone	88-12-0	ND	ND	73	DGMEA	112-15-2	ND	ND
	Methyl acetate*	79-20-9	ND	ND		Vinyl acetate*	108-05-4	ND	ND
	Total VOCs (LOQ =50µg/com	pound/section)	ND	ND		Worksheet check		yes	yes

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ABN 81 913 830 179 Level 2, Building 1, 9–15 Chilvers Road, Thornleigh, NSW 2120, Australia Telephone +61 2 9473 4000 Email lab@safework.nsw.gov.au Website testsafe.com.au



Accreditation No. 3726 Accredited for compliance with ISO/IEC 17025 - Testing

SW08051 0817





Amended Report

Client : Jay Weber

ND = Not Detected

All compounds numbered 1-73 are included of this analysis in the scope of NATA accreditation. Any additional compounds attonated with * are not covered by NATA accreditation. Method : Analysis of Volatile Organic Compounds in Workplace Air by Gas Chromatography/Mass Spectrometry Method Number : WCA.207 Limit of Quantitation : 5µg/section; 25µg/section for oxygenated hydrocarbons except acetone, MEK and MIBK at Each of Qualitation (spin section, 2) greater is suggestion to suggestion the workplace air onto charcoal tubes by the use of a personal air monitoring pump. The volatile organic compounds are then desorbed from the charcoal in the laboratory with CS_2 An aliquot of the desorbant is analysed by capillary gas chromatography with mass spectrometry detection. PGME : Propylene Glycol Monomethyl Ether PGMEA : Propylene Glycol Monomethyl Ether Acetate DGMEA : Diethylene Glycol Monoethyl Ether Acetate Measurement Uncertainty The measurement uncertainty is an estimate that characterises the range of values within which the true value is asserted to lie. The uncertainty estimate is an expanded uncertainty using a coverage factor of 2, which gives a level of confidence of approximately 95%. The estimate is compliant with the "ISO Guide to the Expression of Uncertainty in Measurement" and is a full estimate based on in-house method validation and quality control data. Quality Assurance In order to ensure the highest degree of accuracy and precision in our analytical results, we undertake extensive intra- and In order to ensure the highest degree of accuracy and precision in our analytical results, we undertake extensive intra- and inter-laboratory quality assurance (QA) activities. Within our own laboratory, we analyse laboratory and field blanks and perform duplicate and repeat analysis of samples. Spiked QA samples are also included routinely in each run to ensure the accuracy of the analyses. WorkCover Laboratory Services has participated for many years in several national and international inter-laboratory comparison programs listed below: Workplace Analysis Scheme for Proficiency (WASP) conducted by the Health & Safety Executive UK; Quality Management in Occupational and Environmental Medicine QA Program, conducted by the Institute for Occupational, Social and Environmental Medicine, University of Erlangen – Nuremberg, Germany; Quality Control Technologies OA Program Australia:

- Quality Control Technologies QA Program, Australia; Royal College of Pathologists QA Program, Australia.

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SW08051 0817

APPENDIX D – INSTRUMENT CALIBRATION DETAILS

SEMA Asset No.	Equipment Description	Date Last Calibrated	Calibration Due Date
647	Stopwatch	05-Jul-19	05-Jan-20
701	Stopwatch	05-Jul-19	05-Jan-20
904	Gas Meter	21-Mar-17	16-Apr-20
786	Gas Meter	17-Jan-19	17-Jan-20
708	Gas Meter	14-Mar-19	14-Mar-20
769	Thermocouple	04-Jul-19	04-Jan-20
527	Nozzle PM ₁₀ Head	17-Jan-19	17-Jan-20
937	Nozzle PM ₁₀ Head	17-Jan-19	17-Jan-20
916	Nozzle PM ₁₀ Head	17-Jan-19	17-Jan-20
857	Digital Temperature Reader	04-Jul-19	04-Jan-20
815	Digital Manometer	21-Jan-19	21-Jan-20
183	Pitot	17-Apr-19	17-Apr-2020 Visually inspected On-Site before use
928	Balance		Response Check with SEMA Site Mass
929	Calibrated Site Mass	14-Mar-19	14-Mar-20
764	TSI Thermal Mass Flowmeter	22-Aug-19	22-Feb-20
834	Personal Sampler	14-Mar-19	14-Mar-20
934	Personal Sampler	26-Aug-19	26-Aug-20
832	Personal Sampler	14-Mar-19	14-Mar-20
835	Personal Sampler	14-Mar-19	14-Mar-20
678	Personal Sampler	09-Apr-19	09-Apr-20
613	Barometer	21-Jan-19	21-Jan-20
	Gas Mixtures used for	Analyser Span Response	2
Conc.	Mixture	Cylinder No.	Expiry Date
400 ppm 400 ppm 401 ppm	Nitric Oxide Total Oxide Of Nitrogen In Nitrogen Sulphur Dioxide In Nitrogen	ALWB6150	05-May-20
262 ppm 263 ppm 249 ppm	Nitric Oxide Total Oxide Of Nitrogen In Nitrogen Sulphur Dioxide In Nitrogen	ALWB 4441	23-Jun-21
0.099% 9.8% 10.1%	Carbon Monoxide Carbon Dioxide Oxygen In Nitrogen	ALWB 5361	17-Jul-21

TABLE D-1	INSTRUMENT	CALIBRATION	DETAILS 4	SEPTEMBER 2019
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APPENDIX E - SAMPLE LOCATIONS























FIGURE E-7 HOT MELT BELT COOLER EXHAUST VENT

