Stephenson

Environmental Management Australia

ANNUAL COMPLIANCE SCRUBBER SOURCE EMISSION MONITORING–2023

AUSTRALIAN COMFORT GROUP PTY LTD

WETHERILL PARK, NSW

PROJECT NO.: 7348/S26190/23

DATE OF SURVEY: 27 SEPTEMBER 2023

DATE OF ISSUE: 12 DECEMBER 2023

Stephenson

Environmental Management Australia

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PW STEPHENSON

M KIMBER

GARY HALL – TCA

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1 EXECUTIVE SUMMARY

Stephenson Environmental Management Australia (SEMA) was requested by Australian Comfort Group Pty Limited (ACG) to assess the emission from the two exhaust stacks serving the pouring and curing processes at their flexible foam products manufacturing plant at 32-36 Frank Street, Wetherill Park, NSW.

SEMA appointed the NATA accredited Trinity Consultants Australia Pty Ltd (TCA) to assist with the emission testing under SEMA project management.

The compliance emission tests were undertaken during normal production conditions on September 27, 2023.

The objectives of the tests were to undertake annual compliance source emission tests of the flexible foam manufacture including pouring, curing and associated exhaust gas cleaning equipment as required by the Environment Protection Authority (EPA) Environment Protection Licence (EPL) No. 2372.

Table 2-1 summarises the scope of work undertaken with the EPL emission concentration limits. Table 2-1 also summarises the emission test results which are presented in detail in the NATA endorsed emission test report in Appendix A.

2 RESULTS AND DISCUSSION

2.1 EMISSION TEST RESULTS

TCA conducted the sampling for all the parameters and the analysis for flow, temperature, moisture, toluene diisocyanate (TDI) (2,4 and 2,6) and dichloromethane (DCM).

TCA is NATA accredited (No.15841) for this work. Refer to Appendix A for TCA's NATA accredited Emissions Test Report and Safe Work NSW/Test Safe Australia NATA accredited certificates of analysis.

The results of the source emission tests are presented in Table 2-1 and Appendix A. The sample locations are graphically presented in Appendix B.

TABLE 2-1 EMISSION CONCENTRATION TEST RESULTS, EPA ID NOS. 1 & 2

Emission Parameter	EPA ID No. 1 Exhaust Stack serving Pouring Line	EPA ID No. 2 Exhaust Stack serving Hot Block Store for curing foam		EPL 2732 Emission Limit
		Run 1 Pour	Run 2 Cure	
Exhaust Temperature (C)	25	24	24	--
Exhaust Velocity (m/s)	9.7	14.1	14.1	--
Volumetric Flow (Dry) (m^3/s)	9.8	14.1	14.1	--
Dry Gas Molecular Weight (g/g-mole)	28.84	28.84	28.84	--
Stack Static Pressure (mmH2O)	-1.3	7.8	7.8	--
Moisture (%)	1.8	1.8	1.8	--
TDI 2,4&2,6 (mg/m^3) (as NCO)	0.002	<0.002	<0.0006	0.002
TDI 2,4&2,6 (mg/m^3) (as TDI 2,4 or 2,6)	<0.007	<0.007	<0.002	0.002
DCM (mg/m^3)	310	110	47	1200

Key:

	TDI 2,4	=	Toluene Di-isocyanate 2,4
	TDI 2,6	=	Toluene Di-isocyanate 2,6
	DCM	=	Dichloromethane
	VOC	=	Volatile Organic Compounds
	^oC	=	degrees Celsius
	m/s	=	metres per second
	m^3/s	=	dry cubic metre per second at 0^oC and 101.3 kilopascals (kPa)
	kg/m^3	=	Kilograms per cubic metre
	kPa	=	Kilo Pascals
	%	=	percent
	mg/m^3	=	milligrams per cubic metre at 0^oC and 101.3 kilopascals (kPa)
	<	=	less than the limit of detection for the analytical method

3 CONCLUSIONS

Thus, it is concluded that:

- All emission parameters TDI 2,4 and 2,6 and DCM emissions showed the flexible foam pouring and curing process and associated emission control system for EPA ID No.1 and No.2 were being operated efficiently and the measured emission test results complied with the discharge limits specified in EPL Licence No.2732.
- All TDI analysis were non-detects and less than the NATA accredited laboratory PQLs (limits of detection).
- The short run times for the pouring process define the sample volume and run time; which in turn limits the concentration calculation.
- However, during the pouring process, the 2,4 and 2,6 TDI emission was at the EPL emission concentration limit when NCO PQL of 0.1 microgram per sample was used and exceed when the 0.4 microgram TDI only PQL was used.
- This is the conundrum of short run manufacturing processes when nothing has been detected in the emission in the analytical process.
- Some VOC test methods allow a conclusion that if two or more non-detects are recorded that it can be concluded that the VOC of interest is not there. This has been the case for these Comfort Group/Flexible Foams stacks for many years. Refer separate historical reports on EPA file.

APPENDIX A – NATA ENDORSED EMISSION TEST REPORTS:

TCA 237401.0157;

SAFEWORK NSW/TESTSAFE AUSTRALIA 2023-4962 & 4963 AND

CHAIN OF CUSTODY

SCRUBBER EMISSION MONITORING - AUSTRALIAN COMFORT GROUP 2023

Wetherill Park, NSW

Stephenson Environmental Management

NATA
WORLD RECOGNISED ACCREDITATION

Accredited for Compliance with ISO/IEC 17025 – Testing

Sampling Date: 27 September 2023
Issued: 4 December 2023
Report: 237401.0157R01V01

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237401.0157R01V01 _draft	29/11/23	Draft for internal review	Mitchell Steele	-
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Document Approval	
Approver Signature	
Name	Gary Hall
Title	Manager – Air Monitoring

NATA Accreditation Number: 15841
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Should you have any queries regarding the contents of this document, please contact Trinity Consultants Australia.

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EXECUTIVE SUMMARY

Stack Emission testing from the two exhaust stacks serving the pouring and curing processes at the Australian Comfort Group site in Wetherill Park, NSW was conducted on 27 September 2023. Sampling was conducted for flow parameters as well as toluene diisocyanate 2.4 and 2.6 (TDI) and dichloromethane (DCM) to confirm compliance with Environment Protection Authority (EPA) Environment Protection Licence (EPL) No. 2372. A summary of the results are included in **Table E1.1.**

Table E1.1: Summary of Results

Compound	Release Point			Units
	EPA ID No. 1 Exhaust Stack serving Pouring Line	EPA ID No. 2 Exhaust Stack serving Hot Block Store for Curing Foam		
		Run 1 Pour	Run 2 Cure	
Isocyanates -TDI (2,4 or 2.6)	<0.007	<0.007	<0.002	mg/m^3
Isocyanates (NCO)	<0.002	<0.002	<0.0006	mg/m^3
DCM	310	110	47	mg/m^3

All Isocyanate samples were below the limit of reporting.

1. INTRODUCTION

Stephenson Environmental Management (SEMA) commissioned Trinity Consultants Australia to conduct monitoring of air emissions from the Australian Comfort Group Pty Ltd site in Wetherill Park NSW. The emissions from the 2 stacks were completed on 27 September 2023.

The objective of the emission testing was to meet the annual monitoring requirements for the stacks under the site's Environmental Protection Licence (EPL), Number (No.) 2372 and to determine if the concentration limits specified in the EPL were met.

Table 1.1 details the monitoring locations and the monitoring performed at each location.

Table 1.1: Monitoring Locations and Parameters

Compound	Release Point	
	EPA ID 1	EPA ID 2
Temperature	x	x
Velocity	x	x
Volumetric Flow	x	x
Dry Gas Density	x	x
Moisture Content	x	x
Isocyanates (mg/m^3)	x	x
DCM (mg/m^3)	x	x

The monitoring of air emissions at the Wetherill Park facility was completed during normal operating conditions. Any factors that may have affected the monitoring results were not observed by, or brought to the notice of Trinity Consultants Australia staff except where noted in this report.

2. METHODOLOGY

2.1 Emission Testing

Table 2.1 below lists the Methods used when undertaking emission monitoring at the Australian Comfort Group facility.

All air quality monitoring undertaken by the Trinity Consultants Australia staff has been undertaken in accordance with the methods identified in **Table 2.1** below unless as specified in section 2.2 below.

Table 2.1: Summary of Emission Monitoring Methods

Measurement Parameter	Method Equivalency
Temperature	**TM-2 (USEPA Method 2** Determination of Stack Gas Velocity and Flow Rate)
Dry Gas Density	**TM23 (USEPA Method 3** Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources)
Flow	**TM-2 (USEPA Method 2** Determination of Stack Gas Velocity and Flow Rate)
Moisture Content	**TM-22 (USEPA Method 4** Determination of Moisture Content in Stack Gases)
Molecular Weight	**TM23 (USEPA Method 3** Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources)
TDI 2,4 and 2.6 (mg/m^3)	**HSE-MDHS 25/3, (WCA 110)**
DCM (mg/m^3)	**TM-34 (USEPA Method 18** Measurement of Gaseous Organic Compounds by Gas Chromatography)

2.2 Deviation from Methods

Post sampling, DCM and TDI sample media were provided to SEMA who submitted the samples to Test Safe Laboratories for the analysis.

2.3 Laboratory Analysis

Table 2.2 below presents a list of the NATA accredited laboratories that performed the applicable analysis and their NATA accreditation number and the report number.

Table 2.2: Table of NATA accredited Laboratories with Accreditation Number

Measurement Parameter	NATA Accreditation Number	Report Number
TDI 2,4 (mg/m^3)	SafeWork NSW TestSafe Australia 3726	2023-4963
DCM (mg/m^3)	SafeWork NSW TestSafe Australia 3726	2023-4962

3. RESULTS

3.1 Monitoring Results

Results of emissions monitoring for the 2 stacks are provided in **Table 3.1** below for emissions monitoring completed on 27 September 2023.

Table 3.1: Flow and Sample Characteristics for EPA ID No. 1 & 2

Parameter	Unit of Measure	EPA ID No. 1 Exhaust stack serving Pouring Line	EPA ID No. 2 Exhaust stack serving Hot Block Store		EPL 2732 EPA limit
			Run 1 Pour	Run 2 Purge	
Sample Start Time (hours)	hh:mm	10:06	10:06	11:15	-
Sample Finish Time (hours)	hh:mm	11:06	11:06	14:15	-
Stack Temperature	°C	25	24	24	-
Stack Cross-Sectional area	m^2	1.13	1.13	1.13	-
Velocity	m/s	9.7	14.1	14.1	-
Actual Volumetric flow	m^3/s	11	16	16	-
Normal volumetric flow rate	Nm^3/s	9.8	14.1	14.1	-
Dry Gas Molecular Weight	g/g-mole	28.84	28.84	28.84	-
Stack Static Pressure	mmH_2O	-1.3	7.8	7.8	-
Moisture	%	1.8	1.8	1.8	-
Isocyanates -TDI (2,4 or 2.6)	mg/m^3	<0.007	<0.007	<0.002	0.002
Isocyanates (NCO)	mg/m^3	<0.002	<0.002	<0.0006	0.002
DCM	mg/m^3	310	110	47	1200

3.2 Accuracy of Monitoring Results

Table 3.2 presents a summary of the estimated method uncertainties for each of the monitoring parameters.

Table 3.2: Estimated Method Uncertainties

Measurement Parameter	Method	% Uncertainty
TDI (Total Isocyanates)	HSE-MDHS 25/3 (WCA.110)	-
VOC's (DCM)	NSW TM-34	15
Velocity	NSW TM-2 (AS 4323.1, US EPA2)	5

Uncertainty values cited are calculated at the 95% confidence level, with a coverage factor of 2.

APPENDIX A GLOSSARY

Parameter or Term	Description
<	The analytes tested for was not detected, the value stated is the reportable limit of detection
µg	Micrograms (10^{-6}grams)
AS	Australian Standard
dscm	dry standard cubic meters (at 0°C and 1 atmosphere)
g	grams
kg	kilograms
m	metres
m^3	Cubic Metres, actual gas volume in cubic metres as measured.
mg	Milligrams
min	Minute
mg/m^3	Milligrams (10^{-3}) per cubic metre.
mmH_2O	Millimetres of water
Mole	The mole, symbol mol, is the SI unit of amount of substance. One mole contains exactly 6.022 140 76 x 10^{23} elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A, when expressed in the unit mol^{-1} and is called the Avogadro number. The amount of substance, symbol n, of a system is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles. This definition implies the exact relation N_A = 6.022 140 76 x 10^{23} mol^{-1}. Inverting this relation gives an exact expression for the mole in terms of the defining constant N_A: $1\ \text{mol} = \left(\frac{6.022\,140\,76 \times 10^{23}}{N_A}\right)$ The effect of this definition is that the mole is the amount of substance of a system that contains 6.022 140 76 x 10^{23}specified elementary entities.
N/A	Not Applicable
ng	Nanograms (10^{-9} grams)
Nm^3	Normalised Cubic Metres - Gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa).
ou	Odour Units
°C	Degrees Celsius
$µg/m^3$	Micrograms (10^{-6}) per cubic metre. Conversions from $µg/m^3$ to parts per volume concentrations (ie, ppb) are calculated at 25 °C.
ppb / ppm	Parts per billion / million.
PM	Particulate Matter.
PM_{10}, $PM_{2.5}$, PM_1	Fine particulate matter with an equivalent aerodynamic diameter of less than 10, 2.5 or 1 micrometres respectively. Fine particulates are predominantly sourced from combustion processes. Vehicle emissions are a key source in urban environments.
sec	Second
Sm^3	Standardised Cubic Metres - Gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa) and corrected to a standardised value (e.g. 7% O_2).
STP	Standard Temperature and Pressure (0°C and 101.3 kPa).

Parameter or Term	Description
TVOC	Total Volatile Organic Compounds. These compounds can be both toxic and odorous.
USEPA	United States Environmental Protection Agency


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NSW GOVERNMENT | SafeWork NSW

Test Safe AUSTRALIA

Peter Stephenson
Stephenson Environmental Management Australia
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SILVERWATER NSW 1811

Lab. Reference: 2023-4963

Samples analysed as received

SAMPLE ORIGIN: Project No: 7348

DATE OF INVESTIGATION: 27/09/2023 **DATE RECEIVED:** 28/09/23

ANALYSIS REQUIRED: Volatile Organic Compound

REPORT OF ANALYSIS OFFICIAL: Sensitive – Personal

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.

Martin Mazereeuw
Manager

Date: 4/10/23

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ilac-MRA NATA

Accreditation No. 3726

Accredited for compliance with ISO/IEC 17025 - Testing

NSW GOVERNMENT SafeWork NSW

Test Safe AUSTRALIA

Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

Client: Stephenson
Sample ID: 728799

Date Sampled : 27/09/2023
Date Analysed : 3/10/2023
Reference Number : 2023-4963-1

No	Compounds	CAS No	Front	Back	No	Compounds	CAS No	Front	Back
			µg/section					µg/section	
	Aliphatic hydrocarbons (LOQ =1µg/c/s; #10, #18 - #23 =5µg/c/s)					**Aromatic hydrocarbons** (LOQ = 1µg/compound/section)			
1	2-Methylbutane	*78-78-4*	<LOQ	<LOQ	39	Benzene	*71-43-2*	<LOQ	<LOQ
2	n-Pentane	*109-66-0*	<LOQ	<LOQ	40	Ethylbenzene	*100-41-4*	<LOQ	<LOQ
3	2-Methylpentane	*107-83-5*	<LOQ	<LOQ	41	Isopropylbenzene	*98-82-8*	<LOQ	<LOQ
4	3-Methylpentane	*96-14-0*	<LOQ	<LOQ	42	1,2,3-Trimethylbenzene	*526-73-8*	<LOQ	<LOQ
5	Cyclopentane	*287-92-3*	<LOQ	<LOQ	43	1,2,4-Trimethylbenzene	*95-63-6*	<LOQ	<LOQ
6	Methylcyclopentane	*96-37-7*	<LOQ	<LOQ	44	1,3,5-Trimethylbenzene	*108-67-8*	<LOQ	<LOQ
7	2,3-Dimethylpentane	*565-59-3*	<LOQ	<LOQ	45	Styrene	*100-42-5*	<LOQ	<LOQ
8	n-Hexane	*110-54-3*	<LOQ	<LOQ	46	Toluene	*108-88-3*	<LOQ	<LOQ
9	3-Methylhexane	*589-34-4*	<LOQ	<LOQ	47	p-Xylene &/or m-Xylene	*106-42-3 & 108-38-3*	<LOQ	<LOQ
10	Cyclohexane	*110-82-7*	<LOQ	<LOQ	48	o-Xylene	*95-47-6*	<LOQ	<LOQ
11	Methylcyclohexane	*108-87-2*	<LOQ	<LOQ		**Ketones** (LOQ =1µg/c/s; LOQ #49, #53 =10µg/c/s; #50, #51 =50µg/c/s)			
12	2,2,4-Trimethylpentane	*540-84-1*	<LOQ	<LOQ	49	Acetone	*67-64-1*	<LOQ	<LOQ
13	n-Heptane	*142-82-5*	<LOQ	<LOQ	50	Acetoin	*513-86-0*	<LOQ	<LOQ
14	n-Octane	*111-65-9*	<LOQ	<LOQ	51	Diacetone alcohol	*123-42-2*	<LOQ	<LOQ
15	n-Nonane	*111-84-2*	<LOQ	<LOQ	52	Cyclohexanone	*108-94-1*	<LOQ	<LOQ
16	n-Decane	*124-18-5*	<LOQ	<LOQ	53	Isophorone	*78-59-1*	<LOQ	<LOQ
17	n-Undecane	*1120-21-4*	<LOQ	<LOQ	54	Methyl ethyl ketone (MEK)	*78-93-3*	1	<LOQ
18	n-Dodecane	*112-40-3*	<LOQ	<LOQ	55	Methyl isobutyl ketone (MIBK)	*108-10-1*	<LOQ	<LOQ
19	n-Tridecane	*629-50-5*	<LOQ	<LOQ		**Alcohols** (LOQ =1µg/c/s; #56, #57, #58, #60 =10µg/c/s)			
20	n-Tetradecane	*629-59-4*	<LOQ	<LOQ	56	Ethyl alcohol	*64-17-5*	<LOQ	<LOQ
21	α-Pinene	*80-56-8*	<LOQ	<LOQ	57	n-Butyl alcohol	*71-36-3*	<LOQ	<LOQ
22	β-Pinene	*127-91-3*	<LOQ	<LOQ	58	Isobutyl alcohol	*78-83-1*	<LOQ	<LOQ
23	D-Limonene	*138-86-3*	<LOQ	<LOQ	59	Isopropyl alcohol	*67-63-0*	<LOQ	<LOQ
	Chlorinated hydrocarbons (LOQ = 1µg/c/s; #30 =5µg/c/s)				60	2-Ethyl hexanol	*104-76-7*	<LOQ	<LOQ
24	Dichloromethane	*75-09-2*	1773	<LOQ	61	Cyclohexanol	*108-93-0*	<LOQ	<LOQ
25	1,1-Dichloroethane	*75-34-3*	<LOQ	<LOQ		**Acetates** (LOQ =1µg/c/s; #62 =10µg/c/s)			
26	1,2-Dichloroethane	*107-06-2*	<LOQ	<LOQ	62	Ethyl acetate	*141-78-6*	<LOQ	<LOQ
27	Chloroform	*67-66-3*	<LOQ	<LOQ	63	n-Propyl acetate	*109-60-4*	<LOQ	<LOQ
28	1,1,1-Trichloroethane	*71-55-6*	<LOQ	<LOQ	64	n-Butyl acetate	*123-86-4*	<LOQ	<LOQ
29	1,1,2-Trichloroethane	*79-00-5*	<LOQ	<LOQ	65	Isobutyl acetate	*110-19-0*	<LOQ	<LOQ
30	Trichloroethylene	*79-01-6*	<LOQ	<LOQ		**Ethers** (LOQ =1µg/c/s; #66 =10µg/c/s)			
31	Carbon tetrachloride	*56-23-5*	<LOQ	<LOQ	66	Ethyl ether	*60-29-7*	<LOQ	<LOQ
32	Perchloroethylene	*127-18-4*	<LOQ	<LOQ	67	*tert*-Butyl methyl ether (MTBE)	*1634-04-4*	<LOQ	<LOQ
33	1,1,2,2-Tetrachloroethane	*79-34-5*	<LOQ	<LOQ	68	Tetrahydrofuran (THF)	*109-99-9*	<LOQ	<LOQ
34	Chlorobenzene	*108-90-7*	<LOQ	<LOQ		**Glycols** (LOQ =1µg/c/s; #69, #73 =50µg/c/s)			
35	1,2-Dichlorobenzene	*95-50-1*	<LOQ	<LOQ	69	PGME	*107-98-2*	<LOQ	<LOQ
36	1,4-Dichlorobenzene	*106-46-7*	<LOQ	<LOQ	70	Ethylene glycol diethyl ether	*629-14-1*	<LOQ	<LOQ
	Miscellaneous (LOQ #37= 10µg & #38=50µg/compound/sample)				71	PGMEA	*108-65-6*	<LOQ	<LOQ
37	Acetonitrile	*75-05-8*	<LOQ	<LOQ	72	Cellosolve acetate	*111-15-9*	<LOQ	<LOQ
38	n-Vinyl-2-pyrrolidinone	*88-12-0*	<LOQ	<LOQ	73	DGMEA	*112-15-2*	<LOQ	<LOQ
	Extra compound (LOQ = 10µg/compound/sample)					**Extra compound** (LOQ = 50µg/compound/sample)			
74	Bromopropane *	*106-94-5*	<LOQ	<LOQ	75	Naphthalene *	*91-20-3*	<LOQ	<LOQ
	Total VOCs (LOQ =50µg/compound/section)		1774	<LOQ		Worksheet check		2023-4963-1	

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Accreditation No. 3726
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2023-4963

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NSW GOVERNMENT SafeWork NSW

Test Safe AUSTRALIA

Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

Client: Stephenson
Sample ID: 728800

Date Sampled : 27/09/2023
Date Analysed : 3/10/2023
Reference Number : 2023-4963-2

No	Compounds	CAS No	Front µg/section	Back µg/section	No	Compounds	CAS No	Front µg/section	Back µg/section
	Aliphatic hydrocarbons (LOQ =1µg/c/s; #10, #18 - #23 =5µg/c/s)					**Aromatic hydrocarbons** (LOQ = 1µg/compound/section)			
1	2-Methylbutane	78-78-4	<LOQ	<LOQ	39	Benzene	71-43-2	<LOQ	<LOQ
2	n-Pentane	109-66-0	<LOQ	<LOQ	40	Ethylbenzene	100-41-4	<LOQ	<LOQ
3	2-Methylpentane	107-83-5	<LOQ	<LOQ	41	Isopropylbenzene	98-82-8	<LOQ	<LOQ
4	3-Methylpentane	96-14-0	<LOQ	<LOQ	42	1,2,3-Trimethylbenzene	526-73-8	<LOQ	<LOQ
5	Cyclopentane	287-92-3	<LOQ	<LOQ	43	1,2,4-Trimethylbenzene	95-63-6	<LOQ	<LOQ
6	Methylcyclopentane	96-37-7	<LOQ	<LOQ	44	1,3,5-Trimethylbenzene	108-67-8	<LOQ	<LOQ
7	2,3-Dimethylpentane	565-59-3	<LOQ	<LOQ	45	Styrene	100-42-5	<LOQ	<LOQ
8	n-Hexane	110-54-3	<LOQ	<LOQ	46	Toluene	108-88-3	<LOQ	<LOQ
9	3-Methylhexane	589-34-4	<LOQ	<LOQ	47	p-Xylene &/or m-Xylene	106-42-3 & 108-38-3	<LOQ	<LOQ
10	Cyclohexane	110-82-7	<LOQ	<LOQ	48	o-Xylene	95-47-6	<LOQ	<LOQ
11	Methylcyclohexane	108-87-2	<LOQ	<LOQ		**Ketones** (LOQ =1µg/c/s; LOQ #49, #53 =10µg/c/s; #50, #51 =50µg/c/s)			
12	2,2,4-Trimethylpentane	540-84-1	<LOQ	<LOQ	49	Acetone	67-64-1	<LOQ	<LOQ
13	n-Heptane	142-82-5	<LOQ	<LOQ	50	Acetoin	513-86-0	<LOQ	<LOQ
14	n-Octane	111-65-9	<LOQ	<LOQ	51	Diacetone alcohol	123-42-2	<LOQ	<LOQ
15	n-Nonane	111-84-2	<LOQ	<LOQ	52	Cyclohexanone	108-94-1	<LOQ	<LOQ
16	n-Decane	124-18-5	<LOQ	<LOQ	53	Isophorone	78-59-1	<LOQ	<LOQ
17	n-Undecane	1120-21-4	<LOQ	<LOQ	54	Methyl ethyl ketone (MEK)	78-93-3	<LOQ	<LOQ
18	n-Dodecane	112-40-3	<LOQ	<LOQ	55	Methyl isobutyl ketone (MIBK)	108-10-1	<LOQ	<LOQ
19	n-Tridecane	629-50-5	<LOQ	<LOQ		**Alcohols** (LOQ =1µg/c/s; #56, #57, #58, #60 =10µg/c/s)			
20	n-Tetradecane	629-59-4	<LOQ	<LOQ	56	Ethyl alcohol	64-17-5	<LOQ	<LOQ
21	α-Pinene	80-56-8	<LOQ	<LOQ	57	n-Butyl alcohol	71-36-3	<LOQ	<LOQ
22	β-Pinene	127-91-3	<LOQ	<LOQ	58	Isobutyl alcohol	78-83-1	<LOQ	<LOQ
23	D-Limonene	138-86-3	<LOQ	<LOQ	59	Isopropyl alcohol	67-63-0	<LOQ	<LOQ
	Chlorinated hydrocarbons (LOQ = 1µg/c/s; #30 =5µg/c/s)				60	2-Ethyl hexanol	104-76-7	<LOQ	<LOQ
24	Dichloromethane	75-09-2	605	<LOQ	61	Cyclohexanol	108-93-0	<LOQ	<LOQ
25	1,1-Dichloroethane	75-34-3	<LOQ	<LOQ		**Acetates** (LOQ =1µg/c/s; #62 =10µg/c/s)			
26	1,2-Dichloroethane	107-06-2	<LOQ	<LOQ	62	Ethyl acetate	141-78-6	<LOQ	<LOQ
27	Chloroform	67-66-3	<LOQ	<LOQ	63	n-Propyl acetate	109-60-4	<LOQ	<LOQ
28	1,1,1-Trichloroethane	71-55-6	<LOQ	<LOQ	64	n-Butyl acetate	123-86-4	<LOQ	<LOQ
29	1,1,2-Trichloroethane	79-00-5	<LOQ	<LOQ	65	Isobutyl acetate	110-19-0	<LOQ	<LOQ
30	Trichloroethylene	79-01-6	<LOQ	<LOQ		**Ethers** (LOQ =1µg/c/s; #66 =10µg/c/s)			
31	Carbon tetrachloride	56-23-5	<LOQ	<LOQ	66	Ethyl ether	60-29-7	<LOQ	<LOQ
32	Perchloroethylene	127-18-4	<LOQ	<LOQ	67	*tert*-Butyl methyl ether (MTBE)	1634-04-4	<LOQ	<LOQ
33	1,1,2,2-Tetrachloroethane	79-34-5	<LOQ	<LOQ	68	Tetrahydrofuran (THF)	109-99-9	<LOQ	<LOQ
34	Chlorobenzene	108-90-7	<LOQ	<LOQ		**Glycols** (LOQ =1µg/c/s; #69, #73 =50µg/c/s)			
35	1,2-Dichlorobenzene	95-50-1	<LOQ	<LOQ	69	PGME	107-98-2	<LOQ	<LOQ
36	1,4-Dichlorobenzene	106-46-7	<LOQ	<LOQ	70	Ethylene glycol diethyl ether	629-14-1	<LOQ	<LOQ
	Miscellaneous (LOQ #37= 10µg & #38=50µg/compound/sample)				71	PGMEA	108-65-6	<LOQ	<LOQ
37	Acetonitrile	75-05-8	<LOQ	<LOQ	72	Cellosolve acetate	111-15-9	<LOQ	<LOQ
38	n-Vinyl-2-pyrrolidinone	88-12-0	<LOQ	<LOQ	73	DGMEA	112-15-2	<LOQ	<LOQ
	Extra compound (LOQ = 10µg/compound/sample)					**Extra compound** (LOQ = 50µg/compound/sample)			
74	Bromopropane *	106-94-5	<LOQ	<LOQ	75	Naphthalene *	91-20-3	<LOQ	<LOQ
	Total VOCs (LOQ =50µg/compound/section)		605	<LOQ		Worksheet check		2023-4963-2	

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NSW SafeWork NSW

Test Safe AUSTRALIA

Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

Client: Stephenson
Sample ID: 728801

Date Sampled : 27/09/2023
Date Analysed : 3/10/2023
Reference Number : 2023-4963-3

No	Compounds	CAS No	Front µg/section	Back µg/section	No	Compounds	CAS No	Front µg/section	Back µg/section
	Aliphatic hydrocarbons (LOQ = 1µg/c/s; #10, #18 - #23 = 5µg/c/s)					**Aromatic hydrocarbons** (LOQ = 1µg/compound/section)			
1	2-Methylbutane	78-78-4	<LOQ	<LOQ	39	Benzene	71-43-2	<LOQ	<LOQ
2	n-Pentane	109-66-0	<LOQ	<LOQ	40	Ethylbenzene	100-41-4	<LOQ	<LOQ
3	2-Methylpentane	107-83-5	<LOQ	<LOQ	41	Isopropylbenzene	98-82-8	<LOQ	<LOQ
4	3-Methylpentane	96-14-0	<LOQ	<LOQ	42	1,2,3-Trimethylbenzene	526-73-8	<LOQ	<LOQ
5	Cyclopentane	287-92-3	<LOQ	<LOQ	43	1,2,4-Trimethylbenzene	95-63-6	<LOQ	<LOQ
6	Methylcyclopentane	96-37-7	<LOQ	<LOQ	44	1,3,5-Trimethylbenzene	108-67-8	<LOQ	<LOQ
7	2,3-Dimethylpentane	565-59-3	<LOQ	<LOQ	45	Styrene	100-42-5	<LOQ	<LOQ
8	n-Hexane	110-54-3	<LOQ	<LOQ	46	Toluene	108-88-3	<LOQ	<LOQ
9	3-Methylhexane	589-34-4	<LOQ	<LOQ	47	p-Xylene &/or m-Xylene	106-42-3 & 108-38-3	<LOQ	<LOQ
10	Cyclohexane	110-82-7	<LOQ	<LOQ	48	o-Xylene	95-47-6	<LOQ	<LOQ
11	Methylcyclohexane	108-87-2	<LOQ	<LOQ		**Ketones** (LOQ = 1µg/c/s; LOQ #49, #53 = 10µg/c/s; #50, #51 = 50µg/c/s)			
12	2,2,4-Trimethylpentane	540-84-1	<LOQ	<LOQ	49	Acetone	67-64-1	<LOQ	<LOQ
13	n-Heptane	142-82-5	<LOQ	<LOQ	50	Acetoin	513-86-0	<LOQ	<LOQ
14	n-Octane	111-65-9	<LOQ	<LOQ	51	Diacetone alcohol	123-42-2	<LOQ	<LOQ
15	n-Nonane	111-84-2	<LOQ	<LOQ	52	Cyclohexanone	108-94-1	<LOQ	<LOQ
16	n-Decane	124-18-5	<LOQ	<LOQ	53	Isophorone	78-59-1	<LOQ	<LOQ
17	n-Undecane	1120-21-4	<LOQ	<LOQ	54	Methyl ethyl ketone (MEK)	78-93-3	<LOQ	<LOQ
18	n-Dodecane	112-40-3	<LOQ	<LOQ	55	Methyl isobutyl ketone (MIBK)	108-10-1	<LOQ	<LOQ
19	n-Tridecane	629-50-5	<LOQ	<LOQ		**Alcohols** (LOQ = 1µg/c/s; #56, #57, #58, #60 = 10µg/c/s)			
20	n-Tetradecane	629-59-4	<LOQ	<LOQ	56	Ethyl alcohol	64-17-5	<LOQ	<LOQ
21	α-Pinene	80-56-8	<LOQ	<LOQ	57	n-Butyl alcohol	71-36-3	<LOQ	<LOQ
22	β-Pinene	127-91-3	<LOQ	<LOQ	58	Isobutyl alcohol	78-83-1	<LOQ	<LOQ
23	D-Limonene	138-86-3	<LOQ	<LOQ	59	Isopropyl alcohol	67-63-0	<LOQ	<LOQ
	Chlorinated hydrocarbons (LOQ = 1µg/c/s; #30 = 5µg/c/s)				60	2-Ethyl hexanol	104-76-7	<LOQ	<LOQ
24	Dichloromethane	75-09-2	794	<LOQ	61	Cyclohexanol	108-93-0	<LOQ	<LOQ
25	1,1-Dichloroethane	75-34-3	<LOQ	<LOQ		**Acetates** (LOQ = 1µg/c/s; #62 = 10µg/c/s)			
26	1,2-Dichloroethane	107-06-2	<LOQ	<LOQ	62	Ethyl acetate	141-78-6	<LOQ	<LOQ
27	Chloroform	67-66-3	<LOQ	<LOQ	63	n-Propyl acetate	109-60-4	<LOQ	<LOQ
28	1,1,1-Trichloroethane	71-55-6	<LOQ	<LOQ	64	n-Butyl acetate	123-86-4	<LOQ	<LOQ
29	1,1,2-Trichloroethane	79-00-5	<LOQ	<LOQ	65	Isobutyl acetate	110-19-0	<LOQ	<LOQ
30	Trichloroethylene	79-01-6	<LOQ	<LOQ		**Ethers** (LOQ = 1µg/c/s; #66 = 10µg/c/s)			
31	Carbon tetrachloride	56-23-5	<LOQ	<LOQ	66	Ethyl ether	60-29-7	<LOQ	<LOQ
32	Perchloroethylene	127-18-4	<LOQ	<LOQ	67	*tert*-Butyl methyl ether (MTBE)	1634-04-4	<LOQ	<LOQ
33	1,1,2,2-Tetrachloroethane	79-34-5	<LOQ	<LOQ	68	Tetrahydrofuran (THF)	109-99-9	<LOQ	<LOQ
34	Chlorobenzene	108-90-7	<LOQ	<LOQ		**Glycols** (LOQ = 1µg/c/s; #69, #73 = 50µg/c/s)			
35	1,2-Dichlorobenzene	95-50-1	<LOQ	<LOQ	69	PGME	107-98-2	<LOQ	<LOQ
36	1,4-Dichlorobenzene	106-46-7	<LOQ	<LOQ	70	Ethylene glycol diethyl ether	629-14-1	<LOQ	<LOQ
	Miscellaneous (LOQ #37 = 10µg & #38=50µg/compound/sample)				71	PGMEA	108-65-6	<LOQ	<LOQ
37	Acetonitrile	75-05-8	<LOQ	<LOQ	72	Cellosolve acetate	111-15-9	<LOQ	<LOQ
38	n-Vinyl-2-pyrrolidinone	88-12-0	<LOQ	<LOQ	73	DGMEA	112-15-2	<LOQ	<LOQ
	Extra compound (LOQ = 10µg/compound/sample)					**Extra compound** (LOQ = 50µg/compound/sample)			
74	Bromopropane *	106-94-5	<LOQ	<LOQ	75	Naphthalene *	91-20-3	<LOQ	<LOQ
	Total VOCs (LOQ = 50µg/compound/section)		794	<LOQ		Worksheet check			2023-4963-3

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Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

All compounds (numbered 1-73) that are reported in the analysis are covered within the scope of NATA accreditation. Any additional compounds denoted with * are not covered by NATA accreditation.

Method : WCA.207 Analysis of Volatile Organic Compounds in Workplace Air by Gas Chromatography/Mass Spectrometry

Limit of Quantitation (LOQ) : 1 µg/sample except Cyclohexane, n-Dodecane, n-Tridecane, n-Tetradecane, a-Pinene, b-Pinene, Limonene and Trichloroethylene at 5 µg/sample; 10 µg/sample for Acetonitrile, Acetone, Isophorone, Ethanol, n-Butyl alcohol, Isobutyl alcohol, 2-Ethyl hexanol, Ethyl acetate, Ethyl ether and Bromopropane; 50 µg/sample for n-Vinyl-2-pyrrolidione, Acetoin, Diacetone alcohol, PGME, DGMEA and Naphthalene.

Method Description : Volatile organic compounds were trapped from the workplace air onto charcoal tubes by the use of a personal air monitoring pump. The volatile organic compounds were desorbed from the charcoal in the laboratory with CS_2. An aliquot of the desorbant was analysed by 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. The measurement uncertainty relates to the analysis of the analyte on the sampling device and does not take into consideration the sampling parameters such as pump flowrate, time, temperature and pressure. The measurement of uncertainty estimates are available upon request.

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2023-4963

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Stephenson
Environmental Management Australia

Chain of Custody & Analysis Request

Received
28 SEP 2023
E-Carbo

Peter W Stephenson & Associates Pty Ltd
ACN 002 600 526 (Incorporated in NSW)
ABN 75 002 600 526
PO Box 6398
Silverwater NSW 1811 Australia
Tel: (02) 9737 9991
e-mail: margot@stephensonenv.com.au
info@stephensonenv.com.au
peter@stephensonenv.com.au

Document No: S26191
Project No: 7348
Purchase Order No.: 5286

Purchase Results Required By: **Normal**
Lab Name: Workcover (TestSafe) Australia
Lab Telephone: 02 9473 4000 Lab Facsimile: 02 9980 6849
Lab Contact Name: Sample Receipts

Location	Sampling Date	Sample ID		Lab Sample ID	Parameter	NSW Test Method	Workcover Method	Other Method	Temperature Chilled/ Ambient
DP1 R1	27/09/2023	728794 ✓	-F		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP1 R1	27/09/2023	728794 ✓	-I		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP2 R1	27/09/2023	728795 ✓	-F		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP2 R1	27/09/2023	728795 ✓	-I		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP2 R2	27/09/2023	728796 ✓	-F		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP2 R2	27/09/2023	728796 ✓	-I		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP1 Blank(F)	27/09/2023	728797 ✓	-F		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
DP1 Blank(I)	27/09/2023	728797 ✓	-I		Isocyanates (TDI 2,4 and 2,6)		WCA.110	HSE MDHS25/3	Chilled
Relinquished By: Peter Stephenson		Date/Time: 28/09/2023@ 12:30			Received By: Liz Corbel			Date/Time 28/9/2023 @ 2:45pm	
Samples Sent Intact: YES					Samples Received Intact: (YES) / NO				
Comments: **Please analyse using method HSE MDHS25/3 AND SEPARATELY REPORT TDI 2,4 and 2,6).**									

P: QUALITY SYSTEMS/FORMS/SITE WORK
ISSUE DATE: MAY 2021

VERSION: 1.4
PAGE 1 of 2

NSW GOVERNMENT | SafeWork NSW

Test Safe AUSTRALIA

Peter Stephenson
Stephenson Environmental Management Australia
PO Box 6398
SILVERWATER NSW 1811

Lab. Reference: 2023-4962

SAMPLE ORIGIN: Project No: 7348

DATE OF INVESTIGATION: 27/09/2023 **DATE RECEIVED:** 28/09/23

ANALYSIS REQUIRED: Isocyanate in air

AMENDED REPORT OF ANALYSIS ***OFFICIAL: Sensitive – Personal***

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.

This report replaces the report dated 11/10/2023. Report amended to include LOQ for NCO group

Martin Mazereeuw
Manager

Date: 1/12/23

TestSafe Australia – Chemical Analysis Branch
Level 2, Building 1, 9-15 Chilvers Road, Thornleigh, NSW 2120, Australia
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ABN 81 913 830 179

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Test Safe AUSTRALIA

Analysis of Isocyanates in Air

Client: Peter Stephenson **Date Sampled: 27/09/2023**

Company: SEMA **Date Analysed: 11/10/2023**

Client Reference: 7348

Laboratory Reference Number	Sample ID	Sample Type	2,4-TDI (µg /Sample)	2,6-TDI (µg /Sample)
2023-4962-1	728794	Impinger	<LOQ	<LOQ
2023-4962-1	728794	Filter	<LOQ	<LOQ
2023-4962-2	728795	Impinger	<LOQ	<LOQ
2023-4962-2	728795	Filter	<LOQ	<LOQ
2023-4962-3	728796	Impinger	<LOQ	<LOQ
2023-4962-3	728796	Filter	<LOQ	<LOQ
2023-4962-4	728797 DP1 BLK	Impinger	<LOQ	<LOQ
2023-4962-4	728797 DP1 BLK	Filter	<LOQ	<LOQ
2023-4962-5	728798 DP2 BLK	Impinger	<LOQ	<LOQ
2023-4962-5	728798 DP2 BLK	Filter	<LOQ	<LOQ

Method No : WCA.110 Analysis of Isocyanates in Air by High Pressure Liquid Chromatography

Limit of Quantitation (LOQ) : 0.4 µg 2,4-TDI or 2,6-TDI/Sample and 0.1 µg NCO/Sample

Brief Description : Isocyanates are collected onto filters and/or impingers containing 1-(2-methoxyphenyl)-piperazine/toluene absorbing solution. The filters trap the greater proportion of isocyanates in the vapour phase and the impingers trap the greater proportion of isocyanates in the aerosol phase. The organic isocyanates react to form urea derivatives that are measured by HPLC using UV detection at 242 nm and electrochemical detection.

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. The measurement uncertainty relates to the analysis of the analyte on the sampling device and does not take into consideration the sampling parameters such as pump flowrate, time, temperature and pressure. The measurement of uncertainty estimates are available upon request.

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Accreditation No. 3726

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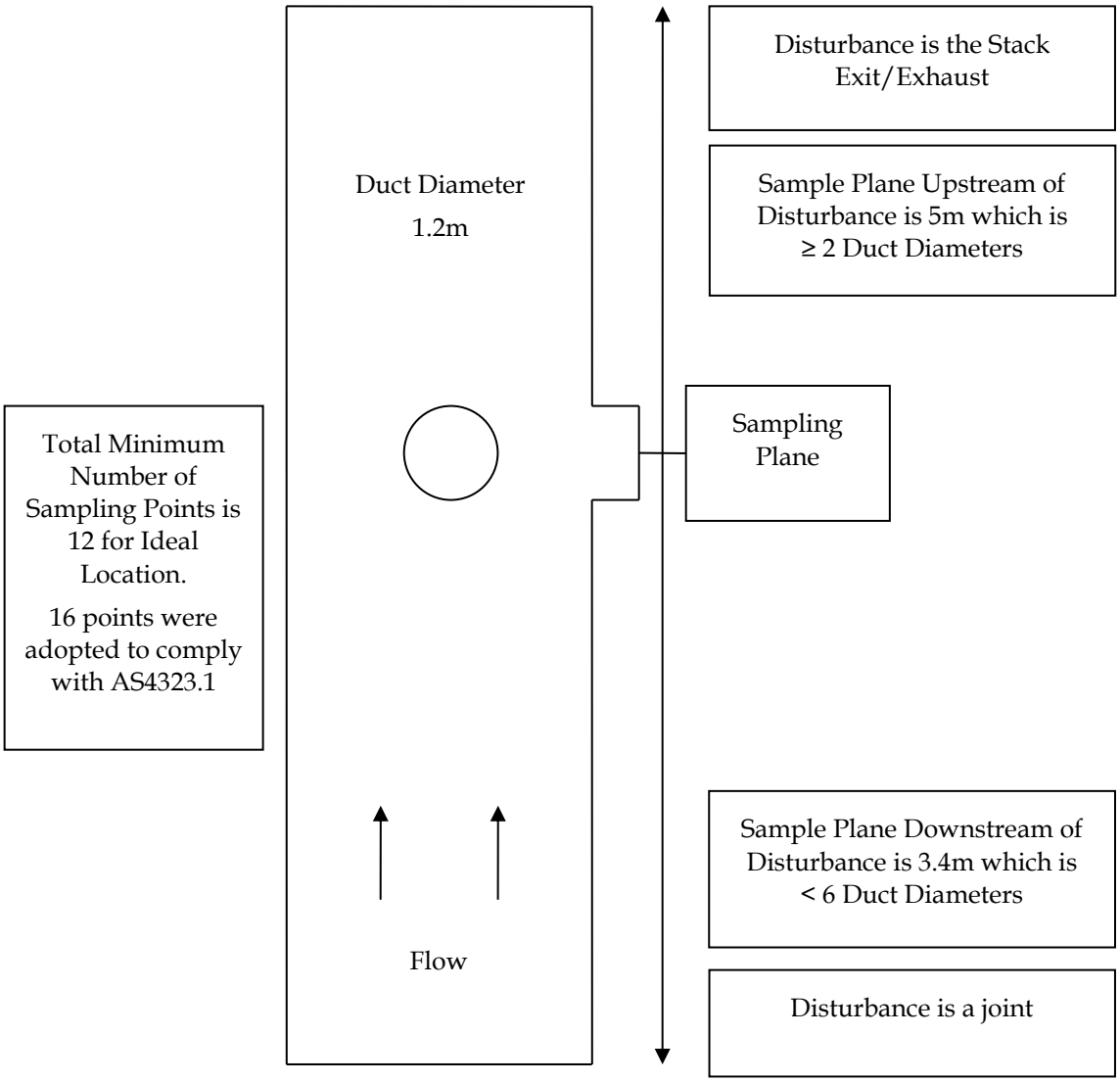
SW08051 0817

APPENDIX B – SAMPLE LOCATION

FIGURE B-1 EPA NO.1 SCRUBBER STACK SERVING THE POURING LINE

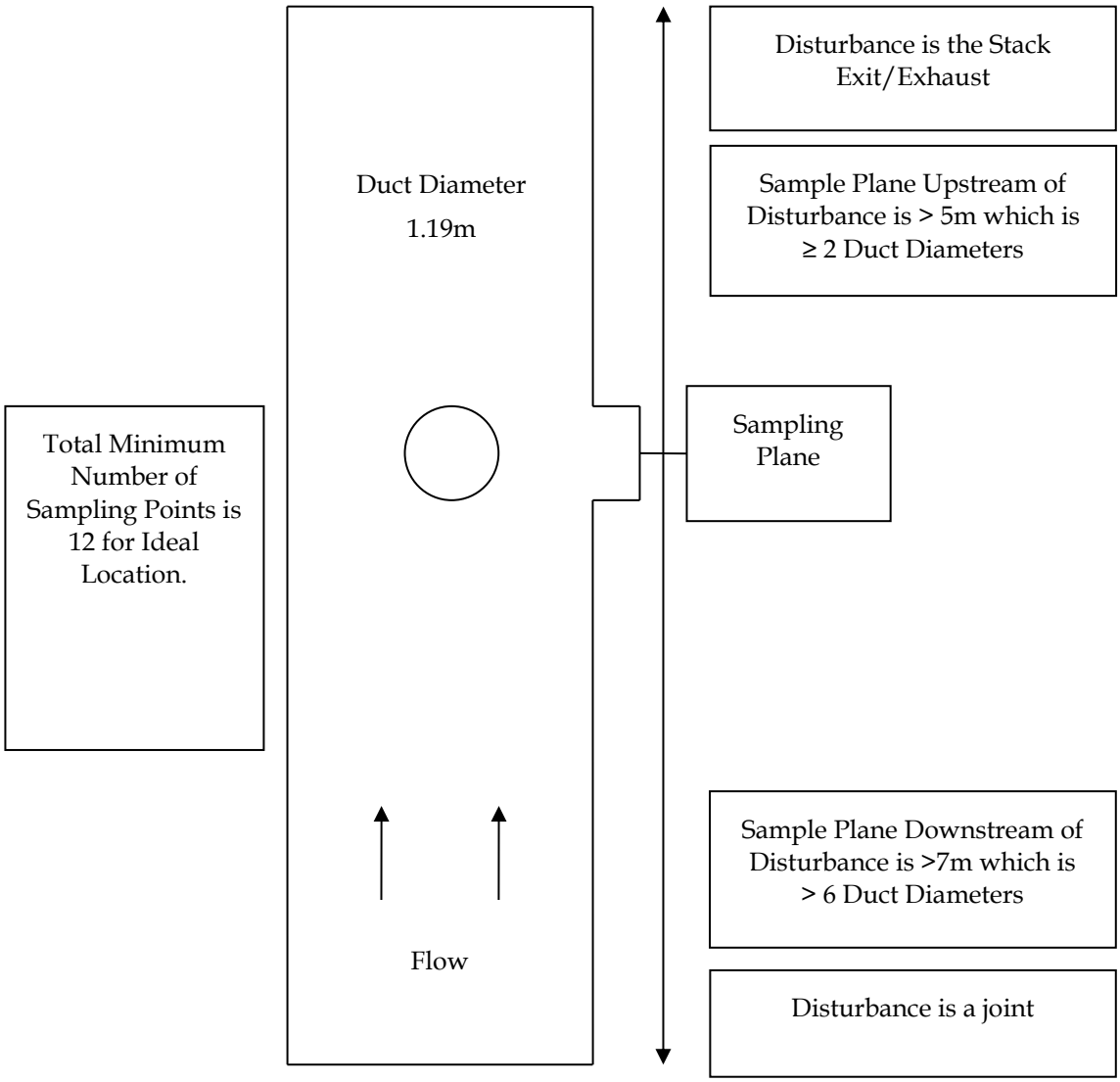


In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does not meet this criterion. Additional sample points were used in compliance with AS4323.1 as the sampling plane was non-ideal.

The sample plane however does meet the minimum sampling plane conditions; sampling plane conditions will be found to exist at 2 duct diameters downstream and 0.5 duct diameters upstream from a flow disturbance.

The location of the sampling plane complies with AS4323.1 criteria for temperature, velocity and gas flow profile and therefore is satisfactory for gas flow sampling.

FIGURE B-2 EPA NO.2 SCRUBBER STACK SERVING THE HOT BLOCK STORE



In the absence of cyclonic flow activity ideal sampling plane conditions will be found to exist at 6-8 duct diameters downstream and 2-3 duct diameters upstream from a flow disturbance. The sampling plane does meet this criterion.

The location of the sampling plane complies with AS4323.1 criteria for temperature, velocity and gas flow profile and therefore is satisfactory for gas flow sampling.