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AN ASSESSMENT OF EMISSIONS TO ATMOSPHERE FROM 2 OVEN VENTS, SPRAY BOOTH AND THE MAIN STACK

**TRELLEBORG PPL
TUFTHANE BUILDING
FALKLAND CLOSE
COVENTRY
CV4 8AU**

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Survey Date:	5th September 2012	Site Contact:	Victoria Tennant
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EXECUTIVE SUMMARY

Emissions to atmosphere were assessed on the 5th September 2012 during spray foaming of boiler cylinders. The monitoring was deemed requisite to comply with the requirements stated in permit PPC 194. The results and information obtained during the visit indicated that:

- Levels of MDI Isocyanates were under the LOD (Limit of Detection) and therefore under all pollution prevention control limits.
- Levels of VOC were all well under the PPC 194 limits given as 100mg/nm³
- The results were therefore under the authorised limits for Trelleborg PPL as stated within PPC 194

SURVEYED BY :



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VERIFIED BY:



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Occupational Hygienist

1. INTRODUCTION

The survey described in this report was carried out on the 5th September 2012 by Christian Dolphin at the request of Trelleborg PPL and in accordance with our work specifications outlined in quotation reference OH11131, in order to determine emissions to atmosphere to comply with the companies Pollution Prevention Control PPC194

Monitoring of emissions was carried out from four stacks; three stacks associated with curing ovens and the fourth stack a spray booth.

2. DESCRIPTION OF PROCESS

Production schedules on the date of the survey were described as normal and the emissions quantified may be considered representative of working conditions.

The Oven Venting process is based on the force curing of polyurethane components moulded from MDI. All ovens exhaust to atmosphere via stacks directly through the factory roof or via a combined stack arrangement.

Oven 18 had 4 casts of wear tubes, 2.5 kg weight of each part, with 4 casts of PY1021 blocks, 400g x 4 off and 95a MDI was placed within both.

Oven 13 had 4 casts of PY 1021 blocks, 400g x 4 and there were 16 blocks in total again 95a MDI was used.

In the Coventry Factory 1 facility a spray booth had recently been installed and emissions to atmosphere for VOC were quantified whilst a primer and bonder were in use.

The main stack fed from Ovens 22 & 23, the press, seismic mould and the release area, so this was tested for isocyanates and total volatile organic compounds.

3. MONITORING

Isocyanate Monitoring

A low flow sampling pump was connected to an inline filter holder loaded with a pre-treated GFA filter and impinger containing MDHS 25/3 absorber solution. The flow rate was set using a calibrated rotameter. The duration of sampling, location and flow rate were recorded. Following monitoring the filter and the solution were submitted for analysis in accordance with Health and Safety Executive Publication - Methods for the Determination of Hazardous Substances (MDHS) 25/3.

Volatile Organic Compound (VOC) Monitoring

The sampling system comprises of a sampling head containing a SKC Sorbent sample tube (226-01), connected to a portable precision pump, capable of running continuously for 8 hours at the recommended flow rate. The pump flow rate is stable to within 5% and the total volume of air sampled by the pump over the recommended sampling period is within 10% of the calculated volume. The flow rate is set using a SKC Saga Bubble Flow Gauge. Following monitoring the 226-01 sorbent tube is capped and placed in a sealed inert container until analysis can be carried out. Analysis is by Gas Chromatography/Mass Spectrometry using specified procedures for the instrumentation.

Stack Velocity

Stack velocity was measured using a pitot tube, coupled to an electronic manometer; both are calibrated annually by a UKAS accredited supplier. Temperature measurements were taken using a K-type thermocouple connected to an electronic thermometer; again both are calibrated annually by a UKAS accredited supplier.

4. RESULTS

The detailed results are attached as Appendix 1 for the Volatile Organic Compounds, as no NCO was detected there are no appendixes for calculation sheets. The results for the monitoring period are summarised below:-

Oven Vent 13

Substance	Concentration	PPC Limit	Time
	mg/nm ³		
di-isocyanates total NCO Run 1	<0.0067	0.1	12:09 – 12:39
di-isocyanates total NCO Run 2	<0.0067	0.1	12:50 – 13:20
VOC As Carbon Run 1	2.36	50.0	12:09 – 12:39
VOC As Carbon Run 2	3.41	50.0	12:50 – 13:20

Oven Vent 18

Substance	Concentration	PPC Limit	Time
	mg/nm ³		
di-isocyanates total NCO Run 1	<0.0067	0.1	10:07 – 10:37
di-isocyanates total NCO Run 2	<0.0067	0.1	10:45 – 11:15
VOC As Carbon Run 1	2.32	100	10:07 – 10:37
VOC As Carbon Run 2	12.64	100	10:45 – 11:15

Main Stack

Substance	Concentration	PPC Limit	Time
	mg/nm ³		
di-isocyanates total NCO Run 1	<0.0067	0.1	14:16 – 14:46
di-isocyanates total NCO Run 2	<0.0067	0.1	14:50 – 15:20
VOC As Carbon Run 1	2.71	100	14:16 – 14:46
VOC As Carbon Run 2	3.84	100	14:50 – 15:20

Spray Booth Vent 1

Substance	Concentration	PPC Limit	Time
	mg/nm ³		
VOC As Carbon Run 1	5.08	100	08:49 - 09:09
VOC As Carbon Run 2	5.96	100	09:11 – 09:41

Pitot Traverse Velocity Profile from Each Stack

Location	Velocity Profile m/s	Average m/s
Oven Vent 13	7.3, 7.7, 6.9, 6.4, 6.8, 6.2, 6.7, 6.9, 6.4, 6.6	6.8
Oven Vent 18	5.4, 5.6, 6.0, 6.2, 6.4, 6.5, 6.2, 6.1, 5.8, 5.5	6.0
Spray Booth Vent 1	7.0, 6.8, 7.2, 7.4, 7.0, 6.8, 6.6, 7.1, 6.9, 7.0	7.0
Main Stack	11.0, 11.0, 10.5, 9.4, 8.8, 9.2, 8.4, 7.6, 7.5, 7.4	9.1

5. CONCLUSIONS AND RECOMMENDATIONS

All results were satisfactory and within the limits set out in PPC194.

APPENDIX 1
VOC EMISSION CALCULATIONS

Location:	Vent 13 Run 1
Date of Sample:	05-Sep-12

Absolute temperature in duct (Td)	349	K
Total pressure in duct = barometric + static (Pd)	102.9	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.009	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	1.88	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	2.36	mg/m ³

Location:	Vent 13 Run 2
Date of Sample:	05-Sep-12

Absolute temperature in duct (Td)	349	K
Total pressure in duct = barometric + static (Pd)	102.9	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	Mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.013	Mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	2.71	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	3.41	mg/m ³

Location: Vent 18 Run 1
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	343	K
Total pressure in duct = barometric + static (Pd)	102.8	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.009	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	1.88	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	2.32	mg/m ³

Location: Vent 18 Run 2
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	343	K
Total pressure in duct = barometric + static (Pd)	102.8	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.049	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	10.21	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	12.64	mg/m ³

Location: Main Stack Run 1
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	300	K
Total pressure in duct = barometric + static (Pd)	102.8	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.012	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	2.50	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	2.71	mg/m ³

Location: Main Stack Run 2
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	300	K
Total pressure in duct = barometric + static (Pd)	102.8	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.017	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	3.54	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	3.84	mg/m ³

Location: Spray Booth Run 1
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	294	K
Total pressure in duct = barometric + static (Pd)	102.9	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.023	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	4.79	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	5.08	mg/m ³

Location: Spray Booth Run 2
Date of Sample: 05-Sep-12

Absolute temperature in duct (Td)	294	K
Total pressure in duct = barometric + static (Pd)	102.9	kPa
Flow rate for VOC sampling (f)	160	ml/min
Total period of sampling (t) = T1-T0	30	mins
Total quantity of air samples = f x t (Q voc)	0.005	m ³
Weight of VOC collected expressed as Carbon (Wc)	0.027	mg
Concentration VOC = $\frac{Wc}{Q \text{ voc}}$	5.63	mg/m ³
Correction to STP = $\frac{Wc \times Td \times 101.3}{Q \text{ voc} \times 273 \times Pd}$	5.96	mg/m ³