

A14



25<sup>th</sup> May 2005

Aaron Morley  
Environmental Protection Officer  
Environment Health Services Division  
Huntingdon District Council  
St Mary`s Street  
Huntingdon  
PE29 3TN

**Exel AMS**  
Alconbury Airfield  
Alconbury  
Cambridgeshire  
PE17 5WX

Telephone 01480 482122  
Facsimile 01480 482113

Dear Aaron

**Emission Monitoring**

I hope you are keeping well; please find enclosed a copy of the Emission Monitoring report carried out on 5<sup>th</sup> May 2005 by Jon Lawrence.

Again I`m pleased to say that the tests show we are well below the limits.

Yours sincerely

**Mr Pasc Di Salvo**  
Bodyshop Manager

Pasc.DiSalvo@exel.com  
Tel 01480 482122  
Fax 01480 482113  
Mobile 07771 531609



*Jon Lawrence*

*Health, Safety & Environment Consultant*

**Emission Monitoring Report for:-**

**EXEL**

**Building 94**

**RAF Alconbury Airfield**

**(Northgate) Alconbury**

**HUNTINGDON**

**Cambridgeshire**

**PE28 4WY**

**Work Completed By :- Mr J Lawrence**

**Date of Monitoring:- 5<sup>th</sup> May 2005**

**Date Reported:- 20<sup>th</sup> May 2005**

**Report Number:- 1084**

**Introduction**

The report covers emission monitoring for emissions to atmosphere for compliance to PG6/34(97), 'Vehicle Re-Spraying Processes'.

The report covers the emissions of Volatile Organic compounds (VOC's) from the one Dalby Spray booth (Top Coat Oven) flue at the Alconbury site.

Written By :- Mr J. Lawrence

Signature :- *PP. J. Lawrence*

**JON LAWRENCE**

*(Head Office)*

14 Springbank, Bollington, Macclesfield, Cheshire SK10 5LQ

 : 01942 720596  : 01942 711428  : [jlowre@aol.com](mailto:jlowre@aol.com)

## **Methods**

### **(1) Process Details**

Cars are delivered to the site, predominantly from fleet hire companies / insurance companies for repair and paintwork touch-up at the Alconbury site of Exel Limited. Upon completion of any repairs, the car body parts requiring paint application, are then usually sprayed with an compliant coating undercoat and compliant coating top coat of paint, followed by a none compliant coating of a lacquer coat in any of two Dalby, spray booths.

The paint is applied using HVLP spray guns, by usually one paint sprayer per booth, the car body panels themselves, are by design, subject to an amount of overspray, which is extracted by the spray booth, through several particulate filtration plants, then to external atmosphere.

The spray booths have a guarantee from Harry Dalby Engineering Limited that emissions of particulate matter are below the process guidance limit of 10 mg/m<sup>3</sup> (Copy of report is enclosed for reference), so testing for total particulate matter was not deemed as being required, hence only VOC monitoring was requested, its understood that Exel, do predominantly use compliant coatings in the primer and colour coat's.

### **(2) Strategy**

The spray booths operator, (one personnel), were requested to spray under normal conditions for a normal time period, required to spray body panels (e.g. car wing, bumper, etc), in all spray booths, for the usual paint application used, in each respective booth, of an area of at least 1m<sup>2</sup>.

Initial velocity temperature measurements were made before spraying commenced, followed by the VOC sampling run and duplicate, when spraying commenced in the booth.

Independent checks were made, to ensure that spraying was continuing, during the period of the testing on site.

### **(3) Preparation**

Initial measurements were taken from each stack, before emission sampling commenced.

The measurements taken, were used for standardisation requirements, temperature within the stack, pressure, mass flow rate of each stack.

Efflux Velocities were taken using a pitot tube and air neotronics electronic manometer.

Temperature readings were taken with ETP 'K type' air probe and digital readout unit, with traceable NPL calibration certificate.

Stack diameter's and mass air flow were also recorded.

#### (4) Volatile Organic Compounds (VOC's)

VOC's were sampled using a Minirae Flame Ionisation Detector, which samples for the Carbon present within the VOC's being emitted to atmosphere.

The FID measures all VOC's as ppm carbon, this is then corrected to a mg/m<sup>3</sup> reading, corrected to standard temperature and pressure.

Sampling was completed during normal spraying operations, within each respective booth, for a 2 minute period during spraying and a 15 minute period during baking process, for each respective paint type and each stack.

#### Standard Calculation Formula:-

$$\text{Mg/m}^3 \text{ Carbon} = \frac{\text{Measured Temp}}{\text{Standard Temp}} \times \frac{\text{Measured Pressure}}{\text{Standard Pressure}}$$

$$\begin{array}{l} \times \text{ Instrument Reading (ppm)} \\ \text{Response factor of solvent} \end{array} \quad \begin{array}{l} \times 50 \\ \times \text{ ppm reading for 50 mg/m}^3 \end{array}$$

Standard temperature = 273 Kelvin

Standard pressure = 101.3 Kpa.

#### FID Calibration

The FID was calibrated with 804 ppm Methane standard.

#### Calibration Readings

Specified Value = 804 ppm CH<sub>4</sub>

Actual Value = 801 ppm CH<sub>4</sub>

## RESULTS

## Dalby Spray Booth Serial Number SB4133 (Top Coat Oven)

### Mass Flowrates

Efflux Velocity; 13.8 m/s  
Stack Diameter; 0.40 x 0.40 m  
Cross Sectional Area; 0.16 m<sup>2</sup>  
Mass Emission Rate; 11,232 m<sup>3</sup>/hour  
Normal Operation Conditions  
Temperature within the stack; 25.4 °C  
Pressure; 101.3 Kpa  
Spray area; Ford Mondeo Rear Bumper  
Paint application type; Standox MS Xtra Klarlack Lacquer Coat  
Main constituents of Solvents in product; Naptha, Butyl Acetate, Trimethyl Benzene  
Minirac Reading at 50 mg/m<sup>3</sup> Carbon = 48.2  
Mean Response Factor = 2.1

### Volatile Organic Compounds, (VOC's)

	<u>Paint Spraying</u>	<u>Baking Cycle (ppm Carbon)</u>
Time		
1 minute	71	4.0
2 minutes	64	2.0
3 "	38	1.6
4 "	12	1.2
5 "	7	0.8
6 "	See Baking cycle	0.7
7 "		0.6
8 "		0.4
9 "		0.2
10 "		0
11 "		0
12 "		0
13 "		0
14 "		0
15 "		0
Highest 2 minute mean;	<u>67.5 ppm Carbon</u>	<u>3 ppm Carbon</u>

### Results;

Spraying Lacquer = 35.3 mg/m<sup>3</sup>

Baking Cycle = 1.6 mg/m<sup>3</sup>

Note:- During baking cycle, extraction does not go to atmosphere, but is recycled into booth, hence readings only show, VOC residues left in ducting. Filter Tube residual VOC'S Present during 1<sup>st</sup> run.

Exel  
Stack Emission Monitoring  
5<sup>th</sup> May 2005  
Report No. 1084

## CONCLUSIONS

## Conclusions

On the day of testing, 5<sup>th</sup> May 2005 , it can be shown that Emissions to atmosphere of Volatile Organic Compounds (VOC's), were measured at being well below the PG6/34(97) guidance note limit, of 50 mg/m<sup>3</sup>, during the use of Stadox medium solids lacquer coating.

## Volatile Organic Compounds (VOC) Emissions

<u>Dalby Spraybooths</u>	<u>RESULT</u>		<u>PG6/34(97) Limit</u>
	Spraying (2 Mins)	Baking (15 Mins)	
<b>Dalby Top Coat Oven (S/N SB4133)</b>	<b>35.3 mg/m<sup>3</sup></b>	<b>1.6 mg/m<sup>3</sup></b>	<b>50 mg/m<sup>3</sup></b>

### Note:-

All results are corrected to standard temperature and pressure (273 Kelvin, 101.3 KPA)



*Jon Lawrence*

*Health, Safety & Environment Consultant*

**Emission Monitoring Report for:-**

**EXEL**

Building 94  
RAF Alconbury Airfield  
(Northgate) Alconbury  
HUNTINGDON  
Cambridgeshire  
PE28 4WY

Work Completed By :- Mr J Lawrence  
Date of Monitoring:- 18<sup>th</sup> October 2005  
Date Reported:- 21<sup>st</sup> October 2005  
Report Number:- 1323

**Introduction**

The report covers emission monitoring for emissions to atmosphere for compliance to PG6/34, 'Vehicle Re-Spraying Processes'.

The report covers the emissions of Volatile Organic compounds (VOC's) from the one Dalby Spray booth (Top Coat Oven) flue at the Alconbury site.

Written By :- Miss S.Lowrence

Signature :- *PP J Lawrence*

**JON LAWRENCE**

*(Head Office)*

14 Springbank, Bollington, Macclesfield, Cheshire SK10 5LQ

 : 01942 720596  : 01942 711428 / 720596  : jlowre@aol.com

## **Methods**

### **(1) Process Details**

Cars are delivered to the site, predominantly from fleet hire companies / insurance companies for repair and paintwork touch-up at the Alconbury site of Exel Limited. Upon completion of any repairs, the car body parts requiring paint application, are then usually sprayed with a compliant coating undercoat and compliant coating top coat of paint, followed by a none compliant coating of a lacquer coat in any of two Dalby, spray booths.

The paint is applied using HVLP spray guns, by usually one paint sprayer per booth, the car body panels themselves, are by design, subject to an amount of overspray, which is extracted by the spray booth, through several particulate filtration plants, then to external atmosphere.

The spray booths have a guarantee from Harry Dalby Engineering Limited that emissions of particulate matter are below the process guidance limit of 10 mg/m<sup>3</sup> (Copy of report is available for reference), so testing for total particulate matter was not deemed as being required, hence only VOC monitoring was requested, its understood that Exel, do predominantly use compliant coatings in the primer and colour coat's.

### **(2) Strategy**

The spray booths operator, (one personnel), were requested to spray under normal conditions for a normal time period, required to spray body panels (e.g. car wing, bumper, etc), in all spray booths, for the usual paint application used, in each respective booth, of an area of at least 1m<sup>2</sup>.

Initial velocity temperature measurements were made before spraying commenced, followed by the VOC sampling run and duplicate, when spraying commenced in the booth.

Independent checks were made, to ensure that spraying was continuing, during the period of the testing on site.

### **(3) Preparation**

Initial measurements were taken from each stack, before emission sampling commenced.

The measurements taken, were used for standardisation requirements, temperature within the stack, pressure, mass flow rate of each stack.

Efflux Velocities were taken using a pitot tube and air neotronics electronic manometer.

Temperature readings were taken with ETP 'K type' air probe and digital readout unit, with traceable NPL calibration certificate.

Stack diameter's and mass air flow were also recorded.

#### (4) Volatile Organic Compounds (VOC's)

VOC's were sampled using a Minirae Flame Ionisation Detector, which samples for the Carbon present within the VOC's being emitted to atmosphere.

The FID measures all VOC's as ppm carbon, this is then corrected to a mg/m<sup>3</sup> reading, corrected to standard temperature and pressure.

Sampling was completed during normal spraying operations, within each respective booth, for a 2 minute period during spraying and a 15 minute period during baking process, for each respective paint type and each stack.

Standard Calculation Formula:-

$\text{Mg/m}^3 \text{ Carbon} = \frac{\text{Measured Temp}}{\text{Standard Temp}} \times \frac{\text{Measured Pressure}}{\text{Standard Pressure}}$
$\times \frac{\text{Instrument Reading (ppm)}}{\text{Response factor of solvent}} \times \frac{50}{\text{ppm reading for 50 mg/m}^3}$

Standard temperature = 273 Kelvin  
Standard pressure = 101.3 Kpa.

#### FID Calibration

The FID was calibrated with 804 ppm Methane standard.

#### Calibration Readings

Specified Value = 804 ppm CH<sub>4</sub>  
Actual Value = 801 ppm CH<sub>4</sub>

## RESULTS

Exel  
Stack Emission Monitoring  
18<sup>th</sup> October 2005  
Report No. 1323

## Dalby Spray Booth Serial Number SB4133 (Top Coat Oven)

### Mass Flowrates

Efflux Velocity; 13.3 m/s  
Stack Diameter; 0.40 x 0.40 m  
Cross Sectional Area; 0.16 m<sup>2</sup>  
Mass Emission Rate; 11,232 m<sup>3</sup>/hour  
Normal Operation Conditions  
Temperature within the stack; 26.0 °C  
Pressure; 101.3 Kpa  
Spray area; Ford Fiesta n/s door and rear bumper  
Paint application type; Stadox MS Xtra Klarlack Lacquer Coat  
Main constituents of Solvents in product; Naptha, Butyl Acetate, Trimethyl Benzene  
Minirac Reading at 50 mg/m<sup>3</sup> Carbon = 48.2  
Mean Response Factor = 2.1

### Volatile Organic Compounds, (VOC's)

	<u>Paint Spraying</u>	<u>Baking Cycle (ppm Carbon)</u>
Time		
1 minute	84	4.0
2 minutes	62	4.1
3 "	45	3.2
4 "	18	2.1
5 "	4	0.6
6 "	See Baking cycle	0.4
7 "		0.1
8 "		0.2
9 "		0.1
10 "		0.1
11 "		0
12 "		0
13 "		0
14 "		0
15 "		0
Highest 2 minute mean;	<u>73.0 ppm Carbon</u>	<u>4.0 ppm Carbon</u>

### Results:

Spraying Lacquer = 38.2 mg/m<sup>3</sup>

Baking Cycle = 1.4 mg/m<sup>3</sup>

Note:- During baking cycle, extraction does not go to atmosphere, but is recycled into booth, hence readings only show, VOC residues left in ducting. Filter Tube residual VOC'S Present during 1<sup>st</sup> run.

Exel  
Stack Emission Monitoring  
18<sup>th</sup> October 2005  
Report No. 1323

## CONCLUSIONS

## **Conclusions**

On the day of testing, 18<sup>th</sup> October 2005, it can be shown that Emissions to atmosphere of Volatile Organic Compounds (VOC's), were measured at being well below the PG6/34(97) guidance note limit, of 50 mg/m<sup>3</sup>, during the use of Stadox medium solids lacquer coating.

## **Volatile Organic Compounds (VOC) Emissions**

<b><u>Dalby Spravbooths</u></b>	<b><u>RESULT</u></b>		<b><u>PG6/34(97) Limit</u></b>
	Spraying (2 Mins)	Baking (15 Mins)	
<b>Dalby Top Coat Oven (S/N SB4133)</b>	<b>38.2 mg/m<sup>3</sup></b>	<b>1.4 mg/m<sup>3</sup></b>	<b>50 mg/m<sup>3</sup></b>

### **Note:-**

All results are corrected to standard temperature and pressure (273 Kelvin, 101.3 KPA)