STADCO Coventry

Determination of Gaseous Species
ED Incinerator
Holbrook Lane, Coventry
CV6 4AW

8 February 2007

Prepared by: **CES Environmental Instruments Ltd**
Bretby Business Park
Ashby Road
Stanhope Bretby
Burton Upon Trent
DE15 OYZ

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Report prepared by [redacted]
R.M. Allen
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Report authorised by [redacted]
D.J. Slack
MCERTS Reg No. MM 02 100

UKAS TESTING
2338

mCERTS

Contents

Part 1: Executive Summary

Operator Company: -	STADCO Coventry
Address: -	Holbrook Lane, Coventry, CV6 4AW
Plant: -	ED Incinerator
Permit Number: -	PPC/058
Monitoring Date: -	8 February 2007
Monitoring Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Analytical Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Report Number: -	EI/4261CI
Report Date: -	12 February 2007

Monitoring Objective
To monitor quantify gaseous emissions to atmosphere from the ED Incinerator located at STADCO, Coventry.

Test Team
R. Allen (MCERTS Level 2, TE1, TE2, TE3, TE4 MM 02 009)
R. Ward (MCERTS Level 2, TE1, TE4 MM 02 101)
A. Orme (MCERTS Level 1 MM 04 530)
D. Littlewood (MCERTS Trainee MM 06 772)

Report authorised by [redacted].....
D.J. Slack
MCERTS Reg No. MM 02 100

Results
Date of Sampling: 8 February 2007

Location	Pollutant	Start and End Times	Test No.	Concentration mg/Nm³	Mean Concentration mg/Nm³	Uncertainty (±) mg/Nm³	Emission Rate kg/hr	Mean Emission Rate kg/hr
ED Incinerator	Oxides of Nitrogen	10:30-15:29	1	2.5	2.5	0.5	-	-
ED Incinerator	Carbon Monoxide	10:30-15:29	1	17.1	17.1	1.7	-	-
ED Incinerator	Volatile Organic Compounds	10:30-15:29	1	71.4	71.4	14.3	-	-

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%	-	Wet/Dry	Dry

All tests UKAS Accredited to BS EN ISO / IEC 17025 and MCERTS except where * shown

1. Introduction

STADCO placed a contract with CES Environmental Instruments Ltd to monitor and quantify the gaseous emissions emitted to atmosphere from the ED Incinerator. The test work was undertaken on 8 February 2007 by CES Environmental Instruments Ltd Engineers. This report described the work carried out and the results obtained.

2. Plant and Process Details and Authorisation Limits

2.1 ED Incinerator

Contrapol Incinerator is a gas fired unit installed at Mayflower Vehicle Systems, Holbrook Lane Coventry. The incinerator is utilised to dispose of relic ED paint. The incinerator output is estimated to be in the region of 2,000,000 kcal/hr. For the duration of the test the incinerator was operating under normal operating conditions, the normal cycle is one item being dipped every 8 minutes.

2.2 Authorisation Limits

The authorisation limits as set out under Coventry City Council, Authorisation Number PPC/058.

Oxides of Nitrogen	100mg/m^3
Carbon Monoxide	100mg/m^3
Volatile Organic Compounds	None at present

3. Sampling Location

Orientation	Dimensions	Cross Sectional Area	Sample Ports Available/Used	Sampling Positions Per Plane	Standard
Vertical	Dia 200mm	0.031m^2	1/1	1	BS EN 13284-1
Comments: Sample ports: 1 off 4" BSP socket Single Point sampling will be undertaken					
				Yes	No
Does the sample plane comply upstream?					✓
Does the sample plane comply downstream?					✓
Are the appropriate sample ports fitted?				✓	
Does the velocity air temperature profile comply?				N/A	
Minimum platform area >5m^2				✓	

4. Sampling Methods

Pollutant	Method	CES Procedure	Equipment	Uncertainty (±)	LOD	Accreditation	ED Incinerator
Oxides of Nitrogen	BS ISO 10849	WI4/18	C212	20%	1ppm	UKAS, MCERTS	✓
Carbon Monoxide	BS IO 12039	WI4/19	C212	10%	1ppm	UKAS, MCERTS	✓
VOCs	BS EN 12619	WI4/28	C124	20%	0.1ppm	UKAS, MCERTS	✓

Sampling Equipment: Horiba PG-250: CES Reference C212
FID: CES Reference C124

5. Sample Analysis

Determinand	Method	Laboratory	Date of Analysis	UKAS Accredited
Oxides of Nitrogen	Chemiluminescence	CESEI	09/02/07	Y
Carbon Monoxide	NDIR	CESEI	09/02/07	Y
Volatile Organic Compounds	Signal FID	CESEI	09/02/07	Y

6. Summary of Results

Location	Pollutant	Start and End Times	Test No.	Concentration mg/Nm³	Mean Concentration mg/Nm³	Uncertainty (±) mg/Nm³	Emission Rate kg/hr	Mean Emission Rate kg/hr
ED Incinerator	Oxides of Nitrogen	10:30-15:29	1	2.5	2.5	0.5	-	-
ED Incinerator	Carbon Monoxide	10:30-15:29	1	17.1	17.1	1.7	-	-
ED Incinerator	Volatile Organic Compounds	10:30-15:29	1	71.4	71.4	14.3	-	-

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%	-	Wet/Dry	Dry

All tests UKAS Accredited to BS EN ISO / IEC 17025 and MCERTS except where * shown

7. Deviations from Standard Methods

The sample plane does not comply upstream/downstream.

Part 2: Supporting Information - Appendices

Operator Company: -	STADCO Coventry
Address: -	Holbrook Lane, Coventry, CV6 4AW
Plant: -	ED Incinerator
Permit Number: -	PPC/058
Monitoring Date: -	8 February 2007
Monitoring Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Analytical Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Report Number: -	EI/4261CI
Report Date: -	12 February 2007

Test Team
R. Allen (MCERTS Level 2, TE1, TE2, TE3, TE4 MM 02 009)
R. Ward (MCERTS Level 2, TE1, TE4 MM 02 101)
A. Orme (MCERTS Level 1 MM 04 530)
D. Littlewood (MCERTS Trainee MM 06 772)

Report authorised by [redacted].....
D.J. Slack
MCERTS Reg No. MM 02 100

Contents

Appendix 1
(Logged Values)

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon	Carbon	Nitric	Oxides of	VOCs	VOCs
08/02/07		Monoxide	Monoxide	Oxide	Nitrogen (NO2)		
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
Mean Value (10:30-11:29)	20.5	14	17	2	4	35	57
Mean Value (11:30-12:29)	20.4	15	19	1	3	58	93
Mean Value (12:30-13:29)	20.5	12	15	1	2	39	63
Mean Value (13:30-14:29)	20.5	14	18	1	2	49	78
Mean Value (14:30-15:29)	20.5	13	17	1	2	41	66
Max Test Result	20.5	14.8	18.5	1.8	3.7	58.0	93.2
Min Test Result	20.4	12.2	15.2	0.9	1.8	35.2	56.6
Mean Test Result	20.5	13.7	17.1	1.2	2.5	44.4	71.4

Results correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Dry	Dry

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon Monoxide	Carbon Monoxide	Nitric Oxide	Oxides of Nitrogen (NO2)	VOCs	VOCs
08/02/2007							
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
10:30	20.6	10	12	2	4	5	8
10:31	20.6	10	12	2	3	3	5
10:32	20.6	10	12	1	3	5	8
10:33	20.6	10	12	1	3	5	8
10:34	20.5	11	14	1	3	9	15
10:35	20.5	12	15	1	2	22	35
10:36	20.6	13	16	1	2	5	8
10:37	20.5	11	14	1	3	5	8
10:38	20.8	14	18	2	3	9	15
10:39	20.7	14	18	2	4	16	25
10:40	20.6	14	18	2	4	22	35
10:41	20.6	13	17	2	3	31	50
10:42	20.6	13	16	2	3	38	60
10:43	20.6	14	18	2	3	44	70
10:44	20.5	14	17	2	4	48	78
10:45	20.5	14	17	2	4	50	80
10:46	20.6	13	16	2	4	48	78
10:47	20.5	14	17	2	4	45	73
10:48	20.5	15	18	2	4	44	70
10:49	20.5	16	20	2	5	39	63
10:50	20.5	16	20	2	5	36	58
10:51	20.5	16	20	2	5	33	53
10:52	20.5	17	21	2	5	31	50
10:53	20.5	17	21	2	5	30	48
10:54	20.5	16	19	2	5	27	43
10:55	20.5	15	19	2	5	27	43
10:56	20.5	15	18	3	5	25	40
10:57	20.5	14	18	3	5	27	43
10:58	20.5	14	17	3	5	28	45
10:59	20.5	13	17	3	5	30	48
11:00	20.5	13	16	3	5	31	50
11:01	20.5	12	15	3	5	33	53
11:02	20.6	12	16	2	5	36	58
11:03	20.1	10	13	1	3	36	58
11:04	20.7	10	13	1	3	41	65
11:05	20.5	16	19	1	3	47	75
11:06	20.5	15	18	1	3	53	85
11:07	20.5	15	19	2	4	53	85
11:08	20.5	14	17	2	4	52	83
11:09	20.5	14	17	2	4	53	85
11:10	20.5	14	17	2	4	52	83
11:11	20.4	14	18	2	4	50	80
11:12	20.3	16	20	2	4	48	78
11:13	20.3	16	20	2	4	48	78
11:14	20.3	13	16	2	4	50	80
11:15	20.3	14	17	1	3	50	80
11:16	20.3	14	17	1	2	52	83
11:17	20.3	14	17	1	2	50	80
11:18	20.5	14	18	1	2	47	75
11:19	20.4	16	20	1	3	45	73
11:20	20.3	16	20	2	3	42	68
11:21	20.3	15	19	2	3	39	63
11:22	20.3	15	18	2	4	36	58
11:23	20.3	15	18	2	4	39	63
11:24	20.3	14	18	2	4	42	68
11:25	20.3	14	17	2	4	42	68
11:26	20.3	13	17	2	4	42	68
11:27	20.3	11	14	2	4	41	65
11:28	20.3	11	13	2	4	39	63
11:29	20.3	11	13	2	4	39	63
Max Test Result	**20.8**	**16.6**	**20.7**	**2.6**	**5.4**	**53.1**	**85.4**
Min Test Result	**20.1**	**9.6**	**12.0**	**1.1**	**2.2**	**3.1**	**5.0**

Mean Test Result	**20.5**	**13.6**	**17.0**	**1.8**	**3.7**	**35.2**	**56.6**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Dry

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon	Carbon	Nitric	Oxides of	VOCs	VOCs
08/02/2007		Monoxide	Monoxide	Oxide	Nitrogen (NO2)		
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
11:30	20.3	10	13	2	4	41	65
11:31	20.4	11	13	2	3	50	80
11:32	20.5	11	14	1	3	59	95
11:33	20.5	12	15	1	3	67	108
11:34	20.5	11	14	1	3	70	113
11:35	20.5	12	15	1	2	72	116
11:36	20.5	13	17	1	2	72	116
11:37	20.4	14	18	1	3	67	108
11:38	20.5	15	19	1	3	66	105
11:39	20.5	16	20	1	3	66	105
11:40	20.5	16	20	1	3	70	113
11:41	20.6	17	21	1	3	70	113
11:42	20.6	16	20	1	2	70	113
11:43	20.6	17	21	1	2	67	108
11:44	20.6	17	21	1	2	61	98
11:45	20.5	19	24	1	3	56	90
11:46	20.4	19	23	1	3	52	83
11:47	20.4	18	23	2	3	48	78
11:48	20.3	18	22	2	3	47	75
11:49	20.3	18	22	2	3	50	80
11:50	20.3	16	20	2	3	56	90
11:51	20.3	15	19	2	3	59	95
11:52	20.3	15	18	2	3	61	98
11:53	20.4	13	17	2	3	63	100
11:54	20.4	13	16	2	3	63	100
11:55	20.4	13	16	1	3	61	98
11:56	20.4	14	17	1	3	61	98
11:57	20.4	15	18	1	3	67	108
11:58	20.4	15	19	1	3	70	113
11:59	20.4	16	20	1	3	72	116
12:00	20.4	16	20	1	3	70	113
12:01	20.4	16	19	1	3	66	105
12:02	20.4	17	21	1	3	61	98
12:03	20.3	18	23	1	3	55	88
12:04	20.3	19	23	1	3	48	78
12:05	20.3	19	23	2	3	41	65
12:06	20.3	18	22	1	3	41	65
12:07	20.3	17	22	2	3	42	68
12:08	20.3	17	21	2	3	45	73
12:09	20.3	16	20	2	3	45	73
12:10	20.3	13	17	2	3	44	70
12:11	20.4	12	15	1	3	42	68
12:12	20.3	12	14	2	3	42	68
12:13	20.3	12	15	2	3	42	68
12:14	20.3	12	15	2	3	45	73
12:15	20.3	12	14	2	3	50	80
12:16	20.3	11	14	2	3	58	93
12:17	20.4	11	14	1	3	64	103
12:18	20.5	12	15	1	3	66	105
12:19	20.5	13	16	1	2	66	105
12:20	20.6	13	16	1	2	64	103
12:21	20.6	14	18	1	2	59	95
12:22	20.6	15	19	1	2	56	90
12:23	20.6	15	19	1	2	58	93
12:24	20.6	16	20	1	2	58	93
12:25	20.6	16	20	1	2	59	95
12:26	20.6	15	19	1	2	59	95
12:27	20.6	15	19	1	2	61	98
12:28	20.6	16	20	1	2	59	95
12:29	20.5	17	21	1	2	56	90
Max Test Result	**20.6**	**19.0**	**23.7**	**1.8**	**3.8**	**71.9**	**115.5**
Min Test Result	**20.3**	**10.4**	**13.0**	**0.9**	**1.9**	**40.6**	**65.3**
Mean Test Result	**20.4**	**14.8**	**18.5**	**1.4**	**2.8**	**58.0**	**93.2**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Dry

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon	Carbon	Nitric	Oxides of	VOCs	VOCs
08/02/2007		Monoxide	Monoxide	Oxide	Nitrogen (NO2)		
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
12:30	20.4	16	20	1	3	56	90
12:31	20.4	15	19	1	2	52	83
12:32	20.4	15	19	1	2	53	85
12:33	20.4	15	19	1	2	53	85
12:34	20.4	15	18	1	2	58	93
12:35	20.4	15	19	1	2	63	100
12:36	20.4	14	18	1	2	66	105
12:37	20.4	15	19	1	2	64	103
12:38	20.4	15	19	1	2	63	100
12:39	20.3	16	20	1	2	59	95
12:40	20.3	17	21	1	2	53	85
12:41	20.3	18	22	1	2	47	75
12:42	20.3	18	22	1	2	44	70
12:43	20.3	18	22	1	2	41	65
12:44	20.3	17	21	1	2	38	60
12:45	20.3	17	21	1	2	34	55
12:46	20.4	15	19	1	2	31	50
12:47	20.4	14	17	1	2	30	48
12:48	20.4	13	16	1	2	30	48
12:49	20.4	12	15	1	3	28	45
12:50	20.4	11	14	1	3	25	40
12:51	20.4	11	14	1	3	27	43
12:52	20.4	10	13	1	3	28	45
12:53	20.4	11	13	1	2	30	48
12:54	20.4	10	13	1	3	30	48
12:55	20.5	9	11	1	2	30	48
12:56	20.4	9	11	1	2	31	50
12:57	20.4	9	12	1	2	31	50
12:58	20.4	10	13	1	2	30	48
12:59	20.4	11	13	1	2	30	48
13:00	20.4	11	13	1	2	28	45
13:01	20.4	11	14	1	2	28	45
13:02	20.4	11	14	1	2	25	40
13:03	20.4	11	14	1	2	25	40
13:04	20.4	11	13	1	2	25	40
13:05	20.4	11	14	1	2	22	35
13:06	20.4	10	13	1	2	22	35
13:07	20.5	10	12	1	2	25	40
13:08	20.5	10	12	1	2	31	50
13:09	20.6	10	13	1	2	41	65
13:10	20.6	10	13	1	2	45	73
13:11	20.6	10	12	1	2	42	68
13:12	20.6	10	12	1	2	39	63
13:13	20.5	11	14	1	2	34	55
13:14	20.4	11	14	1	2	31	50
13:15	20.5	12	14	1	2	30	48
13:16	20.6	12	14	1	2	30	48
13:17	20.6	12	15	1	2	28	45
13:18	20.6	11	13	1	2	28	45
13:19	20.6	11	13	1	2	28	45
13:20	20.6	11	13	1	2	31	50
13:21	20.6	10	13	1	2	33	53
13:22	20.5	10	13	1	2	36	58
13:23	20.5	10	13	1	2	41	65
13:24	20.5	10	12	1	2	44	70
13:25	20.6	10	12	1	2	53	85
13:26	20.6	10	13	1	2	61	98
13:27	20.6	11	14	1	2	64	103
13:28	20.6	12	15	1	1	61	98
13:29	20.6	12	15	1	1	55	88
Max Test Result	**20.6**	**17.8**	**22.3**	**1.3**	**2.6**	**65.6**	**105.5**
Min Test Result	**20.3**	**9.0**	**11.3**	**0.7**	**1.3**	**21.9**	**35.2**
Mean Test Result	**20.5**	**12.2**	**15.2**	**1.1**	**2.2**	**39.0**	**62.6**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Dry

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon	Carbon	Nitric	Oxides of	VOCs	VOCs
08/02/2007		Monoxide	Monoxide	Oxide	Nitrogen (NO2)		
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
13:30	20.6	14	17	1	1	48	78
13:31	20.6	16	20	1	1	42	68
13:32	20.6	17	21	1	2	38	60
13:33	20.6	17	21	1	2	34	55
13:34	20.6	17	21	1	2	36	58
13:35	20.6	15	18	1	2	36	58
13:36	20.6	13	17	1	2	34	55
13:37	20.6	12	15	1	2	33	53
13:38	20.6	11	14	1	2	31	50
13:39	20.5	11	14	1	2	31	50
13:40	20.4	11	14	1	2	31	50
13:41	20.4	11	13	1	2	34	55
13:42	20.4	11	14	1	2	39	63
13:43	20.4	11	14	1	2	47	75
13:44	20.4	11	14	1	2	59	95
13:45	20.4	11	14	1	2	67	108
13:46	20.4	11	14	1	2	70	113
13:47	20.4	12	15	1	2	67	108
13:48	20.5	13	16	1	2	61	98
13:49	20.5	15	18	1	2	56	90
13:50	20.6	16	20	1	2	53	85
13:51	20.6	17	21	1	2	52	83
13:52	20.6	18	23	1	2	48	78
13:53	20.6	18	22	1	1	48	78
13:54	20.6	17	21	1	1	50	80
13:55	20.6	17	21	1	2	50	80
13:56	20.5	18	22	1	2	50	80
13:57	20.4	17	21	1	2	50	80
13:58	20.4	15	19	1	2	52	83
13:59	20.3	15	19	1	2	52	83
14:00	20.3	14	18	1	2	58	93
14:01	20.3	15	19	1	2	61	98
14:02	20.3	15	19	1	2	58	93
14:03	20.3	16	20	1	2	53	85
14:04	20.4	15	19	1	2	47	75
14:05	20.4	15	19	1	2	45	73
14:06	20.4	16	20	1	2	44	70
14:07	20.4	17	21	1	2	44	70
14:08	20.4	16	20	1	2	50	80
14:09	20.4	16	20	1	2	56	90
14:10	20.4	15	19	1	2	64	103
14:11	20.4	14	18	1	2	69	110
14:12	20.5	14	18	1	2	70	113
14:13	20.6	15	18	1	2	67	108
14:14	20.5	15	19	1	2	63	100
14:15	20.4	16	20	1	2	56	90
14:16	20.4	15	19	1	2	52	83
14:17	20.4	16	20	1	2	45	73
14:18	20.4	16	19	1	2	39	63
14:19	20.4	15	19	1	2	39	63
14:20	20.5	15	18	1	2	38	60
14:21	20.6	15	18	1	2	38	60
14:22	20.6	14	18	1	2	36	58
14:23	20.5	14	17	1	2	36	58
14:24	20.5	13	16	1	2	39	63
14:25	20.4	12	15	1	2	39	63
14:26	20.4	12	15	1	2	45	73
14:27	20.4	12	15	1	2	53	85
14:28	20.4	12	15	1	2	61	98
14:29	20.4	12	15	1	2	61	98
Max Test Result	**20.6**	**18.3**	**22.9**	**1.1**	**2.3**	**70.3**	**113.0**
Min Test Result	**20.3**	**10.8**	**13.5**	**0.7**	**1.4**	**31.3**	**50.2**
Mean Test Result	**20.5**	**14.4**	**18.0**	**0.9**	**1.8**	**48.8**	**78.4**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Dry

Site : STADCO Coventry
Date : 8 February 2007
Plant : Contrapol Incinerator
File Ref. 4261

Date	Oxygen	Carbon	Carbon	Nitric	Oxides of	VOCs	VOCs
08/02/2007		Monoxide	Monoxide	Oxide	Nitrogen (NO2)		
Time	%	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
14:30	20.4	12	15	1	2	58	93
14:31	20.5	12	15	1	2	53	85
14:32	20.4	13	17	1	2	47	75
14:33	20.4	14	18	1	2	42	68
14:34	20.4	15	19	1	2	42	68
14:35	20.4	15	19	1	2	45	73
14:36	20.4	15	18	1	2	50	80
14:37	20.4	13	17	1	2	55	88
14:38	20.4	13	17	1	2	58	93
14:39	20.5	12	15	1	2	58	93
14:40	20.5	13	16	1	2	58	93
14:41	20.5	14	17	1	2	58	93
14:42	20.4	14	17	1	2	56	90
14:43	20.4	14	17	1	2	58	93
14:44	20.4	14	17	1	2	64	103
14:45	20.4	14	18	1	2	67	108
14:46	20.4	15	18	1	2	64	103
14:47	20.5	14	18	1	2	59	95
14:48	20.6	15	18	1	2	53	85
14:49	20.5	16	21	1	2	47	75
14:50	20.4	16	20	1	2	44	70
14:51	20.5	16	21	1	2	41	65
14:52	20.5	16	21	1	1	44	70
14:53	20.6	16	21	1	1	47	75
14:54	20.6	15	19	1	1	53	85
14:55	20.6	15	18	1	1	58	93
14:56	20.6	14	18	1	2	58	93
14:57	20.6	14	17	1	1	58	93
14:58	20.5	14	18	1	2	56	90
14:59	20.5	15	18	1	2	53	85
15:00	20.4	15	19	1	2	48	78
15:01	20.4	15	19	1	2	47	75
15:02	20.4	16	20	1	2	45	73
15:03	20.4	15	19	1	2	45	73
15:04	20.4	16	20	1	2	44	70
15:05	20.4	15	19	1	2	42	68
15:06	20.4	16	19	1	2	39	63
15:07	20.4	16	20	1	2	34	55
15:08	20.4	15	18	1	2	30	48
15:09	20.4	15	18	1	2	25	40
15:10	20.4	14	18	1	2	22	35
15:11	20.4	14	18	1	2	22	35
15:12	20.4	14	17	1	2	23	38
15:13	20.4	13	16	1	2	25	40
15:14	20.4	12	15	1	2	27	43
15:15	20.5	10	13	1	2	30	48
15:16	20.5	9	11	1	2	31	50
15:17	20.5	9	11	1	2	31	50
15:18	20.5	9	12	1	2	31	50
15:19	20.5	10	13	1	2	28	45
15:20	20.5	10	13	1	2	25	40
15:21	20.5	11	14	1	2	22	35
15:22	20.5	12	14	1	2	20	33
15:23	20.5	11	13	1	2	19	30
15:24	20.5	10	13	1	2	16	25
15:25	20.5	10	13	1	2	17	28
15:26	20.5	10	12	1	2	16	25
15:27	20.5	9	11	1	2	14	23
15:28	20.5	8	10	1	2	13	20
Max Test Result	**20.6**	**16.5**	**20.6**	**1.1**	**2.3**	**67.2**	**108.0**
Min Test Result	**20.4**	**8.3**	**10.4**	**0.7**	**1.4**	**12.5**	**20.1**
Mean Test Result	**20.5**	**13.4**	**16.7**	**0.9**	**1.8**	**41.3**	**66.3**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Dry

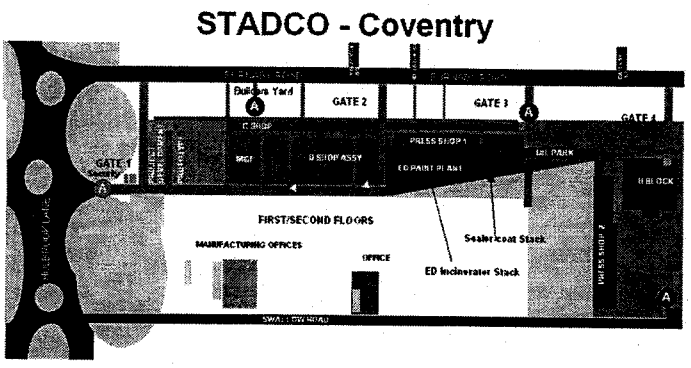
Appendix 2
(Process Data)

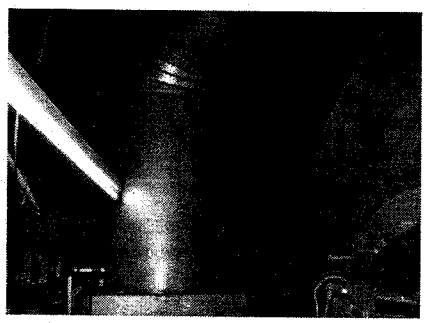
Process Data

1. ED Incinerator

The ED Incinerator was operating at normal conditions and continuously during the sampling period.

Electro Dip Particulates & VOC Monitoring 8/2/07												
Materials Used During Monitoring Exercise												
Manufacturer				**Parts Dipped**				**Description**			**Type/ identity nu**	
PPG				**As per log sheet**				**Powercron 648**			**ED 5**	
Time	**Product**	**Time**	**Product**	**Time**	**Product**	**Time**	**Product**	**Time**	**Product**	**Time**	**Product**	**Time**
7.11	305 bodyside r/h (5 off)	9.21	Taxi & parts	11.31	305 bodyside l/h x 5	13.41	N W A	15.51	Marshal Base	18.01		
7.20	305 doors r/h (12 off)	9.30	Roofs x 2	11.40	Roofs + 803 hoods	13.50	N W A	15.59	305 bodyside r/h (5 off)	18.09		
7.29	Taxi & parts	9.38	305 bodyside r/h (5 off)	11.48	Taxi & parts	13.58	N W A	16.06	305 bodyside l/h (5 off)	18.18		
7.37	Roofs, 803 Roofs	9.47	Taxi & parts	11.57	305 bodyside r/h (5 off)	14.07	N W A	16.17	305 bodyside x 5 l/h	18.27		
7.46	N W A	9.56	Taxi & parts	12.05	Roofs + Marshall parts	14.16	Taxi	16.25	305 roofs (10)	18.35		
7.54	803 Doors (12) r/h	10.04	Taxi & parts	12.14	803 x l/h bodyside x 12	14.24	803 doors (10) l/h	16.34		18.44		
8.03	Taxi & parts	10.13	305 bodyside l/h (5 off)	12.23	roofs x 2	14.33	N W A	16.43		18.53		
8.12	Roofs, 305 Roofs	10.22	S.P.L. Spares	12.32	Taxi & parts	14.42	Roofs	16.51		19.01		
8.20	l/r Doors 305 (9) 803(3)	10.30	Rem Plates	12.40	305 b/sides (5) 803 b/sides (5)	14.50	803 doors (12) l/h	17.00				
8.29	305 b/sides (3) l/h	10.39	S/L High Efficiency	12.49	305 b/sides (5)	14.59	Taxi + Parts	17.09				
8.38	Taxi & parts	10.48	Doors 12 x 803 r/h	12.58	Jig Remplates	15.07	Roofs + Taxi parts	17.17				
8.46	305 roofs (10)	10.56	Taxi & parts	12.05	Roofs	15.15	Empty	17.26				
8.55	305 b/sides (5) l/h	11.05	Roofs + rem plates	13.15	N W A	15.25	Empty	17.35				
9.04	Taxi & parts	11.14	S.P.L. Chassis	13.24	N W A	15.33	Empty	17.43				
9.12	Roofs + spl spares	11.22	Taxi & parts	13.32	N W A	15.42	Empty	17.52				





Appendix 3
(Equipment Calibration Certificate)

CES Environmental Instruments Ltd

GAS ANALYSER CALIBRATION SHEET

Gas Analyser Calibration		Client	STADCO	Date	08/02/2007
Instrument Type	Horiba PG-250	Job Number	4261	Test	1
Quality No.	C212	Site	Incinerator	Test Period	10:30-15:29

Range - Nitrogen (N2)	%
Range - Carbon Dioxide (CO2)	%
Range - Oxygen (O2)	25%
Range - Carbon Monoxide (CO)	200ppm
Range - Nitric Oxide (NO)	100ppm
Range - Nitrogen Dioxide (NO2)	ppm
Range - Sulphur Dioxide (SO2)	ppm
Range - Propane (C3H8)	ppm

Zero Gas - Nitrogen (N_2)	%	Certificate Number:	
Span Gas 1 - Carbon Dioxide (CO_2)	%	Certificate Number:	
Span Gas 1 - Oxygen (O_2)	%	Certificate Number:	
Span Gas 1 - Carbon Monoxide (CO)	100 ppm	Certificate Number:	16883-1-1
Span Gas 1 - Nitric Oxide (NO)	103ppm	Certificate Number:	16880-1-1
Span Gas 1 - Nitrogen Dioxide (NO_2)	ppm	Certificate Number:	
Span Gas 1 - Sulphur Dioxide (SO_2)	ppm	Certificate Number:	
Span Gas 1 - Propane (C3H8)	10ppm	Certificate Number:	13918-2-1

Span Gas 2 - Carbon Dioxide (CO_2)	%	Certificate Number:	
Span Gas 2 - Oxygen (O_2)	%	Certificate Number:	
Span Gas 2 - Carbon Monoxide (CO)	10ppm	Certificate Number:	16883-1-1
Span Gas 2 - Nitric Oxide (NO)	10 ppm	Certificate Number:	16880-1-1
Span Gas 2 - Nitrogen Dioxide (NO_2)	ppm	Certificate Number:	
Span Gas 2 - Sulphur Dioxide (SO_2)	ppm	Certificate Number:	
Span Gas 1 - Propane (C3H8)	ppm	Certificate Number:	

Pre-Sampling (Test Gas Entered Via Probe)

	CO_2	O_2	CO	NO	NO_2	SO_2	C_3H_8
Zero Reading	0	0	0	0		0	0
Span Gas 1 Reading			100	103			10
Span Gas 2 Reading			10	10			
Ambient Air		20.9	0	0		0	

Post-Sampling (Test Gas Entered Via Probe)

	CO_2	O_2	CO	NO	NO_2	SO_2	C_3H_8
Zero Reading	0	0	0	0		0	0
Span Gas 1 Reading			99	102			9.9
Span Gas 2 Reading			10	9			
Ambient Air		20.9	0	0		0	0

Checks completed by: Robert Allen

STADCO Coventry

Determination of Particulates
Sealer Coat Plant
Holbrook Lane, Coventry
CV6 4AW

8 February 2007

Prepared by: **CES Environmental Instruments Ltd**
Bretby Business Park
Ashby Road
Stanhope Bretby
Burton Upon Trent
DE15 OYZ

Telephone 01283 216334

Report prepared by [redacted]
R.M. Allen
MCERTS Reg No. MM 02 009

Report authorised by [redacted]
D.J. Slack
MCERTS Reg No. MM 02 100

UKAS TESTING
2338

mCERTS

Contents

Part 1: Executive Summary

Operator Company: -	STADCO Coventry
Address: -	Holbrook Lane, Coventry, CV6 4AW
Plant: -	Sealer Coat Plant
Permit Number: -	PPC/058
Monitoring Date: -	8 February 2007
Monitoring Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Analytical Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Report Number: -	EI/4261SC
Report Date: -	12 February 2007

Monitoring Objective
To monitor and quantify particulate emissions to atmosphere from the Sealer Coat Plant located at STADCO, Coventry.

Test Team
R. Allen (MCERTS Level 2, TE1, TE2, TE3, TE4 MM 02 009)
R. Ward (MCERTS Level 2, TE1, TE4 MM 02 101)
A. Orme (MCERTS Level 1 MM 04 530)
D. Littlewood (MCERTS Trainee MM 06 772)

Report authorised by ..[redacted]
D.J. Slack
MCERTS Reg No. MM 02 100

Results
Date of Sampling: 8 February 2007

Location	Pollutant	Start and End Times	Test No.	Concentration mg/Nm³	Mean Concentration mg/Nm³	Uncertainty (±) mg/Nm³	Emission Rate kg/hr	Mean Emission Rate kg/hr
Sealer Coat Plant	Particulate	10:57-11:46	1	1.0	0.5	0.2	0.041	0.021
Sealer Coat Plant	Particulate	11:54-12:36	2	0.0			0.000	
Sealer Coat Plant	Particulate	-	Blank	0.0	0.0	-	-	-

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%	-	Wet/Dry	Wet

All tests UKAS Accredited to BS EN ISO / IEC 17025 and MCERTS except where * shown

1. Introduction

STADCO placed a contract with CES Environmental Instruments Ltd to monitor and quantify the particulate emissions emitted to atmosphere from the Sealer Coat Plant. The test work was undertaken on 8 February 2007 by CES Environmental Instruments Ltd Engineers. This report described the work carried out and the results obtained.

2. Plant and Process Details and Authorisation Limits

2.1 Seal Coat Plant

The Seal Coat Plant is a wetback filter system with a single fan and stack. This is used for compliant coatings only.

2.2 Authorisation Limits

The authorisation limits as set out under Coventry City Council, Authorisation Number PPC/058.

Particulates 50 mg/m^3

3. Sampling Location

Orientation	Dimensions	Cross Sectional Area	Sample Ports Available/Used	Sampling Positions Per Plane	Standard
Vertical	1400mm x 1100mm	1.54m^2	2/2	8	BS EN 13284-1

Comments:
Sample ports: 2 off 4" BSP sockets
Sample times are calculated from the total sample time equally divided by the no. of sample positions per plane. Sample time per position must be greater than 3mins.
Pitot Traverse
Along lines A & B at positions consistent with BS 13284-1 these positions are:
6.7%, 25.0%, 75.0%, 93.3%
(10 point traverse if required 2.6%, 8.2%, 14.6%, 22.6%, 34.2%, 65.8%, 77.4%, 85.4%, 91.8%, 97.4%)
Sample Positions
Along lines A & B at as many of the positions required within the standard method as can be achieved given the clearance limitations behind each socket. BS 13284-1 requires sampling at 8 points (4 on each of two lines) these positions are:
6.7%, 25.0%, 75.0%, 93.3%

	Yes	No
Does the sample plane comply upstream?		✓
Does the sample plane comply downstream?		✓
Are the appropriate sample ports fitted?	✓	
Does the velocity air temperature profile comply?	✓	
Minimum platform area >5m^2		✓

4. Sampling Methods

Pollutant	Method	CES Procedure	Equipment	Uncertainty (±)	LOD	Accreditation	Sealer Coat
Particulates	BS EN 13284-1	WI4/1	C193	30%	0.5mg	UKAS, MCERTS	✓

Sampling Equipment: Gravimat: CES Reference C193

5. Sample Analysis

Determinand	Method	Laboratory	Date of Analysis	UKAS Accredited
Particulate	Gravimetric	CESEI	12/02/07	Y

6. Summary of Results

Location	Pollutant	Start and End Times	Test No.	Concentration mg/Nm³	Mean Concentration mg/Nm³	Uncertainty (±) mg/Nm³	Emission Rate kg/hr	Mean Emission Rate kg/hr
Sealer Coat Plant	Particulate	10:57-11:46	1	1.0	0.5	0.2	0.041	0.021
Sealer Coat Plant	Particulate	11:54-12:36	2	0.0			0.000	
Sealer Coat Plant	Particulate	-	Blank	0.0	0.0	-	-	-

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%	-	Wet/Dry	Wet

All tests UKAS Accredited to BS EN ISO / IEC 17025 and MCERTS except where * shown

7. Deviations from Standard Methods

The sample plane does not comply upstream/downstream.
The sample platform does not comply with the standard.

Part 2: Supporting Information - Appendices

Operator Company: -	STADCO Coventry
Address: -	Holbrook Lane, Coventry, CV6 4AW
Plant: -	Sealer Coat (ED) Plant
Permit Number: -	PPC/058
Monitoring Date: -	8 February 2007
Monitoring Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Analytical Company: -	CES Environmental Instruments Ltd UKAS Accreditation Number: 2338
Address: -	Bretby Business Park, Ashby Road, Stanhope, Bretby Burton on Trent, DE15 0YZ
Report Number: -	EI/4261SC
Report Date: -	12 February 2007

Test Team
R. Allen (MCERTS Level 2, TE1, TE2, TE3, TE4 MM 02 009)
R. Ward (MCERTS Level 2, TE1, TE4 MM 02 101)
A. Orme (MCERTS Level 1 MM 04 530)
D. Littlewood (MCERTS Trainee MM 06 772)

Report authorised by .....
D.J. Slack
MCERTS Reg No. MM 02 100

Contents

Appendix 1
(Extraction Protocol)

Site : STADCO, Coventry
Date : 8 February 2007
Plant : Sealer Coat Plant
File Ref. 4261

Mean Particulate Results

Filter	mg/m³	kg/hr
80365	1.0	0.041
80329	0.0	0.000
Mean	**0.5**	**0.021**

Control Blank Filter

Filter	Volume (m³)
80365	0.918
80329	0.941
Mean	**0.930**

(Reference Conditions with no correction for Oxygen)

Filter 42956

Tare Weight	**16719.2 mg**
Gross Weight	**16719.2 mg**
Gain	**0.0 mg**
Measured Oxygen	**0.0 %**
Concentration	**0.0 mg/Nm³**

Results Correct to

Temperature		Pressure		Oxygen		Gas	
°C/K	0/273	mbar/kPa	1013/101.3	%		Wet/Dry	Wet

protocol vT-measurement

08/02/2007 10:49
08/02/2007 11:51

engineer	RW/AO/DL
plant name	Sealer Coat Plant Spraybooth
place	Stadco Coventry
remarks	Normal Operations Diam= 1400mm x 1100mm

operating parameter

normal density humid	[kg / m³]	: 1.3
water vapour	[%Vol]	: 15
ambient pressure	[mbar]	: 974
duct cross-section	[m²]	: 1.54

evaluation

meas. time	[h:m:s]	: 00:05:40
volume flow in duct		
actual conditions	[m³/h]	: 45405
in norm wet	[Nm³/h]	: 41563
in norm dry	[Nm³/h]	: 35329

protocol vT-measurement 08/02/2007 10:49
08/02/2007 11:51

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_set [m³/h]	meas. time [H:M:S]	p10 [mbar]	density [kg/m³]
1	1	14	7.9	-1.0	1.36	00:00:19	1.00	1.19
1	2	14	7.7	2.9	1.39	00:00:31	1.00	1.19
1	3	14	7.7	0.3	1.39	00:00:19	1.00	1.19
1	4	14	7.4	2.8	1.35	00:00:15	1.00	1.19
1	5	14	7.6	1.9	1.37	00:00:15	1.00	1.19
1	6	14	7.5	0.1	1.35	00:00:16	1.00	1.19
1	7	14	8.2	-0.1	1.43	00:00:17	1.00	1.19
1	8	14	8.5	-2.4	1.51	00:00:15	1.00	1.19
1	9	14	8.8	-3.8	1.56	00:00:16	1.00	1.19
1	10	14	9.2	-3.3	1.63	00:00:15	1.00	1.19
2	1	14	8.1	-0.9	1.41	00:00:14	1.00	1.19
2	2	14	7.9	-0.7	1.43	00:00:22	1.00	1.19
2	3	15	7.7	-0.6	1.42	00:00:14	1.00	1.19
2	4	15	8.0	0.1	1.42	00:00:14	1.00	1.19
2	5	15	8.0	0.5	1.45	00:00:14	1.00	1.19
2	6	15	8.1	-0.3	1.46	00:00:15	1.00	1.19
2	7	15	8.4	-2.7	1.49	00:00:15	1.00	1.19
2	8	15	8.6	-0.3	1.52	00:00:15	1.00	1.19
2	9	15	9.2	-0.6	1.61	00:00:24	1.00	1.19
2	10	15	9.3	-1.4	1.67	00:00:15	1.00	1.19
		14	8.2	-0.5	1.46		1.00	1.19

protocol simultaneous isokinetic extraction measurement

08/02/2007 10:57
08/02/2007 11:46

collector-no. 365

engineer	RW/AO/DL
plant name	Sealer Coat Plant Spraybooth
place	Stadco Coventry
remarks	Normal Operations Diam= 1400mm x 1100mm

operating parameter

normal density humid	[kg / m³]	: 1.3
water vapour	[%Vol]	: 15
ambient pressure	[mbar]	: 974
duct cross-section	[m²]	: 1.54

extraction parameter

change of meas. point	[h:m:s]	: 00:05:00
points / axis		: 4
nozzles diameter	[mm]	: 8
isokinetic factor		: 1
tare weight	[mg]	: 17491.5
gross weight	[mg]	: 17492.4

evaluation

meas. time	[h:m:s]	: 00:40:00
dust weight	[mg]	: 0.90
extracted partial volume		
actual conditions	[m³]	: 1.003
in norm wet	[Nm³]	: 0.918
in norm dry	[Nm³]	: 0.780
volume flow in duct		
actual conditions	[m³/h]	: 46085
in norm wet	[Nm³/h]	: 42185
in norm dry	[Nm³/h]	: 35857
dust concentration		
actual conditions	[mg/m³]	: 0.90
in norm wet	[mg/Nm³]	: 0.98
in norm dry	[mg/Nm³]	: 1.15

protocol simultaneous isokinetic extraction measurement 08/02/2007 10:57
08/02/2007 11:46

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_act. [m³/h]	volume [m³]	meas. time [H:M:S]	p10 [mbar]	p40 [mbar]
1	1	14	8.0	0.2	1.49	0.124	00:05:00	1.00	-16
1	2	14	7.7	1.2	1.39	0.115	00:05:00	1.00	-14
1	3	14	8.5	-1.2	1.53	0.128	00:05:00	1.00	-17
1	4	14	9.3	-0.7	1.67	0.139	00:05:00	1.00	-19
2	1	15	7.9	1.7	1.44	0.120	00:05:00	1.00	-15
2	2	14	7.5	-0.4	1.36	0.113	00:05:00	1.00	-14
2	3	14	8.4	-1.1	1.51	0.126	00:05:00	1.00	-16
2	4	14	9.2	2.9	1.65	0.138	00:05:00	1.00	-19
		14	8.3	0.3	1.50	0.125		1.00	-16

protocol simultaneous isokinetic extraction measurement

08/02/2007 11:54
08/02/2007 12:36

collector-no. 329

engineer	RW/AO/DL
plant name	Sealer Coat Plant Spraybooth
place	Stadco Coventry
remarks	Normal Operations Diam= 1400mm x 1100mm

operating parameter

normal density humid	[kg / m³]	: 1.3
water vapour	[%Vol]	: 15
ambient pressure	[mbar]	: 974
duct cross-section	[m²]	: 1.54

extraction parameter

change of meas. point	[h:m:s]	: 00:05:00
points / axis		: 4
nozzles diameter	[mm]	: 8
isokinetic factor		: 1
tare weight	[mg]	: 17417.9
gross weight	[mg]	: 17417.9

evaluation

meas. time	[h:m:s]	: 00:40:00
dust weight	[mg]	: 0.00
extracted partial volume		
actual conditions	[m³]	: 1.028
in norm wet	[Nm³]	: 0.941
in norm dry	[Nm³]	: 0.800
volume flow in duct		
actual conditions	[m³/h]	: 47401
in norm wet	[Nm³/h]	: 43390
in norm dry	[Nm³/h]	: 36882
dust concentration		
actual conditions	[mg/m³]	: 0.00
in norm wet	[mg/Nm³]	: 0.00
in norm dry	[mg/Nm³]	: 0.00

protocol simultaneous isokinetic extraction measurement 08/02/2007 11:54
08/02/2007 12:36

measured values table

axis	depth	T_probe [°C]	v_duct [m/s]	angle [grd]	Q_act. [m³/h]	volume [m³]	meas. time [H:M:S]	p10 [mbar]	p40 [mbar]
1	1	14	8.3	1.6	1.51	0.126	00:05:00	1.00	-17
1	2	14	8.4	-0.9	1.51	0.126	00:05:00	1.00	-17
1	3	14	8.6	-3.6	1.55	0.130	00:05:00	1.00	-17
1	4	14	9.3	-0.5	1.68	0.140	00:05:00	1.00	-19
2	1	14	8.1	-1.9	1.43	0.119	00:05:00	1.00	-15
2	2	14	7.6	-4.6	1.38	0.115	00:05:00	1.00	-14
2	3	14	8.4	0.1	1.51	0.126	00:05:00	1.00	-16
2	4	14	9.7	-3.1	1.75	0.146	00:05:00	1.00	-20
		14	8.6	-1.6	1.54	0.128		1.00	-17

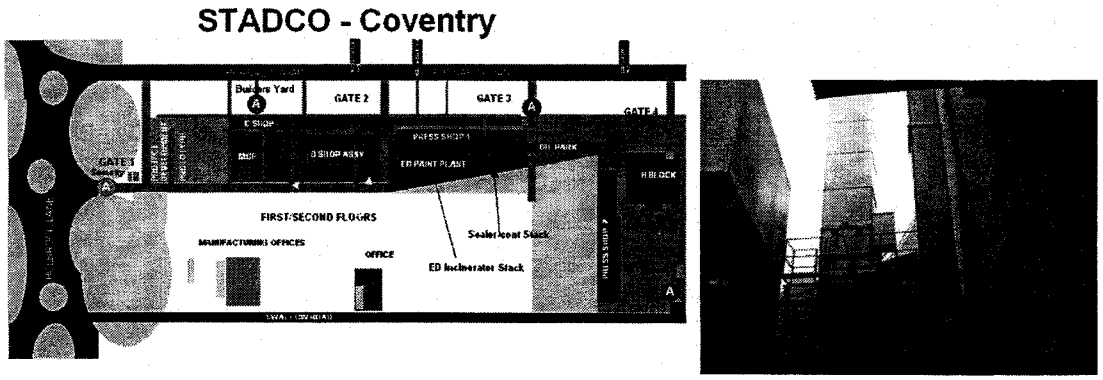
Appendix 2
(Process Data)

Process Data

1. Sealer Coat Plant

The Sealer Coat Plant was operating at normal conditions and continuously during the sampling period.

Sealercoat Particulates Monitoring 8/02/07			
Materials Used During Monitoring Exercise			
Manufacturer	**Parts Sprayed**	**Description**	**Type/ identity number**
PPG	Taxis & Parts 07.00 TO 16.30	1K Waterborne Primer CA-ral-7011-Stadcogrey	27/12/06 No 602398
Notes	14 Off Taxis & 14 Sets of Parts (Bonnet, wings etc.) Shift started at 7.00am and finished at 16.30	30 minute lunch break between 12.30 to 1.0	



Appendix 3
(Equipment Calibration Certificate)

Certificate of Calibration

Date of Issue: 16 June 2006

CES Environmental Instruments Ltd
Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel: 01283 216334 Fax: 01283 550939

[redacted]836
of 2

Certified By

Instrument Details

Instrument Type	Gravimat SHC502AE
Instrument Make	Erwin Sick
Instrument Serial No.	05218792
Quality No.	C193
Calibration Date	16/06/06
Calibrated By Name	R. Allen

Ambient Conditions

Air Temperature (°C)	26	**
Barometric Pressure (mbar)	1004	
Relative Humidity (%)	50	**

Instruments used to undertake calibration

E Type Pitot	UKAS Certificate No. N11089/06	(Qu. No. C136)
Manometer Type FC012	UKAS Certificate No. 02616	(Qu. No. C082)
Manometer Type FC012	UKAS Certificate No. 02617	(Qu. No. C081)
Barometer Type 104	UKAS Certificate No. N1151446V	(Qu. No. C138)
Gallus Dry Gas Meter	UKAS Certificate No. N2075490F	(Qu. No. C125)
RIS Supersal XT	UKAS Certificate No. N2075491E	(Qu. No. C014)

* Not UKAS traceable ** Indication only

Flow and Extraction

The reference pitot was placed in a wind tunnel located at Bretby Business Park. The Gravimat SHC-5 Sampling Probe under test was mounted within the same wind tunnel in close proximity to the reference pitot. The wind tunnel was operated to generate a differential pressure across each pitot, a direct comparison was made. The differential pressures measured were in the region of the calibration points of the reference pitot. Correction factors were applied to the reference pitot and compared to the differential pressure shown for the pitot under test. The extraction system of the unit was operated for a period of one minute.

Volume Flow

A calibrated dry gas meter was connected to the sampling nozzel ot the Gravimat SCH-5. A volume of air is pulled through the sampling system. The measured value shown on the calibrated dry gas meter is then compared to the indicated value on the Gravimat SCH-5 display.

Barometric Pressure

The barometric pressure was measured using a calibrated barometer. The indicated pressure was compared to the Gravimat SHC-5 display.

Temperature

The probe thermocouple was placed in a thermpcouple oven and heated. The temperature was measured using a calibrated thermocouple and temperature indicator. The resultant temperature was compared to the Gravimat SCH-5 display.

Current

A mA current source was injected into the Gravimat SCH-5 using a mA current generator. The injected current was compared to the Gravimat SCH-5 display.

Certificate of Calibration

Date of Issue: 16 June 2006

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel: 01283 216334 Fax: 01283 550939

[redacted]336
of 2

Certified By

Instrument Details

Instrument Type	Gravimat SHC502AE
Instrument Make	Erwin Sick
Instrument Serial No.	05218792
Quality No.	C193
Calibration Date	16/06/06

Ambient Conditions

Air Temperature (°C)	26	**
Barometric Pressure (mbar)	1004	
Relative Humidity (%)	50	**
Air Density @ 0°C (kg/m³)	1.277	
Corrected Air Density (kg/m³)	1.1556	

Calibration Details

Flow and Extraction

Applied Pressure (Pa)	Pitot Correction	Applied Pressure Corrected (Pa)	SHC5 p-dyn (Pa)	Pressure Factor	Calculated Velocity (m/s)	SHC5 Velocity (m/s)	Velocity Factor	Nozzel Diameter (mm)	Calculated Extraction (m³/hr)	SHC5 Extraction (m³/hr)	Extraction Factor
3.9	0.995	3.9	3.9	0.99	2.592	2.600	1.00	10.0	0.733	0.750	0.98
45.8	0.997	45.7	45.8	1.00	8.890	8.900	1.00	10.0	2.515	2.470	1.02
94.6	0.992	93.8	93.2	1.01	12.744	12.700	1.00	8.0	2.307	2.310	1.00
163.8	0.991	162.3	161.1	1.01	16.761	16.700	1.00	8.0	3.034	3.060	0.99
219.4	0.991	217.4	215.2	1.01	19.398	19.300	1.01	6.4	2.247	2.290	0.98

Volume Flow

Nominal Flow Rate	Actual Flow Rate	Actual Flow Rate
l/min	l/min	m³/hr
15.210	15.000	0.900
20.530	20.100	1.206
25.560	24.950	1.497
30.900	30.300	1.818

Barometric Pressure

Pressure	
Required Value (mbar)	Indicated Value (mbar)
1010.0	1010.0
1008.0	1008.0
1004.0	1004.0

Temperature

Temperature Input	
Required Value (°C)	Indicated Value (°C)
25.0	25.1
50.0	50.0
100.0	100.0
150.0	150.0
250.0	249.8
300.0	299.8

Current

Current Value	
Required Value (mA)	Indicated Value (mA)
0.0	0.0
5.0	5.0
10.0	10.0
15.0	15.0
20.0	20.0

Time

Time Period	Required Value	Within Limit
mins	mins	
3:00	2:59 → 3:01	Yes
5:00	4:59 → 5:01	Yes
10:00	9:59 → 10:01	Yes