



Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

ANNUAL EMISSIONS TEST REPORT

**Guildford Crematorium
New Pond Road
Godalming
Surrey
GU7 3DB**

17th October 2017

Report Authorised by



Date 31st October 2017

Business Manager
MCertS Level 2 + TE1
MM 03 336



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1. INTRODUCTION

The Cremator at Guildford Crematorium was monitored on the 17th October 2017 to the requirements given in Process Guidance Note PG5/2 (2012) for annual non-continuous monitoring of cremators.

The cremator is the Model FTIII manufactured by Facultatieve Technologies Limited to meet the requirements of the Environmental Permitting (England & Wales) Regulations 2010 (EPR 2010) as relevant to new crematoria installations, summarised in Process Guidance Note PG5/2 (2012).

The work involved monitoring a range of flue gas components during three cremation cycles.

All tests were conducted over a 60 minute period, commencing 2 minutes after coffin insertion into the cremator.

Measurements were undertaken to enable comparisons to be made of the operation of the cremator with the requirements of the Guidance Note in terms of emission releases to air.

This report details the monitoring procedures used and the results obtained from this test work along with comparisons with the Guidance Note requirements and comments where appropriate.

Relevant procedures were followed to enable quality control to be maintained throughout the test preparation, site test work, laboratory analysis, calculations and reporting.

2. PROCEDURES

2.1 Total Particulate Matter

A flue gas sample was extracted and filtered to collect total particulate matter. A Whatman QM-A filter paper was used with a particle retention of not less than 99.5% at a particle size of 0.3 micron. The flue gas extraction employed techniques given in BS EN 13284 Part 1. Testing was conducted using one sampling plane only to reflect the batch nature of the process. This was done to eliminate the possibility of not taking a fully representative sample due to the necessity of pausing the test during the sampling plane changeover process during a critical period in the cremation process.

The method employed was BS EN 13284 Part 1.

Particulate matter analysis was carried out by weighing the filter and probe rinse collection on a calibrated balance, with the media being dried and weighed prior to and following the test.

2.2 Hydrogen Chloride

A flue gas sample was extracted and filtered. The gas sample was then passed through an absorption medium of de-ionised water to collect hydrogen chloride.

The method employed was BS EN 1911 Parts 1-3.

Laboratory analysis for hydrogen chloride was carried out on the absorption medium using Ion Chromatography (IC).

2.3 Carbon Monoxide

A flue gas sample was continuously extracted, filtered and dried before being passed through a pre-calibrated Siemens Ultramat 23/O₂ infrared analyser for the on-line measurement of carbon monoxide. The analyser was ranged 0-1250 mg/Nm³ and was zeroed with air and calibrated with a nominal 800 ppmv carbon monoxide in balance nitrogen gas.

The method employed was BS EN 15058.

The analyser output was continuously recorded using a Grant 'Squirrel' data logger.

2.4 Volatile Organic Compounds

A flue gas sample was continuously extracted and filtered before being passed via a heated line through a pre-calibrated Signal 3030PM Flame Ionisation Detection (FID) analyser for the on-line measurement of volatile organic compounds. The analyser was ranged 0-100 ppmv total hydrocarbons and was zeroed with air passed through a catalytic converter and calibrated with a nominal 50 ppmv propane in balance air gas.

The method employed was BS EN 12619.

The analyser output was continuously recorded using a Grant 'Squirrel' data logger.

2.5 Oxygen

A flue gas sample was continuously extracted, filtered and dried before being passed through a pre-calibrated Siemens Ultramat 23/O₂ electrochemical cell analyser for the on-line measurement of oxygen. The analyser was zeroed with nitrogen gas and calibrated with air.

The method employed was BS EN 14789.

The analyser output was continuously recorded using a Grant 'Squirrel' data logger.

2.6 Moisture

A flue gas sample was extracted and filtered. The gas sample was then passed through an absorption medium of de-ionised water to collect any water vapour.

The method employed was BS EN 14790.

Flue gas moisture was determined gravimetrically by weighing the absorption medium and final gas drier prior to and following the test.

This was carried out alongside testing for hydrogen chloride.

2.7 Temperature

Flue gas temperature was measured by the insertion of a calibrated Type K thermocouple in the flue.

The method employed was BS EN 13284 Part 1.

Flue gas temperature was continuously recorded using a Grant 'Squirrel' data logger.

2.8 Velocity and Volumetric Flow

Flue gas velocity was found from inserting a calibrated s-type pitot tube into the flue. The pitot head pressure was then measured using a calibrated electronic manometer.

The method employed was BS EN 13284 Part 1.

The electronic manometer output was continuously recorded using a Grant 'Squirrel' data logger.

Flue gas velocity was then calculated from Bernoulli's equation, as the density of the flue gas was known (from measurements of flue gas moisture and temperature). Flue gas volumetric flow rate was found from the measurement of the flue duct size and hence its area and corrected to normalised conditions (again from measurements of flue gas moisture and temperature).

3. RESULTS

The results are summarised in Table 1.

All the data logs and calculations can be seen in Appendix 1.

All analysis reports can be seen in Appendix 2.



TABLE 1
Guildford Cremator No.1
Emissions Monitoring 17th October 2017
Total Particulate Matter & Hydrogen Chloride Sampling

	Test 1	Test 2	Test 3	Average	Requirement to PG5/2 (2012)
Total Particulate Matter - g/h	97.71 ± 6.87	132.33 ± 8.58	115.16 ± 8.06	115.07	<120
Hydrogen Chloride - g/h	44.02 ± 2.53	54.08 ± 3.13	84.69 ± 4.79	60.93	<300
Carbon Monoxide					
Test Average - mg/Nm ³ c.	0.80 ± 0.04	1.11 ± 0.06	0.38 ± 0.02	0.76	<100
- g/h	1.34 ± 0.07	1.26 ± 0.06	0.39 ± 0.02	1.00	<150
First 30 min Average - mg/Nm ³ c.	1.57 ± 0.08	2.18 ± 0.11	0.75 ± 0.04	-	
Second 30 min Average - mg/Nm ³ c.	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	-	
First 60 min Average - mg/Nm ³ c.	0.80 ± 0.04	1.11 ± 0.06	0.38 ± 0.02	-	
Organic Compounds - mg/Nm ³ c.	0.11 ± 0.01	0.17 ± 0.01	0.02 ± 0.00	0.10	<20
- g/h	0.19 ± 0.01	0.20 ± 0.01	0.02 ± 0.00	0.14	<30

Flue Oxygen - %v/v dry	15.59 ± 0.10	15.87 ± 0.10	16.01 ± 0.10	15.82
Flue Moisture - %v/v	5.9 ± 0.6	6.3 ± 0.6	6.5 ± 0.7	6.2
- %w/w	3.7 ± 0.4	4.0 ± 0.4	4.2 ± 0.4	4.0
Flue Temperature - Deg C	505 ± 2	520 ± 2	511 ± 2	512
Volumetric Flow - Nm ³ /h dry	3120 ± 62	2222 ± 44	2088 ± 42	2477

Note 1: All emissions as concentration levels are given as mg/Nm³ corrected to 11%v/v oxygen and dry gas

Note 2: All uncertainties (±) are calculated to a 95% confidence interval

Uncertainties estimated using the procedure suggested in the STA Quality Guidance Note QGN001-01



4. COMMENTS

The results obtained from these tests show that the cremator is compliant with the PG 5/2 (2012) requirements for the average mass release of pollutants to atmosphere that is understood to be the basis of the Permit issued by the Regulator.

There was no visible plume from the chimney throughout the testing.



5. QUALITY CONTROL

All the measurements performed were carried out to the guidance given in the appropriate listed Standards using calibrated equipment. The gas analysers were calibrated on site using suitable calibration gases.

Analysis of the sample media was carried out in-house and at an external laboratory.

For this test work the following external laboratory was used for the given determination:

Concept Life Sciences	}	Hydrogen Chloride
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APPENDIX 1

Data Logs and Calculations



Guildford Cremator No.1

Data Log

17/10/17

Test 1 Female, 75, Medium, Chipboard, 78644

Time	Flue Gas °C	Meter °C	Flue Oxygen %v/v dry	CO mg/Nm ³ c.	VOC mg/Nm ³ c.	Sample Point Pa
08:52	505	12.7	15.10	0.00	0.00	82.7
08:53	500	12.7	14.70	0.00	0.00	82.8
08:54	501	12.7	15.30	0.00	0.00	62.9
08:55	503	13.1	15.60	0.00	0.00	49.1
08:56	510	13.2	15.20	0.00	0.00	33.6
08:57	515	13.4	14.80	0.00	0.00	31.4
08:58	516	13.6	14.90	0.00	0.27	37.9
08:59	516	13.7	15.40	3.23	0.93	52.7
09:00	513	13.6	14.90	12.66	2.25	66.5
09:01	511	13.7	15.20	15.57	1.90	63.3
09:02	507	13.8	15.80	12.17	1.31	52.5
09:03	509	13.8	16.20	4.94	0.18	43.0
09:04	515	13.8	16.20	0.00	0.00	29.3
09:05	521	13.9	15.20	0.00	0.00	28.3
09:06	519	14.0	14.80	0.00	0.00	29.3
09:07	521	14.1	14.80	0.00	0.00	29.5
09:08	521	14.2	14.90	0.00	0.00	29.8
09:09	522	14.3	15.00	0.00	0.00	27.7
09:10	522	14.4	14.80	0.00	0.00	30.7
09:11	526	14.4	15.10	0.00	0.00	28.6
09:12	525	14.5	14.90	0.00	0.00	28.6
09:13	520	14.6	14.90	0.00	0.00	28.2
09:14	514	14.8	15.00	0.00	0.00	54.1
09:15	510	14.9	13.90	0.00	0.00	54.2
09:16	523	15.0	14.70	0.00	0.00	38.1
09:17	511	15.1	15.50	0.00	0.00	38.8
09:18	507	15.4	15.30	0.00	0.00	64.0
09:19	504	15.6	14.50	0.00	0.00	85.7
09:20	502	15.6	15.20	0.00	0.00	78.2
09:21	507	15.7	16.10	0.00	0.00	56.9
09:22	504	15.8	16.40	0.00	0.00	48.8
09:23	505	15.9	15.40	0.00	0.00	80.1
09:24	483	16.0	15.40	0.00	0.00	85.1
09:25	483	16.0	16.60	0.00	0.00	95.7
09:26	497	16.1	15.80	0.00	0.00	90.6
09:27	501	16.3	15.50	0.00	0.00	82.1
09:28	503	16.3	15.50	0.00	0.00	82.9
09:29	502	16.4	15.50	0.00	0.00	85.3
09:30	504	16.5	15.60	0.00	0.00	83.1
09:31	503	16.7	15.60	0.00	0.00	84.8



09:32	504	16.7	15.60	0.00	0.00	83.2
09:33	499	16.7	15.60	0.00	0.00	72.7
09:34	471	16.7	16.70	0.00	0.00	59.4
09:35	497	16.8	16.50	0.00	0.00	74.8
09:36	502	17.0	15.70	0.00	0.00	76.2
09:37	504	17.1	15.80	0.00	0.00	80.0
09:38	504	17.2	15.90	0.00	0.00	80.8
09:39	504	17.4	16.00	0.00	0.00	78.0
09:40	506	18.0	15.80	0.00	0.00	69.0
09:41	507	17.8	15.70	0.00	0.00	67.6
09:42	509	17.8	15.70	0.00	0.00	68.1
09:43	490	17.7	15.90	0.00	0.00	53.6
09:44	473	17.8	17.20	0.00	0.00	55.4
09:45	501	17.8	16.70	0.00	0.00	67.5
09:46	505	18.1	15.90	0.00	0.00	67.0
09:47	506	18.2	15.90	0.00	0.00	66.7
09:48	507	18.3	15.90	0.00	0.00	68.7
09:49	506	18.5	16.00	0.00	0.00	73.4
09:50	499	18.6	16.20	0.00	0.00	70.1
09:51	471	18.6	17.30	0.00	0.00	49.6
09:52	475	18.6	17.70	0.00	0.00	65.4
Average	505	15.7	15.59	0.80	0.11	60.4

Average for first 30 mins of test	1.57	-
Average for second 30 mins of test	0.00	-
Average for first 60 mins of test	0.80	0.11



Guildford Cremator No.1

Data Log

17/10/17

Test 2 Female, 87, Medium, Wicker, 78643

Time	Flue Gas °C	Meter °C	Flue Oxygen %v/v dry	CO mg/Nm ³ c.	VOC mg/Nm ³ c.	Sample Point Pa
10:29	489	16.5	16.00	8.84	2.22	60.0
10:30	481	16.4	18.20	39.44	5.70	62.5
10:31	505	16.5	17.10	18.09	2.72	65.7
10:32	514	16.5	16.30	1.28	0.00	44.6
10:33	524	16.6	15.30	0.00	0.00	34.0
10:34	524	16.7	15.20	0.00	0.00	36.5
10:35	526	16.9	15.40	0.00	0.00	36.6
10:36	527	17.0	15.40	0.00	0.00	36.6
10:37	529	17.1	15.30	0.00	0.00	36.5
10:38	531	17.2	15.20	0.00	0.00	36.8
10:39	532	17.3	15.20	0.00	0.00	38.1
10:40	533	17.3	15.20	0.00	0.00	35.9
10:41	538	17.4	15.10	0.00	0.00	33.7
10:42	541	17.4	15.20	0.00	0.00	33.5
10:43	539	17.5	15.20	0.00	0.00	32.9
10:44	532	17.6	15.10	0.00	0.00	13.9
10:45	508	17.6	16.80	0.00	0.00	8.1
10:46	533	17.7	16.70	0.00	0.00	12.2
10:47	571	17.7	15.60	0.00	0.00	15.1
10:48	547	17.7	12.00	0.00	0.00	14.9
10:49	531	17.7	13.30	0.00	0.00	14.4
10:50	550	17.8	15.90	0.00	0.00	28.6
10:51	539	17.8	14.30	0.00	0.00	36.1
10:52	535	17.9	14.60	0.00	0.00	48.2
10:53	532	18.0	14.90	0.00	0.00	50.4
10:54	506	18.2	15.90	0.00	0.00	29.1
10:55	503	18.2	16.90	0.00	0.00	29.7
10:56	525	18.3	15.40	0.00	0.00	43.8
10:57	518	18.4	14.60	0.00	0.00	40.5
10:58	496	18.5	16.40	0.00	0.00	25.6
10:59	523	18.6	15.70	0.00	0.00	36.7
11:00	527	18.6	14.40	0.00	0.00	45.4
11:01	527	18.6	15.10	0.00	0.00	42.9
11:02	510	18.5	16.00	0.00	0.00	20.2
11:03	505	18.5	17.00	0.00	0.00	21.7
11:04	527	18.5	16.60	0.00	0.00	29.9
11:05	527	18.7	14.60	0.00	0.00	29.1
11:06	517	18.8	15.00	0.00	0.00	17.6
11:07	508	18.9	16.80	0.00	0.00	24.5
11:08	536	18.9	15.80	0.00	0.00	29.1



11:09	525	18.9	14.10	0.00	0.00	20.6
11:10	527	19.1	16.20	0.00	0.00	11.4
11:11	513	19.1	16.40	0.00	0.00	18.8
11:12	542	19.0	15.90	0.00	0.00	23.6
11:13	531	19.0	14.00	0.00	0.00	17.6
11:14	522	19.0	16.80	0.00	0.00	14.3
11:15	505	19.1	17.50	0.00	0.00	24.4
11:16	523	19.1	16.90	0.00	0.00	32.3
11:17	502	19.3	15.50	0.00	0.00	33.3
11:18	502	19.4	15.50	0.00	0.00	20.0
11:19	501	19.4	16.70	0.00	0.00	27.2
11:20	524	19.4	17.70	0.00	0.00	30.7
11:21	507	19.4	15.60	0.00	0.00	45.1
11:22	493	19.4	15.90	0.00	0.00	22.4
11:23	512	19.4	18.50	0.00	0.00	14.0
11:24	505	19.4	19.00	0.00	0.00	29.4
11:25	509	19.5	17.10	0.00	0.00	61.9
11:26	492	19.4	16.10	0.00	0.00	23.3
11:27	487	19.4	18.40	0.00	0.00	22.2
11:28	511	19.5	18.60	0.00	0.00	41.2
11:29	502	19.5	15.00	0.00	0.00	51.2
Average	520	18.3	15.87	1.11	0.17	31.4

Average for first 30 mins of test	2.18	-
Average for second 30 mins of test	0.00	-
Average for first 60 mins of test	1.11	0.17



Guildford Cremator No.1

Data Log

17/10/17

Test 3 Male, 74, Medium, Chipboard, 78645

Time	Flue Gas °C	Meter °C	Flue Oxygen %v/v dry	CO mg/Nm ³ c.	VOC mg/Nm ³ c.	Sample Point Pa
12:03	513	17.2	16.10	2.67	0.05	77.2
12:04	495	17.3	16.70	10.07	0.78	54.9
12:05	487	17.4	17.10	6.72	0.47	49.6
12:06	507	17.6	16.90	0.98	0.00	58.7
12:07	519	17.7	15.20	0.00	0.00	45.9
12:08	504	17.9	15.90	0.00	0.00	26.3
12:09	503	18.1	15.20	0.00	0.00	31.8
12:10	502	18.2	14.80	0.00	0.00	32.8
12:11	503	18.4	14.90	0.00	0.00	39.0
12:12	504	18.4	14.30	0.60	0.00	45.4
12:13	501	18.5	15.10	0.85	0.00	43.3
12:14	498	18.5	15.70	1.33	0.00	34.7
12:15	497	18.6	16.30	0.00	0.00	25.2
12:16	512	18.7	16.70	0.00	0.00	36.8
12:17	524	18.9	15.20	0.00	0.00	34.6
12:18	517	19.0	15.80	0.00	0.00	14.4
12:19	515	19.1	16.30	0.00	0.00	9.4
12:20	520	19.1	15.20	0.00	0.00	9.8
12:21	520	19.1	14.90	0.00	0.00	9.7
12:22	510	19.2	14.90	0.00	0.00	14.7
12:23	533	19.4	15.00	0.00	0.00	34.0
12:24	519	19.5	14.60	0.00	0.00	22.5
12:25	513	19.6	16.70	0.00	0.00	27.8
12:26	529	19.5	15.80	0.00	0.00	45.6
12:27	524	19.4	14.80	0.00	0.00	51.5
12:28	503	19.5	16.00	0.00	0.00	26.4
12:29	509	19.5	16.20	0.00	0.00	18.9
12:30	501	19.7	15.70	0.00	0.00	21.1
12:31	523	19.8	15.50	0.00	0.00	34.4
12:32	506	19.9	13.90	0.00	0.00	29.7
12:33	504	20.1	15.90	0.00	0.00	17.4
12:34	514	20.0	16.00	0.00	0.00	29.1
12:35	521	19.8	14.80	0.00	0.00	29.6
12:36	510	20.0	15.50	0.00	0.00	18.3
12:37	510	20.1	16.60	0.00	0.00	17.6
12:38	519	20.1	16.40	0.00	0.00	31.6
12:39	519	20.0	14.60	0.00	0.00	29.6
12:40	511	19.8	16.10	0.00	0.00	16.6
12:41	515	19.8	16.80	0.00	0.00	13.1
12:42	521	19.9	16.70	0.00	0.00	11.1
12:43	512	20.0	16.40	0.00	0.00	21.7



12:44	529	20.1	15.30	0.00	0.00	20.2
12:45	524	19.9	14.90	0.00	0.00	10.2
12:46	509	19.9	16.80	0.00	0.00	17.4
12:47	537	20.0	16.40	0.00	0.00	22.4
12:48	530	20.1	14.10	0.00	0.00	16.4
12:49	524	20.2	15.30	0.00	0.00	12.9
12:50	510	20.3	16.90	0.00	0.00	15.9
12:51	506	20.4	17.30	0.00	0.00	15.4
12:52	495	20.5	17.60	0.00	0.00	19.9
12:53	514	20.5	17.80	0.00	0.00	33.1
12:54	508	20.5	15.90	0.00	0.00	21.6
12:55	490	20.6	17.90	0.00	0.00	21.5
12:56	520	20.7	17.90	0.00	0.00	40.9
12:57	519	20.8	14.30	0.00	0.00	21.5
12:58	506	20.8	16.30	0.00	0.00	15.4
12:59	500	20.9	18.30	0.00	0.00	14.8
13:00	494	21.0	18.60	0.00	0.00	23.1
13:01	513	21.0	17.70	0.00	0.00	55.0
13:02	491	21.0	15.70	0.00	0.00	19.0
13:03	487	20.9	18.30	0.00	0.00	23.2
Average	511	19.5	16.01	0.38	0.02	27.6

Average for first 30 mins of test	0.75	-
Average for second 30 mins of test	0.00	-
Average for first 60 mins of test	0.38	0.02



Guildford Cremator No.1

Total Particulate Matter and Hydrogen Chloride

Contract Guildford Crematorium, DEM1060
Date 17th October 2017
Location Cremator Stack
Engineer(s) SA & ST
Absorbent H₂O

Test Log	Test 1		Test 2		Test 3	
Barometric Pressure(kPa)	102.1		102.0		102.0	
Gas Meter Temperature(Deg C)	15.7		18.3		19.5	
Oxygen Concentration(%v/v dry)	15.59		15.87		16.01	
Flue Gas Volumetric Flow(Nm ³ /h dry)	3120		2222		2088	
Time	Start	End	Start	End	Start	End
Gas Meter Reading(Am ³ dry)	08:52	09:52	10:29	11:29	12:03	13:03
Absorber Weight(g)	1.680	2.192	2.307	2.672	2.774	3.094
Filter Reference	3547.1	3571.6	3317.4	3335.9	3545.2	3562.1
Filter Weight(g)	GU171017F1		GU171017F2		GU171017F3	
Probe Rinse Reference	0.53578	0.54980	0.53260	0.55142	0.53285	0.54806
Probe Rinse Weight(g)	GU171017R1		GU171017R2		GU171017R3	
Sample Reference HCl	77.8307	77.8320	77.8320	77.8336	77.8336	77.8350
Absorbent Volume(ml)	GU171017H1		GU171017H2		GU171017H3 A&B	
Absorbent(mg/l as HCl)	500		500		250	
Blank(mg/l as HCl)	14		17		32	
	0.23		0.23		0.23	

Calculation: General

Barometric Pressure(kPa)	102.1	102.0	102.0
Gas Meter temperature(Deg C)	15.7	18.3	19.5
Gas Volume Sampled(Am ³ dry)	0.512	0.365	0.320
Gas Volume Sampled(Nm ³ dry)	0.4880	0.3445	0.3007
Mass of Dry Gas(g @ 1292.8 g/Nm ³)	630.86	445.32	388.72
Change in Absorber Weight(g)	24.5	18.5	16.9
Water Vapour Volume(Nm ³ @ 803.9 g/Nm ³)	0.0305	0.0230	0.0210
Gas Volume(Nm ³ wet)	0.5185	0.3675	0.3217
Mass of Wet Gas(g)	655.36	463.82	405.62
Moisture Concentration(%v/v)	5.9	6.3	6.5
Moisture Concentration(%w/w)	3.7	4.0	4.2



Calculation: Particulate

Increase In Filter Weights(g)	0.01528	0.02052	0.01658
Particulate Emission(mg/Nm ³ dry)	31.32	59.56	55.14
Oxygen Concentration(%v/v dry)	15.59	15.87	16.01
Particulate Emission (mg/Nm³ @ 11 %v/v Oxygen dry)	58.12	116.67	111.03
Flue Gas Volumetric Flow(Nm ³ /h dry)	3120	2222	2088
Particulate Emission(g/h)	97.71	132.33	115.16
Required Sample Velocity(Nm/s)	5.43	3.86	3.63
Nozzle Used(mm)	5.5	5.5	5.5
Area of Nozzle(m ²)	0.00002376	0.00002376	0.00002376
Test Duration(mins)	60	60	60
Actual Sample Velocity(Nm/s)	5.71	4.03	3.52
Isokinetic Closure(%)	105	104	97
		102	

Calculation: HCl

Absorbent(mg/l as HCl)	14.00	17.00	49
Blank(mg/l as HCl)	0.23	0.23	0.23
Chloride Absorbed(mg/l as HCl)	13.77	16.77	48.77
Chloride Absorbed(mg as HCl)	6.89	8.39	12.19
HCl(mg)	6.89	8.39	12.19
HCl Emission(mg/Nm ³ dry)	14.11	24.34	40.55
Oxygen Concentration(%v/v dry)	15.59	15.87	16.01
HCl Emission (mg/Nm³ @ 11 %v/v Oxygen dry)	26.18	47.68	81.64
Flue Gas Volumetric Flow(Nm ³ /h dry)	3120	2222	2088
HCl Emission(g/h)	44.02	54.08	84.69



Guildford Cremator No.1

Flue Gas Volumetric Flow

Contract Guildford Crematorium, DEM1060
Date 17th October 2017
Location Cremator Stack
Engineer(s) SA & ST

Test Log	Test 1	Test 2	Test 3
Flue Gas Temperature(Deg C)	505	520	511
Flue Gas Pitot Head Sample Points(Pa)	60.4	31.4	27.6
Flue Gas Pitot Head Duct Mean(Pa)	60.9	31.7	27.8
Flue Gas Moisture(%v/v)	5.9	6.3	6.5
Flue Gas Moisture(%w/w)	3.7	4.0	4.2
Flue Gas Duct Dimensions(mm)	450mm dia. Duct		
Flue Gas Duct Area(m ²)	0.1590		

Calculation

Flue Gas Density(kg/m ³)	0.4471	0.4386	0.4431
<u>Sample Points</u>			
Flue Gas Velocity(Am/s)	16.44	11.97	11.16
Flue Gas Volumetric Flowrate(Am ³ /h)	9412	6853	6387
Flue Gas Volumetric Flowrate(Am ³ /h dry)	8858	6424	5970
Flue Gas Volumetric Flowrate(Nm ³ /h dry)	3107	2213	2079
<u>Duct Mean</u>			
Flue Gas Velocity(Am/s)	16.50	12.02	11.21
Flue Gas Volumetric Flowrate(Am ³ /h)	9450	6882	6417
Flue Gas Volumetric Flowrate(Am ³ /h dry)	8894	6451	5998
Flue Gas Volumetric Flowrate(Nm³/h dry)	3120	2222	2088



Davies & Co. (Environmental) Ltd
Emissions Monitoring Specialists

APPENDIX 2

Analysis Reports

Concept Life Sciences Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2404

Report Number: 691827-1

Date of Report: 30-Oct-2017

Customer: Davies & Co (Environmental)
Moor Road
Leeds
LS10 2DD

Customer Contact: . Reports

Customer Job Reference: DEM1060
Customer Purchase Order: 50001514
Date Job Received at Concept: 25-Oct-2017
Date Analysis Started: 25-Oct-2017
Date Analysis Completed: 30-Oct-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked
and authorised by :
[Redacted]
Customer Service Advisor

Issued by : [Redacted]
Signature valid
[Redacted]
Customer Service Advisor
Reason Issue Location SAL 05 GMT

Page 1 of 2
691827-1



Concept Reference: 691827					
Customer Reference: DEM1060					
Impinger(DI water) Analysed as Impinger(DI water)					
Hydrogen Chloride					
Concept Reference	691827 001	691827 002	691827 003	691827 004	691827 005
Customer Sample Reference	GU171017 H1	GU171017 H2	GU171017 H3A	GU171017 H3B	GU171017 HOB
Test Sample	AR	AR	AR	AR	AR
Date Sampled	17-OCT-2017	17-OCT-2017	17-OCT-2017	17-OCT-2017	17-OCT-2017
Determinand	Method	LOD	Units	Symbol	
Hydrogen Chloride	IC	0.05	mg/l	U	(13) 14 (13) 17 (13) 32 (13) 17 (13) 0.23

Index to symbols used in 691827-1

Value	Description
AR	As Received
13	Results have been blank corrected
U	Analysis is UKAS accredited

**Davies & Co. (Environmental) Ltd***Emissions Monitoring Specialists***Particulate Weight Determination**

Filter / Rinse Reference		Clean Dry Weight g	Dirty Dry Weight g
GU171017F1	K12	0.53578	0.54980
GU171017F2	K13	0.53260	0.55142
GU171017F3	K14	0.53285	0.54806
GU171017R1	1	77.83069	77.83195
GU171017R2	2	77.83195	77.83365
GU171017R3	3	77.83365	77.83502

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