CLOW

CLOW WATER SYSTEMS COMPANY

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Coshocton, Ohio 43812-6001
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RECEIVED
MAY 31 2013
AIR ENFORCEMENT BRANCH
U.S. EPA REGION 5

May 29, 2013

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James M. Proctor II
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JMProctor@mcwane.com

Jeet Radia
McWane, Inc.
jradia@mcwane.com

Re: Consent Decree Civil Action No. [CV] 10-JEO-1902-S
NESHAP 40 CFR Part 63 Subpart ZZZZZ

Dear Sir/Madam:

Clow Water Systems Company (Clow) conducted a stack test on May 2, 2013 of its Cupola Scrubber System (P901) to demonstrate compliance with the Emission Limit of 0.078 pounds of particulate matter per ton of metal melted as required by the Consent Decree (Appendix 3 (III)).

In addition, observations were made for opacity at the Cupola Shroud and Flange Fabrication central roof vent using Method 9 and Method 22 respectfully in accordance with NESHAP 40 CFR Part 63 Subpart ZZZZZ.

A copy of the stack test report is enclosed. The results of the stack test are summarized below. All values are averages of three 60-minute test runs.

Emission Rate (lb PM/ton metal melted):	0.046
Operating Rate (ton metal melted/hr):	76
Scrubber System Total Pressure Drop (in. H_20):	76
Ring Jet Water Flow Rate (gpm):	752
Ring Jet Pump Pressure (psi):	34
Venturi Water Flow Rate (gpm):	359
Venturi Pump Pressure (psi):	13
Method 9 Cupola Shroud (max % VE):	15
Method 22 Flange Fabrication vent:	no VE observed

If you have any questions regarding the enclosed, please contact me at (740) 291-1087.

Sincerely,

Heather Rainwater

Heather Rainwater
Environmental Manager
Clow Water Systems Company

Superior Quality Emission Testing.

Valid Results Guaranteed.

Air Compliance Testing, Inc.

P.O. Box 41156 Cleveland, Ohio 44141
1-800-EPA-AIR1 www.aircomp.com
testing@aircomp.com

May 28, 2013

Heather Rainwater
Environmental Manager
Clow Water Systems Co.
PO Box 6001
Coshocton, Ohio 43812-6001

Dear Heather:

The following report provides the results of the compliance emission testing conducted on May 2, 2013. These results are a product of the application of the U.S. EPA Stationary Source Sampling Methods listed in 40 CFR Part 60 Appendix A that were in effect at the time of this test. To the best of my knowledge, this report has been checked for completeness, and the results presented are accurate, error-free, legible, and representative of the actual emissions measured during testing.

Please mail one copy of this report along with any other supportive process operating data collected during this test to your local EPA representative. You should also attach a cover letter (on company letterhead) stating the purpose and the outcome of this test. Additionally, you may address, preferably in a timetable format, any obligations or implications that might be necessary to achieve environmental compliance because of the result of this test.

Please do not hesitate to call if you have any questions or concerns about these test results. On behalf of Air Compliance Testing, I would also like to personally thank you for the opportunity to work with you on this testing project and would enjoy the opportunity to work with you again on any additional future testing projects.

Sincerely,

Robert J. Lisy, Jr.
Technical Manager

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1.0 INTRODUCTION

1.1 Summary of Test Program

Clow Water Systems Co. (Facility ID: 06-16-01-0006), located in Coshocton, Ohio, contracted Air Compliance Testing, Inc. of Cleveland, Ohio, to conduct compliance stack emission testing for their Cupola Emission System (P901). Testing was performed to satisfy the emission testing requirements pursuant to Appendix 3 Section III of the McWane, Inc. Consent Decree and the testing requirements outlined in the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries Area Sources (40 CFR Part 63 Subpart ZZZZZ). The testing was performed on May 2, 2013.

Sampling was performed at the P901 Scrubber Exhaust Stack to determine the emissions of filterable particulate matter (PM). In addition, observations were performed at the P901 Scrubber System Shroud Area to determine the percent opacity of visible emissions (VE's) and at the Flange Fabrication Building to determine the frequency of fugitive emissions. Testing was conducted during maximum achievable operations. During this test, emissions from P901 were controlled by an afterburner, wet cap, venturi scrubber, and Ring Jet scrubber system which includes packed bed, Ring Jets and demister.

The test methods that were conducted during this test were EPA Methods 1, 2, 3, 4, 5, and 9. EPA Method 22 observations were performed by Clow Water Systems personnel.

1.2 Key Personnel

The key personnel who coordinated this test program (and their phone numbers) were:

Heather Rainwater, Environmental Manager, Clow Water Systems Company, 740-622-6651
Marco Deshaies, Ohio EPA, SEDO DAPC, 740-380-5255
Tyson Houchin QSTI, Operations Director, Air Compliance Testing, Inc., 800-372-2471
Sin Hoi Chiew QI, Reporting Engineer, Air Compliance Testing, Inc., 800-372-2471

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

2.1 Objectives and Test Matrix

The purpose of this test was to determine the emissions of filterable PM at the P901 Scrubber System Exhaust Stack, the percent opacity of VE's at the P901 Scrubber System Shroud Area, and the frequency of fugitive emissions at the Flange Fabrication Building during maximum achievable operations. Testing was performed to satisfy the emission testing requirements pursuant to Appendix 3 Section III of the McWane, Inc. Consent Decree and the testing requirements outlined in 40 CFR Part 63 Subpart ZZZZZ.

The specific test objectives for this test were to:

Measure the concentration of filterable PM at the P901 Scrubber System Exhaust Stack.

Measure the dry standard and actual volumetric flow rate of the stack gas at the P901 Scrubber Exhaust Stack.

Utilize the above variables to determine the emissions of filterable PM at the P901 Scrubber Exhaust Stack during maximum achievable operations.

Determine the VE's (as %-opacity) at the P901 Scrubber System Shroud Area during maximum achievable operations.

Table 2.1 presents the sampling and analytical matrix log for this test.

2.2 Field Test Changes and Problems

No field test changes or problems occurred during the performance of this test that would bias the accuracy of the results of this test.

2.3 Presentation of Results

A single sampling train was utilized during each run at the P901 Scrubber Exhaust Stack to determine the emissions of filterable PM. This sampling train measured the stack gas volumetric flow rate, dry molecular weight, moisture content, and concentration of filterable PM.

Table 2.2 displays the emissions of filterable PM measured at the P901 Scrubber Exhaust Stack.

Table 2.3 summarizes the VE results. The table displays the minimum, maximum, and six-minute average opacity readings. Table 2.3 also displays the frequency of fugitive emissions recoded at the Flange Fabrication Building. Fugitive emission frequencies were recorded by Clow Water Systems personnel.

Tables 2.4.1 - 2.4.3 display the measured results for the VE readings at the P901 Scrubber System Shroud Area. The data displays the minimum, maximum, and maximum six-minute average opacity readings.

			EPA TEST METHODS UTILIZED			
			M1/M2 (Flow)	M3 (Dry Mol. Wt.)	M4 (%H_2O)	M5 (Filterable PM)
Date	Run No.	Sampling Location	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)
5/2/2013	1	P901 Scrubber Exhaust Stack	7:43 - 8:51 60	7:43 - 8:51 60	7:43 - 8:51 60	7:43 - 8:51 60
5/2/2013	2	P901 Scrubber Exhaust Stack	9:17 - 10:24 60	9:17 - 10:24 60	9:17 - 10:24 60	9:17 - 10:24 60
5/2/2013	3	P901 Scrubber Exhaust Stack	10:50 - 11:54 60	10:50 - 11:54 60	10:50 - 11:54 60	10:50 - 11:54 60

All times are Eastern Daylight Time.

Table 2.1 - Sampling and Analytical Matrix

	P901 Scrubber Exhaust Stack			
	Run 1	**Run 2**	**Run 3**	**Average**
Total Metal Charged (ton/hr)*	81	78	67	75
Filterable Particulate Matter Mass Emission Rate (lb/ton)	0.044	0.043	0.049	0.046
Filterable Particulate Matter Mass Emission Rate (lb/hr)	3.58	3.36	3.32	3.42
Filterable Particulate Matter Concentration (grains/dscf)	0.0077	0.0071	0.0072	0.0073
Stack Gas Average Flow Rate (acfm)	67,184	68,364	67,338	67,629
Stack Gas Average Flow Rate (scfm)	57,687	58,347	57,509	57,848
Stack Gas Average Flow Rate (dscfm)	54,554	54,843	53,771	54,389
Stack Gas Average Velocity (fpm)	3,074	3,128	3,081	3,095
Stack Gas Average Static Pressure (in-H_2O)	-0.83	-0.40	-0.63	-0.62
Stack Gas Average Temperature (°F)	140	144	144	143
Stack Gas Percent by Volume Moisture (%H_2O)	5.43	6.01	6.50	5.98
Measured Stack Inner Diameter (in)†	63.30	63.30	63.30	63.30
Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	11.00	12.47	11.00	11.49
Percent by Volume Oxygen in Stack Gas (%-dry)	12.00	12.37	11.50	11.96
Percent by Volume Nitrogen in Stack Gas (%-dry)	77.00	75.17	77.50	76.56

* Provided by Clow Water Systems personnel.

† The P901 Scrubber Exhaust Stack was elliptical in shape.

Table 2.2 - Emission Results

Date	Run No.	Sampling Location	Test Run Start Time	Test Run Stop Time	Test Run Duration (min)	Minimum Reading (%-opacity)	Maximum Reading (%-opacity)	Highest Six-Minute Average (%-opacity)
5/2/2013	1	P901 Scrubber System Shroud Area	7:45	8:45	60	0.0	15.0	5.2
5/2/2013	2	P901 Scrubber System Shroud Area	9:17	10:17	60	0.0	15.0	8.1
5/2/2013	3	P901 Scrubber System Shroud Area	10:50	11:50	60	0.0	15.0	6.3

Date	Run No.	Sampling Location	Test Run Start Time	Test Run Stop Time	Test Run Duration (min)	Accumulated Emission Time (min)
5/2/2013	1	Flange Fabrication Building	7:56	8:46	40	0.0
5/2/2013	2	Flange Fabrication Building	9:18	10:08	40	0.0
5/2/2013	3	Flange Fabrication Building	10:52	11:42	40	0.0

Note: EPA Method 22 observations were performed by Clow Water Systems personnel.

Table 2.3 - Opacity Test Result Summary

Max 6 min average	5.21
Minimum Reading	0
Maximum Reading	15.00
Start Time	7:45
End Time	8:45

Sec.	0	15	30	45	Six minute averages:			
Min.								
0	0	10	0	5	3.13	3.33	2.92	2.92
1	5	10	0	0	2.92	2.71	2.50	2.71
2	0	0	0	0	2.92	2.92	2.92	3.33
3	5	5	15	5	3.75	3.75	3.75	3.13
4	0	0	0	0	2.92	2.92	3.13	3.54
5	5	0	5	5	3.54	3.75	3.96	4.17
6	5	0	0	5	4.17	3.96	3.96	3.96
7	0	5	5	5	3.96	4.17	3.96	3.75
8	0	0	10	10	3.75	4.17	4.58	4.17
9	5	5	0	0	3.96	3.96	4.17	4.38
10	0	5	10	0	4.38	4.38	4.17	3.75
11	10	5	10	5	3.96	3.75	3.54	3.13
12	0	0	0	5	3.13	3.75	3.75	3.96
13	5	0	0	5	3.96	3.96	4.17	4.17
14	10	10	0	5	4.38	4.38	4.38	4.58
15	5	10	5	0	4.38	4.17	3.96	3.75
16	0	0	0	5	3.96	4.17	4.38	4.38
17	5	0	0	5	4.38	4.17	4.17	4.17
18	15	0	5	5	3.96	3.33	3.54	3.54
19	5	5	0	10	3.33	3.13	2.92	2.92
20	10	10	5	0	2.50	2.08	1.88	1.88
21	0	5	0	5	2.08	2.71	2.71	2.92
22	5	5	0	5	2.92	3.13	3.13	3.13
23	0	0	0	0	2.92	3.13	3.13	3.13
24	0	5	5	0	3.13	3.13	2.92	2.92
25	0	0	0	0	3.13	3.13	3.33	3.33
26	0	5	5	5	3.33	3.33	3.33	3.54
27	15	5	5	5	3.33	2.71	2.92	2.92
28	10	5	0	0	2.71	2.71	2.92	2.92
29	5	0	0	0	2.92	2.71	2.92	3.13
30	0	0	5	5	3.13	3.33	3.54	3.33
31	0	5	0	0	3.33	3.75	3.75	3.75
32	0	5	10	0	3.75	3.75	3.75	3.54
33	0	10	5	0	3.54	4.17	3.75	3.96
34	10	10	0	0	4.17	3.96	3.96	4.17
35	0	5	5	0	4.79	4.79	4.58	4.38
36	5	5	0	5	4.38	4.17	3.96	4.17
37	10	5	0	0	4.17	3.96	3.75	3.96
38	0	5	5	0	4.38	4.58	4.79	4.58
39	15	0	10	5	5.00	4.79	5.21	4.79
40	5	10	5	15	4.79	5.00	4.58	4.58
41	0	0	0	0	4.17	4.17	4.38	4.38
42	0	0	5	5	4.38	4.38	4.58	4.38
43	5	0	5	10	4.38	4.38	4.38	4.17
44	5	10	0	10	3.75	3.54	3.13	3.13
45	10	10	0	5	2.71	2.29	1.88	1.88
46	10	0	5	5	1.67	1.25	1.25	1.04
47	0	5	0	0	1.04	1.04	0.83	0.83
48	0	5	0	5	0.83	1.04	0.83	0.83
49	5	0	0	0	0.63	0.42	0.42	0.42
50	0	0	0	0	0.83	1.25	1.46	1.88
51	0	0	0	0	2.29	2.50	2.50	2.71
52	0	0	0	5	2.71	2.71	3.13	3.54
53	0	0	0	0	3.33	3.54	3.54	3.54
54	5	0	0	0	3.75			
55	0	0	0	10				
56	10	5	10	10				
57	5	0	5	0				
58	0	10	10	0				
59	5	0	0	5				

Table 2.4.1 - Visible Emissions

Max 6 min average	8.13
Minimum Reading	0
Maximum Reading	15.00

Start Time	9:17
End Time	10:17

Sec.	0	15	30	45	Six minute averages:			
Min.								
0	5	5	10	5	4.58	4.79	4.79	4.58
1	5	0	5	0	4.79	4.79	4.79	5.00
2	5	5	0	5	5.21	5.00	4.79	4.79
3	10	10	5	5	4.79	4.58	4.38	4.17
4	5	5	5	0	4.38	4.17	4.38	4.38
5	0	5	0	10	4.38	4.58	4.58	5.00
6	10	5	5	10	5.00	5.00	5.21	5.42
7	5	0	10	5	5.63	5.83	6.04	5.83
8	0	0	0	5	5.83	6.04	6.25	6.46
9	5	5	0	10	6.25	6.04	6.25	6.88
10	0	10	5	0	7.08	7.50	7.29	7.50
11	5	5	10	10	8.13	8.13	7.92	7.71
12	10	10	10	15	7.29	6.88	6.67	6.46
13	10	5	5	5	6.04	6.04	6.25	6.46
14	5	5	5	0	6.46	6.25	6.46	6.88
15	0	10	15	15	7.50	7.92	7.92	7.29
16	10	5	10	15	7.08	6.88	6.88	6.46
17	5	0	5	0	5.83	5.63	5.63	5.42
18	0	5	5	5	5.42	5.42	5.42	5.42
19	10	10	10	5	5.42	5.00	4.79	4.58
20	0	10	15	15	4.38	4.79	4.58	3.96
21	10	10	0	10	3.33	2.92	2.50	2.50
22	5	5	0	0	2.08	1.88	1.67	2.08
23	0	0	0	0	2.29	2.50	2.71	2.71
24	0	5	5	5	2.92	2.92	2.92	2.71
25	0	5	5	0	2.50	2.50	2.29	2.08
26	10	5	0	0	2.29	2.08	2.08	2.50
27	0	0	0	0	2.50	2.50	2.71	2.92
28	0	0	10	5	3.13	3.54	3.54	3.54
29	5	5	0	5	3.54	3.75	4.17	4.58
30	0	5	0	0	4.58	4.58	4.58	4.79
31	0	0	0	5	5.21	5.63	5.83	5.83
32	5	5	10	0	5.63	5.63	5.63	5.42
33	0	5	5	5	5.42	5.42	5.83	6.04
34	10	0	10	5	6.25	6.46	7.08	7.29
35	10	15	10	5	7.50	7.50	7.08	6.88
36	0	5	5	10	6.88	7.08	7.08	7.08
37	10	5	0	0	7.08	6.67	6.88	7.08
38	5	5	5	0	7.08	7.29	7.29	7.08
39	0	15	10	10	7.08	7.08	6.46	6.25
40	15	15	15	10	6.04	5.63	5.42	5.00
41	10	5	5	5	4.79	4.38	4.38	4.38
42	5	5	5	10	4.58	4.58	4.58	4.38
43	0	10	5	0	3.96	4.17	3.75	3.54
44	10	5	0	0	3.54	3.33	3.13	3.33
45	0	0	5	5	3.54	3.54	3.75	3.54
46	5	10	5	5	3.54	3.54	3.13	2.92
47	0	5	5	10	2.71	2.71	2.50	2.29
48	5	5	0	0	1.88	1.67	1.67	1.88
49	5	0	0	0	2.08	1.88	1.88	1.88
50	5	0	5	5	2.08	1.88	2.29	2.50
51	0	5	0	5	2.50	2.71	2.71	2.92
52	5	0	0	0	2.71	2.50	2.71	3.13
53	0	0	0	0	3.54	3.96	4.17	4.38
54	0	5	5	5	4.58			
55	0	0	0	5				
56	0	10	10	5				
57	5	5	5	0				
58	0	5	10	10				
59	10	5	5	5				

Table 2.4.2 - Visible Emissions

Max 6 min average	6.25
Minimum Reading	0
Maximum Reading	15.00

Start Time	10:50
End Time	11:50

Sec.	0	15	30	45	Six minute averages:			
Min.								
0	0	5	0	10	4.79	5.21	5.21	5.21
1	5	5	10	5	4.79	4.58	4.38	3.96
2	0	10	10	5	3.75	3.75	3.33	2.92
3	0	0	5	5	2.92	3.13	3.33	3.13
4	5	5	5	5	3.13	2.92	2.71	2.71
5	0	5	5	10	2.92	3.13	3.13	2.92
6	10	5	0	0	2.50	2.08	2.08	2.29
7	0	0	0	0	2.50	2.92	3.33	3.54
8	0	0	0	5	3.96	3.96	4.17	4.38
9	5	5	0	5	4.17	3.96	3.75	3.96
10	0	0	5	10	3.75	3.75	3.75	3.75
11	5	5	0	0	3.54	3.33	3.13	3.33
12	0	5	5	5	3.33	3.33	3.13	2.92
13	10	10	5	10	2.71	2.29	2.08	2.08
14	0	5	5	0	1.88	1.88	1.88	1.67
15	0	0	5	0	1.67	1.67	1.88	2.08
16	0	0	5	5	2.29	2.50	2.71	2.92
17	0	0	5	0	3.13	3.54	3.54	3.33
18	0	0	0	0	3.54	3.75	4.17	4.38
19	0	5	5	5	4.38	4.38	4.17	4.17
20	0	5	0	0	4.17	4.38	4.38	4.58
21	0	5	10	5	4.79	5.21	5.21	5.00
22	5	5	10	10	5.00	4.79	5.00	5.00
23	10	0	0	5	5.00	4.79	5.00	5.42
24	5	10	5	0	5.63	5.63	5.21	5.00
25	0	0	5	5	5.21	5.42	5.63	5.63
26	5	5	5	5	5.83	6.04	6.04	6.04
27	10	5	5	5	6.04	5.63	5.63	5.63
28	0	10	10	10	5.83	5.83	5.42	5.21
29	5	5	10	10	4.79	4.79	4.79	4.58
30	5	0	0	5	4.17	3.96	3.96	4.17
31	5	5	5	10	4.17	3.96	3.96	3.96
32	10	5	5	5	3.96	3.96	4.17	4.17
33	0	5	5	10	4.17	4.58	4.58	5.00
34	0	0	5	0	5.00	5.21	5.63	5.83
35	5	5	5	0	6.04	6.25	6.25	6.04
36	0	0	5	5	6.04	6.04	6.04	5.83
37	0	5	5	10	5.83	6.04	5.83	6.04
38	10	10	5	5	6.04	5.63	5.21	5.00
39	10	5	15	10	4.79	4.58	4.58	4.17
40	5	10	10	5	3.96	3.96	3.54	3.33
41	10	5	0	0	3.33	2.92	2.71	2.71
42	0	0	0	5	2.92	2.92	2.92	2.92
43	5	0	10	10	2.71	2.71	2.92	2.50
44	0	0	0	0	2.08	2.29	2.71	3.13
45	5	5	5	5	3.54	3.54	3.54	3.54
46	5	0	5	5	3.54	3.54	3.54	3.33
47	0	0	0	5	3.33	3.54	3.54	3.75
48	0	0	0	0	3.75	3.96	4.17	4.17
49	5	5	0	0	4.17	3.96	3.96	4.17
50	5	10	10	10	4.38	4.58	4.38	4.38
51	5	5	5	5	4.38	4.38	4.58	4.58
52	5	0	0	5	4.58	4.38	4.79	4.79
53	5	0	5	5	4.58	4.58	4.79	4.79
54	5	5	0	0	4.79			
55	0	5	5	5				
56	10	5	10	10				
57	5	10	5	5				
58	0	10	0	0				
59	5	5	5	5				

Table 2.4.3 - Visible Emissions

3.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

3.1 Process Description and Operation

Clow Water Systems Company manufactures ductile iron pipe and fittings. As part of the grey and ductile iron casting process, scrap metal is melted in a cupola, poured into specially designed sand molds or centrifugal casting machines, and then, undergoes a controlled solidification and cooling process. The P901 Cupola Melting Furnace was in operation for this test event and has a permitted capacity of 85 tons/hr.

Figure 3.1 depicts the process schematic.

3.2 Control Equipment Description

During this test, emissions from P901 were controlled by an afterburner, wet cap, venturi scrubber, and Ring Jet scrubber system which includes packed bed, Ring Jets and demister.

3.3 Flue Gas Sampling Locations

The P901 Scrubber Exhaust Stack had a measured inner diameter of 63.3-inches, was oriented in the vertical plane, and was accessed from a manlift. Two (2) 6.0-inch I.D. sampling ports were located 90° apart from one another at a location that met EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the stack was traversed to verify the absence of cyclonic flow. An average yaw angle of 7.29° was measured. Therefore, the sampling location also met EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the stack was traversed for stack gas volumetric flow rate, dry molecular weight, moisture content, and filterable PM concentration determinations.

Figure 3.2 schematically illustrates the traverse point and sample port locations utilized.

3.4 Process Sampling Location

The EPA Reference Test Methods performed did not specifically require that process samples were to be taken during the performance of this testing event. It is in the best knowledge of Air Compliance Testing that no process samples were obtained and therefore no process sampling location was identified in this report.

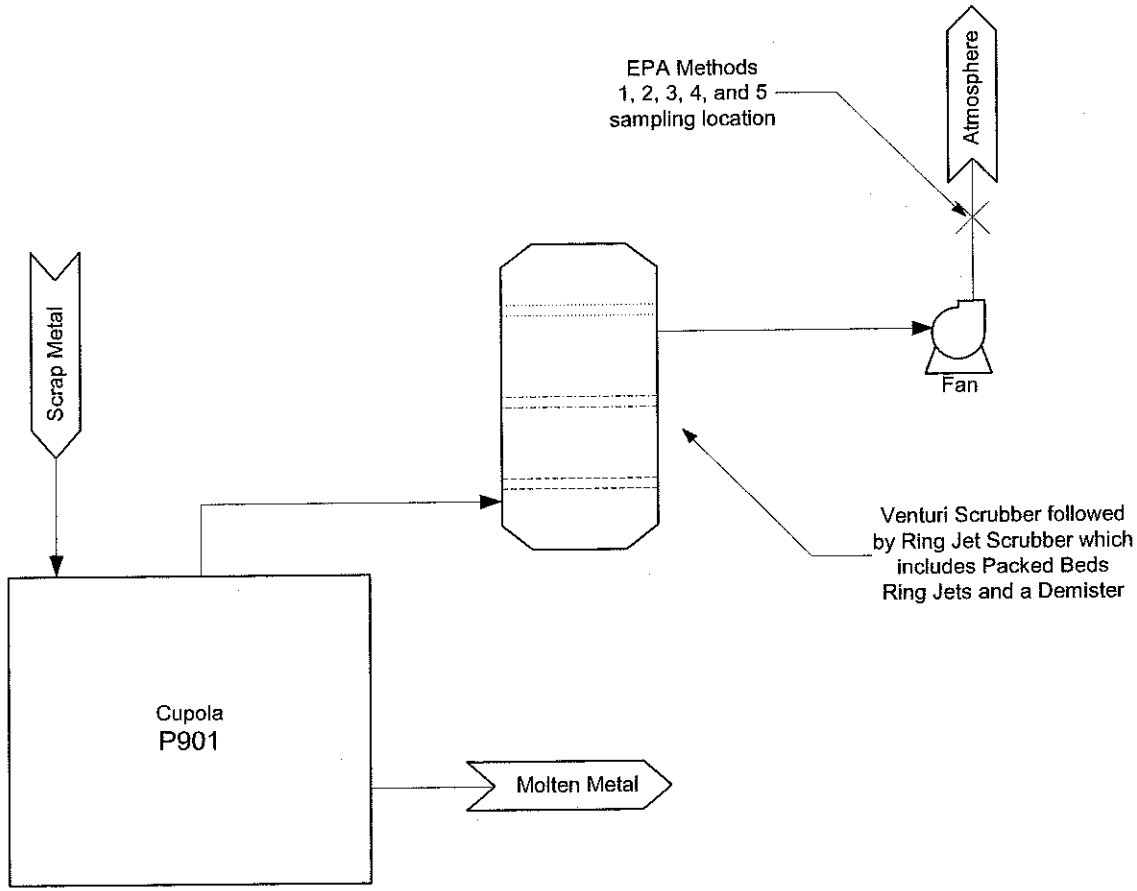
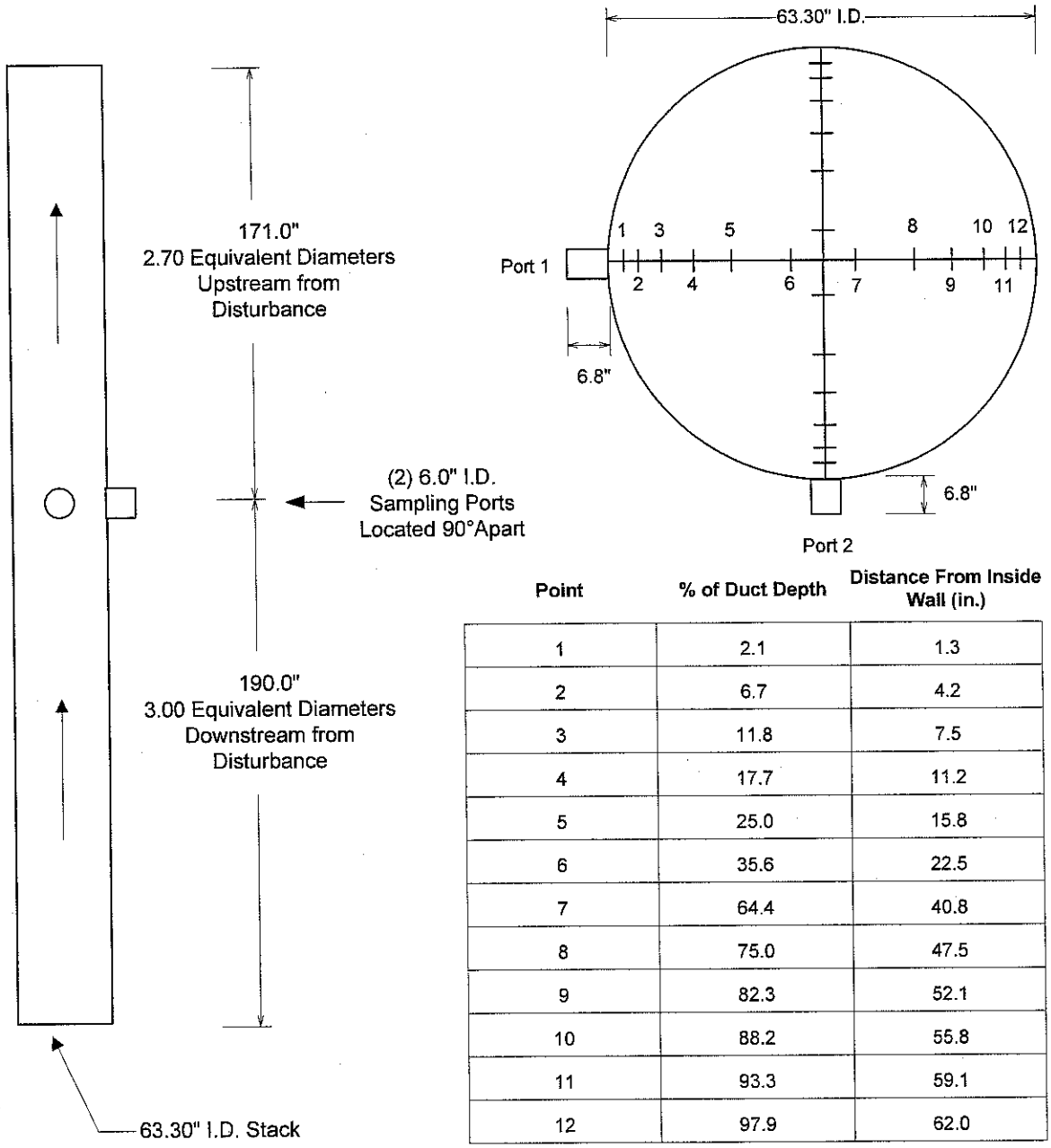


Figure 3.1 - Cupola Emission Control System Schematic



Point	% of Duct Depth	Distance From Inside Wall (in.)
1	2.1	1.3
2	6.7	4.2
3	11.8	7.5
4	17.7	11.2
5	25.0	15.8
6	35.6	22.5
7	64.4	40.8
8	75.0	47.5
9	82.3	52.1
10	88.2	55.8
11	93.3	59.1
12	97.9	62.0

Figure 3.2 - P901 Scrubber Exhaust Stack Traverse Point Location Drawing

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Test Methods

4.1.1 EPA Method 1: Sample and Velocity Traverses for Stationary Sources
Principle: To aid in the representative measurement of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.2 EPA Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S)
Principle: The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.3 EPA Method 3: Gas Analysis for the Determination of Dry Molecular Weight
Principle: A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent CO_2, percent O_2, and if necessary, for percent CO. For dry molecular weight determination a Fyrite analyzer will be used for the analysis. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.4 EPA Method 4: Determination of Moisture Content in Stack Gases
Principle: A gas sample is extracted at a constant rate from the source; moisture is removed from the sample stream and determined either volumetrically or gravimetrically. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.5 EPA Method 5: Determination of Particulate Emissions from Stationary Sources (Filterable PM only)
Principle: Particulate matter (PM) is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature in the range of 120 ± 14°C (248 ± 25°F) or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator, U.S. Environmental Protection Agency, for a particular application. The PM mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal of uncombined water. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.6 EPA Method 9: Visual Determination of the Opacity of Emissions from Stationary Sources
Principle: The opacity of emissions from stationary sources is determined visually by a qualified observer. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.7 EPA Method 22: Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares

Principle: Fugitive emissions produced during material processing, handling, and transfer operations or smoke emissions from flares are visually determined by an observer without the aid of instruments. This method is used also to determine visible smoke emissions from flares used for combustion of waste process materials. This method determines the amount of time that visible emissions occur during the observation period (i.e., the accumulated emission time.). This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

The sampling train utilized during this testing project is depicted in Figure 4.1.

4.2 Procedures for Obtaining Process Data

Process data was recorded by Clow Water Systems Co. personnel utilizing their typical record keeping procedures. Recorded process data was provided to Air Compliance Testing, Inc. personnel at the conclusion of this test event. The process data is located in Table 2.2 and in the Appendix.

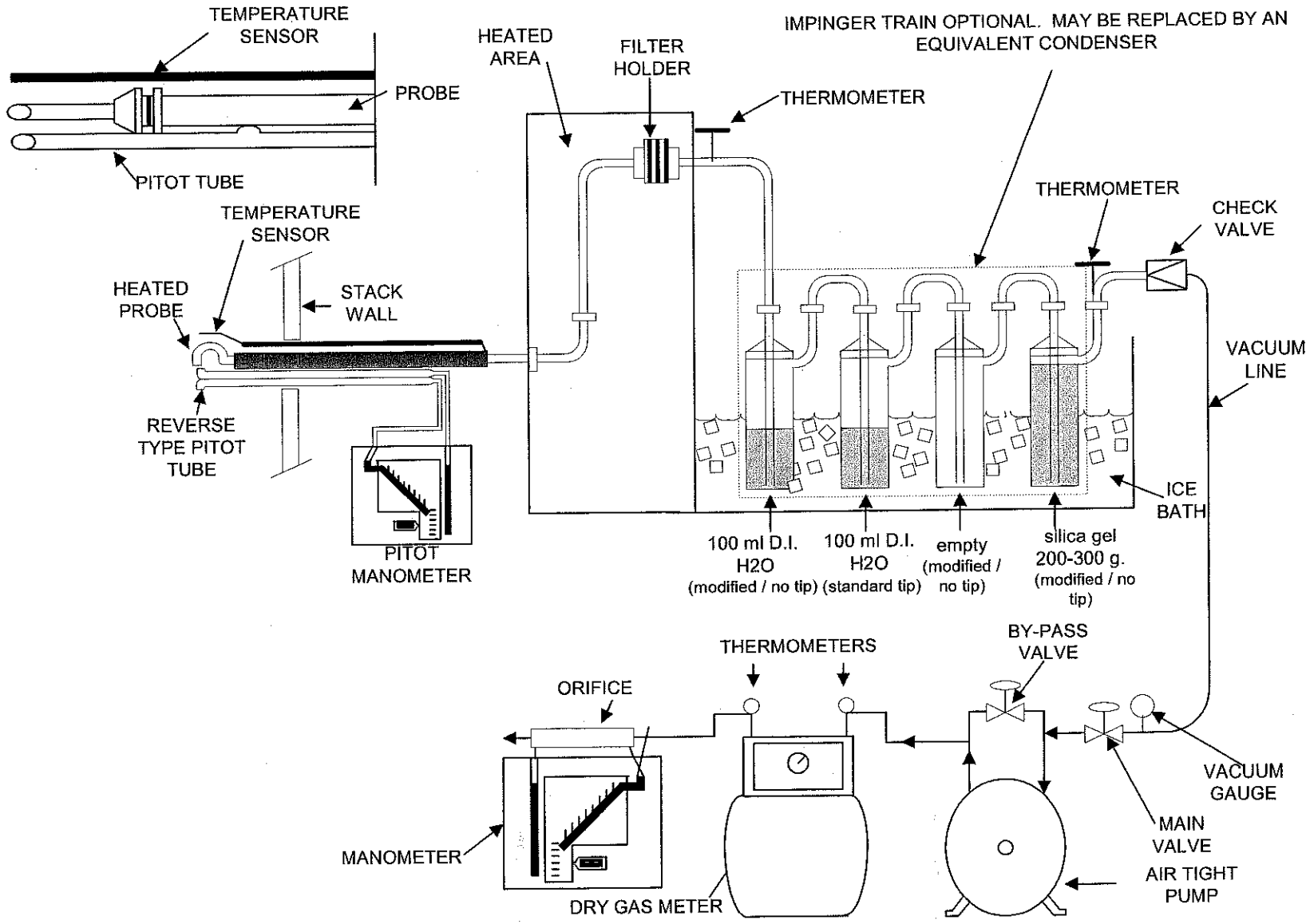


Figure 4.1 - EPA Method 5 Sampling Train Schematic

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA Audits

Tables 5.1 and 5.2 illustrate the QA audit activities that were performed during this test.

All meter boxes and sampling trains used during sampling performed within the requirements of their respective methods as is shown in Tables 5.1 and 5.2. All pre-test and post-test leak checks were well below the applicable limit. Minimum metered volumes and percent isokinetics were also met where applicable.

Aleksandr Spektor was certified on April 10, 2013 as a Visible Emissions Evaluator. The expiration date is six months from the issue date.

For quality assurance, the observers obtained a view of the emissions with the best available contrasting background and with the sun oriented in the 140° sector to their back. Readings were taken every 15 seconds and made to the nearest 5% opacity.

5.2 QA/QC Problems

No QA/QC problems occurred during this test event.

	P901 Scrubber Exhaust Stack		
Method 5 Sampling Train	**Run 1**	**Run 2**	**Run 3**
Leak Rate Observed (Pre/Post) (cfm)	0.001 / 0.000	0.003 / 0.000	0.002 / 0.000
Applicable Method Allowable Leak Rate (cfm)	< 0.020	< 0.020	< 0.020
Acceptable	Yes	Yes	Yes
Volume of Dry Gas Collected (dscf)	40.723	41.694	40.551
Recommended Volume of Dry Gas Collected (dscf)	21.000	21.000	21.000
Acceptable	Yes	Yes	Yes
Percent of Isokinetic Sampling Rate (%)	98.5	100.3	99.5
Applicable Method Allowable Isokinetic Sampling Rate (%)	100 ± 10	100 ± 10	100 ± 10
Acceptable	Yes	Yes	Yes

Table 5.1 - EPA Method 5 Sample Train Audit Results Table

P901 Scrubber Exhaust Stack				
Pre-Test Dry Gas Meter Calibration Factor (Y)	Average Post-Test Dry Gas Meter Calibration Check Value (Yqa)	Post Test Dry Gas Meter Calibration Check Value Difference From Pre-Test Calibration Factor (%)	Applicable Method Allowable Difference (%)	Acceptable
1.0008	1.0255	2.47%	5.00%	Yes

Table 5.2 - EPA Method 5 Dry Gas Meter Audit Results Table

6.0 APPENDIX

Appendix attached.

APPENDIX

to

Compliance Stack Emission Test Report

Determination of Filterable Particulate Matter and Visible Emissions

Cupola Emission System (P901)

EPA Methods 1, 2, 3, 4, 5, 9, and 22

Clow Water Systems Co.
Coshocton, Ohio

Date Conducted: May 2, 2013
Job Number: 130502

Prepared by:

Air Compliance Testing, Inc.

PO Box 41156
Cleveland OH 44141-0156
Phone: (800) EPA-AIR1 (372-2471)

Report Date: May 28, 2013

Appendix Contents

1-PROCESS DATA

- [x] Process Operational Data

2-LABORATORY DATA

- [x] Laboratory Results

3-FIELD DATA

- [x] Excel Test Data
- [x] Excel Method Specific Data
- [x] Excel Run Data
- [x] Example Calculation

- [ ] Test Log (CEMS Methods)
- [ ] Main Method Field Data Sheets
- [x] Isokinetic Field Data Sheets
- [ ] EPA Method 9 Field Data
- [x] EPA Method 4 and ALT-008 Moisture Recovery
- [x] EPA Method 3 Fyrite/Orsat Field Data
- [x] EPA Method 3 Dry Molecular Weight Calculation
- [ ] EPA Method 2 Flow Data Sheets
- [x] EPA Method 1 Cyclonic Flow
- [x] EPA Method 1 Preliminary Field Data

4-CALIBRATIONS AND CERTIFICATIONS

ANALYZER CALIBRATIONS

- [ ] Analyzer Calibration Error
- [ ] Analyzer System Bias and System Drift

EQUIPMENT INSPECTIONS / CALIBRATIONS

- [x] Probe Nozzle Inspections
- [x] Pre-Test Pitot Tube / Probe Inspections
- [x] Post-Test Pitot Tube / Probe Inspections

- [x] Pre-Test Thermocouple System Audit
- [x] Post-Test Thermocouple Check

- [x] 10-Minute Cals
- [x] Pre-Test Meter Box Leak Check
- [x] Pre-Test Dry Gas Meter / Orifice Calibration
- [x] Pre-Test Meter Console Calibration
- [x] Post-Test dry Gas Meter ALT-009 Leak Check

- [ ] Post-Test Dry Gas Meter / Orifice and Console Calibration

- [ ] Post-Test Mini Meter / Orifice and Console Calibration

EQUIPMENT CERTIFICATIONS / HISTORY

- [x] Dry Gas Meter Calibration History
- [x] Aneroid Barometer/ DPG Calibration History
- [x] Acetone Residuals History

- [ ] Calibration Gas Certifications
- [ ] Calibration Gas Diluter Certifications
- [ ] Reagent Certifications
- [x] Quartz or Glass Fiber Filter Certification
- [ ] True Primary Flow Standard
- [x] Reference Meter Calibration
- [ ] Micromanometer Certificate
- [x] Ω Thermocouple Certificate of Calibration
- [x] Lake Balance (Method 4 and ALT-008)
- [x] Lake Balance Report for H64 (Gravimetrics)
- [ ] Balance Calibration Weights Certification
- [ ] Balance Calibration History
- [x] VE Azimuth Tables
- [x] VE Declination
- [x] VE Certificates
- [x] Intent to Test Notification / Test Protocol

CLOW WATER OPERATIONAL DATA
05/02/13 SUMMARY

					60 minute averages				
Run	Start Time	Pause Time	Stop Time	Total Metal Charged (ton/hr)	Emission System Total DP (in.H2O)	Ring Jet Water Flow Rate (gpm)	Ring Jet Pump Pressure (psi)	Venturi Water Flow Rate (gpm)	Venturi Pump Pressure (psi)
1	7:43am	8:13am - 8:21am	8:51am	81	76	752	34	361	14
2	9:17am	9:47am-9:54am	10:14am	78	76	752	34	359	13
3	10:50am	11:20am-11:24am	11:54am	67	76	751	34	357	13
			AVERAGE	**76**	**76**	**752**	**34**	**359**	**13**

Run 1

(7:43am-8:13am; 8:21am-8:51am)

Emission System Monitoring Data

Date	Time	Emission System Total DP (in.H2O)	Ring Jet Water Flow Rate (gpm)	Ring Jet Pump Pressure (psi)	Venturi Water Flow Rate (gpm)	Venturi Pump Pressure (psi)
5/2/2013	07:43:41.713	77	752	34	360	14
5/2/2013	07:44:41.739	75	752	34	362	14
5/2/2013	07:45:41.893	75	753	34	360	14
5/2/2013	07:46:41.946	76	753	34	360	14
5/2/2013	07:47:42.004	75	752	34	362	14
5/2/2013	07:48:42.104	76	752	34	361	14
5/2/2013	07:49:42.186	75	752	34	359	14
5/2/2013	07:50:42.292	75	753	34	361	14
5/2/2013	07:51:42.435	75	751	34	361	14
5/2/2013	07:52:42.473	76	753	34	360	14
5/2/2013	07:53:42.651	76	752	34	361	14
5/2/2013	07:54:42.899	76	751	34	360	14
5/2/2013	07:55:42.960	76	752	34	360	13
5/2/2013	07:56:43.038	76	753	34	361	13
5/2/2013	07:57:43.108	77	752	34	360	14
5/2/2013	07:58:43.251	76	752	34	359	14
5/2/2013	07:59:43.395	76	753	34	359	13
5/2/2013	08:00:43.486	76	752	34	358	14
5/2/2013	08:01:43.500	75	752	34	359	14
5/2/2013	08:02:43.672	76	752	34	360	14
5/2/2013	08:03:43.799	76	752	34	361	13
5/2/2013	08:04:43.821	75	753	34	359	13
5/2/2013	08:05:43.984	76	751	34	361	14
5/2/2013	08:06:44.090	75	752	34	361	14
5/2/2013	08:07:44.165	75	753	34	360	13
5/2/2013	08:08:44.374	77	751	34	361	14
5/2/2013	08:09:44.534	76	751	34	361	14
5/2/2013	08:10:44.764	74	751	34	361	13
5/2/2013	08:11:44.873	77	752	34	361	14
5/2/2013	08:12:45.096	76	753	34	364	14
5/2/2013	08:21:46.161	77	753	34	363	14
5/2/2013	08:22:46.428	77	752	34	362	14
5/2/2013	08:23:46.515	75	752	34	362	14
5/2/2013	08:24:46.583	74	753	34	360	13
5/2/2013	08:25:46.803	75	752	34	360	13
5/2/2013	08:26:46.975	75	752	34	359	14
5/2/2013	08:27:47.068	76	753	34	360	14
5/2/2013	08:28:47.161	76	753	34	361	14
5/2/2013	08:29:47.192	76	752	34	361	13
5/2/2013	08:30:47.417	75	752	34	361	13
5/2/2013	08:31:47.669	76	752	34	361	14
5/2/2013	08:32:47.746	77	753	34	360	14
5/2/2013	08:33:47.899	76	752	34	360	13
5/2/2013	08:34:48.061	75	753	34	361	14
5/2/2013	08:35:48.101	77	753	34	361	14
5/2/2013	08:36:48.120	76	752	34	361	14
5/2/2013	08:37:48.217	75	751	34	361	14
5/2/2013	08:38:48.298	75	753	34	361	14
5/2/2013	08:39:48.378	77	752	34	361	13
5/2/2013	08:40:48.496	76	753	34	363	14
5/2/2013	08:41:48.607	77	753	34	361	14
5/2/2013	08:42:48.656	74	753	34	360	14
5/2/2013	08:43:48.744	75	753	34	362	14
5/2/2013	08:44:48.782	75	753	34	361	14
5/2/2013	08:45:49.014	77	751	34	360	13
5/2/2013	08:46:49.206	76	753	34	362	14
5/2/2013	08:47:49.328	75	753	34	361	14
5/2/2013	08:48:49.605	76	752	34	361	14
5/2/2013	08:49:49.720	76	753	34	360	14
5/2/2013	08:50:49.787	75	751	34	361	14
	AVERAGE	**76**	**752**	**34**	**361**	**14**

Run 1

(7:43am-8:13am; 8:21am-8:51am)

Cupola Melt Data

Date	Time	Total Metal Charged (lb)	
5/2/2013	07:43:32	7181	
5/2/2013	07:46:08	7030	
5/2/2013	07:48:45	7050	
5/2/2013	07:51:23	7018	
5/2/2013	07:54:06	7133	
5/2/2013	07:56:42	7032	
5/2/2013	07:59:19	7103	
5/2/2013	08:01:56	7028	
5/2/2013	08:05:05	7090	
5/2/2013	08:07:40	6996	
5/2/2013	08:10:17	7050	
5/2/2013	08:12:55	7033	
5/2/2013	08:23:22	7065	
5/2/2013	08:26:08	7140	
5/2/2013	08:28:45	7109	
5/2/2013	08:31:22	7141	
5/2/2013	08:34:00	7034	
5/2/2013	08:36:47	7122	
5/2/2013	08:39:25	7040	
5/2/2013	08:42:31	7115	
5/2/2013	08:45:07	7052	
5/2/2013	08:47:43	7018	
5/2/2013	08:50:21	7050	
	TOTAL	162,630	
	TOTAL	**81**	**ton/hr**

Run 2

(9:17am-9:47am; 9:54am-10:14am)

Emission System Monitoring Data

Date	Time	Emission System Total DP (in.H2O)	Ring Jet Water Flow Rate (gpm)	Ring Jet Pump Pressure (psi)	Venturi Water Flow Rate (gpm)	Venturi Pump Pressure (psi)
5/2/2013	09:17:52.220	77	754	34	360	14
5/2/2013	09:18:52.258	76	752	34	360	13
5/2/2013	09:19:52.405	77	751	34	359	13
5/2/2013	09:20:52.513	74	753	34	360	13
5/2/2013	09:21:52.762	75	752	34	361	14
5/2/2013	09:22:52.835	76	752	34	361	13
5/2/2013	09:23:52.893	77	753	34	358	13
5/2/2013	09:24:52.997	77	752	34	357	13
5/2/2013	09:25:53.137	77	752	34	358	13
5/2/2013	09:26:53.238	75	752	34	357	14
5/2/2013	09:27:53.266	77	753	34	358	13
5/2/2013	09:28:53.309	73	751	34	357	13
5/2/2013	09:29:53.443	76	754	34	358	14
5/2/2013	09:30:53.510	76	753	34	360	14
5/2/2013	09:31:53.528	75	753	34	360	14
5/2/2013	09:32:53.585	76	752	34	358	14
5/2/2013	09:33:53.873	77	753	34	357	14
5/2/2013	09:34:53.882	77	751	34	358	13
5/2/2013	09:35:53.963	76	752	34	359	13
5/2/2013	09:36:54.032	77	753	34	358	13
5/2/2013	09:37:54.072	78	751	34	358	13
5/2/2013	09:38:54.061	77	752	34	358	13
5/2/2013	09:39:54.280	76	752	34	358	13
5/2/2013	09:39:54.283	76	752	34	358	13
5/2/2013	09:40:54.497	77	753	34	358	13
5/2/2013	09:41:54.592	76	752	34	357	13
5/2/2013	09:42:54.665	77	752	34	358	13
5/2/2013	09:43:54.763	78	753	34	359	14
5/2/2013	09:44:54.889	76	752	34	360	14
5/2/2013	09:45:55.015	77	752	34	359	13
5/2/2013	09:46:55.114	77	753	34	358	13
5/2/2013	09:54:55.853	78	753	34	360	13
5/2/2013	09:55:56.007	75	751	34	360	13
5/2/2013	09:56:56.181	76	753	34	358	14
5/2/2013	09:57:56.280	74	752	34	358	13
5/2/2013	09:58:56.454	77	752	34	359	13
5/2/2013	09:59:56.708	75	753	34	359	14
5/2/2013	10:00:56.801	77	752	34	358	14
5/2/2013	10:01:56.853	76	753	34	358	14
5/2/2013	10:02:56.863	75	753	34	359	14
5/2/2013	10:03:56.894	77	753	34	360	14
5/2/2013	10:04:56.904	76	752	34	358	13
5/2/2013	10:05:56.952	75	751	34	357	13
5/2/2013	10:06:56.968	77	754	34	358	13
5/2/2013	10:07:56.979	76	752	34	359	13
5/2/2013	10:08:57.071	76	753	34	358	13
5/2/2013	10:09:57.141	75	751	34	359	13
5/2/2013	10:10:57.240	76	752	34	359	14
5/2/2013	10:11:57.421	76	751	34	359	13
5/2/2013	10:12:57.452	76	752	34	358	13
5/2/2013	10:13:57.563	73	750	34	358	13
	AVERAGE	**76**	**752**	**34**	**359**	**13**

Run 2

(9:17am-9:47am; 9:54am-10:14am)

Cupola Melt Data

Date	Time	Total Metal Charged (lb)	
5/2/2013	09:17:49	7077	
5/2/2013	09:20:40	7141	
5/2/2013	09:23:16	7005	
5/2/2013	09:25:53	7070	
5/2/2013	09:28:31	7041	
5/2/2013	09:31:24	6989	
5/2/2013	09:34:02	7005	
5/2/2013	09:36:38	6991	
5/2/2013	09:39:22	7105	
5/2/2013	09:41:57	7162	
5/2/2013	09:44:34	7131	
5/2/2013	09:55:02	7095	
5/2/2013	09:57:38	7131	
5/2/2013	10:00:15	7116	
5/2/2013	10:02:52	7216	
5/2/2013	10:05:45	7218	
5/2/2013	10:08:22	7034	
5/2/2013	10:10:59	7024	
5/2/2013	10:13:36	7025	
5/2/2013	10:16:21	7136	
5/2/2013	10:18:57	7000	
5/2/2013	10:21:33	7253	
	TOTAL	155,965	
	TOTAL	**78**	**ton/hr**

Run 3

(10:50am-11:20am; 11:24am-11:54am)

Emission System Monitoring Data

Date	Time	Emission System Total DP (in.H2O)	Ring Jet Water Flow Rate (gpm)	Ring Jet Pump Pressure (psi)	Venturi Water Flow Rate (gpm)	Venturi Pump Pressure (psi)
5/2/2013	10:50:00.916	76	751	34	359	14
5/2/2013	10:51:01.016	76	750	34	360	14
5/2/2013	10:52:01.100	76	751	34	359	13
5/2/2013	10:53:01.214	75	751	34	359	14
5/2/2013	10:54:01.462	75	751	34	359	13
5/2/2013	10:55:01.600	74	751	34	361	13
5/2/2013	10:56:01.683	77	750	34	357	13
5/2/2013	10:57:01.771	73	750	34	358	13
5/2/2013	10:58:01.830	76	751	34	355	13
5/2/2013	10:59:01.914	76	750	34	356	13
5/2/2013	11:00:01.973	75	751	34	357	14
5/2/2013	11:01:02.082	76	751	34	358	13
5/2/2013	11:02:02.304	75	751	34	358	13
5/2/2013	11:03:02.459	77	751	34	360	13
5/2/2013	11:04:02.584	76	752	34	358	14
5/2/2013	11:05:02.793	76	750	34	358	13
5/2/2013	11:06:02.844	77	752	34	361	13
5/2/2013	11:07:03.030	77	752	34	358	13
5/2/2013	11:08:03.118	77	752	34	359	13
5/2/2013	11:09:03.166	75	752	34	358	13
5/2/2013	11:10:03.286	76	749	34	360	13
5/2/2013	11:11:03.514	75	751	34	358	13
5/2/2013	11:12:03.661	78	752	34	358	13
5/2/2013	11:13:03.815	77	752	34	358	13
5/2/2013	11:14:03.981	77	750	34	359	14
5/2/2013	11:15:04.147	76	751	34	358	13
5/2/2013	11:16:04.252	76	751	34	358	13
5/2/2013	11:17:04.337	77	752	34	358	14
5/2/2013	11:17:04.338	77	752	34	358	14
5/2/2013	11:18:04.437	76	751	34	357	13
5/2/2013	11:19:04.593	75	751	34	358	13
5/2/2013	11:24:05.033	76	751	34	357	13
5/2/2013	11:25:05.262	77	750	34	358	14
5/2/2013	11:26:05.316	76	752	34	359	14
5/2/2013	11:27:05.381	76	752	34	356	13
5/2/2013	11:28:05.465	76	751	34	356	13
5/2/2013	11:29:05.481	77	751	34	359	13
5/2/2013	11:30:05.626	76	750	34	356	13
5/2/2013	11:31:05.775	74	753	34	357	14
5/2/2013	11:32:05.839	76	751	34	357	14
5/2/2013	11:33:05.867	75	750	34	357	13
5/2/2013	11:34:05.981	73	750	34	356	13
5/2/2013	11:35:06.039	76	752	34	358	14
5/2/2013	11:36:06.150	76	752	34	355	13
5/2/2013	11:37:06.321	74	750	34	355	13
5/2/2013	11:38:06.574	75	751	34	356	13
5/2/2013	11:39:06.648	75	751	34	356	14
5/2/2013	11:40:06.821	76	750	34	353	13
5/2/2013	11:41:06.954	76	751	34	355	13
5/2/2013	11:42:06.993	75	752	34	353	13
5/2/2013	11:43:06.984	76	752	34	354	13
5/2/2013	11:44:07.036	75	753	34	354	14
5/2/2013	11:45:07.036	76	753	34	354	13
5/2/2013	11:46:07.129	75	752	34	354	13
5/2/2013	11:47:07.209	74	751	34	354	13
5/2/2013	11:48:07.317	74	750	34	355	13
5/2/2013	11:49:07.467	78	751	34	354	14
5/2/2013	11:50:07.585	75	752	34	354	14
5/2/2013	11:51:07.650	74	750	34	354	14
5/2/2013	11:52:07.705	75	751	34	352	13
5/2/2013	11:53:07.764	76	751	34	355	13
	AVERAGE	76	751	34	357	13

Run 3

(10:50am-11:20am; 11:24am-11:54am)

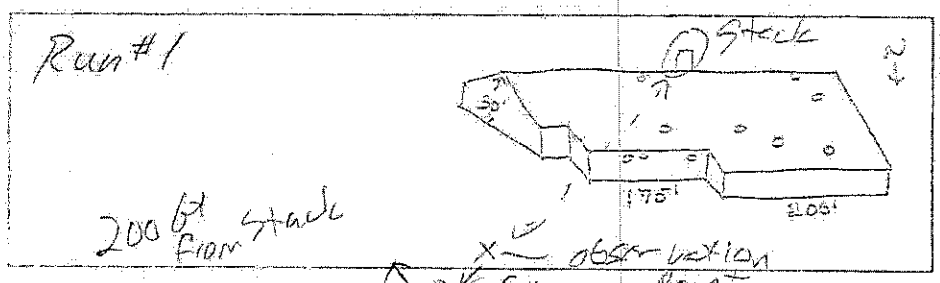
Cupola Melt Data

Date	Time	Total Metal Charged (lb)	
5/2/2013	10:52:53	7051	
5/2/2013	10:56:31	7071	
5/2/2013	11:01:11	6980	
5/2/2013	11:06:57	7135	
5/2/2013	11:09:34	7119	
5/2/2013	11:12:21	7212	
5/2/2013	11:14:56	6988	
5/2/2013	11:17:34	6968	
5/2/2013	11:25:33	7065	
5/2/2013	11:28:10	7071	
5/2/2013	11:30:47	7034	
5/2/2013	11:33:24	7131	
5/2/2013	11:35:59	7195	
5/2/2013	11:38:37	7138	
5/2/2013	11:41:14	7129	
5/2/2013	11:43:51	6984	
5/2/2013	11:46:27	7268	
5/2/2013	11:49:08	7156	
5/2/2013	11:51:46	7296	
	TOTAL	134,991	
	TOTAL	**67**	**ton/hr**

FUGITIVE OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Company Clow water	Observer Eric Squire
Location	Affiliation ENV. Manager
Company Rep. Eric Squire	Date 5-2-13
Sky Conditions Clear	Wind Direction 5 MPH
Precipitation none	Wind Speed South
Industry ductile iron foundry	Process Unit Machining & Fabrication

Sketch process unit: indicate observer position relative to source and sun, indicate potential emission points and/or actual emission points.



OBSERVATIONS

	Clock Time	Observation Period Duration, min:sec	Accumulated Emission Time, min:sec
Begin Observation	7:46am	20 min	0
end.	8:06		
	8:26am	20 min	0
	8:46am		
End Observation			

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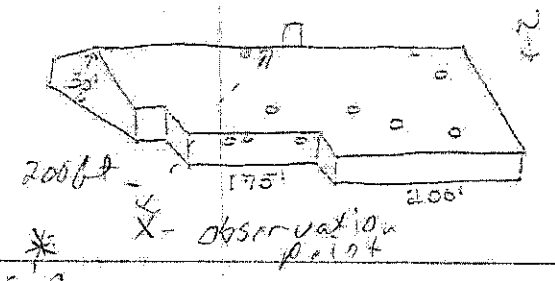
FUGITIVE OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Company Clow Water	Observer Eric Squire
Location	Affiliation ENV. Manager
Company Rep. Eric Squire	Date 5-2-13
Sky Conditions Clear	Wind Direction South
Precipitation None	Wind Speed 5-10 mph
Industry Ductile Iron Foundry	Process Unit Machining & Fabrication

Sketch process unit; indicate observer position relative to source and sun, indicate potential emission points and/or actual emission points.

Run # 2



OBSERVATIONS

	Clock Time	Observation Period Duration, min:sec	Accumulated Emission Time, min:sec
Begin Observation	9:19am	20min	0
end	9:39am		
	9:44am	20min	0
	10:05am		
End Observation			

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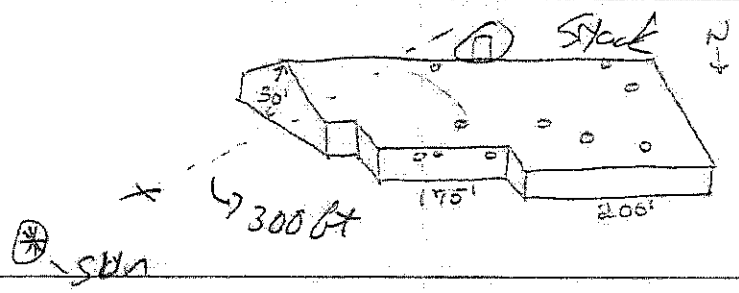
FUGITIVE OR SMOKE EMISSION INSPECTION
OUTDOOR LOCATION

Company Clow Water	Observer Eric Squire
Location	Affiliation ENV. Manager
Company Rep. Eric Squire	Date 5-2-13
Sky Conditions clear	Wind Direction South
Precipitation none ~~Sunny~~	Wind Speed 10-15 mph
Industry Ductile Iron Foundry	Process Unit Machining & Fabrication

Sketch process unit: indicate observer position relative to source and sun, indicate potential emission points and/or actual emission points.

Run #3



OBSERVATIONS	Clock Time	Observation Period Duration, min:sec	Accumulated Emission Time, min:sec
Begin Observation	10:52am	20min	0
	11:12am		
	11:22am	20min	0
	11:42am		
End Observation			

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Method 5 Filter Gravimetric

Plant Name Clow Water Systems Location Cupola Emission System (P901) Exhaust Stack

Run Number 1
Run Date 5-2-13
Filter Recovered By AC
Were filters intact upon opening filter assembly? yes
Were there any visible filter fragments remaining on the frit after initial filter removal?** yes
Were filter fragments rinsed into acetone rinse container? yes
Sample Loading - lt / med / heavy heavy
Sample Color tan
Filter Number 5965
Vessel ID 452

Date/Time Sample Placed in Dessicator 5-2-13 , 16:52

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Lab Temp/RH (°F)/(%)	PBar ("Hg)
1	6.5791	AC	5.6.13 819	70 / 33	28.75
2	6.5792	AC	5.6.13 1541	72 / 35	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final	6.5792				

0.3511 Filter Tare Weight (g)
6.2160 Vessel Tare Weight (g)
12.1 **Filter Catch Weight (mg)**

Describe Sample:

Run Number 2
Run Date 5-2-13
Filter Recovered By AC
Were filters intact upon opening filter assembly? yes
Were there any visible filter fragments remaining on the frit after initial filter removal?** yes
Were filter fragments rinsed into acetone rinse container? yes
Sample Loading - lt / med / heavy heavy
Sample Color tan
Filter Number 5822
Vessel ID 453

Date/Time Sample Placed in Dessicator 5-2-13 , 17:00

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Lab Temp/RH (°F)/(%)	PBar ("Hg)
1	6.5795	AC	5.6.13 820	70 / 33	28.75
2	6.5795	AC	5.6.13 1542	72 / 35	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final	6.5795				

0.3513 Filter Tare Weight (g)
6.2147 Vessel Tare Weight (g)
13.5 **Filter Catch Weight (mg)**

Describe Sample:

Circle Analytical Balance I.D. used: Sartorius 3004026 / GR-202 14202198

Balance Located in Stable, Draft-Free Area? Yes / No

* Consecutive weighings must not differ by more than 0.5mg or 1% of the total catch weight, whichever is greater.
** If visible filter fragments were removed from frit, then negative filter weight values may be possible.

Job Number: 130502A
Done By / Date: 15-2-13
Final Check By / Date: 5-22-13

Method 5 Filter Gravimetric

Effective Date: 7/18/12
Rev No. 0
Issued by: Quality Manager

Plant Name Clow Water Systems Location Cupola Emission System (P901) Exhaust Stack

Run Number	3
Run Date	5-2-13
Filter Recovered By	AC
Were filters intact upon opening filter assembly?	yes
Were there any visible filter fragments remaining on the frit after initial filter removal?**	yes
Were filter fragments rinsed into acetone rinse container?	yes
Sample Loading - lt / med / heavy	heavy
Sample Color	tan
Filter Number	5818
Vessel ID	454
Date/Time Sample Placed in Dessicator	5-3-13, 9:57

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Lab Temp/RH (°F)/(%)	PBar ("Hg)
1	6.6380	AC	5.6.13 820	70 / 33	28.75
2	6.6381	AC	5.6.13 1544	72 / 35	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final	6.6381				

0.3617 Filter Tare Weight (g)
6.2629 Vessel Tare Weight (g)
13.5 **Filter Catch Weight (mg)**

Describe Sample:

Run Number	
Run Date	
Filter Recovered By	
Were filters intact upon opening filter assembly?	
Were there any visible filter fragments remaining on the frit after initial filter removal?**	
Were filter fragments rinsed into acetone rinse container?	
Sample Loading - lt / med / heavy	
Sample Color	
Filter Number	
Vessel ID	
Date/Time Sample Placed in Dessicator	/

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Lab Temp/RH (°F)/(%)	PBar ("Hg)
1				/	
2				/	
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final					

Filter Tare Weight (g)
Vessel Tare Weight (g)
Filter Catch Weight (mg)

Describe Sample:

Circle Analytical Balance I.D. used: Sartorius 3004026 / GR-202 14202198

Balance Located in Stable, Draft-Free Area? Yes / No

* Consecutive weighings must not differ by more than 0.5mg or 1% of the total catch weight, whichever is greater.
** If visible filter fragments were removed from frit, then negative filter weight values may be possible.

Job Number: 130502A
Done By / Date: AC 15-2-13
Final Check By / Date: SS 5-22-13

Air Compliance Testing, Inc.
D:\Testing\ACT Test Methods\M005\Method 5
(Method 5-Filter Gravimetric) 5/2/2013
1 of 1

Method 5 Rinse Gravimetric

Plant Name Clow Water Systems

Location Cupola Emission System (P901) Exhaust Stack

Run Number 1
Run Date 5-2-13
Rinse Recovered By AC
Sample Loading - lt / med / heavy lt
Sample Color grey
Vessel ID 1693

Date/Time Sample Placed in Dessicator 5-3-13, 9:54

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Temp/RH (°F)/(%)	PBar ("Hg)
1	2.5544	AC	5.6.13 821	70 / 33	28.75
2	2.5545	AC	5.6.13 1545	72 / 35	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	

Final 2.5545
2.5454 Vessel Tare Weight (g)
125 Rinse Volume (ml)
0.0010 Residue Weight (g)
8.1 **Rinse Catch Weight (mg)**

Describe Sample:

Run Number 2
Run Date 5-2-13
Rinse Recovered By AC
Sample Loading - lt / med / heavy lt
Sample Color grey
Vessel ID 1694

Date/Time Sample Placed in Dessicator 5-3-13, 9:54

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Temp/RH (°F)/(%)	PBar ("Hg)
1	2.5401	AC	5.6.13 822	70 / 33	28.75
2	2.5401	AC	5.6.13 1546	72 / 35	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	

Final 2.5401
2.5333 Vessel Tare Weight (g)
125 Rinse Volume (ml)
0.0010 Residue Weight (g)
5.8 **Rinse Catch Weight (mg)**

Describe Sample:

Cicle Analytical Balance I.D. used: Sartorius 3004026 / GR-202 14202198

Balance Located in Stable, Draft-Free Area? Yes / No

* Consecutive weighings must not differ by more than 0.5mg or 1% of the total catch weight, whichever is greater.

** If no visible fragments remain on frit, then negative filter weight values may be deemed a zero value.

Job Number: 130502A
Done By / Date: AC / 5-2-13
Final Check By / Date: SC / 5-22-13

Method 5 Rinse Gravimetric

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Plant Name Clow Water Systems Location Cupola Emission System (P901) Exhaust Stack

Run Number	3
Run Date	5-2-13
Rinse Recovered By	AC
Sample Loading - lt / med / heavy	lt
Sample Color	grey
Vessel ID	1695
Date/Time Sample Placed in Dessicator	5-3-13, 14:45

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Temp/RH (°F)/(%)	PBar ("Hg)
1	2.5436	AC	5.6.13 822	70 133	28.75
2	2.5438	AC	5.6.13 1547	72135	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final	2.5438				

2.5374 Vessel Tare Weight (g)
125 Rinse Volume (ml)
0.0010 Residue Weight (g)
5.4 **Rinse Catch Weight (mg)**

Describe Sample:

Run Number	B2
Run Date	5-2-13
Rinse Recovered By	AC
Sample Loading - lt / med / heavy	–
Sample Color	–
Vessel ID	1696
Date/Time Sample Placed in Dessicator	5.3.13 , 16:25

Weight Number	Total Weight (g) (Includes Vessel)*	Done By	Date/Time	Temp/RH (°F)/(%)	PBar ("Hg)
1	2.5171	AC	5.6.13 823	70 133	28.75
2	2.5172	AC	5.6.13 1549	72135	28.73
3				/	
4				/	
5				/	
6				/	
7				/	
8				/	
9				/	
10				/	
Final	2.5172				

2.5148 Vessel Tare Weight (g)
250 Rinse Volume (ml)
0.0024 Residue Weight (g)
— **Rinse Catch Weight (mg)**

Describe Sample:

Cicle Analytical Balance I.D. used: Sartorius 3004026 / GR-202 14202198

Balance Located in Stable, Draft-Free Area? Yes / No

* Consecutive weighings must not differ by more than 0.5mg or 1% of the total catch weight, whichever is greater.

** If no visible fragments remain on frit, then negative filter weight values may be deemed a zero value.

Job Number: 130502 A
Done By / Date: AC / 5-2-13
Final Check By / Date: SS 5-22-13

Method 5 Acetone Residual Data

Determine weight of acetone residuals (g) 0.0024

Divide by the volume of the acetone blank (ml) 250

Acetone residuals measured (g/ml) 0.0000096 (should be less than 0.0000079g/ml)

Acetone residuals used (g/ml) 0.0000079

	Run 1	Run 2	Run 3	Run 4
Determine volume of front half rinse (ml)	125	125	125	—
Acetone residuals in sample (g)	0.0010	0.0010	0.0010	—

*Subtract sample residuals from sample catch weight (g)

Job Number: 136562A
Done By / Date: AC 5-22-13
Final Check By / Date: SS 5-22-13

Method 5 Record of Custody Sheet Filter

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Shipping/Transportation Container Number:_____

Sample ID		Full Signature	Date	Time	Notes	Filter Number	Vessel ID
130502 A - 1 - M5/F	S	(JG)	4.19.13	1521		5965	452
	B		5.2.13	1653			
	S						
	B						
130502 A - 2 - M5/F	S		4.3.13	1005		5822	453
	B		5.2.13	1659			
	S						
	B						
130502 A - 3 - M5/F	S	(JG)	4.18.13	1548		5818	454
	B		5.3.13	9560			
	S						
	B						
130502 A - 4 - M5/F	S		4.30.13	16:18		5986	
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						

Were all seals intact?____Yes _____No (Describe seal and reasoning in the "Remarks")

Received By Sample Custodian _____ _____ _____

(Full Signature) (Date) (Time)

Remarks: _____

Job Number: 130502 A
Done By / Date: AC 14.30.13
Final Check By / Date: SS 5/22/13

Method 5 Record of Custody Sheet AR

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Shipping/Transportation Container Number: 5

Sample ID		Full Signature	Date	Time	Notes	Final Vol. ml	Vessel ID
130502 A - 1 - M5/AR	S		5/2/13	12:11		125	1693
	B		5.2.13	1653			
	S						
	B						
130502 A - 2 - M5/AR	S		5/2/13	12:11		125	1694
	B		5.2.13	1659			
	S						
	B						
130502 A - 3 - M5/AR	S		5/2/13	1226		125	1695
	B		5.3.13	9:56			
	S						
	B						
130502 A - 4 - M5/AR	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
	S						
	B						
130502 A - BL - M5/AR	S		5/2/13	12:34		250	1696
	B		5.3.13	10:00			

Were all seals intact?____Yes _____No (Describe seal and reasoning in the "Remarks")

Were all liquid levels at marked levels?_____Yes _____No (Estimate loss in the "Remarks")

Received By Sample Custodian _____ _____ _____

(Full Signature) (Date) (Time)

Remarks: _____

Job Number: 130502 A
Done By / Date: 5/2/13
Final Check By / Date: SS / 5-22-13

TEST DATA

Number of Test Runs	3			
Traverse Points	24			
	Run 1	**Run 2**	**Run 3**	**Average**
Stack Cross-Sectional Diameter 1 (**circular**) (in)	63.30	63.30	63.30	63.30
Stack Cross-Sectional Diameter 2 (**circular**) (in)	63.30	63.30	63.30	63.30
Pitot Tube Coefficient (Cp)	0.84	0.84	0.84	0.84
Barometric Pressure at Ground Level (Pbar) (in Hg)	29.31	29.29	29.30	29.30
Elevation Difference Between Ground Level and Meter Box Locations (ft)	5.00	5.00	5.00	5.00
Elevation Difference Between Ground Level and Sampling Locations (ft)	35.00	35.00	35.00	35.00
Initial Dry Gas Meter Reading (ft3)	955.170	997.325	41.028	
Final Dry Gas Meter Reading (ft3)	997.100	1040.712	83.587	
Dry Gas Meter Calibration Factor (Gamma)	1.0008	1.0008	1.0008	1.0008
Dry Gas Meter Calibration Coefficient (Delta H@)	2.187	2.187	2.187	2.187
Total Sampling Run Time (Theta) (min)	60	60	60	60
Volume of Water Vapor Condensed in the Impingers (g)	39.8	44.2	51.1	45.0
Weight of Water Vapor Collected in Silica Gel (g)	9.8	12.3	8.7	10.3
Air Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	11.0	12.5	11.0	11.5
Air Percent by Volume Oxygen in Stack Gas (%-dry)	12.0	12.4	11.5	12.0
Air Percent by Volume Nitrogen in Stack Gas (%-dry)	77.0	75.2	77.5	76.6
Average Pitot Rotation Angle — Port Number 1	9.0			
Average Pitot Rotation Angle — Port Number 2	5.6			
Test Run Start Time (hrmin)	5/2/2013 7:43	5/2/2013 9:17	5/2/2013 10:50	
Test Run Stop Time (hrmin)	5/2/2013 8:51	5/2/2013 10:24	5/2/2013 11:54	

DETAILED RESULTS

Stack Gas Conditions	**Run 1**	**Run 2**	**Run 3**	**Average**
Stack Cross-Sectional Area (A) (ft2)	21.854	21.854	21.854	21.854
Barometric Pressure at Sampling Location (in Hg)	29.28	29.26	29.27	29.27
Dry Molecular Weight of Stack Gas (Md) (lb/lb-mole)	30.24	30.49	30.22	30.32
Wet Molecular Weight of Stack Gas (Ms) (lb/lb-mole)	29.58	29.74	29.43	29.58
Average Absolute Stack Gas Pressure (Ps) (in Hg)	29.21	29.23	29.22	29.22
Average Stack Gas Static Pressure (ps) (in H2O)	-0.83	-0.40	-0.63	-0.62
Average Stack Gas Temperature (ts) (°F)	140.4	144.3	143.8	142.8
Average Stack Gas Temperature (Ts) (°R)	600.4	604.3	603.8	602.8
Average Stack Gas Velocity (Vs) (ft/sec)	51.24	52.14	51.35	51.58
Average Stack Gas Velocity (Vs) (ft/min)	3,074	3,128	3,081	3,095
Wet Volumetric Stack Gas Flow at Actual Conditions (Qaw) (acfm)	67,184	68,364	67,338	67,629
Wet Volumetric Stack Gas Flow at Standard Conditions (scfm)	57,687	58,347	57,509	57,848
Dry Volumetric Stack Gas Flow at Standard Conditions (Qstd) (dscfm)	54,554	54,843	53,771	54,389
Percent by Volume Moisture as measured in Stack Gas (%H2O)	5.43	6.01	6.50	5.98
Test Results				
Volume of Dry Gas Sampled at Standard Conditions (Vmstd) (dscf)	40.723	41.694	40.551	40.989
Rate of Dry Gas Sampled at Standard Conditions (dscfm)	0.679	0.695	0.676	0.683
Predicted 1-Hour Sample Volume Based on Current Sampling Rate (dscf)	40.723	41.694	40.551	40.989
Dry Mole Fraction of Flue Gas (Mfd) (1-bw/100)	0.946	0.940	0.935	0.940
Average Velocity Pressure (Delta P) (in H2O)	0.7354	0.7608	0.7308	0.7424
Average Square Root of Delta P	0.8559	0.8707	0.8534	0.8600
Average Pressure Differential of Orifice Meter (Delta H) (in H2O)	2.0375	2.1313	2.0458	2.0715
Average DGM Temperature (tm) (°F)	75.625	81.083	85.792	80.833
Average Dry Gas Meter Temperature (Tm) (°R)	535.625	541.083	545.792	540.833
Volume of Metered Gas Sample (Vm) (dry) (acf)	41.930	43.387	42.559	42.625
Post-Test Calibration (Yqa)	1.0301	1.0193	1.0270	1.0255
Post-Test/Pre-Test Calibration Factor Difference (%)	-2.93	-1.85	-2.62	-2.47

SAMPLING QA

Current Predicted Allowable Post-Test Leak Rate (dscfm)	0.020	0.020	0.020
Current Sampling Rate Status	**OK**	**OK**	**OK**
Probe Nozzle Diameter (in)	0.225	0.225	0.225
Percent Isokinetic of Sampling Rate (% I)	98.5	100.3	99.5
In Field Isokinetic QA	**GOOD**	**GOOD**	**GOOD**
Count of Velocity Pressure Readings Below 0.05 in H2O	0	0	0
Sensitivity Factor for Differential Pressure Gauge (T)	1.003	1.003	1.003
Is Meter Box Manometer Adequate (Yes / No) ?	YES	YES	YES

MEASURED DATA FROM TEST RUNS

Point Count	Run #	Run Time (min)	Pitot Delta P (in H2O)	Square Root of Delta P	Orifice Delta H (in H2O)	DGM Temp OUT (°F)	Average DGM Temp (°F)	Stack Pressure (in H2O)	Stack Temp (°F)
1	1	0	0.55	0.742	1.55	70	70.00	-0.83	137
2	1	2.5	0.60	0.775	1.70	70	70.00		139
3	1	5	0.64	0.800	1.80	71	71.00		140
4	1	7.5	0.71	0.843	2.00	72	72.00		140
5	1	10	0.74	0.860	2.05	73	73.00		141
6	1	12.5	0.82	0.906	2.20	73	73.00		140
7	1	15	0.73	0.854	2.00	74	74.00		141
8	1	17.5	0.73	0.854	2.00	75	75.00		140
9	1	20	0.82	0.906	2.20	75	75.00		141
10	1	22.5	0.90	0.949	2.45	76	76.00		140
11	1	25	0.84	0.917	2.25	77	77.00		139
12	1	27.5	0.75	0.866	2.05	77	77.00		139
13	1	30	0.65	0.806	1.80	76	76.00		138
14	1	32.5	0.64	0.800	1.80	76	76.00		140
15	1	35	0.65	0.806	1.80	77	77.00		141
16	1	37.5	0.63	0.794	1.75	77	77.00		141
17	1	40	0.65	0.806	1.85	77	77.00		141
18	1	42.5	0.74	0.860	2.05	78	78.00		142
19	1	45	0.84	0.917	2.35	78	78.00		142
20	1	47.5	0.83	0.911	2.30	78	78.00		142
21	1	50	0.82	0.906	2.30	78	78.00		142
22	1	52.5	0.82	0.906	2.30	79	79.00		142
23	1	55	0.82	0.906	2.30	79	79.00		142
24	1	57.5	0.73	0.854	2.05	79	79.00		140
25	2	0	0.58	0.762	1.60	77	77.00	-0.4	141
26	2	2.5	0.62	0.787	1.75	78	78.00		143
27	2	5	0.67	0.819	1.90	78	78.00		143
28	2	7.5	0.72	0.849	2.00	79	79.00		143
29	2	10	0.80	0.894	2.25	79	79.00		143
30	2	12.5	0.86	0.927	2.40	80	80.00		144
31	2	15	0.78	0.883	2.20	80	80.00		144
32	2	17.5	0.81	0.900	2.25	80	80.00		144
33	2	20	0.90	0.949	2.50	81	81.00		144
34	2	22.5	0.92	0.959	2.60	81	81.00		144
35	2	25	0.82	0.906	2.30	81	81.00		143
36	2	27.5	0.62	0.787	1.75	81	81.00		142
37	2	30	0.65	0.806	1.80	80	80.00		144
38	2	32.5	0.70	0.837	1.95	81	81.00		144
39	2	35	0.72	0.849	2.00	81	81.00		145
40	2	37.5	0.71	0.843	2.00	82	82.00		145
41	2	40	0.74	0.860	2.10	82	82.00		146
42	2	42.5	0.75	0.866	2.10	83	83.00		146
43	2	45	0.86	0.927	2.40	83	83.00		146
44	2	47.5	0.83	0.911	2.30	83	83.00		146
45	2	50	0.85	0.922	2.40	84	84.00		146
46	2	52.5	0.79	0.889	2.20	84	84.00		146
47	2	55	0.82	0.906	2.30	84	84.00		146
48	2	57.5	0.74	0.860	2.10	84	84.00		145

MEASURED DATA FROM TEST RUNS

Point Count	Run #	Run Time (min)	Pitot Delta P (in H2O)	Square Root of Delta P	Orifice Delta H (in H2O)	DGM Temp OUT (°F)	Average DGM Temp (°F)	Stack Pressure (in H2O)	Stack Temp (°F)
49	3	0	0.52	0.721	1.50	83	83.00	-0.63	139
50	3	2.5	0.59	0.768	1.65	83	83.00		141
51	3	5	0.64	0.800	1.80	83	83.00		142
52	3	7.5	0.70	0.837	1.95	84	84.00		143
53	3	10	0.75	0.866	2.10	84	84.00		143
54	3	12.5	0.80	0.894	2.25	84	84.00		143
55	3	15	0.72	0.849	2.00	85	85.00		144
56	3	17.5	0.78	0.883	2.20	85	85.00		144
57	3	20	0.82	0.906	2.30	85	85.00		144
58	3	22.5	0.86	0.927	2.40	86	86.00		143
59	3	25	0.83	0.911	2.30	86	86.00		143
60	3	27.5	0.73	0.854	2.05	86	86.00		142
61	3	30	0.63	0.794	1.75	86	86.00		144
62	3	32.5	0.67	0.819	1.90	86	86.00		144
63	3	35	0.66	0.812	1.85	86	86.00		145
64	3	37.5	0.69	0.831	1.95	86	86.00		145
65	3	40	0.68	0.825	1.90	87	87.00		145
66	3	42.5	0.72	0.849	2.00	87	87.00		145
67	3	45	0.83	0.911	2.30	87	87.00		145
68	3	47.5	0.82	0.906	2.30	88	88.00		146
69	3	50	0.82	0.906	2.30	88	88.00		145
70	3	52.5	0.79	0.889	2.20	88	88.00		146
71	3	55	0.79	0.889	2.20	88	88.00		145
72	3	57.5	0.70	0.837	1.95	88	88.00		144

TEST DATA

	Run 1	Run 2	Run 3	Average
Particulate Weight in Probe Rinse (mg)	8.10	5.80	5.40	6.43
Particulate Weight in Filter Catch (mg)	12.10	13.50	13.50	13.03

DETAILED RESULTS

	Run 1	Run 2	Run 3	Average
Emission Results				
Filterable Particulate Matter Emission Rate (lb/ton)	0.044	0.043	0.049	0.046
Filterable Particulate Matter Emission Rate (lb/hr)	3.579	3.358	3.315	3.417
Filterable Particulate Matter Concentration (grains/dscf)	0.0077	0.0071	0.0072	0.0073

EPA Methods 1, 2, 3, 4, and 5 Nomenclature and Sample Calculations
Run No. - 1

Constants

CO_2F_{wt}= 44.0	in wg= 0.073529	NO_2F_{wt}= 46.01	$HClF_{wt}$= 36.46
O_2F_{wt}= 32.0	gr= 0.000142857	COF_{wt}= 28.01	SO_2F_{wt}= 64.06
CON_2F_{wt}= 28.0	mmBtu= 1000000 Btu	$H_2SO_4F_{wt}$= 98.08	Cl_2F_{wt}= 70.91
H_2OF_{wt}= 18.0	CF_{wt}= 12.011	T_{std}= 528	P_{std}= 29.92
	PF_{wt}= 44.0962		

Stack Variables

Cp =	0.84	pitot tube coefficient (dimensionless)
P_{bar} =	29.31 in. Hg	barometric pressure
E_{box} =	5 ft	elevation difference between ground level and meter box
E_{sam} =	35 ft	elevation difference between ground level and sampling ports
γ =	1.0008	gamma, dry gas meter calibration factor (dimensionless)
θ =	60.0 min	net run time (minutes)
V_{lc} =	49.6 g	total mass of liquid collected in impingers (g)
$\%CO_2$ =	11.00 %	percent CO_2 by volume (dry basis) (dimensionless)
$\%O_2$ =	12.00 %	percent O_2 by volume (dry basis) (dimensionless)
%CO =	0.00 %	percent CO by volume (dry basis) (dimensionless)
$\%N_2$ =	77.00 %	percent N_2 by volume (dry basis) (dimensionless)
A =	21.8542 ft^2	stack cross-sectional area
P_g =	-0.83 in. H_2O	flue gas static pressure
T_{savg} =	600.42 R	average absolute flue gas temperature (460R+tsavg °F)
$SQ\Delta P_{avg}$ =	0.86 in. wg	average square root ΔP
ΔH =	2.04 in. wg	average pressure differential of orifice meter
T_m =	535.63 R	dry gas meter temperature (460R+tsavg °F)
V_m =	41.93 ft^3	volume of metered gas sample (dry actual cubic feet)
D_n =	0.225 in.	sampling nozzle diameter

Calculated Stack Variables

Barometric pressure at sampling location

NOTE: Barometric pressure recorded at ground level

$$P_{sam} = P_{bar} - [(E_{sam} / 100 \text{ ft}) * 0.1 \text{ in. Hg}]$$

$$P_{sam} = 29.31 - ((35.0 / 100) * 0.1)$$

$$P_{sam} = 29.28 \text{ in. Hg}$$

Volume of dry gas sampled at standard conditions (dscf)

$$V_{mstd} = \gamma * Vm * [P_{bar} - ([(E_{box} / 100 \text{ ft}) * 0.1 \text{ in. Hg}] + (\Delta H / 13.6)) / P_{std}] * (T_{std} / T_m)$$

$$V_{mstd} = 1.0008 * 41.930 * ((29.31 - ((5.0 / 100) * 0.1) + (2.0375 / 13.6)) / 29.92) * (528.0 / 535.625)$$

$$V_{mstd} = 40.723 \text{ ft}^3$$

Volume of water vapor at standard conditions (68 °F, scf)

$$V_{wstd} = (0.04715 \text{ ft}^3/\text{g}) * Vlc$$

$$V_{wstd} = (0.04715 * 49.6)$$

$$V_{wstd} = 2.3 \text{ ft}^3$$

Percent moisture by volume as measured in flue gas

$\%H_2O$ (Measured) = 100 * [V_{wstd} / (V_{wstd} + V_{mstd})]

$\%H_2O$ (Measured) = 100 * (2.339 / (2.339 + 40.723))

$\%H_2O$ (Measured) = 5.43

$\%H_2O$ (Saturated) = (100 / P_{sam}) * 10 ^ (6.6911 - (3144 / (T_{savg} + 390.86 - 460)))

$\%H_2O$ (Saturated) = (100 / 29.213971) * 10 ^ (6.6911 - (3144 / (600.416667 + 390.86 - 460)))

$\%H_2O$ (Saturated) = 20.31

$\%H_2O$ = 5.43

Absolute flue gas pressure

P_s = P_{sam} + (Pg / 13.6)

P_s = 29.28 + (-0.83 / 13.6)

P_s = 29.21 in. Hg

Dry mole fraction of flue gas (dimensionless)

M_{fd} = 1 - ($\%H_2O$ / 100)

M_{fd} = 1 - (5.43 / 100)

M_{fd} = 0.946

Dry molecular weight of flue gas (lb/lb-mole)

M_d = [($\%CO_2$ / 100) * 44.0] + [($\%O_2$ / 100) * 32.0] + [((100 - $\%CO_2$ - $\%O_2$) / 100) * 28.0]

M_d = ((11.00 / 100) * 44.0) + ((12.00 / 100) * 32.0) + (((100 - 11.00 - 12.00) / 100) * 28.0)

M_d = 30.24 lb/lb-mole

M_d = 30.24

Wet molecular weight of flue gas (lb/lb-mole)

M_s = M_d * M_{fd} + (H_2OF_{wt} * ($\%H_2O$ / 100))

M_s = 30.240 * 0.946 + 18.00 * (5.43 / 100)

M_s = 29.58 lb/lb-mole

Average flue gas velocity (ft/sec)

v_s = 85.49 * Cp * ($SQ\Delta P_{avg}$) * (T_{avg} / (P_s * M_s))$^{0.5}$

v_s = 85.49 * 0.84 * (0.8559) * (600.42 / (29.214 * 29.575)) ^ 0.5

v_s = 51.24 ft/sec

Wet volumetric flue gas flow rate at actual conditions (acfm)

$Q_{aw} = v_s * A * 60$ sec/min

$Q_{aw} = 51.237 * 21.854 * 60$

$Q_{aw} =$ 67,184 ft^3/min

Wet volumetric flue gas flow rate at standard conditions (scfm)

$Q_{sdw} = v_s * A * (T_{std} / T_{savg}) * (P_s / P_{std}) * 60$ sec/min

$Q_{sdw} = 51.237 * 21.854 * (528.0 / 600.417) * (29.214 / 29.92) * 60$

$Q_{sdw} =$ 57,687 ft^3/min

Dry volumetric flue gas flow rate at standard conditions (dscfm)

$Q_{sd} = M_{fd} * v_s * A * (T_{std} / T_{savg}) * (P_s / P_{std}) * 60$ sec/min

$Q_{sd} = 0.946 * 51.2365 * 21.8542 * (528.0 / 600.417) * (29.214 / 29.92) * 60$

$Q_{sd} =$ 54,554 ft^3/min

Isokinetic Calculations

Percent isokinetic of sampling rate (%)

$\%I = (P_{std} / T_{std}) * (T_{savg} / P_s) * [V_{mstd} / (v_s * M_{fd} * \theta * \pi * (D_n / 2)^2)]$

%I = ((((29.92 / 528.0) * (600.417 / 29.214)) * (40.723 / (51.2365 * 0.946 * 60.0 * (()3.141593 * (0.225 / 2) ^ 2) / 144))) / 60) * 100

%I = 98.5 %

Method 5 Calculations

Filterable PM total catch weight (mg)

$mg_{quan} =$ 20.20 mg

Filterable PM concentration (grains/dscf)

$C_{grcm} = 0.154322 * mg_{quan} / V_{mstd}$

$C_{grcm} = 0.0154322 * 20.20 / 40.723$

$C_{grcm} =$ 0.0077 gr/ft^3

Filterable PM mass emission rate (lb/hr)

$EMR_{lbhr} = (mg_{quan} / V_{mstd}) * Q_{sd} * (60 / 453592)$

$EMR_{lbhr} = 20.20 / 40.723 * 54,553.817 * (60 / 453592)$

$EMR_{lbhr} =$ 3.58 lb/hr

Method 5 Isokinetic Field Data

Effective Date: 7/16/12
Rev No. 0
Issued by Manager

Plant	Clow Water Systems Co.	Meter box no.	T-MTB- 015	Gamma	1.0008
Location	P901 Exhaust Stack (A)	Pump no.	T-PMP- 015	K Factor	2.8, 12.7, 2781
Run no.	1	Probe no.	T-PRB- 811	Nozzle Size, in.	0.225
Test start time	743	Filter box no.	T-FLB- 018	Barometric pressure, in.Hg	29.31 Barometer no. T- BAR-001
Test stop time	851	Impinger box no.	T-IMB- 001	Ambient temperature, °F	70
Pre-test leak rate @ 15in.Hg	0.001	Umbilical cord no.	T-UMC- 006	Filter box temperature setting, °F	248 ± 25
Post-test leak rate @ 5 in.Hg	0.000	Umbilical adapter no.	T-UMA- 018	Probe temperature setting, °F	248 ± 25
Pre-test pitot leak check - total ✓ static ✓		Filter Exit Therm. no.	T-FXT- 020	Orsat flow rate setting, SCFH	0.33 Orsat bag no. 130502A-1-M3/TB
Post-test pitot leak check - total ✓ static ✓					

POINT	CLOCK TIME min	DRY GAS METER CF	PITOT In. H_2O ΔP	ORIFICE ΔH In. H_2O DESIRED	ORIFICE ΔH In. H_2O ACTUAL	PROBE TEMP °F	STACK TEMP °F	DRY GAS TEMP, °F INLET	DRY GAS TEMP, °F OUTLET	FILTER TEMP °F	IMPINGER TEMP °F	FILTER EXIT TEMP °F	PUMP VACUUM In.Hg	ORSAT FLOW SCFH	STATIC PRESSURE ± in.H_2O
1	0	965.170	0.55	1.65	1.65	250	137	—	70	229	52	227	1.0	0.3	~~-0.44~~
2	2.5	968.720	0.60	1.68	1.70	250	139	—	70	248	49	228	1.0	0.3	-0.83
3	5	972.30	0.64	1.79	1.80	250	140	—	71	260	48	229	1.0	0.3	
4	7.5	975.86	0.71	1.99	2.0	265	140	—	72	271	47	229	1.0	0.3	
5	10	979.57	0.74	2.07	2.05	265	141	—	73	274	48	234	1.0	0.3	
6	12.5	983.29	0.82	2.21	2.20	266	140	—	73	272	49	239	1.0	0.3	—
7	15	986.15	0.73	1.97	2.0	266	141	—	74	274	51	244	1.0	0.3	—
8	17.5	989.10	0.78	1.9	2.0	266	140	—	75	265	53	248	1.0	0.3	—
9	20	992.62	0.82	2.21	2.2	264	141	—	75	264	54	248	1.0	0.3	—
10	22.5	996.43	0.90	2.43	2.45	264	140	—	76	265	55	245	1.0	0.3	—
11	25	999.38	0.84	2.27	2.25	265	139	—	77	266	57	245	1.0	0.3	—
12	27.5	994.24	0.73	2.03	2.05	263	139	—	77	266	59	248	1.0	0.3	—
1	30	975.189	0.65	1.81	1.80	266	138	—	76	271	60	234	1.0	0.3	—
2	32.5	977.60	0.64	1.78	1.80	263	140	—	76	265	57	245	1.0	0.3	—
3	35	979.26	0.65	1.81	1.80	263	141	—	77	264	55	243	1.0	0.3	—
4	37.5	980.87	0.63	1.75	1.75	267	141	—	77	265	54	241	1.0	0.3	—
5	40	982.49	0.65	1.83	1.85	262	141	—	77	266	54	241	1.0	0.3	—
6	42.5	984.13	0.74	2.06	2.05	266	142	—	78	266	54	240	1.0	0.3	—
7	45	985.87	0.84	2.34	2.35	266	142	—	78	268	53	240	1.0	0.3	—
8	47.5	987.75	0.83	2.31	2.30	265	142	—	78	266	54	241	1.0	0.3	—
9	50	989.65	0.82	2.28	2.30	262	142	—	78	265	54	241	1.0	0.3	—
10	52.5	991.54	0.82	2.28	2.30	267	142	—	79	268	54	238	1.0	0.3	—
11	55	993.42	0.82	2.28	2.30	265	142	—	79	266	53	242	1.0	0.3	—
12	57.5	995.33	0.73	2.03	2.05	264	140	—	79	266	54	241	1.0	0.3	—
Final	60	997.800													

Nomograph Calibration Variables ΔH@ 2.187 Cp 0.84 Ts ✓ Tm ✓ Ps ✓ Pm ✓ Bws ✓

Comments: Initial 965.170

Leak Checks
Int. DGM Reading 975.989
Final DGM Reading 975.989
0

Pause Times
Pause: 813
Resume: 821

Air Compliance Testing, Inc.
D:\Testing\ACT Test Methods\M005\Method 5.xls
(Method 5.xls-Isokinetic Field Data) 4/30/2013
1 of 1

Job Number: 130502A
Done By / Date: SHC / 5/2/13
Final Check By / Date: SS / 5-22-13

Method 5 Isokinetic Field Data

Plant	Clow Water Systems Co.	Meter box no.	T-MTB- 01	Gamma	1.0008
Location	P901 Exhaust Stack (A)	Pump no.	T-PMP- 01	K Factor	2.8
Run no.	2	Probe no.	T-PRB- 008	Nozzle Size, in.	0.228
Test start time	917	Filter box no.	T-FXB- 001	Barometric pressure, in.Hg	28.29 Barometer no. T- 1307-001
Test stop time	1024	Impinger box no.	T-IMB- 006	Ambient temperature, °F	78
Pre-test leak rate @ 15in.Hg	0.003	Umbilical cord no.	T-UMC- 006	Filter box temperature setting, °F	248 ± 25
Post-test leak rate @ 9 in.Hg	0.000	Umbilical adapter no.	T-UMA- 014	Probe temperature setting, °F	248 ± 25
Pre-test pitot leak check - total ✓	static ✓	Filter Exit Therm. no.	T-FXT- OK	Orsat flow rate setting, SCFH	0.3 Orsat bag no. 130502A-2
Post-test pitot leak check - total	static ✓				

POINT	CLOCK TIME min	DRY GAS METER CF	PITOT in. H_2O ΔP	ORIFICE ΔH in. H_2O DESIRED	ORIFICE ΔH in. H_2O ACTUAL	PROBE TEMP °F	STACK TEMP °F	DRY GAS TEMP, °F INLET	DRY GAS TEMP, °F OUTLET	FILTER TEMP °F	IMPINGER TEMP °F	FILTER EXIT TEMP °F	PUMP VACUUM in.Hg	ORSAT FLOW SCFH	STATIC PRESSURE ± in.H_2O
1	0	997.325	0.58	1.67	1.60	264	141	—	77	268	69	226	1.0	0.3	~~0.18~~
2	2.5	998.91	0.62	1.74	1.75	264	143	—	78	263	56	231	1.0	0.3	0.40
3	5	1000.52	0.67	1.88	1.90	269	143	—	78	264	54	228	1.0	0.3	—
4	7.5	1002.19	0.72	2.02	2.0	269	143	—	79	266	53	239	1.0	0.3	—
5	10	1003.82	0.80	2.24	2.25	265	143	—	79	267	54	238	1.0	0.3	—
6	12.5	1005.49	0.86	2.41	2.40	265	141	—	80	266	55	239	1.0	0.3	—
7	15	1007.11	0.78	2.18	2.2	266	144	—	80	265	57	240	1.0	0.3	—
8	17.5	1008.59	0.81	2.27	2.25	266	144	—	80	267	58	241	1.0	0.3	—
9	20	1011.5	0.90	2.52	2.50	266	145	—	81	267	59	241	1.0	0.3	—
10	22.5	1013.92	0.92	2.58	2.60	264	144	—	81	267	61	241	1.0	0.3	—
11	25	1015.5	0.82	2.3	2.3	266	143	—	81	264	63	241	1.0	0.3	—
12	27.5	1017.30	0.62	1.74	1.75	264	142	—	81	264	64	241	1.0	0.3	—
1	30	1019.000	0.66	1.82	1.80	265	145	—	80	269	66	229	1.0	0.3	—
2	32.5	1020.61	0.70	1.96	1.95	265	144	—	81	263	63	228	1.0	0.3	—
3	35	1022.30	0.72	2.02	2.0	263	145	—	81	268	60	224	1.0	0.3	—
4	37.5	1024.05	0.71	1.99	2.0	268	145	—	82	269	59	223	1.0	0.3	—
5	40	1025.80	0.74	2.07	2.10	266	146	—	82	278	57	228	1.0	0.3	—
6	42.5	1027.60	0.75	2.10	2.10	288	146	—	83	288	56	229	1.0	0.3	—
7	45	1029.35	0.86	2.41	2.40	271	146	—	83	290	58	228	1.0	0.3	—
8	47.5	1031.26	0.83	2.32	2.30	269	146	—	83	293	58	227	1.0	0.3	—
9	50	1033.17	0.85	2.38	2.40	268	146	—	84	297	60	235	1.0	0.3	—
10	52.5	1035.10	0.79	2.21	2.20	270	146	—	84	300	61	236	1.0	0.3	—
11	55	1036.98	0.82	2.3	2.30	262	146	—	84	303	61	239	1.0	0.3	—
12	57.5	1038.88	0.74	2.07	2.10	266	145	—	84	306	60	234	1.0	0.3	—
Final	60	1040.712													

Nomograph Calibration Variables ΔH@ 2.187 Cp 0.84 Ts / Tm / Ps / Pm / Bws /

Comments:

Leak Checks
Int. DGM Reading
Final DGM Reading

Pause Times
Pause: 947
Resume: 1054

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Job Number: 130502 A
Done By / Date: 5/2/13
Final Check By / Date: 5/22/13

Method 5 Isokinetic Field Data

Effective Date: 7/16/12
Rev No. 0
Issued ... Manager

Plant	Clow Water Systems Co.	Meter box no.	T-MTB- 015	Gamma	1.0008
Location	P901 Exhaust Stack (A)	Pump no.	T-PMP- 018	K Factor	1
Run no.	3	Probe no.	T-PRB- 011	Nozzle Size, in.	0.228
Test start time	10:50	Filter box no.	T-FLB- 016	Barometric pressure, in.Hg	29.30 Barometer no. T- 002-001
Test stop time	11:54	Impinger box no.	T-IMB- 001	Ambient temperature, °F	72
Pre-test leak rate @ 15in.Hg	18" Hg 0.002	Umbilical cord no.	T-UMC- 006	Filter box temperature setting, °F	248-256
Post-test leak rate @ 5 in.Hg	0.000	Umbilical adapter no.	T-UMA- 019	Probe temperature setting, °F	248-258
Pre-test pitot leak check - total ✓	static ✓	Filter Exit Therm. no.	T-FXT- 020	Orsat flow rate setting, SCFH	0.3 Orsat bag no. 130502A-2 M3/TA
Post-test pitot leak check - total ✓	static ✓				

POINT	CLOCK TIME min	DRY GAS METER CF	PITOT In. H_2O ΔP	ORIFICE ΔH In. H_2O DESIRED	ORIFICE ΔH In. H_2O ACTUAL	PROBE TEMP °F	STACK TEMP °F	DRY GAS TEMP, °F INLET	DRY GAS TEMP, °F OUTLET	FILTER TEMP °F	IMPINGER TEMP °F	FILTER EXIT TEMP °F	PUMP VACUUM In.Hg	ORSAT FLOW SCFH	STATIC PRESSURE ± in.H_2O
1	0	41.028	0.56	1.46	1.50	255	139	—	83	265	51	230	1.0	0.3	-0.03
2	2.5	42.50	0.59	1.65	1.65	265	141	—	83	263	47	229	1.0	0.3	—
3	5	44.07	0.64	1.79	1.80	266	142	—	83	269	48	250	1.0	0.3	—
4	7.5	45.70	0.70	1.96	1.95	257	143	—	84	260	48	249	1.0	0.3	—
5	10	47.41	0.76	2.10	2.1	258	143	—	84	259	46	246	1.0	0.3	—
6	12.5	49.2	0.80	2.25	2.25	258	143	—	84	260	49	243	1.0	0.3	—
7	15	51.04	0.72	2.02	2.0	258	144	—	84	261	47	243	1.0	0.3	—
8	17.5	52.81	0.78	2.18	2.20	259	144	—	85	261	48	241	1.0	0.3	—
9	20	54.64	0.82	2.30	2.30	257	144	—	85	260	49	241	1.0	0.3	—
10	22.5	56.54	0.86	2.41	2.40	259	143	—	86	257	49	241	1.0	0.3	—
11	25	58.46	0.83	2.32	2.30	260	143	—	86	260	50	242	1.0	0.3	—
12	27.5	60.351	0.73	2.05	2.05	266	142	—	86	259	52	242	1.0	0.3	—
1	30	62.167	0.63	1.76	1.75	258	144	—	86	262	51	227	1.0	0.3	—
2	32.5	63.85	0.67	1.80	1.90	259	144	—	86	262	50	228	1.0	0.3	—
3	35	65.54	0.66	1.86	1.85	258	145	—	86	259	50	232	1.0	0.3	—
4	37.5	67.23	0.69	1.93	1.95	260	145	—	86	261	51	230	1.0	0.3	—
5	40	68.993	0.68	1.90	1.90	259	145	—	87	261	50	229	1.0	0.3	—
6	42.5	70.63	0.72	2.02	2.0	259	145	—	87	261	51	227	1.0	0.3	—
7	45	72.38	0.83	2.32	2.3	261	148	—	87	263	50	228	1.0	0.3	—
8	47.5	74.07	0.82	2.30	2.3	266	146	—	88	269	50	233	1.0	0.3	—
9	50	75.15	0.82	2.30	2.3	268	145	—	88	263	50	235	1.0	0.3	—
10	52.5	78.29	0.79	2.21	2.2	267	146	—	88	265	51	237	1.0	0.3	—
11	55	79.94	0.79	2.21	2.2	267	145	—	88	265	52	238	1.0	0.3	—
12	57.5	81.87	0.70	1.96	1.95	267	144	—	88	267	52	239	1.0	0.3	—
Final	60	83.587													

Nomograph Calibration Variables ΔH@ 2.187 Cp 0.84 Ts — Tm — Ps — Pm — Bws

Comments:

Leak Checks
Int. DGM Reading
Final DGM Reading

Pause Times
Pause: 11:20
Resume: 11:24

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Job Number: 130502 A
Done By / Date: 5/2/13

Method 9 Visible Emissions Observation Form-1

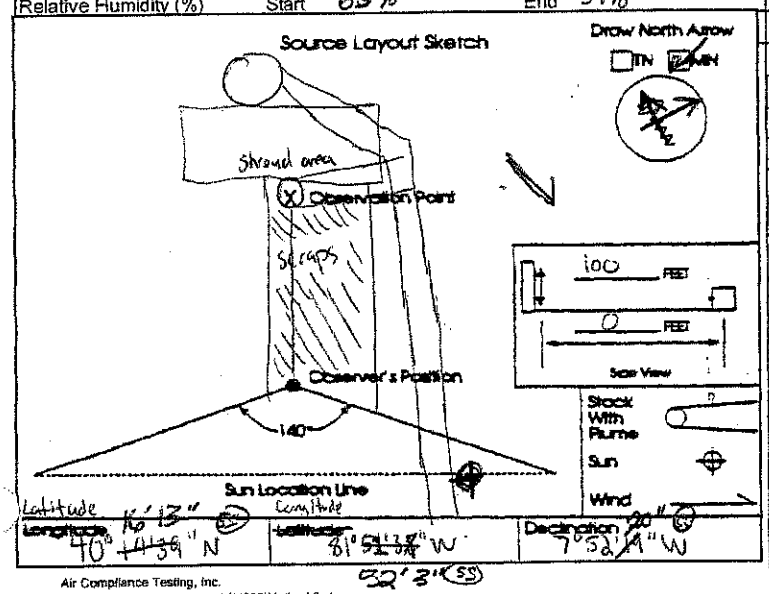
Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Company Name	Clow Water Systems Co.	Observation Date	5/2/13 Run No. 1
Facility Name	Clow Water Systems Co.	Start Time	7:45
Street Address	S Sixth St	End Time	8:45
City Coshocton	State OH Zip 43812		

Process & Unit #	Cupola Emission System	Operating Mode	Maximum Achievable Operations
Control Equipment	Scrubber System	Operating Mode	N/A

Describe Emission Point	Shroud Area, covered area with crane operations, olivegreen building	
Height of Emission Point	Start ~100'	End Same
Height Relative to Observer	Start ~35'	End same
Distance from Observer	Start ~450'	End same
Direction from Observer (°)	Start 302°	End Same
Vertical Angle to Observation Point (°)	Start 10°	End same
Distance and Direction to Observation Point from Emission Point		
Start	30' North directly above	
End	Same	
Describe Emissions	Start white/brown lofting	End Same
Emission Color	Start white/brown	End same
If Water Droplet Plume	Attached N/A	Detached N/A
Point in the Plume at which Opacity was Determined		
Start	at the tip of the roof when it comes out of the shroud area	
End	Same	
Describe Plume Background	Start pipes and sky	End Same
Background Color	Start blue sky, rusted pipes	End Same
Sky Conditions	Start clear	End Same
Wind Speed (mph)	Start 4-6	End 4-6
Wind Direction (From)	Start ESE	End Same
Ambient Temperature (°F)	Start 53	End 62
Relative Humidity (%)	Start 65%	End 51%

Sec.	0	15	30	45	Sec.	0	15	30	45
Min.									
0	0	10	0	5	30	0	0	5	5
1	5	10	0	0	31	0	5	0	0
2	0	0	0	0	32	0	5	10	0
3	5	5	15	5	33	0	10	5	0
4	0	0	0	0	34	10	10	0	0
5	5	0	5	5	35	0	5	5	0
6	5	0	0	5	36	5	5	0	5
7	0	5	5	5	37	10	5	0	0
8	0	0	10	10	38	0	5	5	0
9	5	5	0	0	39	15	0	10	5
10	0	5	10	0	40	5	10	5	15
11	10	5	10	5	41	0	0	0	0
12	0	0	0	5	42	0	0	5	5
13	5	0	0	5	43	5	0	5	10
14	10	10	0	5	44	5	10	0	10
15	5	10	5	0	45	10	10	0	5
16	0	0	0	5	46	10	0	5	5
17	5	0	0	5	47	0	5	0	0
18	15	0	5	5	48	0	5	0	5
19	5	5	0	10	49	5	0	0	0
20	10	10	5	0	50	0	0	0	0
21	0	5	0	5	51	0	0	0	0
22	5	5	0	5	52	0	0	0	5
23	0	0	0	0	53	0	0	0	0
24	0	5	5	0	54	5	0	0	0
25	0	0	0	0	55	0	0	0	10
26	0	5	5	5	56	10	5	10	10
27	15	5	5	5	57	5	0	5	0
28	10	5	0	0	58	0	10	10	0
29	5	0	0	0	59	5	0	0	5



Range of Opacity Readings	
Minimum 0	Maximum 15
Average Opacity for Highest Period	5.21
Observer's Name (Print)	Alex Spektor
Observer's Signature	
Date	5/2/13
Organization	*Air Compliance Testing, Inc.*
Certified By (Check below where applicable):	
[X] Eastern Technical Associates	Date: 4/10/13
[ ] Whitlow Enterprises, LLC	Date:
[ ] Compliance Assurance Associates	Date:

Air Compliance Testing, Inc.
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Job Number: 130502 B
Done By / Date: AS / 5/2/13
Final Check By / Date: SS / 5-22-13

Method 9 Visible Emissions Observation Form-1

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Company Name	Clow Water Systems Co.	Observation Date	5/2/13 Run No. 2
Facility Name	Clow Water Systems Co.	Start Time	9:17
Street Address	S Sixth St	End Time	10:17
City Coshocton	State OH Zip 43812		

Process & Unit #	Cupola Emission System	Operating Mode	Maximum Achievable Operations
Control Equipment	Scrubber System	Operating Mode	NA

Describe Emission Point: Shroud area, covered area with crane operations, olive green building

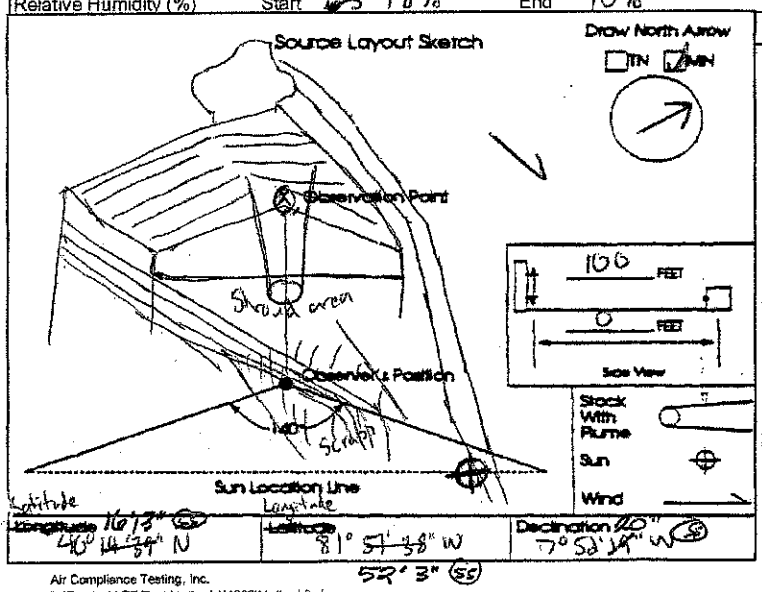
Height of Emission Point	Start ~100'	End	same
Height Relative to Observer	Start ~35'	End	same
Distance from Observer	Start ~450'	End	same
Direction from Observer (°)	Start 302°	End	same
Vertical Angle to Observation Point (°)	Start 10°	End	same

Distance and Direction to Observation Point from Emission Point
Start 30' ~~North~~ directly above
End same

Describe Emissions	Start white/brown lifting	End	same
Emission Color	Start white/brown	End	same
If Water Droplet Plume	Attached NA	Detached	NA

Point in the Plume at which Opacity was Determined
Start at the tip of the roof when it comes out of the shroud area
End Same

Describe Plume Background	Start pipes and sky	End	Same
Background Color	Start blue sky / rust pipes	End	same
Sky Conditions	Start clear	End	same
Wind Speed (mph)	Start ~~4-6~~ 7-10	End	7-10
Wind Direction (From)	Start ~~ESE~~ SE	End	SSE
Ambient Temperature (°F)	Start ~~55~~ 64	End	67
Relative Humidity (%)	Start ~~65~~ 48%	End	45%



Latitude ~~Longitude~~ 16'13" (55) 40° 14' 34" N	Longitude ~~Latitude~~ 81° 51' 38" W 52' 3" (55)	Declination 20" 7° 53' 14" W (5)

Sec.	0	15	30	45	Sec.	0	15	30	45
Min.									
0	5	5	10	5	30	0	5	0	0
1	5	0	5	0	31	0	0	0	5
2	5	5	0	5	32	5	5	10	0
3	10	10	5	5	33	0	5	5	5
4	5	5	5	0	34	10	0	10	5
5	0	5	0	10	35	10	15	10	5
6	10	5	5	10	36	0	5	5	10
7	5	0	10	5	37	10	5	0	0
8	0	0	0	5	38	5	5	5	0
9	5	5	0	10	39	0	15	10	10
10	0	10	5	0	40	15	15	15	10
11	5	5	10	10	41	10	5	5	5
12	10	10	10	15	42	5	5	5	10
13	10	5	5	5	43	0	10	5	0
14	5	5	5	0	44	10	5	0	0
15	0	10	15	15	45	0	0	5	5
16	10	5	10	15	46	5	10	5	5
17	5	0	5	0	47	0	5	5	10
18	0	5	5	5	48	5	5	0	0
19	10	10	10	5	49	5	0	0	0
20	0	10	15	15	50	5	0	5	5
21	10	10	0	10	51	0	5	0	5
22	5	5	0	0	52	5	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	5	5	5	54	0	5	5	5
25	0	5	5	0	55	0	0	0	5
26	10	5	0	0	56	0	10	10	5
27	0	0	0	0	57	5	5	5	0
28	0	0	10	5	58	0	5	10	10
29	5	5	0	5	59	10	5	5	5

Range of Opacity Readings
Minimum 0 Maximum 15
Average Opacity for Highest Period ~~7.92%~~ 8.15 (5)
Observer's Name (Print) Alex Spector
Observer's Signature
Date 5/2/13
Organization *Air Compliance Testing, Inc.*
Certified By (Check below where applicable):
[✓] **Eastern Technical Associates** Date: 4/10/13
[ ] **Whitlow Enterprises, LLC** Date:
[ ] **Compliance Assurance Associates** Date:

Air Compliance Testing, Inc.
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Job Number: 130502 B
Done By / Date: ASA / 5/2/13
Final Check By / Date: SS / 5-22-13

Method 9 Visible Emissions Observation Form-1

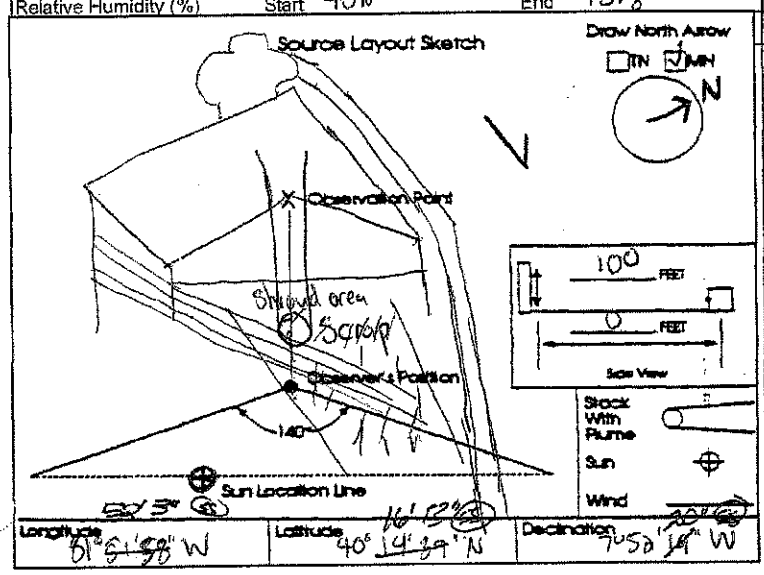
Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Company Name	Clow Water Systems Co.	Observation Date	5/2/13 Run No. 3
Facility Name	Clow Water Systems Co.	Start Time	10:50
Street Address	S Sixth St	End Time	11:50
City Coshocton	State OH Zip 43812		

Process & Unit #	Cupola Emission System	Operating Mode	Maximum Achievable Operations
Control Equipment	Scrubber System	Operating Mode	NA

Describe Emission Point	Shroud Area, covered area with crane operations, olive green building		
Height of Emission Point	Start ~100'	End	Same
Height Relative to Observer	Start ~35'	End	Same
Distance from Observer	Start ~450'	End	Same
Direction from Observer (°)	Start 302°	End	Same
Vertical Angle to Observation Point (°)	Start 10°	End	Same
Distance and Direction to Observation Point from Emission Point	Start 30' directly above	End	Same
Describe Emissions	Start whitelbrown lofting	End	Same
Emission Color	Start whitelbrown	End	Same
If Water Droplet Plume	Attached NA	Detached	NA
Point in the Plume at which Opacity was Determined	Start at the tip of the roof when it comes out of the shroud area	End	Same
Describe Plume Background	Start pipes and sky	End	Same
Background Color	Start blue sky w/ white pipe	End	Same
Sky Conditions	Start clear	End	Same
Wind Speed (mph)	Start 7-10	End	7-10
Wind Direction (From)	Start SSE	End	S
Ambient Temperature (°F)	Start 67	End	72
Relative Humidity (%)	Start 45%	End	43%

Sec.	0	15	30	45	Sec.	0	15	30	45
Min.									
0	0	5	0	10	30	5	0	0	5
1	5	5	10	5	31	5	5	5	10
2	0	10	10	5	32	10	5	5	5
3	0	0	5	5	33	0	5	5	10
4	5	5	5	5	34	0	0	5	0
5	0	5	5	10	35	5	5	5	0
6	10	5	0	0	36	0	0	5	5
7	0	0	0	0	37	0	5	5	10
8	0	0	0	5	38	10	10	5	5
9	5	5	0	5	39	10	5	15	10
10	0	0	5	10	40	5	10	10	5
11	5	5	0	0	41	10	5	0	0
12	0	5	5	5	42	0	0	0	5
13	10	10	5	10	43	5	0	10	10
14	0	5	5	0	44	0	0	0	0
15	0	0	5	0	45	5	5	5	5
16	0	0	5	5	46	5	0	5	5
17	0	0	5	0	47	0	0	0	5
18	0	0	0	0	48	0	0	0	0
19	0	5	5	5	49	5	5	0	0
20	0	5	0	0	50	5	10	10	10
21	0	5	10	5	51	5	5	5	5
22	5	5	10	10	52	5	0	0	5
23	10	0	0	5	53	5	0	5	5
24	5	10	5	0	54	5	5	0	0
25	0	0	5	5	55	0	5	5	5
26	5	5	5	5	56	10	5	10	10
27	10	5	5	5	57	5	10	5	5
28	0	10	10	10	58	0	10	0	0
29	5	5	10	10	59	5	5	5	5



Longitude	81°51'58" W	Latitude	40° 14' 39" N
Declination	7°52' 30" W		

Range of Opacity Readings	
Minimum	0
Maximum	15
Average Opacity for Highest Period	~~6.04%~~ 6.25
Observer's Name (Print)	Alex Spetter
Observer's Signature	
Date	5/2/13
Organization	*Air Compliance Testing, Inc.*
Certified By (Check below where applicable):	
[X] Eastern Technical Associates	Date: 4/10/13
[ ] Whitlow Enterprises, LLC	Date:
[ ] Compliance Assurance Associates	Date:

Air Compliance Testing, Inc.
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Job Number: 130502 B
Done By / Date: ASA / 5/2/13
Final Check By / Date: SS / 5-22-13

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Method 4 Moisture Recovery

Method 4 Gravimetric Determination for Moisture

Method 5 Sample Train

Company Name: Clow Water Systems
Location: P901
Prepared By: ASA Date: 4/26/13 Shop Balance ID: A-BAL-005 Field Balance ID: A-BAL-008

Run Number	1	2	~~3~~	~~4~~ 3
Run Date	5/2/13	5/2/13		5/2/13
Recovery Date	5/2/13	5/2/13		5/2/13
Recovery Time	933	1042		1224
Recovered By	[illegible]	ASA		ASA
Impinger Box No.	0001	006		010
Turbidity / Color (Clear, Cloudy, Suspended Particulates, etc.)	no change	no change		no change

Impinger Initial Weights (Grams)

Knockout Initial				
No. 1 Initial	689.0	~~680.5~~ 691.7	689.6	707.3
No. 2 Initial	680.5	676.1	674.1	698.3
No. 3 Initial	597.7	587.9	587.5	601.4
Silica Gel Initial	892.7	874.6	912.1	902.5

Impinger Final Weights (Grams)

Knockout Final				
No. 1 Final	707.3	711.9		740.5
No. 2 Final	698.3	694.0		713.4
No. 3 Final	601.4	594.0		604.2
Silica Gel Final	902.5	886.9		911.2

Job Number: 130502.A
Done By / Date: [illegible] / 5/1/13
Final Check By / Date: SS / 5-22-13

Method 4 Gravimetric Calculation for Moisture

Method 5 Sampling Train

	Run 1	Run 2	Run 3
IMPINGER #1			
Final Weight (g)	707.3	711.9	740.5
Tared Weight (g)	689.0	691.7	707.3
Condensed H_2O (ml,g)	18.3	20.2	33.2
IMPINGER #2			
Final Weight (g)	698.3	694.0	713.4
Tared Weight (g)	680.5	676.1	698.3
Condensed H_2O (ml,g)	17.8	17.9	15.1
IMPINGER #3			
Final Weight (g)	601.4	594.0	604.2
Tared Weight (g)	597.7	587.9	601.4
Condensed H_2O (ml,g)	3.7	6.1	2.8
Total Condensed (ml,g)	39.8	44.2	51.1
SILICA GEL			
Final Weight (g)	902.5	886.9	911.2
Tared Weight (g)	892.7	874.6	902.5
Adsorbed H_2O (ml,g)	9.8	12.3	8.7
Total H_2O Collected (ml,g)	49.6	56.5	59.8

Method 3 Fyrite Field Data

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Plant Name: Clow Water Systems Co.

Test Location: P901 Exhaust Stack (A)

CO_2 Zero: (Y) N O_2 Zero: (Y) N

Run Number: 1			Operator: Ale	
Time of Sample Collection	Time of Analysis	%CO_2 (A)	%O_2 (B)	%N_2 (100 - (A + B))
745	1031	11.0	12.0	77.0
857	↓	11.0	12.0	77.0
	1036	11.0	12.0	77.0
	Average	11.0	12.0	77.0

Analyzer I.D. - A - FYR - 003 Tedlar Bag I.D.: 130502 A - - M3/TB

Run Number: 2			Operator: ASA	
Time of Sample Collection	Time of Analysis	%CO_2 (A)	%O_2 (B)	%N_2 (100 - (A + B))
907	11:58	12.5	12.5	75.0
1024	12:01	12.4	12.5	75.1
	12:05	12.5	12.1	75.4
	Average	12.47	12.37	~~77.5~~ 75.17

Analyzer I.D. - A - FYR - 003 Tedlar Bag I.D.: 130502 A - 2 - M3/TB

Run Number: 3			Operator: ASA	
Time of Sample Collection	Time of Analysis	%CO_2 (A)	%O_2 (B)	%N_2 (100 - (A + B))
1050	12:09	11.0	11.5	77.5
1154	12:11	11.0	11.5	77.5
	12:13	11.0	11.5	77.5
	Average	11.0	11.5	77.5

Analyzer I.D. - A - FYR - 003 Tedlar Bag I.D.: 130502 A - 3 - M3/TB

Air Compliance Testing, Inc.
D:\TESTING\ACT Test Methods\M003\Method 3 - Fyrite.xls
(Method 3 - Fyrite.xls-Fyrite Field Data) 4/30/2013
1 of 1

Job Number: 130502 A
Done By / Date: SHC/ASA / 5/2/13
Final Check By / Date: SC / 5-22-13

Method 3 Dry Molecular Weight Calculation

Run 1

	%CO2	%O2	%N2	Molecular Weight	Mean Difference
	11.0	12.0	77.0	30.24	0.000
	11.0	12.0	77.0	30.24	0.000
	11.0	12.0	77.0	30.24	0.000
Average	11.00	12.00	77.00	30.24	

Run 2

	%CO2	%O2	%N2	Molecular Weight	Mean Difference
	12.5	12.5	75.0	30.50	0.011
	12.4	12.5	75.1	30.48	-0.005
	12.5	12.1	75.4	30.48	-0.005
Average	12.47	12.37	75.17	30.49	

Run 3

	%CO2	%O2	%N2	Molecular Weight	Mean Difference
	11.0	11.5	77.5	30.22	0.000
	11.0	11.5	77.5	30.22	0.000
	11.0	11.5	77.5	30.22	0.000
Average	11.00	11.50	77.50	30.22	

Cyclonic Flow Determination

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Plant Name	Clow Water Systems Co.
City, State	Coshocton, OH
Test Location	P901 Exhaust Stack (A)
Pitot I.D. - T- DT 801	Manometer I.D. - T- MTB-015 / Umbilical I.D. T- MZU-256

Run Number - 1	Run Number -	Run Number -
Date - 3/7/13	Date -	Date -
Barometric Pressure (in.Hg) : 29.32	Barometric Pressure (in.Hg) :	Barometric Pressure (in.Hg) :
Ambient Temperature (°F): 38	Ambient Temperature (°F):	Ambient Temperature (°F):
Barometer ID- DPG-010	Barometer ID-	Barometer ID-
Start Time - 1208	Start Time -	Start Time -
Finish Time - 1224	Finish Time -	Finish Time -
Manometer Zero and Level - Yes ☑	Manometer Zero and Level - Yes ☐	Manometer Zero and Level - Yes ☐
Apparatus Leak Check - Done By: TS/JH	Apparatus Leak Check - Done By:	Apparatus Leak Check - Done By:
Pre Impact Side - Pass ☑	Pre Impact Side - Pass ☐	Pre Impact Side - Pass ☐
Pre Static Side - Pass ☐	Pre Static Side - Pass ☐	Pre Static Side - Pass ☐

Test Point	Notes	Yaw Angle (°)	Test Point	Notes	Yaw Angle (°)	Test Point	Notes	Yaw Angle (°)
1		-7	1			1		
2		-8	2			2		
3		-8	3			3		
4		-8	4			4		
5		12	5			5		
6		8	6			6		
7	0.0	6	7			7		
8	0.55	5	8			8		
9		3	9			9		
10		8	10			10		
11		18	11			11		
12		14	12			12		
13		12	13			13		
14		7	14			14		
15		4	15			15		
16		3	16			16		
17		4	17			17		
18		1	18			18		
19	5.50	3	19			19		
20		6	20			20		
21		2	21			21		
22		12	22			22		
23		8	23			23		
24		5	24			24		
25			25			25		
	Avg.	7.29		Avg.			Avg.	

Apparatus Leak Check - Done By: TS/JH	Apparatus Leak Check - Done By:	Apparatus Leak Check - Done By:
Post Impact Side - Pass ☑	Post Impact Side - Pass ☐	Post Impact Side - Pass ☐
Post Static Side - Pass ☑	Post Static Side - Pass ☐	Post Static Side - Pass ☐

Note: Yaw angle average is the sum of the absolute values divided by the number of measurements, and must be ≤ 20°.
Yaw angle is the angle measured from the point where zero ΔP should be obtained to the point where zero ΔP is actually obtained

Air Compliance Testing, Inc.
D:\TESTING\ACT Test Methods\M002\Method 2
(Method 2-Cyclonic Flow Determination) 3/1/2013
1 of 1

Job Number: 130312 A
Done By / Date: TS / 3/7/13
Final Check By / Date: ☐ / 4-3-13

Method 1.xls Preliminary Field Data-Round

Plant: Clow Water Systems Co.
City, State: Coshocton, OH
Location: P901 Exhaust Stack (A)

Duct Depth (Inner Diameter):	Port 1	Port 2	Port 3	Port 4
Relative Location	L	R		
From Far Inside Wall to Outside of Port (in.)	70.1	70.1		
Nipple Length and/or Wall Thickness (in.)	6.8	6.8		
Nipple Protrusion (in.)	0.	0		
Stack or Duct Depth (Inner Diameter) (in.)	63.3	63.3		
Stack Outer Circumference (in.)	0	0		
Port Hole Inner Diameter (in.)	6.	6.		

Sample Port Access	MANLIFT
Elevation of Meter Box from Ground Level (ft)	@ 50 0
Elevation of Ports from Ground Level (ft)	50
Number of Ports	2
Direction of Flow	A
Isokinetic Sample (Yes / No)	Y
Measured Particulate Build-up (in.)	NONE

Distance Upstream from Flow Disturbance (in.)	171.0
Diameters Upstream from Flow Disturbance (≥ 0.5 D_e)	2.7
Minimum Traverse Points Needed *	12

Distance Downstream from Flow Disturbance (in.)	190
Diameters Downstream from Flow Disturbance (≥ 2 D_e)	3
Minimum Traverse Points Needed *	24

*Circle Larger of the Two

Stack or Duct Area = 3247.0 in.^{2}

Location of Points in Circular Stacks or Ducts

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

Note:
1) Stacks having a diameter greater than 24in, shall have no traverse points located within 1.0in of the Stack walls.

2) Stacks having a diameter less than or equal to 24in, shall have no traverse points located within .50in of the Stack walls.

3) Add nipple protrusion length to Point 1 only. Actual nipple length = (length - protrusion)

Relocate to a distance equal to the inside diameter of the nozzle being used or to the above minimum distances, whichever is larger.

Job Number: 130502 A
Done By / Date: DWC / 5/01/13
Final Check By / Date: SC / 5-22-13

	1	2
Port Number		
Relative Location	L	R
From Far Wall to Outside of Port (in.)	70.10	70.10
Nipple Length or Wall Thickness (in.)	6.80	6.80
Port Protrusion Length (opt) (in.)	0.00	0.00
Depth of Stack or Duct (in.)	63.30	63.30
Stack or Duct Type	Circular	
Port Hole Inner Diameter (in.)	6.0	
Stack or Duct Width (if Rectangular) (in.)		
Stack Outer Circumference (in.)		
Number of Ports	2.0	
Elevation of Meter Box from Ground Level (ft)	5.0	
Elevation of Ports from Ground Level (ft)	35.0	

#N/A

Equivalent Diameter = D_e (in.)

$$De = \frac{2 \times (\text{Depth} \times \text{Width})}{(\text{Depth} + \text{Width})} = \_\_\_$$

"Velocity" or "Particulate" Traverse	particulate
Distance Upstream from Flow Disturbance (in.)	171.0
Diameters Upstream from Flow Disturbance (* 0.5 De)	2.70
Minimum Traverse Points Needed for a Velocity Traverse *	12
Minimum Traverse Points Needed for a Particulate Traverse *	12
Distance Downstream from Flow Disturbance (in.)	190.0
Diameters Downstream from Flow Disturbance (* 2 De)	3.00
Minimum Traverse Points Needed for a Velocity Traverse *	16
Minimum Traverse Points Needed for a Particulate Traverse *	24
Minimum Traverse Points	24
Traverse Point Overide	
Duct Area - in^2	3147.00
Duct Area - ft^2	21.8542
Diameter Check via Circumference (in.)	0.0000

Location of Points in Circular Stacks or Ducts

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	38.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	36.2	30.6	26.2	22.6
10				97.4	88.2	78.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	93.1	83.1	76.4	69.4	60.7	39.8
13						94.9	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

Note:

1) Stacks having a diameter greater than 24in, shall have no traverse points located within 1.0in of the Stack walls.

2) Stacks having a diameter less than or equal to 24in, shall have no traverse points located within .50in of the Stack walls.

3) Add nipple protrusion length to Point 1 only. Actual nipple length = (length - protrusion) .

Relocate to a distance equal to the inside diameter of the nozzle being used or to the above minimum distances, whichever is larger.

Number of Ports: 2.0
Direction of Flow: Up
Isokinetic Sample: Ye Yes
Stack Build-up: Yes / I No

Port	Point	% of Duct Depth	Dist. From Inside Wall (Decimal)	Dist. From Outside Wall (Decimal)
1	1	2.1	1.3	8.1
1	2	6.7	4.2	11.0
1	3	11.8	7.5	14.3
1	4	17.7	11.2	18.0
1	5	25	15.8	22.6
1	6	35.6	22.5	29.3
1	7	64.4	40.8	47.6
1	8	75	47.5	54.3
1	9	82.3	52.1	58.9
1	10	88.2	55.8	62.6
1	11	93.3	59.1	65.9
1	12	97.9	62.0	68.8
2	1	2.1	1.3	8.1
2	2	6.7	4.2	11.0
2	3	11.8	7.5	14.3
2	4	17.7	11.2	18.0
2	5	25	15.8	22.6
2	6	35.6	22.5	29.3
2	7	64.4	40.8	47.6
2	8	75	47.5	54.3
2	9	82.3	52.1	58.9
2	10	88.2	55.8	62.6
2	11	93.3	59.1	65.9
2	12	97.9	62.0	68.8

Method 5 Probe Nozzle Inspection

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

The sampling nozzle must be calibrated before use in a source experiment. Calibration should be done in the laboratory and checked just before use in the field. Inside / outside calipers are used to measure the interior nozzle diameter to the nearest 0.025mm (0.001 inch).

The calipers are inserted as close to the edge of the nozzle opening as possible; readings are taken on three separate diameters and recorded. The average of the three readings will be the Assigned Nozzle Size. Each reading must agree within 0.1 mm (0.004 inch), or the nozzle must be reshaped. Any nozzle that has been nicked, dented, or corroded must be reshaped and recalibrated. All calibrated nozzles should be permanently identified.

Run # 1/2/3
Nozzle ID # 8-8-11

Measured Nozzle Size (inches)	Assigned Nozzle Size (inches)	Difference Between High and Low Measurements	
0.225			
0.226	0.225	0.001	<= 0.004in
0.225			

Run # 2
Nozzle ID #

Measured Nozzle Size (inches)	Assigned Nozzle Size (inches)	Difference Between High and Low Measurements	
			<= 0.004in

Run # 3
Nozzle ID #

Measured Nozzle Size (inches)	Assigned Nozzle Size (inches)	Difference Between High and Low Measurements	
			<= 0.004in

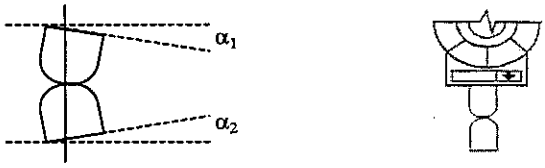
Air Compliance Testing, Inc.
D:\Testing\ACT Test Methods\M005\Method 5.xls
(Method 5.xls-Probe Nozzle Inspection) 4/30/2013
1 of 1

Job Number: 130502 A
Done By / Date: SAW / 5/1/13
Final Check By / Date: SC / 5-22-13

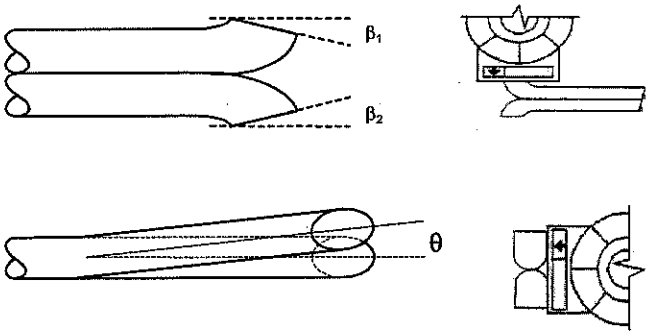
Type S Pitot Tube Inspection

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

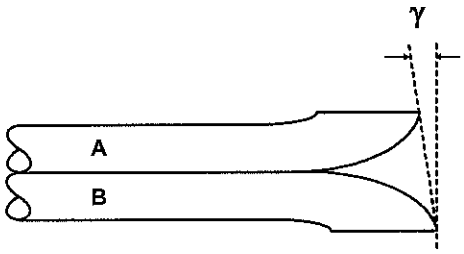
Alignment and Tubing Dimensions



Degree indicating level position for determining α_1 and α_2.

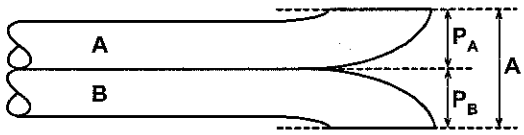


Degree indicating level position for determining θ.

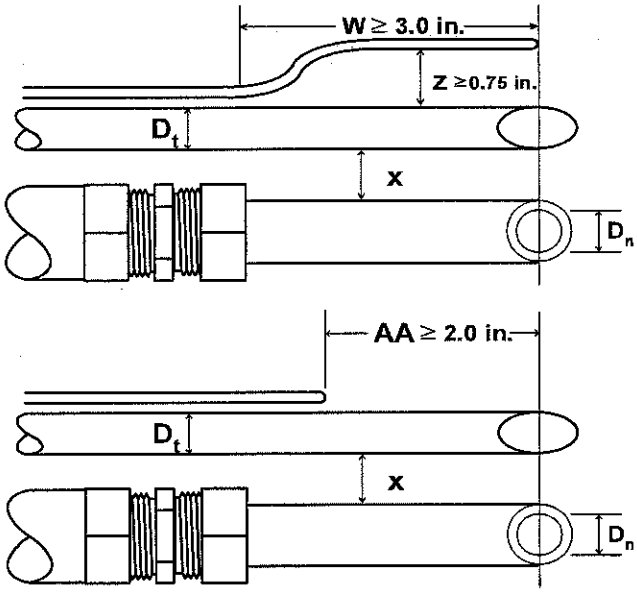


Degree indicating level position for determining γ then calculating Z.

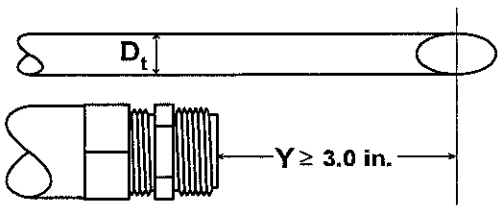
Probe / Pitot Number	T-PIT-801
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	0.0
α_2 $(-10° < \alpha_2 < +10°)$	0.0
β_1 $(-5° < \beta_1 < +5°)$	1.0
β_2 $(-5° < \beta_2 < +5°)$	-1.0
γ	3.00
θ	2.00
A	0.830
z= A tan γ (< 0.125")	0.043
w= A tan θ (< 0.03125")	0.029
D_t (0.1875" < D_t < 0.375")	0.375
P_A ($1.05D_t < P_A < 1.5D_t$)	0.415
P_B ($1.05D_t < P_B < 1.5D_t$)	0.415
$P_A = P_B \pm 0.0625$	0.000



Assembly Inter-Component Spacing Requirements



Effective Length (in.)	97.20
W (≥ 3.0")	37.500
-or- AA (≥ 2.0")	
X	
D_n	
X / D_n (≥ 1.5)	
Y (≥ 3.0")	
Z ≥ 0.75"	1.000

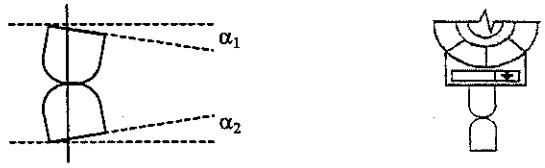


Job Number: 021913
Done By: BI / Date: 2/19/2013 16:45

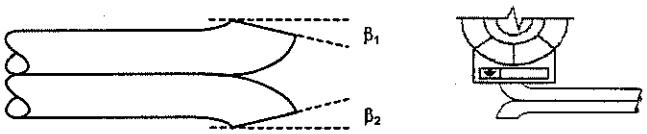
Type S Pitot Tube Inspection

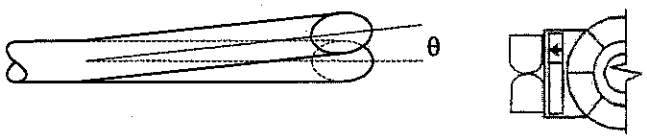
Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Alignment and Tubing Dimensions

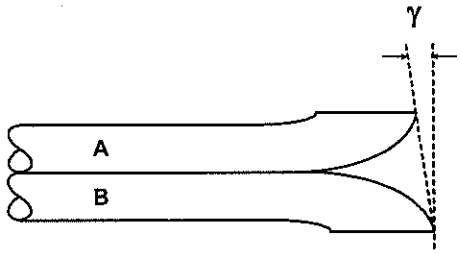


Degree indicating level position for determining α_1 and α_2.



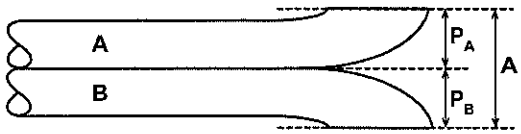


Degree indicating level position for determining θ.

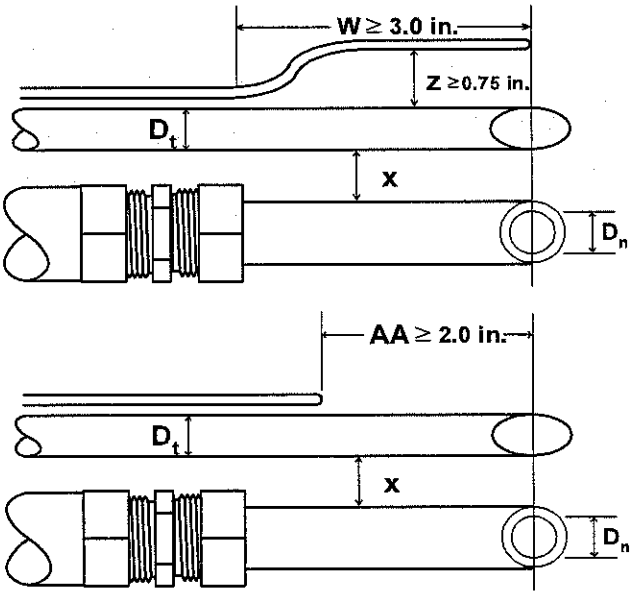


Degree indicating level position for determining γ then calculating Z.

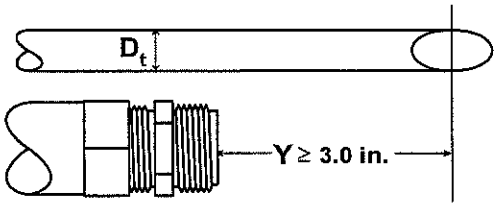
Probe / Pitot Number	T-PRB-808
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	0.0
α_2 $(-10° < \alpha_2 < +10°)$	1.0
β_1 $(-5° < \beta_1 < +5°)$	1.0
β_2 $(-5° < \beta_2 < +5°)$	1.0
γ	1.00
θ	0.00
A	0.923
z= A tan γ (< 0.125")	0.016
w= A tan θ (< 0.03125")	0.000
D_t (0.1875" < D_t < 0.375")	0.375
P_A $(1.05D_t < P_A < 1.5D_t)$	0.462
P_B $(1.05D_t < P_B < 1.5D_t)$	0.461
$P_A = P_B \pm 0.0625$	0.001



Assembly Inter-Component Spacing Requirements

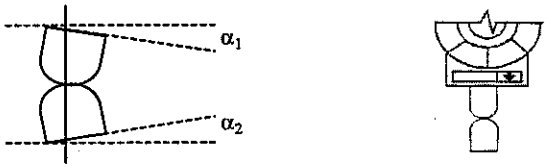


Effective Length (in.)	86.40
W (≥ 3.0")	7.000
-or- AA (≥ 2.0")	
X	1.000
D_n	0.493
X / D_n (≥ 1.5)	2.028
Y (≥ 3.0")	3.700
Z ≥ 0.75"	1.000

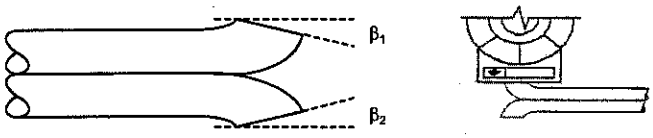


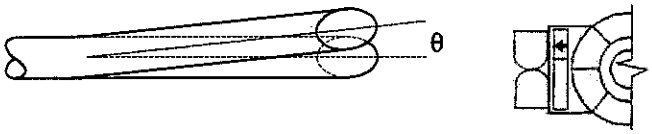
Type S Pitot Tube Inspection

Alignment and Tubing Dimensions

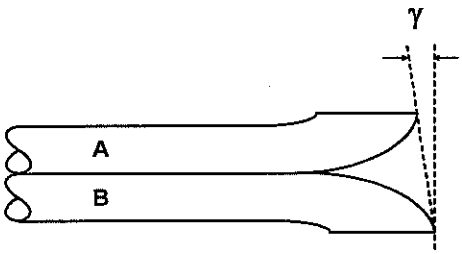


Degree indicating level position for determining α_1 and α_2.



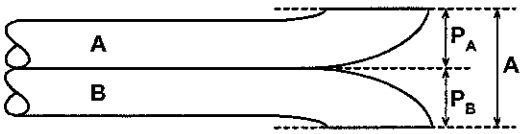


Degree indicating level position for determining θ.

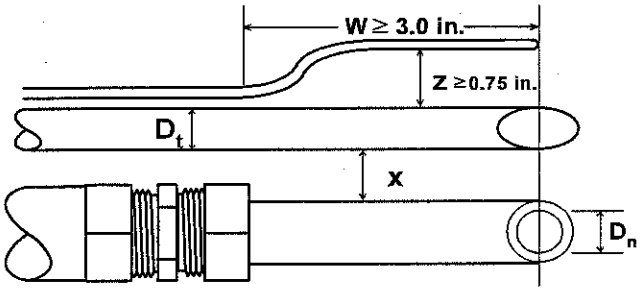


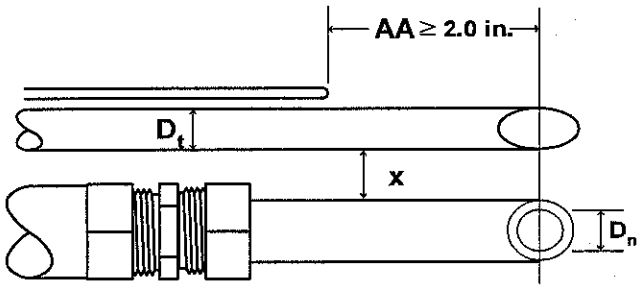
Degree indicating level position for determining γ then calculating Z.

Probe / Pitot Number	T-PRB-810
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	0.0
α_2 $(-10° < \alpha_2 < +10°)$	0.0
β_1 $(-5° < \beta_1 < +5°)$	0.0
β_2 $(-5° < \beta_2 < +5°)$	0.0
γ	0.00
θ	0.00
A	0.906
z= A tan γ (< 0.125")	0.000
w= A tan θ (< 0.03125")	0.000
D_t (0.1875" < D_t < 0.375")	0.375
P_A $(1.05D_t < P_A < 1.5D_t)$	0.480
P_B $(1.05D_t < P_B < 1.5D_t)$	0.426
$P_A = P_B \pm 0.0625$	0.054

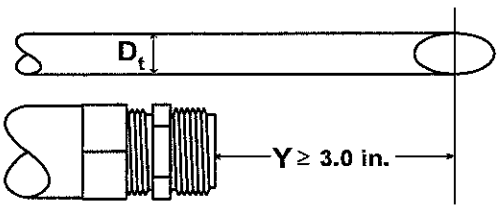


Assembly Inter-Component Spacing Requirements



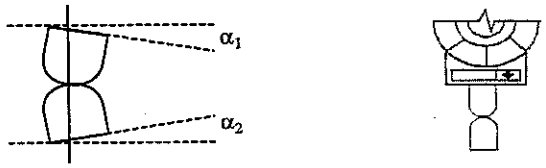


Effective Length (in.)	88.00
W (≥ 3.0")	7.000
-or- AA (≥ 2.0")	
X	0.875
D_n	0.480
X / D_n (≥ 1.5)	1.823
Y (≥ 3.0")	4.375
Z ≥ 0.75"	1.875

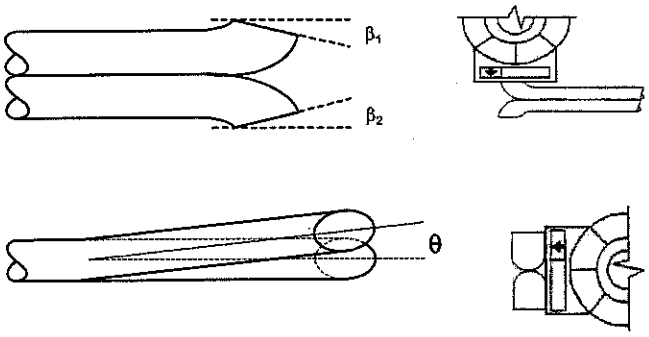


Type S Pitot Tube Inspection

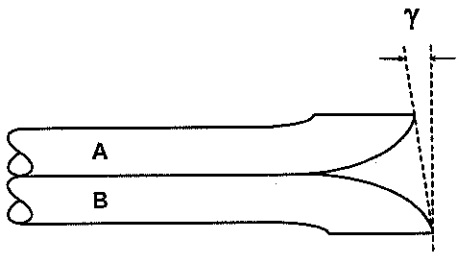
Alignment and Tubing Dimensions



Degree indicating level position for determining α_1 and α_2.

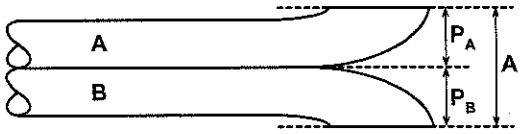


Degree indicating level position for determining θ.

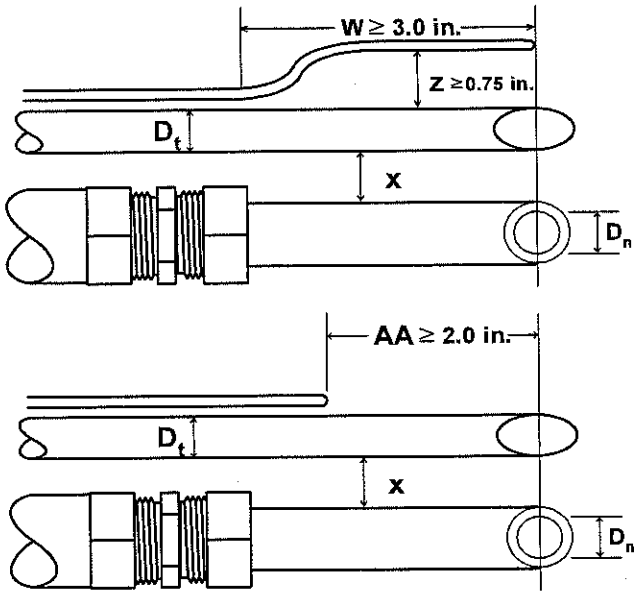


Degree indicating level position for determining γ then calculating Z.

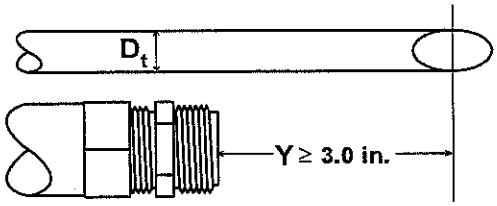
Probe / Pitot Number	T-PIT-801
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	0.0
α_2 $(-10° < \alpha_2 < +10°)$	-1.0
β_1 $(-5° < \beta_1 < +5°)$	2.0
β_2 $(-5° < \beta_2 < +5°)$	3.0
γ	1.00
θ	1.00
A	0.826
z= A tan γ (< 0.125")	0.014
w= A tan θ (< 0.03125")	0.014
D_t (0.1875" < D_t < 0.375")	0.375
P_A $(1.05D_t < P_A < 1.5D_t)$	0.413
P_B $(1.05D_t < P_B < 1.5D_t)$	0.413
$P_A = P_B \pm 0.0625$	0.000



Assembly Inter-Component Spacing Requirements



Effective Length (in.)	97.00
W (≥ 3.0")	3.100
-or- AA (≥ 2.0")	
X	
D_n	
X / D_n (≥ 1.5)	
Y (≥ 3.0")	
Z ≥ 0.75"	0.900

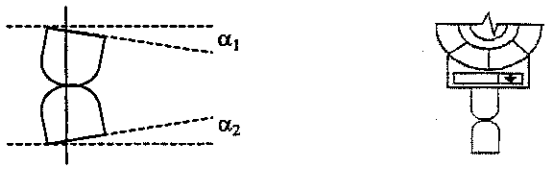


Job Number: 031113
Done By: PB / Date: 3/11/2013 15:00

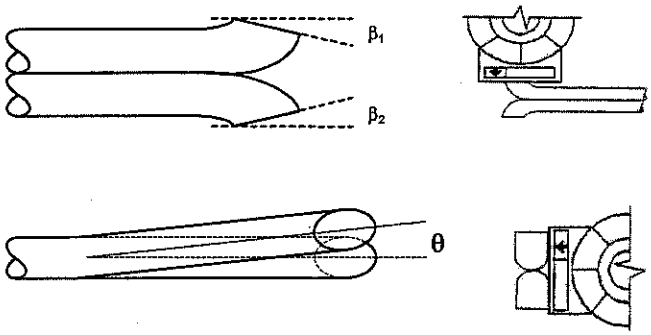
Type S Pitot Tube Inspection

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

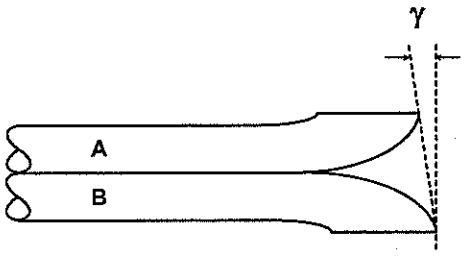
Alignment and Tubing Dimensions



Degree indicating level position for determining α_1 and α_2.



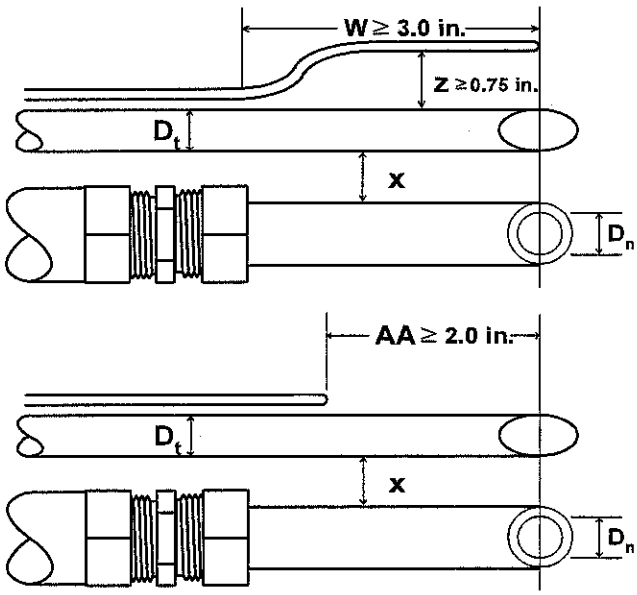
Degree indicating level position for determining θ.



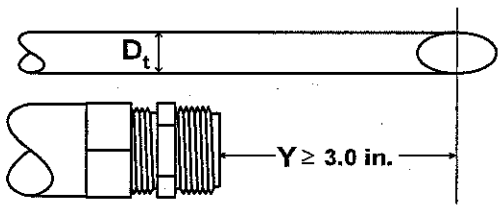
Degree indicating level position for determining γ then calculating Z.

Probe / Pitot Number	T-PRB-808
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	0.0
α_2 $(-10° < \alpha_2 < +10°)$	1.0
β_1 $(-5° < \beta_1 < +5°)$	1.0
β_2 $(-5° < \beta_2 < +5°)$	1.0
γ	1.00
θ	0.00
A	0.924
z= A tan γ (< 0.125")	0.016
w= A tan θ (< 0.03125")	0.000
D_t (0.1875" < D_t < 0.375")	0.375
P_A $(1.05D_t < P_A < 1.5D_t)$	0.462
P_B $(1.05D_t < P_B < 1.5D_t)$	0.462
$P_A = P_B \pm 0.0625$	0.000

Assembly Inter-Component Spacing Requirements



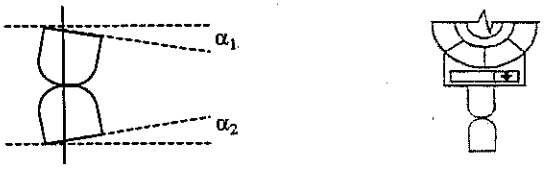
Effective Length (in.)	86.40
W (≥ 3.0")	7.000
-or- AA (≥ 2.0")	
X	1.000
D_n	0.493
X / D_n (≥ 1.5)	2.028
Y (≥ 3.0")	3.700
Z ≥ 0.75"	1.000



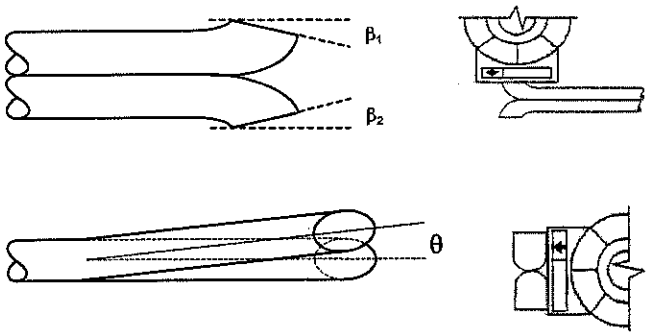
Type S Pitot Tube Inspection

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

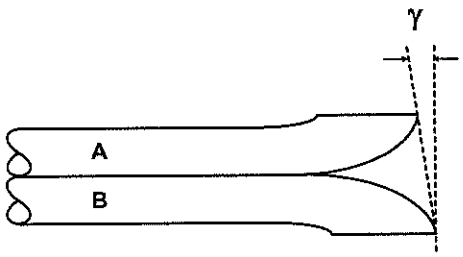
Alignment and Tubing Dimensions



Degree indicating level position for determining α_1 and α_2.



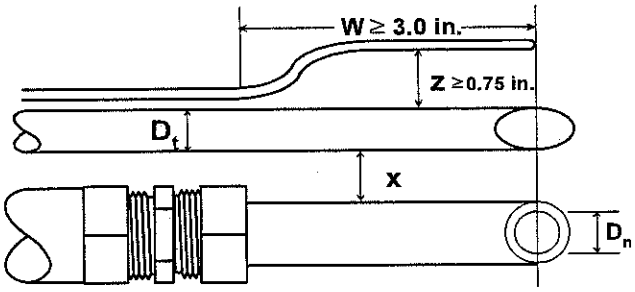
Degree indicating level position for determining θ.



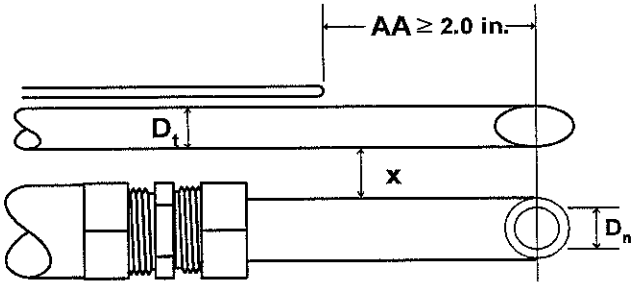
Degree indicating level position for determining γ then calculating Z.

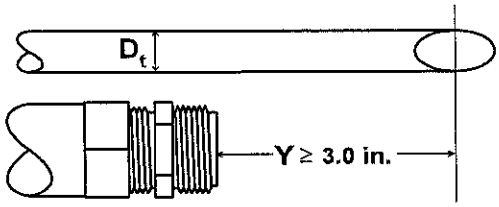
Probe / Pitot Number	T-PRB-811
Level and Perpendicular	☑
No Obstructions	☑
No Damage	☑
α_1 $(-10° < \alpha_1 < +10°)$	1.0
α_2 $(-10° < \alpha_2 < +10°)$	0.0
β_1 $(-5° < \beta_1 < +5°)$	2.0
β_2 $(-5° < \beta_2 < +5°)$	2.0
γ	4.00
θ	1.00
A	0.984
z= A tan γ (< 0.125")	0.069
w= A tan θ (< 0.03125")	0.017
D_t (0.1875" < D_t < 0.375")	0.375
P_A $(1.05D_t < P_A < 1.5D_t)$	0.492
P_B $(1.05D_t < P_B < 1.5D_t)$	0.492
$P_A = P_B \pm 0.0625$	0.000

Assembly Inter-Component Spacing Requirements



Effective Length (in.)	87.00
W (≥ 3.0")	7.000
-or- AA (≥ 2.0")	
X	1.000
D_n	0.493
X / D_n (≥ 1.5)	2.028
Y (≥ 3.0")	3.700
Z ≥ 0.75"	1.800





Method 4 Thermocouple System Audit

Reference Thermometer I.D. :	T-THR-011
Temperature Readout I.D.:	T-MTB- 015
Umbilical Cord I.D. :	T-UMC- 104
Umbilical Cord I.D. :	T-M2U- 451
Umbilical Cord I.D. :	

Probe/Pitot Thermocouple ID	T-PIT- 603		
Filter Exit ID	T-FXT-	T-FXT-	T-FXT-
Umbilical Adapter ID	T-UMA- 014	T-UMA-	T-UMA-

Sample Train Thermocouple Audit

	Run 1	Run 2	Run 3
Ref. Thermometer Temp (°F)	65		
Stack Thermocouple Temp (°F)	64		
Meterbox Temp IN (°F)			
Meterbox Temp OUT (°F)	62		
Filter Exit Temp (oF)			
Impinger Exit Temp (°F)	63		

Meterbox Thermocouple Audit

Thermocouple Simulator Setting (°F)	Stack Temp (°F)	Filter Exit Temp (°F)	Impinger Exit Temp (°F)
50	51		51
100	100		100
200	200		
300	301		
400	399		
600	600		
800	800		
1000	1000		
1500	1497		

Tolerance Ranges

Stack ± 8.0°F or ± 1.5% absolute
Filter Exit ± 5.4°F
Meter Box ± 5.4°F
Impinger Exit ± 2.0°F

Job Number: 130201

Air Compliance Testing Inc.

Performed by : AS2 Date: 04/15/2013

Method 2 Post-Test Thermocouple Check

ALT-011 Post-Test Stack Thermocouple System Check Procedure

Reference Thermometer ID and Serial No. :	THR-006
Temperature Display ID (Hanna/MTB) :	T-MTB-015
Umbilical Cord I.D. :	UMC-106
Umbilical Cord I.D. :	
Umbilical Cord I.D. :	
Continuity Check Performed:	✔

	Run 1	Run 2	Run 3	Run 4
Probe/Pitot ID:	T-PRB-811	T-PRB-808	T-PRB-811	
Reference Thermometer Ambient Readout (°F):	68	68	68	
Stack Temperature Thermocouple Ambient Readout (°F):	68	68	68	
Temperature Difference (must be ±2°F):	0	0	0	0

Air Compliance Testing, Inc.

Job Number: 130502A

Performed by: AS2 Date: 05/03/2013

issued 9/4/2012 rev 11/9/12

Method 4 Pre-Test Orifice Meter Check

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

✓ Assemble meter box - level / zero the manometer

✓ Operate the meter box at the ΔH@ pressure differential for at least **10 minutes**.

The ΔH@ number is taken from the meter console calibration sheet or the tag.

✓ *During the warm-up period, verify flow through the Method 3 flowmeter.*

✓ Record the dry gas meter volume, meter temperatures and barometric pressure (in.Hg).

Meter Box No. **T-MTB-** 015

Pump No. **T-PMP-** 015

Calibration Date 3/25/13

Barometric Pressure (in.Hg) 29.22

Gamma (γ) 1.0008

ΔH@ 2.187

Initial Dry Gas Meter Volume (cf) 946.850

Final Dry Gas Meter Volume (cf) 954.493

Time (min)	Meter In (°F)	Meter Out (°F)
2	–	80
4	–	81
6	–	82
8	–	82
10	–	82
Avg.	81.4	

PASS Calculate the Dry Gas Meter Calibration Value (γ_c) and compare γ_c against the Dry Gas Meter Calibration Factor (γ) to determine if $\gamma_c = \gamma \pm 3\%$

X If the γ_c is not within this range, the Meter Box should be investigated before beginning the test.

Air Compliance Testing, Inc.
D:\Testing\ACT Test Methods\M004\Method 4.xls
(Method 4.xls-Pre-Test Orifice Meter Check) 4/30/2013
1 of 1

Job Number: 130502 A
Done By / Date: [illegible] / 3/1/13
Final Check By / Date: SS / 5-2-13

Method 4 Pre-Test Orifice Meter Check

Method 5 Sampling Train

Meter Box No.	015
Calibration Date	3/25/13
γ =	1.0008
$\Delta H@$ =	2.187

Initial Dry Gas Meter Volume	946.850
Final Dry Gas Meter Volume	954.493
Net Dry Gas Meter Volume	7.643
Barometric Pressure (inHg)	29.13

Time (min)	Meter In (°F)	Meter Out (°F)
2	80	80
4	81	81
6	82	82
8	82	82
10	82	82
Avg.	81.4	81.4
Avg. of Avgs.	81.4	

_____ Calculate the Dry Gas Meter Calibration Value (γ_c)

$$\gamma_c = (10 / Vm) * [0.0319 (Tm/Pbar]^{1/2}$$

$$0.97(\gamma) < \gamma_c < 1.03(\gamma)$$

0.9708 < **1.0074** < 1.0308

Meter Box Pre-Test Leak Check

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

- [x] Remove the front panel from the meter box
- [x] Disconnect the fan
- [x] Hook up the proper pump to the meter box
- [x] Close both the fine and coarse adjustment valves
- [x] Connect the DH hoses on the front of the meter box
- [x] Remove the copper elbow from stainless tube at the exit side of gas meter
- [x] Stopper the stainless tube with a rubber stopper
- [x] Disconnect the DH static line from the orifice (bottom)
- [x] Plug in leak check tube into the static side of the orifice
- [x] Blowing into the leak check tube, pressurize the system to 5-7 inches and clamp off
- [x] Hold for one minute
- [x] No leakage should occur. If leak is present, it must be corrected
- [x] Affix (w/ electrical tape) the copper elbow onto the stainless tube at the exit side of gas meter
- [x] Reassemble meter box
- [x] Plug in capped swagelok stem at sample inlet
- [x] Start pump, bringing system vacuum to at least 15 in. Hg
- [x] Note DGM reading, start timer
- [x] Observe DGM for one minute
- [x] No leakage should occur. If leak is present, it must be corrected
- [x] Check oil wick position (should be 1/4" above the black O-ring)
- [x] Check pump oil level (should be at fill line)

Meter Box Number MTB- 015

Pump Number PMP- 015

Job Number: 032513
Done By: AS2 / Date: 4/4/2013 15:26

Method 4 Pre-Test Meter Calculation Orifice Calibration Data

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Meter Box I.D:	T - MTB - 015
Meter Box Serial Number:	352795
Standard Meter I.D:	T - DGM - 006
Temp Sensor I.D:	T - DGM 015
Barometer I.D:	T DPG- MIC-003
Meter Box Level?	☑

Standard Meter

Calibrated By:	Apex Instruments Inc.
Calibration Date:	February 25, 2013
Gamma:	0.9977
Serial Number:	1512377

REMOVE CAPS FROM STANDARD METER

Run 1

Pressures

ΔH:	1.00	in.H_2O
Meter Box Vac:	5.0	in.Hg
P Bar:	28.30	in.Hg

Meter Readings

	Time	Std Meter	Meter Box
Begin	0.0	781.554	506.275
End	12.0	787.823	512.512
Net	12.0	6.269	6.237

(>5.0 dcf)

Temperatures

Time (min)	Std Meter In	Std Meter Out	Meter Box In	Meter Box Out
4	61.0	62.0	61.0	61.0
8	61.0	61.0	60.0	60.0
12	60.0	60.0	60.0	60.0
Avg.	60.83		60.33	

Run 2

Pressures

ΔH:	2.00	in.H_2O
Meter Box Vac:	5.0	in.Hg
P Bar:	28.30	in.Hg

Meter Readings

	Time	Std Meter	Meter Box
Begin	0.0	788.392	513.080
End	12.0	797.081	521.753
Net	12.0	8.689	8.673

(>5.0 dcf)

Temperatures

Time (min)	Std Meter In	Std Meter Out	Meter Box In	Meter Box Out
4	61.0	61.0	62.0	62.0
8	61.0	61.0	63.0	63.0
12	61.0	62.0	64.0	64.0
Avg.	61.17		63.00	

Run 3

Pressures

ΔH:	3.00	in.H_2O
Meter Box Vac:	4.2	in.Hg
P Bar:	28.30	in.Hg

Meter Readings

	Time	Std Meter	Meter Box
Begin	0.0	823.212	547.734
End	12.0	833.973	558.372
Net	12.0	10.761	10.638

(>5.0 dcf)

Temperatures

Time (min)	Std Meter In	Std Meter Out	Meter Box In	Meter Box Out
4	62.0	62.0	64.0	64.0
8	61.0	62.0	64.0	64.0
12	62.0	63.0	64.0	64.0
Avg.	62.00		64.00	

ΔH:	$\Delta H_@$	γ
1	2.150	0.9993
2	2.229	0.9979
3	2.183	1.0053
AVG.	2.187	1.0008

* Adjust and recalculate if γ does not equal 1.00 ± 0.02

Air Compliance Testing, Inc.
D:\TESTING\Calibration History\Ohio\Meters\Pre-Calibration\Meters\T-MTB-015\032513
(032513-Pre-Test Meter Calc) 4/23/2013
2 of 3

Job Number: 032513
Done By: AS2 / Date: 4/4/2013 15:26

Method 4 Pre-Test Meter Console Calibration

Effective Date: 7/16/12
Rev No. 0
Issued by: Quality Manager

Run No.	Calibration Meter Correction Factor (Yc)	Barometric Press. (Pb) (in.Hg)	Delta H (in w.g.)	Meter Box Volume (Vd) (cu.ft.)	Average Meter Box Temperature (Tm) (F)	Standard Meter Volume (Vc) (cu.ft.)	Standard Meter Temperature (Tc) (F)	Time (min.)	Gamma (Y)	Tolerance (plus or minus 0.02)	Delta H@	Tolerance (plus or minus 0.2)
1	0.9977	28.30	1.000	6.237	60.33	6.269	60.83	12	0.9993	-0.001539	2.150	-0.038
2	0.9977	28.30	2.000	8.673	63.00	8.689	61.17	12	0.9979	-0.002928	2.229	0.042
3	0.9977	28.30	3.000	10.638	64.00	10.761	62.00	12	1.0053	0.004467	2.183	-0.004
										PASS		PASS
							Average		1.0008	PASS	2.187	

Pump Number T-PMP- 015

Meter Box Number T-MTB- 015

Reference Meter Number MIC- T-DGM- 003

Add Values to 30 Day Calibration History
Add Values to Dry Gas Meter Calibration History
Tag Meter Box

Job Number: 032513
Done By: AS2 / Date: 4/4/2013 15:26

ALT-009 Post-Test Leak Check

NOTE: Do not perform leak check if meter failed ALT-009 requirements.

- ☑ Remove the front panel from the meter box
- ☑ Disconnect the fan
- ☑ Hook up the proper pump to the meter box
- ☑ Close both the fine and coarse adjustment valves
- ☑ Connect the DH hoses on the front of the meter box
- ☑ Remove the copper elbow from stainless tube at the exit side of gas meter
- ☑ Stopper the stainless tube with a rubber stopper
- ☑ Disconnect the DH static line from the orifice (bottom)
- ☑ Plug in leak check tube into the static side of the orifice
- ☑ Blowing into the leak check tube, pressurize the system to 5-7 inches and clamp off
- ☑ Hold for one minute
- ☑ No leakage should occur.
- ☑ Affix (w/ electrical tape) the copper elbow onto the stainless tube at the exit side of gas meter
- ☑ Reassemble meter box

Meter Box Number MTB- 015

Pump Number PMP- 015

Job Number: 130502A

Done By / Date: AS2 / 05/03/2013

Method 4 DGM Calibration History

Type	Date	Standard Meter Serial #	Meter Box #	Delta H	Delta H@	Delta H	Delta H@	Delta H	Delta H@	Gamma	Average Delta H@	By
PRE	7/13/2012	1512377	T-MTB- 012	1.00	1.856	2.00	1.890	3.00	1.882	0.9876	1.876	JL
PRE	7/13/2012	1512377	T-MTB- 009	1.00	1.930	2.00	1.933	3.00	1.896	1.0048	1.920	JL
PRE	7/26/2012	1512377	T-MTB- 014	1.00	1.548	2.00	1.640	3.00	1.669	0.9950	1.619	PB
PRE	7/26/2012	1512377	T-MTB- 010	1.00	1.959	2.00	2.028	3.00	1.980	1.0127	1.989	PB
PRE	8/8/2012	1512377	T-MTB- 006	1.00	2.133	2.00	2.149	3.00	2.124	0.9897	2.135	PB
PRE	8/10/2012	1512377	T-MTB- 019	1.00	1.914	2.00	1.838	3.00	1.857	1.0057	1.870	PB
PRE	8/10/2012	1512377	T-MTB- 018	1.00	1.929	2.00	1.909	3.00	1.878	1.0054	1.905	PB
PRE	8/10/2012	1512377	T-MTB- 017	1.00	1.883	2.00	1.908	3.00	1.856	0.9956	1.882	PB
PRE	8/24/2012	1512377	T-MTB- 003	1.00	1.756	2.00	1.818	3.00	1.796	0.9942	1.790	PB
PRE	9/17/2012	1512377	T-MTB- 012	1.00	1.880	2.00	1.945	3.00	1.915	0.9811	1.913	PB
POST	9/17/2012	1512377	T-MTB- 012	1.50	1.942	1.50	1.940	3.00	1.927	0.9911	1.936	PB
PRE	9/18/2012	1512377	T-MTB- 009	1.00	1.903	2.00	1.897	3.00	1.852	0.9858	1.884	PB
PRE	9/19/2012	1512377	T-MTB- 014	1.00	1.805	2.00	1.919	3.00	1.919	0.9821	1.881	PB
PRE	9/24/2012	1512377	T-MTB- 015	1.00	2.135	2.00	2.222	3.00	2.173	0.9967	2.176	PB
PRE	9/28/2012	1512377	T-MTB- 010	1.00	1.999	2.00	2.053	3.00	2.006	0.9956	2.019	PB
PRE	10/8/2012	1512377	T-MTB- 006	1.00	2.077	2.00	2.166	3.00	2.171	0.9967	2.138	PB
PRE	10/24/2012	1512377	T-MTB- 003	1.00	1.804	2.00	1.858	3.00	1.839	1.0000	1.834	RS
POST	10/25/2012	1512377	T-MTB- 009	1.83	1.916	1.83	1.857	1.83	1.896	0.9868	1.890	PB
PRE	10/26/2012	1512377	T-MTB- 018	1.00	1.939	2.00	1.879	3.00	1.880	0.9973	1.899	PB
PRE	10/26/2012	1512377	T-MTB- 019	1.00	1.897	2.00	1.862	3.00	1.917	1.0082	1.892	PB
POST	11/2/2012	1512377	T-MTB- 012	1.64	1.970	1.64	1.959	1.64	1.961	0.9939	1.963	PB
POST	11/8/2012	1512377	T-MTB- 009	1.41	1.617	1.41	1.899	1.41	1.884	0.9842	1.800	PB
PRE	11/16/2012	1512377	T-MTB- 012	1.00	1.922	2.00	1.970	3.00	1.962	0.9848	1.951	PB
PRE	11/16/2012	1512377	T-MTB- 014	1.00	1.704	2.00	1.812	3.00	1.830	0.9837	1.782	PB
PRE	11/29/2012	1512377	T-MTB- 006	1.00	2.101	2.00	2.207	3.00	2.161	0.9941	2.156	AS
PRE	11/29/2012	1512377	T-MTB- 015	1.00	2.188	2.00	2.304	3.00	2.242	0.9836	2.244	AS
POST	11/23/2012	1512377	T-MTB- 018	1.14	1.928	1.14	1.948	1.14	2.021	0.9973	1.966	PB
POST	11/23/2012	1512377	T-MTB- 014	1.00	1.794	1.00	1.775	1.00	1.768	0.9837	1.779	JL
POST	12/7/2012	1512377	T-MTB- 012	1.50	1.970	1.50	1.934	1.50	1.933	0.9917	1.946	JL
POST	12/7/2012	1512377	T-MTB- 018	1.14	1.928	1.14	1.948	1.14	2.021	0.9973	1.966	JL
PRE	12/7/2012	1512377	T-MTB- 017	1.00	1.932	2.00	1.881	3.00	1.907	0.9840	1.906	JL
POST	12/14/2012	1512377	T-MTB- 015	1.01	2.186	1.01	2.160	1.01	2.183	0.9893	2.176	WD
PRE	12/26/2012	1512377	T-MTB- 003	1.00	1.766	2.00	1.858	3.00	1.830	0.9844	1.818	PB
PRE	12/26/2012	1512377	T-MTB- 019	1.00	1.922	2.00	1.885	3.00	1.872	0.9993	1.893	PB
PRE	12/28/2013	1512377	T-MTB- 018	1.00	2.005	2.00	1.960	3.00	1.911	0.9918	1.958	WD
POST	1/4/2013	1512377	T-MTB- 006	2.00	2.224	2.00	2.211	2.00	2.211	0.9872	2.215	PB
PRE	1/11/2013	1512377	T-MTB- 014	1.00	1.579	2.00	1.554	3.00	1.599	0.9880	1.577	WD
PRE	1/16/2013	1512377	T-MTB- 012	1.00	1.800	2.00	1.867	3.00	1.831	0.9857	1.833	PB
PRE	1/24/2013	1512377	T-MTB- 006	1.00	2.106	2.00	2.158	3.00	2.133	0.9891	2.132	WD
PRE	1/25/2013	1512377	T-MTB- 015	1.00	2.141	2.00	2.127	3.00	2.120	0.9818	2.129	PB
PRE	2/1/2013	1512377	T-MTB- 010	1.00	2.013	2.00	2.011	3.00	2.015	1.0023	2.013	JL
PRE	2/1/2013	1512377	T-MTB- 017	1.00	1.920	2.00	1.913	3.00	1.888	0.9835	1.907	JL
PRE	2/1/2013	1512377	T-MTB- 003	1.00	1.819	2.00	1.838	3.00	1.821	0.9904	1.826	JL
POST	2/11/2013	1512377	T-MTB- 012	1.06	1.868	1.06	1.875	1.06	1.854	1.0051	1.866	JL
POST	2/11/2013	1512377	T-MTB- 012	0.92	1.881	0.92	1.873	0.92	1.752	1.0095	1.835	JL
POST	2/26/2013	1512377	T-MTB- 014	1.40	1.528	1.40	1.698	1.40	1.722	1.0011	1.649	PB
POST	2/27/2013	1512377	T-MTB- 014	1.71	1.571	1.71	1.583	1.71	1.588	1.0000	1.580	PB
POST	3/1/2013	1512377	T-MTB- 003	1.09	1.744	1.09	1.742	1.09	1.737	1.0112	1.741	PB
POST	3/1/2013	1512377	T-MTB- 003	1.91	1.739	1.91	1.731	1.91	1.732	1.0007	1.734	PB
POST	3/1/2013	1512377	T-MTB- 015	2.00	2.177	2.00	2.169	2.00	2.165	1.0077	2.170	PB
PRE	3/1/2013	1512377	T-MTB- 019	1.00	1.901	2.00	1.821	3.00	1.812	1.0099	1.844	JL
PRE	3/1/2013	1512377	T-MTB- 018	1.00	1.936	2.00	1.866	3.00	1.830	1.0103	1.877	JL
POST	3/11/2013	1512377	T-MTB- 015	1.35	2.173	1.35	2.170	1.35	2.157	1.0044	2.167	PB
POST	3/12/2013	1512377	T-MTB- 012	1.50	1.881	1.50	1.881	1.50	1.884	0.9945	1.882	PB
PRE	3/12/2013	1512377	T-MTB- 012	1.00	1.934	2.00	1.962	3.00	1.915	0.9951	1.937	PB
PRE	3/12/2013	1512377	T-MTB- 014	1.00	1.612	2.00	1.736	3.00	1.683	0.9927	1.677	PB
PRE	3/18/2013	1512377	T-MTB- 006	1.00	2.054	2.00	2.148	3.00	2.114	0.9981	2.105	PB
PRE	3/25/2013	1512377	T-MTB- 015	1.00	2.150	2.00	2.229	3.00	2.183	1.0008	2.187	AS2
PRE	4/3/2013	1512377	T-MTB- 003	1.00	1.799	2.00	1.865	3.00	1.841	0.9868	1.835	AS2
POST	4/8/2013	1512377	T-MTB- 003	1.50	1.850	1.50	1.863	1.50	1.813	0.9936	1.842	AS2
PRE	4/12/2013	1512377	T-MTB- 010	1.00	1.967	2.00	2.017	3.00	2.007	1.0056	1.997	AS2
PRE	4/19/2013	1512377	T-MTB- 018	1.00	1.942	2.00	1.896	3.00	1.849	1.0078	1.896	JL

Barometer Calibration History

Date	Aneroid Barometer #		("Hg) Mercury Barometer	("Hg) Aneroid Barometer	("Hg) Difference	(<.10" Hg) Pass/Fail	By whom	Adjusted?	(°F) Temp.
7/15/2011	T-BAR-	001	29.36	29.35	0.01	PASS	RL	YES	80
7/29/2011	T-BAR-	001	29.30	29.31	-0.01	PASS	PT	NO	84
8/25/2011	T-BAR-	001	29.21	29.27	-0.06	PASS	MC	NO	82
12/19/2011	T-BAR-	001	28.70	28.75	-0.05	PASS	KL	NO	58
1/6/2012	T-BAR-	001	28.45	28.50	-0.05	PASS	PB	NO	64
3/28/2012	T-BAR-	001	28.40	28.40	0.00	PASS	PB	YES	72
5/7/2012	T-BAR-	001	28.74	28.65	0.09	PASS	KL	NO	70
6/8/2012	T-BAR-	001	28.80	28.80	0.00	PASS	PB	YES	73
7/13/2012	T-BAR-	001	28.90	28.90	0.00	PASS	JL	NO	80
7/13/2012	T-BAR-	001	29.00	29.00	0.00	PASS	PB	NO	77
10/11/2012	T-BAR-	001	28.80	28.80	0.00	PASS	PB	NO	65
11/23/2012	T-BAR-	001	28.50	28.50	0.00	PASS	PB	NO	64.4
1/16/2013	T-BAR-	001	28.60	28.60	0.00	PASS	PB	NO	63.1
3/27/2013	T-BAR-	001	28.80	28.81	-0.01	PASS	BW	NO	61
3/27/2013	T-BAR-	004	28.80	28.70	0.10	FAIL	BW	YES	61
3/27/2013	T-BAR-	004	28.80	28.83	-0.03	PASS	JG	No	61
5/3/2013	T-BAR-	001	28.90	28.89	0.01	PASS	AS2	NO	68.4

Method 5 Acetone Residuals History

DATE	VOL (ml)	RESIDUAL (g/ml)	DATE	VOL (ml)	RESIDUAL (g/ml)	DATE	VOL (ml)	RESIDUAL (g/ml)
10/09/09	200	0.0000008	10/01/10	200	0.0000079	09/12/11	200	0.0000005
10/12/09	200	0.0000015	10/06/10	200	0.0000000	09/26/11	200	0.0000018
10/14/09	200	0.0000000	10/14/10	200	0.0000015	09/28/11	200	0.0000020
10/14/09	200	0.0000005	10/14/10	200	0.0000015	09/29/11	200	0.0000005
10/20/09	200	0.0000005	10/15/10	200	0.0000053	09/29/11	200	0.0000015
10/20/09	200	0.0000008	10/22/10	200	0.0000000	09/26/11	200	0.0000000
10/26/09	200	0.0000079	10/24/10	200	0.0000025	10/05/11	200	0.0000030
11/04/09	200	0.0000010	10/29/10	200	0.0000000	10/05/11	200	0.0000028
11/30/09	200	0.0000000	11/02/10	200	0.0000000	10/05/11	200	0.0000025
11/30/09	200	0.0000000	11/05/10	200	0.0000000	10/22/11	200	0.0000015
12/02/09	200	0.0000000	11/13/10	200	0.0000000	10/26/11	200	0.0000038
01/04/10	200	0.0000010	11/15/10	200	0.0000000	10/26/11	200	0.0000013
01/05/10	200	0.0000000	11/23/10	200	0.0000000	11/07/11	100	0.0000000
01/11/10	200	0.0000000	11/26/10	200	0.0000005	11/21/11	200	0.0000005
01/15/10	250	0.0000002	12/10/10	200	0.0000000	11/21/11	200	0.0000000
01/20/10	200	0.0000030	12/13/10	200	0.0000000	11/23/11	200	0.0000015
02/02/10	200	0.0000010	12/17/10	200	0.0000018	12/14/11	200	0.0000000
02/11/10	200	0.0000060	01/06/11	200	0.0000003	12/18/11	200	0.0000000
02/11/10	200	0.0000050	01/07/11	200	0.0000075	12/19/11	200	0.0000000
02/12/10	200	0.0000000	01/27/11	200	0.0000018	12/23/11	200	0.0000000
02/17/10	220	0.0000016	01/28/11	200	0.0000000	12/29/11	200	0.0000030
03/02/10	200	0.0000027	01/28/11	200	0.0000010	12/29/11	200	0.0000050
03/02/10	200	0.0000000	01/28/11	200	0.0000020	12/29/11	200	0.0000000
03/29/10	300	0.0000012	02/18/11	200	0.0000000	01/18/12	200	0.0000000
04/16/10	200	0.0000070	02/28/11	200	0.0000000	01/19/12	200	0.0000025
04/16/10	200	0.0000005	03/06/11	200	0.0000013	01/31/12	200	0.0000005
04/16/10	200	0.0000000	03/06/11	200	0.0000008	02/03/12	200	0.0000000
04/20/10	200	0.0000013	03/16/11	200	0.0000008	02/29/12	200	0.0000079
04/22/10	200	0.0000018	03/23/11	200	0.0000000	03/08/12	200	0.0000035
05/12/10	200	0.0000018	04/01/11	200	0.0000079	03/16/12	200	0.0000100
05/24/10	200	0.0000070	04/01/11	200	0.0000048	03/26/12	200	0.0000060
05/24/10	200	0.0000079	04/08/11	200	0.0000000	03/26/12	200	0.0000065
05/25/10	100	0.0000079	04/22/11	200	0.0000015	03/30/12	200	0.0000079
06/04/10	100	0.0000050	04/23/11	200	0.0000058	04/03/12	200	0.0000079
06/16/10	200	0.0000025	04/24/11	200	0.0000000	04/05/12	200	0.0000079
06/29/10	200	0.0000033	04/29/11	200	0.0000010	04/11/12	150	0.0000079
07/29/10	200	0.0000018	05/08/11	200	0.0000005	04/17/12	200	0.0000079
07/29/10	200	0.0000033	05/15/11	200	0.0000068	04/27/12	100	0.0000079
08/11/10	200	0.0000010	05/20/11	200	0.0000005	04/28/12	100	0.0000000
08/12/10	200	0.0000079	05/21/11	200	0.0000010	05/01/12	200	0.0000079
08/20/10	200	0.0000043	06/04/11	200	0.0000079	05/02/12	200	0.0000079
08/21/10	200	0.0000079	06/06/11	200	0.0000043	05/04/12	200	0.0000079
08/31/10	200	0.0000079	06/10/11	200	0.0000005	05/05/12	200	0.0000023
08/31/10	200	0.0000010	06/24/11	200	0.0000079	05/13/12	200	0.0000000
09/01/10	200	0.0000079	07/07/11	200	0.0000079	05/20/12	100	0.0000790
09/01/10	200	0.0000063	07/16/11	200	0.0000079	05/24/12	100	0.0000270
09/12/10	200	0.0000065	08/08/11	200	0.0000045	06/08/12	200	0.0000040
09/21/10	200	0.0000079	08/09/11	200	0.0000020	06/14/12	200	0.0000079
09/22/10	200	0.0000079	08/24/11	200	0.0000079	07/02/12	200	0.0000079

Method 5 Acetone Residuals History

DATE	VOL (ml)	RESIDUAL (g/ml)	DATE	VOL (ml)	RESIDUAL (g/ml)	DATE	VOL (ml)	RESIDUAL (g/ml)
07/05/12	200	0.0000079	03/05/13	200	0.0000045			
07/20/12	200	0.0000048	03/06/13	200	0.0000030			
07/20/12	200	0.0000050	03/18/13	200	0.0000030			
07/21/12	200	0.0000050	03/18/13	250	0.0000060			
08/01/12	200	0.0000079	03/22/13	250	0.0000016			
08/09/12	100	0.0000060	03/25/13	250	0.0000079			
08/09/12	200	0.0000000	03/28/13	250	0.0000040			
08/10/12	200	0.0000000	03/29/13	200	0.0000050			
08/17/12	400	0.0000018	04/18/13	200	0.0000055			
08/24/12	150	0.0000013	04/10/13	215	0.0000047			
08/26/12	200	0.0000060	04/25/13	200	0.0000070			
09/04/12	200	0.0000045	05/02/13	250	0.0000079			
09/04/12	200	0.0000079						
09/06/12	200	0.0000025						
09/14/12	200	0.0000050						
09/17/12	200	0.0000030						
09/17/12	200	0.0000015						
09/28/12	200	0.0000053						
10/07/12	200	0.0000000						
10/11/12	200	0.0000000						
10/13/12	200	0.0000045						
10/13/12	200	0.0000000						
10/17/12	200	0.0000000						
10/18/12	200	0.0000000						
10/20/12	200	0.0000055						
10/23/12	200	0.0000010						
11/06/12	200	0.0000020						
11/08/12	200	0.0000079						
11/09/12	200	0.0000079						
11/15/12	200	0.0000050						
11/25/12	125	0.0000079						
11/28/12	275	0.0000065						
11/28/12	250	0.0000052						
11/28/12	275	0.0000065						
12/11/12	200	0.0000079						
12/13/13	200	0.0000045						
12/17/12	200	0.0000040						
12/31/13	200	0.0000025						
01/04/13	250	0.0000044						
01/11/13	200	0.0000045						
01/16/13	200	0.0000040						
01/18/13	200	0.0000079						
01/24/13	350	0.0000077						
02/01/13	200	0.0000079						
02/04/13	200	0.0000045						
02/08/13	275	0.0000079						
02/13/13	250	0.0000040						
02/22/13	250	0.0000056						
02/28/13	200	0.0000070						

PALL Gelman Laboratory

New!

Pallflex® Filters

Wide range of filters uniquely suited for a broad range of air monitoring applications.

- Can be used for high temperature and hot gas air monitoring applications.

Applications

Tissuquartz™ Filters

- Heat treated for reduction of trace organics and superior chemical purity.
- High temperature use for analysis of acidic gases and stack sampling aerosols.
- High flow rate and filtration efficiency.
- Ultra-pure soft water processing to reduce residual ion content. Contact us for typical values.

Fiberfilm™ Filters

- Fiberfilm is well suited for a broad range of air sampling applications
- Moisture variations in air or gases during air sampling will not cause chemical reactions on the filter
- Heat-treated (HT) version available for reduction of trace organics.

Emfab™ Filters

- Withstands folding for weighing and transport
- Every filter flushed with DI water to remove any water-soluble residue
- Low air resistance for use in critical aerosol sampling tests such as diesel exhaust.

Complementary Products

For other products related to these applications see:

In-line Holders.....172-174
Open-face Holders.....175

Specifications

Description	Tissuquartz	Emfab	Fiberfilm
Filter Media	Pure quartz, no binder	Borosilicate microfibers reinforced with woven glass cloth and bonded with PTFE	Heat resistant borosilicate glass fiber coated with fluorocarbon (TFE)
Diameter	25 - 90 mm (and 8 x 10 in.)	12 - 142 mm (and 8 x 10 in.)	25 - 100 mm (and 8 x 10 in.)
Typical Thickness	432 µm (17 mils)	178 µm (7 mils)	203 µm (8 mils)
Typical Filter Weight	5.8 mg/cm^2	5.0 mg/cm^2	3.4 mg/cm^2
Typical Water Flow Rate at 0.35 bar (5 psi)	220 mL/min/cm^2	32 mL/min/cm^2	220 mL/min/cm^2
Typical Air Flow Rate at 0.7 bar (10 psi)	73 L/min/cm^2	68 L/min/cm^2	180 L/min/cm^2
Maximum Operating Temperature – Air	1093 °C (2000 °F)	260 °C (500 °F)	315.5 °C (600 °F)
Typical Aerosol Retention*	99.9%	99.9%	96.4%
pH in Boiled Water Extract	6.5 - 7.5	Not available	Not available

**Following ASTM D 2986-71 0.3 µm (DOP) at 32 L/min/100 cm^2 filter media*

Microfiltration

Filter Specifications

Air Compliance Testing, Inc.

APEX INSTRUMENTS REFERENCE METER VERIFICATION
USING WET-TEST METER #11AE6
2-POINT ENGLISH UNITS

Calibration Meter Information	
WTM Model #	AL20
WTM Serial #	11AE6
WTM Gamma	0.9999
Original 15Pt Gamma	0.9977

Calibration Conditions			
Date	Time	25-Feb-13	10:30
Barometric Pressure		30.10	in Hg
Calibration Tech		EW	
DGM Serial Number		S-120-1512377	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	°R/in Hg

Calibration Data												Results		
Run Time	Metering Console						Calibration Meter					Dry Gas Meter		
	DGM Input	Volume	Volume	Volume	Outlet Temp	Outlet Temp	Volume	Volume	Volume	Outlet Temp	Outlet Temp	Calibration Factor		Flowrate
Elapsed	Pressure	Initial	Final	Sample	Initial	Final	Initial	Final	Sample	Initial	Final	Previous	Current	Std & Corr
(Θ)	(P_m)	(V_{mi})	(V_{mf})	(V_m)	(t_{mi})	(t_{mf})	(Vw_i)	(Vw_f)	(V_w)	(t_{wi})	(t_{wf})	(Y)	(Y)	($Q_{m std/corr}$)
min	in H_2O	cubic feet	cubic feet	cubic feet	°F	°F	cubic feet	cubic feet	cubic feet	°F	°F			cfm
6.00	-3.6	82.459	88.371	5.912	71.6	71.6	961.890	967.795	5.905	70	70	0.9966	1.0107	0.986
											Variation	1.42%	must be less than 1.5%	
10.00	-2.1	88.371	93.937	5.566	71.6	71.6	967.795	973.370	5.575	70	70	0.9992	1.0098	0.559
											Variation	1.06%	must be less than 1.5%	

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, App A, Method 5, Paragraph 7.1.2.2, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature [illegible] Date 2/25/13

APEX INSTRUMENTS REFERENCE METER CALIBRATION
USING WET-TEST METER #11AE6
16-POINT ENGLISH UNITS

Calibration Meter Information	
Wet Test Meter Model #	AL-20
Wet Test Meter Serial #	11AE6
Wet Test Meter Gamma	0.9990

Calibration Conditions			
Date	Time	16-Apr-09	2:15
Barometric Pressure		29.9	in Hg
Calibration Technician		EW	
DGM Serial Number		S-120-1512377	

Factors/Conversions		
Std Temp	528	°R
Std Press	29.92	in Hg
K_1	17.647	°R/in Hg

Calibration Data												Results		
Run Time	Dry Gas Meter						Calibration Meter					Dry Gas Meter		
												Calibration Factor		Flowrate
Elapsed	Meter Pressure	Volume Initial	Volume Final	Sample Volume	Outlet Temp Initial	Outlet Temp Final	Volume Initial	Volume Final	Sample Volume	Outlet Temp Initial	Outlet Temp Final	Value	Variation	Std & Corr
(θ)	(P_m)	(V_{mi})	(V_{mf})	(V_m)	(t_{mi})	(t_{mf})	(V_{wi})	(V_{wf})	(V_w)	(t_{wi})	(t_{wf})	(Y)	(ΔY)	($Q_{std,corr}$)
min	in H_2O	cubic feet	cubic feet	cubic feet	°F	°F	cubic feet	cubic feet	cubic feet	°F	°F			cfm
5.00	-5.5	474.747	480.983	6.236	84.2	84.2	868.400	874.380	5.980	73	73	0.9925	-0.00137	1.182
5.00	-5.5	480.983	487.223	6.240	84.2	86.0	874.380	880.360	5.980	73	73	0.9935	-0.00036	1.182
5.00	-5.5	487.223	493.460	6.237	86.0	87.8	880.360	886.330	5.970	73	73	0.9956	0.00173	1.180
										Passed Calibration Factor Var		0.9939	Averages	1.181
6.00	-4.2	511.684	517.728	6.044	86.0	86.0	904.035	909.850	5.815	73	73	0.9958	-0.00081	0.958
6.00	-4.2	517.728	523.804	6.076	86.0	87.8	909.850	915.695	5.845	73	73	0.9969	0.00023	0.962
6.00	-4.2	523.804	529.885	6.081	87.8	87.8	915.695	921.540	5.845	73	73	0.9972	0.00058	0.962
										Passed Calibration Factor Var		0.9966	Averages	0.961
7.00	-3.3	529.885	535.485	5.600	87.8	89.6	921.540	926.930	5.390	73	73	0.9980	-0.00016	0.760
7.00	-3.3	535.485	541.071	5.586	89.6	89.6	926.930	932.300	5.370	73	73	0.9984	0.00026	0.757
7.00	-3.3	541.071	546.659	5.588	89.6	89.6	932.300	937.670	5.370	73	73	0.9980	-0.00010	0.757
										Passed Calibration Factor Var		0.9981	Averages	0.758
10.00	-2.5	546.659	552.300	5.641	89.6	89.6	937.670	943.120	5.450	73	74	1.0009	0.00176	0.538
10.00	-2.5	552.300	557.928	5.628	89.6	89.6	943.120	948.545	5.425	74	74	0.9982	-0.00100	0.535
10.00	-2.5	557.928	563.565	5.637	89.6	89.6	948.545	953.980	5.435	74	74	0.9984	-0.00076	0.536
										Passed Calibration Factor Var		0.9992	Averages	0.536
15.00	-2.3	493.460	499.555	6.095	86.0	86.0	886.330	892.255	5.925	73	73	1.0014	0.00061	0.390
15.00	-2.3	499.555	505.615	6.060	86.0	86.0	892.255	898.140	5.885	73	73	1.0004	-0.00041	0.388
15.00	-2.3	505.615	511.684	6.069	86.0	86.0	898.140	904.035	5.895	73	73	1.0006	-0.00020	0.388
										Passed Calibration Factor Var		1.0008	Averages	0.389
											Overall Average Y	0.9977		

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3795, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature Erin Watts Date 4/16/09

7410 Worthington-Galena Road
Worthington, Ohio 43085
Phone: (614) 436-4933
Fax: (614) 436-9144

Industrial Environmental Monitoring Instruments, Inc.

Website: www.ierents.com

Temperature Calibrator/Thermometer Certificate

Model: Omega CL25
Serial #: T-286993

Date: 5/10/2013
Technition Sam Shults

Thermometer Calibration

Type K, J & T multiple points over Full Scale Results: +/- .7 F
Unit Accuracy: +/- 1.0 F

Calibrator Mode Calibration

Type K, J & T multiple points over Full Scale Results: +/- .5 F
Unit Accuracy: +/- 1.0 F

Thermocouple Test

Lab Std.	Actual		Lab Std.	Actual
32.0 F	31.6 F	*Type K*	140.0 F	139.0 F
80.0 F	79.2 F		275.0 F	274.1 F

NIST Reference Standards

Agilent 34401A Multimeter sn. MY41002352 Calibration Due 12/1/2013
Analogic DigiCalc II Calibration Due: 14/22/2012
Hart 9103 Temperature Well Calibration Due: 4/27/2012

Calibration Standards are NIST Traceable
Instrument must be calibrated and operated according to manufacturers specifications

7410 Worthington-Galena Road
Worthington, Ohio 43085
Phone: (614) 436-4933
Fax: (614) 436-9144

Industrial Environmental Monitoring Instruments, Inc.

Website: www.ierents.com

Temperature Calibrator/Thermometer Certificate

Model: Omega CL3512A
Serial #: 11000091

Date: 7/17/2012
Technition Sam Shults

Thermometer Calibration

Type K, J, E & T multiple points over Full Scale Results: +/- 1.0 F
Unit Accuracy: +/- 1.8 F

Calibrator Mode Calibration

Type K, J,E & T multiple points over Full Scale Results: +/- 1.0 F
Unit Accuracy: +/- 1.8 F

NIST Reference Standards
Agilent 34401A Multimeter sn. MY41002352 Calibration Due 12/1/2013
Analogic DigiCalc II Calibration Due: 17/13/2013
Hart 9103 Temperature Well Calibration Due: 5/16/2013

Calibration Standards are NIST Traceable
Instrument must be calibrated and operated according to manufacturers specifications

7410 Worthington-Galena Road
Worthington, Ohio 43085
Phone: (614) 436-4933
Fax: (614) 436-9144

Industrial Environmental Monitoring Instruments, Inc.

Website: www.ierents.com

Temperature Calibrator/Thermometer Certificate

Model: Omega CL3512A
Serial #: 11000622

Date: 9/14/2012
Technition Sam Shults

Thermometer Calibration

Type K, J & T multiple points over Full Scale Results: +/- .3 F
Unit Accuracy: +/- 2.0 F

Calibrator Mode Calibration

Type K, J & T multiple points over Full Scale Results: +/- 1.0 F
Unit Accuracy: +/- 3.0 F

NIST Reference Standards
Agilent 34401A Multimeter sn. MY41002352 Calibration Due 12/1/2013
Analogic DigiCalc II Calibration Due: 7/13/2013

Calibration Standards are NIST Traceable
Instrument must be calibrated and operated according to manufacturers specifications

Certificate of Calibration

OCS technologies, inc.
1300 East Granger Road; Brooklyn Hts, OH 44131
(800) 362-0364 www.ocscal.com

LABORATORY ACCREDITATION BUREAU ACCREDITED
CERT# L1152-1 Calibration

CUSTOMER:
AIR COMPLIANCE TESTING, INC.
10060 BRECKSVILLE ROAD
BRECKSVILLE, OH 44141

ASSET NUMBER:	**B26978**	**PERFORMED ON:**	**01 Feb 2013**
OWNER ASSET #:	BAL-005	**DATE DUE:**	**01 Feb 2014**
UNIT UNDER TEST:	A&D EK-1200G BALANCE, 1200G X 0.1G	TEST RESULT:	PASS
		DATA TYPE:	FOUND-LEFT
		TEMP / HUMIDITY:	68.0 °F / 32 %RH
SERIAL NUMBER:	J8084811	SERVICE SITE:	ON-SITE
LOCATION:		CALIBRATED BY:	ANGELO COLOMBO
PROCEDURE NAME:	NIST HANDBOOK 44,g,2 STDS	APPROVED BY:	

Unless Otherwise Noted: OCS Technologies, Inc. certifies that the above listed instrument has been tested with a 2:1 Test Uncertainty Ratio (TUR) using standards that are traceable to the International System of Units (SI) through the National Institute of Standards & Technology (NIST), or through NIST accepted intrinsic standards of measurement, or through another National Metrology Institute (NMI). The item tested meets or exceeds all specifications as stated in the referenced procedure solely at the time of calibration. Measurement uncertainty if reported has been calculated at k=2 providing a 95% confidence interval and has been excluded from the Pass/Fail Result above. OCS is ISO/IEC 17025 accredited by the Laboratory Accreditation Bureau. Calibration performed in accordance with ISO 17025:2005 and ISO 10012:2003. This report may only be reproduced in full. Temperature and Humidity for on-site work may be reported above as the mean of high and low values recorded for all items on the day of service. If the data type is FOUNDLEFT then the As Found and As Left data are the same.

Remarks: .

Standards Used

Asset	Traceable Through	Description	Cal Date	Cal Due Date
B947	CERT#1867044	RICE LAKE 1MG - 100G CLASS 1 WEIGHT KIT (210.886G TOTAL)	17 May 2012	17 May 2013
B947A	CERT#216195	RICE LAKE 50G - 5KG CLASS 1 WEIGHT KIT (10950G TOTAL)	21 May 2012	21 May 2013

Test Results

Test Description	Range	True Value	Test Result	Lower Limit	Upper Limit		%TOL	Status
TESTED IN ACCORDANCE WITH NIST Handbook 44-Current Rev Section 2.20 Paragraphs N1.1, N1.3, N1.11, N.2,N.3.2 T.N.5 & Tables 4, T.11, 7A as Applicable.								
REPEATABILITY VERIFICATION:								
Result of Operator Evaluation								Pass
SHIFT TEST VERIFICATION:								
Result of Operator Evaluation								Pass
LINEARITY:								
1.00 g		1.00	1.0	0.9	1.1	g	0	Pass
10.00 g		10.00	10.0	9.9	10.1	g	0	Pass
100.00 g		100.00	100.0	99.8	100.2	g	0	Pass
500.00 g		500.00	499.9	499.5	500.5	g	20	Pass
1000.00 g		1000.00	1000.0	999.5	1000.5	g	0	Pass

Uncertainty of Measurement is +/- 0.13 G

Certificate # 4AE9858FAB35EF469723E51CF5641A5C
Date Printed: 01 Feb 2013 Form No.: 133 Rev 09/2011 Page 1 of 1

Certificate of Calibration

OCS technologies, inc.
1300 East Granger Road; Brooklyn Hts. OH 44131
(800) 362-0364 www.ocscal.com

LABORATORY ACCREDITATION BUREAU ACCREDITED
CERT# L1152-1 Calibration

CUSTOMER:
AIR COMPLIANCE TESTING, INC.
10060 BRECKSVILLE ROAD
BRECKSVILLE, OH 44141

ASSET NUMBER:	**B26975**	**PERFORMED ON:**	**01 Feb 2013**
OWNER ASSET #:	BAL-008	**DATE DUE:**	**01 Feb 2014**
UNIT UNDER TEST:	A&D EK-1200I BALANCE, 1200G X 0.1G	TEST RESULT:	PASS
		DATA TYPE:	FOUND-LEFT
		TEMP / HUMIDITY:	68.0 °F / 32 %RH
SERIAL NUMBER:	EP1861727	SERVICE SITE:	ON-SITE
LOCATION:		CALIBRATED BY:	ANGELO COLOMBO
PROCEDURE NAME:	NIST HANDBOOK 44,g,1 STD	APPROVED BY:	

Unless Otherwise Noted: OCS Technologies, Inc. certifies that the above listed instrument has been tested with a 2:1 Test Uncertainty Ratio (TUR) using standards that are traceable to the International System of Units (SI) through the National Institute of Standards & Technology (NIST), or through NIST accepted intrinsic standards of measurement, or through another National Metrology Institute (NMI). The item tested meets or exceeds all specifications as stated in the referenced procedure solely at the time of calibration. Measurement uncertainty if reported has been calculated at k=2 providing a 95% confidence interval and has been excluded from the Pass/Fail Result above. OCS is ISO/IEC 17025 accredited by the Laboratory Accreditation Bureau. Calibration performed in accordance with ISO 17025:2005 and ISO 10012:2003. This report may only be reproduced in full. Temperature and Humidity for on-site work may be reported above as the mean of high and low values recorded for all items on the day of service. If the data type is FOUNDLEFT then the As Found and As Left data are the same.

Remarks: .

Standards Used

Asset	Traceable Through	Description	Cal Date	Cal Due Date
B947A	CERT#216195	RICE LAKE 50G - 5KG CLASS 1 WEIGHT KIT (10950G TOTAL)	21 May 2012	21 May 2013

Test Results

Test Description	Range	True Value	Test Result	Lower Limit	Upper Limit		%TOL	Status
TESTED IN ACCORDANCE WITH NIST Handbook 44-Current Rev Section 2.20 Paragraphs N1.1, N1.3, N1.11, N.2,N.3.2 T.N.5 & Tables 4, T.11, 7A as Applicable.								
REPEATABILITY VERIFICATION:								
Result of Operator Evaluation								Pass
SHIFT TEST VERIFICATION:								
Result of Operator Evaluation								Pass
LINEARITY:								
100.00 g		100.00	100.0	99.8	100.2	g	0	Pass
200.00 g		200.00	200.0	199.8	200.2	g	0	Pass
500.00 g		500.00	500.1	499.5	500.5	g	20	Pass

Uncertainty of Measurement is +/- 0.13 G

Certificate # AA023FED8F1D244B92FF8BB9AAE452E6
Date Printed: 01 Feb 2013 Form No.: 133 Rev 09/2011 Page 1 of 1

Certificate of Calibration

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(800) 362-0364 www.ocscal.com

LABORATORY ACCREDITATION BUREAU ACCREDITED
CERT# L1152-1 Calibration

CUSTOMER:
AIR COMPLIANCE TESTING, INC.
10060 BRECKSVILLE ROAD
BRECKSVILLE, OH 44141

ASSET NUMBER:	B26977	**PERFORMED ON:**	01 Feb 2013
OWNER ASSET #:		**DATE DUE:**	01 Feb 2014
UNIT UNDER TEST:	SARTORIUS 1602MP BALANCE, 160G X 0.0001G	TEST RESULT:	PASS
		DATA TYPE:	AS-LEFT
		TEMP / HUMIDITY:	68.0 °F / 32 %RH
SERIAL NUMBER:	3004026	SERVICE SITE:	ON-SITE
LOCATION:		CALIBRATED BY:	ANGELO COLOMBO
PROCEDURE NAME:	NIST HANDBOOK 44,g,1 STD	APPROVED BY:	

Unless Otherwise Noted: OCS Technologies, Inc. certifies that the above listed instrument has been tested with a 2:1 Test Uncertainty Ratio (TUR) using standards that are traceable to the International System of Units (SI) through the National Institute of Standards & Technology (NIST), or through NIST accepted intrinsic standards of measurement, or through another National Metrology Institute (NMI). The item tested meets or exceeds all specifications as stated in the referenced procedure solely at the time of calibration. Measurement uncertainty if reported has been calculated at k=2 providing a 95% confidence interval and has been excluded from the Pass/Fail Result above. OCS is ISO/IEC 17025 accredited by the Laboratory Accreditation Bureau. Calibration performed in accordance with ISO 17025:2005 and ISO 10012:2003. This report may only be reproduced in full. Temperature and Humidity for on-site work may be reported above as the mean of high and low values recorded for all items on the day of service. If the data type is FOUNDLEFT then the As Found and As Left data are the same.

Remarks: . AFTER ADJUSTMENTS

Standards Used

Asset	Traceable Through	Description	Cal Date	Cal Due Date
B947	CERT#1867044	RICE LAKE 1MG - 100G CLASS 1 WEIGHT KIT (210.886G TOTAL)	17 May 2012	17 May 2013

Test Results

Test Description	Range	True Value	Test Result	Lower Limit	Upper Limit		%TOL	Status
TESTED IN ACCORDANCE WITH NIST Handbook 44-Current Rev Section 2.20 Paragraphs N1.1, N1.3, N1.11, N.2,N.3.2 T.N.5 & Tables 4, T.11, 7A as Applicable.								
REPEATABILITY VERIFICATION:								
Result of Operator Evaluation								Pass
SHIFT TEST VERIFICATION:								
Result of Operator Evaluation								Pass
LINEARITY:								
0.00100 g		0.00100	0.0010	0.0009	0.0011	g	0	Pass
0.01000 g		0.01000	0.0100	0.0099	0.0101	g	0	Pass
0.10000 g		0.10000	0.1000	0.0999	0.1001	g	0	Pass
10.00000 g		10.00000	10.0000	9.9998	10.0002	g	0	Pass
50.00000 g		50.00000	49.9999	49.9995	50.0005	g	20	Pass

Uncertainty of Measurement is +/- 0.0002 G

Certificate # EF114D4C1082CE4D8687DE9226810F09

Date Printed: 01 Feb 2013 Form No.: 133 Rev 09/2011 Page 1 of 1

Certificate of Calibration

OCS technologies, inc.
1300 East Granger Road; Brooklyn Hts. OH 44131
(800) 362-0364 www.ocscal.com

LABORATORY ACCREDITATION BUREAU ACCREDITED
CERT# L1152-1 Calibration

CUSTOMER:
AIR COMPLIANCE TESTING, INC.
10060 BRECKSVILLE ROAD
BRECKSVILLE, OH 44141

ASSET NUMBER:	B26977	**PERFORMED ON:**	**01 Feb 2013**
OWNER ASSET #:		**DATE DUE:**	**01 Feb 2013**
UNIT UNDER TEST:	SARTORIUS 1602MP BALANCE, 160G X 0.0001G	TEST RESULT:	FAIL
		DATA TYPE:	AS-FOUND
		TEMP / HUMIDITY:	68.0 °F / 32 %RH
SERIAL NUMBER:	3004026	SERVICE SITE:	ON-SITE
LOCATION:		CALIBRATED BY:	ANGELO COLOMBO
PROCEDURE NAME:	NIST HANDBOOK 44,g,1 STD	APPROVED BY:	

Unless Otherwise Noted: OCS Technologies, Inc. certifies that the above listed instrument has been tested with a 2:1 Test Uncertainty Ratio (TUR) using standards that are traceable to the International System of Units (SI) through the National Institute of Standards & Technology (NIST), or through NIST accepted intrinsic standards of measurement, or through another National Metrology Institute (NMI). The item tested meets or exceeds all specifications as stated in the referenced procedure solely at the time of calibration. Measurement uncertainty if reported has been calculated at k=2 providing a 95% confidence interval and has been excluded from the Pass/Fail Result above. OCS is ISO/IEC 17025 accredited by the Laboratory Accreditation Bureau. Calibration performed in accordance with ISO 17025:2005 and ISO 10012:2003. This report may only be reproduced in full. Temperature and Humidity for on-site work may be reported above as the mean of high and low values recorded for all items on the day of service. If the data type is FOUND/LEFT then the As Found and As Left data are the same.

Remarks: . BEFORE ADJUSTMENTS

Standards Used

Asset	Traceable Through	Description	Cal Date	Cal Due Date
B947	CERT#1867044	RICE LAKE 1MG - 100G CLASS 1 WEIGHT KIT (210.886G TOTAL)	17 May 2012	17 May 2013

Test Results

Test Description	Range	True Value	Test Result	Lower Limit	Upper Limit		%TOL	Status
TESTED IN ACCORDANCE WITH NIST Handbook 44-Current Rev Section 2.20 Paragraphs N1.1, N1.3, N1.11, N.2,N.3.2 T.N.5 & Tables 4, T.11, 7A as Applicable.								
REPEATABILITY VERIFICATION:								
Result of Operator Evaluation								Pass
SHIFT TEST VERIFICATION:								
Result of Operator Evaluation								Pass
LINEARITY:								
0.00100 g		0.00100	0.0010	0.0009	0.0011	g	0	Pass
0.01000 g		0.01000	0.0100	0.0099	0.0101	g	0	Pass
0.10000 g		0.10000	0.1000	0.0999	0.1001	g	0	Pass
10.00000 g		10.00000	10.0001	9.9998	10.0002	g	50	Pass
50.00000 g		50.00000	49.9965	49.9995	50.0005	g	700	Fail

Uncertainty of Measurement is +/- 0.0002 G

Certificate # 6E9498DFB157F24C983B1176F66FAAD1

Date Printed: 01 Feb 2013 Form No.: 133 Rev 09/2011 Page 1 of 1

Astronomical Applications Dept.
U.S. Naval Observatory
Washington, DC 20392-5420
COSHOCTON, OHIO
° ' ° '
W 81 50, N40 16
Altitude and Azimuth of the Sun
May 22, 2013
Eastern Daylight Time

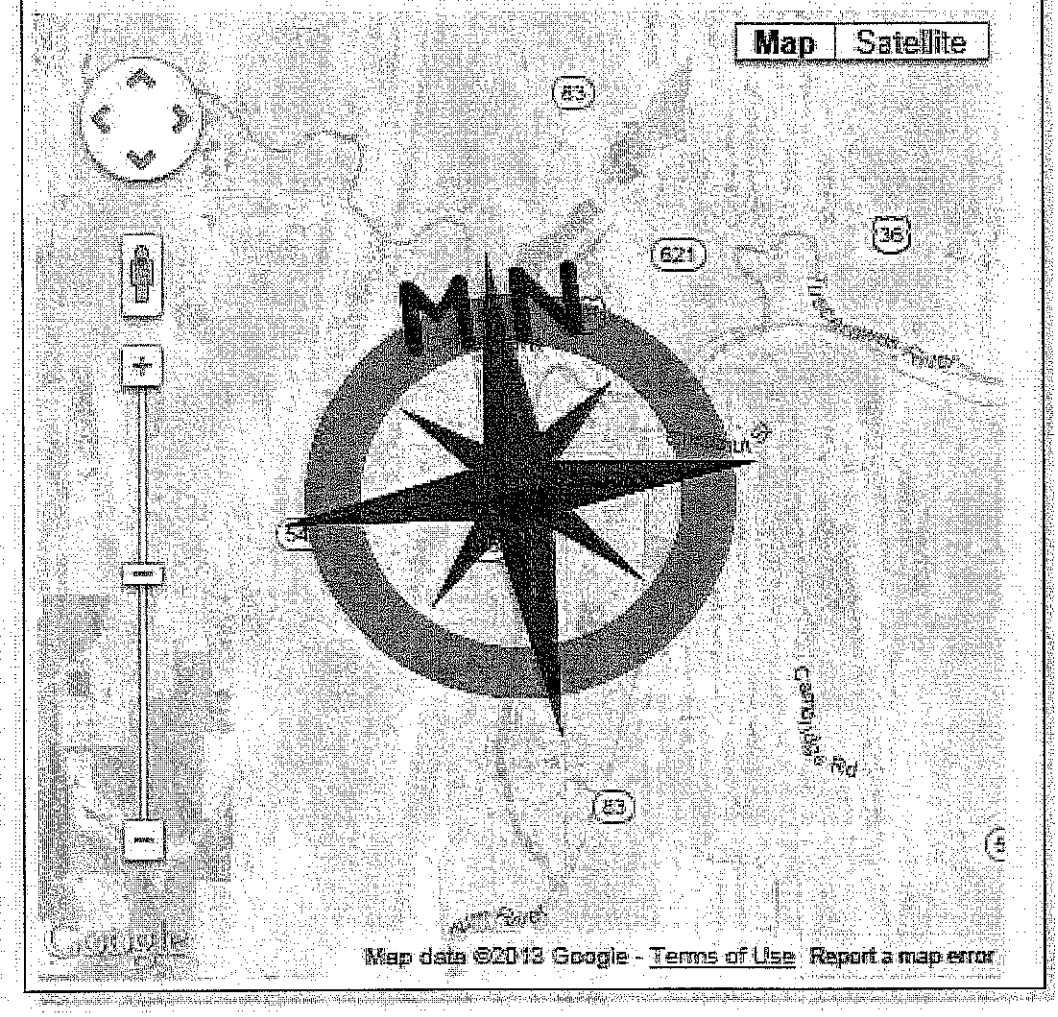
h m	Altitude °	Azimuth (E of N) °
05:00	-11.2	50.6
05:10	-9.7	52.4
05:20	-8.2	54.2
05:30	-6.6	56.0
05:40	-5.0	57.7
05:50	-3.4	59.4
06:00	-1.7	61.1
06:10	0.4	62.7
06:20	2.0	64.3
06:30	3.6	65.9
06:40	5.3	67.4
06:50	7.0	69.0
07:00	8.8	70.5
07:10	10.6	72.0
07:20	12.4	73.5
07:30	14.2	75.0
07:40	16.1	76.5
07:50	17.9	78.0
08:00	19.8	79.5
08:10	21.7	81.0
08:20	23.5	82.5
08:30	25.4	84.0
08:40	27.3	85.5
08:50	29.2	87.0
09:00	31.1	88.6
09:10	33.1	90.2
09:20	35.0	91.9
09:30	36.9	93.5
09:40	38.8	95.3
09:50	40.7	97.0
10:00	42.5	98.9
10:10	44.4	100.8
10:20	46.3	102.8
10:30	48.1	104.9
10:40	50.0	107.2
10:50	51.8	109.5
11:00	53.6	112.0
11:10	55.3	114.7
11:20	57.0	117.6
11:30	58.7	120.6
11:40	60.3	124.0
11:50	61.9	127.6
12:00	63.3	131.6
12:10	64.7	135.9
12:20	66.0	140.6
12:30	67.1	145.8
12:40	68.1	151.3

12:50	69.0	157.3
13:00	69.6	163.7
13:10	70.0	170.3
13:20	70.2	177.2
13:30	70.2	184.1
13:40	70.0	191.0
13:50	69.5	197.6
14:00	68.8	203.9
14:10	68.0	209.8
14:20	66.9	215.3
14:30	65.8	220.3
14:40	64.5	225.0
14:50	63.1	229.2
15:00	61.6	233.1
15:10	60.0	236.7
15:20	58.4	240.0
15:30	56.7	243.1
15:40	55.0	245.9
15:50	53.3	248.5
16:00	51.5	251.0
16:10	49.7	253.3
16:20	47.8	255.5
16:30	46.0	257.6
16:40	44.1	259.6
16:50	42.2	261.5
17:00	40.3	263.4
17:10	38.4	265.1
17:20	36.5	266.9
17:30	34.6	268.5
17:40	32.7	270.2
17:50	30.8	271.8
18:00	28.9	273.3
18:10	27.0	274.9
18:20	25.1	276.4
18:30	23.2	277.9
18:40	21.4	279.4
18:50	19.5	280.9
19:00	17.6	282.4
19:10	15.8	283.9
19:20	13.9	285.4
19:30	12.1	286.9
19:40	10.3	288.4
19:50	8.5	289.9
20:00	6.8	291.4
20:10	5.0	293.0
20:20	3.3	294.5
20:30	1.7	296.1
20:40	0.2	297.7
20:50	-2.0	299.3
21:00	-3.6	301.0
21:10	-5.2	302.7
21:20	-6.8	304.4
21:30	-8.4	306.2
21:40	-9.9	308.0
21:50	-11.4	309.8

Back to form

Declination

Latitude:	40° 16' 13" N
Longitude:	81° 52' 3" W
Date	**Declination**
2013-05-02	7° 52' 20" W changing by 2.7' W per year



VISIBLE EMISSIONS EVALUATOR

Aleksandr Spektor

This is to certify that the above named observer has met the specifications of Federal Reference Method 9 and is qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates, Inc. of Raleigh, N.C.

This certificate is valid for six months from date of Issue.

412193	**SPE603125**
Certificate Number	Student ID Number
4/10/2013	**Pittsburgh, PA**
Date of Certification	Location
10/10/2013	**PGHS13**
Certification Expiration Date	Last Lecture

Marty Hughes
Director of Training

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Cleveland, Ohio and Gainesville, Florida
1-800-EPA-AIR1 www.aircomp.com

March 26, 2013

Kim Reinbold
Ohio EPA, SEDO DAPC
2195 Front St
Logan, OH 43138

Dear Kim:

This letter accompanies the attached Intent to Test (ITT) Notification Form that we have completed on the behalf of our client, Clow Water Systems Company, located in Coshocton, OH. The purpose of this emissions testing project is to satisfy the emission testing requirements pursuant to Appendix 3 Section III of the McWane, Inc. Consent Decree and the testing requirements outlined in 40 CFR Part 63, Subpart ZZZZZ.

The scope of this testing project is to measure Total Front-Half Particulate Matter (PM) using EPA Method 5 from the Cupola Emission System (P901) at the Scrubber System Exhaust Stack during Maximum Achievable Operations.

Please note that this scope of work also includes Visible Emissions using EPA Method 9 from the Cupola Emission System (P901) at the Shroud Area. This testing will be completed simultaneously with the aforementioned EPA Method 5 testing.

As is written in this ITT, a date of **May 2, 2013** has been selected as the test day with testing equipment set-up occurring on the day before. Typically Run No. 1's start time is targeted for 7:30 am. If this start time changes, Air Compliance Testing or facility personnel will contact you in advance to notify you of the new starting time.

If you have any questions regarding the scope of this testing project, the scheduled test day, or the process(es) being tested, please don't hesitate to call Heather Rainwater of Clow Water Systems Company at 740-622-6651, or myself, and we would be happy to assist you in any way possible.

Thank you again for your careful consideration, and I am looking forward to working with you on this upcoming compliance testing project.

Sincerely,

Air Compliance Testing, Inc.

By:_____
Tyson E. Houchin
Operations Director

cc: Heather Rainwater, Clow Water Systems Company

INTENT TO TEST NOTIFICATION (One Emissions Unit Per Sheet)

Agency use only	
Date Received	
Assigned	

Facility Premise No.	0616010006	Proposed Test Date	May 2, 2013
Emissions Unit PTI No.	P0105615	Proposed Start Time	7:30 am
SCC Number	30400301		

A. Facility Contact Information:

Name	Clow Water Systems Company
Address	PO Box 6001, Coshocton OH 43812-6001
Contact Person	Heather Rainwater
Telephone (O)	740-291-1087 (Cell) 740-502-0577
E-Mail	heather.rainwater@clowwater.com

Testing Firm Information:

Name	Air Compliance Testing, Inc.
Address	PO Box 41156, Cleveland OH 44141-0156
Contact Person	Tyson E. Houchin
Telephone (O)	216 525-0900 (Cell) 440-821-7805
E-Mail	tyson@aircomp.com

B. Test Location Information

Name	Clow Water Systems Co.	Address	S Sixth St, Coshocton OH 43812
Contact Person	Heather Rainwater	Telephone (O)	740-291-1087 (Cell) 740-502-0577

C. Test Plan and Emissions Unit Information Table: List the applicable information under each respective column heading.

Emission Unit	StackID	Test Location	Control Equipment	Monitoring Equipment	Pollutant(s) to be Tested	EPA Test Method	Number of Sampling Points	Total Time per Test Run (min)	Number of Sampling Runs
Cupola Emission System (P901)	A	Scrubber System Exhaust Stack	Scrubber System	Pressure Drop and Water Flow Rates	Volumetric Flow Rate	1, 2, 3, and 4	24	60	3
					PM	5	24	60	3
	B	Shroud Area	None	N/A	VEs	9	1	60	3 (if possible)
Flange / Fabrication Building	C	Central Roof Vent	None	N/A	VEs	22	24	60	3 (if possible)

Are *any* modifications or alternatives as spelled within the test methods being proposed? Yes [ ] No [X] If "no", then no modifications or alternatives, however minor, will be accepted. If yes, list each test method and section being modified, and attach a detailed modification description and justification.

Source is testing to comply with (check all that apply): McWane Consent Decree Appendix 3 Section III and 40 CFR Part 63, Subpart ZZZZZ

D. What is the maximum rated capacity or throughput of the emissions unit given its permit-to-install or permit-to-operate? 85 Tons / hour

Has the facility scheduled production or throughput so that the emissions unit can be operated at the maximum capacity given its permit-to-install or permit-to-operate during the test? Yes [X] No [ ]

Specify how the operating rate will be demonstrated during the testing: Normal facility process and recordkeeping procedures

Sampling Location(s): Inlet [ ] Outlet [X] Simultaneous [ ] Will cyclonic flow check(s) be conducted? Yes [X] No [ ]

Fuel Sampling: Coal-Proximate [ ] Ultimate [ ] Other [X] If other specify: N/A

Emission Rate to be calculated using: F-Factor [ ] Ultimate Coal Analysis [ ] Other [X] If other specify: As dictated by EPA Method 5 calculation algorithms in terms of lb/hr and lb/ton

Has any maintenance or parts replacement been performed on the emissions unit or the control equipment within the last year? Yes [X] No [ ] 6/2012: Replacement in kind of Ring Jet tower shell, Ring Jet demister. 12/2012: Replaced Final Exhaust Stack

(Note: Some maintenance, such as installing new filter bags in a baghouse, or replacing the activated carbon in an adsorber, may disqualify the emissions unit from a performance test until a sufficient amount of time has elapsed to ensure a test which will be representative of normal operations.)

E. Sample Train Calibration: All affected measuring and monitoring equipment should be calibrated within 60 days of the scheduled testing.

THE FOLLOWING ADDITIONAL INFORMATION SHALL BE SUBMITTED AS ATTACHMENTS:

F. Sample Train Information:

1. A schematic diagram of each sampling train.
2. The type or types of capture media to be used to collect each gas stream pollutant. (Include filter specification sheets)
3. Sample tube type, (e.g., glass, teflon, stainless steel, etc.)
4. Probe cleaning method and solvent to be used, if applicable.

1. See attached Site-Specific Test Plan.
2. Type or types of capture media: M3 - Fyrite: The Fyrite analyzer utilizes a chromium chloride-zinc chloride-hydrochloric acid solution for O2 absorption and a potassium hydroxide solution for CO2 absorption. M4: Samples are condensed in H2O and adsorbed onto Silica Gel. M5: Samples are collected on Glass Filter (filter specification sheets attached). M9 / 22: N/A
3. Sample tube type: M3 - Fyrite: borosilicate glass or stainless steel with connecting borosilicate glassware. M4: borosilicate glass or stainless steel with connecting borosilicate glassware. M5: Probe liner is borosilicate glass or stainless steel with a borosilicate glass or stainless steel nozzle.
4. Probe cleaning method and solvent to be used: M3 - Fyrite: N/A M4: N/A M5: Reagent Grade Acetone. M9 / 22: N/A

G. Laboratory Analysis:

A description of the laboratory analysis methods to be used to determine the concentration of each pollutant.
M3 - Fyrite: A Fyrite analyzer will be used for the analysis in a manner consistent with manufacturer's specifications. M4: A gas sample is extracted at a constant rate (or isokinetically in conjunction with other methods) from the source; moisture is removed from the sample stream and determined either volumetrically or gravimetrically. M5: The analysis for Particulate Matter (PM) will be a gravimetric analysis.
M9 / 22: N/A

H. Description of Operations:

- A description of any operation, process, or activity that could vent exhaust gases to the stack being tested. This shall include the description and feed rate of all materials capable of producing pollutant emissions used in each separate operation. Maximum process weight rate, or coating rate, and parameters such as line speed, VOC content etc. should be specifically documented with calculations to confirm worst case scenario emissions.

Note 1: All compliance demonstration testing shall be performed at maximum rate capacity as specified by the equipment manufacturer or at the maximum rate actually used in the emissions unit operation, whichever is greater, or at any other rate as agreed upon with Ohio EPA.

Note 2: If the emissions unit is not operated at maximum capacity, or as close as possible thereto, the emissions unit might be derated to the production capacity achieved during the test.

The only operations, processes, and/or activities that could vent exhaust gases to the test stack are those described above in this document.

I. Stack and Vent Description:

- A dimensional sketch or sketches showing the plan and elevation view of the entire ducting and stack arrangement. The sketch should include the relative position of all processes or operations venting to the stack or vent to be tested. It should also include the position of the ports relative to the nearest upstream and downstream gas flow disturbance or duct dimensional change. The sketches should include the relative position, type, and manufacturer's claimed efficiency of all gas cleaning equipment.
- A cross sectional dimensional sketch of the stack or duct at the sampling ports, showing the position of sampling points. In case of a rectangular duct, show division of duct into equal areas.
- For Fugitive emissions testing, a sketch illustrating the specific emissions points to be observed must be included.

See attachments to this ITT.

J. Safety:

Describe all possible safety hazards including such items as the presence of toxic fumes, high noise levels, areas where eye protection is required, etc.
Note: Conditions considered unsafe at the time of the test will cause postponement.
The Plant requires the use of safety glasses, safety shoes, hard hats, and hearing protection (in designated areas). At this time, and to the best of our belief and knowledge, there are no toxic fumes or other hazards expected to be on site at this facility that would cause you to formally prepare for your exposure to them. It is our recommendation however, to consult plant personnel regarding its safety policies before accessing the production areas on this site. Air Compliance Testing personnel will be required to wear safety shoes and safety glasses at all times while on site at the facility to comply with our own company policy.