PARTICULATE AND METALS EMISSIONS STUDY

Performed At The

PCC Structurals, Inc.
Large Parts Campass (LPC Steel)
LPCS Donaldson Day Baghouse #5549 HEPA Exhaust (EU5549)
LPCS Grinding Cell Baghouse #6417 HEPA Exhaust (EU6417)
LPCS Torch Burnoff Booth & Cheetah Saw Baghouse #9203 HEPA Exhaust – East (EU9203-East)
LPCS Torch Burnoff Booth & Cheetah Saw Baghouse #9203 HEPA Exhaust – West (EU9203-West)
ASC Baghouse #6532 HEPA Exhaust (EU6532)
ASC Baghouse #8901 HEPA Exhaust (EU8901)
ASC Baghouse #8901 Inlet (EU8901-Inlet)

Portland, Oregon

Test Date(s)

June 21 through 23, 2016

Report No.

TRC Environmental Corporation Report 258103A – Revision 1

Report Submittal Date

September 6, 2016

TRC Environmental Corporation
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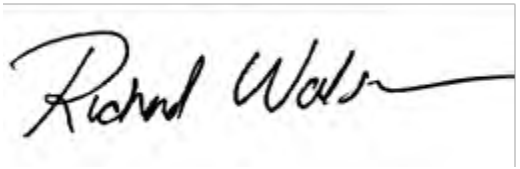
Report Certification

I certify that to the best of my knowledge:

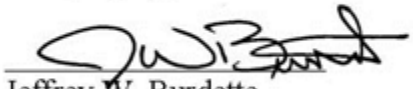
- Testing data and all corresponding information have been checked for accuracy and completeness.
- Sampling and analysis have been conducted in accordance with the approved protocol and applicable reference methods (as applicable).
- All deviations, method modifications, or sampling and analytical anomalies are summarized in the appropriate report narrative(s).



Richard Walston
Senior Group Project Manager

September 6, 2016
Date

TRC was operating in conformance with the requirements of ASTM D7036-04 during this test program.



Jeffrey W. Burdette
TRC Air Measurements Technical Director

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) performed a particulate and metals emission engineering test program on the exhaust from six (6) baghouses with HEPA after-filters which control 5 sets of sources at the PCC Structurals, Inc. (PCC) plant located in Portland, Oregon. Simultaneous testing was also performed at the inlet of one (1) baghouse so as to test control efficiency. The tests were authorized by and performed for PCC.

The purpose of this test program was to quantify emission rates of filterable particulate matter (FPM) and an array of metals from each of the identified emission units (EUs) while the associated processes operated at their maximum rates. The results of the test program will be used to determine emission factors for FPM and metals, and to determine the FPM removal efficiency of ASC Baghouse 8901.

Revisions to report number 258103A were required to accommodate a request from the Oregon Department of Environmental Quality (ODEQ) that a different approach be used to calculate and present results for metals that were present in concentrations below the analytical laboratory's detection limit. Please see Section 3.0 for additional detail.

1.1 Project Contact Information

Participants		
Test Facility	PCC Structurals, Inc. Large Parts Campus (LPC) 4600 SE Harney Drive Portland, Oregon 97206	Ms. Sherry Uchytil Division Environmental Affairs 503-777-7683 suchytil@pccstructurals.com
Regulatory Agency	Department of Environmental Quality Northwest Region 700 NE Multnomah Street, Suite 600 Portland, Oregon 97232	Mr. Greg Grunow Air Permits and Compliance 503-229-5690 grunow.greg@deq.state.or.us
Air Emissions Testing Body (AETB)	TRC Environmental Corporation 19874 141st Place NE Woodinville, Washington 98072 4120 SE International Way Suite A110 Milwaukie, OR 97222	Mr. Richard Walston, QSTI Senior Group Project Manager 425-489-1938, ext. 18178 rwalston@trcsolutions.com Ms. Judith Aasland, QSTI Project Director 425-949-9032 jaasland@trcsolutions.com

The tests were conducted by Richard Walston, Ken Allmendinger, Reid Swanson, Ed MacKinnon and Mike Worthy of TRC. Documentation of the on-site ASTM D7036-04 Qualified Individual(s) (QI) are provided in the Appendix.

1.2 Facility and Process Description

PCC Structurals manufactures steel and titanium investment castings for aerospace, land-based turbine, medical, military armament, and many other applications.

The Large Parts Campus (LPC) is composed of two business units; the steel casting plant (LPC-S) and the titanium casting plant (LPC-T). The manufacturing process starts with the creation of a wax replica of the finished product. Wax gates are attached to the replica to create the wax assembly. In the Investing department, the wax assembly is repeatedly dipped into slurry and coated with sand. Upon drying, a hard ceramic shell is formed. The wax is then melted out of the ceramic shell and the shell is cured to create a mold for casting. In the Casting department, molten metal is then poured into the shell and upon cooling, the shell is removed from the metal casting by physical and chemical processes. After the shell and metal gating are removed, the metal product then goes through finishing processes including heat treating, grinding, abrasive blasting, and welding.

During this test program, a sample was collected at each of the following emission units:

- LPCS Donaldson Day Baghouse #5549 HEPA Exhaust (EU5549)
- LPCS Grinding Cell Baghouse #6417 HEPA Exhaust (EU6417)
- LPCS Torch Burnoff Booth & Cheetah Saw Baghouse #9203 HEPA Exhaust – East (EU9203-East)
- LPCS Torch Burnoff Booth & Cheetah Saw Baghouse #9203 HEPA Exhaust – West (EU9203-West)
- ASC Baghouse #6532 HEPA Exhaust (EU6532)
- ASC Baghouse #8901 HEPA Exhaust (EU8901)
- ASC Baghouse #8901 Inlet (EU8901-Inlet)

1.3 Production Data

Included below are the production pieces processed on each test day.

Baghouse #	EU9203	EU8901	EU6532	EU5549	EU6417
Date	Tuesday 6/21/2016	Wednesday 6/22/2016	Wednesday 6/22/2016	Thursday 6/23/2016	Thursday 6/23/2016
Production	19 castings	40 ingots	78 ingots	20 castings	17 castings

2.0 SUMMARY OF RESULTS

The results of the filterable particulate test program are summarized in the table below. Detailed individual run results along with metal emission rate data are presented in Section 6.0.

Summary of FPM Test Results		
Emission Point	**FPM Concentration**	**FPM Emission Rates**
EU5549	<5.93E-05 gr/dscf	<5.72E-03 lb/hr
EU6417	<9.07E-05 gr/dscf	<1.16E-02 lb/hr
EU9203 East	<5.39E-05 gr/dscf	<5.59E-03 lb/hr
EU9203 West	<1.03E-04 gr/dscf	<1.05E-02 lb/hr
EU6532	<1.50E-04 gr/dscf	<5.36E-03 lb/hr

EU8901 – FPM and Removal Efficiency Summary		
Parameter	**Inlet**	**Outlet**
Volumetric flow rate	2, 098 dscfm	2,070 dscfm
FPM Concentration	8.46E-03 gr/dscf	<1.05E-04 gr/dscf
FPM Mass Flow Rate	1.52E-01 lb/hr	<1.86E-03 lb/hr
FPM Removal Efficiency	>98.8%	

Please see Section 3.0 for a description of the use of the "<" symbol.

The table below summarizes the test methods used, as well as the number and duration of each at each test location:

Unit ID/ Sample Location	Parameter Measured	Test Method	No. of Runs	Run Duration
EU5549, EU6417, EU9203 East, EU9203 West, EU6532 and EU8901 Stack	Volumetric Flow Rate	USEPA 2	1	480 min
	Molecular Weight[1]	USEPA 2		
	Stack Gas Moisture	USEPA 4		
	Filterable Particulate Matter (FPM)	USEPA 5/29		
	Metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ag, Tl, Zn)	USEPA 5/29		

[1] Calculated using a dry molecular weight of 29.0 since the process emits essentially air, as allowed in EPA Method 2, Section 8.6.

Unit ID/ Sample Location	Parameter Measured	Test Method	No. of Runs	Run Duration
EU8901 Inlet	Volumetric Flow Rate	USEPA 2	1	480 min
	Molecular Weight[1]	USEPA 2		
	Stack Gas Moisture	USEPA 4		
	Filterable Particulate Matter (FPM)	USEPA 5		

[1] Calculated using a dry molecular weight of 29.0 since the process emits essentially air, as allowed in EPA Method 2, Section 8.6.

3.0 DISCUSSION OF RESULTS

No problems were encountered with the testing equipment during the test program. Source operation appeared normal during the entire test program. No changes or problems were encountered that required modification of any procedures presented in the test plan. No adverse test or environmental conditions were encountered during the conduct of this test program. PM and Metals were combined into a single Method 29 sample train with front half Method 5 recovery. A check for the absence of cyclonic flow was performed on each source prior to sampling. All of the sources exhibited results that met the Method 1 requirement.

For each of the outlet samples, the Quartz filter utilized in the front-half section of the Method 5/29 train stuck to the O-ring of the frit. During the post-test recovery of each sampling train, the O ring was scraped and any filter material that was recovered was either placed on the filter or in the front-half acetone rinse. In several cases, the mass of particulate matter on the filter was less than the precision/detection limit of the Method 5 analysis, which is 0.5 milligrams. In these cases, FPM concentrations and mass flow rates were calculated using a value of 0.5 mg for the filter, and the results are presented in Section 2.0 preceded by a less than (<) symbol. This conservative approach yields results that are biased high.

As was the case with Method 5, the mass of Metals was below the Method 29 analytical detection limit in several cases. At the request of ODEQ, the following process was used to calculate and report Metals concentrations and mass flow rates:

1. If the mass of a metal in both the sample and the reagent blank was greater than the analytical detection limit, the Method 29 blank correction procedure was followed, and the result is reported with no preceding symbol.
2. If the mass of a metal in the sample was greater than the analytical detection limit, but the mass found in the reagent blank was not, the Method 29 blank correction procedure was not followed, and the result is reported with an asterisk (*) postscript.
3. If the mass of a metal found in both the sample and the reagent blank was less than the analytical detection limit, the Method 29 blank correction procedure was not followed. The concentration and mass flow rate of the metal was calculated based on the sample analytical detection limit, and the result is reported preceded by a less than (<) symbol.

Steps 2 and 3 yield results that are biased high.

Although participation in the Stationary Source Audit Program (SSAP) was not required for this engineering test program, a metals audit sample was ordered and analyzed for chromium, cobalt and nickel. Due to a miscommunication with the regulatory agency, the sample was obtained post-test from the audit sample provider, ERA. The audit sample was analyzed with the samples. The percent recoveries of the selected metals fell within the acceptable limits of the performance evaluation. A copy of the audit sample report is included in the appendix of this report.

4.0 SAMPLING AND ANALYSIS PROCEDURES

All testing, sampling, analytical, and calibration procedures used for this test program were performed in accordance with the methods presented in the following sections. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, USEPA 600/R-94/038c, September 1994 was used to supplement procedures.

4.1 Determination of Sample Point Locations by USEPA Method 1

This method is applicable to gas streams flowing in ducts, stacks, and flues and is designed to aid in the representative measurement of pollutant emissions and/or total volumetric flow rates from stationary sources. In order to qualify as an acceptable sample location, it must be located at a position at least two stack or duct equivalent diameters downstream and a half equivalent diameter upstream from any flow disturbance.

The cross-section of the measurement site was divided into a number of equal areas, and the traverse points were then located in the center of these areas. The minimum number of points were determined from Figure 1-1 (particulate) of USEPA Method 1.

4.2 Volumetric Flow Rate Determination by USEPA Method 2

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream.

The gas velocity head (ΔP) and temperature were measured at traverse points defined by USEPA Method 1. The velocity head was measured with a Type S (Stausscheibe or reverse type) pitot tube and oil-filled manometer; and the gas temperature was measured with a Type K thermocouple. The average gas velocity in the flue was calculated based on: the gas density (as determined by USEPA Methods 2 and 4); the flue gas pressure; the average of the square roots of the velocity heads at each traverse point, and the average flue gas temperature.

4.3 Molecular Weight Determination by USEPA Method 2

Section 8.6 of this method is applicable for the determination of dry molecular weight of a sample from an effluent gas stream emitting essentially air.

For processes emitting essentially air, an analysis need not be conducted and the use of a dry molecular weight of 29.0 is acceptable.

4.4 Moisture Determination by USEPA Method 4

This method is applicable for the determination of the moisture content of stack gas.

A gas sample was extracted in the Method 5/29 sampling trains at a constant rate from the source. Moisture was removed from the sample stream by a series of pre-weighed impingers immersed in an ice bath. A minimum of 21 dry standard cubic feet (dscf) of flue gas was collected during each sample run.

4.5 Filterable PM Determination by USEPA Method 5

This method is applicable for the determination of PM emissions from stationary sources. USEPA Methods 2-4 were performed concurrently with, and as an integral part of, these determinations. PM emissions were determined using a single combined Method 5/Method 29 test rain.

Flue gas was withdrawn isokinetically from the source at traverse points determined per USEPA Method 1, and PM was collected in the nozzle, probe liner, and on a glass fiber filter. The probe liner and filter were maintained at a temperature 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 for a particular application. The PM mass, which included any material that condensed at or above the filtration temperature, was determined gravimetrically after the removal of uncombined water.

4.6 Trace Metals Determination by USEPA Method 29

This method is applicable for the determination of metals emissions from stationary sources. This method may be used to determine particulate emissions in addition to the metals emissions if the prescribed procedures and precautions are followed. USEPA Methods 2-4 were performed concurrently with, and as an integral part of these

determinations. Trace metals were determined using a single combined Method 5/Method 29 test rain.

Flue gas was withdrawn isokinetically from the source at traverse points determined per USEPA Method 1 through a nozzle, probe liner, glass fiber filter and a series of impingers. The probe liner and filter were maintained at a temperature 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 for a particular application. Particle-bound metals were collected in the nozzle, probe and the filter. Gaseous metals were collected in a solution of nitric acid and hydrogen peroxide (analyzed for all metals including Hg) and a solution of acidified potassium permanganate (analyzed only for Hg). The PM was recovered from the filter, the probe and the nozzle was analyzed per Method 5.

The recovered samples were analyzed using the techniques identified in the appended analytical report.

5.0 QUALITY ASSURANCE PROCEDURES

TRC integrates our Quality Management System (QMS) into every aspect of our testing service. We follow the procedures specified in current published versions of the test Method(s) referenced in this report. Any modifications or deviations are specifically identified in the body of the report. We routinely participate in independent, third party audits of our activities, and maintain:

- Accreditation from the Louisiana Environmental Laboratory Accreditation Program (LELAP);
- Accreditation from the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA) that our operations conform with the requirements of ASTM D 7036 as an Air Emission Testing Body (AETB).

These accreditations demonstrate that our systems for training, equipment maintenance and calibration, document control and project management will fully ensure that project objectives are achieved in a timely and efficient manner with a strict commitment to quality.

All calibrations are performed in accordance with the test Method(s) identified in this report. If a Method allows for more than one calibration approach, or if approved alternatives are available, the calibration documentation in the appendices specifies

which approach was used. All measurement devices are calibrated or verified at set intervals against standards traceable to the National Institute of Standards and Technology (NIST). NIST traceability information is available upon request.

ASTM D7036-04 specifies that: *"AETBs shall have and shall apply procedures for estimating the uncertainty of measurement. Conformance with this section may be demonstrated by the use of approved test protocols for all tests. When such protocols are used, reference shall be made to published literature, when available, where estimates of uncertainty for test methods may be found."* TRC conforms with this section by using approved test protocols for all tests.

6.0 TEST RESULTS SUMMARIES

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU5549
Location:	Stack Outlet

Test Run Number	1
Source Condition	Normal
Date	6/23/2016
Start Time	9:00
End Time	17:11
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	72.6
Fractional Gas Moisture Content, B_{ws}:	0.0159
Gas Wet MW, M_s, (lb/lbmole-mole):	28.83
Average Gas Velocty, V_s, (ft/sec):	32.33
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	11,521
Q_{std} (std ft^3/min):	11,439
$Q_{std(dry)}$ (dry std ft^3/min):	11,257
Sample Volume, $V_{m(std)}$, (dry std ft^3):	262.471
PM Collected, m_n, (mg):	
Filterable:	<1.01
PM Concentration, C_s, (gr/dscf):	
Filterable	<5.93E-05
PM Emission Rate, ER_{M2}, (lb/hr):	
Filterable:	<5.72E-03
Isokinetic Variance (%):	106.4

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU5549
Location:	Stack Outlet

Run No:	1		
Date:	6/23/16		
Start Time:	9:00		
End Time:	17:11		
Run Duration (min):	480.0		
Fractional Moisture Content:	0.0159		
Sample Volume (V_{mStd}) (dry std ft^3):	262.471		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	11,439		
$Q_{std(dry)}$ (dry std ft^3/min):	11,257		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	0.05	3.06E-09	2.95E-07
Arsenic:	<0.19	<1.09E-08	<1.05E-06
Barium:	0.20	1.18E-08	1.14E-06
Beryllium:	<0.04	<2.59E-09	<2.50E-07
Cadmium:	0.05*	3.17E-09*	3.07E-07*
Chromium:	10.66	6.27E-07	6.05E-05
Cobalt:	6.78	3.99E-07	3.85E-05
Copper:	4.57	2.69E-07	2.60E-05
Mercury:	<0.04	<2.23E-09	<2.16E-07
Manganese:	0.31	1.82E-08	1.76E-06
Nickel:	31.14	1.83E-06	1.77E-04
Phosphorus:	45.39	2.67E-06	2.58E-04
Lead:	0.23	1.35E-08	1.31E-06
Antimony:	0.00	0.00E+00	0.00E+00
Selenium:	0.85	5.00E-08	4.83E-06
Thallium:	<0.13	<7.47E-09	<7.21E-07
Zinc:	15.20*	8.94E-07*	8.63E-05*
Isokinetic Variation (%):	106.4		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU6417
Location:	Stack Outlet

Test Run Number	1
Source Condition	Normal
Date	6/23/2016
Start Time	9:00
End Time	17:14
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	72.8
Fractional Gas Moisture Content, B_{ws}:	0.0163
Gas Wet MW, M_s, (lb/lbmole-mole):	28.82
Average Gas Velocty, V_s, (ft/sec):	40.94
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	15,261
Q_{std} (std ft^3/min):	15,128
$Q_{std(dry)}$ (dry std ft^3/min):	14,881
Sample Volume, $V_{m(std)}$, (dry std ft^3):	324.890
PM Collected, m_n, (mg):	
Filterable:	<1.91
PM Concentration, C_s, (gr/dscf):	
Filterable	<9.07E-05
PM Emission Rate, ER_{M2}, (lb/hr):	
Filterable:	<1.16E-02
Isokinetic Variance (%)	103.3

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU6417
Location:	Stack Outlet

Run No:	1		
Date:	6/23/16		
Start Time:	9:00		
End Time:	17:14		
Run Duration (min):	480.0		
Fractional Moisture Content:	0.0163		
Sample Volume (V_{mStd}) (dry std ft^3):	324.890		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	15,128		
$Q_{std(dry)}$ (dry std ft^3/min):	14,881		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	0.94	4.48E-08	5.71E-06
Arsenic:	<0.19	<8.79E-09	<1.12E-06
Barium:	0.90	4.27E-08	5.46E-06
Beryllium:	<0.04	<2.09E-09	<2.67E-07
Cadmium:	0.24*	1.15E-08*	1.47E-06*
Chromium:	24.46	1.16E-06	1.48E-04
Cobalt:	17.93	8.52E-07	1.09E-04
Copper:	5.23	2.48E-07	3.17E-05
Mercury:	<0.15	<7.17E-09	<9.16E-07
Manganese:	1.38	6.55E-08	8.37E-06
Nickel:	73.24	3.48E-06	4.44E-04
Phosphorus:	47.44	2.25E-06	2.88E-04
Lead:	0.21	9.97E-09	1.27E-06
Antimony:	<0.01	<3.70E-10	<4.73E-08
Selenium:	<0.63	<2.99E-08	<3.82E-06
Thallium:	<0.13	<6.03E-09	<7.70E-07
Zinc:	16.20*	7.69E-07*	9.82E-05*
Isokinetic Variation (%):	103.3		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU9203
Location:	East Stack

Test Run Number	1
Source Condition	Normal
Date	6/21/2016
Start Time	10:30
End Time	18:58
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	90.6
Fractional Gas Moisture Content, B_{ws}:	0.0120
Gas Wet MW, M_s, (lb/lbmole-mole):	28.87
Average Gas Velocty, V_s, (ft/sec):	33.68
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	12,651
Q_{std} (std ft^3/min):	12,239
$Q_{std(dry)}$ (dry std ft^3/min):	12,092
Sample Volume, $V_{m(std)}$, (dry std ft^3):	261.961
PM Collected, m_n, (mg):	
Filterable:	<0.92
PM Concentration, C_s, (gr/dscf):	
Filterable:	<5.39E-05
PM Emission Rate, ER_{M2}, (lb/hr):	
Filterable:	<5.59E-03
Isokinetic Variance (I)	104.2

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU9203
Location:	East Stack

Run No:	1		
Date:	6/21/16		
Start Time:	10:30		
End Time:	18:58		
Run Duration (min):	480.0		
Sample Volume, $V_{m(std)}$, (dry std ft^3):	261.961		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	12,239		
$Q_{std(dry)}$ (dry std ft^3/min):	12,092		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	0.52	3.08E-08	3.19E-06
Arsenic:	<0.19	<1.09E-08	<1.13E-06
Barium:	0.40	2.36E-08	2.44E-06
Beryllium:	<0.28	<1.64E-08	<1.70E-06
Cadmium:	0.04*	2.06E-09*	2.14E-07*
Chromium:	0.12	7.07E-09	7.33E-07
Cobalt:	0.05	3.00E-09	3.12E-07
Copper:	1.10	6.49E-08	6.73E-06
Mercury:	<0.04	<2.30E-09	<2.38E-07
Manganese:	0.24	1.41E-08	1.47E-06
Nickel:	0.00	0.00E+00	0.00E+00
Phosphorus:	42.54	2.51E-06	2.60E-04
Lead:	0.10	5.89E-09	6.11E-07
Antimony:	0.01	4.54E-10	4.71E-08
Selenium:	<0.63	<3.71E-08	<3.85E-06
Thallium:	<0.13	<7.36E-09	<7.64E-07
Zinc:	6.00*	3.53E-07*	3.67E-05*
Isokinetic Variation (%):	104.2		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU9203
Location:	West Stack

Test Run Number	1
Source Condition	Normal
Date	6/21/2016
Start Time	10:30
End Time	18:58
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	82.9
Fractional Gas Moisture Content, B_{ws}:	0.0116
Gas Wet MW, M_s, (lb/lbmole-mole):	29.19
Average Gas Velocty, V_s, (ft/sec):	32.68
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	12,272
Q_{std} (std ft^3/min):	12,044
$Q_{std(dry)}$ (dry std ft^3/min):	11,904
Sample Volume, $V_{m(std)}$, (dry std ft^3):	259.122
PM Collected, m_n, (mg)	
Filterable:	<1.72
PM Concentration, C_s, (gr/dscf)	
Filterable:	<1.03E-04
PM Emission Rate, ER_{M2}, (lb/hr)	
Filterable:	<1.05E-02
Isokinetic Variance (I)	103.8

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU9203
Location:	West Stack

Run No:	1		
Date:	6/21/16		
Start Time:	10:30		
End Time:	18:58		
Run Duration (min):	480.0		
Fractional Moisture Content:	0.0116		
Sample Volume, $V_{m(std)}$, (dry std ft^3):	259.122		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	12,044		
$Q_{std(dry)}$ (dry std ft^3/min):	11,904		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	2.40	1.43E-07	1.46E-05
Arsenic:	<0.19	<1.10E-08	<1.13E-06
Barium:	0.80	4.76E-08	4.87E-06
Beryllium:	<0.04	<2.62E-09	<2.68E-07
Cadmium:	0.07*	4.05E-09*	4.14E-07*
Chromium:	0.50	2.98E-08	3.04E-06
Cobalt:	0.04	2.44E-09	2.49E-07
Copper:	2.94	1.75E-07	1.79E-05
Mercury:	<0.08	<4.76E-09	<4.87E-07
Manganese:	2.37	1.41E-07	1.44E-05
Nickel:	0.70	4.17E-08	4.26E-06
Phosphorus:	43.49	2.59E-06	2.65E-04
Lead:	0.48	2.86E-08	2.92E-06
Antimony:	<0.01	<4.64E-10	<4.74E-08
Selenium:	<0.63	<3.75E-08	<3.83E-06
Thallium:	<0.13	<7.56E-09	<7.72E-07
Zinc:	14.10*	8.40E-07*	8.58E-05*
Isokinetic Variation (%):	103.8		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structurals
Plant:	Portland, OR
Unit:	EU6532
Location:	Stack Outlet

Test Run Number	1
Source Condition	Normal
Date	6/22/2016
Start Time	10:25
End Time	18:35
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	86.1
Fractional Gas Moisture Content, B_{ws}:	0.0118
Gas Wet MW, M_s, (lb/lbmole-mole):	28.87
Average Gas Velocty, V_s, (ft/sec):	52.14
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	4,368
Q_{std} (std ft^3/min):	4,224
$Q_{std(dry)}$ (dry std ft^3/min):	4,174
Sample Volume, $V_{m(std)}$, (dry std ft^3):	260.203
PM Collected, m_n, (mg)	
Filterable	<2.52
PM Concentration, C_s, (gr/dscf)	
Filterable	<1.50E-04
PM Emission Rate, ER_{M2}, (lb/hr)	
Filterable:	<5.36E-03
Isokinetic Variance (%)	102.7

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structurals
Plant:	Portland, OR
Unit:	EU6532
Location:	Stack Outlet

Run No:	1		
Date:	6/22/16		
Start Time:	10:25		
End Time:	18:35		
Run Duration (min):	480.0		
Fractional Moisture Content:	0.012		
Sample Volume, $V_{m(std)}$, (dry std ft^3):	260.203		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	4,224		
$Q_{std(dry)}$ (dry std ft^3/min):	4,174		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	0.59	3.51E-08	1.26E-06
Arsenic:	<0.19	<1.10E-08	<3.93E-07
Barium:	6.00	3.56E-07	1.27E-05
Beryllium:	<0.04	<2.61E-09	<9.34E-08
Cadmium:	0.58*	3.42E-08*	1.23E-06*
Chromium:	3.78	2.24E-07	8.03E-06
Cobalt:	6.83	4.05E-07	1.45E-05
Copper:	3.63	2.15E-07	7.71E-06
Mercury:	<0.08	<4.57E-09	<1.64E-07
Manganese:	10.32	6.12E-07	2.19E-05
Nickel:	9.54	5.66E-07	2.03E-05
Phosphorus:	49.39	2.93E-06	1.05E-04
Lead:	0.53	3.14E-08	1.13E-06
Antimony:	<0.01	<4.63E-10	<1.66E-08
Selenium:	<0.63	<3.74E-08	<1.34E-06
Thallium:	<0.13	<7.53E-09	<2.70E-07
Zinc:	33.80*	2.00E-06*	7.18E-05*
Isokinetic Variation (%):	102.7		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU8901
Location:	Stack Outlet

Test Run Number	1
Source Condition	Normal
Date	6/22/2016
Start Time	10:25
End Time	18:35
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	89.9
Fractional Gas Moisture Content, B_{ws}:	0.0111
Gas Wet MW, M_s, (lb/lbmole-mole):	28.88
Average Gas Velocty, V_s, (ft/sec):	46.25
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	2,179
Q_{std} (std ft^3/min):	2,093
$Q_{std(dry)}$ (dry std ft^3/min):	2,070
Sample Volume, $V_{m(std)}$, (dry std ft^3):	327.129
PM Collected, m_n, (mg)	
Filterable:	<2.22
PM Concentration, C_s, (gr/dscf)	
Filterable:	<1.05E-04
PM Emission Rate, ER_{M2}, (lb/hr)	
Filterable:	<1.86E-03
Isokinetic Variance (%)	107.6

English Units: Standard conditions of 29.92 in/Hg and 68º F

Method 29 Metals Test Results Summary

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU8901
Location:	Stack Outlet

Run No:	1		
Date:	6/22/16		
Start Time:	10:25		
End Time:	18:35		
Run Duration (min):	480.0		
Fractional Moisture Content:	0.011		
Sample Volume, Vm(std), (dry std ft^3):	327.129		
Measured Volumetric Flow Rate			
Q_{std} (std ft^3/min):	2,093		
$Q_{std(dry)}$ (dry std ft^3/min):	2,070		
Metal	Net Mass Collected (ug)	Concentration (gr/dscf)	Emission Rate (lb/hr)
Silver:	0.91	4.30E-08	7.64E-07
Arsenic:	<0.19	<8.73E-09	<1.55E-07
Barium:	0.50	2.36E-08	4.19E-07
Beryllium:	<0.05	<2.12E-09	<3.77E-08
Cadmium:	0.14*	6.46E-09*	1.15E-07*
Chromium:	3.62	1.71E-07	3.03E-06
Cobalt:	2.06	9.72E-08	1.73E-06
Copper:	2.20	1.04E-07	1.84E-06
Mercury:	<0.08	<3.58E-09	<6.37E-08
Manganese:	0.36	1.70E-08	3.02E-07
Nickel:	9.54	4.50E-07	7.99E-06
Phosphorus:	51.49	2.43E-06	4.31E-05
Lead:	0.19	8.96E-09	1.59E-07
Antimony:	<0.01	<3.77E-10	<6.70E-09
Selenium:	<0.65	<3.07E-08	<5.44E-07
Thallium:	<0.13	<6.08E-09	<1.08E-07
Zinc:	11.40*	5.38E-07*	9.55E-06*
Isokinetic Variation (%):	107.6		

English Units: Standard conditions of 29.92 in/Hg and 68º F

FPM TEST RESULTS SUMMARY

Company:	PCC Structural
Plant:	Portland, OR
Unit:	EU8901
Location:	Inlet Duct

Test Run Number	1
Source Condition	Normal
Date	6/22/2016
Start Time	10:22
End Time	18:31
Sample Duration (min):	480.0
Average Gas Temp, T_s, (^oF):	77.7
Fractional Gas Moisture Content, B_{ws}:	0.0124
Gas Wet MW, M_s, (lb/lbmole-mole):	28.86
Average Gas Velocty, V_s, (ft/sec):	47.32
Measured Volumetric Flow Rate	
Q (actual ft^3/min):	2,185
Q_{std} (std ft^3/min):	2,124
$Q_{std(dry)}$ (dry std ft^3/min):	2,098
Sample Volume, $V_{m(std)}$, (dry std ft^3):	234.675
PM Collected, m_n, (mg)	
Filterable:	128.66
PM Concentration, C_s, (gr/dscf)	
Filterable:	8.46E-03
PM Emission Rate, ER_{M2}, (lb/hr)	
Filterable:	1.52E-01
Isokinetic Variance (I)	96.2

English Units: Standard conditions of 29.92 in/Hg and 68º F

APPENDIX

AETB and QI Information Summary

Facility Name:	PCC Structurals, Inc.
Location:	Units 5549, 6417, 9203 East, 9203-West, 6532, 8901 Stack and 8901 Inlet
Test Dates:	June 21 through 23, 2016

Test Parameters:	Methods 1, 2, 4, 5 and 29	
QI Last Name:	Walston	Allmendinger
QI First Name:	Richard	Kenyon
QI Middle Initial:	----	----
AETB Name:	TRC Environmental Corporation	TRC Environmental Corporation
AETB Phone No:	425-489-1938	425-691-0104
AETB Email:	rwalston@trcsolutions.com	kallmendinger@trcsolutions.com
Group 1 Exam Date:	08-17-2015	10-28-2010
Provider Name:	Source Evaluation Society	Source Evaluation Society
Provider Email:	qstiprogram@gmail.com.	qstiprogram@gmail.com.
Group 4 Exam Date:	03-07-2016	----
Provider Name:	Source Evaluation Society	----
Provider Email:	qstiprogram@gmail.com.	----

This is to Certify that:

Richard Walston

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 2H, 3, 3B, 4, 5, 5A, 5B, 5D, 5E, 5F, 5i, 17, 19, 201A, and 202.

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed a comprehensive examination for the test methods designated above.

This certification is effective until: **08-17-2020**

Date of Issue: 09-08-2015

Certificate Number: 00812

Edward J MacKinnon

Air Measurements Practice Quality Manager

TRC

This certificate is the exclusive property of TRC and is non-transferable.

This is to Certify that:

Richard Walston

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 1, 2, 3, 4, 12, 19, 29, 30B, 101, 101A, 102, and ASTM D6784-02.

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed a comprehensive examination for the test methods designated above.

This certification is effective until: **03-07-2021**

Date of Issue: 03-22-2016

Certificate Number: 00958

Edward J MacKinnon

Air Measurements Practice Quality Manager

TRC

This certificate is the exclusive property of TRC and is non-transferable.

This is to Certify that:

Kenyon Allmendinger

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 2H, 3, 3B, 4, 5, 5A, 5B, 5E, 5F, 5i, 17, 19, 201A and 202.

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed an internal comprehensive examination for the test methods designated above.

This certification is effective until: **10-28-2015**

Date of Issue: 04-25-2011

Certificate Number: 00152

Edward J MacKinnon

Air Measurements Practice Quality Director

TRC

CertifyMeOnline.net

Certificate # 155919

Certificate of Completion

is awarded to

Ken Allmendinger

of TRC Environmental Corporation for successful completion of

Aerial & Scissor Lift Operator Certification

In compliance with Occupation Safety and Health Standards
29 CFR 1910, 1926 and ANSI Standards A92.2-2006 and A92.5-2006
on 06/15/2016 with 3-Year Evaluation Due: 2019 .

Signature of Operator

Hands on Evaluation Form Must Accompany this Certificate.

CERTIFIED

Signature of Evaluator

www.CertifyMeOnline.net 888-699-4800

CertifyMeOnline.net

Where 3-Year Re-Evaluations Are Always FREE!

www.CertifyMeOnline.net 888-699-4800

CERTIFIED OPERATOR: Ken Allmendinger

Completed Online Classroom Training and has been Evaluated Onsite for:

Aerial & Scissor Lift Operator Certification

3-YEAR RE-EVAL DUE: 2019

Contact CertifyMe.net for re-evaluation form.

CertifyMeOnline.net

Professional Excellence in Safety

888-699-4800

CertifyMeOnline.net

Certificate # 156842

Certificate of Completion

is awarded to

Reid Swanson

of TRC Environmental Corporation for successful completion of

Aerial & Scissor Lift Operator Certification

In compliance with Occupation Safety and Health Standards
29 CFR 1910, 1926 and ANSI Standards A92.2-2006 and A92.5-2006
on 06/14/2016 with 3-Year Evaluation Due: 2019 .

Signature of Operator

Hands on Evaluation Form Must Accompany this Certificate.

CERTIFIED

Signature of Evaluator

www.CertifyMeOnline.net 888-699-4800

CertifyMeOnline.net

Where 3-Year Re-Evaluations Are Always FREE!

www.CertifyMeOnline.net 888-699-4800

CERTIFIED OPERATOR: Reid Swanson

Completed Online Classroom Training and has been Evaluated Onsite for:

Aerial & Scissor Lift Operator Certification

3-YEAR RE-EVAL DUE: 2019

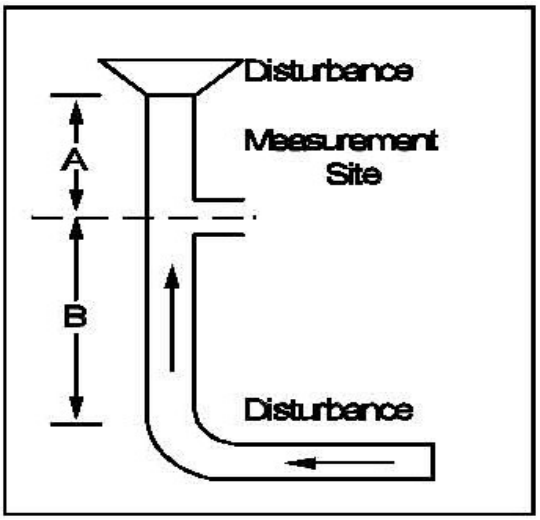
Contact CertifyMe.net for re-evaluation form.

CertifyMeOnline.net
Professional Excellence in Safety
888-699-4800

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	33 inches 2.75 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	12
Unit ID:	EU5549	Sample Plane:	Horizontal
Sample Location:	Stack Outlet	Port Type:	Nipple
		Port Length:	4.0 inches
Distance A:	4.00 Feet, 1.45 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	5.67 Feet, 2.06 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	2.1	1.0 *	5.0
2	6.7	2.2	6.2
3	11.8	3.9	7.9
4	17.7	5.8	9.8
5	25.0	8.3	12.3
6	35.6	11.7	15.7
7	64.4	21.3	25.3
8	75.0	24.8	28.8
9	82.3	27.2	31.2
10	88.2	29.1	33.1
11	93.3	30.8	34.8
12	97.9	32.0 *	36.0

* Values have been relocated per EPA M1

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

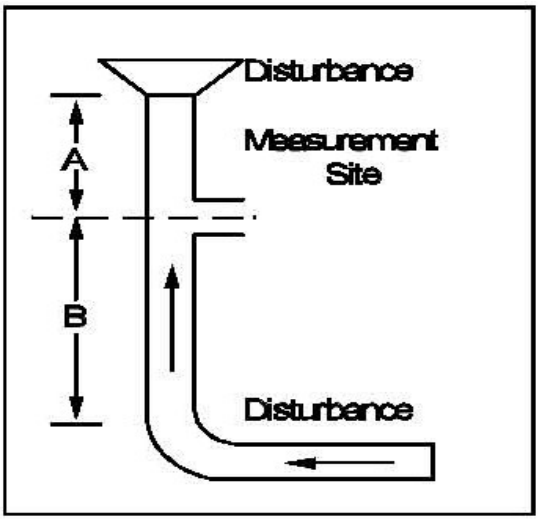
	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})
1	0.32	59	3	0.25	61	0	-	-	-	-	-	-
2	0.36	61	5	0.30	63	3	-	-	-	-	-	-
3	0.37	62	5	0.35	64	5	-	-	-	-	-	-
4	0.38	63	0	0.36	64	5	-	-	-	-	-	-
5	0.38	64	5	0.37	65	8	-	-	-	-	-	-
6	0.38	64	10	0.38	65	5	-	-	-	-	-	-
7	0.39	65	8	0.38	66	0	-	-	-	-	-	-
8	0.38	65	5	0.38	66	3	-	-	-	-	-	-
9	0.36	65	0	0.35	66	3	-	-	-	-	-	-
10	0.1	65	0	0.31	66	0	-	-	-	-	-	-
11	0.1	65	3	0.22	66	0	-	-	-	-	-	-
12	0.05	64	0	0.18	66	0	-	-	-	-	-	-

Average a: 3.2 (^{o}) Average Ts: 64.167 (^{o}F) Average ΔP: 0.3083 ("H2O)
Status: Pass Avg of sqrt ΔP: 0.5441

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	33.75 inches 2.81 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	12
Unit ID:	EU6417	Sample Plane:	Horizontal
Sample Location:	Stack Outlet	Port Type:	Nipple
		Port Length:	4.0 inches
Distance A:	4.00 Feet, 1.42 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	5.75 Feet, 2.04 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	2.1	1.0 *	5.0
2	6.7	2.3	6.3
3	11.8	4.0	8.0
4	17.7	6.0	10.0
5	25.0	8.4	12.4
6	35.6	12.0	16.0
7	64.4	21.7	25.7
8	75.0	25.3	29.3
9	82.3	27.8	31.8
10	88.2	29.8	33.8
11	93.3	31.5	35.5
12	97.9	32.8 *	36.8

* Values have been relocated per EPA M1

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})
1	0.51	65	2	0.62	67	8	-	-	-	-	-	-
2	0.55	65	6	0.64	67	10	-	-	-	-	-	-
3	0.60	66	10	0.64	67	10	-	-	-	-	-	-
4	0.63	66	11	0.65	67	11	-	-	-	-	-	-
5	0.64	66	11	0.65	67	15	-	-	-	-	-	-
6	0.64	66	9	0.65	68	15	-	-	-	-	-	-
7	0.65	67	8	0.64	68	12	-	-	-	-	-	-
8	0.63	67	10	0.63	68	11	-	-	-	-	-	-
9	0.61	67	12	0.62	68	10	-	-	-	-	-	-
10	0.56	67	11	0.61	68	9	-	-	-	-	-	-
11	0.52	67	9	0.57	68	6	-	-	-	-	-	-
12	0.49	67	4	0.53	68	4	-	-	-	-	-	-

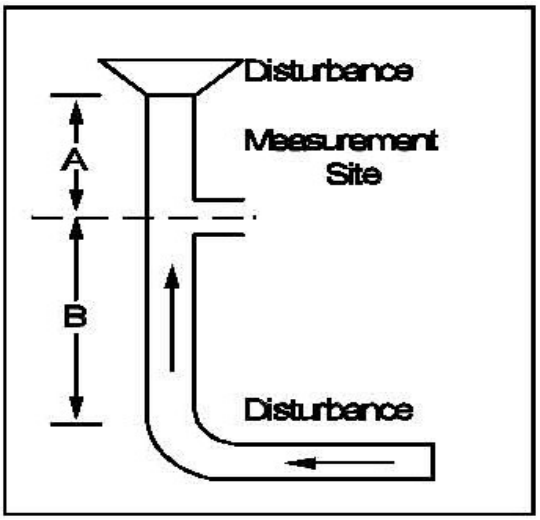
Average a: 9.3 (^{o}) Average Ts: 66.958 (^{o}F) Average ΔP: 0.6033 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.7761

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	33.875 inches 2.82 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	12
Unit ID:	EU9203	Sample Plane:	Horizontal
Sample Location:	East Stack	Port Type:	Nipple
		Port Length:	3.125 inches
Distance A:	4.29 Feet, 1.52 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	7.96 Feet, 2.82 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	2.1	1.0 *	4.1
2	6.7	2.3	5.4
3	11.8	4.0	7.1
4	17.7	6.0	9.1
5	25.0	8.5	11.6
6	35.6	12.1	15.2
7	64.4	21.8	24.9
8	75.0	25.4	28.5
9	82.3	27.9	31.0
10	88.2	29.9	33.0
11	93.3	31.6	34.7
12	97.9	32.9 *	36.0

* Values have been relocated per EPA M1

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})
1	0.24	72	3	0.28	72	3	-	-	-	-	-	-
2	0.29	72	6	0.30	72	7	-	-	-	-	-	-
3	0.32	72	0	0.34	73	5	-	-	-	-	-	-
4	0.34	72	5	0.38	73	5	-	-	-	-	-	-
5	0.40	72	5	0.42	73	6	-	-	-	-	-	-
6	0.43	73	6	0.44	73	6	-	-	-	-	-	-
7	0.44	72	5	0.45	73	6	-	-	-	-	-	-
8	0.44	72	6	0.45	73	5	-	-	-	-	-	-
9	0.43	72	5	0.44	73	4	-	-	-	-	-	-
10	0.40	72	5	0.42	73	3	-	-	-	-	-	-
11	0.37	72	5	0.38	73	5	-	-	-	-	-	-
12	0.35	72	5	0.27	73	5	-	-	-	-	-	-

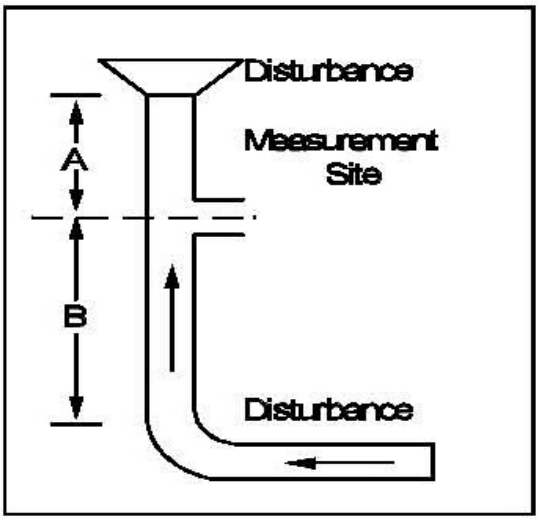
Average a: 4.8 (^{o}) Average Ts: 72.458 (^{o}F) Average ΔP: 0.3758 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.6107

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	33.875 inches 2.82 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	12
Unit ID:	EU9203	Sample Plane:	Horizontal
Sample Location:	West Stack	Port Type:	Nipple
		Port Length:	3.1 inches
Distance A:	4.29 Feet, 1.52 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	7.96 Feet, 2.82 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	2.1	1.0 *	4.1
2	6.7	2.3	5.4
3	11.8	4.0	7.1
4	17.7	6.0	9.1
5	25.0	8.5	11.6
6	35.6	12.1	15.2
7	64.4	21.8	24.9
8	75.0	25.4	28.5
9	82.3	27.9	31.0
10	88.2	29.9	33.0
11	93.3	31.6	34.7
12	97.9	32.9 *	36.0

* Values have been relocated per EPA M1

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})
1	0.25	72	5	0.27	72	5	-	-	-	-	-	-
2	0.27	72	4	0.31	72	4	-	-	-	-	-	-
3	0.30	73	5	0.34	73	5	-	-	-	-	-	-
4	0.31	73	5	0.38	73	6	-	-	-	-	-	-
5	0.38	73	5	0.40	73	6	-	-	-	-	-	-
6	0.40	73	6	0.42	73	5	-	-	-	-	-	-
7	0.42	73	7	0.38	73	5	-	-	-	-	-	-
8	0.41	73	8	0.4	73	5	-	-	-	-	-	-
9	0.4	73	8	0.4	73	5	-	-	-	-	-	-
10	0.37	73	7	0.38	73	5	-	-	-	-	-	-
11	0.34	73	6	0.34	73	6	-	-	-	-	-	-
12	0.31	73	5	0.3	73	4	-	-	-	-	-	-

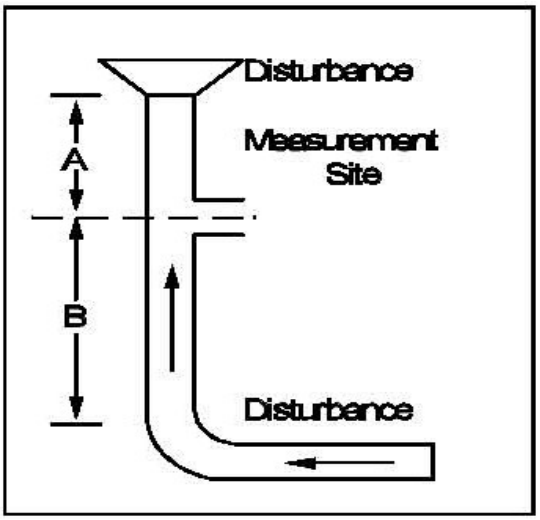
Average a: 5.5 (^{o}) Average Ts: 72.833 (^{o}F) Average ΔP: 0.3533 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.5928

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	16 inches 1.33 feet
Company:	PCC Structurals	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	6
Unit ID:	EU6532	Sample Plane:	Horizontal
Sample Location:	Stack Outlet	Port Type:	Nipple
		Port Length:	4.0 inches
Distance A:	4.00 Feet, 3.00 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	13.33 Feet, 10.00 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	4.4	0.7	4.7
2	14.6	2.3	6.3
3	29.6	4.7	8.7
4	70.4	11.3	15.3
5	85.4	13.7	17.7
6	95.6	15.3	19.3

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})
1	0.51	79	0	0.47	77	0	-	-	-	-	-	-
2	0.63	79	9	0.69	75	8	-	-	-	-	-	-
3	0.73	78	9	0.75	75	6	-	-	-	-	-	-
4	0.82	78	6	0.86	75	5	-	-	-	-	-	-
5	0.83	78	0	0.89	75	4	-	-	-	-	-	-
6	0.81	78	3	0.87	75	7	-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-

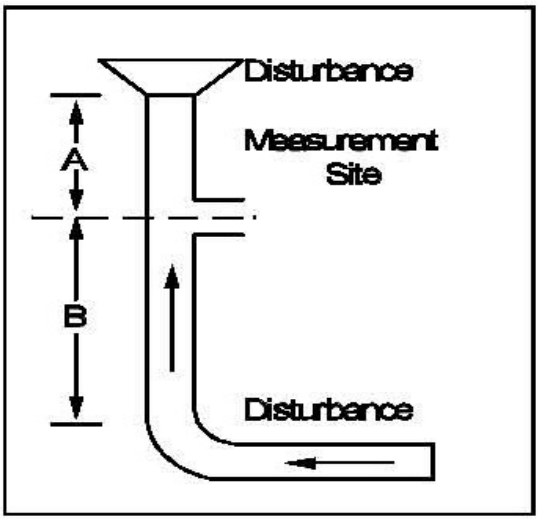
Average a: 4.8 (^{o}) Average Ts: 76.833 (^{o}F) Average ΔP: 0.7383 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.8554

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	12 inches 1.00 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	6
Unit ID:	EU8901	Sample Plane:	Horizontal
Sample Location:	Stack Outlet	Port Type:	Nipple
		Port Length:	4.0 inches
Distance A:	4.00 Feet, 4.00 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	13.33 Feet, 13.33 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	4.4	0.5	4.5
2	14.6	1.8	5.8
3	29.6	3.6	7.6
4	70.4	8.4	12.4
5	85.4	10.2	14.2
6	95.6	11.5	15.5

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})	("H2O)	(^{o}F)	(^{o})
1	0.41	69	0	0.38	72	0	-	-	-	-	-	-
2	0.52	71	15	0.50	73	12	-	-	-	-	-	-
3	0.63	71	5	0.60	73	4	-	-	-	-	-	-
4	0.80	73	1	0.65	73	1	-	-	-	-	-	-
5	0.79	73	2	0.65	73	4	-	-	-	-	-	-
6	0.73	73	8	0.60	73	8	-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-

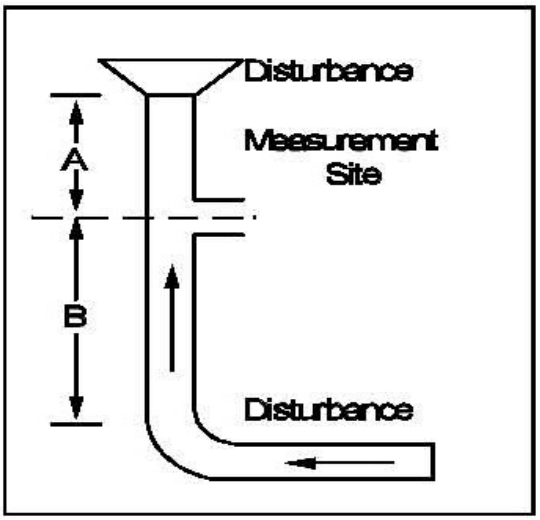
Average a: 5.0 (^{o}) Average Ts: 72.25 (^{o}F) Average ΔP: 0.605 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.7732

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #:	258103	Duct Diameter:	12 inches 1.00 feet
Company:	PCC Structural	# of Ports Used:	2
Plant:	Portland, OR	# of Points/Diameter:	4
Unit ID:	EU8901	Sample Plane:	Horizontal
Sample Location:	Inlet Duct	Port Type:	Nipple
		Port Length:	4.0 inches
Distance A:	4.17 Feet, 4.17 Duct diameters	Port Inside Diameter:	4.0 inches
Distance B:	8.33 Feet, 8.33 Duct diameters		

Meets Method 1 criteria



Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	6.7	0.8	4.8
2	25.0	3.0	7.0
3	75.0	9.0	13.0
4	93.3	11.2	15.2

Pre-cyclonic flow check conducted? Yes

Pre-Test Cyclonic Flow Check Data

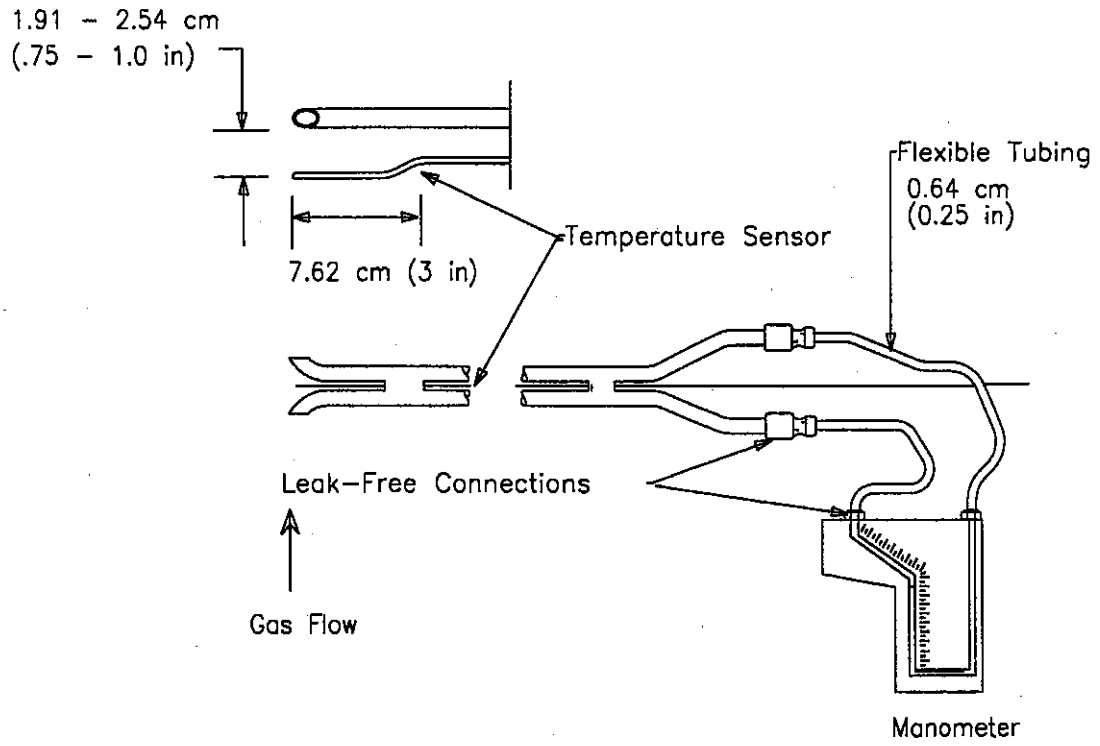
	Port: A			Port: B			Port:			Port:		
	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a	ΔP	T_s	a
Point #	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})	("H2O)	(^oF)	(^{o})
1	0.67	75	3	0.70	68	2	-	-	-	-	-	-
2	0.62	77	2	0.65	69	3	-	-	-	-	-	-
3	0.70	75	5	0.65	69	5	-	-	-	-	-	-
4	0.68	75	3	0.63	70	3	-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-
							-	-	-	-	-	-

Average a: 3.3 (^{o}) Average Ts: 72.25 (^{o}F) Average ΔP: 0.6625 ("H2O)

Status: Pass Avg of sqrt ΔP: 0.8138

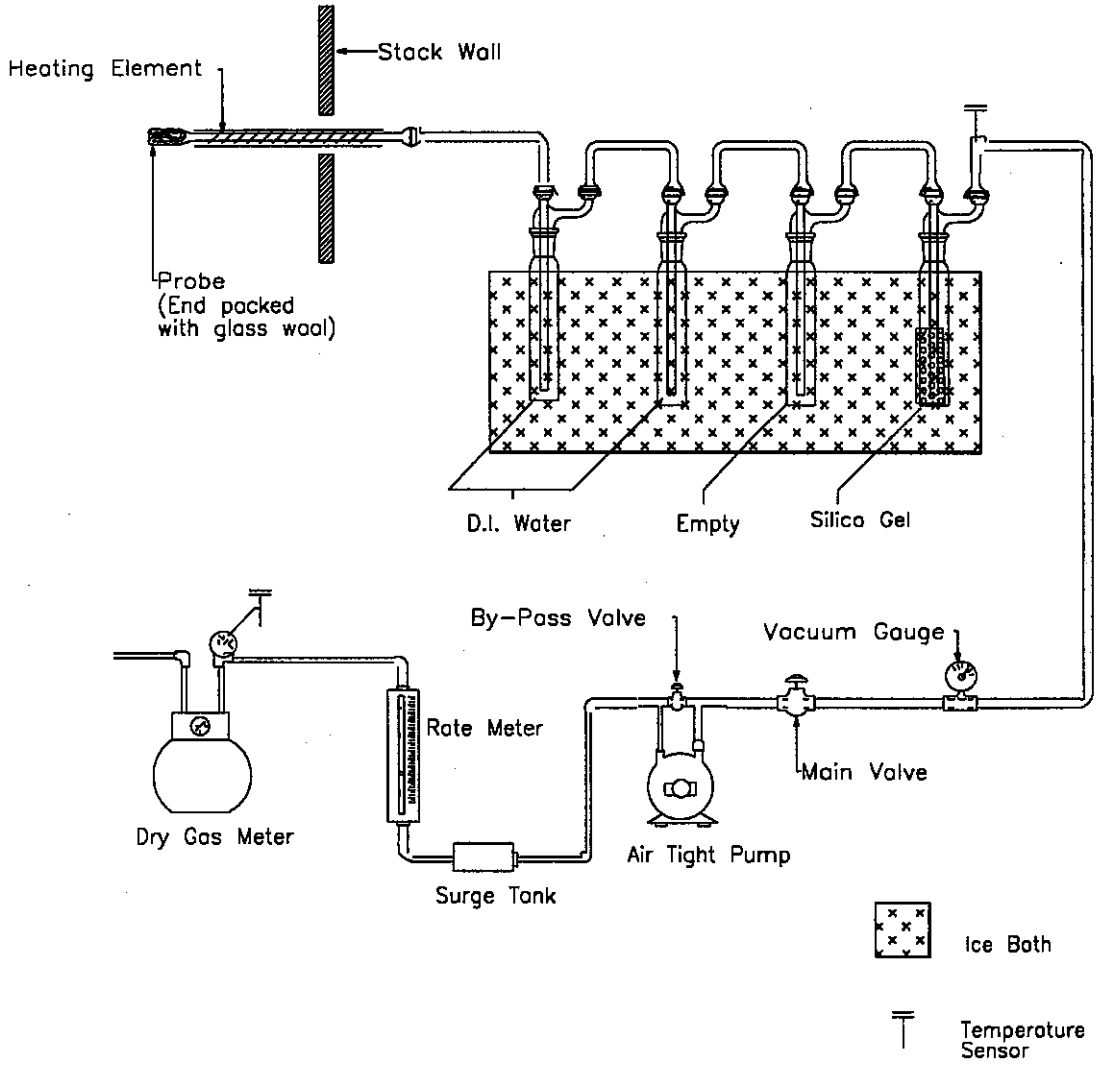
Determination of Stack Gas Velocity and Volumetric Flow Rate

USEPA Promulgated Test Method 2



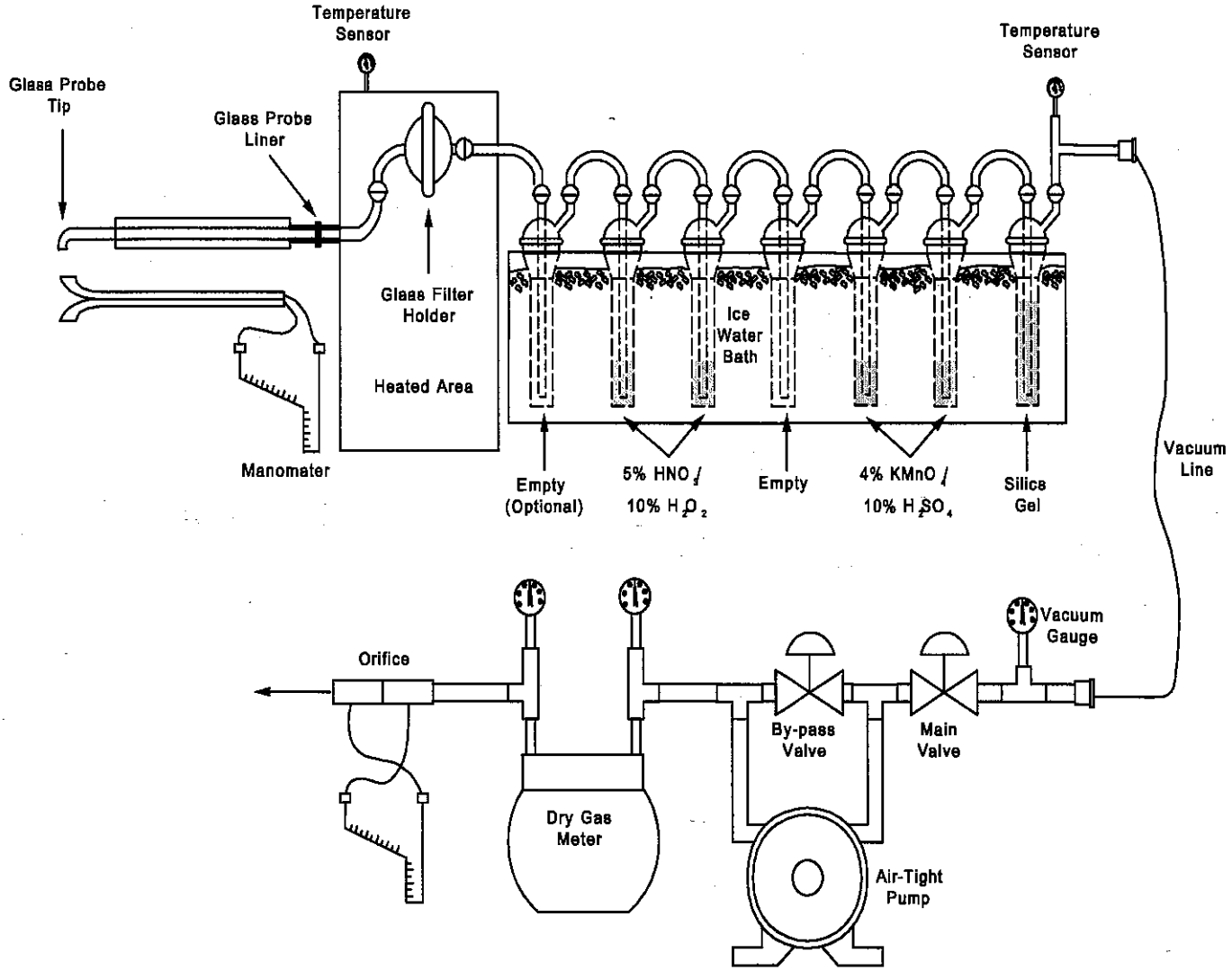
Determination of Moisture Content in Stack Gases

USEPA Promulgated Method 4



Determination of Metals Emissions From Stationary Sources

USEPA Promulgated Methods 5 and 29



Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU5549**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	6/23/2016

Filterable PM	Run 1	Run 2	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.60	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	96.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	0.60	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.09	-	-	-	
Net acetone rinse mass (milligrams):	0.51	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**1.01**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU5549**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**06/23/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (ug)	< 0.052	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	1.60	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.032	-	-	-	0.012
Cr (µg)	14.00	-	-	-	4.00
Co (µg)	7.90	-	-	-	1.20
Cµ (µg)	0.54	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	0.84	-	-	-	0.87
Ni (µg)	42.00	-	-	-	13.00
P (µg)	35.00	-	-	-	36.00
Pb (µg)	0.19	-	-	-	0.17
Sb (µg)	0.38	-	-	-	1.20
Se (µg)	0.48	-	-	-	< 0.26
Tl (µg)	< 0.052	-	-	-	< 0.052
Zn (µg)	2.30	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU5549**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**June 23, 2016**

Gross Back-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (µg)	0.025	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.85	-	-	-	1.90
Be (µg)	< 0.026	-	-	-	< 0.027
Cd (µg)	0.034	-	-	-	< 0.017
Cr (µg)	0.92	-	-	-	0.26
Co (µg)	0.15	-	-	-	0.069
Cµ (µg)	4.30	-	-	-	0.059
2B Hg (µg)	< 0.049	-	-	-	< 0.049
3A Hg (µg)	0.044	-	-	-	< 0.025
3B Hg (µg)	0.029	-	-	-	< 0.020
3C Hg (µg)	< 0.16	-	-	-	< 0.15
Mn (µg)	0.57	-	-	-	0.26
Ni (µg)	1.60	-	-	-	1.00
P (µg)	23.00	-	-	-	21.00
Pb (µg)	0.42	-	-	-	0.21
Sb (µg)	0.012	-	-	-	0.14
Se (µg)	< 0.37	-	-	-	< 0.39
Tl (µg)	< 0.075	-	-	-	< 0.078
Zn (µg)	16.00	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.00	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.03 *	-	-	-
Cd (µg)	0.03	-	-	-
Cr (µg)	0.66	-	-	-
Co (µg)	0.08	-	-	-
Cµ (µg)	4.24	-	-	-
Total Hg (front and back) (µg)	0.04 *	-	-	-
Mn (µg)	0.31	-	-	-
Ni (µg)	0.60	-	-	-
P (µg)	21.85	-	-	-
Pb (µg)	0.21	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.37 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	15.00	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU6417**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	6/23/2016

Filterable PM	Run 1	Run 0	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.40	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	96.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	1.50	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.09	-	-	-	
Net acetone rinse mass (milligrams):	1.41	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**1.91**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU6417**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**06/23/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 0	Run 3	Run 4	Reagent Blank
Ag (ug)	0.95	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	2.30	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.21	-	-	-	0.012
Cr (µg)	28.00	-	-	-	4.00
Co (µg)	19.00	-	-	-	1.20
Cµ (µg)	3.10	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	1.80	-	-	-	0.87
Ni (µg)	84.00	-	-	-	13.00
P (µg)	38.00	-	-	-	36.00
Pb (µg)	0.31	-	-	-	0.17
Sb (µg)	0.057	-	-	-	1.20
Se (µg)	< 0.26	-	-	-	< 0.26
Tl (µg)	< 0.052	-	-	-	< 0.052
Zn (µg)	7.30	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 0	Run 3	Run 4
Ag (µg)	0.94	-	-	-
As (µg)	0.08 *	-	-	-
Ba (µg)	0.90	-	-	-
Be (µg)	0.02 *	-	-	-
Cd (µg)	0.20	-	-	-
Cr (µg)	24.00	-	-	-
Co (µg)	17.80	-	-	-
Cµ (µg)	2.89	-	-	-
1B Hg (µg)	0.01 *	N/A	N/A	N/A
Mn (µg)	0.93	-	-	-
Ni (µg)	72.54	-	-	-
P (µg)	26.54	-	-	-
Pb (µg)	0.14	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.26 *	-	-	-
Tl (µg)	0.05 *	-	-	-
Zn (µg)	5.20	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU6417**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**June 23, 2016**

Gross Back-half metals

	Run 1	Run 0	Run 3	Run 4	Reagent Blank
Ag (µg)	0.014	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.90	-	-	-	1.90
Be (µg)	< 0.026	-	-	-	< 0.027
Cd (µg)	0.061	-	-	-	< 0.017
Cr (µg)	0.72	-	-	-	0.26
Co (µg)	0.20	-	-	-	0.069
Cµ (µg)	2.40	-	-	-	0.059
2B Hg (µg)	< 0.050	-	-	-	< 0.049
3A Hg (µg)	0.160	-	-	-	< 0.025
3B Hg (µg)	< 0.025	-	-	-	< 0.020
3C Hg (µg)	< 0.16	-	-	-	< 0.15
Mn (µg)	0.71	-	-	-	0.26
Ni (µg)	1.70	-	-	-	1.00
P (µg)	22.00	-	-	-	21.00
Pb (µg)	0.28	-	-	-	0.21
Sb (µg)	< 0.0078	-	-	-	0.14
Se (µg)	< 0.37	-	-	-	< 0.39
Tl (µg)	< 0.075	-	-	-	< 0.078
Zn (µg)	11.00	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

	Run 1	Run 0	Run 3	Run 4
Ag (µg)	0.00	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.03 *	-	-	-
Cd (µg)	0.04	-	-	-
Cr (µg)	0.46	-	-	-
Co (µg)	0.13	-	-	-
Cµ (µg)	2.34	-	-	-
Total Hg (front and back) (µg)	0.15	-	-	-
Mn (µg)	0.45	-	-	-
Ni (µg)	0.70	-	-	-
P (µg)	20.90	-	-	-
Pb (µg)	0.07	-	-	-
Sb (µg)	0.01 *	-	-	-
Se (µg)	0.37 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	11.00	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**East Stack**
Plant:	**Portland, OR**	Test Date(s):	6/21/2016

Filterable PM	Run 1	Run 2	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.00	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	89.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	0.50	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.08	-	-	-	
Net acetone rinse mass (milligrams):	0.42	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**0.92**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**East Stack**
Plant:	**Portland, OR**	Test Date(s):	**06/21/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (ug)	0.53	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	1.80	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.031	-	-	-	0.012
Cr (µg)	2.80	-	-	-	4.00
Co (µg)	0.58	-	-	-	1.20
Cu (µg)	0.79	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	0.66	-	-	-	0.87
Ni (µg)	9.30	-	-	-	13.00
P (µg)	35.00	-	-	-	36.00
Pb (µg)	0.18	-	-	-	0.17
Sb (µg)	0.51	-	-	-	1.20
Se (µg)	< 0.26	-	-	-	< 0.26
Tl (µg)	< 0.05	-	-	-	< 0.052
Zn (µg)	3.30	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.52	-	-	-
As (µg)	0.08 *	-	-	-
Ba (µg)	0.40	-	-	-
Be (µg)	0.02 *	-	-	-
Cd (µg)	0.02	-	-	-
Cr (µg)	0.00	-	-	-
Co (µg)	0.00	-	-	-
Cµ (µg)	0.58	-	-	-
1B Hg (µg)	N/A *	N/A	N/A	N/A
Mn (µg)	0.00	-	-	-
Ni (µg)	0.00	-	-	-
P (µg)	23.54	-	-	-
Pb (µg)	0.01	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.26 *	-	-	-
Tl (µg)	0.05 *	-	-	-
Zn (µg)	1.20	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**East Stack**
Plant:	**Portland, OR**	Test Date(s):	**June 21, 2016**

Gross Back-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (µg)	0.026	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.49	-	-	-	1.90
Be (µg)	< 0.026	-	-	-	< 0.027
Cd (µg)	0.016	-	-	-	< 0.017
Cr (µg)	0.38	-	-	-	0.26
Co (µg)	0.12	-	-	-	0.069
Cµ (µg)	0.58	-	-	-	0.059
2B Hg (µg)	< 0.048	-	-	-	< 0.049
3A Hg (µg)	0.050	-	-	-	< 0.025
3B Hg (µg)	< 0.025	-	-	-	< 0.020
3C Hg (µg)	< 0.160	-	-	-	< 0.15
Mn (µg)	0.50	-	-	-	0.26
Ni (µg)	0.93	-	-	-	1.00
P (µg)	20.00	-	-	-	21.00
Pb (µg)	0.30	-	-	-	0.21
Sb (µg)	< 0.0077	-	-	-	0.14
Se (µg)	< 0.37	-	-	-	< 0.39
Tl (µg)	< 0.075	-	-	-	< 0.078
Zn (µg)	5.80	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.00	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.26 *	-	-	-
Cd (µg)	0.02	-	-	-
Cr (µg)	0.12	-	-	-
Co (µg)	0.05	-	-	-
Cµ (µg)	0.52	-	-	-
Total Hg (front and back) (µg)	0.04	-	-	-
Mn (µg)	0.24	-	-	-
Ni (µg)	0.00	-	-	-
P (µg)	19.00	-	-	-
Pb (µg)	0.09	-	-	-
Sb (µg)	0.01 *	-	-	-
Se (µg)	0.37 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	4.80	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**West Stack**
Plant:	**Portland, OR**	Test Date(s):	6/21/2016

Filterable PM	Run 1	Run 2	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.30	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	80.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	1.30	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.08	-	-	-	
Net acetone rinse mass (milligrams):	1.22	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**1.72**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**West Stack**
Plant:	**Portland, OR**	Test Date(s):	**06/21/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (ug)	2.40	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	2.20	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.035	-	-	-	0.012
Cr (µg)	3.10	-	-	-	4.00
Co (µg)	0.53	-	-	-	1.20
Cµ (µg)	0.61	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	1.60	-	-	-	0.87
Ni (µg)	9.30	-	-	-	13.00
P (µg)	35.00	-	-	-	36.00
Pb (µg)	0.25	-	-	-	0.17
Sb (µg)	1.10	-	-	-	1.20
Se (µg)	< 0.26	-	-	-	< 0.26
Tl (µg)	< 0.052	-	-	-	< 0.052
Zn (µg)	4.20	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	2.39	-	-	-
As (µg)	0.08 *	-	-	-
Ba (µg)	0.80	-	-	-
Be (µg)	0.02 *	-	-	-
Cd (µg)	0.02	-	-	-
Cr (µg)	0.00	-	-	-
Co (µg)	0.00	-	-	-
Cµ (µg)	0.40	-	-	-
1B Hg (µg)	0.01 *	N/A	N/A	N/A
Mn (µg)	0.73	-	-	-
Ni (µg)	0.00	-	-	-
P (µg)	23.54	-	-	-
Pb (µg)	0.08	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.26 *	-	-	-
Tl (µg)	0.05 *	-	-	-
Zn (µg)	2.10	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU9203**
Company:	**PCC Structural**	Location:	**West Stack**
Plant:	**Portland, OR**	Test Date(s):	**June 21, 2016**

Gross Back-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (µg)	0.038	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.56	-	-	-	1.90
Be (µg)	< 0.026	-	-	-	< 0.027
Cd (µg)	0.045	-	-	-	< 0.017
Cr (µg)	0.76	-	-	-	0.26
Co (µg)	0.11	-	-	-	0.069
Cµ (µg)	2.60	-	-	-	0.059
2B Hg (µg)	< 0.048	-	-	-	< 0.049
3A Hg (µg)	0.091	-	-	-	< 0.025
3B Hg (µg)	< 0.025	-	-	-	< 0.020
3C Hg (µg)	< 0.16	-	-	-	< 0.15
Mn (µg)	1.90	-	-	-	0.26
Ni (µg)	1.70	-	-	-	1.00
P (µg)	21.00	-	-	-	21.00
Pb (µg)	0.61	-	-	-	0.21
Sb (µg)	< 0.0078	-	-	-	0.14
Se (µg)	< 0.37	-	-	-	< 0.39
Tl (µg)	< 0.075	-	-	-	< 0.078
Zn (µg)	13.00	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.01	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.03 *	-	-	-
Cd (µg)	0.05	-	-	-
Cr (µg)	0.50	-	-	-
Co (µg)	0.04	-	-	-
Cµ (µg)	2.54	-	-	-
Total Hg (front and back) (µg)	0.08	-	-	-
Mn (µg)	1.64	-	-	-
Ni (µg)	0.70	-	-	-
P (µg)	19.95	-	-	-
Pb (µg)	0.40	-	-	-
Sb (µg)	0.01 *	-	-	-
Se (µg)	0.37 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	12.00	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU6532**
Company:	**PCC Structurals**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	6/22/2016

Filterable PM	Run 1	Run 2	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.70	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	80.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	2.10	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.08	-	-	-	
Net acetone rinse mass (milligrams):	2.02	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**2.52**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU6532**
Company:	**PCC Structurals**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**06/22/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (ug)	0.60	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	7.40	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.55	-	-	-	0.012
Cr (µg)	7.50	-	-	-	4.00
Co (µg)	6.90	-	-	-	1.20
Cµ (µg)	1.20	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	11.00	-	-	-	0.87
Ni (µg)	21.00	-	-	-	13.00
P (µg)	39.00	-	-	-	36.00
Pb (µg)	0.58	-	-	-	0.17
Sb (µg)	0.063	-	-	-	1.20
Se (µg)	< 0.26	-	-	-	< 0.26
Tl (µg)	< 0.052	-	-	-	< 0.052
Zn (µg)	10.00	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.59	-	-	-
As (µg)	0.08 *	-	-	-
Ba (µg)	6.00	-	-	-
Be (µg)	0.02 *	-	-	-
Cd (µg)	0.54	-	-	-
Cr (µg)	3.50	-	-	-
Co (µg)	5.70	-	-	-
Cµ (µg)	0.99	-	-	-
1B Hg (µg)	0.01 *	N/A	N/A	N/A
Mn (µg)	10.13	-	-	-
Ni (µg)	9.54	-	-	-
P (µg)	27.54	-	-	-
Pb (µg)	0.41	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.26 *	-	-	-
Tl (µg)	0.05 *	-	-	-
Zn (µg)	7.90	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU6532**
Company:	**PCC Structurals**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**June 22, 2016**

Gross Back-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Ag (µg)	0.025	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.56	-	-	-	1.90
Be (µg)	< 0.026	-	-	-	< 0.027
Cd (µg)	0.039	-	-	-	< 0.017
Cr (µg)	0.54	-	-	-	0.26
Co (µg)	1.20	-	-	-	0.069
Cµ (µg)	2.70	-	-	-	0.059
2B Hg (µg)	< 0.051	-	-	-	< 0.049
3A Hg (µg)	0.085	-	-	-	< 0.025
3B Hg (µg)	< 0.025	-	-	-	< 0.020
3C Hg (µg)	< 0.16	-	-	-	< 0.15
Mn (µg)	0.45	-	-	-	0.26
Ni (µg)	0.81	-	-	-	1.00
P (µg)	23.00	-	-	-	21.00
Pb (µg)	0.33	-	-	-	0.21
Sb (µg)	< 0.0078	-	-	-	0.14
Se (µg)	< 0.37	-	-	-	< 0.39
Tl (µg)	< 0.075	-	-	-	< 0.078
Zn (µg)	27.00	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

	Run 1	Run 2	Run 3	Run 4
Ag (µg)	0.00	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.03 *	-	-	-
Cd (µg)	0.04	-	-	-
Cr (µg)	0.28	-	-	-
Co (µg)	1.13	-	-	-
Cµ (µg)	2.64	-	-	-
Total Hg (front and back) (µg)	0.08	-	-	-
Mn (µg)	0.19	-	-	-
Ni (µg)	0.00	-	-	-
P (µg)	21.85	-	-	-
Pb (µg)	0.12	-	-	-
Sb (µg)	0.01 *	-	-	-
Se (µg)	0.37 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	25.90	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU8901**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	6/22/2016

Filterable PM	Run 1	Run 0	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	-1.50	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	80.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	1.80	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.08	-	-	-	
Net acetone rinse mass (milligrams):	1.72	-	-	-	
Total Filterable PM, m_n, (milligrams)*:	**2.22**	**-**	**-**	**-**	

*** based on precision/detection limit for filter**

Method 29 Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU8901**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**06/22/16**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 0	Run 3	Run 4	Reagent Blank
Ag (ug)	0.89	-	-	-	0.0077
As (µg)	< 0.075	-	-	-	< 0.075
Ba (µg)	1.90	-	-	-	1.40
Be (µg)	< 0.018	-	-	-	< 0.018
Cd (µg)	0.13	-	-	-	0.012
Cr (µg)	7.40	-	-	-	4.00
Co (µg)	3.20	-	-	-	1.20
Cµ (µg)	1.50	-	-	-	0.21
1B Hg (µg)	< 0.0074	-	-	-	< 0.0074
Mn (µg)	1.10	-	-	-	0.87
Ni (µg)	21.00	-	-	-	13.00
P (µg)	43.00	-	-	-	36.00
Pb (µg)	0.19	-	-	-	0.17
Sb (µg)	0.023	-	-	-	1.20
Se (µg)	< 0.26	-	-	-	< 0.26
Tl (µg)	< 0.052	-	-	-	< 0.052
Zn (µg)	4.50	-	-	-	2.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 0	Run 3	Run 4
Ag (µg)	0.88	-	-	-
As (µg)	0.08 *	-	-	-
Ba (µg)	0.50	-	-	-
Be (µg)	0.02 *	-	-	-
Cd (µg)	0.12	-	-	-
Cr (µg)	3.40	-	-	-
Co (µg)	2.00	-	-	-
Cµ (µg)	1.29	-	-	-
1B Hg (µg)	0.01 *	N/A	N/A	N/A
Mn (µg)	0.23	-	-	-
Ni (µg)	9.54	-	-	-
P (µg)	31.54	-	-	-
Pb (µg)	0.02	-	-	-
Sb (µg)	0.00	-	-	-
Se (µg)	0.26 *	-	-	-
Tl (µg)	0.05 *	-	-	-
Zn (µg)	2.40	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Method 29 Sample Analysis Summary

FSR#:	**258103**	Unit ID:	**EU8901**
Company:	**PCC Structural**	Location:	**Stack Outlet**
Plant:	**Portland, OR**	Test Date(s):	**June 22, 2016**

Gross Back-half metals

	Run 1	Run 0	Run 3	Run 4	Reagent Blank
Ag (µg)	0.057	-	-	-	0.027
As (µg)	< 0.11	-	-	-	< 0.11
Ba (µg)	0.39	-	-	-	1.90
Be (µg)	< 0.027	-	-	-	< 0.027
Cd (µg)	0.019	-	-	-	< 0.017
Cr (µg)	0.48	-	-	-	0.26
Co (µg)	0.13	-	-	-	0.069
Cµ (µg)	0.97	-	-	-	0.059
2B Hg (µg)	< 0.052	-	-	-	< 0.049
3A Hg (µg)	0.093	-	-	-	< 0.025
3B Hg (µg)	< 0.025	-	-	-	< 0.020
3C Hg (µg)	< 0.15	-	-	-	< 0.15
Mn (µg)	0.39	-	-	-	0.26
Ni (µg)	0.77	-	-	-	1.00
P (µg)	21.00	-	-	-	21.00
Pb (µg)	0.38	-	-	-	0.21
Sb (µg)	< 0.0080	-	-	-	0.14
Se (µg)	< 0.39	-	-	-	< 0.39
Tl (µg)	< 0.077	-	-	-	< 0.078
Zn (µg)	10.00	-	-	-	< 1.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected back-half metals

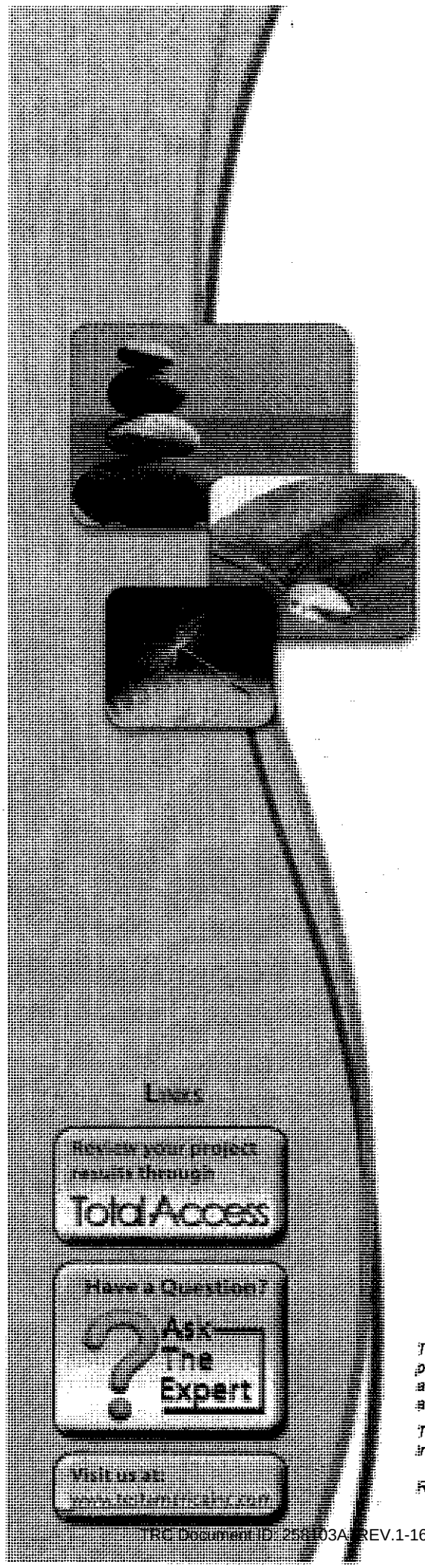
	Run 1	Run 0	Run 3	Run 4
Ag (µg)	0.03	-	-	-
As (µg)	0.11 *	-	-	-
Ba (µg)	0.00	-	-	-
Be (µg)	0.03 *	-	-	-
Cd (µg)	0.02	-	-	-
Cr (µg)	0.22	-	-	-
Co (µg)	0.06	-	-	-
Cµ (µg)	0.91	-	-	-
Total Hg (front and back) (µg)	0.08	-	-	-
Mn (µg)	0.13	-	-	-
Ni (µg)	0.00	-	-	-
P (µg)	19.95	-	-	-
Pb (µg)	0.17	-	-	-
Sb (µg)	0.01 *	-	-	-
Se (µg)	0.39 *	-	-	-
Tl (µg)	0.08 *	-	-	-
Zn (µg)	9.00	-	-	-

* If "<" preceeds a "Gross" value, subsequent calculations were conducted using the detection limit

Filterable Particulate Sample Analysis Summary

Project#:	**258103**	Unit ID:	**EU8901**
Company:	**PCC Structural**	Location:	**Inlet Duct**
Plant:	**Portland, OR**	Test Date(s):	6/22/2016

Filterable PM	Run 1	Run 1	Run 3	Run 4	Blank
Total filter weight gain (milligrams):	53.20	-	-	-	
Acetone rinse volume, V_{aw}, (ml):	145.0	-	-	-	211.0
Acetone rinse weight gain, m_a, (milligrams):	75.60	-	-	-	0.2
Applied acetone blank, W_a, (mg)	0.14	-	-	-	
Net acetone rinse mass (milligrams):	75.46	-	-	-	
Total Filterable PM, m_n, (milligrams):	**128.66**	**-**	**-**	**-**	



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ANALYTICAL REPORT

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Client Project/Site: 258103

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Authorized for release by:
7/25/2016 3:19:38 PM

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Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
*	LCS or LCSD is outside acceptance limits.
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL. The data are considered valid because the absolute difference is less than the RL.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-19913-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-19913-1

Comments
As requested, Nickel was added to the list of metals.

No additional comments.

Receipt
The samples were received on 6/29/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C.

Metals
Method(s) 29/6020: The laboratory control sample/laboratory control sample (LCS/LCSD) for preparation batch 320-117873 and analytical batch 320-118727 recovered outside acceptance limits for Silver (Ag). Since the samples are consumed during the digestion, no corrective action was possible.

Method(s) 5: There were visible pieces of filter missing from the whole filter and no visible particulates on the filters for the following samples: M29-EU9203E-FH (320-19913-1), M29-EU9203W-FH (320-19913-3), M29-EU6532-FH (320-19913-5), M29-EU8901-OUT-FH (320-19913-7), M29-EU5549-FH (320-19913-9) and M29-EU6417-FH (320-19913-11).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Client Sample ID: M29-EU9203E-FH

Lab Sample ID: 320-19913-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.51		0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	1.8		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.031	J	0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	2.8		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	0.58	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	0.79		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.18		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	0.66		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	9.3	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	35		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	0.53	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	3.3		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0005		0.0005	0.0005	g	1		5	Total/NA

Client Sample ID: M29-EU9203E-BH

Lab Sample ID: 320-19913-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.49		0.21	0.20	ug/Sample	1		29/6020	Total/NA
Cadmium	0.016	J	0.21	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.38	J	0.43	0.20	ug/Sample	1		29/6020	Total/NA
Cobalt	0.12	J B	0.21	0.012	ug/Sample	1		29/6020	Total/NA
Copper	0.58		0.43	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.30	B	0.21	0.014	ug/Sample	1		29/6020	Total/NA
Manganese	0.50		0.21	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	0.93		0.43	0.021	ug/Sample	1		29/6020	Total/NA
Phosphorus	20	J	21	11	ug/Sample	1		29/6020	Total/NA
Silver	0.026	J	0.21	0.0064	ug/Sample	1		29/6020	Total/NA
Zinc	5.8		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.050	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA

Client Sample ID: M29-EU9203W-FH

Lab Sample ID: 320-19913-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	1.1		0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	2.2		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.035	J	0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	3.1		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	0.53	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	0.61		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.25		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	1.6		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	9.3	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	35		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	2.4	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	4.2		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0013		0.0005	0.0005	g	1		5	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample ID: M29-EU9203W-BH

Lab Sample ID: 320-19913-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.56		0.22	0.20	ug/Sample	1		29/6020	Total/NA
Cadmium	0.045	J	0.22	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.76		0.43	0.20	ug/Sample	1		29/6020	Total/NA
Cobalt	0.11	J B	0.22	0.012	ug/Sample	1		29/6020	Total/NA
Copper	2.6		0.43	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.61	B	0.22	0.014	ug/Sample	1		29/6020	Total/NA
Manganese	1.9		0.22	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	1.7		0.43	0.022	ug/Sample	1		29/6020	Total/NA
Phosphorus	21	J	22	11	ug/Sample	1		29/6020	Total/NA
Silver	0.038	J	0.22	0.0065	ug/Sample	1		29/6020	Total/NA
Zinc	13		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.091	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA

Client Sample ID: M29-EU6532-FH

Lab Sample ID: 320-19913-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.063	J	0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	7.4		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.55		0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	7.5		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	6.9	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	1.2		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.58		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	11		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	21	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	39		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	0.60	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	10		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0021		0.0005	0.0005	g	1		5	Total/NA

Client Sample ID: M29-EU6532-BH

Lab Sample ID: 320-19913-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.56		0.22	0.20	ug/Sample	1		29/6020	Total/NA
Cadmium	0.039	J	0.22	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.54		0.43	0.20	ug/Sample	1		29/6020	Total/NA
Cobalt	1.2	B	0.22	0.012	ug/Sample	1		29/6020	Total/NA
Copper	2.7		0.43	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.33	B	0.22	0.014	ug/Sample	1		29/6020	Total/NA
Manganese	0.45		0.22	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	0.81		0.43	0.022	ug/Sample	1		29/6020	Total/NA
Phosphorus	23		22	11	ug/Sample	1		29/6020	Total/NA
Silver	0.025	J	0.22	0.0065	ug/Sample	1		29/6020	Total/NA
Zinc	27		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.085	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA

Client Sample ID: M29-EU8901-OUT-FH

Lab Sample ID: 320-19913-7

This Detection Summary does not include radiochemical test results.

Client Sample ID: M29-EU8901-OUT-FH (Continued)

Lab Sample ID: 320-19913-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.023	J	0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	1.9		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.13	J	0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	7.4		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	3.2	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	1.5		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.19		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	1.1		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	21	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	43		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	0.89	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	4.5		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0018		0.0005	0.0005	g	1		5	Total/NA

Client Sample ID: M29-EU8901-OUT-BH

Lab Sample ID: 320-19913-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.39		0.22	0.21	ug/Sample	1		29/6020	Total/NA
Cadmium	0.019	J	0.22	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.48		0.44	0.21	ug/Sample	1		29/6020	Total/NA
Cobalt	0.13	J B	0.22	0.013	ug/Sample	1		29/6020	Total/NA
Copper	0.97		0.44	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.38	B	0.22	0.015	ug/Sample	1		29/6020	Total/NA
Manganese	0.39		0.22	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	0.77		0.44	0.022	ug/Sample	1		29/6020	Total/NA
Phosphorus	21	J	22	11	ug/Sample	1		29/6020	Total/NA
Silver	0.057	J	0.22	0.0067	ug/Sample	1		29/6020	Total/NA
Zinc	10		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.093	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA

Client Sample ID: M29-EU5549-FH

Lab Sample ID: 320-19913-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.38		0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	1.6		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.032	J	0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	14		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	7.9	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	0.54		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.19		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	0.84		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	42	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	35		15	7.5	ug/Sample	1		29/6020	Total/NA
Selenium	0.48		0.30	0.26	ug/Sample	1		29/6020	Total/NA
Silver	0.77	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	2.3		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0006		0.0005	0.0005	g	1		5	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Client Sample ID: M29-EU5549-BH

Lab Sample ID: 320-19913-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.012	J	0.43	0.0078	ug/Sample	1		29/6020	Total/NA
Barium	0.85		0.22	0.20	ug/Sample	1		29/6020	Total/NA
Cadmium	0.034	J	0.22	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.92		0.43	0.20	ug/Sample	1		29/6020	Total/NA
Cobalt	0.15	J B	0.22	0.012	ug/Sample	1		29/6020	Total/NA
Copper	4.3		0.43	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.42	B	0.22	0.014	ug/Sample	1		29/6020	Total/NA
Manganese	0.57		0.22	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	1.6		0.43	0.022	ug/Sample	1		29/6020	Total/NA
Phosphorus	23		22	11	ug/Sample	1		29/6020	Total/NA
Silver	0.025	J	0.22	0.0065	ug/Sample	1		29/6020	Total/NA
Zinc	16		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.044	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA
Hg	0.029	J	0.10	0.025	ug/Sample	1		29/7470A	Total/NA

Client Sample ID: M29-EU6417-FH

Lab Sample ID: 320-19913-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.057	J	0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	2.3		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.21		0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	28		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	19	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	3.1		0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.31		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	1.8		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	84	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	38		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	0.95	*	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	7.3		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0015		0.0005	0.0005	g	1		5	Total/NA

Client Sample ID: M29-EU6417-BH

Lab Sample ID: 320-19913-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.90		0.22	0.20	ug/Sample	1		29/6020	Total/NA
Cadmium	0.061	J	0.22	0.016	ug/Sample	1		29/6020	Total/NA
Chromium	0.72		0.43	0.20	ug/Sample	1		29/6020	Total/NA
Cobalt	0.20	J B	0.22	0.012	ug/Sample	1		29/6020	Total/NA
Copper	2.4		0.43	0.012	ug/Sample	1		29/6020	Total/NA
Lead	0.28	B	0.22	0.014	ug/Sample	1		29/6020	Total/NA
Manganese	0.71		0.22	0.019	ug/Sample	1		29/6020	Total/NA
Nickel	1.7		0.43	0.022	ug/Sample	1		29/6020	Total/NA
Phosphorus	22		22	11	ug/Sample	1		29/6020	Total/NA
Silver	0.014	J	0.22	0.0065	ug/Sample	1		29/6020	Total/NA
Zinc	11		1.1	1.1	ug/Sample	1		29/6020	Total/NA
Hg	0.16		0.10	0.025	ug/Sample	1		29/7470A	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Client Sample ID: M29-RB-FH — Lab Sample ID: 320-19913-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	1.2		0.30	0.0054	ug/Sample	1		29/6020	Total/NA
Barium	1.4		0.15	0.14	ug/Sample	1		29/6020	Total/NA
Cadmium	0.012	J	0.15	0.011	ug/Sample	1		29/6020	Total/NA
Chromium	4.0		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	1.2	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Copper	0.21	J	0.30	0.0084	ug/Sample	1		29/6020	Total/NA
Lead	0.17		0.15	0.0099	ug/Sample	1		29/6020	Total/NA
Manganese	0.87		0.15	0.013	ug/Sample	1		29/6020	Total/NA
Nickel	13	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA
Phosphorus	36		15	7.5	ug/Sample	1		29/6020	Total/NA
Silver	0.0077	J *	0.15	0.0045	ug/Sample	1		29/6020	Total/NA
Zinc	2.1		0.75	0.75	ug/Sample	1		29/6020	Total/NA

Client Sample ID: M29-RB-BH — Lab Sample ID: 320-19913-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.14	J	0.45	0.0081	ug/Sample	1		29/6020	Total/NA
Barium	1.9		0.23	0.21	ug/Sample	1		29/6020	Total/NA
Chromium	0.26	J	0.45	0.21	ug/Sample	1		29/6020	Total/NA
Cobalt	0.069	J B	0.23	0.013	ug/Sample	1		29/6020	Total/NA
Copper	0.059	J	0.45	0.013	ug/Sample	1		29/6020	Total/NA
Lead	0.21	J B	0.23	0.015	ug/Sample	1		29/6020	Total/NA
Manganese	0.26		0.23	0.020	ug/Sample	1		29/6020	Total/NA
Nickel	1.0		0.45	0.023	ug/Sample	1		29/6020	Total/NA
Phosphorus	21	J	23	11	ug/Sample	1		29/6020	Total/NA
Silver	0.027	J	0.23	0.0068	ug/Sample	1		29/6020	Total/NA

Client Sample ID: M5-EU8901-IN-FH — Lab Sample ID: 320-19913-15

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter - Acetone	0.0756		0.0005	0.0005	g	1		5	Total/NA
Particulate Matter - Filter	0.0532		0.0005	0.0005	g	1		5	Total/NA

Client Sample ID: M5-RB-ACETONE — Lab Sample ID: 320-19913-16

No Detections.

Client Sample ID: AUDIT 1425 — Lab Sample ID: 320-19913-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	34		0.30	0.14	ug/Sample	1		29/6020	Total/NA
Cobalt	23	B	0.15	0.0086	ug/Sample	1		29/6020	Total/NA
Nickel	33	B	0.30	0.015	ug/Sample	1		29/6020	Total/NA

Client Sample ID: AUDIT 1426 — Lab Sample ID: 320-19913-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	290		1.0	0.47	ug/Sample	1		29/6020	Total/NA
Cobalt	270	B	0.50	0.029	ug/Sample	1		29/6020	Total/NA
Nickel	380		1.0	0.050	ug/Sample	1		29/6020	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample ID: M29-EU9203E-FH

Lab Sample ID: 320-19913-1

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.51		0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Barium	1.8		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Cadmium	0.031	J	0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Chromium	2.8		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Cobalt	0.58	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Copper	0.79		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Lead	0.18		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Manganese	0.66		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Nickel	9.3	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Phosphorus	35		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Silver	0.53	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 20:34	1
Zinc	3.3		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 20:34	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 11:57	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0005		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU9203E-BH

Lab Sample ID: 320-19913-2

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.43	0.0077	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Arsenic	ND		0.43	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Barium	0.49		0.21	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Beryllium	ND		0.21	0.026	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Cadmium	0.016	J	0.21	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Chromium	0.38	J	0.43	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Cobalt	0.12	J B	0.21	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Copper	0.58		0.43	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Lead	0.30	B	0.21	0.014	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Manganese	0.50		0.21	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Nickel	0.93		0.43	0.021	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Phosphorus	20	J	21	11	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Selenium	ND		0.43	0.37	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Silver	0.026	J	0.21	0.0064	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Thallium	ND		0.21	0.075	ug/Sample		07/14/16 12:30	07/19/16 22:08	1
Zinc	5.8		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:08	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.19	0.048	ug/Sample		07/13/16 19:43	07/14/16 13:07	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.050	J	0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 12:48	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:05	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.66	0.16	ug/Sample		07/13/16 19:43	07/14/16 12:11	1

Client Sample ID: M29-EU9203W-FH

Lab Sample ID: 320-19913-3

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.1		0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Barium	2.2		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Cadmium	0.035	J	0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Chromium	3.1		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Cobalt	0.53	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Copper	0.61		0.30	0.0064	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Lead	0.25		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Manganese	1.6		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Nickel	9.3	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Phosphorus	35		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Silver	2.4	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 20:44	1
Zinc	4.2		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 20:44	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 11:59	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0013		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU9203W-BH

Lab Sample ID: 320-19913-4

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.43	0.0078	ug/Sample		07/14/16 12:30	07/19/16 22:19	1

Client Sample ID: M29-EU9203W-BH

Date Collected: 06/21/16 00:00
Date Received: 06/29/16 09:30
Sample Container: Air Train

Lab Sample ID: 320-19913-4

Matrix: Air

Method: 29/6020 - Metals ICPMS (Back Half) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.43	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Barium	0.56		0.22	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Beryllium	ND		0.22	0.026	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Cadmium	0.045	J	0.22	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Chromium	0.76		0.43	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Cobalt	0.11	J B	0.22	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Copper	2.6		0.43	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Lead	0.61	B	0.22	0.014	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Manganese	1.9		0.22	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Nickel	1.7		0.43	0.022	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Phosphorus	21	J	22	11	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Selenium	ND		0.43	0.37	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Silver	0.038	J	0.22	0.0065	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Thallium	ND		0.22	0.075	ug/Sample		07/14/16 12:30	07/19/16 22:19	1
Zinc	13		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:19	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.048	ug/Sample		07/13/16 19:43	07/14/16 13:09	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.091	J	0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 12:50	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:07	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.66	0.16	ug/Sample		07/13/16 19:43	07/14/16 12:21	1

Client Sample ID: M29-EU6532-FH

Date Collected: 06/22/16 00:00
Date Received: 06/29/16 09:30
Sample Container: Air Train

Lab Sample ID: 320-19913-5

Matrix: Air

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.063	J	0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Barium	7.4		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Cadmium	0.55		0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Chromium	7.5		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Cobalt	6.9	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Copper	1.2		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Lead	0.58		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Manganese	11		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Nickel	21	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 21:02	1

Client Sample ID: M29-EU6532-FH

Lab Sample ID: 320-19913-5

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus	39		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Silver	0.60	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 21:02	1
Zinc	10		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 21:02	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 12:01	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0021		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU6532-BH

Lab Sample ID: 320-19913-6

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.43	0.0078	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Arsenic	ND		0.43	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Barium	0.56		0.22	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Beryllium	ND		0.22	0.026	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Cadmium	0.039	J	0.22	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Chromium	0.54		0.43	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Cobalt	1.2	B	0.22	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Copper	2.7		0.43	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Lead	0.33	B	0.22	0.014	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Manganese	0.45		0.22	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Nickel	0.81		0.43	0.022	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Phosphorus	23		22	11	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Selenium	ND		0.43	0.37	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Silver	0.025	J	0.22	0.0065	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Thallium	ND		0.22	0.075	ug/Sample		07/14/16 12:30	07/19/16 22:37	1
Zinc	27		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:37	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.21	0.051	ug/Sample		07/13/16 19:43	07/14/16 13:11	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.085	J	0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 12:52	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:09	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.66	0.16	ug/Sample		07/13/16 19:43	07/14/16 12:23	1

Client Sample ID: M29-EU8901-OUT-FH

Lab Sample ID: 320-19913-7

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.023	J	0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Barium	1.9		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Cadmium	0.13	J	0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Chromium	7.4		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Cobalt	3.2	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Copper	1.5		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Lead	0.19		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Manganese	1.1		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Nickel	21	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Phosphorus	43		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Silver	0.89	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 21:05	1
Zinc	4.5		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 21:05	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 12:02	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0018		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU8901-OUT-BH

Lab Sample ID: 320-19913-8

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.44	0.0080	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Arsenic	ND		0.44	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Barium	0.39		0.22	0.21	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Beryllium	ND		0.22	0.027	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Cadmium	0.019	J	0.22	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Chromium	0.48		0.44	0.21	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Cobalt	0.13	J B	0.22	0.013	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Copper	0.97		0.44	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Lead	0.38	B	0.22	0.015	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Manganese	0.39		0.22	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Nickel	0.77		0.44	0.022	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Phosphorus	21	J	22	11	ug/Sample		07/14/16 12:30	07/19/16 22:40	1

Client Sample ID: M29-EU8901-OUT-BH

Lab Sample ID: 320-19913-8

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.44	0.39	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Silver	0.057	J	0.22	0.0067	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Thallium	ND		0.22	0.077	ug/Sample		07/14/16 12:30	07/19/16 22:40	1
Zinc	10		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:40	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.21	0.052	ug/Sample		07/13/16 19:43	07/14/16 13:12	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.093	J	0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 12:53	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:11	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.62	0.15	ug/Sample		07/13/16 19:43	07/14/16 12:25	1

Client Sample ID: M29-EU5549-FH

Lab Sample ID: 320-19913-9

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.38		0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Barium	1.6		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Cadmium	0.032	J	0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Chromium	14		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Cobalt	7.9	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Copper	0.54		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Lead	0.19		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Manganese	0.84		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Nickel	42	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Phosphorus	35		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Selenium	0.48		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Silver	0.77	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 21:09	1
Zinc	2.3		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 21:09	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 12:04	1

Client Sample ID: M29-EU5549-FH

Lab Sample ID: 320-19913-9

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0006		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU5549-BH

Lab Sample ID: 320-19913-10

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.012	J	0.43	0.0078	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Arsenic	ND		0.43	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Barium	0.85		0.22	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Beryllium	ND		0.22	0.026	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Cadmium	0.034	J	0.22	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Chromium	0.92		0.43	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Cobalt	0.15	J B	0.22	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Copper	4.3		0.43	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Lead	0.42	B	0.22	0.014	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Manganese	0.57		0.22	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Nickel	1.6		0.43	0.022	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Phosphorus	23		22	11	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Selenium	ND		0.43	0.37	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Silver	0.025	J	0.22	0.0065	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Thallium	ND		0.22	0.075	ug/Sample		07/14/16 12:30	07/19/16 22:44	1
Zinc	16		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:44	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/13/16 19:43	07/14/16 13:14	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.044	J	0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 12:59	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.029	J	0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:13	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.66	0.16	ug/Sample		07/13/16 19:43	07/14/16 12:26	1

Client Sample ID: M29-EU6417-FH

Lab Sample ID: 320-19913-11

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.057	J	0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Barium	2.3		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Cadmium	0.21		0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Chromium	28		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Cobalt	19	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Copper	3.1		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Lead	0.31		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Manganese	1.8		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Nickel	84	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Phosphorus	38		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Silver	0.95	*	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 21:12	1
Zinc	7.3		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 21:12	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 12:06	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	0.0015		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	ND		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M29-EU6417-BH

Lab Sample ID: 320-19913-12

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.43	0.0078	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Arsenic	ND		0.43	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Barium	0.90		0.22	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Beryllium	ND		0.22	0.026	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Cadmium	0.061	J	0.22	0.016	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Chromium	0.72		0.43	0.20	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Cobalt	0.20	J B	0.22	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Copper	2.4		0.43	0.012	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Lead	0.28	B	0.22	0.014	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Manganese	0.71		0.22	0.019	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Nickel	1.7		0.43	0.022	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Phosphorus	22		22	11	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Selenium	ND		0.43	0.37	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Silver	0.014	J	0.22	0.0065	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Thallium	ND		0.22	0.075	ug/Sample		07/14/16 12:30	07/19/16 22:47	1
Zinc	11		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:47	1

Client Sample ID: M29-EU6417-BH

Lab Sample ID: 320-19913-12

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.050	ug/Sample		07/13/16 19:43	07/14/16 13:17	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.16		0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 13:02	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/13/16 13:40	07/13/16 19:19	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.66	0.16	ug/Sample		07/13/16 19:43	07/14/16 12:28	1

Client Sample ID: M29-RB-FH

Lab Sample ID: 320-19913-13

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.2		0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Barium	1.4		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Cadmium	0.012	J	0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Chromium	4.0		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Cobalt	1.2	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Copper	0.21	J	0.30	0.0064	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Lead	0.17		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Manganese	0.87		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Nickel	13	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Phosphorus	36		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Silver	0.0077	J *	0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 21:16	1
Zinc	2.1		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 21:16	1

Method: 29/7470A - Mercury - Front Half

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 12:12	1

Client Sample ID: M29-RB-BH

Lab Sample ID: 320-19913-14

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.14	J	0.45	0.0081	ug/Sample		07/14/16 12:30	07/19/16 22:51	1

Client Sample ID: M29-RB-BH

Lab Sample ID: 320-19913-14

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

Method: 29/6020 - Metals ICPMS (Back Half) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.45	0.11	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Barium	**1.9**		0.23	0.21	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Beryllium	ND		0.23	0.027	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Cadmium	ND		0.23	0.017	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Chromium	**0.26**	J	0.45	0.21	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Cobalt	**0.069**	J B	0.23	0.013	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Copper	**0.059**	J	0.45	0.013	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Lead	**0.21**	J B	0.23	0.015	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Manganese	**0.26**		0.23	0.020	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Nickel	**1.0**		0.45	0.023	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Phosphorus	**21**	J	23	11	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Selenium	ND		0.45	0.39	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Silver	**0.027**	J	0.23	0.0068	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Thallium	ND		0.23	0.078	ug/Sample		07/14/16 12:30	07/19/16 22:51	1
Zinc	ND		1.1	1.1	ug/Sample		07/14/16 12:30	07/19/16 22:51	1

Method: 29/7470A - Mercury - Empty

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/13/16 19:43	07/14/16 13:19	1

Method: 29/7470A - Mercury - HCl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.025	ug/Sample		07/15/16 08:55	07/15/16 13:04	1

Method: 29/7470A - Mercury - KMNO4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.080	0.020	ug/Sample		07/13/16 13:40	07/13/16 19:21	1

Method: 29/7470A - Mercury - Nitric/Peroxide

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.60	0.15	ug/Sample		07/13/16 19:43	07/14/16 12:31	1

Client Sample ID: M5-EU8901-IN-FH

Lab Sample ID: 320-19913-15

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	**0.0756**		0.0005	0.0005	g			07/11/16 08:44	1
Particulate Matter - Filter	**0.0532**		0.0005	0.0005	g			07/10/16 11:20	1

Client Sample ID: M5-RB-ACETONE

Lab Sample ID: 320-19913-16

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30
Sample Container: Air Train

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	ND		0.0005	0.0005	g			07/11/16 08:44	1

Client Sample ID: AUDIT 1425

Lab Sample ID: 320-19913-17

Date Collected: 07/08/16 00:00
Matrix: Air
Date Received: 07/11/16 09:45
Sample Container: Petri/Filter

Method: 29/6020 - Metals ICPMS (Front Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	34		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 20:13	1
Cobalt	23	B	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 20:13	1
Nickel	33	B	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 20:13	1

Client Sample ID: AUDIT 1426

Lab Sample ID: 320-19913-18

Date Collected: 07/08/16 00:00
Matrix: Air
Date Received: 07/11/16 09:45
Sample Container: Vial (PT sample)

Method: 29/6020 - Metals ICPMS (Back Half)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	290		1.0	0.47	ug/Sample		07/14/16 12:30	07/19/16 21:48	1
Cobalt	270	B	0.50	0.029	ug/Sample		07/14/16 12:30	07/19/16 21:48	1
Nickel	380		1.0	0.050	ug/Sample		07/14/16 12:30	07/19/16 21:48	1

Method: 29/6020 - Metals ICPMS (Back Half)

Lab Sample ID: MB 320-117867/1-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117867

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.30	0.0054	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Barium	ND		0.15	0.14	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Cadmium	ND		0.15	0.011	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Chromium	ND		0.30	0.14	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Cobalt	0.0450	J	0.15	0.0086	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Copper	ND		0.30	0.0084	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Lead	0.0813	J	0.15	0.0099	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Manganese	ND		0.15	0.013	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Nickel	ND		0.30	0.015	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Phosphorus	ND		15	7.5	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Silver	ND		0.15	0.0045	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 12:30	07/19/16 21:33	1
Zinc	ND		0.75	0.75	ug/Sample		07/14/16 12:30	07/19/16 21:33	1

Lab Sample ID: LCS 320-117867/2-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 117867

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	30.0	30.7		ug/Sample		102	77 - 110
Arsenic	30.0	25.6		ug/Sample		85	79 - 110
Barium	30.0	29.0		ug/Sample		97	84 - 110
Beryllium	30.0	28.7		ug/Sample		96	70 - 110
Cadmium	30.0	29.0		ug/Sample		97	79 - 110
Chromium	30.0	29.1		ug/Sample		97	84 - 110
Cobalt	30.0	29.3		ug/Sample		98	81 - 113
Copper	30.0	29.0		ug/Sample		97	83 - 110
Lead	30.0	29.7		ug/Sample		99	86 - 110
Manganese	30.0	28.0		ug/Sample		93	84 - 110
Nickel	30.0	29.2		ug/Sample		97	86 - 110
Phosphorus	150	139		ug/Sample		93	83 - 110
Selenium	30.0	25.1		ug/Sample		84	65 - 110
Silver	7.50	7.23		ug/Sample		96	82 - 110
Thallium	7.50	7.27		ug/Sample		97	90 - 111
Zinc	30.0	26.2		ug/Sample		87	75 - 110

Lab Sample ID: LCSD 320-117867/3-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117867

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	30.0	30.5		ug/Sample		102	77 - 110	1	15
Arsenic	30.0	25.1		ug/Sample		84	79 - 110	2	15
Barium	30.0	28.8		ug/Sample		96	84 - 110	1	20
Beryllium	30.0	28.1		ug/Sample		94	70 - 110	2	15

Method: 29/6020 - Metals ICPMS (Back Half) (Continued)

Lab Sample ID: LCSD 320-117867/3-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117867

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	30.0	28.8		ug/Sample		96	79 - 110	1	16
Chromium	30.0	29.7		ug/Sample		99	84 - 110	2	15
Cobalt	30.0	29.6		ug/Sample		99	81 - 113	1	17
Copper	30.0	29.2		ug/Sample		97	83 - 110	1	15
Lead	30.0	29.1		ug/Sample		97	86 - 110	2	15
Manganese	30.0	28.7		ug/Sample		96	84 - 110	3	15
Nickel	30.0	29.5		ug/Sample		98	86 - 110	1	15
Phosphorus	150	142		ug/Sample		95	83 - 110	2	20
Selenium	30.0	24.5		ug/Sample		82	65 - 110	2	15
Silver	7.50	7.23		ug/Sample		96	82 - 110	0	15
Thallium	7.50	7.28		ug/Sample		97	90 - 111	0	15
Zinc	30.0	25.2		ug/Sample		84	75 - 110	4	15

Lab Sample ID: 320-19913-2 DU
Matrix: Air
Analysis Batch: 118727

Client Sample ID: M29-EU9203E-BH
Prep Type: Total/NA
Prep Batch: 117867

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		0.00795	J	ug/Sample		NC	20
Arsenic	ND		ND		ug/Sample		NC	20
Barium	0.49		0.521		ug/Sample		5	20
Beryllium	ND		ND		ug/Sample		NC	20
Cadmium	0.016	J	0.0372	J F5	ug/Sample		79	20
Chromium	0.38	J	0.425	J	ug/Sample		11	20
Cobalt	0.12	J B	0.142	J	ug/Sample		14	20
Copper	0.58		0.615		ug/Sample		6	20
Lead	0.30	B	0.329		ug/Sample		8	20
Manganese	0.50		0.494		ug/Sample		0.9	20
Nickel	0.93		0.996		ug/Sample		6	20
Phosphorus	20	J	21.6		ug/Sample		9	20
Selenium	ND		ND		ug/Sample		NC	20
Silver	0.026	J	0.0294	J	ug/Sample		12	20
Thallium	ND		ND		ug/Sample		NC	20
Zinc	5.8		5.95		ug/Sample		2	20

Method: 29/6020 - Metals ICPMS (Front Half)

Lab Sample ID: MB 320-117873/1-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117873

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.30	0.0054	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Arsenic	ND		0.30	0.075	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Barium	ND		0.15	0.14	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Beryllium	ND		0.15	0.018	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Cadmium	ND		0.15	0.011	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Chromium	ND		0.30	0.14	ug/Sample		07/14/16 09:00	07/19/16 19:58	1

Method: 29/6020 - Metals ICPMS (Front Half) (Continued)

Lab Sample ID: MB 320-117873/1-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117873

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.0218	J	0.15	0.0086	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Copper	ND		0.30	0.0084	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Lead	ND		0.15	0.0099	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Manganese	ND		0.15	0.013	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Nickel	0.0245	J	0.30	0.015	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Phosphorus	ND		15	7.5	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Selenium	ND		0.30	0.26	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Silver	ND		0.15	0.0045	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Thallium	ND		0.15	0.052	ug/Sample		07/14/16 09:00	07/19/16 19:58	1
Zinc	ND		0.75	0.75	ug/Sample		07/14/16 09:00	07/19/16 19:58	1

Lab Sample ID: LCS 320-117873/2-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 117873

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	30.0	28.5		ug/Sample		95	77 - 110
Arsenic	30.0	28.1		ug/Sample		94	79 - 110
Barium	30.0	26.9		ug/Sample		90	84 - 110
Beryllium	30.0	29.2		ug/Sample		97	70 - 110
Cadmium	30.0	26.1		ug/Sample		87	79 - 110
Chromium	30.0	27.6		ug/Sample		92	84 - 110
Cobalt	30.0	27.3		ug/Sample		91	81 - 113
Copper	30.0	26.9		ug/Sample		90	83 - 110
Lead	30.0	27.3		ug/Sample		91	86 - 110
Manganese	30.0	27.5		ug/Sample		92	84 - 110
Nickel	30.0	27.2		ug/Sample		91	86 - 110
Phosphorus	150	145		ug/Sample		96	83 - 110
Selenium	30.0	26.1		ug/Sample		87	65 - 110
Silver	7.50	4.97	*	ug/Sample		66	82 - 110
Thallium	7.50	6.78		ug/Sample		90	90 - 111
Zinc	30.0	28.1		ug/Sample		94	75 - 110

Lab Sample ID: LCSD 320-117873/3-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117873

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	30.0	28.3		ug/Sample		94	77 - 110	1	15
Arsenic	30.0	27.8		ug/Sample		93	79 - 110	1	15
Barium	30.0	27.2		ug/Sample		91	84 - 110	1	20
Beryllium	30.0	29.3		ug/Sample		98	70 - 110	0	15
Cadmium	30.0	26.4		ug/Sample		88	79 - 110	1	16
Chromium	30.0	27.1		ug/Sample		90	84 - 110	2	15
Cobalt	30.0	26.8		ug/Sample		89	81 - 113	2	17
Copper	30.0	26.3		ug/Sample		88	83 - 110	2	15
Lead	30.0	27.5		ug/Sample		92	86 - 110	1	15
Manganese	30.0	27.1		ug/Sample		90	84 - 110	1	15
Nickel	30.0	26.8		ug/Sample		89	86 - 110	2	15

Method: 29/6020 - Metals ICPMS (Front Half) (Continued)

Lab Sample ID: LCSD 320-117873/3-A
Matrix: Air
Analysis Batch: 118727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117873

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus	150	144		ug/Sample		96	83 - 110	1	20
Selenium	30.0	26.2		ug/Sample		87	65 - 110	1	15
Silver	7.50	5.37	*	ug/Sample		72	82 - 110	8	15
Thallium	7.50	6.85		ug/Sample		91	90 - 111	1	15
Zinc	30.0	28.4		ug/Sample		95	75 - 110	1	15

Lab Sample ID: 320-19913-1 DU
Matrix: Air
Analysis Batch: 118727

Client Sample ID: M29-EU9203E-FH
Prep Type: Total/NA
Prep Batch: 117873

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	0.51		0.544		ug/Sample		6	20
Arsenic	ND		ND		ug/Sample		NC	20
Barium	1.8		1.90		ug/Sample		4	20
Beryllium	ND		ND		ug/Sample		NC	20
Cadmium	0.031	J	0.0273	J	ug/Sample		14	20
Chromium	2.8		2.97		ug/Sample		4	20
Cobalt	0.58	B	0.600		ug/Sample		3	20
Copper	0.79		0.815		ug/Sample		4	20
Lead	0.18		0.185		ug/Sample		2	20
Manganese	0.66		0.673		ug/Sample		2	20
Nickel	9.3	B	9.52		ug/Sample		2	20
Phosphorus	35		33.0		ug/Sample		7	20
Selenium	ND		ND		ug/Sample		NC	20
Silver	0.53	*	0.559	*	ug/Sample		5	20
Thallium	ND		ND		ug/Sample		NC	20
Zinc	3.3		3.37		ug/Sample		2	20

Method: 29/7470A - Mercury - HCl

Lab Sample ID: MB 320-117641/1-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 118008

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/15/16 08:55	07/15/16 11:49	1

Lab Sample ID: LCS 320-117641/2-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 118008

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	1.00	0.994		ug/Sample		99	85 - 115

Method: 29/7470A - Mercury - HCl (Continued)

Lab Sample ID: LCSD 320-117641/3-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 118008

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	1.00	1.01		ug/Sample		101	85 - 115	2	20

Method: 29/7470A - Mercury - Empty

Lab Sample ID: MB 320-117606/1-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117822

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/13/16 19:43	07/14/16 12:03	1

Lab Sample ID: LCS 320-117606/2-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 117822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	1.00	0.994		ug/Sample		99	85 - 115

Lab Sample ID: LCSD 320-117606/3-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117822

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	1.00	0.978		ug/Sample		98	85 - 115	2	20

Method: 29/7470A - Mercury - KMNO4

Lab Sample ID: MB 320-117607/1-B
Matrix: Air
Analysis Batch: 117833

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117758

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/13/16 13:40	07/13/16 18:38	1

Lab Sample ID: LCS 320-117607/2-B
Matrix: Air
Analysis Batch: 117833

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 117758

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	1.00	1.01		ug/Sample		101	85 - 115

Lab Sample ID: LCSD 320-117607/3-B
Matrix: Air
Analysis Batch: 117833

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117758

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	1.00	1.01		ug/Sample		101	85 - 115	0	20

Method: 29/7470A - Mercury - Front Half

Lab Sample ID: MB 320-117671/1-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 118005

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.030	0.0074	ug/Sample		07/15/16 08:55	07/15/16 11:25	1

Lab Sample ID: LCS 320-117671/2-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 118005

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	0.150	0.150		ug/Sample		100	85 - 115

Lab Sample ID: LCSD 320-117671/3-B
Matrix: Air
Analysis Batch: 118114

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 118005

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.150	0.153		ug/Sample		102	85 - 115	2	20

Method: 29/7470A - Mercury - Nitric/Peroxide

Lab Sample ID: MB 320-117665/1-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 117819

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.20	0.049	ug/Sample		07/13/16 19:43	07/14/16 11:57	1

Lab Sample ID: LCS 320-117665/2-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 117819

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	1.00	0.905		ug/Sample		91	85 - 115

Lab Sample ID: LCSD 320-117665/3-B
Matrix: Air
Analysis Batch: 117939

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 117819

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	1.00	1.01		ug/Sample		101	85 - 115	11	20

Lab Sample ID: 320-19913-2 MS
Matrix: Air
Analysis Batch: 117939

Client Sample ID: M29-EU9203E-BH
Prep Type: Total/NA
Prep Batch: 117819

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	ND		3.31	3.18		ug/Sample		96	85 - 115

Method: 29/7470A - Mercury - Nitric/Peroxide (Continued)

Lab Sample ID: 320-19913-2 MSD
Matrix: Air
Analysis Batch: 117939

Client Sample ID: M29-EU9203E-BH
Prep Type: Total/NA
Prep Batch: 117819

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	ND		3.31	3.26		ug/Sample		98	85 - 115	2	20

Method: 5 - Particulate - Acetone

Lab Sample ID: MB 320-117604/1
Matrix: Air
Analysis Batch: 117604

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter - Acetone	ND		0.0005	0.0005	g			07/11/16 08:44	1

Metals

Pre Prep Batch: 117606

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	
320-19913-4	M29-EU9203W-BH	Total/NA	Air	Air Train Vol.	
320-19913-6	M29-EU6532-BH	Total/NA	Air	Air Train Vol.	
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	Air Train Vol.	
320-19913-10	M29-EU5549-BH	Total/NA	Air	Air Train Vol.	
320-19913-12	M29-EU6417-BH	Total/NA	Air	Air Train Vol.	
320-19913-14	M29-RB-BH	Total/NA	Air	Air Train Vol.	
MB 320-117606/1-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 320-117606/2-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
LCSD 320-117606/3-B	Lab Control Sample Dup	Total/NA	Air	Air Train Vol.	

Pre Prep Batch: 117607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	
320-19913-4	M29-EU9203W-BH	Total/NA	Air	Air Train Vol.	
320-19913-6	M29-EU6532-BH	Total/NA	Air	Air Train Vol.	
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	Air Train Vol.	
320-19913-10	M29-EU5549-BH	Total/NA	Air	Air Train Vol.	
320-19913-12	M29-EU6417-BH	Total/NA	Air	Air Train Vol.	
320-19913-14	M29-RB-BH	Total/NA	Air	Air Train Vol.	
MB 320-117607/1-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 320-117607/2-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
LCSD 320-117607/3-B	Lab Control Sample Dup	Total/NA	Air	Air Train Vol.	

Pre Prep Batch: 117641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	
320-19913-4	M29-EU9203W-BH	Total/NA	Air	Air Train Vol.	
320-19913-6	M29-EU6532-BH	Total/NA	Air	Air Train Vol.	
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	Air Train Vol.	
320-19913-10	M29-EU5549-BH	Total/NA	Air	Air Train Vol.	
320-19913-12	M29-EU6417-BH	Total/NA	Air	Air Train Vol.	
320-19913-14	M29-RB-BH	Total/NA	Air	Air Train Vol.	
MB 320-117641/1-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 320-117641/2-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
LCSD 320-117641/3-B	Lab Control Sample Dup	Total/NA	Air	Air Train Vol.	

Pre Prep Batch: 117665

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	
320-19913-4	M29-EU9203W-BH	Total/NA	Air	Air Train Vol.	
320-19913-6	M29-EU6532-BH	Total/NA	Air	Air Train Vol.	
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	Air Train Vol.	
320-19913-10	M29-EU5549-BH	Total/NA	Air	Air Train Vol.	
320-19913-12	M29-EU6417-BH	Total/NA	Air	Air Train Vol.	
320-19913-14	M29-RB-BH	Total/NA	Air	Air Train Vol.	
MB 320-117665/1-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 320-117665/2-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
LCSD 320-117665/3-B	Lab Control Sample Dup	Total/NA	Air	Air Train Vol.	
320-19913-2 MS	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	
320-19913-2 MSD	M29-EU9203E-BH	Total/NA	Air	Air Train Vol.	

QC Association Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Pre Prep Batch: 117671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	Air Train Vol.	
320-19913-3	M29-EU9203W-FH	Total/NA	Air	Air Train Vol.	
320-19913-5	M29-EU6532-FH	Total/NA	Air	Air Train Vol.	
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	Air Train Vol.	
320-19913-9	M29-EU5549-FH	Total/NA	Air	Air Train Vol.	
320-19913-11	M29-EU6417-FH	Total/NA	Air	Air Train Vol.	
320-19913-13	M29-RB-FH	Total/NA	Air	Air Train Vol.	
MB 320-117671/1-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 320-117671/2-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
LCSD 320-117671/3-B	Lab Control Sample Dup	Total/NA	Air	Air Train Vol.	

Prep Batch: 117758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-4	M29-EU9203W-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-6	M29-EU6532-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-10	M29-EU5549-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-12	M29-EU6417-BH	Total/NA	Air	AT Prep (KMnO4)	117607
320-19913-14	M29-RB-BH	Total/NA	Air	AT Prep (KMnO4)	117607
MB 320-117607/1-B	Method Blank	Total/NA	Air	AT Prep (KMnO4)	117607
LCS 320-117607/2-B	Lab Control Sample	Total/NA	Air	AT Prep (KMnO4)	117607
LCSD 320-117607/3-B	Lab Control Sample Dup	Total/NA	Air	AT Prep (KMnO4)	117607

Prep Batch: 117819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-4	M29-EU9203W-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-6	M29-EU6532-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-10	M29-EU5549-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-12	M29-EU6417-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-14	M29-RB-BH	Total/NA	Air	AT Prep (BH)	117665
MB 320-117665/1-B	Method Blank	Total/NA	Air	AT Prep (BH)	117665
LCS 320-117665/2-B	Lab Control Sample	Total/NA	Air	AT Prep (BH)	117665
LCSD 320-117665/3-B	Lab Control Sample Dup	Total/NA	Air	AT Prep (BH)	117665
320-19913-2 MS	M29-EU9203E-BH	Total/NA	Air	AT Prep (BH)	117665
320-19913-2 MSD	M29-EU9203E-BH	Total/NA	Air	AT Prep (BH)	117665

Prep Batch: 117822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	AT Prep (Empty)	117606
320-19913-4	M29-EU9203W-BH	Total/NA	Air	AT Prep (Empty)	117606
320-19913-6	M29-EU6532-BH	Total/NA	Air	AT Prep (Empty)	117606
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	AT Prep (Empty)	117606

Metals (Continued)

Prep Batch: 117822 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-10	M29-EU5549-BH	Total/NA	Air	AT Prep (Empty)	117606
320-19913-12	M29-EU6417-BH	Total/NA	Air	AT Prep (Empty)	117606
320-19913-14	M29-RB-BH	Total/NA	Air	AT Prep (Empty)	117606
MB 320-117606/1-B	Method Blank	Total/NA	Air	AT Prep (Empty)	117606
LCS 320-117606/2-B	Lab Control Sample	Total/NA	Air	AT Prep (Empty)	117606
LCSD 320-117606/3-B	Lab Control Sample Dup	Total/NA	Air	AT Prep (Empty)	117606

Analysis Batch: 117833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	29/7470A	117758
320-19913-4	M29-EU9203W-BH	Total/NA	Air	29/7470A	117758
320-19913-6	M29-EU6532-BH	Total/NA	Air	29/7470A	117758
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	29/7470A	117758
320-19913-10	M29-EU5549-BH	Total/NA	Air	29/7470A	117758
320-19913-12	M29-EU6417-BH	Total/NA	Air	29/7470A	117758
320-19913-14	M29-RB-BH	Total/NA	Air	29/7470A	117758
MB 320-117607/1-B	Method Blank	Total/NA	Air	29/7470A	117758
LCS 320-117607/2-B	Lab Control Sample	Total/NA	Air	29/7470A	117758
LCSD 320-117607/3-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	117758

Prep Batch: 117867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	Air Train Prep	
320-19913-4	M29-EU9203W-BH	Total/NA	Air	Air Train Prep	
320-19913-6	M29-EU6532-BH	Total/NA	Air	Air Train Prep	
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	Air Train Prep	
320-19913-10	M29-EU5549-BH	Total/NA	Air	Air Train Prep	
320-19913-12	M29-EU6417-BH	Total/NA	Air	Air Train Prep	
320-19913-14	M29-RB-BH	Total/NA	Air	Air Train Prep	
320-19913-18	AUDIT 1426	Total/NA	Air	Air Train Prep	
MB 320-117867/1-A	Method Blank	Total/NA	Air	Air Train Prep	
LCS 320-117867/2-A	Lab Control Sample	Total/NA	Air	Air Train Prep	
LCSD 320-117867/3-A	Lab Control Sample Dup	Total/NA	Air	Air Train Prep	
320-19913-2 DU	M29-EU9203E-BH	Total/NA	Air	Air Train Prep	

Prep Batch: 117873

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	Air Tain Prep	
320-19913-3	M29-EU9203W-FH	Total/NA	Air	Air Tain Prep	
320-19913-5	M29-EU6532-FH	Total/NA	Air	Air Tain Prep	
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	Air Tain Prep	
320-19913-9	M29-EU5549-FH	Total/NA	Air	Air Tain Prep	
320-19913-11	M29-EU6417-FH	Total/NA	Air	Air Tain Prep	
320-19913-13	M29-RB-FH	Total/NA	Air	Air Tain Prep	
320-19913-17	AUDIT 1425	Total/NA	Air	Air Tain Prep	
MB 320-117873/1-A	Method Blank	Total/NA	Air	Air Tain Prep	
LCS 320-117873/2-A	Lab Control Sample	Total/NA	Air	Air Tain Prep	
LCSD 320-117873/3-A	Lab Control Sample Dup	Total/NA	Air	Air Tain Prep	
320-19913-1 DU	M29-EU9203E-FH	Total/NA	Air	Air Tain Prep	

Metals (Continued)

Analysis Batch: 117939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	29/7470A	117819
320-19913-2	M29-EU9203E-BH	Total/NA	Air	29/7470A	117822
320-19913-4	M29-EU9203W-BH	Total/NA	Air	29/7470A	117819
320-19913-4	M29-EU9203W-BH	Total/NA	Air	29/7470A	117822
320-19913-6	M29-EU6532-BH	Total/NA	Air	29/7470A	117819
320-19913-6	M29-EU6532-BH	Total/NA	Air	29/7470A	117822
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	29/7470A	117819
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	29/7470A	117822
320-19913-10	M29-EU5549-BH	Total/NA	Air	29/7470A	117819
320-19913-10	M29-EU5549-BH	Total/NA	Air	29/7470A	117822
320-19913-12	M29-EU6417-BH	Total/NA	Air	29/7470A	117819
320-19913-12	M29-EU6417-BH	Total/NA	Air	29/7470A	117822
320-19913-14	M29-RB-BH	Total/NA	Air	29/7470A	117819
320-19913-14	M29-RB-BH	Total/NA	Air	29/7470A	117822
MB 320-117606/1-B	Method Blank	Total/NA	Air	29/7470A	117822
MB 320-117665/1-B	Method Blank	Total/NA	Air	29/7470A	117819
LCS 320-117606/2-B	Lab Control Sample	Total/NA	Air	29/7470A	117822
LCS 320-117665/2-B	Lab Control Sample	Total/NA	Air	29/7470A	117819
LCSD 320-117606/3-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	117822
LCSD 320-117665/3-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	117819
320-19913-2 MS	M29-EU9203E-BH	Total/NA	Air	29/7470A	117819
320-19913-2 MSD	M29-EU9203E-BH	Total/NA	Air	29/7470A	117819

Prep Batch: 118005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-3	M29-EU9203W-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-5	M29-EU6532-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-9	M29-EU5549-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-11	M29-EU6417-FH	Total/NA	Air	AT Hg Prep (FH)	117671
320-19913-13	M29-RB-FH	Total/NA	Air	AT Hg Prep (FH)	117671
MB 320-117671/1-B	Method Blank	Total/NA	Air	AT Hg Prep (FH)	117671
LCS 320-117671/2-B	Lab Control Sample	Total/NA	Air	AT Hg Prep (FH)	117671
LCSD 320-117671/3-B	Lab Control Sample Dup	Total/NA	Air	AT Hg Prep (FH)	117671

Prep Batch: 118008

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-2	M29-EU9203E-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-4	M29-EU9203W-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-6	M29-EU6532-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-10	M29-EU5549-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-12	M29-EU6417-BH	Total/NA	Air	AT Prep (HCl)	117641
320-19913-14	M29-RB-BH	Total/NA	Air	AT Prep (HCl)	117641
MB 320-117641/1-B	Method Blank	Total/NA	Air	AT Prep (HCl)	117641
LCS 320-117641/2-B	Lab Control Sample	Total/NA	Air	AT Prep (HCl)	117641
LCSD 320-117641/3-B	Lab Control Sample Dup	Total/NA	Air	AT Prep (HCl)	117641

Metals (Continued)

Analysis Batch: 118114

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	29/7470A	118005
320-19913-2	M29-EU9203E-BH	Total/NA	Air	29/7470A	118008
320-19913-3	M29-EU9203W-FH	Total/NA	Air	29/7470A	118005
320-19913-4	M29-EU9203W-BH	Total/NA	Air	29/7470A	118008
320-19913-5	M29-EU6532-FH	Total/NA	Air	29/7470A	118005
320-19913-6	M29-EU6532-BH	Total/NA	Air	29/7470A	118008
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	29/7470A	118005
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	29/7470A	118008
320-19913-9	M29-EU5549-FH	Total/NA	Air	29/7470A	118005
320-19913-10	M29-EU5549-BH	Total/NA	Air	29/7470A	118008
320-19913-11	M29-EU6417-FH	Total/NA	Air	29/7470A	118005
320-19913-12	M29-EU6417-BH	Total/NA	Air	29/7470A	118008
320-19913-13	M29-RB-FH	Total/NA	Air	29/7470A	118005
320-19913-14	M29-RB-BH	Total/NA	Air	29/7470A	118008
MB 320-117641/1-B	Method Blank	Total/NA	Air	29/7470A	118008
MB 320-117671/1-B	Method Blank	Total/NA	Air	29/7470A	118005
LCS 320-117641/2-B	Lab Control Sample	Total/NA	Air	29/7470A	118008
LCS 320-117671/2-B	Lab Control Sample	Total/NA	Air	29/7470A	118005
LCSD 320-117641/3-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	118008
LCSD 320-117671/3-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	118005

Analysis Batch: 118727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	29/6020	117873
320-19913-2	M29-EU9203E-BH	Total/NA	Air	29/6020	117867
320-19913-3	M29-EU9203W-FH	Total/NA	Air	29/6020	117873
320-19913-4	M29-EU9203W-BH	Total/NA	Air	29/6020	117867
320-19913-5	M29-EU6532-FH	Total/NA	Air	29/6020	117873
320-19913-6	M29-EU6532-BH	Total/NA	Air	29/6020	117867
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	29/6020	117873
320-19913-8	M29-EU8901-OUT-BH	Total/NA	Air	29/6020	117867
320-19913-9	M29-EU5549-FH	Total/NA	Air	29/6020	117873
320-19913-10	M29-EU5549-BH	Total/NA	Air	29/6020	117867
320-19913-11	M29-EU6417-FH	Total/NA	Air	29/6020	117873
320-19913-12	M29-EU6417-BH	Total/NA	Air	29/6020	117867
320-19913-13	M29-RB-FH	Total/NA	Air	29/6020	117873
320-19913-14	M29-RB-BH	Total/NA	Air	29/6020	117867
320-19913-17	AUDIT 1425	Total/NA	Air	29/6020	117873
320-19913-18	AUDIT 1426	Total/NA	Air	29/6020	117867
MB 320-117867/1-A	Method Blank	Total/NA	Air	29/6020	117867
MB 320-117873/1-A	Method Blank	Total/NA	Air	29/6020	117873
LCS 320-117867/2-A	Lab Control Sample	Total/NA	Air	29/6020	117867
LCS 320-117873/2-A	Lab Control Sample	Total/NA	Air	29/6020	117873
LCSD 320-117867/3-A	Lab Control Sample Dup	Total/NA	Air	29/6020	117867
LCSD 320-117873/3-A	Lab Control Sample Dup	Total/NA	Air	29/6020	117873
320-19913-1 DU	M29-EU9203E-FH	Total/NA	Air	29/6020	117873
320-19913-2 DU	M29-EU9203E-BH	Total/NA	Air	29/6020	117867

General Chemistry

Analysis Batch: 117604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	5	
320-19913-3	M29-EU9203W-FH	Total/NA	Air	5	
320-19913-5	M29-EU6532-FH	Total/NA	Air	5	
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	5	
320-19913-9	M29-EU5549-FH	Total/NA	Air	5	
320-19913-11	M29-EU6417-FH	Total/NA	Air	5	
320-19913-15	M5-EU8901-IN-FH	Total/NA	Air	5	
320-19913-16	M5-RB-ACETONE	Total/NA	Air	5	
MB 320-117604/1	Method Blank	Total/NA	Air	5	

Analysis Batch: 117965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-19913-1	M29-EU9203E-FH	Total/NA	Air	5	
320-19913-3	M29-EU9203W-FH	Total/NA	Air	5	
320-19913-5	M29-EU6532-FH	Total/NA	Air	5	
320-19913-7	M29-EU8901-OUT-FH	Total/NA	Air	5	
320-19913-9	M29-EU5549-FH	Total/NA	Air	5	
320-19913-11	M29-EU6417-FH	Total/NA	Air	5	
320-19913-15	M5-EU8901-IN-FH	Total/NA	Air	5	

Client Sample ID: M29-EU9203E-FH

Date Collected: 06/21/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 20:34	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 11:57	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU9203E-BH

Date Collected: 06/21/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	214.9350649 35065 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:08	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:05	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	331 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:11	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	97 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:07	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:48	SFM	TAL SAC

Client Sample ID: M29-EU9203W-FH

Date Collected: 06/21/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 20:44	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 11:59	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU9203W-BH

Lab Sample ID: 320-19913-4

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	215.502183406113 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:19	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:07	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	329 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/18 12:21	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	98 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:09	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:50	SFM	TAL SAC

Client Sample ID: M29-EU6532-FH

Lab Sample ID: 320-19913-5

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:02	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:01	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU6532-BH

Lab Sample ID: 320-19913-6

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	215.502183406113 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:37	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:09	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	329 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:23	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	104 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC

Client Sample ID: M29-EU6532-BH

Lab Sample ID: 320-19913-6

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:11	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:52	SFM	TAL SAC

Client Sample ID: M29-EU8901-OUT-FH

Lab Sample ID: 320-19913-7

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:05	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:02	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU8901-OUT-BH

Lab Sample ID: 320-19913-8

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	222.1153846 15385 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:40	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:11	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	308 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:25	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	107 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:12	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:53	SFM	TAL SAC

Client Sample ID: M29-EU5549-FH

Date Collected: 06/23/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-9
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:09	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:04	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU5549-BH

Date Collected: 06/23/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-10
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	215.502183406113 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:44	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:13	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	329 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:26	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	99 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:14	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:59	SFM	TAL SAC

Client Sample ID: M29-EU6417-FH

Date Collected: 06/23/16 00:00
Date Received: 06/29/16 09:30

Lab Sample ID: 320-19913-11
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:12	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:06	SFM	TAL SAC
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M29-EU6417-BH

Lab Sample ID: 320-19913-12

Date Collected: 06/23/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	215.5021834 06113 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:47	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:19	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	329 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:28	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	102 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:17	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 13:02	SFM	TAL SAC

Client Sample ID: M29-RB-FH

Lab Sample ID: 320-19913-13

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:16	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	117671	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Hg Prep (FH)			30 mL	30 mL	118005	07/15/16 08:55	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			118114	07/15/16 12:12	SFM	TAL SAC

Client Sample ID: M29-RB-BH

Lab Sample ID: 320-19913-14

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	225 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 22:51	CV1	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	400 mL	117607	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (KMnO4)			30 mL	30 mL	117758	07/13/16 13:40	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117833	07/13/16 19:21	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	300 mL	117665	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (BH)			3 mL	30 mL	117819	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 12:31	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	117606	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (Empty)			3 mL	30 mL	117822	07/13/16 19:43	SFM	TAL SAC
Total/NA	Analysis	29/7470A		1			117939	07/14/16 13:19	SFM	TAL SAC
Total/NA	Pre Prep	Air Train Vol.			1 Sample	500 mL	117641	07/12/16 15:00	CV1	TAL SAC
Total/NA	Prep	AT Prep (HCl)			30 mL	30 mL	118008	07/15/16 08:55	SFM	TAL SAC

Client Sample ID: M29-RB-BH

Lab Sample ID: 320-19913-14

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	29/7470A		1			118114	07/15/16 13:04	SFM	TAL SAC

Client Sample ID: M5-EU8901-IN-FH

Lab Sample ID: 320-19913-15

Date Collected: 06/22/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			117965	07/10/16 11:20	CV1	TAL SAC
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: M5-RB-ACETONE

Lab Sample ID: 320-19913-16

Date Collected: 06/21/16 00:00
Matrix: Air
Date Received: 06/29/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			117604	07/11/16 08:44	CV1	TAL SAC

Client Sample ID: AUDIT 1425

Lab Sample ID: 320-19913-17

Date Collected: 07/08/16 00:00
Matrix: Air
Date Received: 07/11/16 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Tain Prep			1 Sample	150 mL	117873	07/14/16 09:00	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 20:13	CV1	TAL SAC

Client Sample ID: AUDIT 1426

Lab Sample ID: 320-19913-18

Date Collected: 07/08/16 00:00
Matrix: Air
Date Received: 07/11/16 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Air Train Prep			1 L	499.999999999999 mL	117867	07/14/16 12:30	CV1	TAL SAC
Total/NA	Analysis	29/6020		1			118727	07/19/16 21:48	CV1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-17
Alaska (UST)	State Program	10	UST-055	12-18-16
Arizona	State Program	9	AZ0708	08-11-16 *
Arkansas DEQ	State Program	6	88-0691	06-17-17
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-16
Connecticut	State Program	1	PH-0691	06-30-17
Florida	NELAP	4	E87570	06-30-17
Hawaii	State Program	9	N/A	01-31-17
Illinois	NELAP	5	200060	03-17-17
Kansas	NELAP	7	E-10375	07-31-16 *
Louisiana	NELAP	6	30612	06-30-17
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-17
New Jersey	NELAP	2	CA005	06-30-17
New York	NELAP	2	11666	04-01-17
Oregon	NELAP	10	4040	01-29-17
Pennsylvania	NELAP	3	68-01272	03-31-17
Texas	NELAP	6	T104704399	07-31-17
US Fish & Wildlife	Federal		LE148388-0	10-31-16
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-16
Utah	NELAP	8	CA00044	02-28-17
Virginia	NELAP	3	460278	03-14-17
Washington	State Program	10	C581	05-05-17
West Virginia (DW)	State Program	3	9930C	12-31-16
Wyoming	State Program	8	8TMS-L	01-29-17

* Certification renewal pending - certification considered valid.

Method Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Method	Method Description	Protocol	Laboratory
29/6020	Metals ICPMS (Front Half)	EPA	TAL SAC
29/6020	Metals ICPMS (Back Half)	EPA	TAL SAC
29/7470A	Mercury - Empty	EPA	TAL SAC
29/7470A	Mercury - KMNO4	EPA	TAL SAC
29/7470A	Mercury - HCl	EPA	TAL SAC
29/7470A	Mercury - Nitric/Peroxide	EPA	TAL SAC
29/7470A	Mercury - Front Half	EPA	TAL SAC
5	Particulate - Acetone	EPA	TAL SAC
5	Particulate - Filter	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: TRC Environmental Corporation
Project/Site: 258103

TestAmerica Job ID: 320-19913-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-19913-1	M29-EU9203E-FH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-2	M29-EU9203E-BH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-3	M29-EU9203W-FH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-4	M29-EU9203W-BH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-5	M29-EU6532-FH	Air	06/22/16 00:00	06/29/16 09:30
320-19913-6	M29-EU6532-BH	Air	06/22/16 00:00	06/29/16 09:30
320-19913-7	M29-EU8901-OUT-FH	Air	06/22/16 00:00	06/29/16 09:30
320-19913-8	M29-EU8901-OUT-BH	Air	06/22/16 00:00	06/29/16 09:30
320-19913-9	M29-EU5549-FH	Air	06/23/16 00:00	06/29/16 09:30
320-19913-10	M29-EU5549-BH	Air	06/23/16 00:00	06/29/16 09:30
320-19913-11	M29-EU6417-FH	Air	06/23/16 00:00	06/29/16 09:30
320-19913-12	M29-EU6417-BH	Air	06/23/16 00:00	06/29/16 09:30
320-19913-13	M29-RB-FH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-14	M29-RB-BH	Air	06/21/16 00:00	06/29/16 09:30
320-19913-15	M5-EU8901-IN-FH	Air	06/22/16 00:00	06/29/16 09:30
320-19913-16	M5-RB-ACETONE	Air	06/21/16 00:00	06/29/16 09:30
320-19913-17	AUDIT 1425	Air	07/08/16 00:00	07/11/16 09:45
320-19913-18	AUDIT 1426	Air	07/08/16 00:00	07/11/16 09:45

Login Sample Receipt Checklist

Client: TRC Environmental Corporation

Job Number: 320-19913-1

Login Number: 19913
List Number: 1
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

BDH®
VWR ANALYTICAL

Certificate of Analysis

Material Description: Acetone ACS
Material Number: BDH1101-4LG
Lot Number: 111815A
Date of Manufacture: 11/2015
Use By: 05/2017

Characteristics	Specifications		Measured Values	
Test	**Min.**	**Max.**	**Result**	**Units**
Water by Karl Fischer Titration		0.50	0.32	%
Residue after Evaporation		0.0010	0.0001	%
Assay (GC, excluding water)	99.5		99.97	%
Solubility in Water	Passes test		Passes test	
Color (APHA)		10	<10	
Titrable Acid		0.3	0.22	µeq/g
Titrable Base		0.6	0.23	µeq/g
Aldehyde (as HCHO)		0.002	<0.002	%
Isopropyl Alcohol		0.05	<0.05	%
Methanol		0.05	<0.05	%
Substances Reducing Permanganate	Passes test		Passes test	

Meets ACS Specifications for General Use
Tested to the 10th Edition of the American Chemical Society Specification for Reagent Chemicals

Quality Control Approval

VWR International LLC, Radnor Corporate Center, Building One, Suite 200, 100 Matsonford Road Radnor, PA 19087
VWR International bvba/sprl, Haasrode Research Park Zone 2020, Geldenaaksebaan 464, 3001 Leuven, Belgium
http://www.vwr.com

Alfa Aesar

Certificate of analysis

Product No.: 22934

Product: Water, ultrapure, HPLC Grade

Lot No.: L02X518

Specific conductance at 25°C	< 1.5 µS/cm
Substances reducing permanganate	Passes
Residue after evaporation	0.2 ppm
Optical absorbance at:	
190 nm	0.006 AU
200 nm	0.008 AU
250 nm	0.003 AU
300 nm	0.002 AU
400 nm	0.001 AU

This document has been electronically generated and does not require a signature.

CERTIFICATE OF ANALYSIS

HYDROGEN PEROXIDE, 30%

Integra Product #:	H768.10
Grade:	Certified Analytical Reagent (ACS)
Lot #:	TM08A3*
Release Date:	12/08/14
Integra Specification #:	H76810
Specification Revision #:	000

Analysis:

This is to certify that the above lot of material conforms to American Chemical Society (ACS) reagent chemical specifications:

Property	Specification	Analysis
Assay	29.0 – 32.0%	31.6%
Color (APHA)	10 max	0
Residue after evaporation	0.002% max	0.001%
Titrable acid	0.0006 meq/g max	0.0002 meq/g
Chloride	3 ppm max	<0.01 ppm
Nitrate	2 ppm max	0.02 ppm
Phosphate	2 ppm max	0.9 ppm
Sulfate	5 ppm max	<0.01 ppm
Ammonium	5 ppm max	3 ppm
Heavy metals (as Pb)	1 ppm max	<1 ppm
Iron	0.5 ppm max	0.005 ppm

Paul Burg
Quality Assurance

*The last (7th) digit of the lot number as it appears on product labels is for internal control purposes only and may vary within each lot.

INTEGRA Chemical Company

1216 6th Ave N
Kent, WA 98032
253.479.7000
Fax 253.479.7079
chemicals@integrachem.com
page 1 of 1

SIGNED ORIGINAL DOCUMENT ON FILE. NA = NOT APPLICABLE. NG = NO GRADE

CERTIFICATE OF ANALYSIS

HYDROCHLORIC ACID, 37%

Integra Product #:	H627.10
Grade:	Certified Analytical Reagent (ACS)
Lot #:	TL21A3*
Release Date:	11/21/14
Integra Specification #:	H62710
Specification Revision #:	002

Analysis:

This is to certify that the above lot of material conforms to American Chemical Society (ACS) reagent chemical specifications:

Property	Specification	Analysis
Assay	36.5 – 38.0%	37.0%
Color (APHA)	10 max	3
Residue after ignition	5 ppm max	2 ppm
Bromide	0.005% max	<0.005%
Sulfate	1 ppm max	<1 ppm
Sulfite	1 ppm max	<1 ppm
Extractable organic substances	To pass test (about 5 ppm max)	Passes test
Free chlorine	1 ppm max	<1 ppm
Ammonium	3 ppm max	<3 ppm
Arsenic	0.01 ppm max	<0.01 ppm
Heavy metals (as Pb)	1 ppm max	<1 ppm
Iron	0.2 ppm max	<0.2 ppm

Paul Burg
Quality Assurance

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page 1 of 1

CERTIFICATE OF ANALYSIS

NITRIC ACID

Integra Product #:	N767.10
Grade:	Certified Analytical Reagent (ACS)
Lot #:	UM09B30*
Release Date:	01/13/16
Integra Specification #:	N76710
Specification Revision #:	000

Analysis:

This is to certify that the above lot of material conforms to American Chemical Society (ACS) reagent chemical specifications:

Property	Specification	Analysis
Assay	68.0 – 70.0%	69.5%
Appearance	Colorless and free from suspended matter or sediment	Passes test
Color (APHA)	10 max	0
Residue after ignition	5 ppm max	<1 ppm
Chloride	0.5 ppm max	<0.04 ppm
Sulfate	1 ppm max	<0.025 ppm
Arsenic	0.01 ppm max	<0.0001 ppm
Heavy metals (as Pb)	0.2 ppm max	<0.002 ppm
Iron	0.2 ppm max	0.0005 ppm

Paul Burg
Quality Assurance

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RICCA CHEMICAL COMPANY®

Arlington, TX 76012
Pocomoke City, MD 21851
Batesville, IN 47006
http://www.riccachemical.com
1-888-GO-RICCA
customerservice@riccachemical.com

Product Specification

Potassium Permanganate, 5% (w/v), Mercury Free

Lot Number: SAMPLE **Product Number:** 6360

Manufacture Date: N/A
Expiration Date: N/A

Manufactured from special, Low in Mercury (0.05 ppm Hg maximum allowable), ACS Reagent Grade Potassium Permanganate ($KMnO_4$), CAS No. 7722-64-7.

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Permanganate	7722-64-7	ACS

Test	Specification	Result
Appearance	Purple liquid	N/A
Assay (by Specific Gravity)	4.92-5.08 % (w/v)	N/A

Specification	Reference
Potassium Permanganate Solution	APHA (3500-Hg C)
Potassium permanganate solution	APHA (3112 B)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (60)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (3665A)
Potassium Permanganate, Mercury-Free, 5% Solution (w/v)	EPA (SW-846) (7471A)
Potassium Permanganate, Mercury-Free, 5% solution (w/v)	EPA (SW-846) (7470A)
Potassium Permanganate, 5% solution, w/v	EPA (245.5)
Potassium Permanganate Solution (50 g/L)	ASTM (D 3223)

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
6360-2.5	10 L Cubitainer®	24 months
6360-32	1 L amber glass	24 months
6360-5	20 L Cubitainer®	24 months
6360-1	4 L amber glass	24 months
6360-16	500 mL amber glass	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)

Katie Schnur
Quality Control Manager

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

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customerservice@riccachemical.com

Certificate of Analysis

Potassium Permanganate, 5% (w/v), Mercury Free

Lot Number: 2605977 **Product Number:** 6360

Manufacture Date: MAY 09, 2016
Expiration Date: APR 2018

Manufactured from special, Low in Mercury (0.05 ppm Hg maximum allowable), ACS Reagent Grade Potassium Permanganate ($KMnO_4$), CAS No. 7722-64-7.

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Permanganate	7722-64-7	ACS

Test	Specification	Result
Appearance	Purple liquid	Passed
Assay (by Specific Gravity)	4.92-5.08 % (w/v)	5.08 % (w/v)

Specification	Reference
Potassium Permanganate Solution	APHA (3500-Hg C)
Potassium permanganate solution	APHA (3112 B)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (60)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (3665A)
Potassium Permanganate, Mercury-Free, 5% Solution (w/v)	EPA (SW-846) (7471A)
Potassium Permanganate, Mercury-Free, 5% solution (w/v)	EPA (SW-846) (7470A)
Potassium Permanganate, 5% solution, w/v	EPA (245.5)
Potassium Permanganate Solution (50 g/L)	ASTM (D 3223)

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable te the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
6360-2.5	10 L Cubitainer®	24 months
6360-32	1 L amber glass	24 months
6360-5	20 L Cubitainer®	24 months
6360-1	4 L amber glass	24 months
6360-16	500 mL amber glass	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)

Katie Schnur
Quality Control Manager

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Certificate of Analysis

Potassium Permanganate, 5% (w/v), Mercury Free

Lot Number: 2601D06 **Product Number:** 6360

Manufacture Date: JAN 25, 2016
Expiration Date: JAN 2018

Manufactured from special, Low in Mercury (0.05 ppm Hg maximum allowable), ACS Reagent Grade Potassium Permanganate ($KMnO_4$), CAS No. 7722-64-7.

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Permanganate	7722-64-7	ACS

Test	Specification	Result
Appearance	Purple liquid	Passed
Assay (by Specific Gravity)	4.92-5.08 % (w/v)	4.92 % (w/v)

Specification	Reference
Potassium Permanganate Solution	APHA (3500-Hg C)
Potassium permanganate solution	APHA (3112 B)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (60)
Potassium Permanganate, 5% (w/v)	EPA (SW-846) (3665A)
Potassium Permanganate, Mercury-Free, 5% Solution (w/v)	EPA (SW-846) (7471A)
Potassium Permanganate, Mercury-Free, 5% solution (w/v)	EPA (SW-846) (7470A)
Potassium Permanganate, 5% solution, w/v	EPA (245.5)
Potassium Permanganate Solution (50 g/L)	ASTM (D 3223)

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
6360-2.5	10 L Cubitainer®	24 months
6360-32	1 L amber glass	24 months
6360-5	20 L Cubitainer®	24 months
6360-1	4 L amber glass	24 months
6360-16	500 mL amber glass	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)

Katie Schnur
Quality Control Manager

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

CERTIFICATE OF ANALYSIS

SULFURIC ACID

Integra Product #:	S978.10
Grade:	Certified Analytical Reagent (ACS)
Lot #:	SM17A3*
Release Date:	12/17/13
Integra Specification #:	S97810
Specification Revision #:	000

Analysis:

This is to certify that the above lot of material conforms to American Chemical Society (ACS) reagent chemical specifications:

Property	Specification	Analysis
Assay	95.0 – 98.0%	96.4%
Appearance	Free of suspended or insoluble matter	Passes
Color (APHA)	10 max	0
Residue after ignition	5 ppm max	< 5 ppm
Chloride	0.2 ppm max	< 0.2 ppm
Nitrate	0.5 ppm max	< 0.5 ppm
Ammonium	2 ppm max	< 2 ppm
Substances reducing permanganate (as SO_2)	2 ppm max	< 2 ppm
Arsenic	0.01 ppm max	< 0.01 ppm
Heavy metals (as Pb)	1 ppm max	< 1 ppm
Iron	0.2 ppm max	< 0.1 ppm
Mercury	5 ppb max	< 5 ppb

Paul Burg
Quality Assurance

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page 1 of 1

SIGNED ORIGINAL DOCUMENT ON FILE. NA = NOT APPLICABLE. NG = NO GRADE

CHAIN OF CUSTODY RECORD

Project Name:	PCC Structurals	**Project Manager:**	R. Walston
Project No.:	258103	**TRC Office:**	WDV
Sampling Date(s):	6/21/16 to 06/22/16	**Phone No.:**	425-489-1938
Laboratory:	TA	**PM Email:**	rwalston@trcsolutions.com
Laboratory P.O.:	96989		
Shipping Date(s):	06/28/16		
Shipper's Name:	TRC		

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX	Description	ANALYSIS	Box No.	Comments
[redacted]	06/21/16	250 ml	G	organic	front half acetone rinse	particulate	E	
M29-EU9203E-FH-HNO3	06/21/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU9203E-HNO3/H2O2	06/21/16	1000 ml	P	acid	5%HNO3/10% H2O2 inpingers sol.	metals	C	
M29-EU9203E-IMP3	06/21/16	125 ml	P	acid	0.1N HNO3, empty Imp.	Hg	A	
[redacted]	06/21/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU9203E-HCl	06/21/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU9203E-PF	06/21/16	petri	P	filter	Particulate filter	Particulate, metals	F	
[redacted]	06/21/16	250 ml	G	organic	front half acetone rinse	particulate	E	
M29-EU9203W-FH-HNO3	06/21/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU9203W-HNO3/H2O2	06/21/16	1000 ml	P	acid	5%HNO3/10% H2O2 inpingers sol.	metals	C	
M29-EU9203W-IMP3	06/21/16	125 ml	P	acid	0.1N HNO3, empty Imp.	Hg	A	
[redacted]	06/21/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU9203W-HCl	06/21/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU9203W-PF	06/21/16	petri	P	filter	Particulate filter	Particulate, metals	F	
[redacted]	06/22/16	250 ml	G	organic	front half acetone rinse	particulate	E	
M29-EU6532-FH-HNO3	06/22/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU6532-HNO3/H2O2	06/22/16	1000 ml	P	acid	5%HNO3/10% H2O2 inpingers sol.	metals	C	
M29-EU6532-IMP3	06/22/16	125 ml	P	acid	0.1N HNO3, empty Imp.	Hg	A	

Relinquished by:	Tamara A VanWinkle	**Date/Time:**	6/28/16 11:00am
Relinquished by:			
Received by:		**Date/Time:**	
Received by:			

Remarks (*): metals = Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, P, Se, Ag, Tl, Zn, Al, Ti.

TRC

CHAIN OF CUSTODY RECORD

Project Name:	PCC Structurals	**Project Manager:**	R. Walston
Project No.:	258103	**TRC Office:**	WDV
Sampling Date(s):	6/22/16 to 06/23/16	**Phone No.:**	425-489-1938
Laboratory:	TA	**PM Email:**	rwalston@trcsolutions.com
Laboratory P.O.:	96989		
Shipping Date(s):	06/28/16		
Shipper's Name:	TRC		

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX	Description	ANALYSIS	Box No.	Comments
[redacted]	06/22/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU6532-HCl	06/22/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU6532-PF	06/22/16	petri	P	filter	Particulate filter	Particulate, metals	F	
[redacted]	06/22/16	250 ml	G	organic	front half acetone rinse	particulate	E	
M29-EU8901-out-FHHNO3	06/22/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU8901-out-HNO3/H2O2	06/22/16	1000 ml	P	acid	5%HNO3/10% H2O2 inpingers sol.	metals	C	
M29-EU8901-out-IMP3	06/22/16	125 ml	P	acid	0.1N HNO3, empty imp.	Hg	A	
[redacted]	06/22/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU8901-out-HCl	06/22/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU8901-out-PF	06/22/16	petri	P	filter	Particulate filter	Particulate, metals	F	
[redacted]	06/23/16	250 ml	G	organic	front half acetone rinse	particulate	E	
M29-EU5549-FHHNO3	06/23/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU5549-HNO3/H2O2	06/23/16	1000 ml	P	acid	5%HNO3/10% H2O2 inpingers sol.	metals	C	
M29-EU5549-IMP3	06/23/16	125 ml	P	acid	0.1N HNO3, empty imp.	Hg	A	
[redacted]	06/23/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU5549-HCl	06/23/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU5549-PF	06/23/16	petri	P	filter	Particulate filter	Particulate, metals	F	
[redacted]	06/23/16	250 ml	G	organic	front half acetone rinse	particulate	E	

Relinquished by: SumamiA VanWin	**Date/Time:** 6/28/16 11:00am	**Relinquished by:**
Received by:	**Date/Time:**	**Received by:**

Remarks (*): metals = Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, P, Se, Ag, Tl, Zn, Al, Ti.

TRC

AM-EMT-79_Rev 4_062714

CHAIN OF CUSTODY RECORD

Project Name: PCC Structurals
Project No.: 258103
Sampling Date(s): 6/21/16 to 06/23/16
Laboratory: TA
Laboratory P.O.: 96989
Shipping Date(s): 06/28/16
Shipper's Name: TRC

Project Manager: R. Walston
TRC Office: WDV
Phone No.: 425-489-1938
PM Email: rwalston@trcsolutions.com

Sample Code	Sampled Date	Container Size	Container G/P	MATRIX	Description	ANALYSIS	Box No.	Comments
M29-EU6417-FHHNO3	06/23/16	125 ml	P	acid	front half HNO3 rinse	metals	A	
M29-EU6417-HNO3/H2O2	06/23/16	1000 ml	P	acid	5%HNO3/10% H2O2 Inpingers sol.	metals	C	
M29-EU6417-IMP3	06/23/16	125 ml	P	acid	0.1N HNO3, empty Imp.	Hg	A	
[redacted]	06/23/16	500 ml	G	acid	4%KMnO4/10% H2SO4 impingers	Hg	D	
M29-EU6417-HCl	06/23/16	250 ml	G	acid	8N HCl impinger rinse	Hg	B	
M29-EU6417-PF	06/23/16	petri	P	filter	Particulate filter	Particulate, metals	F	
M5-EU8901-IN-PF	06/22/16	petri	P	filter	Particulate filter	Particulate	F	
[redacted]	06/22/16	250 ml	G	organic	front half acetone rinse	Particulate	E	
[redacted]	06/21/16	250 ml	G	organic	Reagent Blank - Acetone	particulate	E	
M29-RB-0.1N HNO3	06/21/16	1000 ml	P	acid	Reagent Blank - 0.1 N HNO3	metals	C	
M29-RB-HNO3/H2O2	06/21/16	250 ml	G	acid	Reagent Blank - 5%HNO3/10% H2O2	metals	C	
[redacted]	06/21/16	250 ml	G	acid	Reagent Blank - 4%KMnO4/10%H2SO4	Hg	D	
M29-RB-DI H2O	06/21/16	125 ml	P	water	Reagent Blank - DI Water	metals	A	
M29-RB-PF	06/21/16	petri	P	filter	Reagent Blank - PM filter	metals	F	
[redacted]	06/21/16	250 ml	G	organic	Reagent Blank - acetone	metals	E	
M29-RB-HCl	06/21/16	250 ml	G	acid	Reagent Blank - 8N HCl/200 ml H2O	Hg	B	

Relinquished by: Jumani A VanWinkle **Date/Time:** 6/28/16 11:00am **Relinquished by:**
Received by: **Date/Time:** **Received by:**

Remarks (*): metals = Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, P, Se, Ag, Tl, Zn, Al, Ti.

TRC

AM-EMT-79_Rev 4_062714

ERA
A Waters Company

July 27, 2016

Judith Aasland
TRC Environmental
19874 141st Place NE
Woodinville, WA 98072

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

Pat Larson

Patrick Larson
Quality Officer

cc: Project File Number 070816O

ERA
A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	OR-OR DEQ(SSAS) Portland 700 NE Multnomah St Suite 600 Portland, OR 97232 USA	Greg Grunow grunow.greg@deq.state.or.us Phone: 503-229-5690	
Facility	PCC Structurals Large Parts Campus 4600 SE Harney Dr Portland, OR 97206 USA	Sherry Uchytil suchytil@pccstructurals.com Phone: 503-777-7683	
Lab	TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 USA	Lisa Stafford QA Manager Lisa.Stafford@testamericainc.com Phone: (916) 374-4308	
Tester	TRC Environmental 19874 141st Place NE Woodinville, WA 98072 USA	Judith Aasland jaasland@trcsolutions.com Phone: 425-489-1938	258103.0000 .0000

ACCREDITED

Project # : 070816O

070816O Laboratory Exception Report

A Waters Company

Lisa Stafford
QA Manager
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
(916) 374-4308

EPA ID: **Not Reported**
ERA Customer Number: **T999784**

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

There were no Not Acceptable evaluations for this study.

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com

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Final Report Results For Laboratory TestAmerica Sacramento

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SSAP Evaluation Report

Project Number: **070816O**

ERA Customer Number: **T999784**

Laboratory Name: **TestAmerica Sacramento**

Inorganic Results

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070816O Evaluation Final Complete Report

Lisa Stafford
QA Manager
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
(916) 374-4308

EPA ID: Not Reported
ERA Customer Number: T999784

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
SSAP Metals on Filter Paper (cat# 1425, lot# 070816O) Study Dates: 07/08/16 - 07/27/16									
1005	Antimony	µg/Filter		37.6	28.2 - 47.0	Not Reported			
1010	Arsenic	µg/Filter		37.2	27.9 - 46.5	Not Reported			
1015	Barium	µg/Filter		42.0	31.5 - 52.5	Not Reported			
1020	Beryllium	µg/Filter		27.1	20.3 - 33.9	Not Reported			
1030	Cadmium	µg/Filter		29.1	23.3 - 34.9	Not Reported			
1040	Chromium	µg/Filter	33.8	34.4	27.5 - 41.3	Acceptable	EPA Method 29 2000	7/19/2016	
1050	Cobalt	µg/Filter	23.1	23.0	17.2 - 28.8	Acceptable	EPA Method 29 2000	7/19/2016	
1055	Copper	µg/Filter		21.1	15.8 - 26.4	Not Reported			
1075	Lead	µg/Filter		64.3	51.4 - 77.2	Not Reported			
1090	Manganese	µg/Filter		21.1	16.9 - 25.3	Not Reported			
1105	Nickel	µg/Filter	33.1	34.5	27.6 - 41.4	Acceptable	EPA Method 29 2000	7/19/2016	
1140	Selenium	µg/Filter		47.6	35.7 - 59.5	Not Reported			
1150	Silver	µg/Filter		74.9	52.4 - 97.4	Not Reported			
1165	Thallium	µg/Filter		66.3	49.7 - 82.9	Not Reported			
1190	Zinc	µg/Filter		54.8	41.1 - 68.5	Not Reported			

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070816O Evaluation Final Complete Report

ERA
A Waters Company

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EPA ID: Not Reported
ERA Customer Number: T999784

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
SSAP Metals in Impinger Solution (cat# 1426, lot# 070816O) Study Dates: 07/08/16 - 07/27/16									
1005	Antimony	µg/mL		0.462	0.346 - 0.578	Not Reported			
1010	Arsenic	µg/mL		0.543	0.407 - 0.679	Not Reported			
1015	Barium	µg/mL		2.82	2.12 - 3.52	Not Reported			
1020	Beryllium	µg/mL		0.584	0.409 - 0.759	Not Reported			
1030	Cadmium	µg/mL		0.836	0.669 - 1.00	Not Reported			
1040	Chromium	µg/mL	0.581	0.557	0.446 - 0.668	Acceptable	EPA Method 29 2000	7/19/2016	
1050	Cobalt	µg/mL	0.536	0.497	0.373 - 0.621	Acceptable	EPA Method 29 2000	7/19/2016	
1055	Copper	µg/mL		0.654	0.490 - 0.818	Not Reported			
1075	Lead	µg/mL		2.58	1.94 - 3.22	Not Reported			
1090	Manganese	µg/mL		0.503	0.377 - 0.629	Not Reported			
1105	Nickel	µg/mL	0.751	0.760	0.608 - 0.912	Acceptable	EPA Method 29 2000	7/19/2016	
1140	Selenium	µg/mL		0.883	0.662 - 1.10	Not Reported			
1150	Silver	µg/mL		0.892	0.669 - 1.12	Not Reported			
1165	Thallium	µg/mL		0.588	0.441 - 0.735	Not Reported			
1190	Zinc	µg/mL		1.15	0.862 - 1.44	Not Reported			

Company:	PCC Structural	**Run:**	1
Plant:	Portland, OR	**Test Date:**	6/23/2016
Unit:	EU5549		
Test Location:	Stack Outlet		

K-Factor Isokinetic Sampling Coefficient (based on pre-test data)

$$\text{K-Factor} = 846.72 \times (D_n)^4 \times \Delta H_{@l} \times C_p^2 \times (1-B_{ws})^2 \times \frac{(M_d \times T_m \times P_s)}{(M_s \times T_s \times (P_{bar} + (\Delta H_{@l}/13.6)))}$$

Where:
- T_s = Temperature of effluent gas (°R)
- T_m = Average dry test meter temperature (°R)
- D_n = Nozzle Diameter (in.)
- $\Delta H_{@l}$ = Orifice pressure drop corresponding to 0.75 cfm meter flow rate (in. H_20)
- C_p = Pitot Tube Coefficient (dimensionless)
- B_{ws} = Effluent gas fractional moisture content (dimensionless)
- M_d = Dry molecular weight of exhaust (lb/lb-mole)
- M_s = Molecular weight of exhaust, wet basis (lb/lb-mole)
- P_s = Absolute flue gas pressure ("Hg)
- P_{bar} = Ambient barometric pressure at sample elevation ("Hg)

D_n =	0.223	in.	P_s =	30.22	in. Hg abs.
$\Delta H_{@l}$ =	1.69	in. H_20	M_s =	29.00	lb/lb-mole
C_p =	0.84	(dimensionless)	T_s =	535	°R
M_d =	29.00	lb/lb-mole	P_{bar} =	30.20	in. Hg
T_m =	530	°R	B_{ws} =	0.000	(dimensionless)

K-Factor = 2.470

Dry Molecular Weight

$$M_d = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

Where:
- M_d = Effluent gas molecular weight (lb/lb-mole, dry basis)
- $\%CO_2$ = Effluent gas Carbon Dioxide Content (% volume, dry basis)
- $\%O_2$ = Effluent gas Oxygen Content (% volume, dry basis)
- $\%N_2$ = Effluent gas Nitrogen Dioxide Content (% volume, dry basis)

$\%CO_2$ =	1.0	%vol dry	$\%N_2$ =	78.0	%vol dry
$\%O_2$ =	21.0	%vol dry			

M_d = 29.00 **lb/lb-mole**

Wet Molecular Weight

$$M_s = M_d \times (1-B_{ws}) + (18.0 \times B_{ws})$$

Where:
- M_s = Effluent gas molecular weight (lb/lb-mole, wet basis)
- B_{ws} = Effluent gas fractional moisture content (dimensionless)

M_d =	29.00 lb/lb-mole	*Bws* =	0.016

M_s = 28.83 **lb/lb-mole**

Effluent Gas Pressure

$$P_s = P_{bar} + (P_g/13.6)$$

Where:
- P_s = flue gas pressure ("Hg)
- P_{bar} = Ambient barometric pressure at sample elevation ("Hg)
- P_g = Flue gas gauge pressure ("H_2O)

P_{bar} =	29.95 "Hg	P_g =	0.25 "H_2O

P_s = 29.97 **"Hg**

Company:	PCC Structural	**Run:**	1
Plant:	Portland, OR	**Test Date:**	6/23/2016
Unit:	EU5549		
Test Location:	Stack Outlet		

Average Meter Temperature

$$T_m = \frac{\sum_{i=1}^{n} (T_{mini} + T_{mout})/2}{n}$$

Where:

T_m = Average dry test meter temperature (°R)
T_{min} = Temperature of gas entering dry test meter (°R)
T_{mout} = Temperature of gas leaving dry test meter (°R)

Avg T_{min} = 526.7 °R Avg T_{mout} = 523.2 °R

T_m = 524.9 °R

ΔH at Sample Point - Example Point A1

$$\Delta H_i = \text{K-Factor} \times \Delta pI$$

Where:

ΔH = Pressure drop across calibrated orifice ("H_2O)
ΔP = Pressure drop across pitot ("H_2O)

K-Factor = 2.47 ΔPi = 0.36 "H_2O

ΔH_i = 0.89 "H_2O

Sample Volume at Standard Conditions

$$V_{m(std)} = (T_{std}/29.92) \times Y \times V_m \times (P_{bar} + \Delta H/13.6)/T_m$$

Where:

$V_{m(std)}$ = Sample volume collected corrected to 29.92 in. Hg and 528(°R) (ft3, dry basis)
Y = Dry test meter calibration coefficient (dimensionless)
V_m = V_m = Sample volume collected at actual conditions (ft^3, dry basis)
T_{std} = Standard Temperature 528(°R)

Y = 0.996 V_m = 261.197 cf
P_{bar} = 29.95 "Hg ΔH = 0.85 "H_2O
T_m = 524.9 °R T_{std} = 528 °R

$V_{m(std)}$ = 262.471 dscf

Volume of Water Vapor Condensed

$$V_{wc(std)} = 0.04715 \times (T_{std} / 528) \times M_{H2O}$$

Where:

$V_{wc(std)}$ = Volume of water vapor collected at 29.92"Hg and 528°R (ft^3)
M_{H2O} = Net weight gain of impingers (grams)

M_{H2O} = 89.8 grams

$V_{w(std)}$ = 4.234 wscf

Company:	PCC Structural	**Run:**	1
Plant:	Portland, OR	**Test Date:**	6/23/2016
Unit:	EU5549		
Test Location:	Stack Outlet		

Moisture Content

$$B_{ws} = \frac{V_{wc(std)}}{V_{wc(std)} + V_{m(std)}}$$

$V_{wc(std)}$ = 4.234 wscf $V_{m(std)}$ = 262.471 dscf

B_{ws} = **0.016**

Average Duct Velocity

$$V_s = 85.49 \times C_p \times \text{Sqrt } \Delta P \text{ (avg)} \times (T_s/(P_s \times M_s))^{1/2}$$

Where:
V_s = Average velocity of effluent gas (ft/sec)
C_p = Pitot calibration coefficient (dimensionless)
Sqrt ΔP (avg) = Average of the square roots of DP's at all traverse points

C_p = 0.823 Sqrt ΔP (avg) = 0.585
T_s = 532.6 °R P_s = 29.97 "Hg
M_s = 28.83 lb/lb-mole

V_s = **32.33 ft/sec**

Method 2 Volumetric Flow Rate (Actual Basis)

$$Q = V_s \times A \times 60$$

Where:
Q = Effluent gas volumetric flow rate at actual conditions (ft^3/min)
A = Cross-sectional area of duct at sample location (ft^2)

V_s = 32.33 ft/sec A = 5.940 ft^2

Q = 11,521 cfm

Method 2 Volumetric Flow Rate (Standard Basis)

$$Q_{std} = \frac{T_{std} \times Q \times P_s}{T_s \times 29.92}$$

Where:
Q_{std} = Effluent gas volumetric flow rate corrected to 29.92 in. Hg and 528°R (ft3/min)

Q = 11521 cfm P_s = 29.97 "Hg
T_s = 532.6 °R

Q_{std} = 11,439 scfm

Method 2 Volumetric Flow Rate (Standard Dry Basis)

$$Q_{std(dry)} = Q_{std} \times (1 - B_{ws})$$

Where:
$Q_{std(dry)}$ = Effluent gas volumetric flow rate corrected to 29.92 in. Hg and 528°R (ft3/min, dry basis)

Q_{std} = 11439 scfm *Bws* = 0.016

$Q_{std(dry)}$ = 11,257 dscfm

Company:	PCC Structural	**Run:**	1
Plant:	Portland, OR	**Test Date:**	6/23/2016
Unit:	EU5549		
Test Location:	Stack Outlet		

Isokinetic Variation:

$$I = \frac{0.0945 \times T_s \times V_{m(std)} \times 528}{V_s \times \theta \times A_n \times P_s \times (1\text{-}Bws) \times T_{std}}$$

Where:
I = Percent of isokinetic sampling (dimensionless)
θ = Total sample collection time (min)
A_n = Cross-sectional area of nozzle (ft^2)

T_s =	532.6 °R	$V_{m(std)}$ =	262.471 dscf		
V_s =	32.328 ft/sec	θ =	480.0 min		
P_s =	29.97 "Hg	A_n =	0.000271 ft^2	B_{ws} =	0.016

I = 106.4 %

PM Concentration - example for filterable only:

$$C_s = \frac{m_n \times 0.01543}{V_{m(std)}}$$

Where:
C_s = Particulate matter concentration (grains/dry standard ft^3)
m_n = Net mass of particulate matter collected (mg)

m_n = 1.0 mg $V_{m(std)}$ = 262.471 dscf

C_s = < 5.93167E-05 gr/dscf

PM Emission Rate Based on Method 2 Volumetric Flow Rate

$$ER_{M2} = \frac{C_s \times Q_{std(dry)} \times 60}{7000}$$

Where:
ER_{M2} = Particulate matter emission rate calculated using Method 2 volumetric flow rate (lb/hr)
7000 = grains per pound

C_s = 0.0001 gr/dscf $Q_{std(dry)}$ = 11257 dscf/min

ER_{M2} = < 5.72E-03 lb/hr

Example Calculations - Selected Metal Emission Rate

Project Number:	258103	Test Date:	June 23, 2016
Customer:	PCC Structural	Facility:	Portland, OR
Unit Identification:	EU5549	Run #:	1
Sample Location:	Stack Outlet	Selected Metal:	Chromium:

Chromium: Concentration (µg/dscm)

$$C_s = \frac{M}{V_{m\,(std)}}$$

Where:

C_s = Concentration of selected metal, µg/dscm
M = Mass collected, microgram, µg
$V_{m(std)}$ = Volume of sample gas in dry standard cubic meters

M = 10.6600 µg $V_{m(std)}$ = 7.432 dry std. m^3

C_s = **1.434E+00 µg/dscm**

Chromium: Concentration (lb/dscf):

$$C_d = \frac{\left(\frac{M}{(10^6 \times 453.6)}\right)}{V_{m(std)}}$$

Where:

C_d = Concentration of selected metal, lb/dscf
M = Mass collected, microgram, µg
453.6 = conversion, 453.6 grams to lbs
$V_{m(std)}$ = Volume of sample gas in dry standard cubic feet

$V_{m(std)}$ = 2.625E+02 dscf

C_d = **8.954E-11 lb/dscf**

Chromium: Emission Rate (lb/hr):

$$ER = C_d \times 60 \times Q_{STD(dry)}$$

Where:

ER = Emission Rate of Selected Metal, lb/hr
C_d = Concentration of selected metal, lb/dscf
60 = conversion, 60 minutes/hr
$Q_{std(dry)}$ = Stack gas volumetric flow rate, dry standard cubic feet per minute

C_d = 8.954E-11 lb/dscf $Q_{std(dry)}$ = 11257 ft^3/min

ER = **6.048E-05 lb/hr**

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU5549	Test Run #:	1
Location:	Stack Outlet	Test Date(s):	6/23/2016

Console Operator:	RFW	Unit Operating Mode:	Normal
Console ID:	1424	Duct Shape/Area:	Round / 5.94 ft^2
Meter Y:	0.996	Fuel Type:	
Orifice $\Delta H_{@}$:	1.694	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P15	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.82	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.223 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	24	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	20.0 min	1	Impinger 1	756.3	786.8
Target run duration:	480.0 min	2	Impinger 2	730.5	742.7
		3	Impinger 3	631.5	635.8
Barometric Pressure (P_{bar}):	29.95 in Hg	4	Impinger 4	751.9	821.9
Stack Static Pressure (P_g):	0.25 in H2O	5	Impinger 5	755.2	687.5
Stack Pressure (P_s):	29.97 in Hg	6	Impinger 6	991.1	1031.6
		7	Impinger 7	928.0	928.0
Leak Checks					
Pre-Test Train Leak Check:	0.001 CFM @ 17 "Hg			Net grams (M_{H2O}):	89.8
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 5 "Hg	CO_2:	1.00	%vol	
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	21.00	%vol	
Pump/Orifice Leak Check:	Pass (Pass or Fail)	N_2:	78.00	%vol	
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU5549
Location: Stack Outlet

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/23/2016
K-Factor: 2.47
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	9:00:00	217.260	0.38	68	54	54	0.94	0.0
A1	9:10:00	222.850	0.36	70	60	56	0.89	0.0
A2	9:20:00	228.370	0.36	71	63	57	0.89	0.0
A2	9:30:00	233.880	0.39	70	65	59	0.96	0.0
A3	9:40:00	239.550	0.38	70	66	60	0.94	0.0
A3	9:50:00	245.200	0.37	69	66	61	0.91	0.0
A4	10:00:00	250.770	0.37	70	66	61	0.91	0.0
A4	10:10:00	256.360	0.36	70	64	61	0.89	0.0
A5	10:20:00	261.870	0.37	70	64	61	0.91	0.0
A5	10:30:00	267.450	0.35	70	64	60	0.86	0.0
A6	10:40:00	272.930	0.35	70	63	60	0.86	0.0
A6	10:50:00	278.400	0.36	69	62	60	0.89	0.0
A7	11:00:00	283.890	0.34	71	64	60	0.84	0.0
A7	11:10:00	289.300	0.35	72	64	60	0.66	0.0
A8	11:20:00	294.750	0.35	73	64	60	0.86	0.0
A8	11:30:00	300.200	0.35	73	65	61	0.86	0.0
A9	11:40:00	305.700	0.35	73	65	61	0.86	0.0
A9	11:50:00	311.210	0.36	73	65	61	0.89	0.0
A10	12:00:00	316.630	0.35	74	66	61	0.86	0.0
A10	12:10:00	322.090	0.35	74	66	62	0.86	0.0
A11	12:20:00	327.480	0.34	74	67	62	0.84	0.0
A11	12:30:00	332.800	0.33	75	66	63	0.82	0.0
A12	12:40:00	337.980	0.32	74	66	63	0.79	0.0
A12	12:50:00	343.120	0.32	73	67	63	0.79	0.0
	13:00:00	348.270						
B1	13:11:00	348.270	0.35	69	63	64	0.86	0.0
B1	13:21:00	353.600	0.35	72	67	64	0.86	0.0
B2	13:31:00	358.940	0.35	72	67	64	0.86	0.0
B2	13:41:00	364.400	0.36	72	68	64	0.89	0.0
B3	13:51:00	368.960	0.36	76	70	65	0.89	0.0
B3	14:01:00	375.500	0.35	79	70	66	0.86	0.0
B4	14:11:00	381.000	0.36	76	69	66	0.89	0.0
B4	14:21:00	386.500	0.37	74	70	66	0.91	0.0
B5	14:31:00	392.140	0.37	74	70	66	0.91	0.0
B5	14:41:00	397.740	0.37	73	70	66	0.91	0.0
B6	14:51:00	403.500	0.37	73	70	66	0.91	0.0
B6	15:01:00	408.940	0.35	73	70	66	0.86	0.0
B7	15:11:00	414.325	0.34	75	69	66	0.84	0.0
B7	15:21:00	419.730	0.34	75	69	66	0.84	0.0
B8	15:31:00	425.140	0.35	76	70	66	0.86	0.0
B8	15:41:00	430.615	0.34	76	70	67	0.84	0.0
B9	15:51:00	436.030	0.34	75	71	67	0.84	0.0
B9	16:01:00	441.250	0.35	75	71	68	0.86	0.0
B10	16:11:00	447.060	0.35	74	72	68	0.86	0.0
B10	16:21:00	452.390	0.30	73	71	68	0.74	0.0
B11	16:31:00	457.420	0.30	72	70	67	0.74	0.0
B11	16:41:00	462.470	0.30	72	68	66	0.74	0.0
B12	16:51:00	468.350	0.18	72	68	66	0.44	0.0
B12	17:01:00	471.700	0.18	73	68	67	0.44	0.0
	17:11:00	478.457						
Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	9:00	261.197	0.34	72.6	66.7	63.2	0.846	0
End	17:11		Ave. $\sqrt{\Delta P}$	T_s, °R	Ave. T_m, °R			
			0.5849	532.6	524.9			
Comments/Notes:								

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU6417	Test Run #:	1
Location:	Stack Outlet	Test Date(s):	6/23/2016

Console Operator:	MW	Unit Operating Mode:	Normal
Console ID:	1490	Duct Shape/Area:	Round / 6.21 ft^2
Meter Y:	0.986	Fuel Type:	
Orifice $\Delta H_{@}$:	1.662	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P19	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.83	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.224 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	24	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	20.0 min	1	Impinger 1	743.2	750.8
Target run duration:	480.0 min	2	Impinger 2	754.5	789.5
		3	Impinger 3	641.5	647.3
Barometric Pressure (P_{bar}):	29.95 in Hg	4	Impinger 4	714.1	717.6
Stack Static Pressure (P_g):	-0.30 in H2O	5	Impinger 5	753.0	752.3
Stack Pressure (P_s):	29.93 in Hg	6	Impinger 6	948.1	1000.7
		7	Impinger 7	883.1	893.6
Leak Checks					
Pre-Test Train Leak Check:	0.000 CFM @ 5 "Hg			Net grams (M_{H2O}):	114.5
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 5 "Hg	CO_2:	1.00	%vol	
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	21.00	%vol	
Pump/Orifice Leak Check:	Pass (Pass or Fail)	N_2:	78.00	%vol	
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU6417
Location: Stack Outlet

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/23/2016
K-Factor: 2.46
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	9:00:00	868.515	0.53	69	57	56	1.30	1.0
A1	9:10:00	875.120	0.53	70	61	57	1.30	1.0
A2	9:20:00	881.750	0.53	70	63	58	1.30	1.0
A2	9:30:00	888.420	0.53	70	63	58	1.30	1.0
A3	9:40:00	895.650	0.58	71	63	59	1.43	1.0
A3	9:50:00	902.050	0.58	71	64	59	1.43	1.0
A4	10:00:00	908.970	0.58	71	64	59	1.43	1.0
A4	10:10:00	915.770	0.58	71	64	59	1.43	1.0
A5	10:20:00	922.410	0.58	72	63	60	1.43	1.0
A5	10:30:00	930.170	0.58	72	63	60	1.43	1.0
A6	10:40:00	936.340	0.58	72	64	60	1.43	1.0
A6	10:50:00	943.440	0.55	72	66	61	1.35	1.0
A7	11:00:00	950.210	0.55	72	67	61	1.35	1.0
A7	11:10:00	957.430	0.55	72	67	62	1.35	1.0
A8	11:20:00	964.430	0.55	73	68	63	1.35	1.0
A8	11:30:00	971.140	0.55	73	68	63	1.35	1.0
A9	11:40:00	977.210	0.53	74	69	64	1.30	1.0
A9	11:50:00	983.820	0.53	74	69	64	1.30	1.0
A10	12:00:00	990.410	0.53	73	69	64	1.30	1.0
A10	12:10:00	997.060	0.53	74	69	65	1.30	1.0
A11	12:20:00	1010.730	0.46	74	70	65	1.13	1.0
A11	12:30:00	1017.110	0.46	74	70	65	1.13	1.0
A12	12:40:00	1025.010	0.46	72	69	65	1.13	1.0
A12	12:50:00	1027.220	0.46	72	69	65	1.13	1.0
	13:00:00	1029.191						
B1	13:14:00	1029.308	0.57	71	65	64	1.40	1.0
B1	13:24:00	1037.850	0.58	71	68	64	1.43	1.0
B2	13:34:00	1045.310	0.58	71	69	65	1.43	1.0
B2	13:44:00	1052.210	0.58	71	70	65	1.43	1.0
B3	13:54:00	1058.820	0.58	74	71	66	1.43	1.0
B3	14:04:00	1065.820	0.58	74	71	66	1.43	1.0
B4	14:14:00	1073.430	0.59	73	71	66	1.45	1.0
B4	14:24:00	1081.220	0.59	74	72	68	1.45	1.0
B5	14:34:00	1088.140	0.59	74	72	68	1.45	1.0
B5	14:44:00	1094.110	0.57	74	72	68	1.40	1.0
B6	14:54:00	1100.840	0.57	74	72	68	1.40	1.0
B6	15:04:00	1107.960	0.56	74	72	68	1.38	1.0
B7	15:14:00	1114.770	0.54	74	72	68	1.33	1.0
B7	15:24:00	1121.420	0.54	74	72	68	1.33	1.0
B8	15:34:00	1129.740	0.55	75	72	68	1.35	1.0
B8	15:44:00	1136.440	0.55	75	72	68	1.35	1.0
B9	15:54:00	1143.420	0.51	75	72	68	1.25	1.0
B9	16:04:00	1149.920	0.51	75	73	69	1.25	1.0
B10	16:14:00	1156.490	0.51	75	73	69	1.25	1.0
B10	16:24:00	1162.950	0.51	74	72	68	1.25	1.0
B11	16:34:00	1169.530	0.51	74	70	67	1.25	1.0
B11	16:44:00	1176.710	0.51	73	70	67	1.25	1.0
B12	16:54:00	1183.470	0.50	73	70	67	1.23	1.0
B12	17:04:00	1189.610	0.50	73	70	67	1.23	1.0
	17:14:00	1195.668						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	9:00	327.036	0.54	72.8	68.4	64.2	1.335	1
End	17:14		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.7365	532.8	526.3			

Comments/Notes:

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU9203	Test Run #:	1
Location:	East Stack	Test Date(s):	6/21/2016

Console Operator:	KBA	Unit Operating Mode:	Normal
Console ID:	1424	Duct Shape/Area:	Round / 6.26 ft^2
Meter Y:	0.996	Fuel Type:	
Orifice $\Delta H_{@}$:	1.694	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P17	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.82	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.223 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	24	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	20.0 min	1	Impinger 1	759.4	750.0
Target run duration:	480.0 min	2	Impinger 2	729.6	758.3
		3	Impinger 3	614.3	617.5
Barometric Pressure (P_{bar}):	30.20 in Hg	4	Impinger 4	762.5	768.5
Stack Static Pressure (P_g):	-0.19 in H2O	5	Impinger 5	711.6	710.3
Stack Pressure (P_s):	30.19 in Hg	6	Impinger 6	1001.2	1041.5
Leak Checks					
Pre-Test Train Leak Check:	0.005 CFM @ 15 "Hg			Net grams (M_{H2O}):	67.5
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 3 "Hg	CO_2:	1.00 %vol		
Post-Test Pitot Leak Check:	Pass (Pass or Fsil)	O_2:	21.00 %vol		
Pump/Orifice Leak Check:	(Pass or Fail)	N_2:	78.00 %vol		
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU9203
Location: East Stack

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/21/2016
K-Factor: 2.479
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	10:30:00	704.810	0.26	85	73	72	0.64	0.0
A1	10:40:00	709.610	0.27	80	75	71	0.67	0.0
A2	10:50:00	714.300	0.28	77	77	72	0.69	0.0
A2	11:00:00	719.230	0.28	80	79	73	0.69	0.0
A3	11:10:00	724.230	0.34	87	80	74	0.84	0.0
A3	11:20:00	729.050	0.34	82	81	75	0.84	0.0
A4	11:30:00	734.740	0.34	82	81	76	0.84	0.0
A4	11:40:00	740.080	0.34	81	82	77	0.84	0.0
A5	11:50:00	745.450	0.38	79	82	77	0.94	0.0
A5	12:00:00	751.950	0.38	80	83	78	0.94	0.0
A6	12:10:00	756.860	0.40	76	83	78	0.99	0.0
A6	12:20:00	762.770	0.40	81	83	78	0.99	0.0
A7	12:30:00	768.630	0.41	92	83	79	1.00	0.0
A7	12:40:00	774.630	0.41	87	84	79	1.00	0.0
A8	12:50:00	780.460	0.42	90	84	79	1.00	1.0
A8	13:00:00	786.420	0.41	86	84	79	1.00	1.0
A9	13:10:00	792.370	0.41	86	84	80	1.00	1.0
A9	13:20:00	798.330	0.42	86	85	80	1.00	1.0
A10	13:30:00	804.820	0.41	95	85	81	1.00	1.0
A10	13:40:00	810.180	0.41	101	86	81	1.00	1.0
A11	13:50:00	816.050	0.35	96	86	81	0.87	0.0
A11	14:00:00	821.800	0.36	101	86	81	0.89	0.0
A12	14:10:00	827.240	0.34	106	86	82	0.84	0.0
A12	14:20:00	832.680	0.34	103	87	82	0.84	0.0
	14:30:00	837.974						
B1	14:58:00	838.010	0.30	96	81	81	0.74	0.0
B1	15:08:00	843.080	0.31	99	83	81	0.77	0.0
B2	15:18:00	848.150	0.31	98	85	81	0.77	0.0
B2	15:28:00	853.280	0.31	100	85	81	0.77	0.0
B3	15:38:00	858.600	0.33	102	85	82	0.82	0.0
B3	15:48:00	863.730	0.33	100	86	82	0.82	0.0
B4	15:58:00	869.070	0.35	94	86	82	0.87	0.0
B4	16:08:00	874.400	0.35	95	86	82	0.87	0.0
B5	16:18:00	879.810	0.35	95	86	82	0.87	0.0
B5	16:28:00	885.100	0.36	93	86	82	0.89	0.0
B6	16:38:00	890.580	0.38	95	87	82	0.94	1.0
B6	16:48:00	896.380	0.38	95	87	82	0.94	1.0
B7	16:58:00	902.160	0.39	97	87	83	0.97	1.0
B7	17:08:00	908.150	0.42	98	87	83	1.00	1.0
B8	17:18:00	913.880	0.42	99	87	83	1.00	1.0
B8	17:28:00	919.870	0.42	92	87	83	1.00	1.0
B9	17:38:00	925.780	0.40	93	88	83	0.99	1.0
B9	17:48:00	931.750	0.41	88	88	83	1.00	1.0
B10	17:58:00	937.590	0.40	88	88	83	0.99	1.0
B10	18:08:00	943.530	0.40	92	88	83	0.99	1.0
B11	18:18:00	949.450	0.38	93	88	83	0.94	1.0
B11	18:28:00	955.160	0.36	81	88	84	0.89	1.0
B12	18:38:00	960.750	0.36	83	88	83	0.89	1.0
B12	18:48:00	966.320	0.35	84	87	83	0.87	1.0
	18:58:00	971.866						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	10:30	267.020	0.36	90.6	84.4	80.0	0.895	1
End	18:58		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.6021	550.6	542.2			

Comments/Notes:

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU9203	Test Run #:	1
Location:	West Stack	Test Date(s):	6/21/2016

Console Operator:	MW	Unit Operating Mode:	Normal
Console ID:	1490	Duct Shape/Area:	Round / 6.26 ft^2
Meter Y:	0.986	Fuel Type:	
Orifice $\Delta H_{@i}$:	1.682	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P-17	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.82	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.224 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	24	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	20.0 min	1	HNO3/H2O2	726.5	717.6
Target run duration:	480.0 min	2	HNO3/H2O2	742.2	771.8
		3	Empty	636.9	638.8
Barometric Pressure (P_{bar}):	30.20 in Hg	4	KMNO4	723.4	789.0
Stack Static Pressure (P_g):	-0.10 in H2O	5	KMNO4	755.0	690.2
Stack Pressure (P_s):	30.19 in Hg	6	Silica Gel	859.3	900.4
Leak Checks					
Pre-Test Train Leak Check:	0.000 CFM @ 2 "Hg			Net grams (M_{H2O}):	64.5
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 3 "Hg	CO_2:	1.0 %vol		
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	29.0 %vol		
Pump/Orifice Leak Check:	(Pass or Fail)	N_2:	70.0 %vol		
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU9203
Location: West Stack

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/21/2016
K-Factor: 2.506
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	10:30:00	604.065	0.31	78	69	69	0.75	1.0
A1	10:40:00	609.21	0.31	77	71	73	0.75	1.0
A2	10:50:00	614.37	0.32	77	72	69	0.78	1.0
A2	11:00:00	619.91	0.32	78	73	69	0.78	1.0
A3	11:10:00	624.83	0.32	79	73	70	0.78	1.0
A3	11:20:00	630.64	0.32	78	73	71	0.78	1.0
A4	11:30:00	635.69	0.33	78	74	71	0.80	1.0
A4	11:40:00	640.83	0.32	78	74	71	0.78	1.0
A5	11:50:00	645.57	0.37	79	74	71	0.89	1.0
A5	12:00:00	650.47	0.37	78	75	72	0.89	1.0
A6	12:10:00	656.97	0.40	79	75	72	0.97	1.0
A6	12:20:00	663.35	0.40	79	75	72	0.97	1.0
A7	12:30:00	668.95	0.42	80	75	72	1.02	1.0
A7	12:40:00	674.64	0.42	80	76	73	1.02	1.0
A8	12:50:00	680.98	0.43	80	77	73	1.04	1.0
A8	13:00:00	686.86	0.43	80	77	73	1.04	1.0
A9	13:10:00	692.82	0.41	80	77	74	0.97	1.0
A9	13:20:00	698.68	0.41	81	78	75	0.87	1.0
A10	13:30:00	704.87	0.37	83	78	75	0.90	1.0
A10	13:40:00	710.21	0.37	83	80	75	0.90	1.0
A11	13:50:00	716.01	0.33	84	82	76	0.79	1.0
A11	14:00:00	720.95	0.33	84	81	77	0.79	1.0
A12	14:10:00	726.02	0.31	85	80	78	0.75	1.0
A12	14:20:00	732.24	0.31	85	81	78	0.75	1.0
	14:30:00	737.009						
B1	14:58:00	736.91	0.27	85	78	78	0.65	1.0
B1	15:08:00	742.43	0.27	85	78	78	0.65	1.0
B2	15:18:00	746.62	0.27	85	79	78	0.65	1.0
B2	15:28:00	751.41	0.24	85	79	77	0.58	1.0
B3	15:38:00	756.04	0.30	86	79	77	0.73	1.0
B3	15:48:00	761.11	0.31	85	79	77	0.75	1.0
B4	15:58:00	766.46	0.34	86	79	77	0.83	1.0
B4	16:08:00	771.94	0.34	86	79	77	0.83	1.0
B5	16:18:00	777.23	0.37	86	79	77	0.90	1.0
B5	16:28:00	782.93	0.39	86	79	77	0.95	1.0
B6	16:38:00	788.88	0.40	86	80	77	0.97	1.0
B6	16:48:00	794.63	0.40	85	80	77	0.97	1.0
B7	16:58:00	800.51	0.43	86	81	78	1.04	1.0
B7	17:08:00	806.54	0.42	86	81	78	1.02	1.0
B8	17:18:00	812.65	0.42	86	80	77	1.02	1.0
B8	17:28:00	818.53	0.42	87	81	77	1.02	1.0
B9	17:38:00	824.54	0.40	87	81	78	0.97	1.0
B9	17:48:00	830.44	0.40	86	81	78	0.97	1.0
B10	17:58:00	836.47	0.32	86	81	78	0.78	1.0
B10	18:08:00	842.55	0.32	86	80	78	0.78	1.0
B11	18:18:00	847.31	0.32	86	79	77	0.78	1.0
B11	18:28:00	852.43	0.30	85	79	77	0.73	1.0
B12	18:38:00	857.58	0.31	85	79	77	0.75	1.0
B12	18:48:00	862.87	0.31	85	79	77	0.75	1.0
	18:58:00	887.934						
Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	10:30	263.968	0.35	82.9	77.7	75.1	0.851	1
End	18:58		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.59	542.9	536.4			
Comments/Notes:								

TRC

Isokinetic Test Support Data

Company:	PCC Structurals	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU6532	Test Run #:	1
Location:	Stack Outlet	Test Date(s):	6/22/2016

Console Operator:	MW	Unit Operating Mode:	Normal
Console ID:	1421	Duct Shape/Area:	Round / 1.40 ft^2
Meter Y:	1	Fuel Type:	
Orifice $\Delta H_{@}$:	1.593	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P318	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.180 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	12	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	40.0 min	1	Impinger 1	887.9	889.3
Target run duration:	480.0 min	2	Impinger 2	631.1	619.7
		3	Impinger 3	730.4	758.5
Barometric Pressure (P_{bar}):	29.95 in Hg	4	Impinger 4	570.1	576.2
Stack Static Pressure (P_g):	-0.35 in H2O	5	Impinger 5	626.4	628.3
Stack Pressure (P_s):	29.92 in Hg	6	Impinger 6	748.6	747.6
		7	Impinger 7	872.3	912.9
Leak Checks					
Pre-Test Train Leak Check:	0.001 CFM @ 10 "Hg			Net grams (M_{H2O}):	65.7
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 5 "Hg	CO_2:	1.0 %vol		
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	21.0 %vol		
Pump/Orifice Leak Check:	(Pass or Fail)	N_2:	78.0 %vol		
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structurals
Plant: Portland, OR
Unit: EU6532
Location: Stack Outlet

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/22/2016
K-Factor: 1.000
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	10:25:00	848.387	0.97	79	71	71	0.97	1.0
A1	10:35:00	854.320	0.97	79	73	72	0.97	1.0
A1	10:45:00	860.270	0.97	78	75	74	0.97	1.0
A1	10:55:00	866.310	0.97	78	74	73	0.97	1.0
A2	11:05:00	872.350	0.95	80	77	74	0.95	1.0
A2	11:15:00	878.120	0.95	81	78	75	0.95	1.0
A2	11:25:00	883.850	0.95	80	77	75	0.95	1.0
A2	11:35:00	889.740	0.94	80	79	76	0.94	1.0
A3	11:45:00	895.470	0.94	82	80	77	0.94	1.0
A3	11:55:00	901.390	0.94	82	81	78	0.94	1.0
A3	12:05:00	905.730	0.94	82	81	78	0.94	1.0
A3	12:15:00	913.070	0.93	81	80	78	0.93	1.0
A4	12:25:00	919.320	0.93	82	81	79	0.93	1.0
A4	12:35:00	925.370	0.85	82	82	79	0.85	1.0
A4	12:45:00	931.240	0.83	82	82	79	0.83	1.0
A4	12:55:00	937.430	0.83	82	81	80	0.83	1.0
A5	13:05:00	944.910	0.83	82	81	80	0.83	1.0
A5	13:15:00	947.310	0.74	85	83	81	0.74	1.0
A5	13:25:00	952.320	0.74	85	83	81	0.74	1.0
A5	13:35:00	958.010	0.74	85	85	82	0.74	1.0
A6	13:45:00	962.810	0.58	86	85	83	0.58	1.0
A6	13:55:00	967.330	0.58	87	85	84	0.58	1.0
A6	14:05:00	972.150	0.57	87	86	84	0.57	1.0
A6	14:15:00	976.910	0.57	87	85	84	0.57	1.0
	14:25:00	981.459						
B1	14:35:00	981.622	1.00	88	84	84	1.00	1.0
B1	14:45:00	987.410	0.99	90	87	84	0.99	1.0
B1	14:55:00	992.680	0.99	90	87	84	0.99	1.0
B1	15:05:00	999.420	0.99	89	85	84	0.99	1.0
B2	15:15:00	1005.950	0.95	90	86	85	0.95	1.0
B2	15:25:00	1011.640	0.95	91	88	85	0.95	1.0
B2	15:35:00	1017.530	0.95	91	88	86	0.95	1.0
B2	15:45:00	1023.470	0.94	91	89	86	0.94	1.0
B3	15:55:00	1029.310	0.94	91	89	86	0.94	1.0
B3	16:05:00	1035.270	0.94	90	90	88	0.94	1.0
B3	16:15:00	1041.130	0.94	90	90	88	0.94	1.0
B3	16:25:00	1047.070	0.95	89	89	87	0.95	1.0
B4	16:35:00	1053.010	0.84	90	90	88	0.84	1.0
B4	16:45:00	1058.630	0.84	90	89	88	0.84	1.0
B4	16:55:00	1064.360	0.84	90	89	88	0.84	1.0
B4	17:05:00	1069.890	0.84	90	87	89	0.84	1.0
B5	17:15:00	1075.460	0.72	90	87	87	0.72	1.0
B5	17:25:00	1080.720	0.72	89	88	87	0.72	1.0
B5	17:35:00	1085.910	0.72	89	89	87	0.72	1.0
B5	17:45:00	1091.120	0.72	89	89	87	0.72	1.0
B6	17:55:00	1096.320	0.59	89	88	86	0.59	1.0
B6	18:05:00	1101.110	0.59	91	87	86	0.59	1.0
B6	18:15:00	1105.870	0.59	91	87	86	0.59	1.0
B6	18:25:00	1110.630	0.59	91	87	86	0.59	1.0
	18:35:00	1115.403						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	10:25	266.853	0.84	86.1	84.0	82.3	0.840	1
End	18:35		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.91	546.1	543.2			

Comments/Notes:

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5/M29
Unit ID:	EU8901	Test Run #:	1
Location:	Stack Outlet	Test Date(s):	6/22/2016

Console Operator:	MW	Unit Operating Mode:	Normal
Console ID:	1420	Duct Shape/Area:	Round / 0.79 ft^2
Meter Y:	0.985	Fuel Type:	
Orifice $\Delta H_{@}$:	1.678	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P50	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Procese/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.21 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	12	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	40.0 min	1	Impinger 1	876.1	882.3
Target run duration:	480.0 min	2	Impinger 2	771.8	746.1
		3	Impinger 3	727.6	769.4
Barometric Pressure (P_{bar}):	29.95 in Hg	4	Impinger 4	650.7	660.4
Stack Static Pressure (P_g):	-0.34 in H2O	5	Impinger 5	637.8	647.8
Stack Pressure (P_s):	29.93 in Hg	6	Impinger 6	754.6	742.6
		7	Impinger 7	949.8	998.0
Leak Checks					
Pre-Test Train Leak Check:	0.001 CFM @ 10 "Hg			Net grams (M_{H2O}):	78.2
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.001 CFM @ 10 "Hg	CO_2:	1.00 %vol		
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	21.00 %vol		
Pump/Orifice Leak Check:	Pass (Pass or Fail)	N_2:	78.00 %vol		
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU8901
Location: Stack Outlet

Project #: 258103
Method(s): M5/M29
Run #: 1

Test Date: 6/22/2016
K-Factor: 1.93
Minutes/pt: 10

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	10:25:00	466.445	0.60	89	74	74	1.18	4.0
A1	10:35:00	473.180	0.61	83	76	75	1.20	4.0
A1	10:45:00	480.060	0.61	82	77	76	1.20	4.0
A1	10:55:00	486.690	0.61	81	78	77	1.20	4.0
A2	11:05:00	493.540	0.63	83	80	77	1.24	4.5
A2	11:15:00	500.200	0.63	84	81	78	1.24	4.5
A2	11:25:00	507.130	0.63	86	80	78	1.24	4.5
A2	11:35:00	514.100	0.63	86	82	80	1.24	4.5
A3	11:45:00	521.080	0.65	86	83	81	1.28	5.0
A3	11:55:00	528.310	0.65	87	84	81	1.28	5.0
A3	12:05:00	535.470	0.65	87	83	82	1.28	5.0
A3	12:15:00	542.680	0.65	87	82	82	1.28	5.0
A4	12:25:00	549.350	0.61	86	84	83	1.20	4.5
A4	12:35:00	556.220	0.61	88	84	83	1.20	4.5
A4	12:45:00	563.060	0.62	87	84	83	1.22	5.0
A4	12:55:00	569.910	0.62	87	85	84	1.22	5.0
A5	13:05:00	576.760	0.64	88	85	84	1.26	5.0
A5	13:15:00	583.770	0.64	88	86	84	1.26	5.0
A5	13:25:00	590.780	0.64	89	87	85	1.26	5.0
A5	13:35:00	597.790	0.64	90	88	86	1.26	5.0
A6	13:45:00	604.840	0.63	92	89	87	1.24	5.0
A6	13:55:00	611.850	0.63	93	88	86	1.24	5.0
A6	14:05:00	618.880	0.63	93	89	87	1.24	5.0
A6	14:15:00	625.910	0.63	93	89	88	1.24	5.0
	14:25:00	632.923						
B1	14:35:00	633.012	0.64	90	87	87	1.26	5.0
B1	14:45:00	640.130	0.67	90	89	88	1.32	5.0
B1	14:55:00	647.350	0.67	91	88	87	1.32	5.0
B1	15:05:00	654.490	0.67	91	88	87	1.32	5.0
B2	15:15:00	661.700	0.71	91	90	88	1.40	5.5
B2	15:25:00	669.100	0.71	91	90	88	1.40	5.5
B2	15:35:00	676.550	0.70	92	91	89	1.38	5.5
B2	15:45:00	683.960	0.70	91	91	89	1.38	5.5
B3	15:55:00	691.390	0.68	94	91	89	1.34	5.5
B3	16:05:00	698.820	0.69	93	92	90	1.36	5.5
B3	16:15:00	706.090	0.68	93	90	90	1.34	5.5
B3	16:25:00	713.440	0.70	93	91	89	1.38	5.5
B4	16:35:00	720.850	0.71	93	92	90	1.40	5.5
B4	16:45:00	728.340	0.72	92	92	91	1.42	5.5
B4	16:55:00	735.860	0.72	94	91	90	1.42	5.5
B4	17:05:00	743.690	0.71	94	91	90	1.40	5.5
B5	17:15:00	750.970	0.63	94	90	90	1.24	5.5
B5	17:25:00	758.100	0.62	94	91	90	1.22	5.5
B5	17:35:00	765.180	0.68	94	91	90	1.34	5.5
B5	17:45:00	772.550	0.61	94	91	90	1.20	5.5
B6	17:55:00	779.620	0.65	94	90	88	1.28	5.5
B6	18:05:00	786.850	0.65	93	90	88	1.28	5.5
B6	18:15:00	794.210	0.65	93	90	88	1.28	5.5
B6	18:25:00	801.330	0.65	91	89	87	1.28	5.5
	18:35:00	808.557						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	10:25	342.023	0.65	89.9	86.8	85.3	1.285	5.5
End	18:35		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.8074	549.9	546.0			

Comments/Notes:

TRC

Isokinetic Test Support Data

Company:	PCC Structural	Project#:	258103
Plant:	Portland, OR	Test Method(s):	M5
Unit ID:	EU8901	Test Run #:	1
Location:	Inlet Duct	Test Date(s):	6/22/2016

Console Operator:	KBA	Unit Operating Mode:	Normal
Console ID:	1424	Duct Shape/Area:	Round / 0.79 ft^2
Meter Y:	0.996	Fuel Type:	
Orifice $\Delta H_{@i}$:	1.694	F_d Factor:	dscf/MMBtu
Pitot Tube ID:	P-5C	F_c Factor:	scf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	/ hr
Nozzle Material:	Glass	Soot blown?	N/A
Nozzle Diameter (D_n):	0.185 in	Duration:	N/A min

Sample collection time				Tare wt.	Final wt:
Total # of points:	8	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	60.0 min	1	Impinger 1	721.3	735.6
Target run duration:	480.0 min	2	Impinger 2	739.6	745.1
		3	Impinger 3	638.5	642.1
Barometric Pressure (P_{bar}):	29.95 in Hg	4	Impinger 4	915.5	951.3
Stack Static Pressure (P_g):	-4.60 in H2O	5	Impinger 5	810.4	813.9
Stack Pressure (P_s):	29.61 in Hg				
Leak Checks					
Pre-Test Train Leak Check:	0.005 CFM @ 15 "Hg			Net grams (M_{H2O}):	62.7
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)	Fixed Gas Analysis:			
Post-Test Train Leak Rate:	0.000 CFM @ 3 "Hg	CO_2:	1.00 %vol		
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	O_2:	21.00 %vol		
Pump/Orifice Leak Check:	(Pass or Fail)	N_2:	78.00 %vol		
Filter/Thimble ID:					
Tare Weight:	grams				

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company: PCC Structural
Plant: Portland, OR
Unit: EU8901
Location: Inlet Duct

Project #: 258103
Method(s): M5
Run #: 1

Test Date: 6/22/2016
K-Factor: 1.19
Minutes/pt: 10

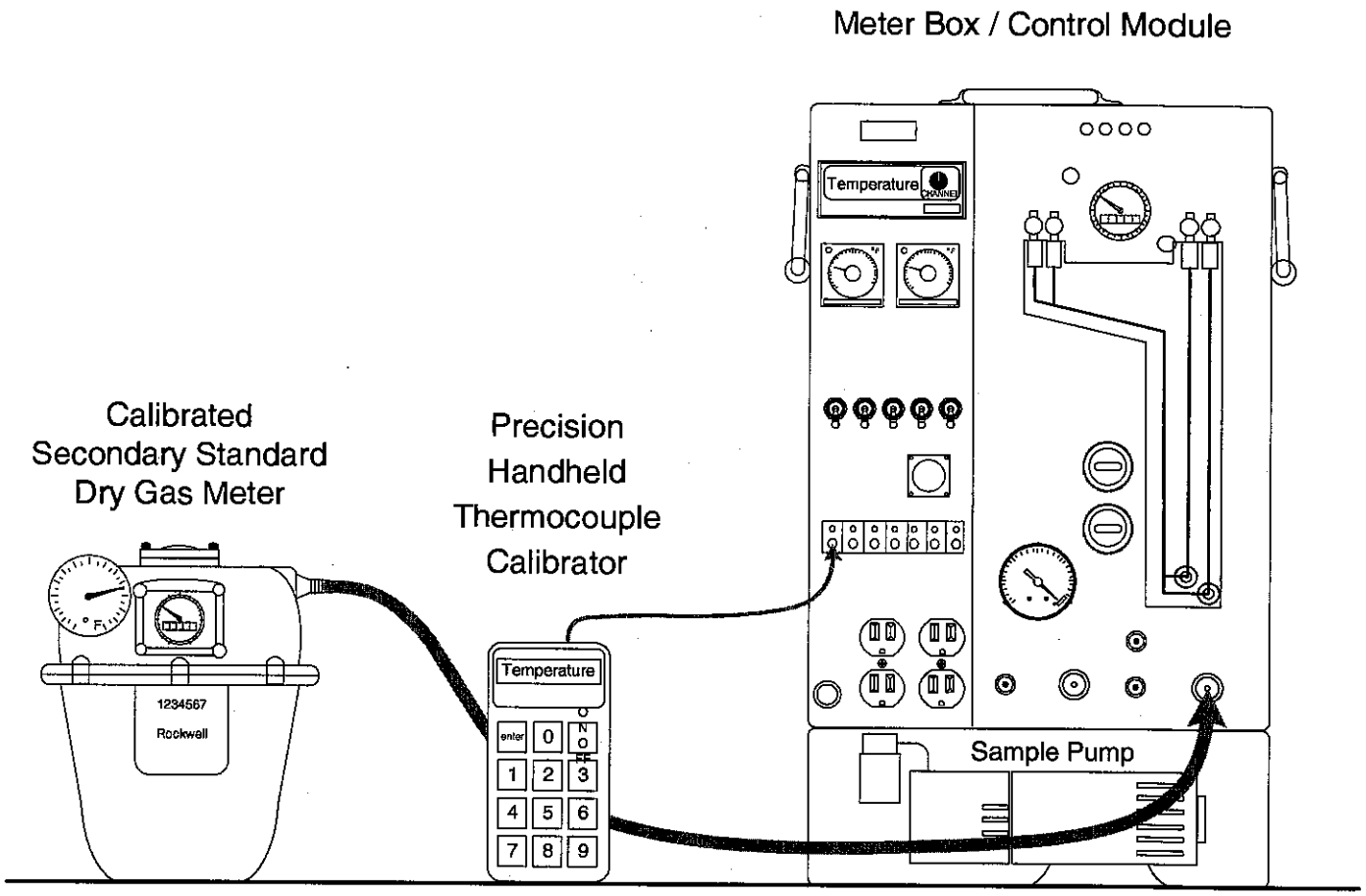
Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
A1	10:22:00	972.079	0.67	76	66	66	0.67	0.0
A1	10:32:00	976.800	0.69	73	70	67	0.69	0.0
A1	10:42:00	981.670	0.69	73	73	68	0.69	0.0
A1	10:52:00	986.530	0.69	73	76	70	0.69	0.0
A1	11:02:00	991.420	0.68	75	78	72	0.68	0.0
A1	11:12:00	996.250	0.69	74	79	73	0.69	0.0
A2	11:22:00	1001.060	0.65	74	80	74	0.65	0.0
A2	11:32:00	1005.500	0.65	74	81	76	0.65	0.0
A2	11:42:00	1010.580	0.66	74	82	77	0.66	0.0
A2	11:52:00	1015.370	0.66	75	83	78	0.66	0.0
A2	12:02:00	1020.140	0.65	75	84	78	0.65	0.0
A2	12:12:00	1024.890	0.65	74	84	79	0.65	0.0
A3	12:22:00	1029.690	0.69	75	85	80	0.69	0.0
A3	12:32:00	1034.560	0.71	75	85	81	0.71	0.0
A3	12:42:00	1039.540	0.69	75	86	81	0.69	0.0
A3	12:52:00	1044.510	0.71	75	86	82	0.71	0.0
A3	13:02:00	1049.500	0.71	75	86	82	0.71	0.0
A3	13:12:00	1054.480	0.69	76	87	83	0.69	0.0
A4	13:22:00	1059.335	0.69	77	87	83	0.69	0.0
A4	13:32:00	1064.215	0.69	77	88	83	0.69	0.0
A4	13:42:00	1069.155	0.71	80	88	84	0.71	0.0
A4	13:52:00	1074.100	0.70	80	89	84	0.70	0.0
A4	14:02:00	1079.200	0.68	81	89	85	0.68	0.0
A4	14:12:00	1083.950	0.68	78	90	85	0.68	0.0
	14:22:00	1088.400						
B1	14:31:00	1088.400	0.78	78	86	86	0.87	0.0
B1	14:41:00	1094.370	0.78	78	88	86	0.87	0.0
B1	14:51:00	1100.000	0.77	79	90	86	0.86	0.0
B1	15:01:00	1105.520	0.76	79	91	86	0.85	0.0
B1	15:11:00	1111.020	0.76	79	91	87	0.85	0.0
B1	15:21:00	1116.530	0.76	79	92	87	0.85	0.0
B2	15:31:00	1122.040	0.71	79	92	88	0.79	0.0
B2	15:41:00	1127.500	0.70	79	93	88	0.78	0.0
B2	15:51:00	1132.710	0.71	79	93	88	0.79	0.0
B2	16:01:00	1137.940	0.70	83	93	89	0.78	0.0
B2	16:11:00	1143.160	0.70	81	93	89	0.78	0.0
B2	16:21:00	1148.390	0.70	81	94	89	0.78	0.0
B3	16:31:00	1153.620	0.67	80	94	90	0.75	0.0
B3	16:41:00	1158.740	0.67	80	94	90	0.75	0.0
B3	16:51:00	1163.850	0.67	80	94	90	0.75	0.0
B3	17:01:00	1168.970	0.67	80	94	90	0.75	0.0
B3	17:11:00	1174.080	0.67	80	94	90	0.75	0.0
B3	17:21:00	1179.180	0.67	80	94	91	0.75	0.0
B4	17:31:00	1184.300	0.67	80	94	91	0.75	0.0
B4	17:41:00	1189.420	0.65	80	94	91	0.73	0.0
B4	17:51:00	1194.490	0.65	80	94	91	0.73	0.0
B4	18:01:00	1199.570	0.65	80	94	91	0.73	0.0
B4	18:11:00	1204.870	0.65	80	94	91	0.73	0.0
B4	18:21:00	1209.740	0.65	80	94	91	0.73	0.0
	18:31:00	1214.849						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	10:22	242.770	0.69	77.7	87.6	83.5	0.732	0
End	18:31		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			0.8308	537.7	545.6			

Comments/Notes:

Equipment Configuration for Meter Box Calibration

USEPA Promulgated Method 5



APEX SOURCE TESTING EQUIPMENT INSTRUMENTS

25 November, 2013

Certificate of Conformance

Type S Pitot Tubes

Apex Instruments, Inc. hereby certifies that the design of the following Pitot Tubes manufactured by Apex Instruments, Inc. conform with the construction design criteria and specifications cited in USEPA Method 2, Code of Federal Regulations (40 CFR Part 60) and hereby are assigned a baseline calibration coefficient (C_P) of 0.84

Modular Type S Pitot Tubes for Probe Assemblies

MPT-6-181	Modular Pitot Tip, 3/8 inch Tube, Std length for Method 5 probes
MPT-6-320	Type Modular Pitot Tip, 3/8 inch Tube, Extended for SFA-300 & PM10
MPT-6-218	Type Modular Pitot Tip, 3/8 inch Tube, Extended for SFA-47
MPT-6-421	Extended Pitot Tip for PM2.

Method 5 Probes and Sheaths

(including, but not limited to the following part numbers)

PA-6S	6' SS Method 5 probe assembly
PA-8S	8' SS Method 5 probe assembly
IPS-6	6' inconel Method 5 probe assembly
IPS-8	8' inconel Method 5 probe assembly
IPS-10	10' inconel Method 5 probe assembly

John Stauber
Sales Manager

Apex Instruments, Inc. 125 Quantum Street; Holly Springs, North Carolina 27540 USA

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 3 ° (<10°), α_2 = 2 ° (<10°) z = A sin γ = 0.025 (in.); (<0.125 in.)

β_1 = 2 ° (<5°), β_2 = 2.5 ° (<5°) w = A sin θ = 0.025 (in.); (<0.03125 in.)

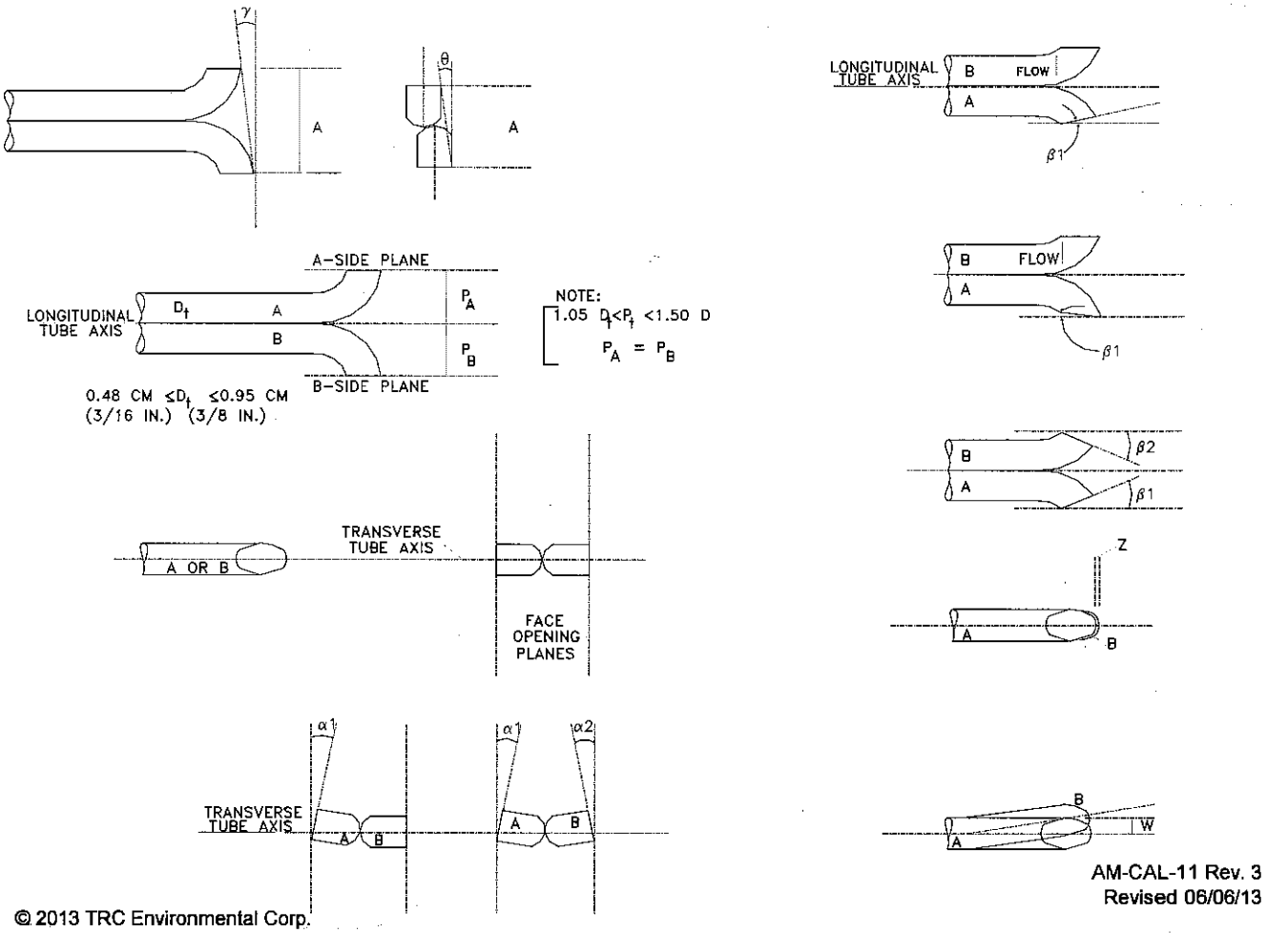
γ = 1.5 °, θ = 1.5 °, A = 0.958 (in.) P_A = 0.479 (in.), P_B = 0.479 (in.), *D_t = 0.375 (in.)

Comments:

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ____ yes X no

Pitot Tube No.: p-17 Date: 6/16/2016 Name: SVD



AM-CAL-11 Rev. 3
Revised 06/06/13

Environmental Supply Company, Inc.
Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

Customer: TRC Environmental

S-type Pitot ID:	P-17	Date:	12-Jan-10
Standard Pitot ID:	001	Personnel:	DH
Cp(std):	0.99	Cp(actual):	0.8230
Part Number:	pps12-y-007.5	P(bar):	29.94
Test Velocity (fps):	29 - 42 - 52 - 59	T(°F):	35

Calibration Results

Velocity (fps)	[illegible]	Cp [illegible]	Cp [illegible]	Cp [illegible]
29	0.2993	0.8177	0.8166	0.8171
42	0.6094	0.8179	0.8238	0.8209
52	0.9172	0.8278	0.8313	0.8295
59	1.2134	0.8225	0.8264	0.8244
		Overall Average		0.8230

Pitot tube S/N P-17 was calibrated in accordance with the Code of Federal Regulations, Title 40, Part 60 Appendix A, Method 2, Section 10.

Signature

Date

2142 E. Geer Street, Durham, North Carolina 27704 www.environsupply.com 919-956-9688 FAX: 919-682-0333

S-Type Pitot (S/N P-17) - Pitot Coefficient (Cp) vs Velocity (fps)
Environmental Supply Company Wind Tunnel - 01/12/2010
Pitot Coefficient (Cp)
0.8500
0.8400
0.8300
0.8200
0.8100
0.8000
Velocity (fps)
55
60
65
70
Cp (Actual)
Cp (Ave)
Average Cp

Environmental Supply Company, Inc.

Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID:	P-17	Date:	12-Jan-10
Standard Pitot ID:	001	Personnel:	DH
Cp(std):	0.99	Cp(actual):	0.8171
Part Number:	apsl2-y-037.5	P(bar):	29.94
Test Velocity (fps):	29	T(°F):	35

A-SIDE

ΔP (in. H_2O)	ΔP (in. H_2O)	Cp(s)	Deviation*
0.2021	0.2992	0.8136	-0.004
0.2038	0.3008	0.8149	-0.003
0.2058	0.2974	0.8235	0.006
0.2047	0.2992	0.8189	0.001
	AVERAGE	0.8177	0.003
		Std deviation	0.004

B-SIDE

ΔP (in. H_2O)	ΔP (in. H_2O)	Cp(s)	Deviation*
0.2031	0.3018	0.8121	-0.004
0.2021	0.2969	0.8168	0.000
0.2038	0.2987	0.8177	0.001
0.2058	0.3003	0.8196	0.003
	AVERAGE	0.8166	0.002
		Std deviation	0.003

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.001 (must be <0.010)

*Deviation = (Cp(s) - AVG Cp(s)) (must be <0.010)

Standard deviation of the deviations must be less than 0.02 for both

Pitot tube S/N P-17 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature

01/12/10

Date

2142 E. Geer Street, Durham, North Carolina 27704 www.environsupply.com [illegible]

Environmental Supply Company, Inc.
Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID:	P-17	Date:	12-Jan-10
Standard Pitot ID:	001	Personnel:	DH
Cp(std):	0.99	Cp(actual):	0.8209
Part Number:	pes12-y-007.5	P(bar):	29.94
Test Velocity (fps):	42	T(°F):	35

A-SIDE

ΔP std (in H2O)	ΔP s (in H2O)	Cp(s)	Deviation
0.4186	0.6079	0.8215	0.004
0.4143	0.6174	0.8110	-0.007
0.4209	0.6193	0.8162	-0.002
0.4237	0.6131	0.8230	0.005
	AVERAGE	0.8179	0.004
		Std deviation	0.005

B-SIDE

ΔP std (in H2O)	ΔP s (in H2O)	Cp(s)	Deviation
0.4200	0.6107	0.8210	-0.003
0.4186	0.6131	0.8180	-0.006
0.4143	0.6018	0.8214	-0.002
0.4209	0.5921	0.8347	0.011
	AVERAGE	0.8238	0.005
		Std deviation	0.007

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.006 (must be <0.010)

*Deviation = (Cp(s) - AVG Cp(s)) (must be <0.010)

Standard deviation of the deviations must be less than 0.02 for both

Pitot tube S/N P-17 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature Date

2142 E. Geer Street, Durham, North Carolina 27704 www.envirosupply.com 919-956-9688 FAX: 919-682-0333

S-type Pitot ID: P-17 Date: 12-Jan-10

Standard Pitot ID: 001 Personnel: DM

Cp(std): 0.99 Cp(average): 0.8295

Part Number: pps12-y-007.5 P(bar): 29.94

Test velocity (fps): 52 T(°F): 35

0.6499	0.9202	0.8320	0.004
0.6397	0.9215	0.8247	-0.003
0.6414	0.9273	0.8234	-0.004
0.6512	0.9247	0.8310	0.003
	AVERAGE	0.8278	0.004
		Std deviation	0.004

0.6279	0.9017	0.8327	0.001
0.6499	0.9045	0.8390	0.065
0.6397	0.9112	0.8295	0.001
0.6414	0.9260	0.8239	-0.007
	AVERAGE	0.8313	0.005
		Std deviation	0.006

$$Cp(s) = Cp(std) \times \frac{\Delta P(std)}{\Delta P(s)}$$

Cp(A) - Cp(B) = 0.004 (must be <0.010)

*Deviation = (Cp(s) - AVG Cp(s)) (must be <0.010)

Standard deviation of the deviations must be less than 0.02 for both

Pitot tube S/N P-17 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature

Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	P-17	Date:	12-Jan-10
Standard Pitot ID:	001	Personnel:	DH
Cp(std):	0.99	Cp(actual):	0.8244
Part Number:	pps12-y-007.5	P(bar):	29.94
Test Velocity (fps):	59	T(°F):	35

A-SIDE

ΔP std (in H_2O)	ΔP s (in H_2O)	Cp(s)	Deviation
0.8490	1.2251	0.8241	0.002
0.8430	1.2239	0.8216	-0.001
0.8434	1.2226	0.8223	0.000
0.8489	1.2316	0.8219	-0.001
	AVERAGE	0.8225	0.001
		Std deviation	0.001

B-SIDE

ΔP std (in H_2O)	ΔP s (in H_2O)	Cp(s)	Deviation
0.8306	1.2104	0.8201	-0.006
0.8305	1.1823	0.8297	0.003
0.8430	1.1977	0.8306	0.004
0.8434	1.2138	0.8252	-0.001
	AVERAGE	0.8264	0.004
		Std deviation	0.005

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.004 (must be ≤0.01)

*Deviation = (Cp(s) - AVG Cp(s)) (must be ≤0.01)

Standard deviation of the deviations must be less than 0.02 for both

Pitot tube S/N P-17 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature   01/12/10
Date

TRC TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 3 ° (<10°), α_2 = 2 ° (<10°) z = A tan γ = 0.000 (in.); (<0.125 in.)

β_1 = 2 ° (<5°), β_2 = 2 ° (<5°) w = A tan θ = 0.000 (in.); (<0.03125 in.)

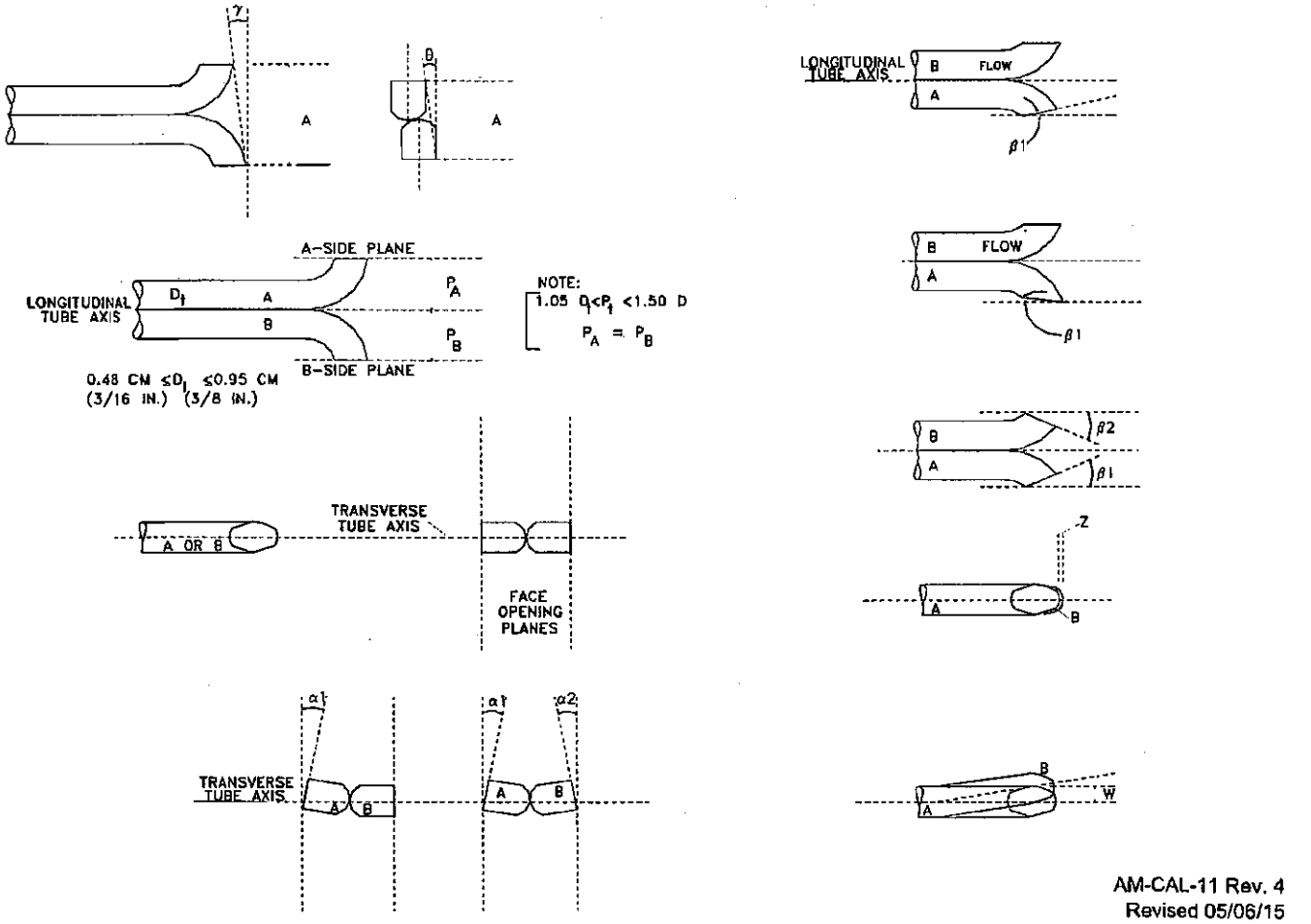
γ = 1.5 °, θ = 1 °, A = .958 (in.) P_A = 0.000 (in.), P_B = 0.000 (in.), *D_t = .375 (in.)

Comments: _____

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ~~x~~ yes ~~x~~ no **Pitot Repair or Wind Tunnel Calibration Required**

Pitot Tube No.: 17 Date: 8-5-16 Name: SVD



AM-CAL-11 Rev. 4
Revised 05/06/15

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? X yes ____ no

Pitot tube openings damaged? ____ yes (explain below) X no

α_1 = 2 ° (<10°), α_2 = 2 ° (<10°) z = A tan γ = 0.018 (in.); (<0.125 in.)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°) w = A tan θ = 0.018 (in.); (<0.03125 in.)

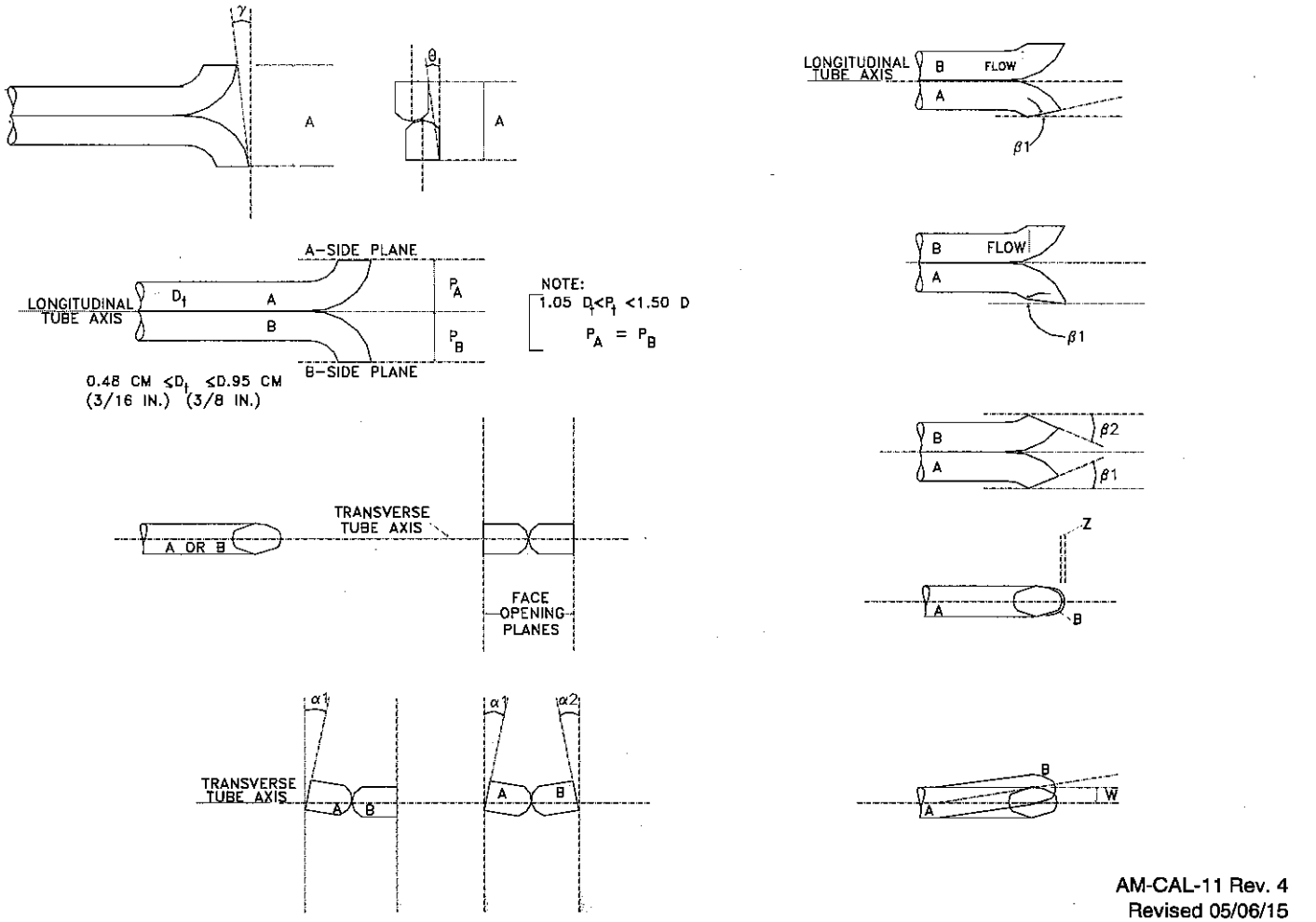
γ = 1 °, θ = 1 °, A = 1.055 (in.) P_A = 0.528 (in.), P_B = 0.528 (in.), *D_t = 0.375 (in.)

Comments:

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ____ yes X no

Pitot Tube No.: P-5C Date: 2/8/2016 Name: S. VanDaal



AM-CAL-11 Rev. 4
Revised 05/06/15

TRC TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 2 ° (<10°), α_2 = 1 ° (<10°) z = A tan γ = 0.000 (in.); (<0.125 in.)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°) w = A tan θ = 0.000 (in.); (<0.03125 in.)

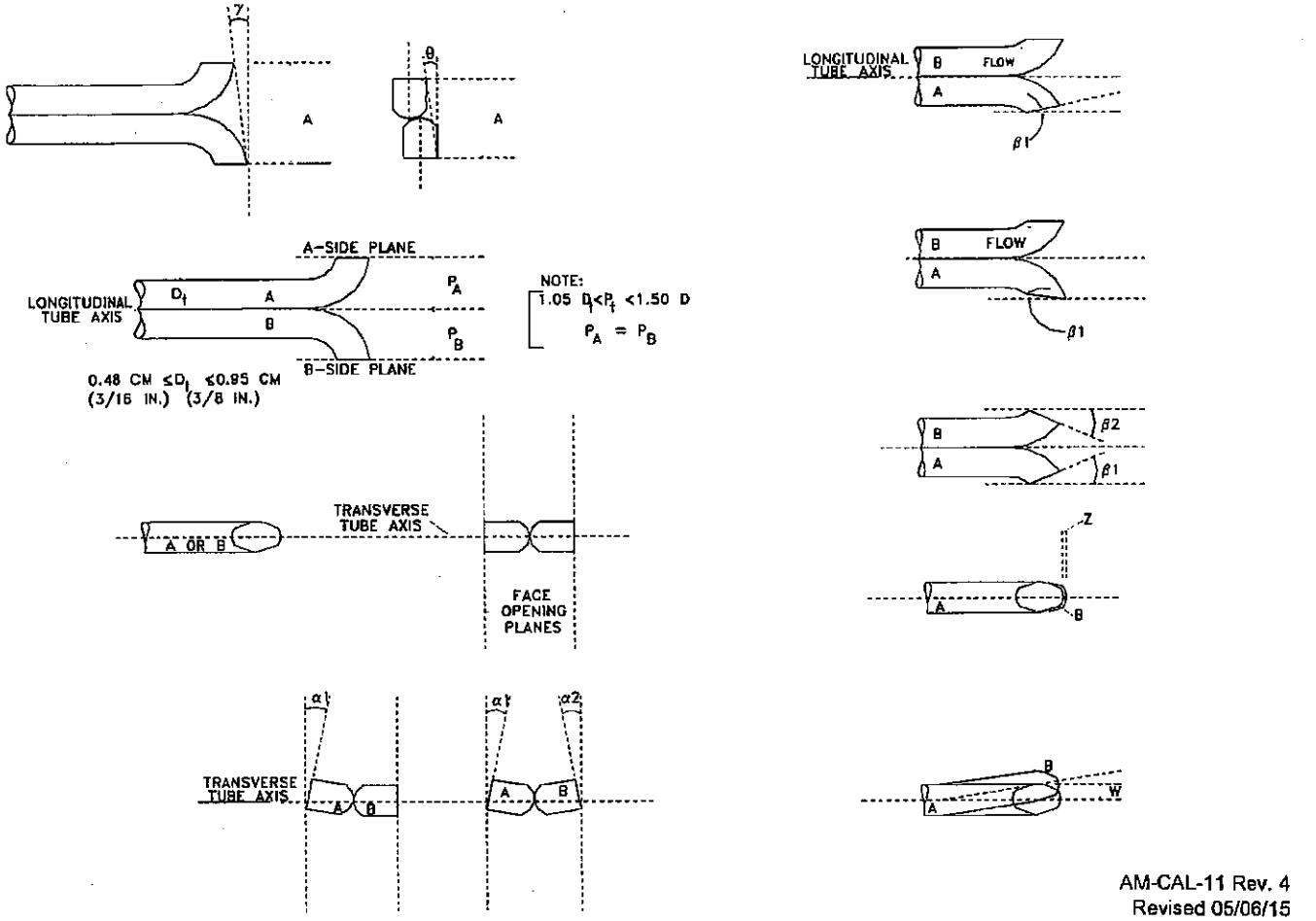
γ = 1 °, θ = 1 °, A = 1.065 (in.) P_A = 0.000 (in.), P_B = 0.000 (in.), *D_t = .375 (in.)

Comments: _____

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ~~x~~ yes x no **Pitot Repair or Wind Tunnel Calibration Required**

Pitot Tube No.: 5C Date: 8-5-16 Name: SUD



AM-CAL-11 Rev. 4
Revised 05/06/15

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 1 ° (<10°), α_2 = 2 ° (<10°) z = A sin γ = 0.033 (in.); (<0.125 in.)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°) w = A sin θ = 0.016 (in.); (<0.03125 in.)

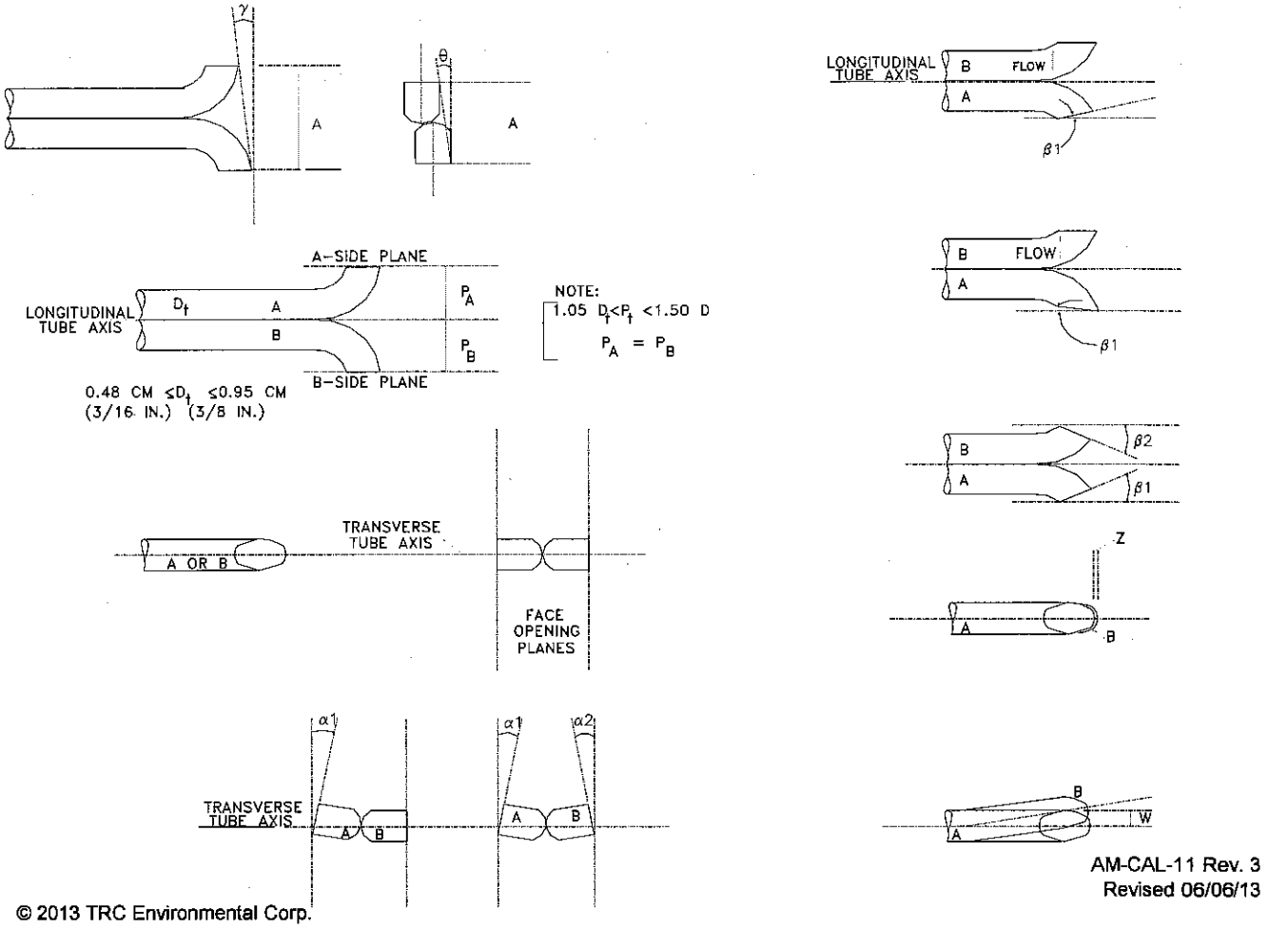
γ = 2 °, θ = 1 °, A = 0.937 (in.) P_A = 0.469 (in.), P_B = 0.469 (in.), *D_t = 0.375 (in.)

Comments:

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ____ yes X no

Pitot Tube No.: p-318 Date: 6/16/2016 Name: SVD



AM-CAL-11 Rev. 3
Revised 06/06/13

TRC TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 1 ° (<10°), α_2 = 2 ° (<10°) z = A tan γ = 0.000 (in.); (<0.125 in.)

β_1 = 1 ° (<5°), β_2 = 2 ° (<5°) w = A tan θ = 0.000 (in.); (<0.03125 in.)

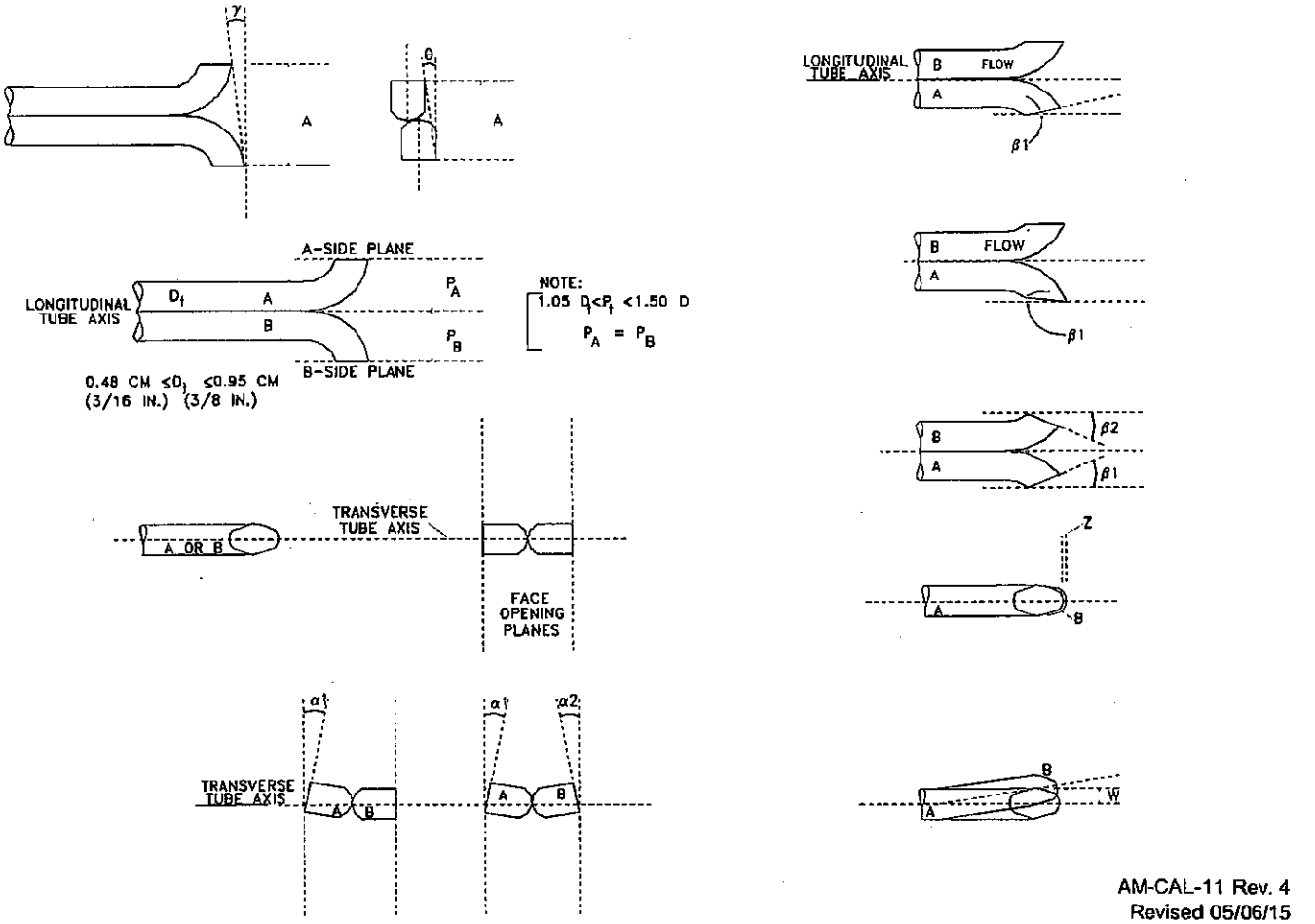
γ = 2 °, θ = 1 °, A = .937 (in.) P_A = 0.000 (in.), P_B = 0.000 (in.), *D_t = .375 (in.)

Comments: _____

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ~~x~~ yes ~~x~~ no **Pitot Repair or Wind Tunnel Calibration Required**

Pitot Tube No.: 318 Date: 8-5-16 Name: SUD



AM-CAL-11 Rev. 4
Revised 05/06/15

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 2 ° (<10°), α_2 = 3 ° (<10°) z = A sin γ = 0.026 (in.); (<0.125 in.)

β_1 = 1.5 ° (<5°), β_2 = 1.5 ° (<5°) w = A sin θ = 0.026 (in.); (<0.03125 in.)

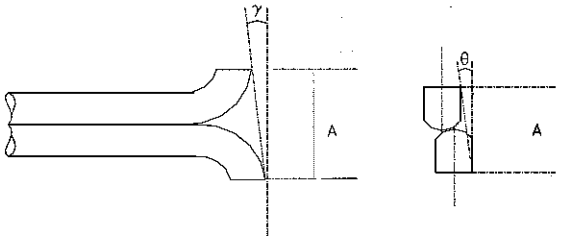
γ = 1.5 °, θ = 1.5 °, A = 0.977 (in.) P_A = 0.489 (in.), P_B = 0.489 (in.), *D_t = 0.375 (in.)

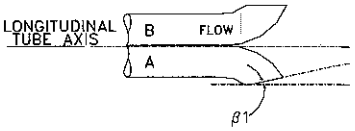
Comments:

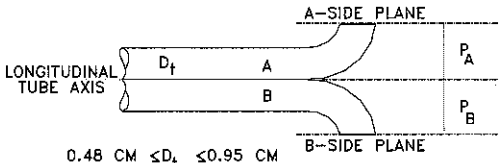
Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ____ yes X no

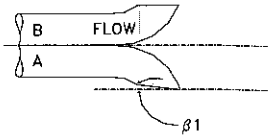
Pitot Tube No.: p-15 Date: 6/16/2016 Name: SVD

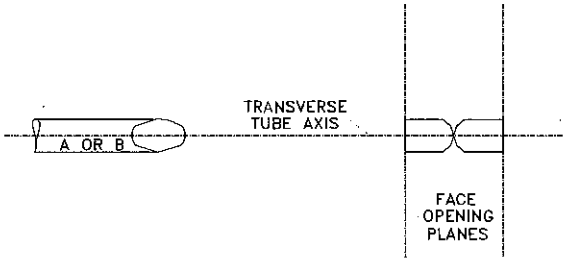


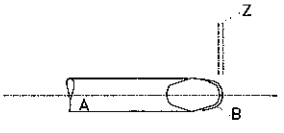


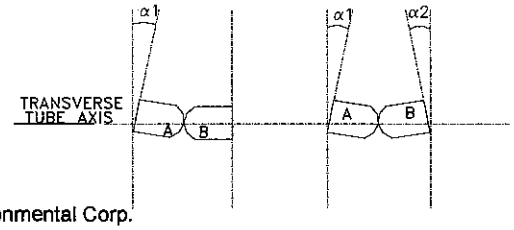


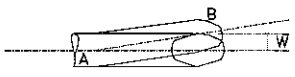
NOTE:
1.05 D_t<P_t <1.50 D
P_A = P_B











AM-CAL-11 Rev. 3
Revised 06/06/13

Wind Tunnel Pitot Calibration

Customer:	**TRC Environmental**		
S-type Pitot ID:	**P-15**	Date:	**7-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8233**
Part Number:	**pps12-y-007.5**	Barometric	
Test Velocity (fps):	**24 - 35 - 42 - 61**	Pressure (inHg):	**29.62**
		Temperature (°F):	**48**

Calibration Results

Velocity (fps)	Nominal ΔPs [inches H_2O]	$Cp_{(s)}$ A-Side	$Cp_{(s)}$ B-Side	$Cp_{(s)}$ Average
24	**0.2052**	**0.8124**	**0.8126**	**0.8125**
35	**0.4058**	**0.8249**	**0.8221**	**0.8235**
42	**0.6080**	**0.8116**	**0.8198**	**0.8157**
61	**1.1902**	**0.8368**	**0.8466**	**0.8417**
			Overall Average	**0.8233**

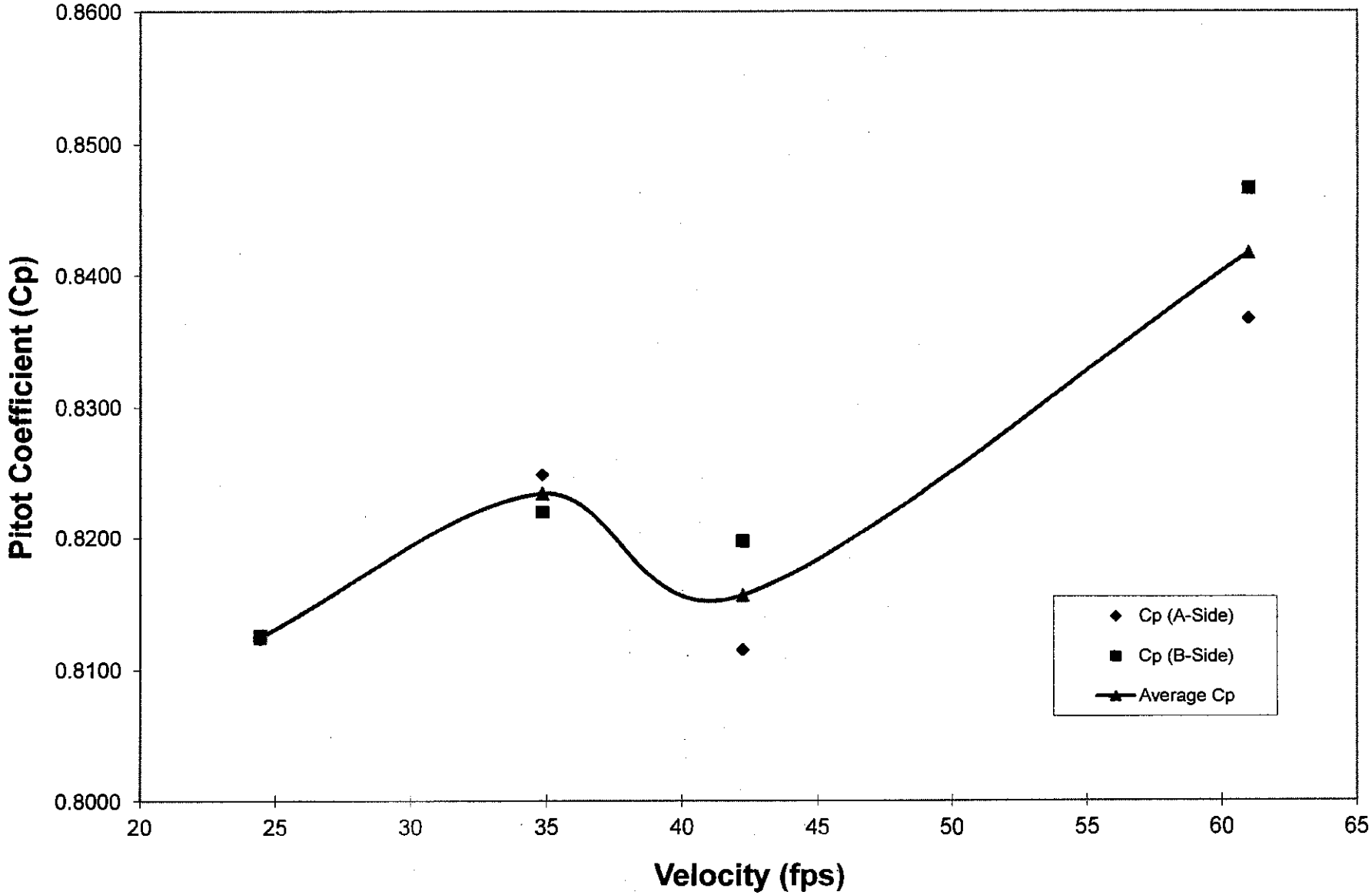
Pitot tube S/N P-15 was calibrated in accordance with the Code of Federal Regulations, Title 40, Part 60 Appendix A, Method 2, Section 10.

William Burt
Signature

3/7/2011
Date

S-Type Pitot (S/N P-15) - Pitot Coefficient (Cp) vs Velocity (fps)

Environmental Supply Company Wind Tunnel - 3/7/2011



Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-15**	Date:	**7-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8125**
Part Number:	**pps12-y-007.5**	Barometric Pressure (inHg):	**29.62**
Test Velocity (fps):	**24**	Temperature (°F):	**48**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.1379	**0.2036**	**0.8148**	0.0024
0.1380	**0.2053**	**0.8117**	-0.0007
0.1384	**0.2062**	**0.8111**	-0.0013
0.1388	**0.2063**	**0.8120**	-0.0003
	AVERAGE	**0.8124**	0.0012
		Std deviation	0.0016

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.1376	**0.2045**	**0.8121**	-0.0005
0.1377	**0.2046**	**0.8122**	-0.0004
0.1387	**0.2054**	**0.8135**	0.0009
0.1386	**0.2057**	**0.8126**	0.0000
	AVERAGE	**0.8126**	0.0005
		Std deviation	0.0007

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0002 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-15 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burk
Signature

3/7/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-15**	Date:	**7-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8235**
Part Number:	**pps12-y-007.5**	Barometric	
Test Velocity (fps):	**35**	Pressure (inHg):	**29.62**
		Temperature (°F):	**48**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.2833	**0.4074**	**0.8256**	0.0006
0.2808	**0.4055**	**0.8238**	-0.0011
0.2807	**0.4044**	**0.8248**	-0.0001
0.2813	**0.4045**	**0.8256**	0.0006
	AVERAGE	**0.8249**	0.0006
		Std deviation	0.0008

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.2802	**0.4062**	**0.8222**	0.0002
0.2791	**0.4066**	**0.8202**	-0.0019
0.2795	**0.4052**	**0.8222**	0.0001
0.2813	**0.4064**	**0.8237**	0.0016
	AVERAGE	**0.8221**	0.0009
		Std deviation	0.0014

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0029 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-15 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burgt
Signature

3/7/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-15**	Date:	**7-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8157**
Part Number:	**pps12-y-007.5**	Barometric	
Test Velocity (fps):	**42**	Pressure (inHg):	**29.62**
		Temperature (°F):	**48**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.4087	**0.6085**	**0.8113**	-0.0002
0.4113	**0.6120**	**0.8116**	0.0000
0.4113	**0.6128**	**0.8111**	-0.0005
0.4138	**0.6148**	**0.8122**	0.0006
	AVERAGE	**0.8116**	0.0003
		Std deviation	0.0005

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.4134	**0.5980**	**0.8231**	0.0033
0.4137	**0.6008**	**0.8215**	0.0017
0.4140	**0.6070**	**0.8176**	-0.0022
0.4155	**0.6102**	**0.8169**	-0.0029
	AVERAGE	**0.8198**	0.0025
		Std deviation	0.0030

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.008 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-15 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burke
Signature

3/7/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-15**	Date:	**7-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8417**
Part Number:	**pps12-y-007.5**	Barometric	
Test Velocity (fps):	**61**	Pressure (inHg):	**29.62**
		Temperature (°F):	**48**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.8600	**1.2043**	**0.8366**	-0.0002
0.8598	**1.2023**	**0.8372**	0.0004
0.8604	**1.2028**	**0.8373**	0.0005
0.8621	**1.2089**	**0.8360**	-0.0008
	AVERAGE	**0.8368**	0.0005
		Std deviation	0.0006

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.8630	**1.1646**	**0.8522**	0.0056
0.8610	**1.1776**	**0.8465**	-0.0001
0.8565	**1.1799**	**0.8435**	-0.0032
0.8591	**1.1810**	**0.8444**	-0.0023
	AVERAGE	**0.8466**	0.0028
		Std deviation	0.0039

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0099 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-15 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burkhart
Signature

3/7/2011
Date

TRC TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes _____ no

Pitot tube openings damaged? _____ yes (explain below) x no

α_1 = 2 ° (<10°), α_2 = 2 ° (<10°) z = A tan γ = 0.000 (in.); (<0.125 in.)

β_1 = 1.5 ° (<5°), β_2 = 1 ° (<5°) w = A tan θ = 0.000 (in.); (<0.03125 in.)

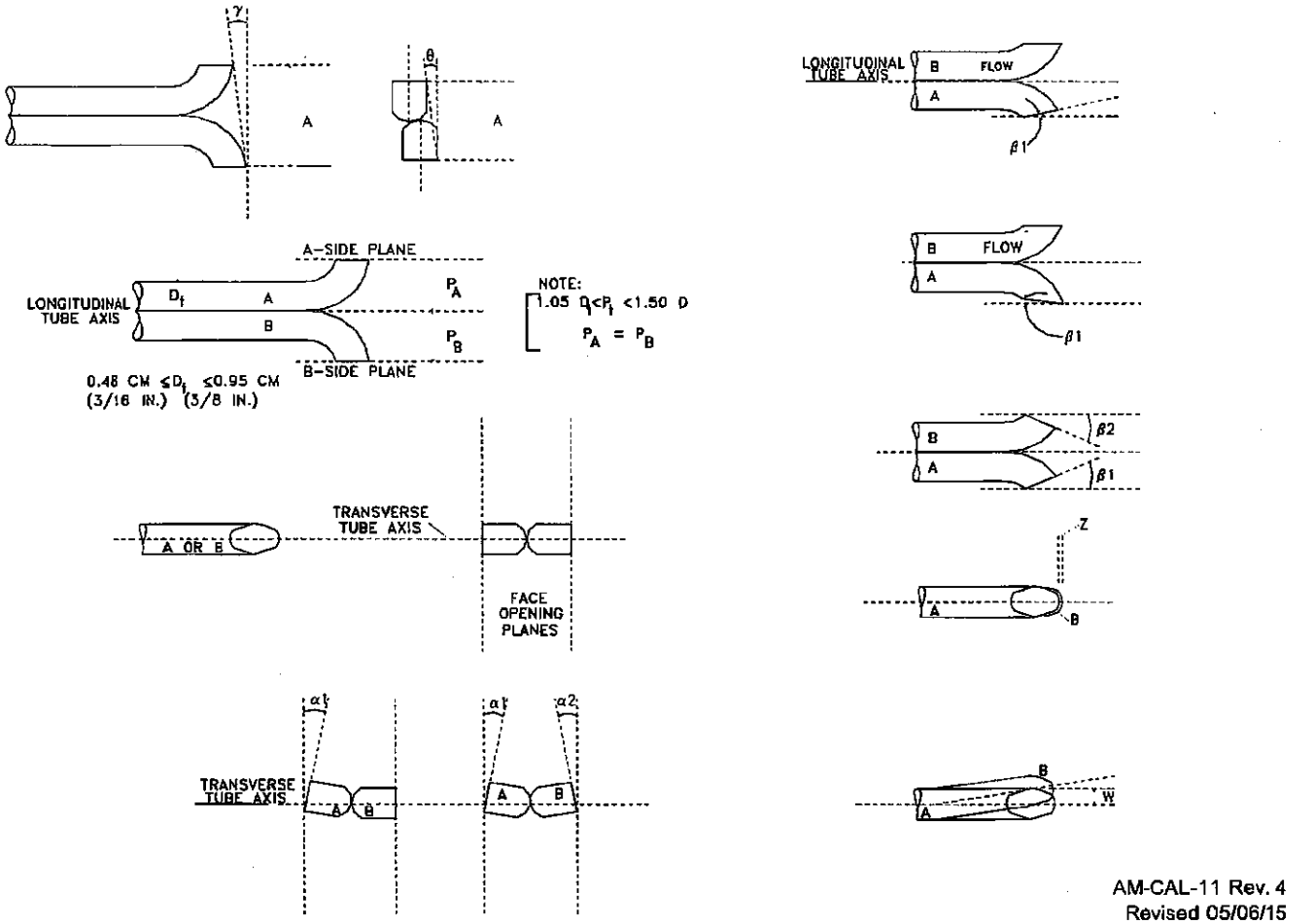
γ = 1 °, θ = 1 °, A = .977 (in.) P_A = 0.000 (in.), P_B = 0.000 (in.), *D_t = .375 (in.)

Comments: _____

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ✱ yes ✗ no **Pitot Repair or Wind Tunnel Calibration Required**

Pitot Tube No.: 15 Date: 8-5-16 Name: SKD



AM-CAL-11 Rev. 4
Revised 05/06/15

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 5 ° (<10°), α_2 = 5 ° (<10°) z = A sin γ = 0.000 (in.); (<0.125 in.)

β_1 = 2 ° (<5°), β_2 = 0 ° (<5°) w = A sin θ = 0.023 (in.); (<0.03125 in.)

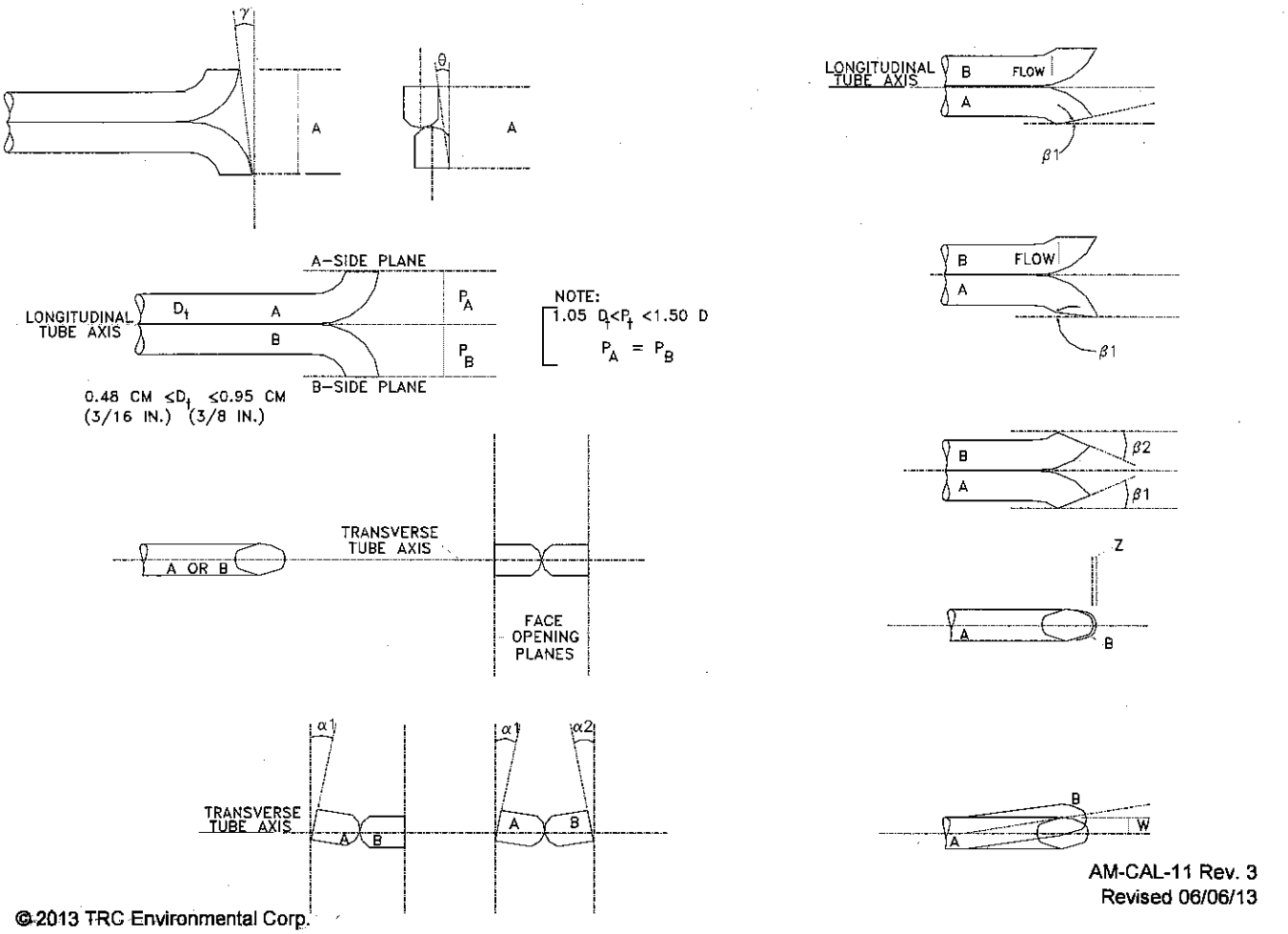
γ = 0 °, θ = 1.5 °, A = 0.887 (in.) P_A = 0.444 (in.), P_B = 0.444 (in.), *D_t = 0.375 (in.)

Comments:

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? ____ yes X no

Pitot Tube No.: p-19 Date: 6/16/2016 Name: SVD



AM-CAL-11 Rev. 3
Revised 06/06/13

Wind Tunnel Pitot Calibration

Customer:	**TRC Environmental**		
S-type Pitot ID:	**P-19**	Date:	**9-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8273**
Part Number:	**pps12-y-007.5**	Barometric Pressure (inHg):	**29.68**
Test Velocity (fps):	**25 - 35 - 43 - 61**	Temperature (°F):	**55**

Calibration Results

Velocity (fps)	Nominal ΔPs [inches H_2O]	$Cp_{(s)}$ A-Side	$Cp_{(s)}$ B-Side	$Cp_{(s)}$ Average
25	0.2009	0.8238	0.8317	0.8277
35	0.4042	0.8203	0.8263	0.8233
43	0.6021	0.8280	0.8264	0.8272
61	1.2046	0.8315	0.8308	0.8311
			Overall Average	0.8273

Pitot tube S/N P-19 was calibrated in accordance with the Code of Federal Regulations, Title 40, Part 60 Appendix A, Method 2, Section 10.

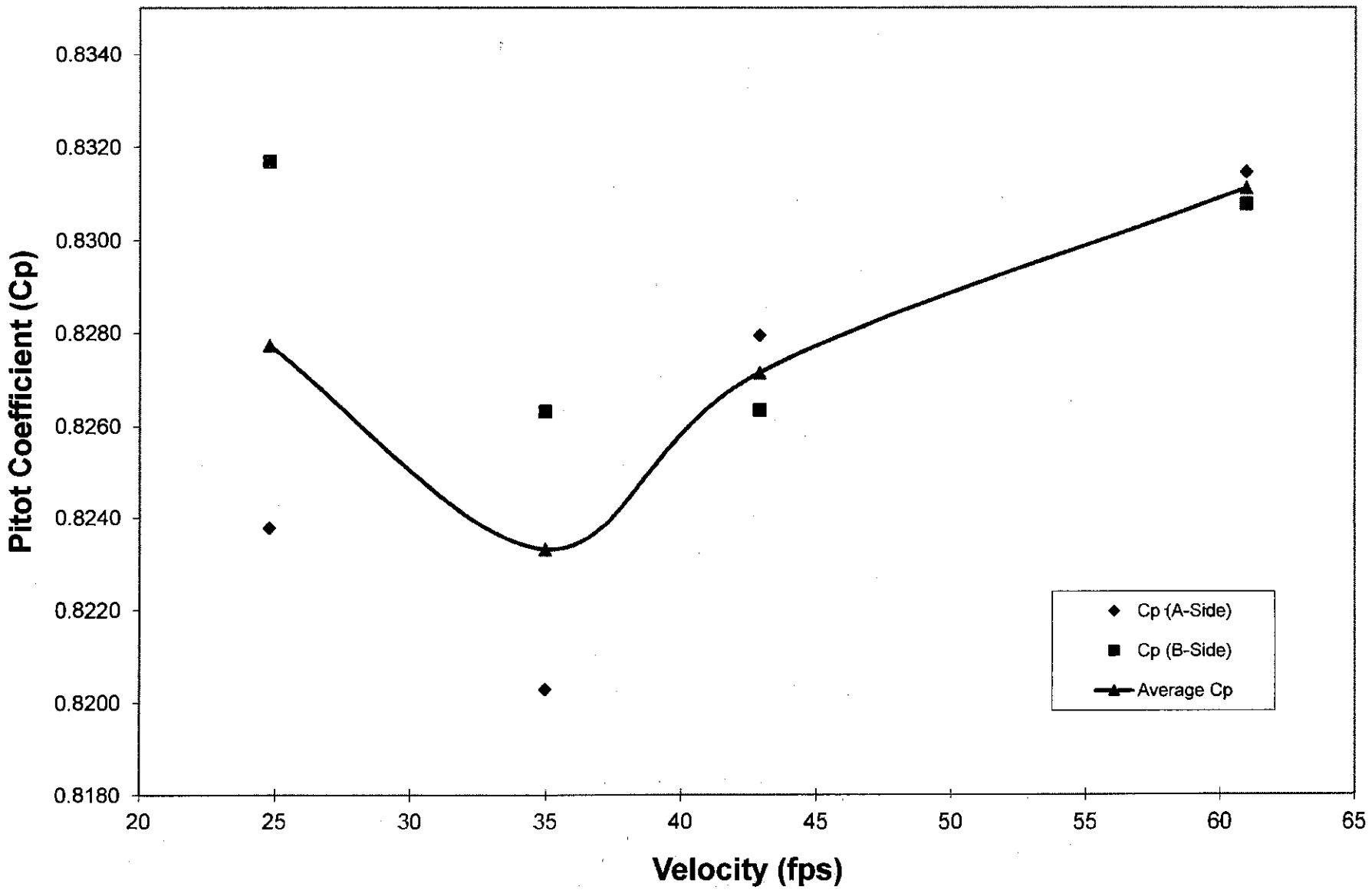
Signature

3/9/2011
Date

2142 E. Geer Street, Durham, North Carolina 27704 www.environsupply.com 919-956-9688 FAX: 919-682-0333

S-Type Pitot (S/N P-19) - Pitot Coefficient (Cp) vs Velocity (fps)

Environmental Supply Company Wind Tunnel - 3/9/2011



Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-19**	Date:	**9-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8277**
Part Number:	**pps12-y-007.5**	Barometric	
Test Velocity (fps):	**25**	Pressure (inHg):	**29.68**
		Temperature (°F):	**55**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.1399	**0.2036**	**0.8206**	-0.0031
0.1401	**0.2028**	**0.8228**	-0.0009
0.1417	**0.2030**	**0.8271**	0.0033
0.1408	**0.2030**	**0.8245**	0.0007
	AVERAGE	**0.8238**	0.0020
		Std deviation	0.0027

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.1408	**0.1981**	**0.8346**	0.0029
0.1399	**0.1999**	**0.8282**	-0.0035
0.1396	**0.1985**	**0.8302**	-0.0015
0.1405	**0.1981**	**0.8337**	0.0020
	AVERAGE	**0.8317**	0.0025
		Std deviation	0.0030

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0079 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-19 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burkhart
Signature

3/9/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-19**	Date:	**9-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8233**
Part Number:	**pps12-y-007.5**	Barometric Pressure (inHg):	**29.68**
Test Velocity (fps):	**35**	Temperature (°F):	**55**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.2805	**0.4090**	**0.8199**	-0.0004
0.2791	**0.4051**	**0.8217**	0.0014
0.2800	**0.4078**	**0.8203**	0.0000
0.2792	**0.4077**	**0.8193**	-0.0010
	AVERAGE	**0.8203**	0.0007
		Std deviation	0.0011

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.2786	**0.4011**	**0.8251**	-0.0012
0.2800	**0.3997**	**0.8286**	0.0023
0.2778	**0.4029**	**0.8221**	-0.0043
0.2812	**0.4005**	**0.8295**	0.0032
	AVERAGE	**0.8263**	0.0028
		Std deviation	0.0034

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0060 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-19 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

William Burkhart
Signature

3/9/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-19**	Date:	**9-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8272**
Part Number:	**pps12-y-007.5**	Barometric Pressure (inHg):	**29.68**
Test Velocity (fps):	**43**	Temperature (°F):	**55**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.4234	**0.5967**	**0.8339**	0.0060
0.4155	**0.5988**	**0.8247**	-0.0033
0.4192	**0.6034**	**0.8252**	-0.0028
0.4194	**0.5995**	**0.8280**	0.0001
	AVERAGE	**0.8280**	0.0030
		Std deviation	0.0043

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.4192	**0.6096**	**0.8210**	-0.0054
0.4222	**0.6007**	**0.8300**	0.0036
0.4174	**0.6019**	**0.8244**	-0.0019
0.4263	**0.6064**	**0.8301**	0.0037
	AVERAGE	**0.8264**	0.0037
		Std deviation	0.0045

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0016 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-19 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

D. William Burt
Signature

3/9/2011
Date

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-19**	Date:	**9-Mar-11**
Standard Pitot ID:	**001**	Personnel:	**WB**
Cp(std):	**0.99**	Cp(actual):	**0.8311**
Part Number:	**pps12-y-007.5**	Barometric Pressure (inHg):	**29.68**
Test Velocity (fps):	**61**	Temperature (°F):	**55**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.8523	**1.2101**	**0.8308**	-0.0006
0.8482	**1.1974**	**0.8332**	0.0018
0.8523	**1.2042**	**0.8329**	0.0014
0.8473	**1.2087**	**0.8289**	-0.0026
	AVERAGE	**0.8315**	0.0016
		Std deviation	0.0020

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.8443	**1.2098**	**0.8270**	-0.0037
0.8492	**1.2010**	**0.8325**	0.0017
0.8525	**1.2054**	**0.8326**	0.0018
0.8459	**1.2005**	**0.8310**	0.0002
	AVERAGE	**0.8308**	0.0019
		Std deviation	0.0026

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.0007 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both sides.

Pitot tube S/N P-19 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature

3/9/2011
Date

TRC TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? x yes ____ no

Pitot tube openings damaged? ____ yes (explain below) x no

α_1 = 4 ° (<10°), α_2 = 5 ° (<10°) z = A tan γ = 0.000 (in.); (<0.125 in.)

β_1 = 2 ° (<5°), β_2 = 0 ° (<5°) w = A tan θ = 0.000 (in.); (<0.03125 in.)

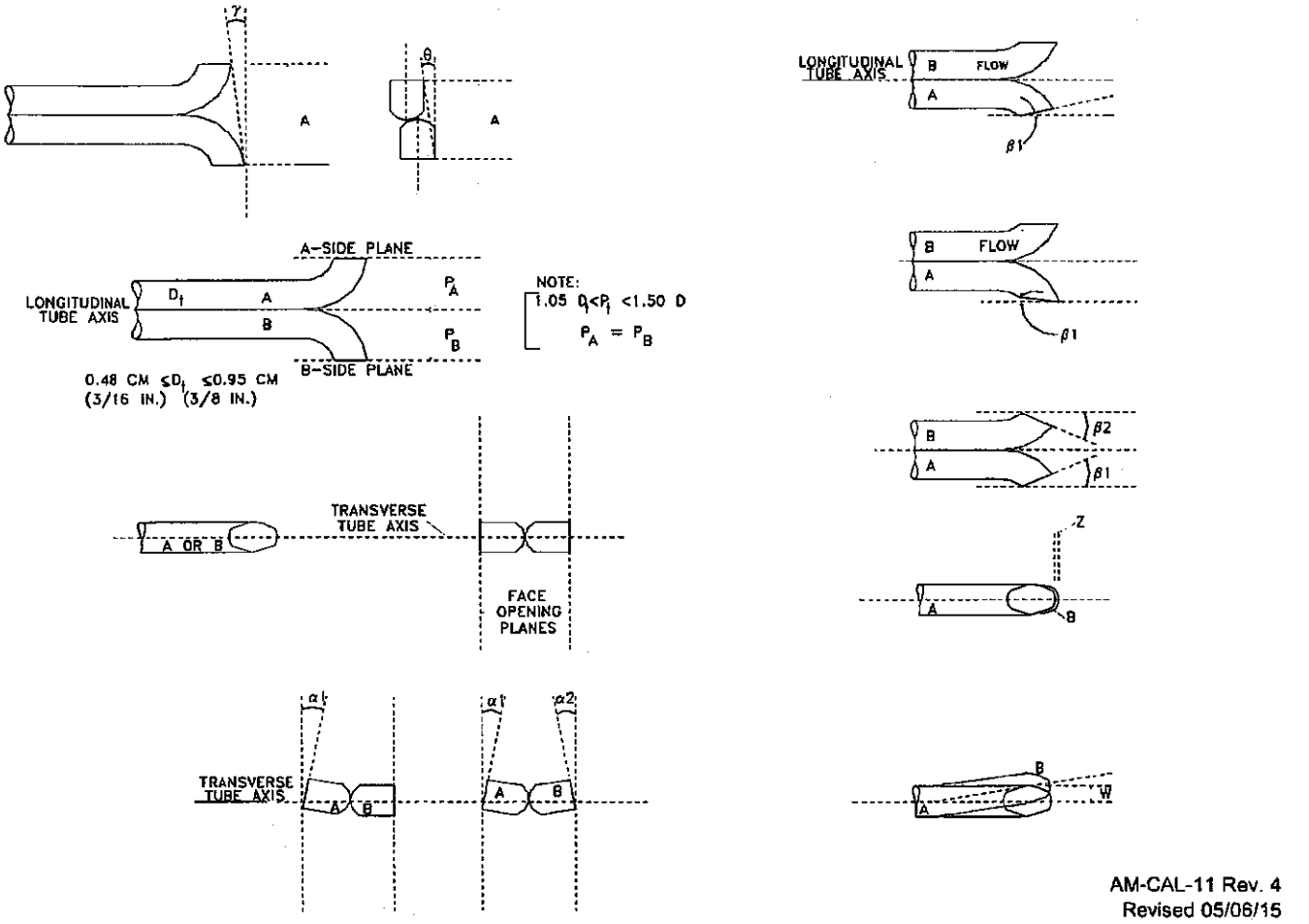
γ = 0 °, θ = 1.5 °, A = .887 (in.) P_A = 0.000 (in.), P_B = 0.000 (in.), *D_t = .375 (in.)

Comments: _____

Note: *D_t = Recommended nominal pitot tube diameter of 0.250 (in.) or 0.375 (in.) only.

Calibration required? * yes ^ no **Pitot Repair or Wind Tunnel Calibration Required**

Pitot Tube No.: 19 Date: 8-5-16 Name: SUD



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Revised 05/06/15

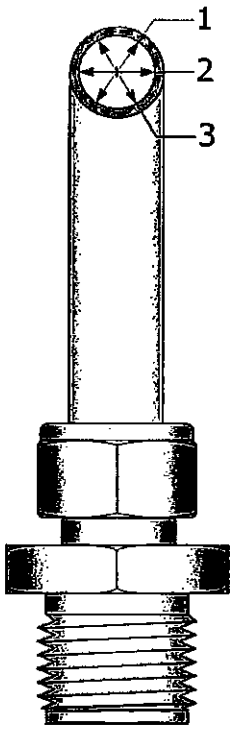
Nozzle Calibration

Date: 6/23/2016

Nozzle ID No.: EU5549

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.223	1	✓
0.223	2	✓
0.224	3	✓

PASS - acceptable measurements found

Average
0.223

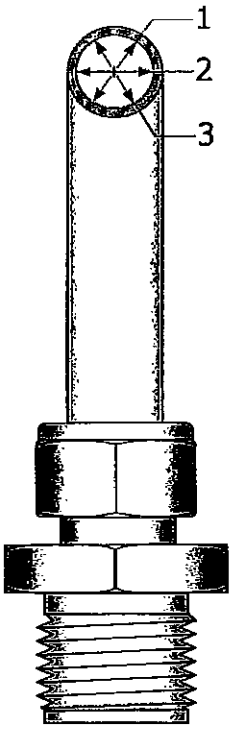
Nozzle Calibration

Date: 6/23/2016

Nozzle ID No.: EU6417

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.224	1	✓
0.224	2	✓
0.224	3	✓

PASS - acceptable measurements found

Average
0.224

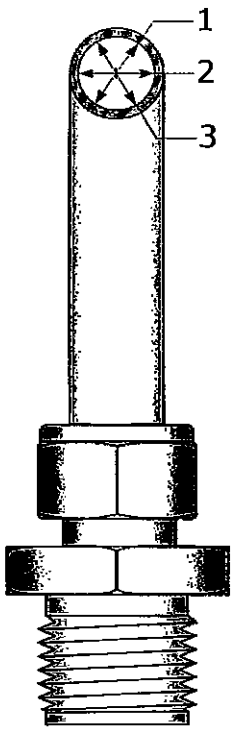
Nozzle Calibration

Date: 6/22/2016

Nozzle ID No.: EU6532

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.180	1	✓
0.180	2	✓
0.180	3	✓

PASS - acceptable measurements found

Average
0.180

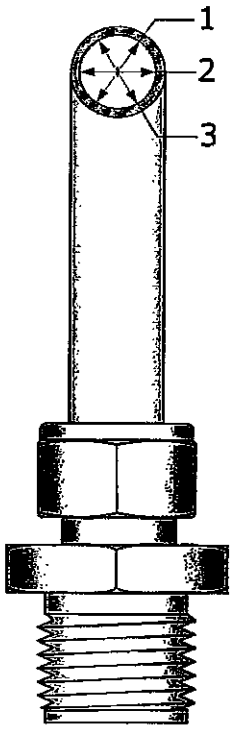
Nozzle Calibration

Date: 6/22/2016

Nozzle ID No.: EU8901 Outlet

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.210	1	✓
0.210	2	✓
0.210	3	✓

PASS - acceptable measurements found

Average
0.210

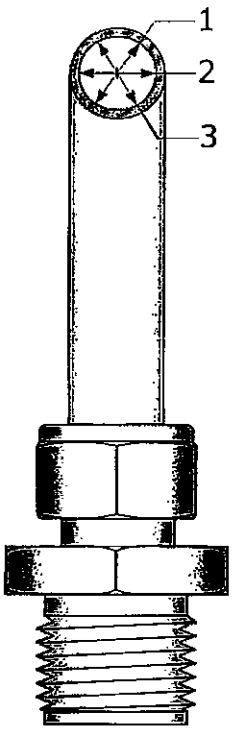
Nozzle Calibration

Date: 6/22/2016

Nozzle ID No.: EU8901 Inlet

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.185	1	✓
0.185	2	✓
0.185	3	✓

PASS - acceptable measurements found

Average
0.185

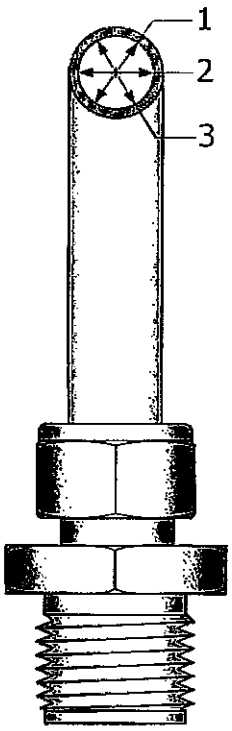
Nozzle Calibration

Date: 6/21/2016

Nozzle ID No.: EU9203 East

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.223	1	√
0.223	2	√
0.224	3	√

PASS - acceptable measurements found

Average
0.223

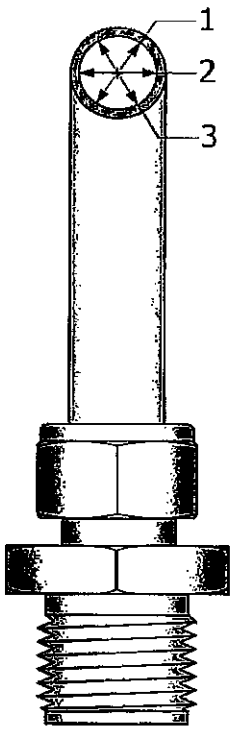
Nozzle Calibration

Date: 6/21/2016

Nozzle ID No.: EU9203 West

Analyst: RFW

Maximum - Minimum ≤ 0.004 inches



Pre Test		Post Test
0.224	1	✓
0.224	2	✓
0.224	3	✓

PASS - acceptable measurements found

Average
0.224

TRC

METHOD 5 PRETEST CONSOLE CALIBRATION USING CALIBRATED CRITICAL ORIFICES
4-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1420
Console Serial Number	
DGM Model Number	
DGM Serial Number	9366861

CALIBRATION CONDITIONS			
Date	Time	6-May-16	9:00
Barometric Pressure		29.90	in. Hg
Theoretical Critical Vacuum[1]		14.113	in. Hg
Calibration Technician			

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in. Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 \cdot °R^{1/2})/(in.\ Hg \cdot min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed (Θ) min.	DGM Orifice ΔH (P_m) in. H_2O	Volume Initial (V_{mi}) cubic feet	Volume Final (V_{mf}) cubic feet	Outlet Temp. Initial (t_{mi}) °F	Outlet Temp. Final (t_{mf}) °F	Serial Number	Orifice Coefficient K' see above[2]	Amb. Temp. Initial (t_{amb}) °F	Amb. Temp. Final (t_{amb}) °F	Actual Vacuum in. Hg
18.0	0.47	415.214	422.618	67.0	67.0	1385-12	0.3112	66.0	66.0	23.0
14.0	0.47	422.828	428.591	67.0	67.0	1385-12	0.3112	66.0	66.0	23.0
9.0	0.94	428.591	433.739	68.0	68.0	1385-16	0.4343	67.0	67.0	21.5
9.0	0.94	433.739	438.890	68.0	68.0	1385-16	0.4343	67.0	67.0	21.5
9.0	1.30	438.890	444.799	68.0	69.0	1385-18	0.4949	67.0	67.0	20.5
9.0	1.30	444.799	450.705	68.0	69.0	1385-18	0.4949	67.0	67.0	20.5
8.0	2.60	450.705	458.295	69.0	69.0	1385-27	0.7224	67.0	67.0	18.4
8.0	2.60	458.295	465.893	69.0	69.0	1385-27	0.7224	67.0	67.0	18.4

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std. & Corr.	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($Vcr_{(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
7.422	0.412	7.303	0.406	0.984		0.406	1.613	-0.065
5.777	0.413	5.680	0.406	0.983	-0.001	0.406	1.613	-0.065
5.156	0.573	5.091	0.566	0.987		0.566	1.660	-0.018
5.159	0.573	5.091	0.566	0.987	0.002	0.566	1.660	-0.018
5.918	0.658	5.801	0.645	0.980		0.645	1.770	0.091
5.915	0.657	5.801	0.645	0.981	-0.004	0.645	1.770	0.091
7.619	0.952	7.527	0.941	0.988		0.941	1.670	-0.008
7.627	0.953	7.527	0.941	0.987	0.003	0.941	1.670	-0.008
				0.985	**Y Average**		**1.678**	**ΔH@ Average**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Y must be 0.980 - 1.02 ΔH@ must be 1.84 ± 0.25

Leak check must be performed before calibration.

Leak Check: Negative: 0 CFM (for 60 secs.) Must not exceed 0.02 cfm over 60 seconds.
Positive: Pass (Pass/Fail) ΔH between 5 and 7 in. H_2O, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Jordan Aragon Date: 6-May-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1420

Reference Calibrator Make: Fluke Model: 714 Serial No.: 8340051

Operator: Jordan Aragon Date: 05/06/16

Pretest: X Posttest:

TC Channel ID	Reference Temp. 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp. 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	52	52	0.00%	Pass	182	184	-0.21%	Pass
2	52	52	0.00%	Pass	182	184	-0.21%	Pass
3	52	52	0.00%	Pass	182	183	-0.10%	Pass
4	52	51	0.21%	Pass	182	182	0.00%	Pass
5	52	50	0.41%	Pass	132	131	0.24%	Pass
6	52	53	-0.20%	Pass	61	61	0.00%	Pass
7	52	52	0.00%	Pass	61	61	0.00%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp. 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp. 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	282	285	-0.40%	Pass	432	434	-0.22%	Pass
2	282	285	-0.40%	Pass	432	433	-0.11%	Pass
3	282	285	-0.40%	Pass	382	384	-0.24%	Pass
4	282	283	-0.10%	Pass	382	382	0.00%	Pass
5	182	182	0.00%	Pass	232	233	-0.14%	Pass
6	82	82	0.00%	Pass	102	102	0.00%	Pass
7	82	82	0.00%	Pass	102	102	0.00%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation: $\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$

QA/QC Check By: _____

Date: _____

TRC

METHOD 5 POSTTEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1420
Console Serial Number	
DGM Model Number	
DGM Serial Number	

CALIBRATION CONDITIONS			
Date	Time	4-Aug-16	10:00
Barometric Pressure		29.95	in. Hg
Theoretical Critical Vacuum[1]		14.136	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
15.0	1.20	386.007	395.905	71.0	72.0	1385-18	0.4949	68.0	68.0	22.0
15.0	1.20	395.905	405.731	72.0	72.0	1385-18	0.4949	68.0	68.0	22.0
15.0	1.20	405.731	415.566	72.0	73.0	1385-18	0.4949	68.0	68.0	22.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($V_{cr(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
9.872	0.658	9.676	0.645	0.980	-0.005	0.645	1.624	0.002
9.790	0.653	9.676	0.645	0.988	0.003	0.645	1.622	0.000
9.791	0.653	9.676	0.645	0.988	0.003	0.645	1.621	-0.002
Pretest Gamma	0.985	% Deviation	0.1	0.986	Y Average		1.622	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Post Calibration Acceptance Criteria is ≤ 5% Deviation

Leak check must be performed before calibration.

Leak Check:				
	Negative:	0	CFM (for 60 secs.)	Must not exceed 0.02 cfm over 60 seconds.
	Positive:	pass	(Pass/Fail)	ΔH between 5 and 7 inches, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 1-Aug-16

Signature: _____

Reviewed and Approved by: _____ Date: 08/04/16

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1420

Reference Calibrator Make: Fluke 714 Model: Z540 Serial No.: 8340051

Operator: SVD Date: 4-Aug

Pretest: _____ Posttest: X

TC Channel ID	Reference Temp 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	50	50	0.00%	Pass	100	101	-0.18%	Pass
2	50	51	-0.20%	Pass	100	99	0.18%	Pass
3	50	50	0.00%	Pass	100	100	0.00%	Pass
4	50	50	0.00%	Pass	100	100	0.00%	Pass
5	50	50	0.00%	Pass	100	100	0.00%	Pass
6	50	51	-0.20%	Pass	100	101	-0.18%	Pass
7	50	50	0.00%	Pass	100	101	-0.18%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	200	200	0.00%	Pass	300	300	0.00%	Pass
2	200	201	-0.15%	Pass	300	301	-0.13%	Pass
3	200	200	0.00%	Pass	300	300	0.00%	Pass
4	200	200	0.00%	Pass	300	300	0.00%	Pass
5	200	200	0.00%	Pass	300	301	-0.13%	Pass
6	200	201	-0.15%	Pass	300	301	-0.13%	Pass
7	200	200	0.00%	Pass	300	301	-0.13%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

TRC

METHOD 5 PRETEST CONSOLE CALIBRATION USING CALIBRATED CRITICAL ORIFICES
4-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	
Console Serial Number	1421
DGM Model Number	
DGM Serial Number	9366862

CALIBRATION CONDITIONS			
Date	Time	13-May-16	11:45
Barometric Pressure		29.80	in. Hg
Theoretical Critical Vacuum[1]		14.066	in. Hg
Calibration Technician		JFA	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in. Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.\ Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
18.0	0.46	791.817	799.173	70.0	71.0	1385-12	0.3112	73.0	73.0	21.0
15.0	0.46	799.173	805.304	71.0	72.0	1385-12	0.3112	73.0	73.0	21.0
10.0	0.85	805.304	810.954	72.0	72.0	1385-16	0.4343	73.0	73.0	20.0
10.0	0.85	810.954	816.632	72.0	72.0	1385-16	0.4343	73.0	73.0	20.0
17.0	1.20	816.632	827.588	72.0	73.0	1385-18	0.4949	73.0	74.0	19.0
11.0	1.20	827.588	834.789	73.0	73.0	1385-18	0.4949	74.0	74.0	19.0
7.0	2.50	834.789	841.209	73.0	74.0	1385-27	0.7224	74.0	75.0	16.0
7.0	2.50	841.209	847.736	74.0	74.0	1385-27	0.7224	75.0	75.0	16.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std. & Corr.	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($Vcr_{(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
7.300	0.406	7.230	0.402	0.990		0.402	1.595	0.002
6.073	0.405	6.025	0.402	0.992	-0.008	0.402	1.592	-0.001
5.597	0.560	5.606	0.561	1.002		0.561	1.511	-0.081
5.624	0.562	5.606	0.561	0.997	-0.001	0.561	1.511	-0.081
10.852	0.638	10.855	0.639	1.000		0.639	1.646	0.053
7.126	0.648	7.020	0.638	0.985	-0.007	0.638	1.646	0.053
6.367	0.910	6.518	0.931	1.024		0.931	1.620	0.027
6.467	0.924	6.515	0.931	1.007	0.016	0.931	1.620	0.027
				1.000	**Y Average**		**1.593**	**ΔH@ Average**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Y must be 0.980 - 1.02 ΔH@ must be 1.84 ± 0.25

Leak check must be performed before calibration.

Leak Check: Negative: 0 CFM (for 60 secs.) Must not exceed 0.02 cfm over 60 seconds.
Positive: Pass (Pass/Fail) ΔH between 5 and 7 in. H_2O, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Jordan F. Aragon Date: 13-May-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1421

Reference Calibrator Make: FLUKE Model: 714 Serial No.: 8340051

Operator: JFA Date: 05/13/16

Pretest: X Posttest: _____

TC Channel ID	Reference Temp. 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp. 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	32	30	0.41%	Pass	132	129	0.51%	Pass
2	32	30	0.41%	Pass	132	130	0.34%	Pass
3	32	30	0.41%	Pass	82	79	0.55%	Pass
4	32	30	0.41%	Pass	82	79	0.55%	Pass
5	32	30	0.41%	Pass	82	79	0.55%	Pass
6	32	30	0.41%	Pass	82	79	0.55%	Pass
7	32	30	0.41%	Pass	82	79	0.55%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp. 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp. 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	282	282	0.00%	Pass	332	330	0.20%	Pass
2	282	282	0.00%	Pass	332	330	0.20%	Pass
3	182	181	0.16%	Pass	332	331	0.13%	Pass
4	182	180	0.56%	Pass	182	181	0.19%	Pass
5	182	180	0.56%	Pass	182	181	0.19%	Pass
6	182	180	0.56%	Pass	182	181	0.19%	Pass
7	182	180	0.56%	Pass	182	181	0.19%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation: $\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$

QA/QC Check By: _____

Date: _____

AM-CAL-20 Rev. 1
Revised 04/17/2015

TRC

METHOD 5 POSTTEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1421
Console Serial Number	
DGM Model Number	
DGM Serial Number	

CALIBRATION CONDITIONS			
Date	Time	2-Aug-16	11
Barometric Pressure		29.950	in. Hg
Theoretical Critical Vacuum[1]		14.136	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
16.0	0.85	355.321	364.414	69.0	69.0	1385-16	0.4343	68.0	68.0	20.0
15.0	0.85	364.414	372.820	69.0	70.0	1385-16	0.4343	68.0	68.0	20.0
16.0	0.85	372.820	381.815	70.0	70.0	1385-16	0.4343	68.0	68.0	20.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($V_{cr(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
9.104	0.569	9.057	0.566	0.995	-0.009	0.566	1.498	0.001
8.408	0.561	8.491	0.566	1.010	0.006	0.566	1.497	0.000
8.989	0.562	9.057	0.566	1.008	0.003	0.566	1.495	-0.001
Pretest Gamma	1.000	% Deviation	0.4	1.004	Y Average		1.497	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Post Calibration Acceptance Criteria is ≤ 5% Deviation

Leak check must be performed before calibration.

Leak Check:			
	Negative:	0 CFM (for 60 secs.)	Must not exceed 0.02 cfm over 60 seconds.
	Positive:	pass (Pass/Fail)	ΔH between 5 and 7 inches, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 2-Aug-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1421

Reference Calibrator Make: fluke 714 Model: z540 Serial No.: 8340051

Operator: SVD Date: 2-Aug

Pretest: Posttest: x

TC Channel ID	Reference Temp 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	50	50	0.00%	Pass	100	99	0.18%	Pass
2	50	50	0.00%	Pass	100	100	0.00%	Pass
3	50	51	-0.20%	Pass	100	100	0.00%	Pass
4	50	50	0.00%	Pass	100	100	0.00%	Pass
5	50	50	0.00%	Pass	100	101	-0.18%	Pass
6	50	50	0.00%	Pass	100	101	-0.18%	Pass
7	50	50	0.00%	Pass	100	101	-0.18%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	200	201	-0.15%	Pass	300	300	0.00%	Pass
2	200	200	0.00%	Pass	300	301	-0.13%	Pass
3	200	200	0.00%	Pass	300	301	-0.13%	Pass
4	200	201	-0.15%	Pass	300	300	0.00%	Pass
5	200	201	-0.15%	Pass	300	300	0.00%	Pass
6	200	200	0.00%	Pass	300	300	0.00%	Pass
7	200	200	0.00%	Pass	300	300	0.00%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

TRC

METHOD 5 PRETEST CONSOLE CALIBRATION USING CALIBRATED CRITICAL ORIFICES
4-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1424
Console Serial Number	
DGM Model Number	
DGM Serial Number	9739325

CALIBRATION CONDITIONS			
Date	Time	6-Jun-16	11
Barometric Pressure		29.75	in. Hg
Theoretical Critical Vacuum[1]		14.042	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in. Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*{}^oR^{1/2})/(in.\ Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
15.0	0.48	642.778	648.811	72.0	73.0	1385-12	0.3112	76.0	76.0	18.0
16.0	0.48	648.911	655.467	73.0	74.0	1385-12	0.3112	76.0	76.0	18.0
13.0	0.96	655.467	662.857	74.0	75.0	1385-16	0.4343	76.0	76.0	17.0
11.0	0.96	662.857	669.168	75.0	75.0	1385-16	0.4343	76.0	76.0	17.0
11.0	1.20	669.168	676.331	75.0	75.0	1385-18	0.4949	76.0	76.0	16.0
11.0	1.20	676.331	683.505	75.0	76.0	1385-18	0.4949	76.0	76.0	16.0
10.0	2.70	683.505	692.955	76.0	76.0	1385-27	0.7224	76.0	76.0	14.0
10.0	2.70	692.955	702.378	76.0	77.0	1385-27	0.7224	76.0	76.0	14.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std. & Corr.	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($Vcr_{(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
5.955	0.397	5.998	0.400	1.007		0.400	1.670	-0.025
6.459	0.404	6.398	0.400	0.991	0.003	0.400	1.667	-0.028
7.276	0.560	7.255	0.558	0.997		0.558	1.712	0.018
6.208	0.564	6.139	0.558	0.989	-0.002	0.558	1.711	0.016
7.050	0.641	6.995	0.636	0.992		0.636	1.649	-0.046
7.054	0.641	6.995	0.636	0.992	-0.004	0.636	1.647	-0.047
9.318	0.932	9.283	0.928	0.996		0.928	1.751	0.056
9.283	0.928	9.283	0.928	1.000	0.003	0.928	1.749	0.055
				0.996	**Y Average**		**1.694**	**ΔH@ Average**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Y must be 0.980 - 1.02 ΔH@ must be 1.84 ± 0.25

Leak check must be performed before calibration.

Leak Check:			
	Negative:	0.001 CFM (for 60 secs.)	Must not exceed 0.02 cfm over 60 seconds.
	Positive:	PASS (Pass/Fail)	ΔH between 5 and 7 in. H_2O, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 6-Jun-16

Signature: *(signature on file)*

Reviewed and Approved by: Jordan F Aragon Date: 06/06/16

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1424

Reference Calibrator Make: FLUKE Model: 714 Serial No.: 8340051

Operator: SVD Date: 06/06/16

Pretest: X Posttest:

TC Channel ID	Reference Temp. 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp. 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	32	30	0.41%	**Pass**	82	81	0.18%	**Pass**
2	32	31	0.20%	**Pass**	82	80	0.37%	**Pass**
3	32	30	0.41%	**Pass**	82	80	0.37%	**Pass**
4	32	31	0.20%	**Pass**	82	81	0.18%	**Pass**
5	32	30	0.41%	**Pass**	82	80	0.37%	**Pass**
6	32	30	0.41%	**Pass**	82	81	0.18%	**Pass**
7	32	31	0.20%	**Pass**	82	80	0.37%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

TC Channel ID	Reference Temp. 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp. 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	132	133	-0.17%	**Pass**	332	334	-0.25%	**Pass**
2	132	132	0.00%	**Pass**	332	334	-0.25%	**Pass**
3	132	131	0.17%	**Pass**	332	333	-0.13%	**Pass**
4	132	130	0.34%	**Pass**	332	333	-0.13%	**Pass**
5	132	130	0.34%	**Pass**	332	330	0.25%	**Pass**
6	132	131	0.17%	**Pass**	332	331	0.13%	**Pass**
7	132	131	0.17%	**Pass**	332	331	0.13%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation: $$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: JFA

Date: 6/6/2016

METHOD 5 POSTTEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1424
Console Serial Number	
DGM Model Number	
DGM Serial Number	9739325

CALIBRATION CONDITIONS			
Date	Time	2-Aug-16	11
Barometric Pressure		29.950	in. Hg
Theoretical Critical Vacuum[1]		14.136	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
15.0	0.88	174.726	183.231	68.0	69.0	1385-16	0.4343	68.0	68.0	18.0
15.0	0.88	183.231	191.627	69.0	70.0	1385-16	0.4343	68.0	68.0	18.0
30.0	0.88	191.627	208.693	70.0	71.0	1385-16	0.4343	68.0	68.0	18.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($V_{cr(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
8.524	0.568	8.491	0.566	0.996	-0.005	0.566	1.553	0.003
8.399	0.560	8.491	0.566	1.011	0.010	0.566	1.550	0.000
17.039	0.568	16.982	0.566	0.997	-0.005	0.566	1.547	-0.003
Pretest Gamma	0.996	**% Deviation**	0.5	1.001	Y Average		1.550	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Post Calibration Acceptance Criteria is ≤ 5% Deviation

Leak check must be performed before calibration.

Leak Check: Negative: 0 CFM (for 60 secs.) Must not exceed 0.02 cfm over 60 seconds.
Positive: pass (Pass/Fail) ΔH between 5 and 7 inches, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 2-Aug-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1424

Reference Calibrator Make: fluke 714 Model: Z540 Serial No.: 8340051

Operator: SVD Date: 2-Aug

Pretest: Posttest: x

TC Channel ID	Reference Temp 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	50	51	-0.20%	**Pass**	100	101	-0.18%	**Pass**
2	50	50	0.00%	**Pass**	100	100	0.00%	**Pass**
3	50	50	0.00%	**Pass**	100	100	0.00%	**Pass**
4	50	50	0.00%	**Pass**	100	99	0.18%	**Pass**
5	50	50	0.00%	**Pass**	100	99	0.18%	**Pass**
6	50	51	-0.20%	**Pass**	100	100	0.00%	**Pass**
7	50	51	-0.20%	**Pass**	100	100	0.00%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

TC Channel ID	Reference Temp 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	200	200	0.00%	**Pass**	300	300	0.00%	**Pass**
2	200	201	-0.15%	**Pass**	300	301	-0.13%	**Pass**
3	200	201	-0.15%	**Pass**	300	300	0.00%	**Pass**
4	200	200	0.00%	**Pass**	300	300	0.00%	**Pass**
5	200	200	0.00%	**Pass**	300	300	0.00%	**Pass**
6	200	201	-0.15%	**Pass**	300	301	-0.13%	**Pass**
7	200	200	0.00%	**Pass**	300	301	-0.13%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

METHOD 5 PRETEST CONSOLE CALIBRATION USING CALIBRATED CRITICAL ORIFICES
4-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1490
Console Serial Number	L00354
DGM Model Number	
DGM Serial Number	9366865

CALIBRATION CONDITIONS			
Date	Time	5-May-16	11:20
Barometric Pressure		29.85	in. Hg
Theoretical Critical Vacuum[1]		14.089	in. Hg
Calibration Technician		JFA/SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in. Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*{}^oR^{1/2})/(in.\ Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
13.0	0.50	509.685	515.103	69.0	69.0	1385-12	0.3112	68.0	68.0	22.0
16.0	0.50	515.103	521.783	69.0	69.0	1385-12	0.3112	68.0	68.0	22.0
9.0	0.96	521.783	526.935	69.0	69.0	1385-16	0.4343	68.0	68.0	20.0
12.0	0.96	526.935	533.817	69.0	70.0	1385-16	0.4343	68.0	68.0	20.0
10.0	1.20	533.817	540.379	70.0	70.0	1385-18	0.4949	68.0	68.0	19.0
8.0	1.20	540.379	545.620	70.0	70.0	1385-18	0.4949	68.0	68.0	19.0
8.0	2.60	502.173	509.685	68.0	69.0	1385-27	0.7224	68.0	68.0	17.0
6.0	2.60	496.615	502.173	68.0	68.0	1385-27	0.7224	68.0	68.0	17.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std. & Corr.	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($Vcr_{(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
5.402	0.416	5.255	0.404	0.973		0.404	1.719	0.037
6.660	0.416	6.468	0.404	0.971	-0.014	0.404	1.719	0.037
5.142	0.571	5.078	0.564	0.987		0.564	1.699	0.016
6.863	0.572	6.770	0.564	0.987	0.001	0.564	1.697	0.015
6.541	0.654	6.429	0.643	0.983		0.643	1.634	-0.048
5.224	0.653	5.143	0.643	0.984	-0.003	0.643	1.634	-0.048
7.535	0.942	7.507	0.938	0.996		0.938	1.678	-0.005
5.581	0.930	5.631	0.938	1.009	0.016	0.938	1.679	-0.003
				0.986	**Y Average**		**1.682**	**ΔH@ Average**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Y must be 0.980 - 1.02 ΔH@ must be 1.84 ± 0.25

Leak check must be performed before calibration.

Leak Check:			
	Negative:	0 CFM (for 60 secs.)	Must not exceed 0.02 cfm over 60 seconds.
	Positive:	pass (Pass/Fail)	ΔH between 5 and 7 in. H_2O, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Jordan Aragon/Steven van Daal Date: 5-May-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1490

Reference Calibrator Make: FLUKE Model: 714 Serial No.: 8340051

Operator: JFA/SVD Date: 05/05/16

Pretest: X Posttest:

TC Channel ID	Reference Temp. 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp. 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	82	81	0.18%	**Pass**	182	183	-0.16%	**Pass**
2	82	81	0.18%	**Pass**	182	182	0.00%	**Pass**
3	82	81	0.18%	**Pass**	182	182	0.00%	**Pass**
4	42	40	0.40%	**Pass**	61	59	0.38%	**Pass**
5	100	98	0.36%	**Pass**	150	149	0.16%	**Pass**
6	50	49	0.20%	**Pass**	70	69	0.19%	**Pass**
7	50	50	0.00%	**Pass**	70	70	0.00%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

TC Channel ID	Reference Temp. 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp. 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	382	382	0.00%	**Pass**	532	531	0.10%	**Pass**
2	382	382	0.00%	**Pass**	532	531	0.10%	**Pass**
3	382	381	0.12%	**Pass**	532	530	0.20%	**Pass**
4	80	78	0.37%	**Pass**	100	98	0.36%	**Pass**
5	200	200	0.00%	**Pass**	300	300	0.00%	**Pass**
6	100	99	0.18%	**Pass**	130	129	0.17%	**Pass**
7	90	90	0.00%	**Pass**	130	130	0.00%	**Pass**
8			0.00%	**Pass**			0.00%	**Pass**
9			0.00%	**Pass**			0.00%	**Pass**
10			0.00%	**Pass**			0.00%	**Pass**

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

TRC

METHOD 5 POSTTEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1490
Console Serial Number	
DGM Model Number	
DGM Serial Number	

CALIBRATION CONDITIONS			
Date	Time	2-Aug-16	11
Barometric Pressure		29.950	in. Hg
Theoretical Critical Vacuum[1]		14.136	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
15.0	0.98	203.883	212.505	70.0	71.0	1385-16	0.4343	68.0	68.0	22.0
20.0	0.98	212.539	224.055	71.0	72.0	1385-16	0.4343	68.0	68.0	22.0
23.0	0.98	224.075	236.992	72.0	73.0	1385-16	0.4343	68.0	68.0	22.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($V_{cr(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
8.611	0.574	8.491	0.566	0.986	-0.009	0.566	1.724	0.003
11.479	0.574	11.321	0.566	0.986	-0.009	0.566	1.720	0.000
12.852	0.559	13.020	0.566	1.013	0.018	0.566	1.717	-0.003
Pretest Gamma	0.986	% Deviation	0.9	0.995	Y Average		1.720	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Post Calibration Acceptance Criteria is ≤ 5% Deviation

Leak check must be performed before calibration.

Leak Check: Negative: 0 CFM (for 60 secs.) Must not exceed 0.02 cfm over 60 seconds.
Positive: pass (Pass/Fail) ΔH between 5 and 7 inches, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 2-Aug-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1490

Reference Calibrator Make: fluke 714 Model: z540 Serial No.: 8340051

Operator: SVD Date: 2-Aug

Pretest: _____ Posttest: x

TC Channel ID	Reference Temp 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	50	51	-0.20%	Pass	100	101	-0.18%	Pass
2	50	51	-0.20%	Pass	100	100	0.00%	Pass
3	50	51	-0.20%	Pass	100	100	0.00%	Pass
4	50	50	0.00%	Pass	100	101	-0.18%	Pass
5	50	50	0.00%	Pass	100	100	0.00%	Pass
6	50	50	0.00%	Pass	100	100	0.00%	Pass
7	50	50	0.00%	Pass	100	100	0.00%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	200	200	0.00%	Pass	300	301	-0.13%	Pass
2	200	200	0.00%	Pass	300	300	0.00%	Pass
3	200	201	-0.15%	Pass	300	300	0.00%	Pass
4	200	201	-0.15%	Pass	300	300	0.00%	Pass
5	200	200	0.00%	Pass	300	300	0.00%	Pass
6	200	200	0.00%	Pass	300	301	-0.13%	Pass
7	200	201	-0.15%	Pass	300	301	-0.13%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

TRC

METHOD 5 POSTTEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT CALIBRATION - ENGLISH UNITS

METER CONSOLE INFORMATION	
Console Model Number	1490
Console Serial Number	
DGM Model Number	
DGM Serial Number	

CALIBRATION CONDITIONS			
Date	Time	2-Aug-16	11
Barometric Pressure		29.950	in. Hg
Theoretical Critical Vacuum[1]		14.136	in. Hg
Calibration Technician		SVD	

FACTORS/CONVERSIONS		
Std. Temp.	528	°R
Std. Pressure	29.92	in. Hg
K_1	17.647	°R/in Hg

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3*°R^{1/2})/(in.Hg*min)$.

CALIBRATION DATA

Run Time	Metering Console					Critical Orifice				
Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp. Initial	Outlet Temp. Final	Serial Number	Orifice Coefficient	Amb. Temp. Initial	Amb. Temp. Final	Actual Vacuum
(Θ) min.	(P_m) in. H_2O	(V_{mi}) cubic feet	(V_{mf}) cubic feet	(t_{mi}) °F	(t_{mf}) °F		K' see above[2]	(t_{amb}) °F	(t_{amb}) °F	in. Hg
15.0	1.30	252.257	262.200	74.0	74.0	1385-16	0.4949	68.0	68.0	20.0
15.0	1.30	262.200	272.166	74.0	75.0	1385-16	0.4949	68.0	68.0	20.0
26.0	1.30	272.166	289.424	75.0	76.0	1385-16	0.4949	68.0	68.0	20.0

RESULTS

Standardized Data				Dry Gas Meter				
				Calibration Factor		Flowrate	ΔH@	
Dry Gas Meter		Critical Orifice		Value	Variation	Std & Corr	0.75 SCFM	Variation
($V_{m(std)}$) cubic feet	($Q_{m(std)}$) cfm	($V_{cr(std)}$) cubic feet	($Q_{cr(std)}$) cfm	(Y)	(ΔY)	($Q_{m(std)(corr)}$) cfm	(ΔH@) in. H2O	(ΔΔH@)
9.873	0.658	9.676	0.645	0.980	0.000	0.645	1.752	0.002
9.886	0.659	9.676	0.645	0.979	-0.001	0.645	1.750	0.001
17.088	0.657	16.771	0.645	0.981	0.001	0.645	1.747	-0.003
Pretest Gamma	0.986	% Deviation	0.6	0.980	Y Average		1.750	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptance tolerance of individual values from the average is ± 0.02.
Post Calibration Acceptance Criteria is ≤ 5% Deviation

Leak check must be performed before calibration.

Leak Check: Negative: 0 CFM (for 60 secs.) Must not exceed 0.02 cfm over 60 seconds.
Positive: pass (Pass/Fail) ΔH between 5 and 7 inches, must hold steady for 60 seconds.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3.

Technician Name: Steven van Daal Date: 2-Aug-16

Signature: *(signature on file)*

Reviewed and Approved by: _____ Date: _____

TRC

TEMPERATURE DISPLAY CALIBRATION FORM

Meter Console Number: 1490

Reference Calibrator Make: fluke 714 Model: z540 Serial No.: 8340051

Operator: SVD Date: 2-Aug

Pretest: _____ Posttest: x

TC Channel ID	Reference Temp 1, °F	Temperature Reading 1, °F	% Diff.	Criteria Met	Reference Temp 2, °F	Temperature Reading 2, °F	% Diff.	Criteria Met
1	50	51	-0.20%	Pass	100	101	-0.18%	Pass
2	50	51	-0.20%	Pass	100	100	0.00%	Pass
3	50	51	-0.20%	Pass	100	100	0.00%	Pass
4	50	50	0.00%	Pass	100	101	-0.18%	Pass
5	50	50	0.00%	Pass	100	100	0.00%	Pass
6	50	50	0.00%	Pass	100	100	0.00%	Pass
7	50	50	0.00%	Pass	100	100	0.00%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

TC Channel ID	Reference Temp 3, °F	Temperature Reading 3, °F	% Diff.	Criteria Met	Reference Temp 4, °F	Temperature Reading 4, °F	% Diff.	Criteria Met
1	200	200	0.00%	Pass	300	301	-0.13%	Pass
2	200	200	0.00%	Pass	300	300	0.00%	Pass
3	200	201	-0.13%	Pass	300	300	0.00%	Pass
4	200	201	-0.13%	Pass	300	300	0.00%	Pass
5	200	200	0.00%	Pass	300	301	-0.13%	Pass
6	200	201	-0.13%	Pass	300	301	-0.13%	Pass
7	200	201	-0.13%	Pass	300	301	-0.13%	Pass
8			0.00%	Pass			0.00%	Pass
9			0.00%	Pass			0.00%	Pass
10			0.00%	Pass			0.00%	Pass

Criteria: Percent difference (% Diff.) between the Reference Temperature and the Average Temperature can be only ± 1.5%°R.

% Difference Equation:

$$\frac{[(\text{Ref. Temp.} + 460) - (\text{Temp. Reading} + 460)] \times 100}{(\text{Ref. Temp.} + 460)}$$

QA/QC Check By: _____

Date: _____

METHOD 5 CRITICAL ORIFICE CALIBRATION

Environmental Supply Company, Inc.

CRITICAL ORIFICE SET S/N: 1385

DATE: January 12, 2016

REFERENCE DRY GAS METER
SERIAL NUMBER: 16300942
CALIBRATION FACTOR, Yc: 0.991

LEAK CHECK: Passed

ORIFICE #	RUN #	CRITICAL VACUUM (in Hg)	TESTED VACUUM (in Hg)	Barometric Pressure per Orifice AVG (P_{bar})	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	K' FACTOR (english)	K' FACTOR (metric-liters)	K' FACTOR (metric-m^3)	K' FACTOR VARIATION (%)
31	1	15	17.5		336.840	343.394	6.554	70.9	73.8	73.8	74.0	74.0	73.90	6.00	3.85	0.8323	0.6916	6.9157E-04	0.02
	2	15	17.5	29.42	343.394	349.946	6.552	70.9	73.8	73.9	74.1	74.2	74.00	6.00	3.85	0.8318	0.6912	6.9122E-04	-0.02
															AVG K' FACTOR =	0.8321	0.6914	6.914E-04	
27	1	15	18		349.946	356.592	6.646	70.8	73.8	73.8	74.1	74.1	73.95	7.00	2.91	0.7216	0.5996	5.9958E-04	-0.12
	2	15	18	29.41	356.592	363.255	6.663	70.8	73.9	73.8	74.2	74.2	74.03	7.00	2.91	0.7233	0.6010	6.0103E-04	0.12
															AVG K' FACTOR =	0.7224	0.6003	6.003E-04	
18	1	15	18		363.255	368.486	5.231	70.8	73.8	73.6	74.1	74.2	73.93	8.00	1.40	0.4951	0.4114	4.1141E-04	0.05
	2	15	18	29.40	368.486	373.712	5.226	70.8	73.7	73.7	74.1	74.2	73.93	8.00	1.40	0.4946	0.4110	4.1101E-04	-0.05
															AVG K' FACTOR =	0.4949	0.4112	4.112E-04	
16	1	15	18		373.712	379.455	5.743	70.8	73.7	74.0	74.1	74.4	74.05	10.00	1.10	0.4344	0.3610	3.6098E-04	0.03
	2	15	18	29.40	379.455	385.197	5.742	70.9	74.1	74.2	74.4	74.5	74.30	10.00	1.10	0.4342	0.3608	3.6079E-04	-0.03
															AVG K' FACTOR =	0.4343	0.3609	3.609E-04	
12	1	15	18		385.197	390.141	4.944	71.2	74.1	74.1	74.5	74.5	74.30	12.00	0.54	0.3112	0.2586	2.5858E-04	-0.02
	2	15	18	29.40	390.141	395.087	4.946	71.1	74.1	74.0	74.5	74.5	74.28	12.00	0.54	0.3113	0.2587	2.5868E-04	0.02
															AVG K' FACTOR =	0.3112	0.2586	2.586E-04	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
Calculate the standard volumes of air passed through the DGM and the critical orifices, and calculate the DGM calibration factor, Y, using the equations in US EPA Method 5, Section 7.2.3.3 (these equations are programmed on the spreadsheet included with each orifice set).

K' = Critical orifice coefficient,

$[(ft^3)(°R)^{1/2})]/[(in.Hg)(min.)]$ - English Units

$[(liters)(°K)^{1/2})]/[(mm\ Hg)(min.)]$ - Metric-Liters Units

$[(m^3)(°K)^{1/2})]/[(mm\ Hg)(min.)]$ - Metric Units

Critical Orifice Set number 1385 was calibrated in accordance with the Code of Federal Regulations, Title 40, Part 60, Appendix A, Method 5, Section 7.2

Signature

01/12/16
Date

Certificate No.: na1086-182-012516

Mettler Toledo
Service Business Unit Laboratory
1900 Polaris Parkway
Columbus, OH 43240
1-800-METTLER

METTLER TOLEDO

ISO 9001: 2008 Registered

Basic Test Confirmation

Customer

Company:	TRC Environmental		
Address:	19874 141st Pl NE		
City:	Woodinville	*State/Province:*	Washington
Zip/Postal:	98072		
Procedure Statement:	The device referenced in this document has been metrologically tested in accordance with METTLER TOLEDO Work Instruction VW0152A. All translations into other languages are based on the referenced work instruction, which is in English. This certificate refers to: As Found and As Left		
Test Date:	25-Jan-2016	*Next Cal. Due Date:*	31-Jan-2017
Service Technician:	Attila Tocik	*Signature:*	ELECTRONIC SIGNATURE

Reference Weights

Traceability of Test Equipment:	All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1

Weight Set No.:	476	*Date of Issue:*	13-Jul-2015
Calibration Due Date:	31-Jul-2016	*NIST Traceability No.*	MT5061/MT001304
Class:	E2		

Weight Set 2

Weight Set No.:	644	*Date of Issue:*	23-Sep-2015
Calibration Due Date:	28-Oct-2017	*NIST Traceability No.*	MT5061/MT001376
Class:	F1		

List of Devices Tested

Manufacturer	*Model*	*Serial No.*	*Ecc*	*Lin*	*Hys*	*Weight Set*	*Ref. Wt. Span*	*AS FOUND*	*AS LEFT*
Mettler Toledo	PB8001-S	1122143828	✔	✔	✔	644	8000.0 g	7999.8 g	8000.0 g
Ohaus	SP2001	7132161414	✔	✔	✔	644	2000.0 g	1999.9 g	2000.0 g
Ohaus	SP2001	7132160632	✔	✔	✔	644	2000.0 g	1999.8 g	2000.0 g

Remarks

Balance PM and Calibration

Device is obsolete and repair parts are no longer available -- 1122143828

TROEMNER
Henry Troemner LLC

Traceable Certificate

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

Weight

TRC Solutions
19874 141st Place NE
Woodinville, WA 98072

Order Number	845015
Certificate Number	848197A
Date Of Calibration	24-AUG-2015
Calibration Due Date	24-AUG-2016
As Found	In Tolerance
As Left	In Tolerance

Description of Weights: E/B Weight

Material	Assumed Density at 20 °C	Range
Stainless Steel	7.95g/cm3	1kg

Tested with Reference Standards Traceable to the National Institute of Standards & Technology through NIST Test Number 822-275872-11.

We certify that the weights listed are calibrated to ASTM E617 Class 4 tolerances.

The calibration of these weights is based on apparent mass vs material of density 8.0 g/cm³.

Nominal Mass Value	Notes	Serial Number	Correction before Calibration *	Correction after Calibration *	Tolerance (+ or -)	Uncertainty (+ or -)
1 kg		65482	2.7 mg	2.7 mg	20.000 mg	5.0 mg

* Correction is defined as the difference between the mass value of a weight and its nominal value. A positive correction indicates that the mass value is greater than the nominal value by the amount of the correction.

Joseph Moran, Metrology Manager, Approved Signatory

1 As Found / 1 Total

Z540.1

FLUKE

Certificate of Calibration

Everett Service Center

Certificate Number:	168484		
Data Type:	Found-Left	**Calibration Date:**	28-Aug-2015
Result Summary:	In Tolerance	**Calibration Due:**	28-Aug-2016
Manufacturer:	Fluke	**Certificate Date:**	28-Aug-2015
Model:	714	**Temperature:**	22.4 °C
Serial Number:	8340051	**Humidity:**	44.5 %
Description:	Thermocouple Calibrator		
Procedure:	Fluke 714:(1 year) CAL VER	**Revision:**	2.0
Customer:	TRC ENVIRONMENTAL CORPORATION		
City:	WOODINVILLE	**Country:**	US
State:	WA		
Purchase Order:	N300361	**RMA:**	30857147

This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.), ratiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation. Calibration certificates without signature are not valid. The calibration has been completed in accordance with Fluke Electronics Corporation Quality System Document 111.0 Revision 118 8/2014 and/or Fluke 17025 Quality Manual QSD 111.41 Revision 005 9/2014.

The Data Type found in this certificate must be interpreted as:

- As - Found Calibration data collected before the unit is adjusted and / or repaired.
- As - Left Calibration data collected after the unit has been adjusted and / or repaired.
- Found-Left Calibration data collected without any adjustment and / or repair performed.

This calibration conforms to the requirements of ANSI/NCSL Z540-1-1994 (R2002).

In the attached measurement results, deviation may be expressed with units, Measured Value (MV) - Nominal Value (NV) or as a proportion of the nominal value ((MV-NV)/NV), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mA/A, µV/V, etc.) Descriptions such as µA/A, µV/V, and others, where used to annotate results or column headings are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and described the results in that column, unless otherwise noted by units symbols.

Where applicable, the expanded uncertainty of measurement at the time of test is given in the following pages. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement (GUM). The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, such that the confidence level approximates 95%.

Where applicable, the Test Uncertainty Ratio (TUR) is provided in the following pages. Unless otherwise stated, the TUR for a given measurement result is 4:1 or greater.

Results are reviewed to establish where any measurement results exceeded the manufacturer's specifications.

Measurement results greater than limits of error are indicated by '!'.

Cert #: 168484
Date: 28-Aug-2015
Due: 28-Aug-2016
www.fluke.com

SIERRA FREEMAN
Issued By

FLUKE.

Certificate Number: 168484 **Date of Calibration:** 28-Aug-2015

Standards Used

Asset	Description	Cal-Date	Cal-Due
13607	Fluke 5520A Calibrator	24-Feb-2015	24-Feb-2016
13461	Fluke 8846A Precision Multimeter	02-Jul-2015	02-Jul-2016

Certificate Number: 168484 **Date of Calibration:** 28-Aug-2015

Calibration Data

Parameter	Nominal Value	Measurement Result	Limits of Error Lower Limit	Limits of Error Upper Limit	Test Uncertainty Ratio (TUR)
Firmware Revision: 1.3					
THERMOCOUPLE MEASUREMENT MODE TESTS					
mV Mode					
-10.000 mV	-10.0000	-10.000	-10.030	-9.970	
30.000 mV	30.0000	30.000	29.970	30.030	
75.000 mV	75.0000	74.990	74.970	75.030	
Type J Themocouple					
-200.0 °C	-200.00	-200.1	-200.9	-199.1	3.33
0.0 °C	0.00	0.0	-0.7	0.7	
1200.0 °C	1200.00	1199.9	1199.3	1200.7	3.04
THERMOCOUPLE SOURCE MODE TESTS					
mV Mode					
-10.000 mV	-10.000	-10.0026	-10.0280	-9.9720	
30.000 mV	30.000	30.0019	29.9720	30.0280	
75.000 mV	75.000	75.0062	74.9720	75.0280	
Type J Themocouple					
-200.00 °C	-200.0	-200.10	-200.94	-199.06	3.48
0.00 °C	0.0	-0.07	-0.70	0.70	
1200.00 °C	1200.0	1200.02	1199.33	1200.67	2.91
KEYPAD TEST- THERMOCOUPLE SOURCE					
Did the display scroll up?		Pass			
Did the display scroll down?		Pass			
Does UUT display OUTPUT 1472.0°F?		Pass			

TRC

ISOKINETIC FIELD DATA SHEET

Method: 5/29

Project No. 258103			Date 6.21.16
Client PCC			Operator Name KBH
Facility Portland OR	Stack Diameter (in.) 33.875		Barometer ID ~~30.20SGW 400H~~
Source Cheetah Saw 9203 East #1	Condition		Barometric Pressure (in. Hg) 30.20
Sampling Location stack (SET 2)	Run No. 1		Static Pressure (in. H_2O) -.19

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe: Liner Material	Probe: Setting (°F)	Probe: Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle: ID No.
K Factor			Glass	250	3'	___Y ___N	SITE SPECIFIC ID .223

Pitot: Pre-test: Pass?	Pitot: Post-test: Pass?	Pitot Tube: ID No.	Pitot Tube: PTCF or Cp	DGM - Meter Box: Console No.	DGM - Meter Box: Meter No.	DGM - Meter Box: ΔH @	DGM - Meter Box: DGMCF or Y	DGM - Meter Box: Diameter (in.)
+ ✓Y ___N - ✓Y ___N	+ ✓Y ___N - ✓Y ___N	P-15	0.8233 .8233	1424		1.694	0.996	.223

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A1	10.30	~~00~~ 0	704.81	.26		.64	85	265	252	66	73	72		0
		10	709.61	.27		.67	80	261	252	64	75	71		0
2	2	20	714.30	.28		.69	77	262	260	52	77	72		0
		30	719.23	.28		.69	80	254	252	52	79	73		0
3	3	40	724.23	.34		.84	87	253	248	54	80	74		0
		50	729.05	.34		.84	82	254	242	55	81	75		0
4	4	60	734.74	.34		.84	82	254	249	56	81	76		0
		70	740.08	.34		.84	81	254	248	57	82	77		0
5	5	80	745.45	.38		.94	79	254	249	56	82	77		0
		90	751.95	.38		.94	80	253	247	57	83	78		0
6	6	100	756.86	.40		.99	76	254	254	57	83	78		0
		110	762.77	.40		.99	81	253	248	58	83	78		0
7	7	120	768.63	.41		1.0	82	252	248	58	83	79		0
		130	774.63	.41		1.0	87	252	245	60	84	79		0
8	8	140	780.46	.42		1.0	90	252	242	60	84	79		1
		150	786.42	.41		1.0	86	253	245	57	84	79		1
9	9	160	792.37	.41		1.0	86	253	247	57	84	80		1
		170	798.33	.42		1.0	86	251	246	57	85	80		1
10	10	180	804.82	.41		1.0	95	252	246	58	85	81		1
		190	810.18	.41		1.0	101	253	247	59	86	81		1
11	11	200	816.05	.35		.87	96	251	249	60	86	81		0
		210	821.80	.36		.89	101	251	245	54	86	81		0
12	12	220	827.24	.34		.84	106	251	242	53	86	82		0
		230	832.68	.34		.84	103	252	248	54	87	82		0
	1430	240	837.974	—	—		—		—		—	—		

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)						
Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before				15	0.005
	After				3	0.00
Port:	Before					
	After				3	0.00

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

METHOD(S) 5/29

Plant Name	PCC	Run Number	1
Sampling Location	Cheetah Saw 4203 East #1	Job Number	258103
Test Personnel	JSH	Test Date	6-21-16

Line	Point No.	Time Clock (24-hr)	Time Test (min)	Dry Gas Meter Reading (cu. ft.)	Pitot Reading (in. H2O)	Delta H Actual (in. H2O)	DGM Temp (°F)	Stack Temp (°F)	Probe Temp (°F)	Filter/Box Temp (°F)	Gauge Vacuum (in. Hg)	Imp Exit Temp (°F)	XAD Temp (°F)	____ Temp (°F)
26	B 1	1958	240	838.010	.30	.74	81/81	96	253	236	0	68		
27			250	843.08	.31	.77	83, 81	99	252	244	0	61		
28	2		260	848.15	.31	.77	85, 81	98	252	253	0	60		
29			270	853.28	.31	.77	85, 81	100	253	247	0	61		
30	3		280	858.60	.33	.82	85, 82	102	250	255	0	62		
31			290	863.73	.33	.82	86, 82	700	251	248	0	62		
32	4		300	869.07	.35	.87	86, 82	94	253	247	0	56		
33			310	874.40	.35	.87	86, 82	95	250	249	0	53		
34	5		320	879.81	.35	.87	86, 82	95	251	249	0	53		
35			330	885.10	.36	.89	86, 82	93	252	252	0	53		
36	6		340	890.58	.38	.94	87, 82	95	252	242	1	54		
37			350	896.38	.38	.94	87, 82	95	252	242	1	56		
38	7		360	902.16	.39	.97	87, 83	97	251	256	1	57		
39			370	908.15	.42	1.0	87, 83	98	253	250	1	56		
40	8		380	913.88	.42	1.0	87, 83	99	252	244	1	57		
41			390	919.87	.42	1.0	87, 83	92	253	256	1	56		
42	9		400	925.78	.40	.99	88, 83	93	251	250	1	58		
43			410	931.75	.41	1.0	88, 83	88	253	243	1	58		
44	10		420	937.59	.40	.99	88, 83	88	252	246	1	58		
45			430	943.53	.40	.99	88, 83	92	253	247	1	59		
46	11		440	949.45	.38	.94	88, 83	93	253	247	1	59		
47			450	955.16	.36	.89	88, 84	81	252	249	1	61		
48	12		460	960.75	.36	.89	88, 83	83	251	251	1	62		
49			470	966.32	.35	.87	87, 83	84	252	243	1	62		
50		1858	480	971.866	—	—	—	—		—	—		—	—
51														
52														
53														
54														
55														
56														
57														
58														
59														
60														

Run Time	Total Volume	RMS Delta P	Delta H	T meter Avg	T stack Avg
480	267.020	0.6021	0.895	82.2	90.6

Checked By: _____ Date: _____

AM-FDS-100-Rev1

TRC

CYCLONIC FLOW DETERMINATION DATA SHEET
(WITH PRELIMINARY VELOCITY AND MOISTURE)

Client Name	PCC			Velocity Run No.	E-M2-1			
Plant Name	PORTLAND			Moisture Run No.	N/A			
City/State	PORTLAND, OR.			Project Number	258103			
Test Location	EAST STACK #2 B.H.9203			Test Date	6/21/16			
Personnel	M. MURTHY		0.8230	Time: Start	0830	Stop	0850	
Pitot I.D	P-17	Pitot Coeff.	0.84	P barometer, "Hg	30.2			
Meter Box ID	1490	Gas Meter Y	0.986	P static, " H_2O	-0.19			
Pressure Gauge ID	1490	TC ID	P-17	Tester Signature				

Cyclonic Flow / Velocity Traverse

	Point No.	Yaw Angle (deg)	Delta P in. H2O	Temp Deg. F
1	A-1	3	0.24	72
2	2	6	0.29	72
3	3	0	0.32	72
4	4	5	0.34	72
5	5	5	0.40	72
6	6	6	0.43	73
7	7	5	0.44	72
8	8	6	0.44	72
9	9	5	0.43	72
10	10	5	0.40	72
11	11	5	0.37	72
12	12	5	0.35	72
13	B-1	3	0.28	72
14	2	7	0.30	72
15	3	5	0.34	73
16	4	5	0.38	73
17	5	6	0.42	73
18	6	6	0.44	73
19	7	6	0.45	73
20	8	5	0.45	73
21	9	4	0.44	73
22	10	3	0.42	73
23	11	5	0.38	73
24	12	5	0.27	73
25				
26				
27				
28				
Avg				

Location is acceptable if avg of ABS(Yaw) ≤ 20°

Preliminary Moisture Sample Data

Test Time	DGM Reading Cubic Feet	Avg DGM Temp (F)	Delta H in. H2O	Vac. in. Hg	Imp Exit Temp (F)

Gas Parameters

Moisture Analytical Results

	# 1	# 2	# 3	# 4	Sil Gel
Final Wt. / Vol					
Initial Wt. / Vol					
Moisture Gain					

Total Catch

Balance No. _____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2%			

Leak Check Data

Meter	Pre	Post
in. Hg		
cfm		
Pitot		

Delta P avg is square of the average of the individual square roots

Checked By: _____ Date: _____

TRC

ISOKINETIC FIELD DATA SHEET

Method: M5 | 29

Project No. 258103			Date 6/21/16
Client PCC			Operator Name M. Worthy
Facility PORTLAND, OR.	Stack Diameter (in.) 33.875		Barometer ID SGW400H
Source WEST #1 BAGHOUSE 9203	Condition		Barometric Pressure (in. Hg) 30.2
Sampling Location WEST STACK	Run No. W1-M5/29-1		Static Pressure (in. H_2O) -0.10

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor ~~2.43~~ 2.506			GLASS	250	31	___Y ___N	site specific ID 0.224

7-18-16 SJ

Pitot Tube				DGM - Meter Box				
Pitot Pre-test: Pass?	+ ✓Y ___N - ✓Y ___N	ID No.	PTCF or Cp	Console No.	Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
Pitot Post-test: Pass?	+ ___Y ___N - ___Y ___N	P-17	0.8830	1490	9366865	1.682	0.986	0.224

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A-1	1030	0	604.065	.31	0.75	0.75	78	250	250	52	69	69		1
		10	609.21	0.31	0.75	0.75	77	250	249	47	71	73		1
2		20	614.37	0.32	0.78	0.78	77	253	247	46	72	69		1
		30	619.91	0.32	0.78	0.78	78	249	246	50	73	69		1
3		40	624.83	0.32	0.78	0.78	79	249	248	50	73	70		1
		50	630.64	0.32	0.78	0.78	78	251	250	49	73	71		1
4		60	635.69	0.33	0.80	0.80	78	250	249	49	74	71		1
		70	640.83	0.32	0.78	0.78	78	254	251	51	74	71		1
5		80	645.57	0.37	0.89	0.89	79	250	249	51	74	71		1
		90	650.47	0.37	0.89	0.89	78	252	250	53	75	72		1
6		100	656.97	0.40	0.97	0.97	79	249	248	53	75	72		1
		110	663.35	0.40	0.97	0.97	79	249	248	53	75	72		1
7		120	668.95	0.42	1.02	1.02	80	248	247	57	75	72		1
		130	674.64	0.42	1.02	1.02	80	251	252	57	76	73		1
8		140	680.98	0.43	1.04	1.04	80	251	252	57	77	73		1
		150	686.86	0.43	1.04	1.04	80	250	251	56	77	73		1
9		160	692.82	0.41	0.97	0.97	80	248	256	56	77	74		1
		170	698.68	0.41	0.97	0.97	81	250	249	59	78	75		1
10		180	704.87	0.37	~~0.90~~ 0.98 MCW	0.90	83	250	256	60	78	75		1
		190	710.21	0.37	0.90	0.90	83	252	250	60	80	75		1
11		200	716.01	0.33	0.79	0.79	84	247	251	61	82	76		1
		210	720.95	0.33	0.79	0.79	84	248	254	53	81	77		1
12		220	726.02	0.31	0.75	0.75	85	253	250	53	80	78		1
		230	732.24	0.31	0.75	0.75	85	251	253	53	81	78		1
B-1	1439	~~0~~ 240	736.915	0.27	0.65	0.65	85	251	250	66	78	78		1

MCW 6/21/16

~~1458~~ 1459

Sampling Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before	736.915	737.009	30	2	0.000
	After					
Port:	Before					
	After				3	0.00

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

METHOD(S) M5/29

Plant Name	PCC	Run Number	WI-M5/29-1
Sampling Location	WEST #1 BAGHOUSE 9203	Job Number	258103
Test Personnel	M. WORTHY	Test Date	6/21/16

Line	Point No.	Time Clock (24-hr)	Time Test (min)	Dry Gas Meter Reading (cu. ft.)	Pitot Reading (in. H2O)	Delta H Actual (in. H2O)	DGM Temp (°F)	Stack Temp (°F)	Probe Temp (°F)	Filter/Box Temp (°F)	Gauge Vacuum (in. Hg)	Imp Exit Temp (°F)	XAD Temp (°F)	____ Temp (°F)
MCW														
742.43 6/21/16	MCW	1458	250 10	~~747.009~~										
27	B-2		20	746.62	0.27	0.65	79/78	85	246	253	1	58	n/a	n/a
28			30	751.41	0.24	0.58	79/77	85	250	252	1	60		
29	3		40	756.04	0.30	0.73	78/77	86	252	250	1	62		
30			50	761.11	0.31	0.75	79/77	85	250	254	1	61		
31	4		60	766.46	0.34	0.83	79/77	86	250	248	1	52		
32			70	771.94	0.34	0.83	79/77	86	250	253	1	50		
33	5		80	777.23	0.37	0.90	79/77	86	251	250	1	51		
34			90	782.93	0.39	0.95	79/77	86	251	250	1	51		
35	6		100	788.88	0.40	0.97	80/77	86	249	247	1	51		
36			110	794.63	0.40	0.97	80/77	85	250	252	1	51		
37	7		120	800.51	0.43	1.04	81/78	86	253	250	1	51		
38			130	806.54	0.42	1.02	81/78	86	250	249	1	52		
39	8		140	812.65	0.42	1.02	80/77	86	250	249	1	54		
40			150	818.53	0.42	1.02	81/77	87	253	250	1	53		
41	9		160	824.54	0.40	0.97	81/78	87	249	253	1	54		
42			170	830.44	0.40	0.97	81/78	86	249	249	1	57		
43	10		180	836.47	0.32	0.78	81/78	86	250	248	1	53		
44			190	842.55	0.32	0.78	80/78	86	250	247	1	54		
45	11		200	847.31	0.32	0.78	79/77	86	252	248	1	54		
46			210	852.43	0.30	0.73	79/77	85	250	250	1	55		
47	12		220	857.58	0.31	0.75	79/77	85	250	251	1	55		
48			230	862.87	0.31	0.75	79/77	85	249	252	1	56		
49	End	1858	0/480	867.934										
50														
51														
52														
53														
54														
55														
56														
57														
58														
59														
60														

Run Time	Total Volume	RMS Delta P	Delta H	T meter Avg	T stack Avg

Checked By: _____ Date: _____

AM-FDS-100-Rev1

TRC

CYCLONIC FLOW DETERMINATION DATA SHEET
(WITH PRELIMINARY VELOCITY AND MOISTURE)

Client Name	PCC			Velocity Run No.	W-M2-1			
Plant Name	PORTLAND			Moisture Run No.	N/A			
City/State	PORTLAND, OR			Project Number	258103			
Test Location	WEST STACK #1 B.H.			Test Date	6/21/16			
Personnel	M. WOODRUFF		0.8230	Time:	Start	0855	Stop	0920
Pitot I.D	P-17	Pitot Coeff.	0.8230	P barometer, "Hg	30.2			
Meter Box ID	1490	Gas Meter Y	0.986	P static, " H_2O	-0.21			
Pressure Gauge ID	1490	TC ID	P-17	Tester Signature				

Cyclonic Flow / Velocity Traverse

	Point No.	Yaw Angle (deg)	Delta P in. H_2O	Temp Deg. F
1	A-1	5	0.25	72
2	2	4	0.27	72
3	3	5	0.30	73
4	4	5	0.31	73
5	5	5	0.38	73
6	6	6	0.40	73
7	7	7	0.42	73
8	8	8	0.41	73
9	9	8	0.40	73
10	10	7	0.37	73
11	11	6	0.34	73
12	12	5	0.31	73
13	B-1	5	0.27	72
14	2	4	0.31	72
15	3	5	0.34	73
16	4	6	0.38	73
17	5	6	0.40	73
18	6	5	0.42	73
19	7	5	0.38	73
20	8	5	0.40	73
21	9	5	0.40	73
22	10	5	0.38	73
23	11	6	0.34	73
24	12	4	0.30	73
25				
26				
27				
28				
Avg				

Location is acceptable if avg of ABS(Yaw) ≤ 20°

Preliminary Moisture Sample Data

Test Time	DGM Reading Cubic Feet	Avg DGM Temp (F)	Delta H in. H_2O	Vac. in. Hg	Imp Exit Temp (F)

				Gas Parameters

Moisture Analytical Results

	# 1	# 2	# 3	# 4	Sil Gel
Final Wt. / Vol					
Initial Wt. / Vol					
Moisture Gain					

Total Catch | |

Balance No. _____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2%			

Leak Check Data

Meter	Pre	Post
in. Hg		
cfm		
Pitot		

Delta P avg is square of the average of the individual square roots

Checked By: _____ Date: _____

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103			Date 6/22/16
Client PCC			Operator Name Reid Swanson
Facility Portland, OR	Stack Diameter (in.) 12		Barometer ID N/A
Source ASL-8901	Condition Normal		Barometric Pressure (in. Hg) 29.95
Sampling Location Stack	Run No. ONE		Static Pressure (in. H_2O) -0.34

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
			Glass	250	4	✓Y ___N	SITE SPECIFIC ID

7-18-16 seq

K Factor ~~1.968~~ 1.931

Pitot Tube				DGM - Meter Box				
Pitot Pre-test: Pass?	+ ✓Y ___N - ✓Y ___N	ID No.	PTCF or Cp	Console No.	Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
Pitot Post-test: Pass?	+ ✓Y ___N - ✓Y ___N	P-5C	.84	1420	9366861	1.678	0.985	0.210

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
~~B~~ 1	10:25	0	466.445	.60	1.18	1.18	89	245	271	64	74	74		4
1	10:35	10	473.18	.61	1.20	1.20	83	246	272	54	76	75		4
1	10:45	20	480.06	.61	1.20	1.20	82	245	271	55	77	76		4
1	10:55	30	486.69	.61	1.20	1.20	81	251	268	57	78	77		4
2	11:05	40	493.54	.63	1.24	1.24	83	245	269	58	80	77		4.5
	11:15	50	500.20	.63	1.24	1.24	84	245	277	60	81	78		4.5
	11:25	60	507.13	.63	1.24	1.24	86	250	279	56	80	78		4.5
	11:35	70	514.10	.63	1.24	1.24	86	249	275	56	82	80		4.5
3	11:45	80	521.08	.65	1.28	1.28	86	248	277	57	83	81		5
	11:55	90	528.31	.65	1.28	1.28	87	248	277	58	84	81		5
	12:05	100	535.47	.65	1.28	1.28	87	245	279	59	83	82		5
	12:15	110	542.68	.65	1.28	1.28	87	251	279	55	82	82		5
4	12:25	120	549.35	.61	1.20	1.20	86	251	278	56	84	83		4.5
	12:35	130	556.22	.61	1.20	1.20	88	250	279	56	84	83		4.5
	12:45	140	563.06	.62	1.22	1.22	89	251	280	57	84	83		5
	12:55	150	569.91	.62	1.22	1.22	87	253	278	57	85	84		5
5	13:05	160	576.76	.64	1.26	1.26	88	249	277	58	85	84		5
	13:15	170	583.77	.64	1.26	1.26	88	249	277	59	86	84		5
	13:25	180	590.78	.64	1.26	1.26	89	244	279	60	87	85		5
	13:35	190	597.79	.64	1.26	1.26	90	251	278	56	88	86		5
6	13:45	200	604.84	.63	1.24	1.24	92	246	280	55	89	87		5
	13:55	210	611.85	.63	1.24	1.24	93	248	277	55	88	86		5
	14:05	220	618.88	.63	1.24	1.24	93	248	277	56	89	87		5
	14:15	230	625.91	.63	1.24	1.24	93	245	278	58	89	88		5
End ~~B~~ 1	14:25	240	632.923											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port: B	Before				10	.001
	After				10	.001
Port: A	Before				10	.001
	End After				5"	.000

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103			Date 6/22/16
Client PCC			Operator Name Reid Swanson
Facility Portland, OR	Stack Diameter (in.) 24		Barometer ID N/A
Source ASC-8901	Condition Normal		Barometric Pressure (in. Hg) 29.95
Sampling Location Stack	Run No. One		Static Pressure (in. H_2O) -.34

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor ~~1.967~~ 1.931			Glass	250	4	✓Y __N	SITE SPECIFIC ID

7-18-16 SM

Pitot Tube Pre-test: Pass?	Pitot Post-test: Pass?	ID No.	PTCF or Cp	Console No.	DGM - Meter Box Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
+ ✓Y __N - ✓Y __N	+ ✓Y __N - ✓Y __N	P-5C	0.84	1420	9366861	1.678	0.985	0.210

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A-1	14:35	0	633.012	.64	1.26	1.26	90	256	278	64	87	87		5
	14:45	10	640.13	.67	1.32	1.32	90	255	278	53	89	88		5
	14:55	20	647.35	.67	1.32	1.32	91	249	281	53	88	87		5
	15:05	30	654.49	.69	1.32	1.32	91	249	279	56	88	87		5
2	15:15	40	661.70	.71	1.40	1.40	91	247	278	61	90	88		5.5
	15:25	50	669.10	.71	1.40	1.40	91	248	276	55	90	88		5.5
	15:35	60	676.55	.70	1.38	1.38	92	252	279	55	91	89		5.5
	15:45	70	683.96	.70	1.38	1.38	91	252	277	54	91	89		5.5
3	15:55	80	691.39	.68	1.34	1.34	94	249	281	58	91	89		5.5
	16:05	90	698.82	.69	1.36	1.36	93	251	278	57	92	90		5.5
	16:15	100	706.09	.68	1.34	1.34	93	250	279	58	90	90		5.5
	16:25	110	713.44	.70	1.38	1.38	93	250	279	55	91	89		5.5
4	16:36	120	720.85	.71	1.40	1.40	93	249	279	57	92	90		5.5
	16:46	130	728.34	.72	1.42	1.42	92	249	279	56	92	91		5.5
	16:55	140	735.86	.72	1.42	1.42	94	249	279	56	91	90		5.5
	17:05	150	743.69	.71	1.40	1.40	94	250	279	53	91	90		5.5
5	17:15	160	750.97	.63	1.24	1.24	94	248	281	54	90	90		5.5
	17:25	170	758.10	.62	1.22	1.22	94	249	274	54	91	90		5.5
	17:35	180	765.18	.68	1.34	1.34	94	247	274	55	91	90		5.5
	17:45	190	772.55	.61	1.20	1.20	94	248	274	56	91	90		5.5
6	17:55	200	779.62	.65	1.28	1.28	94	250	276	54	90	88		5.5
	18:05	210	786.85	.65	1.28	1.28	93	250	273	53	90	88		5.5
	18:15	220	794.21	.65	1.28	1.28	93	250	274	53	90	88		5.5
	18:25	230	801.33	.65	1.28	1.28	91	243	271	53	89	87		5.5
END	18:35	240	808.559											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port: B	Before				10	.001
	After				10	.001
Port: A	Before				10	.001
	After					.001

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

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METHOD 1 - TRAVERSE POINT LOCATIONS

Plant Name	PCC
City/State	PORTLAND, OR
Test Location	ASC-8901 STACK
Personnel / Date	MCW / 6-22-16

Stack / Ports					
	Type of Stack:	Circular	X	Rectangle	
	No. of Ports Available			2	
	No. of Ports Used			2	
	Port Inside Diameter, in			3	

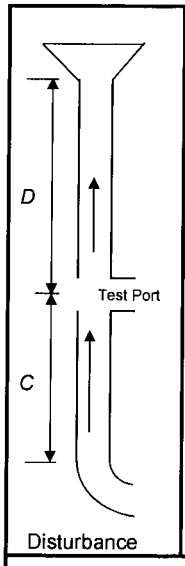
Dimensions		
Put diagram of test location(s) on back of this sheet	Far Wall to Outside of Port, in	16
	Port Length, in	4
	Stack Diameter or Depth, in	12
	Stack Width (if rectangle), in	
	Equivalent Stack Diameter, in	12
	Area of Stack, ft^2	0.785

Distance to Flow Disturbances	Distance, ft	Diameters
Upstream (C)	160"	13.3
Downstream (D)	48"	4

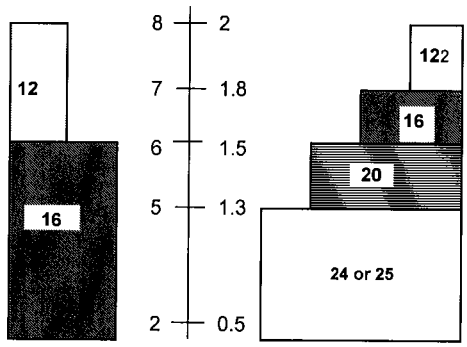
Number of Traverse Points			Minimum # Required
Particulate Traverse			12
Velocity Traverse			
# of Ports Used	2	# Points/Port	6
Number of Traverse Points Used			12

Point No.	Fraction of Stack Dia.	Dist. from Inside Wall	Port Length	Dist. From Edge of Port
1	0.044	0.53	4	4 1/2
2	0.146	1.75	4	5 3/4
3	0.296	3.55	4	7 1/2
4	0.704	8.45	4	12 1/2
5	0.854	10.25	4	14 1/4
6	0.956	11.47	4	15 1/2
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Note: When using 4 ports in a circular duct, the probe is marked with only the points for the first half of the full diameter traverse.



If more than 8 and 2 diameters **and** If duct diameter is less than 24", use 8 or 9 points



DRAW HORIZONTAL LINES THROUGH UPSTREAM AND DOWNSTREAM DIAMETERS AND USE THE HIGHER NUMBER OF POINTS.

Equivalent Diameter (for rectangular ducts):	
De = 2 * Depth * Width / (Depth + Width)	
De = 2 * ( ) * ( ) / ( ) + ( ) =	

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	4	6	8	10	12	14	16	18	20
1	.146	.067	.044	.032	.026	.021	.018	.016	.014	.013
2	.854	.250	.146	.105	.082	.067	.057	.049	.044	.039
3		.750	.296	.194	.146	.118	.099	.085	.075	.067
4		.933	.704	.323	.226	.177	.146	.125	.109	.097
5			.854	.677	.342	.250	.201	.169	.146	.129
6			.956	.806	.658	.356	.269	.220	.188	.165
7				.895	.774	.644	.366	.283	.236	.204
8				.968	.854	.750	.634	.375	.296	.250
9					.918	.823	.731	.625	.382	.306
10					.974	.882	.799	.717	.618	.388
11						.933	.854	.780	.704	.612
12						.979	.901	.831	.764	.694
13							.943	.875	.812	.750
14							.982	.915	.854	.796
15								.951	.891	.835
16								.984	.925	.871
17									.956	.903
18									.986	.933
19										.961
20										.987

For 22 or 24 test points, see Method 1 table in CFR

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	3	4	5	6	7	8	9	10	11	12
1	.250	.167	.125	.100	.083	.071	.063	.056	.050	.045	.042
2	.750	.500	.375	.300	.250	.214	.188	.167	.150	.136	.125
3		.833	.625	.500	.417	.357	.313	.278	.250	.227	.208
4			.875	.700	.583	.500	.438	.389	.350	.318	.292
5				.900	.750	.643	.563	.500	.450	.409	.375
6					.917	.786	.688	.611	.550	.500	.458
7						.929	.813	.722	.650	.591	.542
8							.938	.833	.750	.682	.625
9								.944	.850	.773	.708
10									.950	.864	.792
11										.955	.875
12											.958

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TRC

CYCLONIC FLOW DETERMINATION DATA SHEET
(WITH PRELIMINARY VELOCITY AND MOISTURE)

Client Name	PCC			Velocity Run No.	ASC-8901-M2-1		
Plant Name	PORTLAND			Moisture Run No.	N/A		
City/State	PORTLAND, OR.			Project Number	258103		
Test Location	ASC - 8901			Test Date	6/22/16		
Personnel	MCW P-5C 8/5/16			Time: Start	0815	Stop	0835
Pitot I.D	~~P-50~~	Pitot Coeff.	0.84	P barometer, "Hg	29.85		
Meter Box ID	1420	Gas Meter Y	0.985	P static, " H_2O	-0.34		
Pressure Gauge ID	1420	TC ID	TC-50	Tester Signature			

Cyclonic Flow / Velocity Traverse

	Point No.	Yaw Angle (deg)	Delta P in. H_2O	Temp Deg. F
1	A-1	0	0.41	69
2	2	15	0.52	71
3	3	5	0.63	71
4	4	1	0.80	73
5	5	-2	0.79	73
6	6	-8	0.73	73
7	B-1	0	0.38	72
8	2	12	0.50	73
9	3	4	0.60	73
10	4	1	0.65	73
11	5	-4	0.65	73
12	6	-8	0.60	73
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
Avg				

Location is acceptable if avg of ABS(Yaw) ≤ 20°

Preliminary Moisture Sample Data

Test Time	DGM Reading Cubic Feet	Avg DGM Temp (F)	Delta H in. H_2O	Vac. in. Hg	Imp Exit Temp (F)

Gas Parameters

Moisture Analytical Results

	# 1	# 2	# 3	# 4	Sil Gel
Final Wt. / Vol					
Initial Wt. / Vol					
Moisture Gain					

Total Catch

Balance No. _____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2%			

Leak Check Data

Meter	Pre	Post
in. Hg		
cfm		
Pitot		

Delta P avg is square of the average of the individual square roots

Checked By: _____ Date: _____

TRC

ISOKINETIC FIELD DATA SHEET — Method: 5

Project No.	~~PC~~ 258103	Date	6.22.16
Client	PCC	Operator Name	KBA
Facility	Portland OR	Stack Diameter (in.) 12	Barometer ID ~~29.95~~
Source	ASC 8901 Inlet	Condition	Barometric Pressure (in. Hg) 29.95
Sampling Location		Run No. 1	Static Pressure (in. H_2O) -4.6

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor			Glass	250	3'	___Y ___N	SITE SPECIFIC ID

Pitot Tube		ID No.	PTCF or Cp	DGM - Meter Box Console No.	Meter No.	ΔH @	DGMCF or Y	Nozzle Diameter (in.)
Pitot Pre-test: Pass?	+ ✓Y ___N; - ✓Y ___N							
Pitot Post-test: Pass?	+ ___Y ___N; - ___Y ___N	P-15	0.8233 ~~.84~~	1424		1.644	0.996	0.185

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice ΔH: Desired (in. H_2O)	Orifice ΔH: Actual (in. H_2O)	Temp. (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out	Gas House [illegible]	Pump Vacuum (in. Hg)
A 1	1022	0	972.079	.60		.67	76	250	245	68	66	66	2.3 ~~1.5~~	0
~~[illegible]~~		10	976.80	.62		.69	73	257	247	53	70	67		0
		20	981.67	.62		.69 ~~.72~~	73	257	249	46	73	68		0
		30	986.53	.62		.69	73	257	250	45	76	70		0
		40	991.42	.61		.68	75	258	250	44	78	72		0
		50	996.25	.62		.69	74	257	249	44	79	75		0
2		60	1001.06	.58		.65	77	257	249	44	80	74		0
		70	1005.50	.58		.65	74	257	249	44	81	76	2.3 ~~1.4~~	0
		80	10.58	.59		.66	74	257	249	44	82	77		0
		90	15.37	.59		.66	75	257	248	45	83	78		0
		100	20.14	.58		.65	75	257	249	46	84	78		0
		110	24.89	.58		.65	74	257	248	46	84	79		0
3		120	29.69	.62		.69	75	258	248	47	85	80	2.3	0
		130	34.56	.63		.71	75	257	249	47	85	81		0
		140	39.54	.62		.69	75	257	249	47	86	81		0
		150	44.51	.63		.71	75	258	249	48	86	82		0
		160	49.50	.63		.71	75	257	248	48	86	82		0
		170	54.48	.62		.69	76	252	248	49	87	83		0
4		180	59.335	.62		.69	77	251	248	49	87	83	2.3	0
		190	64.215	.62		.69	77	251	249	50	88	83		0
		200	69.155	.63		.71	80	252	249	50	88	84		0
		210	74.10	.61		.70	80	252	248	51	89	84		0
		220	79.20	.61		.68	81	251	249	51	89	85		0
		230	83.95	.61		.68	78	251	249	52	90	85		0
	1422	240	1088.400											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before				15	0.005
	After					
Port:	Before					
	After				3	0.00

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: ______________________________(Project Manager or QA Manager - sign and date)

NA = Not Applicable

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TRC

ISOKINETIC FIELD DATA SHEET

METHOD(S) 5

Plant Name	ACC	Run Number	1
Sampling Location	ASC 8901 Inlet	Job Number	258103
Test Personnel	KBH	Test Date	6.22.16

Line	Point No.	Time Clock (24-hr)	Time Test (min)	Dry Gas Meter Reading (cu. ft.)	Pitot Reading (in. H2O)	Delta H Actual (in. H2O)	DGM Temp (°F)	Stack Temp (°F)	Probe Temp (°F)	Filter/Box Temp (°F)	Gauge Vacuum (in. Hg)	Imp Exit Temp (°F)	XAD Temp (°F)	____ Temp (°F)
26	B 1	1451	240	88.700	.78	.87	86/86	78	253	251	0	65		
27			250	94.37	.78	.87	88.86	78	252	249	0	48		
28			260	1100.00	.77	.86	90,86	79	251	248	0	44		
29			270	105.52	.76	.85	91,86	79	251	249	0	44		
30			280	111.02	.76	.85	91,87	79	251	249	0	44		
31			290	116.53	.76	.85	92,87	79	252	248	0	44		
32	2		300	122.04	.71	.79	92,88	79	252	248	0	44		
33			310	127.50	.70	.78	93,88	79	251	248	0	44		
34			320	132.71	.71	.79	93,88	79	252	248	0	45		
35			330	137.94	.70	.78	93,89	83	252	248	0	45		
36			340	143.16	.70	.78	93,89	81	252	248	0	46		
37			350	148.39	.70	.78	94,89	81	252	248	0	46		
38	3		360	153.62	.67	.75	94,90	80	251	247	0	46		
39			370	158.74	.67	.75	94,90	80	253	248	0	47		
40			380	163.85	.67	.75	94,90	80	252	248	0	48		
41			390	168.97	.67	.75	94,90	80	252	248	0	48		
42			400	174.08	.67	.75	94,90	80	252	248	0	49		
43			410	179.18	.67	.75	94,91	80	251	247	0	49		
44	4		420	184.30	.67	.75	94,91	80	252	248	0	49		
45			430	189.42	.65	.73	94,91	80	251	248	0	50		
46			440	194.49	.65	.73	94,91	80	252	247	0	51		
47			450	199.57	.65	.73	94,91	80	252	247	0	51		
48			460	204.87	.65	.73	94,91	80	252	248	0	51		
49			470	209.74	.65	.73	94,91	80	252	248	0	51		
50		1851	480	1214.849				END						
51														
52														
53														
54														
55														
56														
57														
58														
59														
60														

Run Time	Total Volume	RMS Delta P	Delta H	T meter Avg	T stack Avg
480	242.770	0.8082	0.732	85.6	77.7

Checked By: _____ Date: _____

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TRC

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40 CFR 60 Method 1 -- TRAVERSE POINT LOCATIONS

Project No.	258103	Date	6-22-16
Client	PCC	Operator Name	KBA
Facility	Portland OR	Source	ASC 8901 Inlet

Dimensions

Circular — **Rectangular** *(inside dimensions)*

Far Wall to Outside of Port (in.)	15	Stack Width (in.)	
Port Length (in.)	3	Depth (in.)	+2
Stack Diameter or Depth (in.)	12	Equiv. Stack Diameter (in.)	

Point No.	A Internal Dimension (in.)	B Internal Dimension (%)	(A x B) Distance from Inside Wall (in.)	C Port Length (in.)	(A x B) + C Point Location (in.)
1	12	6.7	0.8	3	3.8
2	|	25.0	3.0	|	6.0
3	|	75.0	9.0	|	12.0
4	|	93.3	11.2	|	14.2

Comments:

Stack / Ports Stack Type: ✓ Circular ___ Rectangular

Number and Type of Ports Available: 2

Port Inside Diameter (in.): 5"

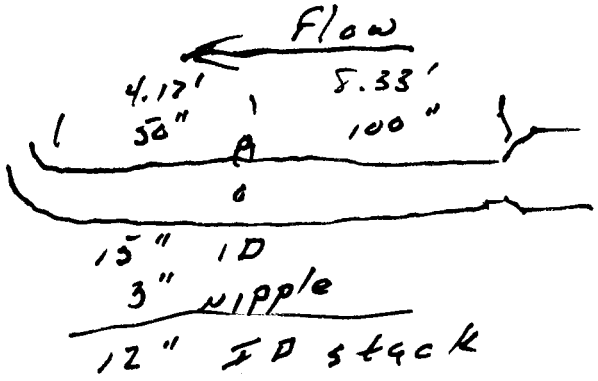
Distance to Flow Disturb. Reference: ___ Disturbance ___ Port

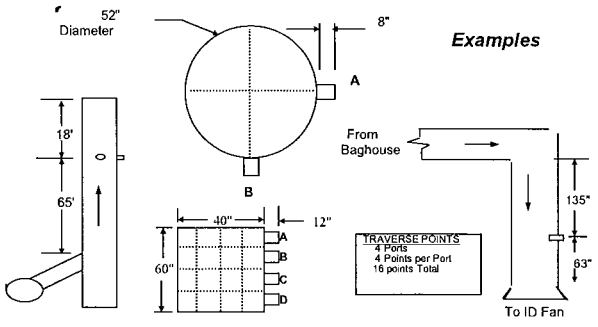
	Distance (ft)	Diameters
Upstream (U)	4.17	4.17
Downstream (D)	8.33	8.33

Number of Traverse Points	Particulates	Velocity
Minimum Required	8	
Number of Ports Used	2	
Points per Port	4	

Test Location Schematic(s)

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the air flow direction.





NA = Not Applicable

Checked By: _____ (Project Manager or QA Manager - sign and date)

AM-FDS-27 R0

40 CFR 60 METHOD 2 VELOCITY TRAVERSE

Page____of____

Project No.:	Pitot ID No.:	Stack Diameter (in.):	Date:
258103	P-15	12	6.22.16
Client:	**Pitot Tube Cp:**	**Coupling Length (in.):**	**Operator:**
PCC	0.8233 ~~.84~~	3	WBA
Facility:	**Thermalcouple ID No.:**	**Distance Up Stream (A) (ft):**	**P Bar ("Hg):**
Portland OR		4.17	29.95
Source:	**Pressure Gauge ID No.:**	**Distance Down Stream (B) (ft):**	**Assumed Moisture (%):**
ASC 8401 Inlet	1424	8.33	

Run No.:_____

Static Pressure ("H2O):		Run Time (24-hr)	Start:	Stop:
-4.6				
CO2 (%)	**O2 (%)**	**Pitot Leak Checks**	**Pre-Test**	**Post-Test**
0.0	20.9		+ ✓ - ✓	+ ✓ - ✓

Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0
A 1	75	.67	5	
2	77	.62	2	
3	75	~~.703~~	5	
4	75	.68	3	
B 1	68	.70	2	
2	69	.65	3	
3	69	.65	5	
4	70	.63	3	

Run No.:_____

Static Pressure ("H2O):		Run Time (24-hr)	Start:	Stop:
CO2 (%)	**O2 (%)**	**Pitot Leak Checks**	**Pre-Test**	**Post-Test**
			+ ____ - ____	+ ____ - ____

Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0

Run No.:_____

Static Pressure ("H2O):		Run Time (24-hr)	Start:	Stop:
CO2 (%)	**O2 (%)**	**Pitot Leak Checks**	**Pre-Test**	**Post-Test**
			+ ____ - ____	+ ____ - ____

Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0

Comments:	Test Location Schematic(s):
	1 Include distance to distubances and note what they are. 2 Show label all ports, Note which was used for each test type. 3 Indicate the flow direction.

NA = Not Applicable

Checked By: _____
(Project Manager or QA Manager - sign and date)

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103			Date 6/22/16
Client PCC			Operator Name M. WORTHY
Facility PORTLAND, OR.	Stack Diameter (in.) 16		Barometer ID 2
Source ASC-6532	Condition		Barometric Pressure (in. Hg) 29.95
Sampling Location STACK	Run No. S-MS/22-1		Static Pressure (in. H_2O) -0.35

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe: Liner Material	Probe: Setting (°F)	Probe: Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor 1.000			GLASS	250	4	✓Y ___N	18 SITE SPECIFIC ID

Pitot: Pre-test: Pass?	Pitot: Post-test: Pass?	Pitot Tube ID No.	Pitot Tube PTCF or Cp	DGM-Meter Box: Console No.	DGM-Meter Box: Meter No.	DGM-Meter Box: ΔH @	DGMCF or Y	Nozzle Diameter (in.)
+ ✓Y ___N - ✓Y ___N	+ ✓Y ___N - ✓Y ___N	P-318	0.84	1421	9366862	1.593	1.000	0.180

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A-1	1025	0	848.387	0.97	0.97	0.97	79	255	247	64	71	71		1
		10	854.32	0.97	0.97	0.97	79	253	247	51	73	72		1
		20	860.27	0.97	0.97	0.97	78	253	252	50	75	74		1
		30	866.31	0.97	0.97	0.97	78	243	255	51	74	73		1
2		40	872.35	0.95	0.95	0.95	80	245	252	53	77	74		1
		50	878.12	0.95	0.95	0.95	81	255	252	54	78	75		1
		60	883.85	0.95	0.95	0.95	80	257	253	51	77	75		1
		70	889.74	0.94	0.94	0.94	80	257	253	50	79	76		1
3		80	895.47	0.94	0.94	0.94	82	255	249	53	80	77		1
		90	901.39	0.94	0.94	0.94	82	251	250	54	81	78		1
		100	905.13	0.94	0.94	0.94	82	252	250	54	81	78		1
		110	913.07	0.93	0.93	0.93	81	254	252	54	80	78		1
4		120	919.32	0.93	0.93	0.93	82	258	249	51	81	79		1
		130	925.57	0.85	0.85	0.85	82	257	254	50	82	79		1
		140	931.24	0.83	0.83	0.83	82	257	254	50	82	79		1
		150	937.43	0.83	0.83	0.83	82	255	253	50	81	80		1
5		160	944.91	0.83	0.83	0.83	82	253	253	50	81	80		1
		170	947.31	0.74	0.74	0.74	85	255	250	53	83	81		1
		180	952.32	0.74	0.74	0.74	85	257	253	55	83	81		1
		190	958.01	0.74	0.74	0.74	86	257	255	54	86	82		1
6		200	962.81	0.58	0.58	0.58	86	257	256	55	85	83		1
		210	967.53	0.58	0.58	0.58	87	257	254	56	85	84		1
		220	972.15	0.57	0.57	0.57	87	255	254	56	86	84		1
		230	976.91	0.57	0.57	0.57	87	255	254	59	85	84		
B-1	1435	240	981.459	1.00	1.00	1.00	88	242	253	66	84	84		

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port: A	Before	981.459	981.567		10"	0.001
	After	981.567	981.622		10"	0.001
Port:	Before					
	END After				5"	0.000

Comments:

Notes: Test Location Schematic is presented separately. additional leak checks here or on a separate sheet.

Document

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No.	258103	Date	6/22/16
Client	PCC	Operator Name	M. Worthy
Facility	PORTLAND, OR.	Stack Diameter (in.)	16
Source	ASC-6532	Condition	
Sampling Location	STACK	Run No.	3-MS/29-1
Barometer ID			
Barometric Pressure (in. Hg)	29.95		
Static Pressure (in. H_2O)	-0.35		

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe: Liner Material	Probe: Setting (°F)	Probe: Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor 1.000			GLASS	250	4	V Y __N	18 SITE SPECIFIC ID

Pitot Tube: Pre-test Pass?	Pitot Tube: Post-test Pass?	Pitot Tube ID No.	Pitot Tube PTCF or Cp	DGM-Meter Box: Console No.	DGM-Meter Box: Meter No.	DGM-Meter Box: ΔH @	DGMCF or Y	Nozzle Diameter (in.)
+ ___Y ___N - ___Y ___N	+ ___Y ___N - ___Y ___N	P-318	0.84	1421	9366962	1.593	1.000	0.180

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
B-1		250	987.41	0.99	0.99	0.99	90	245	252	55	87	84		1
		260	992.68	0.99	0.99	0.99	90	245	252	55	87	84		1
		270	999.42	0.99	0.99	0.99	89	245	254	55	85	84		1
2		280	1005.95	0.95	0.95	0.95	90	245	254	55	86	85		1
		290	1011.64	0.95	0.95	0.95	91	250	251	52	89	85		1
		300	1017.53	0.95	0.95	0.95	91	250	252	50	88	86		1
		310	1023.47	0.94	0.94	0.94	91	250	252	49	89	86		1
3		320	1029.31	0.94	0.94	0.94	91	250	252	49	89	86		1
		330	1035.27	0.94	0.94	0.94	90	249	250	50	90	88		1
		340	1041.13	0.94	0.94	0.94	90	249	251	50	90	88		1
		350	1047.07	0.95	0.95	0.95	89	249	252	49	89	87		1
4		360	1053.01	0.84	0.84	0.84	90	249	252	47	90	88		1
		370	1058.63	0.84	0.84	0.84	90	250	251	47	89	88		1
		380	1064.36	0.84	0.84	0.84	90	247	251	47	89	88		1
		390	1069.89	0.84	0.84	0.84	90	244	250	43	87	89		1
5		400	1075.46	0.72	0.72	0.72	90	245	250	43	87	87		1
		410	1080.72	0.72	0.72	0.72	89	245	251	45	88	87		1
		420	1085.91	0.72	0.72	0.72	89	245	251	45	89	87		1
		430	1091.12	0.72	0.72	0.72	89	245	251	45	89	87		1
6		440	1096.32	0.59	0.59	0.59	89	245	251	45	88	86		1
		450	1101.11	0.59	0.59	0.59	91	245	251	46	87	86		1
		460	1105.87	0.59	0.59	0.59	91	245	251	46	87	86		1
		470	1110.69	0.59	0.59	0.59	91	245	252	46	87	86		1
END	1835	480	1115.403											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)						
Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

METHOD 1 - TRAVERSE POINT LOCATIONS

Plant Name	PCC
City/State	PORTLAND, OR.
Test Location	ASC-6532 STACK
Personnel / Date	MGW / 6-22-16

Stack / Ports					
	Type of Stack:	Circular	X	Rectangle	
	No. of Ports Available		2		
	No. of Ports Used		2		
	Port Inside Diameter, in		3		

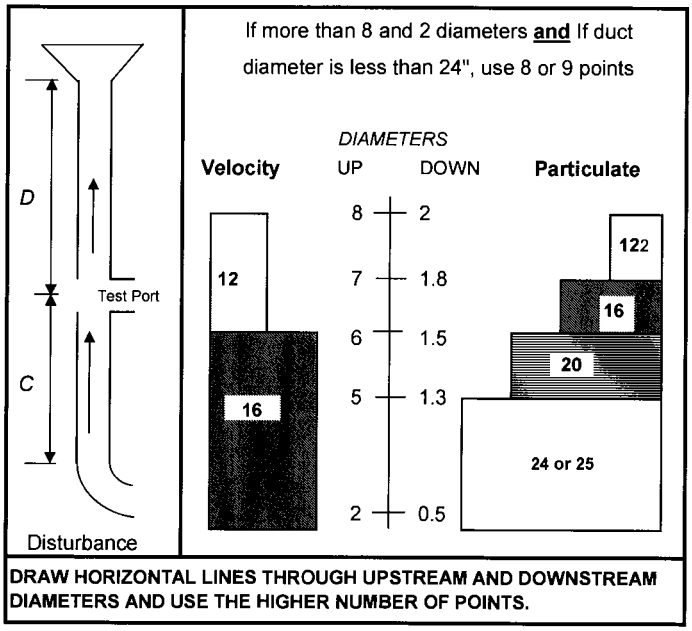
Dimensions		
Put diagram of test location(s) on back of this sheet	Far Wall to Outside of Port, in	20
	Port Length, in	4
	Stack Diameter or Depth, in	16
	Stack Width (if rectangle), in	
	Equivalent Stack Diameter, in	16
	Area of Stack, ft^2	1.396

Distance to Flow Disturbances	Distance, ft	Diameters
Upstream (C)	160"	10
Downstream (D)	48"	3

Number of Traverse Points			Minimum # Required
Particulate Traverse			12
Velocity Traverse			
# of Ports Used	2	# Points/Port	6
Number of Traverse Points Used			12

Point No.	Fraction of Stack Dia.	Dist. from Inside Wall	Port Length	Dist. From Edge of Port
1	0.044	0.70	4	4 3/4
2	0.146	2.34	4	6 3/8
3	0.296	4.74	4	8 3/4
4	0.704	11.26	4	15 1/4
5	0.854	13.66	4	17 5/8
6	0.956	15.30	4	19 1/4
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Note: When using 4 ports in a circular duct, the probe is marked with only the points for the first half of the full diameter traverse.



DRAW HORIZONTAL LINES THROUGH UPSTREAM AND DOWNSTREAM DIAMETERS AND USE THE HIGHER NUMBER OF POINTS.

Equivalent Diameter (for rectangular ducts):	
De = 2 * Depth * Width / (Depth + Width)	
De = 2 * ( ) * ( ) / ( ) + ( ) =	

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	4	6	8	10	12	14	16	18	20
1	.146	.067	.044	.032	.026	.021	.018	.016	.014	.013
2	.854	.250	.146	.105	.082	.067	.057	.049	.044	.039
3		.750	.296	.194	.146	.118	.099	.085	.075	.067
4		.933	.704	.323	.226	.177	.146	.125	.109	.097
5			.854	.677	.342	.250	.201	.169	.146	.129
6			.956	.806	.658	.356	.269	.220	.188	.165
7				.895	.774	.644	.366	.283	.236	.204
8				.968	.854	.750	.634	.375	.296	.250
9					.918	.823	.731	.625	.382	.306
10					.974	.882	.799	.717	.618	.388
11						.933	.854	.780	.704	.612
12						.979	.901	.831	.764	.694
13							.943	.875	.812	.750
14							.982	.915	.854	.796
15	For 22 or 24 test points, see Method 1 table in CFR							.951	.891	.835
16								.984	.925	.871
17									.956	.903
18									.986	.933
19										.961
20										.987

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	3	4	5	6	7	8	9	10	11	12
1	.250	.167	.125	.100	.083	.071	.063	.056	.050	.045	.042
2	.750	.500	.375	.300	.250	.214	.188	.167	.150	.136	.125
3		.833	.625	.500	.417	.357	.313	.278	.250	.227	.208
4			.875	.700	.583	.500	.438	.389	.350	.318	.292
5				.900	.750	.643	.563	.500	.450	.409	.375
6					.917	.786	.688	.611	.550	.500	.458
7						.929	.813	.722	.650	.591	.542
8							.938	.833	.750	.682	.625
9								.944	.850	.773	.708
10									.950	.864	.792
11										.955	.875
12											.958

AM-FDS-89-Rev1

TRC

CYCLONIC FLOW DETERMINATION DATA SHEET
(WITH PRELIMINARY VELOCITY AND MOISTURE)

Client Name	PCC			Velocity Run No.	ASC-6532-M2-1			
Plant Name	PORTLAND			Moisture Run No.	NA			
City/State	PORTLAND, OR			Project Number	258103			
Test Location	ASC-6532			Test Date	6/22/16			
Personnel	MCW			Time: Start	0840	Stop	0900	
Pitot I.D	P-~~30~~ 318	Pitot Coeff.	0.84	P barometer, "Hg	29.95			
Meter Box ID	1421	Gas Meter Y	@ 1.000	P static, " H_2O	-0.35			
Pressure Gauge ID	1421	TC ID	TC-5U	Tester Signature				

Cyclonic Flow / Velocity Traverse

	Point No.	Yaw Angle (deg)	Delta P in. H_2O	Temp Deg. F
1	A-1	0	0.51	79
2	2	-9	0.63	79
3	3	-9	0.73	78
4	4	6	0.82	78
5	5	0	0.83	78
6	6	3	0.81	78
7	B-1	0	0.47	77
8	2	-8	0.69	75
9	3	-6	0.75	75
10	4	5	0.86	75
11	5	4	0.89	75
12	6	7	0.87	75
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
Avg				

Location is acceptable if avg of ABS(Yaw) ≤ 20°

Preliminary Moisture Sample Data

Test Time	DGM Reading Cubic Feet	Avg DGM Temp (F)	Delta H in. H_2O	Vac. in. Hg	Imp Exit Temp (F)

Gas Parameters

Moisture Analytical Results

	# 1	# 2	# 3	# 4	Sil Gel
Final Wt. / Vol					
Initial Wt. / Vol					
Moisture Gain					

Balance No. _____ **Total Catch** _____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2%			

Leak Check Data

Meter	Pre	Post
in. Hg		
cfm		
Pitot		

Delta P avg is square of the average of the individual square roots

Checked By: _____ Date: _____

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103.0000.0000			Date 6/23/16
Client PCC			Operator Name REW
Facility PORTLAND, OR	Stack Diameter (in.) 33"		Barometer ID SGW-400H
Source LPCS 5549	Condition Normal		Barometric Pressure (in. Hg) 29.95
Sampling Location STACK OUTLET	Run No. 1		Static Pressure (in. H_2O) +0.25

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor 2.47			QTZ	250	3'	___Y ✓N	SITE SPECIFIC ID

Pitot Tube Pre-test: Pass?	Pitot Post-test: Pass?	ID No.	PTCF or Cp	DGM - Meter Box Console No.	Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
+ ✓Y ___N - ___Y ___N	+ ✓Y ___N - ✓Y ___N	P15	0.8233 ~~0.84~~	1424		1.694	0.996	0.223

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A1	09:00	0	217.780	.38		.94	68	250	250	52	54	54		0
1		10	222.85	.36		.89	70	249	244	40	60	56		0
2		20	228.37	.36		.89	71	248	259	41	63	57		0
2		30	233.89	.39		.96	70	251	252	43	65	59		0
3		40	239.55	.38		.94	70	248	247	44	66	60		0
3		50	245.20	.37		.91	69	250	252	45	66	61		0
4		60	250.77	.37		.91	70	252	248	46	66	61		0
4		70	256.36	.36		.89	70	251	252	46	64	61		0
5		80	261.87	.37		.91	70	249	248	46	64	61		0
5		90	267.45	.35		.86	70	251	255	47	64	60		0
6		100	272.93	.35		.86	70	247	250	47	63	60		0
6		110	278.40	.36		.89	69	253	247	46	62	60		0
7		120	283.89	.34		.84	71	249	252	45	64	60		0
7		130	289.30	.35		.86	72	252	248	45	64	60		0
8		140	294.75	.35		.86	73	246	258	45	64	60		0
8		150	300.2	.35		.86	73	253	252	46	65	61		0
9		160	305.7	.35		.86	73	250	250	46	65	61		0
9		170	311.21	.36		.89	73	251	248	46	65	61		0
10		180	316.63	.35		.86	74	249	251	48	66	61		0
10		190	322.09	.35		.86	74	248	255	49	66	62		0
11		200	327.48	.34		.84	74	251	249	44	67	62		0
11		210	332.80	.33		.82	75	250	251	44	66	63		0
12		220	337.98	.32		.79	74	251	250	44	66	63		0
12		230	343.12	.32		.79	73	250	249	45	67	63		0
	1300	240	348.270											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)

Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before					
	After					
Port:	Before					
	After					

Comments:

Initial Leak check 0.001 @ 17" Hg

Final leak check 0.000 @ 5" Hg

Notes: Test Location Schematic is presented separately. additional leak checks here or on a separate sheet.

Document

NA = Not Applicable

Checked By: _____ (Project Manager or QA Manager - sign and date)

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

METHOD(S) 5/29

Plant Name	PCC	Run Number	1
Sampling Location	LPCS 5549	Job Number	258103
Test Personnel	RFW	Test Date	6/23/16

Line	Point No.	Time Clock (24-hr)	Time Test (min)	Dry Gas Meter Reading (cu. ft.)	Pitot Reading (in. H2O)	Delta H Actual (in. H2O)	DGM Temp (°F)	Stack Temp (°F)	Probe Temp (°F)	Filter/Box Temp (°F)	Gauge Vacuum (in. Hg)	Imp Exit Temp (°F)	XAD Temp (°F)	____ Temp (°F)
26	B1	1311	0	348.270	.35	.86	63/64	69	248	247	0	56		
27	1		10	353.60	.35	.86	67-64	72	252	249	0	45		
28	2		20	358.94	.35	.86	67-64	72	251	251	0	45		
29	2		30	364.40	.36	.89	68-64	72	249	251	0	46		
30	3		40	368.96	.36	.89	70-65	76	250	252	0	48		
31	3		50	375.50	.35	.86	70-66	79	250	252	0	49		
32	4		60	381.00	.36	.89	69-66	76	248	248	0	48		
33	4		70	386.500	.37	.91	70-66	74	249	248	0	47		
34	5		80	392.14	.37	.91	70-66	74	250	248	0	47		
35	5		90	397.74	.37	.91	70-66	73	252	250	0	48		
36	6		100	403.50	.37	.91	70-66	73	251	250	0	48		
37	6		110	408.94	.35	.86	70-66	73	251	245	0	49		
38	7		120	414.325	.34	.84	69-66	75	254	248	0	50		
39	7		130	419.730	.34	.84	69-66	75	250	248	0	50		
40	8		140	425.14	.35	.86	70-66	76	253	246	0	50		
41	8		150	430.1615	.34	.84	70-67	76	250	249	0	50		
42	9		160	436.03	.34	.84	71-67	75	250	250	0	50		
43	9		170	441.250	.35	.86	71-68	75	255	248	0	50		
44	10		180	447.000	.35	.86	72-68	74	250	250	0	50		
45	10		190	452.39	.30	.74	71-68	73	244	249	0	50		
46	11		200	457.42	.30	.74	70-67	72	249	251	0	51		
47	11		210	462.47	.30	.74	68-66	72	251	250	0	50		
48	12		220	468.50	.18	.44	68-66	72	249	247	0	51		
49	12		230	471.70	.18	.44	68-67	73	250	249	0	52		
50		1711	240	478.457										
51														
52														
53														
54														
55														
56														
57														
58														
59														
60														

7-18-16 sky —

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7-18-16 sky.

Run Time	Total Volume	RMS Delta P	Delta H	T meter Avg	T stack Avg

Checked By: _____ Date: 7/14

AM-FDS-100-Rev1

40 CFR 60 METHOD 2 VELOCITY TRAVERSE

Project No.: 258103	Pitot ID No.: P-15	Stack Diameter (in.): 33.~~FF~~	Date: 6/23
Client: PCC	Pitot Tube Cp: ~~0.84~~ 0.8233	Coupling Length (in.): 4.~~F~~	Operator: RFW
Facility: PORTLAND, OR	Thermalcouple ID No.: PR18	Distance Up Stream (A) (ft): 48"	P Bar ("Hg): 29.95
Source: LPCS 5549	Pressure Gauge ID No.:	Distance Down Stream (B) (ft): 68"	Assumed Moisture (%): 3-5%

Run No.: Initial

Static Pressure ("H2O): +.25		Run Time (24-hr) Start: 7:32		Stop:
CO2 (%) 0.0%	O2 (%) 21.0%	Pitot Leak Checks	Pre-Test + ✓ - ✓	Post-Test + ✓ - ✓

Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0
A-1	59	.32		3
2	61	.36		5
3	62	.37		5
4	63	.38		0
5	64	.38		5
6	64	.38		10
7	65	.39		8
8	65	.38		5
9	65	.36		0
10	65	.10		0
11	65	.10		3
12	64	.05		0
B-1	61	.25		0
2	63	.30		3
3	64	.35		5
4	64	.36		5
5	65	.37		8
6	65	.38		5
7	66	.38		0
8	66	.38		3
9	66	.35		3
10	66	.31		0
11	66	.22		0
12	66	.18		0

Run No.:_____

Static Pressure ("H2O):		Run Time (24-hr) Start:		Stop:
CO2 (%)	O2 (%)	Pitot Leak Checks	Pre-Test + _____ - _____	Post-Test + _____ - _____

Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0

Run No.:_____

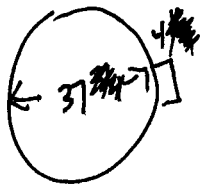
Static Pressure ("H2O):		Run Time (24-hr) Start:		Stop:
CO2 (%)	O2 (%)	Pitot Leak Checks	Pre-Test + _____ - _____	Post-Test + _____ - _____

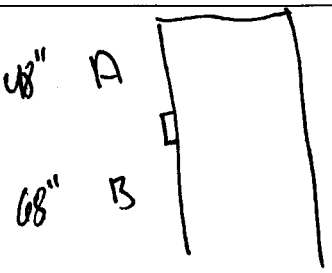
Traverse Point No.	Flue Gas Temp. (°F)	ΔP (in H_2O)	ΔP @ 0° (in H_2O)	Angle for ΔP=0

Comments:

Test Location Schematic(s):

1 Include distance to distubances and note what they are.
2 Show label all ports, Note which was used for each test type.
3 Indicate the flow direction.





NA = Not Applicable

Checked By: 7/14
(Project Manager or QA Manager - sign and date)

6417

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103			Date 6/28/16
Client PCC			Operator Name M. WORTHY
Facility PORTLAND, OR.	Stack Diameter (in.) 33.75		Barometer ID
Source DUST COLLECTOR GRIND BOOTHS 8,9	Condition		Barometric Pressure (in. Hg) 29.85
Sampling Location STACK	Run No. MS/29-1		Static Pressure (in. H_2O) -0.30

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe: Liner Material	Probe: Setting (°F)	Probe: Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor 2.457		061316-7	GLASS	250	4	✓ Y ___ N	SITE SPECIFIC ID

Pitot: Pre-test: Pass?	Pitot: Post-test: Pass?	Pitot Tube ID No.	PTCF or Cp	DGM - Meter Box: Console No.	Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
+ ✓ Y ___ N - ✓ Y ___ N	+ ✓ Y ___ N - ✓ Y ___ N	P-19	0.8273 ~~0.84~~	1490	9366805	1.682	0.986	0.224

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
A-1	0900	0	868.515	0.53	1.30	1.30	69	257	253	48	57	56		1
		10	875.12	0.53	1.30	1.30	70	252	250	44	61	57		1
2		20	881.75	0.53	1.30	1.30	70	252	251	43	63	58		1
		30	889.42	0.53	1.30	1.30	70	252	252	43	63	58		1
3		40	895.65	0.58	1.43	1.43	71	252	254	43	63	59		1
		50	902.05	0.58	1.43	1.43	71	252	254	45	64	59		1
4		60	908.97	0.58	1.43	1.43	71	252	254	45	64	59		1
		70	915.77	0.58	1.43	1.43	71	248	250	45	64	59		1
5		80	922.41	0.58	1.43	1.43	72	250	250	45	63	60		1
		90	930.17	0.58	1.43	1.43	72	251	250	46	63	60		1
6		100	936.34	0.58	1.43	1.43	72	249	250	47	64	60		1
		110	943.44	0.55	1.35	1.35	72	250	250	47	66	61		1
7		120	950.21	0.55	1.35	1.35	72	251	250	47	67	61		1
		130	957.43	0.55	1.35	1.35	72	251	250	47	67	62		1
8		140	964.43	0.55	1.35	1.35	73	249	250	47	68	63		1
		150	971.14	0.55	1.35	1.35	73	249	250	47	68	63		1
9		160	977.21	0.53	1.30	1.30	74	249	250	51	69	64		1
		170	983.92	0.53	1.30	1.30	74	249	250	51	69	64		1
10		180	990.41	0.53	1.30	1.30	73	250	250	51	69	64		1
		190	997.06	0.53	1.30	1.30	74	251	250	52	69	65		1
11		200	1010.73	0.46	1.13	1.13	74	249	251	52	70	65		1
		210	1017.11	0.46	1.13	1.13	74	249	251	52	70	65		1
12		220	1025.01	0.46	1.13	1.13	72	249	249	52	69	65		1
		230	1027.22	0.46	1.13	1.13	72	249	249	52	69	65		1
B-1	1314	0/240	1029.191	0.57	1.40	1.40	71	249	251	56	65	64		1

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)						
Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)
Port:	Before	1029.191	1029.308		5"	0.000
	After					
Port:	Before					
FLUKE	After				5"	0.000

Comments:

Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

TRC

ISOKINETIC FIELD DATA SHEET

Method:

Project No. 258103			Date 6/23/16
Client PCC			Operator Name M. WORTHY
Facility PORTLAND, OR.	Stack Diameter (in.) 33.75		Barometer ID
Source DUST COLLECTOR GRIND BOOTHS 8,9	Condition		Barometric Pressure (in. Hg) 29.95
Sampling Location STACK	Run No. M5/29-1		Static Pressure (in. H_2O) -0.30

Assumed Moisture (%)	Ambient Temp. (°F)	Filter No.	Probe Liner Material	Probe Setting (°F)	Probe Length (ft)	Post-Test Positive Orifice/Meter Leak Check Pass?	Nozzle ID No.
K Factor 2.457		061316-7	GLASS	250	4	___Y ___N	SITE SPECIFIC ID

Pitot Tube: Pre-test: Pass? (+ ___Y ___N / - ___Y ___N)	ID No.	PTCF or Cp	DGM - Meter Box: Console No.	Meter No.	ΔH @	DGMCF or Y	Diameter (in.)
Pitot Post-test: Pass? (+ ___Y ___N / - ___Y ___N)	P-19	0.8273 ~~0.84~~	1490	9366865	1.682	0.986	0.224

Traverse Point	Time: Clock (24 hr)	Time: Elapsed (min)	DGM Volume (ft^3)	Pitot ΔP (in. H_2O)	Orifice, ΔH: Desired (in. H_2O)	Orifice, ΔH: Actual (in. H_2O)	Temperature (°F): Stack Flue Gas	Probe	Filter Box	Impingers Exit	DGM Meter In	DGM Meter Out		Pump Vacuum (in. Hg)
		0	1037.85	0.58	1.43	1.43	71	253	250	50	68	64		1
B-2		20	1045.31	0.58	1.43	1.43	71	249	250	51	69	65		1
		30	1052.21	0.58	1.43	1.43	71	250	251	49	70	65		1
3		40	1058.82	0.58	1.43	1.43	74	249	250	49	71	66		1
		50	1065.82	0.58	1.43	1.43	74	249	252	49	71	66		1
4		60	1073.43	0.59	1.45	1.45	73	251	252	49	71	66		1
		70	1081.22	0.59	1.45	1.45	74	250	251	49	72	68		1
5		80	1088.14	0.59	1.45	1.45	74	250	251	49	72	68		1
		90	1094.11	0.57	1.40	1.40	74	250	250	49	72	68		1
6		100	1100.84	0.57	1.40	1.40	74	251	250	51	72	68		1
		110	1107.96	0.56	1.38	1.38	74	251	250	52	72	68		1
7		120	1114.77	0.54	1.33	1.33	74	250	250	51	72	68		1
		130	1121.42	0.54	1.33	1.33	74	250	250	51	72	68		1
8		140	1129.74	0.55	1.35	1.35	75	250	251	54	72	68		1
		150	1136.44	0.55	1.35	1.35	75	251	252	54	72	68		1
9		160	1143.42	0.51	1.25	1.25	75	250	248	55	72	68		1
		170	1149.82	0.51	1.25	1.25	75	250	249	55	73	69		1
10		180	1156.49	0.51	1.25	1.25	75	251	250	55	73	69		1
		190	1162.95	0.51	1.25	1.25	74	250	251	56	72	68		1
11		200	1169.53	0.51	1.25	1.25	74	250	251	56	70	67		1
		210	1176.71	0.51	1.25	1.25	73	250	251	56	70	67		1
12		220	1185.47	0.50	1.23	1.23	73	253	251	56	70	67		1
		230	1189.61	0.50	1.23	1.23	73	253	251	56	70	67		1
END	1714	0480	1195.668											

Sample Train Leak Checks (e.g., pre-test, at each port change, post-test)							Comments:
Port / AWFCO		Volume (ft^3) Start	Volume (ft^3) Stop	Time (sec.)	Vacuum (in Hg)	Leak Rate (cfm)	
Port:	Before						
	After						
Port:	Before						
	After						Notes: Test Location Schematic is presented separately. Document additional leak checks here or on a separate sheet.

Checked By: _____ (Project Manager or QA Manager - sign and date)

NA = Not Applicable

AM-FDS-24 R0

METHOD 1 - TRAVERSE POINT LOCATIONS

6417

Plant Name	PCC
City/State	PORTLAND, OR.
Test Location	DUST COLLECTOR GRIND BOOTH 8,9
Personnel / Date	M. WORTHY / 6-23-16

Stack / Ports					
	Type of Stack:	Circular	X	Rectangle	
	No. of Ports Available		2		
	No. of Ports Used		2		
	Port Inside Diameter, in		3		

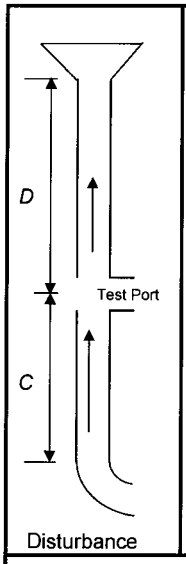
Dimensions		
Put diagram of test location(s) on back of this sheet	Far Wall to Outside of Port, in	37.75
	Port Length, in	4
	Stack Diameter or Depth, in	33.75
	Stack Width (if rectangle), in	
	Equivalent Stack Diameter, in	33.75
	Area of Stack, ft^2	6.213

Distance to Flow Disturbances	Distance, ft	Diameters
Upstream (C)	48"	1.422
Downstream (D)	69"	2.044

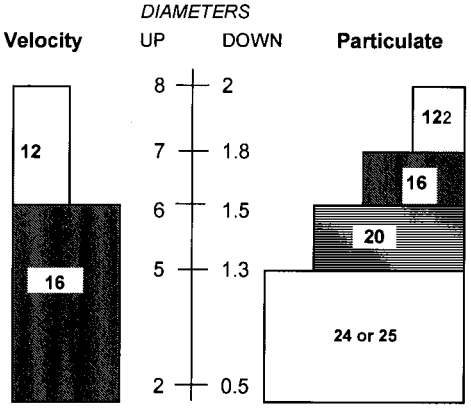
Number of Traverse Points			Minimum # Required
Particulate Traverse			24
Velocity Traverse			
# of Ports Used	2	# Points/Port	12
Number of Traverse Points Used			24

Point No.	Fraction of Stack Dia.	Dist. from Inside Wall	Port Length	Dist. From Edge of Port
1	0.021	1.00	4	5
2	0.067	2.26	4	6 1/4
3	0.118	3.98	4	8
4	0.177	5.97	4	10
5	0.250	8.44	4	12 1/2
6	0.356	12.02	4	16
7	0.644	21.74	4	25 3/4
8	0.750	25.31	4	29 3/8
9	0.823	27.78	4	31 3/4
10	0.882	29.77	4	33 3/4
11	0.933	31.49	4	35 1/2
12	0.979	32.75	4	36 3/4
13				
14				
15				
16				

Note: When using 4 ports in a circular duct, the probe is marked with only the points for the first half of the full diameter traverse.



If more than 8 and 2 diameters **and** If duct diameter is less than 24", use 8 or 9 points



DRAW HORIZONTAL LINES THROUGH UPSTREAM AND DOWNSTREAM DIAMETERS AND USE THE HIGHER NUMBER OF POINTS.

Equivalent Diameter (for rectangular ducts):	
De = 2 * Depth * Width / (Depth + Width)	
De = 2 * ( ) * ( ) / ( ) + ( ) =	

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	4	6	8	10	12	14	16	18	20
1	.146	.067	.044	.032	.026	.021	.018	.016	.014	.013
2	.854	.250	.146	.105	.082	.067	.057	.049	.044	.039
3		.750	.296	.194	.146	.118	.099	.085	.075	.067
4		.933	.704	.323	.226	.177	.146	.125	.109	.097
5			.854	.677	.342	.250	.201	.169	.146	.129
6			.956	.806	.658	.356	.269	.220	.188	.165
7				.895	.774	.644	.366	.283	.236	.204
8				.968	.854	.750	.634	.375	.296	.250
9					.918	.823	.731	.625	.382	.306
10					.974	.882	.799	.717	.618	.388
11						.933	.854	.780	.704	.612
12						.979	.901	.831	.764	.694
13							.943	.875	.812	.750
14							.982	.915	.854	.796
15								.951	.891	.835
16								.984	.925	.871
17									.956	.903
18									.986	.933
19										.961
20										.987

For 22 or 24 test points, see Method 1 table in CFR

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

(Fraction of stack diameter from inside wall to traverse point)

	2	3	4	5	6	7	8	9	10	11	12
1	.250	.167	.125	.100	.083	.071	.063	.056	.050	.045	.042
2	.750	.500	.375	.300	.250	.214	.188	.167	.150	.136	.125
3		.833	.625	.500	.417	.357	.313	.278	.250	.227	.208
4			.875	.700	.583	.500	.438	.389	.350	.318	.292
5				.900	.750	.643	.563	.500	.450	.409	.375
6					.917	.786	.688	.611	.550	.500	.458
7						.929	.813	.722	.650	.591	.542
8							.938	.833	.750	.682	.625
9								.944	.850	.773	.708
10									.950	.864	.792
11										.955	.875
12											.958

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CYCLONIC FLOW DETERMINATION DATA SHEET
(WITH PRELIMINARY VELOCITY AND MOISTURE)

Client Name	PCC			Velocity Run No.	1			
Plant Name	PORTLAND			Moisture Run No.	N/A			
City/State	PORTLAND, OR.			Project Number	258103			
Test Location	DUST COLLECTOR GRIND BOOTHS 8,9			Test Date	6/23/16			
Personnel	M. WORTHY		0.8273	Time: Start	0810	Stop	0830	
Pitot I.D	P-19	Pitot Coeff.	~~0.84~~	P barometer, "Hg	29.95			
Meter Box ID	1490	Gas Meter Y	0.986	P static, " H_2O	-0.31			
Pressure Gauge ID	1490	TC ID	P-19	Tester Signature				

Cyclonic Flow / Velocity Traverse

	Point No.	Yaw Angle (deg)	Delta P in. H_2O	Temp Deg. F
1	A-1	2	0.51	65
2	2	6	0.55	65
3	3	10	0.60	66
4	4	11	0.63	66
5	5	11	0.64	66
6	6	9	0.64	66
7	7	8	0.65	67
8	8	10	0.63	67
9	9	12	0.61	67
10	10	11	0.56	67
11	11	9	0.52	67
12	12	4	0.49	67
13	B-1	8	0.62	67
14	2	10	0.64	67
15	3	10	0.64	67
16	4	11	0.65	67
17	5	15	0.65	67
18	6	15	0.65	68
19	7	12	0.64	68
20	8	11	0.63	68
21	9	10	0.62	68
22	10	9	0.61	68
23	11	6	0.57	68
24	12	4	0.53	68
25				
26				
27				
28				
	Avg			

Location is acceptable if avg of ABS(Yaw) ≤ 20°

Preliminary Moisture Sample Data

Test Time	DGM Reading Cubic Feet	Avg DGM Temp (F)	Delta H in. H_2O	Vac. in. Hg	Imp Exit Temp (F)

Gas Parameters

Moisture Analytical Results

	# 1	# 2	# 3	# 4	Sil Gel
Final Wt. / Vol					
Initial Wt. / Vol					
Moisture Gain					

Total Catch

Balance No. _____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2%			

Leak Check Data

Meter	Pre	Post
in. Hg		
cfm		
Pitot		

Delta P avg is square of the average of the individual square roots

Checked By: _____ Date: _____

METHOD 5/29 - MOISTURE ANALYSIS DATA SHEET

Client Name	PCC Structurals LLC	Project Number	258103
Plant Name	PCC	Sample Method	5/29
City / State	Portland, OR	Recovery Location	Trailer
Test Location		Analyst Signature	CJM

Run Number	EU9203W	EU9203E	EU8901-OUT	EU6532
Test Date	6-21-16	6-21-16	6-22-16	6-22-16
Recovery Date	6-21-16	6-21-16	6-22-16	6-22-16
Recovered By	CM	CM	CM	CM
Impinger 1: Empty	Filter: TRC061316-1	TRC061316-2	TRC061316-3	TRC-061316-4
Final Weight, g			882.3	889.3
Initial Weight, g			876.1	887.9
Net weight, g				
Impinger 2: HNO_3/H_2O_2				
Final Weight, g	717.6	750.0	746.1	619.7
Initial Weight, g	726.5	759.4	771.8	631.1
Net weight, g				
Impinger 3: HNO_3/H_2O_2				
Final Weight, g	771.8	758.3	769.4	758.5
Initial Weight, g	742.2	729.6	727.6	730.4
Net weight, g				
Impinger 4: Empty				
Final Weight, g	638.8	617.5	660.4	576.2
Initial Weight, g	636.9	614.3	650.7	570.1
Net weight, g				
Impinger 5: KMnO4		768.5		
Final Weight, g	789.0	762.5	647.8	628.3
Initial Weight, g	723.4	~~652.5~~ 424	637.8	626.4
Net weight, g				
Impinger 6: KMnO4				
Final Weight, g	690.2	710.3	742.6	747.6
Initial Weight, g	755.0	711.6	754.6	748.6
Net weight, g				
Impinger 7: Sil Gel				
Final Weight, g	900.4	1041.5	998.0	912.9
Initial Weight, g	859.3	1001.2	949.8	872.3
Net weight, g				
Total Catch, g				
Train Glass	1	2	3	4

2nd Signal

Checked By: _____ Date: _____

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w 6/21/16 CM 6/21/16

Scale: 713216414

1 Kg = 999.8g

CM 6/22/16

1 Kg = 999.9g

METHOD 5/29 - MOISTURE ANALYSIS DATA SHEET

Client Name	PCC Structurals LLC	Project Number	258103
Plant Name	PCC	Sample Method	5/29
City / State	Portland, OR	Recovery Location	Trailer
Test Location		Analyst Signature	

	TRC061316-6	TRC061316-7		
Run Number	EU5549	EU6417		
Test Date	6/23/16	6/23/16		
Recovery Date	6/23/16	6/23/16		
Recovered By				
Impinger 1: ~~Empty~~ HNO_3/H_2O_2				
Final Weight, g	786.8	750.8		
Initial Weight, g	756.3	743.2		
Net weight, g				
Impinger 2: ~~HNO_3/H_2O_2~~				
Final Weight, g	742.7	789.5		
Initial Weight, g	730.5	754.5		
Net weight, g				
Impinger 3: ~~HNO_3/H_2O_2~~				
Final Weight, g	635.8	647.3		
Initial Weight, g	631.5	641.5		
Net weight, g				
Impinger 4: ~~Empty~~				
Final Weight, g	821.9	717.6		
Initial Weight, g	751.9	714.1		
Net weight, g				
Impinger 5: ~~$KMnO_4$~~				
Final Weight, g	687.5	752.3		
Initial Weight, g	755.2	753.0		
Net weight, g				
Impinger 6: ~~$KMnO_4$~~				
Final Weight, g	1031.6	1000.7		
Initial Weight, g	991.1	948.1		
Net weight, g				
Impinger 7: Sil Gel				
Final Weight, g	928.0	893.8		
Initial Weight, g	928.0	883.1		
Net weight, g				
Total Catch, g				
Train	5	6		

Checked By: _____ Date: _____

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6/23/16

1 Kg = 999.9g

TRC

METHOD 4 - MOISTURE ANALYSIS DATA SHEET

Client Name	PCC Structurals LLC	Project Number	258103
VesselPlant	PCC	Sample Method	5
City / State	Portland OR	Load / Condition	Normal
Test Location	Inlet EU8901	Analyst Signature	

Run Number	ONE	TWO	THREE	FOUR
Test Date	6/22/16			
Recovery Date				
Recovered By				
Impinger 1 DI				
Final Weight, g	735.6			
Initial Weight, g	721.3			
Net weight, g				
Impinger 2 DI				
Final Weight, g	745.1			
Initial Weight, g	739.6			
Net weight, g				
Impinger 3 empty				
Final Weight, g	642.1			
Initial Weight, g	638.5			
Net weight, g				
Impinger 4 Silicagel				
Final Weight, g	951.3			
Initial Weight, g	915.5			
Net weight, g				
Impinger 5 Silicagel				
Final Weight, g	813.9			
Initial Weight, g	810.4			
Net weight, g				
Impinger 6				
Final Weight, g				
Initial Weight, g				
Net weight, g				
Impinger 7				
Final Weight, g				
Initial Weight, g				
Net weight, g				
Total Catch, g				

Filter TRC 061316-5

Scale Info - See M5/29 Sheet.

AM-FDS-86 REV. 0

Oregon Department of Environmental Quality (ODEQ)

STAR Forms

SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 23, 2016

Emission Unit:Donaldson Day Baghouse #5549 HEPA Exhaust
Sampling Location: Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided.
D. Was the source operating within ±10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program.
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory.
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory.
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section.

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist III

Signature: Sheryl Uchytil Date: 9/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 23, 2016 ___
Emission Unit: Donaldson/Carter Day Baghouse #5549 HEPA Exhaust Sampling Location:Outlet

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	Baghouse with HEPA Exhaust				--	
Unit Subtype	--					
Manufacturer	Donaldson				--	
Date of Manufacturer	United Kingdom				--	
Date of Installation	2013				--	
Permitted Capacity - _____/_____						
Rated Capacity -_____/_____						
Type of Fuel (if applicable)	N/A					
Type of Pollution Control Device A	Baghouse with HEPA Filtration				--	
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 - _TOTAL CASTNGS	20				--	
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other_____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____	N/A					
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other _____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired	N/A					
Moisture Content -% wt. as fired	N/A					
Amount of Fines -% _____	N/A					
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC). Permit #: 26-1867 Test Date: June 23, 2016
Emission Unit.: Donaldson Day Baghouse #5549 HEPA Exhaust Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Outlet	ID:___	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C			33	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	33			33	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.00			33	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	5.67			33	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	24			33	
PROCEDURAL INFORMATION		ID:Outlet	ID:___	ID:___		
1.6	Number of Traverse Points Utilized	24			33	
1.7	Distance from Inside Wall to Traverse Point #1, inches	1.0			33	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	3.2			33	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N			33	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc. (LPC)_ Permit #:26-1867_ Test Date: June 23, 2016___
Emission Unit: Donaldson Day Baghouse #5549 HEPA Exhaust Sampling Location: Outlet____

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P			129	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)					
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01			--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA			--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA			--	
PITOT TUBE (S)		ID:P-15	ID:_____	ID:_____		
2.6	Pitot Tube Coefficient	0.8233			158	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/16			157	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM			164	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	nc			164	
STACK TEMPERATURE GAUGE(S)		ID:1424	ID:_____	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/2/2016			191	
BAROMETER		ID:Outlet	ID:_____	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	--			--	Not reported.

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867__ Test Date: June 23, 2016__
Emission Unit: Donaldson Day Baghouse #5549 HEPA Exhaust_ Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
5.1	Saturated Exhaust? (Y=yes, N=no)	N			13	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N			13	1.59%
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	0.0	--	--	122-126	Separate spreadsheet used to complete hand calculation.
GRAVIMETRIC ANALYSIS		ID:Outlet	ID:_____	ID:_____		
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA				Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	< 0.00095			43	0.2 mg/211 mL
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	--			--	
5.7	Maximum laboratory temp. during all tare and final weighings {≤70°F}	75			270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {≤±0.5 mg}	-1.1			274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {≤±0.5 mg}	2.0			275	
TEMPERATURE GAUGE(S)		ID:1424	ID:_____	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	6/6/2016			189	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not reported.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not reported.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID: 1424	ID:_____	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	6/6/2016			192	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O			198	
5.15	Pre Test Meter Calibration Date	6/6/2016			192	
5.16	Pre Test Meter Calibration Factor	0.996			192	
5.17	Post Test Meter Calibration Date	8/2/2016			194	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.5			194	
5.19	dH of Meter During Post Test Meter Calibration	1.550			194	
SAMPLE NOZZLE(S)		ID:Outlet EU5549	ID:_____	ID:_____		
5.20	Number of inside diameters measured	3			173	
5.21	Date of nozzle calibration	6/23/2016			173	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000			173	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Outlet	ID:_____	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA			--	
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA			--	
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA			--	
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA			--	

SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #: N26-1867 Test Date: June 23, 2016

Emission Unit: Grinding Cell Baghouse #6417 HEPA Exhaust
Sampling Location: Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided.
D. Was the source operating within ±10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program.
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory.
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory.
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section.

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist II

Signature: Sheryl Uchytil Date: 9/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC)__ Permit #: 26-1867_ Test Date: June 23, 2016__
Emission Unit: Grinding Cell Baghouse #6417 HEPA Exhaust_ Sampling Location:Outlet_

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	Baghouse with HEPA Exhaust					
Unit Subtype						
Manufacturer						
Date of Manufacturer						
Date of Installation						
Permitted Capacity - _____/_____						
Rated Capacity -_____/_____						
Type of Fuel (if applicable)	N/A					
Type of Pollution Control Device A	Baghouse with HEPA Filtration					
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 -	N/A					
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other: _____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____	N/A					
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other_____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired	N/A					
Moisture Content -% wt. as fired	N/A					
Amount of Fines -% _____	N/A					
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC)__ Permit #: _26-1867 Test Date: June 23, 2016_
Emission Unit.: Grinding Cell Baghouse #6417 HEPA Exhaust_ Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Outlet	ID:___	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C			34	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	33.75			34	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.00			34	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	5.75			34	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	24			34	
PROCEDURAL INFORMATION		ID:Outlet	ID:___	ID:___		
1.6	Number of Traverse Points Utilized	24			34	
1.7	Distance from Inside Wall to Traverse Point #1, inches	1.0			34	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	9.3			34	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N			34	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc.(LPC) Permit #: 26-1867 Test Date: June 23, 2016
Emission Unit: Grinding Cell Baghouse #6417 HEPA Exhaust Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P			131	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)	--			--	
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01			--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA			--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA			--	
PITOT TUBE (S)		ID: P19t	ID:_____	ID:_____		
2.6	Pitot Tube Coefficient	0.8273			166	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/2016			165	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM			172	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	NC			172	
STACK TEMPERATURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/2/2016			191	
BAROMETER		ID:Outlet	ID:_____	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	--			--	Not reported

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC)____ Permit #:NA Test Date: June 23, 2016_____
Emission Unit: Grinding Cell Baghouse #6417 HEPA Exhaust_ Sampling Location: Outlet___

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
5.1	Saturated Exhaust? (Y=yes, N=no)	N			15	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N			15	1.63%
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	NA			--	
GRAVIMETRIC ANALYSIS		ID:Outlet	ID:_____	ID:_____		
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA			--	Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	< 0.00095			46	0.2 mg/211 mL
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	NA			--	
5.7	Maximum laboratory temp. during all tare and final weighings {≤70°F}	75			270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {<±0.5 mg}	-1.8			274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {<±0.5 mg}	-177.7			275	
TEMPERATURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	5/5/2016			193	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--				Not Reported.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not Reported.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID: 1490	ID:_____	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	5/5/2016			192	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O			198	
5.15	Pre Test Meter Calibration Date	5/5/2016			192	
5.16	Pre Test Meter Calibration Factor	0.986			192	
5.17	Post Test Meter Calibration Date	8/2/2016			192	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.9			194	
5.19	dH of Meter During Post Test Meter Calibration	1.720			194	
SAMPLE NOZZLE(S)		ID: EU6417	ID: _____	ID:_____		
5.20	Number of inside diameters measured	3			174	
5.21	Date of nozzle calibration	6/23/2016			174	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000			174	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Outlet	ID:_____	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA			--	
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA			--	
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA			--	
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA			--	

SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 21, 2016

Emission Unit:Donaldson Baghouse #9203E HEPA Exhaust
Sampling Location: Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided
D. Was the source operating within ±10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory.
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist II

Signature: Sheryl Uchytil Date: 9/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 21, 2016 ___
Emission Unit: Donaldson Day Baghouse #9203E HEPA Exhaust Sampling Location:Outlet

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	Baghouse with HEPA Exhaust				--	
Unit Subtype	--					
Manufacturer	Donaldson				--	
Date of Manufacturer	United Kingdom 2016				--	
Date of Installation	HEPA installed 2016				--	
Permitted Capacity - _____/_____						
Rated Capacity -_____/_____						
Type of Fuel (if applicable)	N/A					
Type of Pollution Control Device A	Baghouse with HEPA Filtration				--	
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 - _TOTAL CASTNGS	19				--	
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other_____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____	N/A					
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other _____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired	N/A					
Moisture Content -% wt. as fired	N/A					
Amount of Fines -% _____	N/A					
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC). Permit #: 26-1867 Test Date: June 21, 2016
Emission Unit.: Donaldson Baghouse #9203E HEPA Exhaust Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Outlet	ID:___	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C			35	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	33.875			35	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.29			35	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	7.96			35	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	24			35	
PROCEDURAL INFORMATION		ID:Outlet	ID:___	ID:___		
1.6	Number of Traverse Points Utilized	24			35	
1.7	Distance from Inside Wall to Traverse Point #1, inches	1.0			35	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	4.8			35	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N			35	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc. (LLC)_ Permit #:26-1867_ Test Date: June 21, 2016___
Emission Unit: Donaldson Baghouse #9203E HEPA Exhaust Sampling Location: Outlet____

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P			133	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)	--			--	
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01			--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA			--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA			--	
PITOT TUBE (S)		ID:P-15	ID:_____	ID:_____		
2.6	Pitot Tube Coefficient	0.8233			158	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/16			157	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM			164	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	NC0			164	
STACK TEMPERATURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/2/2016			191	
BAROMETER		ID:Outlet	ID:_____	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	--			--	Not reported.

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867__ Test Date: June 21, 2016__
Emission Unit: Donaldson Baghouse #9203E HEPA Exhaust_ Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
5.1	Saturated Exhaust? (Y=yes, N=no)	N			17	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N			17	1.20%
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	NA	--	--	--	Separate spreadsheet used to complete hand calculation.
GRAVIMETRIC ANALYSIS		ID:Outlet	ID:_____	ID:_____		
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA				Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	NA			--	Performed M5/M29
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	< 0.00095			46	0.2 mg/211 mL
5.7	Maximum laboratory temp. during all tare and final weighings {≤70°F}	75			270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {<+0.5 mg}	-1.6			274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {<+0.5 mg}	0.6			275	
TEMPERATURE GAUGE(S)		ID:1424	ID:_____	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	6/6/2016			189	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--				Not reported.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not reported.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID: 1424	ID:_____	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	6/6/2016			190	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O			200	
5.15	Pre Test Meter Calibration Date	6/6/16			190	
5.16	Pre Test Meter Calibration Factor	0.996			190	
5.17	Post Test Meter Calibration Date	8/2/2016			192	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.5			192	
5.19	dH of Meter During Post Test Meter Calibration	1.550			192	
SAMPLE NOZZLE(S)		ID:Outlet EU9203-E	ID:_____	ID:_____		
5.20	Number of inside diameters measured	3			180	
5.21	Date of nozzle calibration	6/23/2016			180	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000			180	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Outlet	ID:_____	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA			--	
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA			--	
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA			--	
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA			--	

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SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 21, 2016

Emission Unit:Donaldson Baghouse #9203W HEPA Exhaust
Sampling Location: Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided.
D. Was the source operating within ±10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program.
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory.
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory.
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section.

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist II

Signature: Sheryl Uchytil Date: 9/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 21, 2016
Emission Unit: Donaldson Baghouse #9203W HEPA Exhaust Sampling Location:Outlet

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	Baghouse with HEPA Exhaust				--	
Unit Subtype	--					
Manufacturer	Donaldson				--	
Date of Manufacturer	United Kingdom 2016				--	
Date of Installation	HEPA installed 2016				--	
Permitted Capacity - _____/_____						
Rated Capacity -_____/_____						
Type of Fuel (if applicable)	N/A					
Type of Pollution Control Device A	Baghouse with HEPA Filtration				--	
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 - _TOTAL CASTNGS	19				--	
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other_____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____	N/A					
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other _____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired	N/A					
Moisture Content -% wt. as fired	N/A					
Amount of Fines -% _____	N/A					
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC)__ Permit #: _26-1867 Test Date: June 21, 2016_
Emission Unit.: Donaldson Baghouse #9203W HEPA Exhaust_ Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Outlet	ID:___	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C			36	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	33.875			36	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.29			36	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	7.96			36	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	24			36	
PROCEDURAL INFORMATION		ID:Outlet	ID:___	ID:___		
1.6	Number of Traverse Points Utilized	24			36	
1.7	Distance from Inside Wall to Traverse Point #1, inches	1.0			36	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	5.5			36	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N			36	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc.(LPC) Permit #: 26-1867 Test Date: June 21, 2016
Emission Unit: Donaldson Baghouse #9203W HEPA Exhaust Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P			135	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)	--			--	
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01			--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA			--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA			--	
PITOT TUBE (S)		ID: P17	ID:_____	ID:_____		
2.6	Pitot Tube Coefficient	0.8230			146	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/2016			145	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM			152	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	NC			152	
STACK TEMPERATURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/2/2016			195	
BAROMETER		ID:Outlet	ID:_____	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	--	1		--	Not reported

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC)___ Permit #:NA Test Date: June 21, 2016_____
Emission Unit: Donaldson Baghouse #9203W HEPA Exhaust_ Sampling Location: Outlet___

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
5.1	Saturated Exhaust? (Y=yes, N=no)	N			19	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N			19	1.16%
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	NA			--	
GRAVIMETRIC ANALYSIS		ID:Outlet	ID:_____	ID:_____		
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA			--	Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	< 0.00095			41	0.2 mg/211 mL
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	NA			--	
5.7	Maximum laboratory temp. during all tare and final weighings {≤70°F}	75			270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {≤±0.5 mg}	-1.8			274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {≤±0.5 mg}	1.9			275	
TEMPERATURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	5/5/2016			193	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--			--	Data not recorded.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--			--	Data not recorded.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID: 1490	ID:_____	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	5/5/2016			192	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O			198	
5.15	Pre Test Meter Calibration Date	5/5/16			192	
5.16	Pre Test Meter Calibration Factor	0.986			192	
5.17	Post Test Meter Calibration Date	8/2/2016			194	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.9			194	
5.19	dH of Meter During Post Test Meter Calibration	1.720			194	
SAMPLE NOZZLE(S)		ID: EU9203W	ID: _____	ID:_____		
5.20	Number of inside diameters measured	3			179	
5.21	Date of nozzle calibration	6/21/2016			179	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000			179	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Outlet	ID:_____	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA			--	
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA			--	
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA			--	
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA			--	

SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016

Emission Unit: ASC Baghouse #6532 HEPA Exhaust Sampling Location: Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided.
D. Was the source operating within +10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program.
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory.
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory.
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section.

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist II

Signature: Sheryl Uchytil Date: 9/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016
Emission Unit: ASC Baghouse #6532 HEPA Exhaust Sampling Location: Outlet

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	HEPA Exhaust					
Unit Subtype	Flows into baghouse with HEPA					
Manufacturer	Donaldson				--	
Date of Manufacturer	United Kingdom				--	
Date of Installation	2002				--	
Permitted Capacity - _____/_____						
Rated Capacity -_____/_____						
Type of Fuel (if applicable)						
Type of Pollution Control Device A	Baghouse with HEPA Filtration				--	
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 - -- TOTAL INGOTS	78				--	
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other_____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other_____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired						
Moisture Content -% wt. as fired						
Amount of Fines -% _____						
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC)_ Permit #: _26-1867_ Test Date: June 22, 2016__
Emission Unit.: ASC Baghouse #6532 HEPA Exhaust Sampling Location:Outlett__

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Outlet	ID:___	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C			37	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	16			37	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.00			37	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	13.33			37	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	12			37	
PROCEDURAL INFORMATION		ID:Outlet	ID:___	ID:___		
1.6	Number of Traverse Points Utilized	12			37	
1.7	Distance from Inside Wall to Traverse Point #1, inches	0.7			37	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	4.8			37	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N			--	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc. (LPC) Permit #:26-1867 Test Date: June 22, 2016
Emission Unit: ASC Baghouse #6532 HEPA Exhaust Sampling Location: Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P			137	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)	--			--	
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Outlet	ID:_____	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01			--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA			--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA			--	
PITOT TUBE (S)		ID: P-318	ID:_____	ID:_____		
2.6	Pitot Tube Coefficient	0.84			144	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/2016			155	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM			156	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	NC			156	
STACK TEMPERATURE GAUGE(S)		ID:1421	ID:_____	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/2/2016			187	
BAROMETER		ID:Outlet	ID:_____	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	--			--	Not reported.

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867__ Test Date: June 22, 2016__
Emission Unit: ASC Baghouse #6532 HEPA Exhaust___ Sampling Location: Outlet___

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Outlet	ID:_____	ID:_____		
5.1	Saturated Exhaust? (Y=yes, N=no)	N			--	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N			21	1.18% moisture
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	--			--	
GRAVIMETRIC ANALYSIS		ID:Outlet	ID:_____	ID:_____		
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA				Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	< 0.00095			55	0.2 mg/250 mL
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	NA			--	
5.7	Maximum laboratory temp. during all tare and final weighings {≤70ºF}	75			270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {<±0.5 mg}	-2.2			274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {<±0.5 mg}	2.7			275	
TEMPERATURE GAUGE(S)		ID:1421	ID:_____	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	5/13/2016			185	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not reported.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--			--	Not reported.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID:1421	ID:_____	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	5/13/2016			184	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O			198	
5.15	Pre Test Meter Calibration Date	5/13/2016			184	
5.16	Pre Test Meter Calibration Factor	1.000			184	
5.17	Post Test Meter Calibration Date	8/2/2016			186	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.4			186	
5.19	dH of Meter During Post Test Meter Calibration	1.497			186	
SAMPLE NOZZLE(S)		ID: EU6532	ID:_____	ID:_____		
5.20	Number of inside diameters measured	3			175	
5.21	Date of nozzle calibration	6/22/2016			175	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000			175	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Outlet	ID:_____	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA				
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA				
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA				
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA				

SOURCE TESTING AUDIT REPORT: CERTIFICATION FORM

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016

Emission Unit::ASC Baghouse #8901 HEPA Exhaust Sampling Location: Inlet and Outlet

SECTION 1: TESTING PROGRAM CERTIFICATION INFORMATION

ITEM OF INQUIRY	Yes	No	EXPLANATION
A. Is the purpose(s) for the testing clearly defined within the test report?	X		
B. Did testing include all pollutants specified within the Source Test Plan (STP)?	X		
C. Were all issues within the Department's response to the STP fully addressed?	X		None were provided.
D. Was the source operating within ±10% of normal maximum capacity?	X		
E. Are all appropriate operating conditions documented?	X		PCC provided number of castings processed during test program
F. Were there any test interruptions?		X	
G. Were there any variances or modifications to the STP? (if Yes; reply to i & ii)	X		EPA M29 audit sample submitted directly to laboratory
i. Were the variances or modifications approved by the Department?	X		Received email notification from ODEQ granting permission to submit post-test audit sample directly to laboratory
ii. Does the report include an evaluation of the impact the variances or modifications had on the test data?	X		Noted in discussion of results section.

SECTION 2: SOURCE SAMPLING REPORT AUDITOR CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Judith Aasland Title: Project Director

Signature: Judith Aasland Date: 8/10/2016

SECTION 3: PERMITTEE REPRESENTATIVE CERTIFICATION:

I hereby certify that to the best of my knowledge, the information provided within this source sampling audit report is complete and factual.

Name: Sheryl Uchytil Title: Environmental Specialist II

Signature: Sheryl Uchytil Date: 8/6/2016

SECTION 4: DEPARTMENT REPRESENTATIVE:

The Oregon Department of Environmental Quality has evaluated the Source Sampling Audit Report and has determined that the information provided is sufficient for accepting the results originating from the testing program. Although no deficiencies were exposed by the Source Sampling Audit Report, additional errors and/or inconsistencies may be detected through additional Departmental review at a later date, which may lead to a retest or an enforcement action against the permittee.

Name: _____ Title: _____

Signature: _____ Date: _____

SOURCE DESCRIPTION & OPERATING PARAMETERS

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016
Emission Unit: ASC Baghouse #8901 HEPA Exhaust Sampling Location: Inlet and Outlet

SOURCE & POLLUTION CONTROL INFORMATION	DESCRIPTION				PAGE #	NOTES/COMMENTS
Unit Type	EU8901 ASC Baghouse (Inlet/Outlet)					
Unit Subtype	--					
Manufacturer	AirTech					
Date of Manufacturer	United Kingdom 2012					
Date of Installation	2014/2015					
Permitted Capacity - _____/_____	N/A					
Rated Capacity -_____/_____	N/A					
Type of Fuel (if applicable)	N/A					
Type of Pollution Control Device A	Baghouse with HEPA Filtration					
Type of Pollution Control Device B						
SOURCE PROCESS & OPERATING PARAMETERS	INLET RUN 1	OUTLET RUN 1	RUN __	RUN __	AVG.	NOTES/COMMENTS
Process Rate 1 - TOTAL INGOTS	40					
Process Rate 2 - _____/_____						
Process Rate 3 - _____/_____						
Operating Parameter 1 -_____						
Operating Parameter 2 -_____						
Operating Parameter 3 -_____						
Other: _____						
Other_____						
POLLUTION CONTROL DEVICE PARAMETERS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "A" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Control Device "B" Operating Parameter _____						
Other_____						
Other_____						
FUEL ANALYSIS	RUN __	RUN __	RUN __	RUN __	AVG.	NOTES/COMMENTS
Sulfur Content -% wt. as fired	N/A					
Moisture Content -% wt. as fired	N/A					
Amount of Fines -% _____	N/A					
Other_____						
Other_____						

SOURCE TESTING AUDIT FORM: EPA METHOD 1

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016
Emission Unit.: ASC Baghouse #8901 HEPA Exhaust Sampling Location: Inlet and Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PHYSICAL CHARACTERISTICS		ID:Inlet	ID:Outlet	ID:___		
1.1	Exhaust Duct Shape (C=circular : R=rectangular)	C	C		39, 38	
1.2	Exhaust Duct Inside Diameter, inches (equivalent diameter if rectangular)	12"	12"		39, 38	
1.3	Duct Diameters Upstream From Flow Disturbance (Distance A)	4.17	4.00		39, 38	
1.4	Duct Diameters Downstream From Flow Disturbance (Distance B)	8.33	13.33		39, 38	
1.5	Minimum Number of Traverse Points Required (Fig. 1-1, Pt. 60, App A, Meth. 1)	8	12		39, 38	
PROCEDURAL INFORMATION		ID:Inlet	ID:Outlet	ID:___		
1.6	Number of Traverse Points Utilized	8	12		39, 38	
1.7	Distance from Inside Wall to Traverse Point #1, inches	0.8	0.5		39, 38	
1.8	Was the Absence of Cyclonic Flow Verified? (if yes, the average measured yaw angle? : N = no)	3.3	5.0		39, 38	
1.9	Was a Three Dimensional Directional Probe Utilized (if yes, the average measured pitch and yaw angles? : N = no)	N	N		39, 38	

SOURCE TESTING AUDIT FORM: EPA METHOD 2

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016
Emission Unit: ASC Baghouse #8901 HEPA Exhaust Sampling Location: Inlet and Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Inlet	ID:Outlet	ID:_____		
2.1	Post Test Leak Check Status (P=pass, F=fail)	P	P		141, 139	
2.2	Difference in Flow Rate Between Reported & Hand Calculation, % (hand sample calculations required for one run)	NA	NA		--	
DIFFERENTIAL PRESSURE GAUGE(S)		ID:Inlet	ID:Outlet	ID:_____		
2.3	Smallest Division on Scale of Differential Pressure Gauge, "H_2O	0.01	0.01		--	
2.4	Date of Post Test Differential Pressure Gauge Calibration (manometer = NA)	NA	NA		--	
2.5	Difference Between Differential Pressure Gauge & Reference Manometer, % {allowable ≤ 5%} (manometer = NA)	NA	NA		--	
PITOT TUBE (S)		ID: P15	ID: P5C	ID:_____		
2.6	Pitot Tube Coefficient	0.8233	0.84		158, 144	
2.7	Type-S Pitot Tube Calibration Date (NA=std type) {within 6 months prior to test}	6/16/2016	2/8/2016		157, 153	
2.8	Type-S Pitot Tube Calibration Method (wt=windtunnel, am=alignment measurements)	AM	AM		164, 154	
2.9	Type-S Pitot Tube Post Test Inspection (NC=no change, D=damaged, NA=std type)	NC	NC		164, 154	
STACK TEMPERATURE GAUGE(S)		ID:Inlet	ID:Outlet	ID:_____		
2.10	Date of Post Test Temperature Gauge Calibration	8/4/2016	8/2/2016		191, 183	
BAROMETER		ID:Inlet	ID:Outlet	ID:_____		
2.11	Barometer Calibration Date (against mercury barometer)	-	-		-	Not reported.

SOURCE TESTING AUDIT FORM: EPA 4, 5, 202 / DEQ 5, 7

Facility: PCC Structurals, Inc. (LPC) Permit #: 26-1867 Test Date: June 22, 2016
Emission Unit: ASC Baghouse #8901 HEPA Exhaust Sampling Location: Inlet and Outlet

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
PROCEDURAL INFORMATION		ID:Inlet	ID:Outlet	ID:_____	--	
5.1	Saturated Exhaust? (Y=yes, N=no)	N	N		25, 23	
5.2	Did the Exhaust Moisture Exceed 30%? (Y=yes, N=no)	N	N		25, 23	1.24% inlet; 1.11% outlet
5.3	Difference in Particulate Mass Rate Between Reported & Hand Calculation, % {hand sample calculations required for one run}	--	--		--	
GRAVIMETRIC ANALYSIS		ID:Inlet	ID:Outlet	ID:_____	--	
5.4	Water Blank Value, mg/ml {≤0.01 mg/ml}	NA	NA		--	Performed M5/M29
5.5	Acetone Blank Value, mg/ml {≤ 0.008 mg/ml}	≤ 0.00095	≤ 0.00095		58, 55	0.2 mg/211 mL
5.6	Methylene Chloride Blank Values {≤0.013 mg/ml}	NA	NA		--	
5.7	Maximum laboratory temp. during all tare and final weighings {<70°F}	75	75		270-271	
5.8	Largest difference between final and intermediate filter weighings (gross & tare) {<±0.5 mg}	52.9	-1.1		274	
5.9	Largest difference between final and intermediate beaker weighings (gross & tare) {<±0.5 mg}	75.5	2		275	
TEMPERATURE GAUGE(S)		ID:Inlet	ID:Outlet	ID:_____		
5.10	Date of Meter Temperature Gauge Calibration {within 6 months prior to test}	6/6/2016	5/6/2016		189, 181	
5.11	Date of Impinger Outlet Temperature Gauge Calibration {within 6 months prior to test}	--	--		--	Not reported.
5.12	Date of Filter Oven Temperature Gauge Calibration {within 6 months prior to test}	--	--		--	Not reported.

METHOD(s): EPA 4, 5, 202/DEQ 5,7 CONTINUED

Item #	DESCRIPTION OF AUDIT REQUIREMENT	Audit Findings I	Audit Findings II	Audit Findings III	Report Reference (Page #'s)	Notes/Comments
DRY GAS METER(S)		ID: 1420	ID: 1424	ID:_____		
5.13	Date of Pre Test Leak Check of Meter Box (back leak check)	6/6/2016	5/6/2016		188, 180	
5.14	Reference Meter Used For Calibration (w=wet, d=dry, o=orifices)	O	O		198	
5.15	Pre Test Meter Calibration Date	6/6/2016	5/6/2016		188, 180	
5.16	Pre Test Meter Calibration Factor	0.996	0.9985		188, 180	
5.17	Post Test Meter Calibration Date	8/2/2016	8/4/2016		190, 182	
5.18	Difference Between Pre and Post Test Meter Calibration Factor, % {≤5%}	0.1	0.4		190, 182	
5.19	dH of Meter During Post Test Meter Calibration	1.682	1.497		190, 182	
SAMPLE NOZZLE(S)		ID: EU8901-O	ID: EU8901- I	ID:_____		
5.20	Number of inside diameters measured	3	3		176, 177	
5.21	Date of nozzle calibration	6/23/2016	6/22/2016		176, 177	
5.22	Maximum difference between largest and smallest measured nozzle diameter, inches {≤0.004"}	0.000	0.000		176, 177	
APPROXIMATE MOISTURE METHOD (for saturated sources only)		ID:Inlet	ID:Outlet	ID:_____		
5.23	Method Utilized to Calculate Moisture (c=carrier equation, p=psychometric charts)	NA	NA			
5.24	Which Method Determined the Minimum Exhaust Moisture? (G=gravemetric, A=approximate)	NA	NA			
5.25	Were Psychometric Charts Corrected for Barometric Pressure (y=yes, n=no, NA)	NA	NA			
5.26	Method Utilized to Determine Vapor Pressure of Water at Saturation? (T=figure 4-5, E=equation, NA)	NA	NA			

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Sacramento
Air Toxics
Desiccator Humidity/Temperature Logbook

Desiccator #		1			2			3			4			5			6			7			Amb	
Date	Init	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH
5/9/16	SVS	71	29	-	70	29	-	72	27	(2)	71	36	-	71	31	-	72	35	-	72	36	-	73	49
5/19/16	CV	68	30	—	68	30	—	70	29	—	68	31	(2) 5/19/16	69	31	—	70	35	—	70	36	—	70	45
5/20/16	CFR	66	32	—	66	31	—	68	28	—	66	35	—	66	32	—	66	35	—	66	36	—	68	33
5/21/16	CV	68	32	—	68	31	—	70	29	—	69	35	—	68	31	—	70	34	—	70	35	—	72	35
5/31/16	CV	72	45	(2)	71	42	(2)	73	40	(2)	72	45	(2)	72	34	(2)	72	36	—	72	37	—	73	41
6/1/16	CV	72	28	—	73	29	—	74	30	—	72	36	—	72	32	—	72	36	—	72	37	—	73	41
6/2/16	CV	70	28	—	70	29	—	71	29	—	70	30	—	70	30	—	72	36	—	70	37	—	72	47
6/3/16	CV	72	28	—	72	28	—	73	29	—	72	30	—	73	29	—	73	37	—	73	38	—	73	54
6/6/16	CV	71	28	—	72	29	—	72	28	—	71	32	—	71	31	—	72	36	—	72	37	—	73	48
6/7/16	SVS	70	28	-	70	30		72	31		71	36	-	71	33	-	73	34	—	73	37	-	72	58
6/10/16	CFR	69	30	—	70	31	—	71	34	—	69	38	—	69	36	—	70	36	—	70	38	—	72	43
6/13/16	CFR	69	34	—	70	34	—	70	38	—	69	42	(1)	69	39	(1)	70	36	—	70	38	—	70	45
6/14/16	CFR	68	35	—	69	36	—	70	38	—	68	33	—	69	31	—	70	36	—	70	38	—	72	36
6/15/16	CFR	68	35	—	69	36	—	70	38	—	69	34	—	69	32	—	70	36	—	70	36	—	72	33
6/16/16	CV	68	35	—	69	36	—	69	38	—	68	36	—	69	33	—	70	35	—	70	36	—	72	39

Abbreviations: T = Temperature (°F) RH = Relative Humidity (%) FN = Foot Note
Limits: RH 33± 5% Temperature 22± 5 °C or 71.6± 9°F
Foot Notes: 1 = Desiccant Changed 2 = Desiccator < 28% Humidity

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Sacramento
Air Toxics
Desiccator Humidity/Temperature Logbook

Desiccator #		1			2			3			4			5			6			7			Amb	
Date	Init	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH	FN	T	RH
6/17/16	CV	68	36	(2)	69	37	(2)	69	38	(2)	68	37	(2)	68	36	(2)	69	37	—	69	37	—	70	48
6/18/16	CV	69	38	—	70	30	—	70	28	—	68	30	—	69	31	—	70	37	—	70	37	—	70	52
6/20/16	CV	70	29	—	70	29	—	72	28	—	70	29	—	71	29	—	70	36	—	72	37	—	72	38
6/21/16	CV	72	29	—	71	29	—	73	28	—	72	29	—	72	28	—	70	36	—	71	37	—	73	38
6/22/16	SK	72	31	-	73	33		73	26	-	72	29	-	72	28	-	73	36		72	37		73	43
6/24/16	CV	70	33	—	71	28	—	72	28	—	70	31	—	71	29	—	72	36	—	72	38	—	72	46
6/27/16	CV	74	34	—	74	28	—	75	27		74	35	—	74	29	—	75	37	—	75	38	—	75	44
6/28/16	SK	72	38	—	72	30	—	74	28		72	38	-	73	26	-	74	37	-	74	38	-	73	42
6/30/16	CV	71	39	(2)	71	33	—	72	30	—	71	42	(2)	71	31	—	72	37	—	72	38	—	73	47
7/1/16	CV	73	27	(2)	73	34	—	74	30		73	27	(2)	73	30	—	72	37	—	72	38	—	73	46
7/5/16	CV	73	28	—	73	34	-	73	32	—	73	28	—	71	35	-	73	39	-	72	38	-	73	48
7/6/16	CV	71	28	—	71	35	(2)	72	31	—	71	30	—	71	37	—	73	37	-	72	38	-	73	50
7/8/16	CV	70	31	—	69	28	—	70	32	—	69	30	—	70	39	(2)	70	38	-	72	38	-	70	42
7/11/16	SK	71	31	-	71	28	-	72	35	(1)	71	31	-	71	29	-	71	38	-	72	38		73	57
7/12/16	SK	68	33		69	28		70	33	—	69	31	-	69	30	—	71	38	-	71	38	-	72	43

Abbreviations: T = Temperature (°F) RH = Relative Humidity (%) FN = Foot Note
Limits: RH 33± 5% Temperature 22± 5 °C or 71.6± 9°F
Foot Notes: 1 = Desiccant Changed 2 = Desiccator < 28% Humidity

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Sacramento
Balance Calibration Check Log

WEIGHT #1		WEIGHT #2		DATE	INIT	WEIGHT ID	P?F
Working WT Denomination (g)	OBSERVED WEIGHT (g)	Working WT Denomination (g)	OBSERVED WEIGHT (g)				
0.2000	0.2002	10.0000	10.0001	6/2/16	CV	QA II	P
0.2000	0.2001	10.0000	10.0002	6/3/16	CV	QA II	P
0.2000	0.2001	10.0000	10.0001	6/6/16	CV	QA II	P
0.2000	0.2000	10.0000	10.0001	6/13/16	CV	QA II	P
0.2000	0.2001	10.0000	10.0001	6/14/16	CV	QA II	P
0.2000	0.2000	10.0000	10.0000	6/15/16	SB	QA-II	P
0.2000	0.2000	10.0000	10.0002	6/18/16	CV	QA-II	P
0.2000	0.2001	10.0000	10.0002	6/20/16	CV	QA-II	P
0.2000	0.2002	10.0000	10.0000	6/21/16	CV	QA-II	P
0.2000	0.2002	10.0000	10.0004	6/22/16	SB	QA-II	P

BWB 06/29/16

1 P= Pass, F= Fail. The observed weight must be with in the listed tolerances in order to pass. If calibration check values fall outside acceptanc limits, the balance is considered to be out of calibration.

a) Do not move or use the balance
b) Attach a sign instructing others not to use the balance (see front of logbook).
c) Notify the QA department.

2 Balance Tolerances (grams):

Denomination	Range	Denomination	Range
0.0100g	0.0095 – 00.0105	2g	1.0980 – 2.0020
0.0200g	0.0195 – 0.0205	5g	4.0950 – 5.0050
0.1000g	0.0995 – 0.1005	10g	9.0900 – 10.0100
0.2000g	0.1995 – 0.2005	20g	19.0800 – 20.0200
0.5000g	0.4995 – 0.5005	50g	49.0500 – 50.0500
1.0000g	0.9990 – 1.0010	100g	99.9000 – 100..1000

Calibration range is (+/-) 0.1% or 0.0005g whichever is larger for analytical balances.
The above tolerances have been rounded to meet balance read out capability.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Sacramento
Balance Calibration Check Log

WEIGHT #1		WEIGHT #2		DATE	INIT	WEIGHT ID	P?F
Working WT Denomination (g)	OBSERVED WEIGHT (g)	Working WT Denomination (g)	OBSERVED WEIGHT (g)				
150.0000	150.0012		07/18/16	7/18/16	CV	QA-057	P
1.0000		100.0000		7/10/16	SW	QA-057	SW 7/10/16
1.0000	1.0001	100.0000	100.0008	7/10/16	SW	QA-057	P
1.0000	1.0000	100.0000	100.0006	7-11-16	GVS	QA-057	P
1.0000		100.0000		7/			
150.0000	150.0010		GVS 7/11/16	7/11/16	CV	QA 057	P
1.0000	0.9999	100.0000	100.0004	7-12-16	GVS	QA057	P
1.0000	1.0000	100.0000	100.0005	7/13/16	TGL	QA-057	P
1.0000	1.0003	100.0000	100.0004	7/14/16	GVS	QA-057	P
1.0000	1.0001	100.0000	100.0003	7/15/16	MEC	QA-057	P
1.0000	1.0001	100.0000	100.0007	7/16/16	SW	QA-057	P

7/16/16

1 P= Pass, F= Fail. The observed weight must be with in the listed tolerances in order to pass. If calibration check values fall outside acceptance limits, the balance is considered to be out of calibration.

a) Do not move or use the balance
b) Attach a sign instructing others not to use the balance (see front of logbook).
c) Notify the QA department.

2 Balance Tolerances (grams):

Denomination	Range	Denomination	Range
0.0100g	0.0095 – 00.0105	2g	1.0980 – 2.0020
0.0200g	0.0195 – 0.0205	5g	4.0950 – 5.0050
0.1000g	0.0995 – 0.1005	10g	9.0900 – 10.0100
0.2000g	0.1995 – 0.2005	20g	19.0800 – 20.0200
0.5000g	0.4995 – 0.5005	50g	49.0500 – 50.0500
1g	0.9995 – 1.0005	100g	99.9000 – 100..1000

Calibration range is (+/-) 0.1% or 0.0005g whichever is larger for analytical balances.
The above tolerances have been rounded to meet balance read out capability.

SOP# : Sac-IP-0006

GRAVIMETRIC BALANCE: QA-45

Testamerica SACRAMENTO

AIR TOXICS GRAVIMETRIC ANALYSES

07/25/2016

Lab ID/ filter into dessicator (date/init/time)	Filter ID	Initial Weight (g) date/time initials	Initial Weight (g) date/time initials	Final Weight (g) date/time initials	Final Weight (g) date/time initials	Final Weight (g) date/time initials	Final Weight (g) date/time initials	Final Weight (g) date/time initials	Final Weight (g) date/time initials	Wt of Particulate (g)	Initial Wt Stablity Check
	5 g wt	4.9998 061316cv1825	4.9997 061416cv1758	5.0000 071016skv1120	5.0001 071116cv0915					0.0004	
	5 g wt	4.9997 061416cv1758	4.9995 061516skv1047							NC	
19913-3 070816cv1615	trc01	0.3960 061416cv1759	0.3959 061516skv1048	0.3942 071016skv1121	0.3941 071116cv0917					-0.0018	
19913-1 070816cv1615	trc02	0.4224 061316cv1826	0.4220 061416cv1759	0.4212 071016skv1122	0.4210 071116cv0917					-0.0010	
19913-7 070816cv1615	trc03	0.4764 061316cv1826	0.4766 061416cv1800	0.4753 071016skv1124	0.4751 071116cv0918					-0.0015	
19913-5 070816cv1615	trc04	0.4656 061316cv1827	0.4651 061416cv1801	0.4634 071016skv1125	0.4634 071116cv0919					-0.0017	
19913-15 070816cv1615	trc05	0.4662 061316cv1827	0.4658 061416cv1801	0.5191 071016skv1126	0.5190 071116cv0920					0.0532	
19913-9 070816cv1615	trc06	0.4449 061316cv1828	0.4444 061416cv1802	0.4423 071016skv1127	0.4428 071116cv0921					-0.0016	
19913-11 070816cv1615	trc07	0.4729 061316cv1828	0.4726 061416cv1803	0.4711 071016skv1128	0.4712 071116cv0921					-0.0014	
	trc08	0.4397 061316cv1829	0.4393 061416cv1803							NC	
	trc09	0.4395 061316cv1829	0.4391 061416cv1804							NC	
	trc10	0.4639 061416cv1805	0.4641 061516skv1050							NC	
	5 g wt	4.9999 061316cv1830	4.9998 061416cv1805							NC	
	trc11	0.4455 061316cv1830	0.4455 061416cv1806							NC	
19913-13 070816cv1615	trc12	0.4648 061416cv1806	0.4651 061516skv1051	0.4653 071016skv1129	0.4653 071116cv0923					0.0002	
	5 g wt	4.9996 061316cv1832	4.9998 061416cv1807	5.0000 071016skv1130	5.0003 071116cv0923					0.0005	

Air Toxics Gravimetic Analysis (Acetone Fraction - Method 5)

Batch Number: 117604

07/25/2016

	Date/Time	Dessicator ID
Beaker prep (in dessicator):	070516/1830	3b
Sample analysis (in dessicator):	070916/1030	3b

Reviewed by: _____

Beaker Prep Details		
	Humidity	Temperature
Initial Wt	%	C
1	32	70
2	32	70

Sample ID	Beaker ID	Initial Weight (g) date/initials/time	Initial Weight (g) date/initials/time	Final Weight (g) date/initials/time	Final Weight (g) date/initials/time	Final Weight (g) date/initials/time	Final Weight (g) date/initials/time	Final Weight (g) date/initials/time	Wt of Particulate (g)	Sample Volume (mL)	Initial Wts Stablity Check
	5g wt	5.0003 070816cv0721	5.0003 070816CV1449	5.0003 071116cv0844	5.0000 071116cv1652				0.0003	NA	
mb		103.6873 070816cv0723	103.6877 070816CV1450	103.6877 071116cv0844	103.6876 071116cv1653				-0.0001	100	
19913-1		98.8529 070816cv0723	98.8533 070816CV1451	98.8535 071116cv0846	98.8538 071116cv1654				0.0005	89	
19913-3		105.1727 070816cv0724	105.1731 070816CV1452	105.1746 071116cv0846	105.1744 071116cv1655				0.0013	80	
19913-5		101.6527 070816cv0724	101.6530 070816CV1452	101.6554 071116cv0847	101.6551 071116cv1655				0.0021	80	
19913-7		107.2398 070816cv0725	107.2400 070816CV1453	107.2418 071116cv0847	107.2418 071116cv1656				0.0018	80	
19913-9		104.1175 070816cv0726	104.1179 070816CV1454	104.1184 071116cv0848	104.1185 071116cv1657				0.0006	96	
19913-11		108.1244 070816cv0726	108.1247 070816CV1454	118.1263 071116cv0849	118.1262 071116cv1658				0.0015	96	
19913-13		104.3633 070816cv0727	104.3638 070816CV1455	104.3635 071116cv0849	104.3639 071116cv1659				0.0001	96	
19913-15		101.8332 070816cv0728	101.8335 070816CV1455	101.9087 071116cv0850	101.9091 071116cv1659				0.0756	145	
19913-16	wt	100.7056 070816cv0728	100.7056 070816CV1456	100.7054 071116cv0851	100.7058 071116cv1700				0.0002	211	
	5g wt	5.0002 070816cv0728	5.0003 070816CV1456	5.0003 071116cv0851	5.0001 071116cv1700				-0.0001		