Metals Emissions Test Report

PCC Structurals, Inc.
Large Parts Campus
Baghouse 8901
5001 SE Johnson Creek Blvd.
Milwaukie, Oregon 97222
Project No. M232604A Rev.1
June 28 and 29, 2023

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5001 SE Johnson Creek Blvd.
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Project No. M232604A Rev.1

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1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a metals emissions test program for PCC Structurals, Inc. (PCC) at their Large Parts Campus (LPC) facility located at 5001 SE Johnson Creek Blvd. in Milwaukie, Oregon. Testing was performed to demonstrate removal efficiencies across each baghouse system as well as mass emission rates of several metals, including hexavalent chrome (Cr^{+6}), from the baghouse inlet and HEPA exhaust outlet.

Inlet samples were collected utilizing Teflon coated stainless steel nozzles and a flexible sampling line connection between the filter and impingers.

The test locations, test dates, and test parameters are summarized below.

TEST INFORMATION		
Test Locations	**Test Dates**	**Test Parameters**
8901 Baghouse Inlet	June 28 and 29, 2023	Aluminum (Al), Arsenic (As), Antimony (Sb), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Phosphorus (P), Selenium (Se), Silver (Ag), Thallium (Tl), Vanadium (V), Zinc (Zn), and Hexavalent Chromium (Cr^{+6})
8901 Baghouse Outlet		

2.0 PROCESS DESCRIPTION

Baghouse/HEPA 8901 (BH8901) controls emissions from ingot finishing operations in the Alloy Service Center, which include cutting and grinding activities.

2.1 Project Contact Information

Location	Address	Contact
Test Consultant	Maul Foster & Alongi, Inc. 6 Centerpointe Drive, Suite 360 Lake Oswego, OR 97035	Mr. Brian Eagle Senior Consultant 971.713.3571 beagle@maulfoster.com
Test Facility	PCC Structurals, Inc. 5001 SE Johnson Creek Blvd. Milwaukie, OR 97222	Mr. Brandon Hadzinsky Division Environmental Affairs 503.724.3036 Brandon.hadzinsky@pccstructurals.com
Test Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, IL 60126	Mr. Eric Ehlers VP, Field Operations (630) 699-7690 eehlers@mp-mail.com

The test crew consisted of Messrs. C. Trezak, K. Addison, N. Colangelo, M. Sather, V. Vang, J. Meade, C. Rock, M. Dolatowski, P. Pradhan, J. Jiminez, F. Diaz, and E. Ehlers of Mostardi Platt.

Mr. Thomas Rhodes of the Oregon Department of Environmental Quality (ODEQ) observed a portion of the test program.

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3.0 OVERVIEW OF TEST RESULTS

Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report. Operating data was provided by PCC and is found in Appendix E.

ADL means both fractions of the sample analyses were above the detection limit. DLL means that one of the fractions of the sample analyses were below the detection limit. BDL means both fractions of the sample analyses were below the detection limit.

The filters that were used for the test program had Aluminum and Phosphorus contents exceeding levels specified in Section 7.2.1 of Method 29, and as a result, the Method 29 blank corrections likely overestimate calculated emissions of these constituents. This is particularly true for aluminum - in some instances the blank correction calculated using the methodology outlined in Section 12.6.3 of Method 29 was almost 20 times lower than the Aluminum content of the filter blank. Therefore, the reported emission rates should not be considered valid.

3.1 8901 Baghouse System Run 1

Measured Parameter	Inlet Emission Rate lb/hr	Outlet Emission Rate lb/hr	Inlet Emission Factor lb/ton metal processed	Outlet Emission Factor lb/ton metal processed	Removal Efficiency %
Al	1.30E-02	8.43E-04	1.17E-02	7.61E-04	93.52%
Sb	ND	ND	ND	ND	N/A
As	≤1.33E-05[a]	≤5.30E-06[b]	≤1.20E-05[a]	≤4.79E-06[b]	N/A
Ba	7.07E-05	8.61E-06	6.38E-05	7.77E-06	N/A
Be	≤3.39E-07[a]	≤1.19E-07[b]	≤3.06E-07[a]	≤1.07E-07[b]	N/A
Cd	3.82E-06	1.69E-06	3.45E-06	1.53E-06	55.65%
Cr	1.98E-01	1.81E-04	1.79E-01	1.63E-04	99.91%
Co	1.11E-01	4.44E-06	9.98E-02	4.01E-06	99.99%
Cu	6.95E-05	9.81E-06	6.27E-05	8.85E-06	85.89%
Pb	1.11E-05	2.138E-06	1.00E-05	1.92E-06	80.86%
Mn	1.86E-04	5.18E-05	1.68E-04	4.68E-05	72.16%
Hg	≤8.95E-07[a]	≤6.92E-07[a]	≤8.08E-07[a]	≤6.25E-07[a]	N/A
Ni	4.66E-01	1.61E-04	4.21E-01	1.45E-04	99.97%
P	5.10E-04	1.57E-04	4.61E-04	1.42E-04	69.22%
Se	5.53E-06	≤6.45E-06[a]	4.99E-06	≤5.82E-06[a]	N/A
Ag	1.18E-04	≤2.06E-05[a]	1.06E-04	≤1.86E-05[a]	N/A
Tl	≤1.64E-06[a]	≤2.23E-06[b]	≤1.48E-06[a]	≤2.01E-06[b]	N/A
V	≤9.67E-05[a]	≤1.46E-06[a]	≤8.73E-05[a]	≤1.32E-06[a]	N/A
Zn	3.41E-03	5.09E-05	3.08E-03	4.60E-05	98.51%
Cr^{+6}	1.89E-05	8.57E-02	1.71E-05	7.74-E06	N/A

ND – Non-detect. Analyte below detection limit at both inlet and outlet.
N/A – No control efficiency was calculated.
[a] – Value based on data qualified as DLL in the lab report.
[b] – Analyte below detection limit at outlet, but measurable at inlet. Value shown is the detection limit.

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3.2 8901 Baghouse System Run 2

Measured Parameter	Inlet Emission Rate lb/hr	Outlet Emission Rate lb/hr	Inlet Emission Factor lb/ton metal processed	Outlet Emission Factor lb/ton metal processed	Removal Efficiency %
Al	1.82E-03	8.34E-04	2.43E-03	1.12E-03	54.18%
Sb	ND	ND	ND	ND	N/A
As	ND	ND	ND	ND	N/A
Ba	1.69E-05	≤4.31E-06[a]	2.26E-05	≤5.77E-06[a]	N/A
Be	ND	ND	ND	ND	N/A
Cd	5.69E-07	2.48E-07	7.61E-07	3.32E-07	56.40%
Cr	3.89E-03	1.47E-05	5.20E-03	1.96E-05	99.62%
Co	1.57E-03	1.72E-06	2.10E-03	2.30E-06	99.89%
Cu	8.19E-06	7.86E-06	1.10E-05	1.05E-05	4.08%
Pb	3.16E-06	≤1.36E-06[a]	4.23E-06	≤1.82E-06[a]	N/A
Mn	4.37E-04	5.17E-05	5.85E-04	6.91E-05	88.18%
Hg	≤8.09E-07[a]	≤7.52E-07[a]	≤1.08E-06[a]	≤1.01E-06[a]	N/A
Ni	1.11E-02	4.23E-05	1.49E-02	5.66E-05	99.62%
P	1.47E-04	1.47E-04	1.97E-04	1.96E-04	N/A
Se	ND	ND	ND	ND	N/A
Ag	≤6.83E-06[a]	≤1.95E-06[b]	≤9.13E-06[a]	≤2.61E-06[b]	N/A
Tl	ND	ND	ND	ND	N/A
V	≤5.40E-06[a]	≤3.65E-07[a]	≤7.23E-06[a]	≤4.89E-07[a]	N/A
Zn	1.29E-04	4.66E-05	1.72E-04	6.24E-05	63.74%
Cr^{+6}	1.45E-06	3.64E-06	1.94E-06	4.87E-06	N/A

ND – Non-detect. Analyte below detection limit at both inlet and outlet.
N/A – No control efficiency was calculated.
[a] – Value based on data qualified as DLL in the lab report.
[b] – Analyte below detection limit at outlet, but measurable at inlet. Value shown is the detection limit.

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4.0 TEST METHODOLOGY

Emission testing was conducted following the United States Environmental Protection Agency (USEPA) methods specified in 40CFR60 and 40CFR63, Appendix A in addition the Mostardi Platt Quality Manual. Schematics of the test section diagrams and sampling trains used are included in Appendix A and B respectively. Calculation nomenclature are included in Appendix C. Laboratory analysis for each test run are included in Appendix H. The computerized reference method test data is included in Appendix D.

The following methodologies were used during the test program:

4.1 Method 1 Sample and Velocity Traverse Determination

Test measurement points were selected in accordance with Method 1, 40 CFR, Part 60, Appendix A. The characteristics of each measurement location is summarized in the table below. A null-point pitot traverse was performed prior to testing to ensure the absence of cyclonic flow.

Sample Point Selection

Test Location	Stack Diameter	Upstream Diameters	Downstream Diameters	Test Parameters	Number of Sampling Points
BH8901 Inlet	12”	8.5	20	Cr^{+6} and Metals	24
BH8901 Outlet	12”	>0.5	>2.0	Cr^{+6} and Metals	24

4.2 Method 2 Volumetric Flow Rate Determination

Gas velocity was measured following Method 2, 40 CFR, Part 60, Appendix A, for purposes of calculating gas volumetric flow rate and emission rates on a lb/hr and lb/ton metal processed basis. An S-type pitot tube, as a component of the isokinetic sampling train, differential pressure gauge, thermocouple, and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data is presented in Appendix G of this report.

4.3 Method 29 Metals Determination

Metals concentrations and emission rates were determined in accordance with Method 29.

Impingers one and two were loaded with 100 mL each of 5% HNO_3/10% H_2O_2. The third impinger remained empty. The fourth and fifth impinger were loaded with 100mL of 10% H_2SO_4/5% $KMnO_4$. The sixth impinger was filled with silica gel. The impingers were weighed prior to and after each test run in order to determine moisture content of the stack gas. Impingers were recovered as proscribed in the method, with 0.1N HNO_3 used on impingers 1 and 2, 0.1N HNO_3 also used on impinger three (in a separate sample container), and 10% H_2SO_4/5% $KMnO_4$, DI water, and 8N HCl for impingers four and five.

The filter media were Whatman quartz microfiber filters exhibiting a 99.97% efficiency on 0.3-micron DOP smoke particles in accordance with ASTM Standard Method D-2986-71.

Sample analysis was conducted by ChesterNet Labs for particle bound metals from the nozzle, probe, and filter catch, and analyzed for vapor phase metals from the impinger catch.

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4.4 Method 0061 Cr^{+6} Determination

Hexavalent chromium (Cr^{+6}) concentrations were determined in accordance with SW-846 Method 0061. The sample was extracted isokinetically from the gas stream and passed through a 0.5N potassium hydroxide (KOH) solution, which was also recirculated through the first impinger to the sample nozzle. The sample train consisted of a glass nozzle, and five impingers. The first three impingers contained the KOH solution (150 mL in impinger one, approximately 75mL each in impingers two and three, the fourth impinger remained empty, and the fifth impinger contained silica gel to absorb any remaining moisture). The pH of the first impinger was checked and verified to be greater than 8.5. A post-test nitrogen purge was performed on the impinger train for thirty minutes at 10 liters/minute. Once this purge was complete, samples were filtered and recovered utilizing deionized water and stored in Nalgene sample containers.

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5.0 TEST RESULT SUMMARIES

5.1 Baghouse Inlet Method 29 Summary

Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Test Method: 29

Source Condition			**Batch Process**			
Date		**6/28/23**	**6/29/23**			
Start Time		**9:05**	**6:40**			
End Time		**18:00**	**15:25**			
		Run 1	**Run 2**			**Average**
Stack Conditions						
Average Gas Temperature, °F		78.1	73.6			75.9
Flue Gas Moisture, percent by volume		0.9%	1.2%			1.1%
Average Flue Pressure, in. Hg		29.65	29.57			29.61
Gas Sample Volume, dscf		412.429	361.213			386.821
Average Gas Velocity, ft/sec		93.964	81.997			87.981
Gas Volumetric Flow Rate, acfm		4,428	3,864			4,146
Gas Volumetric Flow Rate, dscfm		4,265	3,734			4,000
Gas Volumetric Flow Rate, scfm		4,305	3,778			4,042
Isokinetic Variance		99.3	99.3			99.3
Sample Duration, hours		8.00	8.00			
Tons of metal processed		8.863	5.979			7.421
Aluminum (Al) Emissions						
Detection Limit Qualifier		**ADL**	**ADL**			
ug of sample collected		9,500.39	1,328.01			5,414.20
ppb		724.67	115.66			420.17
ug/dscm		813.48	129.83			471.66
ug/dscf		2.30E+01	3.68E+00			1.34E+01
lb/hr		1.30E-02	1.82E-03			7.41E-03
lb/ton metal processed		1.17E-02	2.43E-03			7.08E-03
Antimony (Sb) Emissions						
Detection Limit Qualifier		**BDL**	**BDL**			
ug of sample collected	≤	1.44	≤ 1.44	≤		1.44
ppb	≤	0.02	≤ 0.03	≤		0.03
ug/dscm	≤	0.12	≤ 0.14	≤		0.13
ug/dscf	≤	3.40E-03	≤ 3.96E-03	≤		3.68E-03
lb/hr	≤	1.97E-06	≤ 1.97E-06	≤		1.97E-06
lb/ton metal processed	≤	1.78E-06	≤ 2.63E-06	≤		2.21E-06
Arsenic (As) Emissions						
Detection Limit Qualifier		**DLL**	**BDL**			
ug of sample collected	≤	9.69	≤ 3.28	≤		6.48
ppb	≤	0.27	≤ 0.10	≤		0.18
ug/dscm	≤	0.83	≤ 0.32	≤		0.58
ug/dscf	≤	2.35E-02	≤ 9.06E-03	≤		1.63E-02
lb/hr	≤	1.33E-05	≤ 4.48E-06	≤		8.87E-06
lb/ton metal processed	≤	1.20E-05	≤ 6.00E-06	≤		8.98E-06
Barium (Ba) Emissions						
Detection Limit Qualifier		**ADL**	**ADL**			
ug of sample collected		51.69	12.33			32.01
ppb		0.78	0.21			0.49
ug/dscm		4.43	1.21			2.82
ug/dscf		1.25E-01	3.43E-02			7.99E-02
lb/hr		7.07E-05	1.69E-05			4.38E-05
lb/ton metal processed		6.38E-05	2.26E-05			4.32E-05
Beryllium (Be) Emissions						
Detection Limit Qualifier		**DLL**	**BDL**			
ug of sample collected	≤	0.25	≤ 0.07	≤		0.16
ppb	≤	0.06	≤ 0.02	≤		0.04
ug/dscm	≤	0.02	≤ 0.01	≤		0.02
ug/dscf	≤	5.66E-04	≤ 2.83E-04	≤		4.25E-04
lb/hr	≤	3.39E-07	≤ 9.85E-08	≤		2.19E-07
lb/ton metal processed	≤	3.06E-07	≤ 1.32E-07	≤		2.19E-07
Cadmium (Cd) Emissions						
Detection Limit Qualifier		**ADL**	**ADL**			
ug of sample collected		2.79	0.42			1.61
ppb		0.05	0.01			0.03
ug/dscm		0.24	0.04			0.14
ug/dscf		6.80E-03	1.13E-03			3.96E-03
lb/hr		3.82E-06	5.69E-07			2.20E-06
lb/ton metal processed		3.45E-06	7.61E-07			2.11E-06

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Test Method: 29

Source Condition		Batch Process		
Date		6/28/23	6/29/23	
Start Time		9:05	6:40	
End Time		18:00	15:25	
		Run 1	Run 2	Average
Stack Conditions				
Average Gas Temperature, °F		78.1	73.6	75.9
Flue Gas Moisture, percent by volume		0.9%	1.2%	1.1%
Average Flue Pressure, in. Hg		29.65	29.57	29.61
Gas Sample Volume, dscf		412.429	361.213	386.821
Average Gas Velocity, ft/sec		93.964	81.997	87.981
Gas Volumetric Flow Rate, acfm		4,428	3,864	4,146
Gas Volumetric Flow Rate, dscfm		4,265	3,734	4,000
Gas Volumetric Flow Rate, scfm		4,305	3,778	4,042
Isokinetic Variance		99.3	99.3	99.3
Sample Duration, hours		8.00	8.00	
Tons of metal processed		8.863	5.979	7.421
Chromium (Cr) Emissions				
Detection Limit Qualifier		ADL	ADL	
ug of sample collected		145,004.43	2,842.00	73,923.21
ppb		5,738.78	128.42	2,933.60
ug/dscm		12,416.16	277.85	6,347.01
ug/dscf		3.52E+02	7.87E+00	1.80E+02
lb/hr		1.98E-01	3.89E-03	1.01E-01
lb/ton metal processed		1.79E-01	5.20E-03	9.21E-02
Cobalt (Co) Emissions				
Detection Limit Qualifier		ADL	ADL	
ug of sample collected		80,801.96	1,150.26	40,976.11
ppb		2,821.80	45.87	1,433.83
ug/dscm		6,918.75	112.46	3,515.61
ug/dscf		1.96E+02	3.18E+00	9.96E+01
lb/hr		1.11E-01	1.57E-03	5.60E-02
lb/ton metal processed		9.98E-02	2.10E-03	5.09E-02
Copper (Cu) Emissions				
Detection Limit Qualifier		ADL	ADL	
ug of sample collected		50.81	5.99	28.40
ppb		1.65	0.22	0.93
ug/dscm		4.35	0.59	2.47
ug/dscf		1.23E-01	1.67E-02	6.99E-02
lb/hr		6.95E-05	8.19E-06	3.88E-05
lb/ton metal processed		6.27E-05	1.10E-05	3.68E-05
Lead (Pb) Emissions				
Detection Limit Qualifier		ADL	ADL	
ug of sample collected		8.12	2.31	5.22
ppb		0.08	0.03	0.05
ug/dscm		0.70	0.23	0.47
ug/dscf		1.98E-02	6.51E-03	1.32E-02
lb/hr		1.11E-05	3.16E-06	7.13E-06
lb/ton metal processed		1.00E-05	4.23E-06	7.13E-06
Manganese (Mn) Emissions				
Detection Limit Qualifier		ADL	ADL	
ug of sample collected		136.07	319.77	227.92
ppb		5.10	13.68	9.39
ug/dscm		11.65	31.26	21.46
ug/dscf		3.30E-01	8.85E-01	6.08E-01
lb/hr		1.86E-04	4.37E-04	3.12E-04
lb/ton metal processed		1.68E-04	5.85E-04	3.77E-04
Mercury (Hg) Emissions				
Detection Limit Qualifier		DLL	DLL	
ug of sample collected	≤	0.65	≤ 0.59	≤ 0.62
ppb	≤	0.01	≤ 0.01	≤ 0.01
ug/dscm	≤	0.06	≤ 0.06	≤ 0.06
ug/dscf	≤	1.70E-03	≤ 1.70E-03	≤ 1.70E-03
lb/hr	≤	8.95E-07	≤ 8.09E-07	≤ 8.52E-07
lb/ton metal processed	≤	8.08E-07	≤ 1.08E-06	≤ 9.45E-07

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Test Method: 29

Source Condition				**Batch Process**		
Date		**6/28/23**		**6/29/23**		
Start Time		**9:05**		**6:40**		
End Time		**18:00**		**15:25**		
		Run 1		**Run 2**		**Average**
Stack Conditions						
Average Gas Temperature, °F		78.1		73.6		75.9
Flue Gas Moisture, percent by volume		0.9%		1.2%		1.1%
Average Flue Pressure, in. Hg		29.65		29.57		29.61
Gas Sample Volume, dscf		412.429		361.213		386.821
Average Gas Velocity, ft/sec		93.964		81.997		87.981
Gas Volumetric Flow Rate, acfm		4,428		3,864		4,146
Gas Volumetric Flow Rate, dscfm		4,265		3,734		4,000
Gas Volumetric Flow Rate, scfm		4,305		3,778		4,042
Isokinetic Variance		99.3		99.3		99.3
Sample Duration, hours		8.00		8.00		
Tons of metal processed		8.863		5.979		7.421
Nickel (Ni) Emissions						
Detection Limit Qualifier		**ADL**		**ADL**		
ug of sample collected		341,018.52		8,126.65		174,572.59
ppb		11,957.91		325.37		6,141.64
ug/dscm		29,200.07		794.52		14,997.30
ug/dscf		8.27E+02		2.25E+01		4.25E+02
lb/hr		4.66E-01		1.11E-02		2.39E-01
lb/ton metal processed		4.21E-01		1.49E-02		2.18E-01
Phosphorus (P) Emissions						
Detection Limit Qualifier		**ADL**		**ADL**		
ug of sample collected		373.16		107.54		240.35
ppb		24.80		8.16		16.48
ug/dscm		31.95		10.51		21.23
ug/dscf		9.05E-01		2.98E-01		6.01E-01
lb/hr		5.10E-04		1.47E-04		3.29E-04
lb/ton metal processed		4.61E-04		1.97E-04		3.29E-04
Selenium (Se) Emissions						
Detection Limit Qualifier		**ADL**		**BDL**		
ug of sample collected		4.04	≤	2.16	≤	3.10
ppb		0.11	≤	0.06	≤	0.08
ug/dscm		0.35	≤	0.21	≤	0.28
ug/dscf		9.91E-03	≤	5.95E-03	≤	7.93E-03
lb/hr		5.53E-06	≤	2.95E-06	≤	4.24E-06
lb/ton metal processed		4.99E-06	≤	3.95E-06	≤	4.47E-06
Silver (Ag) Emissions						
Detection Limit Qualifier		**ADL**		**DLL**		
ug of sample collected		86.23	≤	4.99	≤	45.61
ppb		0.87	≤	0.06	≤	0.46
ug/dscm		7.38	≤	0.49	≤	3.94
ug/dscf		2.09E-01	≤	1.39E-02	≤	1.11E-01
lb/hr		1.18E-04	≤	6.83E-06	≤	6.24E-05
lb/ton metal processed		1.06E-04	≤	9.13E-06	≤	5.78E-05
Thallium (Tl) Emissions						
Detection Limit Qualifier		**DLL**		**BDL**		
ug of sample collected	≤	1.20	≤	1.21	≤	1.21
ppb	≤	0.01	≤	0.01	≤	0.01
ug/dscm	≤	0.10	≤	0.12	≤	0.11
ug/dscf	≤	2.83E-03	≤	3.40E-03	≤	3.11E-03
lb/hr	≤	1.64E-06	≤	1.65E-06	≤	1.65E-06
lb/ton metal processed	≤	1.48E-06	≤	2.21E-06	≤	1.85E-06
Vanadium (V) Emissions						
Detection Limit Qualifier		**DLL**		**DLL**		
ug of sample collected	≤	70.71	≤	3.95	≤	37.33
ppb	≤	2.86	≤	0.18	≤	1.52
ug/dscm	≤	6.05	≤	0.39	≤	3.22
ug/dscf	≤	1.71E-01	≤	1.10E-02	≤	9.12E-02
lb/hr	≤	9.67E-05	≤	5.40E-06	≤	5.11E-05
lb/ton metal processed	≤	8.73E-05	≤	7.23E-06	≤	4.73E-05
Zinc (Zn) Emissions						
Detection Limit Qualifier		**ADL**		**ADL**		
ug of sample collected		2,493.58		94.08		1,293.83
ppb		78.49		3.38		40.94
ug/dscm		213.52		9.20		111.36
ug/dscf		6.05E+00		2.61E-01		3.15E+00
lb/hr		3.41E-03		1.29E-04		1.77E-03
lb/ton metal processed		3.08E-03		1.72E-04		1.63E-03

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5.2 Baghouse Inlet Method 0061 Summary

Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Test Method: 0061

Source Condition		Batch Process	
Date	6/28/23	6/29/23	
Start Time	9:05	6:40	
End Time	18:00	15:25	
	Run 1	Run 2	Average
Stack Conditions			
Average Gas Temperature, °F	80.1	75.3	77.7
Flue Gas Moisture, percent by volume	0.9%	1.2%	1.1%
Average Flue Pressure, in. Hg	29.65	29.57	29.61
Gas Sample Volume, dscf	360.114	397.791	378.953
Average Gas Velocity, ft/sec	76.133	83.509	79.821
Gas Volumetric Flow Rate, acfm	3,588	3,935	3,762
Gas Volumetric Flow Rate, dscfm	3,444	3,790	3,617
Gas Volumetric Flow Rate, scfm	3,475	3,836	3,656
Isokinetic Variance	99.1	99.4	99.3
Tons of metal processed	8.863	5.979	7.421
Hexavalent Chromium (Cr+6) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	14.97	1.15	8.06
ppb	0.68	0.05	0.36
ug/dscm	1.47E+00	1.00E-01	7.85E-01
ug/dscf	4.16E-02	2.83E-03	2.22E-02
lb/hr	1.89E-05	1.45E-06	1.02E-05
lb/ton metal processed	1.71E-05	1.94E-06	9.52E-06

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5.3 Baghouse Outlet Method 29 Summary

Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Outlet
Test Method: 29

Source Condition		**Batch Process**				
Date		**6/28/23**		**6/29/23**		
Start Time		**9:05**		**6:40**		
End Time		**18:10**		**15:35**		
		Run 1		**Run 2**		**Average**
Stack Conditions						
Average Gas Temperature, °F		87.0		81.6		84.3
Flue Gas Moisture, percent by volume		1.1%		1.0%		1.1%
Average Flue Pressure, in. Hg		30.00		30.12		30.06
Gas Sample Volume, dscf		299.392		301.092		300.242
Average Gas Velocity, ft/sec		77.231		76.613		76.922
Gas Volumetric Flow Rate, acfm		3,639		3,610		3,625
Gas Volumetric Flow Rate, dscfm		3,484		3,507		3,496
Gas Volumetric Flow Rate, scfm		3,522		3,543		3,533
Isokinetic Variance		100.8		100.7		100.8
Sample Duration, hours		8.00		8.00		
Tons of metal processed		8.863		5.979		7.421
Aluminum (Al) Emissions						
Detection Limit Qualifier		**ADL**		**ADL**		
ug of sample collected		547.68		541.50		544.59
ppb		57.55		56.58		57.06
ug/dscm		64.60		63.51		64.06
ug/dscf		1.83E+00		1.80E+00		1.81E+00
lb/hr		8.43E-04		8.34E-04		8.39E-04
lb/ton metal processed		7.61E-04		1.12E-03		9.39E-04
Antimony (Sb) Emissions						
Detection Limit Qualifier		**BDL**		**BDL**		
ug of sample collected	≤	1.54	≤	1.53	≤	1.54
ppb	≤	0.04	≤	0.04	≤	0.04
ug/dscm	≤	0.18	≤	0.18	≤	0.18
ug/dscf	≤	5.10E-03	≤	5.10E-03	≤	5.10E-03
lb/hr	≤	2.37E-06	≤	2.36E-06	≤	2.37E-06
lb/ton metal processed	≤	2.14E-06	≤	3.16E-06	≤	2.65E-06
Arsenic (As) Emissions						
Detection Limit Qualifier		**BDL**		**BDL**		
ug of sample collected	≤	3.45	≤	3.43	≤	3.44
ppb	≤	0.13	≤	0.13	≤	0.13
ug/dscm	≤	0.41	≤	0.40	≤	0.41
ug/dscf	≤	1.16E-02	≤	1.13E-02	≤	1.15E-02
lb/hr	≤	5.30E-06	≤	5.29E-06	≤	5.29E-06
lb/ton metal processed	≤	4.79E-06	≤	7.07E-06	≤	5.93E-06
Barium (Ba) Emissions						
Detection Limit Qualifier		**ADL**		**DLL**		
ug of sample collected		5.59	≤	2.80	≤	4.20
ppb		0.12	≤	0.06	≤	0.09
ug/dscm		0.66	≤	0.33	≤	0.50
ug/dscf		1.87E-02	≤	9.34E-03	≤	1.40E-02
lb/hr		8.61E-06	≤	4.31E-06	≤	6.46E-06
lb/ton metal processed		7.77E-06	≤	5.77E-06	≤	6.77E-06
Beryllium (Be) Emissions						
Detection Limit Qualifier		**BDL**		**BDL**		
ug of sample collected	≤	0.08	≤	0.08	≤	0.08
ppb	≤	0.02	≤	0.02	≤	0.02
ug/dscm	≤	0.01	≤	0.01	≤	0.01
ug/dscf	≤	2.83E-04	≤	2.83E-04	≤	2.83E-04
lb/hr	≤	1.19E-07	≤	1.19E-07	≤	1.19E-07
lb/ton metal processed	≤	1.07E-07	≤	1.59E-07	≤	1.33E-07
Cadmium (Cd) Emissions						
Detection Limit Qualifier		**ADL**		**ADL**		
ug of sample collected		1.10		0.16		0.63
ppb		0.03		0.00		0.02
ug/dscm		0.13		0.02		0.08
ug/dscf		3.68E-03		5.66E-04		2.12E-03
lb/hr		1.69E-06		2.48E-07		9.71E-07
lb/ton metal processed		1.53E-06		3.32E-07		9.31E-07

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Outlet
Test Method: 29

Source Condition	Batch Process		
Date	6/28/23	6/29/23	
Start Time	9:05	6:40	
End Time	18:10	15:35	
	Run 1	Run 2	Average
Stack Conditions			
Average Gas Temperature, °F	87.0	81.6	84.3
Flue Gas Moisture, percent by volume	1.1%	1.0%	1.1%
Average Flue Pressure, in. Hg	30.00	30.12	30.06
Gas Sample Volume, dscf	299.392	301.092	300.242
Average Gas Velocity, ft/sec	77.231	76.613	76.922
Gas Volumetric Flow Rate, acfm	3,639	3,610	3,625
Gas Volumetric Flow Rate, dscfm	3,484	3,507	3,496
Gas Volumetric Flow Rate, scfm	3,522	3,543	3,533
Isokinetic Variance	100.8	100.7	100.8
Sample Duration, hours	8.00	8.00	
Tons of metal processed	8.863	5.979	7.421
Chromium (Cr) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	117.39	9.53	63.46
ppb	6.40	0.52	3.46
ug/dscm	13.85	1.12	7.49
ug/dscf	3.92E-01	3.17E-02	2.12E-01
lb/hr	1.81E-04	1.47E-05	9.77E-05
lb/ton metal processed	1.63E-04	1.96E-05	9.14E-05
Cobalt (Co) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	2.88	1.12	2.00
ppb	0.14	0.05	0.10
ug/dscm	0.34	0.13	0.24
ug/dscf	9.63E-03	3.68E-03	6.65E-03
lb/hr	4.44E-06	1.72E-06	3.08E-06
lb/ton metal processed	4.01E-06	2.30E-06	3.15E-06
Copper (Cu) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	6.37	5.10	5.74
ppb	0.28	0.23	0.26
ug/dscm	0.75	0.60	0.68
ug/dscf	2.12E-02	1.70E-02	1.91E-02
lb/hr	9.81E-06	7.86E-06	8.83E-06
lb/ton metal processed	8.85E-06	1.05E-05	9.68E-06
Lead (Pb) Emissions			
Detection Limit Qualifier	ADL	DLL	
ug of sample collected	1.38	≤ 0.88	≤ 1.13
ppb	0.02	≤ 0.01	≤ 0.02
ug/dscm	0.16	≤ 0.10	≤ 0.13
ug/dscf	4.53E-03	≤ 2.83E-03	≤ 3.68E-03
lb/hr	2.13E-06	≤ 1.36E-06	≤ 1.74E-06
lb/ton metal processed	1.92E-06	≤ 1.82E-06	≤ 1.87E-06
Manganese (Mn) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	33.66	33.55	33.60
ppb	1.74	1.72	1.73
ug/dscm	3.97	3.93	3.95
ug/dscf	1.12E-01	1.11E-01	1.12E-01
lb/hr	5.18E-05	5.17E-05	5.17E-05
lb/ton metal processed	4.68E-05	6.91E-05	5.80E-05
Mercury (Hg) Emissions			
Detection Limit Qualifier	DLL	DLL	
ug of sample collected	≤ 0.45	≤ 0.49	≤ 0.47
ppb	≤ 0.01	≤ 0.01	≤ 0.01
ug/dscm	≤ 0.05	≤ 0.06	≤ 0.06
ug/dscf	≤ 1.42E-03	≤ 1.70E-03	≤ 1.56E-03
lb/hr	≤ 6.92E-07	≤ 7.52E-07	≤ 7.22E-07
lb/ton metal processed	≤ 6.25E-07	≤ 1.01E-06	≤ 8.16E-07

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Outlet
Test Method: 29

Source Condition			**Batch Process**			
Date	**6/28/23**		**6/29/23**			
Start Time	**9:05**		**6:40**			
End Time	**18:10**		**15:35**			
	Run 1		**Run 2**			**Average**
Stack Conditions						
Average Gas Temperature, °F	87.0		81.6			84.3
Flue Gas Moisture, percent by volume	1.1%		1.0%			1.1%
Average Flue Pressure, in. Hg	30.00		30.12			30.06
Gas Sample Volume, dscf	299.392		301.092			300.242
Average Gas Velocity, ft/sec	77.231		76.613			76.922
Gas Volumetric Flow Rate, acfm	3,639		3,610			3,625
Gas Volumetric Flow Rate, dscfm	3,484		3,507			3,496
Gas Volumetric Flow Rate, scfm	3,522		3,543			3,533
Isokinetic Variance	100.8		100.7			100.8
Sample Duration, hours	8.00		8.00			
Tons of metal processed	8.863		5.979			7.421
Nickel (Ni) Emissions						
Detection Limit Qualifier	**ADL**		**ADL**			
ug of sample collected	104.56		27.48			66.02
ppb	5.05		1.32			3.19
ug/dscm	12.33		3.22			7.78
ug/dscf	3.49E-01		9.12E-02			2.20E-01
lb/hr	1.61E-04		4.23E-05			1.02E-04
lb/ton metal processed	1.45E-04		5.66E-05			1.01E-04
Phosphorus (P) Emissions						
Detection Limit Qualifier	**ADL**		**ADL**			
ug of sample collected	101.93		95.10			98.51
ppb	9.33		8.66			8.99
ug/dscm	12.02		11.15			11.59
ug/dscf	3.40E-01		3.16E-01			3.28E-01
lb/hr	1.57E-04		1.47E-04			1.52E-04
lb/ton metal processed	1.42E-04		1.96E-04			1.69E-04
Selenium (Se) Emissions						
Detection Limit Qualifier	**DLL**		**BDL**			
ug of sample collected	≤ 4.19		≤ 2.50		≤	3.35
ppb	≤ 0.15		≤ 0.09		≤	0.12
ug/dscm	≤ 0.49		≤ 0.29		≤	0.39
ug/dscf	≤ 1.39E-02		≤ 8.21E-03		≤	1.10E-02
lb/hr	≤ 6.45E-06		≤ 3.85E-06		≤	5.15E-06
lb/ton metal processed	≤ 5.82E-06		≤ 5.15E-06		≤	5.49E-06
Silver (Ag) Emissions						
Detection Limit Qualifier	**DLL**		**BDL**			
ug of sample collected	≤ 13.37		≤ 1.27		≤	7.32
ppb	≤ 0.35		≤ 0.03		≤	0.19
ug/dscm	≤ 1.58		≤ 0.15		≤	0.87
ug/dscf	≤ 4.47E-02		≤ 4.25E-03		≤	2.45E-02
lb/hr	≤ 2.06E-05		≤ 1.95E-06		≤	1.13E-05
lb/ton metal processed	≤ 1.86E-05		≤ 2.61E-06		≤	1.06E-05
Thallium (Tl) Emissions						
Detection Limit Qualifier	**BDL**		**BDL**			
ug of sample collected	≤ 1.45		≤ 1.43		≤	1.44
ppb	≤ 0.02		≤ 0.02		≤	0.02
ug/dscm	≤ 0.17		≤ 0.17		≤	0.17
ug/dscf	≤ 4.81E-03		≤ 4.81E-03		≤	4.81E-03
lb/hr	≤ 2.23E-06		≤ 2.20E-06		≤	2.22E-06
lb/ton metal processed	≤ 2.01E-06		≤ 2.95E-06		≤	2.48E-06
Vanadium (V) Emissions						
Detection Limit Qualifier	**DLL**		**DLL**			
ug of sample collected	≤ 0.95		≤ 0.24		≤	0.59
ppb	≤ 0.05		≤ 0.01		≤	0.03
ug/dscm	≤ 0.11		≤ 0.03		≤	0.07
ug/dscf	≤ 3.11E-03		≤ 8.50E-04		≤	1.98E-03
lb/hr	≤ 1.46E-06		≤ 3.65E-07		≤	9.11E-07
lb/ton metal processed	≤ 1.32E-06		≤ 4.89E-07		≤	9.02E-07
Zinc (Zn) Emissions						
Detection Limit Qualifier	**ADL**		**ADL**			
ug of sample collected	33.08		30.28			31.68
ppb	1.43		1.31			1.37
ug/dscm	3.90		3.55			3.73
ug/dscf	1.10E-01		1.01E-01			1.05E-01
lb/hr	5.09E-05		4.66E-05			4.88E-05
lb/ton metal processed	4.60E-05		6.24E-05			5.42E-05

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5.4 Baghouse Outlet Method 0061 Summary

Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Outlet
Test Method: 0061

Source Condition		Batch Process	
Date	6/28/23	6/29/23	
Start Time	9:05	6:40	
End Time	18:10	15:35	
	Run 1	Run 2	Average
Stack Conditions			
Average Gas Temperature, °F	85.4	80.6	83.0
Flue Gas Moisture, percent by volume	1.0%	1.0%	1.0%
Average Flue Pressure, in. Hg	30.00	30.12	30.06
Gas Sample Volume, dscf	375.674	377.858	376.766
Average Gas Velocity, ft/sec	77.038	76.504	76.771
Gas Volumetric Flow Rate, acfm	3,630	3,605	3,618
Gas Volumetric Flow Rate, dscfm	3,488	3,509	3,499
Gas Volumetric Flow Rate, scfm	3,524	3,544	3,534
Isokinetic Variance	99.8	99.8	99.8
Tons of metal processed	8.863	5.979	7.421
Hexavalent Chromium (Cr+6) Emissions			
Detection Limit Qualifier	ADL	ADL	
ug of sample collected	6.98	2.96	4.97
ppb	0.30	0.13	0.22
ug/dscm	0.66	0.28	0.47
ug/dscf	1.87E-02	7.93E-03	1.33E-02
lb/hr	8.57E-06	3.64E-06	6.10E-06
lb/ton metal processed	7.74E-06	4.87E-06	6.30E-06

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6.0 CERTIFICATION

Mostardi Platt is pleased to have been of service to PCC Structurals, Inc. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

As the program manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results. The test program was performed in accordance with the test methods and the Mostardi Platt Quality Manual, as applicable.

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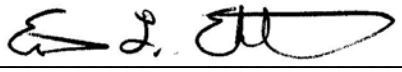
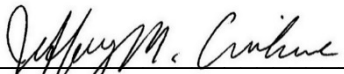


Program Manager

Eric L. Ehlers



Quality Assurance

Jeffrey M. Crivlare

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APPENDICES

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Appendix A - Test Section Diagrams

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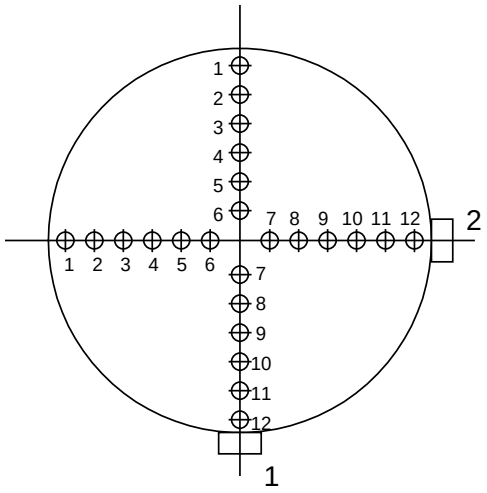
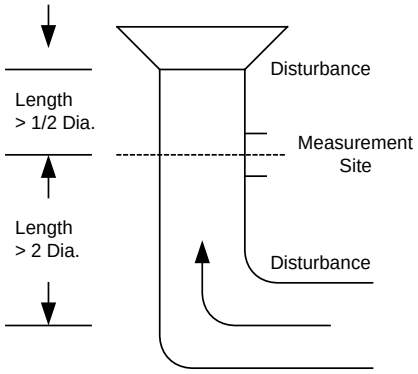
EQUAL AREA TRAVERSE FOR ROUND DUCTS





Project:	PCC Structurals, Inc. Large Parts Campus Milwaukie, Oregon
Unit:	BH8901 Inlet
Stack Diameter:	1.0 Foot
Stack Area:	0.785 Square Feet
No. Points Across Diameter:	12
No. of Ports:	2
Port Length:	4.0 in.
Upstream Distance:	>0.5
Downstream Distance:	>2.0

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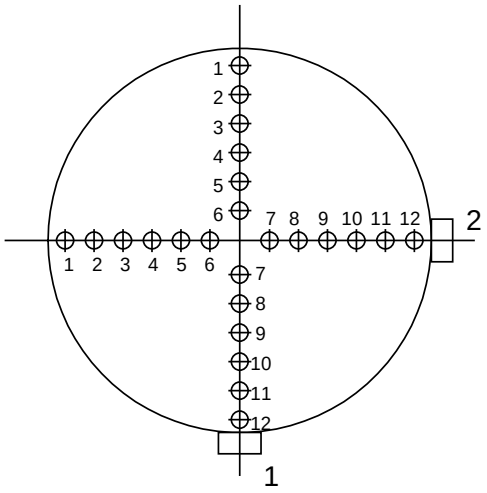
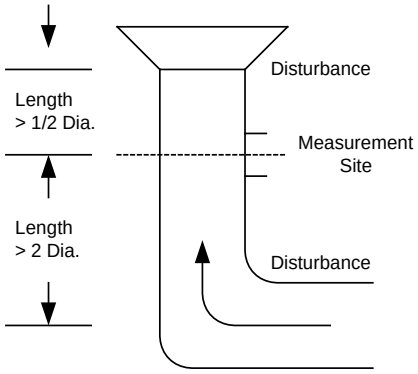
EQUAL AREA TRAVERSE FOR ROUND DUCTS





Project:	PCC Structurals, Inc. Large Parts Campus Milwaukie, Oregon
Unit:	BH8901 Outlet
Stack Diameter:	1.0 Foot
Stack Area:	0.785 Square Feet
No. Points Across Diameter:	12
No. of Ports:	2
Port Length:	3.0 in.
Upstream Distance:	>0.5
Downstream Distance:	>2.0

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Appendix B - Sample Train Diagrams

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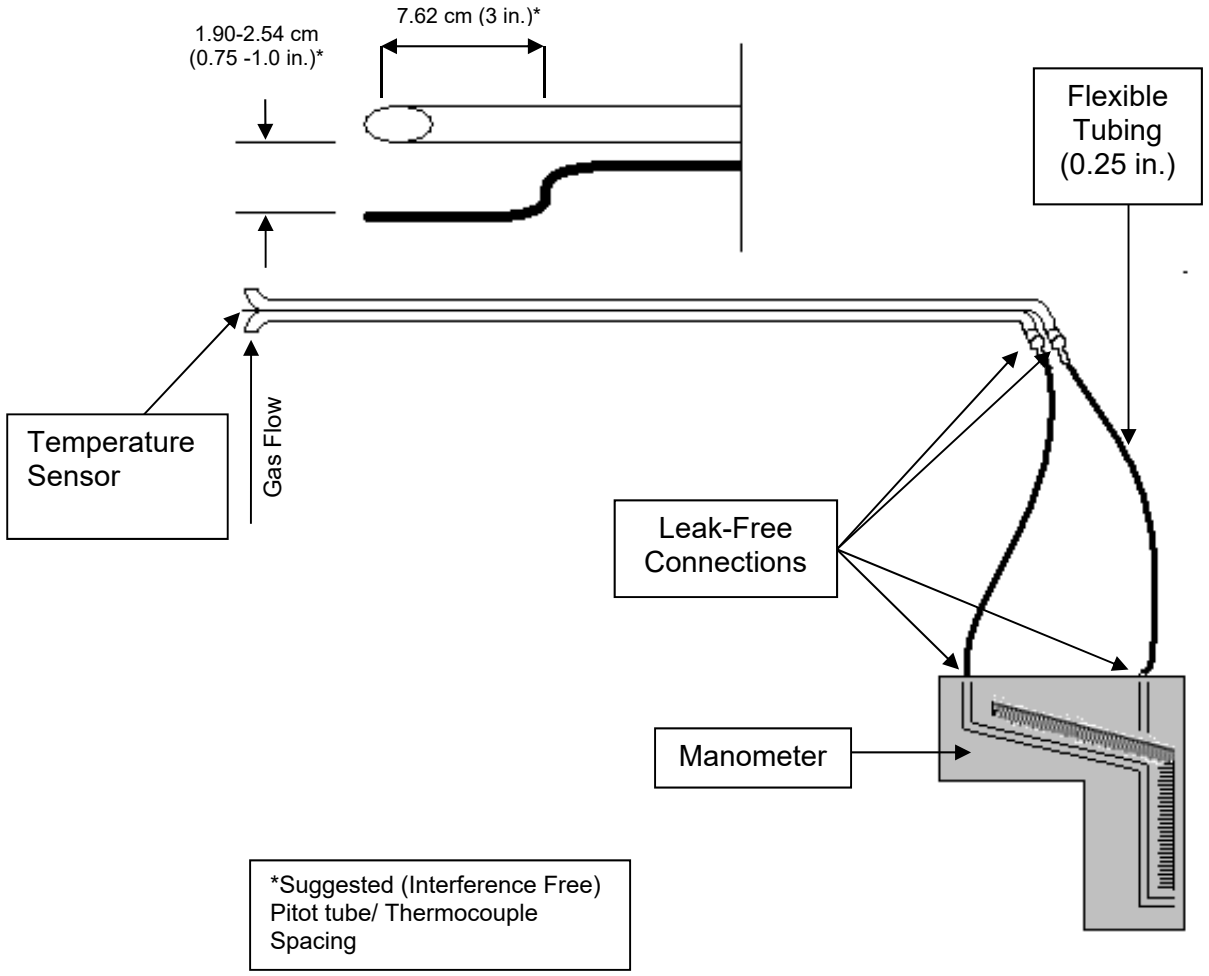
USEPA Method 2 – Type S Pitot Tube Manometer Assembly



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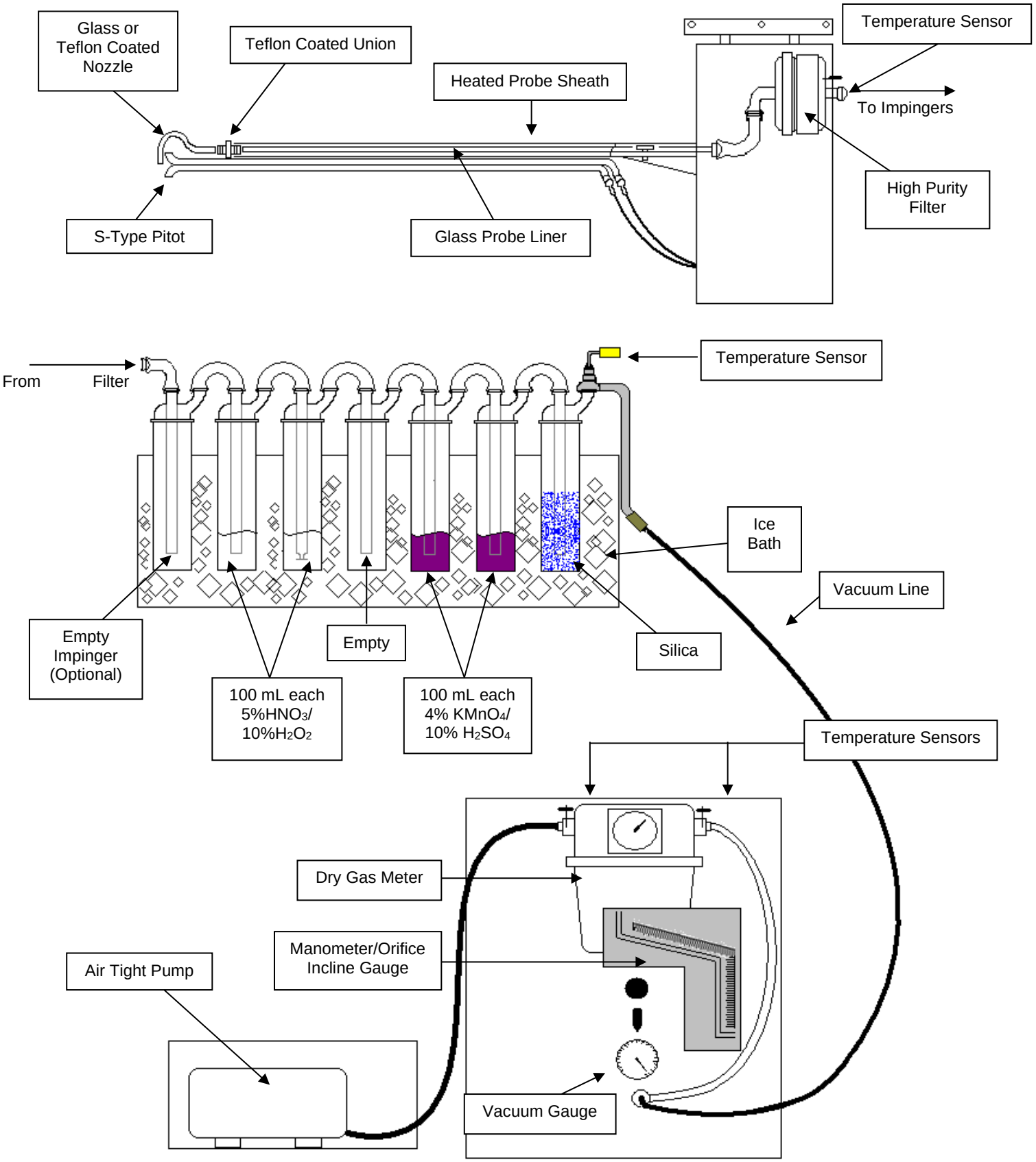
USEPA Method 29- Metals Sample Train Diagram



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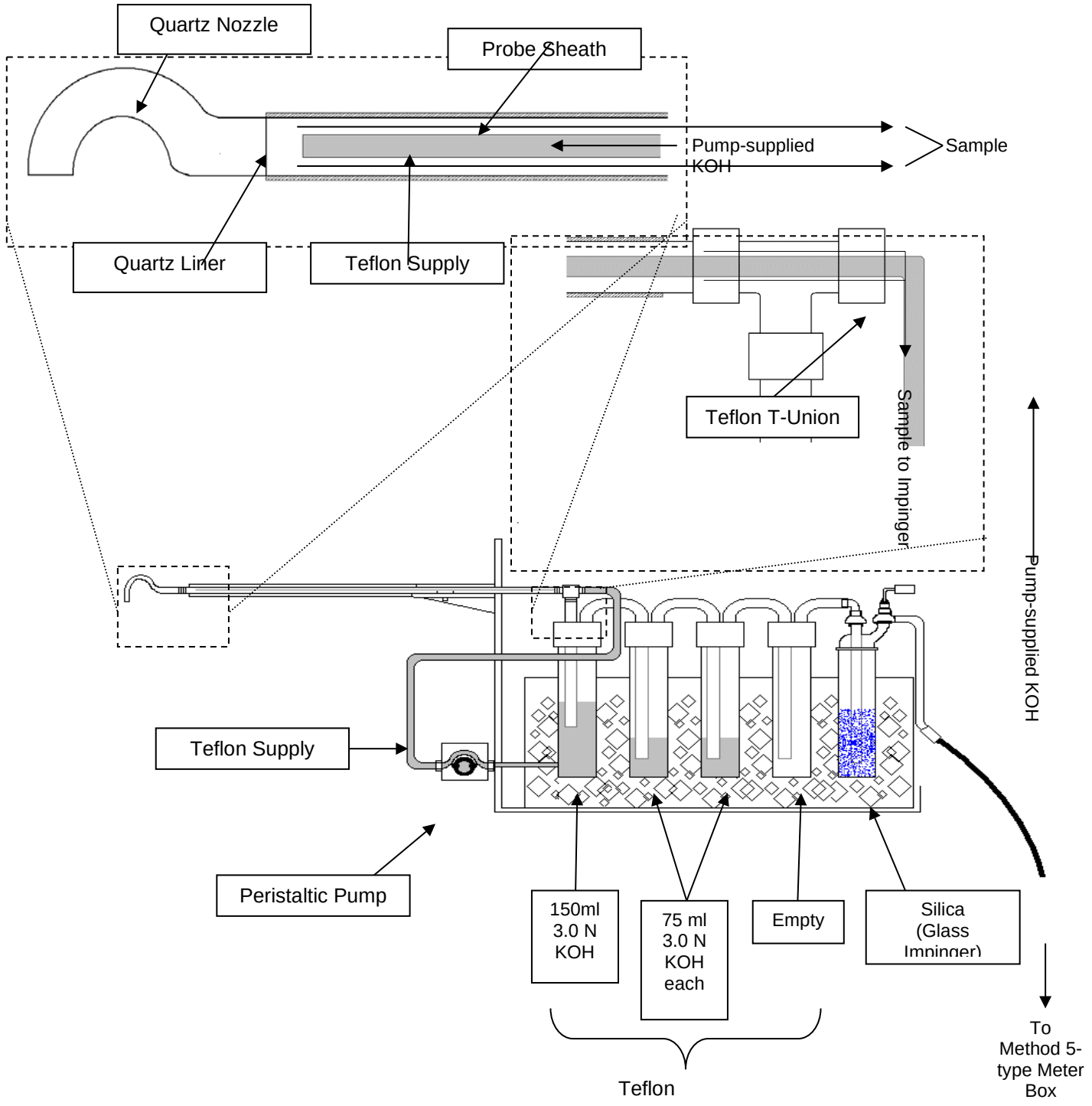
Method 0061- Hexavalent Chromium Sampling Train



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Appendix C - Calculation Nomenclature and Formulas

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Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Inlet**
Run:	**1**
Date:	**6/28/2023**
Method:	**0061**
Source Condition:	**Batch**

Wet Molecular Weight

$$Ms = Md \times (1-Bws) + (18.0 \times Bws)$$

Md = 29.000 Bws = 0.009

Ms = 28.901

Meter Volume at Standard Conditions

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{(Pbar + DH/13.6)}{Tm}$$

Y = 0.999 Vm = 370.137 Pbar = 30.1

DH = 1.9 Tm = 547.1

Vm(std) = 360.114

Volume of Water Vapor Condensed

$$Vw(std) = 0.0471 \times (\text{net } H_2O \text{ gain})$$

Net H_2O = 0.0

Vw(std) = 0.000

Moisture Content

$$Bws = \frac{Vw(std)}{Vw(std) + Vm(std)}$$

Vw(std) = 0.000 Vm(std) = 360.114

Bws = 0.009

Average Duct Velocity

$$Vs = 85.49 \times Cp \times \text{Sqrt DP (avg)} \times (Ts(avg) + 460/(Ps \times Ms))^{1/2}$$

Cp = 0.840 Ts (avg) = 80.1 Sqrt DP (avg): 1.335

Ps = 29.65 Ms = 28.901

Vs = 76.133

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Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Inlet**
Run:	**1**
Date:	**6/28/2023**
Method:	**0061**
Source Condition:	**Batch**

Volumetric Flow Rate (Actual Basis)

$$Q = Vs \times A \times 60$$

Vs = 76.133 **A =** 0.785

Q = 3,588

Volumetric Flow Rate (Standard Basis)

$$Qstd = 17.647 \times Q \times \frac{Ps}{Ts\ (avg) + 460}$$

Q = 3,588 **Ps =** 29.65 **Ts (avg) =** 80.1

Qstd = 3,475

Volumetric Flow Rate (Standard Dry Basis)

$$Qstd(dry) = Qstd \times (1-Bws)$$

Qstd = 3,475 **Bws =** 0.009

Qstd(dry) = 3,444

Isokinetic Variation:

$$\%ISO = \frac{0.0945 \times (Ts + 460) \times Vm(std)}{Vs \times \theta \times An \times Ps \times (1-Bws)}$$

Ts = 80.1 **Vm(std) =** 360.114 **Vs =** 76.133

An = 0.0001728 **θ =** 480 **Ps =** 29.65

Bws = 0.009

%ISO = 99.1

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Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Inlet**
Run:	**1**
Date:	**6/28/2023**
Method:	**0061**
Source Condition:	**Batch**

Hexavalent Chromium (Cr+6) Concentration:

$$\mu g/m^3 = \frac{\mu g \text{ of Hexavalent Chromium (Cr+6)}}{Vm(std) \times 0.02832\ m^3/ft^3}$$

µg= 15.10 **Vm(std) =** 360.114

µg/m³= 1.48

Hexavalent Chromium (Cr+6) Emission Rate:

$$\text{lb of Hexavalent Chromium (Cr+6)} = \frac{\mu g \text{ of sample} \times 10^{-6}\ grams/\mu g}{453.6\ grams/lb}$$

lb of Hexavalent Chromium (Cr+6) = 3.33E-08 **dscfm =** 3,444

$$\text{Emission Rate lb/hr} = \frac{\text{lb of Hexavalent Chromium (Cr+6)}}{Vm(std)} \times dscfm \times 60\ min/hr$$

Emission Rate lb/hr = 0.000019

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Client: PCC Structurals, Inc.
Plant: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Run: 1
Date: 6/28/2023

Moisture Calculations

$$Vwc(std) = \frac{(Vf - Vi)*Pw*R*Tstd}{Pstd*Mw} = 0.04707\ (Vf - Vi)$$

$$Vwsg(std) = \frac{(Wf - Wi)*Pw*R*Tstd}{Pstd*Mw} = 0.04715\ (Vf - Vi)$$

$$Vm(std) = 17.64*Vm*Y*\frac{Pbar + \frac{\Delta H}{13.6}}{Tm}$$

$$Bws = \frac{Vwc(std) + Vwsg(std)}{Vwc(std) + Vwsg(std) + Vm(std)}$$

Vf =	3690.2	Wf =	848.5
Vi =	3662.2	Wi =	793.2
Vwc(std) =	1.32	Vwsg(std) =	2.61
Vm =	414.220	Y =	1.011
Pbar =	30.05	ΔH =	1.945
Tm =	542		
Vm(std) =	412.429		
Bws =	0.009		

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Volumetric Flow Nomenclature

A = Cross-sectional area of stack or duct, ft^2

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot tube coefficient, dimensionless

M_d = Dry molecular weight of gas, lb/lb-mole

M_s = Molecular weight of gas, wet basis, lb/lb-mole

M_w = Molecular weight of water, 18.0 lb/lb-mole

P_{bar} = Barometric pressure at testing site, in. Hg

P_g = Static pressure of gas, in. Hg (in. H_2O/13.6)

P_s = Absolute pressure of gas, in. Hg = $P_{bar} + P_g$

P_{std} = Standard absolute pressure, 29.92 in. Hg

Q_{acfm} = Actual volumetric gas flow rate, acfm

Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, dscf/hr

R = Ideal gas constant, 21.85 in. Hg-ft^3/°R-lb-mole

T_s = Absolute gas temperature, °R

T_{std} = Standard absolute temperature, 528°R

v_s = Gas velocity, ft/sec

$V_{w(std)}$ = Volume of water vapor in gas sample, corrected to standard conditions, scf

Y = Dry gas meter calibration factor

Δp = Velocity head of gas, in. H_2O

K_1 = 17.647 °R/in. Hg

%EA = Percent excess air

$\%CO_2$ = Percent carbon dioxide by volume, dry basis

$\%O_2$ = Percent oxygen by volume, dry basis

$\%N_2$ = Percent nitrogen by volume, dry basis

0.264 = Ratio of O_2 to N_2 in air, v/v

0.28 = Molecular weight of N_2 or CO, divided by 100

0.32 = Molecular weight of O_2 divided by 100

0.44 = Molecular weight of CO_2 divided by 100

13.6 = Specific gravity of mercury (Hg)

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Volumetric Air Flow Calculations

$$Vm\ (std) = 17.647 \times Vm \times \left[\frac{\left(P_{bar} + \left[\frac{DH}{13.6}\right]\right)}{(460 + Tm)}\right] \times Y$$

$$Vw\ (std) = 0.0471 \times Vlc$$

$$Bws = \left[\frac{Vw\ (std)}{Vw\ (std) + Vm\ (std)}\right]$$

$$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + [0.28 \times (100 - \%CO_2 - \%O_2)]$$

$$Ms = Md \times (1 - Bws) + (18 \times Bws)$$

$$Vs = \sqrt{\frac{(Ts + 460)}{Ms \times Ps}} \times \sqrt{DP} \times Cp \times 85.49$$

$$Acfm = Vs \times Area\ (of\ stack\ or\ duct) \times 60$$

$$Scfm = Acfm \times 17.647 \times \left[\frac{Ps}{(460 + Ts)}\right]$$

$$Scfh = Scfm \times 60\frac{min}{hr}$$

$$Dscfm = Scfm \times (1 - Bws)$$

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Isokinetic Nomenclature

A = Cross-sectional area of stack or duct, square feet
A_n = Cross-sectional area of nozzle, square feet
B_{ws} = Water vapor in gas stream, by volume
C_a = Acetone blank residue concentration, g/g
C_{acf} = Concentration of particulate matter in gas stream at actual conditions, gr/acf
C_p = Pitot tube coefficient
C_s = Concentration of particulate matter in gas stream, dry basis, corrected to standard conditions, gr/dscf
IKV = Isokinetic sampling variance, must be 90.0 % ≤ IKV ≤ 110.0%
M_d = Dry molecular weight of gas, lb/lb-mole
M_s = Molecular weight of gas, wet basis, lb/lb-mole
M_w = Molecular weight of water, 18.0 lb/lb-mole
m_a = Mass of residue of acetone after evaporation, grams
P_{bar} = Barometric pressure at testing site, inches mercury
P_g = Static pressure of gas, inches mercury (inches water/13.6)
P_s = Absolute pressure of gas, inches mercury = $P_{bar} + P_g$
P_{std} = Standard absolute pressure, 29.92 inches mercury
Q_{acfm} = Actual volumetric gas flow rate, acfm
Q_{sd} = Dry volumetric gas flow rate corrected to standard conditions, dscfh
R = Ideal gas constant, 21.85 inches mercury cubic foot/°R-lb-mole
T_m = Dry gas meter temperature, °R
T_s = Gas temperature, °R
T_{std} = Absolute temperature, 528°R
V_a = Volume of acetone blank, ml
V_{aw} = Volume of acetone used in wash, ml
W_a = Weight of residue in acetone wash, grams
m_n = Total amount of particulate matter collected, grams
V_{1c} = Total volume of liquid collected in impingers and silica gel, ml
V_m = Volume of gas sample as measured by dry gas meter, dcf
$V_{m(std)}$ = Volume of gas sample measured by dry gas meter, corrected to standard conditions, dscf
v_s = Gas velocity, ft/sec
$V_{w(std)}$ = Volume of water vapor in gas sample, corrected to standard conditions, scf
Y = Dry gas meter calibration factor
ΔH = Average pressure differential across the orifice meter, inches water
Δp = Velocity head of gas, inches water
ρ_a = Density of acetone, 0.7855 g/ml (average)
ρ_w = Density of water, 0.002201 lb/ml
θ = Total sampling time, minutes
K_1 = 17.647 °R/in. Hg
K_2 = 0.04707 ft^3/ml
K_4 = 0.09450/100 = 0.000945
K_p = $85.49 \frac{\text{ft}}{\text{sec}} \left[\frac{(\text{lb/lb} - \text{mole})(\text{in. Hg})}{(^\circ\text{R})(\text{in. H}_2\text{O})} \right]^{1/2}$
Pitot tube constant,
%EA = Percent excess air
$\%CO_2$ = Percent carbon dioxide by volume, dry basis
$\%O_2$ = Percent oxygen by volume, dry basis
%CO = Percent carbon monoxide by volume, dry basis
$\%N_2$ = Percent nitrogen by volume, dry basis
0.264 = Ratio of O_2 to N_2 in air, v/v
28 = Molecular weight of N_2 or CO
32 = Molecular weight of O_2
44 = Molecular weight of CO_2
13.6 = Specific gravity of mercury (Hg)

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Isokinetic Calculation Formulas

1. $$V_{w(std)} = V_{lc}\left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right) = K_2 V_{lc}$$

2. $$V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m}\right)\left(\frac{(P_{bar} + (\frac{\Delta H}{13.6}))}{P_{std}}\right) = K_1 V_m Y \frac{(P_{bar} + (\frac{\Delta H}{13.6}))}{T_m}$$

3. $$B_{ws} = \frac{V_{w(std)}}{(V_{m(std)} + V_{w(std)})}$$

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

5. $$M_s = M_d(1 - B_{ws}) + 18.0(B_{ws})$$

6. $$C_a = \frac{m_a}{V_a \rho_a}$$

7. $$W_a = C_a V_{aw} \rho_a$$

8. $$C_{acf} = 15.43 K_i\left(\frac{m_n P_s}{V_{w(std)} + V_{m(std)}\ T_s}\right)$$

9. $$C_S = (15.43 \text{ grains/gram})\ (m_n / V_{m(std)})$$

10. $$v_s = K_p C_p \sqrt{\frac{\Delta P\ T_s}{P_s M_s}}$$

11. $$Q_{acfm} = v_s A(60_{sec/min})$$

12. $$Q_{sd} = (3600_{sec/hr})(1 - B_{ws})\ v_s\ \left(\frac{T_{std} P_s}{T_s P_{std}}\right)\ A$$

13. $$E \text{ (emission rate, lbs/hr)} = Q_{std}\left(C_s / 7000 \text{ grains/lb}\right)$$

14. $$IKV = \frac{T_s V_{m(std)} P_{std}}{T_{std} v_s \theta A_n P_s 60(1 - B_{ws})} = K_4 \frac{T_s V_{m(std)}}{P_s v_s A_n \theta (1 - B_{ws})}$$

15. $$\%EA = \left(\frac{\%O_2 - (0.5\,\%CO)}{0.264\,\%N_2 - (\%O_2 - 0.5\,\%CO)}\right) \times 100$$

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Moisture Calculations

$$V_{wc(std)} = \frac{(V_f - V_i)\rho_w R T_{std}}{P_{std} M_w} = 0.04707(V_f - V_i)$$

$$V_{wsg(std)} = \frac{(W_f - W_i)\rho_w R T_{std}}{P_{std} M_w} = 0.04715(W_f - W_i)$$

$$V_{m(std)} = 17.64\, V_m Y \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}$$

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

Where:

B_{ws} = Water vapor in gas stream, proportion by volume
M_w = Molecular weight of water, 18.015 lb/lb-mole
P_{bar} = Barometric pressure at the testing site, in. Hg
P_{std} = Standard absolute pressure, 29.92 in. Hg
R = Ideal gas constant, 0.048137 (in. Hg)(ft^3)/(g-mole)(°R) = [21.8348(in. Hg)(ft^3)/(lb-mole)(°R)]/453.592 g-mole/lb-mole
T_m = Absolute average dry gas meter temperature, °R
T_{std} = Standard absolute temperature, 528 °R
V_f = Final volume of condenser water, ml
V_i = Initial volume of condenser water, ml
V_m = Dry gas volume measured by dry gas meter, dcf
$V_{m(std)}$ = Dry gas volume measured by dry gas meter, corrected to standard conditions, scf
$V_{wc(std)}$ = Volume of condensed water vapor, corrected to standard conditions, scf
$V_{wsg(std)}$ = Volume of water vapor collected in silica gel, corrected to standard conditions, scf
W_f = Final weight of silica gel, g
W_i = Initial weight of silica gel, g
Y = Dry gas meter calibration factor
ΔH = Average pressure exerted on dry gas meter outlet by gas sample bag, in. H_2O
ρ_w = Density of water, 0.9982 g/ml
13.6 = Specific gravity of mercury (Hg)
17.64 = T_{std}/P_{std}
0.04707 = ft^3/ml 0.04715 = ft^3/g

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Trace Metal (Including Mercury) Sample Calculations

Concentration

$$\frac{\mu g}{m^3} = \frac{\mu g\ of\ trace\ metal}{dscf\ volume\ sampled \times 0.02832 \frac{m^3}{ft^3}}$$

Emission Rate

$$\frac{\mu g\ of\ sample \times \frac{1 \times 10^{-6} grams}{\mu g}}{453.6\ gr/lb} = lbs\ of\ trace\ metal$$

$$\frac{lbs\ of\ trace\ metal}{V_m(std) sample} \times dscfm \times 60 \frac{min}{hr} = lbs\ of\ trace\ metal/hr$$

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Appendix D - Reference Method Test Data

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Client:	PCC Structurals, Inc.		
Facility:	Large Parts Campus Facility - Milwaukie, OR		
Test Location:	BH8901 Inlet		
Project #:	M232604		
Test Method:	29		
Test Engineer:	JXJ		
Test Technician:	VTV		
	Run 1		**Run 2**
Temp ID:	CM36		CM36
Meter ID:	CM36		CM36
Pitot ID:	296		296
Nozzle Diameter (Inches):	0.171		0.171
Meter Calibration Date:	6/16/2023		6/16/2023
Meter Calibration Factor (Y):	1.011		1.011
Meter Orifice Setting (Delta H):	1.945		1.945
Nozzle Kit ID Number and Material:	TN 8		TN#8
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	2.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	4.00		
Port Size (Diameter, Inches):	4.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	1		
Duct Area (Square Feet):	0.785		
Upstream Diameters:	8.5		
Downstream Diameters:	20.0		
Number of Ports Sampled:	2		
Number of Points per Port:	12		
Minutes per Point:	20.0		
Minutes per Reading:	10.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	480		
Train Type:	Hot Box		
Source Condition:	Batch Process		
Moisture Balance ID:	S10-35		
# of Runs	2		

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Run 1 - Method 29

Client: PCC Structurals, Inc. **Date:** 6/28/23
Facility: Large Parts Campus Facility - Milwaukie, OR **Start Time:** 9:05
Test Location: BH8901 Inlet **End Time:** 18:00
Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.61	in. H_2O	Static Pressure	-5.50	in. H_2O
Meter Temperature, Tm:	81.9	°F	Flue Pressure (Ps):	29.65	in. Hg. abs.
Sqrt ΔP:	1.651	in. H_2O			
Stack Temperature, Ts:	78.1	°F			
Meter Volume, Vm:	414.220	ft^3			
Meter Volume, Vmstd:	412.429	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	3.923	wscf	Gas Weight wet, Ms:	28.896	lb/lb mole
Isokinetic Variance:	99.3	%I			
			Gas Velocity, Vs:	93.964	fps
Test Length:	480.00	in mins.	Volumetric Flow:	4,428	acfm
Nozzle Diameter:	0.171	in inches	Volumetric Flow:	4,265	dscfm
Barometric Pressure:	30.05	in Hg	Volumetric Flow:	4,305	scfm

MOISTURE DETERMINATION

Initial Impinger Content:	3662.2	ml	Silica Initial Wt.	793.2	grams
Final Impinger Content:	3690.2	ml	Silica Final Wt.	848.5	grams
Impinger Difference:	28.0	ml	Silica Difference:	55.3	grams

Total Water Gain: 83.3 Moisture, Bws: 0.009 **Supersaturation Value, Bws: 0.033**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F	
1-1	9:05:00	2.80	2.70	47.215	66	70	70	250	244	57	
1-1	9:15:00	2.70	2.60	55.945	71	72	72	250	252	64	
1-2	9:25:00	2.80	2.70	64.352	69	73	73	250	256	64	
1-2	9:35:00	2.70	2.50	73.027	77	74	74	250	265	64	
1-3	9:45:00	2.70	2.60	81.497	69	75	75	250	265	64	
1-3	9:55:00	2.80	2.70	90.048	70	76	76	250	262	63	
1-4	10:05:00	2.80	2.70	98.763	66	77	77	250	249	62	
1-4	10:15:00	2.70	2.60	107.528	76	77	77	250	244	62	
1-5	10:25:00	2.80	2.70	116.054	72	78	78	250	250	62	
1-5	10:35:00	2.80	2.70	124.785	72	78	78	250	250	61	
1-6	10:45:00	2.70	2.60	133.517	75	78	78	250	259	62	
1-6	10:55:00	2.70	2.60	142.066	73	79	79	250	249	62	
1-7	11:05:00	2.80	2.70	150.648	73	80	80	250	262	63	
1-7	11:15:00	2.80	2.70	159.404	74	80	80	250	260	64	
1-8	11:25:00	2.70	2.60	168.151	74	81	81	250	253	65	
1-8	11:35:00	3.00	2.90	176.757	74	81	81	250	244	65	
1-9	11:45:00	3.10	3.00	185.828	75	83	83	250	266	61	
1-9	11:55:00	2.70	2.60	195.075	75	83	83	250	259	61	
1-10	12:05:00	2.80	2.70	203.704	76	84	84	250	245	57	
1-10	12:15:00	2.90	2.80	212.500	75	84	84	250	243	57	
1-11	12:25:00	2.90	2.80	221.460	76	84	84	250	259	57	
1-11	12:35:00	2.80	2.70	230.411	77	84	84	250	252	58	
1-12	12:45:00	2.50	2.40	239.199	77	83	83	250	254	58	
1-12	12:55:00	2.50	2.40	247.487	78	83	83	250	243	58	
	13:05:00			255.768							
2-1	13:15:00	2.60	2.50	255.768	78	82	82	250	246	59	
2-1	13:25:00	2.60	2.50	264.197	79	82	82	250	255	60	
2-2	13:35:00	2.70	2.60	272.618	78	82	82	250	263	59	
2-2	13:45:00	2.70	2.60	281.208	79	82	82	250	246	57	
2-3	13:55:00	2.70	2.60	289.789	80	83	83	250	245	57	
2-3	14:05:00	2.60	2.50	298.378	80	83	83	250	244	57	
2-4	15:00:00	2.70	2.50	306.807	82	81	81	250	266	56	
2-4	15:10:00	2.70	2.50	315.349	84	82	82	250	261	54	
2-5	15:20:00	2.60	2.40	323.891	82	83	83	250	266	53	
2-5	15:30:00	2.70	2.50	332.304	83	84	84	250	267	53	
2-6	15:40:00	2.60	2.50	340.886	83	84	84	250	249	54	
2-6	15:50:00	2.50	2.40	349.307	83	84	84	250	245	55	
2-7	16:00:00	2.60	2.50	357.564	83	85	85	250	258	55	
2-7	16:10:00	2.60	2.50	366.001	83	86	86	250	254	55	
2-8	16:20:00	2.70	2.60	374.453	84	86	86	250	244	56	
2-8	16:30:00	2.70	2.60	383.058	84	86	86	250	244	53	
2-9	16:40:00	2.80	2.70	391.663	84	86	86	250	261	52	
2-9	16:50:00	2.80	2.70	400.426	84	87	87	250	264	53	
2-10	17:00:00	2.80	2.60	409.205	88	87	87	250	246	52	
2-10	17:10:00	2.70	2.50	417.952	88	87	87	250	244	52	
2-11	17:20:00	2.70	2.60	426.541	86	88	88	250	258	54	
2-11	17:30:00	2.70	2.60	435.254	84	88	88	250	248	53	
2-12	17:40:00	2.80	2.70	443.803	84	88	88	250	246	54	
2-12	17:50:00	2.80	2.70	452.603	84	88	88	250	245	54	
	18:00:00			461.435							
Total	8:45:00			414.220		81.9	81.9				
Average			2.61		78.1	81.9					
Min			2.40		66.0	70.0					
Max			3.00		88.0	88.0					

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Impinger Weight Sheet - Run 1

Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Inlet**
Project #:	**M232604**
Date:	**6/28/2023**
Test Method:	**29**
Weighed/Measured By:	**CST**
Balance ID:	**S10-35**

Scale Calibration Check Date: **6/28/2023**

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

Certified Weight, grams	Result, grams
250	250.0
500	500.1
750	750.1

IMPINGER CONTENTS	FINAL MLS / GRAMS	INITIAL MLS / GRAMS	GAIN MLS / GRAMS
HNO3/H2O2	771.0	759.0	12.0
HNO3/H2O2	775.0	763.4	11.6
Empty	668.6	660.4	8.2
KMnO4/H2SO4	760.8	764.6	-3.8
KMnO4/H2SO4	714.8	714.8	0.0
Silica Gel	848.5	793.2	55.3

Liquid Final	Liquid Initial	Liquid Gain
3,690.2	3,662.2	28.0

Silica Final	Silica Initial	Silica Gain
848.5	793.2	55.3

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Run 2 - Method 29

Client: PCC Structurals, Inc. **Date:** 6/29/23
Facility: Large Parts Campus Facility - Milwaukie, OR **Start Time:** 6:40
Test Location: BH8901 Inlet **End Time:** 15:25
Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.99	In. H_2O	Static Pressure	-5.50	in. H_2O
Meter Temperature, Tm:	76.5	°F	Flue Pressure (Ps):	29.57	in. Hg. abs.
Sqrt ΔP:	1.444	In. H_2O			
Stack Temperature, Ts:	73.6	°F			
Meter Volume, Vm:	360.673	ft^3			
Meter Volume, Vmstd:	361.213	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	4.239	wscf	Gas Weight wet, Ms:	28.872	lb/lb mole
Isokinetic Variance:	99.3	%I			
			Gas Velocity, Vs:	81.997	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,864	acfm
Nozzle Diameter:	0.171	in inches	Volumetric Flow:	3,734	dscfm
Barometric Pressure:	29.97	in Hg	Volumetric Flow:	3,778	scfm

MOISTURE DETERMINATION

Initial Impinger Content:	3729.4	ml	Silica Initial Wt.	803.8	grams
Final Impinger Content:	3772.6	ml	Silica Final Wt.	850.6	grams
Impinger Difference:	43.2	ml	Silica Difference:	46.8	grams

Total Water Gain: 90.0 Moisture, Bws: 0.012 **Supersaturation Value, Bws: 0.028**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-Jan	6:40:00	2.50	2.40	61.942	64	65	65	250	249	54
1-Jan	6:50:00	2.50	2.40	70.132	64	66	66	250	250	54
2-Jan	7:00:00	2.40	2.30	78.215	64	67	67	250	250	63
2-Jan	7:10:00	2.50	2.40	86.200	64	68	68	250	250	57
3-Jan	7:20:00	2.50	2.40	94.378	65	69	68	250	250	57
3-Jan	7:30:00	2.10	2.00	102.553	65	69	69	250	250	57
4-Jan	7:40:00	1.70	1.60	110.125	66	70	70	250	254	57
4-Jan	7:50:00	1.60	1.50	116.785	66	70	70	250	250	57
5-Jan	8:00:00	1.70	1.60	123.333	67	70	70	250	250	57
5-Jan	8:10:00	1.70	1.60	130.125	66	70	70	250	250	57
6-Jan	8:20:00	1.80	1.70	136.822	66	71	71	250	254	57
6-Jan	8:30:00	1.80	1.70	143.773	67	71	71	250	250	57
7-Jan	8:40:00	1.90	1.80	150.725	67	71	71	250	253	57
7-Jan	8:50:00	1.80	1.70	157.888	68	72	72	250	250	58
8-Jan	9:00:00	1.80	1.70	164.830	68	72	72	250	250	58
8-Jan	9:10:00	1.80	1.70	171.782	69	72	72	250	250	58
9-Jan	9:20:00	1.90	1.80	178.733	70	73	73	250	250	58
9-Jan	9:30:00	1.80	1.70	185.882	70	73	73	250	250	58
10-Jan	9:40:00	1.90	1.80	192.845	71	74	74	250	249	59
10-Jan	9:50:00	1.80	1.70	200.115	71	75	75	250	250	56
11-Jan	10:00:00	1.90	1.80	206.975	72	75	75	250	251	53
11-Jan	10:10:00	1.90	1.80	214.135	73	75	75	250	250	53
12-Jan	10:20:00	1.80	1.70	221.290	73	75	75	250	251	53
12-Jan	10:30:00	1.80	1.70	228.255	74	76	76	250	250	53
	10:40:00			235.225						
1-Feb	10:45:00	1.70	1.60	235.225	74	77	77	250	249	58
1-Feb	10:55:00	1.80	1.70	242.112	75	77	77	250	250	54
2-Feb	11:05:00	2.20	2.00	248.989	75	77	77	250	253	54
2-Feb	11:15:00	2.30	2.20	256.705	75	78	78	250	250	51
3-Feb	11:25:00	2.10	2.00	264.605	76	78	78	250	250	51
3-Feb	11:35:00	2.10	2.00	272.150	76	79	79	250	250	51
4-Feb	11:45:00	2.40	2.30	279.755	76	80	80	250	250	51
4-Feb	11:55:00	2.40	2.30	287.800	77	80	80	250	250	52
5-Feb	12:05:00	2.50	2.40	295.885	78	81	81	250	250	50
5-Feb	12:15:00	2.50	2.40	304.150	78	81	81	250	250	49
6-Feb	12:25:00	2.20	2.00	312.415	79	82	82	250	250	48
6-Feb	12:35:00	2.30	2.20	320.164	79	82	82	250	250	49
7-Feb	12:45:00	2.50	2.40	328.105	79	82	82	250	250	49
7-Feb	12:55:00	2.40	2.30	336.365	79	82	82	250	250	49
8-Feb	13:05:00	2.20	2.10	344.465	80	83	83	250	250	49
8-Feb	13:15:00	2.20	2.10	352.230	80	84	84	250	250	50
9-Feb	13:25:00	1.60	1.50	360.100	81	84	84	250	250	50
9-Feb	13:35:00	1.60	1.50	366.635	82	84	84	250	250	50
10-Feb	13:45:00	2.40	2.30	373.255	81	84	84	250	253	51
10-Feb	13:55:00	2.40	2.30	381.370	82	85	85	250	251	49
11-Feb	14:45:00	2.50	2.40	389.495	86	85	85	250	250	48
11-Feb	14:55:00	2.40	2.30	397.754	86	86	86	250	253	47
12-Feb	15:05:00	2.50	2.40	405.865	85	86	86	250	258	47
12-Feb	15:15:00	2.60	2.50	414.150	86	87	87	250	251	49
	15:25:00			422.615						
Total	8:40:00			360.673		76.5	76.5			
Average			1.99		73.6	76.5				
Min			1.50		64.0	65.0				
Max			2.50		86.0	87.0				

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Impinger Weight Sheet - Run 2

Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Inlet**
Project #:	**M232604**
Date:	**6/29/2023**
Test Method:	**29**
Weighed/Measured By:	**CST**
Balance ID:	**S10-35**

Scale Calibration Check Date: **6/29/2023**

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

Certified Weight, grams	Result, grams
250	250.0
500	500.1
750	750.1

IMPINGER CONTENTS	FINAL MLS / GRAMS	INITIAL MLS / GRAMS	GAIN MLS / GRAMS
HNO3/H2O2	778.2	750.1	28.1
HNO3/H2O2	770.6	760.0	10.6
Empty	664.1	659.7	4.4
KMnO4/H2SO4	771.8	775.6	-3.8
KMnO4/H2SO4	787.9	784.0	3.9
Silica Gel	850.6	803.8	46.8
	3,772.6 Liquid Final	3,729.4 Liquid Initial	43.2 Liquid Gain
	850.6 Silica Final	803.8 Silica Initial	46.8 Silica Gain

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Client:	PCC Structurals, Inc.	
Facility:	Large Parts Campus Facility - Milwaukie, OR	
Test Location:	BH8901 Inlet	
Project #:	M232604	
Test Method:	0061	
Test Engineer:	JXJ	
Test Technician:	VTV	
	Run 1	**Run 2**
Temp ID:	CM22	CM22
Meter ID:	CM22	CM22
Pitot ID:	001	001
Nozzle Diameter (Inches):	0.178	0.178
Meter Calibration Date:	6/16/2023	6/16/2023
Meter Calibration Factor (Y):	0.999	0.999
Meter Orifice Setting (Delta H):	1.889	1.889
Pitot Tube Coefficient:	0.840	
Probe Length (Feet):	2.0	
Probe Liner Material:	Glass	
Sample Plane:	Horizontal	
Port Length (Inches):	4.00	
Port Size (Diameter, Inches):	4.00	
Port Type:	Nipple	
Duct Shape:	Circular	
Diameter (Feet):	1	
Duct Area (Square Feet):	0.785	
Upstream Diameters:	8.5	
Downstream Diameters:	20.0	
Number of Ports Sampled:	2	
Number of Points per Port:	12	
Minutes per Point:	20.0	
Minutes per Reading:	10.0	
Total Number of Traverse Points:	24	
Test Length (Minutes):	480	
Train Type:	Hot Box	
Source Condition:	Batch Process	
Moisture Balance ID:	S10-35	
# of Runs	2	

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Run 1 - Method 0061

Client: PCC Structurals, Inc. | **Date: 6/28/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 9:05**

Test Location: BH8901 Inlet | **End Time: 18:00**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.94	in. H_2O	Static Pressure	-5.50	in. H_2O
Meter Temperature, Tm:	87.1	°F	Flue Pressure (Ps):	29.65	in. Hg. abs.
Sqrt ΔP:	1.335	in. H_2O			
Stack Temperature, Ts:	80.1	°F			
Meter Volume, Vm:	370.137	ft^3			
Meter Volume, Vmstd:	360.114	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	0.000	wscf	Gas Weight wet, Ms:	28.901	lb/lb mole
Isokinetic Variance:	99.1	%I			
			Gas Velocity, Vs:	76.133	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,588	acfm
Nozzle Diameter:	0.178	in inches	Volumetric Flow:	3,444	dscfm
Barometric Pressure:	30.05	in Hg	Volumetric Flow:	3,475	scfm

Moisture, Bws: 0.009 **Supersaturation Value, Bws: 0.035**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Impinger Exit Temp °F
1-1	9:05:00	1.90	2.10	55.498	66	80	80	62
1-1	9:15:00	1.90	2.10	63.528	72	73	80	57
1-2	9:25:00	2.00	2.20	71.332	71	72	80	57
1-2	9:35:00	2.00	2.20	79.401	76	72	80	56
1-3	9:45:00	1.80	1.90	87.433	69	72	80	56
1-3	9:55:00	1.70	1.90	95.103	70	73	81	56
1-4	10:05:00	1.70	1.90	102.563	70	74	82	55
1-4	10:15:00	1.70	1.80	110.030	77	76	83	54
1-5	10:25:00	1.70	1.90	117.477	72	76	83	55
1-5	10:35:00	1.70	1.90	124.958	71	76	84	54
1-6	10:45:00	1.80	2.00	132.453	77	76	84	54
1-6	10:55:00	1.70	1.80	140.122	77	77	84	55
1-7	11:05:00	1.70	1.80	147.582	76	78	84	56
1-7	11:15:00	1.60	1.70	155.056	76	79	85	55
1-8	11:25:00	1.70	1.80	162.231	76	81	88	56
1-8	11:35:00	1.70	1.80	169.843	77	81	89	56
1-9	11:45:00	1.60	1.70	177.365	77	82	89	56
1-9	11:55:00	1.70	1.80	184.669	77	82	89	55
1-10	12:05:00	1.80	2.00	192.199	78	82	90	55
1-10	12:15:00	2.00	2.20	199.946	79	83	90	56
1-11	12:25:00	1.90	2.00	208.112	78	84	90	56
1-11	12:35:00	1.80	2.00	216.086	79	87	91	57
1-12	12:45:00	1.60	1.70	223.869	79	88	91	58
1-12	12:55:00	1.60	1.70	231.213	80	89	91	58
	13:05:00			238.557				
2-1	13:15:00	2.00	2.20	238.557	80	89	92	53
2-1	13:25:00	1.90	2.10	246.775	80	87	92	53
2-2	13:35:00	1.60	1.70	254.771	81	86	92	53
2-2	13:45:00	1.70	1.90	262.095	81	86	92	53
2-3	13:55:00	1.70	1.90	269.644	82	87	93	53
2-3	14:05:00	1.70	1.90	277.201	83	87	93	53
2-4	15:00:00	1.80	2.00	284.750	86	92	93	60
2-4	15:10:00	1.70	1.90	292.532	85	88	94	52
2-5	15:20:00	1.80	2.00	300.081	85	88	94	51
2-5	15:30:00	1.70	1.80	307.848	85	88	94	51
2-6	15:40:00	1.80	1.90	315.397	89	89	95	51
2-6	15:50:00	1.70	1.80	323.151	85	89	96	51
2-7	16:00:00	1.90	2.00	330.720	85	89	95	51
2-7	16:10:00	1.80	2.00	338.716	85	89	95	51
2-8	16:20:00	2.00	2.20	346.498	86	89	95	51
2-8	16:30:00	2.00	2.20	354.693	86	91	96	51
2-9	16:40:00	1.70	1.80	362.911	86	91	96	50
2-9	16:50:00	1.70	1.80	370.487	87	90	97	50
2-10	17:00:00	2.00	2.20	378.056	88	91	97	49
2-10	17:10:00	2.00	2.20	386.266	90	91	97	49
2-11	17:20:00	1.70	1.80	394.461	91	91	97	49
2-11	17:30:00	1.60	1.70	402.010	87	92	97	49
2-12	17:40:00	1.90	2.10	409.423	86	92	97	50
2-12	17:50:00	2.00	2.20	417.426	86	92	97	50
	18:00:00			425.635				
Total	8:45:00			370.137		84.1	90.1	
Average			1.94		80.1	87.1		
Min			1.70		66.0	72.0		
Max			2.20		91.0	97.0		

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Run 2 - Method 0061

Client: PCC Structurals, Inc. | **Date: 6/29/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 6:40**

Test Location: BH8901 Inlet | **End Time: 15:25**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.36	In. H_2O	Static Pressure	-5.50	in. H_2O
Meter Temperature, Tm:	81.9	°F	Flue Pressure (Ps):	29.57	in. Hg. abs.
Sqrt ΔP:	1.468	In. H_2O			
Stack Temperature, Ts:	75.3	°F			
Meter Volume, Vm:	405.633	ft^3			
Meter Volume, Vmstd:	397.791	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	0.000	wscf	Gas Weight wet, Ms:	28.868	lb/lb mole
Isokinetic Variance:	99.4	%I			
			Gas Velocity, Vs:	83.509	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,935	acfm
Nozzle Diameter:	0.178	in inches	Volumetric Flow:	3,790	dscfm
Barometric Pressure:	29.97	in Hg	Volumetric Flow:	3,836	scfm

Moisture, Bws: 0.012 **Supersaturation Value, Bws: 0.030**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Impinger Exit Temp °F
1-1	6:40:00	2.10	2.30	29.282	65	70	70	64
1-1	6:50:00	2.00	2.20	37.603	67	67	73	58
1-2	7:00:00	2.10	2.30	45.535	65	66	74	60
1-2	7:10:00	2.10	2.30	53.815	65	67	75	60
1-3	7:20:00	2.40	2.60	62.122	66	67	76	61
1-3	7:30:00	1.90	2.10	70.854	66	68	76	61
1-4	7:40:00	2.00	2.20	78.713	67	69	77	62
1-4	7:50:00	2.00	2.20	86.756	67	69	77	62
1-5	8:00:00	2.00	2.20	94.821	68	70	78	62
1-5	8:10:00	2.00	2.20	102.913	68	71	78	62
1-6	8:20:00	1.90	2.10	110.974	67	72	78	61
1-6	8:30:00	1.90	2.10	118.885	68	73	79	62
1-7	8:40:00	2.10	2.30	126.762	68	73	79	62
1-7	8:50:00	2.10	2.30	135.125	69	73	80	62
1-8	9:00:00	2.00	2.20	143.368	69	73	80	62
1-8	9:10:00	2.10	2.30	151.485	70	74	81	63
1-9	9:20:00	2.10	2.30	159.782	71	74	81	63
1-9	9:30:00	2.20	2.40	168.125	72	74	82	64
1-10	9:40:00	2.30	2.50	176.583	72	75	82	64
1-10	9:50:00	2.20	2.40	185.300	72	75	83	62
1-11	10:00:00	2.10	2.30	193.795	74	76	83	61
1-11	10:10:00	2.10	2.30	202.105	74	76	84	62
1-12	10:20:00	2.10	2.30	210.425	74	77	84	61
1-12	10:30:00	2.20	2.40	218.748	75	78	85	61
	10:40:00			227.300				
2-1	10:45:00	2.10	2.30	227.300	77	82	85	64
2-1	10:55:00	2.20	2.40	235.650	77	80	87	62
2-2	11:05:00	2.20	2.40	244.195	77	80	87	61
2-2	11:15:00	2.10	2.30	252.738	77	80	88	61
2-3	11:25:00	2.20	2.40	261.115	77	80	88	60
2-3	11:35:00	2.10	2.30	269.647	78	81	89	61
2-4	11:45:00	2.20	2.40	278.115	78	81	89	61
2-4	11:55:00	2.20	2.40	286.575	79	82	89	62
2-5	12:05:00	2.20	2.40	295.132	80	84	90	63
2-5	12:15:00	2.30	2.50	303.710	80	85	90	61
2-6	12:25:00	2.30	2.50	312.485	81	84	91	59
2-6	12:35:00	2.30	2.50	321.255	81	84	92	59
2-7	12:45:00	2.40	2.60	330.130	81	84	92	59
2-7	12:55:00	2.40	2.60	338.995	81	86	93	60
2-8	13:05:00	2.30	2.50	347.999	82	87	94	61
2-8	13:15:00	2.30	2.50	356.795	82	87	94	61
2-9	13:25:00	2.10	2.30	365.615	83	87	94	61
2-9	13:35:00	2.10	2.30	374.111	83	86	94	60
2-10	13:45:00	2.20	2.40	382.413	83	87	95	58
2-10	13:55:00	2.20	2.40	391.030	85	87	95	57
2-11	14:45:00	2.30	2.50	399.626	86	91	97	57
2-11	14:55:00	2.30	2.50	408.458	89	89	97	56
2-12	15:05:00	2.20	2.40	417.250	87	89	97	52
2-12	15:15:00	2.40	2.60	425.865	89	91	98	56
	15:25:00			434.915				
Total	8:40:00			405.633		78.4	85.4	
Average			2.36		75.3	81.9		
Min			2.10		65.0	66.0		
Max			2.60		89.0	98.0		

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Method 1 and 2 Cyclonic Flow Check Data

Project Number	M232604	**Source Condition:**	Batch Process
Client:	PCC Structurals, Inc.	**Run No.:**	1
Facility:	Large Parts Campus Facility - Milwaukie, OR	**Date:**	6/29/2023
Location:	BH8901 Inlet	**Start Time:**	6:00
Pitot ID:	001	**End Time:**	6:15
Pitot Coefficient:	0.840	**RM Testers:**	JXJ/VTV
Probe Length:	2	**Port Length:**	4.00

Port	Point	DP (in. H_2O)	Sqrt. DP	Temp (^oF)	Yaw (o)		Velocity (V)	Port	Point	DP (in. H_2O)	Sqrt. DP	Temp (^oF)	Yaw (o)		Velocity (V)
A	1	2.00	1.4142	71.0	5.0	5.0	81.70	B	1	2.10	1.4491	72.0	5.0	5.0	83.79
A	2	2.10	1.4491	72.0	3.0	3.0	83.79	B	2	2.20	1.4832	72.0	5.0	5.0	85.77
A	3	2.00	1.4142	72.0	0.0	0.0	81.77	B	3	2.20	1.4832	73.0	5.0	5.0	85.85
A	4	2.00	1.4142	71.0	0.0	0.0	81.70	B	4	2.10	1.4491	73.0	3.0	3.0	83.87
A	5	2.10	1.4491	72.0	0.0	0.0	83.79	B	5	2.00	1.4142	73.0	2.0	2.0	81.85
A	6	1.90	1.3784	72.0	0.0	0.0	79.70	B	6	2.10	1.4491	74.0	2.0	2.0	83.95
A	7	1.90	1.3784	72.0	0.0	0.0	79.70	B	7	2.10	1.4491	74.0	0.0	0.0	83.95
A	8	2.10	1.4491	73.0	2.0	2.0	83.87	B	8	2.00	1.4142	73.0	0.0	0.0	81.85
A	9	1.80	1.3416	73.0	0.0	0.0	77.65	B	9	1.90	1.3784	73.0	0.0	0.0	79.78
A	10	1.80	1.3416	73.0	3.0	3.0	77.65	B	10	2.00	1.4142	73.0	4.0	4.0	81.85
A	11	1.70	1.3038	72.0	4.0	4.0	75.39	B	11	1.90	1.3784	71.0	5.0	5.0	79.63
A	12	1.70	1.3038	72.0	6.0	6.0	75.39	B	12	1.80	1.3416	70.0	5.0	5.0	77.43

Average Yaw Angle 2.5 ^{o}

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Client:	PCC Structurals, Inc.		
Facility:	Large Parts Campus Facility - Milwaukie, OR		
Test Location:	BH8901 Outlet		
Project #:	M232604		
Test Method:	29		
Test Engineer:	MPS		
Test Technician:	JTM1		
	Run 1		**Run 2**
Temp ID:	CM16		CM16
Meter ID:	CM16		CM16
Pitot ID:	403		403
Nozzle Diameter (Inches):	0.160		0.160
Meter Calibration Date:	6/19/2023		6/19/2023
Meter Calibration Factor (Y):	1.008		1.008
Meter Orifice Setting (Delta H):	1.848		1.848
Nozzle Kit ID Number and Material:	GLASS		GLASS
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	3.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	3.00		
Port Size (Diameter, Inches):	3.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	1		
Duct Area (Square Feet):	0.785		
Upstream Diameters:	4.0		
Downstream Diameters:	3.0		
Number of Ports Sampled:	2		
Number of Points per Port:	12		
Minutes per Point:	20.0		
Minutes per Reading:	10.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	480		
Train Type:	Anderson Box		
Source Condition:	Batch Process		
Moisture Balance ID:	S10-35		
# of Runs	2		

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Run 1 - Method 29

Client: PCC Structurals, Inc. | **Date: 6/28/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 9:05**

Test Location: BH8901 Outlet | **End Time: 18:10**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.33	in. H_2O	Static Pressure	2.00	in. H_2O
Meter Temperature, Tm:	91.1	°F	Flue Pressure (Ps):	30.00	in. Hg. abs.
Sqrt ΔP:	1.353	in. H_2O			
Stack Temperature, Ts:	87.0	°F			
Meter Volume, Vm:	309.721	ft^3			
Meter Volume, Vmstd:	299.392	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	3.226	wscf	Gas Weight wet, Ms:	28.883	lb/lb mole
Isokinetic Variance:	100.8	%I			
			Gas Velocity, Vs:	77.231	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,639	acfm
Nozzle Diameter:	0.160	in inches	Volumetric Flow:	3,484	dscfm
Barometric Pressure:	29.85	in Hg	Volumetric Flow:	3,522	scfm

MOISTURE DETERMINATION

Initial Impinger Content:	3423.5	ml	Silica Initial Wt.	785.4	grams
Final Impinger Content:	3443.6	ml	Silica Final Wt.	833.8	grams
Impinger Difference:	20.1	ml	Silica Difference:	48.4	grams

Total Water Gain: 68.5 | Moisture, Bws: 0.011 | **Supersaturation Value, Bws: 0.043**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	9:05:00	1.60	1.20	8.404	72	70	70	250	251	54
1-1	9:15:00	1.60	1.20	14.310	74	75	72	251	248	51
1-2	9:25:00	1.70	1.20	20.150	75	75	72	250	247	51
1-2	9:35:00	1.70	1.20	26.280	77	78	74	250	250	57
1-3	9:45:00	1.70	1.20	32.420	77	78	74	250	250	58
1-3	9:55:00	1.60	1.20	38.520	77	79	76	250	250	60
1-4	10:05:00	1.70	1.20	44.460	79	82	78	250	250	61
1-4	10:15:00	1.80	1.30	50.590	81	82	80	250	250	61
1-5	10:25:00	2.00	1.40	56.880	82	84	81	250	251	60
1-5	10:35:00	2.00	1.40	63.580	80	85	82	250	249	61
1-6	10:45:00	2.00	1.40	70.230	82	86	84	250	250	62
1-6	10:55:00	2.00	1.40	76.920	82	88	86	250	250	62
1-7	11:05:00	2.10	1.50	83.640	83	87	87	250	250	64
1-7	11:15:00	2.10	1.50	90.480	83	89	88	250	250	49
1-8	11:25:00	2.10	1.50	97.390	83	90	89	250	250	47
1-8	11:35:00	2.10	1.50	104.350	84	91	89	250	250	49
1-9	11:45:00	2.00	1.40	111.260	85	90	90	250	251	50
1-9	11:55:00	2.00	1.40	117.990	85	90	90	250	250	50
1-10	12:05:00	1.80	1.30	124.730	85	89	90	250	249	51
1-10	12:15:00	1.80	1.30	131.110	85	91	90	250	249	53
1-11	12:25:00	1.80	1.30	137.530	86	93	90	250	250	54
1-11	12:35:00	1.80	1.30	143.910	86	94	92	250	250	55
1-12	12:45:00	1.80	1.30	150.350	87	95	93	250	248	56
1-12	12:55:00	1.80	1.30	156.790	88	96	93	250	250	56
	13:05:00			163.186						
2-1	13:15:00	1.80	1.30	163.332	87	98	95	250	251	48
2-1	13:25:00	1.80	1.30	169.740	86	98	96	250	249	49
2-2	13:35:00	1.80	1.30	176.320	87	100	95	251	248	47
2-2	13:45:00	1.80	1.30	182.740	87	98	97	250	251	50
2-3	13:55:00	1.80	1.30	189.220	89	100	97	250	249	51
PAUSE	14:05:00			195.669						
2-3	15:00:00	1.80	1.30	195.669	92	101	98	250	251	58
2-4	15:10:00	2.00	1.40	202.160	91	102	98	250	249	59
2-4	15:20:00	2.00	1.50	208.960	91	102	99	250	250	64
2-5	15:30:00	2.00	1.50	215.770	93	104	99	250	250	61
2-5	15:40:00	2.00	1.50	222.640	94	101	98	250	249	59
2-6	15:50:00	2.00	1.50	229.490	93	100	98	250	251	59
2-6	16:00:00	2.00	1.50	236.270	93	103	98	250	250	61
2-7	16:10:00	2.00	1.50	243.080	93	103	98	250	250	62
2-7	16:20:00	2.00	1.50	249.920	95	101	99	250	250	58
2-8	16:30:00	1.80	1.30	256.730	94	99	98	250	250	54
2-8	16:40:00	1.80	1.30	263.150	94	97	97	250	250	54
2-9	16:50:00	1.70	1.20	269.510	95	98	97	250	250	54
2-9	17:00:00	1.70	1.20	275.770	95	97	96	250	250	54
2-10	17:10:00	1.70	1.20	282.030	96	95	95	250	250	56
2-10	17:20:00	1.60	1.20	288.240	97	95	95	250	250	61
2-11	17:30:00	1.60	1.20	294.220	96	94	94	250	250	61
2-11	17:40:00	1.60	1.20	300.280	94	93	93	250	250	55
2-12	17:50:00	1.60	1.20	306.280	94	92	92	250	250	54
2-12	18:00:00	1.60	1.20	312.250	94	93	92	250	250	54
	18:10:00			318.271						
Total	8:55:00			309.721		92.1	90.1			
Average			1.33		87.0	91.1				
Min			1.20		72.0	70.0				
Max			1.50		97.0	104.0				

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Impinger Weight Sheet - Run 1

Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Outlet**
Project #:	**M232604**
Date:	**6/28/2023**
Test Method:	**29**
Weighed/Measured By:	**CST**
Balance ID:	**S10-35**

Scale Calibration Check Date: **6/28/2023**

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

Certified Weight, grams	Result, grams
250	250.0
500	500.1
750	750.1

IMPINGER CONTENTS	FINAL MLS / GRAMS	INITIAL MLS / GRAMS	GAIN MLS / GRAMS
HNO3/H2O2	748.1	769.6	-21.5
HNO3/H2O2	806.0	776.8	29.2
Empty	511.7	506.0	5.7
KMnO4/H2SO4	739.6	732.7	6.9
KMnO4/H2SO4	638.2	638.4	-0.2
Silica Gel	833.8	785.4	48.4

Liquid Final	Liquid Initial	Liquid Gain
3,443.6	3,423.5	20.1

Silica Final	Silica Initial	Silica Gain
833.8	785.4	48.4

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Run 2 - Method 29

Client: PCC Structurals, Inc. | **Date: 6/29/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 6:40**

Test Location: BH8901 Outlet | **End Time: 15:35**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	1.32	In. H_2O	Static Pressure	2.00	in. H_2O
Meter Temperature, Tm:	83.1	°F	Flue Pressure (Ps):	30.12	in. Hg. abs.
Sqrt ΔP:	1.352	In. H_2O			
Stack Temperature, Ts:	81.6	°F			
Meter Volume, Vm:	305.746	ft^3			
Meter Volume, Vmstd:	301.092	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	3.113	wscf	Gas Weight wet, Ms:	28.887	lb/lb mole
Isokinetic Variance:	100.7	%I			
			Gas Velocity, Vs:	76.613	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,610	acfm
Nozzle Diameter:	0.160	in inches	Volumetric Flow:	3,507	dscfm
Barometric Pressure:	29.97	in Hg	Volumetric Flow:	3,543	scfm

MOISTURE DETERMINATION

Initial Impinger Content:	3563.8	ml	Silica Initial Wt.	840.3	grams
Final Impinger Content:	3587.6	ml	Silica Final Wt.	882.6	grams
Impinger Difference:	23.8	ml	Silica Difference:	42.3	grams

Total Water Gain: 66.1 | Moisture, Bws: 0.010 | **Supersaturation Value, Bws: 0.036**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Probe Temp °F	Filter Exit Temp °F	Impinger Exit Temp °F
1-1	6:40:00	1.60	1.10	18.647	70	59	59	250	250	56
1-1	6:50:00	1.60	1.10	24.380	70	62	60	250	251	45
1-2	7:00:00	1.70	1.20	30.220	70	64	61	250	251	50
1-2	7:10:00	1.70	1.20	36.170	71	65	62	250	250	56
1-3	7:20:00	1.70	1.20	42.120	71	68	63	250	251	58
1-3	7:30:00	1.70	1.20	48.150	72	69	65	250	252	60
1-4	7:40:00	1.70	1.20	54.170	72	70	67	250	251	60
1-4	7:50:00	1.80	1.30	60.190	72	70	67	250	250	58
1-5	8:00:00	2.00	1.40	66.350	73	70	67	250	250	55
1-5	8:10:00	2.00	1.40	72.940	73	73	68	250	250	55
1-6	8:20:00	2.00	1.40	79.520	73	73	69	250	250	56
1-6	8:30:00	2.00	1.40	86.030	74	74	70	250	250	58
1-7	8:40:00	2.00	1.40	92.630	75	75	72	250	250	59
1-7	8:50:00	2.00	1.40	99.250	75	76	72	250	250	58
1-8	9:00:00	2.00	1.40	105.770	75	76	73	250	250	59
1-8	9:10:00	2.00	1.40	112.370	76	77	74	250	249	59
1-9	9:20:00	2.00	1.40	118.950	76	78	75	250	249	60
1-9	9:30:00	2.00	1.40	125.620	78	78	76	250	249	61
1-10	9:40:00	1.80	1.30	132.210	78	80	77	250	250	62
1-10	9:50:00	1.80	1.30	138.550	79	80	78	250	251	62
1-11	10:00:00	1.80	1.30	144.810	79	82	80	250	250	63
1-11	10:10:00	1.80	1.30	151.120	80	83	82	250	251	64
1-12	10:20:00	1.80	1.30	157.420	81	85	83	250	250	63
1-12	10:30:00	1.80	1.30	163.820	82	85	84	250	250	53
	10:40:00			170.106						
2-1	10:50:00	1.80	1.30	170.106	82	85	86	250	251	53
2-1	11:00:00	1.80	1.30	176.440	83	86	86	250	250	52
2-2	11:10:00	1.80	1.30	182.770	84	87	87	250	250	53
2-2	11:20:00	1.80	1.30	189.130	85	88	87	250	250	55
2-3	11:30:00	1.80	1.30	195.480	84	89	88	250	250	56
2-3	11:40:00	1.80	1.30	201.860	85	89	88	250	251	57
2-4	11:50:00	2.00	1.50	208.220	85	90	90	250	250	57
2-4	12:00:00	2.00	1.50	214.950	86	90	90	250	250	58
2-5	12:10:00	2.00	1.50	221.670	86	91	91	250	250	59
2-5	12:20:00	2.00	1.50	228.410	87	91	92	250	250	59
2-6	12:30:00	2.00	1.50	235.120	88	92	92	251	252	60
2-6	12:40:00	2.00	1.50	241.890	87	95	94	250	251	61
2-7	12:50:00	2.00	1.50	248.690	89	95	94	250	249	62
2-7	13:00:00	2.00	1.50	255.440	89	96	95	250	250	63
2-8	13:10:00	1.80	1.30	262.190	90	97	96	250	250	58
2-8	13:20:00	1.80	1.30	268.550	89	99	96	250	251	53
2-9	13:30:00	1.70	1.20	275.010	90	99	97	250	250	54
2-9	13:40:00	1.70	1.20	281.330	91	101	98	251	251	54
2-10	13:50:00	1.70	1.20	287.590	90	101	98	250	249	54
PAUSE	14:00:00			293.858						
2-10	14:45:00	1.70	1.20	293.858	93	97	98	250	251	63
2-11	14:55:00	1.60	1.20	300.140	93	102	99	250	250	63
2-11	15:05:00	1.60	1.20	306.220	94	101	99	250	252	64
2-12	15:15:00	1.60	1.20	312.240	96	100	99	250	250	64
2-12	15:25:00	1.60	1.20	318.350	95	102	99	250	250	65
	15:35:00			324.393						
Total	8:00:00			305.746		84.1	82.1			
Average			1.32		81.6	83.1				
Min			1.10		70.0	59.0				
Max			1.50		96.0	102.0				

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Impinger Weight Sheet - Run 2

Client:	**PCC Structurals, Inc.**
Facility:	**Large Parts Campus Facility - Milwaukie, OR**
Test Location:	**BH8901 Outlet**
Project #:	**M232604**
Date:	**6/29/2023**
Test Method:	**29**
Weighed/Measured By:	**CST**
Balance ID:	**S10-35**

Scale Calibration Check Date: **6/29/2023**

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

Certified Weight, grams	Result, grams
250	250.0
500	500.1
750	750.1

IMPINGER CONTENTS	FINAL MLS / GRAMS	INITIAL MLS / GRAMS	GAIN MLS / GRAMS
HNO3/H2O2	727.1	738.6	-11.5
HNO3/H2O2	738.1	713.1	25.0
Empty	658.3	648.6	9.7
KMnO4/H2SO4	755.2	754.6	0.6
KMnO4/H2SO4	708.9	708.9	0.0
Silica Gel	882.6	840.3	42.3
	3,587.6	3,563.8	23.8
	Liquid Final	**Liquid Initial**	**Liquid Gain**
	882.6	840.3	42.3
	Silica Final	**Silica Initial**	**Silica Gain**

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Client:	PCC Structurals, Inc.		
Facility:	Large Parts Campus Facility - Milwaukie, OR		
Test Location:	BH8901 Outlet		
Project #:	M232604		
Test Method:	0061		
Test Engineer:	MPS		
Test Technician:	JTM1		
	Run 1		**Run 2**
Temp ID:	CM17		CM17
Meter ID:	CM17		CM17
Pitot ID:	835		835
Nozzle Diameter (Inches):	0.180		0.180
Meter Calibration Date:	6/20/2023		6/20/2023
Meter Calibration Factor (Y):	0.993		0.993
Meter Orifice Setting (Delta H):	1.896		1.896
Pitot Tube Coefficient:	0.840		
Probe Length (Feet):	3.0		
Probe Liner Material:	Glass		
Sample Plane:	Horizontal		
Port Length (Inches):	3.00		
Port Size (Diameter, Inches):	3.00		
Port Type:	Nipple		
Duct Shape:	Circular		
Diameter (Feet):	1		
Duct Area (Square Feet):	0.785		
Upstream Diameters:	4.0		
Downstream Diameters:	3.0		
Number of Ports Sampled:	2		
Number of Points per Port:	12		
Minutes per Point:	20.0		
Minutes per Reading:	10.0		
Total Number of Traverse Points:	24		
Test Length (Minutes):	480		
Train Type:	Anderson Box		
Source Condition:	Batch Process		
# of Runs	2		

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Run 1 - Method 0061

Client: PCC Structurals, Inc. | **Date: 6/28/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 9:05**

Test Location: BH8901 Outlet | **End Time: 18:10**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.19	in. H_2O	Static Pressure	2.00	in. H_2O
Meter Temperature, Tm:	90.8	°F	Flue Pressure (Ps):	30.00	in. Hg. abs.
Sqrt ΔP:	1.352	in. H_2O	Carbon Dioxide:		%
Stack Temperature, Ts:	85.4	°F	Oxygen:		%
Meter Volume, Vm:	393.467	ft^3	Nitrogen:	#VALUE!	%
Meter Volume, Vmstd:	375.674	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	0.000	wscf	Gas Weight wet, Ms:	28.890	lb/lb mole
Isokinetic Variance:	99.8	%I	Excess Air:	#VALUE!	%
			Gas Velocity, Vs:	77.038	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,630	acfm
Nozzle Diameter:	0.180	in inches	Volumetric Flow:	3,488	dscfm
Barometric Pressure:	29.85	in Hg	Volumetric Flow:	3,524	scfm

Moisture, Bws: 0.010 **Supersaturation Value, Bws: 0.041**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Impinger Exit Temp °F
1-1	9:05:00	1.80	2.10	2.323	72	68	68	62
1-1	9:15:00	1.80	2.10	10.220	75	72	68	59
1-2	9:25:00	1.80	2.10	18.080	76	73	69	61
1-2	9:35:00	1.80	2.10	26.010	79	77	72	62
1-3	9:45:00	1.80	2.10	33.940	77	78	73	63
1-3	9:55:00	1.80	2.10	41.920	77	80	75	63
1-4	10:05:00	1.80	2.10	49.950	77	81	76	62
1-4	10:15:00	1.90	2.30	57.980	80	81	78	61
1-5	10:25:00	2.00	2.40	66.210	80	83	79	61
1-5	10:35:00	2.00	2.40	74.660	80	86	80	62
1-6	10:45:00	2.00	2.40	83.150	81	86	82	63
1-6	10:55:00	2.00	2.40	91.660	81	87	83	63
1-7	11:05:00	2.00	2.40	100.180	81	87	84	62
1-7	11:15:00	2.00	2.40	108.690	81	89	85	55
1-8	11:25:00	2.00	2.40	117.250	81	89	86	54
1-8	11:35:00	2.00	2.40	125.790	81	91	88	54
1-9	11:45:00	1.80	2.20	134.380	82	91	88	55
1-9	11:55:00	1.80	2.20	142.530	83	91	89	55
1-10	12:05:00	1.60	1.90	150.670	83	91	89	56
1-10	12:15:00	1.60	1.90	158.330	83	92	89	57
1-11	12:25:00	1.70	2.00	166.040	84	94	89	57
1-11	12:35:00	1.70	2.00	173.930	84	96	91	57
1-12	12:45:00	1.60	1.90	181.860	84	96	92	58
1-12	12:55:00	1.60	1.90	189.570	85	96	93	59
	13:05:00			197.320				
2-1	13:15:00	1.60	1.90	197.522	85	98	94	55
2-1	13:25:00	1.60	1.90	205.280	86	98	94	56
2-2	13:35:00	1.70	2.00	213.020	86	100	94	57
2-2	13:45:00	1.70	2.10	221.030	87	99	95	58
2-3	13:55:00	1.70	2.10	228.990	87	99	95	59
PAUSE	14:05:00			236.951				
2-3	15:00:00	1.70	2.10	236.951	90	99	96	62
2-4	15:10:00	1.80	2.20	244.930	91	100	97	63
2-4	15:20:00	1.80	2.20	253.150	90	102	97	62
2-5	15:30:00	2.00	2.40	261.350	90	103	98	60
2-5	15:40:00	2.00	2.40	270.020	91	104	98	58
2-6	15:50:00	2.00	2.40	278.740	91	103	97	59
2-6	16:00:00	2.00	2.40	287.420	90	104	97	59
2-7	16:10:00	2.00	2.40	296.110	91	106	99	58
2-7	16:20:00	2.00	2.40	304.830	92	102	99	60
2-8	16:30:00	2.00	2.40	313.490	92	101	98	58
2-8	16:40:00	2.00	2.40	322.120	92	99	97	59
2-9	16:50:00	1.80	2.20	330.770	91	100	96	61
2-9	17:00:00	1.80	2.20	336.960	93	99	96	60
2-10	17:10:00	1.80	2.20	347.160	94	98	96	60
2-10	17:20:00	1.80	2.10	355.260	95	98	95	61
2-11	17:30:00	1.80	2.10	363.440	93	96	95	62
2-11	17:40:00	1.80	2.10	371.580	92	95	94	63
2-12	17:50:00	1.80	2.10	379.720	92	95	93	63
2-12	18:00:00	1.80	2.10	387.850	91	95	93	64
	18:10:00			395.992				
Total	8:55:00			393.467		92.7	88.9	
Average			2.19		85.4	90.8		
Min			1.90		72.0	68.0		
Max			2.40		95.0	106.0		

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Run 2 - Method 0061

Client: PCC Structurals, Inc. | **Date: 6/29/23**

Facility: Large Parts Campus Facility - Milwaukie, OR | **Start Time: 6:40**

Test Location: BH8901 Outlet | **End Time: 15:35**

Source Condition: Batch Process

DRY GAS METER CONDITIONS			STACK CONDITIONS		
ΔH:	2.18	In. H_2O	Static Pressure	2.00	in. H_2O
Meter Temperature, Tm:	82.6	°F	Flue Pressure (Ps):	30.12	in. Hg. abs.
Sqrt ΔP:	1.352	In. H_2O	Carbon Dioxide:		%
Stack Temperature, Ts:	80.6	°F	Oxygen:		%
Meter Volume, Vm:	388.340	ft^3	Nitrogen:	#VALUE!	%
Meter Volume, Vmstd:	377.858	dscf	Gas Weight dry, Md:	29.000	lb/lb mole
Meter Volume, Vwstd:	0.000	wscf	Gas Weight wet, Ms:	28.890	lb/lb mole
Isokinetic Variance:	99.8	%I	Excess Air:	#VALUE!	%
			Gas Velocity, Vs:	76.504	fps
Test Length:	480.00	in mins.	Volumetric Flow:	3,605	acfm
Nozzle Diameter:	0.180	in inches	Volumetric Flow:	3,509	dscfm
Barometric Pressure:	29.97	in Hg	Volumetric Flow:	3,544	scfm

Moisture, Bws: 0.010 **Supersaturation Value, Bws: 0.035**

Port-Point No.	Clock Time	Velocity Head Δp in. H2O	Orifice ΔH in. H2O	Actual Meter Vol. ft^3	Stack Temp °F	Meter Temp Inlet °F	Meter Temp Outlet °F	Impinger Exit Temp °F
1-1	6:40:00	1.80	2.10	1.111	70	60	60	59
1-1	6:50:00	1.80	2.10	8.890	70	62	61	55
1-2	7:00:00	1.80	2.10	16.720	70	65	62	58
1-2	7:10:00	1.80	2.10	24.480	71	66	63	59
1-3	7:20:00	1.80	2.10	32.320	71	68	64	60
1-3	7:30:00	1.80	2.10	40.220	72	70	66	61
1-4	7:40:00	1.80	2.10	48.050	73	71	68	58
1-4	7:50:00	1.80	2.10	55.990	73	72	67	56
1-5	8:00:00	2.00	2.40	63.880	72	70	66	54
1-5	8:10:00	2.00	2.40	72.190	71	72	67	54
1-6	8:20:00	2.00	2.40	80.530	72	73	69	54
1-6	8:30:00	2.00	2.40	88.830	72	74	70	54
1-7	8:40:00	2.00	2.40	97.220	73	74	71	55
1-7	8:50:00	2.00	2.40	105.550	74	75	71	55
1-8	9:00:00	2.00	2.40	113.920	74	76	72	55
1-8	9:10:00	2.00	2.40	122.310	75	77	73	55
1-9	9:20:00	1.80	2.10	130.690	76	76	74	54
1-9	9:30:00	1.80	2.10	138.660	77	77	74	54
1-10	9:40:00	1.70	2.00	146.610	77	79	75	54
1-10	9:50:00	1.70	2.00	154.420	78	80	76	54
1-11	10:00:00	1.60	1.90	162.150	78	81	78	54
1-11	10:10:00	1.60	1.90	169.690	79	82	79	55
1-12	10:20:00	1.60	1.90	177.260	80	83	81	56
1-12	10:30:00	1.60	1.90	184.840	81	83	82	51
	10:40:00			192.376				
2-1	10:50:00	1.60	1.90	192.376	82	83	83	53
2-1	11:00:00	1.60	1.90	199.960	83	85	83	50
2-2	11:10:00	1.70	2.00	207.520	82	85	84	50
2-2	11:20:00	1.70	2.00	215.350	83	87	85	50
2-3	11:30:00	1.70	2.00	223.180	83	88	86	51
2-3	11:40:00	1.70	2.00	231.010	83	89	87	51
2-4	11:50:00	1.80	2.10	238.910	84	91	89	53
2-4	12:00:00	1.80	2.20	247.010	85	91	89	52
2-5	12:10:00	2.00	2.40	255.090	85	92	90	54
2-5	12:20:00	2.00	2.40	263.650	86	92	91	53
2-6	12:30:00	2.00	2.40	272.230	87	93	91	52
2-6	12:40:00	2.00	2.40	280.820	87	94	92	55
2-7	12:50:00	2.00	2.40	289.360	87	96	93	56
2-7	13:00:00	2.00	2.40	297.970	87	99	94	57
2-8	13:10:00	2.00	2.40	306.640	88	100	94	53
2-8	13:20:00	2.00	2.40	315.270	88	101	95	50
2-9	13:30:00	1.80	2.20	323.930	89	100	96	52
2-9	13:40:00	1.80	2.20	332.060	89	102	97	51
2-10	13:50:00	1.80	2.20	340.330	89	102	97	52
PAUSE	14:00:00			348.523				
2-10	14:45:00	1.80	2.20	348.523	91	99	96	61
2-11	14:55:00	1.80	2.20	356.740	92	100	97	57
2-11	15:05:00	1.80	2.20	364.920	93	101	97	56
2-12	15:15:00	1.80	2.20	373.080	94	102	98	57
2-12	15:25:00	1.80	2.20	381.250	94	103	99	59
	15:35:00			389.451				
Total	8:00:00			388.340		84.2	81.1	
Average			2.18		80.6	82.6		
Min			1.90		70.0	60.0		
Max			2.40		94.0	103.0		

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Method 1 and 2 Cyclonic Flow Check Data

Project Number	M232604	**Source Condition:**	Batch Process
Client:	PCC Structurals, Inc.	**Run No.:**	1
Facility:	Large Parts Campus Facility - Milwaukie, OR	**Date:**	6/28/2023
Location:	BH8901 Outlet	**Start Time:**	7:30
Pitot ID:	403	**End Time:**	7:50
Pitot Coefficient:	0.840	**RM Testers:**	MPS/JTM
Probe Length:	3	**Port Length:**	3.00

Port	Point	DP (in. H_2O)	Sqrt. DP	Temp (^oF)	Yaw (o)		Velocity (V)	Port	Point	DP (in. H_2O)	Sqrt. DP	Temp (^oF)	Yaw (o)		Velocity (V)
A	1	1.70	1.3038	69.0	2.0	2.0	75.18	B	1	1.80	1.3416	70.0	5.0	5.0	77.43
A	2	1.80	1.3416	69.0	0.0	0.0	77.36	B	2	1.90	1.3784	70.0	3.0	3.0	79.55
A	3	1.80	1.3416	70.0	3.0	3.0	77.43	B	3	1.80	1.3416	70.0	5.0	5.0	77.43
A	4	1.80	1.3416	70.0	2.0	2.0	77.43	B	4	1.70	1.3038	70.0	6.0	6.0	75.25
A	5	1.70	1.3038	70.0	3.0	3.0	75.25	B	5	1.80	1.3416	70.0	5.0	5.0	77.43
A	6	1.80	1.3416	70.0	0.0	0.0	77.43	B	6	1.70	1.3038	70.0	5.0	5.0	75.25
A	7	1.70	1.3038	69.0	2.0	2.0	75.18	B	7	1.70	1.3038	71.0	3.0	3.0	75.32
A	8	1.70	1.3038	70.0	0.0	0.0	75.25	B	8	1.80	1.3416	71.0	2.0	2.0	77.51
A	9	1.70	1.3038	70.0	3.0	3.0	75.25	B	9	1.80	1.3416	71.0	3.0	3.0	77.51
A	10	1.70	1.3038	70.0	5.0	5.0	75.25	B	10	1.90	1.3784	70.0	5.0	5.0	79.55
A	11	1.70	1.3038	70.0	3.0	3.0	75.25	B	11	1.70	1.3038	70.0	5.0	5.0	75.25
A	12	1.70	1.3038	69.0	2.0	2.0	75.18	B	12	1.70	1.3038	69.0	5.0	5.0	75.18

Average Yaw Angle 3.2 ^{o}

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Appendix E - Plant Operating Data

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BH 8901
Testing Production Data

Lot No.	Run 1 6/28/2023					Run 2 6/29/2023				
	Total Number of Ingots Processed	Total Production Time (min)	Production During Sampling Downtime (min)	Total Lot Weight (lb)	Adjusted Production Weight[(a)] (lb)	Total Number of Ingots Processed	Total Production Time (min)	Production During Sampling Downtime (min)	Total Lot Weight (lb)	Adjusted Production Weight[(a)] (lb)
1	12	107	0	3,697	3,697	54	211	0	8,037	8,037
2	104	160	15	15,479	14,028	30	53	10	4,465	3,623
3	--			--	--	2	15	0	298	298
Total Weight Processed (lb)	**116**			**19,176**	**17,725**	**86**			**12,800**	**11,957**

(a) Adjusted production weight (lb) = (total lot weight [lb]) x (total production time [min] - production during sampling downtime [min]) / (total production time [min])

Time	Differential Pressure (inches w.c.)	
	Primary	HEPA
Run 1 (6/28/2023)		
9:10	0.4	1.0
9:40	0.4	1.0
10:10	0.4	1.0
10:40	0.4	1.0
11:05	0.4	1.0
11:35	0.4	1.0
12:05	0.4	1.0
12:35	0.4	1.0
13:05	0.4	1.0
13:35	0.4	1.0
14:05	0.4	1.0
14:35	0.4	1.0
15:05	0.4	1.0
15:35	0.4	1.0
16:05	0.4	1.0
16:35	0.4	1.0
17:05	0.4	1.0
17:35	0.4	1.0
18:05	0.4	1.2
Run 2 (6/29/2023)		
6:42	0.6	1.0
7:10	0.4	1.0
7:40	0.4	1.0
8:10	0.6	1.0
8:40	0.4	1.0
9:10	0.4	1.0
9:40	0.4	1.0
10:10	0.4	1.0
10:40	0.4	1.0
11:10	0.4	1.0
11:40	0.4	1.0
12:10	0.4	1.0
12:40	0.6	1.0
13:10	0.4	1.0
13:40	0.4	1.0
14:10	0.4	1.2
14:40	0.6	1.0
15:10	0.4	1.0
15:40	0.4	1.0
16:10	0.4	1.0

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Appendix F - Field Data Sheets

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Isokinetic Sampling Cover Sheet

Client:	PCC Structurals Inc.	**Pitot Tube Cp:**	.840
Facility:	Large Parts Campus Milwaukie	**Probe Length (Feet):**	4
Test Location:	BH8901 Inlet	**Probe Liner Material:**	Glass
Project #:	M232604	**Sample Plane:**	~~Hrzl.~~ or Vert.
Test Method(s):	0061	**Port Length (“):**	4
Test Engineer:	JKJ	**Port Diameter (“):**	4
Test Technician:	VTV	**Port Type:**	Nipple
Upstream Diameters:	9.5	**Duct Shape:**	Circ. or Rect.
Downstream Diameters:	20	**Diameter (Feet):**	1ft
# of Ports Sampled:	2	**Length (Feet):**	
# of Points per Port:	12	**Width (Feet):**	
Source Condition:	Normal	**Duct Area (Sq. Feet):**	.785
Diluent Model/SN:	N/A	**Minutes per Point:**	20
Mid Gas ID/concentration:	N/A /%CO_2 %O_2	**Total Traverse Points:**	24
High Gas ID/concentration:	N/A /%CO_2 %O_2	**Test Length (Min.):**	480
Moisture Balance ID:		**Train Type:**	HotBox

	R# 1	R# 2	R#
Meter ID:	CM22	CM22	
Pitot ID:	~~BA~~ 295	295	
Filter ID:	N/A	N/A	
Filter Pre-Weight (g):	N/A	N/A	
Nozzle Diameter (“):	.178	.178	
Meter Cal Factor (Y):	.999	.999	
Meter Orifice Setting (DH):	1.889	1.889	
Nozzle Kit ID:	TN#8	TN#8	
Individual Nozzle ID:	#8	#8	
Pre Pitot Leak Check:	0.000 @ 5 “H_2O	0.000 @ 7 “H_2O	@ “H_2O
Post Pitot Leak Check:	0.000 @ 7 “H_2O	0.000 @ 8 “H_2O	@ “H_2O
Pre Nozzle Leak Check:	0.000 @ 10 “Hg	0.000 @ 10 “Hg	@ “Hg
Post Nozzle Leak Check:	0.000 @ 10 “Hg	0.000 @ 10 “Hg	@ “Hg
Barometric Pressure,“Hg:	30.05	~~29.65~~ 29.97	
Static Pressure, “H_2O:	-5.5	-5.5	
CO_2 %:			
O_2 %:			

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 | Date: 6/28 | Test Number: 1

Client: PCC Structurals Inc | Test Location: 8901 inlet | Operator: JXJ | Test Tech: VTV

Plant: Milwaukie, OR | Test Method: 0061 | Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	9:05	1.90	2.10	55.498	66	80	80	5			62				
1-1	9:15	1.90	2.10	63.528	72	73	80	5			57				
1-2	9:25	2.00	2.20	71.332	71	72	80	7			57				
1-2	9:35	2.00	2.20	79.401	76	72	80	7			56				
1-3	9:45	1.80	1.90	87.033	69	72	80	7			56				
1-3	9:55	1.70	1.90	95.103	70	73	81	8			56				
1-4	10:05	1.7	1.9	102.563	70	74	82	8			55				
1-4	10:15	1.7	1.8	110.030	77	76	83	8			54				
1-5	10:25	1.7	1.9	117.477	72	76	83	8			55				
1-5	10:35	1.7	1.9	124.958	71	74	84	10			54				
1-6	10:45	1.8	2.0	132.453	77	76	84	10			54				
1-6	10:55	1.7	1.8	140.122	77	77	84	10			55				
1-7	11:05	1.7	1.8	147.582	76	78	84	5			56				
1-7	11:15	1.6	1.7	155.056	76	79	85	5			55				
1-8	11:25	1.7	1.8	162.231	76	81	88	5			56				
1-8	11:35	1.7	1.8	169.843	77	81	89	5			56				
1-9	11:45	1.6	1.7	177.365	77	82	89	5			56				
1-9	11:55	1.7	1.8	184.669	77	82	89	5			55				
1-10	12:05	1.8	2.0	192.199	78	82	90	5			55				
1-10	12:15	2.0	2.2	199.946	79	83	90	5			56				
1-11	12:25	1.9	2.0	208.112	78	84	90	5			56				
1-11	12:35	1.8	2.0	216.086	79	87	91	5			57				
1-12	12:45	1.6	1.7	223.869	79	88	91	5			58				
1-12	12:55	1.6	1.7	231.213	80	89	91	5			58				
	13:05			238.557											

Pre: 0.000 @ 15 - 1 vol. added

Post: 0.000 @ 15

9:06- add 150 KOH

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Isokinetic Sampling Field Data Sheet

Project Number: M232604A | Date: 6/28/23 | Test Number: 1

Client: PCC Structurals Inc | Test Location: 8901 Inlet | Operator: JXJ | Test Tech: CRL

Plant: Milwaukie OR | Test Method: ~~M4~~ 0061 | Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	13:15	2.0	2.2	238.557	80	89	92	10			53				
1	13:25	1.9	2.1	246.775	80	87	92	10			53				
2	13:35	1.6	1.7	254.771	81	86	92	10			53				
2	13:45	1.7	1.9	262.095	81	86	92	10			53				
3	13:55	1.7	1.9	269.644	82	87	93	10			53				
3	14:05	1.7	1.9	277.201	83	87	93	10			53				
4	~~15:00~~	1.8	2.0	284.750	86	92	93	10			60				
4	~~15:10~~	1.7	1.9	292.532	~~85~~	88	94	10			52				
5	~~15:20~~	1.80	2.0	300.081	85	88	94	10			51				
5	15:30	1.70	1.8	307.848	85	88	94	10			51				
6	15:40	1.8	1.9	315.397	89	84	95	10			51				
6	15:50	1.7	1.8	323.151	85	89	96	10			51				
7	16:00	1.9	2.0	330.720	85	89	95	10			51				
7	16:10	1.8	2.0	338.716	85	89	95	10			51				
8	16:20	2.0	2.2	346.498	86	89	95	10			51				
8	16:30	2.0	2.2	354.693	86	91	96	10			51				
9	16:40	1.7	1.8	362.911	86	91	96	8			50				
9	16:50	1.7	1.8	370.487	87	90	97	8			50				
10	17:00	2.0	2.2	378.056	88	91	97	8			49				
10	17:10	2.0	2.2	386.266	90	91	97	8			49				
11	17:20	1.7	1.8	394.461	91	91	97	8			49				
11	17:30	1.6	1.7	402.010	87	92	97	8			49				
12	17:40	1.9	2.1	409.423	86	92	97	8			50				
12	17:50	2.0	2.2	417.426	86	92	97	8			50				
	18:00			425.635											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 06/29/2023 Test Number: 2

Client: PCC Structurals Inc Test Location: BH 8901 Inlet Operator: JxJ Test Tech: CIR1

Plant: Milwaukie OR Test Method: 0061 Page Number: 1 of 2

Port-Point #	Time	(ΔP)	1.061 ~~0.934~~ Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= .556 x 10 Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	6:40	2.1	2.3	29.282	65	70	70	5			64				
1	6:50	2.0	2.2	37.603	67	67	73	5			58				
2	~~6~~:00	2.1	2.3	45.535	65	66	74	5			60				
2	7:10	2.1	2.3	53.815	65	67	76	5			60 61				
3	7:20	~~2.4~~	2.6	62.122	66	67	76	5							
3	7:30	1.9	2.1	70.854	66	68	76	5			61				
4	7:40	2.0	2.2	78.713	67	69	77	5			62				
4	7:50	2.0	2.2	86.756	67	69	77	5			62				
5	8:00	2.0	2.2	94.821	68	70	78	5			62				
5	8:10	2.0	2.2	102.913	69	71	76	5			62				
6	8:20	1.9	2.1	110.974	67	72	78	5			61				
6	8:30	1.9	2.1	118.885	68	73	79	5			62				
7	8:40	2.1	2.3	126.762	68	73	79	5			62				
7	8:50	2.1	2.3	135.125	69	73	80	5			62				
8	9:00	2.0	2.2	143.368	69	73	80	5			62				
8	9:10	2.1	2.3	151.485	70	74	81	5			63				
9	9:20	2.1	2.3	159.782	71	74	81	5			63				
9	9:30	2.2	2.4	168.125	72	74	82	5			64				
10	9:40	2.3	2.5	176.583	72	75	82	5			64				
10	9:50	2.2	2.4	185.300	72	75	83	5			62				
11	10:00	2.1	2.3	193.795	74	76	83	5			61				
11	10:10	2.1	2.3	202.105	74	76	84	5			62				
12	10:20	2.1	2.3	210.425	74	77	84	5			61				
12	10:30	2.2	2.4	218.748	75	78	85	5			61				
	10:40		~~2.2~~	227.300											

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Isokinetic Sampling Field Data Sheet

2

Project Number: M232604A Date: 06/29/2023 Test Number:

Client: PCC Structurals Inc Test Location: BH 8901 Inlet Operator: JXJ Test Tech: CJR 2

Plant: Milwaukie OR Test Method: 0061 Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	10:05	2.1	2.3	227.300	77	82	86	5			64				
1	10:55	2.2	2.4	235.650	77	80	87	5			62				
2	11:05	2.2	2.4	244.195	77	80	87	5			61				
2	11:15	2.1	2.3	252.738	77	80	88	5			61				
3	11:25	2.2	2.4	261.115	77	80	88	5			60				
3	11:35	2.1	2.3	269.647	78	81	89	5			61				
4	11:45	2.2	2.4	278.115	78	81	89	5			61				
4	11:55	2.2	2.4	286.575	79	82	89	5			62				
5	12:05	2.2	2.4	295.132	80	84	90	5			63				
5	12:15	2.3	2.5	303.710	80	85	90	5			61				
6	12:25	2.3	2.5	312.485	81	84	91	5			59				
6	12:35	2.3	2.5	321.255	81	84	92	5			59				
7	12:45	2.4	2.6	330.130	81	84	92	5			59				
7	12:55	2.4	2.6	338.995	81	86	93	5			60				
8	13:05	2.3	2.5	347.999	82	87	94	5			61				
8	13:15	2.3	2.5	356.795	82	87	94	5			61				
9	13:25	2.1	2.3	365.615	83	87	94	5			61				
9	13:35	2.1	2.3	374.111	83	86	94	5			60				
10	13:45	2.2	2.4	382.413	83	87	95	5			58				
10	13:55	2.2	2.4	391.030	85	87	95	5			57				
11	14:45	2.3	2.5	399.626	86	91	97	5			57				
11	14:55	2.3	2.5	408.458	89	89	97	5			56				
12	15:05	2.2	2.4	417.250	87	89	97	5			52				
12	15:15	2.4	2.6	425.865	89	91	98	5			56				
	15:25			434.915											

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Isokinetic Sampling Cover Sheet

Client:	PCC Structurals, Inc	**Pitot Tube Cp:**	.840
Facility:	Large Parts Campus Facility	**Probe Length (Feet):**	2
Test Location:	BH8901 Inlet	**Probe Liner Material:**	Glass
Project #:	M232604	**Sample Plane:**	(Hrztl) or Vert.
Test Method(s):	M29	**Port Length (“):**	4
Test Engineer:	JxJ	**Port Diameter (“):**	4
Test Technician:	VTV	**Port Type:**	Nipple
Upstream Diameters:	8.5	**Duct Shape:**	(Circ) or Rect.
Downstream Diameters:	20	**Diameter (Feet):**	1Ft
# of Ports Sampled:	2	**~~Length~~ (Feet):**	
# of Points per Port:	12	**~~Width~~ (Feet):**	
Source Condition:	Normal	**Duct Area (Sq. Feet):**	.785
Diluent Model/SN:	N/A	**Minutes per Point:**	20
Mid Gas ID/concentration:	N/A /%CO_2 %O_2	**Total Traverse Points:**	24
High Gas ID/concentration:	N/A /%CO_2 %O_2	**Test Length (Min.):**	480
Moisture Balance ID:		**Train Type:**	Hot Box

	R# 1	R# 2	R#
Meter ID:	CM36	CM36	
Pitot ID:	296	296	
Filter ID:	N/A	N/A	
Filter Pre-Weight (g):	N/A	N/A	
Nozzle Diameter (“):	.171	.171	
Meter Cal Factor (Y):	1.011	1.011	
Meter Orifice Setting (DH):	1.945	1.945	
Nozzle Kit ID:	TN#8	TN#8	
Individual Nozzle ID:	#8	#8	
Pre Pitot Leak Check:	0.000 @ 7 “H_2O	0.000 @ 8 “H_2O	@ “H_2O
Post Pitot Leak Check:	0.000 @ 8 “H_2O	0.000 @ 9 “H_2O	@ “H_2O
Pre Nozzle Leak Check:	0.000 @ 10 “Hg	0.000 @ 10 “Hg	@ “Hg
Post Nozzle Leak Check:	0.000 @ 10 “Hg	0.000 @ 10 “Hg	@ “Hg
Barometric Pressure,“Hg:	29.05	~~29.05~~ 29.97	
Static Pressure, “H_2O:	-5.5	-5.5	
CO_2 %:			
O_2 %:			

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 6/28/23 Test Number: 1

Client: PCC Structurals Inc. Test Location: 8901 Inlet Operator: JXJ Test Tech: CIR 1

Plant: Milwaukie, OR Test Method: ~~0061~~ M29 Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	9:05	2.8	2.7	47.215	66	70	70	5	250	244	57				
1	9:15	2.7	2.6	55.945	71	72	72	5	250	252	64				
2	9:25	2.8	2.7	64.352	69	73	73	5	250	256	64				
2	9:35	2.7	2.5	73.027	77	74	74	5	250	265	64				
3	9:45	2.7	2.6	81.497	69	75	75	5	250	265	64				
3	9:55	2.8	2.7	90.048	70	76	76	5	250	262	63				
4	10:05	2.8	2.7	98.763	66	77	77	4	250	249	62				
4	10:15	2.7	2.6	107.528	76	77	77	4	250	244	62				
5	10:25	2.8	2.7	116.054	72	78	78	4	250	250	62				
5	10:35	2.8	2.7	124.785	72	78	78	4	250	250	61				
6	10:45	2.7	2.6	133.517	75	78	78	4	250	259	62				
6	10:55	2.7	2.6	142.066	73	79	79	5	250	249	62				
7	11:05	2.8	2.7	150.648	73	80	80	5	250	262	63				
7	11:15	2.8	2.7	159.404	74	80	80	5	250	260	64				
8	11:25	2.7	2.6	168.151	74	81	81	4	250	253	65				
8	11:35	3.0	2.9	176.757	74	81	81	5	250	244	65				
9	11:45	3.1	3.0	185.828	75	83	83	5	250	266	61				
9	11:55	2.7	2.6	195.075	75	83	83	5	250	259	61				
10	12:05	2.8	2.7	203.704	76	84	84	5	250	245	57				
10	12:15	2.9	2.8	212.500	75	84	84	5	250	243	57				
11	12:25	2.9	2.8	221.460	76	84	84	5	250	259	57				
11	12:35	2.8	2.7	230.411	77	84	84	5	250	252	58				
12	12:45	2.5	2.4	239.199	77	83	83	5	250	254	58				
12	12:55	2.5	2.4	247.487	78	83	83	5	250	243	58				
	13:05			255.768											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604A | Date: 6/28/23 | Test Number: 1

Client: PCC Structurals Inc | Test Location: 8901 Inlet | Operator: JXJ | Test Tech: CJR 1

Plant: Milwaukie OR. | Test Method: M29 | Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	13:15	2.6	2.5	255.768	78	82	82	5	250	246	59				
1	13:25	2.6	2.5	264.197	79	82	82	5	250	255	60				
2	13:35	2.7	2.6	272.618	78	82	82	5	250	263	59				
2	13:45	2.7	2.6	281.208	79	82	82	5	250	246	57				
3	13:55	2.7	2.6	289.789	80	83	83	5	250	245	57				
3	14:05	2.6	2.5	298.378	80	83	83	5	250	244	57				
4	15:00	2.7	2.5	306.869	82	81	81	5	250	266	56				
4	15:10	2.7	2.5	315.349	84	82	82	5	250	261	54				
5	15:20	2.6	2.4	323.891	82	83	83	5	250	266	53				
5	15:30	2.7	2.5	332.304	83	84	84	5	250	267	53				
6	15:40	2.6	2.5	340.886	83	84	84	5	250	249	54				
6	15:50	2.5	2.4	349.307	83	84	84	5	250	245	55				
7	16:00	2.6	2.5	357.564	83	85	85	5	250	258	55				
7	16:10	2.6	2.5	366.001	83	86	86	5	250	254	55				
8	16:20	2.7	2.6	374.453	84	86	86	5	251	244	56				
8	16:30	2.7	2.6	383.058	84	86	86	5	250	244	53				
9	16:40	2.8	2.7	391.663	84	86	86	5	250	261	52				
9	16:50	2.8	2.7	400.426	84	87	87	5	250	264	53				
10	17:00	2.8	2.6	409.205	88	87	87	5	250	246	52				
10	17:10	2.7	2.5	417.952	88	87	87	5	250	244	52				
11	17:20	2.7	2.6	426.541	86	88	88	5	250	258	54				
11	17:30	2.7	2.6	435.254	84	88	88	5	250	248	53				
12	17:40	2.8	2.7	443.803	84	88	88	5	250	246	54				
12	17:50	2.8	2.7	452.603	84	88	88	5	250	245	54				
	18:00			461.435											

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IMPINGER WEIGHT SHEET

PLANT: PCL Structural 8901

UNIT NO: Baghouse 8901 Inlet

LOCATION: Inlet

DATE: 6-28-23

TEST NO: #1

METHOD: M29

WEIGHED/MEASURED BY: AJ

Scale ID Number S10-35

Scale Calibration Check Date: 6-28-23

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

250 grams 250.0

500 grams 500.1

750 grams 750.1

	FINAL WEIGHT		INITIAL WEIGHT		IMPINGER		IMPINGER
Circle One:	MLS / GRAMS		MLS / GRAMS		GAIN		CONTENTS
IMPINGER 1	771.0		759.0				HNO3/H202
IMPINGER 2	775.0		763.4				HNO3/H202
IMPINGER 3	668.6		660.4				Empty
IMPINGER 4	760.8		764.6				KMNO4
IMPINGER 5	714.8		714.8				KMNO4
IMPINGER 6	848.5		793.2				SILICA
IMPINGER 7							
IMPINGER 8							

IMPINGERS _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL IMPINGER GAIN)

SILICA _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL SILICA GAIN)

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 | Date: 06/29/2023 | Test Number: 2

Client: PCC Structurals Inc. | Test Location: BH 8901 Inlet | Operator: JXJ | Test Tech: CIR 1

Plant: Milwaukie OR | Test Method: M29 | Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH) (1.061 K)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) V x K	K= 556	x 10	
												Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	6:40	2.5	2.4	61.942	64	65	65	5	250	249	54		85	8.5	
1	6:50	2.5	2.4	70.132	64	66	66	5	250	250	54				70.
2	7:00	2.4	2.3	78.215	64	67	67	5	250	250	63				
2	7:10	2.5	2.4	86.200	64	68	68	5	250	250	57				
3	7:20	2.5	2.4	94.378	65	69	68	5	250	250	57				
3	7:30	2.1	2.0	102.553	65	69	69	5	250	250	57				
4	7:40	1.7	1.6	110.125	66	70	70	5	250	254	57				
4	7:50	1.6	1.5	116.785	66	70	70	5	250	250	57				
5	8:00	1.7	1.6	123.333	67	70	70	5	250	250	57				
5	8:10	~~2.0~~ 1.7	~~2.3~~ 1.6	130.125	66	70	70	5	250	250	57				
6	8:20	~~1.8~~ 1.8	~~2.1~~ 1.7	136.822	66	71	71	5	250	254	57				
6	8:30	1.8	~~2.1~~ 1.7	143.773	67	71	71	5	250	250	57				
7	8:40	~~1.9~~	~~2.3~~ 1.8	150.725	67	71	71	5	250	253	57				
7	8:50	~~1.8~~	~~2.3~~ 1.7	157.888	68	72	72	5	250	250	58				
8	9:00	1.8	1.7	164.830	68	72	72	5	250	250	58				
8	9:10	1.8	1.7	171.782	69	72	72	5	250	250	58				
9	9:20	1.9	1.8	178.733	70	73	73	5	250	250	58				
9	9:30	1.8	1.7	185.882	70	73	73	5	250	250	58				
10	9:40	1.9	1.8	192.845	71	74	74	5	250	249	59				
10	9:50	1.8	1.7	200.115	71	75	75	5	250	250	56				
11	10:00	1.4	1.8	206.975	72	75	75	5	250	251	53				
11	10:10	1.9	1.8	214.135	73	75	75	5	250	250	53				
12	10:20	2.8	1.7	221.290	73	75	75	5	250	251	53				
12	10:30	1.8	1.7	228.255	74	76	76	5	250	256	53				
	10:40			235.225											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 06/29/2023 Test Number: 2

Client: PCC Structurals Inc Test Location: B901 Inlet Operator: JXJ Test Tech: CIR2

Plant: Milwaukie OR Test Method: M29 Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	10:45	1.7	1.6	235.225	74	77	77	5	250	249	58				
1	10:55	1.8	1.7	242.112	75	77	77	5	250	250	54				
2	11:05	2.2	2.0	248.989	75	77	77	5	250	253	54				
2	11:15	2.3	2.2	256.705	75	78	78	5	250	250	51				
3	11:25	2.1	2.0	264.605	76	78	78	5	250	250	51				
3	11:35	2.1	2.0	272.150	76	79	79	5	250	250	51				
4	11:45	2.4	2.3	279.755	76	80	80	5	250	250	51				
4	11:55	2.4	2.3	287.900	77	80	80	5	250	250	52				
5	12:05	2.5	2.4	295.885	78	81	81	5	250	250	50				
5	12:15	2.5	2.4	304.150	78	81	81	5	250	250	49				
6	12:25	2.2	2.0	312.415	79	82	82	5	250	250	48				
6	12:35	2.3	2.2	320.164	79	82	82	5	250	250	49				
7	12:45	2.5	2.4	328.105	79	82	82	5	250	250	49				
7	12:55	2.4	2.3	336.365	79	82	82	5	250	250	49				
8	13:05	2.2	2.1	344.465	80	83	83	5	250	250	49				
8	13:15	2.2	2.1	352.230	80	84	84	5	250	250	50				
9	13:25	1.6	1.50	360.100	81	84	84	5	250	250	50				
9	13:35	1.6	1.5	366.635	82	84	84	5	250	250	50				
10	13:45	2.4	2.3	373.255	81	84	84	5	250	253	51				
10	13:55	2.4	2.3	381.370	82	85	85	5	250	251	49				
11	14:45	2.5	2.4	389.495	86	85	85	5	250	250	48				
11	14:55	2.4	2.3	397.754	86	86	86	5	250	253	47				
12	15:05	2.5	2.4	405.865	85	86	86	5	250	258	47				
12	15:15	2.6	2.5	414.150	86	87	87	5	250	251	49				
	15:25			422.645											

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IMPINGER WEIGHT SHEET

PLANT: PCC STRUCTURALS

Scale ID Number S10-35

UNIT NO: BH 8901

Scale Calibration Check Date: 6-29-23

LOCATION: INLET

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

DATE: 6-29-23

250 grams 250.0

TEST NO: #2

500 grams 500.1

METHOD: 29

750 grams 750.1

WEIGHED/MEASURED BY: BA

	FINAL WEIGHT		INITIAL WEIGHT		IMPINGER		IMPINGER
Circle One:	MLS / GRAMS		MLS / GRAMS		GAIN		CONTENTS
IMPINGER 1	718.2		750.1				HNO_3/H_2O_2
IMPINGER 2	770.6		760.0				HNO_3/H_2O_2
IMPINGER 3	664.1		659.7				EMPTY
IMPINGER 4	771.8		775.6				$KMNO_4$
IMPINGER 5	787.9		784.0				$KMNO_4$
IMPINGER 6	850.6		803.8				SILICA
IMPINGER 7							
IMPINGER 8							

IMPINGERS _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL IMPINGER GAIN)

SILICA _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL SILICA GAIN)

Isokinetic Sampling Cover Sheet

Test Location ~~Client:~~	BH8901 Outlet	**Pitot Tube Cp:**	.84
Client ~~Facility:~~	PCC Structurals	**Probe Length (Feet):**	3.0
Facility ~~Test Location:~~	Large Parts Campus Facility	**Probe Liner Material:**	Glass
Project #:	M232604	**Sample Plane:**	(Hrztl.) or Vert.
Test Method(s):	0061	**Port Length (“):**	3.0
Test Engineer:	MPS	**Port Diameter (“):**	3.0
Test Technician:	JTM1	**Port Type:**	Nipple
Upstream Diameters:	7.5	**Duct Shape:**	(Circ.) or Rect.
Downstream Diameters:	72.0	**Diameter (Feet):**	1.0
# of Ports Sampled:	2	**Length (Feet):**	—
# of Points per Port:	12	**Width (Feet):**	—
Source Condition:	Normal	**Duct Area (Sq. Feet):**	.785
Diluent Model/SN:	—	**Minutes per Point:**	20
Mid Gas ID/concentration:	— /%CO_2 %O_2	**Total Traverse Points:**	24
High Gas ID/concentration:	— /%CO_2 %O_2	**Test Length (Min.):**	480
Moisture Balance ID:		**Train Type:**	Anderson

	R# 1	R# 2	R#
Meter ID:	CM17	CM17	
Pitot ID:	835	835	
Filter ID:	—	—	
Filter Pre-Weight (g):	—	—	
Nozzle Diameter (“):	~~.244~~ .180	~~.244~~ .180	
Meter Cal Factor (Y):	~~1.004~~ 0.993 ee	~~1.004~~ 0.993 ee	
Meter Orifice Setting (DH):	1.896	1.896	
Nozzle Kit ID:	~~Glass~~ Teflon	~~Glass~~ Teflon	
Individual Nozzle ID:			
Pre Pitot Leak Check:	0 @ 5 “H_2O	0 @ 5 “H_2O	@ “H_2O
Post Pitot Leak Check:	0 @ 5 “H_2O	0 @ 5 “H_2O	@ “H_2O
Pre Nozzle Leak Check:	0 @ 15 “Hg	0 @ 15 “Hg	@ “Hg
Post Nozzle Leak Check:	0 @ 10 “Hg	0 @ 10 “Hg	@ “Hg
Barometric Pressure,“Hg:	~~29.85~~ 30.05	29.97	
Static Pressure, “H_2O:	2.0	2.0	
CO_2 %:	—	—	
O_2 %:	—	—	

Comments:

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 | Date: 6-28-23 | Test Number: 1

Client: PCC Structurals | Test Location: BH 8901 Outlet | Operator: MPS | Test Tech: JTM1

Plant: Large Parts Campus Facility | Test Method: 0061 | Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ____ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	9:05	1.8	2.1	2.323	72	68	68	5	—	—	62				
1	915	1.8	2.1	10.22	75	72	68	5	—	—	59				
2	925	1.8	2.1	18.08	76	73	69	5	—	—	61				
2	935	1.8	2.1	26.01	79	77	72	5	—	—	62				
3	945	1.8	2.1	33.94	77	78	73	5	—	—	63				
3	955	1.8	2.1	41,92	77	80	75	5	—	—	63				
4	1005	1.8	2.1	49.95	77	81	76	5	—	—	62				
4	1015	1.9	2.3	57,98	80	81	78	5	—	—	61				
5	1025	2.0	2.4	66.21	80	83	79	5	—	—	61				
5	1035	2.0	2.4	74.66	80	86	80	5	—	—	62				
6	1045	2.0	2.4	83.15	81	86	82	5	—	—	63				
6	1055	2.0	2.4	91.66	81	87	83	5	—	—	63				
7	1105	2.0	2.4	100.18	81	87	84	5	—	—	62				
7	1115	2.0	2.4	108.69	81	89	85	5	—	—	55				
8	1125	2.0	2.4	117.25	81	89	86	5	—	—	54				
8	1135	2.0	2.4	125.79	81	91	88	5	—	—	54				
9	1145	1.8	2.2	134.38	82	91	88	5	—	—	55				
9	1155	1.8	2.2	142.53	83	91	89	5	—	—	55				
10	1205	1.6	1.9	150.67	83	91	89	5	—	—	56				
10	1215	1.6	1.9	158.33	83	92	89	5	—	—	57				
11	1225	1.7	2.0	166.04	84	94	89	5	—	—	57				
11	1235	1.7	2.0	173.93	84	96	91	5	—	—	57				
12	1245	1.6	1.9	181.86	84	96	92	5	—	—	58				
12	1255	1.6	1.9	189.57	85	96	93	5	—	—	59				
	1305			197.320											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 6-28-23 Test Number: 1

Client: PCC Structurals Test Location: BH 8901 Outlet Operator: MPS Test Tech: JTM

Plant: Large Parts Campus Facility Test Method: 0061 Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ____ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	1315	1.6	1.9	197.522	85	98	94	5	250	254	55				
1	1325	1.6	1.9	205.28	86	98	94	5	—	—	56				
2	1335	1.7	2.0	213.02	86	100	94	5	—	—	57				
2	1345	1.7	2.1	221.03	87	99	95	5	—	—	58				
3	1355	1.7	2.1	228.99	87	99	95	5	—	—	59				
Pause 3	1405/1500	1.7	2.1	236.951	90	99	96	5	—	—	62				
4	1510	1.8	2.2	244.93	91	100	97	5	—	—	63				
4	1520	1.8	2.2	253.15	90	102	97	5	—	—	62				
5	1530	2.0	2.4	261.35	90	103	98	5	—	—	60				
5	1540	2.0	2.4	270.02	91	104	98	5	—	—	58				
6	1550	2.0	2.4	278.74	91	103	97	5	—	—	59				
6	1600	2.0	2.4	287.42	90	104	97	5	—	—	59				
7	1610	2.0	2.4	296.11	91	106	95	5	—	—	58				
7	1620	2.0	2.4	304.83	92	102	99	5	—	—	60				
8	1630	2.0	2.4	313.49	92	101	98	5	—	—	58				
8	1640	2.0	2.4	322.12	92	99	97	5	—	—	59				
9	1650	1.8	2.2	330.77	91	100	96	5	—	—	61				
9	1700	1.8	2.2	336.96	93	95	96	5	—	—	60				
10	1710	1.8	2.2	347.16	94	98	96	5	—	—	60				
10	1720	1.8	2.1	355.26	95	98	95	5	—	—	61				
11	1730	1.8	2.1	363.44	93	96	95	5	—	—	62				
11	1740	1.8	2.1	371.58	92	95	94	5	—	—	63				
12	1750	1.8	2.1	379.72	92	95	93	5	—	—	63				
12	1800	1.8	2.1	387.85	91	95	93	5	—	—	64				
				395.792											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 6-29-23 Test Number: 2

Client: PCC Structural Test Location: BH 8901 Outlet Operator: MPS Test Tech: JTM1

Plant: Large Parts Campus Facility Test Method: 0061 Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft^3, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft^3, per point	Theoretical Meter Volume, (V_m) ft^3, total
1-1	640	1.8	2.1	1.111	70	60	60	5	–	–	59				
1	650	1.8	2.1	8.89	70	62	61	5	–	–	55				
2	700	1.8	2.1	16.72	70	65	62	5	–	–	58				
2	710	1.8	2.1	24.48	71	66	63	5	–	–	59				
3	720	1.8	2.1	32.32	71	68	64	5	–	–	60				
3	730	1.8	2.1	40.22	72	70	66	5	–	–	61				
4	740	1.8	2.1	48.05	73	71	68	5	–	–	58				
4	750	1.8	2.1	55.99	73	72	67	5	–	–	56				
5	800	2.0	2.4	63.88	72	70	66	5	–	–	54				
5	810	2.0	2.4	72.19	71	72	67	5	–	–	54				
6	820	2.0	2.4	80.53	72	73	69	5	–	–	54				
6	830	2.0	2.4	88.83	72	74	70	5	–	–	54				
7	840	2.0	2.4	97.22	73	74	71	5	–	–	55				
7	850	2.0	2.4	105.55	74	75	71	5	–	–	55				
8	900	2.0	2.4	113.92	74	76	72	5	–	–	55				
8	910	2.0	2.4	122.31	75	77	73	5	–	–	55				
9	920	1.8	2.1	130.69	76	76	74	5	–	–	54				
9	930	1.8	2.1	138.66	77	77	74	5	–	–	54				
10	940	1.7	2.0	146.61	77	79	75	5	–	–	54				
10	950	1.7	2.0	154.42	78	80	76	5	–	–	54				
11	1000	1.6	1.9	162.15	78	81	78	5	–	–	54				
11	1010	1.6	1.9	169.69	79	82	79	5	–	–	55				
12	1020	1.6	1.9	177.26	80	83	81	5	–	–	56				
12	1030	1.6	1.9	184.84	81	83	82	5	–	–	51				
	1040			192.376											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 6-29-23 Test Number: 2

Client: PCC Structural Test Location: BH8901 Outlet Operator: MPS Test Tech: JTM1

Plant: Large Parts Campus Facility Test Method: 0061 Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ____ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	1050	1.6	1.9	192.376	82	83	83	5	—	—	53				
1	1100	1.6	1.9	199.96	83	85	83	5	—	—	50				
2	1110	1.7	2.0	207.52	82	85	84	5	—	—	50				
2	1120	1.7	2.0	215.35	83	87	85	5	—	—	50				
3	1130	1.7	2.0	223.18	83	88	86	5	—	—	51				
3	1140	1.7	2.0	231.01	83	89	87	5	—	—	51				
4	1150	1.8	2.1	238.91	84	91	89	5	—	—	53				
4	1200	1.8	2.2	247.01	85	91	89	5	—	—	52				
5	1210	2.0	2.4	255.09	85	92	90	5	—	—	54				
5	1220	2.0	2.4	263.165	86	92	91	5	—	—	53				
6	1230	2.0	2.4	272.23	87	93	91	5	—	—	52				
6	1240	2.0	2.4	280.82	87	94	92	5	—	—	55				
7	1250	2.0	2.4	289.36	87	96	93	5	—	—	56				
7	1300	2.0	2.4	297.97	87	99	94	5	—	—	57				
8	1310	2.0	2.4	306.64	88	100	94	5	—	—	53				
8	1320	2.0	2.4	315.27	88	101	95	5	—	—	50				
9	1330	1.8	2.2	323.93	89	100	96	5	—	—	52				
9	1340	1.8	2.2	332.06	89	102	97	5	—	—	51				
10	1350	1.8	2.2	340.33	89	102	97	5	—	—	52				
Probe 10	1400/1405	1.8	2.2	348.523	91	99	96	5	—	—	61				
11	1455	1.8	2.2	356.74	92	100	97	5	—	—	57				
11	1505	1.8	2.2	364.92	93	101	97	5	—	—	56				
12	1515	1.8	2.2	373.08	94	102	98	5	—	—	57				
12	1525	1.8	2.2	381.25	94	103	99	5	—	—	59				
	1535			388.340											

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Isokinetic Sampling Cover Sheet

Client:	PLC Structurals	**Pitot Tube Cp:**	.84
Facility:	Lorain Parts Campus Facility	**Probe Length (Feet):**	3
Test Location:	BH8901 Outlet	**Probe Liner Material:**	Glass
Project #:	M232604	**Sample Plane:**	(Hrztl) or Vert.
Test Method(s):	29	**Port Length (“):**	3.0
Test Engineer:	MPS	**Port Diameter (“):**	3.0
Test Technician:	JTM1	**Port Type:**	Nipple
Upstream Diameters:	7.5	**Duct Shape:**	(Circ.) or Rect.
Downstream Diameters:	72.0	**Diameter (Feet):**	1.0
# of Ports Sampled:	2	**Length (Feet):**	—
# of Points per Port:	12	**Width (Feet):**	—
Source Condition:	Normal	**Duct Area (Sq. Feet):**	.785
Diluent Model/SN:	—	**Minutes per Point:**	20
Mid Gas ID/concentration:	— /%CO_2 %O_2	**Total Traverse Points:**	24
High Gas ID/concentration:	— /%CO_2 %O_2	**Test Length (Min.):**	480
Moisture Balance ID:		**Train Type:**	Anderson

	R# 1	R# 2	R#
Meter ID:	CM16	CM16	
Pitot ID:	403	403	
Filter ID:	—	—	
Filter Pre-Weight (g):	—	—	
Nozzle Diameter (“):	~~.230~~ .160	~~.230~~ .160	
Meter Cal Factor (Y):	1.008	1.008	
Meter Orifice Setting (DH):	1.848	1.848	
Nozzle Kit ID:	Glass	Glass	
Individual Nozzle ID:			
Pre Pitot Leak Check:	0 @ 5 “H_2O	0 @ 5 “H_2O	@ “H_2O
Post Pitot Leak Check:	0 @ 5 “H_2O	0 @ 5 “H_2O	@ “H_2O
Pre Nozzle Leak Check:	0 @ 15 “Hg	0 @ 15 “Hg	@ “Hg
Post Nozzle Leak Check:	0 @ 10 “Hg	0 @ 10 “Hg	@ “Hg
Barometric Pressure,“Hg:	~~29.85~~ 30.05	29.97	
Static Pressure, “H_2O:	2.0	2.0	
CO_2 %:	—	—	
O_2 %:	—	—	

Comments:

Isokinetic Sampling Field Data Sheet

Project Number: M232604 | Date: 6-28-23 | Test Number: 1

Client: PCC Structurals | Test Location: BH8901 Outlet | Operator: MPS | Test Tech: JJMI

Plant: Large Parts Campus Facility | Test Method: 29 | Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	9:05	1.6	1.2	8.404	72	70	70	5	250	251	54				
17	915	1.6	1.2	14.31	74	75	72	5	251	248	51				
23	925	1.7	1.2	20.15	75	75	72	5	250	247	51				
24	935	1.7	1.2	26.28	77	78	74	5	250	250	57				
35	945	1.7	1.2	32.42	77	78	74	5	250	250	58				
36	955	1.6	1.2	38.52	77	79	76	5	250	250	60				
47	1005	1.7	1.2	44.46	79	82	78	5	250	250	61				
48	1015	1.8	1.3	50.59	81	82	80	5	250	250	61				
5	1025	2.0	1.4	56.88	82	84	81	5	250	251	60				
5	1035	2.0	1.4	63.58	80	85	82	5	250	249	61				
6	1045	2.0	1.4	70.23	82	86	84	5	250	250	62				
6	1055	2.0	1.4	76.92	82	88	86	5	250	250	62				
7	1105	2.1	1.5	83.64	83	87	87	5	250	250	64				
7	1115	2.1	1.5	90.48	83	89	88	5	250	250	49				
8	1125	2.1	1.5	97.39	83	90	89	5	250	250	47				
8	1135	2.1	1.5	104.35	84	91	89	5	250	250	49				
9	1145	~~2.0~~ 2.1	1.4	111.26	85	90	90	5	250	251	50				
9	1155	~~2.0~~ 2.1	1.4	117.99	85	90	90	5	250	250	50				
10	1205	1.8	1.3	124.73	85	89	90	5	250	249	51				
10	1215	1.8	1.3	131.11	85	91	90	5	250	249	53				
11	1225	1.8	1.3	137.53	86	93	90	5	250	250	54				
11	1235	1.8	1.3	143.91	86	94	92	5	250	250	55				
12	1245	1.8	1.3	150.35	87	95	93	5	250	248	56				
12	1255	1.8	1.3	156.79	88	96	93	5	250	250	56				
	1305			163.332											

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 Date: 6-28-23 Test Number: 1

Client: PCC Structurals Test Location: BH 8901 Operator: MPS Test Tech: JTM

Plant: Large Parts Campus Facility Test Method: ~~00~~ 29 Page Number: 2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional)			
													K=	x ___	
												Square Root, ΔP	Meter Rate, Cubic Feet/ Min.	Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	1315	1.8	1.3	163.332	87	98	95	5	250	251	48				
1	1325	1.8	1.3	169.74	86	98	96	5	250	249	49				
2	1335	1.8	1.3	176.32	87	100	95	5	251	248	47				
2	1345	1.8	1.3	182.74	87	98	97	5	250	251	50				
3	1355	1.8	1.3	189.22	89	100	97	5	250	249	51				
Pitot 3	1405/1400	1.8	1.3	195.689	92	101	98	5	250	251	58				
4	1510	2.0	1.4	202.16	91	102	98	5	250	249	59				
4	1520	2.0	1.5	208.96	91	102	99	5	250	250	64				
5	1530	2.0	1.5	215.77	93	104	99	5	250	250	61				
5	1540	2.0	1.5	222.64	94	101	98	5	250	249	59				
6	1550	2.0	1.5	229.49	93	100	98	5	250	251	59				
6	1600	2.0	1.5	236.27	93	103	98	5	250	250	61				
7	1610	2.0	1.5	243.08	93	103	98	5	250	250	62				
7	1620	2.0	1.5	249.92	95	101	99	5	250	250	58				
8	1630	1.8	1.3	256.73	94	99	98	5	250	250	54				
8	1640	1.8	1.3	263.15	94	97	97	5	250	250	54				
9	1650	1.7	1.2	269.51	95	98	97	5	250	250	54				
9	1700	1.7	1.2	275.77	95	97	96	5	250	250	54				
10	1710	1.7	1.2	282.03	96	95	95	5	250	250	56				
10	1720	1.6	1.2	288.24	97	95	95	5	250	250	61				
11	1730	1.6	1.2	294.22	96	94	94	5	250	250	61				
11	1740	1.6	1.2	300.28	94	93	93	5	250	250	55				
12	1750	1.6	1.2	306.28	94	92	92	5	250	250	54				
12	1800	1.6	1.2	312.25	94	93	92	5	250	250	54				
				318.271											

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IMPINGER WEIGHT SHEET

PLANT: PCL STRUCTURAL

UNIT NO: BAGHOUSE 8901

LOCATION: OUTLET

DATE: 6-28-23

TEST NO: #1

METHOD: M29

WEIGHED/MEASURED BY: BT

Scale ID Number S10-35

Scale Calibration Check Date: 6-28-23

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

250 grams 250.0

500 grams 500.1

750 grams 750.1

	FINAL WEIGHT		INITIAL WEIGHT		IMPINGER		IMPINGER
Circle One:	MLS / GRAMS		MLS / GRAMS		GAIN		CONTENTS
IMPINGER 1	748.1		769.6				HNO_3/H_2O_2
IMPINGER 2	806.0		776.8				HNO_3/H_2O_2
IMPINGER 3	511.7		506.0				EMPTY
IMPINGER 4	739.6		732.7				$KMnO_4$
IMPINGER 5	638.2		658.4				$KMnO_4$
IMPINGER 6	833.8		785.4				SILICA
IMPINGER 7							
IMPINGER 8							

IMPINGERS _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL IMPINGER GAIN)

SILICA _____ (FINAL TOTAL) _____ (INITIAL TOTAL) _____ (TOTAL SILICA GAIN)

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Isokinetic Sampling Field Data Sheet

Project Number: M232604 | Date: 6-29-23 | Test Number: 2

Client: PCC Structurals | Test Location: BH8901 Outlet | Operator: MPS | Test Tech: JTM

Plant: Large Parts Campus Facility | Test Method: 29 | Page Number: 1 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
1-1	640	1.6	1.1	18.647	70	59	59	5	250	250	56				
1	650	1.6	1.1	24.38	70	62	60	5	250	251	45				
2	700	1.7	1.2	30.22	70	64	61	5	250	251	50				
2	710	1.7	1.2	36.17	71	65	62	5	250	250	56				
3	720	1.7	1.2	42.12	71	68	63	5	250	251	58				
3	730	1.7	1.2	48.15	72	69	65	5	250	252	60				
4	740	1.7	1.2	54.17	72	70	67	5	250	251	60				
4	750	1.8	1.3	60.19	72	70	67	5	250	250	58				
5	800	2.0	1.4	66.35	73	70	67	5	250	250	55				
5	810	2.0	1.4	72.94	73	73	68	5	250	250	55				
6	820	2.0	1.4	79.52	73	73	69	5	250	250	56				
6	830	2.0	1.4	86.03	74	74	70	5	250	250	58				
7	840	2.0	1.4	92.63	75	75	72	5	250	250	59				
7	850	2.0	1.4	99.25	75	76	72	5	250	250	58				
8	900	2.0	1.4	105.77	75	76	73	5	250	250	59				
8	910	2.0	1.4	112.37	76	77	74	5	250	249	59				
9	920	2.0	1.4	118.95	76	78	75	5	250	249	60				
9	930	2.0	1.4	125.62	78	78	76	5	250	249	61				
10	940	1.8	1.3	132.21	78	80	77	5	250	250	62				
10	950	1.8	1.3	138.55	79	80	78	5	250	250	62				
11	1000	1.8	1.3	144.81	79	82	80	5	250	250	63				
11	1010	1.8	1.3	151.12	80	83	82	5	250	251	64				
12	1020	1.8	1.3	157.42	81	85	83	5	250	250	63				
12	1030	1.8	1.3	163.82	82	85	84	5	250	250	53				
	1040			170.106											

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Isokinetic Sampling Field Data Sheet

Project Number:	M232604	Date:	6-29-23	Test Number:	2
Client:	PCC Structural	Test Location:	BH 8901 Outlet	Operator:	MPS Test Tech: JTM
Plant:	Large Parts Campus Facility	Test Method:	29	Page Number:	2 of 2

Port-Point #	Time	(ΔP)	Orifice Setting (ΔH)	Meter Volume (V_m) ft³, Actual	Stack Temp, °F	Meter Temp Inlet, °F	Meter Temp Outlet, °F	Pump Vacuum, "Hg	Probe Temp. °F	Filter Temp. °F	Impinger Outlet Well Temp. °F	K-Calcs (Optional) Square Root, ΔP	K= Meter Rate, Cubic Feet/ Min.	x ___ Theoretical Meter Volume, (V_m) ft³, per point	Theoretical Meter Volume, (V_m) ft³, total
2-1	1050	1.8	1.3	170.106	82	85	86	5	250	251	53				
1	1100	1.8	1.3	176.44	83	86	86	5	250	250	52				
2	1110	1.8	1.3	182.77	84	87	87	5	250	250	53				
2	1120	1.8	1.3	189.13	85	88	87	5	250	250	55				
3	1130	1.8	1.3	195.48	84	89	88	5	250	250	56				
3	1140	1.8	1.3	201.86	85	89	88	5	250	251	57				
4	1150	2.0	1.5	208.22	85	90	90	5	250	250	57				
4	1200	2.0	1.5	214.95	86	90	90	5	250	250	58				
5	1210	2.0	1.5	221.67	86	91	91	5	250	250	59				
5	1220	2.0	1.5	228.41	87	91	92	5	250	250	59				
6	1230	2.0	1.5	235.12	88	92	92	5	251	252	60				
6	1240	2.0	1.5	241.89	87	95	94	5	250	251	61				
7	1250	2.0	1.5	248.69	89	95	94	5	250	249	62				
7	1300	2.0	1.5	255.44	89	96	95	5	250	250	63				
8	1310	1.8	1.3	262.19	90	97	96	5	250	250	58				
8	1320	1.8	1.3	268.55	89	99	96	5	250	251	53				
9	1330	1.7	1.2	275.01	90	99	97	5	250	250	54				
9	1340	1.7	1.2	281.33	91	101	98	5	251	251	54				
10	1350	1.7	1.2	287.59	90	101	98	5	250	249	54				
Purge 10	1400/1445	1.7	1.2	293.858	93	97	98	5	250	251	63				
11	1455	1.6	1.2	300.14	93	102	99	5	250	250	63				
11	1505	1.6	1.2	306.22	94	101	99	5	250	252	64				
12	1515	1.6	1.2	312.24	96	100	99	5	250	250	64				
12	1525	1.6	1.2	318.35	95	102	99	5	250	250	65				
	1535			305.393											

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IMPINGER WEIGHT SHEET

PLANT: PCC STRUCTURALS

Scale ID Number SLO-35

UNIT NO: BH 8901

Scale Calibration Check Date: 6-29-23

LOCATION: OUTLET

Scale Calibration Check (see QS-6.05C for procedure)
must be within ± 0.5g of certified mass

DATE: 6-29-23

250 grams 250.0

TEST NO: #2

500 grams 500.1

METHOD: 29

750 grams 750.1

WEIGHED/MEASURED BY: [illegible]

	FINAL WEIGHT		INITIAL WEIGHT		IMPINGER		IMPINGER
Circle One:	MLS / GRAMS		MLS / GRAMS		GAIN		CONTENTS
IMPINGER 1	727.1		738.6				HNO_3/H_2O_2
IMPINGER 2	738.1		713.1				HNO_3/H_2O_2
IMPINGER 3	658.3		648.6				EMPTY
IMPINGER 4	755.2		754.6				KMNO4
IMPINGER 5	708.9		708.9				KMNO4
IMPINGER 6	882.6		840.3				SILICA
IMPINGER 7							
IMPINGER 8							

IMPINGERS _____ FINAL TOTAL _____ INITIAL TOTAL _____ TOTAL IMPINGER GAIN

SILICA _____ FINAL TOTAL _____ INITIAL TOTAL _____ TOTAL SILICA GAIN

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Appendix G - Calibration and Response Time Data

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Procedures for Isokentic Calibration

Nozzles

The nozzles are measured according to Method 5, Section 10.1

Dry Gas Meters

The test meters are calibrated according to Method 5, Section 10.3 and 16.1. and “Procedures for Calibrating and Using Dry Gas Volume Meters as Calibration Standards” by P.R. Westlin and R.T. Shigehara, March 10, 1978.

Analytical Balance

The accuracy of the analytical balance is checked with Class S, Stainless Steel Type 303 weights manufactured by F. Hopken and Son, Jersey City, New Jersey.

Temperature Sensing Devices

The potentiometer and thermocouples are calibrated utilizing a NIST traceable millivolt source.

Pitot Tubes

The “S” type pitot tubes utilized during this test program are manufactured according to the specification described and illustrated in the *Code of Federal Regulations*, Title 40, Part 60, Appendix A, Methods 1 and 2. The pitot tubes comply with the alignment specifications in Method 2, Section 10.1; and the pitot tube assemblies are in compliance with specifications in the same section.

These pitot tubes will have a wind tunnel calibrated CP calibrated as referenced to a standard type pitot.

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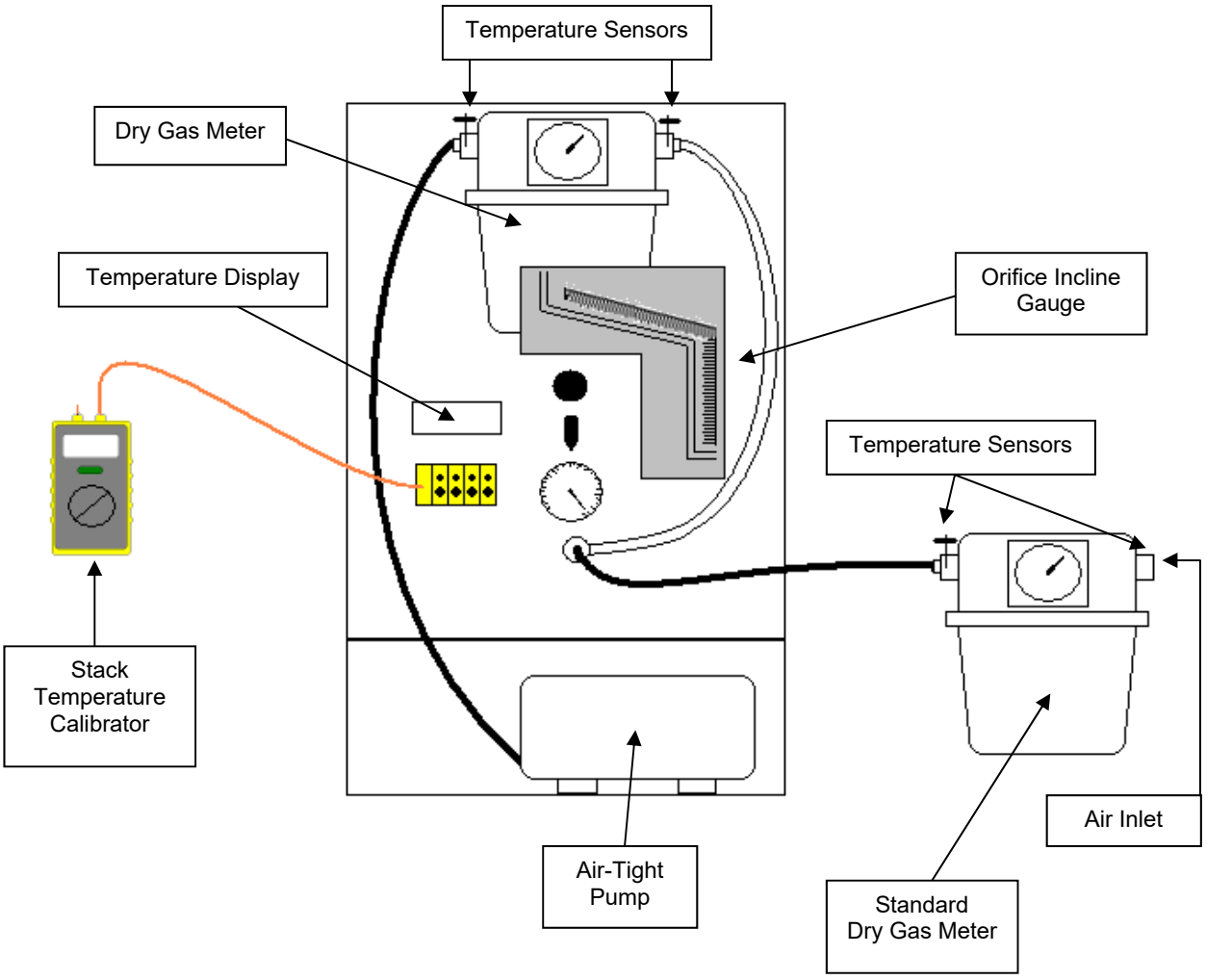
Dry Gas Meter/Control Module Calibration Diagram



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Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM22	Date:	June 16, 2023
Standard Meter No.	366118	Calibrated By:	MJD
Standard Meter (Y)	1.00880	Barometric Pressure:	29.21

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F^o tr	Dry Gas Meter Inlet Temp. F^o tdi	Dry Gas Meter Outlet Temp. F^o tdo	Dry Gas Meter Avg. Temp. F^o td	Time Min	Time Sec	Y	Chg (H)
Final			5.514	31.140	68	79	80					
Initial			0.362	25.781	68	76	77					
Difference	1	0.20	5.152	5.359	68	78	79	78	21	23	0.988	1.913
Final			11.274	37.089	68	80	80					
Initial			5.645	31.271	68	79	80					
Difference	2	0.50	5.629	5.818	68	80	80	80	14	30	0.997	1.836
Final			17.226	43.119	68	78	80					
Initial			11.516	37.339	68	80	80					
Difference	3	0.70	5.710	5.780	68	79	80	80	12	30	1.017	1.858
Final			23.075	49.246	68	80	80					
Initial			17.629	43.634	68	79	80					
Difference	4	0.90	5.446	5.612	68	80	80	80	10	33	0.998	1.869
Final			28.741	55.039	68	80	80					
Initial			23.265	49.429	68	80	80					
Difference	5	1.20	5.476	5.610	68	80	80	80	9	23	1.004	1.949
Final			98.789	24.175	68	74	76					
Initial			93.638	18.882	68	74	75					
Difference	6	2.00	5.151	5.293	68	74	76	75	6	44	0.989	1.909
								Average			**0.999**	**1.889**

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Stack Temperature Sensor Calibration			
Temperature ID :	CM22	Name :	MJD
Ambient Temperature, °F :	71.4	Date :	6/16/2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 18, 2022
Serial # :	T-285668	Expiration Date:	May 18, 2023

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	-1	0.2
250	249	0.1
600	599	0.1
1200	1203	0.2

$$\frac{(\text{Ref. Temp., }^{o}\text{F} + 460) - (\text{Test Therm. Temp., }^{o}\text{F} + 460)}{\text{Ref. Temp., }^{o}\text{F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	*CM22*	*Date:*	*July 14, 2023*
Standard Meter No.	*18654530*	*Calibrated By:*	*JVC*
Standard Meter (Y)	*0.99520*	*Barometric Pressure:*	*29.13*

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F^o tr	Dry Gas Meter Inlet Temp. F^o tdi	Dry Gas Meter Outlet Temp. F^o tdo	Dry Gas Meter Avg. Temp. F^o td	Time Min	Time Sec	Y	Chg (H)
Final			*55.743*	*99.904*	*79*	*89*	*92*					
Initial			*49.969*	*94.031*	*78*	*86*	*88*					
Difference	*1*	*0.20*	*5.774*	*5.873*	*79*	*88*	*90*	*89*	*23*	*54*	*0.997*	*1.999*
Final			*63.794*	*8.138*	*79*	*89*	*93*					
Initial			*55.840*	*0.005*	*79*	*91*	*93*					
Difference	*2*	*0.50*	*7.954*	*8.133*	*79*	*90*	*93*	*92*	*20*	*13*	*0.995*	*1.879*
Final			*71.770*	*16.316*	*80*	*88*	*91*					
Initial			*63.928*	*8.272*	*79*	*92*	*93*					
Difference	*3*	*0.70*	*7.842*	*8.044*	*80*	*90*	*92*	*91*	*17*	*2*	*0.989*	*1.926*
Final			*80.199*	*24.988*	*81*	*91*	*92*					
Initial			*71.971*	*16.528*	*80*	*91*	*92*					
Difference	*4*	*0.90*	*8.228*	*8.460*	*81*	*91*	*92*	*92*	*15*	*42*	*0.985*	*1.917*
Final			*22.136*	*68.042*	*77*	*87*	*86*					
Initial			*14.621*	*60.331*	*77*	*84*	*85*					
Difference	*5*	*1.20*	*7.515*	*7.711*	*77*	*86*	*86*	*86*	*12*	*23*	*0.982*	*1.902*
Final			*49.832*	*93.892*	*78*	*80*	*86*					
Initial			*40.212*	*84.134*	*77*	*81*	*82*					
Difference	*6*	*2.00*	*9.620*	*9.758*	*78*	*81*	*84*	*82*	*12*	*32*	*0.985*	*1.997*

Average	***0.989***	***1.937***

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Temperature ID :	*CM22*	*Name :*	*JVC*
Ambient Temperature, °F :	*80*	*Date :*	*July 15, 2023*

Temperature Calibrator			
Model # :	*CL23A*	*Certification Date:*	*May 2, 2023*
Serial # :	*T-285688*	*Expiration Date:*	*May 1, 2024*

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	***Test Thermometer Temperature (°F)***	***Temperature Difference %***
0	*2*	0.4
250	*253*	0.4
600	*598*	0.2
1200	*1196*	0.2

$$\frac{(\text{Ref. Temp., }^{o}\text{F} + 460) - (\text{Test Therm. Temp., }^{o}\text{F} + 460)}{\text{Ref. Temp., }^{o}\text{F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	*CM36*	*Date:*	*June 16, 2023*
Standard Meter No.		*Calibrated By:*	*FB*
Standard Meter (Y)	*1.00440*	*Barometric Pressure:*	*29.25*

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			*52.799*	*47.135*	*67*	*70*	*70*					
Initial			*47.569*	*41.889*	*67*	*69*	*69*					
Difference	*1*	*0.20*	*5.230*	*5.246*	*67*	*70*	*70*	*70*	*21*	*53*	*1.006*	*1.983*
Final			*59.071*	*53.399*	*67*	*71*	*71*					
Initial			*53.432*	*47.769*	*67*	*70*	*70*					
Difference	*2*	*0.50*	*5.639*	*5.630*	*67*	*71*	*71*	*71*	*15*	*0*	*1.011*	*1.999*
Final			*64.376*	*58.696*	*68*	*72*	*72*					
Initial			*59.389*	*53.703*	*67*	*71*	*71*					
Difference	*3*	*0.70*	*4.987*	*4.993*	*68*	*72*	*72*	*72*	*11*	*0*	*1.009*	*1.925*
Final			*78.735*	*73.040*	*68*	*72*	*72*					
Initial			*73.153*	*67.461*	*68*	*72*	*72*					
Difference	*4*	*0.90*	*5.582*	*5.579*	*68*	*72*	*72*	*72*	*10*	*48*	*1.010*	*1.906*
Final			*85.091*	*79.355*	*68*	*72*	*72*					
Initial			*78.921*	*73.222*	*68*	*72*	*72*					
Difference	*5*	*1.20*	*6.170*	*6.133*	*68*	*72*	*72*	*72*	*10*	*13*	*1.015*	*1.861*
Final			*47.344*	*41.762*	*69*	*67*	*67*					
Initial			*42.042*	*36.567*	*68*	*67*	*67*					
Difference	*6*	*2.00*	*5.302*	*5.195*	*69*	*67*	*67*	*67*	*7*	*0*	*1.017*	*1.995*

Average	***1.011***	***1.945***

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Stack Temperature Sensor Calibration			
Temperature ID :	CM36	Name :	DEJ
Ambient Temperature, °F :	71.7	Date :	6/16/2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 18, 2022
Serial # :	T-285668	Expiration Date:	May 18, 2023

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	-1	-0.1
250	249	0.1
600	598	0.2
1200	1201	0.1

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM36	Date:	July 25, 2023
Standard Meter No.	18654530	Calibrated By:	FB
Standard Meter (Y)	0.99520	Barometric Pressure:	29.39

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F^o tr	Dry Gas Meter Inlet Temp. F^o tdi	Dry Gas Meter Outlet Temp. F^o tdo	Dry Gas Meter Avg. Temp. F^o td	Time Min	Time Sec	Y	Chg (H)
Final			47.073	62.404	80	76	76					
Initial			41.417	56.825	79	76	76					
Difference	1	0.20	5.656	5.579	80	76	76	76	22	31	1.002	1.884
Final			53.665	68.335	81	76	76					
Initial			47.146	61.838	81	76	76					
Difference	2	0.50	6.519	6.497	81	76	76	76	15	46	0.988	1.748
Final			60.325	74.927	82	77	77					
Initial			53.746	68.525	82	77	77					
Difference	3	0.70	6.579	6.402	82	77	77	77	14	11	1.012	1.948
Final			67.255	81.385	83	77	77					
Initial			61.172	75.432	83	77	77					
Difference	4	0.90	6.083	5.953	83	77	77	77	11	39	1.003	1.984
Final			73.350	87.197	84	77	77					
Initial			67.348	81.388	84	77	77					
Difference	5	1.20	6.002	5.809	84	77	77	77	9	29	1.012	1.807
Final			41.327	56.842	79	76	76					
Initial			34.802	50.528	77	76	76					
Difference	6	2.00	6.525	6.314	78	76	76	76	8	29	1.020	1.998
								Average			**1.006**	**1.895**

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Stack Temperature Sensor Calibration			
Temperature ID :	CM36	Name :	FB
Ambient Temperature, ^{o}F :	80.4	Date :	July 25, 2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	November 19, 2022
Serial # :	T-314718	Expiration Date:	November 19, 2023

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (^{o}F)	Test Thermometer Temperature (^{o}F)	Temperature Difference %
0	0	0.0
250	249	0.1
600	598	0.2
1200	1200	0.0

$$\frac{(\text{Ref. Temp., }^{o}\text{F} + 460) - (\text{Test Therm. Temp., }^{o}\text{F} + 460)}{\text{Ref. Temp., }^{o}\text{F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	*CM17*	*Date:*	*June 20, 2023*
Standard Meter No.	*16541852*	*Calibrated By:*	*FB*
Standard Meter (Y)	*1.00440*	*Barometric Pressure:*	*29.35*

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			*90.319*	*83.464*	*83*	*83*	*81*					
Initial			*85.390*	*78.475*	*83*	*83*	*80*					
Difference	*1*	*0.20*	*4.929*	*4.989*	*83*	*83*	*81*	*82*	*20*	*22*	*0.990*	*1.999*
Final			*123.683*	*115.655*	*84*	*84*	*82*					
Initial			*117.443*	*109.304*	*83*	*83*	*81*					
Difference	*2*	*0.50*	*6.240*	*6.351*	*84*	*84*	*82*	*83*	*15*	*39*	*0.984*	*1.842*
Final			*96.746*	*89.982*	*85*	*85*	*82*					
Initial			*90.527*	*83.664*	*83*	*83*	*81*					
Difference	*3*	*0.70*	*6.219*	*6.318*	*84*	*84*	*82*	*83*	*13*	*13*	*0.985*	*1.855*
Final			*141.222*	*133.508*	*87*	*87*	*84*					
Initial			*135.984*	*128.259*	*86*	*86*	*84*					
Difference	*4*	*0.90*	*5.238*	*5.249*	*87*	*87*	*84*	*85*	*10*	*7*	*0.998*	*1.979*
Final			*147.120*	*139.420*	*88*	*88*	*85*					
Initial			*141.477*	*133.762*	*87*	*87*	*85*					
Difference	*5*	*1.20*	*5.643*	*5.658*	*88*	*88*	*85*	*86*	*8*	*56*	*0.996*	*1.776*
Final			*112.286*	*103.930*	*83*	*83*	*77*					
Initial			*106.512*	*98.227*	*81*	*81*	*75*					
Difference	*6*	*2.00*	*5.774*	*5.703*	*82*	*82*	*76*	*79*	*7*	*24*	*1.006*	*1.926*
								Average			***0.993***	***1.896***

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Stack Temperature Sensor Calibration			
Temperature ID :	CM17	Name :	FB
Ambient Temperature, °F :	79.2	Date :	June 21, 2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 2, 2023
Serial # :	T-285668	Expiration Date:	May 1, 2024

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	0	0.0
250	250	0.0
600	599	0.1
1200	1201	0.1

$$\frac{(\text{Ref. Temp., }^{o}\text{F} + 460) - (\text{Test Therm. Temp., }^{o}\text{F} + 460)}{\text{Ref. Temp., }^{o}\text{F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	CM 17	Date:	July 18, 2023
Standard Meter No.	16541852	Calibrated By:	BJE
Standard Meter (Y)	1.00440	Barometric Pressure:	29.29

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F^o tr	Dry Gas Meter Inlet Temp. F^o tdi	Dry Gas Meter Outlet Temp. F^o tdo	Dry Gas Meter Avg. Temp. F^o td	Time Min	Time Sec	Y	Chg (H)
Final			27.234	64.436	78	84	83					
Initial			21.041	58.113	77	84	82					
Difference	1	0.20	6.193	6.323	78	84	83	83	23	33	0.994	1.658
Final			34.671	72.012	78	86	84					
Initial			27.408	64.602	78	83	83					
Difference	2	0.50	7.263	7.410	78	85	84	84	18	3	0.994	1.771
Final			46.788	84.356	78	88	85					
Initial			34.822	72.166	78	85	84					
Difference	3	0.70	11.966	12.190	78	87	85	86	25	0	0.998	1.748
Final			57.331	95.114	78	89	85					
Initial			47.153	84.724	78	86	85					
Difference	4	0.90	10.178	10.390	78	88	85	86	18	41	0.997	1.732
Final			67.475	105.391	79	91	85					
Initial			57.590	95.378	78	87	85					
Difference	5	1.20	9.885	10.013	79	89	85	87	15	37	1.004	1.712
Final			20.895	57.957	77	89	82					
Initial			10.750	47.734	77	82	81					
Difference	6	2.00	10.145	10.223	77	86	82	84	12	30	1.004	1.737
								Average			**0.998**	**1.726**

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Stack Temperature Sensor Calibration			
Temperature ID :	CM17	Name :	JVC
Ambient Temperature, °F :	81.5	Date :	July 18, 2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 2, 2023
Serial # :	T-285668	Expiration Date:	May 1, 2024

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	0	0.0
250	249	0.1
600	598	0.2
1200	1200	0.0

$$\frac{(\text{Ref. Temp., }^{o}\text{F} + 460) - (\text{Test Therm. Temp., }^{o}\text{F} + 460)}{\text{Ref. Temp., }^{o}\text{F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	*CM16*	*Date:*	*June 19, 2023*
Standard Meter No.	*366118*	*Calibrated By:*	*FB*
Standard Meter (Y)	*1.00880*	*Barometric Pressure:*	*29.15*

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			*91.915*	*60.228*	*73*	*79*	*77*					
Initial			*86.246*	*54.505*	*72*	*77*	*76*					
Difference	*1*	*0.20*	*5.669*	*5.723*	*73*	*78*	*77*	*77*	*21*	*43*	*1.008*	*1.663*
Final			*98.492*	*66.823*	*73*	*81*	*79*					
Initial			*92.030*	*60.342*	*72*	*79*	*77*					
Difference	*2*	*0.50*	*6.462*	*6.481*	*73*	*80*	*78*	*79*	*17*	*10*	*1.017*	*1.993*
Final			*114.492*	*83.202*	*74*	*84*	*82*					
Initial			*108.940*	*77.509*	*73*	*82*	*80*					
Difference	*3*	*0.70*	*5.552*	*5.693*	*74*	*83*	*81*	*82*	*12*	*29*	*0.998*	*1.996*
Final			*130.815*	*99.713*	*74*	*84*	*82*					
Initial			*124.710*	*93.514*	*73*	*83*	*82*					
Difference	*4*	*0.90*	*6.105*	*6.199*	*74*	*84*	*82*	*83*	*11*	*18*	*1.008*	*1.736*
Final			*36.612*	*105.330*	*74*	*85*	*82*					
Initial			*31.006*	*99.617*	*74*	*84*	*82*					
Difference	*5*	*1.20*	*5.606*	*5.713*	*74*	*85*	*82*	*83*	*9*	*3*	*1.004*	*1.763*
Final			*78.406*	*46.608*	*72*	*76*	*74*					
Initial			*73.326*	*41.560*	*72*	*75*	*74*					
Difference	*6*	*2.00*	*5.080*	*5.048*	*72*	*76*	*74*	*75*	*6*	*38*	*1.015*	*1.938*
										Average	***1.008***	***1.848***

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Stack Temperature Sensor Calibration			
Temperature ID :	CM16	Name :	FB
Ambient Temperature, °F :	76.9	Date :	6/19/2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 18, 2022
Serial # :	T-285668	Expiration Date:	May 18, 2023

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	1	0.1
250	251	0.1
600	600	0.0
1200	1202	0.2

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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Dry Gas Meter Calibration Data

Dry Gas Meter No.	*CM16*	*Date:*	*July 12, 2023*
Standard Meter No.	*16541852*	*Calibrated By:*	*FB*
Standard Meter (Y)	*1.00440*	*Barometric Pressure:*	*29.23*

Run Number		Orifice Setting in H_2O Chg (H)	Standard Meter Gas Volume vr	Dry Gas Meter Gas Volume vd	Standard Meter Temp. F° tr	Dry Gas Meter Inlet Temp. F° tdi	Dry Gas Meter Outlet Temp. F° tdo	Dry Gas Meter Avg. Temp. F° td	Time Min	Time Sec	Y	Chg (H)
Final			*58.898*	*101.825*	*75*	*80*	*78*					
Initial			*52.944*	*95.887*	*75*	*77*	*76*					
Difference	*1*	*0.20*	*5.954*	*5.938*	*75*	*79*	*77*	*78*	*23*	*43*	*1.012*	*1.825*
Final			*66.595*	*109.766*	*75*	*82*	*80*					
Initial			*60.034*	*103.156*	*75*	*80*	*78*					
Difference	*2*	*0.50*	*6.561*	*6.610*	*75*	*81*	*79*	*80*	*16*	*30*	*1.005*	*1.811*
Final			*73.335*	*116.585*	*74*	*83*	*81*					
Initial			*66.778*	*109.956*	*74*	*82*	*80*					
Difference	*3*	*0.70*	*6.557*	*6.629*	*74*	*83*	*81*	*82*	*14*	*39*	*1.006*	*1.988*
Final			*81.260*	*124.711*	*74*	*84*	*81*					
Initial			*74.450*	*117.822*	*74*	*83*	*80*					
Difference	*4*	*0.90*	*6.810*	*6.889*	*74*	*84*	*81*	*82*	*13*	*22*	*1.005*	*1.971*
Final			*86.757*	*130.678*	*74*	*84*	*81*					
Initial			*81.000*	*124.929*	*74*	*83*	*81*					
Difference	*5*	*1.20*	*5.757*	*5.749*	*74*	*84*	*81*	*82*	*9*	*43*	*1.018*	*1.942*
Final			*52.877*	*95.694*	*74*	*77*	*76*					
Initial			*47.997*	*90.889*	*74*	*76*	*75*					
Difference	*6*	*2.00*	*4.880*	*4.805*	*74*	*77*	*76*	*76*	*6*	*38*	*1.019*	*2.124*
								Average			***1.011***	***1.943***

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Stack Temperature Sensor Calibration			
Temperature ID :	CM16	Name :	FB
Ambient Temperature, °F :	76.4	Date :	July 12, 2023

Temperature Calibrator			
Model # :	CL23A	Certification Date:	May 2, 2023
Serial # :	T-285668	Expiration Date:	May 1, 2024

Primary Standards Directly Traceable National Institute of Standards and Technology (NIST)

Reference Source Temperature (°F)	Test Thermometer Temperature (°F)	Temperature Difference %
0	1	0.2
250	251	0.1
600	600	0.0
1200	1202	0.1

$$\frac{(\text{Ref. Temp., °F} + 460) - (\text{Test Therm. Temp., °F} + 460)}{\text{Ref. Temp., °F} + 460} * 100 <= 1.5\ \%$$

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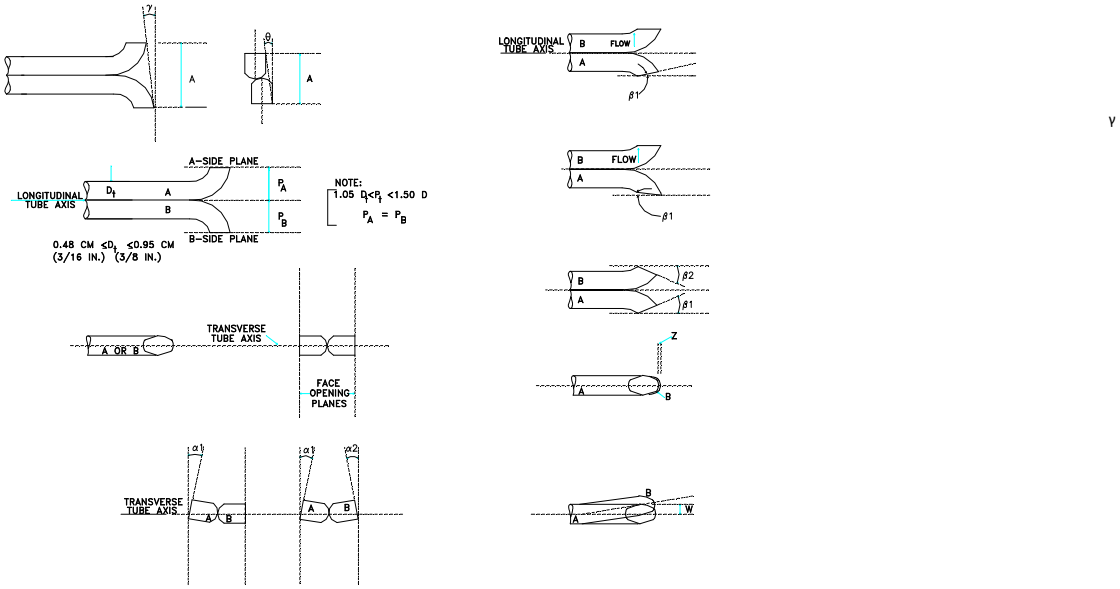
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 403 Date: 3/10/2023 Inspectors Name: DPP

Type of Probe: (circle one)

M2	M5	M17
	X	

Probe Length: 3 ft.



γ

Pitot tube assembly level? X yes _____ no

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

a_1 = 1 ° (≤10°) a_2 = 1 ° (≤10°) z = A sin γ = **0.016** (in.); (≤0.125 in.)

b_1 = 2 ° (≤5°) b_2 = 0.5 ° (≤5°) w = A sin θ = **0.01632** (in.); (≤0.03125 in.)

γ = 1 ° θ = 1 ° A = 0.935 (in.) P_A = 0.468 (in.), P_B = 0.468 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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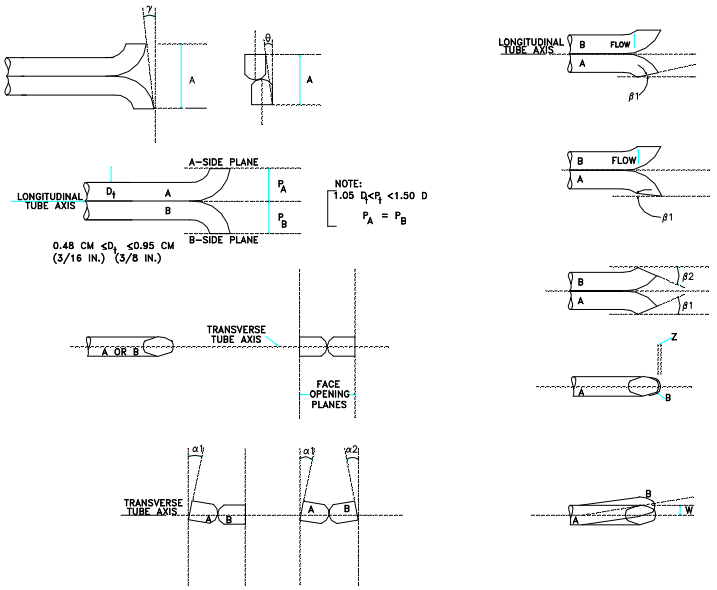
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 403 Date: 7/14/2023 Inspectors Name: RGO

Type of Probe: (circle one)

M2	M5	M17
	X	

Probe Length: 3 ft.



γ

Pitot tube assembly level? X yes _____ no

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

a_1 = 2 ° (≤10°) a_2 = 1 ° (≤10°) z = A sin γ = **0.016** (in.); (≤0.125 in.)

b_1 = 3 ° (≤5°) b_2 = 1 ° (≤5°) w = A sin θ = **0.01632** (in.); (≤0.03125 in.)

γ = 1 ° θ = 1 ° A = 0.935 (in.) P_A = 0.468 (in.), P_B = 0.468 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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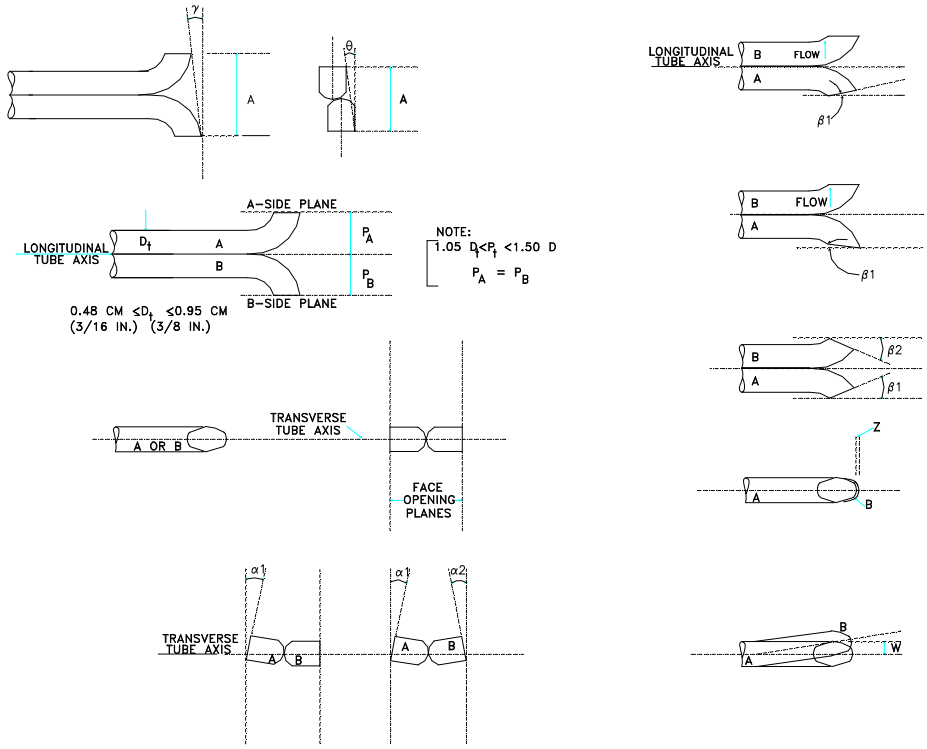
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 835 Date: 6/14/2023 Inspectors Name: VJR

Type of Probe: (mark one)

M2	M5	M17
	x	

Probe Length: 3 ft.



Pitot tube assembly level? x yes _____ no

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

a_1 = 1 ° (≤10°) a_2 = 0.5 ° (≤10°) z = A sin γ = **0.008** (in.); (≤0.125 in.)

b_1 = 1.5 ° (≤5°) b_2 = 0.5 ° (≤5°) w = A sin θ = **0.00000** (in.); (≤0.03125 in.)

γ = 0.5 ° θ = 0 ° A = 0.970 (in.) P_A = 0.485 (in.), P_B = 0.485 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **x** no

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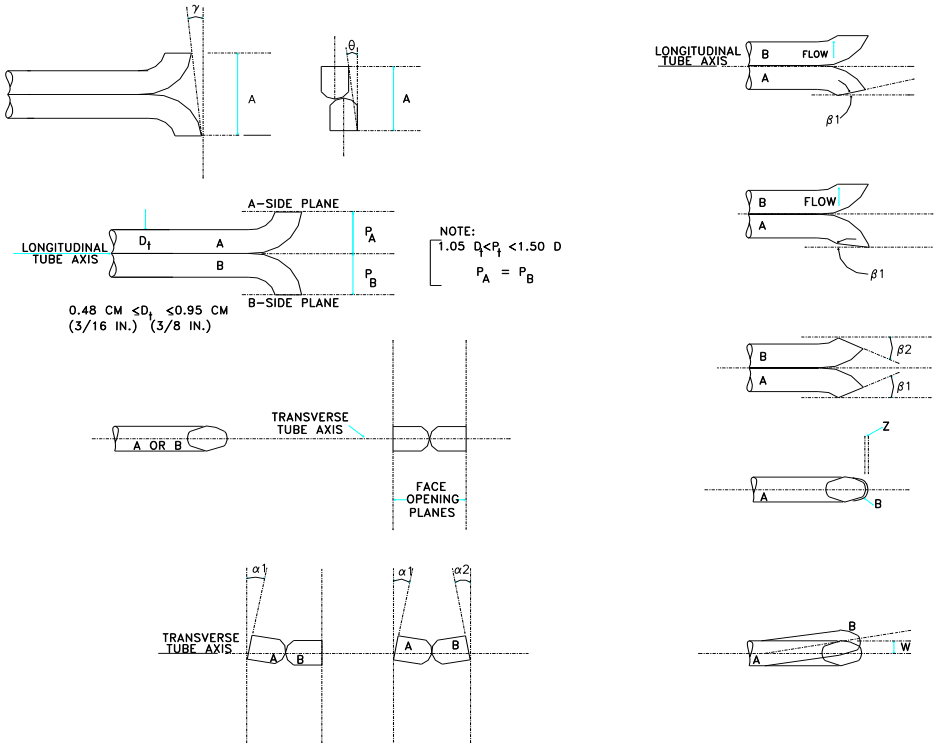
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 835 Date: 7/20/2023 Inspectors Name: JAM

Type of Probe: (mark one)

M2	M5	M17
	X	

Probe Length: 3 ft.



Pitot tube assembly level? X yes _____ no

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

a_1 = 2 ° (≤10°) a_2 = 0.5 ° (≤10°) z = A sin γ = **0.000** (in.); (≤0.125 in.)

b_1 = 2 ° (≤5°) b_2 = 0.5 ° (≤5°) w = A sin θ = **0.00000** (in.); (≤0.03125 in.)

γ = 0 ° θ = 0 ° A = 0.979 (in.) P_A = 0.490 (in.), P_B = 0.490 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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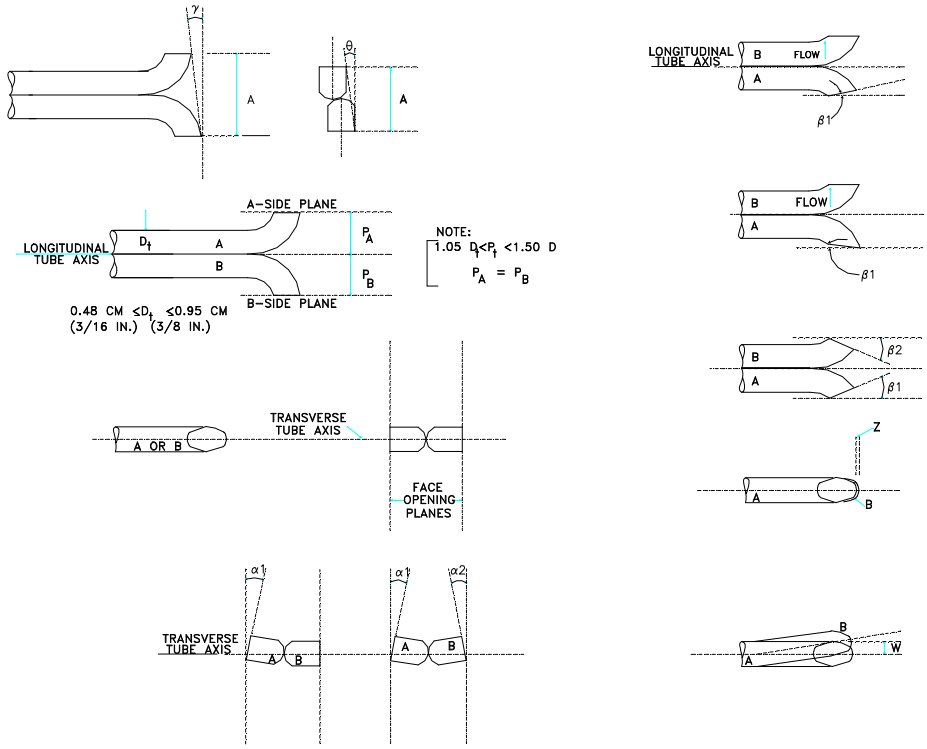
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 295 Date: 6/14/2023 Inspectors Name: JLH

Type of Probe: (mark one)

M2	M5	M17
	X	

Probe Length: 2 ft.



Pitot tube assembly level? X yes _____ no

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

a_1 = 0 ° (≤10°) a_2 = 0 ° (≤10°) z = A sin γ = **0.000** (in.); (≤0.125 in.)

b_1 = 0 ° (≤5°) b_2 = 0 ° (≤5°) w = A sin θ = **0.00000** (in.); (≤0.03125 in.)

γ = 0 ° θ = 0 ° A = 0.955 (in.) P_A = 0.487 (in.), P_B = 0.487 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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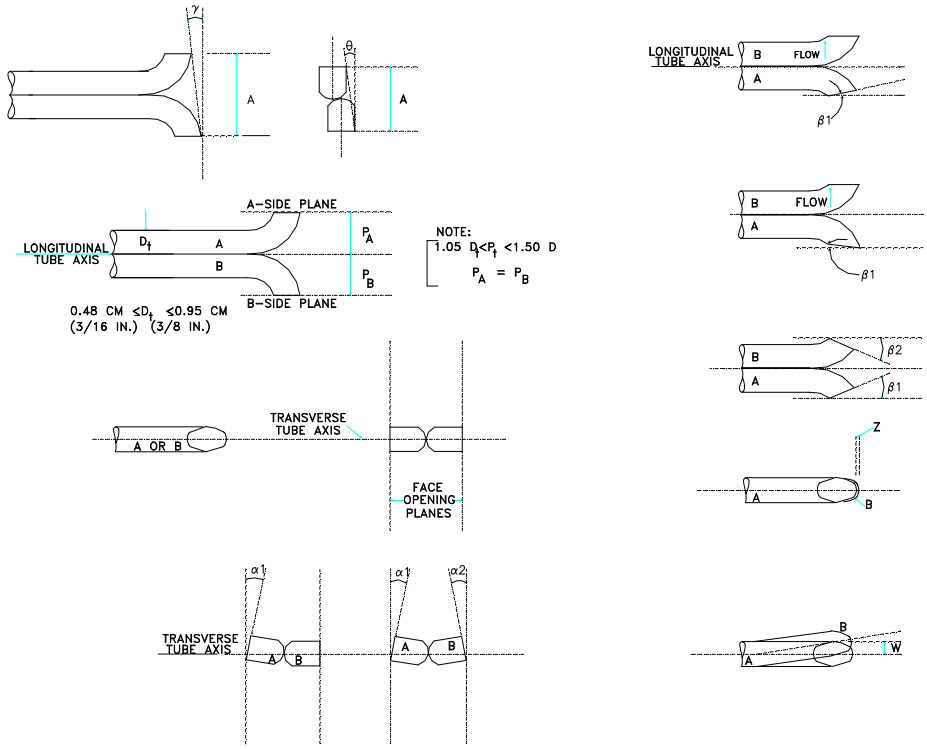
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 295 Date: 7/7/2023 Inspectors Name: VJR

Type of Probe: (mark one)

M2	M5	M17
	X	

Probe Length: 2 ft.



Pitot tube assembly level? X yes _____ no

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

a_1 = 1 ° (≤10°) a_2 = 1 ° (≤10°) z = A sin γ = **0.017** (in.); (≤0.125 in.)

b_1 = 0 ° (≤5°) b_2 = 2 ° (≤5°) w = A sin θ = **0.02513** (in.); (≤0.03125 in.)

γ = 1 ° θ = 1.5 ° A = 0.960 (in.) P_A = 0.480 (in.), P_B = 0.480 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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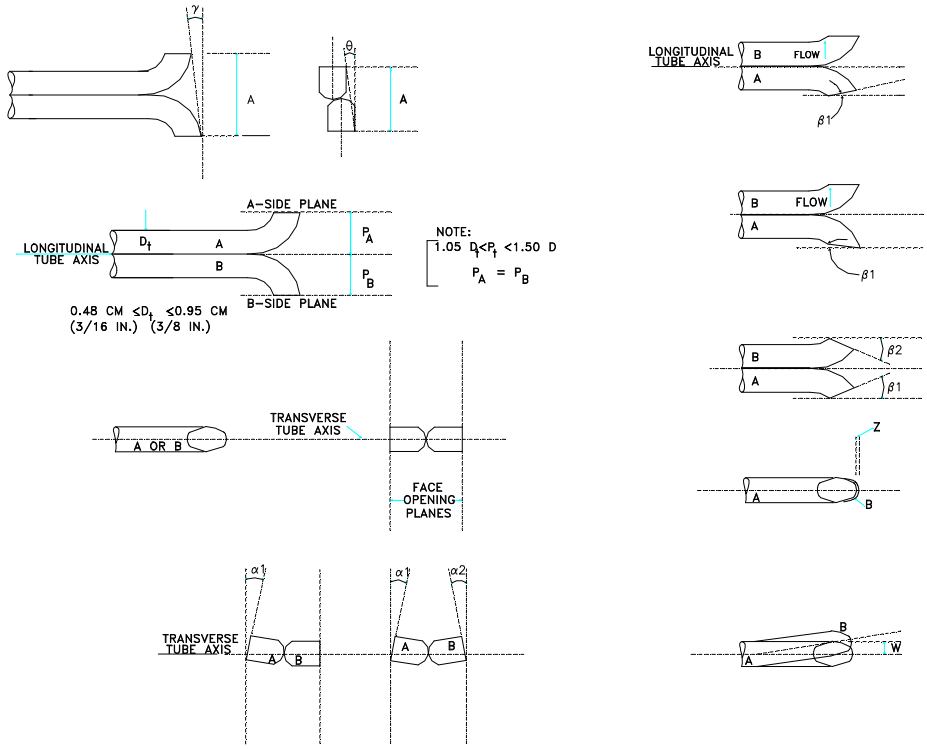
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 296 Date: 6/14/2023 Inspectors Name: JLH

Type of Probe: (mark one)

M2	M5	M17
	X	

Probe Length: 2 ft.



Pitot tube assembly level? X yes _____ no

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

a_1 = 0 ° (≤10°) a_2 = 0 ° (≤10°) z = A sin γ = **0.000** (in.); (≤0.125 in.)

b_1 = 0 ° (≤5°) b_2 = 0 ° (≤5°) w = A sin θ = **0.00000** (in.); (≤0.03125 in.)

γ = 0 ° θ = 0 ° A = 0.925 (in.) P_A = 0.487 (in.), P_B = 0.487 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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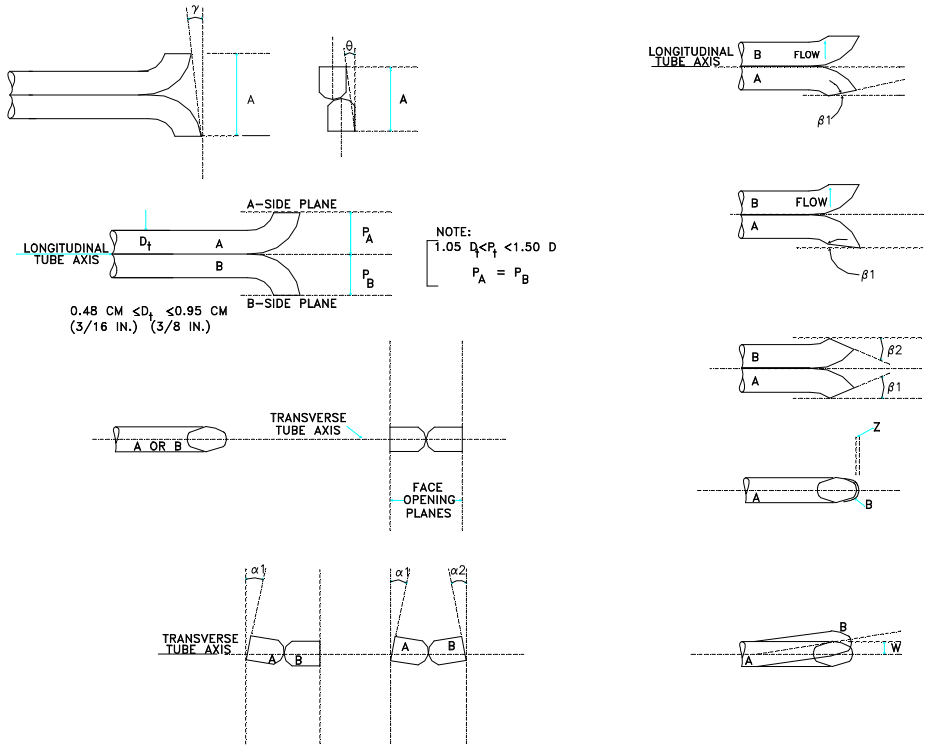
S TYPE PITOT TUBE INSPECTION WORKSHEET

Pitot Tube No: 296 Date: 7/7/2023 Inspectors Name: VJR

Type of Probe: (mark one)

M2	M5	M17
	X	

Probe Length: 2 ft.



Pitot tube assembly level? X yes _____ no

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

a_1 = 1 ° (≤10°) a_2 = 1 ° (≤10°) z = A sin γ = **0.016** (in.); (≤0.125 in.)

b_1 = 0 ° (≤5°) b_2 = 1 ° (≤5°) w = A sin θ = **0.01614** (in.); (≤0.03125 in.)

γ = 1 ° θ = 1 ° A = 0.925 (in.) P_A = 0.463 (in.), P_B = 0.463 (in.), D_t = 0.375 (in.)

Calibration required? _____ yes **X** no

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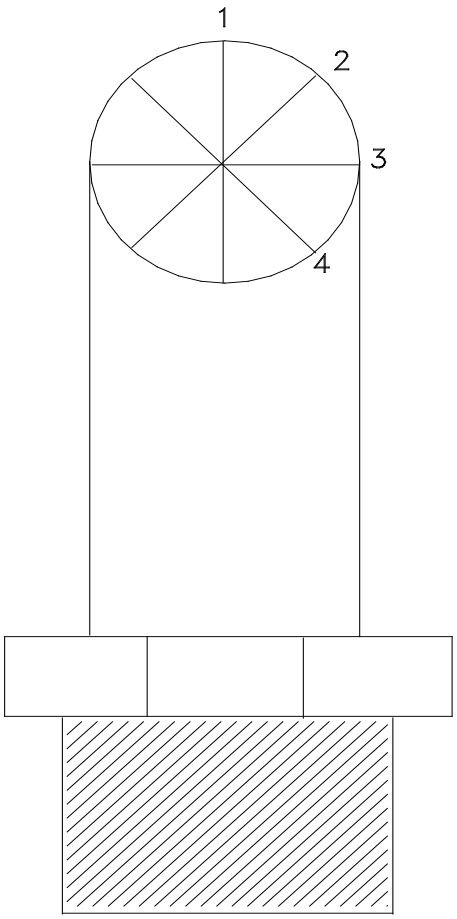
Nozzle Calibration

Date: 9/10/2019

Nozzle ID No.: 33

Analyst: CRR

Material/Type: Teflon



0.178	1
0.178	2
0.178	3
0.179	4

Valid Data

Average
0.178

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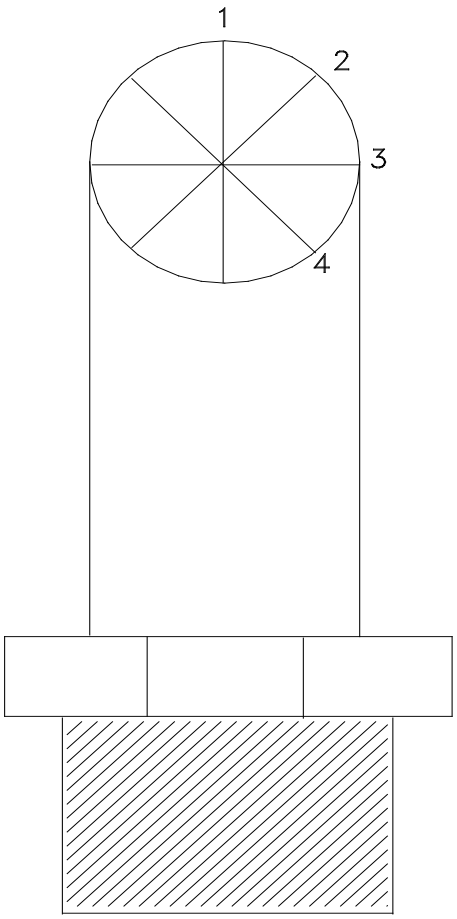
Nozzle Calibration

Date: 6/7/2017

Nozzle ID No.: #6-13

Analyst: MDK

Material/Type: Teflon



0.171	1
0.172	2
0.171	3
0.171	4

Valid Data

Average
0.171

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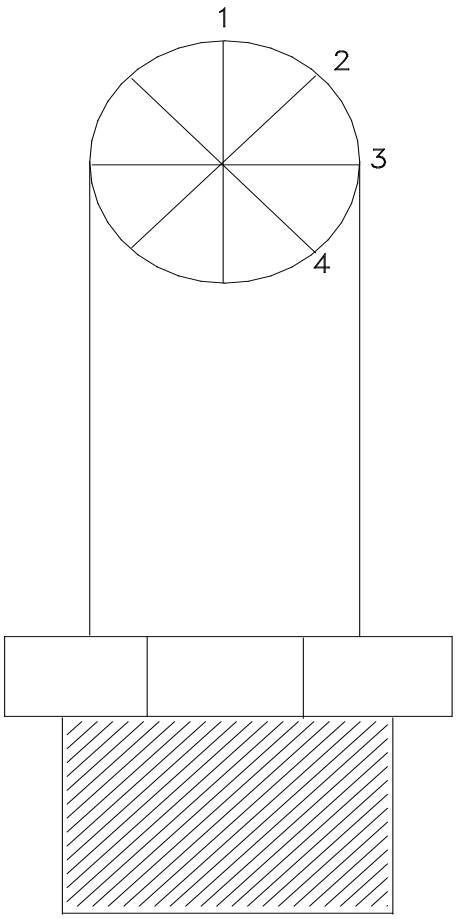
Nozzle Calibration

Date: 2/20/2020

Nozzle ID No.: 7T-5

Analyst: JAP

Material/Type: Teflon



0.179	1
0.180	2
0.179	3
0.180	4

Valid Data

Average
0.180

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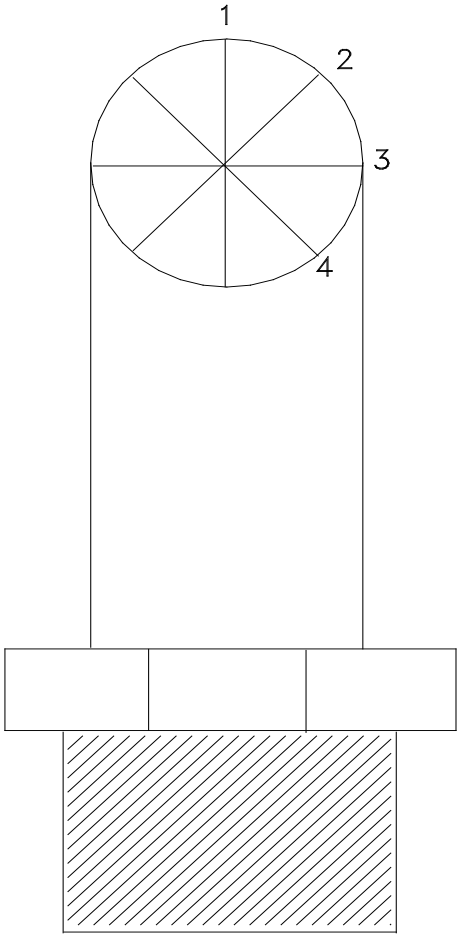
Nozzle Calibration

Date: 2/15/2021

Nozzle ID No.: 943

Analyst: JJC

Material/Type: Glass



0.160	1
0.160	2
0.160	3
0.160	4

Average
0.160

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Appendix H - Laboratory Sample Analysis

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MOSTARDI PLATT

PROJECT: M232604
PCC STRUCTURALS
LPC – MILWAUKIE, OR

CLIENT # M050
REPORT # 23-351

SUBMITTED BY:
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Case Narrative

Date: August 24, 2023

General Information

Client:	Mostardi Platt
Client Number:	M050
Report Number:	23-351
Sample Description:	Impinger Trains
Sample Numbers:	23-S1834 – 23-S1949

Analysis

Analytes:	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ag, Tl, V, Zn, Hexavalent Chromium
Analytical Protocols:	EPA Method 29 (8/2/17 version) SW-846 Method 0061 (revision 0, December 1996)
Analytical Notes:	The petri dish for 23-S1904 contained a large amount of loose deposit. The filter and loose particulate were digested in separate vessels and then combined as one sample. That sample has more acid than the rest of the front half samples. The Co result for that samples was overscale using ICP-MS, but it matched the results as measured on the ICP-OES. The results for 23-S1904 may not be the most reliable because of the nature of the sample. A low level LCS on one mercury run wasn't spiked because of an analyst error. The samples that were analyzed with that LL-LCS were the front half fractions for the second half samples starting with 23-S1874. No problems were encountered during the Cr VI analysis. Results are not blank corrected.
QA/QC Review:	All the data have been reviewed by the analysts performing the analyses and the project manager. All of the quality control and sample-specific information in this package is complete and meets or exceeds t. minimum requirements for acceptability.
Comments:	If you have any questions or concerns regarding this analysis, please feel free to contact the project manager.

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Disclaimer: This report shall not be reproduced, except in full, without the written approval of the laboratory. The results only represent that of the samples as received into the laboratory. All data are reported to the detection limit. Results <5x DL must be considered to have a higher degree of uncertainty associated with them. Due to the statistical process of detection limit determination, data in this report should not be used for statistical analysis as the data has been censored in such a manner as to bias statistical analyses high.

Paul Duda 8/24/23

Project Manager Date
Paul Duda

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Lab ID: 23-S1834
Client ID: 9203 N Inlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	736.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	21.4	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	1.26	0.050	µg/sample
Chromium, ICP	892.	0.200	µg/sample
Cobalt, ICP-MS	208.	0.125	µg/sample
Copper, ICP-MS	320.	0.250	µg/sample
Lead, ICP-MS	2.47	0.125	µg/sample
Manganese, ICP	16.5	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	6,520	0.750	µg/sample
Phosphorus, ICP	110.	5.00	µg/sample
Selenium, ICP-MS	1.05	0.500	µg/sample
Silver, ICP	1.14	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	2.53	0.075	µg/sample
Zinc, ICP	109.	0.750	µg/sample

Lab ID: 23-S1835
Client ID: 9203 N Inlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	55.8	4.71	µg/sample
Antimony, ICP-MS	< DL	0.628	µg/sample
Arsenic, ICP	< DL	1.10	µg/sample
Barium, ICP	4.45	0.078	µg/sample
Beryllium, ICP	< DL	0.031	µg/sample
Cadmium, ICP-MS	0.413	0.031	µg/sample
Chromium, ICP	12.6	0.126	µg/sample
Cobalt, ICP-MS	0.571	0.078	µg/sample
Copper, ICP	18.2	0.785	µg/sample
Lead, ICP	< DL	0.785	µg/sample
Manganese, ICP	13.3	0.047	µg/sample
Mercury, CVAA	0.336	0.0444	µg/sample
Nickel, ICP	18.0	0.471	µg/sample
Phosphorus, ICP	19.4	3.14	µg/sample
Selenium, ICP	11.7	2.36	µg/sample
Silver, ICP	0.812	0.314	µg/sample
Thallium, ICP	< DL	1.57	µg/sample
Vanadium, ICP	0.282	0.157	µg/sample
Zinc, ICP	44.0	0.471	µg/sample

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Lab ID: 23-S1836
Client ID: 9203 N Inlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00805	µg/sample

Lab ID: 23-S1837
Client ID: 9203 N Inlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.196	0.0233	µg/sample

Lab ID: 23-S1838
Client ID: 9203 N Inlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.102	0.0192	µg/sample

Lab ID: 23-S1839
Client ID: 9203 N Inlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	764.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	6.66	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.265	0.050	µg/sample
Chromium, ICP	1,290	0.200	µg/sample
Cobalt, ICP-MS	315.	0.125	µg/sample
Copper, ICP-MS	396.	0.250	µg/sample
Lead, ICP-MS	1.15	0.125	µg/sample
Manganese, ICP	17.7	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	10,100	0.750	µg/sample
Phosphorus, ICP	109.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	0.845	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	2.07	0.075	µg/sample
Zinc, ICP	141.	0.750	µg/sample

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Lab ID: 23-S1840
Client ID: 9203 N Inlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	42.2	4.14	µg/sample
Antimony, ICP-MS	< DL	0.552	µg/sample
Arsenic, ICP	< DL	0.966	µg/sample
Barium, ICP	4.29	0.069	µg/sample
Beryllium, ICP	< DL	0.028	µg/sample
Cadmium, ICP-MS	0.328	0.028	µg/sample
Chromium, ICP	4.44	0.110	µg/sample
Cobalt, ICP-MS	0.600	0.069	µg/sample
Copper, ICP	2.99	0.690	µg/sample
Lead, ICP	0.882	0.690	µg/sample
Manganese, ICP	30.5	0.041	µg/sample
Mercury, CVAA	0.392	0.0315	µg/sample
Nickel, ICP	14.6	0.414	µg/sample
Phosphorus, ICP	19.4	2.76	µg/sample
Selenium, ICP	< DL	2.07	µg/sample
Silver, ICP	0.391	0.276	µg/sample
Thallium, ICP	< DL	1.38	µg/sample
Vanadium, ICP	0.161	0.138	µg/sample
Zinc, ICP	26.2	0.414	µg/sample

Lab ID: 23-S1841
Client ID: 9203 N Inlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00814	µg/sample

Lab ID: 23-S1842
Client ID: 9204 N Inlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.104	0.0214	µg/sample

Lab ID: 23-S1843
Client ID: 9203 N Inlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0194	µg/sample

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Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1844
Client ID: 9203 C Inlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	783.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	53.4	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	2.75	0.050	µg/sample
Chromium, ICP	670.	0.200	µg/sample
Cobalt, ICP-MS	136.	0.125	µg/sample
Copper, ICP-MS	324.	0.250	µg/sample
Lead, ICP-MS	1.94	0.125	µg/sample
Manganese, ICP	49.5	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	4,650	0.750	µg/sample
Phosphorus, ICP	147.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	5.87	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	2.35	0.075	µg/sample
Zinc, ICP	642.	0.750	µg/sample

Lab ID: 23-S1845
Client ID: 9203 C Inlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	42.6	3.39	µg/sample
Antimony, ICP-MS	< DL	0.452	µg/sample
Arsenic, ICP	< DL	0.791	µg/sample
Barium, ICP	4.41	0.056	µg/sample
Beryllium, ICP	< DL	0.023	µg/sample
Cadmium, ICP-MS	0.130	0.023	µg/sample
Chromium, ICP	73.4	0.090	µg/sample
Cobalt, ICP-MS	1.94	0.056	µg/sample
Copper, ICP	85.1	0.565	µg/sample
Lead, ICP	1.65	0.565	µg/sample
Manganese, ICP	69.1	0.034	µg/sample
Mercury, CVAA	0.217	0.0298	µg/sample
Nickel, ICP	211.	0.339	µg/sample
Phosphorus, ICP	22.6	2.26	µg/sample
Selenium, ICP	< DL	1.70	µg/sample
Silver, ICP	0.406	0.226	µg/sample
Thallium, ICP	< DL	1.13	µg/sample
Vanadium, ICP	0.526	0.113	µg/sample
Zinc, ICP	22.2	0.339	µg/sample

Lab ID: 23-S1846
Client ID: 9203 C Inlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00827	µg/sample

Lab ID: 23-S1847
Client ID: 9203 C Inlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.163	0.0248	µg/sample

Lab ID: 23-S1848
Client ID: 9203 C Inlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0192	µg/sample

Lab ID: 23-S1849
Client ID: 9203 C Inlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	899.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	7.10	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.994	0.050	µg/sample
Chromium, ICP	1,360	0.200	µg/sample
Cobalt, ICP-MS	44.6	0.125	µg/sample
Copper, ICP-MS	776.	0.250	µg/sample
Lead, ICP-MS	1.33	0.125	µg/sample
Manganese, ICP	80.3	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	7,850	0.750	µg/sample
Phosphorus, ICP	112.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	1.23	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	3.87	0.075	µg/sample
Zinc, ICP	155.	0.750	µg/sample

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Lab ID: 23-S1850
Client ID: 9203 C Inlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	37.5	4.32	µg/sample
Antimony, ICP-MS	< DL	0.576	µg/sample
Arsenic, ICP	< DL	1.01	µg/sample
Barium, ICP	5.55	0.072	µg/sample
Beryllium, ICP	< DL	0.029	µg/sample
Cadmium, ICP-MS	0.177	0.029	µg/sample
Chromium, ICP	2.33	0.115	µg/sample
Cobalt, ICP-MS	0.763	0.072	µg/sample
Copper, ICP	3.37	0.720	µg/sample
Lead, ICP	< DL	0.720	µg/sample
Manganese, ICP	49.9	0.043	µg/sample
Mercury, CVAA	0.570	0.0341	µg/sample
Nickel, ICP	11.1	0.432	µg/sample
Phosphorus, ICP	19.0	2.88	µg/sample
Selenium, ICP	< DL	2.16	µg/sample
Silver, ICP	1.35	0.288	µg/sample
Thallium, ICP	< DL	1.44	µg/sample
Vanadium, ICP	0.184	0.144	µg/sample
Zinc, ICP	34.4	0.432	µg/sample

Lab ID: 23-S1851
Client ID: 9203 C Inlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00866	µg/sample

Lab ID: 23-S1852
Client ID: 9203 C Inlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.236	0.0240	µg/sample

Lab ID: 23-S1853
Client ID: 9203 C Inlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0196	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1854
Client ID: 9203 S Inlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	828.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	3.61	2.50	µg/sample
Barium, ICP	43.4	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	5.84	0.050	µg/sample
Chromium, ICP	2,640	0.200	µg/sample
Cobalt, ICP-MS	44.4	0.125	µg/sample
Copper, ICP-MS	292.	0.250	µg/sample
Lead, ICP-MS	1.18	0.125	µg/sample
Manganese, ICP	30.2	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	8,120	0.750	µg/sample
Phosphorus, ICP	108.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	3.77	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	5.46	0.075	µg/sample
Zinc, ICP	109.	0.750	µg/sample

Lab ID: 23-S1855
Client ID: 9203 S Inlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	31.6	3.81	µg/sample
Antimony, ICP-MS	< DL	0.508	µg/sample
Arsenic, ICP	< DL	0.889	µg/sample
Barium, ICP	3.74	0.064	µg/sample
Beryllium, ICP	< DL	0.025	µg/sample
Cadmium, ICP-MS	0.241	0.025	µg/sample
Chromium, ICP	1.25	0.102	µg/sample
Cobalt, ICP-MS	0.234	0.064	µg/sample
Copper, ICP	1.23	0.635	µg/sample
Lead, ICP	< DL	0.635	µg/sample
Manganese, ICP	22.3	0.038	µg/sample
Mercury, CVAA	0.305	0.0328	µg/sample
Nickel, ICP	1.41	0.381	µg/sample
Phosphorus, ICP	19.2	2.54	µg/sample
Selenium, ICP	< DL	1.90	µg/sample
Silver, ICP	0.269	0.254	µg/sample
Thallium, ICP	< DL	1.27	µg/sample
Vanadium, ICP	< DL	0.127	µg/sample
Zinc, ICP	79.1	0.381	µg/sample

Lab ID: 23-S1856
Client ID: 9203 S Inlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00814	µg/sample

Lab ID: 23-S1857
Client ID: 9203 S Inlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.106	0.0232	µg/sample

Lab ID: 23-S1858
Client ID: 9203 S Inlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0191	µg/sample

Lab ID: 23-S1859
Client ID: 9203 S Inlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	1,160	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	10.5	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	6.72	0.050	µg/sample
Chromium, ICP	4,890	0.200	µg/sample
Cobalt, ICP-MS	54.9	0.125	µg/sample
Copper, ICP-MS	680.	0.250	µg/sample
Lead, ICP-MS	1.14	0.125	µg/sample
Manganese, ICP	106.	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	20,400	0.750	µg/sample
Phosphorus, ICP	124.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	2.69	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	6.64	0.075	µg/sample
Zinc, ICP	275.	0.750	µg/sample

Lab ID: 23-S1860
Client ID: 9203 S Inlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	34.2	3.36	µg/sample
Antimony, ICP-MS	0.636	0.448	µg/sample
Arsenic, ICP	< DL	0.784	µg/sample
Barium, ICP	5.13	0.056	µg/sample
Beryllium, ICP	< DL	0.022	µg/sample
Cadmium, ICP-MS	0.093	0.022	µg/sample
Chromium, ICP	3.37	0.090	µg/sample
Cobalt, ICP-MS	0.881	0.056	µg/sample
Copper, ICP	1.99	0.560	µg/sample
Lead, ICP	0.968	0.560	µg/sample
Manganese, ICP	167.	0.034	µg/sample
Mercury, CVAA	0.318	0.0332	µg/sample
Nickel, ICP	15.8	0.336	µg/sample
Phosphorus, ICP	20.2	2.24	µg/sample
Selenium, ICP	< DL	1.68	µg/sample
Silver, ICP	< DL	0.224	µg/sample
Thallium, ICP	< DL	1.12	µg/sample
Vanadium, ICP	0.395	0.112	µg/sample
Zinc, ICP	26.7	0.336	µg/sample

Lab ID: 23-S1861
Client ID: 9203 S Inlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00792	µg/sample

Lab ID: 23-S1862
Client ID: 9203 S Inlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.167	0.0156	µg/sample

Lab ID: 23-S1863
Client ID: 9203 S Inlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0196	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1864
Client ID: 9203 N Outlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	506.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	5.52	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.270	0.050	µg/sample
Chromium, ICP	5.57	0.200	µg/sample
Cobalt, ICP-MS	0.689	0.125	µg/sample
Copper, ICP-MS	1.54	0.250	µg/sample
Lead, ICP-MS	0.328	0.125	µg/sample
Manganese, ICP	4.80	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	33.4	0.750	µg/sample
Phosphorus, ICP	86.4	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.110	0.075	µg/sample
Zinc, ICP	10.6	0.750	µg/sample

Lab ID: 23-S1865
Client ID: 9203 N Outlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	61.1	3.48	µg/sample
Antimony, ICP-MS	< DL	0.464	µg/sample
Arsenic, ICP	< DL	0.812	µg/sample
Barium, ICP	4.45	0.058	µg/sample
Beryllium, ICP	< DL	0.023	µg/sample
Cadmium, ICP-MS	0.126	0.023	µg/sample
Chromium, ICP	0.945	0.093	µg/sample
Cobalt, ICP-MS	0.201	0.058	µg/sample
Copper, ICP	2.15	0.580	µg/sample
Lead, ICP	1.53	0.580	µg/sample
Manganese, ICP	47.2	0.035	µg/sample
Mercury, CVAA	0.712	0.0258	µg/sample
Nickel, ICP	1.01	0.348	µg/sample
Phosphorus, ICP	18.6	2.32	µg/sample
Selenium, ICP	< DL	1.74	µg/sample
Silver, ICP	< DL	0.232	µg/sample
Thallium, ICP	< DL	1.16	µg/sample
Vanadium, ICP	< DL	0.116	µg/sample
Zinc, ICP	12.7	0.348	µg/sample

Lab ID: 23-S1866
Client ID: 9203 N Outlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00790	µg/sample

Lab ID: 23-S1867
Client ID: 9203 N Outlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.816	0.0237	µg/sample

Lab ID: 23-S1868
Client ID: 9203 N Outlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.0801	0.0193	µg/sample

Lab ID: 23-S1869
Client ID: 9203 N Outlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	508.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	2.92	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.210	0.050	µg/sample
Chromium, ICP	13.8	0.200	µg/sample
Cobalt, ICP-MS	6.87	0.125	µg/sample
Copper, ICP-MS	1.50	0.250	µg/sample
Lead, ICP-MS	0.318	0.125	µg/sample
Manganese, ICP	2.74	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	43.8	0.750	µg/sample
Phosphorus, ICP	80.0	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.090	0.075	µg/sample
Zinc, ICP	11.4	0.750	µg/sample

Lab ID: 23-S1870
Client ID: 9203 N Outlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	24.2	3.54	µg/sample
Antimony, ICP-MS	< DL	0.472	µg/sample
Arsenic, ICP	< DL	0.826	µg/sample
Barium, ICP	3.49	0.059	µg/sample
Beryllium, ICP	< DL	0.024	µg/sample
Cadmium, ICP-MS	0.028	0.024	µg/sample
Chromium, ICP	1.62	0.094	µg/sample
Cobalt, ICP-MS	0.696	0.059	µg/sample
Copper, ICP	< DL	0.590	µg/sample
Lead, ICP	< DL	0.590	µg/sample
Manganese, ICP	19.2	0.035	µg/sample
Mercury, CVAA	0.535	0.0233	µg/sample
Nickel, ICP	4.09	0.354	µg/sample
Phosphorus, ICP	21.4	2.36	µg/sample
Selenium, ICP	< DL	1.77	µg/sample
Silver, ICP	< DL	0.236	µg/sample
Thallium, ICP	< DL	1.18	µg/sample
Vanadium, ICP	< DL	0.118	µg/sample
Zinc, ICP	5.06	0.354	µg/sample

Lab ID: 23-S1871
Client ID: 9203 N Outlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.0222	0.00971	µg/sample

Lab ID: 23-S1872
Client ID: 9203 N Outlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.275	0.0256	µg/sample

Lab ID: 23-S1873
Client ID: 9203 N Outlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0200	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1874
Client ID: 9203 S Outlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	535.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	12.2	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.474	0.050	µg/sample
Chromium, ICP	3.02	0.200	µg/sample
Cobalt, ICP-MS	0.322	0.125	µg/sample
Copper, ICP-MS	1.58	0.250	µg/sample
Lead, ICP-MS	0.494	0.125	µg/sample
Manganese, ICP	2.64	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	6.35	0.750	µg/sample
Phosphorus, ICP	84.0	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.142	0.075	µg/sample
Zinc, ICP	15.6	0.750	µg/sample

Lab ID: 23-S1875
Client ID: 9203 S Outlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Aluminum, ICP	17.4	4.29	µg/sample
Antimony, ICP-MS	< DL	0.572	µg/sample
Arsenic, ICP	< DL	1.00	µg/sample
Barium, ICP	4.13	0.072	µg/sample
Beryllium, ICP	< DL	0.029	µg/sample
Cadmium, ICP-MS	0.089	0.029	µg/sample
Chromium, ICP	1.23	0.114	µg/sample
Cobalt, ICP-MS	0.172	0.072	µg/sample
Copper, ICP	13.6	0.715	µg/sample
Lead, ICP	< DL	0.715	µg/sample
Manganese, ICP	1.62	0.043	µg/sample
Mercury, CVAA	0.283	0.0233	µg/sample
Nickel, ICP	0.593	0.429	µg/sample
Phosphorus, ICP	17.6	2.86	µg/sample
Selenium, ICP	3.51	2.14	µg/sample
Silver, ICP	< DL	0.286	µg/sample
Thallium, ICP	< DL	1.43	µg/sample
Vanadium, ICP	< DL	0.143	µg/sample
Zinc, ICP	16.7	0.429	µg/sample

Lab ID: 23-S1876
Client ID: 9203 S Outlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00828	µg/sample

Lab ID: 23-S1877
Client ID: 9203 S Outlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	0.145	0.0275	µg/sample

Lab ID: 23-S1878
Client ID: 9203 S Outlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0192	µg/sample

Lab ID: 23-S1879
Client ID: 9203 S Outlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	521.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	4.11	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.076	0.050	µg/sample
Chromium, ICP	32.3	0.200	µg/sample
Cobalt, ICP-MS	13.4	0.125	µg/sample
Copper, ICP-MS	1.66	0.250	µg/sample
Lead, ICP-MS	0.328	0.125	µg/sample
Manganese, ICP	2.59	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	82.1	0.750	µg/sample
Phosphorus, ICP	88.8	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.121	0.075	µg/sample
Zinc, ICP	14.8	0.750	µg/sample

Lab ID: 23-S1880
Client ID: 9203 S Outlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	27.7	3.78	µg/sample
Antimony, ICP-MS	0.540	0.504	µg/sample
Arsenic, ICP	< DL	0.882	µg/sample
Barium, ICP	4.03	0.063	µg/sample
Beryllium, ICP	< DL	0.025	µg/sample
Cadmium, ICP-MS	0.077	0.025	µg/sample
Chromium, ICP	1.32	0.101	µg/sample
Cobalt, ICP-MS	0.315	0.063	µg/sample
Copper, ICP	0.841	0.630	µg/sample
Lead, ICP	< DL	0.630	µg/sample
Manganese, ICP	90.6	0.038	µg/sample
Mercury, CVAA	0.489	0.0257	µg/sample
Nickel, ICP	2.31	0.378	µg/sample
Phosphorus, ICP	20.6	2.52	µg/sample
Selenium, ICP	2.60	1.89	µg/sample
Silver, ICP	< DL	0.252	µg/sample
Thallium, ICP	< DL	1.26	µg/sample
Vanadium, ICP	< DL	0.126	µg/sample
Zinc, ICP	14.7	0.378	µg/sample

Lab ID: 23-S1881
Client ID: 9203 S Outlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0107	µg/sample

Lab ID: 23-S1882
Client ID: 9203 S Outlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.110	0.0154	µg/sample

Lab ID: 23-S1883
Client ID: 9203 S Outlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0161	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1884
Client ID: 9256 Inlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	3,090	7.50	µg/sample
Antimony, ICP-MS	1.07	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	7.90	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.111	0.050	µg/sample
Chromium, ICP	88.7	0.200	µg/sample
Cobalt, ICP-MS	2.60	0.125	µg/sample
Copper, ICP-MS	329.	0.250	µg/sample
Lead, ICP-MS	8.79	0.125	µg/sample
Manganese, ICP	748.	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	121.	0.750	µg/sample
Phosphorus, ICP	93.5	5.00	µg/sample
Selenium, ICP-MS	0.634	0.500	µg/sample
Silver, ICP	0.733	0.500	µg/sample
Thallium, ICP-MS	0.102	0.100	µg/sample
Vanadium, ICP-MS	1.18	0.075	µg/sample
Zinc, ICP	109.	0.750	µg/sample

Lab ID: 23-S1885
Client ID: 9256 Inlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	61.1	3.72	µg/sample
Antimony, ICP-MS	< DL	0.496	µg/sample
Arsenic, ICP	< DL	0.868	µg/sample
Barium, ICP	10.7	0.062	µg/sample
Beryllium, ICP	< DL	0.025	µg/sample
Cadmium, ICP-MS	0.124	0.025	µg/sample
Chromium, ICP	10.3	0.099	µg/sample
Cobalt, ICP-MS	0.956	0.062	µg/sample
Copper, ICP	11.4	0.620	µg/sample
Lead, ICP	< DL	0.620	µg/sample
Manganese, ICP	43.3	0.037	µg/sample
Mercury, CVAA	0.543	0.0359	µg/sample
Nickel, ICP	60.7	0.372	µg/sample
Phosphorus, ICP	27.7	2.48	µg/sample
Selenium, ICP	< DL	1.86	µg/sample
Silver, ICP	0.345	0.248	µg/sample
Thallium, ICP	< DL	1.24	µg/sample
Vanadium, ICP	< DL	0.124	µg/sample
Zinc, ICP	11.4	0.372	µg/sample

Lab ID: 23-S1886
Client ID: 9256 Inlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00818	µg/sample

Lab ID: 23-S1887
Client ID: 9256 Inlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	0.778	0.0234	µg/sample

Lab ID: 23-S1888
Client ID: 9256 Inlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	0.0532	0.0196	µg/sample

Lab ID: 23-S1889
Client ID: 9256 Inlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	3,010	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	21.0	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.484	0.050	µg/sample
Chromium, ICP	103.	0.200	µg/sample
Cobalt, ICP-MS	4.02	0.125	µg/sample
Copper, ICP-MS	417.	0.250	µg/sample
Lead, ICP-MS	4.92	0.125	µg/sample
Manganese, ICP	411.	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	211.	0.750	µg/sample
Phosphorus, ICP	102.	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	1.14	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	1.71	0.075	µg/sample
Zinc, ICP	96.8	0.750	µg/sample

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Client: M050 - Mostardi Platt
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Lab ID: 23-S1890
Client ID: 9256 Inlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	57.6	3.33	µg/sample
Antimony, ICP-MS	0.543	0.444	µg/sample
Arsenic, ICP	< DL	0.777	µg/sample
Barium, ICP	9.83	0.056	µg/sample
Beryllium, ICP	< DL	0.022	µg/sample
Cadmium, ICP-MS	0.105	0.022	µg/sample
Chromium, ICP	3.70	0.089	µg/sample
Cobalt, ICP-MS	0.463	0.056	µg/sample
Copper, ICP	1.92	0.555	µg/sample
Lead, ICP	< DL	0.555	µg/sample
Manganese, ICP	24.0	0.033	µg/sample
Mercury, CVAA	0.334	0.0354	µg/sample
Nickel, ICP	21.1	0.333	µg/sample
Phosphorus, ICP	23.2	2.22	µg/sample
Selenium, ICP	< DL	1.66	µg/sample
Silver, ICP	< DL	0.222	µg/sample
Thallium, ICP	< DL	1.11	µg/sample
Vanadium, ICP	< DL	0.111	µg/sample
Zinc, ICP	31.3	0.333	µg/sample

Lab ID: 23-S1891
Client ID: 9256 Inlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00809	µg/sample

Lab ID: 23-S1892
Client ID: 9256 Inlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	0.164	0.0229	µg/sample

Lab ID: 23-S1893
Client ID: 9256 Inlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0198	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1894
Client ID: 9256 Outlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	516.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	10.3	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.620	0.050	µg/sample
Chromium, ICP	1.92	0.200	µg/sample
Cobalt, ICP-MS	0.566	0.125	µg/sample
Copper, ICP-MS	0.994	0.250	µg/sample
Lead, ICP-MS	0.328	0.125	µg/sample
Manganese, ICP	1.57	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	12.1	0.750	µg/sample
Phosphorus, ICP	83.6	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	0.500	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.122	0.075	µg/sample
Zinc, ICP	13.5	0.750	µg/sample

Lab ID: 23-S1895
Client ID: 9256 Outlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	22.3	3.42	µg/sample
Antimony, ICP-MS	< DL	0.456	µg/sample
Arsenic, ICP	< DL	0.798	µg/sample
Barium, ICP	5.53	0.057	µg/sample
Beryllium, ICP	< DL	0.023	µg/sample
Cadmium, ICP-MS	0.105	0.023	µg/sample
Chromium, ICP	2.30	0.091	µg/sample
Cobalt, ICP-MS	0.145	0.057	µg/sample
Copper, ICP	4.28	0.570	µg/sample
Lead, ICP	< DL	0.570	µg/sample
Manganese, ICP	7.49	0.034	µg/sample
Mercury, CVAA	0.488	0.0284	µg/sample
Nickel, ICP	1.42	0.342	µg/sample
Phosphorus, ICP	28.3	2.28	µg/sample
Selenium, ICP	2.55	1.71	µg/sample
Silver, ICP	< DL	0.228	µg/sample
Thallium, ICP	< DL	1.14	µg/sample
Vanadium, ICP	< DL	0.114	µg/sample
Zinc, ICP	21.2	0.342	µg/sample

Lab ID: 23-S1896
Client ID: 9256 Outlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00822	µg/sample

Lab ID: 23-S1897
Client ID: 9256 Outlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	0.160	0.0267	µg/sample

Lab ID: 23-S1898
Client ID: 9256 Outlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0196	µg/sample

Lab ID: 23-S1899
Client ID: 9256 Outlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	528.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	4.61	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	1.01	0.050	µg/sample
Chromium, ICP	26.9	0.200	µg/sample
Cobalt, ICP-MS	7.77	0.125	µg/sample
Copper, ICP-MS	1.95	0.250	µg/sample
Lead, ICP-MS	0.553	0.125	µg/sample
Manganese, ICP	2.29	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	99.5	0.750	µg/sample
Phosphorus, ICP	86.3	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.140	0.075	µg/sample
Zinc, ICP	8.92	0.750	µg/sample

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Lab ID: 23-S1900
Client ID: 9256 Outlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	31.8	3.99	µg/sample
Antimony, ICP-MS	< DL	0.532	µg/sample
Arsenic, ICP	< DL	0.931	µg/sample
Barium, ICP	4.43	0.066	µg/sample
Beryllium, ICP	< DL	0.027	µg/sample
Cadmium, ICP-MS	0.035	0.027	µg/sample
Chromium, ICP	5.41	0.106	µg/sample
Cobalt, ICP-MS	0.374	0.066	µg/sample
Copper, ICP	4.29	0.665	µg/sample
Lead, ICP	< DL	0.665	µg/sample
Manganese, ICP	24.7	0.040	µg/sample
Mercury, CVAA	0.424	0.0280	µg/sample
Nickel, ICP	31.0	0.399	µg/sample
Phosphorus, ICP	22.1	2.66	µg/sample
Selenium, ICP	< DL	2.00	µg/sample
Silver, ICP	< DL	0.266	µg/sample
Thallium, ICP	< DL	1.33	µg/sample
Vanadium, ICP	< DL	0.133	µg/sample
Zinc, ICP	12.3	0.399	µg/sample

Lab ID: 23-S1901
Client ID: 9256 Outlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00836	µg/sample

Lab ID: 23-S1902
Client ID: 9256 Outlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	0.158	0.0251	µg/sample

Lab ID: 23-S1903
Client ID: 9256 Outlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0194	µg/sample

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Lab ID: 23-S1904
Client ID: 8901 Inlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	9,940	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	8.92	2.50	µg/sample
Barium, ICP	50.9	0.125	µg/sample
Beryllium, ICP-MS	0.226	0.050	µg/sample
Cadmium, ICP-MS	2.68	0.050	µg/sample
Chromium, ICP	145,000	0.200	µg/sample
Cobalt, ICP-MS	80,800	0.125	µg/sample
Copper, ICP-MS	48.8	0.250	µg/sample
Lead, ICP-MS	7.13	0.125	µg/sample
Manganese, ICP	78.6	0.075	µg/sample
Mercury, CVAA	0.0281	0.0219	µg/sample
Nickel, ICP	341,000	0.750	µg/sample
Phosphorus, ICP	368.	5.00	µg/sample
Selenium, ICP-MS	2.07	0.500	µg/sample
Silver, ICP	85.8	1.00	µg/sample
Thallium, ICP-MS	0.101	0.100	µg/sample
Vanadium, ICP-MS	70.6	0.075	µg/sample
Zinc, ICP	2,470	0.750	µg/sample

Lab ID: 23-S1905
Client ID: 8901 Inlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	58.3	3.30	µg/sample
Antimony, ICP-MS	< DL	0.440	µg/sample
Arsenic, ICP	< DL	0.770	µg/sample
Barium, ICP	5.54	0.055	µg/sample
Beryllium, ICP	< DL	0.022	µg/sample
Cadmium, ICP-MS	0.114	0.022	µg/sample
Chromium, ICP	5.86	0.088	µg/sample
Cobalt, ICP-MS	2.90	0.055	µg/sample
Copper, ICP	2.01	0.550	µg/sample
Lead, ICP	1.14	0.550	µg/sample
Manganese, ICP	59.5	0.033	µg/sample
Mercury, CVAA	0.407	0.0385	µg/sample
Nickel, ICP	20.1	0.330	µg/sample
Phosphorus, ICP	24.8	2.20	µg/sample
Selenium, ICP	1.97	1.65	µg/sample
Silver, ICP	0.426	0.220	µg/sample
Thallium, ICP	< DL	1.10	µg/sample
Vanadium, ICP	< DL	0.110	µg/sample
Zinc, ICP	28.8	0.330	µg/sample

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Lab ID: 23-S1906
Client ID: 8901 Inlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00853	µg/sample

Lab ID: 23-S1907
Client ID: 8901 Inlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	0.191	0.0178	µg/sample

Lab ID: 23-S1908
Client ID: 8901 Inlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0196	µg/sample

Lab ID: 23-S1909
Client ID: 8901 Inlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	1,370	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	10.5	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.348	0.050	µg/sample
Chromium, ICP	2,840	0.200	µg/sample
Cobalt, ICP-MS	1,150	0.125	µg/sample
Copper, ICP-MS	4.94	0.250	µg/sample
Lead, ICP-MS	1.21	0.125	µg/sample
Manganese, ICP	25.8	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	8,120	0.750	µg/sample
Phosphorus, ICP	98.1	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	4.77	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	3.84	0.075	µg/sample
Zinc, ICP	83.1	0.750	µg/sample

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Lab ID: 23-S1910
Client ID: 8901 Inlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	27.9	3.33	µg/sample
Antimony, ICP-MS	< DL	0.444	µg/sample
Arsenic, ICP	< DL	0.777	µg/sample
Barium, ICP	6.58	0.056	µg/sample
Beryllium, ICP	< DL	0.022	µg/sample
Cadmium, ICP-MS	0.068	0.022	µg/sample
Chromium, ICP	3.43	0.089	µg/sample
Cobalt, ICP-MS	1.20	0.056	µg/sample
Copper, ICP	1.05	0.555	µg/sample
Lead, ICP	1.25	0.555	µg/sample
Manganese, ICP	296.	0.033	µg/sample
Mercury, CVAA	0.332	0.0341	µg/sample
Nickel, ICP	8.23	0.333	µg/sample
Phosphorus, ICP	22.2	2.22	µg/sample
Selenium, ICP	< DL	1.66	µg/sample
Silver, ICP	< DL	0.222	µg/sample
Thallium, ICP	< DL	1.11	µg/sample
Vanadium, ICP	< DL	0.111	µg/sample
Zinc, ICP	16.2	0.333	µg/sample

Lab ID: 23-S1911
Client ID: 8901 Inlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00814	µg/sample

Lab ID: 23-S1912
Client ID: 8901 Inlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	0.210	0.0258	µg/sample

Lab ID: 23-S1913
Client ID: 8901 Inlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0195	µg/sample

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Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1914
Client ID: 8901 Outlet #1 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	555.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	6.83	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	1.03	0.050	µg/sample
Chromium, ICP	117.	0.200	µg/sample
Cobalt, ICP-MS	3.55	0.125	µg/sample
Copper, ICP-MS	5.01	0.250	µg/sample
Lead, ICP-MS	0.822	0.125	µg/sample
Manganese, ICP	9.89	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	104.	0.750	µg/sample
Phosphorus, ICP	88.4	5.00	µg/sample
Selenium, ICP-MS	2.17	0.500	µg/sample
Silver, ICP	13.1	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.812	0.075	µg/sample
Zinc, ICP	16.2	0.750	µg/sample

Lab ID: 23-S1915
Client ID: 8901 Outlet #1 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Aluminum, ICP	21.5	4.05	µg/sample
Antimony, ICP-MS	< DL	0.540	µg/sample
Arsenic, ICP	< DL	0.945	µg/sample
Barium, ICP	3.51	0.068	µg/sample
Beryllium, ICP	< DL	0.027	µg/sample
Cadmium, ICP-MS	0.071	0.027	µg/sample
Chromium, ICP	1.82	0.108	µg/sample
Cobalt, ICP-MS	0.276	0.068	µg/sample
Copper, ICP	1.36	0.675	µg/sample
Lead, ICP	0.709	0.675	µg/sample
Manganese, ICP	25.8	0.040	µg/sample
Mercury, CVAA	0.240	0.0271	µg/sample
Nickel, ICP	2.14	0.405	µg/sample
Phosphorus, ICP	26.5	2.70	µg/sample
Selenium, ICP	< DL	2.02	µg/sample
Silver, ICP	< DL	0.270	µg/sample
Thallium, ICP	< DL	1.35	µg/sample
Vanadium, ICP	< DL	0.135	µg/sample
Zinc, ICP	22.1	0.405	µg/sample

Lab ID: 23-S1916
Client ID: 8901 Outlet #1 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00822	µg/sample

Lab ID: 23-S1917
Client ID: 8901 Outlet #1 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	0.160	0.0254	µg/sample

Lab ID: 23-S1918
Client ID: 8901 Outlet #1 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0194	µg/sample

Lab ID: 23-S1919
Client ID: 8901 Outlet #2 Filter & Probe
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	534.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	4.18	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	0.068	0.050	µg/sample
Chromium, ICP	8.93	0.200	µg/sample
Cobalt, ICP-MS	1.53	0.125	µg/sample
Copper, ICP-MS	3.14	0.250	µg/sample
Lead, ICP-MS	0.369	0.125	µg/sample
Manganese, ICP	4.18	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	26.7	0.750	µg/sample
Phosphorus, ICP	86.8	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	0.104	0.075	µg/sample
Zinc, ICP	14.2	0.750	µg/sample

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Lab ID: 23-S1920
Client ID: 8901 Outlet #2 HNO3/H2O2
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Aluminum, ICP	36.0	3.99	µg/sample
Antimony, ICP-MS	< DL	0.532	µg/sample
Arsenic, ICP	< DL	0.931	µg/sample
Barium, ICP	3.37	0.066	µg/sample
Beryllium, ICP	< DL	0.027	µg/sample
Cadmium, ICP-MS	0.093	0.027	µg/sample
Chromium, ICP	2.03	0.106	µg/sample
Cobalt, ICP-MS	0.530	0.066	µg/sample
Copper, ICP	1.96	0.665	µg/sample
Lead, ICP	< DL	0.665	µg/sample
Manganese, ICP	31.4	0.040	µg/sample
Mercury, CVAA	0.266	0.0282	µg/sample
Nickel, ICP	2.36	0.399	µg/sample
Phosphorus, ICP	21.0	2.66	µg/sample
Selenium, ICP	< DL	2.00	µg/sample
Silver, ICP	< DL	0.266	µg/sample
Thallium, ICP	< DL	1.33	µg/sample
Vanadium, ICP	< DL	0.133	µg/sample
Zinc, ICP	21.3	0.399	µg/sample

Lab ID: 23-S1921
Client ID: 8901 Outlet #2 Empty Imp
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00814	µg/sample

Lab ID: 23-S1922
Client ID: 8901 Outlet #2 KMnO4
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	0.173	0.0253	µg/sample

Lab ID: 23-S1923
Client ID: 8901 Outlet #2 HCl Rinse
Site: PCC Structurals: LPC-Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0194	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1924
Client ID: Filter Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	495.	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	3.75	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	< DL	0.050	µg/sample
Chromium, ICP	1.06	0.200	µg/sample
Cobalt, ICP-MS	0.445	0.125	µg/sample
Copper, ICP-MS	< DL	0.250	µg/sample
Lead, ICP-MS	0.150	0.125	µg/sample
Manganese, ICP	0.870	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	1.58	0.750	µg/sample
Phosphorus, ICP	79.2	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	< DL	0.075	µg/sample
Zinc, ICP	4.29	0.750	µg/sample

Lab ID: 23-S1925
Client ID: 0.1N HNO3 Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	< DL	7.50	µg/sample
Antimony, ICP-MS	< DL	1.00	µg/sample
Arsenic, ICP-MS	< DL	2.50	µg/sample
Barium, ICP	1.09	0.125	µg/sample
Beryllium, ICP-MS	< DL	0.050	µg/sample
Cadmium, ICP-MS	< DL	0.050	µg/sample
Chromium, ICP	< DL	0.200	µg/sample
Cobalt, ICP-MS	0.412	0.125	µg/sample
Copper, ICP-MS	< DL	0.250	µg/sample
Lead, ICP-MS	< DL	0.125	µg/sample
Manganese, ICP	0.428	0.075	µg/sample
Mercury, CVAA	< DL	0.0219	µg/sample
Nickel, ICP	< DL	0.750	µg/sample
Phosphorus, ICP	< DL	5.00	µg/sample
Selenium, ICP-MS	< DL	0.500	µg/sample
Silver, ICP	< DL	1.00	µg/sample
Thallium, ICP-MS	< DL	0.100	µg/sample
Vanadium, ICP-MS	< DL	0.075	µg/sample
Zinc, ICP	< DL	0.750	µg/sample

Lab ID: 23-S1926
Client ID: HNO3/H2O2 Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Aluminum, ICP	12.1	3.78	µg/sample
Antimony, ICP-MS	< DL	0.504	µg/sample
Arsenic, ICP	< DL	0.882	µg/sample
Barium, ICP	4.59	0.063	µg/sample
Beryllium, ICP	< DL	0.025	µg/sample
Cadmium, ICP-MS	< DL	0.025	µg/sample
Chromium, ICP	0.375	0.101	µg/sample
Cobalt, ICP-MS	0.086	0.063	µg/sample
Copper, ICP	< DL	0.630	µg/sample
Lead, ICP	< DL	0.630	µg/sample
Manganese, ICP	0.735	0.038	µg/sample
Mercury, CVAA	0.274	0.0172	µg/sample
Nickel, ICP	< DL	0.378	µg/sample
Phosphorus, ICP	21.3	2.52	µg/sample
Selenium, ICP	< DL	1.89	µg/sample
Silver, ICP	< DL	0.252	µg/sample
Thallium, ICP	< DL	1.26	µg/sample
Vanadium, ICP	< DL	0.126	µg/sample
Zinc, ICP	0.929	0.378	µg/sample

Lab ID: 23-S1927
Client ID: DI Water Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.00849	µg/sample

Lab ID: 23-S1928
Client ID: KMnO4/H2SO4 Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	0.0430	0.00836	µg/sample

Lab ID: 23-S1929
Client ID: 8N HCl Blank
Site: PCC Structurals: LPC-Milwaukie
Sample Date: 6/30/23

Analyte	Result	DL	Units
Mercury, CVAA	< DL	0.0192	µg/sample

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1930
Client ID: 9203 N Inlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 North Inlet
Sample Date: 6/27/23
Sample Volume: 315. mL

Analyte	µg/L Conc.	DL	µg/sample Conc.	DL
Cr VI	261.	0.010	82.3	0.0032

Lab ID: 23-S1931
Client ID: 9203 N Inlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 North Inlet
Sample Date: 6/30/23
Sample Volume: 285. mL

Analyte	µg/L Conc.	DL	µg/sample Conc.	DL
Cr VI	348.	0.010	99.2	0.0028

Lab ID: 23-S1932
Client ID: 9203 C Inlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/27/23
Sample Volume: 320. mL

Analyte	µg/L Conc.	DL	µg/sample Conc.	DL
Cr VI	638.	0.010	204.	0.0032

Lab ID: 23-S1933
Client ID: 9203 C Inlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 Center Inlet
Sample Date: 6/30/23
Sample Volume: 310. mL

Analyte	µg/L Conc.	DL	µg/sample Conc.	DL
Cr VI	303.	0.010	94.0	0.0031

Lab ID: 23-S1934
Client ID: 9203 S Inlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 South Inlet
Sample Date: 6/27/23
Sample Volume: 360. mL

Analyte	µg/L Conc.	DL	µg/sample Conc.	DL
Cr VI	136.	0.010	49.1	0.0036

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1935
Client ID: 9203 S Inlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 South Inlet
Sample Date: 6/30/23
Sample Volume: 275. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	97.1	0.010	26.7	0.0028

Lab ID: 23-S1936
Client ID: 9203 N Outlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 North Outlet
Sample Date: 6/27/23
Sample Volume: 430. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	2.19	0.010	0.941	0.0043

Lab ID: 23-S1937
Client ID: 9203 N Outlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 North Outlet
Sample Date: 6/30/23
Sample Volume: 590. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	7.82	0.010	4.61	0.0059

Lab ID: 23-S1938
Client ID: 9203 S Outlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 South Outlet
Sample Date: 6/27/23
Sample Volume: 520. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	3.79	0.010	1.97	0.0052

Lab ID: 23-S1939
Client ID: 9203 S Outlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9203 South Outlet
Sample Date: 6/30/23
Sample Volume: 445. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	5.14	0.010	2.29	0.0044

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1940
Client ID: 9256 Inlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9256 Inlet
Sample Date: 6/28/23
Sample Volume: 300. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	5.87	0.010	1.76	0.0030

Lab ID: 23-S1941
Client ID: 9256 Inlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9256 Inlet
Sample Date: 6/29/23
Sample Volume: 365. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	4.72	0.010	1.72	0.0036

Lab ID: 23-S1942
Client ID: 9256 Outlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9256 Outlet
Sample Date: 6/28/23
Sample Volume: 375. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	17.1	0.010	6.40	0.0038

Lab ID: 23-S1943
Client ID: 9256 Outlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 9256 Outlet
Sample Date: 6/29/23
Sample Volume: 335. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	2.49	0.010	0.834	0.0034

Lab ID: 23-S1944
Client ID: 8901 Inlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 8901 Inlet
Sample Date: 6/28/23
Sample Volume: 350. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	43.2	0.010	15.1	0.0035

Client: M050 - Mostardi Platt
Report Number: 23-351

Lab ID: 23-S1945
Client ID: 8901 Inlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 8901 Inlet
Sample Date: 6/29/23
Sample Volume: 290. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	4.40	0.010	1.28	0.0029

Lab ID: 23-S1946
Client ID: 8901 Outlet #1 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 8901 Outlet
Sample Date: 6/28/23
Sample Volume: 355. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	20.0	0.010	7.11	0.0036

Lab ID: 23-S1947
Client ID: 8901 Outlet #2 0061
Site: PCC Structurals: LPC - Milwaukie
Source: 8901 Outlet
Sample Date: 6/29/23
Sample Volume: 325. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	9.50	0.010	3.09	0.0032

Lab ID: 23-S1948
Client ID: 0.5M KOH Reagent Blank
Site: PCC Structurals: LPC - Milwaukie
Sample Date: 6/30/23
Sample Volume: 295. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	0.432	0.010	0.127	0.0030

Lab ID: 23-S1949
Client ID: DI Reagent Blank
Site: PCC Structurals: LPC - Milwaukie
Sample Date: 6/30/23
Sample Volume: 103. mL

	µg/L		µg/sample	
Analyte	Conc.	DL	Conc.	DL
Cr VI	0.0250	0.010	0.0026	0.0010

QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Ag	ICB	< DL	2.00
Ag	Meth_Blk	< DL	2.00
Ag	CCB	< DL	2.00
Ag	CCB	< DL	2.00
Ag	ICB	< DL	2.00
Ag	CCB	< DL	2.00
Al	ICB	< DL	30.0
Al	Meth_Blk	< DL	30.0
Al	CCB	< DL	30.0
Al	CCB	< DL	30.0
Al	CCB	< DL	30.0
Al	CCB	< DL	30.0
Ba	ICB	< DL	0.500
Ba	Meth_Blk	< DL	0.500
Ba	CCB	< DL	0.500
Ba	CCB	< DL	0.500
Ba	CCB	< DL	0.500
Cr	ICB	< DL	0.800
Cr	Meth_Blk	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Cr	ICB	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Mn	ICB	< DL	0.300
Mn	Meth_Blk	< DL	0.300
Mn	CCB	< DL	0.300
Mn	CCB	< DL	0.300
Mn	CCB	< DL	0.300
Ni	ICB	< DL	3.00
Ni	Meth_Blk	< DL	3.00
Ni	CCB	< DL	3.00
Ni	CCB	< DL	3.00
Ni	CCB	< DL	3.00
Ni	ICB	< DL	3.00
Ni	CCB	< DL	3.00
Ni	CCB	< DL	3.00

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are < 10% of sample results

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Blank Data (continued)

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Ni	CCB	< DL	3.00
P	ICB	< DL	20.0
P	Meth_Blk	< DL	20.0
P	CCB	< DL	20.0
P	CCB	< DL	20.0
P	CCB	< DL	20.0
Zn	ICB	< DL	3.00
Zn	Meth_Blk	< DL	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00
Zn	ICB	< DL	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Ag	ICV	2500.	2518.	100.7
Ag	LL-CCV	10.00	9.283	92.8
Ag	LL-LCS	9.000	9.376	104.2
Ag	CCV	2500.	2363.	94.5
Ag	CCV	2500.	2292.	91.7
Ag	ICV	2500.	2516.	100.6
Ag	LL-CCV	10.00	7.793	77.9
Ag	CCV	2500.	2472.	98.9
Al	ICV	2500.	2501.	100.0
Al	LL-CCV	150.0	149.3	99.5
Al	LL-LCS	75.00	87.87	117.2
Al	CCV	2500.	2609.	104.4
Al	CCV	2500.	2616.	104.6
Al	CCV	2500.	2589.	103.6

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Al	CCV	2500.	2581.	103.2
Ba	ICV	2500.	2529.	101.2
Ba	LL-CCV	2.500	2.871	114.8
Ba	LL-LCS	1.500	1.725	115.0
Ba	CCV	2500.	2600.	104.0
Ba	CCV	2500.	2607.	104.3
Ba	CCV	2500.	2572.	102.9
Cr	ICV	2500.	2476.	99.0
Cr	LL-CCV	4.000	4.566	114.2
Cr	LL-LCS	2.000	2.208	110.4
Cr	CCV	2500.	2542.	101.7
Cr	CCV	2500.	2509.	100.4
Cr	CCV	2500.	2499.	100.0
Cr	ICV	2500.	2459.	98.4
Cr	LL-CCV	4.000	4.661	116.5
Cr	CCV	2500.	2449.	98.0
Cr	CCV	2500.	2449.	98.0
Cr	CCV	2500.	2469.	98.8
Mn	ICV	2500.	2552.	102.1
Mn	LL-CCV	1.500	1.698	113.2
Mn	LL-LCS	1.000	1.114	111.4
Mn	CCV	2500.	2623.	104.9
Mn	CCV	2500.	2591.	103.6
Mn	CCV	2500.	2572.	102.9
Ni	ICV	2500.	2426.	97.0
Ni	LL-CCV	15.00	15.34	102.3
Ni	LL-LCS	6.000	5.478	91.3
Ni	CCV	2500.	2476.	99.0
Ni	CCV	2500.	2430.	97.2
Ni	CCV	2500.	2435.	97.4
Ni	ICV	2500.	2396.	95.8
Ni	LL-CCV	15.00	14.94	99.6
Ni	CCV	2500.	2419.	96.8
Ni	CCV	2500.	2419.	96.8
Ni	CCV	2500.	2419.	96.8
P	ICV	2500.	2508.	100.3
P	LL-CCV	100.0	108.7	108.7

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS Limits are significant if sample results are >10X LL-LCS concentration

QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
P	LL-LCS	75.00	70.68	94.2
P	CCV	2500.	2548.	101.9
P	CCV	2500.	2550.	102.0
P	CCV	2500.	2569.	102.8
Zn	ICV	2500.	2517.	100.7
Zn	LL-CCV	15.00	16.53	110.2
Zn	LL-LCS	6.000	6.847	114.1
Zn	CCV	2500.	2582.	103.3
Zn	CCV	2500.	2545.	101.8
Zn	CCV	2500.	2537.	101.5
Zn	ICV	2500.	2501.	100.0
Zn	LL-CCV	15.00	17.60	117.3
Zn	CCV	2500.	2482.	99.3
Zn	CCV	2500.	2484.	99.4
Zn	CCV	2500.	2509.	100.4

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Ag	23-S1834	4.58	3.13	37.6 *
Al	23-S1834	2940	3020	2.65
Ba	23-S1834	85.4	85.1	0.43
Cr	23-S1834	3570	3560	0.28
Mn	23-S1834	65.9	65.6	0.46
Ni	23-S1834	26100	26200	0.42
P	23-S1834	441.	440.	0.16
Zn	23-S1834	435.	434.	0.07

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Ag	LCS	< 2	2550.	2500	102.
Ag	LCS-Duplicate	< 2	2579.	2500	103.
Ag	23-S1839	3.379	2536.	2500	101.
Al	kv:LL-CCV	149.3	2677.	2500	101.
Al	kv:LL-CCV	149.3	2697.	2500	102.
Al	23-S1839	3054.	8240.	5000	104.
Ba	LCS	< 0.5	2506.	2500	100.
Ba	LCS-Duplicate	< 0.5	2532.	2500	101.
Ba	23-S1839	26.65	2493.	2500	98.7
Cr	LCS	< 0.8	2572.	2500	103.
Cr	LCS-Duplicate	< 0.8	2562.	2500	102.
Cr	23-S1839	5172.	9513.	5000	86.8
Mn	LCS	< 0.3	2640.	2500	106.
Mn	LCS-Duplicate	< 0.3	2629.	2500	105.
Mn	23-S1839	70.99	2550.	2500	99.2
Ni	LCS	< 3	2575.	2500	103.
Ni	LCS-Duplicate	< 3	2597.	2500	104.
Ni	23-S1839	40250	84290	50000	88.1
P	LCS	< 20	2693.	2500	108.
P	LCS-Duplicate	< 20	2678.	2500	107.
P	23-S1839	437.3	3008.	2500	103.
Zn	LCS	< 3	2746.	2500	110.
Zn	LCS-Duplicate	< 3	2726.	2500	109.
Zn	23-S1839	565.9	3120.	2500	102.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Ag	LCS-Duplicate	2550.	2579.	1.13
Al	LCS-Duplicate	2677.	2697.	0.74
Ba	LCS-Duplicate	2506.	2532.	1.03
Cr	LCS-Duplicate	2572.	2562.	0.39
Mn	LCS-Duplicate	2640.	2629.	0.42
Ni	LCS-Duplicate	2575.	2597.	0.85
P	LCS-Duplicate	2693.	2678.	0.56
Zn	LCS-Duplicate	2746.	2726.	0.73

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
As	ICB	< DL	1.00
As	CCB	< DL	1.00
As	Meth_Blk	< 10	1.00
As	CCB	< DL	1.00
As	CCB	< DL	1.00
As	CCB	< DL	1.00
As	CCB	< DL	1.00
Be	ICB	< DL	0.020
Be	CCB	< DL	0.020
Be	Meth_Blk	< 0.2	0.020
Be	CCB	< DL	0.020
Be	CCB	< DL	0.020
Be	CCB	< DL	0.020
Be	CCB	< DL	0.020
Cd	ICB	< DL	0.020
Cd	CCB	< DL	0.020
Cd	Meth_Blk	< 0.2	0.020
Cd	CCB	< DL	0.020
Cd	CCB	< DL	0.020
Cd	CCB	< DL	0.020
Cd	CCB	< DL	0.020
Co	ICB	< DL	0.050
Co	CCB	< DL	0.050
Co	Meth_Blk	0.923	0.050
Co	CCB	< DL	0.050
Co	CCB	< DL	0.050
Co	CCB	< DL	0.050
Co	CCB	< DL	0.050
Cu	ICB	< DL	0.100
Cu	CCB	< DL	0.100
Cu	Meth_Blk	< 1	0.100
Cu	CCB	< DL	0.100
Cu	CCB	< DL	0.100
Cu	CCB	< DL	0.100
Cu	CCB	< DL	0.100
Pb	ICB	< DL	0.050
Pb	CCB	< DL	0.050
Pb	Meth_Blk	< 0.5	0.050
Pb	CCB	< DL	0.050

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are < 10% of sample results

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Blank Data (continued)

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Pb	CCB	< DL	0.050
Pb	CCB	< DL	0.050
Pb	CCB	< DL	0.050
Sb	ICB	< DL	0.400
Sb	CCB	< DL	0.400
Sb	Meth_Blk	< 4	0.400
Sb	CCB	< DL	0.400
Sb	CCB	< DL	0.400
Sb	CCB	< DL	0.400
Sb	CCB	< DL	0.400
Se	ICB	< DL	0.200
Se	CCB	< DL	0.200
Se	Meth_Blk	< 2	0.200
Se	CCB	< DL	0.200
Se	CCB	< DL	0.200
Se	CCB	< DL	0.200
Se	CCB	< DL	0.200
Tl	ICB	< DL	0.040
Tl	CCB	< DL	0.040
Tl	Meth_Blk	< 0.4	0.040
Tl	CCB	< DL	0.040
Tl	CCB	< DL	0.040
Tl	CCB	< DL	0.040
Tl	CCB	< DL	0.040
V	ICB	< DL	0.030
V	CCB	< DL	0.030
V	Meth_Blk	< 0.3	0.030
V	CCB	< DL	0.030
V	CCB	< DL	0.030
V	CCB	< DL	0.030
V	CCB	< DL	0.030

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
As	ICV	100.0	100.3	100.3
As	CCV	100.0	97.45	97.4
As	LL-LCS	20.00	25.02	125.1
As	CCV	100.0	95.55	95.6
As	CCV	100.0	94.68	94.7
As	CCV	100.0	95.66	95.7
As	CCV	100.0	95.83	95.8
Be	ICV	100.0	98.34	98.3
Be	CCV	100.0	95.78	95.8
Be	LL-LCS	0.500	0.505	101.0
Be	CCV	100.0	100.3	100.3
Be	CCV	100.0	102.2	102.2
Be	CCV	100.0	103.6	103.6
Be	CCV	100.0	101.1	101.1
Cd	ICV	100.0	98.99	99.0
Cd	CCV	100.0	96.14	96.1
Cd	LL-LCS	1.500	1.411	94.1
Cd	CCV	100.0	96.66	96.7
Cd	CCV	100.0	98.84	98.8
Cd	CCV	100.0	97.83	97.8
Cd	CCV	100.0	96.16	96.2
Co	ICV	100.0	99.22	99.2
Co	CCV	100.0	97.70	97.7
Co	LL-LCS	1.500	2.519	167.9
Co	CCV	100.0	99.13	99.1
Co	CCV	100.0	100.1	100.1
Co	CCV	100.0	100.1	100.1
Co	CCV	100.0	97.19	97.2
Cu	ICV	100.0	101.9	101.9
Cu	CCV	100.0	99.80	99.8
Cu	LL-LCS	15.00	15.26	101.7
Cu	CCV	100.0	100.2	100.2
Cu	CCV	100.0	101.4	101.4
Cu	CCV	100.0	102.1	102.1
Cu	CCV	100.0	98.39	98.4
Pb	ICV	100.0	100.8	100.8
Pb	CCV	100.0	98.03	98.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS Limits are insignificant if sample results are >10X LL-LCS concentration

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Pb	LL-LCS	15.00	14.19	94.6
Pb	CCV	100.0	96.09	96.1
Pb	CCV	100.0	97.32	97.3
Pb	CCV	100.0	95.65	95.6
Pb	CCV	100.0	95.43	95.4
Sb	ICV	100.0	99.17	99.2
Sb	CCV	100.0	95.90	95.9
Sb	LL-LCS	15.00	14.77	98.5
Sb	CCV	100.0	94.52	94.5
Sb	CCV	100.0	94.60	94.6
Sb	CCV	100.0	94.14	94.1
Sb	CCV	100.0	93.52	93.5
Se	ICV	100.0	99.65	99.6
Se	CCV	100.0	94.86	94.9
Se	LL-LCS	25.00	26.62	106.5
Se	CCV	100.0	93.45	93.4
Se	CCV	100.0	91.20	91.2
Se	CCV	100.0	91.73	91.7
Se	CCV	100.0	93.50	93.5
Tl	ICV	100.0	100.8	100.8
Tl	CCV	100.0	98.70	98.7
Tl	LL-LCS	30.00	28.87	96.2
Tl	CCV	100.0	96.86	96.9
Tl	CCV	100.0	99.48	99.5
Tl	CCV	100.0	97.49	97.5
Tl	CCV	100.0	97.72	97.7
V	ICV	100.0	100.3	100.3
V	CCV	100.0	98.62	98.6
V	LL-LCS	3.000	3.019	100.6
V	CCV	100.0	97.61	97.6
V	CCV	100.0	98.39	98.4
V	CCV	100.0	98.43	98.4
V	CCV	100.0	97.36	97.4

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
As	23-S1834	< 10	< 10	N/C *
Be	23-S1834	< 0.2	< 0.2	N/C *
Cd	23-S1834	5.03	4.84	3.83
Co	23-S1834	834.	813.	2.48
Cu	23-S1834	1280	1260	1.81
Pb	23-S1834	9.87	9.78	0.97
Sb	23-S1834	< 4	< 4	N/C *
Se	23-S1834	4.18	3.88	7.39
Tl	23-S1834	< 0.4	< 0.4	N/C *
V	23-S1834	10.1	9.69	4.20

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
As	LCS	< 10	2339.	2500	93.6
As	LCS-Duplicate	< 10	2353.	2500	94.1
As	23-S1839	< 10	904.5	1000	90.4
Be	LCS	< 0.2	2422.	2500	96.9
Be	LCS-Duplicate	< 0.2	2418.	2500	96.7
Be	23-S1839	< 0.2	932.9	1000	93.3
Cd	LCS	< 0.2	2401.	2500	96.0
Cd	LCS-Duplicate	< 0.2	2396.	2500	95.8
Cd	23-S1839	1.060	941.9	1000	94.1
Co	LCS	0.923	2531.	2500	101.
Co	LCS-Duplicate	0.923	2497.	2500	99.8
Co	23-S1839	1259.	2208.	1000	94.9
Cu	LCS	< 1	2557.	2500	102.
Cu	LCS-Duplicate	< 1	2514.	2500	101.
Cu	23-S1839	1582.	2539.	1000	95.7
Pb	LCS	< 0.5	2436.	2500	97.4
Pb	LCS-Duplicate	< 0.5	2432.	2500	97.3
Pb	23-S1839	4.594	930.3	1000	92.6

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Front Half
Report Number: 23-351

Laboratory Control Sample/Matrix Post Spike Analysis (continued)

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Sb	LCS	< 4	2333.	2500	93.3
Sb	LCS-Duplicate	< 4	2331.	2500	93.2
Sb	23-S1839	< 4	900.3	1000	90.0
Se	LCS	< 2	2337.	2500	93.5
Se	LCS-Duplicate	< 2	2328.	2500	93.1
Se	23-S1839	< 2	872.8	1000	87.3
Tl	LCS	< 0.4	2445.	2500	97.8
Tl	LCS-Duplicate	< 0.4	2430.	2500	97.2
Tl	23-S1839	< 0.4	945.1	1000	94.5
V	LCS	< 0.3	2417.	2500	96.7
V	LCS-Duplicate	< 0.3	2408.	2500	96.3
V	23-S1839	8.290	958.2	1000	95.0

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
As	LCS-Duplicate	2339.	2353.	0.60
Be	LCS-Duplicate	2422.	2418.	0.17
Cd	LCS-Duplicate	2401.	2396.	0.21
Co	LCS-Duplicate	2531.	2497.	1.35
Cu	LCS-Duplicate	2557.	2514.	1.70
Pb	LCS-Duplicate	2436.	2432.	0.16
Sb	LCS-Duplicate	2333.	2331.	0.09
Se	LCS-Duplicate	2337.	2328.	0.39
Tl	LCS-Duplicate	2445.	2430.	0.62
V	LCS-Duplicate	2417.	2408.	0.37

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Ag	ICB	< DL	2.00
Ag	Meth_Blk	< DL	2.00
Ag	CCB	< DL	2.00
Ag	CCB	< DL	2.00
Ag	CCB	< DL	2.00
Al	ICB	< DL	30.0
Al	Meth_Blk	< DL	30.0
Al	CCB	< DL	30.0
Al	CCB	< DL	30.0
Al	CCB	< DL	30.0
As	ICB	< DL	7.00
As	Meth_Blk	< DL	7.00
As	CCB	< DL	7.00
As	CCB	< DL	7.00
As	CCB	< DL	7.00
Ba	ICB	< DL	0.500
Ba	Meth_Blk	< DL	0.500
Ba	CCB	< DL	0.500
Ba	CCB	< DL	0.500
Ba	CCB	< DL	0.500
Be	ICB	< DL	0.200
Be	Meth_Blk	< DL	0.200
Be	CCB	< DL	0.200
Be	CCB	< DL	0.200
Be	CCB	< DL	0.200
Cr	ICB	< DL	0.800
Cr	Meth_Blk	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Cr	CCB	< DL	0.800
Cu	ICB	< DL	5.00
Cu	Meth_Blk	< DL	5.00
Cu	CCB	< DL	5.00
Cu	CCB	< DL	5.00
Cu	CCB	< DL	5.00
Mn	ICB	< DL	0.300
Mn	Meth_Blk	< DL	0.300
Mn	CCB	< DL	0.300
Mn	CCB	< DL	0.300

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are < 10% of sample results

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Blank Data (continued)

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Mn	CCB	< DL	0.300
Ni	ICB	< DL	3.00
Ni	Meth_Blk	< DL	3.00
Ni	CCB	< DL	3.00
Ni	CCB	< DL	3.00
Ni	CCB	< DL	3.00
P	ICB	< DL	20.0
P	Meth_Blk	< DL	20.0
P	CCB	< DL	20.0
P	CCB	< DL	20.0
P	CCB	< DL	20.0
Pb	ICB	< DL	5.00
Pb	Meth_Blk	< DL	5.00
Pb	CCB	< DL	5.00
Pb	CCB	< DL	5.00
Pb	CCB	< DL	5.00
Se	ICB	< DL	15.0
Se	Meth_Blk	< DL	15.0
Se	CCB	< DL	15.0
Se	CCB	< DL	15.0
Se	CCB	< DL	15.0
Tl	ICB	< DL	10.0
Tl	Meth_Blk	< DL	10.0
Tl	CCB	< DL	10.0
Tl	CCB	< DL	10.0
Tl	CCB	< DL	10.0
V	ICB	< DL	1.00
V	Meth_Blk	< DL	1.00
V	CCB	< DL	1.00
V	CCB	< DL	1.00
V	CCB	< DL	1.00
Zn	ICB	< DL	3.00
Zn	Meth_Blk	3.39	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00
Zn	CCB	< DL	3.00

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Ag	ICV	2500.	2496.	99.8
Ag	LL-CCV	10.00	9.577	95.8
Ag	LL-LCS	9.000	8.402	93.4
Ag	CCV	2500.	2469.	98.8
Ag	CCV	2500.	2416.	96.6
Ag	CCV	2500.	2277.	91.1
Al	ICV	2500.	2555.	102.2
Al	LL-CCV	150.0	152.2	101.5
Al	LL-LCS	75.00	142.9	190.5
Al	CCV	2500.	2550.	102.0
Al	CCV	2500.	2511.	100.4
Al	CCV	2500.	2515.	100.6
As	ICV	2500.	2513.	100.5
As	LL-CCV	35.00	32.90	94.0
As	LL-LCS	20.00	17.68	88.4
As	CCV	2500.	2525.	101.0
As	CCV	2500.	2546.	101.8
As	CCV	2500.	2550.	102.0
Ba	ICV	2500.	2557.	102.3
Ba	LL-CCV	2.500	2.669	106.8
Ba	LL-LCS	1.500	1.598	106.5
Ba	CCV	2500.	2540.	101.6
Ba	CCV	2500.	2531.	101.2
Ba	CCV	2500.	2552.	102.1
Be	ICV	2500.	2527.	101.1
Be	LL-CCV	1.000	1.006	100.6
Be	LL-LCS	0.500	0.372	74.4
Be	CCV	2500.	2523.	100.9
Be	CCV	2500.	2509.	100.4
Be	CCV	2500.	2498.	99.9
Cr	ICV	2500.	2488.	99.5
Cr	LL-CCV	4.000	4.593	114.8
Cr	LL-LCS	2.000	1.992	99.6
Cr	CCV	2500.	2505.	100.2
Cr	CCV	2500.	2508.	100.3
Cr	CCV	2500.	2538.	101.5
Cu	ICV	2500.	2392.	95.7

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS Limits are insignificant if sample results are >10X LL-LCS concentration

QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Cu	LL-CCV	25.00	27.31	109.2
Cu	LL-LCS	15.00	15.24	101.6
Cu	CCV	2500.	2416.	96.6
Cu	CCV	2500.	2416.	96.6
Cu	CCV	2500.	2457.	98.3
Mn	ICV	2500.	2566.	102.6
Mn	LL-CCV	1.500	1.721	114.7
Mn	LL-LCS	1.000	1.383	138.3
Mn	CCV	2500.	2586.	103.4
Mn	CCV	2500.	2586.	103.4
Mn	CCV	2500.	2621.	104.8
Ni	ICV	2500.	2443.	97.7
Ni	LL-CCV	15.00	15.68	104.5
Ni	LL-LCS	6.000	5.931	98.8
Ni	CCV	2500.	2450.	98.0
Ni	CCV	2500.	2456.	98.2
Ni	CCV	2500.	2461.	98.4
P	ICV	2500.	2527.	101.1
P	LL-CCV	100.0	105.7	105.7
P	LL-LCS	75.00	66.59	88.8
P	CCV	2500.	2510.	100.4
P	CCV	2500.	2462.	98.5
P	CCV	2500.	2460.	98.4
Pb	ICV	2500.	2455.	98.2
Pb	LL-CCV	25.00	26.88	107.5
Pb	LL-LCS	15.00	14.07	93.8
Pb	CCV	2500.	2415.	96.6
Pb	CCV	2500.	2418.	96.7
Pb	CCV	2500.	2415.	96.6
Se	ICV	2500.	2475.	99.0
Se	LL-CCV	75.00	81.05	108.1
Se	LL-LCS	30.00	32.14	107.1
Se	CCV	2500.	2460.	98.4
Se	CCV	2500.	2427.	97.1
Se	CCV	2500.	2400.	96.0
Tl	ICV	2500.	2472.	98.9
Tl	LL-CCV	50.00	53.14	106.3

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS Limits are insignificant if sample results are >10X LL-LCS concentration

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Tl	LL-LCS	30.00	29.80	99.3
Tl	CCV	2500.	2491.	99.6
Tl	CCV	2500.	2498.	99.9
Tl	CCV	2500.	2498.	99.9
V	ICV	2500.	2465.	98.6
V	LL-CCV	5.000	4.878	97.6
V	LL-LCS	3.000	2.567	85.6
V	CCV	2500.	2417.	96.7
V	CCV	2500.	2417.	96.7
V	CCV	2500.	2442.	97.7
Zn	ICV	2500.	2530.	101.2
Zn	LL-CCV	15.00	16.58	110.5
Zn	LL-LCS	6.000	8.323	138.7
Zn	CCV	2500.	2551.	102.0
Zn	CCV	2500.	2546.	101.8
Zn	CCV	2500.	2582.	103.3

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Ag	23-S1835	5.17	4.54	13.0 *
Al	23-S1835	355.	362.	1.95
As	23-S1835	< 7	< 7	N/C *
Ba	23-S1835	28.3	28.4	0.11
Be	23-S1835	< 0.2	< 0.2	N/C *
Cr	23-S1835	80.0	80.6	0.73
Cu	23-S1835	116.	115.	0.78
Mn	23-S1835	84.4	84.8	0.50
Ni	23-S1835	115.	114.	0.79
P	23-S1835	123.	126.	1.93
Pb	23-S1835	< 5	< 5	N/C *
Se	23-S1835	74.3	82.9	10.9 *
Tl	23-S1835	< 10	< 10	N/C *

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Replicate Data (continued)

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
V	23-S1835	1.80	1.80	0.28 *
Zn	23-S1835	280.	266.	5.13

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Ag	LCS	< 2	2285.	2500	91.4
Ag	LCS-Duplicate	< 2	2285.	2500	91.4
Ag	23-S1840	2.831	2214.	2500	88.4
Al	kv:LL-CCV	152.2	2566.	2500	96.6
Al	kv:LL-CCV	152.2	2395.	2500	89.7
Al	23-S1840	305.7	2536.	2500	89.2
As	LCS	< 7	2377.	2500	95.1
As	LCS-Duplicate	< 7	2403.	2500	96.1
As	23-S1840	< 7	2274.	2500	91.0
Ba	LCS	< 0.5	2462.	2500	98.5
Ba	LCS-Duplicate	< 0.5	2461.	2500	98.4
Ba	23-S1840	31.12	2373.	2500	93.7
Be	LCS	< 0.2	2398.	2500	95.9
Be	LCS-Duplicate	< 0.2	2449.	2500	98.0
Be	23-S1840	< 0.2	2290.	2500	91.6
Cr	LCS	< 0.8	2419.	2500	96.8
Cr	LCS-Duplicate	< 0.8	2428.	2500	97.1
Cr	23-S1840	32.21	2354.	2500	92.9
Cu	LCS	< 5	2322.	2500	92.9
Cu	LCS-Duplicate	< 5	2324.	2500	93.0
Cu	23-S1840	21.66	2253.	2500	89.3
Mn	LCS	< 0.3	2479.	2500	99.2
Mn	LCS-Duplicate	< 0.3	2488.	2500	99.5
Mn	23-S1840	221.1	2584.	2500	94.5
Ni	LCS	< 3	2352.	2500	94.1
Ni	LCS-Duplicate	< 3	2385.	2500	95.4

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-OES
Instrument: Perkin Elmer Optima 8300
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Laboratory Control Sample/Matrix Post Spike Analysis (continued)

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Ni	23-S1840	105.8	2362.	2500	90.2
P	LCS	< 20	2367.	2500	94.7
P	LCS-Duplicate	< 20	2382.	2500	95.3
P	23-S1840	140.6	2378.	2500	89.5
Pb	LCS	< 5	2314.	2500	92.6
Pb	LCS-Duplicate	< 5	2361.	2500	94.4
Pb	23-S1840	6.394	2208.	2500	88.1
Se	LCS	< 15	2385.	2500	95.4
Se	LCS-Duplicate	< 15	2420.	2500	96.8
Se	23-S1840	< 15	2238.	2500	89.5
Tl	LCS	< 10	2354.	2500	94.2
Tl	LCS-Duplicate	< 10	2395.	2500	95.8
Tl	23-S1840	< 10	2233.	2500	89.3
V	LCS	< 1	2366.	2500	94.6
V	LCS-Duplicate	< 1	2423.	2500	96.9
V	23-S1840	1.165	2313.	2500	92.5
Zn	LCS	3.387	2414.	2500	96.4
Zn	LCS-Duplicate	3.387	2452.	2500	97.9
Zn	23-S1840	190.1	2477.	2500	91.5

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Ag	LCS-Duplicate	2285.	2285.	0.00
Al	LCS-Duplicate	2566.	2395.	6.89
As	LCS-Duplicate	2377.	2403.	1.09
Ba	LCS-Duplicate	2462.	2461.	0.04
Be	LCS-Duplicate	2398.	2449.	2.10
Cr	LCS-Duplicate	2419.	2428.	0.37
Cu	LCS-Duplicate	2322.	2324.	0.09
Mn	LCS-Duplicate	2479.	2488.	0.36
Ni	LCS-Duplicate	2352.	2385.	1.39
P	LCS-Duplicate	2367.	2382.	0.63
Pb	LCS-Duplicate	2314.	2361.	2.01
Se	LCS-Duplicate	2385.	2420.	1.46
Tl	LCS-Duplicate	2354.	2395.	1.73
V	LCS-Duplicate	2366.	2423.	2.38
Zn	LCS-Duplicate	2414.	2452.	1.56

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Cd	ICB	< DL	0.020
Cd	Meth_Blk	< 0.2	0.020
Cd	CCB	< DL	0.020
Cd	CCB	< DL	0.020
Cd	CCB	< DL	0.020
Co	ICB	< DL	0.050
Co	Meth_Blk	1.51	0.050
Co	CCB	< DL	0.050
Co	CCB	< DL	0.050
Co	CCB	< DL	0.050
Sb	ICB	< DL	0.400
Sb	Meth_Blk	< 4	0.400
Sb	CCB	< DL	0.400
Sb	CCB	< DL	0.400
Sb	CCB	< DL	0.400

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Cd	ICV	100.0	98.99	99.0
Cd	LL-LCS	1.500	1.393	92.9
Cd	CCV	100.0	97.69	97.7
Cd	CCV	100.0	96.14	96.1
Cd	CCV	100.0	96.66	96.7
Co	ICV	100.0	99.22	99.2
Co	LL-LCS	1.500	2.933	195.5
Co	CCV	100.0	98.79	98.8
Co	CCV	100.0	97.70	97.7
Co	CCV	100.0	99.13	99.1
Sb	ICV	100.0	99.17	99.2
Sb	LL-LCS	15.00	13.90	92.7
Sb	CCV	100.0	97.78	97.8
Sb	CCV	100.0	95.90	95.9

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

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Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: ICP-MS
Instrument: Agilent 7850
Sample Description: EPA Method 29 Back Half
Report Number: 23-351

Calibration QC (continued)

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Sb	CCV	100.0	94.52	94.5

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-CCV Limits: 60% - 140% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Replicate Data

Analyte	Sample ID	Sample Conc. µg/L	Replicate Conc. µg/L	RPD
Cd	23-S1835	2.63	2.44	7.45
Co	23-S1835	3.64	3.55	2.53
Sb	23-S1835	< 4	< 4	N/C *

RPD = {(sample-replicate)/[(sample+replicate)/2]}x100
N/C: RPD is not calculated when sample or replicate is below detection limit
Replicate Limit: 20% RPD
*: per EPA CLP protocol, control limits do not apply if sample and/or replicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Post Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Cd	LCS	< 0.2	2422.	2500	96.9
Cd	LCS-Duplicate	< 0.2	2415.	2500	96.6
Cd	23-S1840	2.380	912.9	1000	91.1
Co	LCS	1.506	2430.	2500	97.1
Co	LCS-Duplicate	1.506	2455.	2500	98.1
Co	23-S1840	4.348	929.6	1000	92.5
Sb	LCS	< 4	2404.	2500	96.2
Sb	LCS-Duplicate	< 4	2338.	2500	93.5
Sb	23-S1840	< 4	916.5	1000	91.6

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Cd	LCS-Duplicate	2422.	2415.	0.29
Co	LCS-Duplicate	2430.	2455.	1.02
Sb	LCS-Duplicate	2404.	2338.	2.78

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	MB_FH	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.06	101.1
Hg	LL-LCS	0.020	0.023	115.0
Hg	LL-LCS	0.020	0.021	105.0
Hg	CCV	5.00	5.06	101.2
Hg	CCV	5.00	5.13	102.6
Hg	CCV	5.00	5.05	101.0
Hg	CCV	5.00	5.10	102.0
Hg	CCV	5.00	5.18	103.7
Hg	CCV	5.00	5.14	102.8

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1343	< 0.007	5.03	5.00	101.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.23	104.6
Hg	LL-LCS	0.020	0.022	110.0
Hg	CCV	5.00	5.40	108.0
Hg	CCV	5.00	5.21	104.3
Hg	CCV	5.00	5.22	104.3
Hg	CCV	5.00	5.19	103.7
Hg	CCV	5.00	5.19	103.8
Hg	CCV	5.00	5.16	103.2

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1840	0.087	5.28	5.00	104.
Hg	23-S1880	0.133	5.24	5.00	102.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.08	101.7
Hg	LL-LCS	0.020	0.018	90.0
Hg	CCV	5.00	5.02	100.5
Hg	CCV	5.00	5.02	100.4
Hg	CCV	5.00	5.05	101.0
Hg	CCV	5.00	5.22	104.3
Hg	CCV	5.00	5.05	101.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.09	101.7
Hg	LL-LCS	0.020	0.023	115.0
Hg	CCV	5.00	5.07	101.4
Hg	CCV	5.00	5.06	101.1
Hg	CCV	5.00	5.06	101.3

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1872	0.075	5.20	5.00	103.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.08	101.7
Hg	LL-LCS	0.020	0.018	90.0
Hg	CCV	5.00	5.16	103.1
Hg	CCV	5.00	5.15	103.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1907	0.075	5.13	5.00	101.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.05	101.0
Hg	LL-LCS	0.020	0.021	105.0
Hg	CCV	5.00	4.97	99.4
Hg	CCV	5.00	4.94	98.8
Hg	CCV	5.00	4.97	99.4

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1886	< 0.007	4.99	5.00	99.8

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.01	100.3
Hg	LL-LCS	0.020	0.021	105.0
Hg	CCV	5.00	5.07	101.5
Hg	CCV	5.00	5.07	101.4

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1838	0.037	5.10	5.00	101.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.33	106.6
Hg	LL-LCS	0.020	0.024	120.0
Hg	CCV	5.00	5.27	105.4
Hg	CCV	5.00	5.31	106.2
Hg	CCV	5.00	5.20	104.0

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1888	0.019	5.31	5.00	106.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	MB_FH	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.03	100.5
Hg	LL-LCS	0.020	0.014	70.0
Hg	CCV	5.00	5.08	101.5
Hg	CCV	5.00	5.08	101.7

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	LCS	< 0.007	4.61	5.00	92.2
Hg	LCS-Duplicate	< 0.007	4.58	5.00	91.6
Hg	23-S1834	< 0.007	5.11	5.00	102.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

LCS Duplicate Data

Analyte	Sample ID	Original Conc. µg/L	Replicate Conc. µg/L	RPD
Hg	LCS-Duplicate	4.61	4.58	0.70

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Cold Vapor Atomic Absorption
Instrument: Nippon 3320A CVAA
Sample Description: EPA Method 29
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Hg	ICB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007
Hg	CCB	< DL	0.007

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank
*: Sample Media Blank (SM_Blk) concentration in µg/filter
Method Blank is in control if Method Blank results are <10% of sample results

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Hg	ICV	5.00	5.05	100.9
Hg	LL-LCS	0.020	< 0.007	N/C
Hg	CCV	5.00	5.06	101.2
Hg	CCV	5.00	5.06	101.3
Hg	CCV	5.00	5.39	107.8

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

All samples analyzed in duplicate. The reported concentrations are the average of the two measurements.

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Hg	23-S1874	< 0.007	5.17	5.00	103.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery

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QA/QC Report

Client Name: Mostardi Platt
Project Number: M050
Analytical Technique: Ion Chromatography-PCR
Instrument: Aquion Cr VI IC (1)
Sample Description: SW-846 Method 0061
Report Number: 23-351

Blank Data

Analyte	Sample ID	Measured Conc. µg/L	DL Conc. µg/L
Cr VI	ICB	< DL	0.010
Cr VI	CCB	< DL	0.010
Cr VI	CCB	< DL	0.010
Cr VI	CCB	< DL	0.010
Cr VI	CCB	< DL	0.010

ICB: Initial Calibration Blank CCB: Continuing Calibration Blank

Calibration QC

Analyte	Sample ID	Standard Conc. µg/L	Measured Conc. µg/L	Percent Recovery
Cr VI	ICV	0.500	0.529	105.8
Cr VI	LL-LCS	0.030	0.048	160.0
Cr VI	CCV	0.500	0.527	105.4
Cr VI	CCV	0.500	0.528	105.6
Cr VI	CCV	0.500	0.537	107.4
Cr VI	CCV	0.500	0.533	106.6

ICV: Initial Calibration Verification CCV: Continuing Calibration Verification
Calibration Verification Limits: 90% - 110% Recovery
Low Level-LCS Limits: 50% - 150% Recovery
LL-LCS results are insignificant if sample results are >10x LL-LCS concentration

Duplicate Data

Analyte	Sample ID	Sample Conc. µg/L	Duplicate Conc. µg/L	RPD
Cr VI	23-S1930	261.	266.	1.71

RPD = {(sample-duplicate)/[(sample+duplicate)/2]}x100 Duplicate Limit: 20% RPD
N/C: RPD is not calculated when sample or duplicate is below detection limit
*: per EPA CLP protocol, control limits do not apply if sample and/or duplicate concentration is less than 5x the detection limit

Laboratory Control Sample/Matrix Spike Analysis

Analyte	Sample ID	Sample Conc. µg/L	Spike Conc. µg/L	Spike Amount µg/L	Percent Recovery
Cr VI	23-S1931	348.	620.	250.	109.

LCS Limit: 80% - 120% Recovery Spike Limit: 75% - 125% Recovery
*: per EPA CLP protocol, control limits do not apply if spike concentration is less than 25% of the sample concentration

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SOURCE SAMPLE RECEIPT CHECKLIST

Client	Mostardi Platt	Date	6/30/2023
# Runs	18 + blanks	Report #	23-351

Package intact?	hand delivered	
Chain-of-Custody form inspected	✓	
CoC present with samples?	✓	
CoC indicates analytical methodology to be used? (eg M29, etc.)	EPA 29, 0061	!!
Has CoC been signed by client?	No	
Custody release date and time noted on CoC?	✓	
All sample containers inspected	✓	
Does number of samples match number on CoC form?	✓	!!
Do all sample ID numbers match those on the CoC form?	✓	!!
Did client mark sample volumes prior to shipment?	No	
Sample temperature recorded?	✓ for 0061	
Are the sample containers intact?	✓	!!
If present, Audit Sample intact?	n/a	!!
Are signs of leakage present?	No	*
Chain-of-Custody form signed and dated by CLN	✓	
Corrective actions		
Client contacted due to mismatching sample ID numbers	—	
Client contacted due to broken sample container(s)	—	
Client contacted due to leaking sample container(s)	—	
Client contacted for verification of methodology?	✓	
Corrective actions documented?	✓	
Corrective actions accomplished?	✓	

Items marked !! shall be addressed ***prior to any analytical work being started****.*
*Items marked * shall be* ***noted in case narrative*** *upon reporting of results to client.*

Signed Pat DL

Notes Called Eric to confirm analytes. CrVI only for 0061 samples. Cu should be on M29 list of metals.

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23-351

Chain-of-Custody Form						
Project Number: M232604			Date Results Required:			
Client: PCC Structurals			TAT Required:			
Plant/Test Location: LPC – Milwaukie, OR			Project Supervisor: EE			
Sample Number	Sample Date	Sample Point Identification	# of Conts	Sub Lab	Analysis Required	Volume, mls
001	6/27/23	9203 North Inlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
002	6/27/23	9203 North Inlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
003	6/30/23	9203 North Inlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
004	6/30/23	9203 North Inlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
005	6/27/23	9203 Center Inlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
006	6/27/23	9203 Center Inlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
007	6/30/23	9203 Center Inlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
008	6/30/23	9203 Center Inlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
009	6/27/23	9203 South Inlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
010	6/27/23	9203 South Inlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
011	6/30/23	9203 South Inlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
012	6/30/23	9203 South Inlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
013	6/27/23	9203 North Outlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	

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014	6/27/23	9203 North Outlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
015	6/30/23	9203 North Outlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
016	6/30/23	9203 North Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
017	6/27/23	9203 South Outlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
018	6/27/23	9203 South Outlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
019	6/30/23	9203 South Outlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
020	6/30/23	9203 South Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
021	6/28/23	9256 Inlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
022	6/28/23	9256 Inlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
023	6/29/23	9256 Inlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
024	6/29/23	9256 Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
025	6/28/23	9256 Outlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
026	6/28/23	9256 Outlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
027	6/29/23	9256 Outlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
028	6/29/23	9256 Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
029	6/28/23	8901 Inlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	

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030	6/28/23	8901 Inlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
031	6/29/23	8901 Inlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
032	6/29/23	8901 Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
033	6/28/23	8901 Outlet #1 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
034	6/28/23	8901 Outlet #1 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
035	6/29/23	8901 Outlet #2 M29 – Filter and 0.1N HNO3 probe wash	2		M29*	
036	6/29/23	8901 Outlet #2 M29 – HNO3/H2O2 imps, 0.1N Rinse of empty imp, KMnO4/H2SO4 Imps, HCl Rinse	4		M29*	
037	6/27/23	9203 North Inlet #1 0061 0.5M KOH	1		0061 23-5	1930
038	6/30/23	9203 North Inlet #2 0061 0.5M KOH	1		0061	1931
039	6/27/23	9203 Center Inlet #1 0061 0.5M KOH	1		0061	1932
040	6/30/23	9203 Center Inlet #2 0061 0.5M KOH	1		0061	1933
041	6/27/23	9203 South Inlet #1 0061 0.5M KOH	1		0061	1934
042	6/30/23	9203 South Inlet #2 0061 0.5M KOH	1		0061	1935
043	6/27/23	9203 North Outlet #1 0061 0.5M KOH	1		0061	1936
044	6/30/23	9203 North Outlet #2 0061 0.5M KOH	1		0061	1937
045	6/27/23	9203 South Outlet #1 0061 0.5M KOH	1		0061	1938
046	6/30/23	9203 South Outlet #2 0061 0.5M KOH	1		0061	1939
047	6/28/23	9256 Inlet #1 0061 0.5M KOH	1		0061	1940
048	6/29/23	9256 Inlet #2 0061 0.5M KOH	1		0061	1941
049	6/28/23	9256 Outlet #1 0061 0.5M KOH	1		0061	1942
050	6/29/23	9256 Outlet #2 0061 0.5M KOH	1		0061	1943
051	6/28/23	8901 Inlet #1 0061 0.5M KOH	1		0061	1944
052	6/29/23	8901 Inlet #2 0061 0.5M KOH	1		0061	1945

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053	6/28/23	8901 Outlet #1 0061 0.5M KOH	1		0061	23-S1946
054	6/29/23	8901 Outlet #2 0061 0.5M OKH	1		0061	1947
055	6/30/23	0.1N HNO3 Reagent Blank	1		M29*	
056	6/30/23	DI Water Reagent Blank	1		M29*	
057	6/30/23	HNO3/H2O2 Reagent Blank	1		M29*	
058	6/30/23	KMnO4/H2SO4 Reagent Blank	1		M29*	
059	6/30/23	8N HCl Reagent Blank	1		M29*	
060	6/30/23	Filter Blank	3		M29*	
061	6/30/23	0.5M KOH Reagent Blank	1		0061	23-S1948
062	6/30/23	DI Reagent Blank	1		0061	1949

Delivered to Lab by: Date/Time:	Received by: Date/Time: 6.30.23 @1815	Processed by: Date/Time:

Laboratory Notes: *M29 target metals include: Aluminum, Arsenic, Antimony, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, Phosphorous, Selenium, Silver, Thallium, Vanadium, Zinc.

0061 recd temp 6°C

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23-S1834	9203 N Inlet #1 Filter & Probe
23-S1835	9203 N Inlet #1 HNO3/H2O2
23-S1836	9203 N Inlet #1 Empty Imp
23-S1837	9203 N Inlet #1 KMnO4
23-S1838	9203 N Inlet #1 HCl Rinse
23-S1839	9203 N Inlet #2 Filter & Probe
23-S1840	9203 N Inlet #2 HNO3/H2O2
23-S1841	9203 N Inlet #2 Empty Imp
23-S1842	9204 N Inlet #2 KMnO4
23-S1843	9203 N Inlet #2 HCl Rinse
23-S1844	9203 C Inlet #1 Filter & Probe
23-S1845	9203 C Inlet #1 HNO3/H2O2
23-S1846	9203 C Inlet #1 Empty Imp
23-S1847	9203 C Inlet #1 KMnO4
23-S1848	9203 C Inlet #1 HCl Rinse
23-S1849	9203 C Inlet #2 Filter & Probe
23-S1850	9203 C Inlet #2 HNO3/H2O2
23-S1851	9203 C Inlet #2 Empty Imp
23-S1852	9203 C Inlet #2 KMnO4
23-S1853	9203 C Inlet #2 HCl Rinse
23-S1854	9203 S Inlet #1 Filter & Probe
23-S1855	9203 S Inlet #1 HNO3/H2O2
23-S1856	9203 S Inlet #1 Empty Imp
23-S1857	9203 S Inlet #1 KMnO4
23-S1858	9203 S Inlet #1 HCl Rinse
23-S1859	9203 S Inlet #2 Filter & Probe
23-S1860	9203 S Inlet #2 HNO3/H2O2
23-S1861	9203 S Inlet #2 Empty Imp
23-S1862	9203 S Inlet #2 KMnO4
23-S1863	9203 S Inlet #2 HCl Rinse
23-S1864	9203 N Outlet #1 Filter & Probe
23-S1865	9203 N Outlet #1 HNO3/H2O2
23-S1866	9203 N Outlet #1 Empty Imp
23-S1867	9203 N Outlet #1 KMnO4
23-S1868	9203 N Outlet #1 HCl Rinse
23-S1869	9203 N Outlet #2 Filter & Probe
23-S1870	9203 N Outlet #2 HNO3/H2O2
23-S1871	9203 N Outlet #2 Empty Imp
23-S1872	9203 N Outlet #2 KMnO4
23-S1873	9203 N Outlet #2 HCl Rinse
23-S1874	9203 S Outlet #1 Filter & Probe
23-S1875	9203 S Outlet #1 HNO3/H2O2
23-S1876	9203 S Outlet #1 Empty Imp
23-S1877	9203 S Outlet #1 KMnO4
23-S1878	9203 S Outlet #1 HCl Rinse
23-S1879	9203 S Outlet #2 Filter & Probe
23-S1880	9203 S Outlet #2 HNO3/H2O2
23-S1881	9203 S Outlet #2 Empty Imp
23-S1882	9203 S Outlet #2 KMnO4
23-S1883	9203 S Outlet #2 HCl Rinse
23-S1884	9256 Inlet #1 Filter & Probe
23-S1885	9256 Inlet #1 HNO3/H2O2
23-S1886	9256 Inlet #1 Empty Imp
23-S1887	9256 Inlet #1 KMnO4
23-S1888	9256 Inlet #1 HCl Rinse
23-S1889	9256 Inlet #2 Filter & Probe
23-S1890	9256 Inlet #2 HNO3/H2O2
23-S1891	9256 Inlet #2 Empty Imp
23-S1892	9256 Inlet #2 KMnO4
23-S1893	9256 Inlet #2 HCl Rinse
23-S1894	9256 Outlet #1 Filter & Probe
23-S1895	9256 Outlet #1 HNO3/H2O2
23-S1896	9256 Outlet #1 Empty Imp
23-S1897	9256 Outlet #1 KMnO4
23-S1898	9256 Outlet #1 HCl Rinse
23-S1899	9256 Outlet #2 Filter & Probe
23-S1900	9256 Outlet #2 HNO3/H2O2
23-S1901	9256 Outlet #2 Empty Imp
23-S1902	9256 Outlet #2 KMnO4
23-S1903	9256 Outlet #2 HCl Rinse
23-S1904	8901 Inlet #1 Filter & Probe
23-S1905	8901 Inlet #1 HNO3/H2O2
23-S1906	8901 Inlet #1 Empty Imp
23-S1907	8901 Inlet #1 KMnO4
23-S1908	8901 Inlet #1 HCl Rinse
23-S1909	8901 Inlet #2 Filter & Probe
23-S1910	8901 Inlet #2 HNO3/H2O2
23-S1911	8901 Inlet #2 Empty Imp
23-S1912	8901 Inlet #2 KMnO4
23-S1913	8901 Inlet #2 HCl Rinse
23-S1914	8901 Outlet #1 Filter & Probe
23-S1915	8901 Outlet #1 HNO3/H2O2
23-S1916	8901 Outlet #1 Empty Imp
23-S1917	8901 Outlet #1 KMnO4
23-S1918	8901 Outlet #1 HCl Rinse
23-S1919	8901 Outlet #2 Filter & Probe
23-S1920	8901 Outlet #2 HNO3/H2O2
23-S1921	8901 Outlet #2 Empty Imp
23-S1922	8901 Outlet #2 KMnO4
23-S1923	8901 Outlet #2 HCl Rinse
23-S1924	Filter Blank
23-S1925	0.1N HNO3 Blank
23-S1926	HNO3/H2O2 Blank
23-S1927	DI Water Blank
23-S1928	KMnO4/H2SO4 Blank
23-S1929	8N HCl Blank

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RAW DATA

Available upon request

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Inlet
Test Method: 29
Source Condition: Batch Process

		Run 1	Run 2
Identify Analyte:	Aluminum (Al)		
Molecular Weight:	26.98	ADL	ADL
ug (net) collected:		9500.385	1328.005
Identify Analyte:	Antimony (Sb)		
Molecular Weight:	121.76	BDL	BDL
ug (net) collected:		1.44	1.44
Identify Analyte:	Arsenic (As)		
Molecular Weight:	74.92	DLL	BDL
ug (net) collected:		9.69	3.277
Identify Analyte:	Barium (Ba)		
Molecular Weight:	137.33	ADL	ADL
ug (net) collected:		51.69	12.33
Identify Analyte:	Beryllium (Be)		
Molecular Weight:	9.01	DLL	BDL
ug (net) collected:		0.248	0.072
Identify Analyte:	Cadmium (Cd)		
Molecular Weight:	112.41	ADL	ADL
ug (net) collected:		2.794	0.416
Identify Analyte:	Chromium (Cr)		
Molecular Weight:	52	ADL	ADL
ug (net) collected:		145004.4	2841.995
Identify Analyte:	Cobalt (Co)		
Molecular Weight:	58.93	ADL	ADL
ug (net) collected:		80801.96	1150.257
Identify Analyte:	Copper (Cu)		
Molecular Weight:	63.55	ADL	ADL
ug (net) collected:		50.81	5.99

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Client:	**PCC Structurals, Inc.**		
Facility:	**Large Parts Campus Facility - Milwaukie, OR**		
Test Location:	**BH8901 Inlet**		
Test Method:	**29**		
Source Condition:		**Batch Process**	
		Run 1	**Run 2**
Identify Analyte:	Lead (Pb)		
Molecular Weight:	207.2	ADL	ADL
ug (net) collected:		8.12	2.31
Identify Analyte:	Manganese (Mn)		
Molecular Weight:	54.94	ADL	ADL
ug (net) collected:		136.067	319.767
Identify Analyte:	Mercury (Hg)		
Molecular Weight:	200.59	DLL	DLL
ug (net) collected:		0.65423	0.59154
Identify Analyte:	Nickel (Ni)		
Molecular Weight:	58.69	ADL	ADL
ug (net) collected:		341018.5	8126.65
Identify Analyte:	Phosphorus (P)		
Molecular Weight:	30.97	ADL	ADL
ug (net) collected:		373.16	107.54
Identify Analyte:	Selenium (Se)		
Molecular Weight:	78.96	ADL	BDL
ug (net) collected:		4.04	2.16
Identify Analyte:	Silver (Ag)		
Molecular Weight:	107.87	ADL	DLL
ug (net) collected:		86.226	4.992
Identify Analyte:	Thallium (Tl)		
Molecular Weight:	204.38	DLL	BDL
ug (net) collected:		1.201	1.21
Identify Analyte:	Vanadium (V)		
Molecular Weight:	50.94	DLL	DLL
ug (net) collected:		70.71	3.951
Identify Analyte:	Zinc (Zn)		
Molecular Weight:	65.38	ADL	ADL
ug (net) collected:		2493.581	94.081

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Client: PCC Structurals, Inc.
Facility: Large Parts Campus Facility - Milwaukie, OR
Test Location: BH8901 Outlet
Test Method: 29
Source Condition: Batch Process

		Run 1	Run 2
Identify Analyte:	Aluminum (Al)		
Molecular Weight:	26.98	ADL	ADL
ug (net) collected:		547.675	541.5
Identify Analyte:	Antimony (Sb)		
Molecular Weight:	121.76	BDL	BDL
ug (net) collected:		1.54	1.532
Identify Analyte:	Arsenic (As)		
Molecular Weight:	74.92	BDL	BDL
ug (net) collected:		3.445	3.431
Identify Analyte:	Barium (Ba)		
Molecular Weight:	137.33	ADL	DDL
ug (net) collected:		5.59	2.8
Identify Analyte:	Beryllium (Be)		
Molecular Weight:	9.01	BDL	BDL
ug (net) collected:		0.077	0.077
Identify Analyte:	Cadmium (Cd)		
Molecular Weight:	112.41	ADL	ADL
ug (net) collected:		1.101	0.161
Identify Analyte:	Chromium (Cr)		
Molecular Weight:	52	ADL	ADL
ug (net) collected:		117.385	9.525
Identify Analyte:	Cobalt (Co)		
Molecular Weight:	58.93	ADL	ADL
ug (net) collected:		2.883	1.117
Identify Analyte:	Copper (Cu)		
Molecular Weight:	63.55	ADL	ADL
ug (net) collected:		6.37	5.1

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Client:	**PCC Structurals, Inc.**		
Facility:	**Large Parts Campus Facility - Milwaukie, OR**		
Test Location:	**BH8901 Outlet**		
Test Method:	**29**		
Source Condition:		**Batch Process**	
		Run 1	**Run 2**
Identify Analyte:	Lead (Pb)		
Molecular Weight:	207.2	ADL	DLL
ug (net) collected:		1.381	0.884
Identify Analyte:	Manganese (Mn)		
Molecular Weight:	54.94	ADL	ADL
ug (net) collected:		33.657	33.547
Identify Analyte:	Mercury (Hg)		
Molecular Weight:	200.59	DLL	DLL
ug (net) collected:		0.44952	0.48844
Identify Analyte:	Nickel (Ni)		
Molecular Weight:	58.69	ADL	ADL
ug (net) collected:		104.56	27.48
Identify Analyte:	Phosphorus (P)		
Molecular Weight:	30.97	ADL	ADL
ug (net) collected:		101.925	95.1
Identify Analyte:	Selenium (Se)		
Molecular Weight:	78.96	DLL	BDL
ug (net) collected:		4.19	2.5
Identify Analyte:	Silver (Ag)		
Molecular Weight:	107.87	DLL	BDL
ug (net) collected:		13.37	1.266
Identify Analyte:	Thallium (Tl)		
Molecular Weight:	204.38	BDL	BDL
ug (net) collected:		1.45	1.43
Identify Analyte:	Vanadium (V)		
Molecular Weight:	50.94	DLL	DLL
ug (net) collected:		0.947	0.237
Identify Analyte:	Zinc (Zn)		
Molecular Weight:	65.38	ADL	ADL
ug (net) collected:		33.081	30.281

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Client:	**PCC Structurals, Inc.**		
Facility:	**Large Parts Campus Facility - Milwaukie, OR**		
Test Location:	**BH8901 Inlet**		
Test Method:	**0061**		
Source Condition:		**Batch Process**	
		Run 1	**Run 2**
Identify Analyte:	Hexavalent Chromium (Cr+6)		
Molecular Weight:	52	ADL	ADL
ug (net) collected:		14.9704	1.1504

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Client:	**PCC Structurals, Inc.**		
Facility:	**Large Parts Campus Facility - Milwaukie, OR**		
Test Location:	**BH8901 Outlet**		
Test Method:	**0061**		
Source Condition:		**Batch Process**	
		Run 1	**Run 2**
Identify Analyte:	Hexavalent Chromium (Cr+6)		
Molecular Weight:	52	ADL	ADL
ug (net) collected:		6.9804	2.9604

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END OF THE REPORT

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