Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Runs 1-3 Only

Source Information

Company Name	**Stericycle**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Stack Designation:	**Incinerator Stack**

CO2 Interferece w/CO: ☐ Yes

Wet CEM: ☐ Yes

Correct For O2: ☑ Yes

Test & Review Dates

Test Date:	**12/27-28/2011**	High Flow Test Date:	1/0/1900
Review Date:	3/29/2012	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm	55.0	250.0		0.667	335.800	
Percent						
%O2 Correction as a whole #	**7.00**	**7.00**				

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	fuel flow rate (Btu/hr)	Heat Input (Btu/hr.)
22.50	2.76	1.0280	1.778	0.84	26.15	-0.05		
Round								

Heat Input

Contractor Information

Contact:	Tim Rhodes
Contracting Company:	Rhodes Environmental Testing
Address:	P.O. Box 526112, Salt Lake City, Utah 84152-6112
Phone No.:	801-485-1419 {rhodes@xmission.com}
Project No.:	

☐ F factor used

Diluent

○ O2

○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite 2	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
OIL		○ 9190	○ 320	○ 1420
GAS	Natural	○ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

Tabs Are Sh

Document Date 5/10/2013

DAQ-2013-005300

Division of Air Quality

Reference Methods 2, 3A, 6C, 7E, 10 & 19

Stericycle

Incinerator Stack

lbs/MMBTU
- O2
- CO2
- Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu			
lbs/hr			
ppm	0.67	335.80	
ppm corrected for %O2			

Average % concentration

CO_2	O_2
5.62	13.34

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2
						O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	-1.662E-08	2.210E-05				
lbs/hr				5.64	13.16	C For Cal Drift
ppm corrected for %O	-0.18	332.28		5.61	13.33	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	1.662E-08	2.045E-05				
lbs/hr				5.40	13.64	C For Cal Drift
ppm corrected for %O	0.19	327.77		5.41	13.56	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	1.828E-07	2.291E-05				
lbs/hr				5.81	13.22	C For Cal Drift
ppm corrected for %O	1.99	347.35		5.85	13.02	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Source Information

Company Name	**Stericycle**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Stack Designation:	**Incinerator Stack**

CO2 Interferece w/CO: ☐ Yes

Wet CEM: ☐ Yes

Correct For O2: ☑ Yes

Test & Review Dates

Test Date:	**12/27-28/2011**	High Flow Test Date:	1/0/1900
Review Date:	3/29/2012	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm	55.0	250.0		0.972	261.858	
Percent						
%O2 Correction as a whole #	**7.00**	**7.00**				

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	fuel flow rate (Btu/hr)	Heat Input (Btu/hr.)
22.50	2.76	1.0280	1.778	0.84	26.15	-0.05		
Round								

Heat Input

Contractor Information

Contact:	Tim Rhodes
Contracting Company:	Rhodes Environmental Testing
Address:	P.O. Box 526112, Salt Lake City, Utah 84152-6112
Phone No.:	801-485-1419 {rhodes@xmission.com}
Project No.:	

☐ F factor used

Diluent

○ O2

○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite 2	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
OIL		○ 9190	○ 320	○ 1420
GAS	Natural	○ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

Tabs Are Sh

Stericycle NOx 2-24-12

Division of Air Quality

Reference Methods 2, 3A, 6C, 7E, 10 & 19

Stericycle

Incinerator Stack

lbs/MMBTU
- O2
- CO2
- Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu			
lbs/hr			
ppm	0.97	261.86	
ppm corrected for %O2			

Average % concentration

CO_2	O_2
5.37	13.44

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2 / O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	-1.662E-08	2.210E-05				
lbs/hr				5.64	13.16	C For Cal Drift
ppm corrected for %O	-0.18	332.28		5.61	13.33	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	1.662E-08	2.045E-05				
lbs/hr				5.40	13.64	C For Cal Drift
ppm corrected for %O	0.19	327.77		5.41	13.56	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	1.828E-07	2.291E-05				
lbs/hr				5.81	13.22	C For Cal Drift
ppm corrected for %O	1.99	347.35		5.85	13.02	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	4.986E-08	1.467E-05				
lbs/hr				5.28	13.61	C For Cal Drift
ppm corrected for %O	0.57	234.19		5.25	13.51	Raw Value

Division of Air Quality

Reference Methods 2, 3A, 6C, 7E, 10 & 19

Stericycle

Incinerator Stack

lbs/MMBTU
- O2
- CO2
- Clear

Run 5

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	2.160E-07	1.088E-05				
lbs/hr				4.90	13.79	C For Cal Drift
ppm corrected for %O	2.54	178.00		4.87	13.99	Raw Value

Run 6

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	6.648E-08	1.003E-05				
lbs/hr				5.21	13.20	C For Cal Drift
ppm corrected for %O	0.72	151.56		5.23	13.57	Raw Value

Run 7

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Run 8

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Run 9

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Stericycle NOx 2-24-12

Division of Air Quality

Reference Methods 2, 3A, 6C, 7E, 10 & 19

Stericycle

Incinerator Stack

lbs/MMBTU
- O2
- CO2
- Clear

Run 10

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Run 11

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						Corrected for Moisture
ppm corrected for %O				0.00	0.00	Raw Value

Run 12

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						Corrected for Moisture
ppm corrected for %O				0.00	0.00	Raw Value

Calibration Error Test

Test Date December 19, 2011			O_2				
		CS - Cal. Span	24.19				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	**0.00**	**0.03**	**0.03**	**0.12%**	**Passed Cal.**
		Mid-level	**10.98**	**11.28**	**0.30**	**1.24%**	**Passed Cal.**
		High-level	**24.19**	**24.46**	**0.27**	**1.12%**	**Passed Cal.**
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of CS - Cal. Span		Low-Level	**0.00%**				
40 to 60% of Cal. Span		Mid-level	**45.39%**				
100% of Cal. Span		High-level	**100.00%**				

Test Date December 19, 2011			CO_2				
		CS - Cal. Span	19.60				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	**0.00**	**0.11**	**0.11**	**0.561%**	**Passed Cal.**
		Mid-level	**9.90**	**9.91**	**0.01**	**0.051%**	**Passed Cal.**
		High-level	**19.60**	**19.70**	**0.10**	**0.510%**	**Passed Cal.**
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	**0.00%**				
40 to 60% of Cal. Span		Mid-level	**50.51%**				
100% of Cal. Span		High-level	**100.00%**				

Test Date December 19, 2011			SO2				
		CS - Cal. Span	49.44				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	**0.00**	**-0.20**	**0.20**	**0.405%**	**Passed Cal.**
		Mid-level	**25.25**	**24.70**	**0.55**	**1.112%**	**Passed Cal.**
		High-level	**49.44**	**49.30**	**0.14**	**0.283%**	**Passed Cal.**
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	**0.00%**				
40 to 60% of Cal. Span		Mid-level	**51.07%**				
100% of Cal. Span		High-level	**100.00%**				

Test Date December 19, 2011			NOx				
		CS - Cal. Span	289.00				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	**0.00**	**0.50**	**0.50**	**0.173%**	**Passed Cal.**
		Mid-level	**180.00**	**179.10**	**0.90**	**0.311%**	**Passed Cal.**
		High-level	**289.00**	**284.20**	**4.80**	**1.661%**	**Passed Cal.**
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	**0.00%**				
40 to 60% of Cal. Span		Mid-level	**62.28%**	**out of range**			
100% of Cal. Span		High-level	**100.00%**				

Test Date			CO				
		CS - Cal. Span					
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level					
		Mid-level					
		High-level					
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level					
40 to 60% of Cal. Span		Mid-level					
100% of Cal. Span		High-level					

Division of Air Quality Stack Test Review of

Stericycle

	SO_2	NO_X	CO	CO_2	O_2
CS Calibration Span	49.44	289.00		19.60	24.19
Units	ppm	ppm	ppm	%	%
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.00**	**0.00**		**0.00**	**0.00**
Mid-Level	**25.25**	**180.00**		**9.90**	**10.98**
High-Level	**49.44**	**289.00**		**19.60**	**24.19**
0 to 20% of Cal. Span	**0.00%**	**0.00%**		**0.00%**	**0.00%**
40 to 60% of Cal. Span	**51.1%**	**62.3%**		**50.5%**	**45.4%**
100% of Cal. Span	**100.0%**	**100.0%**		**100.0%**	**100.0%**

Incinerator Stack

☐ CO Calibration Gas

Unprotectec

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{Dir} C_{MA}	**25.25**	**180.00**		**9.90**	**10.98**

Calibration Error Test

Cs - Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**-0.20**	**0.50**		**0.11**	**0.03**
Mid-Level	**24.70**	**179.10**		**9.91**	**11.28**
High-Level	**49.30**	**284.20**		**19.70**	**24.46**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	**24.70**	**179.10**		**9.91**	**11.28**

NOTE
These cells sc appropriate (after the Cm entered.

If this scan is the Cma and gas value.

Low-Level	0.40%	0.17%		0.56%	0.12%
ppmdv Difference	0.2	0.5		0.11	0.03
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level	1.11%	0.31%		0.05%	1.24%
ppmdv Difference	0.55	0.9		0.01	0.3
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level	0.28%	1.66%		0.51%	1.12%
ppmdv Difference	0.14	4.8		0.1	0.27
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	**-0.20**	**0.50**		**0.13**	**0.40**
SBi - Zero Bias	0.00%	0.00%	TRUE	0.10%	1.53%
Difference	0	0	TRUE	0.02	0.37
Pass or Failed Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	**24.70**	**179.10**		**9.76**	**11.38**
SBi - Up-Scale Bias	0.00%	0.00%	TRUE	0.77%	0.41%
Difference	0.00	0.00	TRUE	0.15	0.10
Pass or Failed Invalid Run	**Passed Cal.**	**Passed Cal.**	**TRUE**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 12/19/2011

	SO_2	NO_X	CO	CO_2	O_2
	-0.3	**180.1**		**5.6**	**13.3**
	0.5%	**62.3%**	**0.0%**	**28.6%**	**55.1%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	-0.20	0.10		0.14	-0.11
SBi - Zero Bias	0.00%	0.14%	TRUE	0.15%	0.58%
Difference	**0.0**	**0.4**	**TRUE**	**0.0**	**0.1**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	23.20	171.40		9.72	10.90
SBi - Up-Scale Bias	3.03%	2.66%	TRUE	0.97%	1.57%
Difference	1.5	7.7	TRUE	0.2	0.4
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☑ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.00%	0.14%	TRUE	0.05%	0.95%
Difference	0.0	0.4	TRUE	0.0	0.5
Pass or Re-Calibrate	**Pass**	**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	3.03%	2.66%	TRUE	0.20%	1.16%
Difference	**1.5**	**7.7**	**TRUE**	**0.0**	**0.5**
Pass or Re-Calibrate	**Re-Cal.**	**Pass**		**Pass**	**Pass**

Drift
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*Incinerator Stack*
CS Calibration Span	49.44	289.00		19.60	24.19	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**		**0.00**	**0.00**	
Mid-Level	**25.25**	**180.00**		**9.90**	**10.98**	
High-Level	**49.44**	**289.00**		**19.60**	**24.19**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**		**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**51.1%**	**62.3%**		**50.5%**	**45.4%**	
100% of Cal. Span	**100.0%**	**100.0%**		**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	25.25	180.00		9.90	10.98

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**-0.20**	**0.50**		**0.11**	**0.03**
Mid-Level	**24.70**	**179.10**		**9.91**	**11.28**
High-Level	**49.30**	**284.20**		**19.70**	**24.46**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	24.70	179.10		9.91	11.28
Low-Level	0.40%	0.17%		0.56%	0.12%
ppmdv Difference	0.2	0.5		0.11	0.03
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level	1.11%	0.31%		0.05%	1.24%
ppmdv Difference	0.55	0.9		0.01	0.3
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level	0.28%	1.66%		0.51%	1.12%
ppmdv Difference	0.14	4.8		0.1	0.27
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	-0.20	0.10		0.14	-0.11
SBi - Zero Bias	0.00%	0.14%	TRUE	0.15%	0.58%
Difference	0	0.4	TRUE	0.03	0.14
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	23.20	171.40		9.72	10.90
SBi - Up-Scale Bias	3.03%	2.66%	TRUE	0.97%	1.57%
Difference	1.5	7.7	TRUE	0.19	0.38
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**TRUE**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 12/19/2011

	SO_2	NO_X	CO	CO_2	O_2
	-0.1	**162.2**		**5.4**	**13.6**
	0.2%	**56.1%**	**0.0%**	**27.6%**	**56.1%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	-0.20	1.00		0.15	0.11
SBi - Zero Bias	0.00%	0.17%	TRUE	0.20%	0.33%
Difference	**0.0**	**0.5**	**TRUE**	**0.0**	**0.1**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	23.40	169.70		9.88	10.92
SBi - Up-Scale Bias	2.63%	3.25%	TRUE	0.15%	1.49%
Difference	1.3	9.4	TRUE	0.0	0.4
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.00%	0.03%	TRUE	0.05%	0.25%
Difference	0.0	0.9	TRUE	0.0	0.2
Pass or Re-Calibrate	**Pass**	**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	0.40%	0.59%	TRUE	0.82%	0.08%
Difference	**0.2**	**1.7**	**TRUE**	**0.2**	**0.0**
Pass or Re-Calibrate	**Pass**	**Pass**		**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*Incinerator Stack*
CS Calibration Span	49.44	289.00		19.60	24.19	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**		**0.00**	**0.00**	
Mid-Level	**25.25**	**180.00**		**9.90**	**10.98**	
High-Level	**49.44**	**289.00**		**19.60**	**24.19**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**		**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**51.1%**	**62.3%**		**50.5%**	**45.4%**	
100% of Cal. Span	**100.0%**	**100.0%**		**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	25.25	180.00		9.90	10.98

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**-0.20**	**0.50**		**0.11**	**0.03**
Mid-Level	**24.70**	**179.10**		**9.91**	**11.28**
High-Level	**49.30**	**284.20**		**19.70**	**24.46**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	24.70	179.10		9.91	11.28
Low-Level	0.40%	0.17%		0.56%	0.12%
ppmv Difference	0.2	0.5		0.11	0.03
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level	1.11%	0.31%		0.05%	1.24%
ppmv Difference	0.55	0.9		0.01	0.3
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level	0.28%	1.66%		0.51%	1.12%
ppmv Difference	0.14	4.8		0.1	0.27
Status	**Passed Cal.**	**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	-0.20	1.00		0.15	0.11
SBi - Zero Bias	0.00%	0.17%	TRUE	0.20%	0.33%
Difference	0	0.5	TRUE	0.04	0.08
Pass or Invalid Run	Passed Cal.	Passed Cal.		Passed Cal.	Passed Cal.
C_M - Up-scale Gas	23.40	169.70		9.88	10.92
SBi - Up-Scale Bias	2.63%	3.25%	TRUE	0.15%	1.49%
Difference	1.3	9.4	TRUE	0.03	0.36
Pass or Invalid Run	Passed Cal.	Passed Cal.	TRUE	Passed Cal.	Passed Cal.

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 12/19/2011

	SO_2	NO_X	CO	CO_2	O_2
	1.0	**181.2**		**5.9**	**13.0**
	2.0%	**62.7%**	**0.0%**	**29.8%**	**53.8%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	0.20	0.40		0.15	-0.11
SBi - Zero Bias	0.81%	0.03%	TRUE	0.20%	0.58%
Difference	**0.4**	**0.1**	**TRUE**	**0.0**	**0.1**
Pass or Invalid Run	Passed Cal.	Passed Cal.		Passed Cal.	Passed Cal.
C_M - Up-scale Gas	23.40	170.60		9.84	10.69
SBi - Up-Scale Bias	2.63%	2.94%	TRUE	0.36%	2.44%
Difference	1.3	8.5	TRUE	0.1	0.6
Pass or Invalid Run	Passed Cal.	Passed Cal.		Passed Cal.	Passed Cal.

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.81%	0.14%	TRUE	0.00%	0.25%
Difference	0.4	0.6	TRUE	0.0	0.2
Pass or Re-Calibrate	**Pass**	**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	0.00%	0.31%	TRUE	0.20%	0.95%
Difference	**0.0**	**0.9**	**TRUE**	**0.0**	**0.2**
Pass or Re-Calibrate	**Pass**	**Pass**		**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality
Compliance Demonstration
Method 23 - PCDD/PCDF

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	12/27-28/2011	
Review Date:	3/30/2012	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
125.000	100.000	55.000		

Emission Rates corrected to 7%)2

gr/bill. Dscf	ng/dscm	gr/dscf		
269.1863	**615.9931**	**1.51E-07**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
22.50	2.76	1.0280	1.778	0.84	26.15	-0.05	0.1983

Round

Contractor Information

Contracting Company:	Rhodes Environmental
Contact:	Tim Rhodes
Phone No.:	(801) 485-4419
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Reference Methods 23 - Total CDD/CDF

Compliance Demonstration of

Toxic Equivalents

Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	133.38	130.21	132.21	
CO2 - F_{CO2}	6.24	5.53	5.56	
O2	12.26	13.41	13.43	
N2+C	81.50	81.06	81.01	
Md	29.49	29.42	29.43	
Ms	27.48	27.43	27.33	
Y	1.03	1.03	1.03	
Cp	0.84	0.84	0.84	
Vm cf	91.53	153.57	156.69	
Vlc	377.00	644.30	711.30	
$A_{VG.}$ Tm F	58.38	60.71	61.17	
Vm std	83.84	140.37	143.12	
Vw std	17.75	30.33	33.48	
Bws	0.17	0.18	0.19	
S Bws	0.19	0.17	0.18	
Avg. Sqrt Dlp	0.66	0.87	0.89	
Vs	43.09	56.86	58.25	
scfm wet	5550.64	7364.81	7518.38	
acfm	7138.19	9420.70	9649.73	
Qsd dscfh	274861.83	364822.38	368139.61	
# Sample Points	8.00	8.00	8.00	
Dn	0.198	0.224	0.224	
An	2.14E-04	2.74E-04	2.74E-04	
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	
Time @ point	10.00	10.00	10.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	1.47E-08	
Run 2	0	2.84E-08	
Run 3	0	2.58E-08	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000003	0.000000003	0.000000003		0.00000000
ng/dscm	6.1918	7.1449	6.3663		6.5677
lbs/MMBtu					

Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	2.7058	3.1223	2.7820		2.8700
gr/bill dscf @7% O	4.3531	5.7944	5.1767		5.1081
ng/dscm @7%O2	9.96	13.26	11.85		11.6891

lbs/MMBtu

O2

CO2

F factor used

Summary

Division of Air Quality

Reference Methods 23 - Total PCDD/PCDF

Compliance Demonstration of

Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	133.38	130.21	132.21	
CO2 - F_{CO2}	6.24	5.53	5.56	
O2	12.26	13.41	13.43	
N2+C	81.50	81.06	81.01	
Md	29.49	29.42	29.43	
Ms	27.48	27.43	27.33	
Y	1.03	1.03	1.03	
Cp	0.84	0.84	0.84	
Vm cf	91.53	153.57	156.69	
Vlc	377.00	644.30	711.30	
$A_{VG.}$ Tm F	58.38	60.71	61.17	
Vm std	83.84	140.37	143.12	
Vw std	17.75	30.33	33.48	
Bws	0.17	0.18	0.19	
S Bws	0.19	0.17	0.18	
Avg. Sqrt Dlp	0.66	0.87	0.89	
Vs	43.09	56.86	58.25	
scfm wet	5550.64	7364.81	7518.38	
acfm	7138.19	9420.70	9649.73	
Qsd dscfh	274861.83	364822.38	368139.61	
# Sample Points	8.00	8.00	8.00	
Dn	0.198	0.224	0.224	
An	2.14E-04	2.74E-04	2.74E-04	
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	
Time @ point	10.00	10.00	10.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	7.505E-07	
Run 2	0	0.000001491	
Run 3	0	0.000001401	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000138	0.000000164	0.000000151		0.00000015
ng/dscm	316.1207	375.1093	345.7022		345.6441
lbs/MMBtu					

Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	138.1434	163.9212	151.0704		151.0450
gr/bill dscf @7% O	222.2446	304.2062	281.1082		269.1863
ng/dscm @7%O2	508.57	696.13	643.27		615.9931

lbs/MMBtu

O2

CO2

F factor used

Summary

Division of Air Quality

Reference Methods 23 - Total PCDD/PCDF

Compliance Demonstration of

Toxic Equivalents

Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	133.38	130.21	132.21	
CO2 - F_{CO2}	6.24	5.53	5.56	
O2	12.26	13.41	13.43	
N2+C	81.50	81.06	81.01	
Md	29.49	29.42	29.43	
Ms	27.48	27.43	27.33	
Y	1.03	1.03	1.03	
Cp	0.84	0.84	0.84	
Vm cf	91.53	153.57	156.69	
Vlc	377.00	644.30	711.30	
$A_{VG.}$ Tm F	58.38	60.71	61.17	
Vm std	83.84	140.37	143.12	
Vw std	17.75	30.33	33.48	
Bws	0.17	0.18	0.19	
S Bws	0.19	0.17	0.18	
Avg. Sqrt Dlp	0.66	0.87	0.89	
Vs	43.09	56.86	58.25	
scfm wet	5550.64	7364.81	7518.38	
acfm	7138.19	9420.70	9649.73	
Qsd dscfh	274861.83	364822.38	368139.61	
# Sample Points	8.00	8.00	8.00	
Dn	0.198	0.224	0.224	
An	2.14E-04	2.74E-04	2.74E-04	
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	
Time @ point	10.00	10.00	10.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	1.47E-08	
Run 2	0	2.84E-08	
Run 3	0	2.58E-08	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000003	0.000000003	0.000000003		0.00000000
ng/dscm	6.1918	7.1449	6.3663		6.5677
lbs/MMBtu					

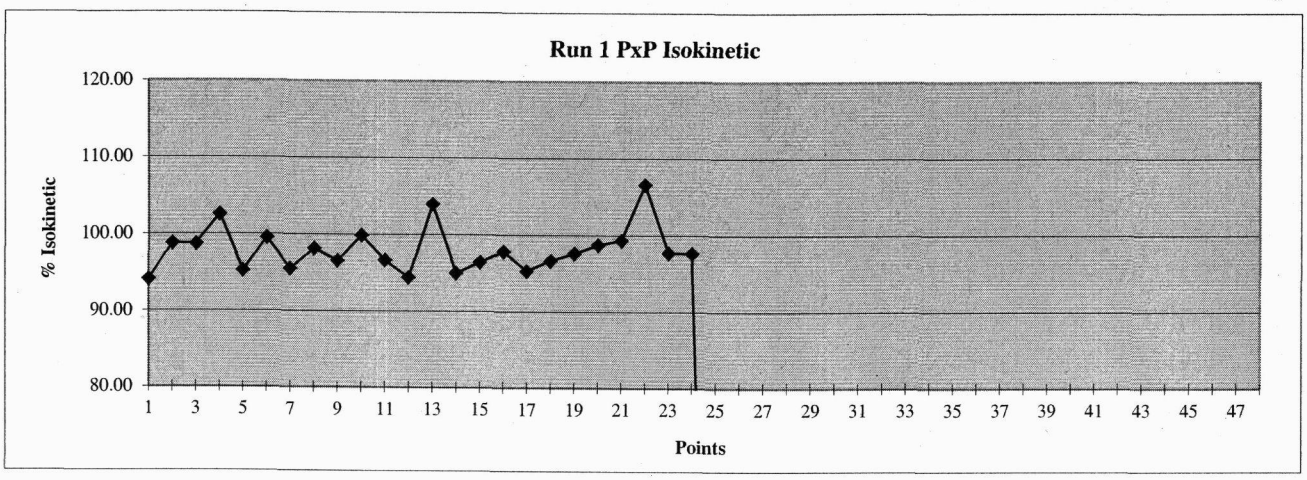
Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	2.7058	3.1223	2.7820		2.8700
gr/bill dscf @7% O	4.3531	5.7944	5.1767		5.1081
ng/dscm @7%O2	9.96	13.26	11.85		11.6891

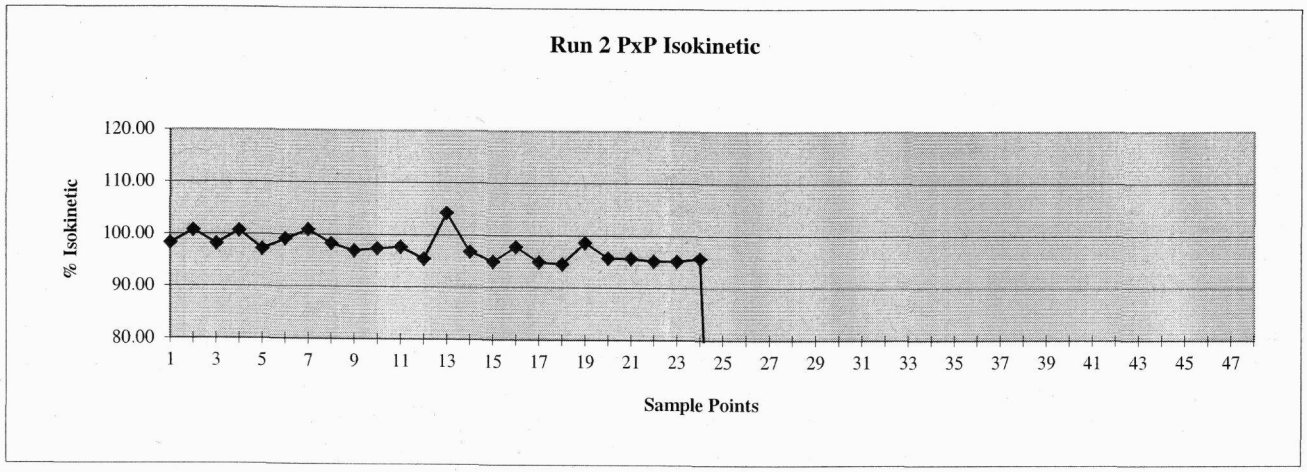
lbs/MMBtu

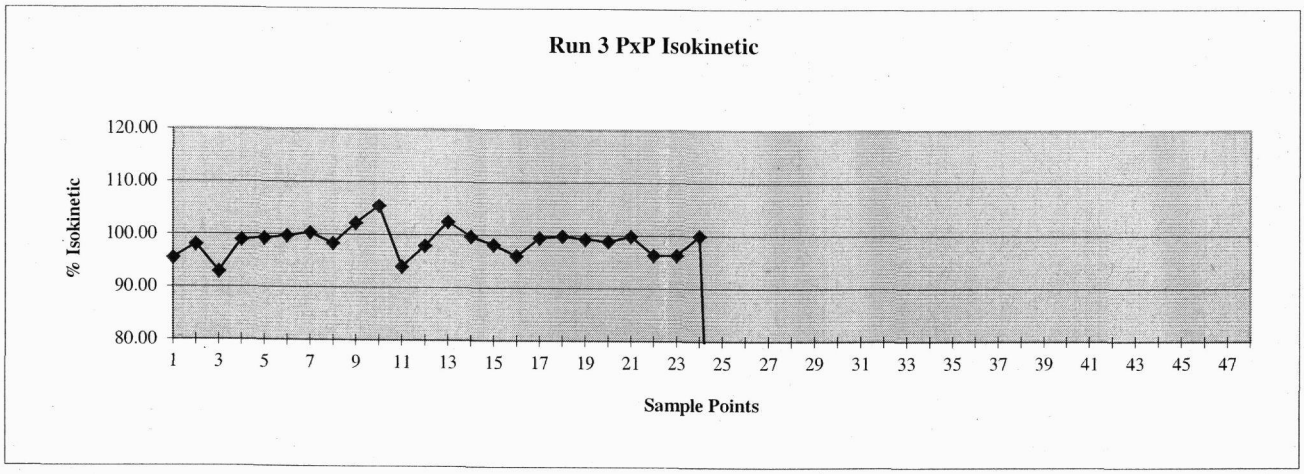
O2

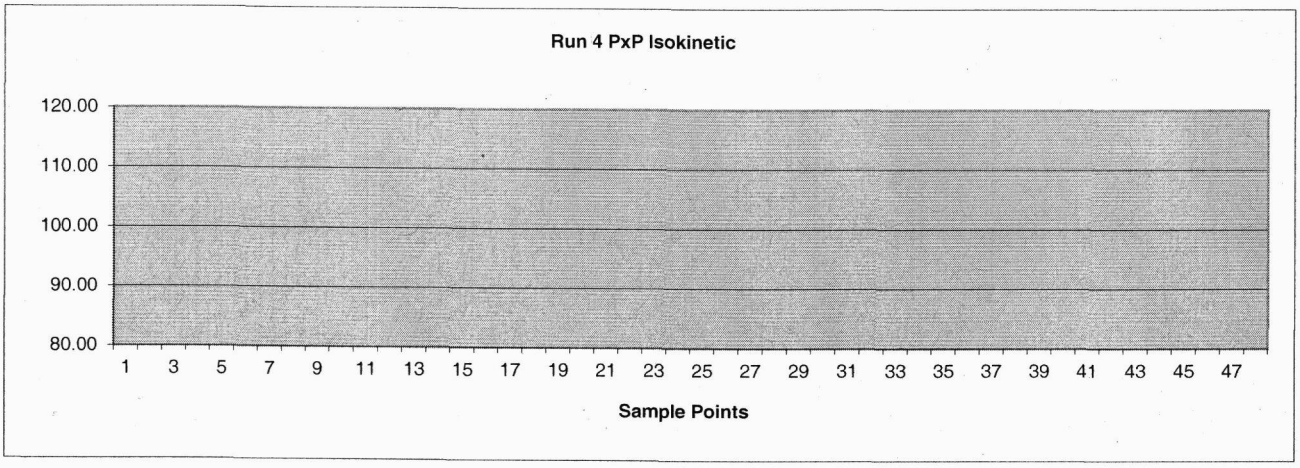
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	12/27-28/2011	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	133	6.24	12.26	81.50	29.49	27.48
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1897
1.0280	0.84	91.525	377.00	58.38	83.841	17.745	0.1747	0.1897	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.660	43.09	5,551	7,138	2.75E+05	8	0.1983	240	10.00	0.487500
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	941.500	0.24	0.26	135	47	47
2	944.150	0.25	0.28	133	50	50
3	947.010	0.31	0.34	133	53	53
4	950.210	0.30	0.33	131	52	52
5	953.480	0.33	0.36	136	50	50
6	956.640	0.33	0.36	135	51	51
7	959.950	0.40	0.42	132	53	53
8	963.470	0.52	0.55	132	54	54
9	967.600	0.50	0.53	133	55	55
10	971.590	0.31	0.33	134	57	57
11	974.850	0.30	0.32	134	58	58
12	977.960	0.27	0.28	133	58	58
13	980.845	0.27	0.28	134	60	60
14	984.030	0.29	0.30	133	60	60
15	987.050	0.58	0.61	133	61	61
16	991.390	0.30	0.32	135	62	62
17	994.560	0.46	0.48	132	63	63
18	998.400	0.49	0.51	134	64	64
19	1002.420	0.64	0.67	136	64	64
20	1007.050	0.75	0.79	135	65	65
21	1012.130	0.68	0.70	132	66	66
22	1017.020	0.50	0.63	132	66	66
23	1021.520	0.95	1.00	134	66	66
24	1027.190	1.00	1.05	130	66	66
25	1033.025					
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
953.4	601.7	351.7
694.3	690.5	3.8
599.6	599.5	0.1
685.5	685.5	0.0
941.7	920.3	21.4

Isokinetics	98.2	
Test Date	12/27-28/2011	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac			Flow & Moisture				Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	130	5.53	13.41	81.06	29.42	27.43
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1744
1.0280	0.84	153.570	644.30	61	140.371	30.327	0.1777	0.1744	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.873	56.86	7,365	9,421	3.65E+05	8	0.224	240	10.00	1.31
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	33.300	0.46	0.76	134.0	50.0	50.0
2	38.200	1.10	1.82	133.0	50.0	50.0
3	45.950	1.10	1.82	130.0	52.0	52.0
4	53.550	1.20	1.98	134.0	54.0	54.0
5	61.690	1.30	2.15	131.0	55.0	55.0
6	69.900	1.40	2.31	134.0	57.0	57.0
7	78.600	1.20	1.98	133.0	58.0	58.0
8	86.830	1.00	1.65	130.0	60.0	60.0
9	94.200	0.71	1.17	129.0	61.0	61.0
10	100.350	0.67	1.11	128.0	62.0	62.0
11	106.370	0.50	0.83	128.0	63.0	63.0
12	111.600	0.70	1.16	129.0	64.0	64.0
13	117.647	0.65	1.07	129.0	62.0	62.0
14	123.990	0.85	1.40	133.0	63.0	63.0
15	130.710	0.95	1.57	133.0	64.0	64.0
16	137.690	0.83	1.37	132.0	65.0	65.0
17	144.430	0.92	1.52	128.0	66.0	66.0
18	151.350	0.96	1.58	132.0	67.0	67.0
19	158.380	0.70	1.16	128.0	66.0	66.0
20	164.660	0.40	0.66	129.0	66.0	66.0
21	169.270	0.40	0.66	126.0	64.0	64.0
22	173.870	0.35	0.58	127.0	63.0	63.0
23	178.140	0.35	0.58	127.0	63.0	63.0
24	182.410	0.38	0.63	128.0	62.0	62.0
25	186.870					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1089.10	612.30	476.8
775.50	650.90	124.6
637.50	636.10	1.4
496.20	493.30	2.9
916.8	878.2	38.6

Isokinetics	97.5
Test Date	12/27-28/2011
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	132	5.56	13.43	81.01	29.43	27.33
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1839
1.0280	0.84	156.690	711.30	61	143.117	33.481	0.1896	0.1839	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.891	58.25	7,518	9,650	3.68E+05	8	0.224	240	10.00	1.37
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	187.300	0.38	0.63	128.0	53.0	53.0
2	191.620	0.40	0.66	128.0	54.0	54.0
3	196.180	0.70	1.16	132.0	55.0	55.0
4	201.880	0.90	1.49	133.0	57.0	57.0
5	208.780	1.20	1.98	132.0	58.0	58.0
6	216.780	1.20	1.98	139.0	59.0	59.0
7	224.790	1.20	1.98	137.0	59.0	59.0
8	232.860	0.74	1.22	136.0	60.0	60.0
9	239.100	0.80	1.32	135.0	61.0	61.0
10	245.860	0.80	1.32	133.0	61.0	61.0
11	252.850	0.63	1.04	133.0	62.0	62.0
12	258.390	0.60	0.99	133.0	62.0	62.0
13	264.025	1.00	1.65	135.0	61.0	61.0
14	271.600	0.91	1.50	134.0	62.0	62.0
15	278.650	0.97	1.60	135.0	62.0	62.0
16	285.810	1.10	1.82	136.0	62.0	62.0
17	293.260	0.98	1.62	133.0	63.0	63.0
18	300.580	1.30	2.15	134.0	63.0	63.0
19	309.020	1.30	2.15	130.0	64.0	64.0
20	317.460	1.10	1.82	130.0	65.0	65.0
21	325.210	0.57	0.94	128.0	66.0	66.0
22	330.880	0.39	0.64	127.0	66.0	66.0
23	335.410	0.32	0.53	126.0	66.0	66.0
24	339.520	0.35	0.58	126.0	67.0	67.0
25	343.990					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1124.7	603.5	521.2
842.6	694.3	148.3
602.2	599.5	2.7
685.6	684.3	1.3
969.1	931.3	37.8

Isokinetics	98.8
Test Date	12/27-28/2011
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 29- Metals

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	12/27-28/2011	
Review Date:	4/2/2012	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.0003	**0.0000**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
22.50	2.76	0.9840	1.535	0.84	26.15	-0.05	0.223

Round

Contractor Information

Contracting Company:	Rhodes Environmental
Contact:	Tim Rhodes
Phone No.:	(801) 485-4419
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 - Lead (Pb) Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	130.71	129.17	130.08	
CO2 - F_{CO2}	6.20	5.50	5.60	
O2	12.30	13.40	13.40	
N2+C	81.50	81.10	81.00	
Md	29.48	29.42	29.43	
Ms	27.45	27.48	27.44	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	51.62	88.22	87.56	
Vlc	223.20	356.67	349.10	
$A_{VG.}$ Tm F	63.06	66.27	63.90	
Vm std	44.85	76.38	76.14	
Vw std	10.51	16.79	16.43	
Bws	0.19	0.18	0.18	
S Bws	0.18	0.17	0.17	
Avg. Sqrt Dlp	0.52	0.90	0.88	
Vs	33.79	58.33	57.12	
scfm wet	4373.12	7567.65	7398.91	
acfm	5598.61	9663.08	9462.31	
Qsd dscfh	216013.05	377042.50	366769.06	
# Sample Points	8.00	8.00	8.00	
Dn	0.223	0.223	0.223	
An	2.71E-04	2.71E-04	2.71E-04	
Start Time				
End Time				
Total Test time	120.00	120.00	120.00	
Time @ point	5.00	5.00	5.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.00000167	
Run 2	0	0.00000125	
Run 3	0	0.0000012500	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000006	0.0000003	0.0000003		0.0000004
lbs/hr	0.0000	0.0000	0.0000		0.000015
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0009	0.0005	0.0005		0.00062
mg/dscm	0.002224	0.001121	0.001124		0.001490

lbs/MMBtu

O2

CO2

F factor used

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 - Cadmium (Cd) Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	130.71	129.17	130.08	
CO2 - F_{CO2}	6.20	5.50	5.60	
O2	12.30	13.40	13.40	
N2+C	81.50	81.10	81.00	
Md	29.48	29.42	29.43	
Ms	27.45	27.48	27.44	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	51.62	88.22	87.56	
Vlc	223.20	356.67	349.10	
$A_{VG.}$ Tm F	63.06	66.27	63.90	
Vm std	44.85	76.38	76.14	
Vw std	10.51	16.79	16.43	
Bws	0.19	0.18	0.18	
S Bws	0.18	0.17	0.17	
Avg. Sqrt Dlp	0.52	0.90	0.88	
Vs	33.79	58.33	57.12	
scfm wet	4373.12	7567.65	7398.91	
acfm	5598.61	9663.08	9462.31	
Qsd dscfh	216013.05	377042.50	366769.06	
# Sample Points	8.00	8.00	8.00	
Dn	0.223	0.223	0.223	
An	2.71E-04	2.71E-04	2.71E-04	
Start Time				
End Time				
Total Test time	120.00	120.00	120.00	
Time @ point	5.00	5.00	5.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.00000181	
Run 2	0	0.000000125	
Run 3	0	0.0000006050	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000006	0.0000000	0.0000001		0.0000003
lbs/hr	0.0000	0.0000	0.0000		0.000009
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0010	0.0000	0.0002		0.00043
mg/dscm	0.002410	0.000112	0.000544		0.001022

lbs/MMBtu

O2

CO2

F factor used

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 - Mercury Stericycle - Incinerator Stack

Testing Results				
Test Date	12/27-28/2011	12/27-28/2011	12/27-28/2011	12/27-28/2011
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	26.15	26.15	26.15	
Pq (static)	-0.05	-0.05	-0.05	
Ps	26.15	26.15	26.15	
Avg. Ts F	130.71	129.17	130.08	
CO2 - F_{CO2}	6.20	5.50	5.60	
O2	12.30	13.40	13.40	
N2+C	81.50	81.10	81.00	
Md	29.48	29.42	29.43	
Ms	27.45	27.48	27.44	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	51.62	88.22	87.56	
Vlc	223.20	356.67	349.10	
$A_{VG.}$ Tm F	63.06	66.27	63.90	
Vm std	44.85	76.38	76.14	
Vw std	10.51	16.79	16.43	
Bws	0.19	0.18	0.18	
S Bws	0.18	0.17	0.17	
Avg. Sqrt Dlp	0.52	0.90	0.88	
Vs	33.79	58.33	57.12	
scfm wet	4373.12	7567.65	7398.91	
acfm	5598.61	9663.08	9462.31	
Qsd dscfh	216013.05	377042.50	366769.06	
# Sample Points	8.00	8.00	8.00	
Dn	0.223	0.223	0.223	
An	2.71E-04	2.71E-04	2.71E-04	
Start Time				
End Time				
Total Test time	120.00	120.00	120.00	
Time @ point	5.00	5.00	5.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.000058386	
Run 2	0	0.000018856	
Run 3	0	0.0000181715	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000201	0.0000038	0.0000037		0.0000092
lbs/hr	0.0006	0.0002	0.0002		0.000339
lbs/MMBtu					

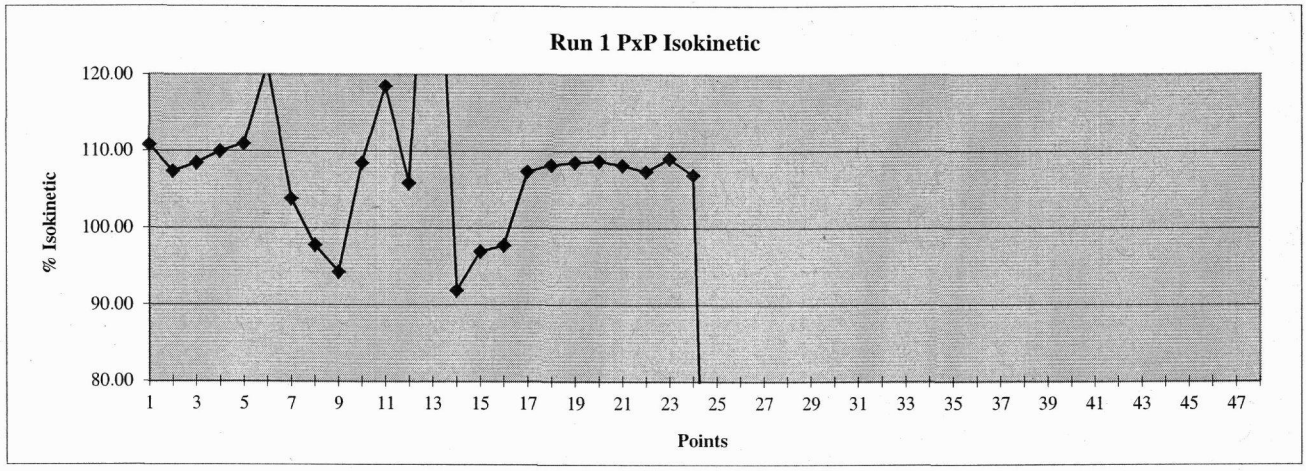
Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0325	0.0071	0.0068		0.0155
mg/dscm	0.077738	0.016907	0.016344		0.036996

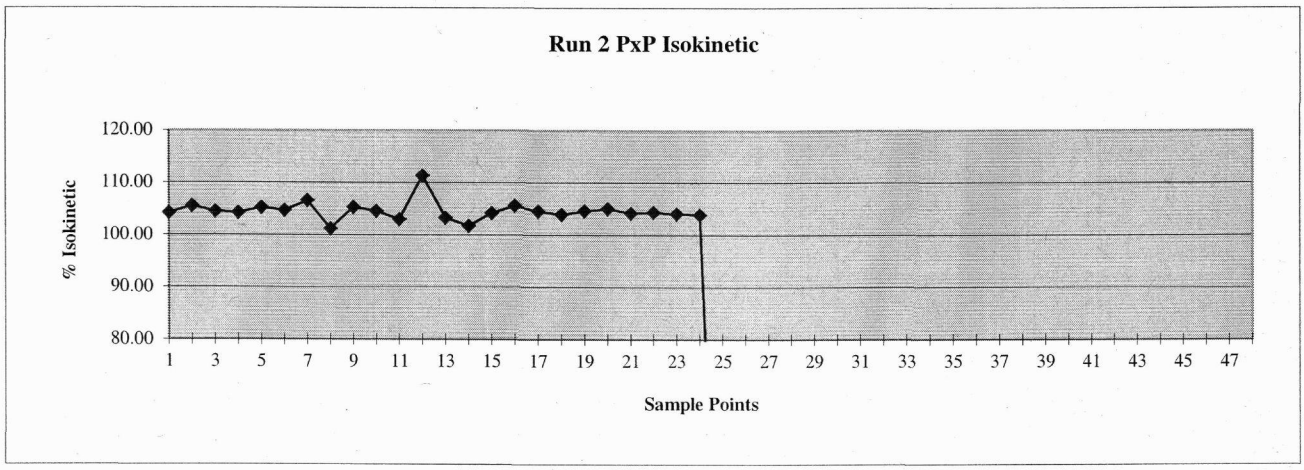
lbs/MMBtu

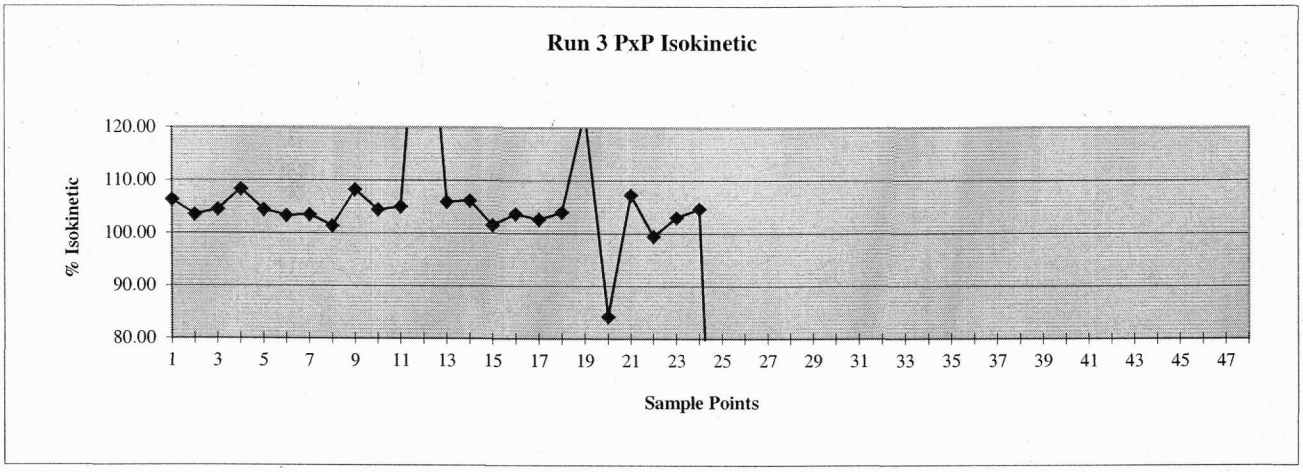
O2

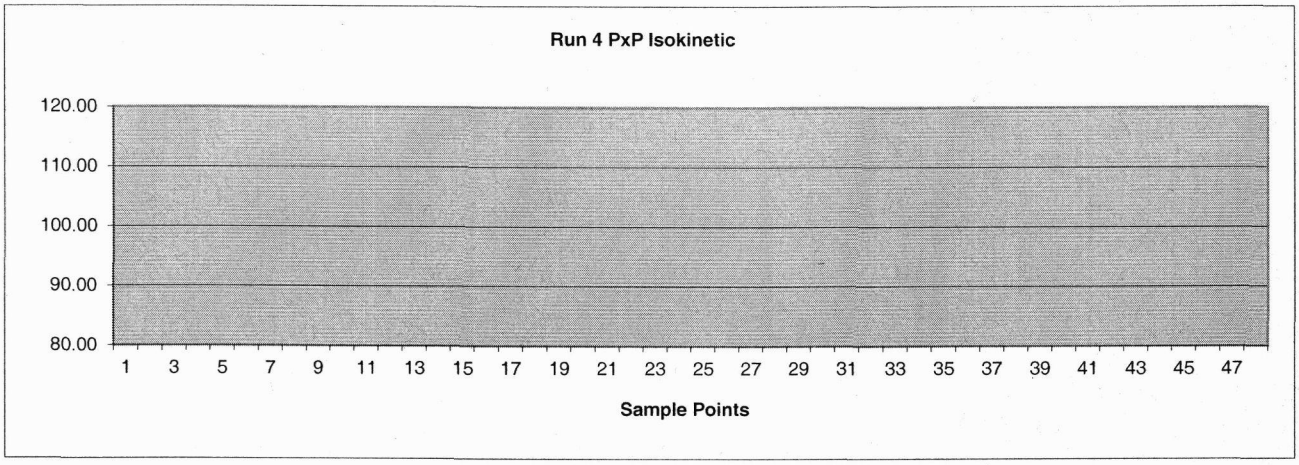
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	12/27-28/2011	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	131	6.20	12.30	81.50	29.48	27.45
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1767
0.9840	0.84	51.616	223.20	63.06	44.854	10.506	0.1898	0.1767	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.519	33.79	4,373	5,599	2.16E+05	8	0.223	120	5.00	0.495625
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	249.237	0.14	0.25	104	52	52
2	250.840	0.35	0.61	127	54	52
3	253.250	0.33	0.58	131	59	53
4	255.620	0.39	0.68	135	61	54
5	258.230	0.25	0.44	133	63	55
6	260.350	0.24	0.42	135	64	55
7	262.620	0.22	0.39	137	65	56
8	264.480	0.17	0.30	135	65	57
9	266.025	0.50	0.88	136	67	58
10	268.580	0.34	0.60	136	68	59
11	271.010	0.24	0.42	133	68	59
12	273.248	0.24	0.42	133	68	60
13	275.248	0.05	0.09	128	65	61
14	276.610	0.07	0.12	129	65	61
15	277.550	0.33	0.58	133	67	62
16	279.700	0.29	0.51	133	71	62
17	281.740	0.59	1.03	133	73	63
18	284.940	0.32	0.56	137	73	63
19	287.310	0.32	0.56	135	72	63
20	289.690	0.32	0.56	134	73	64
21	292.080	0.29	0.51	131	73	64
22	294.350	0.26	0.46	129	72	64
23	296.485	0.26	0.46	120	72	64
24	298.670	0.27	0.47	120	72	64
25	300.853					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1545.9	1348.6	197.3
1362.6	1353.3	9.3
1441.2	1434.4	6.8
842.3	832.5	9.8
		0.0

Isokinetics	107.4	
Test Date	12/27-28/2011	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	129	5.50	13.40	81.10	29.42	27.48
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1696
0.9840	0.84	88.217	356.67	66	76.376	16.788	0.1802	0.1696	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.897	58.33	7,568	9,663	3.77E+05	8	0.223	120	5.00	1.35
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	301.311	0.82	1.35	131.0	58.0	52.0
2	304.925	0.82	1.35	130.0	66.0	54.0
3	308.625	0.84	1.39	129.0	68.0	56.0
4	312.350	0.99	1.63	130.0	70.0	57.0
5	316.390	0.82	1.35	127.0	71.0	58.0
6	320.120	0.99	1.63	129.0	71.0	59.0
7	324.190	0.69	1.09	125.0	71.0	60.0
8	327.670	0.48	0.79	124.0	71.0	60.0
9	330.430	0.45	0.74	126.0	71.0	61.0
10	333.210	0.41	0.69	126.0	71.0	61.0
11	335.845	0.72	1.19	127.0	72.0	61.0
12	339.280	0.72	1.19	126.0	73.0	62.0
13	343.004	0.94	1.55	129.0	64.0	61.0
14	346.900	0.99	1.63	133.0	71.0	61.0
15	350.850	0.99	1.63	135.0	73.0	62.0
16	354.900	1.10	1.82	133.0	74.0	63.0
17	359.240	1.20	1.98	133.0	75.0	63.0
18	363.730	1.20	1.98	131.0	76.0	64.0
19	368.210	0.90	1.48	131.0	76.0	64.0
20	372.120	0.81	1.39	130.0	76.0	64.0
21	375.850	0.81	1.39	131.0	76.0	65.0
22	379.550	0.79	1.30	131.0	76.0	65.0
23	383.210	0.63	1.03	127.0	75.0	65.0
24	386.480	0.55	0.90	126.0	74.0	64.0
25	389.528					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1672.80	1374.30	298.5
1347.20	1314.30	32.9
1379.50	1370.90	8.6
991.10	974.43	16.7
		0.0

Isokinetics	104.5
Test Date	12/27-28/2011
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac			Flow & Moisture				Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	26.15	-0.05	26.15	130	5.60	13.40	81.00	29.43	27.44
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1738
0.9840	0.84	87.562	349.10	64	76.140	16.432	0.1775	0.1738	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.877	57.12	7,399	9,462	3.67E+05	8	0.223	120	5.00	1.29
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	389.748	0.62	1.02	127.0	62.0	57.0
2	393.010	0.65	1.07	131.0	67.0	58.0
3	396.270	0.62	1.02	128.0	68.0	58.0
4	399.494	1.10	1.82	129.0	57.0	56.0
5	403.880	0.70	1.16	129.0	62.0	56.0
6	407.275	0.64	1.06	128.0	65.0	56.0
7	410.500	0.62	1.02	129.0	66.0	56.0
8	413.680	0.62	1.02	128.0	67.0	56.0
9	416.800	0.60	0.99	132.0	68.0	56.0
10	420.070	0.56	0.92	129.0	68.0	57.0
11	423.130	0.50	0.83	130.0	68.0	57.0
12	426.035	0.50	0.83	129.0	68.0	58.0
13	430.421	0.87	1.44	135.0	64.0	57.0
14	434.250	0.87	1.44	133.0	70.0	58.0
15	438.120	0.87	1.44	134.0	71.0	59.0
16	441.825	1.10	1.82	131.0	72.0	60.0
17	446.091	0.99	1.63	131.0	72.0	60.0
18	450.100	1.20	1.98	135.0	73.0	61.0
19	454.560	1.20	1.98	131.0	74.0	61.0
20	459.850	0.96	1.58	128.0	74.0	62.0
21	463.110	0.93	1.53	129.0	75.0	62.0
22	467.200	0.75	1.23	125.0	75.0	63.0
23	470.622	0.74	1.22	131.0	75.0	63.0
24	474.125	0.59	0.97	130.0	75.0	64.0
25	477.310					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1660.8	1357.8	303.0
1493.5	1363.8	129.7
1342.2	1441.1	-98.9
857.4	842.1	15.3
		0.0

Isokinetics	106.2
Test Date	12/27-28/2011
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 23 - PCDD/PCDF
RETEST

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	2/14-15/2012	
Review Date:	4/6/2012	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
125.000	100.000	55.000		

Emission Rates corrected to 7% 02

gr/bill. Dscf	ng/dscm	gr/dscf		
0.8827	**2.0200**	**4.85E-10**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
22.50	2.76	0.9820	1.92	0.84	29.91	0.14	0.258

Round

Contractor Information

Contracting Company:	Rhodes Environmental
Contact:	Tim Rhodes
Phone No.:	(801) 485-4419
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

F factor used

lbs/MMBtu

O2

CO2

Summary

Division of Air Quality

Reference Methods 23 - Total PCDD/PCDF

Compliance Demonstration of

RETEST

Stericycle - Incinerator Stack

Testing Results				
Test Date	2/14-15/2012	2/14-15/2012	2/14-15/2012	2/14-15/2012
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	29.91	29.91	29.91	
Pq (static)	0.14	0.14	0.14	
Ps	29.92	29.92	29.92	
Avg. Ts F	123.83	126.58	125.67	
CO2 - F_{CO2}	6.00	6.00	6.00	
O2	13.26	13.53	13.05	
N2+C	80.74	80.47	80.95	
Md	29.49	29.50	29.48	
Ms	28.02	27.96	27.93	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	179.30	179.17	158.02	
Vlc	634.80	591.80	608.90	
$A_{VG.}$ Tm F	61.67	58.58	56.54	
Vm std	178.85	179.83	159.08	
Vw std	29.88	27.86	28.66	
Bws	0.14	0.13	0.15	
S Bws	0.13	0.14	0.13	
Avg. Sqrt Dlp	0.71	0.73	0.65	
Vs	42.28	43.78	39.27	
scfm wet	6335.11	6528.67	5864.70	
acfm	7004.93	7252.96	6505.15	
Qsd dscfh	331330.42	339179.65	304417.39	
# Sample Points	8.00	8.00	8.00	
Dn	0.258	0.258	0.258	
An	3.63E-04	3.63E-04	3.63E-04	
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	
Time @ point	20.00	20.00	20.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	6.43092E-09	
Run 2	0	4.42358E-09	
Run 3	0	5.37119E-09	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000001	0.000000000	0.000000001		0.00000000
ng/dscm	1.2698	0.8687	1.1924		1.1103
lbs/MMBtu					

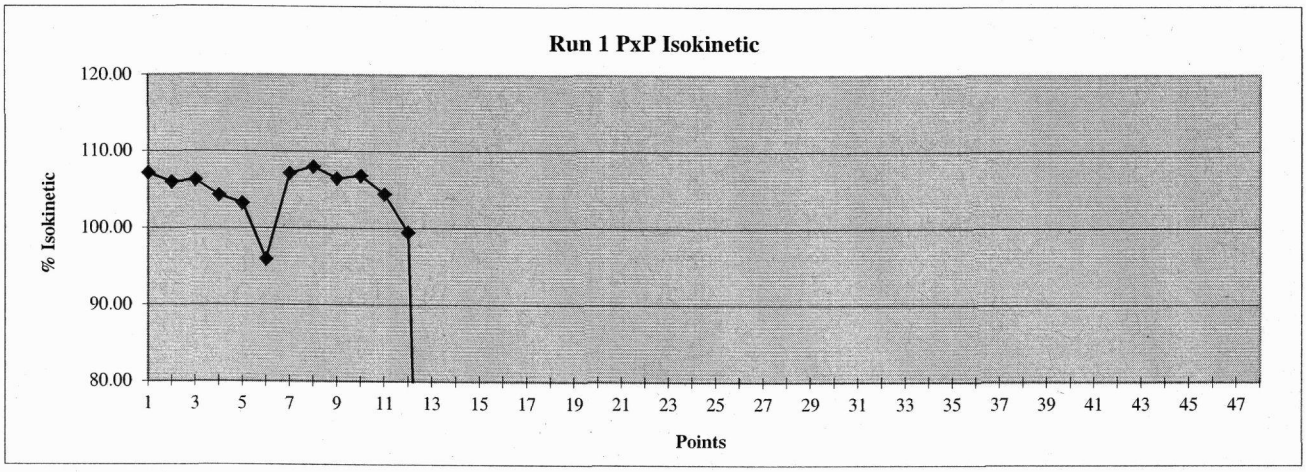
Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	0.5549	0.3796	0.5211		0.4852
gr/bill dscf @7% O	1.0096	0.7160	0.9226		0.8827
ng/dscm @7%O2	2.31	1.64	2.11		2.0200

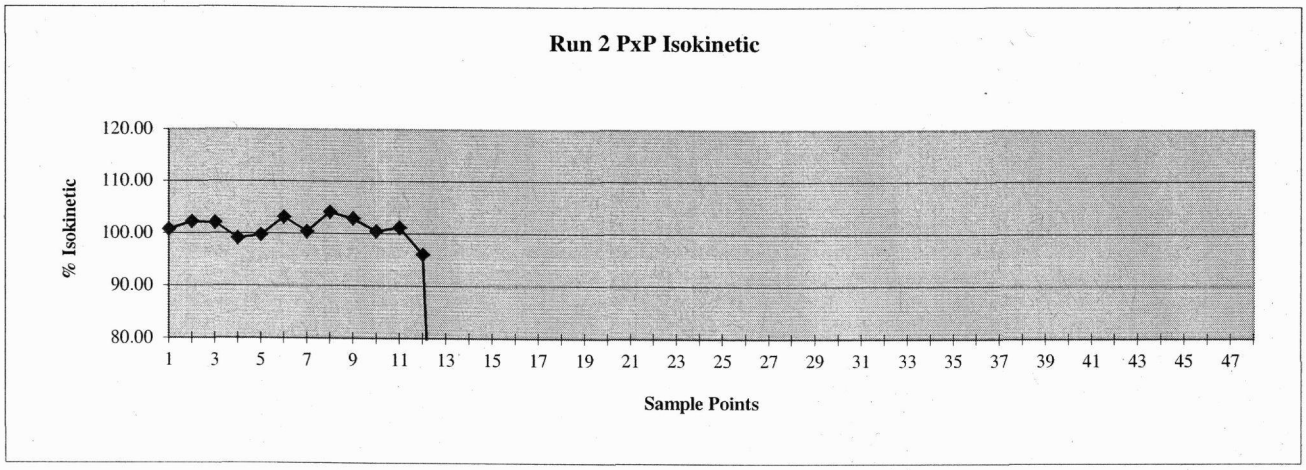
lbs/MMBtu

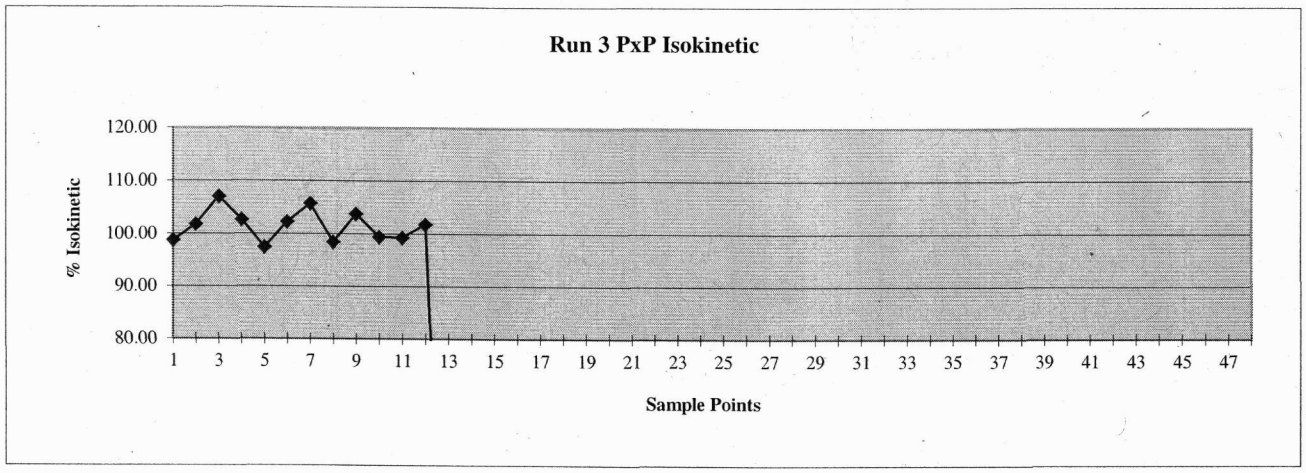
O2

CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
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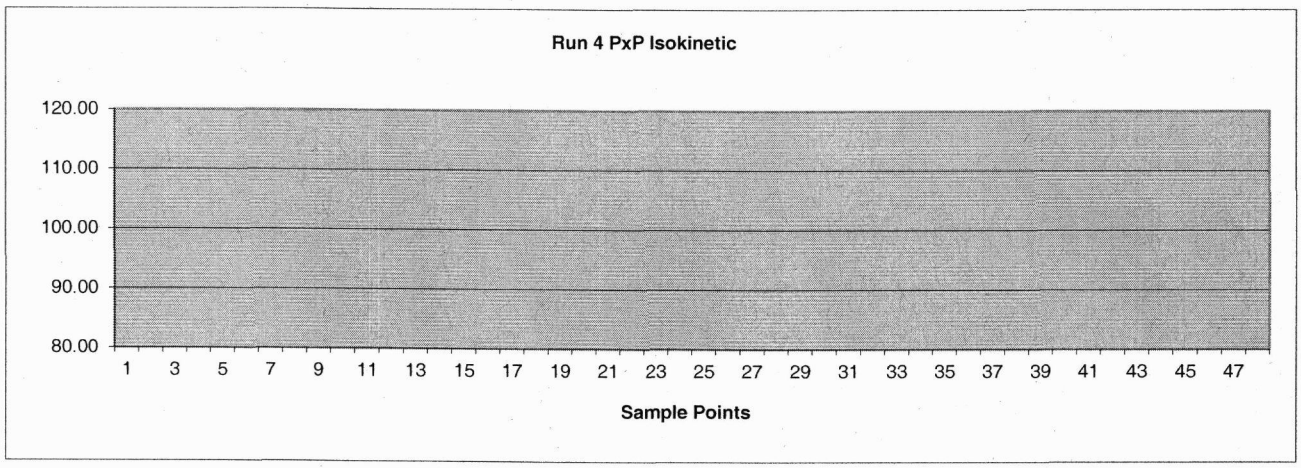
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	2/14-15/2012	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	29.91	0.14	29.92	124	6.00	13.26	80.74	29.49	28.02
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1283
0.9820	0.84	179.300	634.80	61.67	178.849	29.880	0.1432	0.1283	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.706	42.28	6,335	7,005	3.31E+05	8	0.258	240	20.00	1.758333
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	639.730	0.45	1.60	122	66	49
2	654.210	0.58	2.00	126	66	44
3	670.320	0.56	1.90	125	68	46
4	686.270	0.62	2.20	124	69	51
5	702.840	0.60	2.10	124	70	57
6	719.090	0.45	1.60	123	71	60
7	732.250	0.37	1.30	121	72	58
8	745.590	0.35	1.20	126	73	45
9	758.470	0.48	1.70	126	74	46
10	773.350	0.50	1.80	123	75	52
11	788.730	0.46	1.60	123	75	58
12	803.240	0.60	2.10	123	75	60
13	819.030					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
859.5	486.6	372.9
886.2	627.3	258.9
572.1	577.2	-5.1
506.1	498.0	8.1
		0.0

Isokinetics	104.5	
Test Date	2/14-15/2012	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	29.91	0.14	29.92	127	6.00	13.53	80.47	29.50	27.96
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1383
0.9820	0.84	179.170	591.80	59	179.826	27.856	0.1341	0.1383	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.728	43.78	6,529	7,253	3.39E+05	8	0.258	240	20.00	1.86
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	821.400	0.70	2.40	128.0	66.0	54.0
2	838.540	0.58	2.00	122.0	66.0	51.0
3	854.420	0.54	1.90	130.0	66.0	53.0
4	869.640	0.59	2.00	126.0	65.0	52.0
5	885.110	0.63	2.20	127.0	65.0	56.0
6	901.240	0.53	1.90	125.0	64.0	57.0
7	916.580	0.35	1.20	129.0	60.0	63.0
8	928.710	0.32	1.10	130.0	60.0	52.0
9	940.610	0.51	1.80	126.0	60.0	55.0
10	955.520	0.56	1.90	127.0	60.0	53.0
11	970.730	0.49	1.70	125.0	61.0	53.0
12	985.110	0.63	2.20	124.0	63.0	51.0
13	1000.570					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
851.3	492.5	358.8
849.9	624.8	225.1
576.3	578.1	-1.8
509.5	499.8	9.7
		0.0

Isokinetics	100.9
Test Date	2/14-15/2012
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	29.91	0.14	29.92	126	6.00	13.05	80.95	29.48	27.93
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1349
0.9820	0.84	158.020	608.90	57	159.079	28.661	0.1527	0.1349	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.653	39.27	5,865	6,505	3.04E+05	8	0.258	240	20.00	1.48
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	1.610	0.43	1.50	121.0	62.0	44.0
2	14.430	0.35	1.20	121.0	64.0	43.0
3	26.380	0.51	1.80	124.0	65.0	45.0
4	41.530	0.58	2.00	128.0	66.0	48.0
5	57.020	0.65	2.20	128.0	66.0	52.0
6	72.640	0.50	1.70	125.0	66.0	56.0
7	87.130	0.30	1.00	125.0	58.0	60.0
8	98.710	0.37	1.30	126.0	58.0	52.0
9	110.570	0.44	1.50	128.0	58.0	50.0
10	124.150	0.38	1.30	129.0	58.0	53.0
11	136.270	0.35	1.20	129.0	58.0	56.0
12	147.920	0.33	1.10	124.0	58.0	61.0
13	159.630					
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Imp. Liquid Collected.		
Wt. (Final)	Wt. (Initial)	lc
892.5	493.8	398.7
838.3	628.5	209.8
598.3	599.8	-1.5
502.2	500.3	1.9
		0.0

Isokinetics	101.5
Test Date	2/14-15/2012
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 26A - HCl

Source Information

Company Name	**Stericycle - HMIWI Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**HMIWI Stack**

Test & Review Dates

Test Date:	1/22/2013	
Review Date:	3/28/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

ppm@7%O2	lbs/hr	gr/dscf		
100.000	50.000	50.000		

Emission Rates - "Front Half"

ppm@7%O2	lbs/hr	gr/dscf		
143.3395	**2.5644**	**0.0542**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
24.50	3.27	0.9980	1.67	0.826	26.05	0.03	0.276
Round							

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Reference Methods 26A - HCl

Compliance Demonstration of

Stericycle - HMIWI Stack

Testing Results				
Test Date	1/22/2013	1/22/2013	1/22/2013	1/22/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	26.05	26.05	26.05	
Pq (static)	0.03	0.03	0.03	
Ps	26.05	26.05	26.05	
Avg. Ts F	153.88	149.75	143.42	
CO2 - F_{CO2}	6.30	5.80	6.50	
O2	12.50	13.20	12.30	
N2+C	81.20	81.00	81.20	
Md	29.51	29.46	29.53	
Ms	27.55	27.23	27.58	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	53.19	40.99	47.19	
Vlc	198.30	180.30	175.40	
$A_{VG.}$ Tm F	77.83	75.00	77.35	
Vm std	45.62	35.25	40.46	
Vw std	9.33	8.49	8.26	
Bws	0.17	0.19	0.17	
S Bws	0.32	0.29	0.25	
Avg. Sqrt Dlp	0.82	0.66	0.74	
Vs	53.63	42.94	47.98	
scfm wet	7889.23	6359.95	7180.53	
acfm	10534.09	8435.05	9424.45	
Qsd dscfh	392956.45	307543.02	357814.44	
# Sample Points	24.00	24.00	24.00	
Dn	0.276	0.253	0.260	
An	4.15E-04	3.49E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0	0.1064243
Run 2	0	0	0.252214
Run 3	0	0	0.0420017
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000	0.0000	0.0000		0.0000
lbs/hr					#DIV/0!
lbs/MMBtu					

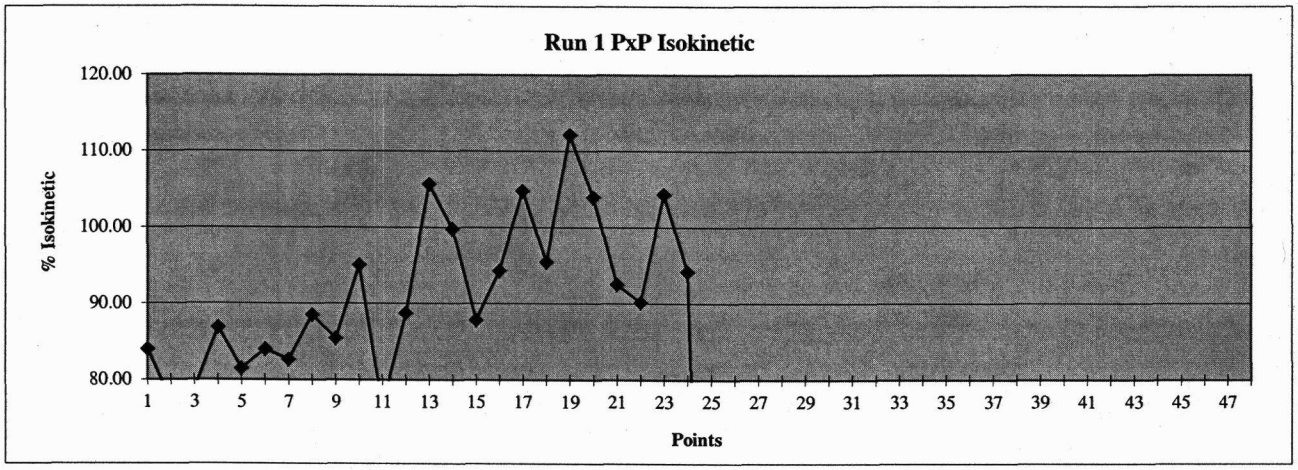
Total Emissions Summary w/back half condensable					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0360	0.1104	0.0160		0.0542
lbs/hr	2.0213	4.8527	0.8191		2.5644
ppmdv	5.435E+01	1.667E+02	2.419E+01		8.176E+01
at 7% O2	89.94030866	300.9827504	39.09531408		143.3394577

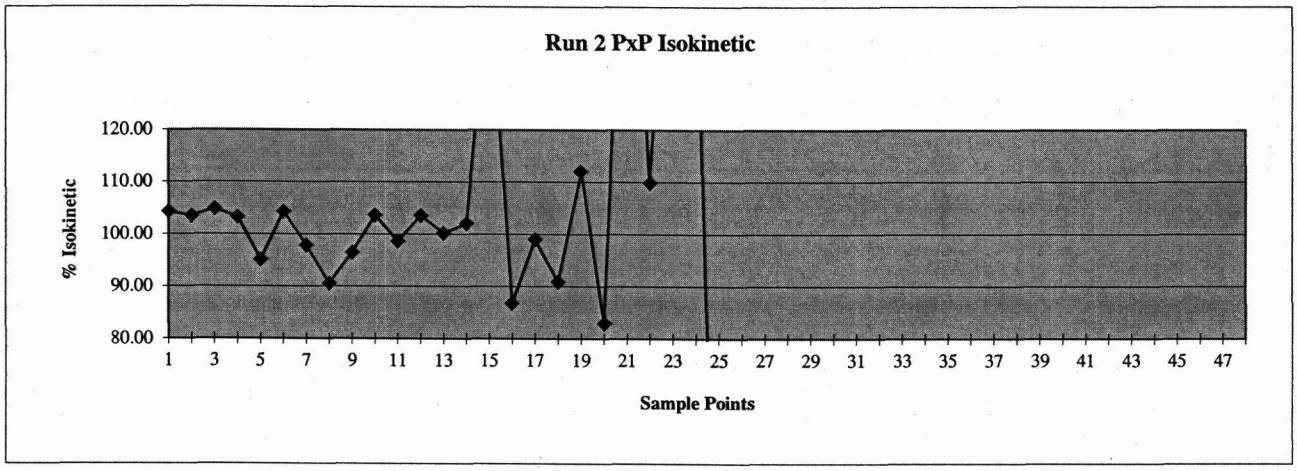
lbs/MMBtu

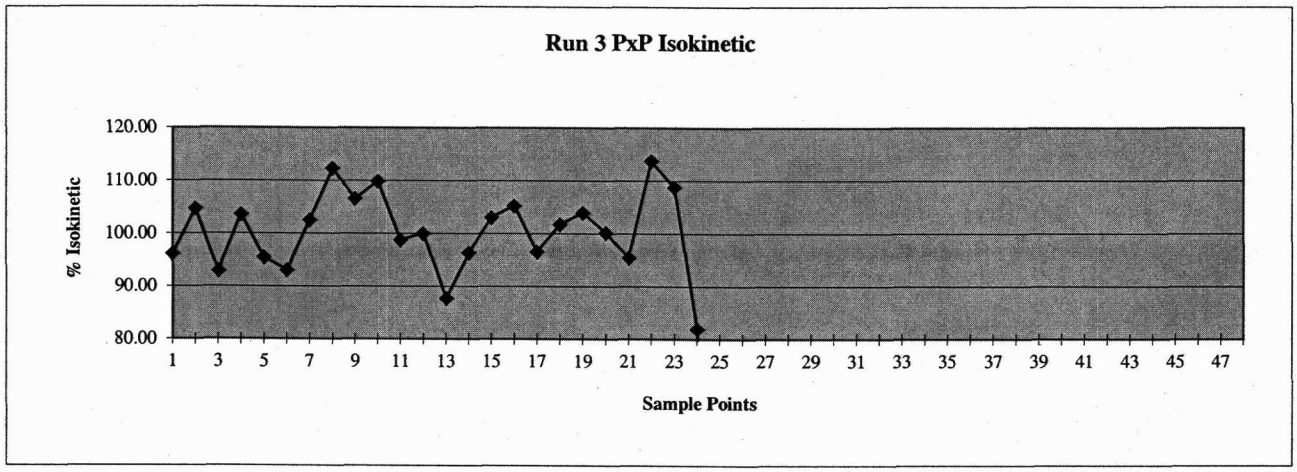
O2

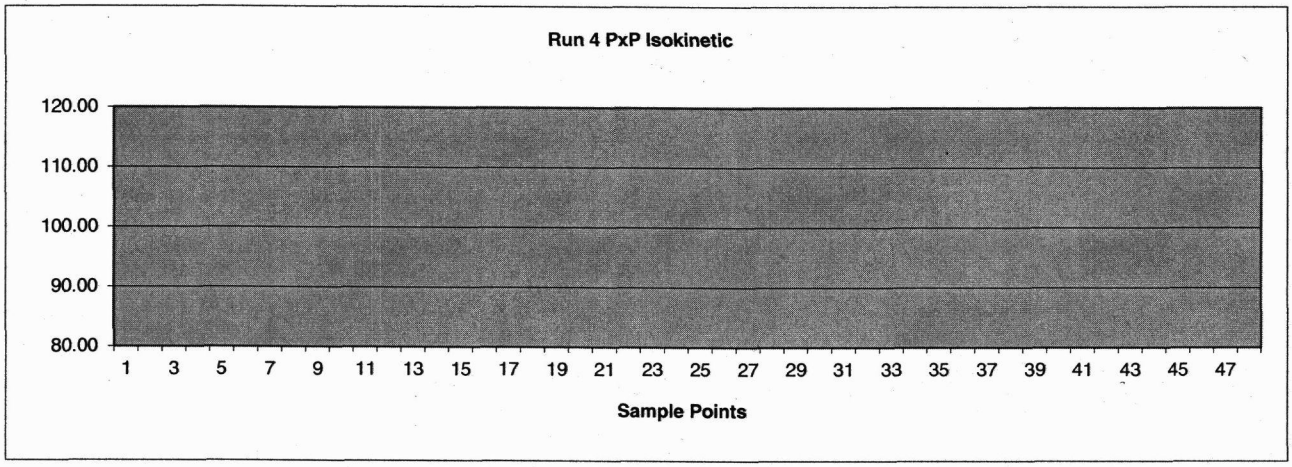
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	1/22/2013	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	154	6.30	12.50	81.20	29.51	27.55
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.3200
0.9980	0.83	53.190	198.30	77.83	45.621	9.334	0.1698	0.3200	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.821	53.63	7,889	10,534	3.93E+05	24	0.276	60	2.50	2.085417
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	135.710	0.50	1.25	157	75	74
2	137.450	0.60	1.50	158	75	74
3	139.200	0.68	1.70	157	75	74
4	141.100	0.68	1.70	158	77	75
5	143.200	0.70	1.70	158	78	75
6	145.200	0.72	1.80	156	79	77
7	147.300	0.82	2.00	156	79	75
8	149.500	0.85	2.10	155	79	75
9	151.900	0.69	1.70	151	80	76
10	154.000	0.61	1.50	151	81	76
11	156.200	0.56	1.40	151	81	76
12	157.900	0.58	1.60	152	81	76
13	159.900	0.45	1.60	151	81	76
14	162.000	0.46	1.60	158	78	83
15	164.000	0.60	2.10	158	78	78
16	166.000	0.69	2.40	157	79	76
17	168.300	0.77	2.70	156	79	76
18	171.000	0.93	3.60	154	79	76
19	173.700	0.82	2.90	151	82	76
20	176.700	0.83	2.90	150	82	76
21	179.500	0.77	2.70	151	82	76
22	181.900	0.74	2.60	150	83	77
23	184.200	0.65	2.30	148	83	77
24	186.700	0.62	2.70	149	83	77
25	188.900					
26						
27						
28						
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
850.3	689.2	161.1
781.4	759.1	22.3
712.3	707.8	4.5
757.5	756.2	1.3
1614.4	1605.3	9.1

Isokinetics	91.5	
Test Date	1/22/2013	
Start Time	enter	enter
End Time	enter	

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	150	5.80	13.20	81.00	29.46	27.23
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2891
0.9980	0.83	40.989	180.30	75	35.245	8.487	0.1941	0.2891	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.656	42.94	6,360	8,435	3.08E+05	24	0.253	60	2.50	1.10
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	191.411	0.45	1.10	152.0	74.0	75.0
2	193.100	0.36	0.90	151.0	74.0	75.0
3	194.600	0.35	0.86	151.0	74.0	75.0
4	196.100	0.36	0.89	149.0	74.0	75.0
5	197.600	0.55	1.40	153.0	74.0	75.0
6	199.300	0.40	0.98	147.0	75.0	74.0
7	200.900	0.40	0.98	147.0	75.0	74.0
8	202.400	0.60	1.50	147.0	76.0	74.0
9	204.100	0.73	1.80	145.0	76.0	74.0
10	206.100	0.70	1.70	149.0	77.0	75.0
11	208.200	0.70	1.70	150.0	78.0	75.0
12	210.200	0.70	1.70	150.0	78.0	75.0
13	212.300	0.55	1.40	151.0	78.0	75.0
14	214.100	0.66	1.60	151.0	75.0	74.0
15	216.100	0.45	1.11	158.0	75.0	74.0
16	218.500	0.45	1.10	156.0	75.0	74.0
17	219.900	0.45	1.10	156.0	76.0	74.0
18	221.500	0.41	1.00	158.0	76.0	74.0
19	222.900	0.35	0.86	154.0	76.0	74.0
20	224.500	0.30	0.74	151.0	76.0	74.0
21	225.600	0.20	0.50	149.0	76.0	74.0
22	227.600	0.20	0.50	141.0	76.0	74.0
23	228.800	0.20	0.50	139.0	76.0	73.0
24	230.700	0.20	0.50	139.0	77.0	73.0
25	232.400					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
862.30	713.20	149.1
725.80	707.20	18.6
718.10	714.80	3.3
789.10	788.10	1.0
1624.4	1616.1	8.3

Isokinetics	107.5
Test Date	1/22/2013
Start Time	enter
End Time	enter

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	143	6.50	12.30	81.20	29.53	27.58
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2467
0.9980	0.83	47.192	175.40	77	40.458	8.256	0.1695	0.2467	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.741	47.98	7,181	9,424	3.58E+05	24	0.26	60	2.50	1.60
					TRUE				
Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)	Imp. Liquid Collected		
1	357.908	0.40	1.14	143.0	76.0	76.0	Wt. (Final)	Wt. (Initial)	lc
2	359.512	0.34	0.97	142.0	75.0	76.0	845.0	711.5	133.5
3	361.122	0.42	1.19	142.0	75.0	76.0	727.6	704.1	23.5
4	362.710	0.42	1.19	142.0	76.0	76.0	721.8	716.2	5.6
5	364.482	0.62	1.76	144.0	76.0	77.0	728.5	726.2	2.3
6	366.461	0.80	2.27	144.0	77.0	76.0	1586.7	1576.2	10.5
7	368.649	0.73	2.07	144.0	78.0	75.0			
8	370.952	0.64	1.82	142.0	78.0	75.0	Isokinetics	100.4	
9	373.321	0.60	1.71	142.0	79.0	75.0	Test Date	1/22/2013	
10	375.500	0.53	1.51	141.0	80.0	77.0	Start Time	enter	
11	377.621	0.58	1.65	142.0	80.0	77.0	End Time	enter	
12	379.613	0.56	1.59	142.0	80.0	75.0			
13	381.591	0.50	1.42	141.0	80.0	74.0			
14	383.231	0.56	1.59	149.0	78.0	75.0			
15	385.123	0.61	2.22	150.0	79.0	75.0			
16	387.231	0.60	1.71	150.0	80.0	75.0			
17	389.371	0.77	2.19	146.0	80.0	75.0			
18	391.600	0.73	2.07	145.0	81.0	75.0			
19	393.891	0.64	1.82	144.0	81.0	75.0			
20	396.087	0.59	1.68	143.0	82.0	75.0			
21	398.123	0.45	1.28	143.0	82.0	76.0			
22	399.821	0.42	1.19	140.0	82.0	76.0			
23	401.781	0.46	1.31	140.0	82.0	76.0			
24	403.741	0.39	1.11	141.0	82.0	76.0			
25	405.100								
26									
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Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Source Information

Company Name	**Stericycle**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Stack Designation:	**HMIWI Stack**

CO2 Interferece w/CO: ☐ Yes

Wet CEM: ☐ Yes

Correct For O2:

Test & Review Dates

Test Date:	**1/22/2013**	High Flow Test Date:	1/0/1900
Review Date:	3/29/2013	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm	55.0	250.0	40.0	9.658	165.693	5.135
Percent						
%O2 Correction as a whole #	**7.00**	**7.00**	**7.00**			

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Heat Input: fuel flow rate (Btu/hr)	Heat Input: Heat Input (Btu/hr.)
24.50	3.27	0.9980	1.67	0.826	26.05	0.03		

Round

Contractor Information

Contact:	Alex Mongold - Chris Keefe
Contracting Company:	Air Pollution Testing (APT)
Address:	1959 South 4130 West, Unit B, SLC,Ut. 84104
Phone No.:	801-974-0481 or 303-420-5949 ext. 24
Project No.:	

☑ F factor used

8710

Diluent

- ○ O2
- ○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite 2	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
Oil		○ 9190	○ 320	○ 1420
GAS	Natural	◉ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

Tabs Are Sh

Division of Air Quality

NSPS Relative Accuracy Performance Specification Test - CEMS C

Stericycle

HMIWI Stack

lbs/MMBTU
O2
CO2
Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu	0.021	0.259	0.005
lbs/hr			
ppm	9.66	165.69	5.14
ppm corrected for %O2			

Average % concentration

CO_2	O_2
6.05	12.88

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2 O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	2.41E-02	2.31E-01	1.54E-02			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	1.047E-06	1.005E-05	6.689E-07			
lbs/hr	0.304	2.913	0.194	6.05	13.00	C For Cal Drift
ppm corrected for %O	11.09	147.97	16.19	6.20	13.00	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	2.19E-02	3.13E-01	1.32E-03			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	9.639E-07	1.376E-05	5.817E-08			
lbs/hr	0.33712	4.81267	0.02034	6.10	12.90	C For Cal Drift
ppm corrected for %O	10.08	200.16	1.39	6.20	12.90	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	1.66E-02	2.34E-01	9.45E-04			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	7.645E-07	1.079E-05	4.363E-08			
lbs/hr	0.300493	4.239763	0.017148	6.30	12.50	C For Cal Drift
ppm corrected for %O	7.61	149.43	0.993	6.40	12.50	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	2.14E-02	2.58E-01	1.87E-03			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	9.140E-07	1.103E-05	7.998E-08			
lbs/hr	0.28	3.39	0.02	5.75	13.13	C For Cal Drift
ppm corrected for %O	9.85	165.21	1.97	5.90	13.20	Raw Value

Calibration Error Test

Test Date January 22, 2013			O_2				
		CS - Cal. Span	21.20				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.00%	Passed Cal.
		Mid-level	10.00	10.10	0.10	0.47%	Passed Cal.
		High-level	21.20	21.20	0.00	0.00%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of CS - Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	47.17%				
100% of Cal. Span		High-level	100.00%				

Test Date January 22, 2013			CO_2				
		CS - Cal. Span	10.10				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.000%	Passed Cal.
		Mid-level	5.07	5.20	0.13	1.287%	Passed Cal.
		High-level	10.10	10.00	0.10	0.990%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	50.20%				
100% of Cal. Span		High-level	100.00%				

Test Date January 22, 2013			SO2				
		CS - Cal. Span	19.60				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.510%	Passed Cal.
		Mid-level	10.20	10.20	0.00	0.000%	Passed Cal.
		High-level	19.60	19.50	0.10	0.510%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	52.04%				
100% of Cal. Span		High-level	100.00%				

Test Date January 22, 2013			NOx				
		CS - Cal. Span	199.00				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.050%	Passed Cal.
		Mid-level	89.90	91.00	1.10	0.553%	Passed Cal.
		High-level	199.00	199.40	0.40	0.201%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	45.18%				
100% of Cal. Span		High-level	100.00%				

Test Date January 22, 2013			CO				
		CS - Cal. Span	15.70				
	40	Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.637%	Passed Cal.
		Mid-level	8.24	8.10	0.14	0.892%	Passed Cal.
		High-level	15.70	15.70	0.00	0.000%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	52.48%				
100% of Cal. Span		High-level	100.00%				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2
CS Calibration Span	19.60	199.00	15.70	10.10	21.20
Units	ppm	ppm	ppm	%	%
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2
Low-Level	0.00	0.00	0.00	0.00	0.00
Mid-Level	10.20	89.90	8.24	5.07	10.00
High-Level	19.60	199.00	15.70	10.10	21.20
0 to 20% of Cal. Span	0.00%	0.00%	0.00%	0.00%	0.00%
40 to 60% of Cal. Span	52.0%	45.2%	52.5%	50.2%	47.2%
100% of Cal. Span	100.0%	100.0%	100.0%	100.0%	100.0%

HMIWI Stack

☐ CO Calibration Gas

Unprotectec

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{Dir} C_{MA}	10.20	89.90	8.24	5.07	10.00

Calibration Error Test

Cs - Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	0.10	0.10	0.10	0.00	0.00
Mid-Level	10.20	91.00	8.10	5.20	10.10
High-Level	19.50	199.40	15.70	10.00	21.20

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	10.20	91.00	8.10	5.20	10.10

NOTE
These cells sc appropriate (after the Cm entered.

If this scan is the Cma and gas value.

Low-Level	0.51%	0.05%	0.64%	0.00%	0.00%
ppmdv Difference	0.1	0.1	0.1	0	0
Status	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.
Mid-Level	0.00%	0.55%	0.89%	1.29%	0.47%
ppmdv Difference	0	1.1	0.14	0.13	0.1
Status	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.
High-Level	0.51%	0.20%	0.00%	0.99%	0.00%
ppmdv Difference	0.1	0.4	0	0.1	0
Status	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	0.60	0.40	0.00	0.00	0.00
SBi - Zero Bias	2.55%	0.15%	0.64%	0.00%	0.00%
Difference	0.5	0.3	0.1	0	0
Pass or Failed Invalid Run	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.
C_M - Up-scale Gas	9.80	89.90	8.10	5.20	10.00
SBi - Up-Scale Bias	2.04%	0.55%	0.00%	0.00%	0.47%
Difference	0.40	1.10	0.00	0.00	0.10
Pass or Failed Invalid Run	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/22/2013

	SO_2	NO_X	CO	CO_2	O_2
	6.2	86.2	8.90	6.2	13.0
	31.6%	43.3%	56.7%	61.4%	61.3%

Time	Start	Stop
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	0.30	1.10	0.30	0.00	0.00
SBi - Zero Bias	1.02%	0.50%	1.27%	0.00%	0.00%
Difference	0.2	1.0	0.2	0.0	0.0
Pass or Invalid Run	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.
C_M - Up-scale Gas	9.80	94.20	8.20	5.20	10.00
SBi - Up-Scale Bias	2.04%	1.61%	0.64%	0.00%	0.47%
Difference	0.4	3.2	0.1	0.0	0.1
Pass or Invalid Run	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.	Passed Cal.

System Bias.
± 5% of Span

☑ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	1.53%	0.35%	0.64%	0.00%	0.00%
Difference	0.3	0.7	0.3	0.0	0.0
Pass or Re-Calibrate	Pass	Pass	Pass	Pass	Pass
Up-scale Gas Drift	0.00%	1.06%	0.64%	0.00%	0.00%
Difference	0.0	4.3	0.1	0.0	0.0
Pass or Re-Calibrate	Pass	Pass	Pass	Pass	Pass

Drift
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	143	6.05	13.00	80.96	29.49	27.29

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.2428
0.9980	0.83	47.621	205.80	74	40.928	9.687	0.1914	0.2428	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.6136	39.9	5,978	7,837	2.900E+5	

Load - Megawatts

Low	Mid	High

#1 - Times
Date

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.100	0.32	139	68	67		205.8		205.8
2	0.110	0.33	139	68	67				0
3	0.200	0.45	140	68	70				0
4	0.170	0.41	139	71	70				0
5	0.170	0.41	138	71	70				0
6	0.250	0.50	137	72	68				
7	0.220	0.47	137	72	68				
8	0.180	0.42	136	74	70				
9	0.210	0.46	134	74	69				
10	0.260	0.51	134	75	69				
11	0.340	0.58	133	76	70				
12	0.350	0.59	147	73	70				
13	0.490	0.70	151	76	72				
14	0.560	0.75	151	77	72				
15	0.540	0.73	148	78	72				
16	0.600	0.77	148	80	73				
17	0.650	0.81	148	80	73				
18	**0.840**	0.92	146	81	74				
19	0.640	0.80	149	81	73				
20	0.550	0.74	149	81	74				
21	0.690	0.83	147	81	74				
22	0.540	0.73	146	82	75				
23	0.540	0.73	148	82	75				
24	0.560	0.75		82	75				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	19.60	199.00	15.70	10.10	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**10.20**	**89.90**	**8.24**	**5.07**	**10.00**	
High-Level	**19.60**	**199.00**	**15.70**	**10.10**	**21.20**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**52.0%**	**45.2%**	**52.5%**	**50.2%**	**47.2%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	10.20	89.90	8.24	5.07	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.10**	**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level	**10.20**	**91.00**	**8.10**	**5.20**	**10.10**
High-Level	**19.50**	**199.40**	**15.70**	**10.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	10.20	91.00	8.10	5.20	10.10

Low-Level	0.51%	0.05%	0.64%	0.00%	0.00%	
ppmdv Difference	0.1	0.1	0.1	0	0	
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	
Mid-Level	0.00%	0.55%	0.89%	1.29%	0.47%	
ppmdv Difference	0	1.1	0.14	0.13	0.1	
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	☐ Failed Cal Error Dialog
High-Level	0.51%	0.20%	0.00%	0.99%	0.00%	
ppmdv Difference	0.1	0.4	0	0.1	0	
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2	
C_O - Low-Level	0.30	1.10	0.30	0.00	0.00	**System Bias.**
SBi - Zero Bias	1.02%	0.50%	1.27%	0.00%	0.00%	**± 5% of Span**
Difference	0.2	1	0.2	0	0	☐ Failed Bias Dialog
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	
C_M - Up-scale Gas	9.80	94.20	8.20	5.20	10.00	
SBi - Up-Scale Bias	2.04%	1.61%	0.64%	0.00%	0.47%	
Difference	0.4	3.2	0.1	0	0.1	
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	

Raw Test Data

Test Date: 1/22/2013

	SO_2	NO_X	CO	CO_2	O_2
	5.7	**119.2**	**0.8**	**6.2**	**12.9**
	29.1%	**59.9%**	**5.1%**	**61.4%**	**60.8%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2	
C_O - Low-Level	0.30	0.80	0.20	0.00	0.00	**System Bias.**
SBi - Zero Bias	1.02%	0.35%	0.64%	0.00%	0.00%	**± 5% of Span**
Difference	**0.2**	**0.7**	**0.1**	**0.0**	**0.0**	☐ Failed Bias Dialog
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	
C_M - Up-scale Gas	9.80	92.30	8.30	5.10	10.00	
SBi - Up-Scale Bias	2.04%	0.65%	1.27%	0.99%	0.47%	
Difference	0.4	1.3	0.2	0.1	0.1	
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.00%	0.15%	0.64%	0.00%	0.00%	Response Spec.
Difference	0.0	0.3	0.1	0.0	0.0	**3% of Span**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	☐ Failed Drift Dialog
Up-scale Gas Drift	0.00%	0.95%	0.64%	0.99%	0.00%	
Difference	**0.0**	**1.9**	**0.1**	**0.1**	**0.0**	
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	

Division of Air Quality Stack Test Review of
Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	153	6.10	12.90	81.00	29.49	27.41

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.3148
0.9980	0.83	46.978	189.10	77	40.149	8.901	0.1815	0.3148	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.7389	48.4	7,121	9,498	3.497E+5	

Load - Megawatts

Low	Mid	High

#1 - Times
Date

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.310	0.56	157	75	75		189.1		189.1
2	0.300	0.55	155	75	75				0
3	0.350	0.59	155	76	75				0
4	0.420	0.65	157	77	75				0
5	0.500	0.71	157	79	75				0
6	0.510	0.71	155	80	76				
7	0.700	0.84	157	80	76				
8	0.700	0.84	155	80	75				
9	0.700	0.84	150	80	75				
10	0.650	0.81	150	80	75				
11	0.610	0.78	150	81	77				
12	0.600	0.77	150	81	7				
13	0.540	0.73	159	81	77				
14	0.500	0.71	153	82	78				
15	0.310	0.56	156	81	76				
16	0.630	0.79	155	81	76				
17	0.640	0.80	154	81	76				
18	0.740	0.86	153	81	77				
19	0.770	0.88	151	81	77				
20	0.600	0.77	150	81	77				
21	0.620	0.79	150	81	77				
22	0.540	0.73	149	81	77				
23	0.540	0.73	149	82	77				
24	0.540	0.73	150	82	77				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	19.60	199.00	15.70	10.10	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**10.20**	**89.90**	**8.24**	**5.07**	**10.00**	
High-Level	**19.60**	**199.00**	**15.70**	**10.10**	**21.20**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**52.0%**	**45.2%**	**52.5%**	**50.2%**	**47.2%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	10.20	89.90	8.24	5.07	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.10**	**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level	**10.20**	**91.00**	**8.10**	**5.20**	**10.10**
High-Level	**19.50**	**199.40**	**15.70**	**10.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	10.20	91.00	8.10	5.20	10.10

Low-Level	0.51%	0.05%	0.64%	0.00%	0.00%
ppmv Difference	0.1	0.1	0.1	0	0
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level	0.00%	0.55%	0.89%	1.29%	0.47%
ppmv Difference	0	1.1	0.14	0.13	0.1
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level	0.51%	0.20%	0.00%	0.99%	0.00%
ppmv Difference	0.1	0.4	0	0.1	0
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - **Low-Level**	0.30	0.80	0.20	0.00	0.00
SBi - Zero Bias	1.02%	0.35%	0.64%	0.00%	0.00%
Difference	0.2	0.7	0.1	0	0
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - **Up-scale Gas**	9.80	92.30	8.30	5.10	10.00
SBi - Up-Scale Bias	2.04%	0.65%	1.27%	0.99%	0.47%
Difference	0.4	1.3	0.2	0.1	0.1
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/22/2013

	SO_2	NO_X	CO	CO_2	O_2
	4.6	**90.9**	**0.6**	**6.4**	**12.5**
	23.5%	**45.7%**	**3.8%**	**63.4%**	**59.0%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - **Low-Level**	0.20	0.50	0.30	0.00	0.00
SBi - Zero Bias	0.51%	0.20%	1.27%	0.00%	0.00%
Difference	**0.1**	**0.4**	**0.2**	**0.0**	**0.0**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - **Up-scale Gas**	9.80	88.80	8.30	5.20	10.00
SBi - Up-Scale Bias	2.04%	1.11%	1.27%	0.00%	0.47%
Difference	0.4	2.2	0.2	0.0	0.1
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.51%	0.15%	0.64%	0.00%	0.00%
Difference	0.1	0.3	0.1	0.0	0.0
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	0.00%	0.45%	0.00%	0.99%	0.00%
Difference	**0.0**	**3.5**	**0.0**	**0.1**	**0.0**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	154	6.30	12.50	81.20	29.51	27.54

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.3200
0.9980	0.83	53.190	198.30	78	45.354	9.334	0.1707	0.3200	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.8221	53.7	7,899	10,548	3.931E+5	

Load - Megawatts

Low	Mid	High

#1 - Times
Date

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.500	0.71	157	75	**74**		198.3		198.3
2	0.600	0.77	158	75	**74**				0
3	0.680	0.82	157	75	**74**				0
4	0.680	0.82	158	77	75				0
5	0.700	0.84	158	78	75				0
6	0.720	0.85	156	79	77				
7	0.820	0.91	156	79	75				
8	0.850	0.92	155	79	75				
9	0.690	0.83	151	80	76				
10	0.610	0.78	151	81	76				
11	0.560	0.75	151	81	76				
12	0.580	0.76	152	81	76				
13	0.480	0.69	151	81	76				
14	0.460	0.68	158	78	83				
15	0.600	0.77	158	78	78				
16	0.690	0.83	157	79	76				
17	0.770	0.88	156	79	76				
18	**0.930**	0.96	154	79	76				
19	0.820	0.91	151	82	76				
20	0.830	0.91	150	82	76				
21	0.770	0.88	151	82	76				
22	0.740	0.86	150	83	77				
23	0.650	0.81	148	83	77				
24	0.620	0.79	149	83	77				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	19.60	199.00	15.70	10.10	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**10.20**	**89.90**	**8.24**	**5.07**	**10.00**	
High-Level	**19.60**	**199.00**	**15.70**	**10.10**	**21.20**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**52.0%**	**45.2%**	**52.5%**	**50.2%**	**47.2%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	10.20	89.90	8.24	5.07	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.10**	**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level	**10.20**	**91.00**	**8.10**	**5.20**	**10.10**
High-Level	**19.50**	**199.40**	**15.70**	**10.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	10.20	91.00	8.10	5.20	10.10

Low-Level	0.51%	0.05%	0.64%	0.00%	0.00%
ppmv Difference	0.1	0.1	0.1	0	0
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level	0.00%	0.55%	0.89%	1.29%	0.47%
ppmv Difference	0	1.1	0.14	0.13	0.1
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level	0.51%	0.20%	0.00%	0.99%	0.00%
ppmv Difference	0.1	0.4	0	0.1	0
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - **Low-Level**	0.20	0.50	0.30	0.00	0.00
SBi - Zero Bias	0.51%	0.20%	1.27%	0.00%	0.00%
Difference	0.1	0.4	0.2	0	0
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - **Up-scale Gas**	9.80	88.80	8.30	5.20	10.00
SBi - Up-Scale Bias	2.04%	1.11%	1.27%	0.00%	0.47%
Difference	0.4	2.2	0.2	0	0.1
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/22/2013

	SO_2	NO_X	CO	CO_2	O_2
	5.4	**90.1**	**1.1**	**5.9**	**13.2**
	27.6%	**45.3%**	**7.0%**	**58.4%**	**62.3%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - **Low-Level**	0.30	0.10	0.30	0.00	0.00
SBi - Zero Bias	1.02%	0.00%	1.27%	0.00%	0.00%
Difference	**0.2**	**0.0**	**0.2**	**0.0**	**0.0**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - **Up-scale Gas**	9.70	86.70	8.30	5.20	10.10
SBi - Up-Scale Bias	2.55%	2.16%	1.27%	0.00%	0.00%
Difference	0.5	4.3	0.2	0.0	0.0
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.51%	0.20%	0.00%	0.00%	0.00%
Difference	0.1	0.4	0.0	0.0	0.0
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	0.51%	1.06%	0.00%	0.00%	0.47%
Difference	**0.1**	**2.1**	**0.0**	**0.0**	**0.1**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	26.05	0.03	26.05	150	5.75	13.13	81.11	29.45	27.22

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.2909
0.9980	0.83	40.989	180.30	75	35.136	8.487	0.1945	0.2909	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.6569	43.0	6,369	8,451	3.078E+5	

Load - Megawatts

Low	Mid	High

#1 - Times
Date

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.450	0.67	152	74	75		180.3		180.3
2	0.360	0.60	151	74	75				0
3	0.350	0.59	151	74	75				0
4	0.360	0.60	149	74	75				0
5	0.550	0.74	153	74	75				0
6	0.400	0.63	147	75	74				
7	0.400	0.63	147	75	74				
8	0.600	0.77	147	76	74				
9	0.730	0.85	145	76	74				
10	0.700	0.84	149	77	75				
11	0.700	0.84	150	78	75				
12	0.700	0.84	150	78	75				
13	0.550	0.74	151	78	75				
14	0.660	0.81	157	75	74				
15	0.460	0.68	158	75	74				
16	0.460	0.68	156	75	74				
17	0.460	0.68	156	76	74				
18	0.410	0.64	158	76	74				
19	0.350	0.59	154	76	74				
20	0.300	0.55	151	76	74				
21	0.200	0.45	149	76	74				
22	0.200	0.45	141	76	73				
23	0.200	0.45	139	76	73				
24	0.200	0.45	139	77	74				

Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Source Information

Company Name	**Stericycle**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Stack Designation:	**HMIWI Stack**

CO2 Interferece w/CO: ☐ Yes

Wet CEM: ☐ Yes

Correct For O2

Test & Review Dates

Test Date:	**1/25/2013**	High Flow Test Date:	1/0/1900
Review Date:	3/29/2013	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm	55.0	250.0	40.0		121.607	
Percent						
%O2 Correction as a whole #	**7.00**	**7.00**	**7.00**			

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)
24.50	3.27	0.9980	1.67	0.826	25.93	0.03

Round

Heat Input

fuel flow rate (Btu/hr)	Heat Input (Btu/hr.)

Contractor Information

Contact:	Alex Mongold - Chris Keefe
Contracting Company:	Air Pollution Testing (APT)
Address:	1959 South 4130 West, Unit B, SLC,Ut. 84104
Phone No.:	801-974-0481 or 303-420-5949 ext. 24
Project No.:	

☑ F factor used

8710

Diluent

- ○ O2
- ○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite 2	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
OIL		○ 9190	○ 320	○ 1420
GAS	Natural	◉ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

Tabs Are Sh

Stericycle NOX 3-19-13

Division of Air Quality

NSPS Relative Accuracy Performance Specification Test - CEMS C

Stericycle

HMIWI Stack

lbs/MMBTU
O2
CO2
Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu		0.190	
lbs/hr			
ppm		121.61	
ppm corrected for %O2			

Average % concentration

CO_2	O_2
6.35	12.47

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2
						O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		1.38E-01				E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		6.379E-06				
lbs/hr				6.35	12.50	C For Cal Drift
ppm corrected for %O		88.36		6.50	12.50	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		1.93E-01				E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		9.174E-06				
lbs/hr				6.41	12.26	C For Cal Drift
ppm corrected for %O		123.57		6.50	12.20	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		2.39E-01				E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		1.082E-05				
lbs/hr				6.27	12.66	C For Cal Drift
ppm corrected for %O		152.89		6.30	12.60	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Calibration Error Test

Test Date January 25, 2013			O_2				
		CS - Cal. Span	21.20				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.00%	Passed Cal.
		Mid-level	10.00	10.00	0.00	0.00%	Passed Cal.
		High-level	21.20	21.20	0.00	0.00%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of CS - Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	47.17%				
100% of Cal. Span		High-level	100.00%				

Test Date January 25, 2013			CO_2				
		CS - Cal. Span	10.10				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.000%	Passed Cal.
		Mid-level	5.07	5.20	0.13	1.287%	Passed Cal.
		High-level	10.10	10.10	0.00	0.000%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	50.20%				
100% of Cal. Span		High-level	100.00%				

Test Date			SO2				
		CS - Cal. Span					
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level					
		Mid-level					
		High-level					
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level					
40 to 60% of Cal. Span		Mid-level					
100% of Cal. Span		High-level					

Test Date January 25, 2013			NOx				
		CS - Cal. Span	199.00				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.050%	Passed Cal.
		Mid-level	89.90	90.70	0.80	0.402%	Passed Cal.
		High-level	199.00	199.70	0.70	0.352%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	45.18%				
100% of Cal. Span		High-level	100.00%				

Test Date			CO				
		CS - Cal. Span					
40		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level					
		Mid-level					
		High-level					
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level					
40 to 60% of Cal. Span		Mid-level					
100% of Cal. Span		High-level					

Division of Air Quality Stack Test Review of

Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		199.00		10.10	21.20	☐ CO Calibration Gas
Units	ppm	ppm	ppm	%	%	Unprotectec
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**		**0.00**	**0.00**	
Mid-Level		**89.90**		**5.07**	**10.00**	
High-Level		**199.00**		**10.10**	**21.20**	
0 to 20% of Cal. Span		**0.00%**		**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.2%**		**50.2%**	**47.2%**	
100% of Cal. Span		**100.0%**		**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{Dir} C_{MA}		**89.90**		**5.07**	**10.00**

Calibration Error Test

Cs - Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**		**0.00**	**0.00**
Mid-Level		**90.70**		**5.20**	**10.00**
High-Level		**199.70**		**10.10**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		**90.70**		**5.20**	**10.00**

NOTE
These cells sc appropriate (after the Cm entered.

If this scan is the Cma and gas value.

Low-Level		0.05%		0.00%	0.00%
ppmdv Difference		0.1		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level		0.40%		1.29%	0.00%
ppmdv Difference		0.8		0.13	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level		0.35%		0.00%	0.00%
ppmdv Difference		0.7		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		**0.10**		**0.00**	**0.00**
SBi - Zero Bias	TRUE	0.00%	TRUE	0.00%	0.00%
Difference	TRUE	0	TRUE	0	0
Pass or Failed Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		**90.70**		**5.20**	**10.00**
SBi - Up-Scale Bias	TRUE	0.00%	TRUE	0.00%	0.00%
Difference	TRUE	0.00	TRUE	0.00	0.00
Pass or Failed Invalid Run	**TRUE**	**Passed Cal.**	**TRUE**	**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/25/2013

	SO_2	NO_X	CO	CO_2	O_2
		53.4		**6.5**	**12.5**
	0.0%	**26.8%**	**0.0%**	**64.4%**	**59.0%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.40		0.10	0.00
SBi - Zero Bias	TRUE	0.15%	TRUE	0.99%	0.00%
Difference	**TRUE**	**0.3**	**TRUE**	**0.1**	**0.0**
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		88.70		5.20	10.00
SBi - Up-Scale Bias	TRUE	1.01%	TRUE	0.00%	0.00%
Difference	TRUE	2.0	TRUE	0.0	0.0
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☑ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.15%	TRUE	0.99%	0.00%
Difference	TRUE	0.3	TRUE	0.1	0.0
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	TRUE	1.01%	TRUE	0.00%	0.00%
Difference	**TRUE**	**2.0**	**TRUE**	**0.0**	**0.0**
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**

Drift **3% of Span**

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		199.00		10.10	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**		**0.00**	**0.00**	
Mid-Level		**89.90**		**5.07**	**10.00**	
High-Level		**199.00**		**10.10**	**21.20**	
0 to 20% of Cal. Span		**0.00%**		**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.2%**		**50.2%**	**47.2%**	
100% of Cal. Span		**100.0%**		**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}		89.90		5.07	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**		**0.00**	**0.00**
Mid-Level		**90.70**		**5.20**	**10.00**
High-Level		**199.70**		**10.10**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		90.70		5.20	10.00
Low-Level		0.05%		0.00%	0.00%
ppmdv Difference		0.1		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level		0.40%		1.29%	0.00%
ppmdv Difference		0.8		0.13	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level		0.35%		0.00%	0.00%
ppmdv Difference		0.7		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.40		0.10	0.00
SBi - Zero Bias	TRUE	0.15%	TRUE	0.99%	0.00%
Difference	TRUE	0.3	TRUE	0.1	0
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		88.70		5.20	10.00
SBi - Up-Scale Bias	TRUE	1.01%	TRUE	0.00%	0.00%
Difference	TRUE	2	TRUE	0	0
Pass or Invalid Run	**TRUE**	**Passed Cal.**	**TRUE**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/25/2013

	SO_2	NO_X	CO	CO_2	O_2
		75.8		**6.5**	**12.2**
	0.0%	**38.1%**	**0.0%**	**64.4%**	**57.5%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.50		0.00	0.00
SBi - Zero Bias	TRUE	0.20%	TRUE	0.00%	0.00%
Difference	**TRUE**	**0.4**	**TRUE**	**0.0**	**0.0**
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		88.50		5.10	9.90
SBi - Up-Scale Bias	TRUE	1.11%	TRUE	0.99%	0.47%
Difference	TRUE	2.2	TRUE	0.1	0.1
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.05%	TRUE	0.99%	0.00%
Difference	TRUE	0.1	TRUE	0.1	0.0
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.10%	TRUE	0.99%	0.47%
Difference	**TRUE**	**0.2**	**TRUE**	**0.1**	**0.1**
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		199.00		10.10	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**		**0.00**	**0.00**	
Mid-Level		**89.90**		**5.07**	**10.00**	
High-Level		**199.00**		**10.10**	**21.20**	
0 to 20% of Cal. Span		**0.00%**		**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.2%**		**50.2%**	**47.2%**	
100% of Cal. Span		**100.0%**		**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}		89.90		5.07	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**		**0.00**	**0.00**
Mid-Level		**90.70**		**5.20**	**10.00**
High-Level		**199.70**		**10.10**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		90.70		5.20	10.00
Low-Level		0.05%		0.00%	0.00%
ppmv Difference		0.1		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
Mid-Level		0.40%		1.29%	0.00%
ppmv Difference		0.8		0.13	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
High-Level		0.35%		0.00%	0.00%
ppmv Difference		0.7		0	0
Status		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.50		0.00	0.00
SBi - Zero Bias	TRUE	0.20%	TRUE	0.00%	0.00%
Difference	TRUE	0.4	TRUE	0	0
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		88.50		5.10	9.90
SBi - Up-Scale Bias	TRUE	1.11%	TRUE	0.99%	0.47%
Difference	TRUE	2.2	TRUE	0.1	0.1
Pass or Invalid Run	**TRUE**	**Passed Cal.**	**TRUE**	**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 1/25/2013

	SO_2	NO_X	CO	CO_2	O_2
		88.7		**6.3**	**12.6**
	0.0%	**44.6%**	**0.0%**	**62.4%**	**59.4%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.50		0.10	0.00
SBi - Zero Bias	TRUE	0.20%	TRUE	0.99%	0.00%
Difference	**TRUE**	**0.4**	**TRUE**	**0.1**	**0.0**
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		87.60		5.10	10.00
SBi - Up-Scale Bias	TRUE	1.56%	TRUE	0.99%	0.00%
Difference	TRUE	3.1	TRUE	0.1	0.0
Pass or Invalid Run		**Passed Cal.**		**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.00%	TRUE	0.99%	0.00%
Difference	TRUE	0.0	TRUE	0.1	0.0
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.45%	TRUE	0.00%	0.47%
Difference	**TRUE**	**0.9**	**TRUE**	**0.0**	**0.1**
Pass or Re-Calibrate		**Pass**		**Pass**	**Pass**

Response Spec. **3% of Span**

☐ Failed Drift Dialog

Division of Air Quality
Compliance Demonstration
Method 23 - PCDD/PCDF

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23-24/2013	
Review Date:	4/1/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
125.000	100.000	55.000		

Emission Rates corrected to 7% O2

gr/bill. Dscf	ng/dscm	gr/dscf		
2.4172	**5.5315**	**1.45E-09**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
22.50	2.76	0.9980	1.67	0.826	25.9	0.04	0.253

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of
Reference Methods 23 - Total PCDD/PCDF
Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23-24/2013	1/23-24/2013	1/23-24/2013	1/23-24/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	25.90	25.90	25.90	
Pq (static)	0.04	0.04	0.04	
Ps	25.90	25.90	25.90	
Avg. Ts F	136.21	138.38	136.21	
CO2 - F_{CO2}	6.40	6.10	6.40	
O2	12.40	12.80	12.40	
N2+C	81.20	81.10	81.20	
Md	29.52	29.49	29.52	
Ms	27.34	27.18	27.34	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	124.61	122.29	124.61	
Vlc	525.40	550.00	525.40	
$A_{VG.}$ Tm F	79.52	81.92	79.52	
Vm std	105.67	103.23	105.67	
Vw std	24.73	25.89	24.73	
Bws	0.19	0.20	0.19	
S Bws	0.21	0.22	0.21	
Avg. Sqrt Dlp	0.68	0.67	0.68	
Vs	44.05	43.46	44.05	
scfm wet	5594.92	5499.65	5594.92	
acfm	7297.43	7199.23	7297.43	
Qsd dscfh	272029.94	263820.00	272029.94	
# Sample Points	8.00	8.00	8.00	
Dn	0.253	0.253	0.253	
An	3.49E-04	3.49E-04	3.49E-04	
Start Time				
End Time				
Total Test time	180.00	180.00	180.00	
Time @ point	7.50	7.50	7.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	1.11653E-08	
Run 2	0	1.11923E-08	
Run 3	0	7.17639E-09	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000002	0.000000002	0.000000001		0.00000000
ng/dscm	3.7315	3.8287	2.3984		3.3195
lbs/MMBtu					

Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	1.6306	1.6731	1.0481		1.4506
gr/bill dscf @7% O	2.6666	2.8712	1.7139		2.4172
ng/dscm @7%O2	6.10	6.57	3.92		5.5315

lbs/MMBtu

O2

CO2

F factor used

Division of Air Quality
Compliance Demonstration
Method 23 - CDD/CDF
Toxic Equivalent

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23-24/2013
Review Date:	4/1/2013
Observer:	**Rob Leishman**
Reviewer:	**Rob Leishman**

Tabs Are Shown

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
125.000	100.000	55.000		

Emission Rates corrected to 7% O2

gr/bill. Dscf	ng/dscm	gr/dscf		
0.1416	**0.3241**	**8.51E-11**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
22.50	2.76	0.9980	1.67	0.826	25.9	0.04	0.253

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Reference Methods 23 - Total CDD/CDF

Compliance Demonstration of

Toxic Equivalent

Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23-24/2013	1/23-24/2013	1/23-24/2013	1/23-24/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	25.90	25.90	25.90	
Pq (static)	0.04	0.04	0.04	
Ps	25.90	25.90	25.90	
Avg. Ts F	136.21	138.38	136.21	
CO2 - F_{CO2}	6.40	6.10	6.40	
O2	12.40	12.80	12.40	
N2+C	81.20	81.10	81.20	
Md	29.52	29.49	29.52	
Ms	27.34	27.18	27.34	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	124.61	122.29	124.61	
Vlc	525.40	550.00	525.40	
$A_{VG.}$ Tm F	79.52	81.92	79.52	
Vm std	105.67	103.23	105.67	
Vw std	24.73	25.89	24.73	
Bws	0.19	0.20	0.19	
S Bws	0.21	0.22	0.21	
Avg. Sqrt Dlp	0.68	0.67	0.68	
Vs	44.05	43.46	44.05	
scfm wet	5594.92	5499.65	5594.92	
acfm	7297.43	7199.23	7297.43	
Qsd dscfh	272029.94	263820.00	272029.94	
# Sample Points	8.00	8.00	8.00	
Dn	0.253	0.253	0.253	
An	3.49E-04	3.49E-04	3.49E-04	
Start Time				
End Time				
Total Test time	180.00	180.00	180.00	
Time @ point	7.50	7.50	7.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	5.88342E-10	
Run 2	0	5.95643E-10	
Run 3	0	5.50763E-10	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.000000000	0.000000000	0.000000000		0.00000000
ng/dscm	0.1966	0.2038	0.1841		0.1948
lbs/MMBtu					

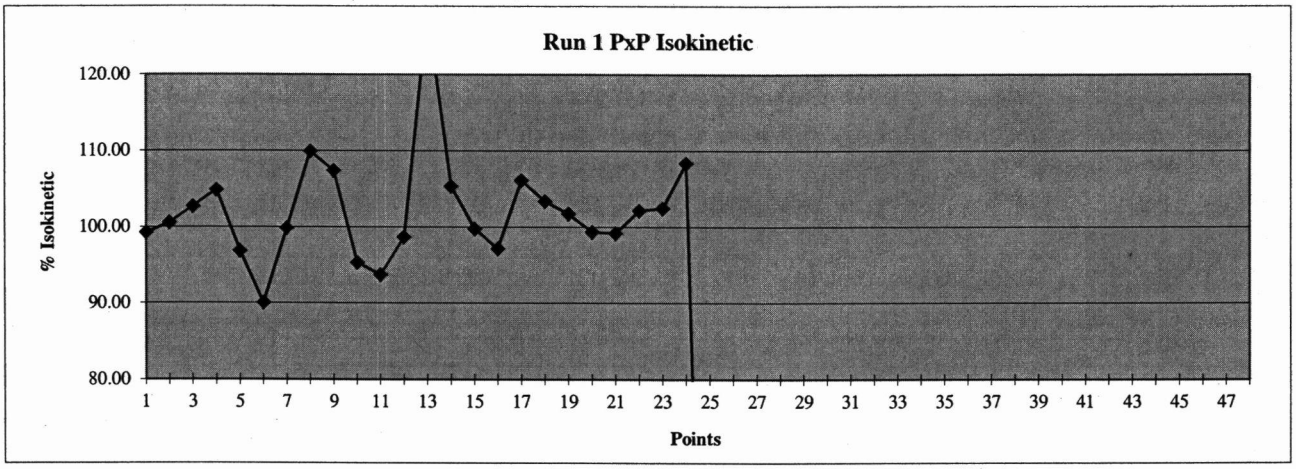
Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	0.0859	0.0890	0.0804		0.0851
gr/bill dscf @7% O	0.1405	0.1528	0.1315		0.1416
ng/dscm @7%O2	0.32	0.35	0.30		0.3241

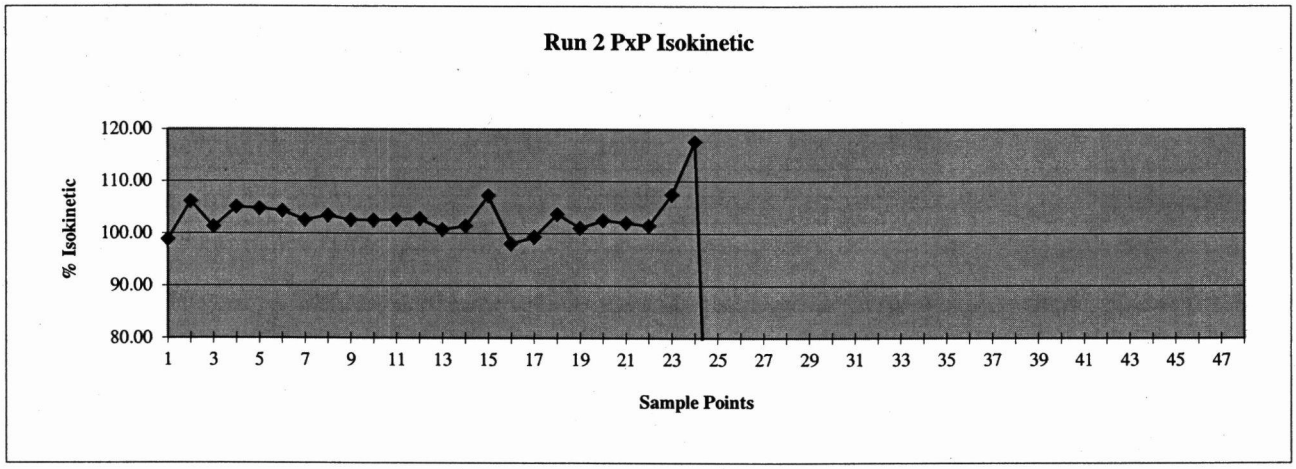
lbs/MMBtu

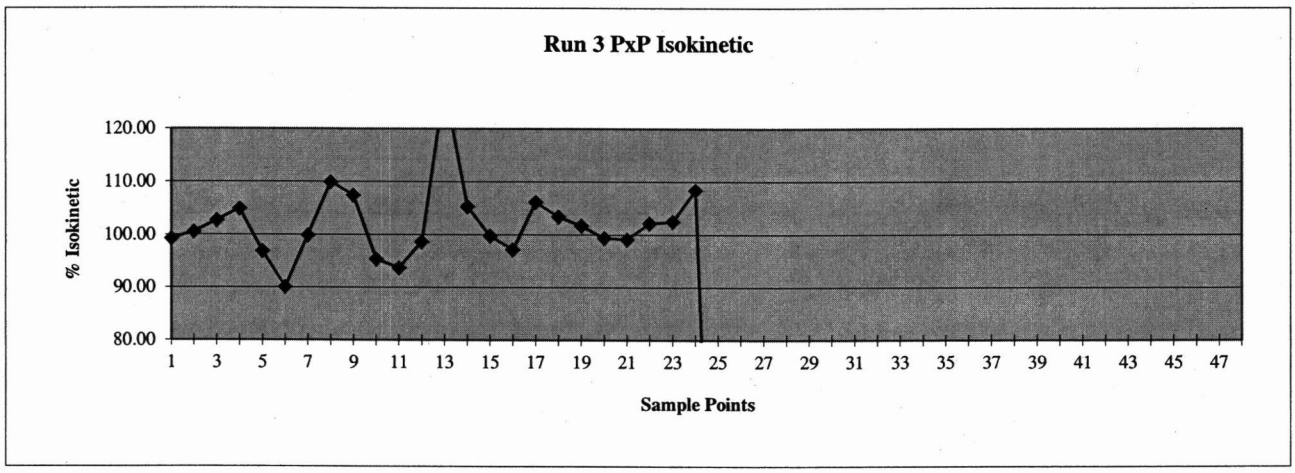
O2

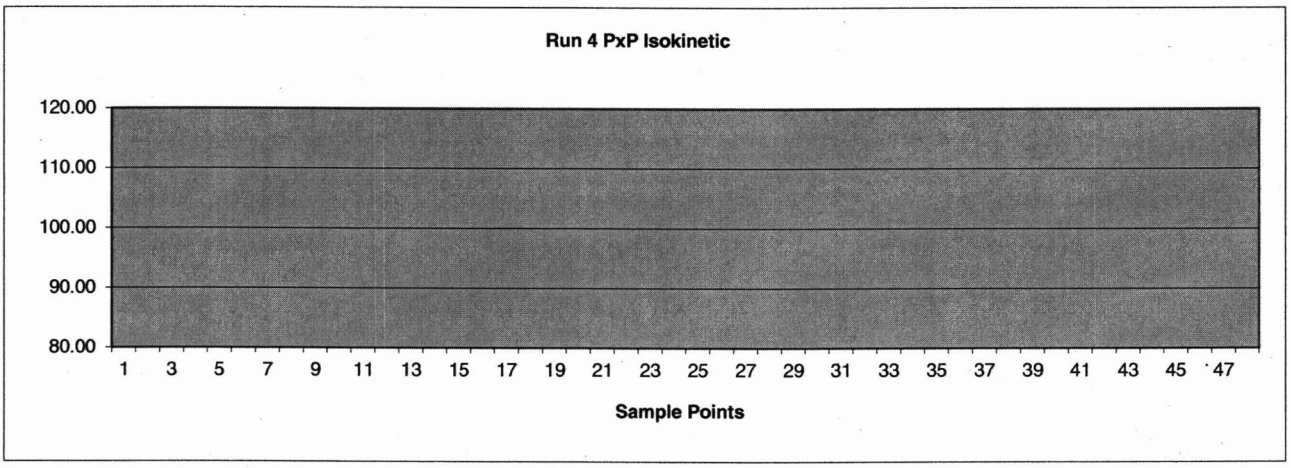
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	1/23-24/2013	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.90	0.04	25.90	136	6.40	12.40	81.20	29.52	27.34
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2062
0.9980	0.83	124.607	525.40	79.52	105.669	24.731	0.1897	0.2062	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.680	44.05	5,595	7,297	2.72E+05	8	0.253	180	7.50	1.205417
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	406.384	0.17	0.43	136	75	77
2	409.421	0.28	0.71	136	75	80
3	413.378	0.45	1.14	134	77	82
4	418.521	0.44	1.11	139	77	83
5	423.700	0.37	0.94	137	78	83
6	428.099	0.53	1.39	136	78	83
7	432.991	0.47	1.19	137	79	83
8	438.104	0.51	1.29	134	79	83
9	443.981	0.49	1.24	134	78	82
10	449.599	0.40	1.01	136	78	82
11	454.100	0.37	0.96	136	78	81
12	458.352	0.50	1.29	135	77	81
13	463.550	0.59	1.53	135	77	81
14	470.892	0.54	1.40	137	77	78
15	476.631	0.51	1.32	137	77	81
16	481.931	0.54	1.40	136	77	82
17	487.249	0.56	1.45	132	77	81
18	493.179	0.56	1.45	137	77	82
19	498.936	0.40	1.03	134	77	82
20	503.742	0.39	1.01	133	77	82
21	508.381	0.48	1.24	137	77	83
22	513.501	0.60	1.55	138	78	83
23	519.394	0.59	1.53	143	78	83
24	525.232	0.51	1.32	140	78	83
25	530.991					
26						
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
986.9	489.5	497.4
754.2	754.7	-0.5
705.5	707.2	-1.7
859.7	829.5	30.2
		0.0

Isokinetics	102.5	
Test Date	1/23-24/2013	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.90	0.04	25.90	138	6.10	12.80	81.10	29.49	27.18
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2181
0.9980	0.83	122.290	550.00	82	103.235	25.889	0.2005	0.2181	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.668	43.46	5,500	7,199	2.64E+05	8	0.253	180	7.50	1.17
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	531.710	0.40	1.10	136.0	77.0	77.0
2	536.300	0.50	1.30	141.0	80.0	77.0
3	541.800	0.57	1.47	143.0	82.0	77.0
4	547.400	0.40	1.00	139.0	83.0	78.0
5	552.300	0.40	1.00	137.0	84.0	78.0
6	557.200	0.42	1.00	138.0	84.0	79.0
7	562.200	0.35	0.90	136.0	85.0	79.0
8	566.700	0.30	0.77	138.0	85.0	80.0
9	570.900	0.40	1.00	139.0	85.0	80.0
10	575.700	0.45	1.20	137.0	86.0	80.0
11	580.800	0.35	0.91	139.0	85.0	81.0
12	585.300	0.35	0.91	141.0	85.0	81.0
13	589.800	0.45	1.20	136.0	83.0	80.0
14	594.800	0.30	0.77	142.0	84.0	80.0
15	598.900	0.35	0.91	138.0	85.0	80.0
16	603.600	0.35	0.89	137.0	85.0	80.0
17	607.900	0.50	1.30	137.0	85.0	80.0
18	613.100	0.55	1.40	137.0	85.0	81.0
19	618.800	0.80	2.10	135.0	86.0	81.0
20	625.500	0.73	1.90	135.0	86.0	81.0
21	632.000	0.63	1.60	138.0	86.0	81.0
22	638.000	0.50	1.30	140.0	85.0	80.0
23	643.300	0.43	1.10	142.0	85.0	80.0
24	648.500	0.40	1.01	140.0	85.0	80.0
25	654.000					
26						
27						
28						
29						
30						
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48						

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
1050.00	529.10	520.9
721.90	722.00	-0.1
729.00	728.80	0.2
913.30	884.30	29.0
		0.0

Isokinetics	103.2
Test Date	1/23-24/2013
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.90	0.04	25.90	136	6.40	12.40	81.20	29.52	27.34
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2062
0.9980	0.83	124.607	525.40	80	105.669	24.731	0.1897	0.2062	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.680	44.05	5,595	7,297	2.72E+05	8	0.253	180	7.50	1.21
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	406.384	0.17	0.43	136	75	77
2	409.421	0.28	0.71	136	75	80
3	413.378	0.45	1.14	134	77	82
4	418.521	0.44	1.11	139	77	83
5	423.700	0.37	0.94	137	78	83
6	428.099	0.53	1.39	136	78	83
7	432.991	0.47	1.19	137	79	83
8	438.104	0.51	1.29	134	79	83
9	443.981	0.49	1.24	134	78	82
10	449.599	0.40	1.01	136	78	82
11	454.100	0.37	0.96	136	78	81
12	458.352	0.50	1.29	135	77	81
13	463.550	0.59	1.53	135	77	81
14	470.892	0.54	1.40	137	77	78
15	476.631	0.51	1.32	137	77	81
16	481.931	0.54	1.40	136	77	82
17	487.249	0.56	1.45	132	77	81
18	493.179	0.56	1.45	137	77	82
19	498.936	0.40	1.03	134	77	82
20	503.742	0.39	1.01	133	77	82
21	508.381	0.48	1.24	137	77	83
22	513.501	0.60	1.55	138	78	83
23	519.394	0.59	1.53	143	78	83
24	525.232	0.51	1.32	140	78	83
25	530.991					
26						
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
986.9	489.5	497.4
754.2	754.7	-0.5
705.5	707.2	-1.7
859.7	829.5	30.2
		0.0

Isokinetics	102.5
Test Date	1/23-24/2013
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 29- Particulate Matter (PM)

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23/2013	
Review Date:	4/2/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.2060	**0.0050**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
24.50	3.27	0.9980	1.67	0.826	25.99	0.04	0.253

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of
Reference Method 29 - Particulate Matter (PM)
Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23/2013	1/23/2013	1/23/2013	1/23/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	25.99	25.99	25.99	
Pq (static)	0.04	0.04	0.04	
Ps	25.99	25.99	25.99	
Avg. Ts F	132.25	145.50	145.33	
CO2 - F_{CO2}	6.20	6.90	6.10	
O2	12.50	11.70	12.90	
N2+C	81.30	81.40	81.00	
Md	29.49	29.57	29.49	
Ms	27.36	27.47	27.51	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	33.81	42.33	43.17	
Vlc	144.50	172.80	164.20	
$A_{VG.}$ Tm F	59.60	69.92	74.50	
Vm std	29.84	36.69	37.10	
Vw std	6.80	8.13	7.73	
Bws	0.19	0.18	0.17	
S Bws	0.19	0.26	0.26	
Avg. Sqrt Dlp	0.57	0.69	0.69	
Vs	36.50	44.62	44.57	
scfm wet	5553.48	6640.26	6634.39	
acfm	7170.37	8765.38	8755.22	
Qsd dscfh	271498.07	326116.89	329433.46	
# Sample Points	20.00	20.00	20.00	
Dn	0.253	0.260	0.260	
An	3.49E-04	3.69E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0.02065	0	
Run 2	0.004	0.00075	
Run 3	0.0048	0.0008500	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0106795	0.0019980	0.0023502		0.0050092
lbs/hr	0.414278	0.093099	0.110625		0.206001
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	17.6720	3.0187	4.0835		8.25808
mg/dscm@7%	42.311940	7.227726	9.777210		19.772292

lbs/MMBtu

O2

CO2

F factor used

Division of Air Quality
Compliance Demonstration
Method 29- Cadmium (Cd)

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23/2013
Review Date:	4/2/2013
Observer:	**Rob Leishman**
Reviewer:	**Rob Leishman**

Tabs Are Shown

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.0000	**0.0000**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
24.50	3.27	0.9980	1.67	0.826	25.99	0.04	0.253

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of
Reference Method 29 - Cadmium (Cd)
Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23/2013	1/23/2013	1/23/2013	1/23/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	25.99	25.99	25.99	
Pq (static)	0.04	0.04	0.04	
Ps	25.99	25.99	25.99	
Avg. Ts F	132.25	145.50	145.33	
CO2 - F_{CO2}	6.20	6.90	6.10	
O2	12.50	11.70	12.90	
N2+C	81.30	81.40	81.00	
Md	29.49	29.57	29.49	
Ms	27.36	27.47	27.51	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	33.81	42.33	43.17	
Vlc	144.50	172.80	164.20	
$A_{VG.}$ Tm F	59.60	69.92	74.50	
Vm std	29.84	36.69	37.10	
Vw std	6.80	8.13	7.73	
Bws	0.19	0.18	0.17	
S Bws	0.19	0.26	0.26	
Avg. Sqrt Dlp	0.57	0.69	0.69	
Vs	36.50	44.62	44.57	
scfm wet	5553.48	6640.26	6634.39	
acfm	7170.37	8765.38	8755.22	
Qsd dscfh	271498.07	326116.89	329433.46	
# Sample Points	20.00	20.00	20.00	
Dn	0.253	0.260	0.260	
An	3.49E-04	3.69E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000017	
Run 2	0	0.0000015	
Run 3	0	0.0000017	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000009	0.0000006	0.0000007		0.0000007
lbs/hr	0.000034	0.000029	0.000033		0.000032
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0015	0.0010	0.0012		0.00121
mg/dscm@7%	0.003483	0.002282	0.002942		0.002903

O2

CO2

F factor used

Division of Air Quality
Compliance Demonstration
Method 29- Lead (Pb)

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23/2013	
Review Date:	4/2/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.0002	**0.0000**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
24.50	3.27	0.9980	1.67	0.826	25.99	0.04	0.253

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 - Lead (Pb) Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23/2013	1/23/2013	1/23/2013	1/23/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	25.99	25.99	25.99	
Pq (static)	0.04	0.04	0.04	
Ps	25.99	25.99	25.99	
Avg. Ts F	132.25	145.50	145.33	
CO2 - F_{CO2}	6.20	6.90	6.10	
O2	12.50	11.70	12.90	
N2+C	81.30	81.40	81.00	
Md	29.49	29.57	29.49	
Ms	27.36	27.47	27.51	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	33.81	42.33	43.17	
Vlc	144.50	172.80	164.20	
$A_{VG.}$ Tm F	59.60	69.92	74.50	
Vm std	29.84	36.69	37.10	
Vw std	6.80	8.13	7.73	
Bws	0.19	0.18	0.17	
S Bws	0.19	0.26	0.26	
Avg. Sqrt Dlp	0.57	0.69	0.69	
Vs	36.50	44.62	44.57	
scfm wet	5553.48	6640.26	6634.39	
acfm	7170.37	8765.38	8755.22	
Qsd dscfh	271498.07	326116.89	329433.46	
# Sample Points	20.00	20.00	20.00	
Dn	0.253	0.260	0.260	
An	3.49E-04	3.69E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000069	
Run 2	0	0.0000238	
Run 3	0	0.0000036	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000036	0.0000100	0.0000015		0.0000050
lbs/hr	0.000138	0.000466	0.000070		0.000225
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0059	0.0151	0.0026		0.00788
mg/dscm@7%	0.014138	0.036215	0.006230		0.018861

lbs/MMBtu

O2

CO2

F factor used

Division of Air Quality
Compliance Demonstration
Method 29- Mercury (Hg)

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	1/23/2013	
Review Date:	4/2/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.0001	**0.0000**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
24.50	3.27	0.9980	1.67	0.826	25.99	0.04	0.253
Round							

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 - Mercury (Hg) Stericycle - Incinerator Stack

Testing Results				
Test Date	1/23/2013	1/23/2013	1/23/2013	1/23/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	25.99	25.99	25.99	
Pq (static)	0.04	0.04	0.04	
Ps	25.99	25.99	25.99	
Avg. Ts F	132.25	145.50	145.33	
CO2 - F_{CO2}	6.20	6.90	6.10	
O2	12.50	11.70	12.90	
N2+C	81.30	81.40	81.00	
Md	29.49	29.57	29.49	
Ms	27.36	27.47	27.51	
Y	1.00	1.00	1.00	
Cp	0.83	0.83	0.83	
Vm cf	33.81	42.33	43.17	
Vlc	144.50	172.80	164.20	
$A_{VG.}$ Tm F	59.60	69.92	74.50	
Vm std	29.84	36.69	37.10	
Vw std	6.80	8.13	7.73	
Bws	0.19	0.18	0.17	
S Bws	0.19	0.26	0.26	
Avg. Sqrt Dlp	0.57	0.69	0.69	
Vs	36.50	44.62	44.57	
scfm wet	5553.48	6640.26	6634.39	
acfm	7170.37	8765.38	8755.22	
Qsd dscfh	271498.07	326116.89	329433.46	
# Sample Points	20.00	20.00	20.00	
Dn	0.253	0.260	0.260	
An	3.49E-04	3.69E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000033	
Run 2	0	0.0000025	
Run 3	0	0.0000026	
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000017	0.0000011	0.0000011		0.0000013
lbs/hr	0.000066	0.000049	0.000051		0.000055
lbs/MMBtu					

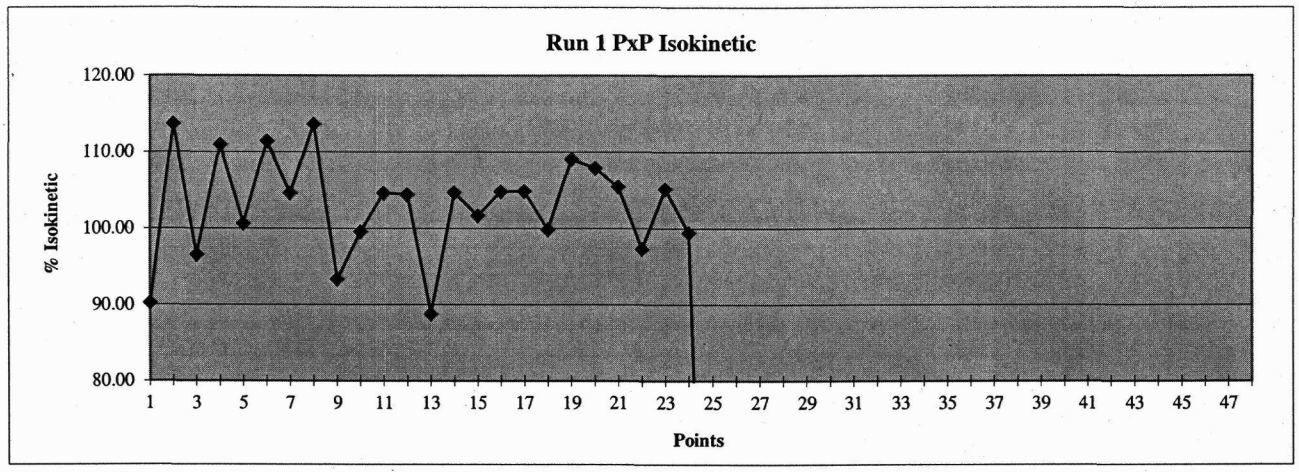
Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.0028	0.0016	0.0019		0.00210
mg/dscm@7%	0.006762	0.003804	0.004499		0.005022

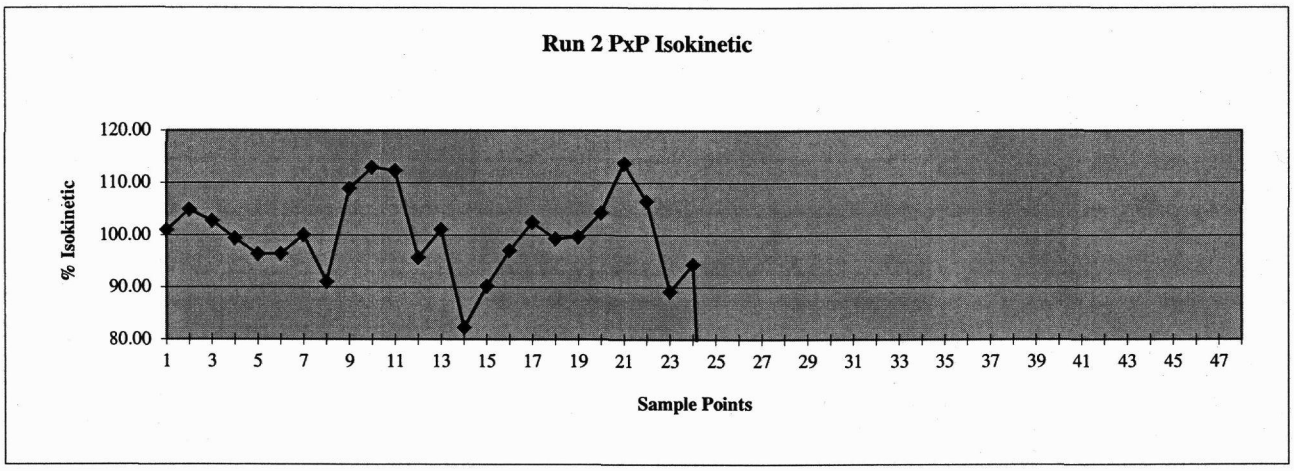
lbs/MMBtu

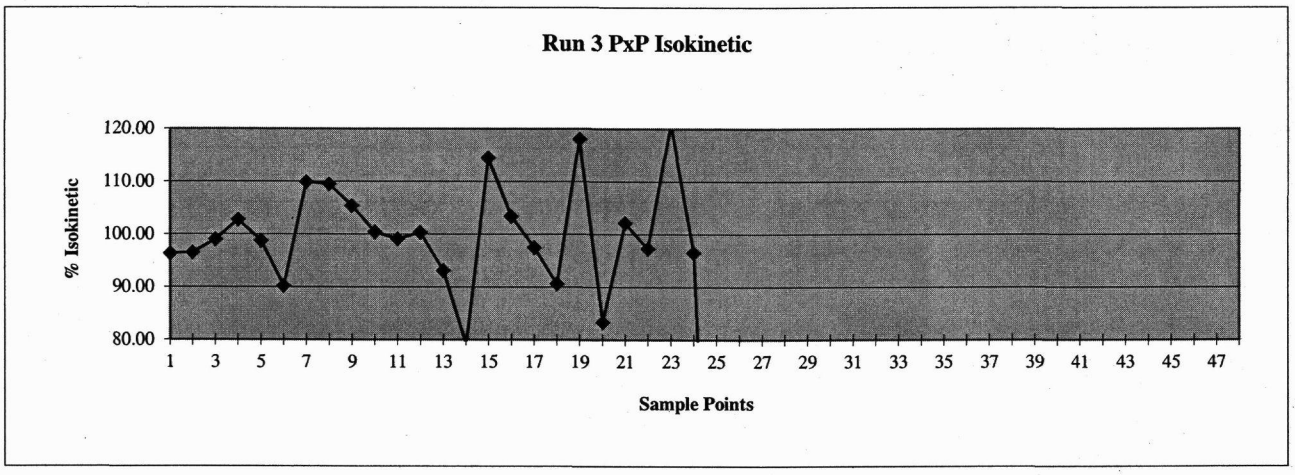
O2

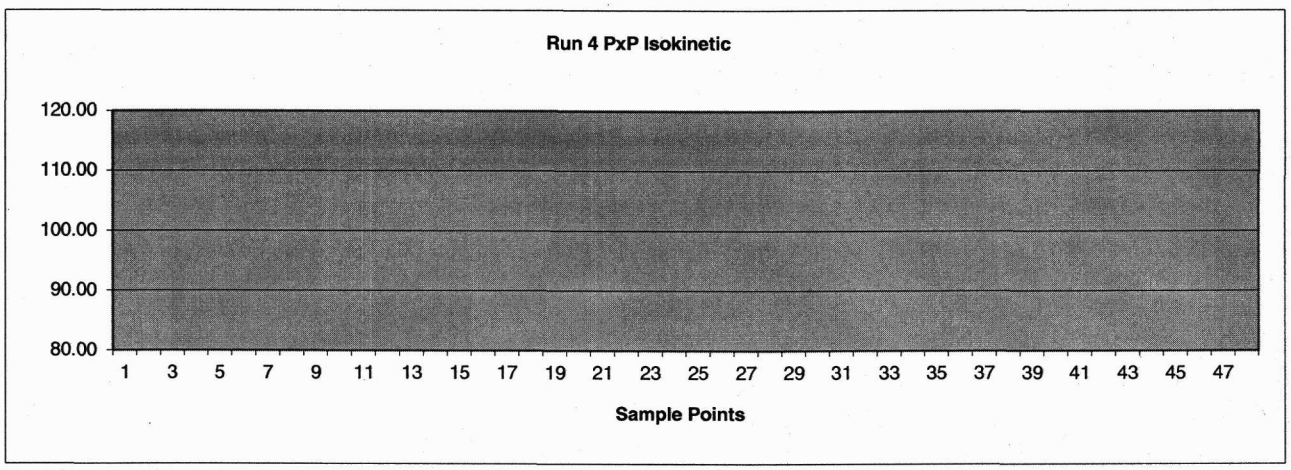
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	1/23/2013	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.99	0.04	25.99	132	6.20	12.50	81.30	29.49	27.36
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1852
0.9980	0.83	33.808	144.50	59.60	29.840	6.802	0.1856	0.1852	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.566	36.50	5,553	7,170	2.71E+05	20	0.253	60	2.50	0.832500
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	237.558	0.33	0.84	133	57	57
2	238.800	0.31	0.78	137	57	57
3	240.312	0.33	0.84	133	57	57
4	241.641	0.30	0.76	133	58	57
5	243.099	0.35	0.88	130	58	58
6	244.532	0.30	0.76	130	59	57
7	246.001	0.31	0.78	131	59	57
8	247.402	0.25	0.64	131	60	58
9	248.772	0.23	0.58	131	60	58
10	249.851	0.22	0.56	131	61	58
11	250.978	0.24	0.61	131	61	58
12	252.215	0.25	0.64	132	62	58
13	253.475	0.15	0.33	128	63	59
14	254.310	0.17	0.43	128	62	60
15	255.358	0.32	0.81	131	63	60
16	256.750	0.35	0.88	134	64	60
17	258.249	0.52	1.30	131	65	60
18	260.081	0.59	1.50	131	66	61
19	261.941	0.52	1.30	131	67	61
20	263.851	0.55	1.40	133	8	61
21	265.682	0.40	1.00	136	68	62
22	267.300	0.37	0.94	139	68	62
23	268.732	0.28	0.71	137	68	62
24	270.082	0.28	0.71	132	69	63
25	271.366					
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
755.7	638.7	117.0
781.6	763.5	18.1
717.9	715.1	2.8
1408.8	1408.9	-0.1
1582.0	1575.3	6.7

Isokinetics	103.2	
Test Date	1/23/2013	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.99	0.04	25.99	146	6.90	11.70	81.40	29.57	27.47
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2606
0.9980	0.83	42.331	172.80	70	36.689	8.134	0.1815	0.2606	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.686	44.62	6,640	8,765	3.26E+05	20	0.26	60	2.50	1.34
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	271.698	0.29	0.80	145.0	66.0	65.0
2	273.087	0.18	0.50	146.0	67.0	65.0
3	274.225	0.32	0.89	148.0	68.0	66.0
4	275.710	0.30	0.83	148.0	69.0	66.0
5	277.102	0.50	1.39	146.0	69.0	66.0
6	278.845	0.53	1.47	145.0	70.0	66.0
7	280.643	0.50	1.39	143.0	70.0	67.0
8	282.461	0.71	1.97	144.0	72.0	67.0
9	284.431	0.45	1.25	144.0	73.0	67.0
10	286.312	0.42	1.16	142.0	73.0	67.0
11	288.201	0.39	1.08	143.0	74.0	67.0
12	290.012	0.35	0.97	143.0	74.0	68.0
13	291.475	0.30	0.83	146.0	70.0	69.0
14	292.899	0.35	0.97	147.0	72.0	69.0
15	294.151	0.64	1.77	148.0	71.0	69.0
16	296.001	0.53	1.47	149.0	72.0	69.0
17	297.813	0.57	1.58	148.0	73.0	69.0
18	299.800	0.74	2.04	147.0	73.0	69.0
19	301.994	0.75	2.08	147.0	74.0	69.0
20	304.213	0.70	1.94	147.0	75.0	70.0
21	306.461	0.60	1.66	147.0	75.0	70.0
22	308.732	0.51	1.41	145.0	75.0	70.0
23	310.698	0.48	1.33	142.0	75.0	70.0
24	312.298	0.50	1.39	142.0	76.0	70.0
25	314.029					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
789.10	662.30	126.8
739.80	711.60	28.2
730.40	723.40	7.0
1421.80	1419.70	2.1
1582.6	1573.9	8.7

Isokinetics	99.9
Test Date	1/23/2013
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.99	0.04	25.99	145	6.10	12.90	81.00	29.49	27.51
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2595
0.9980	0.83	43.174	164.20	75	37.100	7.729	0.1724	0.2595	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.686	44.57	6,634	8,755	3.29E+05	20	0.26	60	2.50	1.35
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	314.442	0.60	1.66	157.0	70.0	69.0
2	316.359	0.58	1.61	157.0	70.0	70.0
3	318.249	0.62	1.72	152.0	70.0	70.0
4	320.261	0.65	1.80	151.0	70.0	70.0
5	322.401	0.72	1.99	149.0	72.0	70.0
6	324.572	0.91	2.52	150.0	74.0	70.0
7	326.800	0.70	1.93	147.0	74.0	70.0
8	329.191	0.65	1.80	146.0	75.0	70.0
9	331.491	0.59	1.63	144.0	76.0	71.0
10	333.610	0.49	1.36	145.0	77.0	71.0
11	335.451	0.42	1.16	140.0	77.0	71.0
12	337.141	0.35	0.97	144.0	78.0	72.0
13	338.701	0.16	0.44	143.0	78.0	72.0
14	339.682	0.29	0.81	144.0	76.0	74.0
15	340.802	0.22	0.62	147.0	78.0	73.0
16	342.213	0.26	0.73	144.0	78.0	73.0
17	343.601	0.35	0.97	144.0	79.0	74.0
18	345.121	0.42	1.16	142.0	80.0	74.0
19	346.671	0.51	1.43	140.0	80.0	74.0
20	348.900	0.54	1.51	140.0	81.0	75.0
21	350.522	0.46	1.29	139.0	82.0	75.0
22	352.361	0.51	1.43	141.0	82.0	75.0
23	354.201	0.35	0.97	141.0	83.0	75.0
24	356.100	0.35	0.97	141.0	83.0	75.0
25	357.616					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
755.9	638.3	117.6
793.3	763.2	30.1
720.8	713.5	7.3
1409.8	1409.1	0.7
1592.4	1583.9	8.5

Isokinetics	100.0
Test Date	1/23/2013
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 26A - HCl

Source Information

Company Name	**Stericycle - HMIWI Stack**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Source Designation:	**HMIWI Stack**

Test & Review Dates

Test Date:	4/10/2013	
Review Date:	4/26/2013	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

ppm@7%O2	lbs/hr	gr/dscf		
100.000	50.000	50.000		

Emission Rates - "Front Half"

ppm@7%O2	lbs/hr	gr/dscf		
4.5284	**0.0877**	**0.0019**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
25.75	3.62	0.9860	1.65	0.82	25.81	-0.11	0.28
Round							

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Reference Methods 26A - HCl

Compliance Demonstration of

Stericycle - HMIWI Stack

Testing Results				
Test Date	4/10/2013	4/10/2013	4/10/2013	4/10/2013
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.62	3.62	3.62	
Pbar	25.81	25.81	25.81	
Pq (static)	-0.11	-0.11	-0.11	
Ps	25.80	25.80	25.80	
Avg. Ts F	131.42	133.04	133.63	
CO2 - F_{CO2}	6.40	6.50	5.80	
O2	12.40	12.20	12.70	
N2+C	81.20	81.30	81.50	
Md	29.52	29.53	29.44	
Ms	27.42	27.34	27.22	
Y	0.99	0.99	0.99	
Cp	0.82	0.82	0.82	
Vm cf	47.99	47.95	43.71	
Vlc	191.00	198.40	184.60	
$A_{VG.}$ Tm F	79.92	81.96	87.65	
Vm std	40.08	39.90	35.96	
Vw std	8.99	9.34	8.69	
Bws	0.18	0.19	0.19	
S Bws	0.18	0.19	0.19	
Avg. Sqrt Dlp	0.63	0.63	0.66	
Vs	40.53	40.55	42.61	
scfm wet	6771.53	6755.35	7091.37	
acfm	8795.39	8798.48	9245.22	
Qsd dscfh	332143.39	328450.94	343167.52	
# Sample Points	24.00	24.00	24.00	
Dn	0.280	0.280	0.260	
An	4.28E-04	4.28E-04	3.69E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0	0.0048
Run 2	0	0	0.0092
Run 3	0	0	0.0004
Run 4			

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000	0.0000	0.0000		0.0000
lbs/hr					#DIV/0!
lbs/MMBtu					

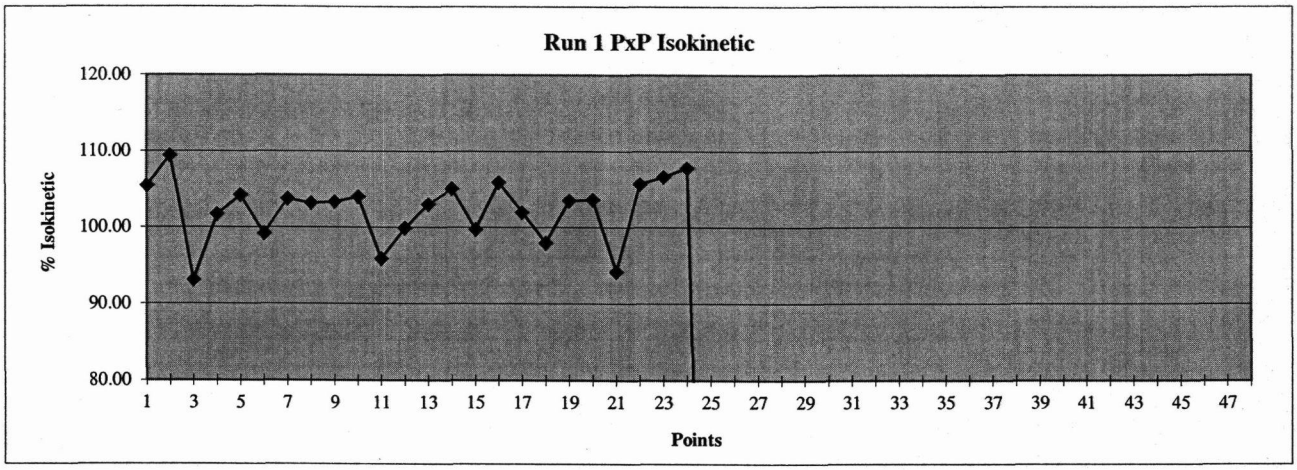
Total Emissions Summary w/back half condensable					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0018	0.0036	0.0002		0.0019
lbs/hr	0.0877	0.1670	0.0084		0.0877
ppmdv	2.790356573	5.371970712	0.259153232		2.807E+00
at 7% O2	4.56305369	8.582803781	0.439296333		4.528384601

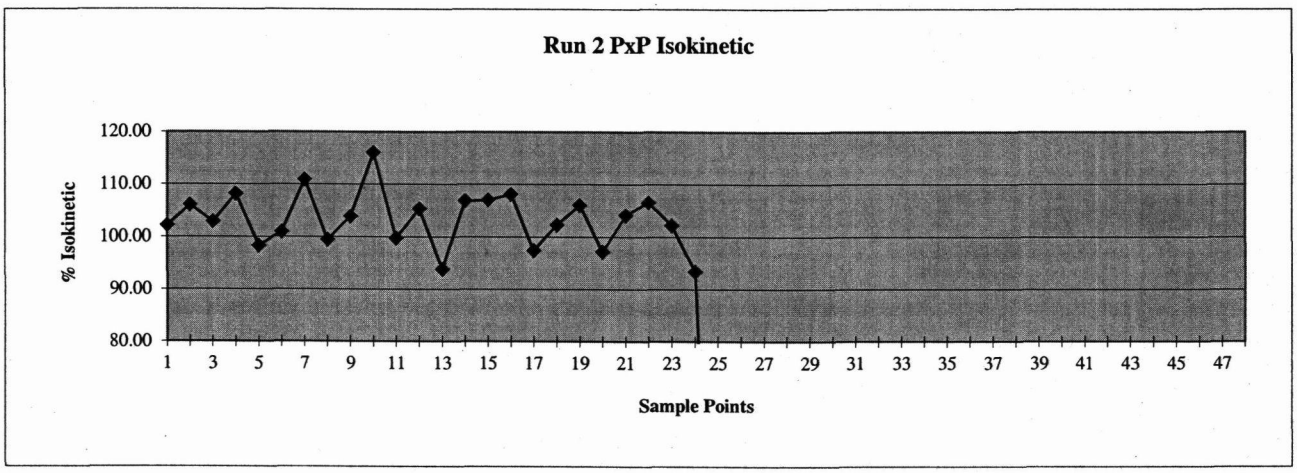
lbs/MMBtu

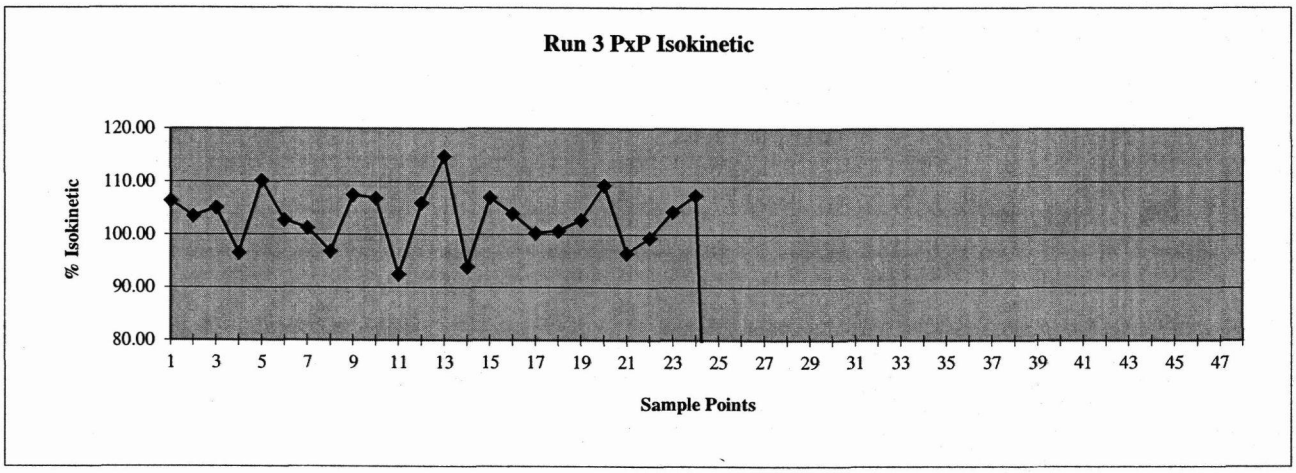
O2

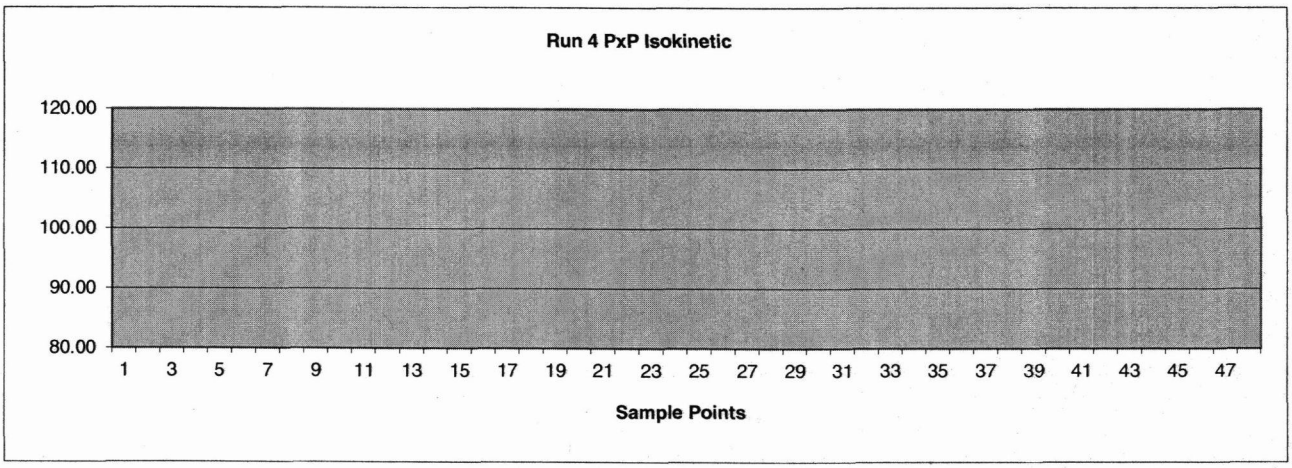
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	4/10/2013	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.81	-0.11	25.80	131	6.40	12.40	81.20	29.52	27.42
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1825
0.9860	0.82	47.985	191.00	79.92	40.080	8.990	0.1832	0.1825	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.632	40.53	6,772	8,795	3.32E+05	24	0.28	60	2.50	1.608333
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	583.225	0.33	1.29	132	80	80
2	585.100	0.17	0.66	131	80	80
3	586.500	0.34	1.33	130	80	80
4	588.182	0.33	1.29	131	80	79
5	589.990	0.25	0.98	134	80	79
6	591.600	0.43	1.68	133	81	80
7	593.610	0.31	1.21	133	81	81
8	595.400	0.42	1.64	132	81	81
9	597.471	0.49	1.92	132	82	80
10	599.710	0.38	1.49	130	82	80
11	601.700	0.38	1.49	131	82	79
12	603.531	0.35	1.36	132	81	80
13	605.361	0.26	0.98	131	78	78
14	606.983	0.28	1.09	132	78	79
15	608.700	0.28	1.09	132	79	79
16	610.331	0.33	1.29	131	80	79
17	612.214	0.46	1.80	131	80	79
18	614.351	0.51	1.99	129	80	78
19	616.513	0.51	1.99	130	81	79
20	618.800	0.67	2.62	132	81	78
21	621.413	0.81	3.16	132	82	78
22	624.022	0.65	2.54	131	82	78
23	626.652	0.55	2.15	131	83	78
24	629.099	0.40	1.56	131	81	79
25	631.210					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
191.0		191.0
		0.0
		0.0
		0.0
		0.0

Isokinetics	102.2	
Test Date	4/10/2013	
Start Time	enter	enter
End Time	enter	

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.81	-0.11	25.80	133	6.50	12.20	81.30	29.53	27.34
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1905
0.9860	0.82	47.953	198.40	82	39.903	9.339	0.1897	0.1905	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.631	40.55	6,755	8,798	3.28E+05	24	0.28	60	2.50	1.61
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	633.979	0.46	1.81	132.0	79.0	78.0
2	636.100	0.42	1.65	131.0	80.0	80.0
3	638.213	0.40	1.57	131.0	80.0	80.0
4	640.213	0.39	1.53	129.0	83.0	80.0
5	642.300	0.40	1.57	127.0	83.0	80.0
6	644.223	0.23	0.90	127.0	83.0	80.0
7	645.723	0.13	0.51	130.0	83.0	80.0
8	646.961	0.27	1.06	133.0	81.0	80.0
9	648.551	0.25	0.98	133.0	81.0	81.0
10	650.151	0.16	0.74	133.0	83.0	80.0
11	651.583	0.25	0.98	133.0	83.0	82.0
12	653.123	0.20	0.79	133.0	81.0	81.0
13	654.575	0.61	2.40	136.0	82.0	81.0
14	656.820	0.55	2.16	135.0	82.0	81.0
15	659.251	0.61	2.40	134.0	84.0	82.0
16	661.823	0.51	2.00	134.0	84.0	81.0
17	664.199	0.55	2.16	135.0	85.0	81.0
18	666.421	0.54	2.12	135.0	85.0	81.0
19	668.733	0.48	1.89	135.0	86.0	82.0
20	670.999	0.47	1.85	136.0	85.0	82.0
21	673.050	0.49	1.92	136.0	85.0	82.0
22	675.293	0.44	1.72	136.0	85.0	82.0
23	677.471	0.51	2.00	134.0	85.0	82.0
24	679.721	0.59	1.92	135.0	85.0	82.0
25	681.932					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
198.40		198.4
		0.0
		0.0
		0.0
		0.0

Isokinetics	102.8
Test Date	4/10/2013
Start Time	enter
End Time	enter

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.81	-0.11	25.80	134	5.80	12.70	81.50	29.44	27.22
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.1935
0.9860	0.82	43.710	184.60	88	35.962	8.689	0.1946	0.1935	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.661	42.61	7,091	9,245	3.43E+05	24	0.26	60	2.50	1.30
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	736.345	0.50	1.48	133.0	86.0	86.0
2	738.351	0.45	1.32	135.0	86.0	86.0
3	740.200	0.41	1.21	133.0	88.0	87.0
4	742.001	0.44	1.30	135.0	88.0	88.0
5	743.712	0.41	1.21	134.0	88.0	88.0
6	745.600	0.62	1.83	135.0	86.0	86.0
7	747.751	0.52	1.53	135.0	89.0	86.0
8	749.700	0.54	1.59	134.0	89.0	86.0
9	751.600	0.48	1.42	134.0	89.0	86.0
10	753.590	0.41	1.21	133.0	89.0	86.0
11	755.421	0.44	1.30	134.0	89.0	88.0
12	757.063	0.40	1.18	135.0	89.0	86.0
13	758.853	0.27	0.80	133.0	87.0	88.0
14	760.451	0.39	1.15	133.0	88.0	87.0
15	762.020	0.42	1.24	134.0	87.0	88.0
16	763.875	0.43	1.27	133.0	89.0	87.0
17	765.700	0.45	1.32	134.0	89.0	87.0
18	767.500	0.47	1.38	132.0	89.0	87.0
19	769.350	0.44	1.30	133.0	89.0	87.0
20	771.175	0.48	1.42	134.0	89.0	87.0
21	773.200	0.42	1.24	133.0	90.0	87.0
22	774.875	0.41	1.21	133.0	90.0	87.0
23	776.580	0.39	1.19	133.0	90.0	86.0
24	778.325	0.36	1.09	132.0	90.0	87.0
25	780.055					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
184.6		184.6
		0.0
		0.0
		0.0
		0.0

Isokinetics	103.0
Test Date	4/10/2013
Start Time	enter
End Time	enter

Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Source Information

Company Name	**Stericycle**
Company Contact:	**Steve McOmber**
Contact Phone No.	**801-936-1260**
Stack Designation:	**HMIWI Stack**

CO2 Interferece w/CO: ☐ Yes

Wet CEM: ☐ Yes

Correct For O2:

Test & Review Dates

Test Date:	**4/10/2013**	High Flow Test Date:	1/0/1900
Review Date:	4/26/2013	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm		250.0	40.0		176.695	3.435
Percent						
%O2 Correction as a whole #		**7.00**	**7.00**			

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	fuel flow rate (Btu/hr)	Heat Input (Btu/hr.)
24.50	3.27	0.9860	1.65	0.82	25.81	-0.11		

Round

Heat Input

Contractor Information

Contact:	Alex Mongold - Chris Keefe
Contracting Company:	Air Pollution Testing (APT)
Address:	1959 South 4130 West, Unit B, SLC,Ut. 84104
Phone No.:	801-974-0481 or 303-420-5949 ext. 24
Project No.:	

☑ F factor used

8710

Diluent

- ○ O2
- ○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite 2	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
OIL		○ 9190	○ 320	○ 1420
GAS	Natural	◉ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

Tabs Are Sh

Stericycle NOX-CO 4-25-13

Division of Air Quality

NSPS Relative Accuracy Performance Specification Test - CEMS C

Stericycle

HMIWI Stack

lbs/MMBTU
- O2
- CO2
- Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu		0.276	0.003
lbs/hr			
ppm		176.70	3.44
ppm corrected for %O2			

Average % concentration

CO_2	O_2
6.33	12.37

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2 / O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		3.01E-01	6.22E-03			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		1.408E-05	2.908E-07			
lbs/hr				6.39	12.39	C For Cal Drift
ppm corrected for %O		192.53	6.53	6.50	12.50	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		3.73E-01	1.54E-04			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		1.764E-05	7.271E-09			
lbs/hr				6.50	12.29	C For Cal Drift
ppm corrected for %O		238.41	0.16	6.60	12.40	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		2.87E-01	1.05E-03			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		1.395E-05	5.090E-08			
lbs/hr				6.62	12.06	C For Cal Drift
ppm corrected for %O		183.66	1.101	6.70	12.10	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)		1.44E-01	5.67E-03			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft		6.474E-06	2.545E-07			
lbs/hr				5.83	12.73	C For Cal Drift
ppm corrected for %O		92.18	5.95	5.90	12.70	Raw Value

Calibration Error Test

Test Date April 10, 2013			O_2				
		CS - Cal. Span	21.20				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.00%	Passed Cal.
		Mid-level	10.00	10.10	0.10	0.47%	Passed Cal.
		High-level	21.20	21.20	0.00	0.00%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of CS - Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	47.17%				
100% of Cal. Span		High-level	100.00%				

Test Date April 10, 2013			CO_2				
		CS - Cal. Span	20.00				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.00	0.00	0.000%	Passed Cal.
		Mid-level	9.95	10.10	0.15	0.750%	Passed Cal.
		High-level	20.00	20.00	0.00	0.000%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	49.75%				
100% of Cal. Span		High-level	100.00%				

Test Date			SO2				
		CS - Cal. Span					
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level					
		Mid-level					
		High-level					
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level					
40 to 60% of Cal. Span		Mid-level					
100% of Cal. Span		High-level					

Test Date April 10, 2013			NOx				
		CS - Cal. Span	197.00				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.051%	Passed Cal.
		Mid-level	90.20	92.00	1.80	0.914%	Passed Cal.
		High-level	197.00	197.80	0.80	0.406%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	45.79%				
100% of Cal. Span		High-level	100.00%				

Test Date April 10, 2013			CO				
		CS - Cal. Span	15.70				
40		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.10	0.10	0.637%	Passed Cal.
		Mid-level	8.20	8.00	0.20	1.274%	Passed Cal.
		High-level	15.70	15.60	0.10	0.637%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	52.23%				
100% of Cal. Span		High-level	100.00%				

Division of Air Quality Stack Test Review of

Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		197.00	15.70	20.00	21.20	☐ CO Calibration Gas
Units	ppm	ppm	ppm	%	%	Unprotectec
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level		**90.20**	**8.20**	**9.95**	**10.00**	
High-Level		**197.00**	**15.70**	**20.00**	**21.20**	
0 to 20% of Cal. Span		**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.8%**	**52.2%**	**49.8%**	**47.2%**	
100% of Cal. Span		**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{Dir} C_{MA}		**90.20**	**8.20**	**9.95**	**10.00**

Calibration Error Test

Cs - Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level		**92.00**	**8.00**	**10.10**	**10.10**
High-Level		**197.80**	**15.60**	**20.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		**92.00**	**8.00**	**10.10**	**10.10**
Low-Level		0.05%	0.64%	0.00%	0.00%
ppmdv Difference		0.1	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level		0.91%	1.27%	0.75%	0.47%
ppmdv Difference		1.8	0.2	0.15	0.1
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level		0.41%	0.64%	0.00%	0.00%
ppmdv Difference		0.8	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

NOTE
These cells sc appropriate (after the Cm entered.

If this scan is the Cma and gas value.

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		**0.20**	**0.10**	**0.10**	**0.10**
SBi - Zero Bias	TRUE	0.05%	0.00%	0.50%	0.47%
Difference	TRUE	0.1	0	0.1	0.1
Pass or Failed Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		**92.90**	**8.00**	**10.10**	**10.10**
SBi - Up-Scale Bias	TRUE	0.46%	0.00%	0.00%	0.00%
Difference	TRUE	0.90	0.00	0.00	0.00
Pass or Failed Invalid Run	**TRUE**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☐ Failed Bias Dialog

Raw Test Data

Test Date: 4/10/2013

	SO_2	NO_X	CO	CO_2	O_2
		121.1	**3.90**	**6.5**	**12.5**
	0.0%	**61.5%**	**24.8%**	**32.5%**	**59.0%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.40	0.20	0.00	0.00
SBi - Zero Bias	TRUE	0.15%	0.64%	0.00%	0.00%
Difference	**TRUE**	**0.3**	**0.1**	**0.0**	**0.0**
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		92.60	8.20	10.10	10.10
SBi - Up-Scale Bias	TRUE	0.30%	1.27%	0.00%	0.00%
Difference	TRUE	0.6	0.2	0.0	0.0
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☑ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.10%	0.64%	0.50%	0.47%
Difference	TRUE	0.2	0.1	0.1	0.1
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.15%	1.27%	0.00%	0.00%
Difference	**TRUE**	**0.3**	**0.2**	**0.0**	**0.0**
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**

Drift
3% of Span
☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		197.00	15.70	20.00	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level		**90.20**	**8.20**	**9.95**	**10.00**	
High-Level		**197.00**	**15.70**	**20.00**	**21.20**	
0 to 20% of Cal. Span		**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.8%**	**52.2%**	**49.8%**	**47.2%**	
100% of Cal. Span		**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}		90.20	8.20	9.95	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level		**92.00**	**8.00**	**10.10**	**10.10**
High-Level		**197.80**	**15.60**	**20.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		92.00	8.00	10.10	10.10

Low-Level		0.05%	0.64%	0.00%	0.00%
ppmdv Difference		0.1	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level		0.91%	1.27%	0.75%	0.47%
ppmdv Difference		1.8	0.2	0.15	0.1
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level		0.41%	0.64%	0.00%	0.00%
ppmdv Difference		0.8	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.40	0.20	0.00	0.00
SBi - Zero Bias	TRUE	0.15%	0.64%	0.00%	0.00%
Difference	TRUE	0.3	0.1	0	0
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		92.60	8.20	10.10	10.10
SBi - Up-Scale Bias	TRUE	0.30%	1.27%	0.00%	0.00%
Difference	TRUE	0.6	0.2	0	0
Pass or Invalid Run	**TRUE**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☐ Failed Bias Dialog

Raw Test Data

Test Date: 4/10/2013

	SO_2	NO_X	CO	CO_2	O_2
		151.1	**0.1**	**6.6**	**12.4**
	0.0%	**76.7%**	**0.6%**	**33.0%**	**58.5%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.50	0.20	0.00	0.10
SBi - Zero Bias	TRUE	0.20%	0.64%	0.00%	0.47%
Difference	**TRUE**	**0.4**	**0.1**	**0.0**	**0.1**
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		92.30	8.20	10.10	10.10
SBi - Up-Scale Bias	TRUE	0.15%	1.27%	0.00%	0.00%
Difference	TRUE	0.3	0.2	0.0	0.0
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.05%	0.00%	0.00%	0.47%
Difference	TRUE	0.1	0.0	0.0	0.1
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.15%	0.00%	0.00%	0.00%
Difference	**TRUE**	**0.3**	**0.0**	**0.0**	**0.0**
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span
☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		197.00	15.70	20.00	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level		**90.20**	**8.20**	**9.95**	**10.00**	
High-Level		**197.00**	**15.70**	**20.00**	**21.20**	
0 to 20% of Cal. Span		**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.8%**	**52.2%**	**49.8%**	**47.2%**	
100% of Cal. Span		**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}		90.20	8.20	9.95	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level		**92.00**	**8.00**	**10.10**	**10.10**
High-Level		**197.80**	**15.60**	**20.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		92.00	8.00	10.10	10.10

Low-Level		0.05%	0.64%	0.00%	0.00%
ppmv Difference		0.1	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level		0.91%	1.27%	0.75%	0.47%
ppmv Difference		1.8	0.2	0.15	0.1
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level		0.41%	0.64%	0.00%	0.00%
ppmv Difference		0.8	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.50	0.20	0.00	0.10
SBi - Zero Bias	TRUE	0.20%	0.64%	0.00%	0.47%
Difference	TRUE	0.4	0.1	0	0.1
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		92.30	8.20	10.10	10.10
SBi - Up-Scale Bias	TRUE	0.15%	1.27%	0.00%	0.00%
Difference	TRUE	0.3	0.2	0	0
Pass or Invalid Run	**TRUE**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 4/10/2013

	SO_2	NO_X	CO	CO_2	O_2
		118.4	**0.7**	**6.7**	**12.1**
	0.0%	**60.1%**	**4.5%**	**33.5%**	**57.1%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.20	0.10	0.10	0.10
SBi - Zero Bias	TRUE	0.05%	0.00%	0.50%	0.47%
Difference	**TRUE**	**0.1**	**0.0**	**0.1**	**0.1**
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		90.70	8.10	10.00	10.00
SBi - Up-Scale Bias	TRUE	0.66%	0.64%	0.50%	0.47%
Difference	TRUE	1.3	0.1	0.1	0.1
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.15%	0.64%	0.50%	0.00%
Difference	TRUE	0.3	0.1	0.1	0.0
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.51%	0.64%	0.50%	0.47%
Difference	**TRUE**	**1.6**	**0.1**	**0.1**	**0.1**
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span		197.00	15.70	20.00	21.20	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level		**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level		**90.20**	**8.20**	**9.95**	**10.00**	
High-Level		**197.00**	**15.70**	**20.00**	**21.20**	
0 to 20% of Cal. Span		**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span		**45.8%**	**52.2%**	**49.8%**	**47.2%**	
100% of Cal. Span		**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}		90.20	8.20	9.95	10.00

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level		**0.10**	**0.10**	**0.00**	**0.00**
Mid-Level		**92.00**	**8.00**	**10.10**	**10.10**
High-Level		**197.80**	**15.60**	**20.00**	**21.20**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1		92.00	8.00	10.10	10.10
Low-Level		0.05%	0.64%	0.00%	0.00%
ppmv Difference		0.1	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level		0.91%	1.27%	0.75%	0.47%
ppmv Difference		1.8	0.2	0.15	0.1
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level		0.41%	0.64%	0.00%	0.00%
ppmv Difference		0.8	0.1	0	0
Status		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.20	0.10	0.10	0.10
SBi - Zero Bias	TRUE	0.05%	0.00%	0.50%	0.47%
Difference	TRUE	0.1	0	0.1	0.1
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		90.70	8.10	10.00	10.00
SBi - Up-Scale Bias	TRUE	0.66%	0.64%	0.50%	0.47%
Difference	TRUE	1.3	0.1	0.1	0.1
Pass or Invalid Run	**TRUE**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 4/10/2013

	SO_2	NO_X	CO	CO_2	O_2
		54.3	**3.4**	**5.9**	**12.7**
	0.0%	**27.6%**	**21.7%**	**29.5%**	**59.9%**

Time	**Start**	**Stop**
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level		0.20	0.10	0.10	0.10
SBi - Zero Bias	TRUE	0.05%	0.00%	0.50%	0.47%
Difference	**TRUE**	**0.1**	**0.0**	**0.1**	**0.1**
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas		89.70	8.10	10.00	10.00
SBi - Up-Scale Bias	TRUE	1.17%	0.64%	0.50%	0.47%
Difference	TRUE	2.3	0.1	0.1	0.1
Pass or Invalid Run		**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	TRUE	0.00%	0.00%	0.00%	0.00%
Difference	TRUE	0.0	0.0	0.0	0.0
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	TRUE	0.51%	0.00%	0.00%	0.00%
Difference	**TRUE**	**1.0**	**0.0**	**0.0**	**0.0**
Pass or Re-Calibrate		**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog