



EU-SPMCASTLINE Emissions Test Report

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Prepared for:

General Motors

Saginaw, Michigan

GM SMCO
1629 N. Washington Ave.
Saginaw, Michigan

Project No. 16-4890.00
October 28, 2016

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48071
(248) 548-8070



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name GM LLC Saginaw Metal Casting Operations County Saginaw

Source Address 1629 N. Washington City Saginaw

AQD Source ID (SRN) B1991 ROP No. B1991-2015a ROP Section No. 1

Please check the appropriate box(es):

☐ Annual Compliance Certification (Pursuant to Rule 213(4)(c))

Reporting period (provide inclusive dates): From _____ To _____

- ☐ 1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.
- ☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

☐ Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))

Reporting period (provide inclusive dates): From _____ To _____

- ☐ 1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.
- ☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

☒ Other Report Certification

Reporting period (provide inclusive dates): From 9-20-2016 To 9-21-2016

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

EU-SPMCASTLINE Emissions Test Report Certification, Project No. 16-4890.00 for SPM

Castlines 1 and 3, dated 10-28-2016.

Note: EU-SPMCASTLINE is covered under MI-ROP-B1991-2015s, revision date March 22, 2016.

EU-SPMCASTLINE is also under PTI 36-12F, not yet incorporated into the active ROP.

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

John Lancaster


Plant Manager

989-757-1432

Name of Responsible Official (print or type)

Title

Phone Number


Signature of Responsible Official

11/15/16
Date

Executive Summary

BT Environmental Consulting, Inc. (BTEC) was retained by General Motors, LLC (GM) to conduct emissions testing at the GM SMC0 facility in Saginaw, Michigan. The test program consisted of evaluation of particulate matter (PM) and condensable particulate matter (CPM) concentrations and emission rates from the SPM Castline 1 and SPM Castline 3 which are two of three cast lines covered by Permit to Install No. 36-12F, EU-SPMCASTLINE. The emissions testing report for SPM Castline 2 was previously submitted to the Air Quality Division (AQD) on April 20, 2016.

Testing of the sources consisted of triplicate 60-minute test runs for PM and CPM. Sampling was performed utilizing United States Environmental Protection Agency (USEPA) reference test methods. Testing occurred on September 20-21, 2016. The results of the emissions test program are summarized by Table 1.

Table 1
Overall Results Summary
Sampling Dates: September 20-21, 2016

Source	Pollutant	Emission Limitation (lb/hr) *	Average Test Result (lb/hr) **
SPM Castline 1	Particulate Matter (PM, PM ₁₀ , PM _{2.5})	7.07	0.54
SPM Castline 3	Particulate Matter (PM, PM ₁₀ , PM _{2.5})	7.07	0.51

*The permit limits particulate matter (PM), particulate matter less than 10 microns (PM₁₀), and particulate matter less than 2.5 micron (PM_{2.5}), each, to 7.07 lb/hr.

** All PM reported as PM_{2.5}

Note: The emission limitations are applicable to SPM Castlines 1, 2, and 3, combined, with a maximum nominal combined production rate of 106 castings per hour.

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1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by General Motors, LLC (GM) to conduct emissions testing at the GM SMCO facility in Saginaw, Michigan. The test program consisted of evaluation of particulate matter (PM) and condensable particulate matter (CPM) concentrations and emission rates from the SPM Castline 1 and SPM Castline 3 which are two of three cast lines covered by Permit to Install No. 36-12F, EU-SPMCASTLINE. The emissions testing report for SPM Castline 2 was previously submitted to the Air Quality Division (AQD) on April 20, 2016.

The Air Quality Division (AQD) of Michigan's Department of Environmental Quality has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013). The following is a summary of the emissions test program and results in the format suggested by the aforementioned document.

1.a Identification, Location, and Dates of Test

The source tested is located at the GM Saginaw Metal Casting Operations located in Saginaw, Michigan. Testing on the sources was conducted September 20-21, 2016.

1.b Purpose of Testing

The purpose of the testing is to demonstrate compliance with emission limitations for EU-SPMCASTLINE under Michigan PTI 36-12F.

1.c Source Description

Sources identified under this project specifically include, EU-SPMCASTLINE, Castlines 1 and 3.

1.d Test Program Contact

The contacts for information regarding the test program as well as the test report are:

Karen Carlson
GECS - Facility Air Compliance & Permit
Lansing Delta Township
8175 Millett Highway
Mail Code: 489-001-011
Lansing, MI 48917
Phone: 517-204-9011
karen.j.carlson@gm.com



Renee M Mietz, CHMM
Sr. Environmental Project Engineer
Saginaw Metal Casting Operations
1629 North Washington Avenue
Saginaw, Michigan 48605
Phone: 313-608-1169
renee.mietz@gm.com

Mr. Barry P. Boulianne
Senior Project Manager
BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, MI 48073
Phone: 313-449-2361
bboulianne@btecinc.com

1.e Test Personnel

Names and affiliations for personnel who were present during the testing program are summarized by Table 2.

Table 2
Test Personnel

Name	Affiliation
Renee Mietz	GM-SMCO
Karen Carlson	GM-WTC
Tom Caltrider	GM-WTC
Matthew Young	BTEC
Steve Smith	BTEC
Paul Molenda	BTEC
Sydney Bruestle	MDEQ
Tom Gasloli	MDEQ

2. Summary of Results

Sections 2.a through 2.d summarize the results of the emissions test program.

2.a Operating Data

Process and control equipment operating data relevant to the emissions test program is provided in Appendix D.

2.b Applicable Permit

The emission units tested for EU-SPMCASTLINE are included in PTI 36-12F.

2.c Results

The results of the emissions test program are summarized by Table 1. Detailed results for are summarized in Tables 3-4.

2.d Emission Regulation Comparison

The Emission regulations are summarized by Table 1.

3. Source Description

Sections 3.a through 3.e provide a detailed description of the process.

3.a Process Description

Cast Line processes

Cast Lines – Three cast lines with a nominal maximum combined production rate of 106 castings per hour (2,460 castings per day) and a nominal maximum production rate of 53 castings per hour on any single casting line.

The cast lines consist of the following: *Section #1:* (3 modular units) making a final mold; mold filling; initial cooling; extraction; and cut sprue. Making a final mold includes mold and core assembly and mold heating with natural gas-fired 18 MMBtu/hr (total heat input rate) burners/torches. Mold filling is conducted by gravity pour. Initial cooling and solidification of the molten metal occurs inside the mold. Extraction of the casting (including sand cores) from the steel mold is completed by the casting extraction unload robot. Top core and down sprue removal. Additional cooling and complete solidification occur in the casting solidification buffer area. Sprue is collected and transported to the sand separator (EU-SANDSEP). *Section #2:* (3 identical modular units) extended casting cooling in the cooling garage.

3.b Process Flow Diagram

Due to the simplicity of castline operations, a process flow diagram is not necessary.

3.c Raw and Finished Materials

The raw materials used in the processes include molten aluminum and sand cores. Natural gas is used in the burners to preheat the molds. See section 3.a.

3.d Process Capacity

Process Production Capacities

Process	Maximum Production Rate	Current Targeted Production Rate	Current Average Production Rate	Average Production Rate Emission Testing
EU-SPMCASTLINE	106 molds/hr, (combined cast lines)	38 molds/hr, (combined cast lines)	22 molds/hr, (combined cast lines)	32 molds/hr on cast line 1 32 molds/hr on cast line 3

3.e Process Instrumentation

The fabric filter pressure drop (in. H₂O), natural gas use, and the production throughput (molds per hour) were recorded during every run of the compliance test. This data is included in Appendix D.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used during the testing.

4.a Sampling Train and Field Procedures

Sampling and analytical methodologies for the emissions test program can be separated into two categories as follows:

- (1) Measurement of exhaust gas velocity, molecular weight, and moisture content;
- (2) Measurement of exhaust gas filterable and condensable PM concentration using USEPA Methods 5/202

Sampling and analytical methodologies by category are summarized below.

Exhaust Gas Velocity, Molecular Weight, and Moisture Content

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Method 1 and Method 2. S-type pitot tubes with thermocouple assemblies, calibrated in accordance with Method 2, Section 4.1.1, were used to measure exhaust gas velocity pressures (using a manometer) and temperatures during testing. The S-type pitot tube dimensions outlined in Sections 2-6 through 2-8 were within specified limits, therefore, a baseline pitot tube coefficient of 0.84 (dimensionless) was assigned. A diagram of the sample points is provided in Figures 1-2.

Cyclonic flow checks were performed at each sampling location. The existence of cyclonic flow is determined by measuring the flow angle at each sample point. The flow angle is the angle between the direction of flow and the axis of the stack. If the average of

the absolute values of the flow angles is greater than 20 degrees, cyclonic flow exists. The null angle was determined to be less than 20 degrees at each sampling point.

The Molecular Weight of the gas stream was evaluated according to procedures outlined in Title 40, Part 60, Appendix A, Method 3A. The O₂/CO₂ content of the gas stream was measured using a Fyrite combustion analyzer.

Exhaust gas was extracted as part of the sampling train. Exhaust gas moisture content was then determined gravimetrically.

Filterable and Condensable PM (USEPA Method 5 /202)

40 CFR 60, Appendix A, Method 5, "*Determination of Particulate Emissions from Stationary*" and 40 CFR 60, Appendix A, Method 202, "*Dry Impinger Method for Determining Condensable Particulate Emissions from Stationary Sources*" was used to measure PM concentrations and calculate PM emission rates (see Figure 3 for a schematic of the sampling train). Triplicate 60-minute test runs were conducted on each source.

BTEC's Nutech[®] Model 2010 modular isokinetic stack sampling system consisted of (1) a stainless-steel nozzle, (2) a glass probe, (3) a stainless-steel filter housing, (4) a Teflon connecting line to the impingers (5) a vertical condenser, (6) an empty pot bellied impinger, (7) an empty modified Greenburg-Smith (GS) impinger, (8) unheated borosilicate filter holder with a teflon filter and Teflon filter support, (9) a second modified GS impinger with 100 ml of deionized water, and a third modified GS impinger containing approximately 300 g of silica gel desiccant, (10) a length of sample line, and (11) a Nutech[®] control case equipped with a pump, dry gas meter, and calibrated orifice.

A sampling train leak test was conducted before and after each test run. After completion of the final leak test for each test run, the filter was recovered, the nozzle, probe and front half of the filter housing were brushed and triple rinsed with acetone. The acetone rinses were collected in a pre-cleaned sample container. The CPM filter was recovered and placed in a petri dish. The back half of the filter housing, the condenser, the pot bellied impinger, the moisture drop out impinger, and the front half of the CPM filter housing and all connecting glassware were double rinsed with deionized water which was collected in a pre-cleaned sample container. The same glassware was then rinsed with acetone which was collected in a pre-cleaned sample container labeled as the organic fraction. The glassware was then double rinsed with hexane which was added to the same organic fraction sample bottle.

BTEC labeled each container with the test number, test location, and test date, and marked the level of liquid on the outside of the container. In addition, blank samples of the acetone, DI water, hexane, and filter were collected. BTEC personnel carried all samples to BTEC's laboratory (for filter and acetone gravimetric analysis) in Royal Oak, Michigan. DI water and organic samples were hand delivered to Maxxam for analysis.

4.b Recovery and Analytical Procedures

Descriptions of the recovery procedures are provided in section 4.a for each sampling method.

4.c Sampling Ports

Diagrams of the stacks showing sampling ports are included as Figures 1 and 2.

4.d Traverse Points

Diagrams of the stacks showing traverse points are included as Figures 1 and 2.

5. Test Results and Discussion

Sections 5.a through 5.k provide a summary of the test results.

5.a Results Tabulation

The overall results of the emissions test program are summarized by Table 1. Detailed results for the emissions test program are summarized by Tables 3-4.

5.b Discussion of Results

Table 1
Overall Results Summary
Sampling Dates: September 20-21, 2016

Source	Pollutant	Emission Limitation (lb/hr) *	Average Test Result (lb/hr) **
SPM Castline 1	Particulate Matter (PM, PM ₁₀ , PM _{2.5})	7.07	0.54
SPM Castline 3	Particulate Matter (PM, PM ₁₀ , PM _{2.5})	7.07	0.51

* The permit limits particulate matter (PM), particulate matter less than 10 microns (PM₁₀), and particulate matter less than 2.5 micron (PM_{2.5}), each, to 7.07 lb/hr.

** All PM reported as PM_{2.5}

Note: The emission limitations are applicable to SPM Castlines 1, 2, and 3, combined, with a maximum nominal combined production rate of 106 castings per hour.



The average production rate during the testing was 32 molds per hour on SPM Castline 1 and 32 molds per hour on Castline 3. The permit emission limitations are applicable to the emissions from all three SPM Castlines, combined, at a nominal maximum combined production rate of 106 molds per hour. Prorating the Average Test Results by a factor of 106 divided by 32 yields the resulting calculated emission rates of 1.79 lb/hr and 1.69 lb/hr, for Castline 1 and Castline 3, respectively. These calculated emission rates demonstrate predicted compliance with the emission limitations for the three SPM Castlines, combined at maximum production rates.

Detailed results for the emissions test program are summarized by Tables 3-4.

5.c Sampling Procedure Variations

There were no sampling procedure variations.

5.d Process or Control Device Upsets

No process or control device upsets occurred during the emissions test program.

5.e Control Device Maintenance

There was no control equipment maintenance performed during the emissions test program.

5.f Audit Sample Analyses

Audit samples were not analyzed as part of this emissions test program.

5.g Calibration Sheets

Calibration documents are provided as Appendix B.

5.h Sample Calculations

Sample calculations are provided as Appendix C.

5.i Field Data Sheets

Field data sheets are provided in Appendix A.

5.j Laboratory Data

Laboratory analysis is provided in Appendix D.

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Table 3
Castline 1 Particulate Matter Emission Rates

Company	SMCO			
Source Designation	CL 1			
Test Date	9/20/2016	9/20/2016	9/20/2016	
Meter/Nozzle Information	P-1	P-2	P-3	Average
Meter Temperature Tm (F)	74.0	77.5	78.4	76.6
Meter Pressure - Pm (in. Hg)	29.6	29.6	29.6	29.6
Measured Sample Volume (Vm)	50.9	50.8	51.1	50.9
Sample Volume (Vm-Std ft3)	49.5	49.2	49.5	49.4
Sample Volume (Vm-Std m3)	1.40	1.39	1.40	1.40
Condensate Volume (Vw-std)	1.014	0.717	0.632	0.787
Gas Density (Ps(std) lbs/ft3) (wet)	0.0740	0.0741	0.0742	0.0741
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	3.74	3.70	3.72	3.72
Total weight of sampled gas (m g lbs) (dry)	3.69	3.66	3.69	3.68
Nozzle Size - An (sq. ft.)	0.000247	0.000247	0.000247	0.000247
Isokinetic Variation - I	100.0	99.5	99.3	99.6
Stack Data				
Average Stack Temperature - Ts (F)	85.4	94.3	99.8	93.2
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.6	28.7	28.7	28.7
Stack Gas Specific Gravity (Gs)	0.988	0.990	0.991	0.990
Percent Moisture (Bws)	2.01	1.44	1.26	1.57
Water Vapor Volume (fraction)	0.0201	0.0144	0.0126	0.0157
Pressure - Ps ("Hg)	29.4	29.4	29.4	29.4
Average Stack Velocity - Vs (ft/sec)	59.7	60.1	61.1	60.3
Area of Stack (ft2)	14.7	14.7	14.7	14.7
Exhaust Gas Flowrate				
Flowrate ft ³ (Actual)	52,792	53,154	54,005	53,317
Flowrate ft ³ (Standard Wet)	50,180	49,764	50,103	50,016
Flowrate ft ³ (Standard Dry)	49,174	49,049	49,471	49,231
Flowrate m ³ (standard dry)	1,392	1,389	1,401	1,394
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	0.5	0.7	0.4	0.5
Organic Condensible Particulate	1.6	1.6	1.3	1.5
Inorganic Condensible Particulate	4.0	4.7	3.5	4.1
Condensable Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	3.6	4.3	2.8	3.6
Total Filterable and Condensible Particulate	4.1	5.0	3.2	4.1
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.000	0.000	0.000	0.000
lb/1000 lb (dry)	0.000	0.000	0.000	0.000
mg/dscm (dry)	0.4	0.5	0.3	0.4
gr/dscf	0.0002	0.0002	0.0001	0.0002
Filterable Particulate Emission Rate				
lb/ hr	0.07	0.09	0.05	0.07
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.002	0.003	0.002	0.002
lb/1000 lb (dry)	0.002	0.003	0.002	0.002
mg/dscm (dry)	2.6	3.1	2.0	2.6
gr/dscf	0.0011	0.0014	0.0009	0.0011
Condensible Particulate Emission Rate				
lb/ hr	0.47	0.57	0.37	0.47
Total Particulate Concentration				
lb/1000 lb (wet)	0.002	0.003	0.002	0.002
lb/1000 lb (dry)	0.002	0.003	0.002	0.002
mg/dscm (dry)	2.9	3.6	2.3	2.9
gr/dscf	0.0013	0.0016	0.0010	0.0013
Total Particulate Emission Rate				
lb/ hr	0.54	0.66	0.42	0.54

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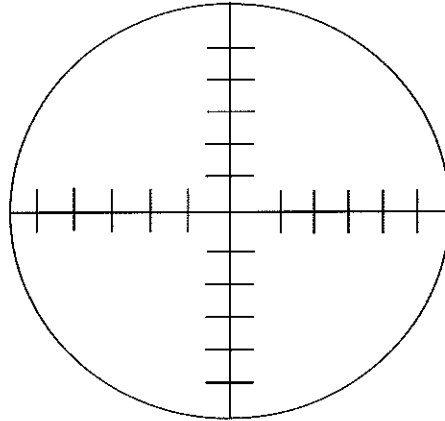
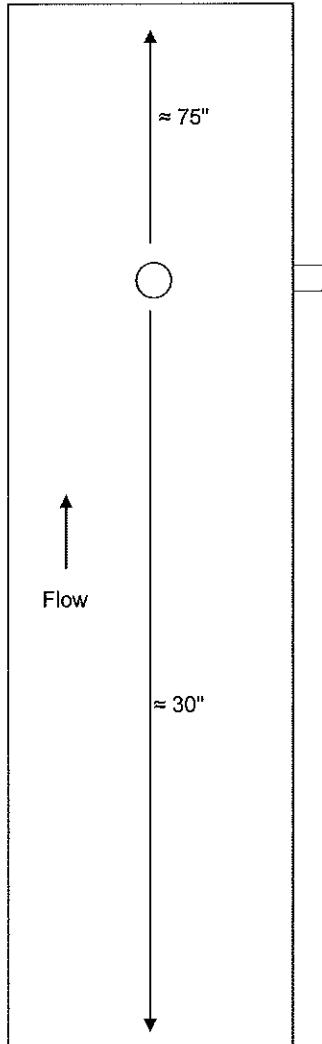
Table 4
Castline 3 Particulate Matter Emission Rates

Company Source Designation Test Date	SMCO CL 3 9/21/2016	9/21/2016	9/21/2016	
Meter/Nozzle Information				
	P-1	P-2	P-3	Average
Meter Temperature Tm (F)	73.7	78.4	79.0	77.0
Meter Pressure - Pm (in. Hg)	29.7	29.7	29.8	29.7
Measured Sample Volume (Vm)	56.5	57.4	57.1	57.0
Sample Volume (Vm-Std ft3)	55.3	55.6	55.5	55.5
Sample Volume (Vm-Std m3)	1.57	1.57	1.57	1.57
Condensate Volume (Vw-std)	0.811	0.844	1.221	0.959
Gas Density (Ps(std) lbs/ft3) (wet)	0.0741	0.0741	0.0739	0.0741
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	4.16	4.18	4.19	4.18
Total weight of sampled gas (m g lbs) (dry)	4.12	4.14	4.13	4.13
Nozzle Size - An (sq. ft.)	0.000247	0.000247	0.000247	0.000247
Isokinetic Variation - I	99.7	99.4	99.9	99.7
Stack Data				
Average Stack Temperature - Ts (F)	88.4	91.5	88.9	89.6
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.7	28.7	28.6	28.7
Stack Gas Specific Gravity (Gs)	0.990	0.990	0.988	0.989
Percent Moisture (Bws)	1.45	1.50	2.15	1.70
Water Vapor Volume (fraction)	0.0145	0.0150	0.0215	0.0170
Pressure - Ps ("Hg)	29.4	29.4	29.5	29.5
Average Stack Velocity - Vs (ft/sec)	66.7	67.7	67.1	67.2
Area of Stack (ft2)	14.7	14.7	14.7	14.7
Exhaust Gas Flowrate				
Flowrate ft ³ (Actual)	58,976	59,848	59,358	59,394
Flowrate ft ³ (Standard Wet)	55,881	56,388	56,349	56,206
Flowrate ft ³ (Standard Dry)	55,073	55,545	55,135	55,251
Flowrate m ³ (standard dry)	1,559	1,573	1,561	1,565
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	0.3	0.4	0.3	0.3
Organic Condensible Particulate	1.4	1.1	1.3	1.3
Inorganic Condensible Particulate	4.7	4.1	3.9	4.2
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	4.1	3.2	3.2	3.5
Total Filterable and Condensible Particulate	4.4	3.6	3.5	3.8
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.000	0.000	0.000	0.000
lb/1000 lb (dry)	0.000	0.000	0.000	0.000
mg/dscm (dry)	0.2	0.3	0.2	0.2
gr/dscf	0.0001	0.0001	0.0001	0.0001
Filterable Particulate Emission Rate				
lb/ hr	0.04	0.05	0.04	0.04
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.002	0.002	0.002	0.002
lb/1000 lb (dry)	0.002	0.002	0.002	0.002
mg/dscm (dry)	2.6	2.0	2.0	2.2
gr/dscf	0.0011	0.0009	0.0009	0.0010
Condensible Particulate Emission Rate				
lb/ hr	0.54	0.42	0.42	0.46
Total Particulate Concentration				
lb/1000 lb (wet)	0.002	0.002	0.002	0.002
lb/1000 lb (dry)	0.002	0.002	0.002	0.002
mg/dscm (dry)	2.8	2.3	2.2	2.4
gr/dscf	0.0012	0.0010	0.0010	0.0011
Total Particulate Emission Rate				
lb/ hr	0.58	0.48	0.46	0.51

Rev. 14.0
3-20-15 BC



diameter = 52 inches



Not to Scale

Points	Distance "
1	1.4
2	4.3
3	7.6
4	11.8
5	17.8
6	34.2
7	40.2
8	44.4
9	47.7
10	50.6

Figure No. 1

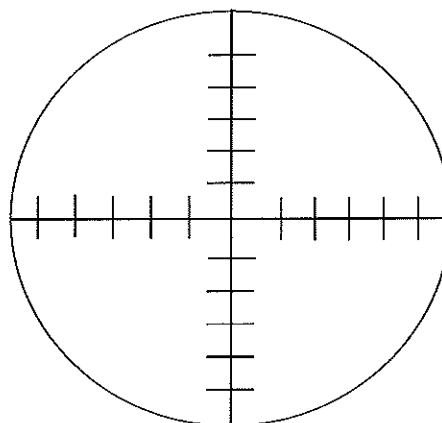
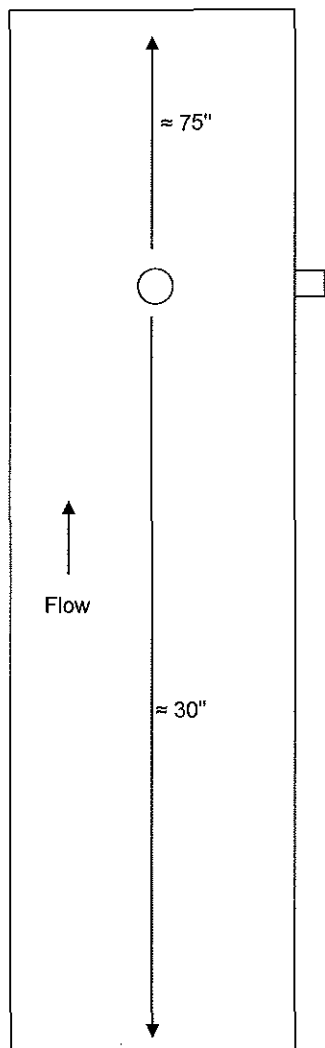
Site:
SPMCASTLINE 1
General Motors SMCO
Saginaw, Michigan

Sampling Date:
September 20, 2016

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073



diameter = 52 inches



Not to Scale

Points	Distance "
1	1.4
2	4.3
3	7.6
4	11.8
5	17.8
6	34.2
7	40.2
8	44.4
9	47.7
10	50.6

Figure No. 2

Site:
SPMCASTLINE 3
General Motors SMCO
Saginaw, Michigan

Sampling Date:
September 21, 2016

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073

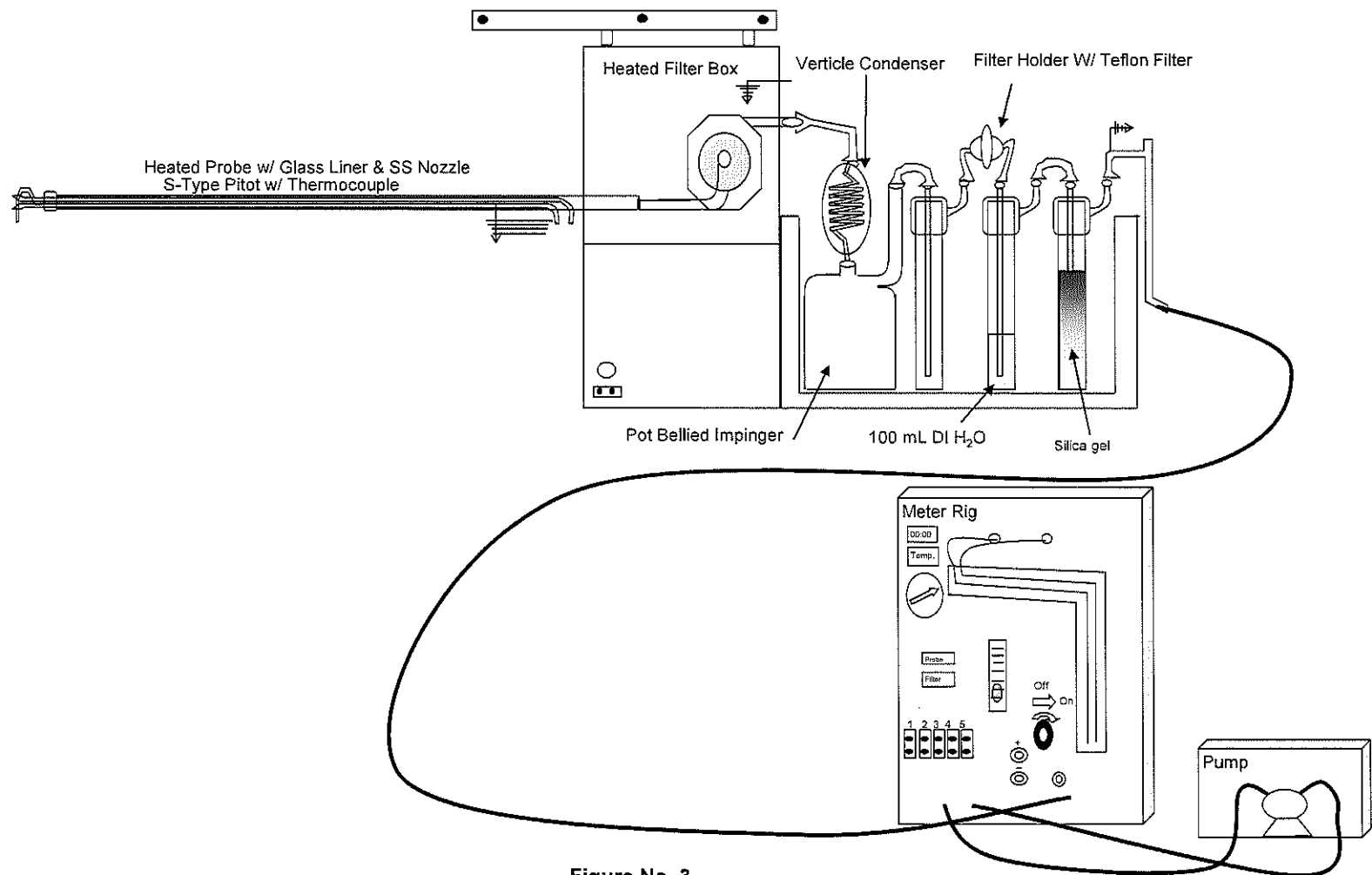


Figure No. 3

Site:
USEPA Method 5/202
General Motors SMCO
Saginaw, Michigan

Sampling Date:
September 20-21, 2016

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073