BTEC Inc.

EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by General Motors LLC (GM) to conduct a compliance emissions test program on nine sources at the GM facility in Flint, Michigan. This emissions testing program included evaluation of particulate matter (PM), condensable particulate matter (CPM), and volatile organic compounds (VOC) destruction efficiency (DE).

The emissions test program included verification of volatile organic compound destruction efficiency (DE) from six regenerative thermal oxidizers (RTO's) and verification of particulate matter emission rates from four regenerative thermal oxidizers (RTO's). As discussed with the Air Quality Division (AQD), GM has submitted a permit modification request to reduce the number of RTOs required to be tested for PM from six to four. The RTOs control VOC emissions from various paint processes at the GM Flint Assembly Plant.

In addition Particulate matter was evaluated at both basecoat prime and basecoat booth exhaust stacks. As allowed in PTI 173-13B, FG-PAINT & ASSEMBLY SC V.2, 3 and 4 the PM emission testing was conducted on one representative basecoat prime booth (one stack) and one representative basecoat booth (two stacks) of EU-THREE WET process.

Testing was conducted October 25th through November 3rd, 2016. Mr. Tom Gasloli and Mr. Bob Byrnes with the Michigan Department of Environmental Quality (MDEQ), were onsite to witness a portion of the testing program.

The results of the test program are summarized by Table I.

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Table I
Test Program Summary

Emission Unit	Pollutant	Test Result
Basecoat Prime Line 1	PM	0.02 lb/hr
		0.0064 lb PM/gal solids sprayed
Topcoat Line 1 RTO	PM	0.08 lb/hr
	VOC DE	98.7%
Topcoat Line 2 RTO	VOC DE	96.4%
Sealer Oven RTO	PM	0.12 lb/hr*
	VOC DE	96.2%
Basecoat Line 1 Stack A	PM	0.006 lb/hr
Basecoat Line 1 Stack B	PM	0.017 lb/hr
Basecoat Line 1 Combined	PM	0.022 lb/hr
		0.013 lb PM/gal solids sprayed
Spray Booth RTO	PM	0.60 lb/hr
	VOC DE	96.0%
ELPO Oven RTO 1	PM	0.18 lb/hr
	VOC DE	98.3%
ELPO Oven RTO 2	VOC DE	97.2%

***See section 5.b**

Permit limits are presented in table 1. Detailed results for each test run can be found in Tables 4-16.

1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by General Motors LLC (GM) to conduct a compliance emissions test program on nine sources at the GM facility in Flint, Michigan. This emissions testing program included evaluation of particulate matter (PM), condensable particulate matter (CPM), and volatile organic compounds (VOC) destruction efficiency (DE). The test program was conducted on October 25th through November 3rd, 2016. The purpose of this report is to document the results of the test program.

AQD 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

Sampling and analysis for the test program was conducted on October 25th through November 3rd, 2016 at the GM facility in Flint, Michigan. The test program included evaluation of PM, CPM, and VOC DE from nine Sources.

1.b Purpose of Testing

Facility SRN is B1606. Permit to Install No. 173-13B. Table 1 summarizes the limitations included in this permit.

Table 1

Emission Unit	Emission Unit ID	Permit Limit
Elpo Oven RTO 1	EU-ECOAT	95% DE
Elpo Oven RTO 2	EU-ECOAT	95% DE
Topcoat 1 Oven RTO	EU-THREE WET	95% DE
Topcoat 2 Oven RTO	EU-THREE WET	95% DE
Sealer Oven RTO	EU-SEALERS & ADHESIVES	95% DE
Spray Booth RTO	EU-THREE WET	95% DE
Equipment for automotive assembly and painting operations	FG-PAINT & ASSEMBLY	649.6 tpy (VOC)
Equipment for automotive assembly and painting operations	FG-PAINT & ASSEMBLY	4.8 pounds per job (VOC)
Equipment for automotive assembly and painting operations	FG-PAINT & ASSEMBLY	25.1 tpy (PM)*
Equipment for automotive assembly and painting operations	FG-PAINT & ASSEMBLY	25.1 tpy (PM10)*
Equipment for automotive assembly and painting operations	FG-PAINT & ASSEMBLY	25.1 tpy (PM2.5)*

*Combined PM Emission limit of 25.1 tpy is applicable to all equipment in FG-Paint & Assembly

1.c Source Description

General Motors operates a new paint shop for the surface coating of light duty automotive vehicles at its Flint, Michigan facility which is subject to air permit requirements of PTI 173-13B. Flint Assembly manufactures the Chevy Silverado and GMC Sierra crew cab 2500 and 3500 pickup truck.

1.d Test Program Contact

The contacts for the source and test report are:

Alexandra Thibeault
General Motors Flint Assembly Plant
G-3100 Van Slyke Road
Flint, Michigan 48551
810-577-9003

Mr. Barry Boulianne
Senior Project Manager
BTEC
4949 Fernlee Ave.
Royal Oak, Michigan 48073
(248) 548-8072

1.e Testing Personnel

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

Table 2
Test Personnel

Name and Title	Affiliation	Telephone
Ms. Alexandra Thibeault Senior Environmental Engineer	General Motors Corporation Flint Assembly Plant	(810)-577-9003
Mr. Tom Caltrider Senior Environmental Engineer	GMNA-Environmental Compliance & Sustainability	(248) 255-7663
Mr. Brent Wilson Senior Environmental Engineer	GMNA-Environmental Compliance & Sustainability	(810) 577-2681
Mr. Apurva Pujara Senior Environmental Engineer	GMNA-Environmental Compliance & Sustainability	(248) 255-7795
Mr. Matthew Young Project Manager	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(586) 744-9133

Mr. Paul Diven Environmental Technician	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(248) 548-8070
Mr. Mike Nummer Environmental Technician	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(248) 548-8070
Mr. Mason Sakshaug Environmental Technician	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(248) 548-8070
Mr. David Trahan Environmental Technician	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(248) 548-8070
Mr. Jacob Zott Environmental Technician	BTEC 4949 Fernlee Ave. Royal Oak, MI 48073	(248) 548-8070
Mr. Tom Gasloli MDEQ	Air Quality Division Constitution Hall 1st Floor South PO Box 30260 Lansing , MI 48909	(517) 284-6778
Mr. Robert Byrnes MDEQ	Air Quality Division Constitution Hall 1st Floor South PO Box 30260 Lansing , MI 48909	(517) 284-6632

2. Summary of Results

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

2.a Operating Data

Process data monitored during the emissions test program included vehicle count, paint usage, and RTO operating temperature. The line rate at the time of testing was around 20 to 30 jobs per hour. The operating data tables (vehicle count, paint usage, and RTO temperatures) are included in Appendix A.

2.b Applicable Permit

Facility SRN is B1606. The applicable permit for this emissions test program is Permit to Install No. 173-13B

2.c Results

The overall results of the emission test program are summarized in Table 3 (see Section 5.a). Detailed results for each source can be found in tables 4-16.

2.d Emission Regulation Comparison

The results summarized by table 3 (section 5.a) shows that the VOC DE for each RTO is well above the minimum requirement of 95%.

3. Source Description

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

3.a Process Description

The Processes in the new paint shop subject to this emission test program include:

i. Elpo dip tank and curing oven controlled by two RTO's,
ii. Sealer application process followed by a sealer oven and controlled by an RTO.
iii. Two identical topcoat lines, each consisting of a basecoat primer (BCP) booth followed by heated flash, a basecoat booth followed by heated flash, a clearcoat booth and a topcoat oven followed by a topcoat RTO.
iv. A Spraybooth RTO controlling VOC emissions from BCP heated flash, BC heated flash, and clearcoat booths of both topcoat lines.

3.b Process Flow Sheet or Diagram

Because of the simplicity of the new paint shop operations, a process flow diagram is not necessary.

3.c Raw and Finished Materials

The GM facility is an automotive assembly center. The facility utilizes numerous materials in the process of automotive assembly, varying from parts and products to pre-assembled automotive supplies. The raw materials used in the surface coating process line include various automotive surface coatings, as well as cleanup and purge solvents.

3.d Process Capacity

Both Topcoat line 1 and 2 have a max line rate of 21.07 jobs per hour, or a total line rate of 42.14 jobs per hour.

3.e Process Instrumentation

The only process operating parameters relevant to the emissions test program are the RTO operating temperature.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify VOC DE.

4.a Sampling Train and Field Procedures

The emissions test program utilized the following test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - "Sample and Velocity Traverses for Stationary Sources"
- Method 2 - "Determination of Stack Gas Velocity and Volumetric Flowrate"
- Method 3 - "Determination of Molecular Weight of Dry Stack Gas"(Fyrite)
- Method 4 - "Determination of Moisture Content in Stack Gases"
- Method 5 - "Determination of Particulate Matter Emissions from stationary sources"
- Method 17 - "Determination of Particulate Emissions from Stationary Sources" (insitu filtration)
- Method 25A - "Determination of Total Gaseous Organic Concentrations using a Flame Ionization Analyzer"
- Method 202 - "Dry Impinger Method for Determining Condensable Particulate Emissions from Stationary Sources"

Exhaust Gas Velocity, Molecular Weight, and Moisture Content

Measurement of exhaust gas velocity, molecular weight, and moisture content was conducted using the following reference test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - *"Location of the Sampling Site and Sampling Points"*
- Method 2 - *"Determination of Stack Gas Velocity and Volumetric Flowrate"*
- Method 3 - *"Determination of Molecular Weight of Dry Stack Gas"(Fyrite)*
- Method 4 - *"Determination of Moisture Content in Stack Gases"*

Stack gas velocity traverses was 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 was within specified limits, therefore, a baseline pitot tube coefficient of 0.84 (dimensionless) was assigned.

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.

Molecular weight determinations were evaluated according to USEPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight." The equipment used for this evaluation consist of a one-way squeeze bulb with connecting tubing and a set of Fyrite® combustion gas analyzers. Carbon dioxide and oxygen content were analyzed using the Fyrite® procedure.

Exhaust gas moisture content was evaluated using Method 4. Exhaust gas was extracted as part of the PM sampling train (see Section 3.2) and passed through (i) a vertical condenser, (ii) and empty pot bellied impinger, (iii) an empty impinger, (iv) an impinger with 100 ml deionized water, and (v) an impinger filled with silica gel. Exhaust gas moisture content is then determined gravimetrically.

Particulate Matter (USEPA Method 5/202)

40 CFR 60, Appendix A, Method 5, *"Determination of Particulate Emissions from Stationary Sources"* 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 2 for a schematic of the sampling train). Triplicate 120-minute test runs were conducted for each source.

BTEC's Nutech® Model 2010 modular isokinetic stack sampling system consists of (1) a stainless-steel nozzle, (2) a steel probe, (3) a heated filter holder, (4) a vertical condenser, (5) an empty pot bellied impinger, (6) an empty modified Greenburg-Smith (GS) impinger, (7) unheated filter holder with a teflon filter, (8) 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, (9) a length of sample line, and (10) 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 is recovered, and the nozzle and the front half of the filter holder assembly was brushed and triple rinsed with acetone. The acetone rinses was collected in a pre-cleaned sample container. The impinger train is then purged with nitrogen for one hour at a flow rate of 14 liters per minute. The CPM filter is 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 are triple rinsed with deionized water which was collected in a pre-cleaned sample container. The same glassware is then rinsed with acetone and collected in a pre-cleaned sample container labeled as the organic fraction. The glassware is then double rinsed with hexane which is added to the same organic fraction sample bottle.

BTEC labels each container with the test number, test location, and test date, and mark the level of liquid on the outside of the container. In addition, blank samples of the acetone, DI water, hexane, and filter are collected. BTEC personnel carry all samples to BTEC's laboratory (for filter and acetone gravimetric analysis) in Royal Oak, Michigan. DI water and organic samples are curried to maxxam analytics in Mississauga Ontario for analysis.

Particulate Matter (USEPA Method 17)

40 CFR 60, Appendix A, Method 17, *"Determination of 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 120-minute test runs were conducted on basecoat prime booth stack. Triplicate simultaneous 60-minute test runs were conducted on basecoat booth stacks 1A and 1B.

BTEC's Nutech® Model 2010 modular isokinetic stack sampling system consists of (1) a stainless-steel nozzle, (2) an in stack stainless-steel filter housing, (3) a steel probe, (4) a set of four Greenburg-Smith (GS) impingers with the first modified and second standard GS impingers each containing 100 ml of deionized water, and with a third dry modified GS impinger and a fourth modified GS impinger containing approximately 300 g of silica gel desiccant, (5) a length of sample line, and (6) a Nutech® control case equipped with a pump, dry gas meter, and calibrated orifice.

A sampling train leak test is conducted before and after each test run. After completion of the final leak test for each test run, the filter is recovered, and the nozzle and the front half of the filter holder assembly are brushed and triple rinsed with acetone. The acetone rinses are collected in a pre-cleaned sample container.

BTEC labels 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

and filter are collected. BTEC personnel carry all samples to BTEC's laboratory (for filter and acetone gravimetric analysis) in Royal Oak, Michigan.

Volatile Organic Compounds (USEPA Method 25A)

Volatile Organic compound (VOC) concentrations were measured according to 40 CFR 60, Appendix A, Method 25A. A sample of the gas stream was drawn through a stainless steel probe with an in-line glass fiber filter to remove any particulate, and a heated Teflon® sample line to prevent the condensation of any moisture from the sample before it enters the analyzer. Data was recorded at 4-second intervals on a PC equipped with Labview® II data acquisition software. BTEC uses a JUM Model 109A Methane/Non-Methane THC hydrocarbon analyzer to determine the VOC concentration.

The JUM Model 109A analyzer utilizes two flame ionization detectors (FIDs) in order to report the average ppmv for total hydrocarbons (THC), as propane, as well as the average ppmv for methane (as methane). Upon entry, the analyzer splits the gas stream. One FID ionizes all of the hydrocarbons in the gas stream sample into carbon, which is then detected as a concentration of total hydrocarbons. Using an analog signal, specifically voltage, the concentration of THC is then sent to the data acquisition system (DAS), where recordings are taken at 4-second intervals to produce an average based on the overall duration of the test. This average is then used to determine the average ppmv for THC reported as the calibration gas, propane, in equivalent units.

The second FID reports methane only. The sample enters a chamber containing a catalyst that destroys all of the hydrocarbons present in the gas stream other than methane. As with the THC sample, the methane gas concentration is sent to the DAS and recorded. The methane concentration, reported as methane, can then be converted to methane, reported as propane, by dividing the measured methane concentration by the analyzer's response factor.

The analyzer's response factor is obtained by introducing a methane calibration gas to the calibrated JUM 109A. The response of the analyzer's THC FID to the methane calibration gas, in ppmv as propane, is divided by the methane analyzer's response to the methane calibration gas, in ppmv as methane.

In accordance with Method 25A, a 3-point (zero, mid, and high) calibration check was performed on the THC analyzer. Calibration drift checks were performed at the completion of each run.

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4.b Recovery and Analytical Procedures

Recovery and analytical procedures were described in Section 4.a.

4.c Sampling Ports

Stack Sampling Ports can be found in figures 4-15.

4.d Traverse Points

Stack Traverse points can be found in figures 4-15.

5. Test Results and Discussion

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

5.a Results Tabulation

The results of the emissions test program are summarized by Table 3.

Table 3
Test Program VOC DE Summary

Emission Unit	Pollutant	Test Result
Basecoat Prime Line 1	PM	0.02 lb/hr
		0.0064 lb PM/gal solids sprayed
Topcoat Line 1 RTO	PM	0.08 lb/hr
	VOC DE	98.7%
Topcoat Line 2 RTO	VOC DE	96.4%
Sealer Oven RTO	PM	0.12 lb/hr*
	VOC DE	96.2%
Basecoat Line 1 Stack A	PM	0.006 lb/hr
Basecoat Line 1 Stack B	PM	0.017 lb/hr
Basecoat Line 1 Combined	PM	0.022 lb/hr
		0.013 lb PM/gal solids sprayed
Spray Booth RTO	PM	0.60 lb/hr
	VOC DE	96.0%
ELPO Oven RTO 1	PM	0.18 lb/hr
	VOC DE	98.3%
ELPO Oven RTO 2	VOC DE	97.2%

***See section 5.b**

Permit limits are presented in table 1. Detailed data for each test run can be found in Tables 4-16.

5.b Discussion of Results

The overall results of the emission test program are summarized by Table 3 (see Section 5.a). VOC emissions from each RTO were above the limit of 95%. It should be noted that the PM emission rate measured during Run 2 on the Sealer Oven was markedly higher than all other test runs conducted and inconsistent with all other data. It is likely that this was due to sampling error and, consequently, this data was omitted from the average emission rates reported in Table 6 for the Sealer Oven.

Detailed results for the test program are summarized by Tables 4-16.

5.c Sampling Procedure Variations

There were no sampling procedure variations during the test program.

5.d Process or Control Device Upsets

No Process or control device upset conditions occurred during testing. However Testing was suspended on 10/28/16 on the Basecoat Prime and Topcoat 1 stacks due to poor production caused by a plantwide change to the new model year. Testing resumed on 11/1/16.

5.e Control Device Maintenance

No maintenance was performed during the test program.

5.f Retest

The emissions test program was not a retest.

5.g Audit Sample Analyses

No audit samples were collected as part of the test program.

5.h Calibration Sheets

Relevant equipment calibration documents are provided as Appendix C.

5.i Sample Calculations

Sample calculations are provided in Appendix D.

5.j Field Data Sheets

Field documents relevant to the emissions test program are presented in Appendix B.

5.k Laboratory Data

Laboratory results for the test program are presented in Appendix E.

Table 4
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Basecoat Prime Line 1**			
Test Date	**10/28/2016**	**10/28/2016**	**11/1/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 3	Average
Meter Temperature Tm (F)	85.6	89.2	88.2	87.7
Meter Pressure - Pm (in. Hg)	29.7	29.7	29.3	29.6
Measured Sample Volume (Vm)	119.9	119.3	118.7	119.3
Sample Volume (Vm-Std ft3)	115.8	114.5	112.7	114.3
Sample Volume (Vm-Std m3)	3.28	3.24	3.19	3.24
Condensate Volume (Vw-std)	2.876	2.758	2.763	2.799
Gas Density (Ps(std) lbs/ft3) (wet)	0.0739	0.0739	0.0739	0.0739
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	8.76	8.66	8.53	8.65
Total weight of sampled gas (m g lbs) (dry)	8.63	8.53	8.40	8.52
Nozzle Size - An (sq. ft.)	0.000319	0.000319	0.000319	0.000319
Isokinetic Variation - I	97.5	97.3	97.5	97.4
Stack Data				
Average Stack Temperature - Ts (F)	78.5	78.6	79.0	78.7
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.6	28.6	28.6	28.6
Stack Gas Specific Gravity (Gs)	0.987	0.987	0.987	0.987
Percent Moisture (Bws)	2.42	2.35	2.39	2.39
Water Vapor Volume (fraction)	0.0242	0.0235	0.0239	0.0239
Pressure - Ps ("Hg)	29.4	29.4	29.0	29.3
Average Stack Velocity -Vs (ft/sec)	54.9	54.4	54.2	54.5
Area of Stack (ft2)	8.1	8.1	8.1	8.1
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	26,640	26,378	26,271	26,430
Flowrate ft^3 (Standard Wet)	25,660	25,406	24,974	25,346
Flowrate ft^3 (Standard Dry)	25,038	24,808	24,376	24,741
Flowrate m^3 (standard dry)	709	702	690	701
Total Particulate Weights (mg)				
Nozzle/Filter	0.9	0.6	0.2	0.6
Total 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)	0.3	0.2	0.1	0.2
gr/dscf	0.0001	0.0001	0.0000	0.0001
Total Particulate Emission Rate				
lb/ hr	0.03	0.02	0.01	0.02
Total Particulate Emission Factor				
Test Time (hr)	2	2	2	2
Paint solids sprayed during test (gal)	6.60	3.55	7.13	5.76
Emission Factor (lb PM/gallons paint solids sprayed)	0.0078	0.0097	0.0016	0.0064

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Table 5
Particulate Matter Emission Rates

Company	GM Flint			
Source Designation	Topcoat Line 1 RTO			
Test Date	10/28/2016	11/1/2016	11/1/2016	
Meter/Nozzle Information	Run 1	Run 3	Run 4	Average
Meter Temperature Tm (F)	99.1	101.2	101.8	100.7
Meter Pressure - Pm (in. Hg)	29.7	29.4	29.4	29.5
Measured Sample Volume (Vm)	100.9	107.1	107.5	105.2
Sample Volume (Vm-Std ft3)	94.3	98.7	99.0	97.3
Sample Volume (Vm-Std m3)	2.67	2.79	2.80	2.76
Condensate Volume (Vw-std)	2.438	3.154	3.041	2.878
Gas Density (Ps(std) lbs/ft3) (wet)	0.0738	0.0737	0.0737	0.0737
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	7.15	7.50	7.52	7.39
Total weight of sampled gas (m g lbs) (dry)	7.03	7.35	7.38	7.25
Nozzle Size - An (sq. ft.)	0.000398	0.000398	0.000398	0.000398
Isokinetic Variation - I	100.4	101.1	101.1	100.9
Stack Data				
Average Stack Temperature - Ts (F)	336.9	335.0	331.6	334.5
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.6	28.5	28.5	28.5
Stack Gas Specific Gravity (Gs)	0.986	0.984	0.985	0.985
Percent Moisture (Bws)	2.52	3.10	2.98	2.87
Water Vapor Volume (fraction)	0.0252	0.0310	0.0298	0.0287
Pressure - Ps ("Hg)	29.5	29.2	29.2	29.3
Average Stack Velocity -Vs (ft/sec)	51.5	54.3	54.1	53.3
Area of Stack (ft2)	4.9	4.9	4.9	4.9
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	15,152	15,972	15,932	15,685
Flowrate ft^3 (Standard Wet)	9,914	10,355	10,374	10,214
Flowrate ft^3 (Standard Dry)	9,664	10,035	10,064	9,921
Flowrate m^3 (standard dry)	274	284	285	281
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	1.9	5.2	0.0	2.4
Organic Condensible Particulate	1.9	1.6	1.2	1.6
Inorganic Condensible Particulate	3.3	3.4	4.7	3.8
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	3.2	3.0	3.9	3.4
Total Filterable and Condensible Particulate	5.1	8.2	3.9	5.7
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.001	0.002	0.000	0.001
lb/1000 lb (dry)	0.001	0.002	0.000	0.001
mg/dscm (dry)	0.7	1.9	0.0	0.9
gr/dscf	0.0003	0.0008	0.0000	0.0004
Filterable Particulate Emission Rate				
lb/ hr	0.03	0.07	0.00	0.03
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.001	0.001	0.001	0.001
lb/1000 lb (dry)	0.001	0.001	0.001	0.001
mg/dscm (dry)	1.2	1.1	1.4	1.2
gr/dscf	0.0005	0.0005	0.0006	0.0005
Condensible Particulate Emission Rate				
lb/ hr	0.04	0.04	0.05	0.05
Total Particulate Concentration				
lb/1000 lb (wet)	0.002	0.002	0.001	0.002
lb/1000 lb (dry)	0.002	0.002	0.001	0.002
mg/dscm (dry)	1.9	2.9	1.4	2.1
gr/dscf	0.0008	0.0013	0.0006	0.0009
Total Particulate Emission Rate				
lb/ hr	0.07	0.11	0.05	0.08

Table 6
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Sealer Oven RTO**			
Test Date	**10/27/2016**	**10/27/2016**	**10/27/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 4	Average
Meter Temperature Tm (F)	95.8	95.7	95.5	95.7
Meter Pressure - Pm (in. Hg)	29.4	29.4	29.4	29.4
Measured Sample Volume (Vm)	95.0	93.5	93.3	94.1
Sample Volume (Vm-Std ft3)	88.4	87.0	86.9	87.6
Sample Volume (Vm-Std m3)	2.50	2.46	2.46	2.48
Condensate Volume (Vw-std)	1.994	2.603	2.579	2.287
Gas Density (Ps(std) lbs/ft3) (wet)	0.0739	0.0737	0.0737	0.0738
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	6.68	6.61	6.59	6.64
Total weight of sampled gas (m g lbs) (dry)	6.59	6.49	6.47	6.53
Nozzle Size - An (sq. ft.)	0.000398	0.000398	0.000398	0.000398
Isokinetic Variation - I	100.7	100.8	100.7	100.7
Stack Data				
Average Stack Temperature - Ts (F)	363.9	367.0	369.9	366.9
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.5	28.5	28.5	28.5
Stack Gas Specific Gravity (Gs)	0.985	0.985	0.985	0.985
Percent Moisture (Bws)	2.21	2.90	2.88	2.55
Water Vapor Volume (fraction)	0.0221	0.0290	0.0288	0.0255
Pressure - Ps ("Hg)	29.3	29.3	29.3	29.3
Average Stack Velocity -Vs (ft/sec)	50.0	49.7	49.9	50.0
Area of Stack (ft2)	5.6	5.6	5.6	5.6
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	16,762	16,659	16,702	16,732
Flowrate ft^3 (Standard Wet)	10,505	10,402	10,392	10,448
Flowrate ft^3 (Standard Dry)	10,273	10,100	10,092	10,183
Flowrate m^3 (standard dry)	291	286	286	288
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	1.5	17.0	3.0	2.3
Organic Condensible Particulate	3.7	160.0	3.0	3.4
Inorganic Condensible Particulate	2.7	11.0	6.0	4.4
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	4.4	169.0	7.0	5.7
Total Filterable and Condensible Particulate	5.9	186.0	10.0	8.0
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.000	0.006	0.001	0.001
lb/1000 lb (dry)	0.001	0.006	0.001	0.001
mg/dscm (dry)	0.6	6.9	1.2	0.9
gr/dscf	0.0003	0.0030	0.0005	0.0004
Filterable Particulate Emission Rate				
lb/ hr	0.02	0.26	0.05	0.03
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.001	0.056	0.002	0.002
lb/1000 lb (dry)	0.001	0.057	0.002	0.002
mg/dscm (dry)	1.8	68.6	2.8	2.3
gr/dscf	0.0008	0.0300	0.0012	0.0010
Condensible Particulate Emission Rate				
lb/ hr	0.07	2.60	0.11	0.09
Total Particulate Concentration				
lb/1000 lb (wet)	0.002	0.062	0.003	0.003
lb/1000 lb (dry)	0.002	0.063	0.003	0.003
mg/dscm (dry)	2.4	75.5	4.1	3.2
gr/dscf	0.0010	0.0330	0.0018	0.0014
Total Particulate Emission Rate				
lb/ hr	0.09	2.87	0.15	0.12

*Run 2 omitted from average

Table 6A
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Sealer Oven RTO**			
Test Date	**10/27/2016**	**10/27/2016**	**10/27/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 4	Average
Meter Temperature Tm (F)	95.8	95.7	95.5	95.7
Meter Pressure - Pm (in. Hg)	29.4	29.4	29.4	29.4
Measured Sample Volume (Vm)	95.0	93.5	93.3	93.9
Sample Volume (Vm-Std ft3)	88.4	87.0	86.9	87.4
Sample Volume (Vm-Std m3)	2.50	2.46	2.46	2.48
Condensate Volume (Vw-std)	1.994	2.603	2.579	2.392
Gas Density (Ps(std) lbs/ft3) (wet)	0.0739	0.0737	0.0737	0.0738
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	6.68	6.61	6.59	6.63
Total weight of sampled gas (m g lbs) (dry)	6.59	6.49	6.47	6.52
Nozzle Size - An (sq. ft.)	0.000398	0.000398	0.000398	0.000398
Isokinetic Variation - I	100.7	100.8	100.7	100.7
Stack Data				
Average Stack Temperature - Ts (F)	363.9	367.0	369.9	366.9
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.5	28.5	28.5	28.5
Stack Gas Specific Gravity (Gs)	0.985	0.985	0.985	0.985
Percent Moisture (Bws)	2.21	2.90	2.88	2.66
Water Vapor Volume (fraction)	0.0221	0.0290	0.0288	0.0266
Pressure - Ps ("Hg)	29.3	29.3	29.3	29.3
Average Stack Velocity -Vs (ft/sec)	50.0	49.7	49.9	49.9
Area of Stack (ft2)	5.6	5.6	5.6	5.6
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	16,762	16,659	16,702	16,708
Flowrate ft^3 (Standard Wet)	10,505	10,402	10,392	10,433
Flowrate ft^3 (Standard Dry)	10,273	10,100	10,092	10,155
Flowrate m^3 (standard dry)	291	286	286	288
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	1.5	17.0	3.0	7.2
Organic Condensible Particulate	3.7	160.0	3.0	55.6
Inorganic Condensible Particulate	2.7	11.0	6.0	6.6
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	4.4	169.0	7.0	60.1
Total Filterable and Condensible Particulate	5.9	186.0	10.0	67.3
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.000	0.006	0.001	0.002
lb/1000 lb (dry)	0.001	0.006	0.001	0.002
mg/dscm (dry)	0.6	6.9	1.2	2.9
gr/dscf	0.0003	0.0030	0.0005	0.0013
Filterable Particulate Emission Rate				
lb/ hr	0.02	0.26	0.05	0.11
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.001	0.056	0.002	0.020
lb/1000 lb (dry)	0.001	0.057	0.002	0.020
mg/dscm (dry)	1.8	68.6	2.8	24.4
gr/dscf	0.0008	0.0300	0.0012	0.0107
Condensible Particulate Emission Rate				
lb/ hr	0.07	2.60	0.11	0.93
Total Particulate Concentration				
lb/1000 lb (wet)	0.002	0.062	0.003	0.022
lb/1000 lb (dry)	0.002	0.063	0.003	0.023
mg/dscm (dry)	2.4	75.5	4.1	27.3
gr/dscf	0.0010	0.0330	0.0018	0.0119
Total Particulate Emission Rate				
lb/ hr	0.09	2.87	0.15	1.04

Table 7
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Basecoat Line 1 Stack A**			
Test Date	**11/2/2016**	**11/2/2016**	**11/2/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 3	Average
Meter Temperature Tm (F)	89.2	87.9	90.6	89.2
Meter Pressure - Pm (in. Hg)	29.5	29.5	29.5	29.5
Measured Sample Volume (Vm)	63.7	64.9	64.5	64.4
Sample Volume (Vm-Std ft3)	60.2	61.4	60.8	60.8
Sample Volume (Vm-Std m3)	1.70	1.74	1.72	1.72
Condensate Volume (Vw-std)	0.816	1.509	1.542	1.289
Gas Density (Ps(std) lbs/ft3) (wet)	0.0742	0.0739	0.0738	0.0740
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	4.52	4.65	4.60	4.59
Total weight of sampled gas (m g lbs) (dry)	4.49	4.58	4.53	4.53
Nozzle Size - An (sq. ft.)	0.000312	0.000312	0.000312	0.000312
Isokinetic Variation - I	96.6	97.8	97.6	97.3
Stack Data				
Average Stack Temperature - Ts (F)	78.9	78.9	78.7	78.8
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.7	28.6	28.6	28.6
Stack Gas Specific Gravity (Gs)	0.991	0.987	0.986	0.988
Percent Moisture (Bws)	1.34	2.40	2.47	2.07
Water Vapor Volume (fraction)	0.0134	0.0240	0.0247	0.0207
Pressure - Ps ("Hg)	29.2	29.2	29.2	29.2
Average Stack Velocity -Vs (ft/sec)	58.9	60.0	59.5	59.5
Area of Stack (ft2)	3.1	3.1	3.1	3.1
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	10,868	11,071	10,986	10,975
Flowrate ft^3 (Standard Wet)	10,388	10,582	10,505	10,492
Flowrate ft^3 (Standard Dry)	10,249	10,328	10,245	10,274
Flowrate m^3 (standard dry)	290	292	290	291
Total Particulate Weights (mg)				
Nozzle/Filter	0.3	0.1	0.4	0.3
Total 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	0.1	0.2	0.2
gr/dscf	0.0001	0.0000	0.0001	0.0001
Total Particulate Emission Rate				
lb/ hr	0.01	0.00	0.01	0.01
Total Particulate Emission Factor				
Test Time (hr)	1	1	1	1
Paint solids sprayed during test (gal)	3.54	3.54	2.79	3.29
Emission Factor (lb PM/gallons paint solids sprayed)	0.0019	0.0006	0.0032	0.0019

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Table 8
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Basecoat Line 1 Stack B**			
Test Date	**11/2/2016**	**11/2/2016**	**11/2/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 3	Average
Meter Temperature Tm (F)	92.2	94.3	95.6	94.0
Meter Pressure - Pm (in. Hg)	29.5	29.5	29.5	29.5
Measured Sample Volume (Vm)	55.6	56.6	55.8	56.0
Sample Volume (Vm-Std ft3)	52.6	53.4	52.5	52.8
Sample Volume (Vm-Std m3)	1.49	1.51	1.49	1.50
Condensate Volume (Vw-std)	1.462	1.358	1.325	1.381
Gas Density (Ps(std) lbs/ft3) (wet)	0.0738	0.0738	0.0738	0.0738
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	3.99	4.04	3.97	4.00
Total weight of sampled gas (m g lbs) (dry)	3.92	3.98	3.91	3.94
Nozzle Size - An (sq. ft.)	0.000252	0.000252	0.000252	0.000252
Isokinetic Variation - I	100.3	100.6	100.8	100.5
Stack Data				
Average Stack Temperature - Ts (F)	79.0	79.0	79.0	79.0
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.5	28.6	28.6	28.6
Stack Gas Specific Gravity (Gs)	0.986	0.986	0.987	0.986
Percent Moisture (Bws)	2.70	2.48	2.46	2.55
Water Vapor Volume (fraction)	0.0270	0.0248	0.0246	0.0255
Pressure - Ps ("Hg)	29.2	29.2	29.2	29.2
Average Stack Velocity -Vs (ft/sec)	62.2	62.7	61.6	62.2
Area of Stack (ft2)	3.1	3.1	3.1	3.1
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	11,472	11,575	11,360	11,469
Flowrate ft^3 (Standard Wet)	10,962	11,060	10,855	10,959
Flowrate ft^3 (Standard Dry)	10,666	10,786	10,588	10,680
Flowrate m^3 (standard dry)	302	305	300	302
Total Particulate Weights (mg)				
Nozzle/Filter	0.5	0.4	1.0	0.6
Total Particulate Concentration				
lb/1000 lb (wet)	0.000	0.000	0.001	0.000
lb/1000 lb (dry)	0.000	0.000	0.001	0.000
mg/dscm (dry)	0.3	0.3	0.7	0.4
gr/dscf	0.0001	0.0001	0.0003	0.0002
Total Particulate Emission Rate				
lb/ hr	0.01	0.01	0.03	0.02
Total Particulate Emission Factor				
Test Time (hr)	1	1	1	1
Paint solids sprayed during test (gal)	1.62	1.65	1.45	1.57
Emission Factor (lb PM/gallons paint solids sprayed)	0.0083	0.0065	0.0185	0.0111

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Table 9
Particulate Matter Emission Rates

Company	**GM Flint**			
Source Designation	**Spray Booth RTO**			
Test Date	**10/25/2016**	**10/25/2016**	**10/25/2016**	
Meter/Nozzle Information	Run 1	Run 2	Run 3	Average
Meter Temperature Tm (F)	75.8	81.3	78.8	78.6
Meter Pressure - Pm (in. Hg)	29.9	29.9	29.9	29.9
Measured Sample Volume (Vm)	122.8	118.4	123.6	121.6
Sample Volume (Vm-Std ft3)	120.6	115.0	120.7	118.8
Sample Volume (Vm-Std m3)	3.41	3.26	3.42	3.36
Condensate Volume (Vw-std)	2.612	2.254	2.230	2.365
Gas Density (Ps(std) lbs/ft3) (wet)	0.0739	0.0740	0.0740	0.0740
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	9.11	8.68	9.10	8.96
Total weight of sampled gas (m g lbs) (dry)	8.99	8.57	9.00	8.85
Nozzle Size - An (sq. ft.)	0.000322	0.000322	0.000322	0.000322
Isokinetic Variation - I	100.3	96.8	100.0	99.0
Stack Data				
Average Stack Temperature - Ts (F)	169.0	166.1	166.7	167.3
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.6	28.6	28.6	28.6
Stack Gas Specific Gravity (Gs)	0.988	0.989	0.989	0.988
Percent Moisture (Bws)	2.12	1.92	1.81	1.95
Water Vapor Volume (fraction)	0.0212	0.0192	0.0181	0.0195
Pressure - Ps ("Hg)	29.6	29.6	29.6	29.6
Average Stack Velocity -Vs (ft/sec)	63.7	62.6	63.5	63.3
Area of Stack (ft2)	24.5	24.5	24.5	24.5
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	93,536	91,871	93,264	92,890
Flowrate ft^3 (Standard Wet)	77,787	76,758	77,849	77,465
Flowrate ft^3 (Standard Dry)	76,138	75,283	76,437	75,952
Flowrate m^3 (standard dry)	2,156	2,132	2,164	2,151
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	3.4	2.2	2.4	2.7
Organic Condensible Particulate	1.0	0.8	0.9	0.9
Inorganic Condensible Particulate	8.0	5.1	3.4	5.5
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	7.0	3.9	2.3	4.4
Total Filterable and Condensible Particulate	10.4	6.1	4.7	7.1
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.001	0.001	0.001	0.001
lb/1000 lb (dry)	0.001	0.001	0.001	0.001
mg/dscm (dry)	1.0	0.7	0.7	0.8
gr/dscf	0.0004	0.0003	0.0003	0.0003
Filterable Particulate Emission Rate				
lb/ hr	0.29	0.19	0.20	0.23
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.002	0.001	0.001	0.001
lb/1000 lb (dry)	0.002	0.001	0.001	0.001
mg/dscm (dry)	2.0	1.2	0.7	1.3
gr/dscf	0.0009	0.0005	0.0003	0.0006
Condensible Particulate Emission Rate				
lb/ hr	0.59	0.34	0.19	0.37
Total Particulate Concentration				
lb/1000 lb (wet)	0.003	0.002	0.001	0.002
lb/1000 lb (dry)	0.003	0.002	0.001	0.002
mg/dscm (dry)	3.0	1.9	1.4	2.1
gr/dscf	0.0013	0.0008	0.0006	0.0009
Total Particulate Emission Rate				
lb/ hr	0.87	0.53	0.40	0.60

Table 10
Particulate Matter Emission Rates

Company	GM Flint			
Source Designation	ELPO Oven 1			
Test Date	11/3/2016	11/3/2016	11/3/2016	
Meter/Nozzle Information	Run 1	Run 2	Run 3	Average
Meter Temperature Tm (F)	94.1	94.4	94.4	94.3
Meter Pressure - Pm (in. Hg)	29.4	29.4	29.4	29.4
Measured Sample Volume (Vm)	89.3	91.9	89.3	90.2
Sample Volume (Vm-Std ft3)	84.0	86.5	84.0	84.9
Sample Volume (Vm-Std m3)	2.38	2.45	2.38	2.40
Condensate Volume (Vw-std)	4.182	4.366	4.277	4.275
Gas Density (Ps(std) lbs/ft3) (wet)	0.0732	0.0732	0.0732	0.0732
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	6.46	6.65	6.46	6.52
Total weight of sampled gas (m g lbs) (dry)	6.26	6.45	6.26	6.32
Nozzle Size - An (sq. ft.)	0.000398	0.000398	0.000398	0.000398
Isokinetic Variation - I	101.8	101.5	101.3	101.5
Stack Data				
Average Stack Temperature - Ts (F)	429.8	427.4	432.6	429.9
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.3	28.3	28.3	28.3
Stack Gas Specific Gravity (Gs)	0.978	0.978	0.978	0.978
Percent Moisture (Bws)	4.74	4.81	4.84	4.80
Water Vapor Volume (fraction)	0.0474	0.0481	0.0484	0.0480
Pressure - Ps ("Hg)	29.2	29.2	29.2	29.2
Average Stack Velocity -Vs (ft/sec)	52.2	53.8	52.7	52.9
Area of Stack (ft2)	6.3	6.3	6.3	6.3
Exhaust Gas Flowrate				
Flowrate ft^3(Actual)	19,740	20,337	19,918	19,998
Flowrate ft^3 (Standard Wet)	11,445	11,823	11,512	11,593
Flowrate ft^3 (Standard Dry)	10,902	11,255	10,954	11,037
Flowrate m^3 (standard dry)	309	319	310	313
Total Particulate Weights (mg)				
Total Nozzle/Probe/Filter	4.3	3.6	3.1	3.7
Organic Condensible Particulate	2.4	2.0	2.3	2.2
Inorganic Condensible Particulate	5.0	7.3	7.7	6.7
Condensible Blank Correction	2.0	2.0	2.0	2.0
Total Condensible Particulate	5.4	7.3	8.0	6.9
Total Filterable and Condensible Particulate	9.7	10.9	11.1	10.6
Filterable Particulate Concentration				
lb/1000 lb (wet)	0.001	0.001	0.001	0.001
lb/1000 lb (dry)	0.002	0.001	0.001	0.001
mg/dscm (dry)	1.8	1.5	1.3	1.5
gr/dscf	0.0008	0.0006	0.0006	0.0007
Filterable Particulate Emission Rate				
lb/ hr	0.07	0.06	0.05	0.06
Condensible Particulate Concentration				
lb/1000 lb (wet)	0.002	0.002	0.003	0.002
lb/1000 lb (dry)	0.002	0.002	0.003	0.002
mg/dscm (dry)	2.3	3.0	3.4	2.9
gr/dscf	0.0010	0.0013	0.0015	0.0013
Condensible Particulate Emission Rate				
lb/ hr	0.09	0.13	0.14	0.12
Total Particulate Concentration				
lb/1000 lb (wet)	0.003	0.004	0.004	0.004
lb/1000 lb (dry)	0.003	0.004	0.004	0.004
mg/dscm (dry)	4.1	4.5	4.7	4.4
gr/dscf	0.0018	0.0019	0.0020	0.0019
Total Particulate Emission Rate				
lb/ hr	0.17	0.19	0.19	0.18

Table 11
RTO Destruction Efficiency Summary
GM Flint - Topcoat Line 1 RTO
Flint, MI

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	10/28/2016	10/28/2016	11/1/2016	
Sampling Time	8:25-9:25	12:06-13:06	17:00-18:00	
Inlet Flowrate (scfm)	11,051	11,031	11,212	11,098
Outlet Flowrate (scfm)	9,914	10,355	10,374	10,214
Inlet VOC Concentration (ppmv propane)	175.7	153.9	192.7	174.1
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	174.3	152.2	198.9	175.1
Inlet VOC Mass Flowrate (lb/hr)	13.2	11.5	15.3	13.4
Outlet VOC Concentration (ppmv propane)	2.3	2.5	2.1	2.3
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	2.6	3.0	2.4	2.7
Outlet CH4 Concentration (ppmv methane)	0.8	0.8	0.8	0.8
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	0.8	0.9	0.9	0.9
Outlet VOC Concentration (- methane)	2.3	2.6	2.1	2.3
Outlet VOC Mass Emission Rate (lb/hr)	0.2	0.2	0.1	0.2
VOC Destruction Efficiency (%)	**98.8**	**98.4**	**99.0**	**98.7**

Inlet VOC Correction			
Co	1.67	3.44	4.71
Cma	198	198	99.7
Cm	199.32	199.22	98.96

Outlet VOC Correction			
Co	-0.31	-0.61	-0.39
Cma	14.9	14.9	14.9
Cm	14.38	14.57	14.89

Outlet CH4 Correction			
Co	-0.05	-0.05	-0.03
Cma	14.9	14.9	14.9
Cm	14.81	14.75	14.57

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
RF=2.38
35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Table 12
RTO Destruction Efficiency Summary
GM Flint - Topcoat Line 2 RTO
Flint, MI

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	11/1/2016	11/1/2016	11/1/2016	
Sampling Time	8:09 - 9:09	10:30 - 11:30	11:55 - 12:55	
Inlet Flowrate (scfm)	10,600	10,463	10,797	10,620
Outlet Flowrate (scfm)	10,878	10,753	10,951	10,861
Inlet VOC Concentration (ppmv propane)	83.3	95.4	131.6	103.4
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	85.0	96.9	135.2	105.7
Inlet VOC Mass Flowrate (lb/hr)	6.2	7.0	10.0	7.7
Outlet VOC Concentration (ppmv propane)	3.2	3.4	4.4	3.7
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	3.4	3.8	4.6	3.9
Outlet CH4 Concentration (ppmv methane)	0.7	0.7	0.6	0.6
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	0.7	0.6	0.5	0.6
Outlet VOC Concentration (- methane)	3.1	3.5	4.4	3.7
Outlet VOC Mass Emission Rate (lb/hr)	0.2	0.3	0.3	0.3
VOC Destruction Efficiency (%)	**96.2**	**96.3**	**96.7**	**96.4**

Inlet VOC Correction			
Co	1.96	3.74	3.82
Cma	99.8	99.8	99.8
Cm	97.44	98.17	98.18

Outlet VOC Correction			
Co	-0.25	-0.39	-0.29
Cma	14.9	14.9	14.9
Cm	14.76	14.56	14.71

Outlet CH4 Correction			
Co	0.02	0.09	0.05
Cma	14.9	14.9	14.9
Cm	14.83	14.72	14.60

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
RF=2.42
35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Table 13
RTO Destruction Efficiency Summary
GM Flint - Sealer Oven RTO
Flint, MI

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	10/27/2016	10/27/2016	10/27/2016	
Sampling Time	8:18 - 9:18	10:19 - 11:19	*11:45-12:25/ 13:10-13:30	
Inlet Flowrate (scfm)	10,162	9,944	10,453	10,186
Outlet Flowrate (scfm)	10,549	11,178	10,670	10,799
Inlet VOC Concentration (ppmv propane)	55.6	58.2	59.4	57.7
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	54.5	57.5	60.0	57.3
Inlet VOC Mass Flowrate (lb/hr)	3.8	3.9	4.3	4.0
Outlet VOC Concentration (ppmv propane)	3.1	3.2	3.5	3.3
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	3.1	3.2	3.4	3.2
Outlet CH4 Concentration (ppmv methane)	2.3	2.7	2.8	2.6
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	2.3	2.7	2.8	2.6
Outlet VOC Concentration (- methane)	2.1	2.0	2.1	2.1
Outlet VOC Mass Emission Rate (lb/hr)	0.1	0.2	0.2	0.2
VOC Destruction Efficiency (%)	**96.1**	**96.2**	**96.3**	**96.2**

*Run 3 test was paused at 12:25 and resumed at 13:10 due to GM Lunch break

Inlet VOC Correction			
Co	0.53	0.32	-1.89
Cma	49.8	49.8	49.8
Cm	50.90	50.45	49.01

Outlet VOC Correction			
Co	0.11	0.11	0.11
Cma	14.95	14.95	14.95
Cm	14.91	14.90	14.84

Outlet CH4 Correction			
Co	0.07	0.04	0.05
Cma	14.95	14.95	14.95
Cm	14.79	14.63	14.67

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
RF=2.28
35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Table 14
RTO Destruction Efficiency Summary
GM Flint - Spray Booth RTO
Flint, MI

Parameter	*Run 1	Run 2	Run 3	Run 4	Average
Sampling Date	10/25/2016	10/25/2016	10/25/2016	10/25/2016	
Sampling Time	8:21-9:21	10:36-11:36	13:47-14:47	15:05-16:05	
Inlet Flowrate (scfm)	78,016	78,016	77,119	75,122	76,752
Outlet Flowrate (scfm)	79,400	79,400	80,854	82,301	80,852
Inlet VOC Concentration (ppmv propane)	192.72	167.1	173.8	187.4	176.1
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	190.3	161.5	168.3	184.8	171.5
Inlet VOC Mass Flowrate (lb/hr)	101.9	86.5	89.1	95.3	90.3
Outlet VOC Concentration (ppmv propane)	9.03	6.1	6.3	7.1	6.5
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	9.3	6.6	6.7	7.1	6.8
Outlet CH4 Concentration (ppmv methane)	0.88	1.0	1.1	0.9	1.0
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	0.8	0.7	0.6	0.2	0.5
Outlet VOC Concentration (- methane)	8.9	6.3	6.4	7.1	6.6
Outlet VOC Mass Emission Rate (lb/hr)	4.9	3.4	3.5	4.0	3.7
VOC Destruction Efficiency (%)	**95.2**	**96.0**	**96.0**	**95.8**	**96.0**

* The RTO temperature setpoint was changed following the first run. This run is not included in the average.

Inlet VOC Correction				
Co	1.19	3.91	3.44	1.22
Cma	198	198	198	198
Cm	200.49	204.03	203.79	200.73

Outlet VOC Correction				
Co	-0.33	-0.67	-0.65	-0.65
Cma	14.95	14.95	14.95	14.95
Cm	14.74	14.48	14.92	15.46

Outlet CH4 Correction				
Co	0.07	0.22	0.40	0.68
Cma	14.95	14.95	14.95	14.95
Cm	15.23	15.16	15.51	15.81

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
RF=2.26
35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Table 15
RTO Destruction Efficiency Summary
GM Flint - ELPO Oven 1 RTO
Flint, MI

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	11/3/2016	11/3/2016	11/3/2016	
Sampling Time	10:49-11:49	12:49-13:49	15:10-16:10	
Inlet Flowrate (scfm)	11,659	11,111	11,363	11,377
Outlet Flowrate (scfm)	11,445	11,823	11,512	11,593
Inlet VOC Concentration (ppmv propane)	171.7	101.1	242.7	171.8
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	169.2	98.0	239.6	168.9
Inlet VOC Mass Flowrate (lb/hr)	13.5	7.5	18.7	13.2
Outlet VOC Concentration (ppmv propane)	3.7	1.7	3.8	3.0
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	4.0	2.1	4.1	3.4
Outlet CH4 Concentration (ppmv methane)	1.8	0.9	1.3	1.3
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	1.8	0.9	1.4	1.3
Outlet VOC Concentration (- methane)	3.2	1.7	3.6	2.8
Outlet VOC Mass Emission Rate (lb/hr)	0.3	0.1	0.3	0.2
VOC Destruction Efficiency (%)	**98.1**	**98.1**	**98.5**	**98.3**

Inlet VOC Correction			
Co	1.42	2.72	3.19
Cma	198	198	198
Cm	200.73	201.61	201.16

Outlet VOC Correction			
Co	-0.24	-0.42	-0.43
Cma	14.9	14.9	14.9
Cm	14.47	14.50	14.69

Outlet CH4 Correction			
Co	0.06	0.06	0.02
Cma	14.9	14.9	14.9
Cm	14.48	14.10	14.08

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)

24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)

RF=2.35

35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Table 16
RTO Destruction Efficiency Summary
GM Flint - ELPO Oven 2
Flint, MI

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	11/3/2016	11/3/2016	11/3/2016	
Sampling Time	19:00-20:00	20:14-21:14	21:31-22:31	
Inlet Flowrate (scfm)	11,909	11,810	11,877	11,865
Outlet Flowrate (scfm)	12,083	12,205	12,022	12,103
Inlet VOC Concentration (ppmv propane)	97.7	109.2	68.8	91.9
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	94.6	107.0	66.4	89.3
Inlet VOC Mass Flowrate (lb/hr)	7.7	8.7	5.4	7.3
Outlet VOC Concentration (ppmv propane)	2.3	2.5	2.1	2.3
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	2.6	3.0	2.6	2.8
Outlet CH4 Concentration (ppmv methane)	0.8	0.8	0.8	0.8
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	0.8	0.9	0.8	0.8
Outlet VOC Concentration (- methane)	2.3	2.6	2.3	2.4
Outlet VOC Mass Emission Rate (lb/hr)	0.2	0.2	0.2	0.2
VOC Destruction Efficiency (%)	**97.5**	**97.4**	**96.5**	**97.2**

Inlet VOC Correction			
Co	3.54	3.44	3.31
Cma	198	198	198
Cm	200.60	199.22	198.51

Outlet VOC Correction			
Co	-0.31	-0.61	-0.62
Cma	14.9	14.9	14.9
Cm	14.38	14.57	14.91

Outlet CH4 Correction			
Co	-0.05	-0.05	0.02
Cma	14.9	14.9	14.9
Cm	14.81	14.75	14.77

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)

24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)

RF=2.38

35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

BTEC Inc.

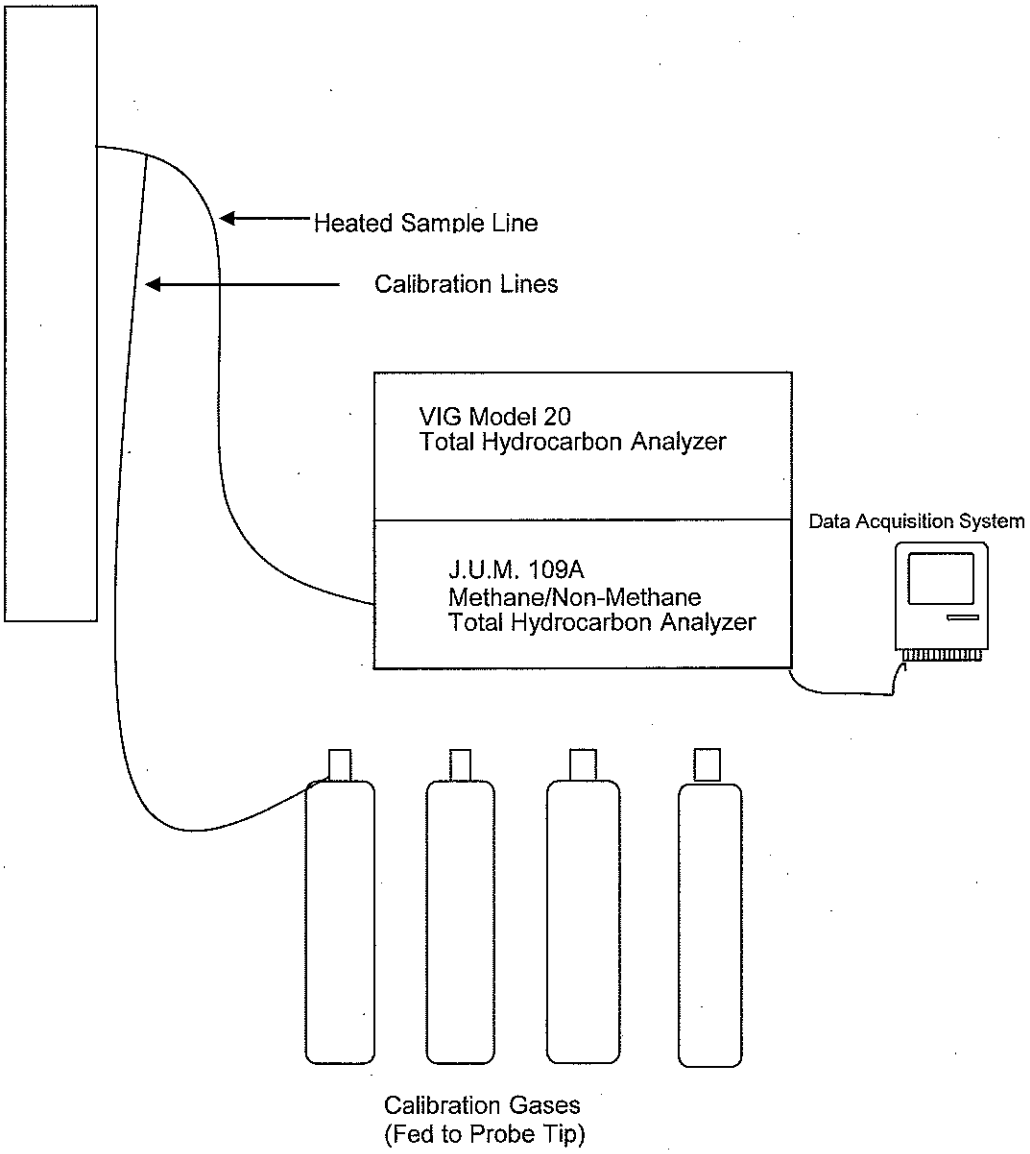


Figure No. 1

Site: **USEPA Method 25A** **GM Flint** **Flint, Michigan**	**Sampling Date:** **October 25, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan 48073**

BTEC Inc.

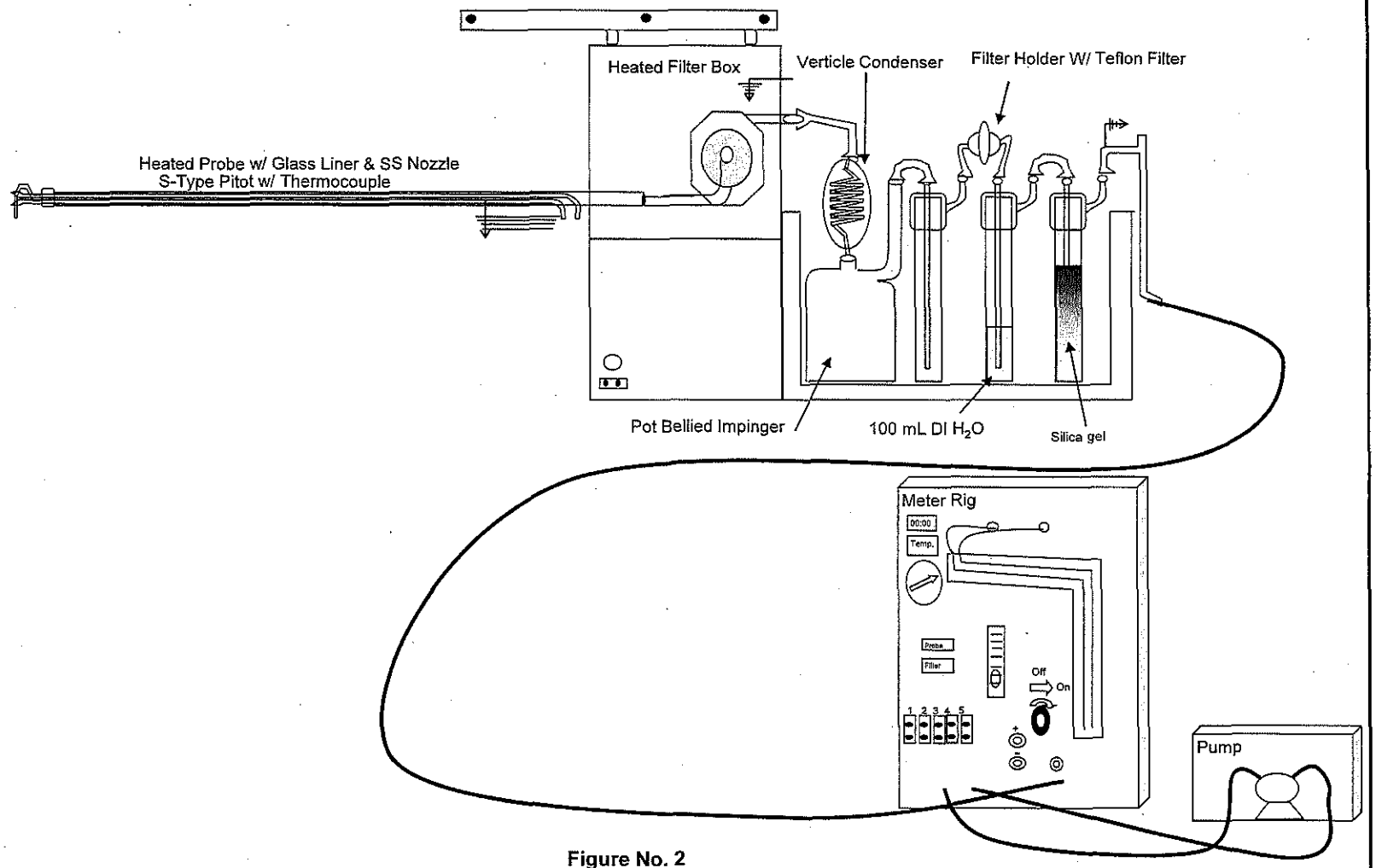


Figure No. 2

Site: **USEPA Method 5/202** **GM Flint** **Flint, Michigan**	**Sampling Date:** **October 25, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan 48073**

BTEC Inc.

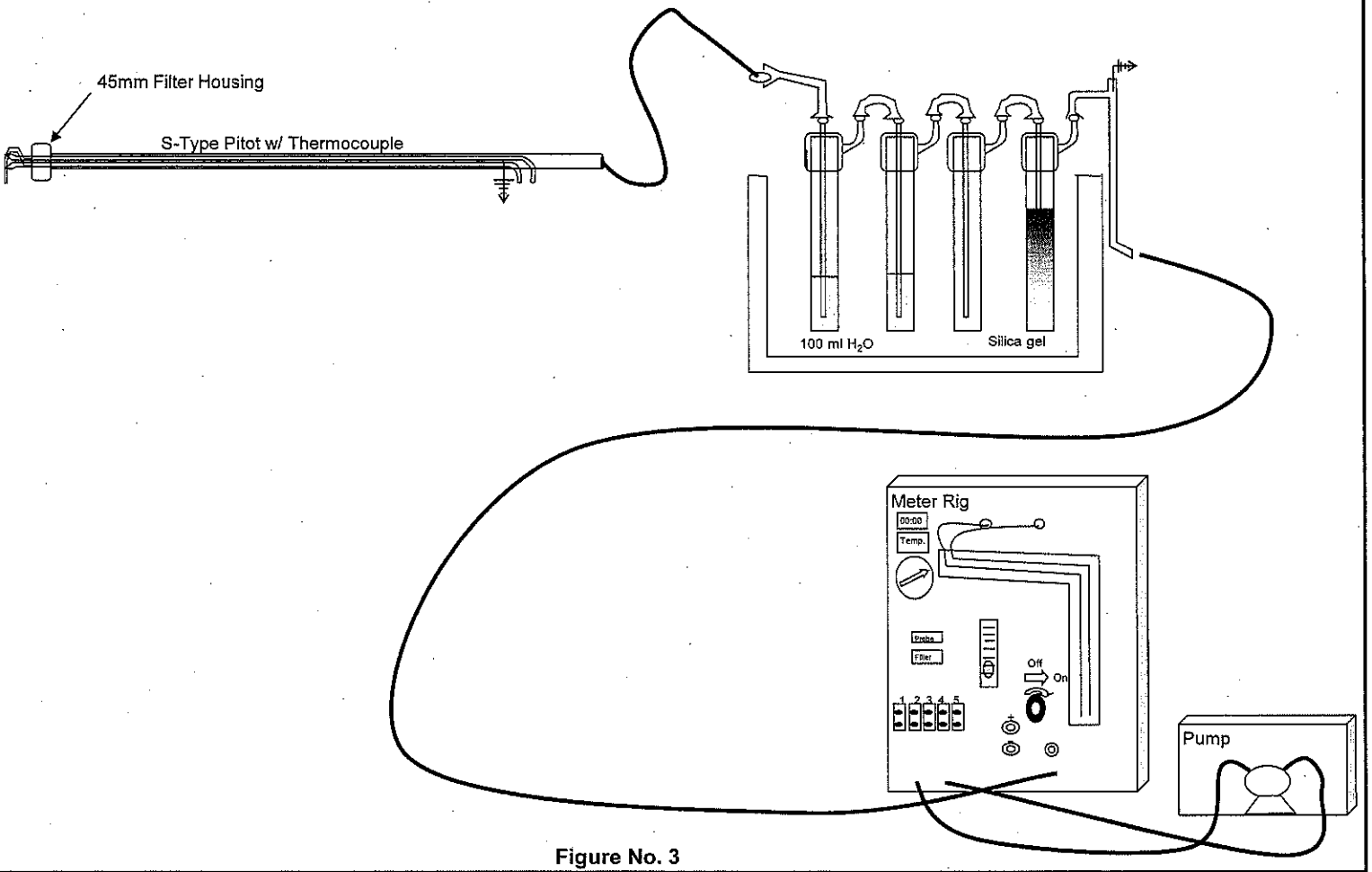
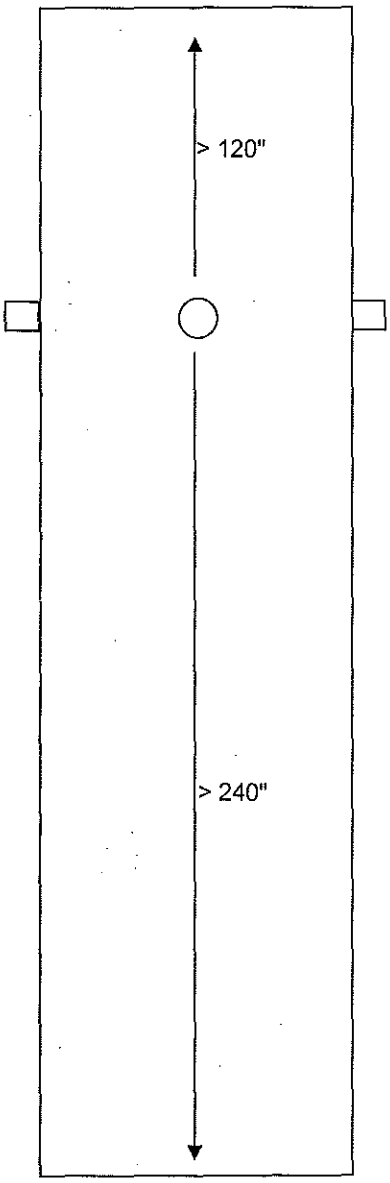


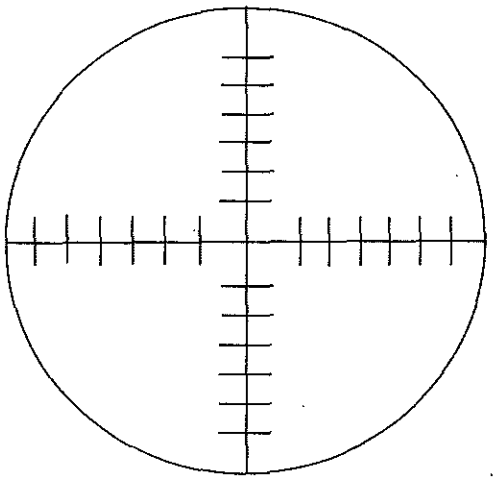
Figure No. 3

Site: **USEPA Method 17** **GM Flint** **Flint, Michigan**	**Sampling Date:** **October 25, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan**

BTEC Inc.

diameter = 38.5"





Not to Scale

Points	Distance "
1	0.8
2	2.6
3	4.5
4	6.8
5	9.6
6	13.7
7	24.8
8	28.9
9	31.7
10	34.0
11	35.9
12	37.7

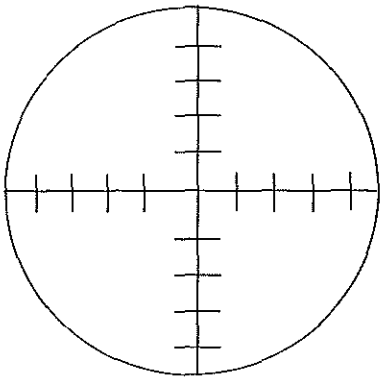
Figure No. 4

Site: **Basecoat Prime Line 1** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **October 28, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 25.75"

Points	Distance "
1	0.8
2	2.7
3	5.0
4	8.3
5	17.4
6	20.8
7	23.0
8	24.9



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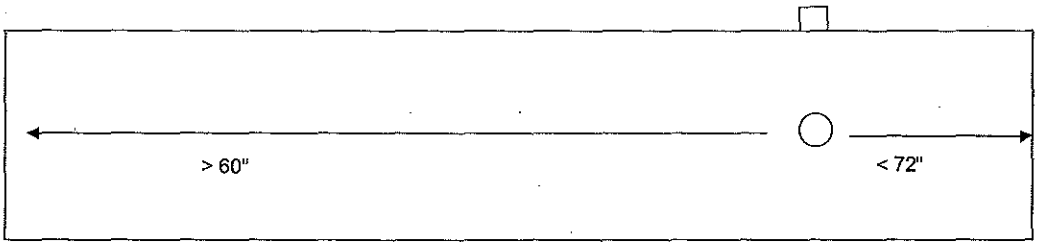
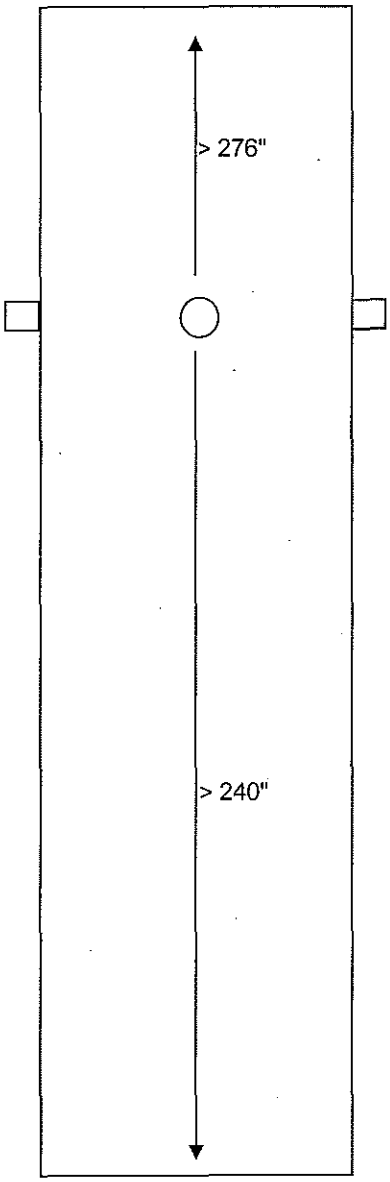


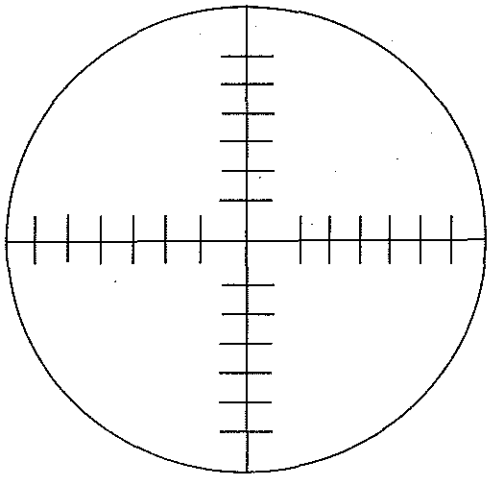
Figure No. 5

Site:	Sampling Date:	BT Environmental Consulting, Inc.
Topcoat Line 1 RTO Inlet GM Flint Flint, Michigan	October 28, 2016	4949 Fernlee Royal Oak, Michigan

BTEC Inc.

diameter = 30"





Not to Scale

Points	Distance "
1	0.6
2	2.0
3	3.5
4	5.3
5	7.5
6	10.7
7	19.3
8	22.5
9	24.7
10	26.5
11	28.0
12	29.4

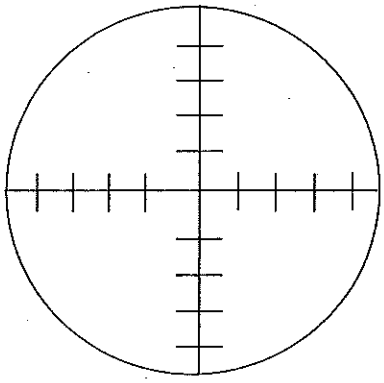
Figure 6

Site: **Topcoat Line 1 and 2 RTO Outlet** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **October 28 and** **November 1, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 25.5"

Points	Distance "
1	0.8
2	2.7
3	4.9
4	8.2
5	17.3
6	20.6
7	22.8
8	24.7



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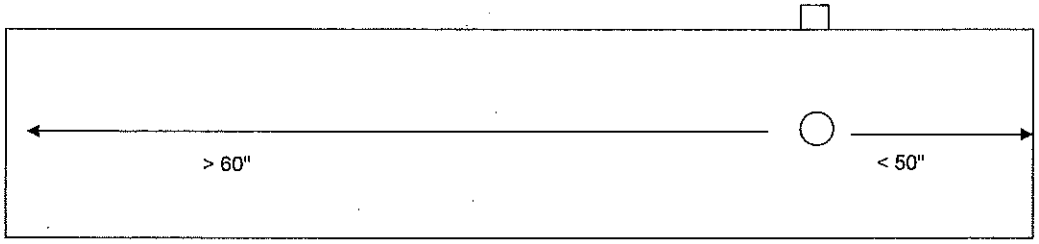


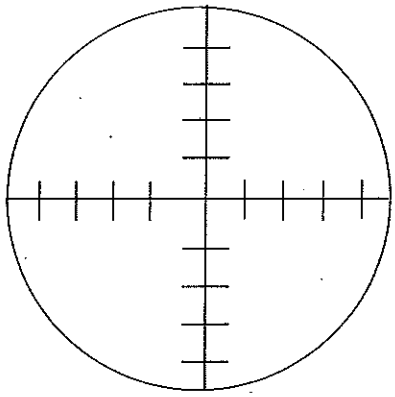
Figure No. 7

Site:	Sampling Date:	BT Environmental Consulting, Inc.
Topcoat Line 2 RTO Inlet GM Flint Flint, Michigan	November 1, 2016	4949 Fernlee Royal Oak, Michigan

BTEC Inc.

diameter = 26"

Points	Distance "
1	0.8
2	2.7
3	5.0
4	8.4
5	17.6
6	21.0
7	23.3
8	25.2



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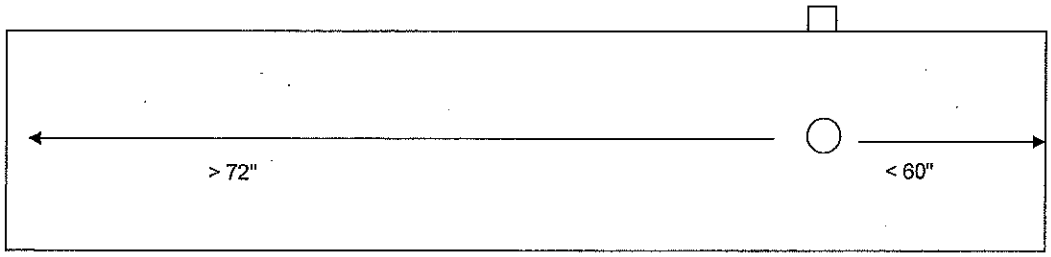
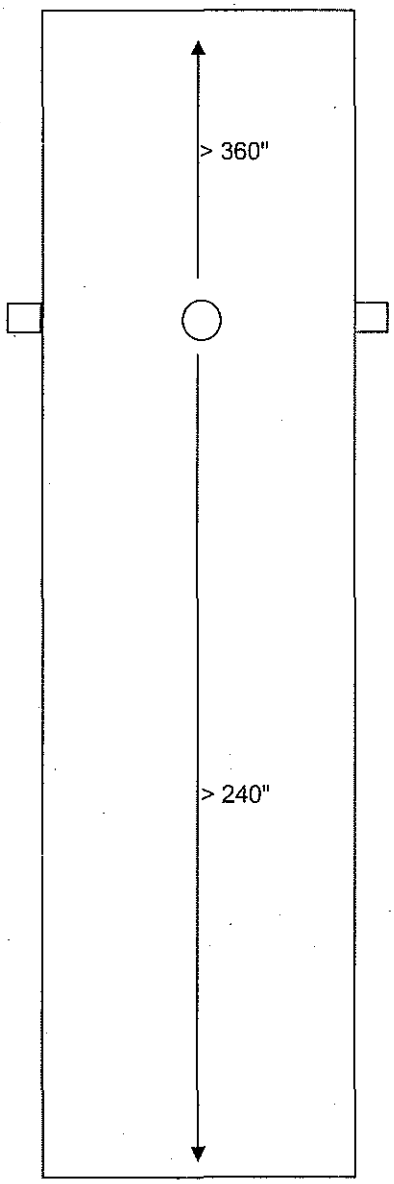


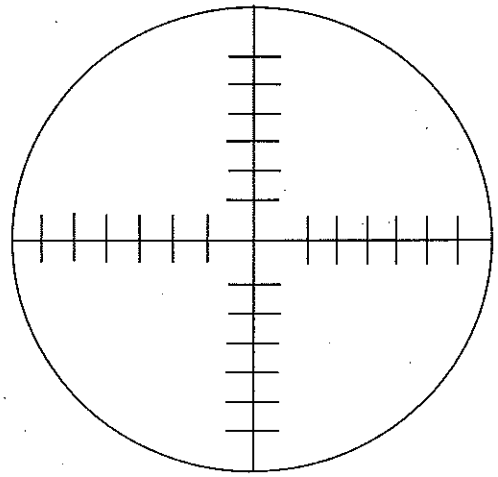
Figure No. 8

Site: **Sealer Oven RTO Inlet** **GM Flint** **Flint, Michigan**	**Sampling Date:** **October 27, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 32"





Not to Scale

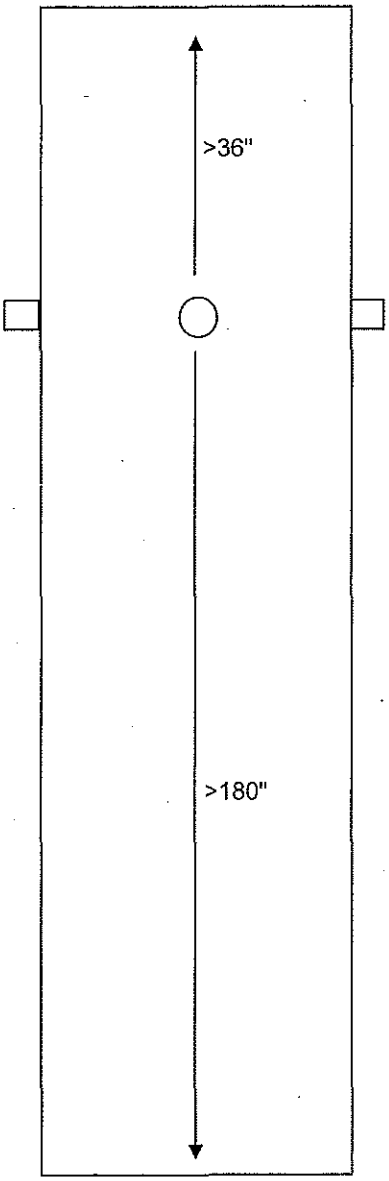
Points	Distance "
1	0.7
2	2.1
3	3.8
4	5.7
5	8.0
6	11.4
7	20.6
8	24.0
9	26.3
10	28.2
11	29.9
12	31.3

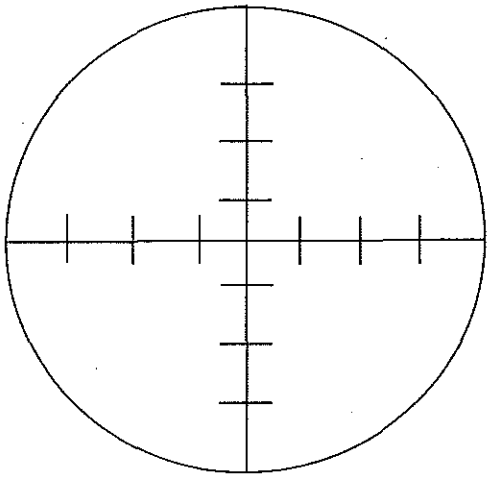
Figure No. 9

Site: **Sealer Oven RTO Outlet** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **October 27, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 23.75"





Not to Scale

Points	Distance "
1	1.0
2	3.5
3	7.0
4	16.7
5	20.3
6	22.7

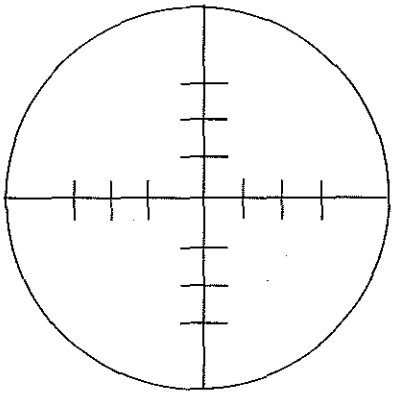
Figure No. 10

Site: **Basecoat Line 1 Stacks A and B** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **November 2, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 66"

Points	Distance "
1	2.9
2	9.6
3	19.5
4	46.5
5	56.4
6	63.1



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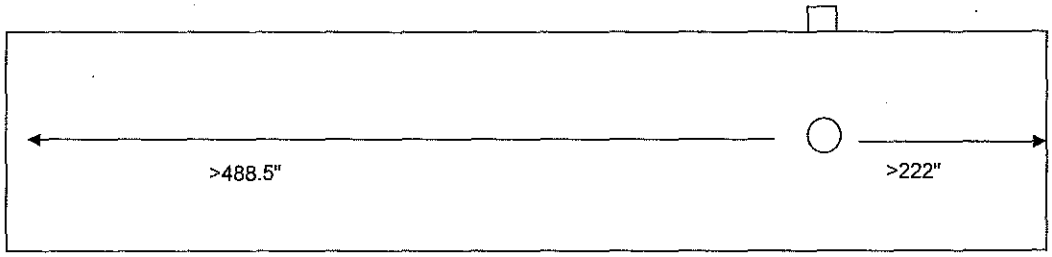
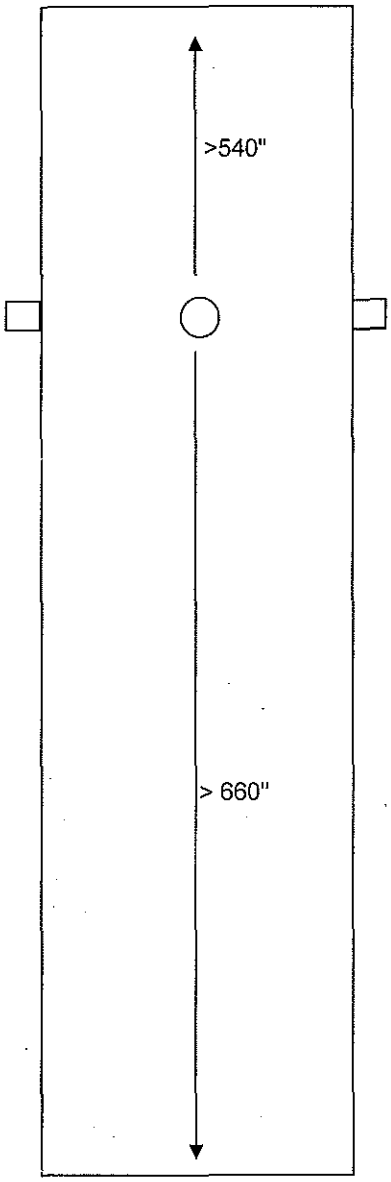


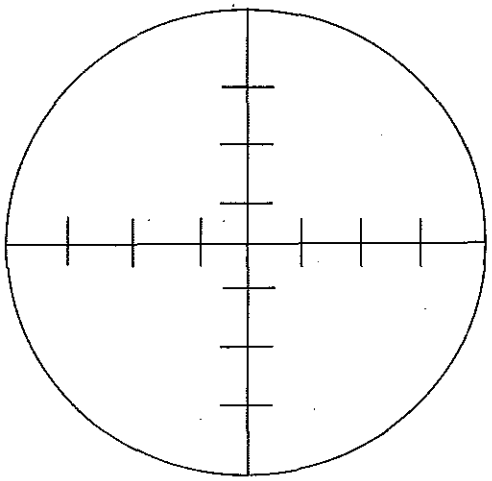
Figure No. 11

Site: Spray Booth RTO Inlet GM Flint Flint, Michigan	Sampling Date: October 25, 2016	BT Environmental Consulting, Inc. 4949 Fernlee Royal Oak, Michigan

BTEC Inc.

diameter = 67"





Not to Scale

Points	Distance "
1	2.9
2	9.8
3	19.8
4	47.2
5	57.2
6	64.1

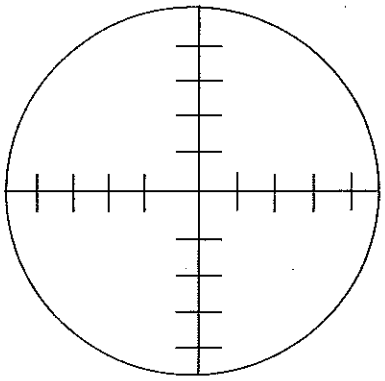
Figure No. 12

Site: **Spray Booth RTO Outlet** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **October 25, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 27.5"

Points	Distance "
1	0.9
2	2.9
3	5.3
4	8.9
5	18.6
6	22.2
7	24.6
8	26.6



Not to Scale

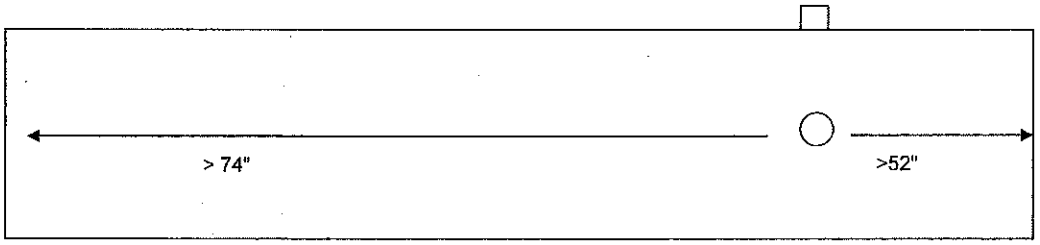
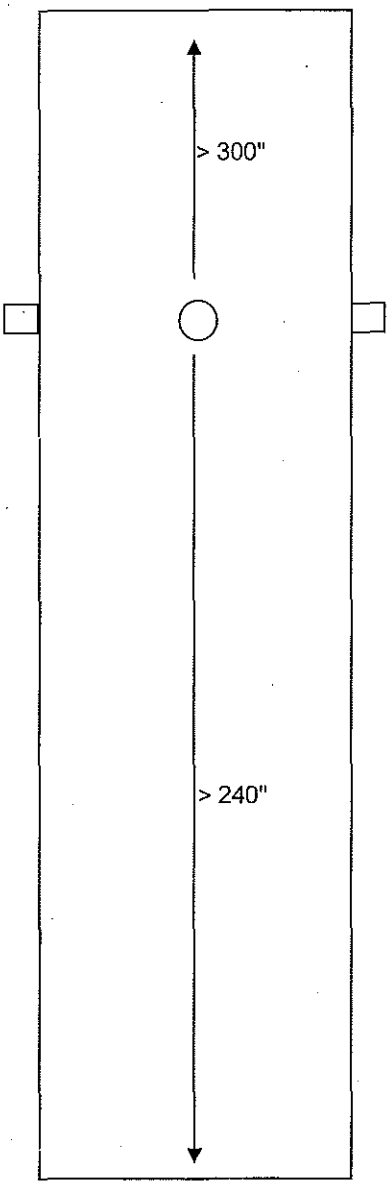


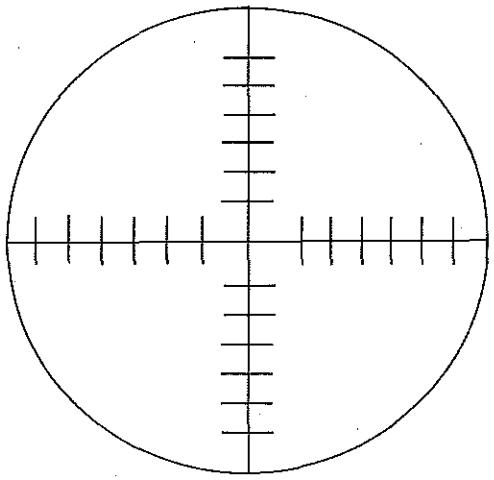
Figure No. 13

Site:	Sampling Date:	BT Environmental Consulting, Inc.
Elpo Oven 1 and 2 RTO Inlet GM Flint Flint, Michigan	November 3, 2016	4949 Fernlee Royal Oak, Michigan

BTEC Inc.

diameter = 34"





Not to Scale

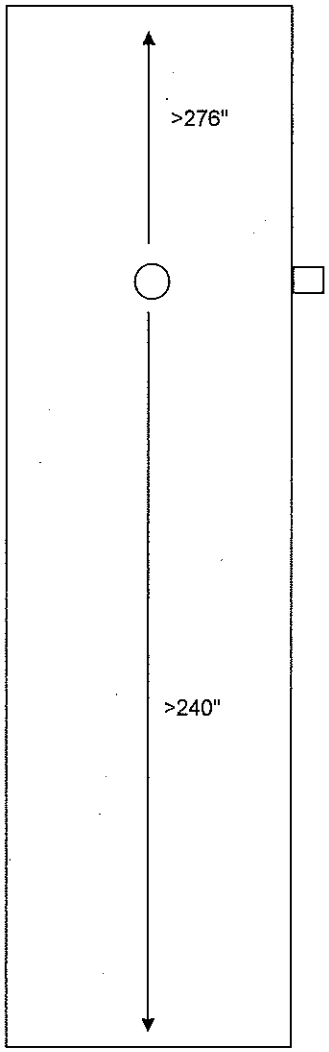
Points	Distance "
1	0.7
2	2.3
3	4.0
4	6.0
5	8.5
6	12.1
7	21.9
8	25.5
9	28.0
10	30.0
11	31.7
12	33.3

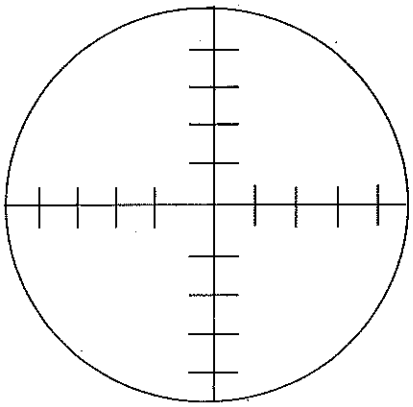
Figure No. 14

Site: **Elpo Oven 1 RTO Outlet** **GM Flint** **Flint, Michigan**	**Sampling Dates:** **November 3, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

BTEC Inc.

diameter = 33.75"





Not to Scale

Points	Distance "
1	1.1
2	3.5
3	6.5
4	10.9
5	22.8
6	27.2
7	30.2
8	32.7

Figure No. 15

Site:	Sampling Date:	BT Environmental Consulting, Inc.
Elpo Oven 2 RTO Outlet GM Flint Flint, Michigan	November 3, 2016	4949 Fernlee Royal Oak, Michigan