Derenzo and Associates, Inc.
Environmental Consultants

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AIR QUALITY DIV.

EMISSION TEST REPORT

Report Title RESULTS FOR THE VERIFICATION OF VOLATILE ORGANIC COMPOUND CAPTURE EFFICIENCY FOR COATING PROCESSES

Report Date June 25, 2015

Test Date June 24, 2015

Facility Information	
Name	Pioneer Metal Finishing Industrial Hwy facility
Street Address	24600 Industrial Hwy.
City, County	Warren, Macomb
Phone	(586) 759-3559

Facility Permit Information	
Renewable Operating Permit:	MI-ROP-N5747-2011b

Testing Contractor	
Company Mailing Address	Derenzo and Associates, Inc. 39395 Schoolcraft Road Livonia, Michigan 48150
Phone	(734) 464-3880
Project No.	1501104

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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 Pioneer Metal Finishing Industrial Hwy County Macomb

Source Address 24600 Industrial Hwy City Warren

AQD Source ID (SRN) N5747 ROP No. N5747-2011b ROP Section No. _____

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 _____ To _____

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

VOC capture efficiency test report for metal parts coating lines.
The testing was performed in accordance with the test notification and the
processes were operated at the maximum routine operating conditions for the facility.

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

Eric Rosenberg (authorized representative)	Warren Campus Manager	586-480-1712
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official Date

* Photocopy this form as needed.

EQP 5736 (Rev 11-04)

EMISSION TEST REPORT

RESULTS FOR THE VERIFICATION OF
VOLATILE ORGANIC COMPOUND CAPTURE EFFICIENCY FOR
COATING PROCESSES

PIONEER METAL FINISHING
WARREN, MICHIGAN

1.0 INTRODUCTION

Pioneer Metal Finishing (Pioneer Metal) operates a metal parts coating facility located at 24600 Industrial Hwy., Warren, Macomb County, Michigan (Industrial Hwy facility, State Registration No. N5747). Coating is transferred metal parts using dip and spray application and dried or cured in coating ovens. The coating lines are equipped with a process air collection system that exhausts captured volatile organic compounds (VOC) to a regenerative thermal oxidizer (RTO) for VOC reduction.

Pioneer Metal received a State of Michigan Permit to Install (PTI No. 2-03L issued January 31, 2014) from the Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) that specifies capture and control system requirements for its coating lines. The PTI requires Pioneer Metal to demonstrate VOC capture efficiency of its three (3) large dip-spin coating lines using the smoke tube test method. At the same time, the facility is required to verify capture efficiency of the three chain-on-edge coating lines (COE1, 2 and 3), a small dip-spin line (Model 10), and a stand-alone batch oven. The modified PTI No. 2-03M was incorporated into the facility's operating permit in February 2015 with the issuance of MI-ROP-N5747-2011b.

Chain-on-edge No. 1 (COE1) has been completely removed from the facility, therefore VOC capture efficiency tests were not performed on this coating line.

A Test Plan for the capture efficiency demonstration was originally submitted to the MDEQ-AQD in May 2014. Following approval of the procedures specified in the Test Notification, capture efficiency testing was performed in June and December 2014. The capture efficiency demonstration is required to be performed semi-annually and will be repeated in December 2015 by Derenzo and Associates, Inc. representatives. The project was coordinated by Eric Rosenberg, Warren Campus Manager for Pioneer Metal. The MDEQ-AQD was notified in May 2015 of the planned capture efficiency testing. Mr. Iranna Konanahalii (MDEQ-AQD) was on-site to observe the June 24, 2015 test event.

Questions regarding this emission test report should be directed to:

Tyler J. Wilson
Environmental Consultant
Derenzo and Associates, Inc.
39395 Schoolcraft Road
Livonia, MI 48150
(734) 464-3880

Mr. Eric Rosenberg
Warren Campus Manager
Pioneer Metal Finishing
24600 Industrial Hwy.
Warren, MI 48089
(586) 480-1712

1.1 Report Certification

A Renewable Operating Permit Report Certification Form (EQP 5736) signed by the Pioneer Metal Responsible Official (or the Responsible Official's authorized representative) accompanies this report.

This test report was prepared by Derenzo, Associates, Inc. based on the field sampling data collected by Derenzo and Associates, Inc. I certify that the testing was conducted in accordance with the approved test plan unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

Report Prepared By:

Tyler J. Wilson
Environmental Consultant

2.0 SUMMARY OF RESULTS

VOC capture efficiency for three (3) large dip-spin coating lines was evaluated using the smoke tube test method; observation of the airflow direction of visual smoke at enclosure openings. Smoke observations were also performed for the oven associated with one chain-on-edge coating line (COE2) and a stand-alone batch oven. COE1 has been completely removed from the facility.

Capture efficiency for the spray booths associated with COE2 and COE3 and a small dip-spin line (Model 10) was verified using differential pressure measurements.

The results of the capture efficiency evaluation are presented in Table 2.1 below. All enclosures are connected to the VOC collection system and exhibited inward flow as indicated by the observation of air current smoke. The average measured differential pressure for all enclosures classified as permanent total enclosures (PTE) satisfied the PTE criteria of maintaining a differential pressure (vacuum) of at least 0.007 inches of water as compared to the surrounding environment.

Table 2.1 Summary of capture efficiency test results for each coating line

Emission Unit Coating Process	Smoke Tube Verified Inward Flow (Y/N)	Differential Pressure (inches w.c.)
EU-LINE1-MODEL24	Y	NA
EU-LINE4-COE2 (Primer Booth)	Y	-0.022
EU-LINE4-COE2 (Topcoat Booth)	Y	-0.013
EU-LINE4-COE2 (Oven)	Y	NA
EU-LINE5-COE3	Y	-0.020
EU-LINE6-MODEL10	Y	-0.009
EU-LINE7-MODEL25	Y	NA
EULINE13-MODEL26	Y	NA
EUBATCHOVEN	Y	NA

NA These systems are classified as non-fugitive enclosures. Differential pressure measurements not required.

3.0 SOURCE DESCRIPTION

3.1 Coating Line Processes

Pioneer Metal operates a number of spay and dip coating processes:

- Three (3) large dip-spin coating lines that are identified as EU-LINE1-MODEL24, EU-LINE7-MODEL25, and EU-LINE13-MODEL26 in the PTI.

- A small dip-spin coating line (EU-LINE6-MODEL) that operates as a permanent total enclosure (PTE).

- One (1) chain-on-edge (COE) coating line, identified as EU-LINE4-COE2 in the PTI, that consist of a continuously moving chain, two spray booths and a curing oven. The booths operate as PTEs; the curing oven operates as a non-fugitive enclosure.

- A Sprimag COE spray coating line, identified as EU-LINE5-COE3 in the PTI. The Sprimag line is an enclosed conveyorized coating line used for coating the interior surface of metal parts. The line is operated as a PTE from the coating section through the attached curing oven.

- A batch oven (identified as EUBATCHOVEN in the PTI) that is a stand-alone enclosed oven. Parts are loaded into the oven in bulk on carts, containers, or pallets and the oven is sealed (door secured closed) while in operation.

- Four (4) Tumble Spray coating lines. In these lines the parts are tumbled within a sealed drum while the coating is spray applied with an HVLP applicator. During operation the tumble spray cover is in the closed position and the opening is sealed by the vacuum caused by the evacuation fan. There are no natural draft openings while the unit is in operation.

3.2 Type of Raw Materials Used

The coatings applied by the processes are either for corrosion resistance, adhesion, or surface priming. The high performance coatings are primarily solvent based, though some waterborne formulations are used. These coatings are received from the manufacturer and diluted (reduced) with organic solvents or water prior to their application.

3.3 Emission Control System Description

Solvent laden air from the individual processes is combined in a mixing plenum near the center of the facility and exhausted to the RTO emissions control system.

The RTO system consists of a variable frequency drive (VFD) fan, three (3) energy recovery columns packed with ceramic heat exchange media and a high-temperature combustion chamber containing natural gas-fired burners. The VFD fan maintains an appropriate vacuum within the process air collection system and directs the collected air to the RTO unit where it is oxidized (combusted) at high temperatures.

The RTO effluent gas is released to atmosphere via a rectangular vertical exhaust stack.

3.4 Process Operating Conditions During the Compliance Testing

During the capture efficiency evaluation, the coating processes operated normally. The chain-on-edge 1 coating line (EU-LINE3-COE1) has been completely removed from the facility, and Tumble Spray No. 4 is currently inoperable and undergoing maintenance. All other lines applied solvent-based coating at typical application rates.

The RTO inlet fan was operated normally to maintain an appropriate vacuum within the main air collection header. The fan operated at 65.6 Hertz (Hz) as indicated by the VFD output display, which resulted in a captured gas volumetric flowrate was 20,849 actual cubic feet per minute (acfm) based on airflow measurements performed at the inlet to the RTO fan.

The RTO combustion chamber temperature was set at 1,500°F and ranged between 1500 and 1520 °F during the testing as observed by the test crew (based on intermittent observations, not continuous monitoring records).

A summary of the VOC capture and emission control system operating parameters during the test event is presented in Table 3.1 below.

Attachment 1 provides RTO operating records and flowrate measurements for the capture efficiency evaluation period.

Table 3.1 VOC capture and emission control system operating parameters

Operating parameter	Value	
Average fan speed	65.6	Hz
Average RTO inlet vacuum	-1.2	in wc
Avg RTO inlet flowrate, actual	20,849	acfm
Avg RTO inlet flowrate, standard	18,227	scfm
Chamber temperature setpoint	1,500	°F
Chamber temp (min.)	1,500	°F
Chamber temp (max.)	1,520	°F

4.0 SAMPLING AND ANALYTICAL PROCEDURES

A description of the sampling and analytical procedures is provided in the previous Test Plan dated May 21, 2014, which was approved by the MDEQ-AQD. Following approval of the procedures specified in the Test Plan, a Test Notification was sent to the MDEQ-AQD for this test event and capture efficiency testing was performed on June 24, 2015. The capture efficiency demonstration is required to be performed semi-annually and will be repeated in December 2015.

This section provides a summary of the capture efficiency verification procedures.

4.1 Smoke Tube Air Current Observations for Non-Fugitive Enclosures

Ventilation or air current smoke tubes were used to observe the direction of air flow for the air collection systems associated with the three (3) large dip-spin lines (Model 24, 25 and 26), chain on edge oven (COE2), and batch oven.

The smoke tube was placed in front of each natural draft opening, an adequate amount of smoke was generated manually using the squeeze bulb, and the direction of air flow (into or out of the natural draft opening) was noted. All natural draft openings for each process were tested and recorded on a data sheet.

Attachment 2 provides field data sheets that were used to identify natural draft openings and record the direction of airflow.

4.2 Differential Pressure Measurements for Permanent Total Enclosures

Enclosure differential pressure measurements for the chain-on-edge coating booths (COE2), Sprimag Booth/Oven and the Model#10 dip-spin line was performed using a Heise® PTE-1 Handheld Pressure Calibrator.

Prior to use, the pressure measurement instrument performs a self zero and calibration procedure. To measure enclosure differential pressure, the low-pressure side of the differential pressure measurement cell was connected by flexible tubing to a port installed on the enclosure wall (or inserted into the enclosure if a measurement port doesn't exist) and the high-pressure side of the measurement cell was open to the surrounding environment. Five (5) individual differential pressure (inches water column) readings were recorded using the 'hold' function on the instrument. The average recorded differential pressure was calculated for each enclosure.

Attachment 3 provides field data sheets that were used to record differential pressure readings.

4.3 Captured Gas Flowrate to the RTO

The captured gas volumetric flowrate was measured at the inlet to the RTO near the beginning and end of the capture efficiency evaluation period. The sampling location for the combined coating line exhaust (RTO inlet) is in the 30-inch diameter duct exterior to the facility wall.

Velocity traverse locations for the sampling points were determined in accordance with USEPA Method 1. The exhaust gas velocity pressure and temperature were measured at each sampling location in accordance with USEPA Method 2. An S-type Pitot tube connected to a red-oil manometer was used to determine velocity pressure and a K-type thermocouple mounted to the Pitot tube was used for temperature measurements. The Pitot tube and connective tubing were leak-checked to verify the integrity of the measurement system. The gas molecular weight was verified using a Fyrite® combustion gas analyzer. A summary of the volumetric airflow measurement methods is summarized below:

Method 1	Velocity and sampling locations were selected based on physical duct measurements in accordance with USEPA Method 1.
Method 2	Gas velocity pressure were determined using a Type-S Pitot tube connected to a red oil incline manometer. Exhaust gas temperature will be measured using a K-type thermocouple connected to the Pitot tube.
Method 3	RTO inlet gas O_2 and CO_2 content were determined by Fyrite® combustion gas analyzer.
Method 4	RTO inlet gas moisture was determined by wet bulb/dry bulb temperature measurements.

The velocity measurement field data sheets and flowrate calculations are provided in Attachment 1 with the RTO operating data.

5.0 TEST RESULTS AND DISCUSSION

5.1 Evaluation of Test Results

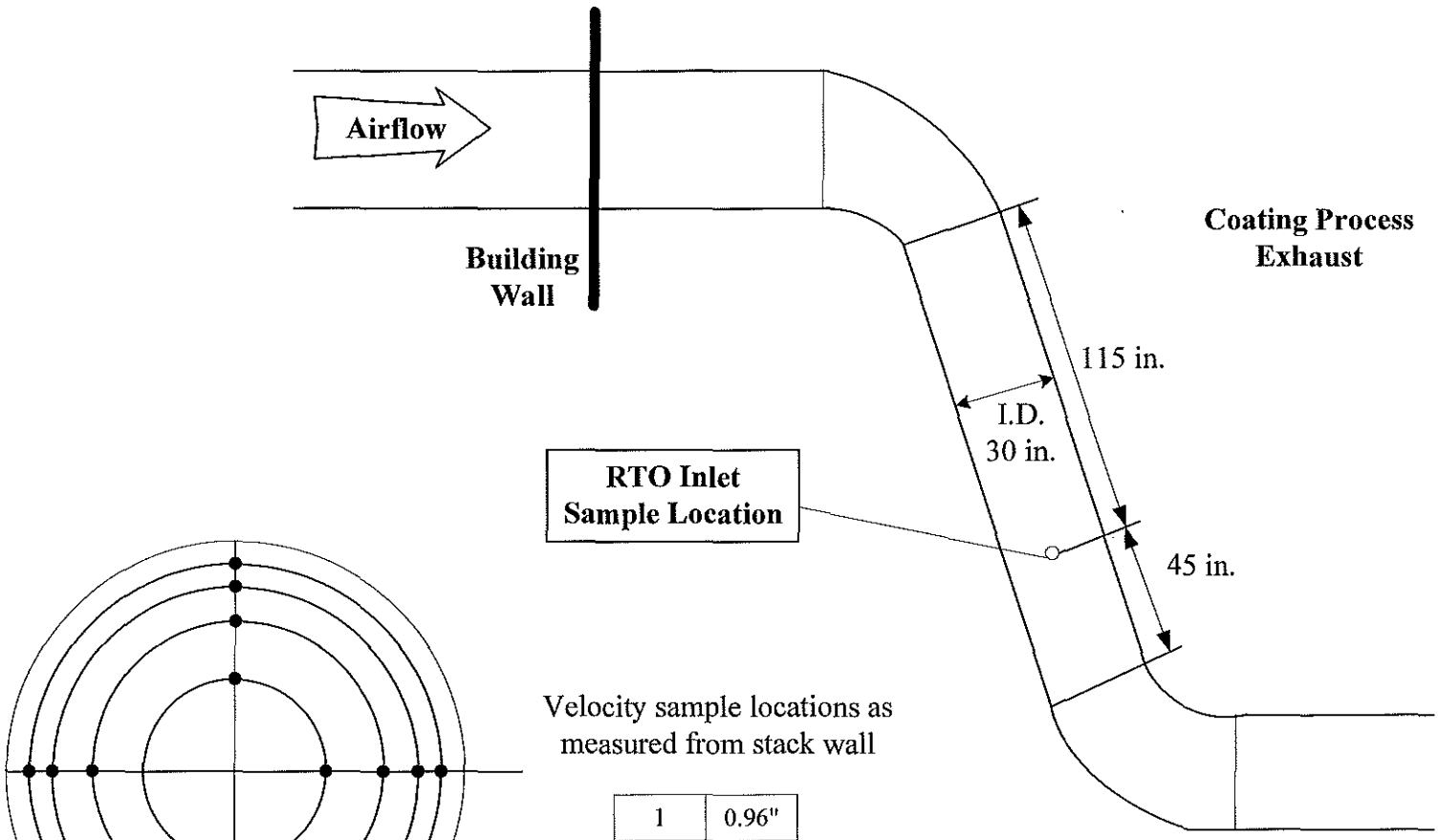
The results of the capture efficiency evaluation are presented in Table 2.1. All enclosures are connected to the VOC collection system and exhibited inward flow as indicated by the observation of air current smoke.

The average measured differential pressure for all enclosures classified as permanent total enclosures exceeded -0.007 inches of water (the PTE criteria).

The captured gas (RTO inlet) flowrate measured on June 24, 2015 was comparable to that measured on December 29, 2014 (18,227scfm compared to 19,239 scfm).

5.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing was performed in accordance with the Test Notification dated May 14, 2015. During the testing program the coating lines were operated at normal operating conditions, at or near maximum capacity and satisfied the parameters specified in the MDEQ-AQD test plan approval letter.



Velocity sample locations as measured from stack wall

1	0.96"
2	3.15"
3	5.82"
4	9.69"
5	20.31"
6	24.18"
7	26.85"
8	29.04"

8-20-14	**Pioneer Metal Fi** **RTO Inlet Sampl**	
	Scale None	Sh 1

ATTACHMENT 3

ENCLOSURE DIFFERENTIAL PRESSURE DATA SHEETS

RTO Operating Data

Average fan speed	65.6	Hz
Average RTO inlet vacuum	-1.2	in wc
Avg RTO inlet flowrate, actual	20,849	acfm
Avg RTO inlet flowrate, standard	18,227	scfm
Chamber temp (min.)	1500	°F
Chamber temp (max.)	1520	°F

Differential Pressure Readings

LINE4-COE2		LINE5-COE3	LINE6-MODEL10	
Primer Booth	Topcoat Booth	Sprimag	Model 10	
10:17	10:20	10:21	10:26	
-0.023	-0.013	-0.019	-0.008	
-0.019	-0.013	-0.020	-0.009	
-0.022	-0.012	-0.018	-0.009	
-0.023	-0.013	-0.022	-0.008	
-0.021	-0.015	-0.020	-0.009	
-0.022	**-0.013**	**-0.020**	**-0.009**	**Average**