



June 27, 2022

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY  
Air Quality Division  
Southeast Michigan District Office  
27700 Donald Ct.  
Warren, MI 48092-2793

Subject: Pioneer Metal Finishing Industrial Hwy  
Test Report for the verification of VOC capture efficiency  
Permit to Install No. MI-PTI-2-03M

Pioneer Metal Finishing (PMF) is submitting the enclosed Test Report for the verification of volatile organic compound (VOC) capture efficiency for coating processes at its Industrial Highway facility. The testing was performed on June 27, 2022, in accordance with the Testing / Sampling conditions for flexible emission group FGLINES specified in Permit to Install No. MI-PTI-2-03M.

The VOC capture systems (enclosures) for each coating line satisfied the permit requirements.

A signed Report Certification form (EQP 5736) accompanies this submittal. Contact information is provided in the enclosed document should you have any questions or require additional information.

Sincerely,

PIONEER METAL FINISHING

Justin Engel  
EHS Coordinator

c: AQD Technical Programs Unit

Enclosure

N5747-test-20220627





MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY  
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 Environment, Great Lakes, and Energy, Air Quality Division upon request.

Source Name Pioneer Metal Finishing Industrial Highway County Macomb

Source Address 24600 Industrial Hwy City Warren

AQD Source ID (SRN) N5747 ROP No. \_\_\_\_\_ 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 previously  
submitted test plan, 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

Justin Engel (authorized representative)	EHS Coordinator	586-480-1704
Name of Responsible Official (print or type)	Title	Phone Number

  
 Signature of Responsible Official

6-28-22  
 Date

\* Photocopy this form as needed.



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AIR QUALITY DIVISION

**EMISSION TEST REPORT  
FOR THE  
VERIFICATION OF VOC CAPTURE EFFICIENCY  
FOR  
COATING PROCESSES**

**Prepared for:  
Pioneer Metal Finishing  
Industrial Highway  
SRN N5747**

**ICT Project No.: 2200025  
June 27, 2022**



## Report Certification

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**EMISSION TEST REPORT  
FOR THE  
VERIFICATION OF VOC CAPTURE EFFICIENCY  
FOR  
COATING PROCESSES**

**Pioneer Metal Finishing  
Industrial Highway  
Warren, MI**

The material and data in this document were prepared under the supervision and direction of the undersigned.

Impact Compliance & Testing, Inc.



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Tyler J. Wilson  
Senior Project Manager

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## 1.0 Introduction

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Pioneer Metal Finishing (Pioneer Metal) operates a metal parts coating facility located at 24600 Industrial Hwy., Warren, Macomb County, Michigan (Industrial Highway 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 Permit to Install (PTI) No. 2-03M (issued February 6, 2015) from the State of Michigan Department of Environment, Great Lakes, and Energy - Air Quality Division (EGLE-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 two (2) chain-on-edge coating lines (COE 2 and 3) and a stand-alone batch oven.

A Test Plan for the capture efficiency demonstration was originally submitted to EGLE-AQD in May 2014. The capture efficiency demonstration is required to be performed semi-annually and has been performed every six (6) months starting in June 2014. This report is for the test event performed June 27, 2022, by Impact Compliance & Testing, Inc. (ICT) representatives.

The project was coordinated by Justin Engel, EHS Coordinator for Pioneer Metal. EGLE-AQD was notified on May 26, 2022, of the planned capture efficiency testing event.

Questions regarding this Emission Test Report should be directed to:

Tyler J. Wilson  
Senior Project Manager  
Impact Compliance & Testing, Inc.  
37660 Hills Tech Drive  
Farmington Hills, MI  
(734) 357-8046

Mr. Justin Engel  
EHS Coordinator  
Pioneer Metal Finishing  
24600 Industrial Hwy.  
Warren, MI 48089  
(586) 480-1704

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## 2.0 Summary of Test 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 ovens associated with chain-on-edge coating line 2 (COE2) and chain-on-edge coating line 3 (COE3).

Capture efficiency for the spray booths associated with COE2 and COE3 was also 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 chain on edge (COE) coating line enclosures satisfied the permanent total enclosure (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 <sup>1</sup> (inches w.c.)
EU-LINE1-MODEL24	Y	NA
EU-LINE4-COE2 (Primer Booth)	Y	-0.024
EU-LINE4-COE2 (Topcoat Booth)	Y	-0.044
EU-LINE4-COE2 (Oven)	Y	NA
EU-LINE5-COE3	Y	-0.5*
EU-LINE6-MODEL10 <sup>2</sup>	NA	NA
EU-LINE7-MODEL25	Y	NA
EU-LINE13-MODEL26	Y	NA
EUBATCHOVEN <sup>3</sup>	NA	NA

NA Measurements were not required or not obtained.

1. Requirement is to maintain a differential pressure of at least 0.007 inches of w.c. (-0.007).

2. EU-LINE6-MODEL10 is no longer operating.

3. EUBATCHOVEN is no longer operating.

\* Differential pressure monitor was measuring overrange for the COE3 Sprimag, so -0.5 in. H<sub>2</sub>O was recorded as a worst-case-scenario.

## 3.0 Source and Sampling Location Description

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### 3.1 Coating Line Processes

Pioneer Metal operates a number of spray 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.
- 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 conveyerized 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.
- Two (2) 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 on June 27, 2022, the coating processes operated normally. Tumble Spray No. 1, the Model 10, and the batch oven were not evaluated for VOC capture efficiency because these processes are no longer operating. Tumble Spray Nos. 2 and 3 operated normally throughout the test event. Tumble Spray No. 4 has been removed from the facility completely. 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 60.0 Hertz (Hz) as indicated by the VFD output display, which resulted in a captured gas volumetric flowrate of 16,587 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 1,487°F and 1,491°F during the testing as observed by the test crew on June 27, 2022 (based on intermittent observations, not continuous monitoring records).

A summary of the VOC capture and emission control system operating parameters during the test events are 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	
Average fan speed	60.0 Hz
Average RTO inlet vacuum	-0.2 in wc
Avg RTO inlet flowrate, actual	16,587 acfm
Avg RTO inlet flowrate, standard	15,830 scfm
Chamber temperature setpoint	1,500 °F
Chamber temp (min.)	1,487 °F
Chamber temp (max.)	1,491 °F

## 4.0 Sampling and Analytical Procedures

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A description of the sampling and analytical procedures is provided in the previous Test Plan dated May 21, 2014, which was submitted to and approved by EGLE-AQD. Following approval of the procedures specified in the Test Plan, a Test Notification was sent to the EGLE-AQD for this test event and capture efficiency testing was performed on June 27, 2022. The capture efficiency demonstration is required to be performed semi-annually and will be repeated in December 2022.

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), and two (2) chain on edge ovens (COE2 and COE3).

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 airflow (into or out of the natural draft opening) was noted. All the 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) and Sprimag Booth/Oven (COE3) 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 on June 27, 2022. 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 onsite, prior to the test event.

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 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

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### 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 27, 2022, was comparable to that measured on December 21, 2021 (15,830 scfm compared to 16,004 scfm).

### 5.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing was performed in accordance with the Test Notification dated October 14, 2021, and the previously submitted Test Plan. 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 EGLE-AQD Test Plan Approval Letter.

EU-LINE6-MODEL10 and EUBATCHOVEN were not evaluated for VOC capture efficiency because they are no longer operating. Pioneer Metal-Industrial Highway representatives have no plans to operate EU-LINE6-MODEL10 or EUBATCHOVEN in the future.

**ATTACHMENT 1**

**RTO OPERATING RECORDS AND  
FLOWRATE MEASUREMENTS**