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. 2-03M issued February 6, 2015) 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 (COE 2 and 3), a small dip-spin line (Model 10), and a stand-alone batch oven.

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 2014, December 2014, June 2015, December 2015, and July 2016. The capture efficiency demonstration is required to be performed semi-annually and will be repeated in December 2016 by Derenzo Environmental Services (DES) representatives. The project was coordinated by Jay Cronin, Process Control Manager for Pioneer Metal. The MDEQ-AQD was notified in April 2016 of the planned capture efficiency testing and June 2016 with the reschedule test date of July 1, 2016.

Questions regarding this emission test report should be directed to:

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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 Environmental Services based on the field sampling data collected by Derenzo Environmental Services. 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
Livonia Office Supervisor
Derenzo Environmental Services

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.

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	-0.023
EU-LINE4-COE2 (Topcoat Booth)	Y	-0.013
EU-LINE4-COE2 (Oven)	Y	NA
EU-LINE5-COE3	Y	-0.020
EU-LINE6-MODEL10	Y	-0.012
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.

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. Tumble Spray No. 3 was not operating during the third observation of the tumble spray lines following completion of a coating cycle. 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 was 20,259 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 1503°F and 1516°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	60.0	Hz
Average RTO inlet vacuum	-1.2	in wc
Avg RTO inlet flowrate, actual	20.259	acfm
Avg RTO inlet flowrate, standard	17,469	scfm
Chamber temperature setpoint	1,500	°F
Chamber temp (min.)	1,503	°F
Chamber temp (max.)	1,516	°F