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AIR QUALITY DIV.

Oven Solvent Loading
Test Report

General Motors, LLC
Detroit-Hamtramck Assembly
2500 East General Motors Boulevard
Detroit, MI 48211

May 21, 2015



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 GM Detroit/Hamtramck Assembly County Wayne
Source Address 2500 E. GM Blvd. City Detroit
AQD Source ID (SRN) M4199 ROP No. MI-ROP-M4199-2010 ROP Section No. 1

Please check the appropriate box(es):

Annual Compliance Certification (Pursuant to Rule 213(4)(c))
Reporting period (provide inclusive dates): From _____ To _____
 1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.
 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))
Reporting period (provide inclusive dates): From _____ To _____
 1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.
 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

Other Report Certification
Reporting period (provide inclusive dates): From _____ To _____
Additional monitoring reports or other applicable documents required by the ROP are attached as described:
Test Report dated (May 21, 2015) for EUPRIMERSURFACER and EUTOPCOATSYSTEM testing the
ovn solvent loading of primer, topcoat and clearcoat systems.

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

Gary L. West Plant Manager 313-972-6020
Name of Responsible Official (print or type) Title Phone Number
Gary L. West Signature of Responsible Official 5/21/2015 Date

* Photocopy this form as needed.

1. Introduction

General Motors Detroit Hamtramck Assembly (GM) retained PPG Industries to conduct Oven Solvent Loading for the GM Detroit Hamtramck facility located at 2500 E. General Motors Blvd., Detroit, MI 48211, MI-ROP-M4199-2010. Oven Solvent Loading Testing of the Primer Surfacer (dated March 26, 2015), topcoat (base solid, clearcoat – dated March 26, 2015) and base metallic (dated April 23, 2015). Testing included: Oven exhaust control device VOC loading rates (Oven Solvent Loading).

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 plan in the format suggested by the aforementioned document.

1.a Identification, Location, and Dates of Test

Oven Solvent Loading Testing of the Primer Surfacer was conducted March 26, 2015, topcoat (base solid, clearcoat) was conducted March 26, 2015, and base metallic was conducted April 23, 2015. Testing was conducted at the PPG facility in Allison Park, PA.

1.b Purpose of Test

The test was conducted to demonstrate compliance with requirements of the facility’s Renewable Operating Permit, MI-ROP-M4199-2010, EUPRIMERSURFACER and EUTUPCOATSYSTEM.

1.c Source Description

The GM facility is an automotive assembly center. The facility utilizes numerous raw materials in the process of automotive assembly, varying from imported parts and products to pre-assembled automotive supplies. The materials utilized that are influential for the proposed emissions test program are paints that are cured in curing ovens. The facility is restricted in the number of finished products produced as being 78.5 fully assembled vehicles per hour and not more than 337,500 assemblies per year.

1.d Test Program Contacts

The contact for the source and test report is:

Ms. Jessica Jeffery
Senior Environmental Engineer
General Motors LLC
Detroit-Hamtramck Assembly
2500 E. GM Blvd.
Detroit, MI 48211
(313) 215-8203

Ms. Jennifer Tegen
Senior Environmental Engineer
General Motors LLC
GECS Facility Air Compliance & Permit
Warren Tech Ctr. Engineering Center
Warren, MI 48090
(810) 706-1319

2. Summary of Results

2.a Operating Data

The operating parameters of the thermal oxidizers are as follows:

Temperature – minimum 1300 degrees Fahrenheit
Minimum of 0.5 second gas retention time
90% destruction efficiency

2.b Applicable Permit

The applicable permit number is MI-ROP-M4199-2010. The emission unit ID is EUPRIMERSURFACER and EUTOPCOATSYSTEM.

2.c Results

The attached report provided as Appendix A provides a summary of results.

3. Source Description

3.a Process Description

EUTOPCOATSYSTEM - A topcoat spray booth followed by a curing oven. There is a heated flash-off area located between the basecoat portion of the booth and the clearcoat portion of the booth. The waterborne basecoat is applied automatically with air atomized or electrostatic spray guns. The solventborne clearcoat is applied automatically with air atomized or electrostatic spray guns. The topcoat booth is equipped with a downdraft water wash system to control particulate emissions from paint overspray. VOC emissions from the curing ovens are controlled by a thermal oxidizer.

EUPRIMERSURFACER - A guidecoat (primer surfacer) spray booth followed by a curing oven. The solventborne primersurfacer is applied automatically with air atomized or electrostatic spray guns. The primer surfacer booth is equipped with a downdraft water wash system to control particulate emissions from paint overspray. VOC emissions from the curing ovens are controlled by a thermal oxidizer.

Oven solvent loading test results are used to calculate paint shop VOC emissions.

3.b Type of Raw and Finished Materials

The following materials were used in the testing program:

- HP78-224E: Gray solventborne primerSect
- EVH8555: Black waterborne basecoat
- EVH636R: Switchblade Silver Metallic waterborne basecoat
- TKS1050A: 2K Clearcoat Part A
- TKS1017B: 2K Clearcoat Part B

3.c Capacity of the Process

The rated volatile organic compound (VOC) destruction efficiency is 90%.

3.d Process Instrumentation

Process instrumentation is not associated with this testing.

4. Sampling and Analytical Procedures

Oven Solvent Loading

Primer Surfacer (Gray primer - HP78-224E),

Filmbuild : 0.8 - 1.4 mils

W0 = weight of bare panel

Apply primer surfacer

W1 = Weight of panel + primer surfacer (immediately after spraying as practical)

Flash for 5 minutes at 85°F (ambient)

W2 = Weight of primed panel after flash

Bake for 25 minutes @ 265°F

Let panel cool

W3 = Weight of cooled, cured primed panel

Waterborne Basecoat Body System (Switchblade Silver Metallic, EVH636R & Black, EVH8555).

Filmbuild for both basecoats: 0.5-0.7 mils.

W0 = weight of bare panel

Apply basecoat (Switchblade Silver Metallic, EVH636R, filmbuild: 0.5-0.7 mils and Black, EVH8555, filmbuild: 0.5 - 0.7 mils)

W1 = Weight of panel + basecoat (immediately after spraying as practical)

Flash for 1 minute at 88 °F (1st pass to 2nd pass of BC) + 20'' at 88 °F

W2 = Weight of basecoated panel after flash

Dehydrate for 6'45'' at 160°F

W3 = Weight of basecoated panel after heated flash

Flash for 25'' @ 88 °F + 1' @ 88F (from 1st CC pass to 2nd) + 4'25'' @ 88°F (CC flash)

W4 = Weight of basecoated panel after flash

Determine the amount of water in the film by spraying extra panels and analyze using Karl Fisher or GC
Bake for 25 minutes at 250°F
Let panel cool
W5 = Weight of cooled, cured basecoated panel

Clearcoat Body System (TKS 1050, filmbuild: 1.8-2.8 mils)

W0 = Weight of bare panel
W1 = Weight of panel + clearcoat (immediately after spraying as practical)
Flash for 25" @ 88 °F + 1' @ 88F (from 1st CC pass to 2nd) + 4'25" @ 88°F (CC flash)
W2 = Weight of clearcoated panel after flash
Bake for 25 minutes at 250F
Let panel cool

5. Test Results

5.a-b Test Results Summary

A summary is presented in the attached reports provided as Appendix A. Results from this test program will be used to calculate associated emissions from the respective sources.

5.c Sampling Procedure Variation

At a very elementary level, paint coatings consists of binders, pigments and fillers, solvents, water, and additives. The primary purpose of the water and solvents is to act as a carrier for the paint solids which ultimately make-up the coating film and color on the vehicle. When developing paint, it is critical that certain solvents are selected based on physical and chemical properties, so that as they evaporate, a quality paint job with no defects can be produced. Specifically, for water based coatings, where the solvents are primarily water and glycol ethers; heat must be applied to the coating film to volatilize these solvents. In the case of automotive coatings, to achieve world class finish, paint suppliers develop coatings so that at each phase of the process a certain level of solids (i.e. non-volatile) remains in the coating film; this ensures uniformity and is critical for a consistent coating film. The data from the March 26, 2015 shows a majority of volatilization occurring within the ambient zone, which does not represent reality in the process. In fact, since the solvents (i.e. water and glycol ether) are primarily released when they reach their volatilization temperature; this occurs mainly in the heated flash zone and in the oven. An additional factor impacting the March 26, 2015 test results was the additional time it took to remove the base metallic panels from the fixtures, obtain weights and transfer into the oven for heated flash as compared to April 23, 2015, which aligns with the test protocol. So, in comparing the data from the two test; the test results from April 23, 2015 more accurately represent emissions as they would occur from the process (i.e. more emissions from heated flash than the ambient zone).

5.d Process or Control Device Upsets

Not applicable for this testing.

5.e Control Device Maintenance

Not applicable for this testing.

5.f Re-test

This was not a re-test.

5.g Quality Assurance Audit Samples

Not applicable for this testing.

5.h Calibration Sheets

Certification of scale accuracy documentation is provided as Appendix B.

5.i Sample calculations

Not applicable for this testing.

5.j Field Data Sheets

Included in attached reports provided as Appendix A.

5.k Laboratory Data

Included in attached reports provided as Appendix A.