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## FCA US LLC

WARREN, MICHIGAN

### WARREN TRUCK ASSEMBLY PLANT (WTAP) EAST PAINT SHOP: EU-COLOR-ONE THERMAL OXIDIZER PARTICULATE MATTER COMPLIANCE TEST

RWDI #2201515

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## EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Warren Truck Assembly Plant (WTAP) located 21500 Mound Road in Warren, Michigan. WTAP operates an automobile assembly plant that includes the West Paint Shop which produces the Jeep Wagoneer and an East Paint Shop which produces the Classic Ram 1500 series truck. Testing was executed as required by Permit to Install (PTI) 13-19B (copy of Source Testing Plan and Michigan Department of Environment, Great Lakes, and Energy (EGLE) response letter is attached in **Appendix A**).

The approved Source Testing Plan covered the following seven (7) sources:

- EUSPOTREPAIREAST - PM emissions from SVDS\_SPOTEAST observation zone
- The balance of the sources are in the FGFACILITY Flexible Group
  - EU-COLOR-ONE Basecoat Observation 1 - PM/PM10/PM2.5 emissions from SVBC1OBEAST1
  - EU-COLOR-ONE Basecoat Observation 2 - PM/PM10/PM2.5 emissions from SVBC1OBEAST2
  - EU-COLOR-ONE Basecoat Observation 3 - PM/PM10/PM2.5 emissions from SVBC1OBEAST3
  - EU-COLOR-ONE Clearcoat Observation 1 - PM/PM10/PM2.5 emissions from SVCC1OBEAST1
  - EU-COLOR-ONE Clearcoat Observation 2 - PM/PM10/PM2.5 emissions from SVCC1OBEAST2
  - EU-COLOR-ONE Topcoat Oven Thermal Oxidizer - PM emissions from SVEXC1INC

As communicated between FCA and the EGLE, the program was split and this report only includes EU-COLOR-ONE Topcoat Oven Thermal Oxidizer - PM emissions from SVEXC1INC. All other sources were completed in June of 2022 and will be reported to EGLE under separate cover by the 60 day reporting period outlined in the PTI.

Ms. Regina Angellotti witnessed the testing on May 18<sup>th</sup>, 2022.

**Executive Table I:** EU-COLOR-ONE Topcoat Oven Thermal Oxidizer – PM Results

Parameter	Emission Rate			
	Test 1	Test 2	Test 3	Average
Particulate Matter (PM/PM <sub>10</sub> /PM <sub>2.5</sub> ) (lb/hr)	0.051	0.074	0.042	0.056
Particulate Matter (PM/PM <sub>10</sub> /PM <sub>2.5</sub> ) (lb/1000 lb of exhaust air (wet))	0.0013	0.0019	0.0011	0.0014



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# 1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Warren Truck Assembly Plant (WTAP) located 21500 Mound Road in Warren, Michigan. WTAP operates an automobile assembly plant that includes the West Paint Shop which produces the Jeep Wagoneer and an East Paint Shop which produces the Classic Ram 1500 series truck. Testing was executed as required by Permit to Install (PTI) 13-19B. A copy of the Source Testing Plan and EGLE Approval Letter is provided in **Appendix A**.

The approved Source Testing Plan covered the following seven (7) sources:

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  - EU-COLOR-ONE Basecoat Observation 2 - PM/PM10/PM2.5 emissions from SVBC1OBEAST2
  - EU-COLOR-ONE Basecoat Observation 3 - PM/PM10/PM2.5 emissions from SVBC1OBEAST3
  - EU-COLOR-ONE Clearcoat Observation 1 - PM/PM10/PM2.5 emissions from SVCC1OBEAST1
  - EU-COLOR-ONE Clearcoat Observation 2 - PM/PM10/PM2.5 emissions from SVCC1OBEAST2
  - EU-COLOR-ONE Topcoat Oven Thermal Oxidizer - PM emissions from SVEXC1INC

As communicated between FCA and the State of Michigan Environment, Great Lakes, and Energy (EGLE), the program was split and this report only includes EU-COLOR-ONE Topcoat Oven Thermal Oxidizer - PM emissions from SVEXC1INC. All other sources were completed in June of 2022 and will be reported to EGLE under separate cover by the 60 day reporting period outlined in the PTI. Ms. Regina Angellotti witnessed the testing on May 18<sup>th</sup>, 2022.

WTAP recorded the production rate of vehicles processed during each particulate test for EU-COLOR-ONE Topcoat Oven Thermal Oxidizer. Production data can be found in **Appendix G**.

Results of individual tests are presented in **Appendix C**. EU-COLOR-ONE Topcoat Oven Thermal Oxidizer was testing May 17<sup>th</sup> and 18<sup>th</sup>, 2022.



## 2 SOURCE DESCRIPTION

### 2.1 Plant and Sources Overview

WTAP operates an automobile assembly plant that produces the RAM 1500 Classic model in the East Paint Shop for FCA US LLC. This program focuses only on the East Paint Shop. This Source Testing Plan includes the required compliance testing for particulate matter of the Topcoat observation zones (Basecoat and Clearcoat), Topcoat Oven Thermal Oxidizer, and Spot Repair Booth. This report only covers the emissions from EU-COLOR-ONE Topcoat Oven Thermal Oxidizer. The following table outlines the sampling program.

**Table 2.1.1:** Summary of Sampling Program – EU-COLOR-ONE Thermal Oxidizer

EU-COLOR-ONE Thermal Oxidizer	
<b>Emission Unit Description [Including Process Equipment &amp; Control Device(s)]</b>	Oven emissions from the EU-COLOR-ONE unit are controlled using a thermal oxidizer. <b>Sources:</b> SVEXC1INC
<b>Parameter Tested</b>	Particulate matter (PM) in addition to Stack Gas Velocity, Stack gas composition, and Moisture
<b>Testing Monitoring Methods</b>	<ul style="list-style-type: none"> <li>USEPA Methods: 1, 2, 3, 4, 5, and 202</li> <li>The sampling train for PM consisted of filterable and condensable particulate capture during three (3) 240-minute runs as described in USEPA Method 5/202.</li> </ul>
<b>Modifications</b>	<ul style="list-style-type: none"> <li>Nitrogen purges were not completed post sample to remove sulphates for any of the sampling. Sulfur dioxide exposure was not expected to be an issue at this source location. This was approved in the Source Testing Plan.</li> </ul>

### 2.2 Sampling Locations Overview

This following table summarizes the sampling locations.

**Table 2.2.1:** Summary of the Stack Characteristics

Source	Parameter	Diameter	Duct Diameters from Flow Disturbance	Number of Ports	Points per Traverse	Total Points per Test	Average Stack Temperature
SVEXC1INC	PM	35.75"	8 downstream and 3 upstream	2	12	24 PM/Flow	296°F



### **3.2.4 USEPA Method 4 – “Determination of Moisture Content in Stack Gases”**

USEPA Method 4 is used to determine the moisture content of stack gas. Moisture is determined via direct condensation. In the case of determining moisture content during an isokinetic test, a gas sample is drawn through a probe and filter, then through a series of impingers (impinger type and contents vary depending on the isokinetic method) and dropped to a temperature below 68° Fahrenheit to ensure all moisture is removed from the sample. The impingers are analyzed gravimetrically pre and post test to determine total moisture gain. Moisture content is then calculated based on moisture gain and total sample volume passed through the impingers.

### **3.2.5 USEPA Method 5 – “Determination of Particulate Matter Emissions from Stationary Sources”**

Particulate matter (PM/PM<sub>10</sub>/PM<sub>2.5</sub>) was sampled following procedures outlined in USEPA Method 5 and Method 202 (Condensable Particulate Matter).

USEPA Method 5 is used to determine filterable particulate matter from the specified source. The sample gas is sampled isokinetically through a stainless-steel nozzle, then a glass/quartz (stainless-steel may also be used) probe-liner, and through a glass-fiber filter. The probe and filter are designed to keep the sampling temperature at 248 ± 25 °F per the method standards. USEPA Method 5 can be combined with other methods, but everything up to the filter is considered filterable particulate matter.

Prior to testing, a leak check is performed on the sampling train to ensure a leak-free system. The probe nozzle is then set to the first sampling point, and sampling begins once all temperatures and flow rates are established. Sampling occurs for a pre-determined amount of time and at all pre-determined sampling points. Sampling rate is determined based on in-stack conditions including flow rate and stack gas temperature. A valid test must sample at an average rate ±10% of 100% isokinetic sampling. Once testing is complete, a post-test leak check is done to show a leak-proof sampling system. The system is leak checked at a vacuum (Hg”) at or just above the maximum vacuum seen during the test.

Once all sampling procedures are complete, recovery begins as soon as possible. The impingers in the train must be weighed prior to recovery for moisture content analysis. For USEPA Method 5, all used sampling equipment up to the filter is rinsed three times with acetone. The probe and nozzle must be rinsed and thoroughly brushed (three times for glass/quartz, six times for stainless-steel). The front half of the filter holder is then rinsed three times with acetone into the same glass sample jar as the probe and nozzle rinse. The filter is then collected and placed in a petri dish. All USEPA Method 5 recovered samples are analyzed gravimetrically by RWDI USA LLC and the Method 202 recovered samples were analyzed by Enthalpy Labs in Durham, North Carolina.



## 5 RESULTS

All calibration information for the equipment used for this study is included in **Appendix F**. The following tables summarize the testing results, and more detailed tables can be found in **Appendices C and D** for the EU-COLOR-ONE Topcoat Thermal Oxidizer.

**Table 5.1:** EU-COLOR-ONE Topcoat Oven Thermal Oxidizer – PM Results

Parameter	Emission Rate			
	Test 1	Test 2	Test 3	Average
Particulate Matter (PM/PM <sub>10</sub> /PM <sub>2.5</sub> ) (lb/hr)	0.051	0.074	0.042	0.056
Particulate Matter (PM/PM <sub>10</sub> /PM <sub>2.5</sub> ) (lb/1000 lb of exhaust air (wet))	0.0013	0.0019	0.0011	0.0014

## 6 CONCLUSIONS

Testing for particulate matter (PM/PM<sub>10</sub>/PM<sub>2.5</sub>) was completed on May 17<sup>th</sup> and 18<sup>th</sup>, 2022 and was completed in accordance with the Source Testing Plan for EU-COLOR-ONE Topcoat Oven Thermal Oxidizer. As noted above the results from the following sources will be included in subsequent reports:

- EUSPOTREPAIREAST - PM emissions from SVDS\_SPOTEAST observation zone
- The balance of the sources are in the FGFACILITY Flexible Group
  - EU-COLOR-ONE Basecoat Observation 1 - PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from SVBC1OBEAST1
  - EU-COLOR-ONE Basecoat Observation 2 - PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from SVBC1OBEAST2
  - EU-COLOR-ONE Basecoat Observation 3 - PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from SVBC1OBEAST3
  - EU-COLOR-ONE Clearcoat Observation 1 - PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from SVCC1OBEAST1
  - EU-COLOR-ONE Clearcoat Observation 2 - PM/PM<sub>10</sub>/PM<sub>2.5</sub> emissions from SVCC1OBEAST2