



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) facility located at 21500 Mound Road, Warren, Michigan. WTAP operates an automobile assembly plant that produces the RAM 1500 Classic. This Source Testing Program outlines the performance testing required for flexible group FGTOPCOATEAST unit EU-COLOR-ONE (Section V3 & V3b). The test program was conducted to fulfill the requirements of the Michigan Department of Environment, Great Lakes and Energy (EGLE) PTI 13-19B. The test included measurements of volatile organic compounds (VOCs, defined as non-methane hydrocarbons). In addition, exhaust air flow rate was determined. Testing was conducted on December 9th, 2021.

Under PTI 13-19B this testing covers the required testing for validation of the east paint shop and includes:

- Oven Exhaust Control Device (OECD) VOC loading test for EU-COLOR-ONE thermal oxidizer

The following table represents a summary of the stack testing results.

Summary of EU-COLOR-ONE - Mass Inlet Loading

Parameter	Symbol	Mass Loading Units	Average
VOCs (as propane)	THC	lb/hr	7.5
VOCs (as propane)	NMOC	lb/hr	7.3

Under Flexible Group Condition FGTOPCOATEAST in PTI 13-19B the following conditions were noted for verification of the Oven Thermal Oxidizer:

- V.5 (3) *Verification of Oven Exhaust Control Device VOC Loading rates of each Topcoat line (OECD loading test on one of the identical lines is sufficient if the permittee can demonstrate that the topcoat lines are identical) and high bake repair operation by testing, at owner expense, is required according to the following schedule:*
- Within 180 days of issuance of the permit, if an Oven Exhaust Control Device VOC Loading test has not been conducted within five years prior to the issuance of the permit, unless the permittee has submitted an acceptable demonstration that the most recent acceptable test remains valid and representative, and at least once during the term.*
 - Within 180 days of making any changes in operating conditions which necessitate reevaluation of the Oven Exhaust Control Device VOC Loading rates.*

Verification of Oven Exhaust Control Device VOC Loading rates includes the submittal (within 60 calendar days following the last date of the sampling to both the AQD District Supervisor and the Technical Programs Unit Supervisor, Air Quality Division, in a format acceptable to AQD) of a complete report of the test results. No less than seven days before any tests are conducted, the permittee shall notify AQD District Supervisor, in writing, of the time and place of the test and who will be conducting it. (R 336.2001(3))



V.5 (4). *Verification of Destruction Efficiency (DE) of the Thermal Oxidizer for the associated oven of each topcoat line and high bake repair operation by testing, at owner expense, is required according to the following schedule:*

- a) *Within 180 days of issuance of the permit, if Destruction Efficiency (DE) test of the Thermal Oxidizer for the oven has not been conducted within five years prior to the issuance of the permit, unless the permittee has submitted an acceptable demonstration that the most recent acceptable test remains valid and representative, and at least once during the term.*
- b) *Within 180 days of making any changes in operating conditions which necessitate reevaluation of the Destruction Efficiency (DE) of the Thermal Oxidizer.*

Verification of Destruction Efficiency (DE) of the Thermal Oxidizer for the oven includes the submittal (within 60 calendar days following the last date of the sampling to both the AQD District Supervisor and the Technical Programs Unit Supervisor, Air Quality Division, in a format acceptable to AQD) of a complete report of the test results. No less than seven days before any tests are conducted, the permittee shall notify AQD District Supervisor, in writing, of the time and place of the test and who will be conducting it. (R 336.2001(3))

The purpose of the source testing was to be responsive to the permit conditions noted above (SC. V.5.3 & 4). The tests measured the VOC loading rate and thermal oxidizer operating parameters after the modifications to the EU-COLOR-ONE spraybooth were complete, and compares them to the same sources' parameters identified during the last testing campaign of September 25, 2018. This testing program provides data to confirm the current operating conditions of EU-COLOR-ONE oven thermal oxidizer (i.e., mass loading, flow rate and oxidizer temperature) are consistent with those measured during the last source test (September 25, 2018), demonstrating that the destruction efficiency measured in September 2018 remains valid and representative.

Summary of EU-COLOR-ONE - Comparison of Thermal Oxidizer ("TO") Parameters 2018 Testing to 2021

Parameter	September 25, 2018	December 9, 2021
EU-COLOR-ONE Thermal Oxidizer Combustion Chamber Temperature (°F)	1290	1304
Inlet THC Concentration (as propane) (ppmv)	220.2	140.4
Inlet THC Mass Loading (lb/hr) (as propane)	11.8	7.5
Production Rate (vehicle count)	29	22
EU-COLOR-ONE Exhaust Flow Rate (dscfm)	7,828	7,578



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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) facility located at 21500 Mound Road, Warren, Michigan. WTAP operates an automobile assembly plant that produces the RAM 1500 Classic. Under Permit to Install (PTI) 13-19B this Source Test Report covers the required testing for validation of Volatile Organic Compound (VOC) emissions from FGTOPCOATEAST unit EU-COLOR-ONE (Section V3 & V3b). A copy of the Source Testing Plan is provided in **Appendix A**. The test program included measurements of volatile organic compounds (VOCs, defined as non-methane hydrocarbons) for the EU-COLOR-ONE. Exhaust air flow rate was determined from the unit during each of the tests.

Testing to determine Oven Exhaust Control Device (OECD) VOC loading for the EU-COLOR-ONE thermal oxidizer was conducted December 9th, 2021. Results from the sampling program are presented in the **Tables Section** of the report, with more detailed sampling results provided in the **Appendices**.

This stack testing study consisted of the following parameters:

- Velocity, flow rate and temperature;
- Volatile Organic Compounds (VOCs); and
- Moisture (%)

Under Flexible Group Condition FGTOPCOATEAST in PTI 13-19B the following conditions were noted for verification of the Oven Thermal Oxidizer:

- V.5 (3) *Verification of Oven Exhaust Control Device VOC Loading rates of each Topcoat line (OECD loading test on one of the identical lines is sufficient if the permittee can demonstrate that the topcoat lines are identical) and high bake repair operation by testing, at owner expense, is required according to the following schedule:*
- Within 180 days of issuance of the permit, if an Oven Exhaust Control Device VOC Loading test has not been conducted within five years prior to the issuance of the permit, unless the permittee has submitted an acceptable demonstration that the most recent acceptable test remains valid and representative, and at least once during the term.*
 - Within 180 days of making any changes in operating conditions which necessitate reevaluation of the Oven Exhaust Control Device VOC Loading rates.*

Verification of Oven Exhaust Control Device VOC Loading rates includes the submittal (within 60 calendar days following the last date of the sampling to both the AQD District Supervisor and the Technical Programs Unit Supervisor, Air Quality Division, in a format acceptable to AQD) of a complete report of the test results. No less than seven days before any tests are conducted, the permittee shall notify AQD District Supervisor, in writing, of the time and place of the test and who will be conducting it. (R 336.2001(3))



3 SAMPLING LOCATION

3.1 Sample Location Description

3.1.1 EU-COLOR-ONE

Continuous emissions monitoring (CEM) for total VOCs, as propane occurred on the inlet of the TO for EU-COLOR-ONE. Total VOCs were monitored at a single point in the middle of the duct. The outlet was located on the roof where flows and moisture tests were conducted. To evaluate the emissions, triplicate 60-minute tests were conducted on the source.

4 SAMPLING METHODOLOGY

The following section provides an overview of the sampling methodologies used in this program.

4.1 Stack Velocity, Temperature, and Volumetric Flow Rate Determination

The exhaust velocities and flow rates were determined following the US EPA Method 2, "Determination of Stack Gas Velocity and Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type pitot tube and inclined manometer. Volumetric flow rates were determined following the equal area method as outlined in US EPA Method 1. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a digital temperature indicator.

The dry molecular weight of the stack gas was determined following calculations outlined in US EPA Method 3, "Determination of Molecular Weight of Dry Stack Gas". Stack moisture content was measured using US EPA Method 4, "Determination of Moisture Content in a Stack".

4.2 Continuous Emissions Monitoring for VOCs

4.2.1 Sampling for Volatile Organic Compounds

Volatile Organic Compounds (VOC) testing was performed at the inlet of the EU-COLOR-ONE thermal oxidizer. The measurements were taken continuously following the USEPA Method 25A. As outlined in Method 25A, the measurement location was taken at the centroid of the source.



5 RESULTS

The flow and emissions data for this study are presented in the 'Tables' section of this report. Detailed information regarding each test run can be found in the corresponding appendix. Below is a summary of the applicable Table ID for each corresponding test parameter.

Table 5.1: Summary of Data

Parameter	Appendix
VOCs	B
Stack Gas Characteristics	C

Reference to **Appendix B** and **C** are noted above in **Table 5.1**. Field notes are presented in **Appendix D**. All calibration information for the equipment used for the program is included in **Appendix E**. Detailed example calculations for each measured pollutant is provided in **Appendix G**.

5.1 EU-COLOR-ONE Results

The following section outlines the results from the testing program for EU-COLOR-ONE

Table 5.1.1: Summary of EU-COLOR-ONE Mass Loading

Parameter	Symbol	Mass Loading Units	Average
VOCs (as propane)	THC	lb/hr	7.5
VOCs (as propane)	NMOC	lb/hr	7.3

TABLES



THC MASS LOADING TABLE

Source: Color One

RWDI Project #2202302

Parameter	1	2	3	Average
Date	9-Dec-21	9-Dec-21	9-Dec-21	--
Start Time:	8:17	9:40	11:00	--
Stop Time:	9:16	10:39	11:59	--
Duration (mins):	60	60	60	--
Average Production Number (Color1):	22	21	24	22
Average Temperature for TO (°F):	1304	1304	1304	1304
Inlet NMOC Concentration (as propane) (ppmv):	173.8	107.6	142.3	141.2
Inlet NMOC Concentration (as propane) (lbs/hr):	8.9	5.6	7.6	7.3
Outlet Flow Rate (dscfm):	7,432	7,531	7,771	7,578