



Chicago Office:
1500 Boyce Memorial Dr.
Ottawa, IL 61350
Phone 815-433-0545
888 STACK TEST
Fax 815-433-0592

**REPORT OF VOC CAPTURE/DESTRUCTION EFFICIENCY TESTING ON THE
FASCIA LINE AT THE VENTRA EVART, LLC FACILITY LOCATED IN EVART, MI**

Prepared for:

VENTRA EVART, LLC
601 W. SEVENTH STREET
EVART, MI 49631

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Prepared by:

STACK TEST GROUP, INC.
1500 BOYCE MEMORIAL DRIVE
OTTAWA, IL 61350

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STACK TEST GROUP, INC. PROJECT NO. 20-3294

Report Prepared By:

Bill J. Byczynski
President

Report Reviewed By:

Ryan J. Schueller
Project Manager

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1.0 EXECUTIVE SUMMARY

On September 30, 2020, The Stack Test Group, Inc. performed volatile organic compound (VOC) capture and destruction efficiency testing on the Fascia coating line at the Ventra Evert, LLC facility located in Evert, MI. The testing was conducted to comply with the Title V/ROP (No. 199600464a) serving this facility, as well as the the NESHAP for Plastic Parts and Products Painting found in 40 CFR Part 63, Supart PPPP. Three three-hour tests were conducted for the VOC capture and destruction efficiency testing. Presented below are the average results of these tests.

Fascia Coating Line Results:

VOC Destruction Efficiency:	98.71 percent
VOC Capture Efficiency:	98.48 percent
Total Overall Efficiency:	97.21 percent

2.0 INTRODUCTION

On September 30, 2020, The Stack Test Group, Inc. performed VOC capture and destruction efficiency testing on the the Fascia coating line at the Ventra Evert, LLC facility located in Evert, MI. The testing was conducted to comply with the Title V/ROP (No. 199600464a) serving this facility, as well as the the NESHAP for Plastic Parts and Products Painting found in 40 CFR Part 63, Supart PPPP. Three three-hour tests were conducted for the VOC capture and destruction efficiency testing.

VOC testing was conducted on the Fascia coating line RTO inlet and outlet for the destruction efficiency testing. Capture efficiency testing followed the guidelines of U.S. EPA Method 204 and 204B. There are three powered exhaust in the Fascia line that are not directed to the RTO. This prevents the Fascia line from being classified as a permanent total enclosure (PTE). Thus, the Fascia line was evaluated based on the criteria outlined in Method 204 as a temporary total enclosure (TTE).

Testing was conducted while Ventra Evert personnel operated the Fascia coating line at maximum rate and normal conditions. A copy of the operating data is included in Appendix G.

Testing was supervised by:

Mr. Bill Byczynski

Principal

Stack Test Group, Inc.

1500 Boyce Memorial Drive

Ottawa, IL 61350

(815) 433-0545

The facility contact for the testing was:

Mr. Nick Spivey
Ventra Plastics
601 W. Seventh Street
Ewart, MI 49631
(231) 734-9000 ext. 9317

Testing was witnessed by representatives of the Michigan Department of Environmental Quality (MDEQ).

All testing followed the guidelines of U.S. EPA Reference Methods 1 through 4, 25A, 204 and 204B. This report contains a summary of results for the above mentioned tests and all the supporting field, process, and computer generated data.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 **Exhaust Gas Parameters**

3.1.1 *Traverse and Sampling Points*

Testing was conducted on the inlet duct and exhaust stack of the RTO as well as the exhaust stacks of the Adpro Manual Booth, Base Coat Manual Booth and Clear Coat Manual Booth. The number of velocity traverse and sample measurement points for the inlet duct and each exhaust stack was determined using EPA Method 1. Each sampling location was located greater than 2.0 equivalent diameters downstream and 0.5 equivalent diameters upstream of the nearest flow disturbance. Velocity measurements were taken at 16 points, 8 points in each of the two diameters set at 90° to each other.

3.1.2 *Velocity Traverse*

Velocity measurements were performed during each VOC destruction and capture efficiency test in accordance with EPA Method 2. An "S" type Pitot Tube with an attached type "K" thermocouple was used to conduct the velocity traverse. Per the requirements of Method 204B, a velocity traverse was performed hourly throughout each three hour test. The average of the four velocities for each test was used in the calculations.

3.1.3 *Gas Composition*

Gas composition for oxygen, carbon dioxide, and nitrogen was determined employing EPA Method 3. An integrated gas sample was collected during each VOC efficiency test. Gas analysis was conducted using a calibrated Servomex Model 1440C O₂/CO₂ analyzer.

3.1.4 *Moisture Content*

The exhaust gas moisture content was determined using EPA Method 4 for all tests. The exhaust stack moisture content was determined by drawing the gas sample through four impingers in the sample train. Volumetric analysis was used to measure the condensed moisture in the first three impingers while gravimetric analysis of silica gel was used to measure moisture collected in the fourth impinger. Moisture for the inlet duct, clear coat, base coat, and Adpro was determined by using a wet bulb dry bulb method.

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3.2 DESTRUCTION EFFICIENCY TESTING

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3.2.1 *Sample Collection*

Testing on the RTO inlet and outlet ducts as well as the clear coat, base coat and Adpro booths was performed using U.S. EPA Reference Method 25A. A J.U.M. Model 3-300 Flame Ionization Detector (FID) was used to determine the emission concentrations at each location. A sample was transported through a heated Teflon line from the exhaust stack and inlet duct to the FIDs which analyzed the samples continuously. The output signal from the FIDs were then recorded at one minute averages throughout the test. Copies of this data may be found in Appendix F.

At the beginning of the test series, the analyzers were calibrated and then checked for calibration error by introducing zero, mid-range and high-range calibration gases to the back of the analyzers. Before and after each individual test run, a system bias was performed by introducing a zero and mid-range propane calibration gas to the outlet of the probes. Calibration gases used were U.S. EPA Protocol 1 certified. Additionally, per the requirements of Method 204B, the calibration gas closest to the measured concentration as well as the high range calibration gas was checked after each test run.

3.2.2 *Sample Duration and Frequency*

The Method 25A train samples were collected in triplicate with each test lasting 180 minutes in duration.

3.2.3 *Calibrations*

All sampling equipment was calibrated according to the procedures outlined in EPA Reference Method 25A. Copies of the FID calibrations are included in Appendix E.

3.3 CAPTURE EFFICIENCY TESTING

3.3.1 *Sample Collection*

Capture efficiency testing on the Fascia line was determined by Method 204, based on the criteria outlined for a temporary total enclosure (TTE). The Fascia line is equipped with three powered exhaust fans. The three exhaust fans are attached to the Ad Pro manual booth, the base coat manual booth and the clear coat manual booth. The VOC emissions from these three booths were measured using U.S. EPA Method 25A. A J.U.M. Model VE-7 Flame Ionization Detector (FID) was used to determine the emission concentrations. A sample was transported through a heated Teflon line from each coating booth as well as the RTO inlet to the FID's which analyzed the sample continuously. The output signal from the FID was then recorded at on a datalogger at one minute averages throughout the test. Copies of this data is included in Appendix F.

At the beginning of the test series, the analyzers were calibrated and then checked for calibration error by introducing zero, low-range, mid-range and high-range calibration

gases to the back of the analyzer. Before and after each individual test run, a system bias was performed by introducing a zero and mid-range propane calibration gas to the outlet of the probe. Calibration gases used were U.S. EPA Protocol 1 certified. Additionally, per the requirements of Method 204B, the calibration gas closest to the measured concentration as well as the high range calibration gas was checked after each test run.

3.3.2 Sample Duration and Frequency

The Method 25A samples were collected in quadruplicate with each test lasting 180 minutes in duration. Run one was discarded because of complications with flow rates at various locations. Run one data is included in the report but not used in final averages. Velocity measurements were made at each location at least once every hour during these tests.

3.3.3 EPA Method 204 Criteria

The capture efficiency was calculated by comparing the mass of VOC's captured (RTO inlet) to the total mass of VOC's measured at all locations for each test run. All VOC's are expressed in terms of pounds per hour as propane.

5.0 TEST RESULTS

Presented in this section are the results of this test series. Test results are reported in Tables 4.1 through 4.5. Table 4.1 reports the clear coat booth exhaust stack results for the VOC capture efficiency testing, including stack gas temperature, percent carbon dioxide and oxygen, percent moisture, molecular weight of the stack gas dry and wet, velocity in feet per second (fps), and flow rate in actual cubic feet per minute (acfm), standard cubic feet per minute (scfm), and dry standard cubic feet per minute (dscfm).

Table 4.1 also presents the VOC results in parts per million as propane and pounds per hour (lb/hr) as propane.

Tables 4.2 through 4.5 present the results for the base coat booth, Adpro booth, RTO inlet duct, and RTO exhaust stack, respectively and in the same manner and format as Table 4.1. Table 4.5 also present the capture results in term of percent and the DE results in terms of percent.

Copies of the calculations used to determine these emission rates may be found in Appendix A. Copies of the field data sheets are presented in Appendix B. Copies of the analytical results are presented in Appendix D. Copies of equipment calibrations are presented in Appendix E.

Table 4.1

VOC Results
Ventra Evert
Evert, MI
09/30/20
Clear Coat Booth Exhaust Stack

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	08:40 AM	12:00 PM	03:40 PM	
Finish Time:	11:40 AM	03:00 PM	06:40 PM	
Stack Gas Temperature, degrees F:	75.7	76.33	78.17	76.7
% Carbon Dioxide:	0.0	0.0	0.0	0.0
% Oxygen:	21.0	21.0	21.0	21.0
% Moisture:	2.10	2.05	1.99	2.05
Molecular Weight dry, lb/lb-Mole:	28.84	28.84	28.84	28.84
Molecular Weight wet, lb/lb-Mole:	28.61	28.62	28.62	28.62
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	24.48	24.45	24.49	24.47
Stack Gas Flow Rate, ACFM:	18,463	18,440	18,470	18,458
Stack Gas Flow Rate, SCFM:	17,674	17,632	17,600	17,636
Stack Gas Flow Rate, DSCF/HR:	1,038,193	1,036,232	1,035,012	1,036,479
Stack Gas Flow Rate, DSCFM:	17,303	17,271	17,250	17,275
VOC Results:				
PPM as Propane:	12.6	13.8	10.8	12.4
LB/DSCF:	1.44E-06	1.58E-06	1.23E-06	1.42E-06
LBS/HR as Propane:	1.53	1.67	1.30	1.50

Table 4.2VOC Results
Ventra Evert
Evert, MI
09/30/20

Base Coat Booth Exhaust Stack

Test No:	T1	T2	T3	Avg.
Start Time:	08:40 AM	12:00 PM	03:40 PM	
Finish Time:	11:40 AM	03:00 PM	06:40 PM	
Stack Gas Temperature, degrees F:	75.29	76.23	78.08	76.5
% Carbon Dioxide:	0.0	0.0	0.0	0.0
% Oxygen:	21.0	21.0	21.0	21.0
% Moisture:	2.00	2.06	2.01	2.02
Molecular Weight dry, lb/lb-Mole:	28.84	28.84	28.84	28.84
Molecular Weight wet, lb/lb-Mole:	28.62	28.62	28.62	28.62
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	30.72	30.61	30.70	30.68
Stack Gas Flow Rate, ACFM:	31,519	31,406	31,498	31,474
Stack Gas Flow Rate, SCFM:	29,531	29,374	29,359	29,421
Stack Gas Flow Rate, DSCF/HR:	1,736,414	1,726,106	1,726,109	1,729,543
Stack Gas Flow Rate, DSCFM:	28,940	28,768	28,768	28,826
VOC Results:				
PPM as Propane:	14.9	8.3	10.2	11.1
LB/DSCF:	1.70E-06	9.48E-07	1.16E-06	1.27E-06
LBS/HR as Propane:	3.01	1.67	2.05	2.25

Table 4.3

VOC Results
Ventra Evert
Evert, MI
09/30/20
Ad Pro Booth Exhaust Stack

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	08:40 AM	12:00 PM	03:40 PM	
Finish Time:	11:40 AM	03:00 PM	06:40 PM	
Stack Gas Temperature, degrees F:	75.9	76.6	78.4	77.0
% Carbon Dioxide:	0.0	0.0	0.0	0.0
% Oxygen:	21.0	21.0	21.0	21.0
% Moisture:	2.10	2.15	2.08	2.11
Molecular Weight dry, lb/lb-Mole:	28.84	28.84	28.84	28.84
Molecular Weight wet, lb/lb-Mole:	28.61	28.61	28.61	28.61
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	26.27	25.73	24.92	25.64
Stack Gas Flow Rate, ACFM:	19,813	19,406	18,795	19,338
Stack Gas Flow Rate, SCFM:	18,542	18,136	17,507	18,062
Stack Gas Flow Rate, DSCF/HR:	1,089,184	1,064,760	1,028,567	1,060,837
Stack Gas Flow Rate, DSCFM:	18,153	17,746	17,143	17,681
VOC Results:				
PPM as Propane:	12.9	9.0	7.4	9.8
LB/DSCF:	1.47E-06	1.03E-06	8.45E-07	1.12E-06
LBS/HR as Propane:	1.64	1.12	0.89	1.21

Table 4.4

VOC Results
Ventra Evert
Evert, MI
09/30/20
RTO Inlet Duct

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	08:40 AM	12:00 PM	03:40 PM	
Finish Time:	11:40 AM	03:00 PM	06:40 PM	
Stack Gas Temperature, degrees F:	99.8	102.6	109.8	104.1
% Carbon Dioxide:	0.0	0.0	0.0	0.0
% Oxygen:	21.0	21.0	21.0	21.0
% Moisture:	1.93	2.02	1.89	1.95
Molecular Weight dry, lb/lb-Mole:	28.84	28.84	28.84	28.84
Molecular Weight wet, lb/lb-Mole:	28.63	28.62	28.64	28.63
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	33.56	34.10	34.48	34.05
Stack Gas Flow Rate, ACFM:	63,428	64,449	65,167	64,348
Stack Gas Flow Rate, SCFM:	56,828	57,454	57,358	57,213
Stack Gas Flow Rate, DSCF/HR:	3,343,876	3,377,608	3,376,447	3,365,977
Stack Gas Flow Rate, DSCFM:	55,731	56,293	56,274	56,100
VOC Results:				
PPM as Propane:	827.5	766.9	803.6	799.3
LB/DSCF:	9.45E-05	8.76E-05	9.18E-05	9.13E-05
LBS/HR as Propane:	322.21	301.90	315.82	313.31
Capture Efficiency, %:	98.12	98.54	98.68	98.45

Table 4.5VOC Results
Ventra Evert
Evert, MI
09/30/20
RTO Exhaust Stack

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	08:40 AM	12:00 PM	03:40 PM	
Finish Time:	11:40 AM	03:00 PM	06:40 PM	
Stack Gas Temperature, degrees F:	233.55	227.17	222.86	227.9
% Carbon Dioxide:	1.5	1.5	1.5	1.5
% Oxygen:	19.0	19.0	19.0	19.0
% Moisture:	2.55	2.60	2.56	2.57
Molecular Weight dry, lb/lb-Mole:	29.00	29.00	29.00	29.00
Molecular Weight wet, lb/lb-Mole:	28.72	28.71	28.72	28.72
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	40.39	40.34	40.19	40.31
Stack Gas Flow Rate, ACFM:	88,866	88,756	88,426	88,683
Stack Gas Flow Rate, SCFM:	64,262	64,778	64,945	64,662
Stack Gas Flow Rate, DSCF/HR:	3,757,403	3,785,650	3,796,937	3,779,997
Stack Gas Flow Rate, DSCFM:	62,623	63,094	63,282	63,000
VOC Results:				
PPM as Propane:	10.4	9.6	7.3	9.1
LB/DSCF:	1.19E-06	1.10E-06	8.34E-07	1.04E-06
LBS/HR as Propane:	4.58	4.26	3.25	4.03
Destruction Efficiency, %:	98.58	98.59	98.97	98.71