

Air Compliance & Emissions Solutions

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REPORT OF VOC AND HAPS TESTING ON THE EXHAUST STACKS ASSOCIATED WITH OXIDIZER #2 AND #5 AT THE PLASCORE INC. FACILITY LOCATED IN ZEELAND, MICHIGAN

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Prepared for:

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AIR QUALITY DIV.

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FEBRUARY 26, 2014 STACK TEST GROUP, INC. PROJECT NO. 13-2462

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1.0 EXECUTIVE SUMMARY

On February 26, 2014 The Stack Test Group, Inc. performed emmision testing on the two exhaust stacks associated with oxidizers number 2 and 5 at the Plascore Inc. facility located in Zeeland, MI. VOC and HAP testing was conducted on each exhaust stacks associated with these oxidizers. Three one-hour tests were conducted on each source to determine the emission rate of each source and to prove compliance with the existing permits.

Oxidizer #2 Results:		
VOC Concentration:	1.83E-06	lbs/dscf
VOC Emission Rate:	0.72	lbs/hr as propane
Formaldehyde Concentration:	1.82E-08	lbs/dscf
Formaldehyde Emission Rate:	0.007	lbs/hr
IPA Concentration:	6.40E-07	lbs/dscf
IPA Emission Rate:	0.25	lbs/hr
Oxidizer #5 Results:		
VOC Concentration:	1,15E-06	lbs/dscf
VOC Emission Rate:	0.47	lbs/hr as propane
Formaldehyde Concentration:	4.93E-09	lbs/dscf
Formaldehyde Emission Rate:	0.002	lbs/hr
IPA Concentration:	1.12E-06	lbs/dscf
IPA Emission Rate:	0.47	lbs/hr

2.0 INTRODUCTION

On February 26, 2014, The Stack Test Group, Inc. performed volatile organic compound (VOC) and hazardous air pollutant (HAP) testing on the two exhaust stacks associated with oxidizers number 2 and 5 at the Plascore Inc. facility located in Zeeland, MI. VOC testing was conducted on the exhaust stacks of each source. Testing was performed to calculate the VOC and HAP emission rate of each source to show compliance with the exiting permit associated with this facility.

Testing was conducted while Plascore personnel operated these sources as close to maximum rate as possible and at normal conditions. A copy of the operating data is included in Appendix G.

Testing was supervised by Mr. Gary Kohnke of the Stack Test Group, Inc. Testing was coordinated by Mr. Ed Weller of Plascore Inc. Testing on was witnessed by Mr. David Patterson and Mrs. April Lazzaro from the Department of Environmental Quality (DEQ).

All testing followed the guidelines of U.S. EPA Reference Methods 1 through 4, 25A and 320. 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 exhaust stack associated with each source. The number of velocity traverse and sample measurement points for each stack was determined using EPA Method 1.

All Source Exhaust Stacks:

Each source exhaust stack met the Method 1 criteria for distances before and after the test ports. Velocity measurements were taken at each of 16 points, 8 points in each of the two ports set at 90° to each other.

3.1.2 Velocity Traverse

Velocity measurements were performed during each VOC test in accordance with EPA Method 2. An "S" type and Standard Pitot Tube with an attached type "K" thermocouple was used to conduct the velocity traverse.

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 test. Gas analysis was conducted using a fyrite analyzer.

3.1.4 Moisture Content

The exhaust gas moisture content was determined using EPA Method 320 for all tests.

3.2 EMISSION RATE TESTING (METHOD 25A/METHOD 320)

3.2.1 Sample Collection

Emission rate testing for each oxidizer was performed using U.S. EPA Reference Method 25A. A J.U.M. Model 3-500 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 to the FIDs which analyzed the samples continuously. The output signal from the FIDs was then recorded at one minute averages throughout the test. Copies of this data may be found in Appendix H.

Emission rate testing for each oxidizer was performed using U.S. EPA Reference Method 320. A MKS MultiGas 2030 FTIR spectrometer was used to determine the emission concentrations at each location. A sample was transported through a heated Teflon line from the exhaust stack to the FTIR which analyzed the sample continuously for specific VOC's. The output signal from the FTIR was then recorded at thirty second averages throughout the test. Copies of this data may be found in Appendix H.

At the beginning of the test series, the analyzers were calibrated by introducing zero, lowrange, mid-range and high-range calibration gases to the outlet of the probe. 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.

3.2.2 Sample Duration and Frequency

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

The Method 320 train sample was also collected in triplicate with each test lasting sixty minutes in duration.

3.2.3 Calibrations

All sampling equipment was calibrated according to the procedures outlined in EPA Reference Method 25A and 320. Copies of the FID calibrations are included in Appendix D. Copies of the FTIR calibrations are included in Appendix H.

4.0 <u>TEST RESULTS</u>

Presented in this section are the results of this test series. Test results are reported in Tables 4.1 and 4.2. Table 4.1 reports the results for the Oxidizer #2 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 results for VOCs, formaldehyde, and IPA in terms of parts per million (PPM), pounds per dry standard cubic feet (lbs/dscf), and pounds per hour (lb/hr).

Table 4.2 presents the results for Oxidizer #5 in the same manner and format as Table 4.1.

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 calibration results are presented in Appendix D. Copies of equipment calibrations are presented in Appendix E.

Table 4.1

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VOC and HAPS Test Results Plascore, Inc. Zeeland, MI 02/26/14

Oxidizer #2

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	02:53 PM	04:02 PM	05:07 PM	
Finish Time:	03:53 PM	05:02 PM	06:07 PM	
Stack Gas Temperature, degrees F:	212.8	212.6	212.4	212.6
% Carbon Dioxide:	0.5	0.5	0.5	0.5
% Oxygen:	20.5	20.5	20.5	20.5
% Moisture:	1.02	1.08	0.91	1.00
Molecular Weight dry, lb/lb-Mole:	28.90	28.90	28.90	28.90
Molecular Weight wet, Ib/Ib-Mole:	28.79	28.78	28.80	28.79
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	37.87	38.47	38.88	38.41
Stack Gas Flow Rate, ACFM:	8,384	8,517	8,608	8,503
Stack Gas Flow Rate, SCFM:	6,463	6,568	6,640	6,557
Stack Gas Flow Rate, DSCF/HR:	383,835	389,808	394,756	389,466
Stack Gas Flow Rate, DSCFM:	6,397	6,497	6,579	6,491
VOC Results Results:				
PPM as Propane:	17.2	9.1	21.7	16.0
LBS/ DSCF:	1.96E-06	1.04E-06	2.48E-06	1.83E-06
LBS/HR (as Propane):	0.76	0.41	0.99	0.72
Formaldehyde Results:				
PPM:	0.6	0.05	0.05	0.23
LBS/DSCF:	4.67E-08	3.89E-09	3.89E-09	1.82E-08
LBS/HR (as Formaldehyde):	0.018	0.002	0.002	0.007
IPA Results:				
PPM:	2.1	8.3	1.9	4.1
LBS/DSCF:	3.28E-07	1.29E-06	2.96E-07	6.40E-07
LBS/HR (as IPA):	0.13	0.51	0.12	0.25

Table 4.2

VOC and HAPS Test Results

Plascore, Inc. Zeeland, MI 02/26/14 Oxidizer #5

Test No:	<u>T1</u>	T2	<u>T3</u>	<u>Avg.</u>
Start Time:	08:56 AM	10:11 AM	11:18 AM	
Finish Time:	09:56 AM	11:11 AM	12:18 PM	
Stack Gas Temperature, degrees F:	208.6	209.4	210.2	209.4
% Carbon Dioxide:	0.5	0.5	0,5	0.5
% Oxygen:	20.5	20.5	20.5	20.5
% Moisture:	1.02	1.17	0.58	0.92
Molecular Weight dry, lb/lb-Mole:	28.90	28.90	28.90	28.90
Molecular Weight wet, Ib/Ib-Mole:	28.79	28.77	28.84	28.80
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	39.30	39.47	42.54	40.44
Stack Gas Flow Rate, ACFM:	8,701	8,739	9,418	8,953
Stack Gas Flow Rate, SCFM:	6,747	6,768	7,286	6,934
Stack Gas Flow Rate, DSCF/HR:	400,707	401,350	434,630	412,229
Stack Gas Flow Rate, DSCFM:	6,678	6,689	7,244	6,870
VOC Results:				
PPM as Propane:	9.7	13.2	7.2	10.0
LBS/ DSCF:	1.11E-06	1.51E-06	8.22E-07	1.15E-06
LBS/HR (as Propane):	0.45	0.61	0.36	0.47
Formaldehyde Results:				
PPM:	0.07	0.09	0.03	0.06
LBS/DSCF:	5.45E-09	7.01E-09	2.34E-09	4.93E-09
LBS/HR (as Formaldehyde):	0.002	0.003	0.001	0.002
IPA Results:				
PPM:	8,3	11.7	1.5	7,2
LBS/DSCF:	1.29E-06	1.82E-06	2.34E-07	1.12E-06
LBS/HR (as IPA):	0.52	0.74	0.10	0.47