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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 (RO) Permit 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 described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name: Dearborn Rock Assembly Plant — County: Wayne

Source Address: 3001 Miller Road — City: Dearborn

AQD Source ID (SRN): A8648 — RO Permit No.: MI-ROP-A8648-2010A — RO Permit Section No.: 1

Please check the appropriate box(es):

☐ **Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**

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 RO Permit, 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 RO Permit.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, 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 RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit 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 RO Permit 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 RO Permit are attached as described:

Air emissions test report

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.

Bradford Huff	Plant Manager	313-845-2480
Name of Responsible Official (print or type)	Title	Phone Number
Signature of Responsible Official		15 JUN 16 Date

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

BTEC Inc.

EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Ford Motor Company (Ford) to evaluate volatile organic compounds (VOC) removal efficiency (RE) emissions testing during a single mobilization at the Dearborn Truck facility located in Dearborn, Michigan. The emissions test program was conducted on April 14, 2016.

Testing consisted of triplicate 60-minute test runs conducted simultaneously at the inlet and outlet of the carbon wheel. The emissions test program was required by MDEQ Air Quality Division. The results of the emission test program are summarized by Table I.

Table I
Carbon Wheel Overall Emission Summary
Test Date: April 14, 2016

Pollutant	Average RE	Average Emission Rate (VOC-CH4) (lb/hr)	Average Desorption Temperature (°F)
VOC	98.8%	1.0	364

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1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Ford Motor Company (Ford) to evaluate volatile organic compounds (VOC) removal efficiency (RE) emissions testing during a single mobilization at the Dearborn Truck facility located in Dearborn, Michigan. The emissions test program was conducted on April 14, 2016. The purpose of this report is to document the results of the test program.

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 program and results in the format suggested by the aforementioned document.

1.a Identification, Location, and Dates of Test

Sampling and analysis for the emission test program was conducted on April 14, 2016 at the Ford facility located in Dearborn, Michigan. The test program included evaluation of VOC RE from the carbon wheel.

1.b Purpose of Testing

The plant has completed conversion to all Zeolite carbon media and wish to test to obtain results to be used in monthly compliance calculations.

1.c Source Description

The carbon media controls emissions from a portion of the clearcoat zones in enamel booth #1 & #2.

1.d Test Program Contacts

The contact for the source and test report is:

Ms. Susan Hicks
Environmental Engineer
Ford Motor Company
Fairlane Plaza North, Suite 800
290 Town Center Drive
Dearborn, Michigan 48126
(313) 594-3185

Names and affiliations for personnel who were present during the testing program are summarized by Table 1.

Table 1
Test Personnel

Name and Title	Affiliation	Telephone
Ms. Susan Hicks Environmental Engineer	Ford Motor Company Fairlane Plaza North, Suite 800 290 Town Center Drive Dearborn, Michigan 48126	(313) 594-3185
Mr. Steve Smith Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Diven Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Molenda Environmental Technician	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Mark Dziadosz	MDEQ Air Quality Division	(586) 753-3745

2. Summary of Results

Sections 2.a through 2.d summarize the results of the emissions compliance test program.

2.a Operating Data

Please see Appendix E – Production & Process Data.

2.b Applicable Permit

State Registration Number (SRN) – A8648, Permit Number MI-ROP-A8648-2015.

2.c Results

The overall results of the emission test program are summarized by Table 2 (see Section 5.a). The overall RE was 98.8%.

3. Source Description

Sections 3.a through 3.e provide a detailed description of the process.

3.a

Dearborn Assembly is an automotive assembly plant located in Dearborn, Michigan. Vehicle body panels are stamped and assembled on site from sheet metal components. The bodies are cleaned, treated, and prepared for painting in the pretreatment system. Drawing compounds, mill oils, and dirt are removed from the vehicle bodies utilizing both high pressure spray and immersion cleaning/rinsing techniques. Vehicle bodies then are dip coated in electro deposition corrosion primer paint for protection. The electro primer (E-coat) is heat-cured to the vehicle body in a high-temperature bake oven. After completing the E-coat operation, vehicle bodies are conveyed to the sealer area for application of various sealants to body seams and joints. Vehicle bodies are then conveyed to an oven to cure the sealers.

After the sealer oven, the vehicles are routed to the Prime system. In the Prime system (spraybooth and oven), the bodies receive solvent-borne coatings: colored primer and tu-tone coatings. After exiting the prime oven, the vehicles are routed to the Topcoat system. In the Topcoat system (spraybooth and oven), the bodies receive two coatings: water-borne basecoat and solvent-borne clearcoat. The bodies are conveyed to an oven for curing.

A portion of the clearcoat spraybooth exhausts are routed to the carbon media for abatment.

3.b Process Flow Diagram

Due to the simplicity of the carbon wheel, a process flow diagram is not necessary.

3.c Raw and Finished Materials

Ford F150 Truck painted vehicle bodies. (See Appendix E for Production data).

3.d Process Capacity

Maximum capacity is 66 JPH and normal rated capacity of the process is 65.2 JPH.

3.e Process Instrumentation

The production within the spraybooth and the desorption temperature of the carbon media were recorded. (See Appendix E – Production and Process Data).

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used.

4.a Sampling Train and Field Procedures

Measurement of exhaust gas velocity, molecular weight, and moisture content was conducted using the following reference test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - *"Location of the Sampling Site and Sampling Points"*
- Method 2 - *"Determination of Stack Gas Velocity and Volumetric Flowrate"*
- Method 3 - *"Determination of Molecular Weight of Dry Stack Gas"(Fyrite)*
- Method 4 - *"Determination of Moisture Content in Stack Gases (WB/DB)"*

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Method 1 and Method 2. S-type pitot tubes with thermocouple assemblies, calibrated in accordance with Method 2, Section 4.1.1, were used to measure exhaust gas velocity pressures (using a manometer) and temperatures during testing. The s-type pitot tube dimensions outlined in Sections 2-6 through 2-8 were within specified limits, therefore, a baseline pitot tube coefficient of 0.84 (dimensionless) was assigned.

Cyclonic flow checks were performed at each sampling location. The existence of cyclonic flow is determined by measuring the flow angle at each sample point. The flow angle is the angle between the direction of flow and the axis of the stack. If the average of the absolute values of the flow angles is greater than 20 degrees, cyclonic flow exists. The average of the absolute values of the flow angles was less than 20 degrees at each sampling location.

Molecular weight determinations were evaluated according to USEPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight." The equipment used for this evaluation consisted of a one-way squeeze bulb with connecting tubing and a set of Fyrite® combustion gas analyzers. Carbon dioxide and oxygen content were analyzed using the Fyrite® procedure.

Exhaust gas moisture content was evaluated using Method 4. Wet bulb/dry bulb was used during this testing for moisture.

Measurement of exhaust gas VOC and methane concentrations was conducted using the following reference test methods codified at 40 CFR 60, Appendix A:

- Method 25A- *"Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer"*

VOC concentrations were measured using the procedures found in 40 CFR 60, Appendix A, Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer."

The carbon wheel outlet VOC concentrations were measured using a JUM 109A Methane/Non-Methane Analyzer. For each sampling location, a sample of the gas stream was drawn through a stainless-steel probe with an in-line glass fiber filter to remove any

particulate and a heated Teflon® sample line to prevent the condensation of any moisture from the sample before it enters the analyzer. Data was recorded at 4-second intervals on a Laptop PC equipped with data acquisition software.

The J.U.M. Model 109A utilizes two flame ionization detectors (FID) to determine the average concentration (ppm) for THC (as propane) and the average concentration for methane. Upon entry, the gas stream is split by the analyzer. One FID ionizes all of the hydrocarbons in the gas stream sample into carbon, which is then detected as a concentration of total hydrocarbons. Using an analog signal, specifically voltage, the concentration of THC is then sent to a data acquisition system (DAS), where 4-second interval data points are recorded to produce an average based on the overall duration of the test. This average is then used to determine the average concentration for THC reported as the calibration gas, propane, in equivalent units.

The analyzer's response factor is obtained by introducing a methane calibration gas to the calibrated J.U.M. 109A. The response of the analyzer's THC FID to the methane calibration gas, in ppm, as propane, is divided by the methane analyzer's response to the methane calibration gas, in ppm as methane.

The carbon wheel inlet was measured using a VIG Model 20 THC analyzer. The VIG THC hydrocarbon analyzer channels a fraction of the gas sample through a capillary tube that directs the sample to the flame ionization detector (FID), where the hydrocarbons present in the sample are ionized into carbon. The carbon concentration is then determined by the detector in parts per million (ppm). This concentration is transmitted to the data acquisition system (DAS) at 4-second intervals in the form of an analog signal, specifically voltage, to produce data that can be averaged over the duration of the testing program. This data is then used to determine the average ppm for total hydrocarbons (THC) using the equivalent units of propane (calibration gas).

For analyzer calibrations, calibration gases were mixed to desired concentrations using an Environics Series 4040 Computerized Gas Dilution System. The Series 4040 consists of a single chassis with four mass flow controllers. The mass flow controllers are factory-calibrated using a primary flow standard traceable to the United States National Institute of Standards and Technology (NIST). Each flow controller utilizes an 11-point calibration table with linear interpolation, to increase accuracy and reduce flow controller nonlinearity. A field quality assurance check of the system was performed pursuant to Method 205 by setting the diluted concentration to a value identical to a Protocol 1 calibration gas and then verifying that the analyzer response is the same with the diluted gas as with the Protocol 1 gas.

A drawing of the Method 25A sampling train used for the testing program is presented as Figure 1. Protocol 1 gas certification sheets for the calibration gases used for this testing program are presented in Appendix B.

4.b Recovery and Analytical Procedures

This test program did not include laboratory samples, consequently, sample recovery and analysis is not applicable to this test program.

4.c Sampling Ports

A diagram of the exhaust stack showing sampling ports in relation to upstream and downstream disturbances is included as Figure 2.

4.d Traverse Points

A diagram of the stack indicating traverse point locations and stack dimensions is included as Figure 2.

5. Test Results and Discussion

Sections 5.a through 5.k provide a summary of the test results.

5.a Results Tabulation

The overall results of the emissions test program are summarized by Table 2. Detailed results for the emissions test program are summarized by Table 3.

Table 2
Carbon Wheel Overall Emission Summary
Test Date: April 14, 2016

Pollutant	Average RE	Average Emission Rate (VOC-CH4) (lb/hr)
VOC	98.8%	1.0

5.b Discussion of Results

The carbon wheel VOC RE averaged 98.8% and had an average emission rate of 1.0 lb/hr (VOC-CH4).

5.c Sampling Procedure Variations

BTEC was not able to safely access the inlet ports to perform a flow rate. The inlet flow rate is assumed to be equal to the outlet flow rate.

5.d Process or Control Device Upsets

No upset conditions occurred during testing.

5.e Control Device Maintenance

There was no control equipment maintenance performed during the emissions test program.

5.f Re-Test

The emissions test program was not a re-test.

5.g Audit Sample Analyses

No audit samples were collected as part of the test program.

5.h Calibration Sheets

Relevant equipment calibration documents are provided in Appendix B.

5.i Sample Calculations

Sample calculations are provided in Appendix C.

5.j Field Data Sheets

Field documents relevant to the emissions test program are presented in Appendix A.

5.k Laboratory Data

There are no laboratory results for this test program. Raw CEM data is provided electronically in Appendix D.

BTEC Inc.

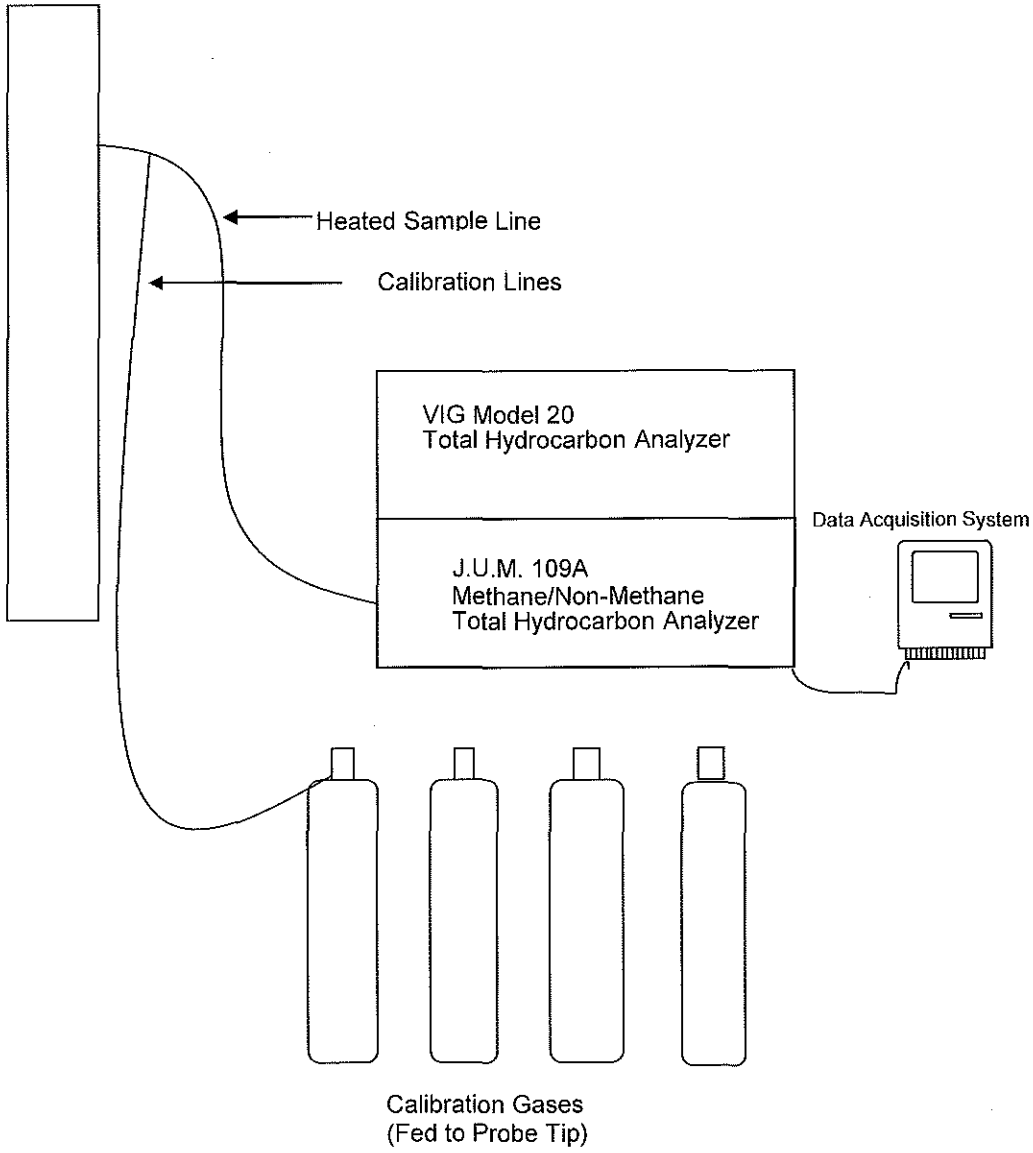
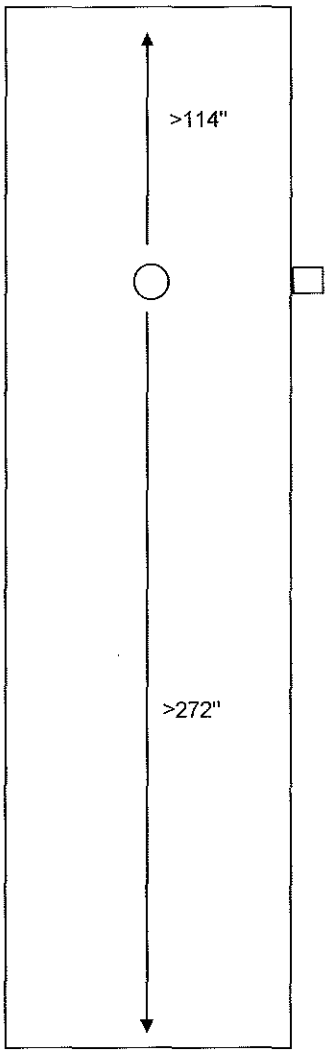


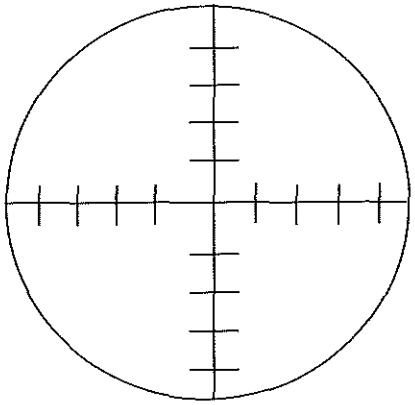
Figure 1

Site: **USEPA Method 25A** **Ford Motor Company** **Dearborn, Michigan**	**Sampling Date:** **April 14, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan 48073**

BTEC Inc.

diameter = 75.5"





Not to Scale

Points	Distance "
1	2.4
2	7.9
3	14.6
4	24.4
5	51.1
6	60.9
7	67.6
8	73.1

Figure 2

Site: **Carbon Wheel Outlet** **Ford Motor Company** **Dearborn, Michigan**	**Sampling Date:** **April 14, 2016**	**BT Environmental Consulting, Inc.** **4949 Fernlee** **Royal Oak, Michigan**

Table 3
Carbon Wheel Detailed Emission Test Results Summary
Ford Motor Company
Dearborn, Michigan

Parameter	Run 1	Run 2	Run 3	Average
Sampling Date	4/14/2016	4/14/2016	4/14/2016	
Sampling Time	8:45-9:45	10:00-11:00	12:30-13:30	
Inlet Flowrate (scfm)	63,759	67,854	64,252	65,288
Outlet Flowrate (scfm)	63,759	67,854	64,252	65,288
Inlet VOC Concentration (ppmv propane)	172.4	205.2	197.6	191.7
Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	174.3	208.3	197.9	193.5
Inlet VOC Mass Flowrate (lb/hr)	76.3	97.0	87.3	86.9
Outlet VOC Concentration (ppmv propane)	3.2	3.5	3.3	3.3
Outlet VOC Concentration (ppmv, corrected as per USEPA 7E)	3.3	3.5	3.4	3.4
Outlet CH4 Concentration (ppmv methane)	2.7	2.6	2.4	2.6
Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	2.5	2.5	2.4	2.5
Outlet VOC Concentration (- methane)	2.2	2.4	2.3	2.3
Outlet VOC Mass Emission Rate (lb/hr)	0.9	1.1	1.0	1.0
VOC Removal Efficiency (%)	**98.8**	**98.8**	**98.8**	**98.8**

Inlet VOC Correction			
Co	0.65	1.11	1.01
Cma	148.7	148.7	148.7
Cm	147.16	146.82	148.71

Outlet VOC Correction			
Co	-0.04	0.02	0.01
Cma	29.8	29.8	29.8
Cm	29.54	29.42	29.38

Outlet CH4 Correction			
Co	0.17	0.13	0.08
Cma	29.8	29.8	29.8
Cm	29.96	29.91	29.83

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
VOC: volatile organic compound
MW = molecular weight (C_3H_8 = 44.10)
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
35.31: ft^3 per m^3
453600: mg per lb

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60