

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Elmer's Crane & Dozer, Inc. (State Registration No.: B4167) contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance test program on the Hot Mix Asphalt (HMA) Plant (EU002) at the Elmer's Crane & Dozer, Inc. facility located in Traverse City, Michigan. Testing was performed on August 31, 2021, for the purpose of satisfying the emission testing requirements pursuant to Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. 7-00E and 40 CFR Part 60 Subpart I.

The specific objectives were to:

- Verify the emissions of filterable particulate matter (FPM) at the exhaust stack (SV002) of the baghouse serving EU002
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

**TABLE 1-1
SUMMARY OF TEST PROGRAM**

Test Date(s)	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
8/31/2021	EU002	Velocity/Volumetric Flow Rate	EPA 1, 2	3	60
8/31/2021	EU002	O ₂ , CO ₂	EPA 3	3	60
8/31/2021	EU002	Moisture	EPA 4	3	60
8/31/2021	EU002	FPM	EPA 5	3	60

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized in Table 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3. The tests were conducted according to the Test Plan dated July 23, 2021 and approved by EGLE on August 13, 2021.

**TABLE 1-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
EU002**

Parameter/Units	Average Results	Emission Limits
Filterable Particulate Matter (FPM)		
grains/dscf	0.0023	0.04
lb/ton	0.0019	0.04

1.2 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location:	Elmer's Crane & Dozer 3600 Rennie School Road Traverse City, MI 49685	
Project Contact:	Tom Wolf	Brian Peace
Role:	Compliance Manager	Asphalt Division Manager
Company:	Elmer's Crane & Dozer	Elmer's Crane & Dozer
Telephone:	231-590-9269	231-218-5725
Email:	tw2095@teamelmers.com	bp777@teamelmers.com

Agency Information

Regulatory Agency:	Michigan Department of Environment, Great Lakes, and Energy	
Air Quality Division:	Lansing, Michigan	Cadillac, Michigan
Agency Contact:	Karen Kajjya-Mills	Caryn Owens
Telephone:	517-335-3122	231-878-6688
Email:	kajjya-millsk@michigan.gov	OwensC1@michigan.gov

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC	
Contact:	Matthew Young	David Trahan
Title:	District Manager	Field Project Manager
Telephone:	248-548-8070	248-548-8070
Email:	myoung@montrose-env.com	dtrahan@montrose-env.com

Laboratory Information

Laboratory: Montrose
City, State: Royal Oak, Michigan
Method: EPA Method 5

Test personnel and observers are summarized in Table 1-3.

**TABLE 1-3
TEST PERSONNEL AND OBSERVERS**

Name	Affiliation	Role/Responsibility
Shawn Jaworski	Montrose	Senior Field Technician, QI
Ben Durham	Montrose	Field Technician
Tom Wolf	Elmer's Crane & Dozer	Client Liaison/Test Coordinator/Observer
Brian Peace	Elmer's Crane & Dozer	Test Coordinator/Observer
Caryn Owens	EGLE	Observer

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2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

Elmer's Crane and Dozer operates a Hot Mix Asphalt (HMA) plant, consisting of a 600 tons per hour aggregate conveyors and 600 tons per hour counterflow drum mixer. Emissions from HMA are controlled by a baghouse.

2.2 FLUE GAS SAMPLING LOCATION

Information regarding the sampling location is presented in Table 2-1.

**TABLE 2-1
 SAMPLING LOCATION**

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
EU002 Baghouse Exhaust Stack	54.0	240 / 4.4	480 / 8.9	Isokinetic: 20* (10/port)

* Traverse points should be 24 (12/port). See Section 4.1 for details.

The sampling location was verified in the field to conform to EPA Method 1. See Section 4.1 for more information.

2.3 OPERATING CONDITIONS AND PROCESS DATA

EU002 and baghouse was tested when operating normally.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The process data that was provided is presented in Appendix B. Data collected during the August 31, 2021 test event includes the following parameters:

- Hot mix asphalt (HMA) production rate, ton/hr
- Mix temperature, °F
- Baghouse pressured drop, in-H₂O
- Reclaimed asphalt pavement (RAP) feed rate, ton/hr
- Virgin aggregate feed rate, ton/hr
- Number of mix designs used during testing

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 TEST METHODS

The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

3.1.2 EPA Method 2, Determination of Stack gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1. The molecular weight of the gas stream is determined from independent measurements of O₂, CO₂, and moisture. The stack gas volumetric flow rate is calculated using the measured average velocity head, the area of the duct at the measurement plane, the measured average temperature, the measured duct static pressure, the molecular weight of the gas stream, and the measured moisture.

3.1.3 EPA Method 3, Gas Analysis for the Determination of Dry Molecular Weight

EPA Method 3 is used to calculate the dry molecular weight of the stack gas using one of three methods. The first choice is to measure the percent O₂ and CO₂ in the gas stream. A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent CO₂ and percent O₂ using either an Orsat or a Fyrite analyzer.

3.1.4 EPA Method 4, Determination of Moisture Content in Stack Gas

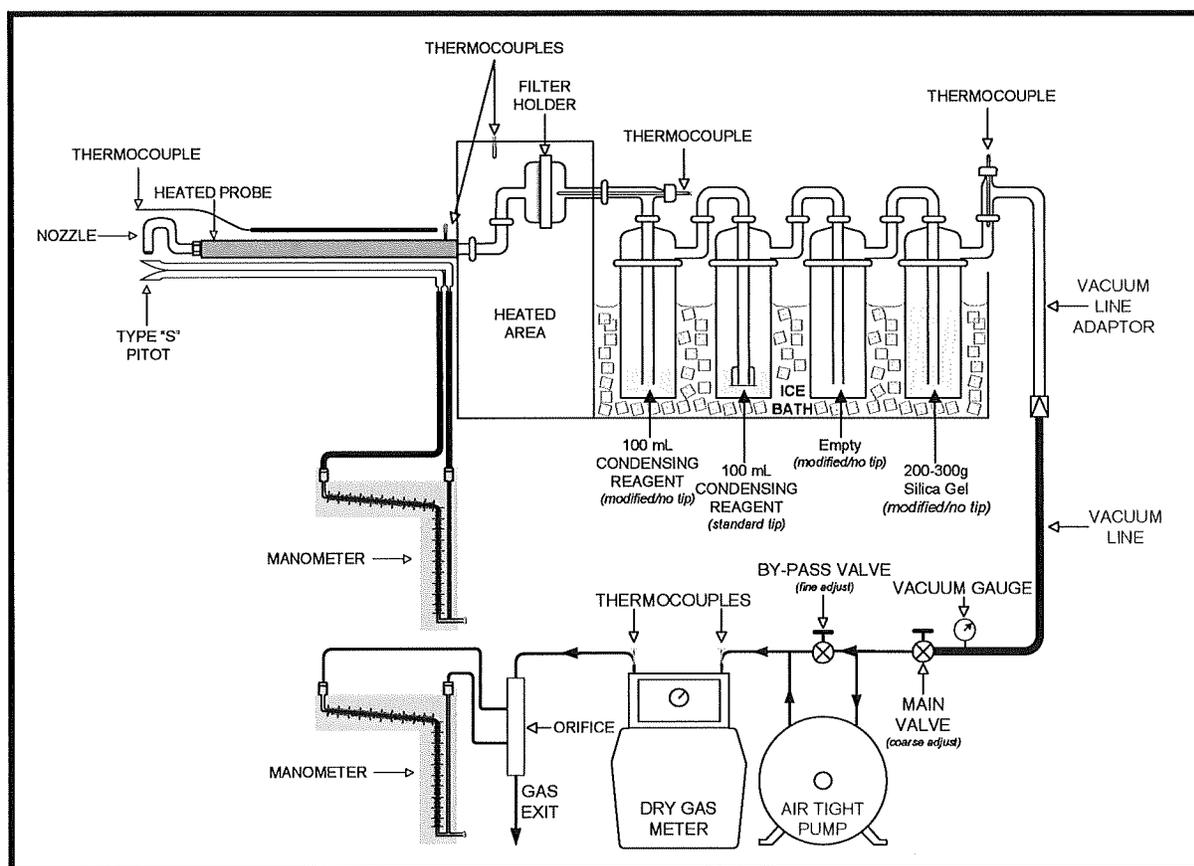
EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

3.1.5 EPA Method 5, Determination of Particulate Matter from Stationary Sources

EPA Method 5 is a manual, isokinetic method used to measure FPM emissions. The samples are analyzed gravimetrically. This method is performed in conjunction with EPA Methods 1 through 4. The stack gas is sampled through a nozzle, probe, filter, and impinger train. FPM results are reported in emission concentration and emission rate units.

The typical sampling system is detailed in Figure 3-1.

**FIGURE 3-1
EPA METHOD 5 SAMPLING TRAIN**



3.2 PROCESS TEST METHODS

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 TEST DISCUSSION AND RESULTS

4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

The EPA Method 1 Section 11.3 criteria based on the upstream and downstream stack diameters for EU002 Baghouse Exhaust Stack requires 24 traverse points (12/port). Instead, 20-traverse points (10/port) were used during this test event.

4.2 PRESENTATION OF RESULTS

The average results are displayed in Table 1-2. The results of individual test runs performed are presented in Table 4-1. Additional information is included in the appendices as presented in the Table of Contents.

Elmer's Crane & Dozer, Inc.
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**TABLE 4-1
FPM EMISSIONS RESULTS -
EU002**

Run Number	1	2	3	Average
Date	8/31/2021	8/31/2021	8/31/2021	--
Time	9:48-10:56	11:30-12:36	13:08-14:15	--
Process Data*				
HMA Production Rate, ton/hr	399.0	393.0	395.0	395.7
Flue Gas Parameters				
O ₂ , % volume dry	12.50	13.00	12.50	12.67
CO ₂ , % volume dry	5.00	5.00	5.00	5.00
flue gas temperature, °F	229.9	224.8	227.4	227.4
moisture content, % volume	31.21	31.72	31.08	31.34
volumetric flow rate, dscfm	37,566	37,614	37,693	37,621
Filterable Particulate Matter (FPM)				
gr/dscf	0.00245	0.00207	0.00234	0.00229
lb/hr	0.790	0.666	0.755	0.737
lb/ton	0.00198	0.00169	0.00191	0.00186

* Process Data provided by Elmer's Crane & Dozer facility personnel.

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA/QC AUDITS

The meter box and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, minimum sample durations, and percent isokinetics met the applicable QA/QC criteria.

Fyrite analyzer audits were performed during this test in accordance with EPA Method 3, Section 10.1 requirements. The results were within $\pm 0.5\%$ of the respective audit gas concentrations.

EPA Method 5 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met, except if noted in Section 5.2. An EPA Method 5 reagent blank was analyzed. The maximum allowable amount that can be subtracted is 0.001% of the weight of the acetone blank. The blank did not exceed the maximum residue allowed.

5.2 QA/QC DISCUSSION

All QA/QC criteria were met during this test program.

5.3 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).

APPENDIX A FIELD DATA AND CALCULATIONS

Appendix A.1 EU002 Sampling Locations

EU002 BAGHOUSE EXHAUST TRAVERSE POINT LOCATION DRAWING

