



Hot Mix Asphalt Plant Emissions Test Report

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AIR QUALITY DIV. *Prepared for:*
Bacco Construction Company

Iron Mountain Plant
N3676 North US-2
Iron Mountain, Michigan 49801

Project No. 17-5037.00
August 17, 2017

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(248) 548-8070



1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Bacco Construction Company (BCC) to evaluate particulate matter (PM) emission rates and exhaust gas opacity from a hot mix asphalt (EUHMAPLANT) plant at the BCC facility located in Iron Mountain, Michigan. The emission test program was conducted on June 23, 2017. 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 June 23, 2017 at the BCC facility located off U.S. Route 2, approximately 6 miles west of Crystal Falls, Michigan. The test program included evaluation of PM and opacity emissions from a single baghouse exhaust.

1.b Purpose of Testing

Permit to Install number 4-17 limits PM emissions from EUHMAPLANT to not more than 0.03 pound per ton of HMA paving material produced and 0.04 grams per dry standard cubic foot. Exhaust gas opacity is limited to not more than 20%

1.c Source Description

The test source is a hot mix asphalt (HMA) portable facility that includes aggregate conveyors, a counter flow drum mixer, and a fabric filter dust collector.

1.d Test Program Contacts

Names, addresses, and telephone numbers of the contacts for information regarding the test and the test report, and names and affiliations of all personnel involved in conducting the testing.

The contact for the source and test report is:

Mr. Kyle Fortier
Project Superintendent
Bacco Construction Company
N3676 North US-2
Iron Mountain, Michigan 49801
(906) 282-1002



EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Bacco Construction Company (BCC) to evaluate particulate matter (PM) emission rates and exhaust gas opacity from a hot mix asphalt (EUHMAPLANT) plant at the BCC facility located in Iron Mountain, Michigan. The emission test program was conducted on June 23, 2017.

Testing consisted of triplicate 60-minute test runs for PM, and triplicate 60-minute test runs for opacity not conducted concurrently with PM. The emissions test program was required by MDEQ Air Quality Division Permit to Install number 4-17. The results of the emission test program are summarized by Table I.

Table I
Overall Emission Summary
Test Date: June 23rd, 2017

Baghouse Exhaust		
Pollutant	Emission Limit	Average Emission Rate
PM	0.03 lb/ton of HMA paving material	0.003 lb/ton of HMA paving material
	0.04 grams per dscf	0.0002 grams per dscf
Opacity	20%	0%

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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
Mr. Kyle Fortier Project Superintendent	Bacco Construction Company N3676 North US-2 Iron Mountain, Michigan 49801	(906) 282-1002
Mr. Eric Dufek Plant Operator	Bacco Construction Company N3676 North US-2 Iron Mountain, Michigan 49801	(906) 282-0711
Mr. Brandon Chase Senior Environmental Engineer	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Steve Smith Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 744-9133
Mr. Joseph Scanlan	MDEQ Air Quality Division	(906) 458-6405

2. Summary of Results

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

2.a Operating Data

Process data monitored during the emissions test program included HMA production rate, baghouse pressure drop, virgin aggregate feed rate, RAP feed rate, fuel oil type burned, product temperature, and drum temperature. Process data is included in Appendix F.

2.b Applicable Permit

The applicable permit for this emissions test program is Permit to Install number 4-17.

2.c Results

The overall results of the emission test program are summarized by Table 2 (see Section 5.a), and detailed results are provided in Table 3. Emissions from the baghouse exhaust were below the corresponding limits for PM and opacity.



3. Source Description

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

3.a Process Description

The test source is a hot mix asphalt (HMA) portable facility that includes aggregate conveyors, a counter flow drum mixer, and a fabric filter dust collector.

The raw materials for the process are asphalt materials and fuel oil #2 or recycled used oil as well as aggregate and asphalt. The maximum allowable production rate is 400 tons per hour.

3.b Process Flow Diagram

Due to the simplicity of the HMA facility, a process flow diagram is not necessary.

3.c Raw and Finished Materials

The raw materials for the process are asphalt materials and fuel oil #2 or recycled used oil as well as aggregate and asphalt. The maximum allowable production rate is 400 tons per hour.

3.d Process Capacity

The maximum allowable production rate is 400 tons per hour.

3.e Process Instrumentation

Process data monitored during the emissions test program included HMA production rate, baghouse pressure drop, virgin aggregate feed rate, RAP feed rate, fuel oil type burned, product temperature, and drum temperature. Process data is included in Appendix F.

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

The emissions test program utilized the following test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - "Sample and Velocity Traverses for Stationary Sources"
- 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"
- Method 5 - "Determination of Particulate Matter Emissions from stationary sources"
- Method 9 - "Visual Determination of the Opacity From Stationary Sources"

40 CFR 60, Appendix A, Method 5, "*Determination of Particulate Emissions from Stationary Sources*" was used to measure PM concentrations and calculate appropriate emission rates (see Figure 2 for a schematic of the sampling train). Triplicate 60-minute test runs were conducted on the baghouse exhaust.

BTEC's Nutech[®] Model 2010 modular isokinetic stack sampling system consisted of (1) a stainless steel nozzle, (2) a glass probe, (3) a set of four Greenburg-Smith (GS) impingers with the first two with 100 ml of H₂O (ii) an empty impinger, (iii) and an impinger filled with approximately 300 grams of silica gel, (4) a length of sample line, and (5) a Nutech[®] control case equipped with a pump, dry gas meter, and calibrated orifice.

Upon completion of the final leak test for each test run, the filter was recovered, and the nozzle, probe, and the front half of the filter holder assembly were brushed and triple rinsed with acetone which was collected in a pre-cleaned sample container.

BTEC labeled each container with the test number, test location, and test date, then marked the level of liquid on the outside of the container. Blank samples of the filter and acetone were collected. BTEC personnel transported all samples to BTEC's laboratory in Royal Oak, Michigan, for analysis.

4.b Recovery and Analytical Procedures

Recovery and analytical procedures were described in Section 4.a.

4.c Sampling Ports

A diagram of the 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
Overall Emission Summary
Test Date: June 23rd, 2017**

Baghouse Exhaust		
Pollutant	Emission Limit	Average Emission Rate
PM	0.03 lb/ton of HMA paving material	0.003 lb/ton of HMA paving material
	0.04 grams per dscf	0.0002 grams per dscf
Opacity	20%	0%

5.b Discussion of Results

All emissions from the baghouse were less than the corresponding emission limits.

5.c Sampling Procedure Variations

There were no sampling variations used during the emission compliance test program.

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.

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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. Opacity sheets and certification documents are presented in Appendix E.

5.k Laboratory Data

Laboratory analytical results are provided in Appendix D.

**Table 3
Baghouse Particulate Matter Emission Rates**

Company	Bacco			
Source Designation	Baghouse			
Test Date	6/23/2017	6/23/2017	6/23/2017	
Meter/Nozzle Information				
	P-1	P-2	P-3	Average
Meter Temperature Tm (F)	62.6	67.9	69.5	66.6
Meter Pressure - Pm (in. Hg)	28.3	28.3	28.4	28.3
Measured Sample Volume (Vm)	59.9	62.2	63.8	62.0
Sample Volume (Vm-Std ft3)	57.2	58.9	60.2	58.8
Sample Volume (Vm-Std m3)	1.62	1.67	1.70	1.66
Condensate Volume (Vw-std)	21.218	21.359	20.510	21.029
Gas Density (Ps(std) lbs/ft3) (wet)	0.0676	0.0678	0.0681	0.0678
Gas Density (Ps(std) lbs/ft3) (dry)	0.0755	0.0755	0.0755	0.0755
Total weight of sampled gas (m g lbs) (wet)	5.31	5.44	5.50	5.41
Total weight of sampled gas (m g lbs) (dry)	4.32	4.45	4.54	4.44
Nozzle Size - An (sq. ft.)	0.000569	0.000569	0.000569	0.000569
Isokinetic Variation - I	99.4	99.9	97.8	99.1
Stack Data				
Average Stack Temperature - Ts (F)	276.3	272.7	268.6	272.5
Molecular Weight Stack Gas- dry (Md)	29.2	29.2	29.2	29.2
Molecular Weight Stack Gas-wet (Ms)	26.2	26.2	26.4	26.2
Stack Gas Specific Gravity (Gs)	0.904	0.905	0.910	0.906
Percent Moisture (Bws)	27.05	26.61	25.41	26.36
Water Vapor Volume (fraction)	0.2705	0.2661	0.2541	0.2636
Pressure - Ps ("Hg)	28.1	28.1	28.1	28.1
Average Stack Velocity -Vs (ft/sec)	54.8	55.6	56.8	55.7
Area of Stack (ft2)	17.1	17.1	17.1	17.1
Exhaust Gas Flowrate				
Flowrate ft ³ (Actual)	56,319	57,084	58,291	57,231
Flowrate ft ³ (Standard Wet)	37,969	38,676	39,714	38,786
Flowrate ft ³ (Standard Dry)	27,698	28,383	29,622	28,568
Flowrate m ³ (standard dry)	784	804	839	809
Total Particulate Weights (mg)				
Nozzle/Probe/Filter	10.0	16.4	14.8	13.7
Paving Material Produced				
Paving Material Produced (tons/hr)	250.0	300.0	340.0	296.7
Total Particulate Concentration				
lb/1000 lb (wet)	0.004	0.007	0.006	0.006
lb/1000 lb (dry)	0.005	0.008	0.007	0.007
mg/dscm (dry)	6.2	9.8	8.7	8.2
g/dscf	0.0002	0.0003	0.0002	0.0002
gr/dscf	0.0027	0.0043	0.0038	0.0036
Total Particulate Emission Rate				
lb/ hr	0.64	1.05	0.97	0.89
lb/ton of paving material produced	0.003	0.003	0.003	0.003

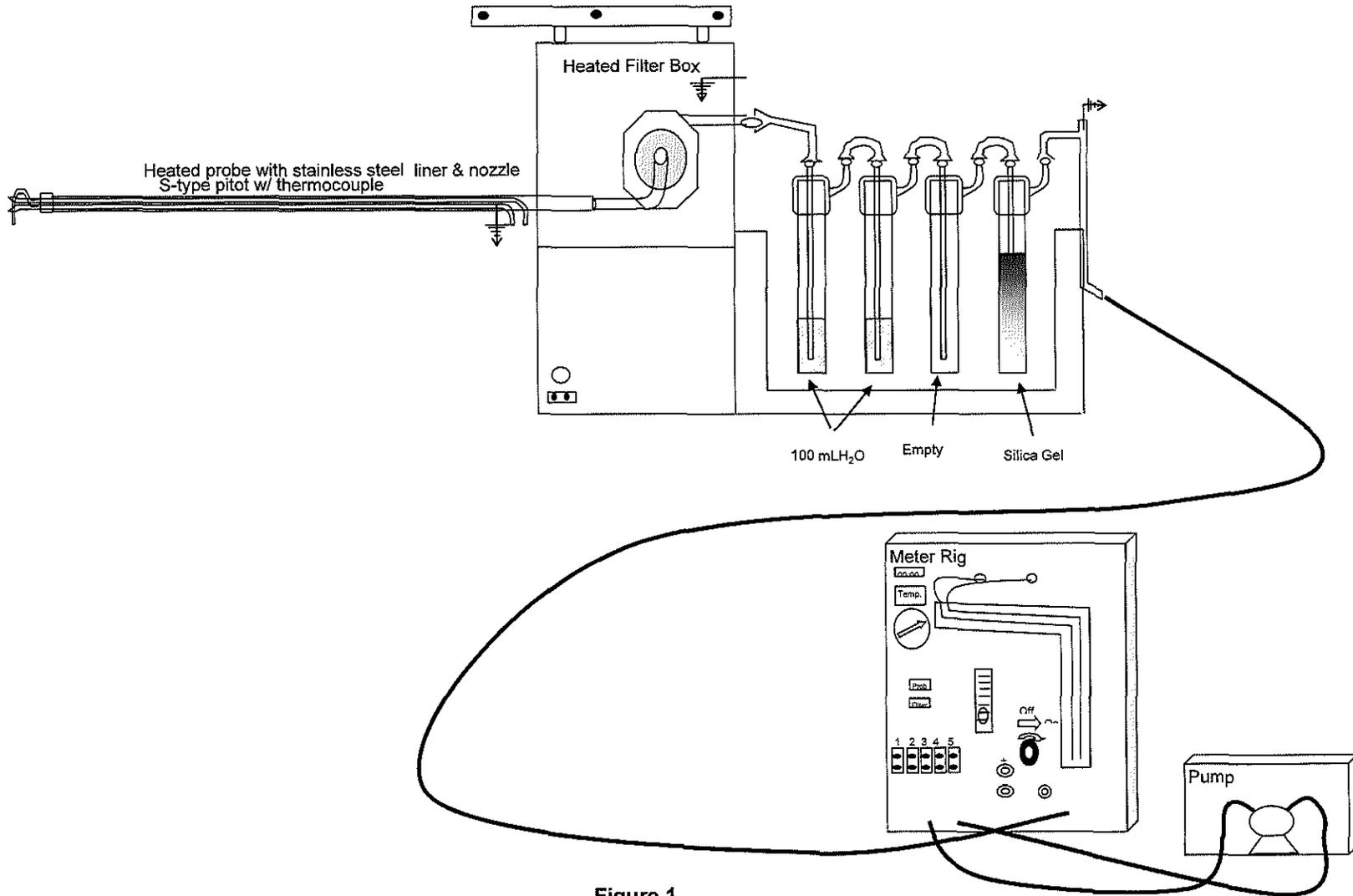


Figure 1

Site:
USEPA Method 5
Bacco Construction Company
Iron Mountain, Michigan

Sampling Date:
June 23, 2017

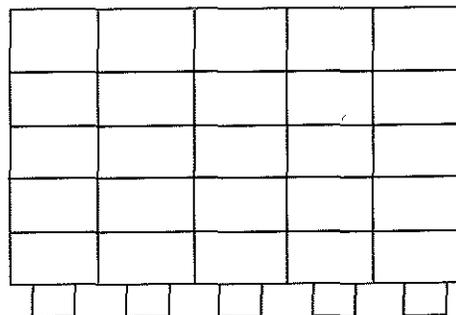
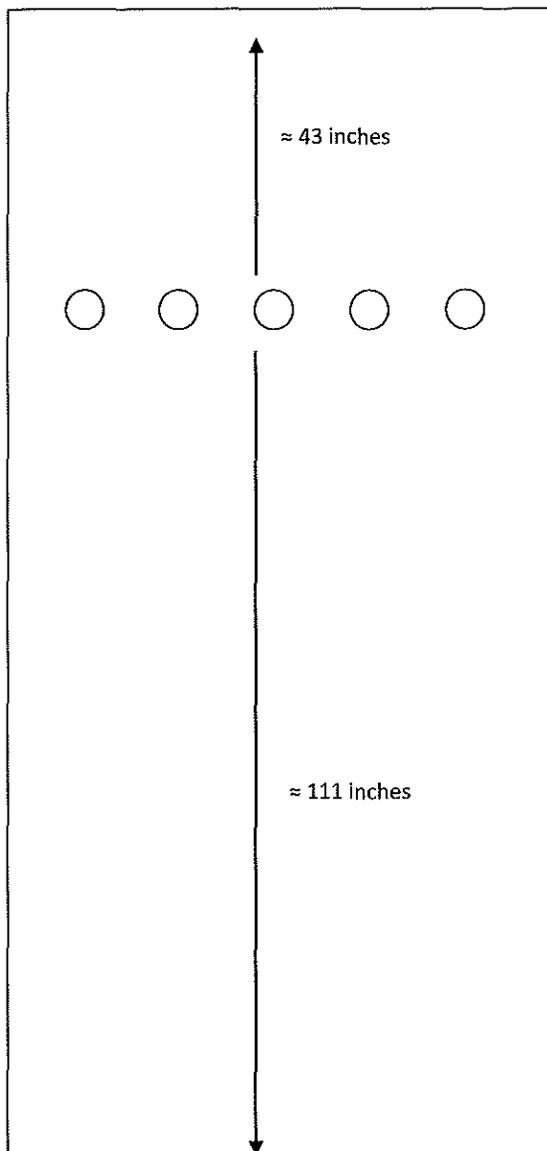
BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073



Stack Dimensions:

Depth: 42.5 inches

Width: 58 inches



Not to Scale

Points	Distance "
1	4.3
2	12.8
3	21.3
4	29.8
5	38.3

Figure No. 2

Site:
Baghouse Exhaust
Bacco Construction Company
Iron Mountain, Michigan

Sampling Date:
June 23, 2017

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