B5838

EXECUTIVE SUMMARY

Wilcox Environmental Engineering, Inc. – Air Analysis Services Division contracted with Rieth-Riley Construction Co., Inc., to sample air emissions at the Benton Harbor, Michigan facility on October 9th, 2014. The EU-HMA-CFLOW hot mix asphalt equipment exhausting to the Fabric Filter Dust Collector was tested. The objective of the testing was to evaluate compliance with particulate matter, carbon monoxide, and visible emissions limits in accordance with Michigan Department of Environmental Quality (MDEQ) Permit No. 110-87E. The following personnel were involved in the testing:

Wilcox Air Analysis Services	Marcus Allen
Wilcox Air Analysis Services	Ernie Brummett
Wilcox Air Analysis Services	Jason Wall
Rieth-Riley Construction	John Berscheit
MDEQ	Tom Gasloli
MDEQ	Matthew Deskins

The testing program was performed using US EPA Methods 1-4, 5, 9, 10, and 202. The test methods, stack identification, and test results crew summarized below.

Table 1. Emissions Sampling

Parameter	Methods	Location
Traverse Point Determination	EPA RM 1	Bag House Exhaust
Flow Rate / Gas Velocity	EPA RM 2	Bag House Exhaust
Gas Determination	EPA RM 3	Bag House Exhaust
Moisture Determination	EPA RM 4	Bag House Exhaust
Filterable Particulate Matter	EPA RM 5	Bag House Exhaust
Visible Emissions	EPA RM 9	Bag House Exhaust
Carbon Monoxide	EPA RM 10	Bag House Exhaust
Condensable Particulate Matter	EPA RM 202	Bag House Exhaust

Table 2. Emissions Summary

Date	Test Parameter	Result – Avg. of 3 Runs	Permit Limit
10/9/2014 8:50 – 14:32	Particulate Matter	0.0997 gr/dscf	0.04 gr/dscf
		0.1172 lbs/ton	0.04 lbs/ton
	Visible Emissions (Highest Rolling 6 min. Avg.)	19.8 %	20/27%
	Carbon Monoxide	0.1630 lbs/ton	0.1980 lbs/ton

Table 3. Emissions Results

Stack Gas Characteristics	Run 1 (8:50 – 9:50)	Run 2 (10:50 – 11:50)	Run 3 (13:32 – 14:32)	Average
Filterable (gr/dscf)	0.0796	0.0793	0.1401	0.0997
Filterable (lbs/ton)	**0.0929**	**0.0854**	**0.1734**	**0.1172**
Condensable (gr/dscf)	0.0329	0.0093	0.0084	0.0449
Condensable (lbs/hr)	10.8633	2.8459	2.9828	5.5640
Filterable + Condensable (gr/dscf)	0.1125	0.0886	0.1485	0.1165
Filterable + Condensable (lbs/ton)	0.1313	0.0954	0.1837	0.1368
Carbon Monoxide (lbs/ton)	**0.1805**	**0.1139**	**0.1946**	**0.1630**
Oxygen %	12.40	12.50	16.00	13.63
Carbon Dioxide %	4.00	3.50	4.00	3.83
Actual Cubic Feet / Minute	65966.50	61535.31	70704.34	66068.71
Dry Standard Cubic Feet / Minute	38568.09	35675.46	41622.46	38622.00
Avg. Stack Temp. (deg. F)	250.43	253.33	248.77	250.84
Stack Gas Velocity (feet/sec)	43.98	41.02	47.14	44.05
Avg. Velocity Head (inches)	0.4225	0.3648	0.4893	0.4255
Avg. Sq. Rt of Delta P (inches)	0.6500	0.6040	0.6995	0.6512
%Isokinetics (Vn/Vs)	96.44	102.21	84.41	94.35
% Moisture of Stack Gas	0.2167	0.2201	0.2132	0.2167
Sample Volume (cubic feet)	34.0006	33.3298	32.1168	33.1490

1.0 INTRODUCTION

1.1 Facility and Process Description

The tested source consists of hot mix asphalt equipment including aggregate conveyors, a 300 TPH counter flow unified drying/mixing drum, a warm mix asphalt foaming system and a fabric filter dust collector.

1.2 Site Test Plan

Testing employed EPA Methods 1-5 and 202 to determine filterable and condensable PM2.5/PM10 emissions; EPA Method 9 to determine opacity of visible emissions; and EPA Method 10 to determine carbon monoxide emissions. Three, 60 minute test runs were conducted with the source operating at normal load conditions. Temperatures and other parameters relevant to compliance and operation were recorded.

2.0 METHODOLOGY

The sampling procedures used by Wilcox Air Analysis Services are as follows:

Title 40 CFR Part 60 Appendix A
US EPA Method 1 "Sampling of Velocity Traverses for Stationary Sources"
US EPA Method 2 "Determination of Stack Gas Velocity and Volumetric Flow Rate"
US EPA Method 3 "Gas Analysis for the Determination of Molecular Weight"
US EPA Method 4 "Determination of Moisture Content in Stack Gas"
US EPA Method 5 "Determination of Particulate Matter Emissions"
US EPA Method 9 "Determination of Visible Emissions"
US EPA Method 10 "Determination of Carbon Monoxide Emissions from Stationary Sources"
US EPA Method 202 "Determination of Condensable Particulate Matter"

2.1 Sample Point Determination-EPA Method 1

Sampling point locations were determined according to EPA Reference Method 1.

Table 2-1. Sampling Points

Locations	Dimensions	Ports	Points Per Port	Total Points
Stack 1 Particulate Traverse	60" x 60"	5	5	25

** Exact measurement points and distances to disturbances are listed in Appendix C - Field Data.

2.2 Velocity and Volumetric Flow Rate – EPA Method 2

EPA Method 2 was used to determine the gas velocity and flow rate at the stack. Each set of velocity determinations included the measurement of gas velocity pressure and gas temperature at each of the Method 1 determined traverse points. The velocity pressures were measured with a Type S pitot tube. Gas temperature measurements were made with a Type K thermocouple and digital pyrometer.

2.3 Gas Composition and Molecular Weight – EPA Method 3

The oxygen and carbon dioxide concentrations were determined in accordance with EPA Method 3/3A. One (1) integrated Tedlar bag sample was collected during each test run. The bag samples were analyzed on site with a combustion gas analyzer. The remaining stack gas constituent was assumed to be nitrogen for the stack gas molecular weight determination.

2.4 Moisture Content – EPA Method 4

The flue gas moisture content at the testing locations was determined in accordance with EPA Method 4. The gas moisture was determined by quantitatively condensing moisture in the chilled impingers and silica absorption. The amount of moisture condensed was determined gravimetrically. A dry gas meter was used to measure the volume of gas sampled. Moisture content is used to determine stack gas velocity.

2.5 Determination of Filterable PM– EPA Method 5

Particulate matter (PM) is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature of 120 ± 14°C (248 ± 25°F) or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator for a particular application. The PM mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after the removal of uncombined water. A diagram of the Method 5 train is shown in Appendix I, Figure 2-1.

2.6 Visible Emissions – EPA Method 9

Stack opacity readings are taken for 60 minutes at 15 second intervals for NSPS and 30 minutes at 15 second intervals for state permitted, non-federal sources, by a certified visible emissions reader. The visible emissions reading are conducted during each of the particulate test runs. The results are reported as an average opacity reading for the testing period. A copy of the visible reader's current certification is included in the Appendix.

2.7 CO Determination – EPA Method 10

Stack gas is withdrawn from the stack at a rate proportional to the stack gas velocity for the duration of each test run and conditioned (moisture is removed) before it is collected into a Tedlar or equivalent flexible bag and then analyzed by an infra-red detection analyzer. CO molecules are absorbed by specific wave lengths. Molecular absorption is directly proportional to the concentration of CO. Quality assurance of the analyzer is first determined by direct injection of known EPA protocol 1 gas concentrations. This process is known as integrated sampling. A system check of the probe, connection lines, and conditioner is also performed prior to and after each sample period to determine drift bias.

2.8 Determination of Condensable PM – EPA Method 202

The CPM is collected in dry impingers after filterable PM has been collected on a filter maintained as specified in either Method 5 of Appendix A-3 to part 60, Method 17 of Appendix A-6 to part 60, or Method 201A of Appendix M to this part. The organic and aqueous fractions of the impingers and an out-of-stack CPM filter are then taken to dryness and weighed. The total of the impinger fractions and the CPM filter represents the CPM.

3.0 LIMITATIONS AND SIGNATURES

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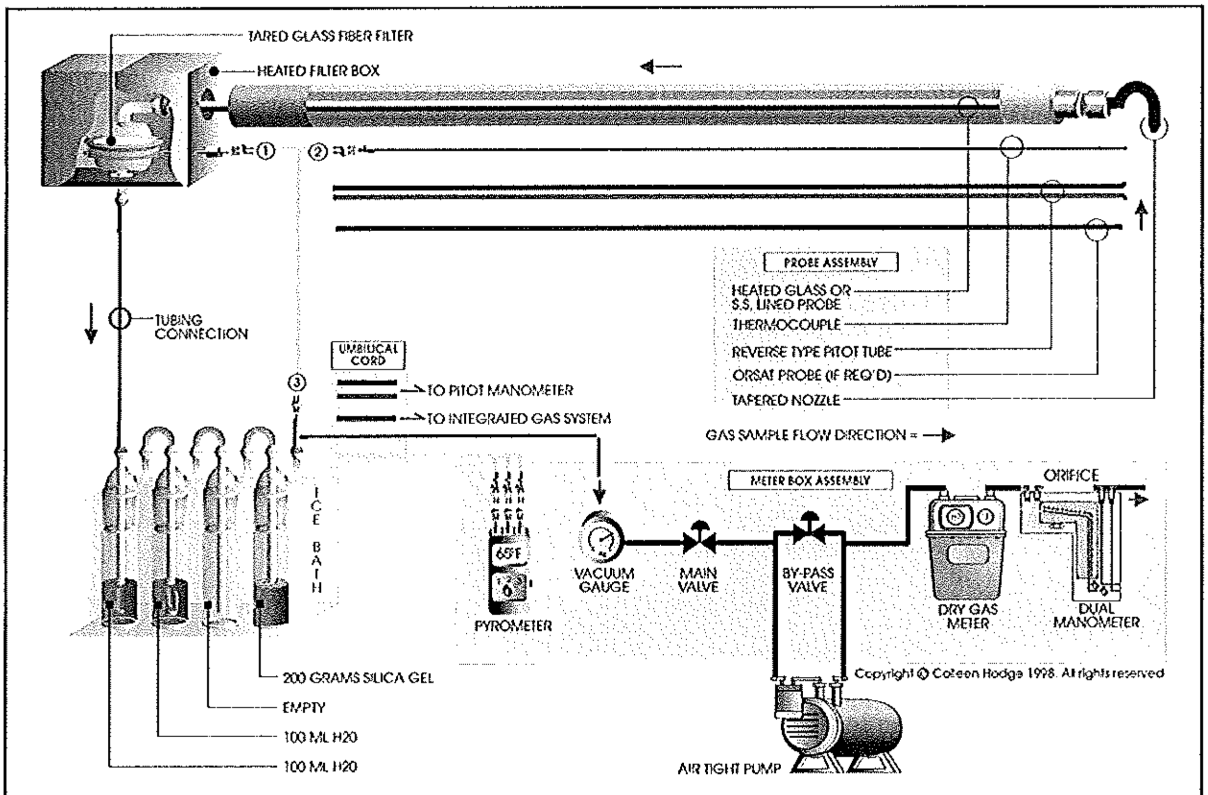
Sincerely,
Wilcox Environmental Engineering, Inc.

Ernest Brummett
Project Engineer

Bob Willis
Technical Director

FIGURES

Figure 2-1. Method 5 Train



U.S. EPA Method 5 Sampling Train