H & H MONITORING, INC.

DETERMINATION OF PARTICULATE EMISSIONS
PERMIT NO. 211-08
EMISSION UNIT:
EU-STEELRECLAIM

RECEIVED
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AIR QUALITY DIVISION

PREPARED FOR:

GMA INDUSTRIES
38127 ECORSE ROAD
ROMULUS, MICHIGAN 48174

SUBMITTED:

JANUARY 18, 2018
PROJECT NUMBER 1709-001

PREPARED BY:

H & H MONITORING, INC.
17022 BETHEL CHURCH ROAD
MANCHESTER, MICHGAN 48158

(734) 428-9659

EXECUTIVE SUMMARY

H & H Monitoring was retained by GMA Industries (GMAI) to perform a particulate matter (PM) including particulate with a nominal diameter of 10 micron and smaller (PM10) emission survey on the emission Unit EU-STEELRECLAIM INSTALLED AT THE GMA Industries Romulus, Michigan plant. The evaluation was performed in accordance with Michigan Department of Environmental Quality (MDEQ) Air Quality Division (AQD) Permit No. 211-08.

The testing was performed in accordance with the procedures stipulated in USEPA Methods 1 through 5. H & H Monitoring professionals conducted the field services on December 20, 2017. Representatives of GMAI coordinated the testing with process operations. MDEQ personnel monitored the testing activities.

AVERAGE EMISSIONS

EU-STEELRECLAIM	Emission Rate	
	lb/1000lbs (PM)	lb/hr
Test Result	0.003	0.091(PM)
PTI Limit	0.010	1.08(PM10)

Lb/1000lbs: pound per 1000 pounds of exhaust gas
Lb/hr: Pounds per hour

1.0 INTRODUCTION

GMA Industries (GMAI) retained H & H Monitoring, Inc. (HHMI) to conduct a particulate emissions survey on a dust collector identified as Emission Unit EU-STEELRECLAIM. The purpose of this testing is to provide emissions data to demonstrate compliance with the requirements stipulated in Permit to Install No. 211-08.

Messrs. Brad Wallace and Daniel Hassett conducted the fieldwork for this study on December 20, 2017.

The following sections of this report detail the results obtained and describe the techniques used in the performance of this testing program. A description of the process tested is presented in Section 2.0. A summary of sampling and analytical procedures used during the testing is provided in Section 3.0. A discussion of the test results is presented in Section 4.0. A summary of the quality assurance procedures is presented in Section 5.0. Result Tables 1 and 2 present the findings from testing activities. Figures 1 and 2 contain diagrams of the traverse point locations for each dust collector and the sampling train. Appendix A presents the test methods example calculations used for the emissions study. Appendix B contains quality assurance information. Appendix C contains copies of the field and calculation data sheets. Appendix D presents the particulate laboratory data. Appendix E contains process data sheets. Appendix F includes the MDEQ approved test plan for this test program.

2.0 PROCESS DESCRIPTION

A combination of equipment used to process material into usable product. The equipment used consists of a scalping screen, feed hopper, air wash station, heat tube/rotary kiln, cooling tube, four screens, bucket elevators and vibratory feeders. All equipment is controlled by a dust collector.

The following shows the set points and corresponding feed rate. 1=2000#/hr; 2=4000#/hr; 3=6000#/hr; 4=8000#/hr; 5=10,000#/hr. Normal operation is at a rheostat setting of 3.

The capacity of EU-STEELRECLAIM is 8000 pounds per hour.

Process operating rate during the testing is included in Appendix D. The process was operated at maximum capacity during the test periods.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 Sampling Sites Description

Test ports for EU-STEELRECLAIM are installed down stream of the dust collector on the 30-inch diameter stack at approximately 200 inches downstream from a 90° elbow and 48.0 inches upstream of from a 90° elbow.

Figures 1 depicts the sampling and traverse point locations.

3.2 Sampling Procedures

Sampling and analytical procedures employed during the performance of this survey were conducted in accordance with USEPA Methods 1, 2, 3, 4 and 5 found in USEPA 40 CFR, Part 60, Appendix A. A summary of the test procedures is presented below.

Method 1 ***Sample and Velocity Traverses for Stationary Sources***

This method was used to determine the number of traverse points for flow rate measurement at the dust collector exhaust stack. The approximate number of up-stream and downstream duct diameters from the sampling ports to the nearest flow disturbance were measured. Based on these measurements, the appropriate number of traverse points were chosen for the purpose of determining the volumetric flow rate of the flue gas.

Method 2: ***Determination of Stack Gas Velocity and Volumetric Flow Rate (Type-S Pitot Tube)***

This method was used to measure velocity pressures and temperatures at each traverse point. A calibrated Type-S pitot tube equipped with a thermocouple was located at each of the sample points and the exhaust gas temperature and velocity pressure were measured and recorded. The Type-S Pitot tube was calibrated in accordance with the specifications outlined in Method 2. Measurement readings were made using a manometer capable of measuring to the nearest 0.01 inch of water. Temperature readings were made using a calibrated pyrometer.

The average stack gas velocity is a function of average velocity pressure, absolute stack pressure, average stack temperature, molecular weight of the wet stack gas, and Pitot tube coefficient. Determination of average stack gas velocity was performed in accordance with equations presented in Method 2. Actual exhaust gas flow rate was determined from the average stack gas velocity and stack dimensions. Exhaust gas flow rate data is provided in Table 2.

Method 3: ***Gas Analysis for the Determination of Dry Molecular Weight***

This method was used to determine the molecular weight of the exhaust gas at the sampling location. A grab sample of exhaust gas was withdrawn from the exhaust of the dry gas meter directly into Fyrite analyzer cells which immediately analyze the exhaust gas for oxygen and carbon dioxide.

Method 4: ***Determination of Moisture Content in Stack Gases***

This method, employed in conjunction with Method 5, was used to measure the moisture in the exhaust gases. A gas sample was extracted from the source and moisture present in the gas sample was condensed in a series of impingers. The impingers each contained a known amount of water and/or silica gel prior to the start of each test run. At the conclusion of each test run, the volumes of the liquid contained in the impingers were measured and recorded, and the silica gel impinger was weighed and recorded.

The percent of moisture in the exhaust gas was determined based on the volume of gas sampled and water condensed. The percent moisture by volume of the exhaust gas, at standard temperature and pressure (68 degrees Fahrenheit and 29.92 inches of mercury), was determined in accordance with equations presented in Method 4. Moisture data from the source is shown in Table 2.

Method 5: ***Determination of Particulate Emissions from Stationary Sources***

This method was used to determine particulate emission. The sampling train consisted of a glass-lined, heated probe equipped with a stainless steel buttonhook nozzle, a glass filter holder containing a binderless, high purity glass filter (Type A/E) inside a heated compartment, and a series of Greenburg-Smith impingers. The first two impingers each contained 100 milliliters of water, the third impinger was empty, and the fourth impinger contained a known weight of silica gel. The silica gel impinger outlet was connected to a sample control case containing a pump, dry gas meter, and a calibrated orifice by a length of flexible sample line. An illustration of the Method 5 Sample Train is depicted in Figure 3.

Sampling was performed isokinetically. The percent isokinetic sampling was calculated to

determine whether each run was valid based on an allowable variance. In accordance with Method 5, the allowable variance is 90 percent to 110 percent.

Prior to the start of sampling, tare weights for filters and rinse dishes were determined. The filters and rinse dishes were desiccated for 24 hours, weighed, then desiccated for 6 hours and re-weighed until two consecutive weights varied by less than 0.5 milligram (mg), as required by Method 5. The average of the two consecutive allowable weights was used for the tare weight.

At the conclusion of sampling, the nozzle, probe liner, and front half of the filter holder were brushed and rinsed with acetone into a labeled polyethylene sample bottle. The filter was recovered and placed into a labeled petri dish. The sample containers were transported to the HHMI laboratory for gravimetric analysis.

The contents of the first three impingers were measured gravimetrically to within 0.5 grams which was recorded. The fourth impinger was also weighed and the weight recorded.

At the laboratory, the volumes of the acetone rinses were measured and placed into the pre-weighed weigh pans and evaporated. The filters and weigh pans were desiccated for 24 hours, weighed, then desiccated for 6 hours and re-weighed until two consecutive weights agreed to within ±0.5 mg. The average of the two consistent weights was used for the post test weight. The post-test weight minus the pre-test weight yielded the net weight of particulate collected. The filters and rinse dish weights were determined on a single analytical balance to the nearest 0.1 milligram. Results of particulate sampling can be found in Table 1.

4.0 DISCUSSION OF RESULTS

The test results provided via this testing program is intended for use to demonstrate compliance with the requirements stipulated in Permit to Install No. 211-08. In accordance with the approved test plan, PM was measured and is used to demonstrate compliance with the PTI limitation. The PM and PM_{10} have the same emission limit detailed in the PTI, therefore when the total PM meets the required limit, so will the filterable PM_{10} ($PM=PM_{10}$).

The particulate emission testing performed in accordance with the approved test plan for emission unit EU-STEELRECLAIM yielded an average PM emission rate of 0.003 pound per 1000 pounds of exhaust gas (lb/1000lbs) and 0.091 pound per hour (lb/hr). Detailed test results and individual run data can be found in Table 1.

During the emission testing, the above emission unit was operated at normal maximum conditions. Appendix D contains the process information collected during the testing. A copy of the MDEQ approved test plan can be found in Appendix E.

5.0 QUALITY ASSURANCE

Where applicable, routine reference method quality control procedures were followed throughout the study. Quality assurance information for field equipment and instrumental analyzer sampling systems is provided in Appendix B. The procedures included, but were not limited to the following:

FIELD SAMPLING EQUIPMENT

- Sampling equipment was calibrated according to procedures contained in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III," EPA 600/4-77-027b. The calibration data for this study are summarized in the table entitled Field Equipment Calibration, which is presented in Appendix B. This table also presents confirmation of equipment calibrations being within stipulated allowable variances.

- The sample trains were configured according to the appropriate test methods.

- Quality control checks of sample trains were performed on-site, including sample train and Pitot tube leak checks.

- Pre/post test equipment calibration was performed as required.

6.0 LIMITATIONS

This report is provided to GMA Industries in response to a limited assignment. HHMI will not provide any information contained in, or associated with, this report to any unauthorized party without expressed written consent from GMA Industries, unless required to do so by law or court order. HHMI accepts responsibility for the performance of the work, specified by the limited assignment, which is consistent with others within the industry, but disclaims any consequential damages arising from the information contained in this report.

This report is intended solely for the use of GMA Industries. The scope of services performed for this assignment may not be appropriate to comply with the requirements of other similar process operations, facilities, or regulatory agencies. Any use of the information presented in this report, for purposes other than the defined assignment, is done so at the sole risk of the user.

This emission testing program was conducted and report developed by the following HMMI personnel:

Brad Wallace
Site Leader

Daniel L. Hassett
President

TABLE 1
PARTICULATE EMISSION RESULTS
EU-STEELRECLAIM
GMA Industries
Romulus, MI
December 20, 2017

Test Run Number	Date	Time		Concentration lb/1000 lbs (dry)	Emission Rate lb/hr
1	12/20	8:29	9:48	0.003	0.095
2	12/20	10:17	11:25	0.003	0.091
3	12/20	11:45	12:52	0.003	0.087
AVERAGES				0.003	0.091

lb/1000 lbs: pound per 100 pounds of exhaust gas

lb/hr: pounds per hour

TABLE 2
STACK GAS FLOWRATES AND COMPOSITION
EU-STEELRECLAIM
GMA Industries
Romulus, MI
December 20, 2017

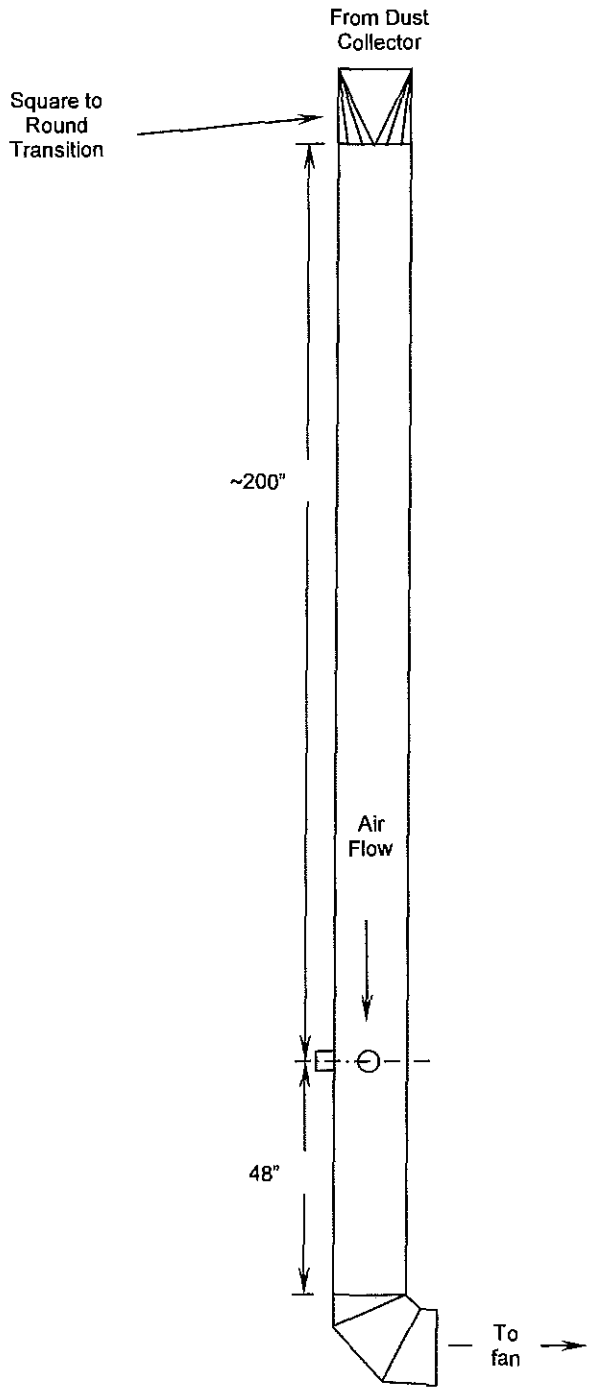
Test Run Number	Date	Time		Velocity fps	Volumetric Flow Rate acfm	scfm	dscfm	Stack Temp.(deg.F)	Moisture %	O_2 %	CO_2 %
1	12/20	8:29	9:48	25.5	7,507	7,635	7,591	61.0	0.6	21.0	0.0
2	12/20	10:17	11:25	24.3	7,152	7,095	7,049	74.1	0.7	21.0	0.0
3	12/20	11:45	12:52	24.5	7,223	7,199	7,154	71.6	0.6	21.0	0.0
AVERAGES				24.8	7,294	7,310	7,265	68.9	0.6	21.0	0.0

Fps: feet per second

acfm: actual cubic feet per minute

scfm: standard cubic feet per minute

dscfm: dry standard cubic feet per minute



Traverse Point Locations	
Stack Dia.:	30
Point #	Distance from Stack wall
1	1.32
2	4.38
3	8.88
4	21.12
5	25.62
6	28.68

NO SCALE

Note: The stack is directed downward into the fan which is attached to an open face filter downstream from the fan.

FIGURE 1

PROPOSED TEST PORT AND TRAVERSE POINT LOCATION
EU-STEELRECLAIM

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ROMULUS, MICHIGAN

DRAWN DLH 11/7/17	DRAWING NUMBER 1709001-1
REVISED DLH 1/12/18	

JOB NO. 1709-001

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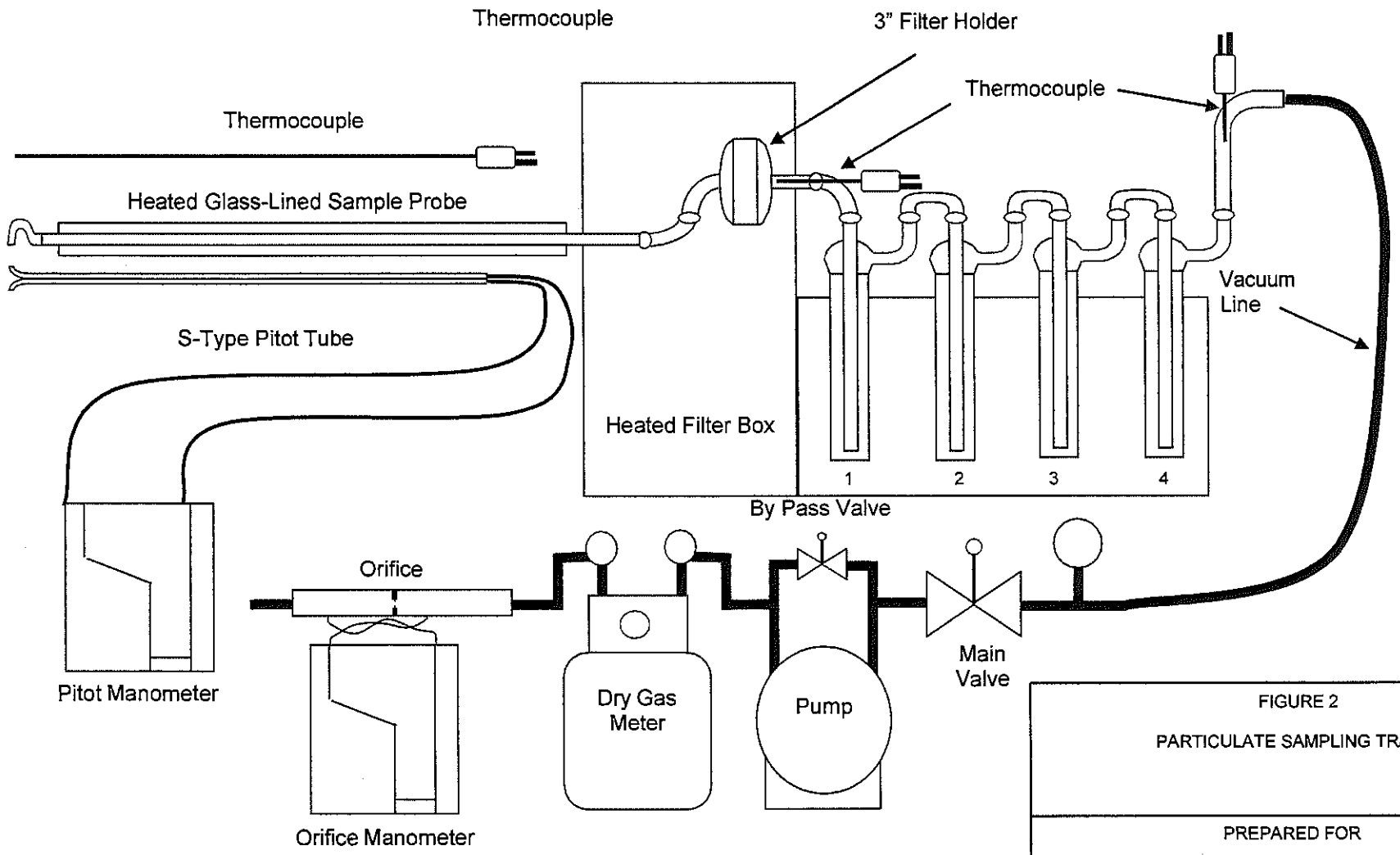

Impinger #1 : 100 ml H_2O
Impinger #2 : 100 lm H_2O
Impinger #3 : Empty
Impinger #4 : Silica Gel

FIGURE 2

PARTICULATE SAMPLING TRAIN

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