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Report of...

JUN 27 2023

Compliance Emission Testing

AIR QUALITY DIVISION

performed for...



CWC Textron
Muskegon, Michigan

on the

Cupola Exhaust

April 11, 2023

209.03

Network Environmental, Inc.
Grand Rapids, MI

B1909_test-20230411

✓

Performed For:

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I. INTRODUCTION

Network Environmental, Inc. was retained by CWC Textron of Muskegon, Michigan to perform compliance emission testing on their Foundry Cupola Exhaust. The purpose of the sampling was to comply with their Air Permit # MI-ROP-B1909-2019a and the Federal Iron and Steel Foundry Area Source Standards (FG-MACT-ZZZZZ). The testing was for the following selected compounds:

- * Metal HAPS – Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Mercury, Nickel, and Selenium
- * Particulates

Sampling was conducted on the exhaust by employing the following reference test methods:

- * Metals - U.S. EPA Method 29/EPA Method 5
- * Particulate – U.S. EPA Method 5
- * Exhaust Gas Parameters (airflow rate, temperature, moisture & density) - U.S. EPA Methods 1-4
- * Visible Emissions – U.S. EPA Reference Method 9 (Plant Wide)

The sampling was conducted on April 11, 2023. R. Scott Cargill, David D. Engelhardt and Richard D. Eerdmans of Network Environmental, Inc. performed the testing. Mr. Bob Meacham of CWC Textron was present to coordinate source operations and data recording and collection during the testing. Mr. Eric Grinstern and Mr. Trevor Drost of the Michigan Department of Environment, Great Lakes and Energy (EGLE), Air Quality Division, were present to observe the testing and source operation.

II. PRESENTATION OF RESULTS

**II.1 TABLE 1
TOTAL METAL HAP's EMISSION RESULTS
CUPOLA SCRUBBER EXHAUST
CWC TEXTRON
MUSKEGON, MICHIGAN
APRIL 11, 2023**

Sample	Time	Air Flow Rate DSCFM	Total Metal HAP's Concentration Grains/DSCF	Total Metal HAP's Mass Rates	
				Lbs/Hr	Lb/Ton
1	9:21-12:15	55,925	5.47E-04	2.63E-01	1.21E-02
2	13:28-16:07	53,776	5.78E-04	2.68E-01	9.59E-03
3	17:31-20:20	56,609	2.31E-04	1.12E-01	4.96E-03
Average		55,437	4.52E-04	2.14E-01	8.89E-03

- (1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 70 °F & 29.92 in. Hg)
- (2) Grains/DSCF = Grains Per Dry Standard Cubic Foot
- (3) Lbs/Hr = Pounds Per Hour
- (4) Lb/Ton = Pound Per Ton of Metal Charged

**II.2 TABLE 2
 PARTICULATE EMISSION RESULTS
 CUPOLA EXHAUST
 CWC TEXTRON
 MUSKEGON, MICHIGAN
 APRIL 11, 2023**

Sample #	Time	Air Flow Rate DSCFM	Concentration Lbs/1000Lbs, Dry ⁽¹⁾	Lbs/Hr ⁽²⁾	Lbs/Ton Charge ⁽³⁾
1	9:21-12:15	55,925	0.0281	7.225	0.3320
2	13:28-16:07	53,776	0.0385	9.521	0.3414
3	17:31-20:20	56,609	0.0318	8.225	0.3628
Average		55,437	0.0328	8.324	0.3454

- (1) = Pounds of particulate per 1000 pounds of exhaust gas on a dry basis.
 (2) = Pounds of particulate per hour
 (3) = Pounds per ton of metal charged

III. DISCUSSION OF RESULTS

The results of the emission testing performed on April 11, 2023 can be found in Section II, Tables II.1. through II.2.

The ROP Particulate emission limit for this source is 0.15 Lbs/1000Lbs, Dry. The Area Source limit for particulate is 0.8 pounds per ton of metal charged or 0.06 pounds of total metal HAP per ton of metal charged.

The opacity limit is 20% six minute average except for one 6-minute average per hour that does not exceed 30%.

The visible Emissions highest 6 minute average was 7.29%

The calculated results for each individual metal HAP can be found in Appendix E (Calculations).

IV. SOURCE OPERATION

The cupola operating parameters can be found in Appendix B.

V. SAMPLING AND ANALYTICAL PROTOCOL

The determinations were performed in accordance with the following sampling and analytical protocols. Laboratory data can be found in Appendix C.

V.1 Particulate/Metals - The metals (arsenic, antimony, beryllium, cadmium, chromium, cobalt, mercury, lead, manganese, nickel, and selenium) and particulate emission sampling were conducted in accordance with U.S. EPA Method 29 (multiple metals train) and EPA Method 5. Figure 1 is a schematic diagram of the Method 29/5 sampling train. Each sample was one hundred twenty (120) minutes in duration and had a minimum sample volume of sixty (60) dry standard cubic feet. The samples were collected isokinetically on quartz filters, and in a nitric acid/hydrogen peroxide solution and a potassium permanganate solution.

The metals & particulate emission sampling was conducted by employing U.S. EPA Method 29 (combined with Method 5 for particulate). This is an out of stack filtration method, where the sampling probe and filter are heated at 248 °F (plus or minus 25 °F).

Each sample was one hundred twenty (120) minutes in duration and had minimum sample volumes of sixty (60) dry standard cubic feet (DCF). The samples were collected isokinetically on quartz filters, and in an impinger train consisting of five (5) total impingers. The first two impingers contained 100 mls each of a nitric acid/hydrogen peroxide solution. The third impinger was empty. The fourth and fifth impingers contained 100 mls each of an acidic potassium permanganate solution.

Prior to the metals analysis, the nozzle/probe rinses & filters were analyzed for particulate by gravimetric analysis. The nozzle/probe rinses, filters and nitric acid/hydrogen peroxide solutions were analyzed for all the metals (except Hg) by inductively coupled argon plasma/mass spectrophotometry (ICAP/MS) analysis in accordance with Method 29. The nozzle/probe rinses, filters, nitric acid/hydrogen peroxide solutions and acidic potassium permanganate solutions were analyzed for Hg by cold vapor atomic absorption spectrophotometry (CVAAS) analysis in accordance with Method 29. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. Figure 1 is a diagram of the sampling train.

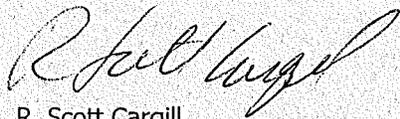
V.2 Visible Emissions - The visible Emissions were performed in accordance with U.S. EPA Reference Method 9. Observations were performed plant wide per the method. Observations were performed for three consecutive hours (one per each PM/Metals sample). Readings were taken at fifteen second intervals in accordance with the method. Readings were recorded in five percent opacity increments.

V.3 Exhaust Gas Parameters - The exhaust gas parameters (airflow rate, temperature, moisture, and density) were determined in conjunction with the other sampling by employing U.S. EPA Reference Methods 1 through 4. All the sampling was conducted on the exhaust stack. There were two sampling ports on the exhaust located at 90 degrees from each other and on the same plane. The test port location met the optimum location criteria of U.S. EPA Method 1. A twelve point (six points per port) traverse was used to perform the sampling. The stack is 84 inches in diameter. The sampling points were as follows:

Point #	Point Location (Inches)
1	3.70
2	12.26
3	24.86
4	59.14
5	71.74
6	80.30

O₂ and CO₂ content were determined by Orsat Method. The moisture was determined from the isokinetic sampling trains. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:



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Project Manager

This report was reviewed by:



David D. Engelhardt
Vice President

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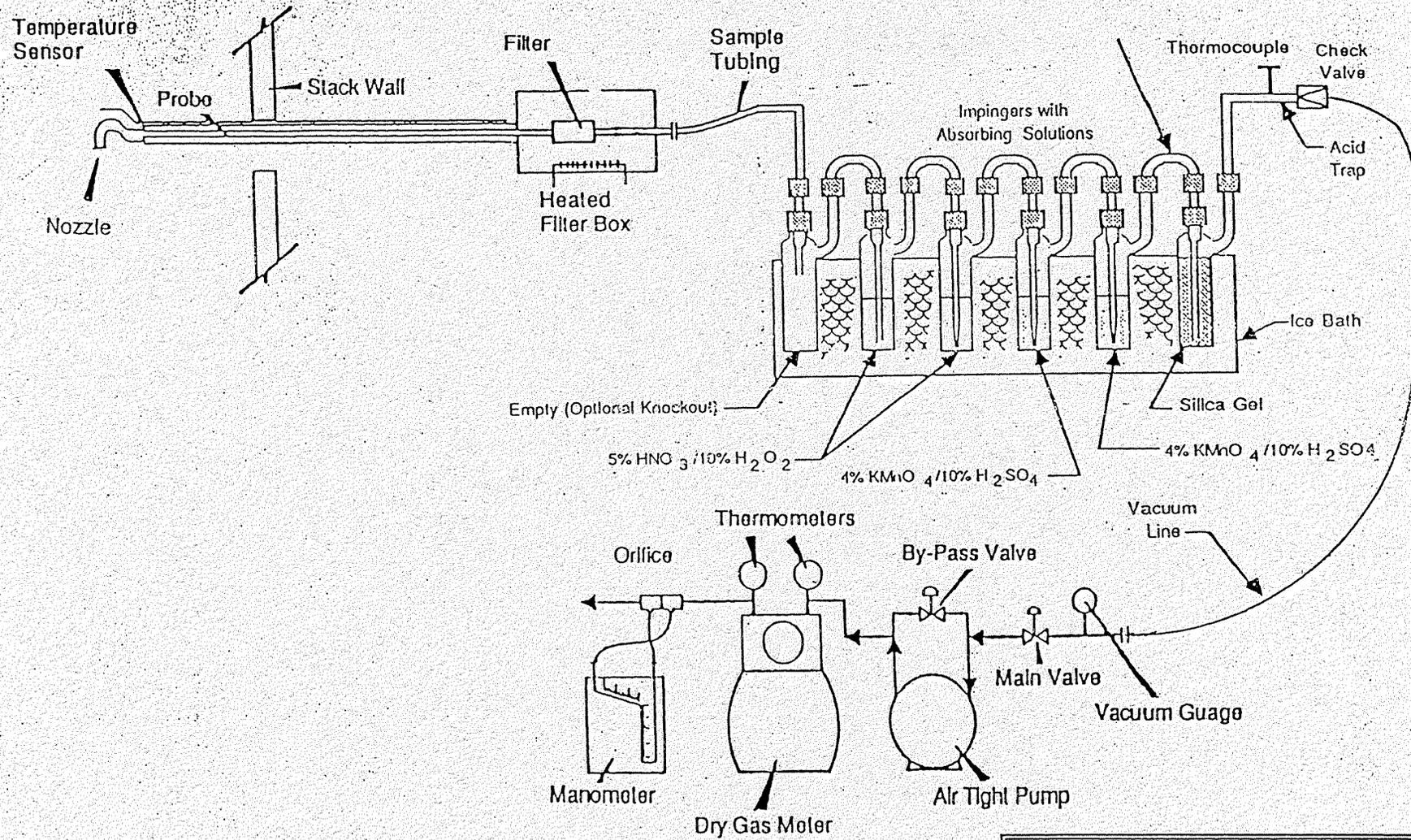


Figure 1
 Particulate/Metals Sampling Train