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Report of...

AIR QUALITY DIVISION

Particulate Emission Sampling

Performed for...

Huron Casting, Inc.
Pigeon, Michigan

On the...

Pouring Lines A & B (Huron Casting), No Bake
Line & Shell Furnace Line (Blue Diamond Casting)

December 13-16, 2022

Project #: 329.01

By...

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performed for

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I. INTRODUCTION

Network Environmental, Inc. was retained by Huron Casting, Inc. of Pigeon, Michigan (SRN: B7013 - Huron County) to conduct particulate emission sampling at their facility and at their Blue Diamond Casting facility. The purpose of the sampling was to meet the testing requirements of the State of Michigan Renewable Operating Permit (ROP) Number MI-ROP-B7013-2018a and 40 CFR Part 63, Subpart ZZZZZ (FG-MACTZZZZZ).

The following is a list of the sources that were sampled and the emission limits for each source:

Source	Emission Limit
Huron Casting Pouring Lines A & B (FG-POUR) (EU-POURINGA & EU-POURINGB)	Particulate (PM): 0.8 Lb/Ton of Metal Charged
Blue Diamond Casting No Bake Furnace Line (EU-NBFURNACE) & Shell Furnace Line (EU-SHELLFURNACE)	Particulate (PM): 0.1 Lb/Ton of Metal Charged

The sampling in the study was conducted over the period of December 13-16, 2022 by R. Scott Cargill, and Richard D. Eerdmans of Network Environmental, Inc.. Assisting with the study were Mr. Daryl Mendrick and the operating staff of the facility. Mr. Daniel Droste and Ms. Gina McCann of the Michigan Department of Environment, Great Lakes and Energy (EGLE) – Air Quality Division were present to observe the sampling and source operation.

II. PRESENTATION OF RESULTS

**II.1 TABLE 1
PARTICULATE EMISSION RESULTS
HURON CASTING, INC.
PIGEON, MICHIGAN**

Source	Sample	Date	Time	Air Flow Rate DSCFM ⁽¹⁾	Particulate Concentration Lbs/1000 Lbs, Dry ⁽²⁾	Particulate Mass Rates	
						Lbs/Hr ⁽³⁾	Lbs/Ton of Charge ⁽⁴⁾
Pouring Line A	1	12/13/22	21:35-23:15	34,093	0.00072	0.110	0.066
	2	12/14/22	08:16-09:59	36,531	0.00052	0.086	0.053
	3	12/14/22	10:28-12:10	35,744	0.00044	0.070	0.043
	Average			35,456	0.00056	0.089	0.054
Pouring Line B	1	12/13/22	09:27-11:11	42,086	0.0023	0.44	0.089
	2	12/13/22	11:42-13:22	42,113	0.0028	0.52	0.093
	3	12/13/22	13:54-15:37	41,952	0.0026	0.48	0.092
	Average			42,050	0.0026	0.48	0.091

- (1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg).
 (2) Lbs/1000 Lbs, Dry = Pounds Of Particulate Per Thousand Pounds Of Exhaust Gas On A Dry Basis
 (3) Lbs/Hr = Pounds Of Particulate Per Hour
 (4) Lbs/Ton of Charge = Lbs Of Particulate per Ton of Metal Charged. Calculated using melt rates supplied by Huron Casting. Melt Rates can be found in Appendix B.

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**II.2 TABLE 2
PARTICULATE EMISSION RESULTS
BLUE DIAMOND CASTING
PIGEON, MICHIGAN**

Source	Sample	Date	Time	Air Flow Rate DSCFM ⁽¹⁾	Particulate Concentration Grains/DSCF ⁽²⁾	Particulate Mass Rates	
						Lbs/Hr ⁽³⁾	Lbs/Ton of Charge ⁽⁴⁾
No Bake Furnace	1	12/14/22	15:19-16:59	48,957	0.00008	0.033	0.0061
	2	12/15/22	09:27-11:11	48,118	0.00006	0.027	0.0052
	3	12/15/22	11:45-13:26	47,812	0.00012	0.047	0.0094
	Average			48,296	0.00009	0.036	0.0069
Shell Furnace	1	12/16/22	07:26-09:06	39,655	0.00009	0.029	0.0064
	2	12/16/22	09:35-11:14	39,183	0.00014	0.047	0.0103
	3	12/16/22	11:47-13:27	39,377	0.00004	0.012	0.0026
	Average			39,405	0.00009	0.029	0.0064

- (1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg).
(2) Grains/DSCF = Grains Of Particulate Per Dry Standard Cubic Foot Of Exhaust Gas
(3) Lbs/Hr = Pounds Of Particulate Per Hour
(4) Lbs/Ton of Charge = Lbs Of Particulate per Ton of Metal Charged. Calculated using melt rates supplied by Huron Casting. Melt Rates can be found in Appendix B.

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1 through 2 (Sections II.1 through II.2).

The results are presented as follows:

III.1 Huron Casting Particulate Emission Results (Table 1)

Table 1 summarizes the particulate emission results as follows:

- Source
- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Lbs/1000 Lbs, Dry) – Pounds of Particulate Per Thousand Pounds of Exhaust Gas on a Dry Basis
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/Ton Charged) – Pounds of Particulate Per Ton of Metal Charged (Melted)

A more detailed breakdown for each sample can be found in Appendix A.

III.2 Blue Diamond Casting Particulate Emission Results (Table 2)

Table 2 summarizes the particulate emission results as follows:

- Source
- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Concentration (Grains/DSCF) – Grains of Particulate Per Dry Standard Cubic Foot of Exhaust Gas
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/Ton Charged) – Pounds of Particulate Per Ton of Metal Charged (Melted)

A more detailed breakdown for each sample can be found in Appendix A.

IV. SOURCE DESCRIPTION

IV.1 Huron Casting

IV.1.1 Pouring Line A (EU-POURINGA) – Three (3) electric induction furnaces, Pouring Line A and ancillary equipment controlled by Baghouse #790. Line exhausts to the in-plant environment.

IV.1.2 Pouring Line B (EU-POURINGB) – Three (3) electric induction furnaces, Pouring Line B, and ancillary equipment controlled by Baghouse #554 and Baghouse #553. Line exhausts to the in-plant environment.

IV.2 Blue Diamond Casting

IV.2.1 No Bake Furnace Line (EU-NBFURNACE) – The no bake furnace line consists of three electric induction furnaces: two 8-ton capacity melt furnaces, one electric arc ladle reheat station and a vacuum degassing unit. Exhaust gases are controlled by two baghouses (BH-01 and BH-22). The exhaust is re-circulated to an area behind the furnace hoods.

IV.2.2 Shell Furnace Line (EU-SHELLFURNACE) – The shell furnace line consists of three 8-ton capacity electric induction furnaces for an expected melting capacity of 200 tons per day. The furnaces are controlled by a baghouse (BH-06). The exhaust is re-circulated back into the furnace hoods.

Operating data during the testing for the all the sources can be found in Appendix B.

V. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location for each source was as follows:

- **Pouring Line A (EU-POURINGA)** – A 36 inch I.D. diameter exhaust duct with 2 sample ports in a location that meets the minimum downstream and upstream from the nearest disturbances requirements of U.S. EPA Method 1. Twenty-four (24) sampling points were used for the isokinetic sampling on this source.

- **Pouring Line B (EU-POURINGB)** – A 48 inch I.D. diameter exhaust duct with 2 sample ports in a location that meets the minimum downstream and upstream from the nearest disturbances requirements of U.S. EPA Method 1. Twenty-four (24) sampling points were used for the isokinetic sampling on this source.
- **No Bake Furnace Line (EU-NBFURNACE)** – A 53.5 inch I.D. diameter exhaust duct with 2 sample ports in a location that meets the minimum downstream and upstream from the nearest disturbances requirements of U.S. EPA Method 1. Twenty-four (24) sampling points were used for the isokinetic sampling on this source.
- **Shell Furnace Line (EU-SHELLFURNACE)** – A 53.5 inch I.D. diameter exhaust duct with 2 sample ports in a location that meets the minimum downstream and upstream from the nearest disturbances requirements of U.S. EPA Method 1. Twenty-four (24) sampling points were used for the isokinetic sampling on this source.

The sampling point dimensions can be found in Appendix F.

The emission sampling was conducted by employing the following reference methods:

- Particulate – U.S. EPA Method 5
- Exhaust Gas Parameters (air flow, temperature, moisture & density) - U.S. EPA Methods 1-4

V.1 Particulate - The particulate emission sampling was conducted in accordance with U.S. EPA Reference Method 5. Method 5 is an out of stack filtration method where the filter is heated at 250 °F (plus or minus 25 °F). Three (3) samples were collected from each of the sources sampled. Each sample was ninety six (96) minutes in duration, and had a minimum sample volume of sixty (60) dry standard cubic feet. The samples were collected isokinetically and analyzed for total particulate by gravimetric analysis. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. A diagram of the particulate sampling train is shown in Figure 1.

V.2 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4.

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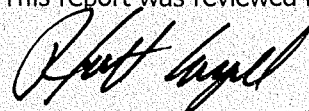
Air flow rates, temperatures and moistures were determined using the isokinetic sampling trains. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

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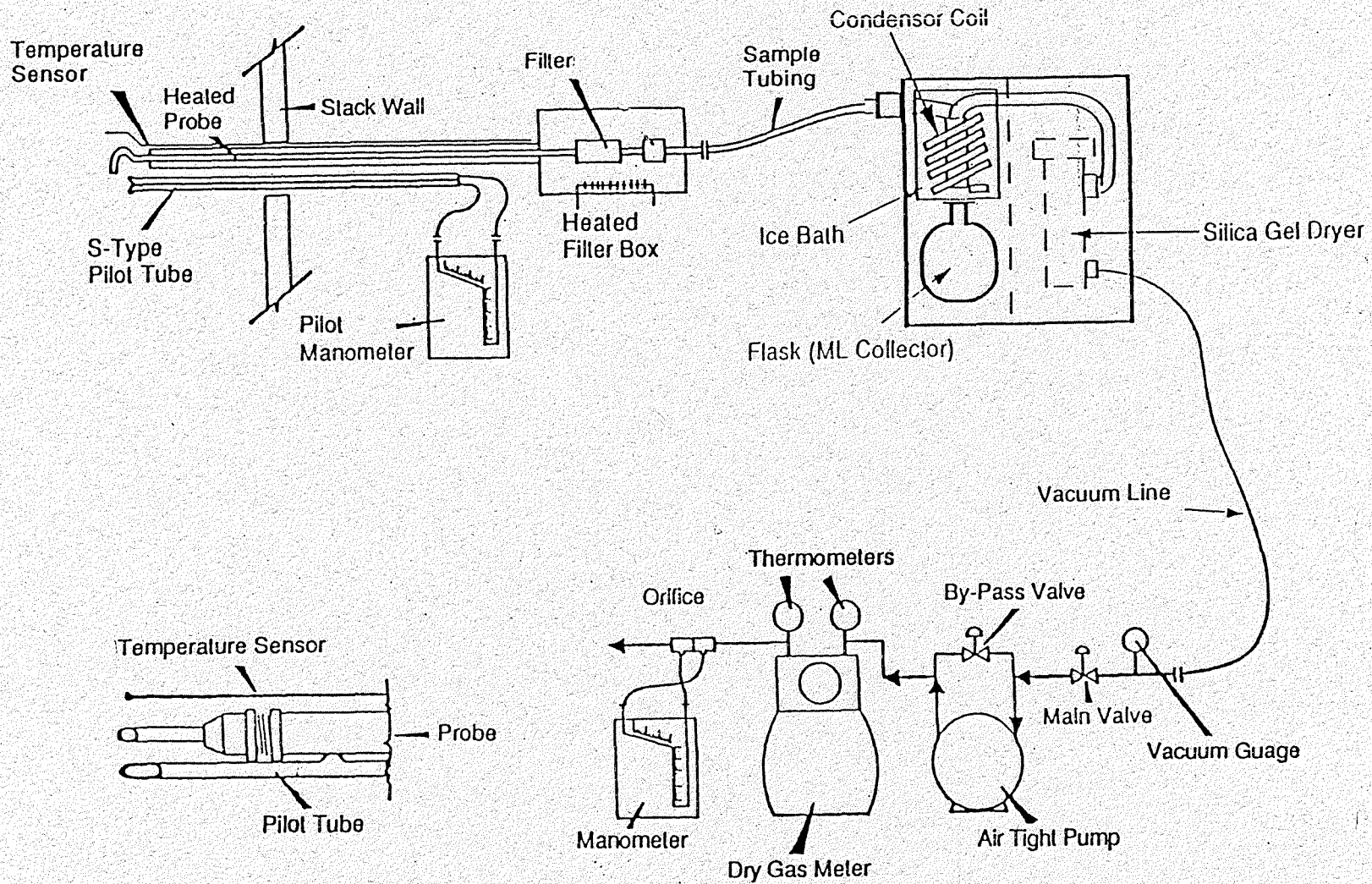


Figure 1
Particulate
Sampling Train