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I. INTRODUCTION

Network Environmental, Inc. was retained by Linamar Structures USA of Fruitport, Michigan to perform compliance emission sampling on their #9 Plibrico Aluminum reverberatory furnace Exhaust. The purpose of the sampling was to determine the particulate emissions from the source to document compliance with Michigan Department of Environment, Great Lakes and Energy (EGLE) Air Quality Division Permit To Install (PTI) 11-23. The testing was for the following selected compounds:

- * Particulates (Total, PM-10 and PM-2.5)

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

- * Particulate – U.S. EPA Methods 5 and 202
- * Exhaust Gas Parameters (airflow rate, temperature, moisture & density) - U.S. EPA Methods 1-4

The sampling was conducted on November 21, 2023. R. Scott Cargill and Richard D. Eerdmans of Network Environmental, Inc. performed the testing. Mr. Robert Eckheart of Linamar Structures USA was present to coordinate source operations and data recording and collection during the testing. Mr. Eric Grintsern, Mr. Trevor Drost and Ms Laura Martin 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
FILTERABLE PARTICULATE EMISSION RESULTS
PLIBRICO #9 FURNACE EXHAUST
LINAMAR STRUCTURES USA
FRUITPORT, MICHIGAN
NOVEMBER 21, 2023**

Sample #	Time	Air Flow Rate DSCFM ⁽¹⁾	Lbs/Hr ⁽²⁾	Lbs/Ton Charge ⁽³⁾
1	9:58-11:07	14,443	0.088	0.024
2	12:04-13:28	13,473	0.041	0.032
3	15:05-16:15	14,741	0.060	0.026
Average		14,219	0.063	0.027

(1) = DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)

(2) = Pounds of particulate per hour

(3) = Pounds per ton of metal charged. These numbers were calculated using data supplied by the operating staff of the facility.

**II.2 TABLE 2
TOTAL PM, PM-10 and PM-2.5 EMISSION RESULTS
PLIBRICO #9 FURNACE EXHAUST
LINAMAR STRUCTURES USA
FRUITPORT, MICHIGAN
NOVEMBER 21, 2023**

Sample #	Time	Air Flow Rate DSCFM ⁽¹⁾	Lbs/Hr ⁽²⁾	Lbs/Ton Charge ⁽³⁾
1	9:58-11:07	14,443	0.165	0.046
2	12:04-13:28	13,473	0.138	0.107
3	15:05-16:15	14,741	0.284	0.123
Average		14,219	0.195	0.092

(1) = DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)

(2) = Pounds of particulate per hour

(3) = Pounds per ton of metal charged. These numbers were calculated using data supplied by the operating staff of the facility.

III. DISCUSSION OF RESULTS

The results of the emission testing performed on November 21, 2023 can be found in Section II, Tables II.1 and II.2.

The limits for this source are as follows:

PM, PM-10 and PM-2.5 = 0.124 Lbs/Ton of Metal Charged

IV. SOURCE OPERATION

The furnace 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 - The particulate emission sampling was conducted in accordance with U.S. EPA Methods 5 and 202. Method 5 is an out of stack filtration method. Both the probe and filter were heated to 250 °F plus or minus 25 °F. Three (3) samples were collected from the exhaust. Each sample was sixty-four (64) minutes in duration and had minimum sample volumes of thirty (30) dry standard cubic feet. The samples were collected isokinetically and analyzed for Particulate by gravimetric analysis.

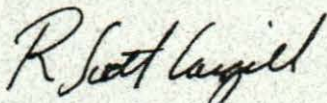
In addition to the standard front half analysis, the back half condensable particulate matter was determined in accordance with U.S. EPA Method 202 (Dry Impinger Technique). The back half samples were extracted and analyzed for condensable particulate in accordance with Method 202. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis. The particulate sampling train is shown in Figure 1.

V.2 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 location criteria of U.S. EPA Reference Method 1. A sixteen point (eight points per port) traverse was used to perform the sampling. The stack was 42 inches in diameter. The sampling points were as follows:

Point #	Point Location (Inches)
1	1.34
2	4.41
3	8.15
4	13.57
5	28.43
6	33.85
7	37.59
8	40.66

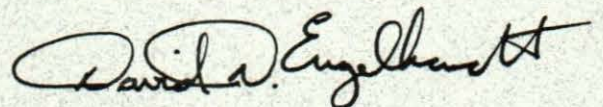
O₂ and CO₂ content were determined by Orsat. The moisture was determined from the isokinetic sampling trains. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:



R. Scott Cargill
Project Manager

This report was reviewed by:



David D. Engelhardt
Vice President

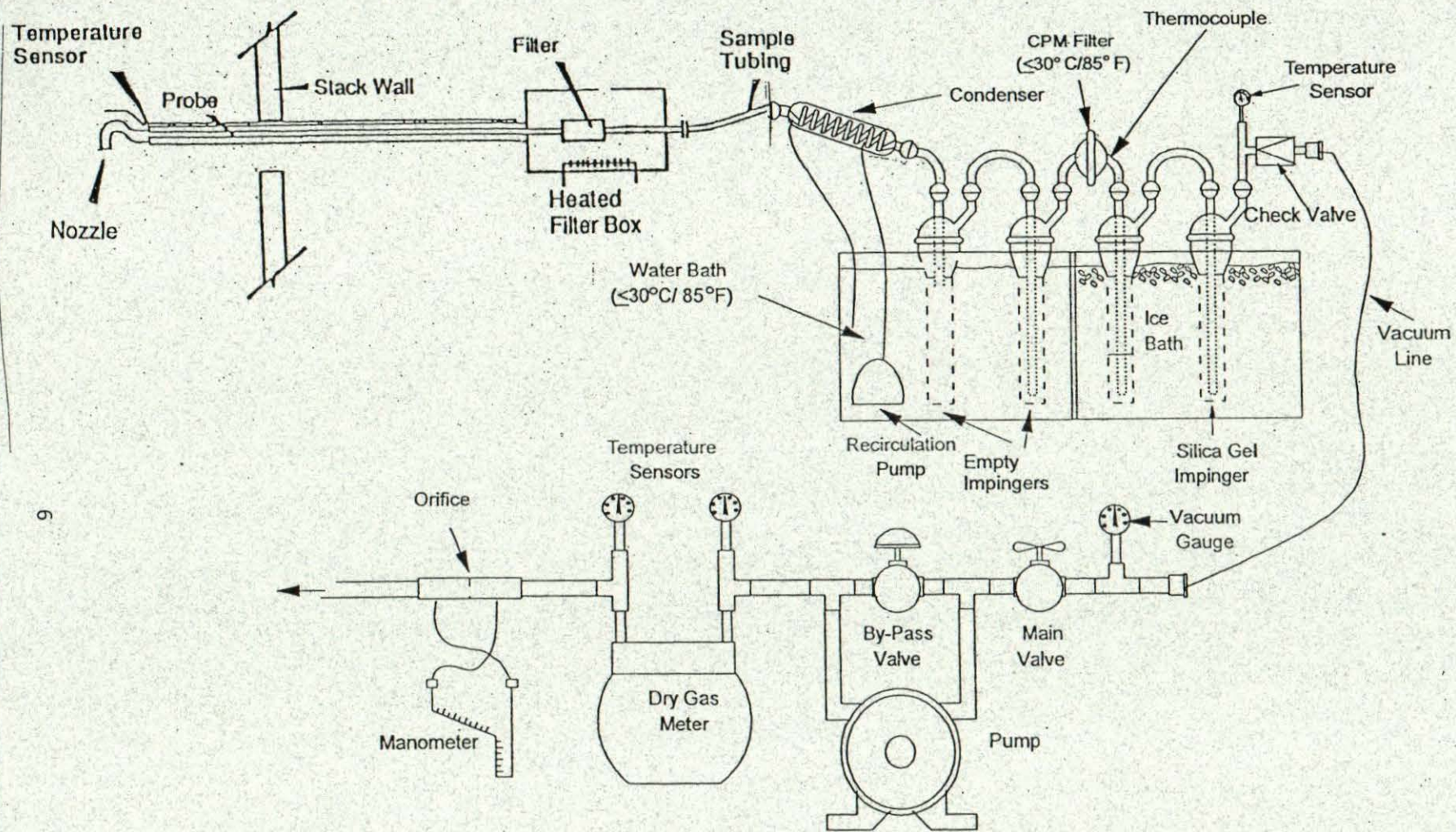


Figure 1
Particulate Sampling Train