EMISSIONS COMPLIANCE STUDY

Performed At The
East Jordan Foundry, LLC
Various Baghouses (A/B, C, D, E, F, G, H/J)
Elmira, Michigan

Test Date(s)
October 14 through 18, 2024

Report No.
TRC Environmental Corporation Report 590241

Report Submittal Date
December 11, 2024

TRC Environmental Corporation
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Report Certification

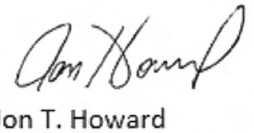
I certify that to the best of my knowledge:

- Testing data and all corresponding information have been checked for accuracy and completeness.
- Sampling and analysis have been conducted in accordance with the approved protocol and applicable reference methods (as applicable).
- All deviations, method modifications, or sampling and analytical anomalies are summarized in the appropriate report narrative(s).

Ben Cacao
Project Manager

December 11, 2024
Date

TRC was operating in conformance with the requirements of ASTM D7036-04 during this test program.



Jon T. Howard
TRC Emission Testing Manager

TABLE OF CONTENTS

1.0 INTRODUCTION 4
1.1 Project Contact Information 4
1.2 Facility and Process Description 4

2.0 SUMMARY OF RESULTS 5

3.0 DISCUSSION OF RESULTS 6

4.0 SAMPLING AND ANALYSIS PROCEDURES 7
4.1 Determination of Sample Point Locations by USEPA Method 1 7
4.2 Volumetric Flow Rate Determination by USEPA Method 2 7
4.3 Determination of the Concentration of Gaseous Pollutants Using a Multi-Pollutant Sampling System 8
4.3.1 CO_2 Determination by USEPA Method 3A 8
4.3.2 O_2 Determination by USEPA Method 3A 8
4.3.3 CO Determination by USEPA Method 10 8
4.4 Filterable PM Determination by USEPA Method 5 8
4.5 Condensable PM Determination by USEPA Method 202 9
4.6 Visible Emissions Determination by USEPA Method 9 9
4.7 Total Organic Concentration Determination by USEPA Method 25A 9

5.0 QUALITY ASSURANCE PROCEDURES 10

6.0 TEST RESULTS SUMMARY 11

APPENDIX
AETB and QI Information Summary 25
Qualified Individual Certificate(s) 26
Process and Pollution Control Equipment Operating Data 30
Sample Location Information 32
Sample Train Diagrams 51
Sample Analysis Data 56
Calculation Nomenclature and Formulas 78
Processed Field Data and Results 86
Visible Emission Data and Observer Certificate 212
Sampling Equipment Calibration Data 225
Response Time Data 263
Analyzer Interference Test Data 275
Calibration Gas Certificates 278
Aborted Test Runs 290

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) performed an emissions compliance test program on the Various Baghouses (A/B, C, D, E, F, G, H/J) at the East Jordan Foundry, LLC of East Jordan Foundry, LLC (EJCO) in Elmira, Michigan on October 14 through 18, 2024. The tests were authorized by and performed for East Jordan Foundry, LLC.

The purpose of this test program was to determine emissions of particulate matter (PM), carbon monoxide (CO), volatile organic compounds (VOC) and visible emissions (VE) on the various baghouse stacks of East Jordan Foundry during normal operating conditions. The test program was conducted according to the TRC Test Protocol, dated August 15, 2024.

1.1 Project Contact Information

Participants		
Test Facility	East Jordan Foundry, LLC 2675 N. US 131 Elmira, Michigan 49730 Permit No. 185-16C Facility No. N6052	Jessica Wagoner Environmental & Sustainability Engineer 680-242-3526 Jessica.Wagoner@ejco.com
Air Emissions Testing Body (AETB)	TRC Environmental Corporation 207C Eisenhower Lane South Lombard, Illinois 60148	Ben Cacao Project Manager 630-280-9068 (phone) bcacao@trccompanies.com

The tests were conducted by Gavin Lewis, Luke Coburn, Archer Jones, Malcolm Green, Ted Kalisz, Rome Rothegeb and Ben Cacao of TRC. Documentation of the on-site ASTM D7036-04 Qualified Individual(s) (QI) can be located in the appendix to this report.

April Lazarro, David Bowman, Amanda Battershell, Tammie Puite and Clay DeRonne of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division observed the testing.

1.2 Facility and Process Description

East Jordan Foundry, LLC (EJF) is a gray and ductile iron foundry in Antrim County, Elmira, Michigan. All sources at the foundry have been installed and will be operated in accordance with the terms of Michigan Department of Environmental Quality (MDEQ) Permit to Install (PTI) No. 185-16C. The facility is considered to be a "Large" area source foundry under the rules of 40 CFR Part 63, Subpart ZZZZZ, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries Area Sources.

2.0 SUMMARY OF RESULTS

The results of this test program are summarized in the table below. Detailed individual run results are presented in Section 6.0.

Emission Unit ID	Vent ID	Pollutant Tested	Unit	Measured Emissions	Emission Limit
Baghouse A/B	SVAB-BH	Filterable PM (FPM)	gr/dscf	0.0001	---
			lb/hr	0.15	---
		PM/PM10/PM2.5	gr/dscf	0.0004	0.003
			lb/hr	0.54	3.41
		CO	lb/ton of metal charged	4.52	8.45
		THC as Propane	lb/ton of metal charged	0.78	1.80
		VE	6 min Average	0.0%	10%
Baghouse C	SVC-BH	FPM	gr/dscf	0.0002	---
			lb/hr	0.17	---
		PM/PM10/PM2.5	gr/dscf	0.0006	0.002
			lb/hr	0.47	1.70
		CO	lb/ton of metal charged	0.34	8.45
		THC as Propane	lb/ton of metal charged	0.27	1.80
		VE	6 min Average	0.0%	10%
Baghouse D	SVD-BH	FPM	gr/dscf	0.0003	---
			lb/hr	0.18	---
		PM/PM10/PM2.5	gr/dscf	0.0008	0.003
			lb/hr	0.52	1.70
		CO	lb/ton of metal charged	1.29	8.45
		THC as Propane	lb/ton of metal charged	0.50	1.80
		VE	6 min Average	0.0%	10%
Baghouse E	SVE-BH	FPM	gr/dscf	0.0003	---
			lb/hr	0.13	---
		PM/PM10/PM2.5	gr/dscf	0.0008	0.002
			lb/hr	0.40	1.04
		CO	lb/ton of metal charged	0.11	8.45
		THC as Propane	lb/ton of metal charged	0.13	1.80
		VE	6 min Average	0.0%	10%

Emission Unit ID	Vent ID	Pollutant Tested	Unit	Measured Emissions	Emission Limit
Baghouse F	SVF-BH	FPM	gr/dscf	0.0002	
			lb/hr	0.08	
		PM/PM10/PM2.5	gr/dscf	0.0006	0.002
			lb/hr	0.32	1.04
Baghouse G	SVG-BH	FPM	gr/dscf	0.0002	---
			lb/hr	0.06	---
		PM/PM10/PM2.5	gr/dscf	0.0007	0.002
			lb/hr	0.23	0.68
Baghouse H/J	SVHJ-BH	FPM	gr/dscf	0.0002	---
			lb/hr	0.25	---
		PM/PM10/PM2.5	gr/dscf	0.0006	0.001
			lb/hr	0.84	1.70

The table below summarizes the test methods used, as well as the number and duration of each at each test location:

Unit ID	Parameter	Method	# of Runs	Duration (min)
Baghouses A/B, C, D, and E	PM	USEPA Method 5	3	96
	$PM/PM_{10/2.5}$	USEPA Method 5/202	3	96
	VE	USEPA Method 9	3	60
	CO	USEPA Method 10	3	60
	VOC	USEPA Method 25A	3	60
	O_2/CO_2	USEPA Method 3A	3	96
Baghouses F, G and H/J	PM	USEPA Method 5	3	96
	$PM/PM_{10/2.5}$	USEPA Method 5/202	3	96

3.0 DISCUSSION OF RESULTS

For Baghouse C, test runs 1, 2 and 3 were aborted due to operational issues. Therefore, test runs 4, 5 and 6 were used for Baghouse C averaged emission results. Furthermore, Baghouse C was retested on November 12, 2024 and those results will be provided in a separate report (TRC Report 637801).

For Baghouse F, test run 1 was aborted due to operational issues. Therefore, test runs 2, 3 and 4 were used for Baghouse F averaged emission results.

Source operation appeared normal during the rest of the test program. EULMPC and EU1230PC were in operation during the Stack A/B, D and E test run times. No problems were encountered with the testing equipment during the test program. No changes or problems were encountered that required modification of any procedures presented in the test plan. No adverse test or environmental conditions were encountered during the conduct of this test program.

4.0 SAMPLING AND ANALYSIS PROCEDURES

All testing, sampling, analytical, and calibration procedures used for this test program were performed in accordance with the methods presented in the following sections. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, USEPA 600/R-94/038c, September 1994 was used to supplement procedures.

4.1 Determination of Sample Point Locations by USEPA Method 1

This method is applicable to gas streams flowing in ducts, stacks, and flues and is designed to provide guidance for the selection of sampling ports and traverse points at which sampling for air pollutants will be performed. Sample ports must be located at least two duct diameters downstream and a half a duct diameter upstream from any flow disturbance.

The cross-section of the measurement site was divided into a number of equal areas, and the traverse points were located in the center of each area. The minimum number of points were determined from Figure 1-1 (particulate) of the Method.

4.2 Volumetric Flow Rate Determination by USEPA Method 2

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream.

The gas velocity head (ΔP) and temperature were measured at traverse points defined by USEPA Method 1. The velocity head was measured with a Type S (Stausscheibe or reverse type) pitot tube and oil-filled manometer; and the gas temperature was measured with a Type K thermocouple. The average gas velocity in the flue was calculated based on: the gas density (as determined by USEPA Methods 3A and 4); the flue gas pressure; the average of the square roots of the velocity heads at each traverse point, and the average flue gas temperature.

On Baghouse G and H/J, the test source was essentially comprised of air, an analysis of O_2 and CO_2 was not conducted, and a dry molecular weight of 29.0 was used per USEPA Method 2 Section 8.6.

4.3 Determination of the Concentration of Gaseous Pollutants Using a Multi-Pollutant Sampling System

Concentrations of the pollutants in the following sub-sections were determined using one sampling system. The number of points at which sample was collected was determined in accordance with 40CFR60 specifications.

A straight-extractive sampling system was used. A data logger continuously recorded pollutant concentrations and generated one-minute averages of those concentrations. All calibrations and system checks were conducted using USEPA Protocol gases. Three-point linearity checks were performed prior to sampling, and in the event of a failing system bias or drift test (and subsequent corrective action). System bias and drift checks were performed using the low-level gas and either the high- or mid-level gas (as specified in the appendices) prior to and following each test run.

The Low Concentration Analyzers (those that routinely operate with a calibration span of less than 20 ppm) used by TRC are ambient-level analyzers. Per Section 3.12 of Method 7E, a Manufacturer's Stability Test is not required for ambient-level analyzers. Analyzer interference tests were conducted in accordance with the regulations in effect at the time that TRC placed an analyzer model in service.

4.3.1 CO_2 Determination by USEPA Method 3A

This method is applicable for the determination of CO_2 concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The CO_2 analyzer was equipped with a non-dispersive infrared (IR) detector.

4.3.2 O_2 Determination by USEPA Method 3A

This method is applicable for the determination of O_2 concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The O_2 analyzer was equipped with a paramagnetic-based detector.

4.3.3 CO Determination by USEPA Method 10

This method is applicable for the determination of CO concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The non-dispersive infrared analyzer (NDIR) CO analyzer was equipped with an internal gas correlation filter wheel, which eliminates potential detector interference. As such, use of an interference removal trap was not required.

4.4 Filterable PM Determination by USEPA Method 5

This method is applicable for the determination of PM emissions from stationary sources. USEPA Methods 2-4 were performed concurrently with, and as an integral part of, these determinations.

Flue gas was withdrawn isokinetically from the source at traverse points determined per USEPA Method 1, and PM was collected in the nozzle, probe liner, and on a glass fiber filter. The probe liner and filter were maintained at a temperature of 120±14°C (248 + 25°F. The PM mass, which included any material that condensed at or above the filtration temperature, was determined gravimetrically after the removal of uncombined water.

4.5 Condensable PM Determination by USEPA Method 202

This method is applicable for the determination of condensable particulate matter (CPM) from stationary sources. CPM is measured in the emissions after removal from the stack and after passing through a filter.

The CPM was collected in dry impingers after filterable particulate material had been collected on filters maintained above 30°C (85°F) using the previously identified Method. The CPM sample train included a Method 23 type condenser capable of cooling the stack gas to less than 85°F, followed by a water dropout impinger. One modified Greenburg Smith impinger and a CPM filter followed the water dropout impinger. Prior to recovery, the impinger contents were immediately purged after the run with nitrogen (N_2) to remove dissolved sulfur dioxide. The impinger solution was then extracted with hexane, and the CPM filter was extracted with water and hexane. The organic and aqueous fractions were then taken to dryness and the residues weighed. A correction, if necessary, was made for any ammonia present due to laboratory analysis procedures. The total of all fractions represented the CPM.

4.6 Visible Emissions Determination by USEPA Method 9

This method is applicable for the determination of the opacity of emissions from stationary sources pursuant to § 60.11(b) and for visually determining opacity of emissions.

Opacity observations were made by a qualified observer. Observations were made at the point of greatest opacity in the portion of the plume where condensed water vapor was not present. Observations were made at 15-second intervals for the duration of the test period.

4.7 Total Organic Concentration Determination by USEPA Method 25A

This method is applicable for the determination of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon.

A gas sample was extracted from the source through a heated sample line and glass fiber filter to a flame ionization analyzer (FIA). If necessary, a source-specific response factor was developed for the FIA.

5.0 QUALITY ASSURANCE PROCEDURES

TRC integrates our Quality Management System (QMS) into every aspect of our testing service. We follow the procedures specified in current published versions of the test Method(s) referenced in this report. Any modifications or deviations are specifically identified in the body of the report. We routinely participate in independent, third-party audits of our activities, and maintain:

- Accreditation from the Louisiana Environmental Laboratory Accreditation Program (LELAP).
- Accreditation from the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA) that our operations conform with the requirements of ASTM D 7036 as an Air Emission Testing Body (AETB).

These accreditations demonstrate that our systems for training, equipment maintenance and calibration, document control and project management will fully ensure that project objectives are achieved in a timely and efficient manner with a strict commitment to quality.

All calibrations are performed in accordance with the test Method(s) identified in this report. If a Method allows for more than one calibration approach, or if approved alternatives are available, the calibration documentation in the appendices specifies which approach was used. All measurement devices are calibrated or verified at set intervals against standards traceable to the National Institute of Standards and Technology (NIST). NIST traceability information is available upon request.

ASTM D7036-04 specifies that: *"AETBs shall have and shall apply procedures for estimating the uncertainty of measurement. Conformance with this section may be demonstrated by the use of approved test protocols for all tests. When such protocols are used, reference shall be made to published literature, when available, where estimates of uncertainty for test methods may be found."* TRC conforms with this section by using approved test protocols for all tests.

6.0 TEST RESULTS SUMMARY

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	A/B
Location:	Stack

Test Run Number:	1	2	3	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/14/2024	10/14/2024	10/14/2024	
Start Time:	8:15	10:30	12:55	
End Time:	9:55	12:09	14:35	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (^oF):	96.9	95.5	98.3	96.9
Fractional Gas Moisture Content, B_{ws}:	0.011	0.009	0.010	0.010
Moisture Content (%vol):	1.1	0.9	1.0	1.0
Gas CO_2 Content (%vol):	0.1	0.1	0.1	0.1
Gas O_2 Content (%vol):	20.7	20.8	20.7	20.7
Gas Wet MW, M_s, (lb/lb-mole):	28.72	28.75	28.74	28.74
Average Gas Velocity, V_s, (ft/sec):	47.20	47.97	48.97	48.04
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	152,159	154,621	157,848	154,876
Q_{std} (std ft^3/min):	138,874	141,470	143,711	141,352
$Q_{std(dry)}$ (dry std ft^3/min):	137,346	140,178	142,286	139,937
Sample Volume, $V_{m(std)}$, (dry std ft^3):	71.082	72.430	73.750	72.420
PM Collected, (mg):				
Filterable, m_n:	0.60	0.70	0.50	0.60
Condensable, m_{cpm}:	2.00	1.10	1.40	1.50
Total, m_{total}:	2.60	1.80	1.90	2.10
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0001	0.0001	0.0001	0.0001
Condensable, C_{cpm}:	0.0004	0.0002	0.0003	0.0003
Total, C:	0.0006	0.0004	0.0004	0.0004
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric flow rate):				
Filterable:	0.15	0.18	0.13	0.15
Condensable:	0.51	0.28	0.36	0.38
Total:	0.66	0.46	0.48	0.54
Isokinetic Variance, I:	96.2	96.0	96.3	96.2

English Units: Standard conditions of 29.92 inHg and 70° F

GASEOUS TEST RESULTS SUMMARY

Project Number:	590241	Start Date:	10/14/24
Customer:	East Jordan Foundry	End Date:	10/14/24
Unit Identification:	A/B Stack	Facility:	EJ Foundry - Elmira, MI
Sample Location:	Stack	Recorded by:	Ben Cacao
RM Probe Type:	Extractive (Dry)	Fc Factor:	-
Load Level/Condition:	Normal	Fd Factor:	-

Reference Method Results, As Measured Moisture Basis

Run #	Date	Start Time	End Time	CO ppmvd	CO2 % v/v dry	O2 % v/v dry
1	10/14/24	8:15	9:14	185.0	0.1	20.7
2	10/14/24	10:30	11:29	198.5	0.1	20.8
3	10/14/24	12:55	13:54	143.6	0.1	20.7
Average				175.7	0.1	20.7

Emission Rate Calculation Summary

Run #	CO lb/hr	CO lb/ton	Metal Charged ton/hr	Flow DSCFM
1	110.81	4.59	24.14	137,346
2	121.38	5.42	22.39	140,178
3	89.09	3.54	25.13	142,286
Average	107.09	4.52	23.89	139,937

Method 25A Test Results Summary

Project Number:	590241	Test Date(s):	10/14/24
Customer:	East Jordan Foundry	Facility:	EJ Foundry - Elmira, MI
Unit Identification:	A/B Stack	Recorded by:	Ben Cacao
Load Level/Condition:	Normal		

Location	A/B Stack			
Test Run No.	1	2	3	Average
Test Date	10/14/2024	10/14/2024	10/14/2024	
Test Time - Start	8:15	10:30	12:55	
Test Time - End	9:14	11:29	13:54	
THC (ppmvw as Propane)	20.37	18.68	18.77	19.27
Volumetric Flow Rate (scfm)	138874	141470	143711	141352
THC (lb/hr as Propane)	19.43	18.15	18.52	18.70
Metal Charged (ton/hr)	24.14	22.39	25.13	23.89
THC (lb/ton as Propane)	0.80	0.81	0.74	0.78

PARTICULATE TEST RESULTS SUMMARY

Company: East Jordan Foundry
Plant: EJ Foundry - Elmira, MI
Unit: C
Location: Stack

Test Run Number:	4	5	6	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/16/2024	10/16/2024	10/16/2024	
Start Time:	7:50	10:35	13:02	
End Time:	9:40	12:15	14:43	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (°F):	96.9	98.3	96.2	97.1
Fractional Gas Moisture Content, B_{ws}:	0.016	0.017	0.017	0.016
Moisture Content (%vol):	1.6	1.7	1.7	1.6
Gas CO_2 Content (%vol):	0.1	0.1	0.1	0.1
Gas O_2 Content (%vol):	20.8	20.9	20.9	20.9
Gas Wet MW, M_s, (lb/lb-mole):	28.67	28.67	28.67	28.67
Average Gas Velocity, V_s, (ft/sec):	47.82	47.54	47.74	47.70
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	97,663	97,086	97,498	97,416
Q_{std} (std ft^3/min):	89,145	88,394	89,115	88,885
$Q_{std(dry)}$ (dry std ft^3/min):	87,706	86,924	87,629	87,420
Sample Volume, $V_{m(std)}$, (dry std ft^3):	73.536	73.079	72.841	73.152
Sample Volume, $V_{m(std)(metric)}$, (dry std. m^3):	2.074	2.062	2.055	2.064
PM Collected, (mg):				
Filterable, m_n:	0.70	1.60	1.00	1.10
Condensable, m_{cpm}:	2.20	1.90	1.50	1.87
Total, m_{total}:	2.90	3.50	2.50	2.97
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0001	0.0003	0.0002	0.0002
Condensable, C_{cpm}:	0.0005	0.0004	0.0003	0.0004
Total, C:	0.0006	0.0007	0.0005	0.0006
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric fl				
Filterable:	0.11	0.25	0.16	0.17
Condensable:	0.35	0.30	0.24	0.29
Total:	0.46	0.55	0.40	0.47
Isokinetic Variance, I:	98.7	99.0	97.9	98.5

English Units: Standard conditions of 29.92 inHg and 70° F

GASEOUS TEST RESULTS SUMMARY

Project Number:	590241	Start Date:	10/16/24
Customer:	East Jordan Foundry	End Date:	10/16/24
Unit Identification:	C Stack	Facility:	EJ Foundry - Elmira, MI
Sample Location:	Stack	Recorded by:	Ben Cacao
RM Probe Type:	Extractive (Dry)	Fc Factor:	-
Load Level/Condition:	Normal	Fd Factor:	-

Reference Method Results, As Measured Moisture Basis

Run #	Date	Start Time	End Time	CO ppmvd	CO2 % v/v dry	O2 % v/v dry
4	10/16/24	7:50	8:49	15.3	0.1	20.8
5	10/16/24	10:35	11:34	19.3	0.1	20.9
6	10/16/24	13:02	14:01	18.4	0.1	20.9
Average				17.7	0.1	20.9

Emission Rate Calculation Summary

Run #	CO lb/hr	CO lb/ton	Metal Charged ton/hr	Flow DSCFM
4	5.85	0.28	21.19	87,706
5	7.30	0.42	17.55	86,924
6	7.03	0.33	21.14	87,629
Average	6.73	0.34	19.96	87,420

Method 25A Test Results Summary

Project Number:	590241	Test Date(s):	October 16, 2024
Customer:	East Jordan Foundry	Facility:	EJ Foundry - Elmira, MI
Unit Identification:	C Stack	Recorded by:	Ben Cacao
Load Level/Condition:	Normal		

Location	C Stack			
Test Run No.	4	5	6	Average
Test Date	10/16/2024	10/16/2024	10/16/2024	
Test Time - Start	7:50	10:35	13:02	
Test Time - End	8:49	11:34	14:01	
THC (ppmvw as Propane)	10.86	9.07	6.68	8.87
Volumetric Flow Rate (scfm)	89145	88394	89115	88885
THC (lb/hr as Propane)	6.648	5.505	4.088	5.414
Metal Charged (ton/hr)	21.19	17.55	21.14	19.96
THC (lb/ton as Propane)	0.31	0.31	0.19	0.27

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	D
Location:	Stack

Test Run Number:	1	2	3	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/17/2024	10/17/2024	10/17/2024	
Start Time:	7:50	10:36	13:15	
End Time:	9:30	12:18	14:54	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (°F):	101.7	103.9	105.3	103.6
Fractional Gas Moisture Content, B_{ws}:	0.027	0.029	0.028	0.028
Moisture Content (%vol):	2.7	2.9	2.8	2.8
Gas CO_2 Content (%vol):	0.1	0.1	0.1	0.1
Gas O_2 Content (%vol):	20.9	20.9	20.9	20.9
Gas Wet MW, M_s, (lb/lb-mole):	28.56	28.54	28.55	28.55
Average Gas Velocity, V_s, (ft/sec):	55.91	54.78	55.76	55.48
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	87,109	85,343	86,878	86,443
Q_{std} (std ft^3/min):	78,793	76,894	78,086	77,924
$Q_{std(dry)}$ (dry std ft^3/min):	76,669	74,650	75,893	75,738
Sample Volume, $V_{m(std)}$, (dry std ft^3):	68.708	67.249	68.179	68.045
PM Collected, (mg):				
Filterable, m_n:	1.40	1.20	1.00	1.20
Condensable, m_{cpm}:	2.80	2.10	2.00	2.30
Total, m_{total}:	4.20	3.30	3.00	3.50
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0003	0.0003	0.0002	0.0003
Condensable, C_{cpm}:	0.0006	0.0005	0.0005	0.0005
Total, C:	0.0009	0.0008	0.0007	0.0008
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric flow rate):				
Filterable:	0.21	0.18	0.15	0.18
Condensable:	0.41	0.31	0.29	0.34
Total:	0.62	0.48	0.44	0.52
Isokinetic Variance, I:	98.9	99.4	99.1	99.1

English Units: Standard conditions of 29.92 inHg and 70° F

GASEOUS TEST RESULTS SUMMARY

Project Number:	590241	Start Date:	10/17/24
Customer:	East Jordan Foundry	End Date:	10/17/24
Unit Identification:	D Stack	Facility:	EJ Foundry - Elmira, MI
Sample Location:	Stack	Recorded by:	Ben Cacao
RM Probe Type:	Extractive (Dry)	Fc Factor:	-
Load Level/Condition:	Normal	Fd Factor:	-

Reference Method Results, As Measured Moisture Basis

Run #	Date	Start Time	End Time	CO ppmvd	CO2 % v/v dry	O2 % v/v dry
1	10/17/24	7:50	8:49	108.1	0.1	20.9
2	10/17/24	10:36	11:35	102.8	0.1	20.9
3	10/17/24	13:15	14:14	117.8	0.1	20.9
Average				109.5	0.1	20.9

Emission Rate Calculation Summary

Run #	CO lb/hr	CO lb/ton	Metal Charged ton/hr	Flow DSCFM
1	36.13	1.21	29.93	76,669
2	33.47	1.29	25.94	74,650
3	38.98	1.36	28.69	75,893
Average	36.19	1.29	28.19	75,737

Method 25A Test Results Summary

Project Number:	590241	Test Date(s):	10/17/24
Customer:	East Jordan Foundry	Facility:	EJ Foundry - Elmira, MI
Unit Identification:	D Stack	Recorded by:	Ben Cacao
Load Level/Condition:	Normal		

Location	D Stack			
Test Run No.	1	2	3	Average
Test Date	10/17/2024	10/17/2024	10/17/2024	
Test Time - Start	7:50	10:36	13:15	
Test Time - End	8:49	11:35	14:14	
THC (ppmvw as Propane)	24.65	28.26	25.47	26.13
Volumetric Flow Rate (scfm)	78793	76894	78086	77924
THC (lb/hr as Propane)	13.34	14.92	13.66	13.97
Metal Charged (ton/hr)	29.93	25.94	28.69	28.19
THC (lb/ton as Propane)	0.45	0.58	0.48	0.50

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	E
Location:	Stack

Test Run Number:	1	2	3	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/18/2024	10/18/2024	10/18/2024	
Start Time:	8:20	10:31	13:15	
End Time:	9:59	12:10	14:55	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (^oF):	102.2	104.3	105.3	103.9
Fractional Gas Moisture Content, B_{ws}:	0.025	0.027	0.026	0.026
Moisture Content (%vol):	2.5	2.7	2.6	2.6
Gas CO_2 Content (%vol):	0.1	0.1	0.0	0.1
Gas O_2 Content (%vol):	20.9	20.9	20.9	20.9
Gas Wet MW, M_s, (lb/lb-mole):	28.58	28.56	28.56	28.56
Average Gas Velocity, V_s, (ft/sec):	58.02	56.98	59.69	58.23
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	66,095	64,910	67,995	66,333
Q_{std} (std ft^3/min):	59,850	58,556	61,231	59,879
$Q_{std(dry)}$ (dry std ft^3/min):	58,331	56,965	59,643	58,313
Sample Volume, $V_{m(std)}$, (dry std ft^3):	70.907	67.977	69.717	69.534
PM Collected, (mg):				
Filterable, m_n:	1.30	1.30	1.00	1.20
Condensable, m_{cpm}:	2.60	2.40	2.10	2.37
Total, m_{total}:	3.90	3.70	3.10	3.57
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0003	0.0003	0.0002	0.0003
Condensable, C_{cpm}:	0.0006	0.0005	0.0005	0.0005
Total, C:	0.0008	0.0008	0.0007	0.0008
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric flow rate):				
Filterable:	0.14	0.14	0.11	0.13
Condensable:	0.28	0.27	0.24	0.26
Total:	0.42	0.41	0.35	0.40
Isokinetic Variance, I:	98.1	96.3	94.3	96.2

English Units: Standard conditions of 29.92 inHg and 70° F

GASEOUS TEST RESULTS SUMMARY

Project Number:	590241	Start Date:	10/18/24
Customer:	East Jordan Foundry	End Date:	10/18/24
Unit Identification:	E Stack	Facility:	EJ Foundry - Elmira, MI
Sample Location:	Stack	Recorded by:	Ben Cacao
RM Probe Type:	Extractive (Dry)	Fc Factor:	-
Load Level/Condition:	Normal	Fd Factor:	-

Reference Method Results, As Measured Moisture Basis

Run #	Date	Start Time	End Time	CO ppmvd	CO2 % v/v dry	O2 % v/v dry
1	10/18/24	8:20	9:19	9.7	0.1	20.9
2	10/18/24	10:31	11:30	13.0	0.1	20.9
3	10/18/24	13:15	14:14	11.7	0.0	20.9
Average				11.5	0.1	20.9

Emission Rate Calculation Summary

Run #	CO lb/hr	CO lb/ton	Metal Charged ton/hr	Flow DSCFM
1	2.48	0.09	26.13	58,331
2	3.24	0.12	27.83	56,965
3	3.03	0.13	23.18	59,643
Average	2.92	0.11	25.71	58,313

Method 25A Test Results Summary

Project Number:	590241	Test Date(s):	10/18/24
Customer:	East Jordan Foundry	Facility:	EJ Foundry - Elmira, MI
Unit Identification:	E Stack	Recorded by:	Ben Cacao
Load Level/Condition:	Normal		

Location	E Stack			
Test Run No.	1	2	3	Average
Test Date	10/18/2024	10/18/2024	10/18/2024	
Test Time - Start	8:20	10:31	13:15	
Test Time - End	9:19	11:30	14:14	
THC (ppmvw as Propane)	8.39	8.97	7.29	8.22
Volumetric Flow Rate (scfm)	59850	58556	61231	59879
THC (lb/hr as Propane)	3.45	3.61	3.07	3.37
Metal Charged (ton/hr)	26.13	27.83	23.18	25.71
THC (lb/ton as Propane)	0.13	0.13	0.13	0.13

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	F
Location:	Stack

Test Run Number:	2	3	4	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/16/2024	10/16/2024	10/16/2024	
Start Time:	7:50	10:35	13:02	
End Time:	9:40	12:15	14:43	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, ($^{\circ}$F):	100.5	101.0	101.1	0.0
Fractional Gas Moisture Content, B_{ws}:	0.022	0.022	0.021	0.022
Moisture Content (%vol):	2.2	2.2	2.1	2.2
Gas CO_2 Content (%vol):	NA	NA	NA	NA
Gas O_2 Content (%vol):	NA	NA	NA	NA
Gas Wet MW, M_s, (lb/lb-mole):	28.76	28.75	28.76	28.76
Average Gas Velocity, V_s, (ft/sec):	58.35	60.14	59.94	59.48
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	66,469	68,511	68,276	67,752
Q_{std} (std ft^3/min):	60,052	61,841	61,620	61,171
$Q_{std(dry)}$ (dry std ft^3/min):	58,737	60,460	60,298	59,831
Sample Volume, $V_{m(std)}$, (dry std ft^3):	73.696	76.366	76.582	75.548
PM Collected, (mg):				
Filterable, m_n:	0.80	0.70	0.90	0.80
Condensable, m_{cpm}:	2.40	2.60	1.70	2.23
Total, m_{total}:	3.20	3.30	2.60	3.03
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0002	0.0001	0.0002	0.0002
Condensable, C_{cpm}:	0.0005	0.0005	0.0003	0.0005
Total, C:	0.0007	0.0007	0.0005	0.0006
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric fl				
Filterable:	0.08	0.07	0.09	0.08
Condensable:	0.25	0.27	0.18	0.23
Total:	0.34	0.35	0.27	0.32
Isokinetic Variance, I:	101.2	101.9	102.5	101.9

English Units: Standard conditions of 29.92 inHg and 68° F

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	G
Location:	Stack

Test Run Number:	1	2	3	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/17/2024	10/17/2024	10/17/2024	
Start Time:	7:50	10:36	13:15	
End Time:	9:30	12:18	14:54	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (^oF):	118.0	119.5	120.2	119.3
Fractional Gas Moisture Content, B_{ws}:	0.049	0.052	0.054	0.051
Moisture Content (%vol):	4.9	5.2	5.4	5.1
Gas CO_2 Content (%vol):	NA	NA	NA	NA
Gas O_2 Content (%vol):	NA	NA	NA	NA
Gas Wet MW, M_s, (lb/lb-mole):	28.46	28.43	28.41	28.43
Average Gas Velocity, V_s, (ft/sec):	62.01	59.73	60.81	60.85
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	48,723	46,929	47,780	47,811
Q_{std} (std ft^3/min):	42,675	40,997	41,695	41,789
$Q_{std(dry)}$ (dry std ft^3/min):	40,585	38,870	39,464	39,640
Sample Volume, $V_{m(std)}$, (dry std ft^3):	70.157	67.210	68.061	68.476
PM Collected, (mg):				
Filterable, m_n:	0.80	0.60	0.80	0.73
Condensable, m_{cpm}:	2.50	2.40	2.00	2.30
Total, m_{total}:	3.30	3.00	2.80	3.03
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0002	0.0001	0.0002	0.0002
Condensable, C_{cpm}:	0.0005	0.0006	0.0005	0.0005
Total, C:	0.0007	0.0007	0.0006	0.0007
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric flow rate):				
Filterable:	0.06	0.05	0.06	0.06
Condensable:	0.19	0.18	0.15	0.18
Total:	0.25	0.23	0.21	0.23
Isokinetic Variance, I:	104.9	104.9	104.7	104.8

English Units: Standard conditions of 29.92 inHg and 68° F

PARTICULATE TEST RESULTS SUMMARY

Company:	East Jordan Foundry
Plant:	EJ Foundry - Elmira, MI
Unit:	H/J
Location:	Stack

Test Run Number:	1	2	3	Average
Source Condition:	Normal	Normal	Normal	
Date:	10/14/2024	10/14/2024	10/15/2024	
Start Time:	8:25	12:10	7:10	
End Time:	11:23	13:48	8:50	
Sample Duration (min):	96.0	96.0	96.0	96.0
Average Gas Temp, T_s, (^oF):	87.8	88.5	83.9	86.7
Fractional Gas Moisture Content, B_{ws}:	0.010	0.008	0.009	0.009
Moisture Content (%vol):	1.0	0.8	0.9	0.9
Gas CO_2 Content (%vol):	NA	NA	NA	NA
Gas O_2 Content (%vol):	NA	NA	NA	NA
Gas Wet MW, M_s, (lb/lb-mole):	28.89	28.91	28.90	28.90
Average Gas Velocity, V_s, (ft/sec):	45.71	45.70	45.65	45.69
Measured Volumetric Flow Rate:				
Q (actual ft^3/min):	191,000	190,960	190,747	190,902
Q_{std} (std ft^3/min):	176,863	176,611	178,693	177,389
$Q_{std(dry)}$ (dry std ft^3/min):	175,055	175,174	177,094	175,774
Sample Volume, $V_{m(std)}$, (dry std ft^3):	75.787	72.992	74.687	74.489
PM Collected, (mg):				
Filterable, m_n:	1.30	0.80	0.30	0.80
Condensable, m_{cpm}:	2.20	1.70	1.80	1.90
Total, m_{total}:	3.50	2.50	2.10	2.70
PM Concentration, (gr/dscf):				
Filterable, C_s:	0.0003	0.0002	0.0001	0.0002
Condensable, C_{cpm}:	0.0004	0.0004	0.0004	0.0004
Total, C:	0.0007	0.0005	0.0004	0.0006
PM Emission Rate, ER_{M2}, (lb/hr based on measured volumetric flow rate):				
Filterable:	0.40	0.25	0.09	0.25
Condensable:	0.67	0.54	0.56	0.59
Total:	1.07	0.79	0.66	0.84
Isokinetic Variance, I:	102.5	98.7	99.9	100.4

English Units: Standard conditions of 29.92 inHg and 68° F

VISIBLE EMISSIONS TEST RESULTS SUMMARIES

East Jordan Foundry, LLC
Elmira, Michigan 49730
October 14 through 18, 2024

Location	Date	Run No.	Time(s)	60 min Observation (Opacity)
A/B Stack	10/14/24	1	8:15 – 9:15	0
		2	10:45 – 11:45	0
		3	13:00 – 14:00	0
C Stack	10/16/24	1	7:50 – 8:15 8:24 – 8:59	0
		2	10:35 – 11:35	0
		3	13:02 – 14:02	0
D Stack	10/17/24	1	8:00 – 9:00	0
		2	10:36 – 11:36	0
		3	13:15 – 14:15	0
E Stack	10/18/24	1	8:20 – 9:20	0
		2	10:31 – 11:31	0
		3	13:20 – 14:20	0