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AIR QUALITY DIVISION


SOURCE TESTING



Source Test Report

Barber Steel Foundry
Corporation
2625 West Winston Road
Rothbury, Michigan

Test Dates: February 27-28 and
March 1-2, 2018

The
Alliance
Advantage



AST Project No. 2018-0284R1

1.0 Introduction

Alliance Source Testing, LLC (AST) was retained by Barber Steel Foundry Corporation (BSF) to conduct compliance testing at the Rothbury, Michigan facility. Portions of the facility are subject to provisions of the Michigan Department of Environmental Quality (MDEQ) Permit to Install 12-14C issued on October 13, 2017. Testing was conducted to determine the emission rates of total particulate matter (PM), including filterable and condensable, at the one (1) exhaust of the Melt Furnace (EUINDUCFURNEIF6) and the two (2) exhausts of the Pouring / Cooling Operations (FG-POURCOOL) fabric filter collector (stacks SV-H1 and SV-H2). Testing was also conducted to determine the emission rates of PM less than 10 micron (PM10) at the Melt Furnace exhaust.

1.1 Facility Description

BSF operates a steel foundry. Facility operations include melting, pouring, cooling, shakeout, mold and core making along with finishing operations. Pouring, cooling, shakeout, some natural gas combustion and mold and core making processes all generate emissions fugitive into the plant environment that may be emitted as fugitive.

1.2 Source and Control System Descriptions

The design melt rate of EUINDUCFURNEIF6 is six tons per hour. The furnace melting emissions are collected by an articulating close capture lid that incorporates a side draft system and is ducted to a 12,500 cfm Torit Dust Cartridge Collector (Collector B) followed by a single stack (SV-B).

During metal pouring operations, a hoist brings transfer ladles of molten metal to the staged molds. The ladles are the “bottom-pour” type. During poured mold-cooling operations, the molds are cooled on the pour floor until they can be moved to shakeout. The pouring and molding emissions and the emissions from the cooling of the castings are collected and vented to the PCS fabric filter collector H, followed by two (2) stacks (SV-H1 and SV-H2).

1.3 Project Team

Personnel involved in this project are identified in the following table.

**Table 1-1
Project Team**

Facility Personnel	Bruce Milligan - BSF Frank Zarate - BSF
Consultant	Benjamin Lemley - TRC
Regulatory Personnel	Jeremy Howe - MDEQ Eric Grinstern - MDEQ
AST Personnel	Kenji Kinoshita Jarret Sproull Tyler Branca

1.4 Site Specific Test Plan

Testing was conducted in accordance with the Site Specific Test Plan (SSTP) submitted to MDEQ on February 16, 2018 except that visible emission evaluations were not conducted and for exceptions provided in Section 1.5.

1.5 Test Program Notes

As stated in U.S. EPA Test Reference Method 201A, the condensable PM is not typically collected if the gas filtration temperature never exceeds 30 °C (85 °F). The exhaust of the Melt Furnace did not exceed 85 °F during the onsite testing; however, the condensable PM was measured by U.S. EPA Test Reference 202 as proposed in the test plan and requested by Jeremy Howe.

The planned PM_{2.5} and PM₁₀ testing on the Melt Furnace was revised to only PM₁₀ onsite because the test ports could not accommodate the combined PM_{2.5}/PM₁₀ sampling probe.

1.6 Revision Notes

During the field testing , a default coefficient of 0.840 was used for the pitot tip used in the Method 201A sample sampling on the Melt Furnace. After the completion of the testing, at MDEQ's request, the pitot tip was calibrated. The Method 201A field data has been updated to use the coefficient derived from the calibration. The report has been revised to reflect these changes.

2.0 Summary of Results

AST conducted compliance testing at the BSF facility in Rothbury, Michigan on February 27-28 and March 1-2, 2018. Testing consisted of determining the emission rates of total PM, including filterable and condensable, at the one (1) exhaust of the Melt Furnace (EUINDUCFURNEIF6) and the two (2) exhausts of the Pouring / Cooling Operations (FG-POURCOOL) fabric filter collector (stacks SV-H1 and SV-H2). Testing also consisted of determining the emission rates of PM10 at the Melt Furnace exhaust.

Table 2-1 provides a summary of the emission testing results with comparisons to the applicable state permit limits. This table also provides a summary of the process operating and control system data collected during testing. Any difference between the summary results listed in the following table and the detailed results contained in appendices is due to rounding for presentation.

**Table 2-1
Summary of Results – Melt Furnace**

Run Number	Run 1	Run 2	Run 3	Average
Date	2/27/18	2/28/18	2/28/18	--
PM2.5/PM10 Data ¹				
Emission Rate, lb/hr	0.077 ³	0.066 ⁴	0.058 ⁴	0.067
Permit Limit, lb/hr	--	--	--	0.17
Percent of Limit, %	--	--	--	39
Total Particulate Matter Data ²				
Emission Rate, lb/hr	0.15	0.092	0.19	0.14
Permit Limit, lb/hr	--	--	--	0.36
Percent of Limit, %	--	--	--	40
Emission Factor, lb/1,000 lb exhaust gas	0.0034	0.0021	0.0042	0.0032
Permit Limit, lb/1,000 lb exhaust gas	--	--	--	0.011
Percent of Limit, %	--	--	--	30

¹ PM2.5/PM10 data presented is the filterable PM2.5/PM10 data collected using Method 201A (PM10 cyclone only). The Method 202 fraction was not included because the stack gas temperature was less than 85°F. The volumetric flow rate measured with the Method 5 sample train was used to calculate the PM10 emission rates.

² Total PM includes filterable and condensable PM using the condensable PM collected in the Method 201A/202 sample train.

³ The particle cut diameter for PM10 exceeded 11.0 um (actual was 11.3 um).

⁴ More than two traverse points exceeded a 121 percent isokinetic sampling rate.

Table 2-2
Summary of Results – Pouring / Cooling Operations

Run Number	Run 1	Run 2	Run 3	Average
Date	3/1/18	3/2/18	3/2/18	--
Total Particulate Matter Data – SV-H1	--	--	--	
Emission Rate, lb/hr	1.1	1.1	1.1	1.1
Total Particulate Matter Data – SV-H2	--	--	--	
Emission Rate, lb/hr	1.5	0.91	0.77	1.0
Total Particulate Matter Data – Combined				
Emission Rate, lb/hr	2.5	2.0	1.9	2.2
Permit Emission Rate, lb/hr	--	--	--	9.5
Percent of Limit, %	--	--	--	23