

**BREMBO, NORTH AMERICA
HOMER, MICHIGAN**

**CONTINUOUS EMISSIONS MONITORING SYSTEM
RELATIVE ACCURACY TEST AUDIT REPORT**

Submitted July 17, 2018 to:

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RECEIVED

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AIR QUALITY DIVISION

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We certify that we have examined the information submitted in this report
and believe the results presented are true, accurate, and complete.

Daniel Klassen
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President

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1.0 INTRODUCTION

Brembo North America (Brembo) contracted Optimal Air Testing Services, Inc. (Optimal) to conduct an air emissions VOC RATA at their Homer, Michigan facility.

Concentrations and emission rates of volatile organic compounds (VOCs as Hexane) were measured from the Sand System Baghouse Outlet (Sand System) on the week of June 4th, 2018. Emissions were measured in accordance with Environmental Protection Agency (EPA) test reference methods set forth in the Code of Federal Regulations, Title 40, Parts 51 and 60. VOC concentrations were measured as total hydrocarbons per EPA Method 25A. VOC results are expressed in terms of parts per million dry volume as Hexane as required in the Iron and Steel Foundry Mact.

A test plan and protocol was submitted to the MDEQ prior to the test mobilization. Approval of the test plan was provided in a letter from Mr. David Patterson of the MDEQ.

Personnel in attendance were:

Joseph Ward and Matthias Barton of Optimal
Christopher Blume of RPS
David Patterson of the MDEQ-AQD
Vivian Rowles of Brembo North America

1.1 RATA Methodology

The RATA was conducted at the Sand System. The RA of the VOC CEMS was determined by comparing the results of reference method tests to the results of the installed CEMS. RATA results are expressed in terms of parts per million Hexane (C₆H₁₄). The RA of the VOC CEMS was based on the allowable limit and was less than 10 percent of the applicable standard.

1.2 Summary of Results

Table 1 Sand System Baghouse Outlet Stack Summary of June 5th, 2018 RATA Results

Constituent	EPA Test Method	Relative Accuracy (%)	Relative Accuracy Limit (%)
Hexane	25a	6.97%	10%*

*Relative Accuracy based on Applicable Standard

Complete summary of test results are presented in Appendix A. Included with the Appendix A results are charts visually comparing Brembo CEMS data to Reference Method results. Reference Method CEMS Data sheets are shown in Appendix B. Brembo CEMS data is attached in Appendix C. Appendix D and E respectively contain on-site Reference Method CEM calibrations and equipment/calibration gas certifications.

1.3 Description of Installation

Brembo, located in Homer, Michigan of the Albion Township, operates a gray iron foundry utilizing greensand castings to produce automobile brake system components. The facility is classified as a new foundry that is a major stationary source of hazardous air pollutant emissions and is subject to the provisions of NESHAP for Iron and Steel Foundries (40 CFR Part 63 Subpart EEEEE).

2.0 SAMPLING AND ANALYTICAL PROCEDURES

Optimal performed the following U.S. Environmental Protection Agency (EPA) test methods to meet the requirements of the specified work. These methods may be referenced in Title 40 of the Code of Federal Regulations, Part 60. The methods are titled as follows:

- *Method 25A* “*Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer;*”

- *Performance Specification 8* “*Specifications and Test Procedures for Volatile Organic Compounds for Continuous Emissions Monitoring Systems in Stationary Sources;*”

3.1 Verification of Gas Dilution Systems

Protocol gases were blended with a certified and calibrated mass flow gas divider to arrive at the desired calibration concentrations. Operation and on-site verification of the gas divider followed procedures listed in 40 CFR Part 51, Test Method 205, Appendix M entitled, "Verification of Gas Dilution Systems for Field Instrument Calibrations".

A Cal Gas Dilution System (CGDS) was used to blend nitrogen and the protocol gas mixtures for the desired calibration gas concentrations. The CGDS utilizes orifices to maintain known flow rates. By maintaining fixed inlet pressures and limiting backpressures, mass flow rates can be fixed. Span gas inlet flow is controlled by passing the span gas through a calibrated orifice. Zero air flow is controlled in the same manner although the operator can select the orifice to be used to achieve the desired dilution ratio. Both gases are directed into a 45-degree wye to begin the blending process. Gases are then directed into a 316 stainless steel mixing chamber where blending is completed. The precision blended calibration gas exits the opposite end of the mixing chamber, through the system flow meter, to the calibration gas outlet located at the rear of the system panel. The gas divider operation on-site was verified with the oxygen analyzer and an independent protocol calibration gas.

The Gas Divider on-site verification was performed by entering two target concentrations into the CGDS. A high range protocol oxygen gas and the zero N₂ gas were blended with the orifices to meet the target concentrations that were introduced to the oxygen analyzer one at a time. Analyzer response was verified by introducing a mid-level calibration gas directly into the analyzer. This process was repeated in triplicate. All analyzer responses for the target concentrations and the verification gas did not deviate more than two percent from the predicted concentrations or more than two percent from the average instrument response for each concentration. Per Method 205, verification of the gas divider operation was demonstrated during the test project.

3.2 Determination of Volatile Organic Compounds

Instrumental Reference Method Procedures for determination of volatile organic compounds utilizing a continuous emission monitor (CEM) sampling apparatus were followed. The gas sample was

extracted from the source at a constant rate, through a stainless steel heated probe and a heated glass fiber filter. Upon leaving the filter, the gas sample passed through a Teflon sample line heated to 275°F. A particulate free, wet gas sample was then suitable for instrument introduction.

EPA Reference Method 25A for Total Hydrocarbon was performed utilizing a total hydrocarbon continuous gas analyzer. The analyzer used was a VIG Model 20 FID calibrated to Hexane.

Gaseous concentrations of volatile organic compounds were measured following procedures listed in 40 CFR 60 Method 25A using Instrument Analyzer Methodology.

A calibration error check to show analyzer linearity was performed prior to the series of tests. The zero and high-range calibration gases were introduced to the analyzer at the calibration valve. The analyzer was then adjusted to the appropriate values. The mid-range and low-range gases were then introduced into the analyzer at the calibration valve with no adjustments made. The measured values for each calibration gas were less than two percent of calibration gas value or the calibration was repeated.

Calibration of the analyzer was performed before and after each test run to determine the analyzer drift. The analyzer drift was less than three percent of the span value for all runs. The analyzer drift was used for correcting the recorded data.

A data acquisition system (DAS) was used to record all gas concentrations and integrate these values into minute averages. These results were transferred to a computer program where average values corrected for calibration responses are reported.

3.3 Relative Accuracy

The Relative Accuracy (RA) methodology consisted of collecting multiple samples. A total of eleven runs were completed. The sixth run was thrown out due to the onsite DAS not recording correctly; the eleventh run was performed and additionally found afterwards to not be recording any data. The data from the nine usable runs was used to calculate RA. The RA of the C₆H₁₄ was calculated using the applicable standard for ppm.