

**NSPS Subpart Db
Compliance CEMS Certification
Project Report
Gas Fired Boilers #12, #13, #14
(432 Boilers)**

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**Dow Silicones Corporation
Michigan Operations
Midland, Michigan**

Sampling Dates: March 13-15, 2018

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CEMS CERTIFICATION REPORT

Gas Fired Boilers #12, #13, #14 (432 Boilers)

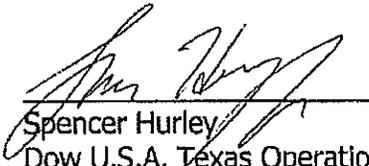
I certify that I have personally examined and am familiar with the information submitted herein, and based on my inquiries of those individuals immediately responsible for obtaining the information; I believe the submitted information is true, accurate, and complete.



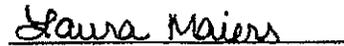
Chuck Glenn
Dow U.S.A. Texas Operations
Dow Stack Testing Team



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Dow Performance Silicones
Process Focal Point



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EH&S Delivery



Laura Maiers
Dow Performance Silicones
Environmental Focal Point



Michael Abel
Dow U.S.A. Texas Operations
EAC Chemist

1.1 Summary of Test Program

This report contains the results of the Performance Specification Test for the Continuous Emission Monitoring Systems for NO_x and Oxygen that are performed on the 432 Boilers owned and operated by Dow Silicones Corporation. This testing was completed as required by NSPS Subpart Db and the Renewable Operating Permit (ROP).

A 5-year requirement to update the CO emission factor was also completed during testing.

The internal stack testing team (AECOM Inc) performed relative accuracy (RA) testing. The following table summarizes the pertinent data for this compliance test:

Responsible Groups	<ul style="list-style-type: none"> • Dow Silicones Corporation • Michigan Department of Environmental Quality (MDEQ) • Environmental Protection Agency (EPA)
Applicable Regulations	<ul style="list-style-type: none"> • MI-ROP-A4043-2008 • 40 CFR 60 NSPS Subpart Db
Industry / Plant	<ul style="list-style-type: none"> • 432 Building
Plant Location	<ul style="list-style-type: none"> • Dow Silicones Corporation Midland, Michigan 48667
Unit Initial Start-up	<ul style="list-style-type: none"> • December 2006 Boiler 12 • December 2006 Boiler 13 • December 2006 Boiler 14
Date of Last RATA	<ul style="list-style-type: none"> • March 21st - 23rd, 2017
Air Pollution Control Equipment	<ul style="list-style-type: none"> • Low NO_x Burners • Exclusive use of Natural Gas
Emission Points	<ul style="list-style-type: none"> • Boiler 12 – Vent SV432-001 • Boiler 13 – Vent SV432-002 • Boiler 14 – Vent SV432-003
Pollutants/Diluent Measured	<ul style="list-style-type: none"> • Nitrogen Oxides (NO_x) • Oxygen (O₂)
Test Dates	<ul style="list-style-type: none"> • Boiler 12 – March 15, 2018 RATA • Boiler 13 – March 15, 2018 RATA • Boiler 14 – March 13, 2018 RATA • Boiler 14 – March 13, 2018 High CO • Boiler 14 – March 13, 2018 Mid CO • Boiler 14 – March 14, 2018 Low CO

1.2 Key Personnel

The key personnel who coordinated the test program are:

- Robbie Seibert provided support as a Process Focal Point. The Process Focal Point is responsible for coordinating the plant operation during the test and ensuring the unit was operating at the agreed upon conditions in the test plan. They also serve as the key contact for collecting any process data required and providing all technical support related to process operation.
- Laura Maiers provided support as the Environmental Focal Point for this unit. The Environmental Focal Point is responsible for ensuring that all regulatory requirements and citations are reviewed and considered for the testing. All agency communication will be completed through this role. Contact information is 989-496-5327.
- Chuck Glenn served as the Test Plan Coordinator. The Test Plan Coordinator is responsible for the overall leadership of the sampling program. They also develop the overall testing plan and determine the correct sample methods.
- Spencer Hurley was the back-up for the Test Plan Coordinator. He also served as the technical review role of the test data.
- Michael Abel provided support as a technical review of the test data.
- Daniel Nunez served as the Project Manager and was responsible for ensuring the data generated met the quality assurance objectives of the plan. Dan Bennett and Kyle Kennedy are sampling technicians that completed this testing.

2.1 Facility Description

432 Building is used to provide steam to chemical manufacturing plants located in the Dow Silicones Corporation Midland Site, which includes three natural gas boilers and all required ancillary equipment. Boiler feed water is imported from existing site infrastructure. Natural gas (High Pressure Fuel Gas, HPFG) provide fuel for these three boilers. Steam produced in the auxiliary boilers will be sent throughout the Dow Silicones Corporation Midland site at 150 psig.

2.2 Control Equipment Descriptions

The boilers utilize a low NO_x burner design with O₂ trim to reduce the stack NO_x concentration.

2.3 Flue Gas Sampling Locations

Emission sampling was conducted from each boiler stack for the RATA testing. CO testing was conducted on Boiler 14. Although the ROP requires verification of CO emission rates from each boiler every 5 years, Dow Silicones Corporation proposed to only test Boiler 14 as it is identical to Boiler nos. 12 and 13. The approach was accepted by the DEQ. Similar approach was allowed in the past as Boiler 13 was tested in 2013 and Boiler 12 in 2008. Each stack has sampling ports installed at a height which complies with the requirements of 40 CFR 60, Appendix A, Reference Method 1. The sample locations are a minimum of two diameters upstream of gas flow disturbances.

FIGURE 2.1: FACILITY DIAGRAM

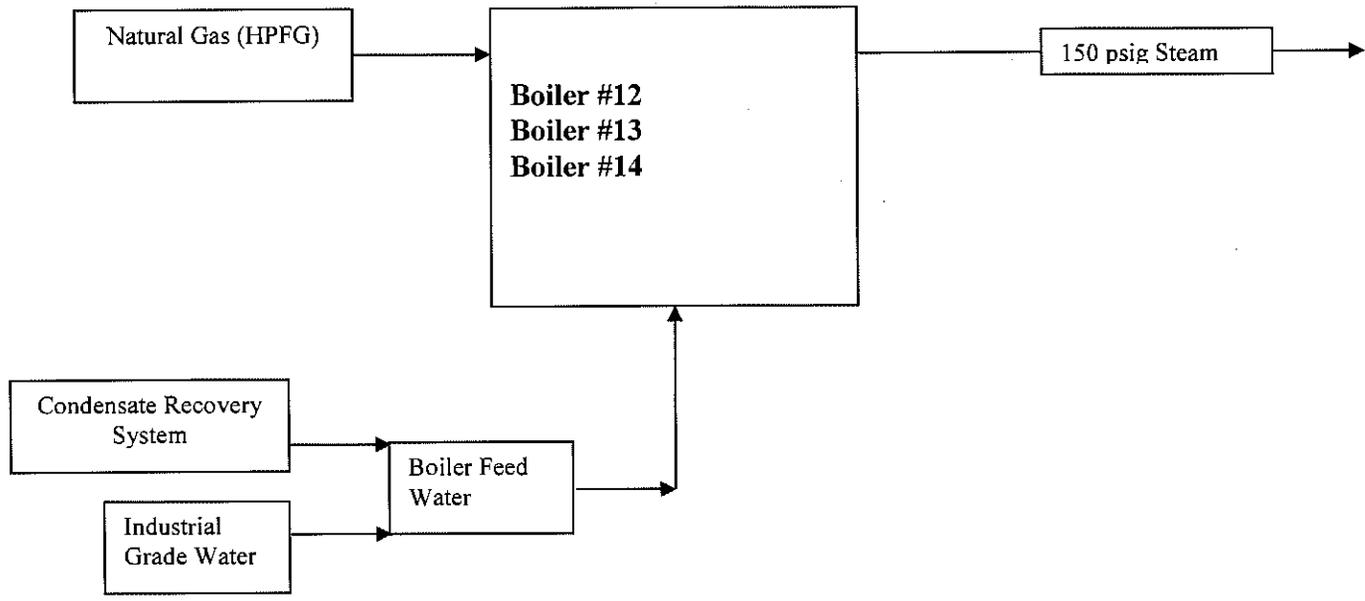
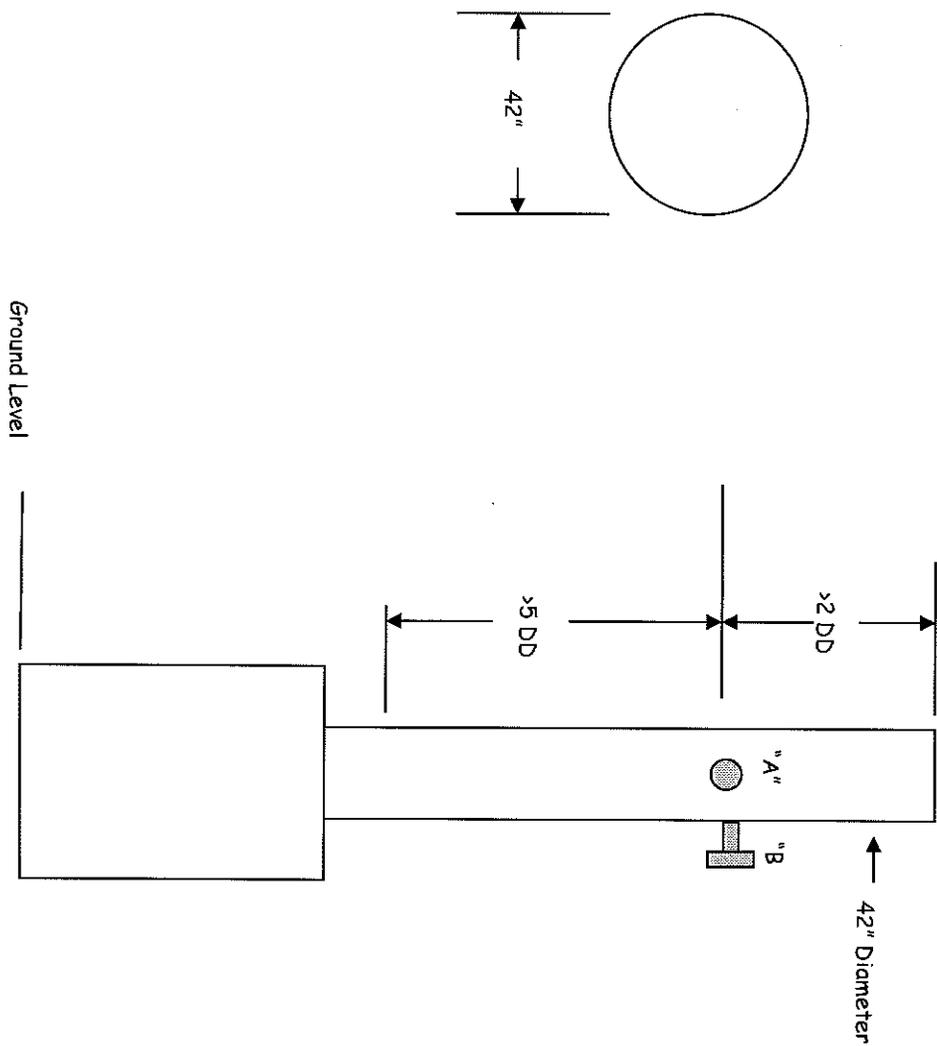


FIGURE 2.2: OUTLET STACK SCHEMATIC



3.1 Objectives and Test Matrix

The purpose of these Performance Specification Tests was to demonstrate compliance with the CEMS testing requirements. This testing was completed as required by NSPS Subpart Db and the ROP. The specific objectives of this test were:

- Measure the NO_x emissions from the boiler stacks
- Measure the CO emissions from the boiler stacks(14 only)
- Determine the O₂ concentration from the boiler stacks

Table 3.1 presents a summary for the results for the Performance Specification Test for CEMS RATA.

3.2 Facility Operations

During the CEMS tests, the plant was operated at greater than 50% of the full load rating of the boiler being tested. Although these units are currently operated as standby units, which is different than how they were operated in the past (and during past tests), it was proposed to operate the units at greater than 50% of the previous normal load during testing. Prior to becoming standby units, the previous normal load was approximately 60 MMBtu/hr heat input.

During the CO emissions test on Boiler 14, testing was conducted at three conditions:

- High firing rate (~84 mmBtu/hr)
- Mid firing rate (~54 mmBtu/hr)
- Low firing rate (~30 mmBtu/hr)

3.3 Comments/Exceptions

- This Performance Specification Test for the boiler stacks consisted of up to 12 total 21-minute runs. A maximum of three runs were not used for RATA calculations as allowed by 40 CFR Part 60, PS 2 and 3.
- CO concentrations for all three conditions were measured below detectable concentrations. A detection level of 0.6 ppmv was used for all CO emission factor calculations.
- It was not realized until after the testing had been completed during report generation that CO₂ data was not collected during the compliance test. The CO₂ was only needed to determine the stack gas molecular weight. Using 0.0% CO₂ provided the highest (worst case)stack flow rate, therefore, the CO emission factor was calculated using 0.0% CO₂.

Summary of Results
 Boiler 12, Vent SV432-001
 Continuous Emission Monitor Certification

NOx Monitoring

Test Type	NOx Monitor Results lb/mmBtu	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	4 %	20% RA using RM or 10% RA using EL	Pass
	1 %		Pass
			Pass

*Emission limit is 0.10 NOx lb/MMBtu based on instantaneous value found in NSPS Subpart Db.

O2 Monitoring

Test Type	O2 Monitor Results	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	1.5 %	No greater than 20.0 % of mean value of RM or the absolute difference between RM and CEMS <= 1.0%	Pass
	0.1 %		Pass
			Pass

Summary of Results
 Boiler 13, Vent SV432-002
 Continuous Emission Monitor Certification

NOx Monitoring

Test Type	NOx Monitor Results lb/mmBtu	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	18 %	20% RA using RM or 10% RA using EL	Pass
	4 %		Pass
			Pass

*Emission limit is 0.10 NOx lb/MMBtu based on instantaneous value found in NSPS Subpart Db.

O2 Monitoring

Test Type	O2 Monitor Results	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	4.4 %	No greater than 20% of mean value of RM or the absolute difference between RM and CEMS <= 1.0%	Pass
	0.2 %		Pass
			Pass

Summary of Results
Boiler 14, Vent SV432-003
Continuous Emission Monitor Certification

NOx Monitoring

Test Type	NOx Monitor Results lb/mmBtu	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	19 %	20% RA using RM or 10% RA using EL	Pass
	7 %		Pass
			Pass

*Emission limit is 0.10 NOx lb/MMBtu based on instantaneous value found in NSPS Subpart Db.

O2 Monitoring

Test Type	O2 Monitor Results	Allowable	Pass/Fail Semi/Annual
Relative Accuracy	3 %	No greater than 20% of mean value of RM or the absolute difference between RM and CEMS <= 1.0%	Pass
	0.2 %		Pass
			Pass

CO Emission Summary – Boiler 14

Operating Condition	Sample	Date	Time	Air Flow Rate DSCFM ⁽¹⁾	CO Conc. ppmv ⁽²⁾	CO Mass Rates	
						Lb/Hr ⁽³⁾	Tons/Year ⁽⁴⁾
High Load (~ 84 %)	1	03/13/18	1626/1725	19070	< 0.6	< 0.050	< 0.219
	2	03/13/18	1743/1842		< 0.6	< 0.050	< 0.219
	3	03/13/18	1900/1959		< 0.6	< 0.050	< 0.218
	Average					< 0.6	< 0.050
Mid Load (~ 54 %)	1	03/13/18	1030/1129	14553	< 0.6	< 0.038	< 0.166
	2	03/13/18	1158/1257		< 0.6	< 0.038	< 0.167
	3	03/13/18	1327/1426		< 0.6	< 0.038	< 0.167
	Average					< 0.6	< 0.038
Low Load (~ 30 %)	1	03/14/18	0930/1029	8988	0.6	0.024	0.104
	2	03/14/18	1050/1149		< 0.6	< 0.023	< 0.102
	3	03/14/18	1208/1307		< 0.6	< 0.023	< 0.103
	Average					< 0.6	< 0.024

- 1) DSCFM = Dry standard cubic feet per minute (std temperature and pressure = 70 °F and 29.92" Hg)
- 2) ppmv = Parts per million (v/v) on a dry basis
- 3) Lb/hr = pounds per hour
- 4) Tons/year = Tons per year calculated using 8760 hours of operation per year (24 hours/day and 365 days/year)