Data Accuracy Assessment Report

Quarterly Linearity Check

40 CFR Part 75, Appendix A

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Boiler No. 8

Test Date(s): April 10, 2017
Source Location: Kalamazoo, Michigan

Report Date: May 8, 2017
Report Number: 170405.3.0
Scope ID: 10938

Prepared For:

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1.0 INTRODUCTION

1.1 Summary of Test Program

Graphic Packaging International, Inc. (Facility ID: MIB1678), located in Kalamazoo, Michigan, contracted MAQS-Cleveland of Cleveland, Ohio, to conduct the Quarterly Linearity Check for the Continuous Emission Monitoring System (CEMS) associated with their Boiler No. 8. The testing was performed on April 10, 2017, for the purpose of determining the accuracy of the emissions data produced by Graphic Packaging International, Inc.'s CEMS system in accordance with 40 CFR Part 75, Appendix A, and Michigan Department of Environmental Quality (MDEQ) Permit No. MI-ROP-B1678-2015.

The Quarterly Linearity Check was performed by utilizing EPA Protocol 1 cylinders to introduce known concentrations of nitrogen oxides (NO_x) and oxygen (O_2) into the Boiler No. 8 CEMS following the procedures contained within 40 CFR Part 75, Appendix A. Three (3) challenges at three (3) audit points were performed on the Boiler No. 8 CEMS. Each challenge was approximately 1.5 to 2.5 minutes.

1.2 Key Personnel

The key personnel who coordinated this test program (and their phone numbers) were:

Donald Krug, Environmental Engineer, Graphic Packaging International, Inc., 269-383-5000

Monica Brothers, Environmental Quality Analyst, Michigan Department of Environmental Quality (MDEQ), 269-567-3552

David Patterson, Environmental Quality Analyst, MDEQ, 517-241-7469

Robert Sava QSTI, Client Project Manager, MAQS-Cleveland, 800-372-2471

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

2.1 Objectives and Test Matrix

The purpose of this project was to perform the required Quarterly Linearity Check on the NO_x pollutant analyzer and O_2 diluent analyzer associated with the Boiler No. 8 CEMS. The testing was performed for the purpose of determining the accuracy of the emissions data produced by Graphic Packaging International's CEMS system in 40 CFR Part 75, Appendix A, and MDEQ Permit No. MI-ROP-B1678-2010.

The specific test objectives for this test were to:

Measure the accuracy of the CEMS NO_x and O_2 analyzers associated with Boiler No. 8 following the procedures contained within 40 CFR Part 75, Appendix A.

Table 2.1 presents the sampling and analytical matrix log for this test.

2.2 Field Test Changes and Problems

No field test changes or problems occurred during the performance of this test that would bias the accuracy of the results of this test.

2.3 Presentation of Results

To perform the Quarterly Linearity Check, the NO_x pollutant analyzer and O_2 diluent analyzer of the CEMS were challenged at three (3) points with audit gases of known concentrations.

The following observations were made:

The NO_x pollutant analyzer and O_2 diluent analyzer associated with the Boiler No. 8 CEMS met the 40 CFR Part 75, Appendix A., Section 3.2 acceptability criteria which requires that the analyzer must perform within ±5 ppm or 5% of the average audit value, whichever is greater.

Tables 2.2.1 and 2.2.2 summarize the Linearity Check results for the Boiler No. 8 CEMS.

Table 2.3 summarizes the analyzers utilized by Graphic Packaging International for the CEMS associated with Boiler No. 8.

Date	Linearity Check Sampling Location	Pollutant/Diluent Analyzer	Sampling Time / Duration (min)
4/10/2017	Boiler No. 8 CEMS	NO_x	12:34 - 13:01 27
4/10/2017	Boiler No. 8 CEMS	O_2	13:17 - 13:43 26

All times are Eastern Daylight Time.

Table 2.1 - Linearity Check Sampling Matrix

Linearity Check for	Boiler No. 8 - NO_x CEMS		
	Audit Point 1	Audit Point 2	Audit Point 2
Date of Audit	4/10/2017	4/10/2017	4/10/2017
Cylinder ID Number	XC022816B	SG9165423BAL	CC706541
Date of Cylinder Expiration	5/17/2024	8/3/2024	12/15/2024
Type of Cylinder Certification	EPA Protocol 1	EPA Protocol 1	EPA Protocol 1
Certified Audit Value (Ca) (ppm as NO_x)	109.7	277.4	453.4
Average CEMS Response Value (Cm) (ppm as NO_x)	107.2	278.2	453.4
Challenge Number 1 (ppm as NO_x)	107.1	278.0	453.0
Challenge Number 2 (ppm as NO_x)	107.3	278.0	453.0
Challenge Number 3 (ppm as NO_x)	107.3	278.6	454.2
Average Difference (ppm as CO): $C_m - C_a$	**-2.5**	**0.8**	**0.0**
Accuracy Percent (%): $A = ((C_m - C_a) / C_a) \times 100$	**-2.25%**	**0.29%**	**0.00%**
Acceptable Range (ppm as NO_x)	**± 16.5**	**± 41.6**	**± 68.0**
Out of Control (Yes/No)	**No**	**No**	**No**

Table 2.2.1 - NO_x Linearity Check

Linearity Check for	Boiler No. 8 - O_2 CEMS		
	Audit Point 1	Audit Point 2	Audit Point 2
Date of Audit	4/10/2017	4/10/2017	4/10/2017
Cylinder ID Number	CC163062	CC315021	CC41781
Date of Cylinder Expiration	9/22/2023	12/15/2022	8/23/2022
Type of Cylinder Certification	EPA Protocol 1	EPA Protocol 1	EPA Protocol 1
Certified Audit Value (C_a) (% as O_2)	5.568	14.12	20.99
Average CEMS Response Value (C_m) (% as O_2)	5.5	13.9	20.8
Challenge Number 1 (% as O_2)	5.5	13.9	20.8
Challenge Number 2 (% as O_2)	5.5	13.9	20.8
Challenge Number 3 (% as O_2)	5.5	13.9	20.9
Average Difference (% as O_2): $C_m - C_a$	**-0.1**	**-0.2**	**-0.2**
Accuracy Percent (%): $A = ((C_m - C_a) / C_a) \times 100$	**-1.22%**	**-1.56%**	**-0.75%**
Acceptable Range (% as O_2)	**± 0.84**	**± 2.12**	**± 3.15**
Out of Control (Yes/No)	**No**	**No**	**No**

Table 2.2.2 - O_2 Linearity Check

	Boiler No. 8 CEMS	
	NO_x Analyzer	**O_2 Analyzer**
Analyzer Manufacturer	Horiba	Horiba
Analyzer Model Number	CMA-EC622	CMA-EC622
Analyzer Serial Number	41866400054	41866400054
Analyzer Type	Straight-Extractive	Straight-Extractive
Analyzer Span Value (High)	500-ppm	25%
Analyzer Span Value (Low)	0 ppm	0%

Table 2.3 - CEMS Analyzer Specifications

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 Linearity Check Test Methods Utilized

The procedures utilized during this Linearity Check are described in 40 CFR Part 75, Appendix A. A CEMS is challenged three (3) times at three (3) audit points. For diluent and pollutant monitors, audit point one is 20 to 30% of span value, audit point two is 50 to 60% of span value, and audit point three is 80 to 100% of span value. EPA Protocol 1 cylinders are utilized to introduce the known concentrations of gases into the CEMS. During this test event, the audit gases were introduced at the 1 psi check valve located on the CEMS calibration line. In order for the challenged CEMS system to pass the audit, it has to perform within ±5 ppm or 5% of the average audit value, whichever is greater.