Compliance Stack Emission Test Report

Determination of Total Gaseous Organic Destruction Efficiency

EUCOATINGLINE

EPA Methods 1, 2, 3, 4, and 25A

Ventra Fowlerville, LLC
Fowlerville, Michigan

Date Conducted: September 5, 2013
Report Number: 130915.1.0

Prepared by:

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Report Date: September 19, 2013

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1.0 INTRODUCTION

1.1 Summary of Test Program

Ventra Fowlerville, LLC (State Registration No.: N7413), located in Fowlerville, Michigan, contracted Air Compliance Testing, Inc. of Cleveland, Ohio, to conduct compliance stack emission testing for their EUCOATINGLINE. Testing was performed to satisfy the emissions testing requirements pursuant to Michigan Department of Environmental Quality (MDEQ) Permit-To-Install (PTI) No. 247-04. The testing was performed on September 5, 2013.

Simultaneous sampling was performed at the EUCOATINGLINE SV-RTO Inlet Duct and EUCOATINGLINE SV-RTO Exhaust Stack to determine the total gaseous organics (TGO) destruction efficiency (DE) of the RTO associated with EUCOATINGLINE. Testing was conducted during maximum production operations. During this test, emissions from EUCOATINGLINE were controlled by an RTO.

The test methods that were conducted during this test were EPA Methods 1, 2, 3, 4, and 25A.

1.2 Key Personnel

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

Kenneth Spitler, Environmental Health & Safety Manager, Ventra Fowlerville, LLC, 517-223-4500
Thomas Reek, Paint Manager, Ventra - Bumper Systems Group, 517-223-4504
Celia Jackson, Director of Environmental Affairs, Meridian Automotive Systems, 616-527-8355
Robert Byrnes, Michigan Department of Environmental Quality, 517-241-2182
David Patterson, Environmental Quality Analyst, MDEQ, 517-241-7469
Tyson Houchin QSTI, Operations Director, Air Compliance Testing, Inc., 800-372-2471
Brian Isom QI, Project Manager, Air Compliance Testing, Inc., 800-372-2471

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

2.1 Objectives and Test Matrix

The purpose of this test was to determine the TGO DE of the RTO associated with EUCOATINGLINE during maximum production operations. Testing was performed to satisfy the emissions testing requirements pursuant to MDEQ PTI No. 247-04.

The specific test objectives for this test were to:

Simultaneously measure the concentrations of TGO at the EUCOATINGLINE SV-RTO Inlet Duct and EUCOATINGLINE SV-RTO Exhaust Stack.

Simultaneously measure the actual and dry standard volumetric flow rate of the stack gas at the EUCOATINGLINE SV-RTO Inlet Duct and EUCOATINGLINE SV-RTO Exhaust Stack.

Utilize the above variables to determine the TGO DE of the RTO associated with the EUCOATINGLINE during maximum production rate operations.

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

Two (2) sampling trains were utilized during each run at the EUCOATINGLINE SV-RTO Inlet Duct and at the EUCOATINGLINE SV-RTO Exhaust Stack to determine the TGO DE of the RTO associated with the EUCOATINGLINE during maximum production operations. At each location, one sampling train measured the stack gas dry molecular weight and moisture content while the second sampling train measured the stack gas concentration of TGO. Stack gas volumetric flow rates were measured at the inlet and exhaust prior to each concentration run.

Table 2.2 displays the TGO DE of the RTO associated with the EUCOATINGLINE during maximum production operations.

The graphs that follow Table 2.2 present the raw, uncorrected concentration data measured in the field by the EPA method 25A sampling systems at the EUCOATINGLINE SV-RTO Inlet Duct and EUCOATINGLINE SV-RTO Exhaust Stack.

			EPA TEST METHODS UTILIZED			
			M1/M2 (Flow)	M3 (Dry Mol. Wt.)	M4 (%H_2O)	M25A (TGO)
Date	Run No.	Sampling Location	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)
9/5/2013	1	EUCOATINGLINE SV-RTO Inlet Duct	8:10 - 8:21 11	9:06 - 10:06 60	9:06 - 10:06 60	9:05 - 10:05 60
9/5/2013	2	EUCOATINGLINE SV-RTO Inlet Duct	10:28 - 10:40 12	10:50 - 11:50 60	10:50 - 11:50 60	10:50 - 11:50 60
9/5/2013	3	EUCOATINGLINE SV-RTO Inlet Duct	12:11 - 12:22 11	12:27 - 13:27 60	12:27 - 13:27 60	12:27 - 13:27 60
9/5/2013	1	EUCOATINGLINE SV-RTO Exhaust Stack	8:10 - 8:19 9	9:06 - 10:14 60	9:06 - 10:14 60	9:05 - 10:05 60
9/5/2013	2	EUCOATINGLINE SV-RTO Exhaust Stack	10:39 - 10:46 7	10:50 - 11:50 60	10:50 - 11:50 60	10:50 - 11:50 60
9/5/2013	3	EUCOATINGLINE SV-RTO Exhaust Stack	12:11 - 12:20 9	12:27 - 13:27 60	12:27 - 13:27 60	12:27 - 13:27 60

All times are Eastern Daylight Time.

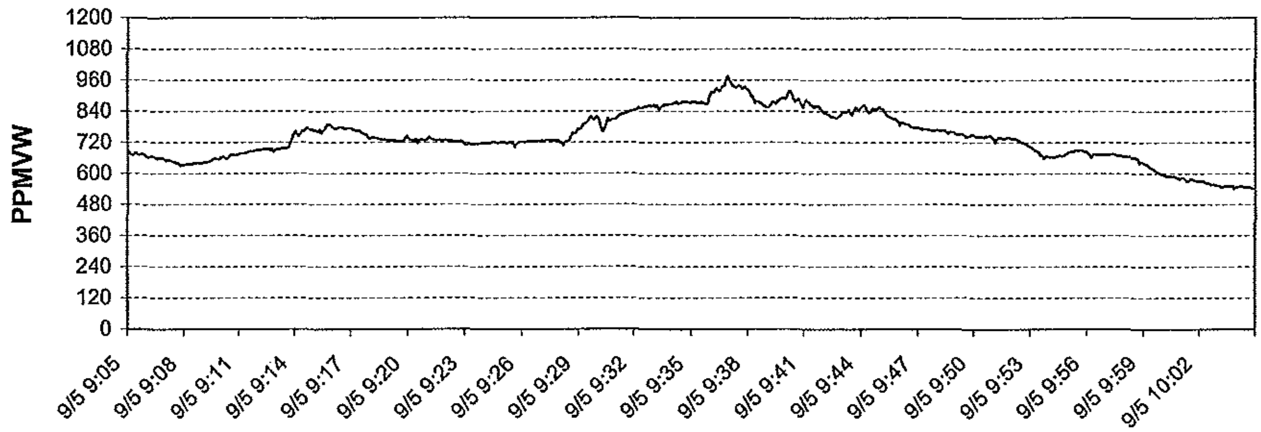
Table 2.1 - Sampling and Analytical Matrix

	EUCOATINGLINE SV-RTO Inlet Duct				EUCOATINGLINE SV-RTO Exhaust Stack			
	Run 1	Run 2	Run 3	Average	Run 1	Run 2	Run 3	Average
TGO Destruction Efficiency (%)	-	-	-	-	95.88	95.87	95.91	95.89
TGO Mass Emission Rate (lb/hr as propane)	99.4	91.7	102.6	97.9	4.10	3.79	4.19	4.03
TGO Concentration (ppmvd as propane)	766.3	676.3	743.5	728.7	33.1	28.9	31.2	31.1
Stack Gas Average Flow Rate (acfm)	21,894	22,854	23,298	22,682	26,021	27,788	28,593	27,467
Stack Gas Average Flow Rate (scfm)	19,571	20,445	20,861	20,293	18,726	19,782	20,312	19,607
Stack Gas Average Flow Rate (dscfm)	18,894	19,740	20,095	19,577	18,034	19,069	19,547	18,883
Stack Gas Average Velocity (fpm)	2,787	2,910	2,966	2,888	2,110	2,253	2,319	2,227
Stack Gas Average Static Pressure (in-H_2O)	-1.75	-2.15	-2.20	-2.03	-0.33	-0.46	-0.41	-0.40
Stack Gas Average Temperature (°F)	114	114	114	114	251	262	265	259
Stack Gas Percent by Volume Moisture (%H_2O)	3.46	3.45	3.67	3.53	3.70	3.61	3.77	3.69
Measured Stack Inner Diameter (in)*	38.2 X 37.7	38.2 X 37.7	38.2 X 37.7	38.2 X 37.7	47.6 X 47.5	47.6 X 47.5	47.6 X 47.5	47.6 X 47.5
Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent by Volume Oxygen in Stack Gas (%-dry)	20.67	20.00	20.00	20.22	19.67	20.00	20.00	19.89
Percent by Volume Nitrogen in Stack Gas (%-dry)	79.33	80.00	80.00	79.78	80.33	80.00	80.00	80.11

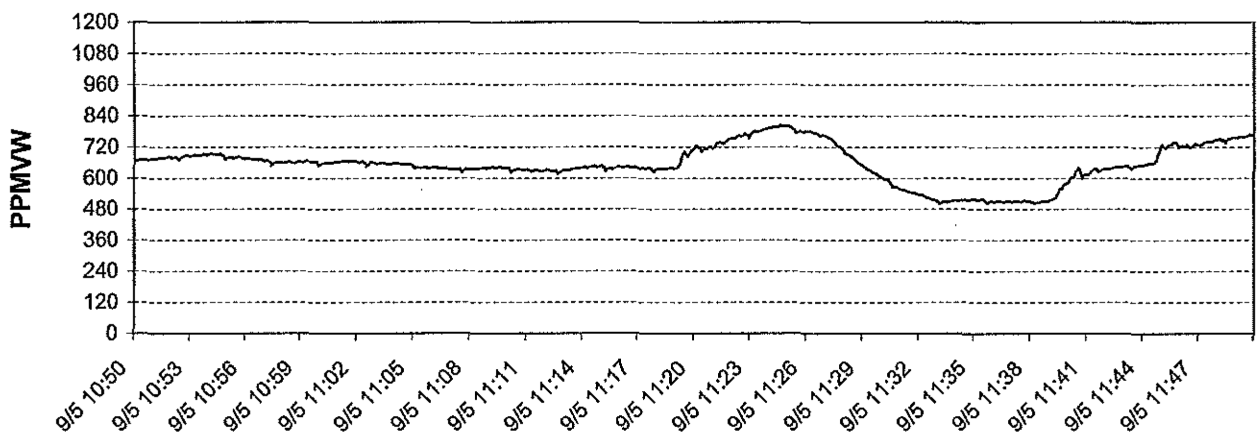
* The EUCOATINGLINE SV-RTO Inlet Duct and EUCOATINGLINE SV-RTO Exhaust Stack were elliptical in shape.

Table 2.2 - Emission Results

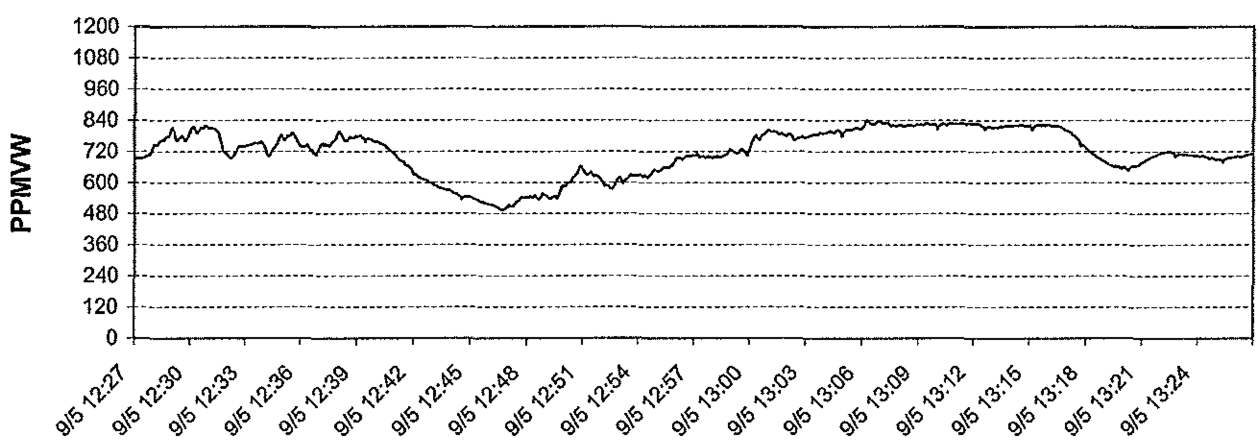
EUCOATINGLINE SV-RTO Inlet Duct - TGO Concentration - Run 1



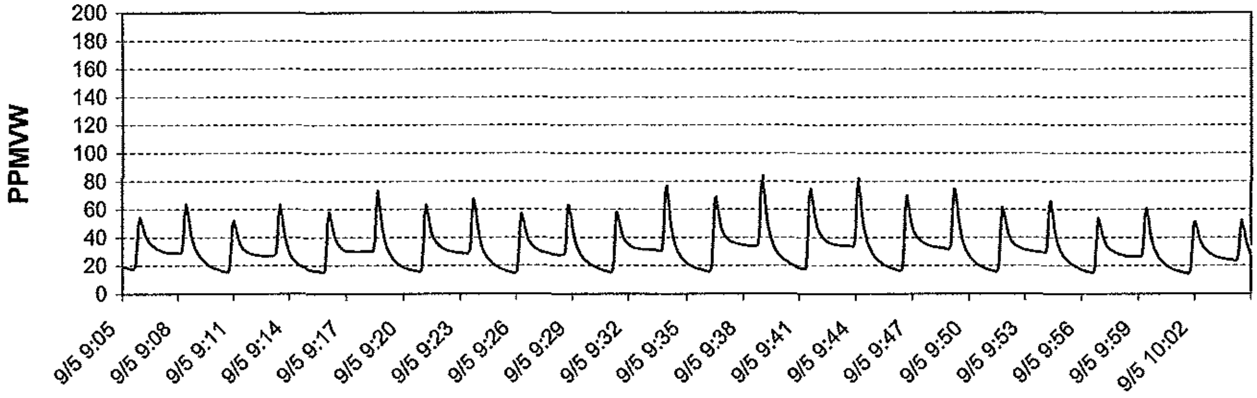
EUCOATINGLINE SV-RTO Inlet Duct - TGO Concentration - Run 2



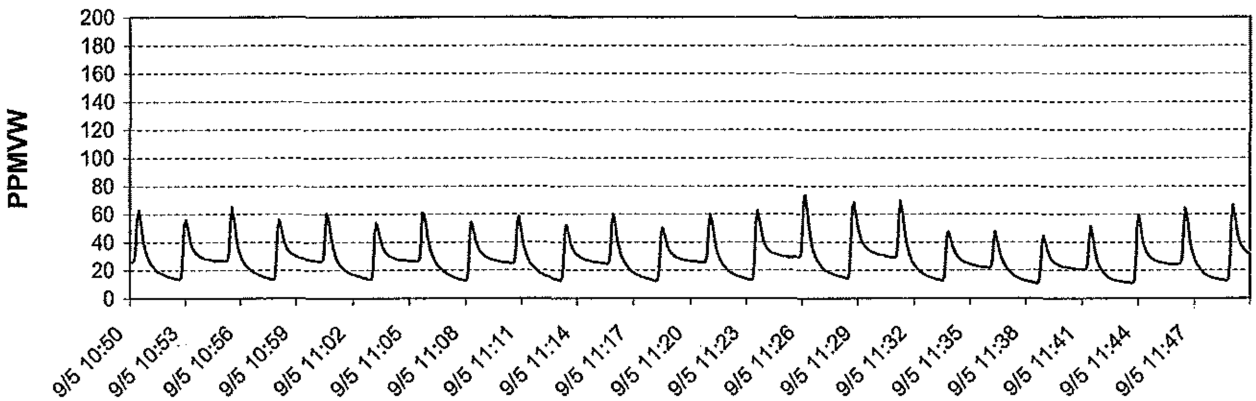
EUCOATINGLINE SV-RTO Inlet Duct - TGO Concentration - Run 3



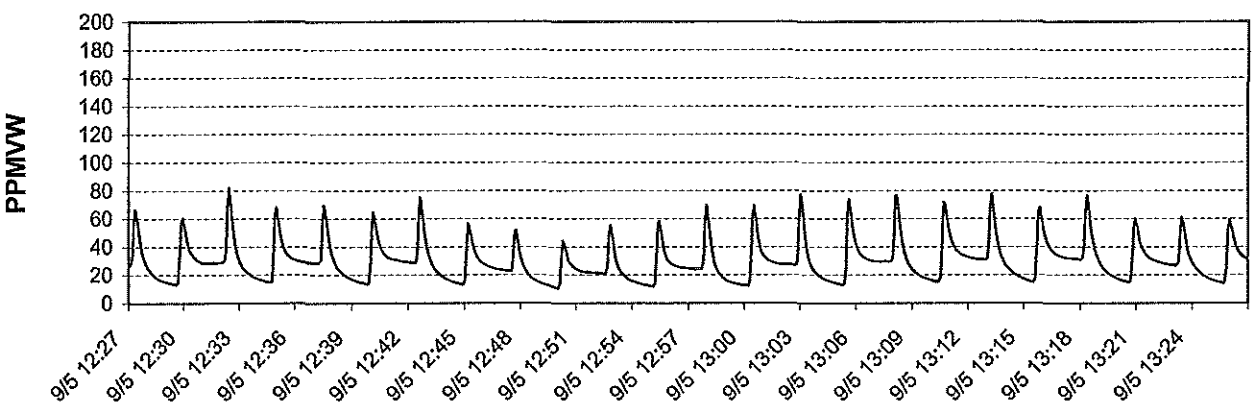
EUCOATINGLINE SV-RTO Exhaust Stack - TGO Concentration - Run 1



EUCOATINGLINE SV-RTO Exhaust Stack - TGO Concentration - Run 2



EUCOATINGLINE SV-RTO Exhaust Stack - TGO Concentration - Run 3



3.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

3.1 Process Description and Operation

Ventra - Bumper Systems Group's Fowlerville facility operates an automotive plastic parts coating line (EUCOATINGLINE). The EUCOATINGLINE is an automated conveyorized system consisting of a 5-stage aqueous wash line, three (3) down-draft water-wash spray booths (adhesive promoter (Ad-Pro), basecoat, and clearcoat), an Ad-Pro drying oven, and a final cure oven. The Ad-Pro booth is equipped with three (3) robots employing non-electrostatic applicators, the basecoat booth is equipped with eight (8) robots, five employing electrostatic bell guns and three (3) electrostatic gun applicators, and the clearcoat booth is equipped with six (6) robots, all employing electrostatic bell applicators.

Uncoated parts enter the wash line for a thorough cleaning and are oven dried prior to being conveyed to the spray booths where the Ad-Pro, base, and clear coatings are applied. Coated parts are then conveyed to a second oven where the coating is cured. The EUCOATINGLINE is a fully enclosed system. Once parts enter the wash line, they are not exposed to the general plant environment until after they emerge from the final cure oven. The EUCOATINGLINE was in operation for this test event.

Figure 3.1 depicts the process schematic.

3.2 Control Equipment Description

During this test, emissions from EUCOATINGLINE were controlled by an RTO.

3.3 Flue Gas Sampling Locations

3.3.1 EUCOATINGLINE SV-RTO Inlet Duct

The EUCOATINGLINE SV-RTO Inlet Duct was elliptical in shape with measured inner diameters of 38.2-inches and 37.7-inches. The stack was oriented in the vertical plane and was accessed from a temporary scaffolding arrangement. Two (2) 2.8-inch I.D. sampling ports were located 90° apart from one another at a location that met EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the stack was traversed to verify the absence of cyclonic flow. An average yaw angle of 11.25° was measured. Therefore, the sampling location also met EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the stack was traversed for stack gas volumetric flow rate. A single point was utilized for dry molecular weight and moisture content determinations. A second point, located within the central 10% of the stack cross-sectional area, was utilized for TGO concentration determination.

3.3.2 EUCOATINGLINE SV-RTO Exhaust Stack

The EUCOATINGLINE SV-RTO Exhaust Stack was elliptical in shape with measured inner diameters of 47.6-inches and 47.5-inches. The stack was oriented in the vertical plane and was accessed from a temporary scaffolding arrangement. Two (2) 3.0-inch I.D. sampling ports were located 90° apart from one another at a location that met EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the stack was traversed to verify the absence of cyclonic flow. An average yaw angle of 9.25° was measured. Therefore, the sampling location also met EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the stack was traversed for stack gas volumetric flow rate. A single point was utilized for dry molecular weight and moisture content determinations. A second point, located within the central 10% of the stack cross-sectional area, was utilized for TGO concentration determination.

Figures 3.2 and 3.3 schematically illustrate the traverse point and sample port locations utilized.

3.4 Process Sampling Location

The EPA Reference Test Methods performed did not specifically require that process samples were to be taken during the performance of this testing event. It is in the best knowledge of Air Compliance Testing that no process samples were obtained and therefore no process sampling location was identified in this report.

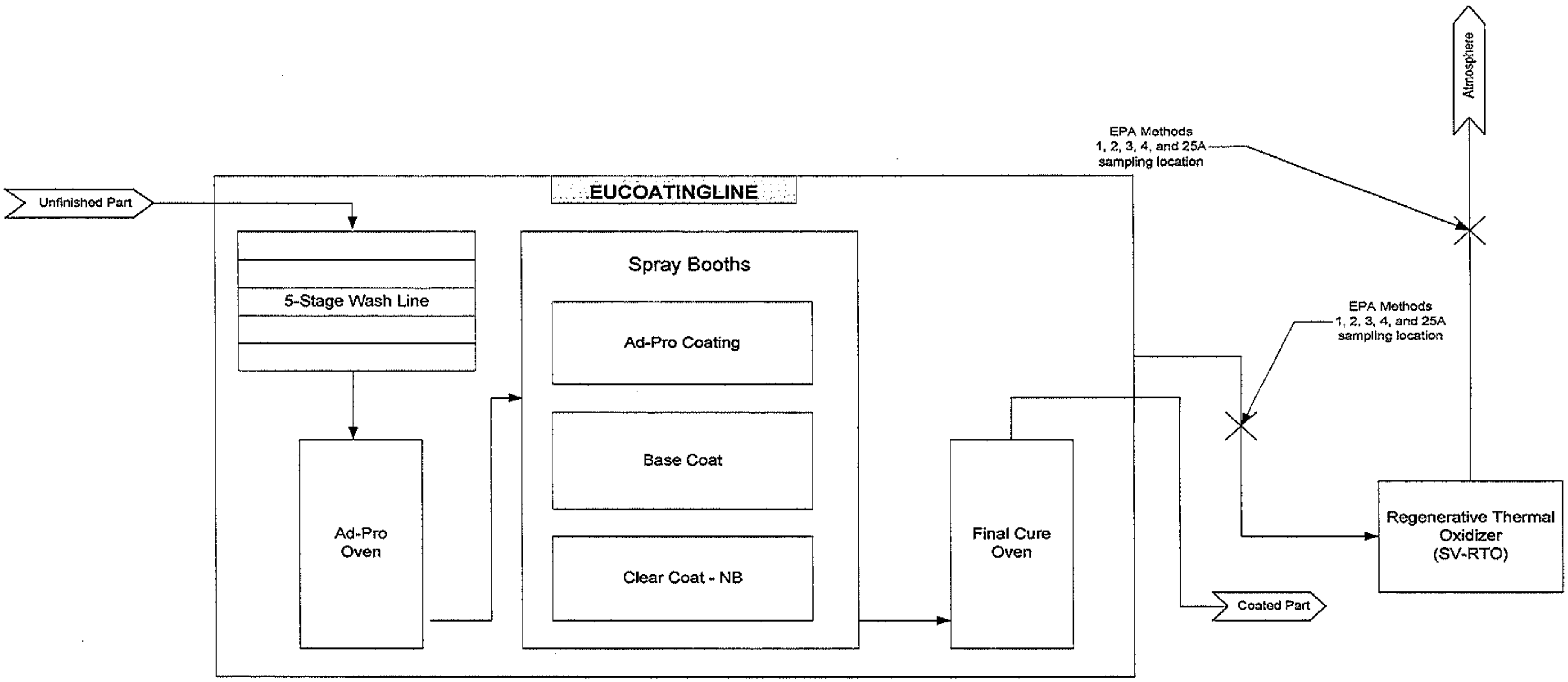
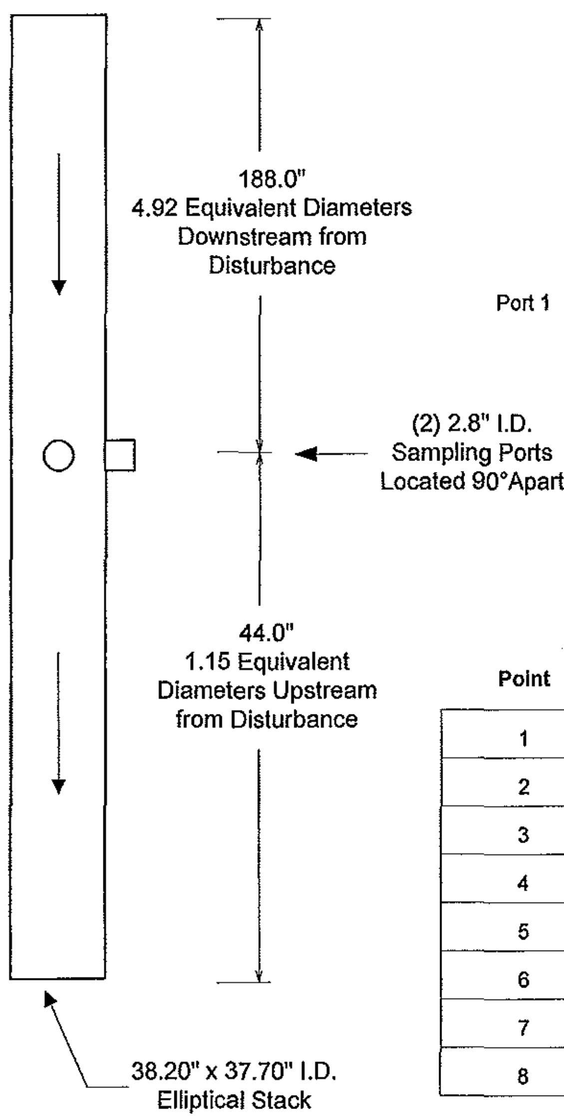
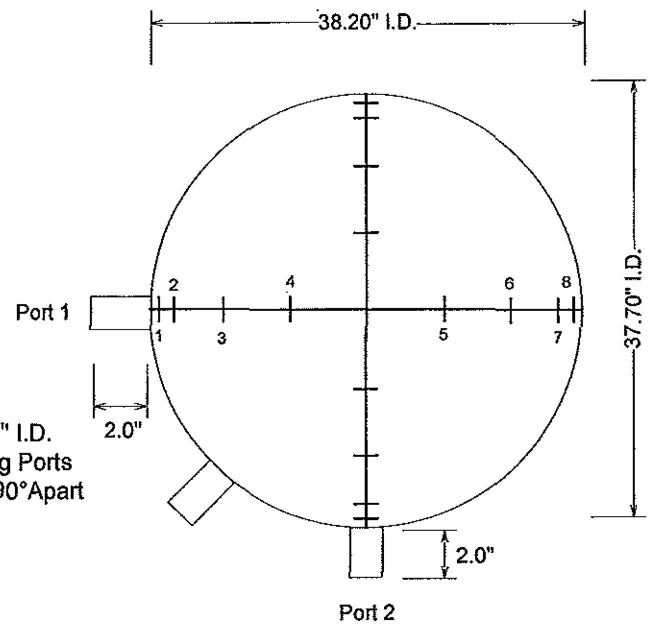


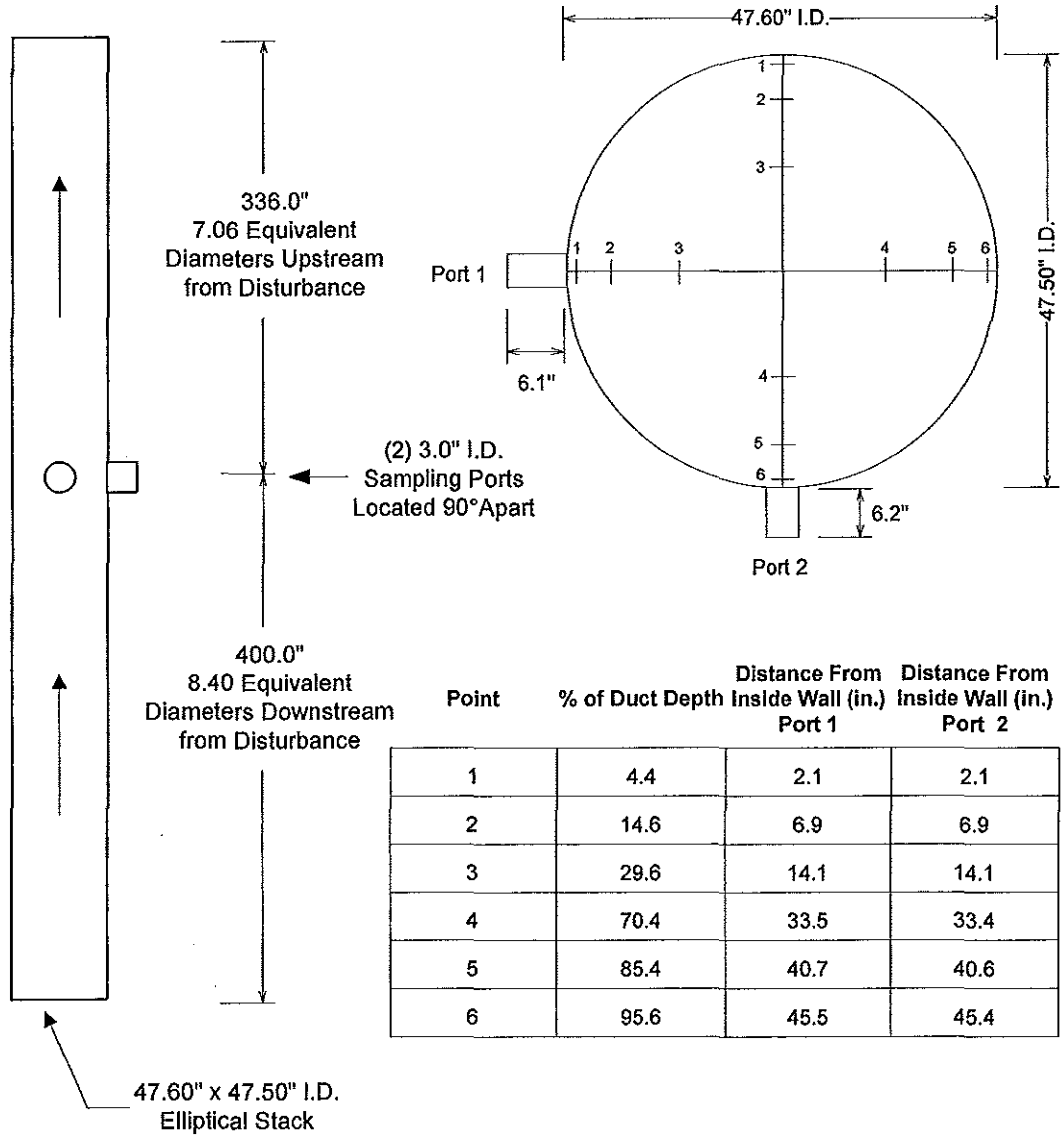
Figure 3.1 - EUCOATINGLINE Process Schematic





Point	% of Duct Depth	Distance From Inside Wall (in.) Port 1	Distance From Inside Wall (in.) Port 2
1	3.2	1.2	1.2
2	10.5	4.0	4.0
3	19.4	7.4	7.3
4	32.3	12.3	12.2
5	67.7	25.9	25.5
6	80.6	30.8	30.4
7	89.5	34.2	33.7
8	96.8	37.0	36.5

Figure 3.2 - EUCOATINGLINE SV-RTO Inlet Duct Traverse Point Location Drawing



Point	% of Duct Depth	Distance From Inside Wall (in.) Port 1	Distance From Inside Wall (in.) Port 2
1	4.4	2.1	2.1
2	14.6	6.9	6.9
3	29.6	14.1	14.1
4	70.4	33.5	33.4
5	85.4	40.7	40.6
6	95.6	45.5	45.4

Figure 3.3 - EUCOATINGLINE SV-RTO Exhaust Stack Traverse Point Location Drawing

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Test Methods

4.1.1 EPA Method 1: Sample and Velocity Traverses for Stationary Sources
Principle: To aid in the representative measurement of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.2 EPA Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S)
Principle: The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.3 EPA Method 3: Gas Analysis for the Determination of Dry Molecular Weight
Principle: A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent CO_2, percent O_2, and if necessary, for percent CO. For dry molecular weight determination a Fyrite analyzer will be used for the analysis. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.4 EPA Method 4: Determination of Moisture Content in Stack Gases
Principle: A gas sample is extracted at a constant rate from the source; moisture is removed from the sample stream and determined either volumetrically or gravimetrically. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.5 EPA Method 25A: Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer (Concentrations assumed less than 10,000 ppm, Propane/Nitrogen Calibration Gases)
Principle: A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

The sampling trains utilized during this testing project are depicted in Figures 4.1 - 4.2.

4.2 Procedures for Obtaining Process Data

No process data was provided to Air Compliance Testing, Inc. during this test event.

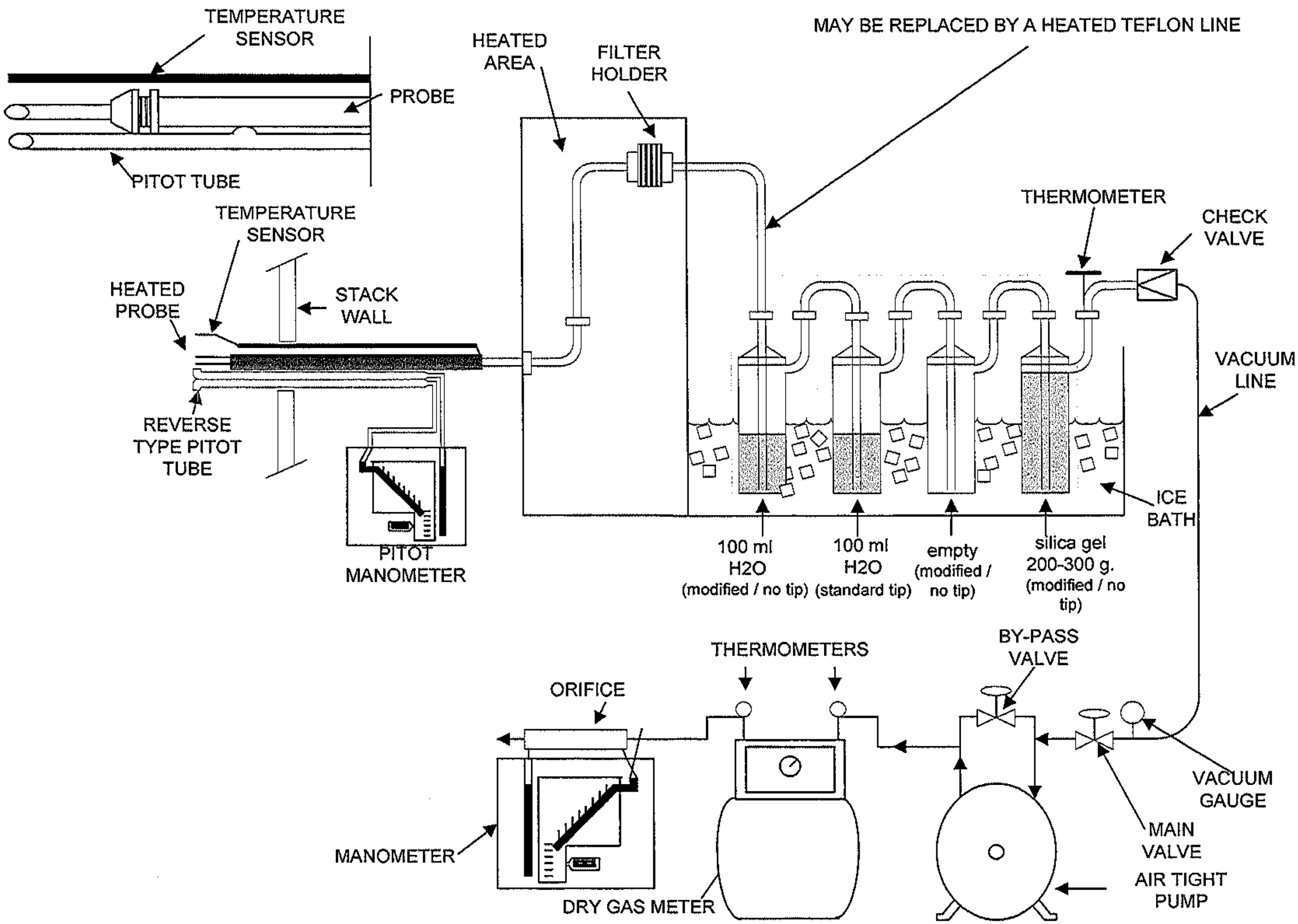


Figure 4.1 - EPA Method 4 Sampling Train Schematic

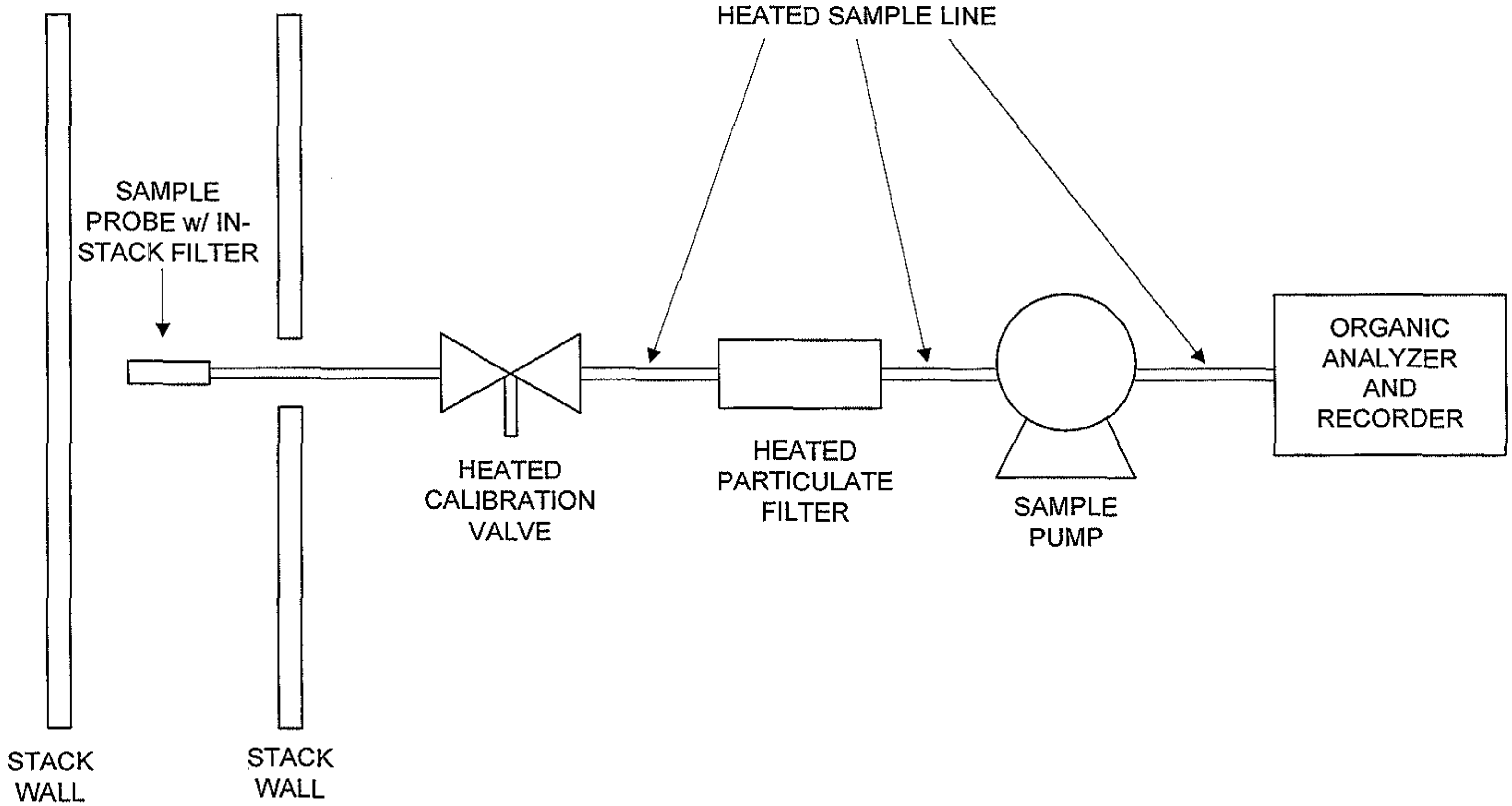


Figure 4.2 - EPA Method 25A Sampling Train Schematic

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA Audits

Tables 5.1 - 5.4 illustrate the QA audit activities that were performed during this test.

All meter boxes and sampling trains used during sampling performed within the requirements of their respective methods as is shown in Tables 5.1 and 5.2. All pre-test and post-test leak checks were well below the applicable limit. Minimum metered volumes were also met where applicable.

Table 5.3 illustrates the FIA calibration audits which were performed during this test (and integral to performing EPA Method 25A correctly) were, except where noted, within the Measurement System Performance Specifications of ±3% of span for the Zero and Calibration Drift Checks, and ±5% of the respective cylinder concentrations for the Calibration Error Checks.

Table 5.4 displays the EPA Method 205 field evaluation of the calibration gas dilution system utilized during this test event. As shown, the average concentration output at each dilution level was within ±2% of the predicted value. The average concentration output of the mid-level gas was also within ±2% of the certified concentration.

5.2 QA/QC Problems

No QA/QC problems occurred during this test event.

	EUCOATINGLINE SV-RTO Inlet Duct		
Method 4 Sampling Train	**Run 1**	**Run 2**	**Run 3**
Leak Rate Observed (Pre/Post) (cfm)	0.000 / 0.000	0.002 / 0.000	0.004 / 0.001
Applicable Method Allowable Leak Rate (cfm)	< 0.020	< 0.020	< 0.020
Acceptable	Yes	Yes	Yes
Volume of Dry Gas Collected (dscf)	36.973	36.453	36.836
Recommended Volume of Dry Gas Collected (dscf)	21.000	21.000	21.000
Acceptable	Yes	Yes	Yes

	EUCOATINGLINE SV-RTO Exhaust Stack		
Method 4 Sampling Train	**Run 1**	**Run 2**	**Run 3**
Leak Rate Observed (Pre/Post) (cfm)	0.000 / 0.000	0.000 / 0.000	0.000 / 0.000
Applicable Method Allowable Leak Rate (cfm)	< 0.020	< 0.020	< 0.020
Acceptable	Yes	Yes	Yes
Volume of Dry Gas Collected (dscf)	39.792	39.583	38.670
Recommended Volume of Dry Gas Collected (dscf)	21.000	21.000	21.000
Acceptable	Yes	Yes	Yes

Table 5.1 - EPA Method 4 Sample Train Audit Results Table

EUCOATINGLINE SV-RTO Inlet Duct				
Pre-Test Dry Gas Meter Calibration Factor (Y)	Average Post-Test Dry Gas Meter Calibration Check Value (Yqa)	Post Test Dry Gas Meter Calibration Check Value Difference From Pre-Test Calibration Factor (%)	Applicable Method Allowable Difference (%)	Acceptable
0.9857	1.0090	2.36%	5.00%	Yes

EUCOATINGLINE SV-RTO Exhaust Stack				
Pre-Test Dry Gas Meter Calibration Factor (Y)	Average Post-Test Dry Gas Meter Calibration Factor (Y)	Post Test Dry Gas Meter Calibration Factor Difference From Pre-Test Calibration Factor (%)	Applicable Method Allowable Difference (%)	Acceptable
0.9942	1.0295	3.55%	5.00%	Yes

Table 5.2 - EPA Method 4 Dry Gas Meter Audit Results Table

	EUCOATINGLINE SV-RTO Inlet Duct					
	Run 1	Acceptable per Method 25A	Run 2	Acceptable per Method 25A	Run 3	Acceptable per Method 25A
Analyzer Span During Test Run (ppmv as propane)	1,200.0	YES	1,200.0	YES	1,200.0	YES
Average Stack Gas Concentration (ppmv as propane)	739.8	YES	653.0	YES	716.2	YES
Zero Drift (% of Span)	0.16	YES	0.43	YES	0.29	YES
Calibration Drift for Mid-Level Gas (% of Span)	-1.00	YES	-1.17	YES	-1.31	YES
Calibration Error for Low-Level Gas (% of Cal. Gas Tag Value)	-0.05	YES	-0.05	YES	-0.05	YES
Calibration Error for Mid-Level Gas (% of Cal. Gas Tag Value)	-0.43	YES	-0.43	YES	-0.43	YES

	EUCOATINGLINE SV-RTO Exhaust Stack					
	Run 1	Acceptable per Method 25A	Run 2	Acceptable per Method 25A	Run 3	Acceptable per Method 25A
Analyzer Span During Test Run (ppmv as propane)	200.0	YES	200.0	YES	200.0	YES
Average Stack Gas Concentration (ppmv as propane)	31.9	YES	27.9	YES	30.1	YES
Zero Drift (% of Span)	0.90	YES	0.70	YES	0.75	YES
Calibration Drift for Mid-Level Gas (% of Span)	0.15	YES	0.10	YES	0.50	YES
Calibration Error for Low-Level Gas (% of Cal. Gas Tag Value)	0.00	YES	0.00	YES	0.00	YES
Calibration Error for Mid-Level Gas (% of Cal. Gas Tag Value)	0.40	YES	0.40	YES	0.40	YES

Table 5.3 - EPA Method 25A Instrument Calibration and QA Table

	Calibration Tag Value (ppm)	Dilution Ratio	Predicted Diluted Value (ppm)	Injection 1 Response (ppm)	Injection 2 Response (ppm)	Injection 3 Response (ppm)	Average Response (ppm)	Difference From Predicted (%)	Acceptable (yes/no)
Dilution Level 1	377.3	2.507	151	150.4	151.1	149.9	150.5	-0.02	yes
Dilution Level 2	377.3	1.509	250	249.4	248.8	249.0	249.1	-0.37	yes
Mid-Level Gas	150.5	-	-	150.0	149.7	149.8	149.8	-0.44	yes

Analyzer Serial Number: 4N10004

Dilution System Serial Number: 2916

Table 5.4 - EPA Method 205 Gas Dilution System Calibration and QA Table

6.0 APPENDIX

Appendix attached.