EXECUTIVE SUMMARY

Ford Motor Company - Michigan Assembly Plant (State Registration No: A8650) contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance test program on four regenerative thermal oxidizers (RTOs) serving EU-ECOAT and EU-TOPCOAT (FG-FACILITY, FG-CONTROLS, FG-MACT) at the Ford Motor Company - Michigan Assembly Plant located in Wayne, Michigan. Testing was performed on October 19-22, 2021, for the purpose of satisfying the emission testing requirements pursuant to Michigan Department of Environment, Great Lakes, and Energy (EGLE) Renewable Operating Permit No. MI-ROP-A8650-2016a.

Testing at the EU-ECOAT RTO, EU-TOPCOAT BOOTH #1 RTO, EU-TOPCOAT BOOTH #2 RTO, and EU-TOPCOAT Oven RTO, sampling locations consisted of three 60-minute test runs.

TABLE 1
OVERALL EMISSION SUMMARY -
EU-ECOAT RTO
OCTOBER 19, 2021

Parameter	Average Results
VOC Destruction Efficiency, %	98.4
RTO Temperature, °F	1499

TABLE 2
OVERALL EMISSION SUMMARY -
EU-TOPCOAT BOOTH #2 RTO
OCTOBER 20 , 2021

Parameter	Average Results
VOC Destruction Efficiency, %	97.6
RTO Temperature, °F	1446

TABLE 3
OVERALL EMISSION SUMMARY -
EU-TOPCOAT BOOTH #1 RTO
OCTOBER 21 , 2021

Parameter	Average Results
VOC Destruction Efficiency, %	97.8
RTO Temperature, °F	1426

TABLE 4
OVERALL EMISSION SUMMARY -
EU-TOPCOAT OVEN RTO
OCTOBER 22 , 2021

Parameter	Average Results
VOC Destruction Efficiency, %	97.2
RTO Temperature, °F	1447

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Ford Motor Company - Michigan Assembly Plant (Facility ID: A8650) contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance test program on the four regenerative thermal oxidizers (RTOs) serving EU-ECOAT and EU-TOPCOAT (FG-FACILITY, FG-CONTROLS, FG-MACT) at the Ford Motor Company - Michigan Assembly Plant located in Wayne, Michigan. Testing was performed on October 19-22, 2021, for the purpose of satisfying the emission testing requirements pursuant to Michigan Department of Environment, Great Lakes, and Energy (EGLE) Renewable Operating Permit No. MI-ROP-A8650-2016a.

The specific objectives were to:

- Verify the volatile organic compound (VOC) destruction efficiency (DE) of the four RTOs serving EU-ECOAT and EU-TOPCOAT
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

TABLE 1-1
SUMMARY OF TEST PROGRAM

Test Dates	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
10/19/2021	EU-ECOAT RTO	Velocity/Volumetric Flow Rate	EPA 1 & 2	4	4-10
10/19/2021	EU-ECOAT RTO	O_2, CO_2	EPA 3	3	5-7
10/19/2021	EU-ECOAT RTO	Moisture (WB/DB) Tank* RTO Inlet	EPA 4	1	1
10/19/2021	EU-ECOAT RTO	Moisture Oven** and Exhaust	EPA 4	1	30
10/19/2021	EU-ECOAT RTO	VOC	EPA 25A	3	60

* EU-ECOAT Electrodeposition Tank RTO Inlet Duct.

** EU-ECOAT Curing Oven RTO Inlet Duct.

TABLE 1-1
SUMMARY OF TEST PROGRAM (CONTINUED)

Test Dates	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
10/20/2021	EU-TOPCOAT BOOTH #2 RTO	Velocity/Volumetric Flow Rate	EPA 1 & 2	3	7-15
10/20/2021	EU-TOPCOAT BOOTH #2 RTO	O_2, CO_2	EPA 3	3	5-7
10/20/2021	EU-TOPCOAT BOOTH #2 RTO	Moisture (WB/DB) RTO Inlet	EPA 4	1	1
10/20/2021	EU-TOPCOAT BOOTH #2 RTO	Moisture RTO Exhaust	EPA 4	1	30
10/20/2021	EU-TOPCOAT BOOTH #2 RTO	VOC	EPA 25A	3	60
10/21/2021	EU-TOPCOAT BOOTH #1 RTO	Velocity/Volumetric Flow Rate	EPA 1 & 2	3	5-12
10/21/2021	EU-TOPCOAT BOOTH #1 RTO	O_2, CO_2	EPA 3	3	5-6
10/21/2021	EU-TOPCOAT BOOTH #1 RTO	Moisture (WB/DB) RTO Inlet	EPA 4	1	1
10/21/2021	EU-TOPCOAT BOOTH #1 RTO	Moisture RTO Exhaust	EPA 4	1	30
10/21/2021	EU-TOPCOAT BOOTH #1 RTO	VOC	EPA 25A	3	60
10/22/2021	EU-TOPCOAT Oven RTO	Velocity/Volumetric Flow Rate	EPA 1 & 2	3	10
10/22/2021	EU-TOPCOAT Oven RTO	O_2, CO_2	EPA 3	3	5
10/22/2021	EU-TOPCOAT Oven RTO	Moisture	EPA 4	1	30
10/22/2021	EU-TOPCOAT Oven RTO	VOC	EPA 25A	3	60

The testing was conducted by the Montrose personnel listed in Table 1-2 on October 19-22, 2021. The tests were conducted according to the test plan (protocol) received on September 29, 2021 by EGLE.

1.2 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location:	Ford Motor Company - Michigan Assembly Plant Wayne, Michigan
Project Contact:	Susan Hicks
Title	Senior Environmental Engineer
Company:	Ford Motor Company
Telephone:	313-594-3185
Email:	shicks3@ford.com

Agency Information

Regulatory Agency:	EGLE
Contact:	Regina Angellotti
Email:	angellottir1@michigan.gov

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC
Contact:	David Trahan
Title:	Field Project Manager
Telephone:	248-548-8070
Email:	dtrahan@montrose-env.com

Test personnel and observers are summarized in Table 1-2.

TABLE 1-2
TEST PERSONNEL AND OBSERVERS

Name	Affiliation	Role/Responsibility
David Trahan	Montrose	Client Project Manager, QI
Shawn Jaworski	Montrose	Senior Field Technician, QI
David Koponen	Montrose	Field Technician
Susan Hicks	Ford Motor Company	Observer/Client Liaison/Test Coordinator
Regina Angellotti	EGLE	Observer

2.0 SUMMARY OF RESULTS

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility (SRN: A8650) and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized in Tables 2-1 through 2-4. Detailed results for individual test runs can be found in Section 5.0. All supporting data (including process data) can be found in the appendices.

To simplify this report, a list of Units and Abbreviations is included in Appendix C.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

TABLE 2-1
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
EU-ECOAT RTO
OCTOBER 19, 2021

Parameter/Units	Average Results	Emission Limits
VOC Destruction Efficiency (DE)		
%	98.6	NA

TABLE 2-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
EU-TOPCOAT BOOTH #2 RTO
OCTOBER 20, 2021

Parameter/Units	Average Results	Emission Limits
VOC Destruction Efficiency (DE)		
%	97.6	NA

TABLE 2-3
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
EU-TOPCOAT BOOTH #1 RTO
OCTOBER 21, 2021

Parameter/Units	Average Results	Emission Limits
VOC Destruction Efficiency (DE)		
%	97.9	NA

TABLE 2-4
SUMMARY OF AVERAGE COMPLIANCE RESULTS - EU-TOPCOAT OVEN RTO
OCTOBER 22, 2021

Parameter/Units	Average Results	Emission Limits
VOC Destruction Efficiency (DE)		
%	97.2	NA

3.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

3.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

The Ford Motor Company - Michigan Assembly Plant coatings operations includes a prime coating process (EU-ECOAT) and a topcoat spray application process (EU-TOPCOAT). Emissions from EU-ECOAT were controlled by an RTO while the emissions from the EU-TOPCOAT were controlled by three separate RTOs (EU-TOPCOAT BOOTH #1 RTO, EU-TOPCOAT BOOTH #2 RTO, and EU-TOPCOAT Oven RTO).

The sampling location schematics are displayed in Figures 3-1 and 3-4.

FIGURE 3-1
EU-ECOAT SAMPLING LOCATION SCHEMATIC

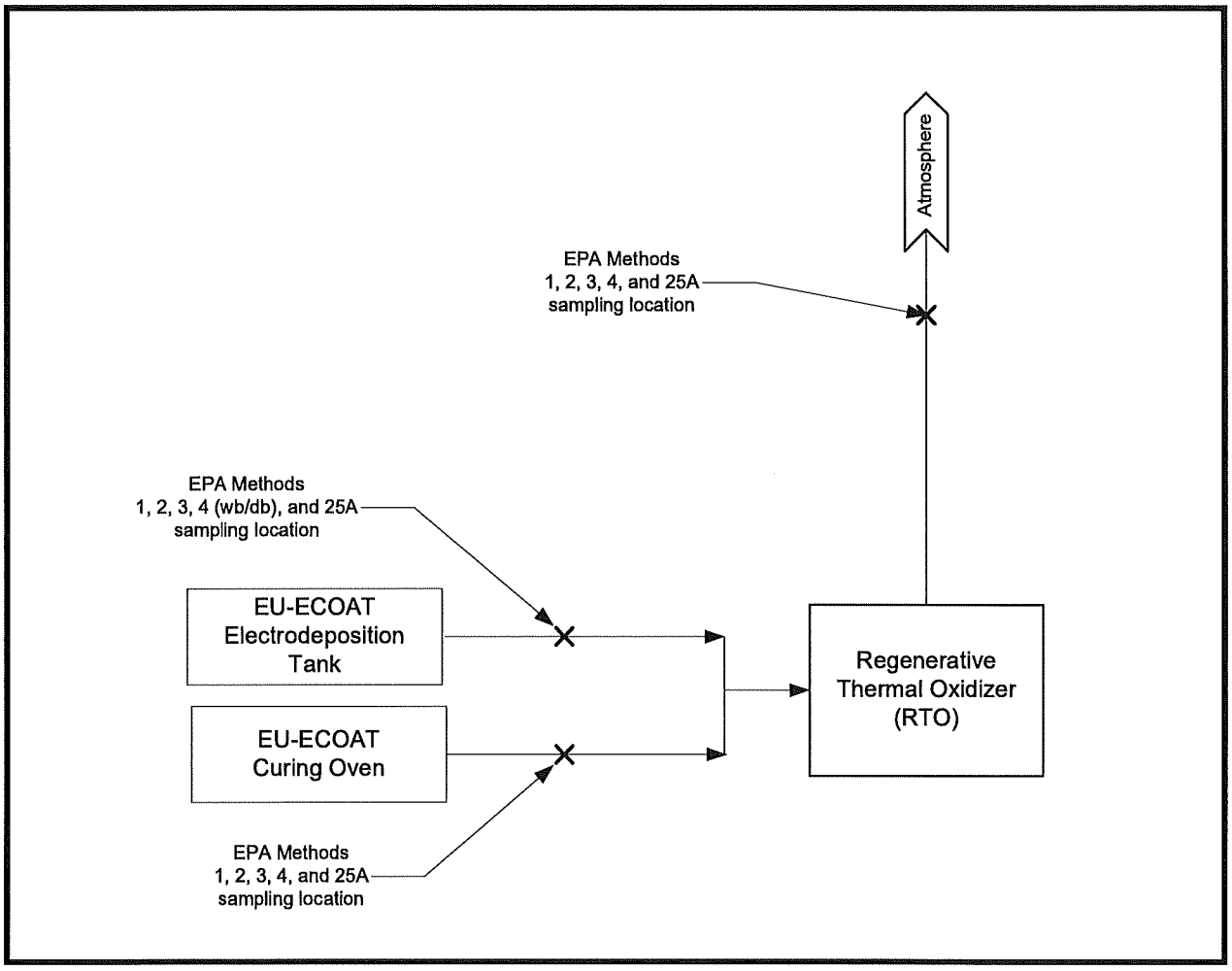


FIGURE 3-2
EU-TOPCOAT BOOTH #1 AND #2 RTOS SAMPLING LOCATION SCHEMATIC

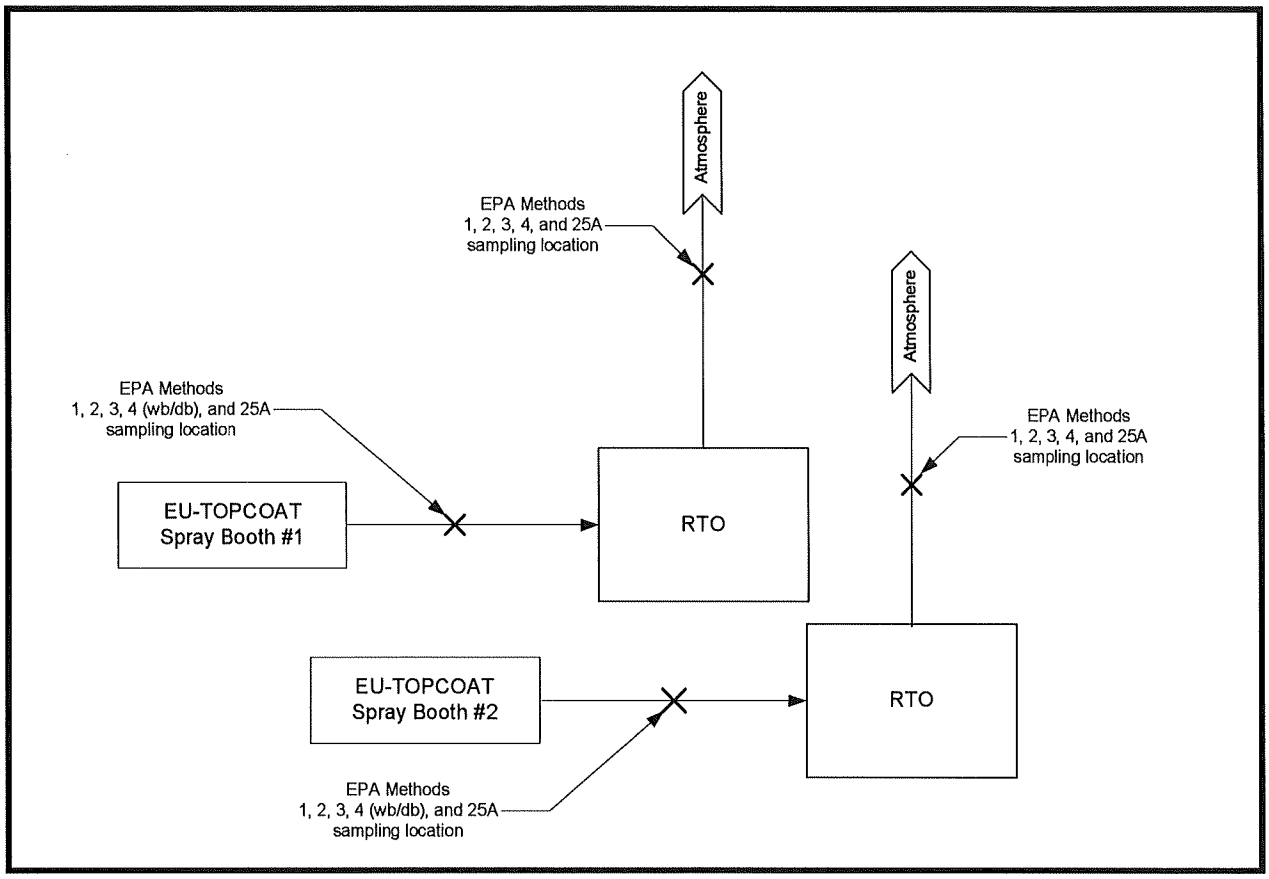
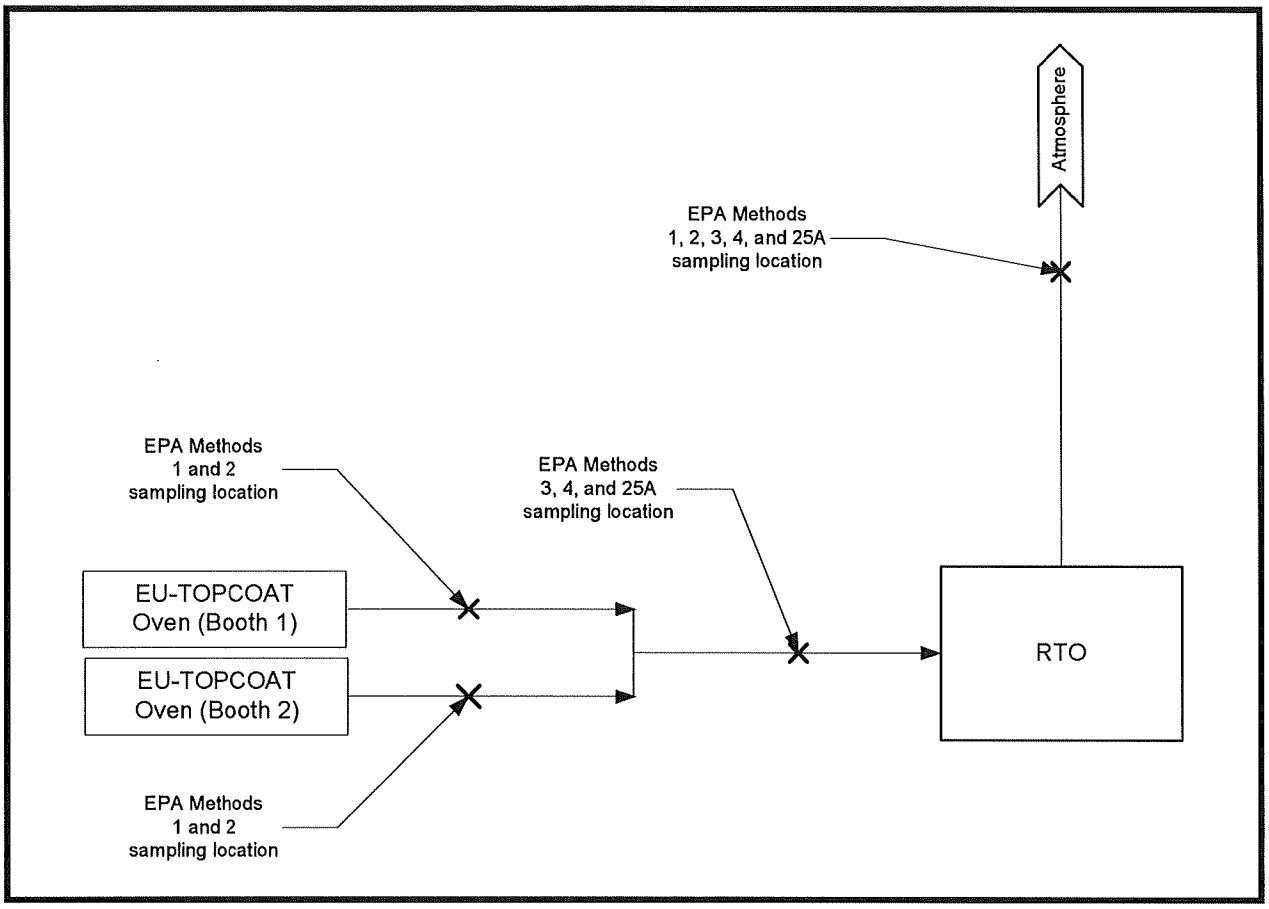


FIGURE 3-3
EU-TOPCOAT OVEN RTO SAMPLING LOCATION SCHEMATIC



3.2 OPERATING CONDITIONS AND PROCESS DATA

Emission tests were performed while the source/units and air pollution control devices were operating at the conditions required by the permit. The units were tested when operating normally.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- RTO combustion chamber set point temperature, °F
- Number of vehicles processed per line, jobs/hour

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

4.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

The sample port and traverse point locations are detailed in Appendix A.

4.1.2 EPA Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

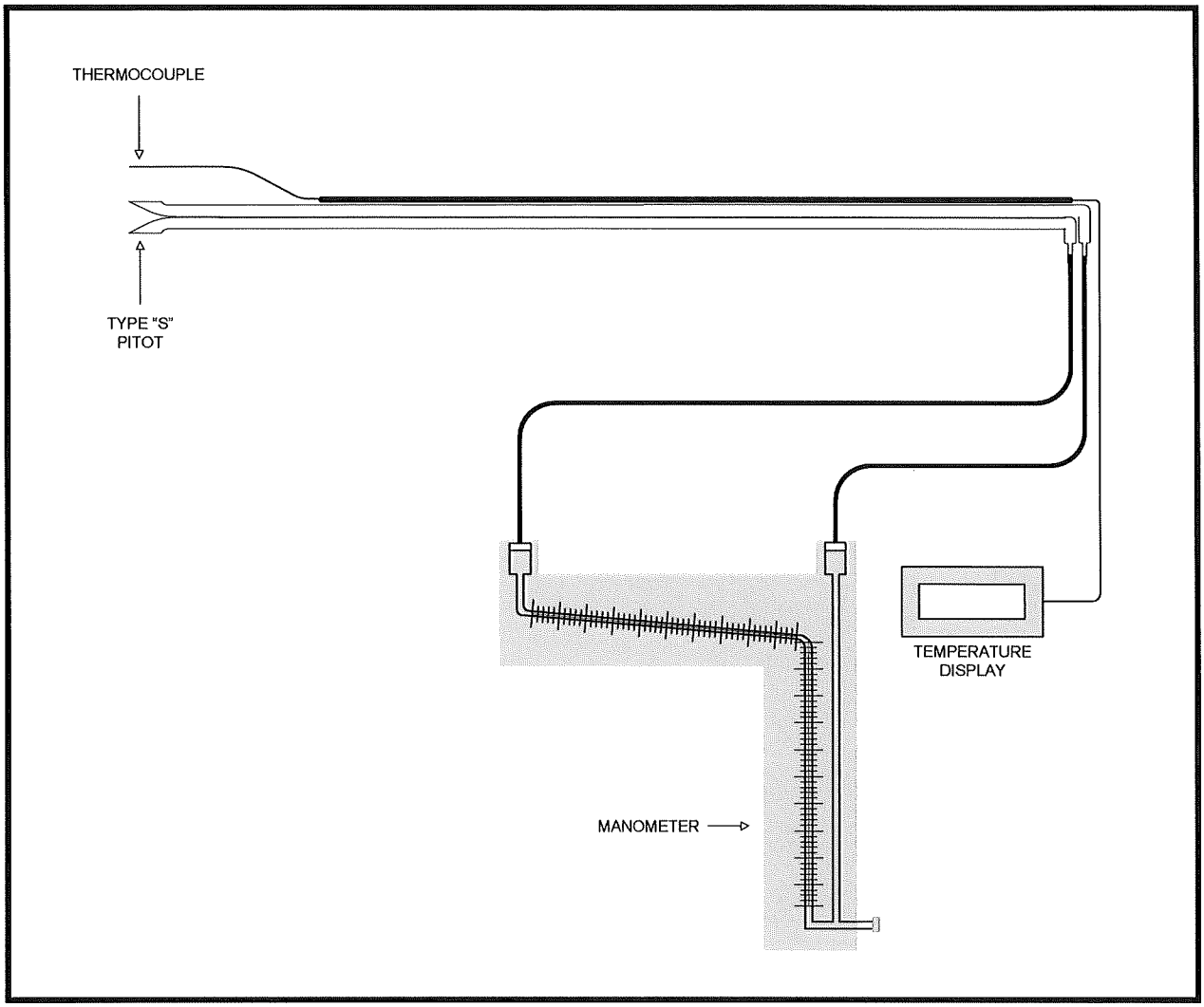
EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1.

The sampling system is detailed in Figure 4-1.

4.1.3 EPA Method 3, Gas Analysis for the Determination of Dry Molecular Weight

EPA Method 3 is used to calculate the dry molecular weight of the stack gas using one of three methods. The first choice is to measure the percent O_2 and CO_2 in the gas stream. 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 and percent O_2 using either an Orsat or a Fyrite analyzer.

FIGURE 4-1
US EPA METHOD 2 SAMPLING TRAIN

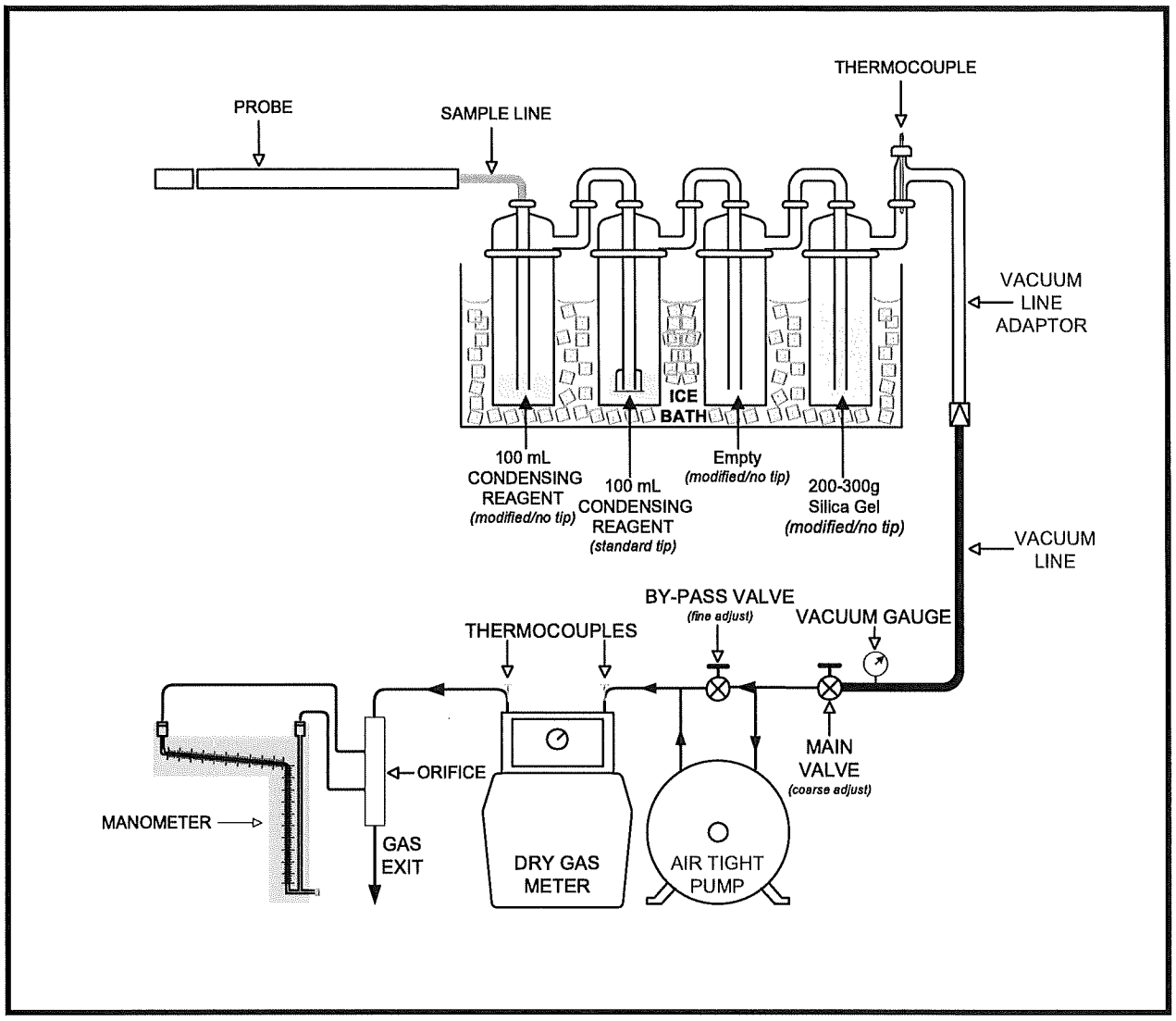


4.1.4 EPA Method 4, Determination of Moisture Content in Stack Gas

EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

The sampling system is detailed in Figure 4-2.

FIGURE 4-2
US EPA METHOD 4 (DETACHED) SAMPLING TRAIN

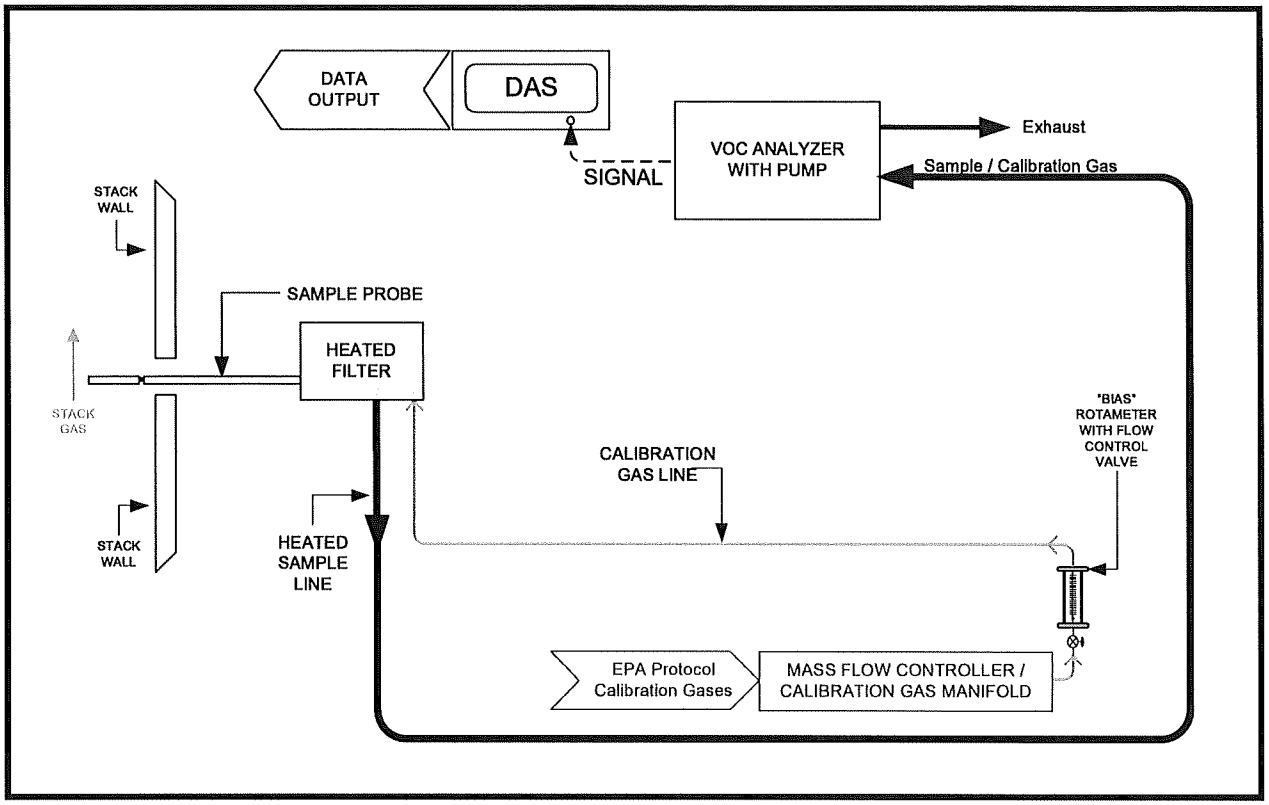


4.1.5 EPA Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

EPA Method 25A is an instrumental test method used to measure the concentration of THC in stack gas. A gas sample is extracted from the source through a heated sample line 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.

The typical sampling system is detailed in Figure 4-3.

FIGURE 4-3
EPA METHOD 25A SAMPLING TRAIN



4.2 FLUE GAS SAMPLING LOCATIONS

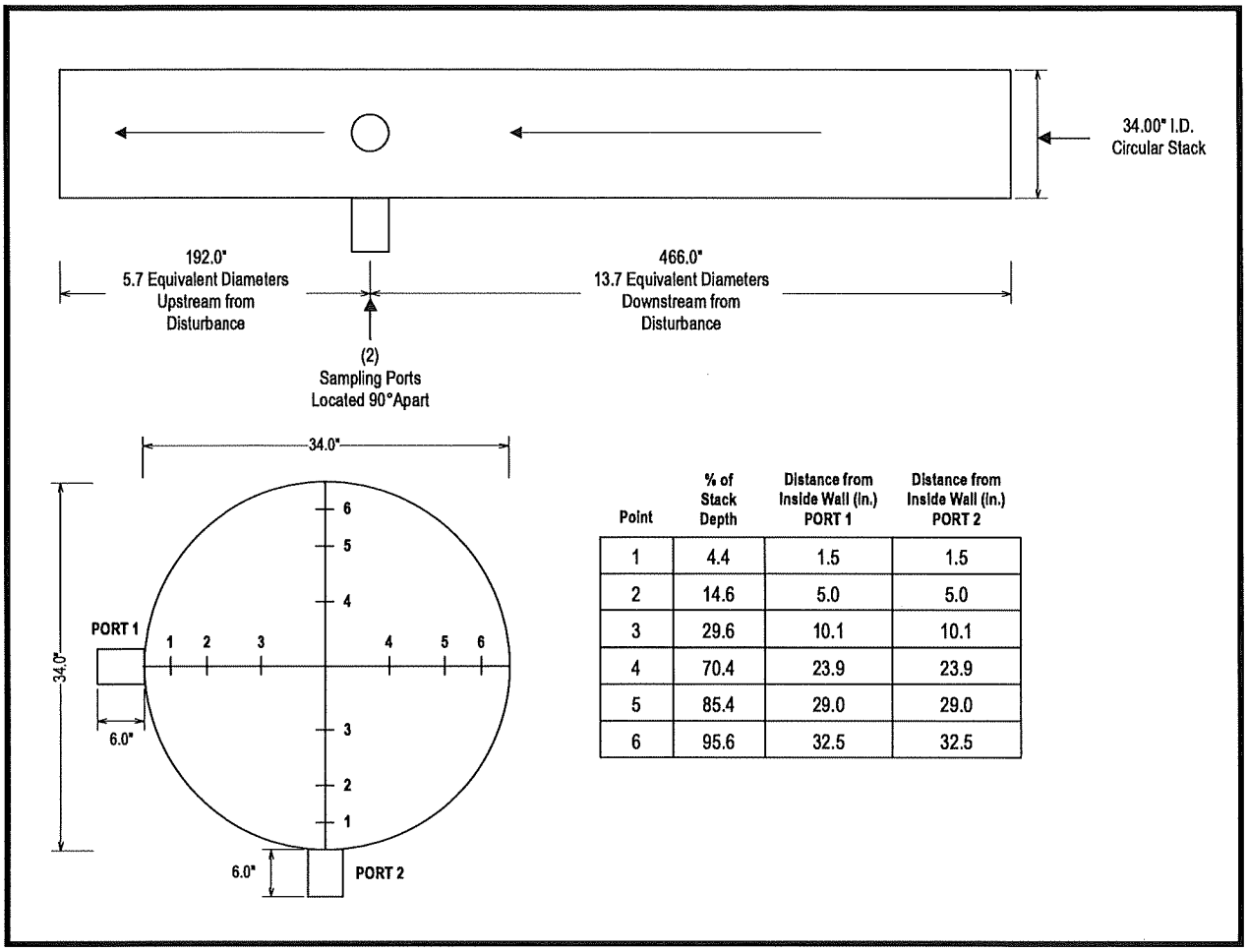
Information regarding the sampling locations is presented in Table 4-1.

TABLE 4-1
SAMPLING LOCATIONS

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
EU-ECOAT Tank RTO Inlet Duct	34.0	466 / 13.7	192 / 5.7	Flow: 12 (6/port); Moisture: 1; VOC: 1
EU-ECOAT Oven RTO Inlet Duct	49.5	306 / 6.2	110 / 2.2	Flow: 24 (12/port); Moisture: 1; VOC: 1
EU-ECOAT RTO Exhaust Stack	48.25	360 / 7.5	120 / 2.5	Flow: 12 (6/port); Moisture: 1; VOC: 1
EU-TOPCOAT BOOTH #1 RTO Inlet Duct	48 X 48 Square	396 / 8.3	372 / 7.8	Flow: 16 (4/port); Moisture: 1; VOC: 1
EU-TOPCOAT BOOTH #1 RTO Exhaust Stack	47.25	144 / 2.G9	120 / 2.4	Flow: 16 (8/port); Moisture: 1; VOC: 1
EU-TOPCOAT BOOTH #2 RTO Inlet Duct	35.5	252 / 7.1	144 / 4.1	Flow: 12 (6/port); Moisture: 1; VOC: 1
EU-TOPCOAT BOOTH #2 RTO Exhaust Stack	120	300 / 2.5	105 / 0.9	Flow: 16 (4/port); Moisture: 1; VOC: 1
EU-TOPCOAT Oven RTO Inlet Duct No. 1	31.5 X 31.5 Square	64 / 2.0	80 / 2.5	Flow: 18 (6/port);
EU-TOPCOAT Oven RTO Inlet Duct No. 2	31 X 31 Square	240 / 7.7	90 / 2.9	Flow: 18 (6/port);
EU-TOPCOAT Oven RTO Combined Inlet Duct	--	--	--	Moisture: 1; VOC: 1
EU-TOPCOAT Oven RTO Exhaust Stack	59	168 / 2.8	273 / 4.6	Flow: 16 (8/port); Moisture: 1; VOC: 1

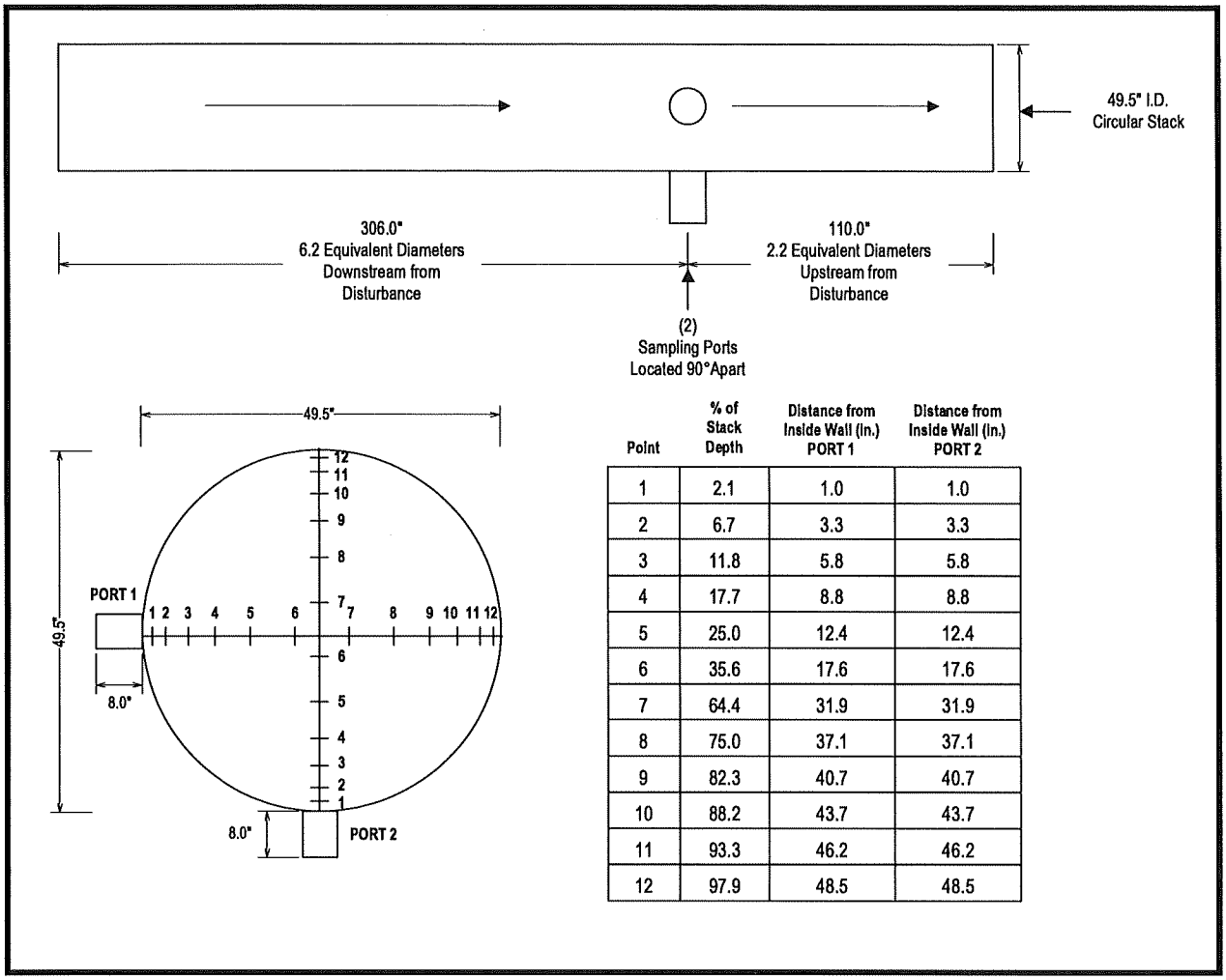
Sample locations were verified in the field to conform to EPA Method 1. Acceptable cyclonic flow conditions were confirmed prior to testing using EPA Method 1, Section 11.4. See Appendices A.1 through A.4 for more information. The Traverse Point Location Drawings for each sampling location are located in Tables 4-4 through 4-13.

FIGURE 4-4
EU-ECOAT RTO TANK INLET DUCT FLOW TRAVERSE SCHEMATIC



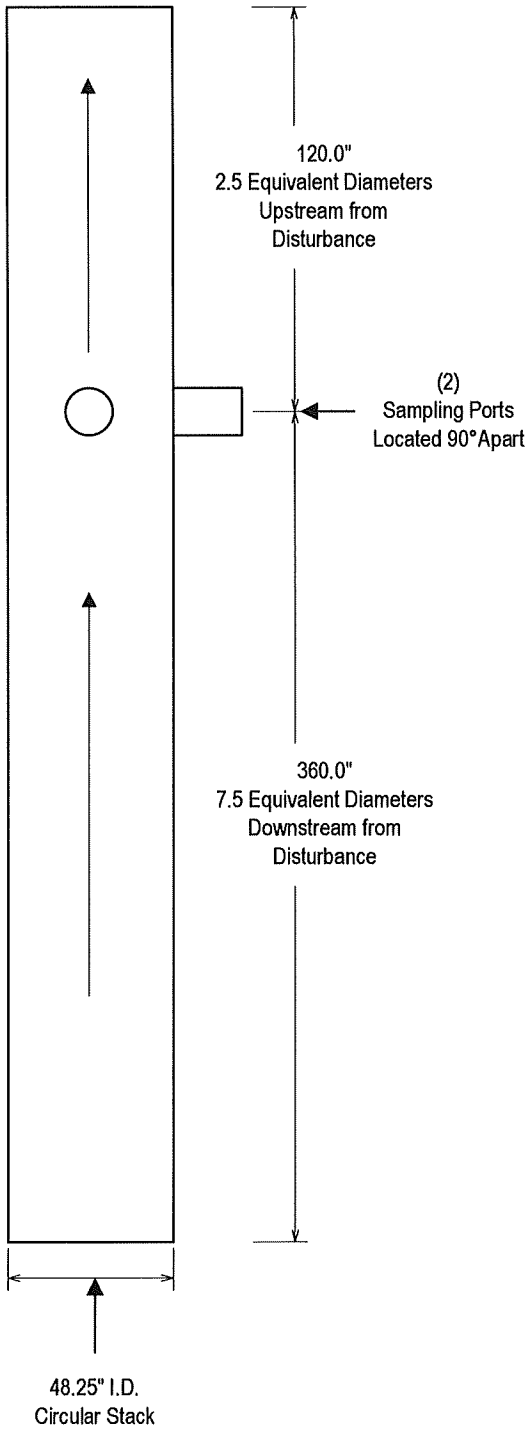
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	4.4	1.5	1.5
2	14.6	5.0	5.0
3	29.6	10.1	10.1
4	70.4	23.9	23.9
5	85.4	29.0	29.0
6	95.6	32.5	32.5

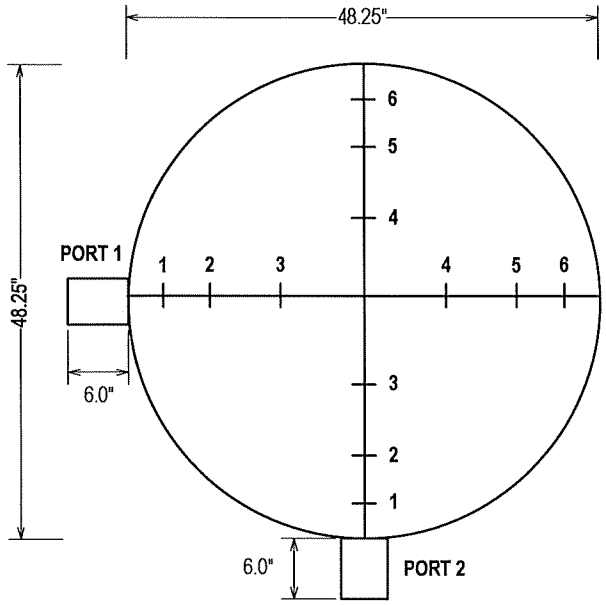
FIGURE 4-5
EU-ECOAT RTO OVEN INLET DUCT FLOW TRAVERSE SCHEMATIC



Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	2.1	1.0	1.0
2	6.7	3.3	3.3
3	11.8	5.8	5.8
4	17.7	8.8	8.8
5	25.0	12.4	12.4
6	35.6	17.6	17.6
7	64.4	31.9	31.9
8	75.0	37.1	37.1
9	82.3	40.7	40.7
10	88.2	43.7	43.7
11	93.3	46.2	46.2
12	97.9	48.5	48.5

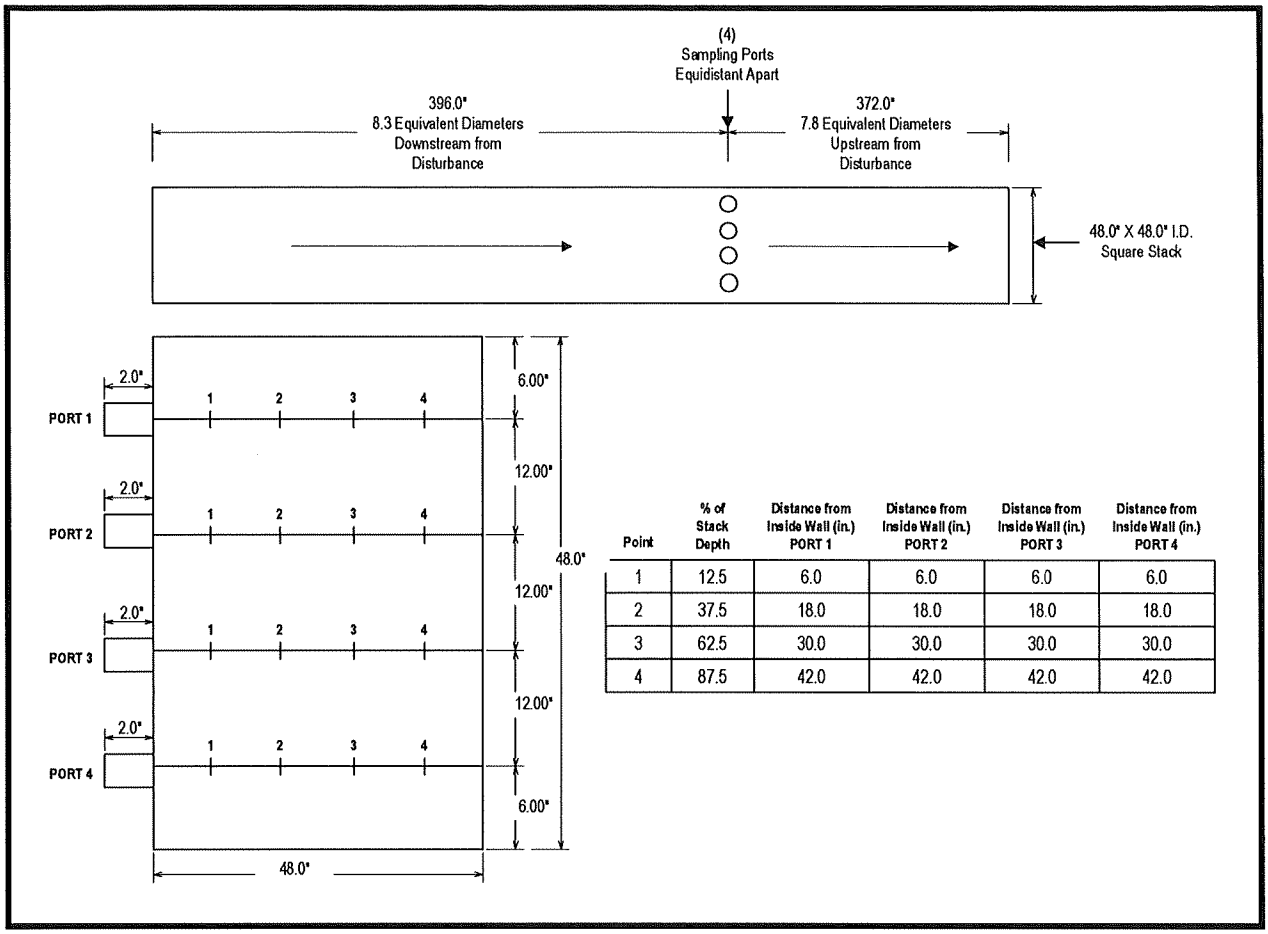
FIGURE 4-6
EU-ECOAT RTO EXHAUST STACK FLOW TRAVERSE SCHEMATIC





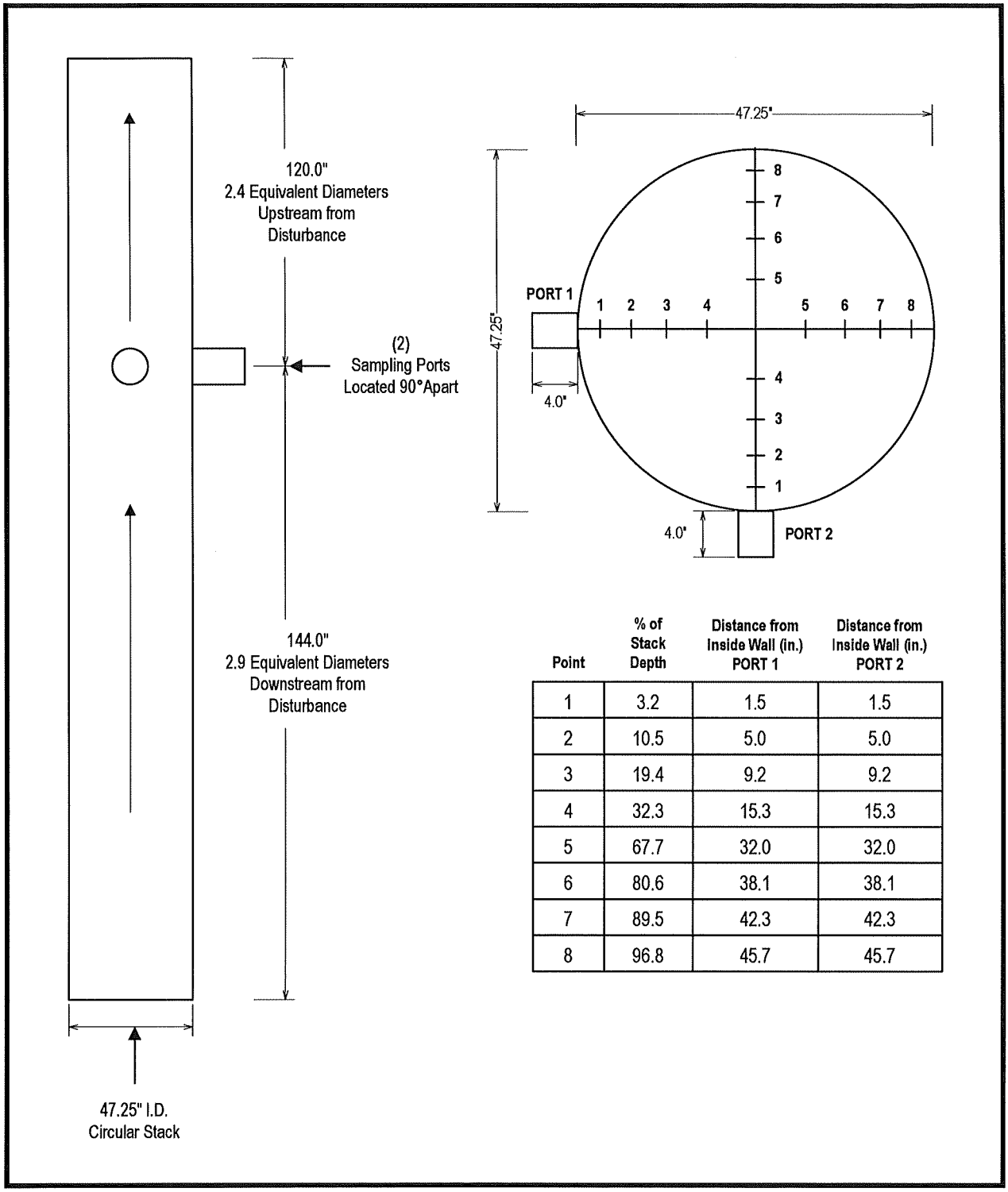
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	4.4	2.1	2.1
2	14.6	7.0	7.0
3	29.6	14.3	14.3
4	70.4	34.0	34.0
5	85.4	41.2	41.2
6	95.6	46.1	46.1

FIGURE 4-7
EU-TOPCOAT BOOTH #1 RTO INLET DUCT FLOW TRAVERSE SCHEMATIC



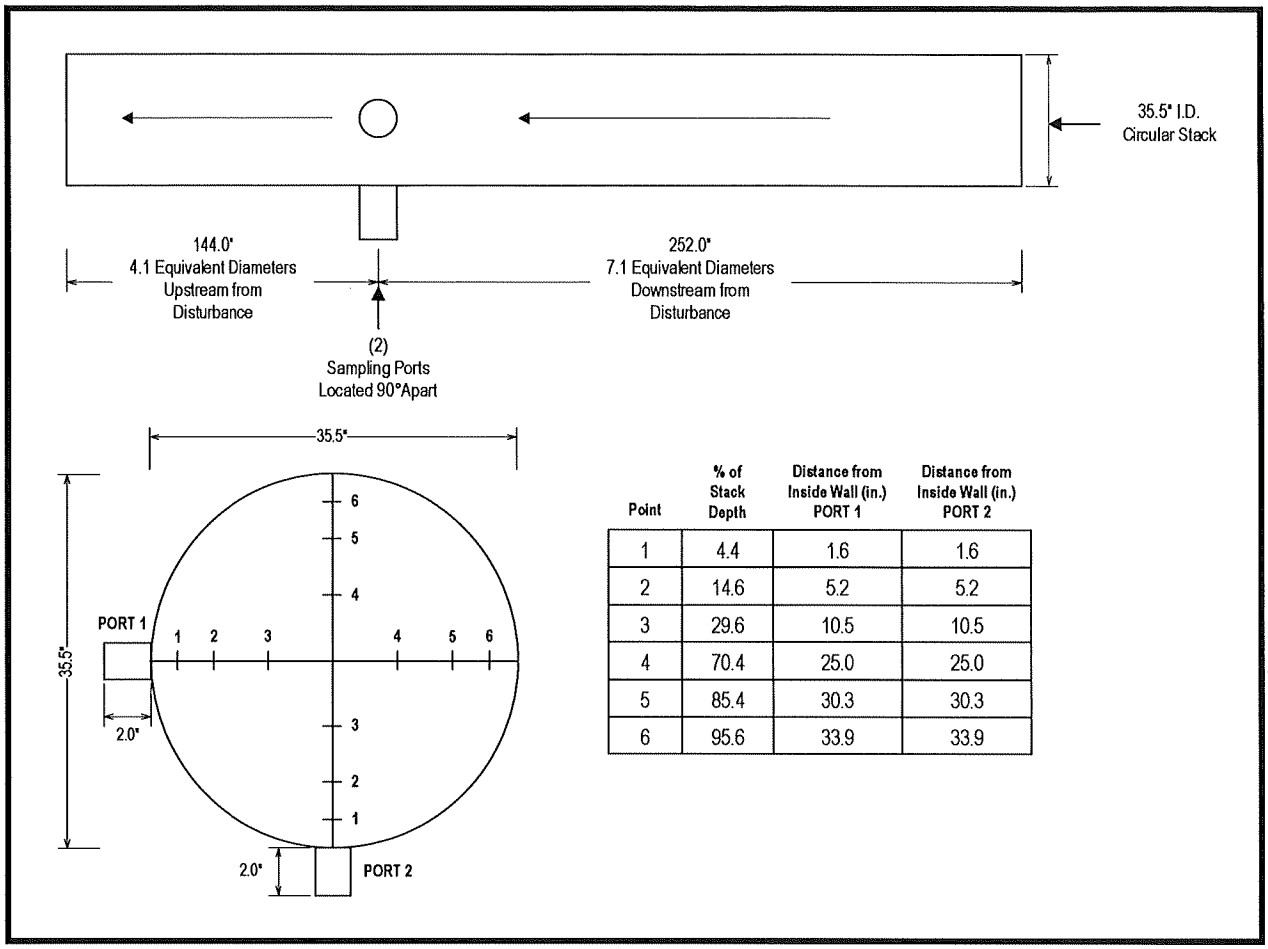
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2	Distance from Inside Wall (in.) PORT 3	Distance from Inside Wall (in.) PORT 4
1	12.5	6.0	6.0	6.0	6.0
2	37.5	18.0	18.0	18.0	18.0
3	62.5	30.0	30.0	30.0	30.0
4	87.5	42.0	42.0	42.0	42.0

FIGURE 4-8
EU-TOPCOAT BOOTH #1 RTO EXHAUST STACK FLOW TRAVERSE SCHEMATIC



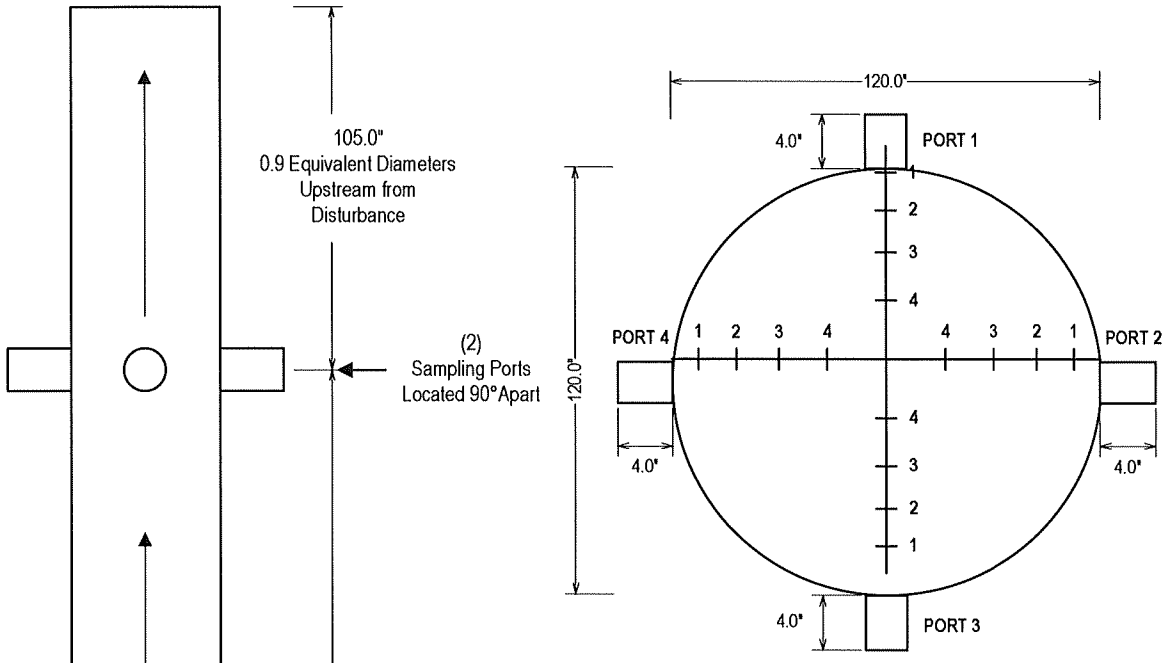
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	3.2	1.5	1.5
2	10.5	5.0	5.0
3	19.4	9.2	9.2
4	32.3	15.3	15.3
5	67.7	32.0	32.0
6	80.6	38.1	38.1
7	89.5	42.3	42.3
8	96.8	45.7	45.7

FIGURE 4-9
EU-TOPCOAT BOOTH #2 RTO INLET DUCT FLOW TRAVERSE SCHEMATIC



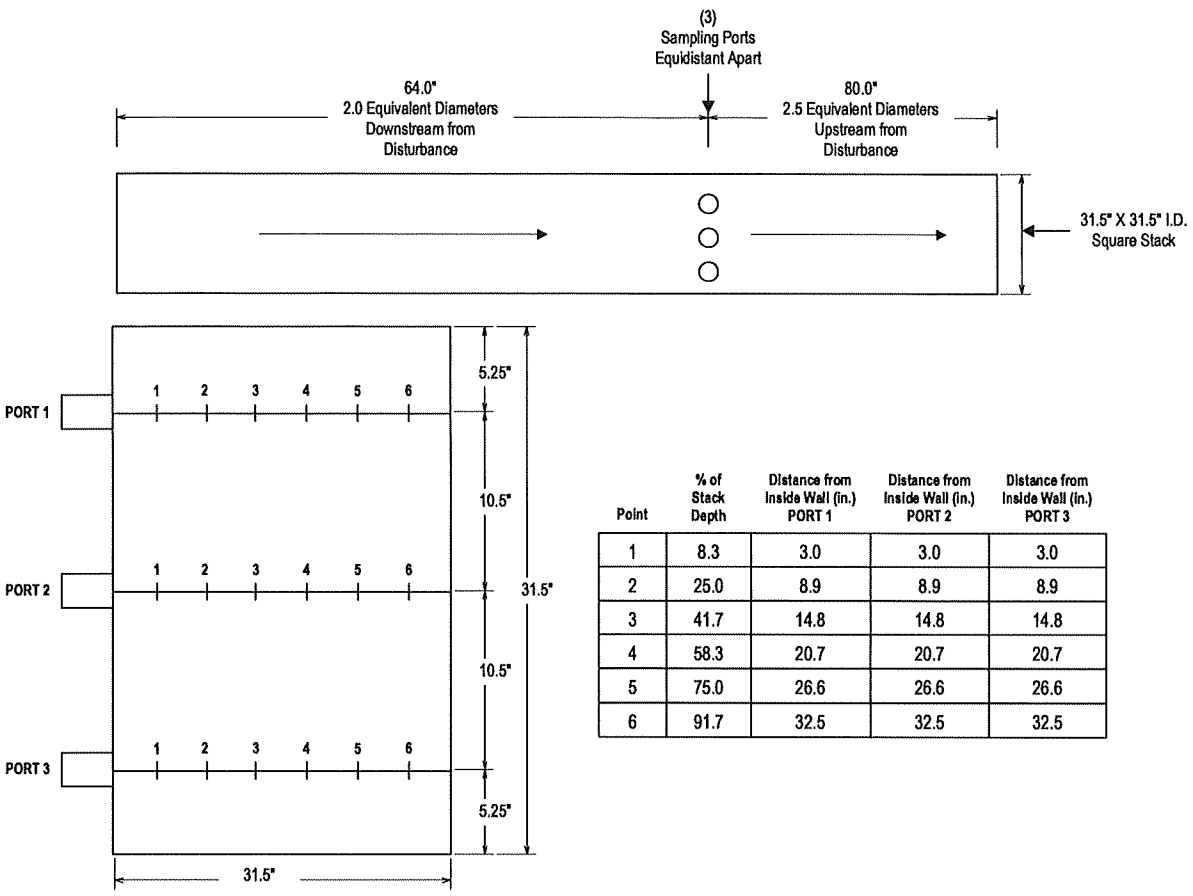
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	4.4	1.6	1.6
2	14.6	5.2	5.2
3	29.6	10.5	10.5
4	70.4	25.0	25.0
5	85.4	30.3	30.3
6	95.6	33.9	33.9

FIGURE 4-10
EU-TOPCOAT BOOTH #2 RTO EXHAUST STACK FLOW TRAVERSE SCHEMATIC



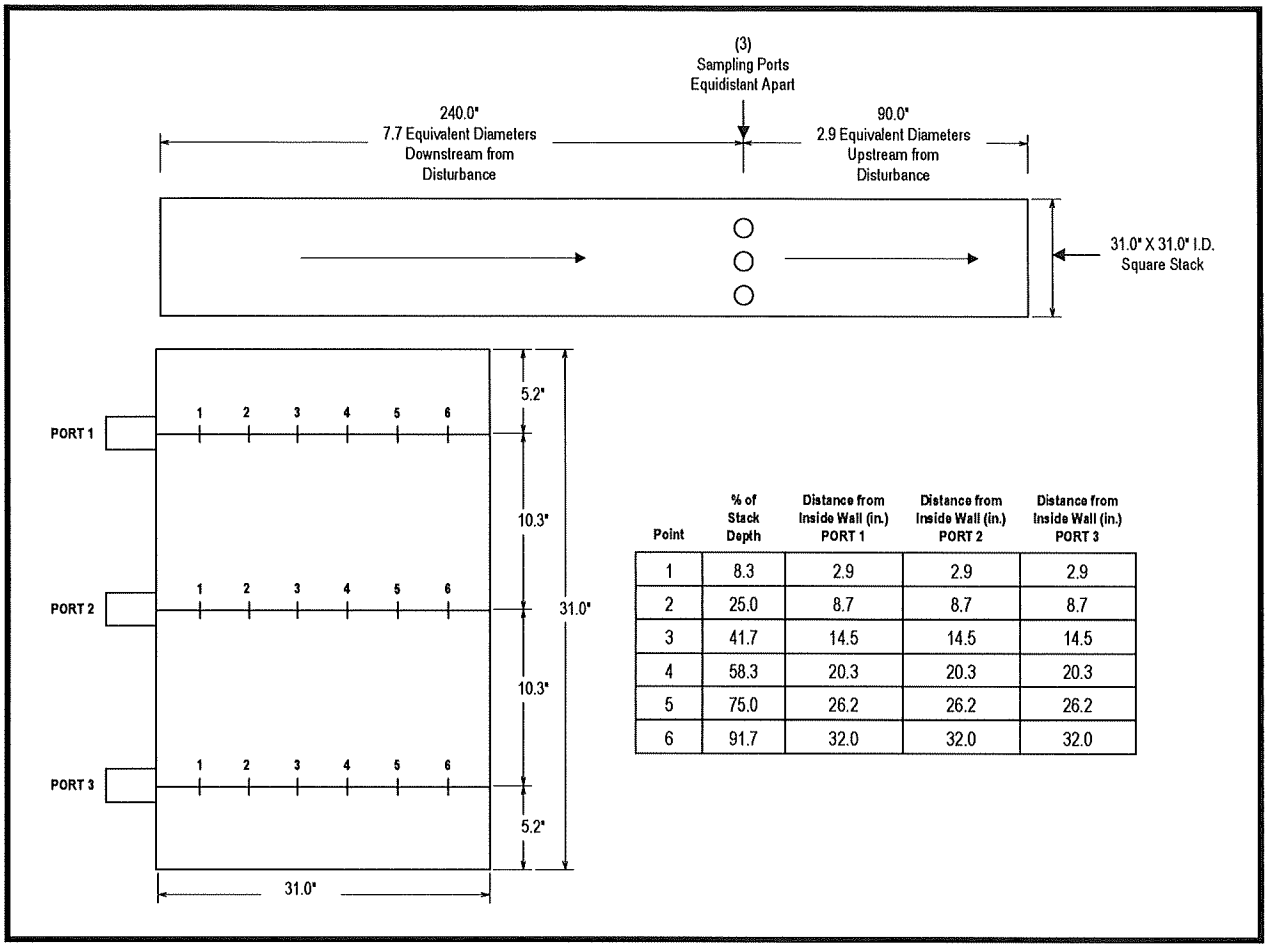
Point	% of Stack Depth	Distance from Inside Wall (in.) PORTS 1 & 3	Distance from Inside Wall (in.) PORTS 2 & 4
1	3.2	3.8	3.8
2	10.5	12.6	12.6
3	19.4	23.3	23.3
4	32.3	38.8	38.8

FIGURE 4-11
EU-TOPCOAT OVEN INLET DUCT No. 1 FLOW TRAVERSE SCHEMATIC



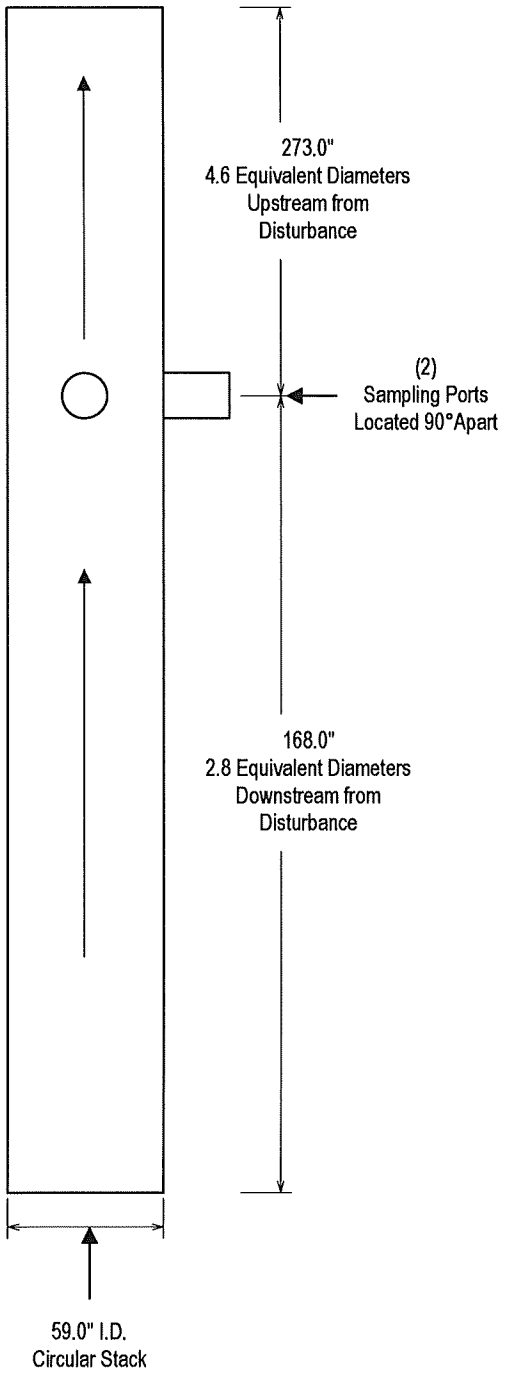
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2	Distance from Inside Wall (in.) PORT 3
1	8.3	3.0	3.0	3.0
2	25.0	8.9	8.9	8.9
3	41.7	14.8	14.8	14.8
4	58.3	20.7	20.7	20.7
5	75.0	26.6	26.6	26.6
6	91.7	32.5	32.5	32.5

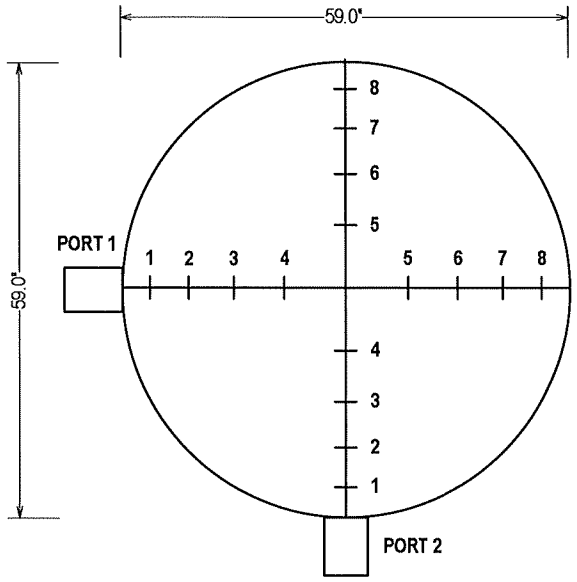
FIGURE 4-12
EU-TOPCOAT OVEN INLET DUCT No. 2 FLOW TRAVERSE SCHEMATIC



Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2	Distance from Inside Wall (in.) PORT 3
1	8.3	2.9	2.9	2.9
2	25.0	8.7	8.7	8.7
3	41.7	14.5	14.5	14.5
4	58.3	20.3	20.3	20.3
5	75.0	26.2	26.2	26.2
6	91.7	32.0	32.0	32.0

FIGURE 4-13
EU-TOPCOAT OVEN EXHAUST STACK FLOW TRAVERSE SCHEMATIC





Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	3.2	1.9	1.9
2	10.5	6.2	6.2
3	19.4	11.4	11.4
4	32.3	19.1	19.1
5	67.7	39.9	39.9
6	80.6	47.6	47.6
7	89.5	52.8	52.8
8	96.8	57.1	57.1

4.3 PROCESS TEST METHODS

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

5.0 TEST DISCUSSION AND RESULTS

5.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

The Test Protocol for this test event called out three 30-minute runs to be performed at the EU-ECOAT RTO Exhaust, EU-TOPCOAT BOOTH #1 RTO Exhaust, EU-TOPCOAT BOOTH #2 RTO Exhaust, and EU-TOPCOAT OVEN RTO Exhaust. Instead, one 30-minute moisture run was performed at each RTO exhaust stack and was utilized for all three runs at each location. This field test deviation was verbally accepted by the EGLE representative who was present at the is test event. See Section 5.2 for more details.

5.2 PRESENTATION OF RESULTS

The average results for EU-ECOAT RTO are presented in Table 2-1 and the results of individual compliance test runs performed for EU-ECOAT RTO are presented in Tables 5-1 through 5-4.

The average results for EU-TOPCOAT BOOTH #1 RTO are presented in Table 2-2 and the results of individual compliance test runs performed for EU-TOPCOAT BOOTH #1 RTO are presented in Tables 5-5 and 5-6.

The average results for EU-TOPCOAT BOOTH #2 RTO are presented in Table 2-3 and the results of individual compliance test runs performed for EU-TOPCOAT BOOTH #2 RTO are presented in Tables 5-7 and 5-8.

The average results for EU-TOPCOAT Oven RTO are presented in Table 2-4 and the results of individual compliance test runs performed for EU-TOPCOAT Oven RTO are presented in Tables 5-9 through 5-12.

Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

Since more than 10% of the individual differential pressure (dP) readings recorded at the EU-TOPCOAT BOOTH #2 RTO Exhaust Stack and EU-TOPCOAT Oven RTO Inlet Duct No. 1 were below 0.05 in-H2O a micromanometer was utilized at these locations as per EPA Method 2, Section 6.2.

Negative differential pressure (dP) readings recorded at the EU-TOPCOAT Oven RTO Inlet Duct No. 1 are assigned a value of zero.

Duct gas moisture content measured at the EU-ECOAT Electrodepositon Tank RTO Inlet Duct during Run 3, utilizing the wet-bulb/dry-bulb approximation method (EPA Method 4 Section 2.2.1), was applied to Runs 1 and 2 at this location.

Duct gas moisture content measured at the EU-ECOAT Curing Oven RTO Inlet Duct during Run 2, utilizing a EPA Method 4 sampling train, was applied to Runs 1 and 3 at this location.

Duct gas moisture content measured at the EU-ECOAT RTO Exhaust Stack during Run 1, utilizing a EPA Method 4 sampling train, was applied to Runs 2 and 3 at this location.

Duct gas moisture content measured at the EU-TOPCOAT BOOTH #1 RTO Inlet Duct during Run 1, utilizing the wet-bulb/dry-bulb approximation method (EPA Method 4 Section 2.2.1), was applied to Runs 2 and 3 at this location.

Duct gas moisture content measured at the EU-TOPCOAT BOOTH #1 RTO Exhaust Stack during Run 1, utilizing a EPA Method 4 sampling train, was applied to Runs 2 and 3 at this location.

Duct gas moisture content measured at the EU-TOPCOAT BOOTH #2 RTO Inlet Duct prior to testing, utilizing the wet-bulb/dry-bulb approximation method (EPA Method 4 Section 2.2.1), was applied to all three runs at this location.

Duct gas moisture content measured at the EU-TOPCOAT BOOTH #2 RTO Exhaust Stack during Run 1, utilizing a EPA Method 4 sampling train, was applied to Runs 2 and 3 at this location.

Duct gas moisture content measured at the EU-TOPCOAT Oven RTO Combined Inlet Duct during Run 1, utilizing a EPA Method 4 sampling train, was applied to Runs 2 and 3 at this location.

Duct gas moisture content measured at the EU-TOPCOAT Oven RTO Exhaust Stack during Run 3, utilizing a EPA Method 4 sampling train, was applied to Runs 1 and 2 at this location.

TABLE 5-1
EMISSIONS RESULTS -
EU-ECOAT (TANK*) RTO INLET DUCT

Run Number	1	2	3	Average
Date	10/19/2021	10/19/2021	10/19/2021	--
Time	8:32-9:32	11:47-12:47	14:05-15:05	--
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	81.5	82.0	84.2	82.6
moisture content, % volume†	2.11	2.11	2.11	2.11
volumetric flow rate, scfm	11,111	11,032	11,150	11,098
Total Gaseous Organics (TGO), as propane				
ppmvw	8.37	15.23	13.30	12.30
Methane, as propane				
ppmvw	2.51	1.79	1.70	2.00
Volatile Organic Compounds (VOC), as propane				
ppmvw	5.86	13.44	11.60	10.30
lb/hr	0.45	1.02	0.89	0.78

* Electrodeposition Tank

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-2
EMISSIONS RESULTS -
EU-ECOAT (OVEN*) RTO INLET DUCT

Run Number	1	2	3	Average
Date	10/19/2021	10/19/2021	10/19/2021	--
Time	8:32-9:32	11:47-12:47	14:05-15:05	--
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	276.3	273.3	272.8	274.1
moisture content, % volume†	3.41	3.41	3.41	3.41
volumetric flow rate, scfm	19,075	18,445	18,808	18,776
Total Gaseous Organics (TGO), as propane				
ppmvw	109.7	104.5	157.6	123.9
Methane, as propane				
ppmvw	4.73	5.10	4.04	4.62
Volatile Organic Compounds (VOC), as propane				
ppmvw	104.9	99.4	153.6	119.3
lb/hr	13.7	12.6	19.8	15.4

* Curing Oven

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-3
COMBINED EMISSIONS RESULTS -
EU-ECOAT TANK/OVEN INLET DUCTS

Run Number	1	2	3	Average
Date	10/19/2021	10/19/2021	10/19/2021	--
Time	8:32-9:32	11:47-12:47	14:05-15:05	--
Flue Gas Parameters				
volumetric flow rate, scfm	30,186	29,477	29,958	29,874
Volatile Organic Compounds (VOC), as propane				
lb/hr	14.2	13.6	20.7	16.2

TABLE 5-4
EMISSIONS RESULTS -
EU-ECOAT RTO EXHAUST STACK

Run Number	1	2	3	Average
Date	10/19/2021	10/19/2021	10/19/2021	--
Time	8:32-9:32	11:47-12:47	14:05-15:05	--
Process Data*				
RTO temperature, °F	1,497	1,503	1,498	1,499
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	351.4	351.1	350.7	351.1
moisture content, % volume†	1.47	1.43	1.43	1.44
volumetric flow rate, scfm	32,220	32,541	32,075	32,279
Total Gaseous Organics (TGO), as propane				
ppmvw	1.09	1.18	1.26	1.17
Methane, as propane				
ppmvw	0.00	0.00	0.00	0.00
Volatile Organic Compounds (VOC), as propane				
ppmvw	1.09	1.18	1.26	1.17
lb/hr	0.24	0.20	0.23	0.22
VOC Destruction Efficiency (DE)				
%	98.3	98.5	98.9	98.6

* Process data was provided by Ford Motor Company - Michigan Assembly Plant personnel.

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-5
EMISSIONS RESULTS -
EU-TOPCOAT BOOTH #2 RTO INLET DUCT

Run Number	1	2	3	Average
Date	10/20/2021	10/20/2021	10/20/2021	--
Time	9:48-10:48	13:41-14:41	15:04-16:04	--
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	76.1	76.3	78.4	76.9
moisture content, % volume†	2.1	2.1	2.1	2.1
volumetric flow rate, scfm	23,622	24,217	23,766	23,868
Total Gaseous Organics (TGO), as propane				
ppmvw	255.1	252.0	263.0	256.7
Methane, as propane				
ppmvw	1.37	1.53	1.44	1.45
Volatile Organic Compounds (VOC), as propane				
ppmvw	253.7	250.5	261.5	255.2
lb/hr	41.2	41.7	42.7	41.8

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-6
EMISSIONS RESULTS -
EU-TOPCOAT BOOTH #2 RTO EXHAUST STACK

Run Number	1	2	3	Average
Date	10/20/2021	10/20/2021	10/20/2021	--
Time	9:48-10:48	13:41-14:41	15:04-16:04	--
Process Data*				
RTO temperature, °F	1,437	1,444	1,456	1,446
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	263.3	264.2	269.2	265.5
moisture content, % volume†	2.63	2.63	2.63	2.63
volumetric flow rate, scfm	21,762	21,729	22,855	22,115
Total Gaseous Organics (TGO), as propane				
ppmvw	7.26	7.08	7.29	7.21
Methane, as propane				
ppmvw	0.57	0.52	0.48	0.52
Volatile Organic Compounds (VOC), as propane				
ppmvw	6.69	6.56	6.81	6.68
lb/hr	1.00	0.98	1.07	1.02
VOC Destruction Efficiency (DE)				
%	97.6	97.7	97.5	97.6

* Process data was provided by Ford Motor Company - Michigan Assembly Plant personnel.

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-7
EMISSIONS RESULTS -
EU-TOPCOAT BOOTH #1 RTO INLET DUCT

Run Number	1	2	3	Average
Date	10/21/2021	10/21/2021	10/21/2021	--
Time	9:02-10:02	10:19-11:19	12:53-13:53	--
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	78.5	81.8	82.3	80.9
moisture content, % volume†	2.25	2.25	2.25	2.25
volumetric flow rate, scfm	21,163	21,499	21,630	21,430
Total Gaseous Organics (TGO), as propane				
ppmvw	300.8	276.5	312.5	296.6
Methane, as propane				
ppmvw	2.42	2.77	1.79	2.33
Volatile Organic Compounds (VOC), as propane				
ppmvw	298.4	273.8	310.7	294.3
lb/hr	43.4	40.4	46.2	43.3

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-8
EMISSIONS RESULTS -
EU-TOPCOAT BOOTH #1 RTO EXHAUST STACK

Run Number	1	2	3	Average
Date	10/21/2021	10/21/2021	10/21/2021	--
Time	9:02-10:02	10:19-11:19	12:53-13:53	--
Process Data*				
RTO temperature, °F	1,426	1,426	1,426	1,426
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	174.8	177.7	179.1	177.2
moisture content, % volume†	3.52	3.52	3.52	3.52
volumetric flow rate, scfm	24,356	24,658	23,391	24,135
Total Gaseous Organics (TGO), as propane				
ppmvw	5.92	5.22	5.84	5.66
Methane, as propane				
ppmvw	0.063	0.047	0.124	0.078
Volatile Organic Compounds (VOC), as propane				
ppmvw	5.86	5.18	5.72	5.59
lb/hr	0.98	0.88	0.92	0.93
VOC Destruction Efficiency (DE)				
%	97.7	97.8	98.0	97.9

* Process data was provided by Ford Motor Company - Michigan Assembly Plant personnel.

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-9
EMISSIONS RESULTS -
EU-TOPCOAT OVEN RTO INLET DUCT No.1

Run Number	1	2	3	Average
Date	10/22/2021	10/22/2021	10/22/2021	--
Time	8:30-8:40	9:55-10:05	11:30-11:40	--
Flue Gas Parameters				
flue gas temperature, °F	268.8	268.8	267.9	268.5
volumetric flow rate, scfm	13,396	11,023	10,027	11,482

TABLE 5-10
EMISSIONS RESULTS -
EU-TOPCOAT OVEN RTO INLET DUCT No. 2

Run Number	1	2	3	Average
Date	10/22/2021	10/22/2021	10/22/2021	--
Time	8:40-8:50	10:06-10:15	11:40-11:50	--
Flue Gas Parameters				
flue gas temperature, °F	256.6	255.2	255.4	255.7
volumetric flow rate, scfm	10,919	11,059	11,054	11,011

TABLE 5-11
EMISSIONS RESULTS -
EU-TOPCOAT OVEN RTO COMBINED INLET DUCT

Run Number	1	2	3	Average
Date	10/22/2021	10/22/2021	10/22/2021	--
Time	8:00-9:00	9:15-10:15	10:35-11:35	--
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
moisture content, % volume†	0.99	0.99	0.99	0.99
volumetric flow rate, scfm	24,315	22,081	21,081	22,492
Total Gaseous Organics (TGO), as propane				
ppmvw	230.37	265.68	263.65	253.23
Methane, as propane				
ppmvw	1.54	1.43	1.08	1.35
Volatile Organic Compounds (VOC), as propane				
ppmvw	228.8	264.3	262.6	251.9
lb/hr	38.2	40.1	38.0	38.8

† See Section 5.2 regarding the moisture content measured at this location.

TABLE 5-12
EMISSIONS RESULTS -
EU-TOPCOAT OVEN RTO EXHAUST STACK

Run Number	1	2	3	Average
Date	10/22/2021	10/22/2021	10/22/2021	--
Time	8:00-9:00	9:15-10:15	10:35-11:35	--
Process Data*				
RTO temperature, °F	1,446	1,449	1,445	1,447
Flue Gas Parameters				
O_2, % volume dry	21	21	21	21
CO_2, % volume dry	0	0	0	0
flue gas temperature, °F	297.6	298.9	298.3	298.3
moisture content, % volume†	1.06	1.06	1.06	1.06
volumetric flow rate, scfm	20,354	21,199	20,989	20,847
Total Gaseous Organics (TGO), as propane				
ppmvw	6.64	7.71	8.34	7.56
Methane, as propane				
ppmvw	0.086	0.052	0.051	0.063
Volatile Organic Compounds (VOC), as propane				
ppmvw	6.55	7.66	8.29	7.50
lb/hr	0.92	1.11	1.19	1.07
VOC Destruction Efficiency (DE)				
%	97.6	97.2	96.9	97.2

* Process data was provided by Ford Motor Company - Michigan Assembly Plant personnel.

† See Section 5.2 regarding the moisture content measured at this location.

5.3 QA/QC AUDITS

The meter box and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes and minimum sample durations met the applicable QA/QC criteria, except at the EU-ECOAT Curing Oven RTO Inlet Duct location which did not meet the minimum metered volume requirement of EPA Method 4. See Section 5.4 for further details.

EPA Method 25A FIA calibration audits were within the measurement system performance specifications for the calibration drift checks and calibration error checks.

An EPA Method 205 field evaluation of the calibration gas dilution system was conducted. The dilution accuracy and precision QA specifications were met.

5.4 QA/QC DISCUSSION

The sampling train at the EU-ECOAT Curing Oven RTO Inlet Duct collected 20.7 dscf which is less than the 21.0 dscf requirement per EPA Method 4, Section 8.1.1.2. Data is reported as measured.

5.5 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).