

## 1.0 INTRODUCTION

### 1.1 SUMMARY OF TEST PROGRAM

Plascore, Inc. (SRN: N0824) contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance emissions test program on their Print Line No. 3 (EUPRINT03) and Aramid Process (EUARAMID) at the Plascore, Inc. facility located in Zeeland, Michigan. The tests were conducted to satisfy the emissions testing requirements pursuant to Michigan Department of Environment Great Lakes and Energy (EGLE) Permit No. 72-98K.

The specific objectives were to:

- Verify the total gaseous organic (TGO) destruction efficiency (DE) of RTO No. 5 serving EUPRINT03
- Verify the total gaseous non-methane organic (TGNMO) DE of RTO No. 7 serving EUARAMID
- 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 - RTO NO. 5**

Test Date(s)	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
07/14/2020	RTO No. 5	Velocity/Volumetric Flow Rate	EPA 1 & 2	3 (Inlet-East) 3 (Inlet-West)	~10
07/14/2020	RTO No. 5	Moisture (wb/db)	EPA 4	3 (Inlet-East) 3 (Inlet-West)	~1
07/14/2020	RTO No. 5	TGO	EPA 25A	3 (Combined Inlets)	60
07/14/2020	RTO No. 5	Moisture	EPA 4	1 (Exhaust)	30
07/14/2020	RTO No. 5	TGO	EPA 25A	3 (Exhaust)	60

**TABLE 1-2**  
**SUMMARY OF TEST PROGRAM - RTO NO. 7**

<b>Test Date(s)</b>	<b>Unit ID/ Source Name</b>	<b>Activity/ Parameters</b>	<b>Test Methods</b>	<b>No. of Runs</b>	<b>Duration (Minutes)</b>
07/15/2020	RTO No. 7	Velocity/Volumetric Flow Rate	EPA 1 & 2	3 (Inlet-East) 3 (Inlet-West)	~10
07/15/2020	RTO No. 7	Moisture (wb/db)	EPA 4	3 (Inlet-East) 3 (Inlet-West)	~1
07/15/2020	RTO No. 7	TGO	EPA 25A	3 (Combined Inlets)	60
07/15/2020	RTO No. 7	Moisture	EPA 4	1 (Exhaust)	30
07/15/2020	RTO No. 7	TGO	EPA 25A	3 (Exhaust)	60

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.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Tables 1-2 and 1-3. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3 on July 14-15, 2020. The tests were conducted according to the test plan (protocol) dated May 7, 2020 that was submitted to and accepted by the EGLE.

**TABLE 1-3  
SUMMARY OF AVERAGE COMPLIANCE RESULTS -  
RTO NO. 5  
JULY 14, 2020**

<b>Parameter/Units</b>	<b>Average Results</b>	<b>Allowable Limits</b>
<b>TGO destruction efficiency</b> %	98	>95

**TABLE 1-4  
SUMMARY OF AVERAGE COMPLIANCE RESULTS -  
RTO NO. 7  
JULY 15, 2020**

<b>Parameter/Units</b>	<b>Average Results</b>	<b>Allowable Limits</b>
<b>TGNMO destruction efficiency</b> %	98	>95

## 1.2 KEY PERSONNEL

A list of project participants is included below:

### Facility Information

Source Location: Plascore, Inc.  
615 N. Fairview  
Zeeland, MI 49464  
Project Contact: Ed Weller  
Role: Facilities Manager  
Company: Plascore, Inc.  
Telephone: 616-748-2231  
Email: eweller@PlascoreInc.com

### Agency Information

Regulatory Agency: Michigan Department of Environment Great Lakes and Energy (EGLE)  
Contact: Karen Kajiya-Mills                      Matt Karl  
Telephone: 517-284-6780                      517-282-2126  
Email: Kajiya-millsk@michigan.gov                      karlm@michigan.gov

### Testing Company Information

Testing Firm: Montrose Air Quality Services, LLC  
Contact: Matthew Young                      Todd Wessel  
Title: District Manager                      Client Project Manager  
Telephone: 248-548-8070                      248-548-8070  
Email: myoung@montrose-env.com                      name@montrose-env.com

Test personnel and observers are summarized in Table 1-5.

**TABLE 1-5  
TEST PERSONNEL AND OBSERVERS**

Name	Affiliation	Role/Responsibility
Todd Wessel	Montrose	Client Project Manager, QI
Mike Nummer	Montrose	Field Technician
Ed Webber	Plascore Inc.	Observer/Client Liaison/Test Coordinator
Matt Karl	EGLE	Observer

## **2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS**

### **2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT**

Plascore Inc. is a manufacturer of honeycomb cores for aerospace, marine, mass transportation and construction. The facility operates print line (EUPRINT03) and an Aramid Fiber Process (EUARAMID). During this test, emissions from EUPRINT03 were controlled by RTO No. 5 and the emissions from EUARAMID were controlled by RTO No. 7.

EUPRINT03 and EUARAMID were in operation during this test event.

### **2.2 FLUE GAS SAMPLING LOCATION(S)**

Information regarding the sampling location(s) is presented in Table 2-1.

**TABLE 2-1  
SAMPLING LOCATIONS**

Sampling Location	Stack Inside Dimensions (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
RTO No. 5 Inlet-East	18.0	36.0/2.0	30.0/1.7	Flow: 16 (8/port) Moisture (WB/DB): 1
RTO No. 5 Inlet-West	18.0	84.0/4.7	60.0/3.3	Flow: 16 (8/port) Moisture (WB/DB): 1
RTO No. 5 Inlet-Combined	--	--	--	Gaseous: 1
RTO No. 5 Exhaust	25.8	420/16.3	24.0/0.9	Flow: 16 (8/port) Moisture: 1 Gaseous: 1
RTO No. 7 Inlet-East	18.0	624.0/34.7	120.0/6.7	Flow: 16 (8/port) Moisture (WB/DB): 1
RTO No. 7 Inlet-West	18.0	84.0/4.7	84.0/4.7	Flow: 16 (8/port) Moisture (WB/DB): 1
RTO No. 7 Inlet-Combined	--	--	--	Gaseous: 1
RTO No. 7 Exhaust	36.0	168.0/4.7	156.0/4.3	Flow: 16 (8/port) Moisture: 1 Gaseous: 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 and A.2 through A-3 for more information.

### 2.3 OPERATING CONDITIONS AND PROCESS DATA

Emission tests were performed while EUPRINT03 and EUARAMID were 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:

- Air Box Temperature, °F
- RTO Temperature, °F

### **3.0 SAMPLING AND ANALYTICAL PROCEDURES**

#### **3.1 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.

##### **3.1.1 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.

##### **3.1.2 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.

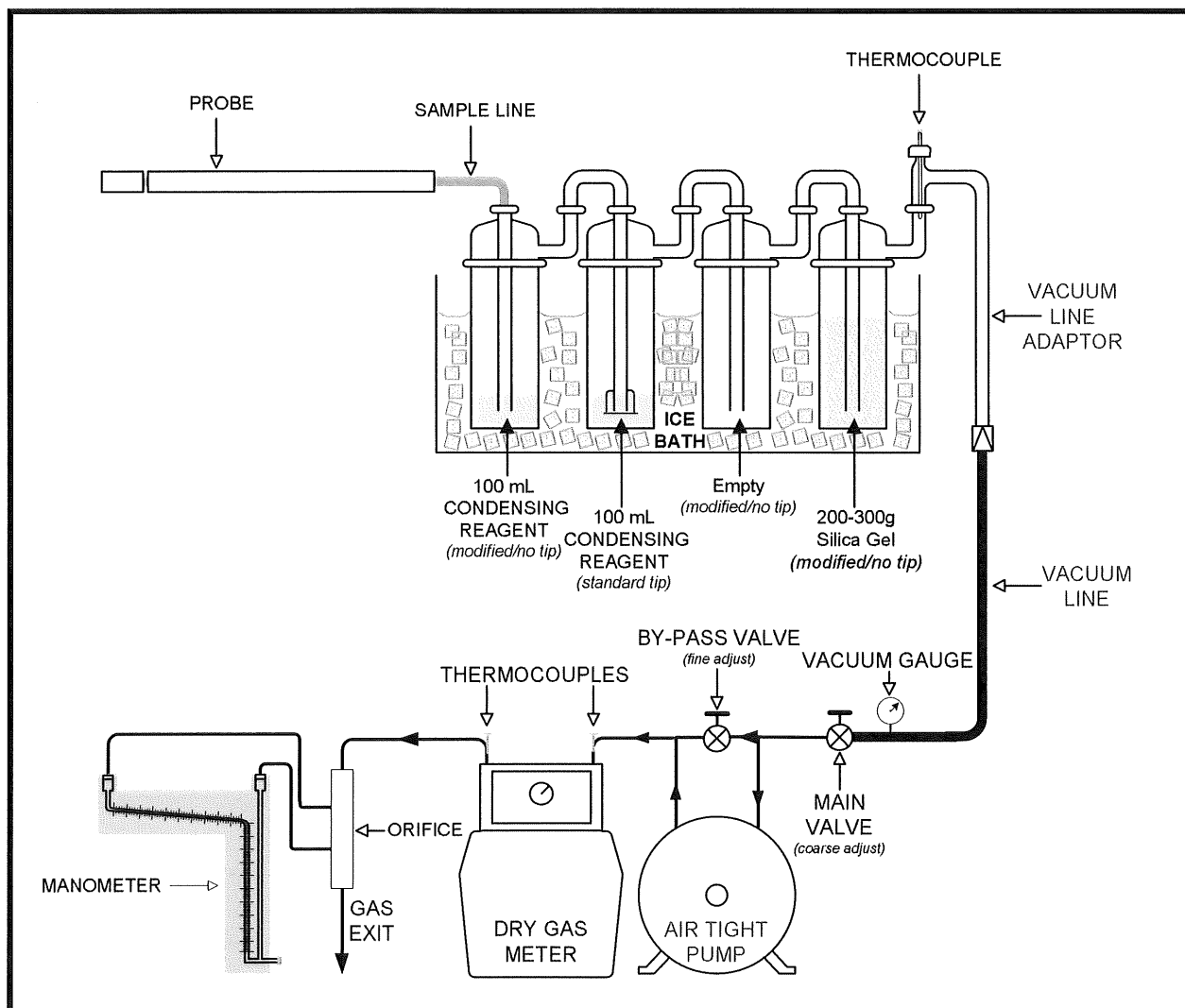
##### **3.1.3 EPA Method 4, Determination of Moisture Content in Stack Gas**

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 wet bulb/dry bulb approximation method (EPA Method 4, Section 2.2.1) was also utilized during this test event.

The sampling system is detailed in Figure 3-1.

**FIGURE 3-1  
EPA METHOD 4(DETACHED) SAMPLING TRAIN**



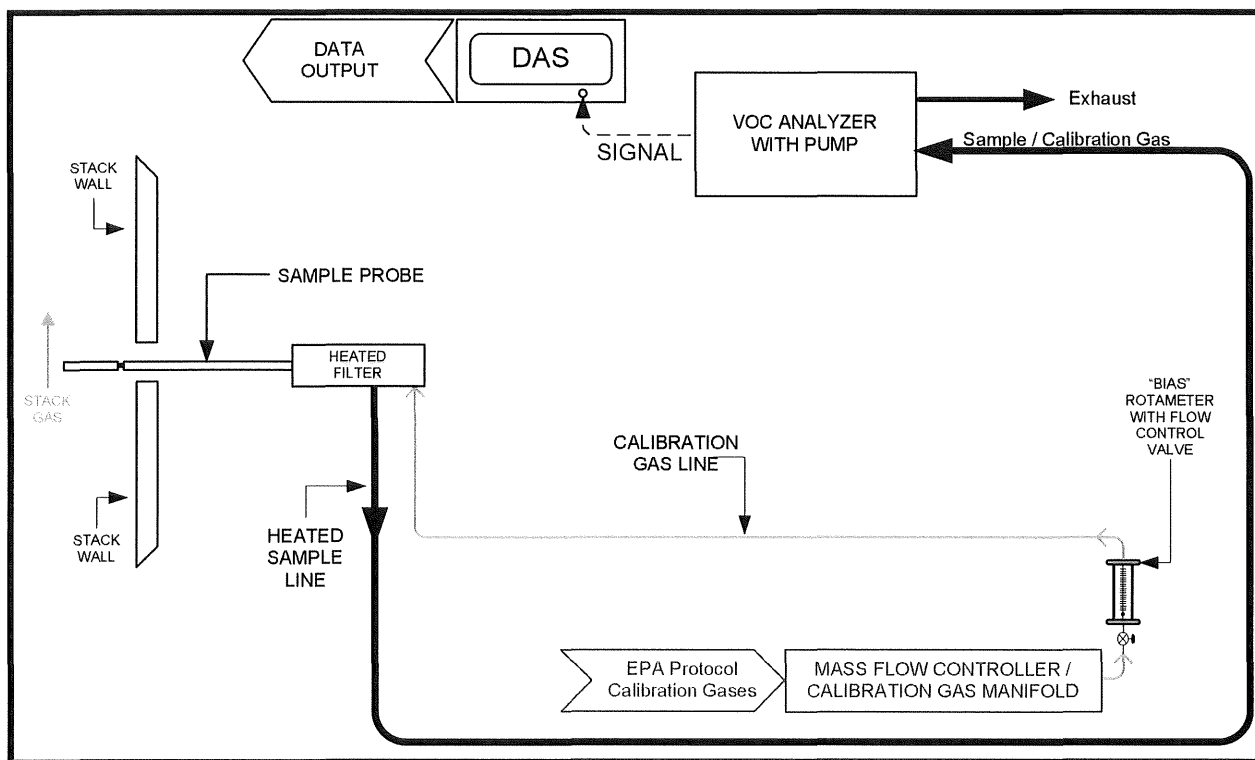
### 3.1.4 EPA Method 25A, Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

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.

Figure 3-2 details the sampling system.



**FIGURE 3-2  
EPA METHOD 25A SAMPLING TRAIN**



### 3.2 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.

## **4.0 TEST DISCUSSION AND RESULTS**

### **4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS**

No field deviations or exceptions from the test plan or test methods occurred during this test program

### **4.2 PRESENTATION OF RESULTS**

The average results are displayed in Tables 1-3 and 1-4. The results of individual test runs performed are presented in Tables 4-1 through 4-8. 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.

Moisture was measured utilizing the wet-bulb/dry-bulb approximation technique during each run at the RTO No. 5 and RTO No. 7 inlet locations.

During this test a dry molecular weight value of 29.0 g/g-mole was utilized at all the testing locations.

A 30-minute moisture run measured at the during Run 1 at RTO No. 5 and Run 1 at RTO No. 7 exhaust locations was applied to Runs 2 and 3 at their respective exhaust locations.

Concentration values for methane in Tables 4-7 and 4-8 measured to be below the minimum detection limit (MDL) of the applicable analytical of the method were assigned a value of zero.

After Run 1 at RTO No. 7, Plascore Inc. facility personnel notified Montrose personnel that the RTO was not functioning properly due to lack of airflow to the RTO. During Run 1 the RTO was receiving airflow from one inlet (Inlet-East). The other inlet (Inlet-West) had the damper closed in anticipation of future facility expansion. After discussions with Matt Karl, EGLE, Run 1 was accepted and the damper for RTO No. 7 Inlet-West was opened for Runs 2 and 3.

**TABLE 4-1  
TGO EMISSIONS RESULTS -  
RTO NO. 5 INLET-EAST LOCATION**

Run Number	1	2	3	Average
Date	07/14/2020	07/14/2020	07/14/2020	--
Time	10:11-10:16	11:08-11:15	13:17-13:25	--
<b>Flue Gas Parameters-East</b>				
flue gas temperature, °F	129	168	167	155
moisture content, % volume	3.34	3.92	3.34	3.53
volumetric flow rate, scfm	2,590	2,410	1,257	2,086
volumetric flow rate, dscfm	2,504	2,316	1,215	2,012

**TABLE 4-2  
TGO EMISSIONS RESULTS -  
RTO NO. 5 INLET-WEST LOCATION**

Run Number	1	2	3	Average
Date	07/14/2020	07/14/2020	07/14/2020	--
Time	10:02-10:07	11:18-11:26	13:10-13:15	--
<b>Flue Gas Parameters-East</b>				
flue gas temperature, °F	100	106	107	105
moisture content, % volume	3.80	3.33	2.73	3.29
volumetric flow rate, scfm	5,642	5,975	5,831	5,816
volumetric flow rate, dscfm	5,428	5,776	5,672	5,626

**TABLE 4-3  
TGO EMISSIONS RESULTS -  
RTO NO. 5 COMBINED INLET LOCATION**

Run Number	1	2	3	Average
Date	07/14/2020	07/14/2020	07/14/2020	--
Time	10:00-11:23	11:24-12:24	12:39-13:40	--
<b>Flue Gas Parameters*</b>				
volumetric flow rate, scfm	8,232	8,386	7,089	7,902
volumetric flow rate, dscfm	7,932	8,092	6,888	7,637
<b>TGO as Propane</b>				
ppmvw	1,283	1,252	1,312	1,282
lb/hr	72.1	71.8	63.2	69.1

\* Combined flow measured at the RTO No. 5 Inlet Duct-East and RTO No. 5 Inlet Duct-West.

**TABLE4-4  
EMISSIONS AND DE RESULTS -  
RTO NO. 5 EXHAUST**

Run Number	1	2	3	Average
Date	07/14/2020	07/14/2020	07/14/2020	--
Time	10:00-11:23	11:24-12:24	12:39-13:40	--
<b>Process Data</b>				
RTO Chamber temperature, °F	1624	1621	1588	1611
<b>Flue Gas Parameters</b>				
flue gas temperature, °F	245	248	246	246
moisture content, % volume	4.64	4.64	4.65	4.64
volumetric flow rate, scfm	6,996	7,305	7,302	7,201
volumetric flow rate, dscfm	6,671	6,966	6,963	6,867
<b>TGO as Propane</b>				
ppmvw	25.4	23.3	23.4	24.0
lb/hr	1.21	1.15	1.15	1.17
<b>TGO DE</b>				
%	98.3	98.4	98.2	98.3

**TABLE 4-5  
FLOW MEASUREMENT RESULTS -  
RTO NO. 7 INLET-EAST LOCATION**

Run Number	1	2	3	Average
Date	07/15/2020	07/15/2020	07/15/2020	--
Time	09:03-09:07	12:49-12:54	14:37-14:43	--
<b>Flue Gas Parameters-East</b>				
flue gas temperature, °F	83.6	88.9	89.3	87.3
moisture content, % volume	2.09	2.39	2.16	2.21
volumetric flow rate, dscfm	4,097	3,609	3,452	3,720
volumetric flow rate, dscfm	4,012	3,523	3,378	3,638

**TABLE 4-6  
FLOW MEASUREMENT RESULTS -  
RTO NO. 7 INLET-WEST LOCATION**

Run Number	1*	2	3	Average
Date	07/15/2020	07/15/2020	07/15/2020	--
Time	--	12:40-12:45	14:48-14:56	--
<b>Flue Gas Parameters-East</b>				
flue gas temperature, °F	--	83.6	85.2	84.4
moisture content, % volume	--	2.22	2.65	2.44
volumetric flow rate, scfm	--	3,921	4,020	3,971
volumetric flow rate, dscfm	--	3,834	3,913	3,874

\* Gas stream volumetric flow rate was not measured during Run 1. See Section 4.2 for details.

**TABLE 4-7**  
**TGNMO EMISSIONS RESULTS -**  
**RTO NO. 7 COMBINED INLET LOCATION**

Run Number	1	2*	3*	Average
Date	07/15/2020	07/15/2020	07/15/2020	--
Time	09:31-10:31	12:56-13:56	14:17-15:17	--
<b>Flue Gas Parameters</b>				
volumetric flow rate, scfm	4,097	7,531	7,472	6,367
volumetric flow rate, dscfm	4,012	7,357	7,291	6,220
<b>Methane as Propane</b>				
ppmvw	0.00	0.00	0.00	0.00
<b>TGO as Propane</b>				
ppmvw	379	1,055	89.5	508
lb/hr	10.7	54.6	4.59	23.3
<b>TGNMO as Propane</b>				
ppmvw	379	1,055	132	522
lb/hr	10.7	54.6	4.59	23.3

\* Combined flow measured at the RTO No. 7 Inlet Duct-East and RTO No. 7 Inlet Duct-West.

**TABLE4-8**  
**TGNMO EMISSIONS AND TGNMO DE RESULTS -**  
**RTO NO. 7 EXHAUST**

Run Number	1	2	3	Average
<b>Date</b>	07/15/2020	07/15/2020	07/15/2020	--
<b>Time</b>	09:31-10:31	12:56-13:56	14:17-15:17	--
<b>Process Data</b>				
RTO temperature, °F	1525	1553	1569	1549
<b>Flue Gas Parameters</b>				
flue gas temperature, °F	195	220	213	209
moisture content, % volume	2.79	2.79	2.79	2.79
volumetric flow rate, scfm	4,746	8,148	7,952	6,949
volumetric flow rate, dscfm	4,614	7,921	7,730	6,755
<b>Methane as Propane</b>				
ppmvw	11.2	0.0	12.4	7.87
<b>TGO as Propane</b>				
ppmvw	19.4	23.8	12.4	18.6
lb/hr	0.63	1.33	0.68	0.88
<b>TGNMO as Propane</b>				
ppmvw	8.20	23.81	0.048	10.7
lb/hr	0.27	1.33	0.0026	0.53
<b>TGNMO DE</b>				
%	97.5	97.6	99.9	98.3

## **5.0 INTERNAL QA/QC ACTIVITIES**

### **5.1 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 met the applicable QA/QC criteria.

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.

### **5.2 QA/QC DISCUSSION**

All QA/QC criteria were met during this test program.

### **5.3 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).



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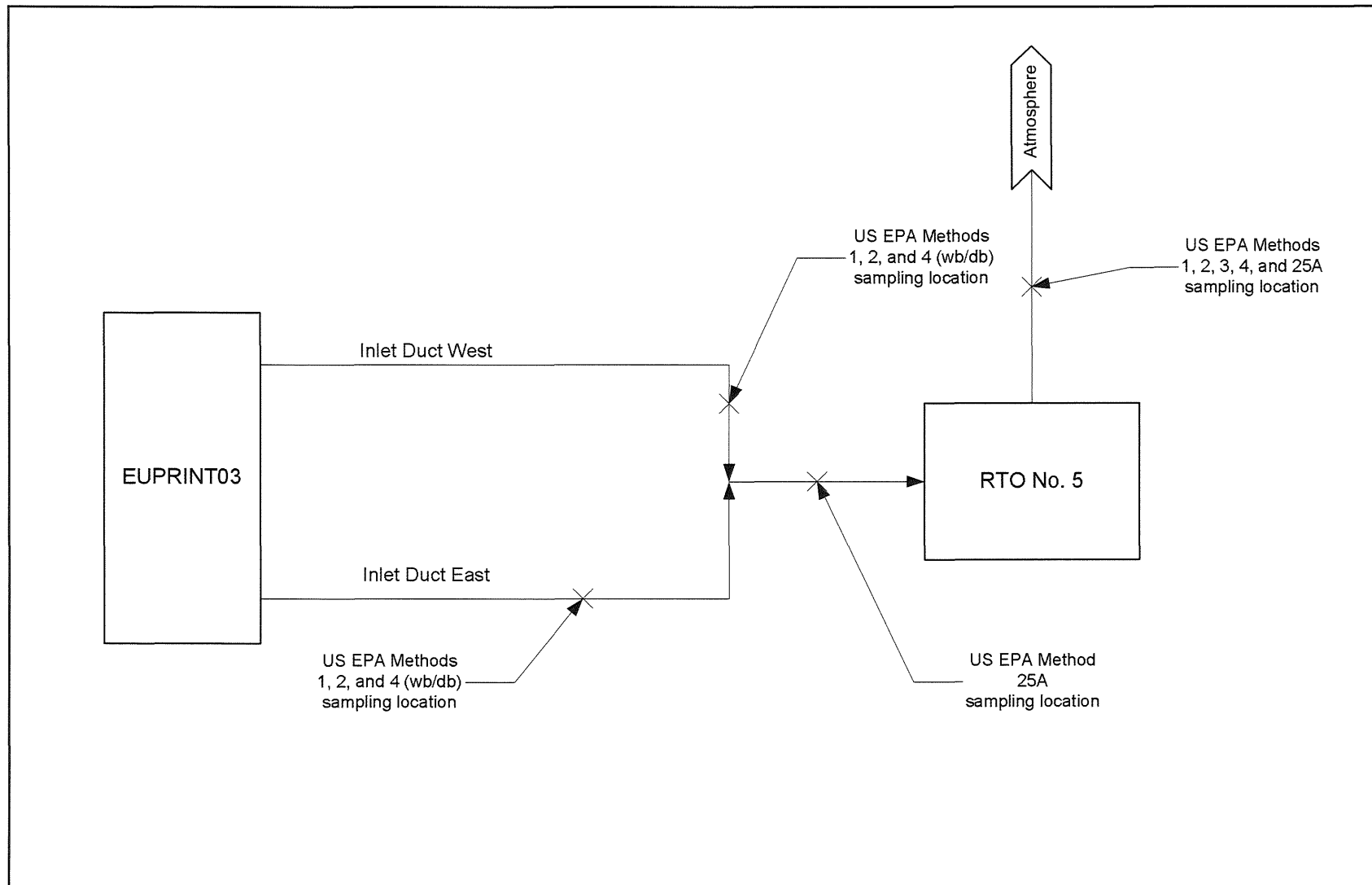
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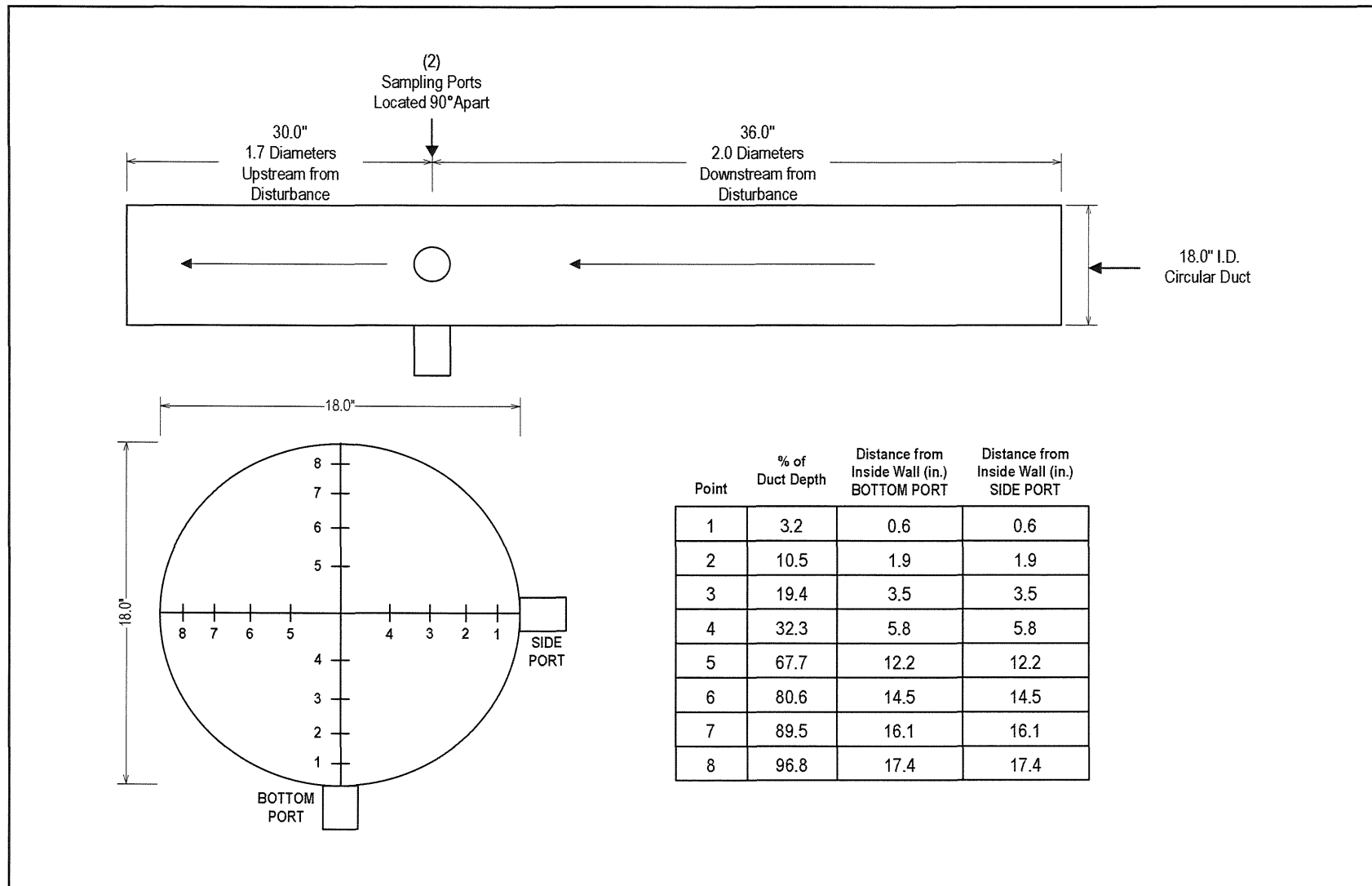
## **APPENDIX A FIELD DATA AND CALCULATIONS**

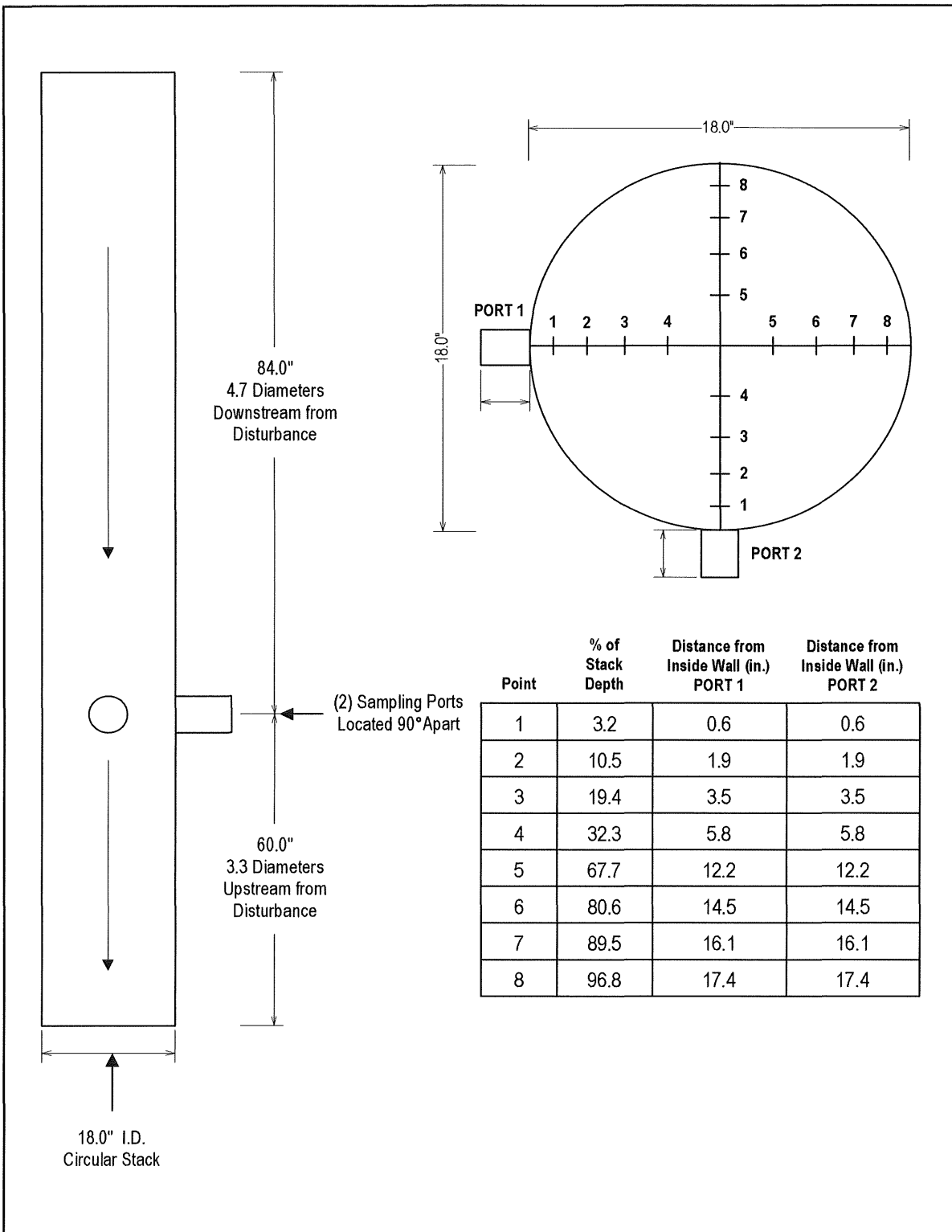
## **Appendix A.1 Sampling Locations**

### EUPRINT03 SAMPLING LOCATION SCHEMATIC

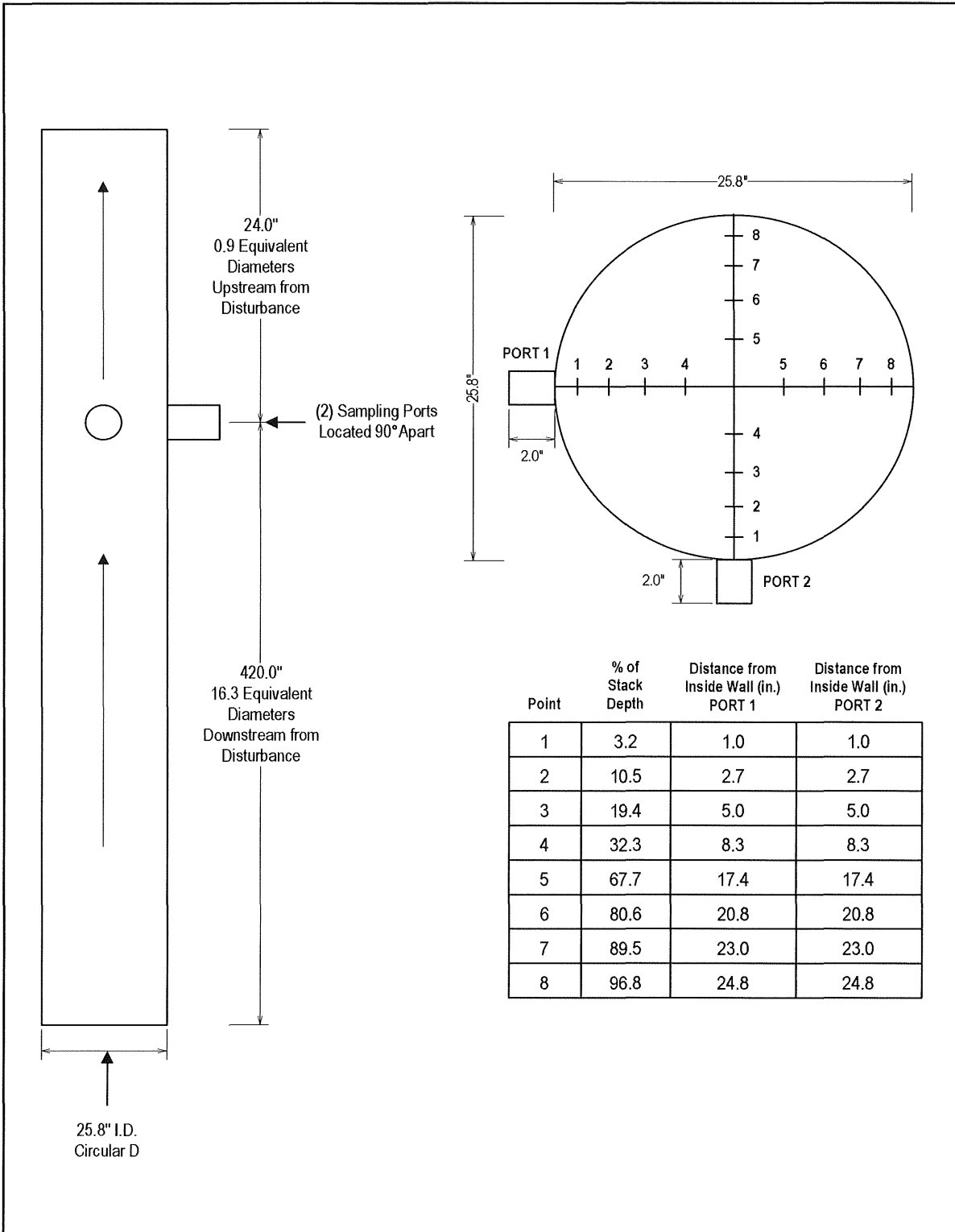


### RTO NO. 5 INLET-EAST TRAVERSE POINT LOCATION

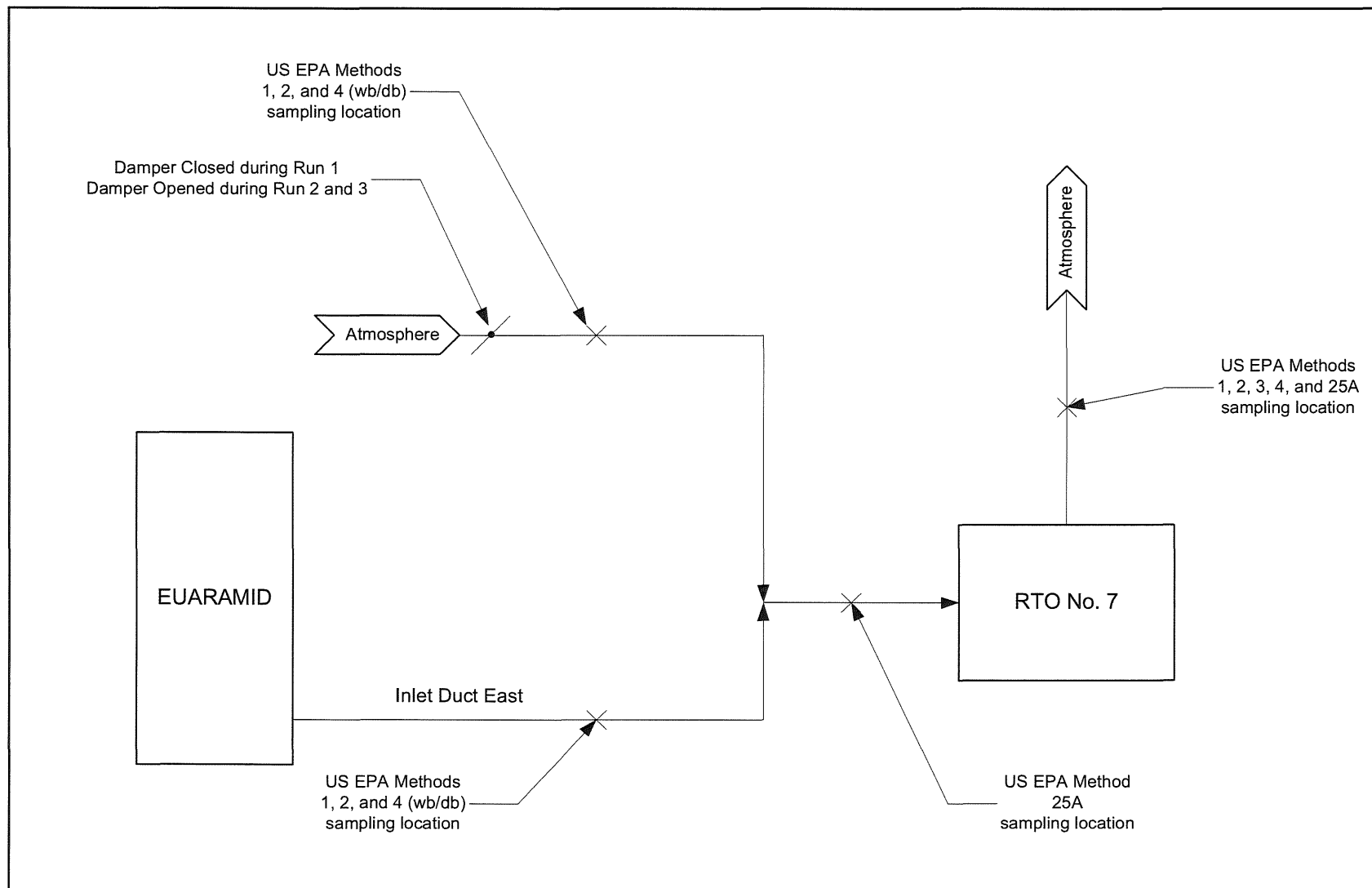


**RTO NO. 5 INLET-WEST TRAVERSE POINT LOCATION**

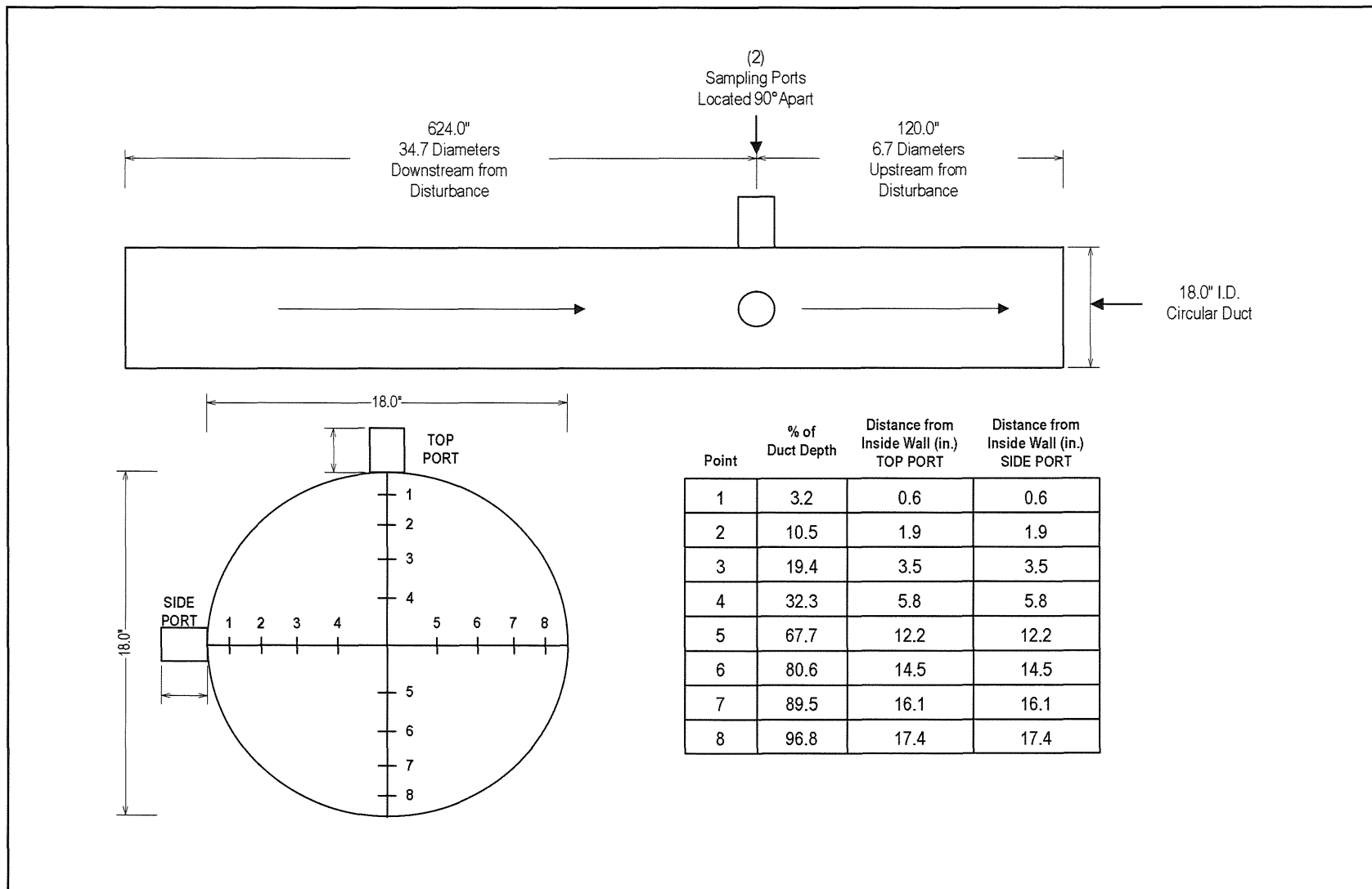
### RT0 NO. 5 EXHAUST STACK TRAVERSE POINT LOCATION



### EUARAMID SAMPLING LOCATION SCHEMATIC

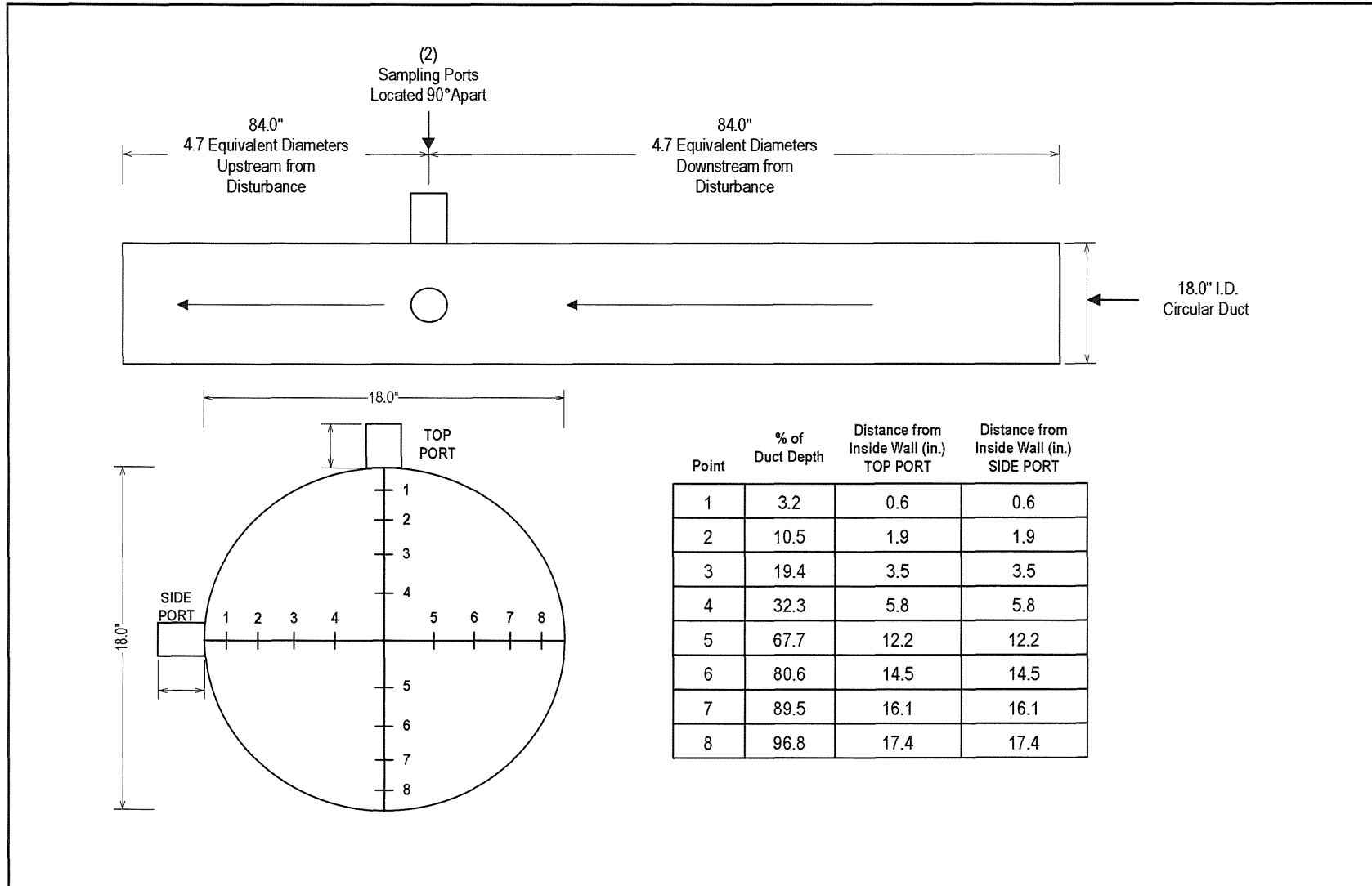


### RTO NO. 7 INLET-EAST TRAVERSE POINT LOCATION





### RTO NO. 7 INLET-WEST TRAVERSE POINT LOCATION



### RTO NO. 7 EXHAUST STACK TRAVERSE POINT LOCATION

