

MICHIGAN FOAM PRODUCTS, LLC

GRAND RAPIDS, MICHIGAN

SOURCE TESTING REPORT: RTO DESTRUCTION EFFICIENCY

RWDI #2401306

January 24, 2024

SUBMITTED TO

**Technical Program Unit Manager
Michigan Department of Environment,
Great Lakes, and Energy (EGLE)**
AQD - Technical Programs Unit (TPU)
Constitution Hall 2nd Floor | South
525 West Allegan Street
Lansing, Michigan 48933

**April Lazzaro
Michigan Department of Environment,
Great Lakes, and Energy (EGLE)**
Grand Rapids District Office
State Office Building, 6th Floor
350 Ottawa Avenue, NW, Unit 10
Grand Rapids, Michigan 49503-2341

Michigan Foam Products, LLC
1820 Chicago Drive SW
Grand Rapids, Michigan 49519

SUBMITTED BY

Brad Bergeron, A.Sc.T., d.E.T.
Technical Director | Principal
Brad.Bergeron@rwdi.com | ext. 2428

Steve Smith, QSTI
Project Manager | Associate
Steve.Smith@rwdi.com | ext. 3706

Mason Sakshaug, QSTI
Supervisor, Source | Associate Principal
Mason.Sakshaug@rwdi.com

**RWDI USA LLC
Consulting Engineers & Scientists**
2239 Star Court
Rochester Hills, Michigan 48309

T: 248.841.8442
F: 519.823.1316



EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by Michigan Foam Products, LLC (MFP) to complete the emission sampling program at their facility located at 1820 Chicago Drive SW, Grand Rapids, Michigan. MFP operates a one batch-type resin pre-expander (EUPLASTICRESIN) system for the manufacturing of foam products.

The source testing program for the RTO was required by the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) Permit to Install (PTI) 211-02F under the Emission Unit EUPLASTICRESIN in order to validate the destruction efficiency (DE) of the regenerative thermal oxidizer (RTO) system controlling emissions from the pre-expander section of the process.

The performance validation of the RTO is based on achieving an outlet emission rate of 1.13 pounds per hour of VOCs (lb/hr) and a 98% destruction efficiency.

During the testing program, the steam injection process to the pre-expander introduced a significant amount of moisture to the inlet of the RTO. RWDI was concerned that the external dilution system used to reduce the inlet concentration would not be able to consistently maintain the 100:1 dilution rate with the changing exhaust gas molecular size (periodic saturation of exhaust stream with introduction of steam). Therefore, as agreed to with EGLE, RWDI also collected sample bags (dry) using US EPA Method 18 for each test on the inlet and outlet of the RTO. From the data, it appears that the dilution ratio may have changed during the higher moisture periods of time as the bag samples were similar to the USEPA Method 25A CEMs data for the outlet (consistent low moisture) however varied greatly for the inlet samples.

Executive Table i: Average Emission Data – US EPA Method 18 Bag Samples

Parameter	Concentration & Emission Rate (ppmv, lb/hr, & % Destruction)			
	Test 1	Test 2	Test 3	Average
Pentane Inlet	32,727 ppmvd 41.7 lb/hr	8,608 ppmvd 15.4 lb/hr	6,314 ppmvd 8.5 lb/hr	18,883 ppmvd 21.9 lb/hr
Pentane Outlet	638 ppmvd 21.2 lb/hr	306 ppmvd 10.8 lb/hr	265 ppmvd 9.14 lb/hr	403 ppmvd 13.7 lb/hr
RTO Temperature (°F)	1550	1551	1551	1551
Destruction Efficiency	49 %	30 %	0 %	24 %
Production Rate	2619.8 lb/hr	2661.4 lb/hr	2659.8 lb/hr	2657.0 lb/hr
% Pentane in Products during Testing	NL M363D – 6.1% Pentane LG R160 – 6.9% Pentane NK M664D – 6.4% Pentane			

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Executive Table ii: Average Emission Data – US EPA Method 25A CEMs

Parameter	Concentration & Emission Rate (ppmv, lb/hr, & % Destruction)			
	Test 1	Test 2	Test 3	Average
VOC (as Pentane) Inlet	50,220 ppmvd 64.0 lb/hr	30,707 ppmvd 55.0 lb/hr	22,947 ppmvd 31.0 lb/hr	34,624 ppmvd 50.0 lb/hr
VOC (as Pentane) Outlet	665 ppmvd 22.2 lb/hr	407 ppmvd 14.3 lb/hr	342 ppmvd 11.8 lb/hr	472 ppmvd 16.1 lb/hr
RTO Temperature (°F)	1550	1551	1551	1551
Destruction Efficiency	65 %	74 %	62 %	67.1 %
Production Rate	2619.8 lb/hr	2661.4 lb/hr	2659.8 lb/hr	2657.0 lb/hr
% Pentane in Products during Testing	NL M363D – 6.1% Pentane LG R160 – 6.9% Pentane NK M664D – 6.4% Pentane			

As a results of the low destruction efficiency and high RTO outlet emission rate, MFP contracted the RTO supplier and completed an inspection of the system. It was determined that a significant problem with the RTO did exist and that the low DE results would be consistent with the problem found with the RTO. As such, the RTO was not functioning properly during the testing period. Once the corrective actions are taken with the RTO, the RTO will be scheduled for a re-test. The current plan is to complete the re-test within the 180 days of commissioning as outlined in the PTI. In addition, the varying results for the inlet concentrations has led to a decision to complete USEPA Method 25 instead of 25A for further testing events. Bag samples may also be taken for comparison purposes.



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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by Michigan Foam Products, LLC (MFP) to complete the emission sampling program at their facility located at 1820 Chicago Drive SW, Grand Rapids, Michigan. MFP operates a one batch-type resin pre-expander (EUPLASTICRESIN) system for the manufacturing of foam products.

The source testing program for the RTO was required by the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) Permit to Install (PTI) 211-02F under the Emission Unit EUPLASTICRESIN in order to validate the destruction efficiency (DE) of the regenerative thermal oxidizer (RTO) system controlling emissions from the pre-expander section of process.

The performance validation of RTO is based on achieving an outlet emission rate of 1.13 pounds per hour of VOCs (lb/hr) and a 98% destruction efficiency.

During the testing program, the steam injection process to the pre-expander introduced a significant amount of moisture to the inlet to the RTO. RWDI was concerned that the external dilution system used to reduce the inlet concentration would not be able to consistently maintain the 100:1 dilution rate with the changing exhaust gas molecular size (periodic saturation of exhaust stream with introduction of steam). Therefore, as agreed to with EGLE, RWDI also collected sample bags (dry) using US EPA Method 18 for each test on the inlet and outlet of the RTO. From the data, it appears that the dilution ratio may have changed during the higher moisture periods of time as the bag samples were similar to the USEPA Method 25A CEMs data for the outlet (consistent low moisture) however varied greatly for the inlet samples.

1.1 Location and Dates of Testing

The test program was completed on December 19th, 2023, at the MFP facility.

1.2 Purpose of Testing

The source test for RTO was required under the State of Michigan Department of Environment, Great Lakes and Energy Permit to Install 211-02F. The facility SRN number is N3078.



1.3 Personnel Involved in Testing

Details with respect to the key individuals involved with the stack sampling survey are provided below.

Table 1.3.1: Testing Personnel

<p>Biplab Roy Executive Director and Senior Consultant Broy@advanced-matrix.com</p>	<p>Advance Matrix, Inc. 44327 Plymouth Oaks Boulevard Plymouth, MI 48170</p>	<p>(734) 635-0066</p>
<p>Matthew Tayler Plant Engineer mtaylor@michiganfoam.com</p>	<p>Michigan Foam Products 1820 Chicago Drive SW Grand Rapids, MI 49519</p>	<p>(616) 452-9611</p>
<p>Alejandro Gutierrez Plant Manager agutierrez@michiganfoam.com</p>		<p>(616) 389-7020</p>
<p>Trevor Drost Environmental Quality Analyst drostt@michigan.gov</p>	<p>EGLE AQD Technical Programs Unit Constitution Hall 2nd Floor South 525 Allegan Street Lansing, MI 48933</p>	<p>(517) 245-5781</p>
<p>April Lazzaro EGLE Air Quality Division Lazzaroa1@michigan.gov</p>	<p>EGLE AQD Grand Rapids District Office State Office Building, 6th Floor 350 Ottawa Ave. NW, Unit 10 Grand Rapids, MI 49503-2341</p>	<p>(616) 558-1092</p>
<p>Brad Bergeron Technical Director Brad.Bergeron@rwdi.com</p>	<p>RWDI USA LLC 2239 Star Court Rochester Hills, MI, 48309</p>	<p>(248) 234-3884</p>
<p>Steve Smith Project Manager Steve.Smith@rwdi.com</p>		<p>(734) 751-9701</p>
<p>Mason Sakshaug Supervisor, USA Field Operations Mason.Sakshaug@rwdi.com</p>		<p>(989) 323-0355</p>
<p>Mike Nummer Senior Field Technician Michael.Nummer@rwdi.com</p>		<p>(248) 841-8442</p>
<p>Kate Strang Field Technician Kate.Strang@rwdi.com</p>		<p>(248) 841-8442</p>



2 SUMMARY OF RESULTS

2.1 Operating Data

Operational data collected during the testing includes the production rate information and the combustion chamber temperatures from RTO during each test. This information can be found in **Appendix A**.

2.2 Applicable Permit Number

EGLE Permit to Install (PTI) No. 211-02F. The facility SRN number is N3078.

3 SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

Michigan Foam operates EUPLASTICRESIN which is a Preex 9000 vacutrans batch-type resin pre-expander and other associated operations to produce expanded polystyrene (EPS) foam. The pre-expander is controlled by a regenerative thermal oxidizer (RTO). The following table outlines the sampling program.

Table 3.1.1: Summary of Sampling Program – RTO

RTO	
Emission Unit Description [Including Process Equipment & Control Device(s)]	Sources: EUPLASTICRESIN - RTO
Parameter Tested	RTO Destruction Efficiency (DE), in addition to Stack Gas Velocity, Stack gas composition, and Moisture
Testing Monitoring Methods	<ul style="list-style-type: none"> USEPA Methods: 1, 2/2C, 3, 4, 18, 25A, and 205. The inlet sampling location for the RTO meets the USEPA Method 1/2C criteria. The inlet sampling location was used for stack gas velocity, flow rate, stack gas composition and moisture. The outlet sampling location for the RTO meets the USEPA Method 1 criteria. The outlet sampling location was used for stack gas velocity, flow rate, stack gas composition and moisture. The sampling train for VOC will consist of two (2) analyzers as described in USEPA Method 25A, continuously sampling via heated sample lines from the inlet and outlet of the RTO simultaneously. An Environics gas dilution system was used to create concentrations for 25A. A USEPA Method 205 check will be done in the field to confirm accuracy of the diluter. A 60-minute moisture was taken at the inlet and outlet of the RTO for each test. USEPA Method 3 utilized a fyrite or a bag sample for O₂/CO₂ concentrations
Modifications	As discussed with EGLE, RWDI also completed bag samples as per USEPA Method 18 to have analyzed for Carbon 1 to 5 which included Pentane (C5). Samples were collected dry from the exhaust of the Dry Gas Meters.

3.2 Process Flow Sheet or Diagram

RTO has one inlet and one outlet. Figures can be found in the **Figure Section**.

3.3 Type and Quantity of Raw and Finished Materials

Various raw materials are used for the manufacturing of foam products. The batch process uses resin and steam to expand the resin for the manufacturing of foam products.

3.4 Normal Rated Capacity of Process

MFP was operating under normal representative production rates. Process data is provided in **Appendix A**.

3.5 Process Instrumentation Monitored During the Test

Production data and RTO combustion chamber temperatures were recorded and monitored during the testing event.

4 SAMPLING AND ANALYTICAL PROCEDURES

The emission test program utilized the following test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- **Method 1** – Sample and Velocity Traverses for Stationary Sources
- **Method 2** – Determination of Stack Gas Velocity and Volumetric Flowrate
- **Method 3** – Determination of Molecular Weight of Dry Stack Gases
- **Method 4** – Determination of Moisture Content
- **Method 25A** – Determination of Total Gaseous Organic Concentrations using a Flame Ionization Analyzer
- **Method 18** – Determination of Gaseous Organic Concentrations by Gas Chromatography

4.1 Stack Velocity, Temperature, and Volumetric Flow Rate

The exhaust velocities and flow rates were determined following U.S. EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type pitot tube and incline manometer or digital manometer. Volumetric flow rates were determined following the equal area method as outlined in U.S. EPA Method 2. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a calibrated digital temperature indicator.



The dry molecular weight of the stack gas from the RTO inlet and outlet was determined following calculations outlined in U.S. EPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight" (Fyrite). RWDI collected integrated sample bags for each of the RTO inlet and outlet using the orsat pump from the sampling consoles or manual pump. The integrated bag samples were collected over the duration of each test period. The bag samples were then introduced to an O₂ and CO₂ Fyrite for analysis. The Fyrite was challenged with a known US EPA Protocol 1 calibration gas prior to analysis.

Stack moisture content was determined according to U.S. EPA Method 4, "Determination of Moisture Content of Stack Gases". A schematic of the Method 2 and 4 sampling train are provided in **Figure Section**.

4.2 Total Hydrocarbon (THC)

THC concentrations were recorded simultaneously at the inlet and outlet of RTO during each test. The measurements were taken continuously following USEPA Method 25A on the inlet and outlet using a Flame Ionization Detector (FID) analyzer with a dual FID for THC. As outlined in Method 25A, the measurement location was taken at the centroid of each source. As discussed with EGLE prior to testing, since the inlet concentration was expected to be in the percent levels, an external dilution system rate and calibrated at 100:1 dilution was used on the inlet of the RTO.

Each test consisted of three (3) 60-minute tests or more depending on batch operation timing. Regular performance checks on the CEMS were carried out by zero and span calibration checks using USEPA Protocol calibration gases. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gases was reviewed frequently as an ongoing indication of analyzer performance.

Prior to testing, a 4-point analyzer calibration error check was conducted using USEPA protocol gases. The calibration error check was performed by introducing zero, low, mid, and high-level calibration gases up the heated line to the probe tip. The calibration error check was performed to confirm that the analyzer response is within $\pm 5\%$ of the certified calibration gas introduced. At the conclusion of each test run a system-bias check was performed to evaluate the percent drift from pre- and post-test system bias checks. The system bias check was used to confirm that the analyzer did not drift greater than $\pm 3\%$ throughout a test run.

Zero and mid gas calibration checks were conducted both before and after each test run to quantify measurement system calibration drift and sampling system bias. During these checks, the calibration gases were introduced into the sampling system at the probe tip so that the calibration gases were analyzed in the same manner as the flue gas samples.

A gas sample was continuously extracted from the stack and delivered to the gas analyzer, which measures the pollutant or diluent concentrations in the gas. The probe tip was equipped with a sintered stainless-steel filter for particulate removal. The end of the probe was connected to a heated Teflon sample line, which delivered the sample gases from the stack to the CEM system. The heated sample line was designed to maintain the gas temperature above 250°F to prevent condensation of stack gas moisture within the line.

A schematic of the USEPA Method 25A is provided in **Figures Section**.



4.3 Gas Dilution System

Calibration gases were mixed using an Environics 4040 Gas Dilution System. The mass flow controllers are factory calibrated using a primary flow standard traceable to the United States National Institute of Standards and Technology (NIST). Each flow controller utilizes an 11-point calibration table with linear interpolation, to increase accuracy and reduce flow controller nonlinearity. The calibration is done yearly, and the records are included in the Source Testing Report. A multi-point EPA Method 205 check was executed in the field prior to testing.

The gas dilution system consists of calibrated orifices or mass flow controllers and dilutes a high-level calibration gas to within $\pm 2\%$ of predicted values. The gas divider is capable of diluting gases at set increments and were evaluated for accuracy in the field in accordance with US EPA Method 205 "Verification of Gas Dilution Systems for Field Instrument Calibrations". The gas divider dilutions were measured to evaluate that the responses are within $\pm 2\%$ of predicted values. In addition, a certified mid-level calibration gas within $\pm 10\%$ of one of the tested dilution gases was introduced into an analyzer to ensure the response of the gas calibration is within $\pm 2\%$ of gas divider dilution concentration.

4.4 Description of Recovery and Analytical Procedures

There were no samples to recover during this test program. All testing used real time data from the analyzers.

4.5 Sampling Port Description

All sampling ports meet USEPA Method 1 locations and can be found in the **Figure Section**.

5 TEST RESULTS AND DISCUSSION

5.1 Detailed Results

Table 5.1.1: Average Emission Data – US EPA Method 18 Bag Samples

Parameter	Concentration & Emission Rate (ppmv, lb/hr, & % Destruction)			
	Test 1	Test 2	Test 3	Average
Pentane Inlet	32,727 ppmvd 41.7 lb/hr	8,608 ppmvd 15.4 lb/hr	6,314 ppmvd 8.5 lb/hr	18,883 ppmvd 21.9 lb/hr
Pentane Outlet	638 ppmvd 21.2 lb/hr	306 ppmvd 10.8 lb/hr	265 ppmvd 9.14 lb/hr	403 ppmvd 13.7 lb/hr
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% Pentane in Products during Testing	NL M363D – 6.1% Pentane LG R160 – 6.9% Pentane NK M664D – 6.4% Pentane			



Table 5.1.2: Average Emission Data – US EPA Method 25A CEMs

Parameter	Concentration & Emission Rate (ppmv, lb/hr, & % Destruction)			
	Test 1	Test 2	Test 3	Average
VOC (as Pentane) Inlet	50,220 ppmvd 64.0 lb/hr	30,707 ppmvd 55.0 lb/hr	22,947 ppmvd 31.0 lb/hr	34,624 ppmvd 50.0 lb/hr
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5.2 Variations in Testing Procedures

During the testing program, the steam inject process to the pre-expander introduced a significant amount of moisture to the inlet to the RTO. RWDI was concerned that the external dilution system used to reduce the inlet concentration would not be able to consistently maintain the 100:1 dilution rate with the changing exhaust gas molecular size (periodic saturation of exhaust stream with introduction of steam). Therefore, as agreed to with EGLE, RWDI also collected sample bags (dry) using US EPA Method 18 for each test on the inlet and outlet of the RTO. From the data, it appears that the dilution ratio may have changed during the higher moisture periods of time as the bag samples were similar to the USEPA Method 25A CEMs data for the outlet (consistent low moisture) however varied greatly for the inlet samples.

5.3 Process Upset Conditions During Testing

There were normal process breaks during production.

5.4 Maintenance Performed in Last Three Months

Only routine maintenance was performed on the machinery in the last three months. RTO was a new installation and prior to testing was in the commissioning and verification stages of the project.

5.5 Re-Test

This was not a retest.



5.6 Audit Samples

This test did not require any audit samples.

5.7 Process Data

Process data can be found in **Appendix A**.

5.8 Measurement Results

Data from the testing can be in **Appendix B and C**.

5.9 Flows and Moisture

Flow and moisture determination results can be found in **Appendix D**.

5.10 Calibration Data

Calibration data can be found in **Appendix E**.

5.11 Field Notes

Field notes can be found in **Appendix F**.

5.12 Example Calculations

Example calculations can be found in **Appendix G**.

5.13 Laboratory Data

Laboratory data is provided in **Appendix B**.

6 CONCLUSION

As a results of the low destruction efficiency and high RTO outlet emission rate, MFP contracted the RTO supplier and completed an inspection of the system. It was determined that a significant problem with the RTO did exist and that the low results would be consistent with the problem found with the RTO. As such, the RTO was not functioning properly during the testing period. Once the corrective actions are taken with the RTO, the RTO will be scheduled for a re-test. The current plan is to complete the re-test within the 180 days of commissioning as outlined in the PTI. In addition, the varying results for the inlet concentrations has led to a decision to complete USEPA Method 25 instead of 25A for further testing events. Bag samples may also be taken for comparison purposes.

TABLES

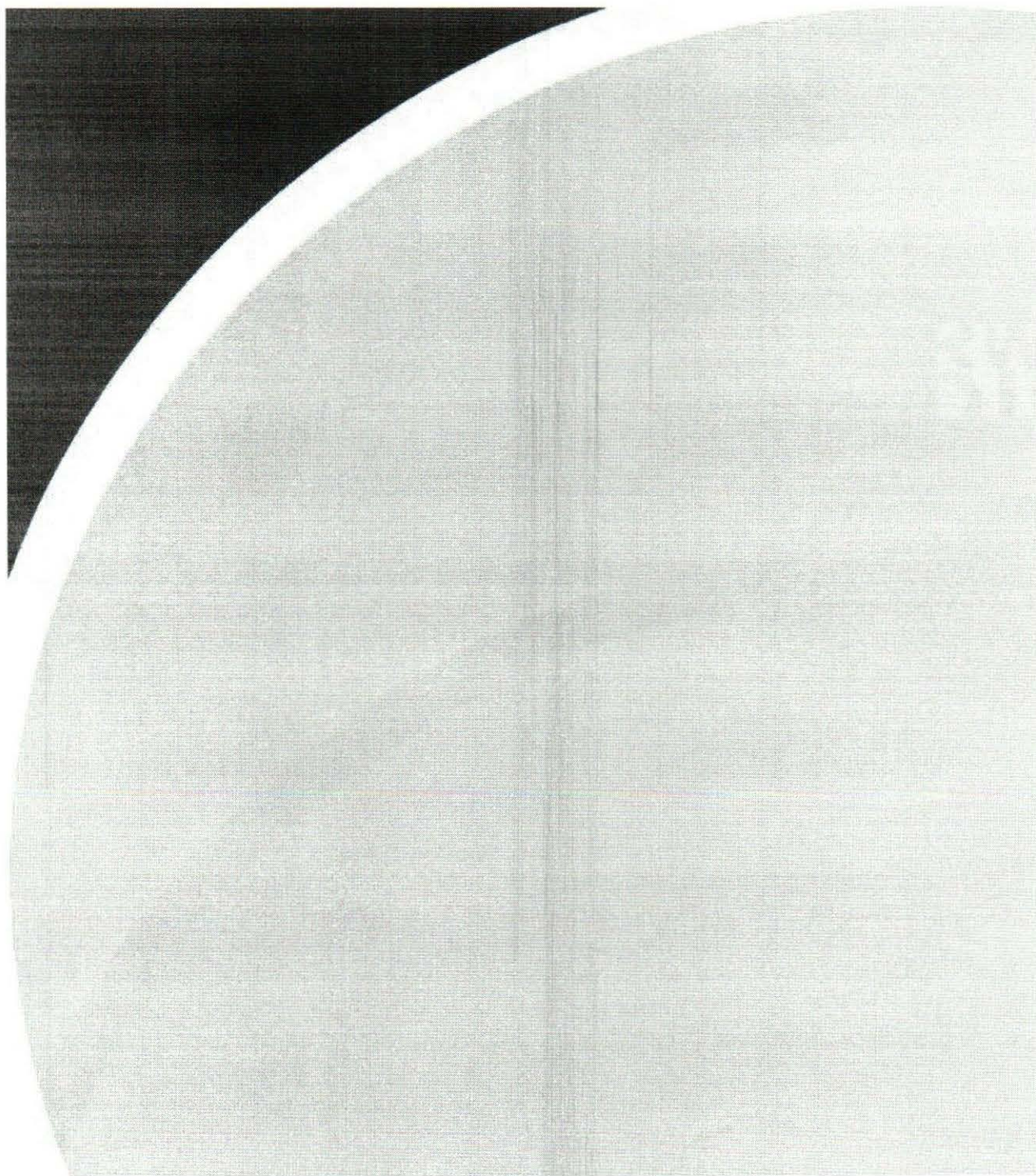


Table 1: Summary of Sampling Parameters and Methodology

Source Location	No. of Tests per Stack	Sampling Parameter	Sampling Method
RTO Inlet	3	Velocity, Temperature, and Flow Rate	U.S. EPA ^[1] Methods 1,2, and 4
	3	Oxygen / Carbon Dioxide	U.S. EPA [1] Method 3
	3	THC/Methane/NMOC	U.S. EPA [1] Method 25A
RTO Outlet	3	Velocity, Temperature, and Flow Rate	U.S. EPA ^[1] Methods 1,2, and 4
	3	Oxygen / Carbon Dioxide	U.S. EPA [1] Method 3
	3	THC/Methane/NMOC	U.S. EPA [1] Method 25A

Notes:

[1] U.S. EPA - United States Environmental Protection Agency

Table 2: Sampling Summary and Sample Log

Source and Test #	Sampling Date	Start Time	End Time
RTO Inlet			
Test #1	19-Dec-23	10:44 to 11:39	11:52 to 11:57
Test #2	19-Dec-23	12:20 PM	1:19 PM
Test #3	19-Dec-23	13:47 to 14:39	14:48 to 14:55
RTO Outlet			
Test #1	19-Dec-23	10:44 to 11:39	11:52 to 11:57
Test #2	19-Dec-23	12:20 PM	1:19 PM
Test #3	19-Dec-23	13:47 to 14:39	14:48 to 14:55

Table 3A: Sampling Summary - Flow Characteristics - RTO Inlet

Stack Gas Parameter	Unit	Test No. 1	Test No. 2	Test No. 3	Average
Testing Date		19-Dec-23	19-Dec-23	19-Dec-23	
Stack Temperature	°F	139	158	139	145
Moisture	%	53.09%	53.17%	54.71%	53.66%
Velocity	ft/s	20.1	29.2	22.1	23.8
Referenced Flow Rate	CFM	113	159	120	131

Notes:

[1] Referenced flow rate expressed as dry at 101.3 kPa, 68 °F, and Actual Oxygen

Table 3B: Sampling Summary - Flow Characteristics - RTO Outlet

Stack Gas Parameter	Unit	Test No. 1	Test No. 2	Test No. 3	Average
Testing Date		19-Dec-23	19-Dec-23	19-Dec-23	
Stack Temperature	°F	74	78	78	77
Moisture	%	2.92%	2.99%	3.51%	3.14%
Velocity	ft/s	17.0	18.1	17.9	17.7
Referenced Flow Rate	CFM	2,976	3,143	3,084	3,068

Notes:

[1] Referenced flow rate expressed as dry at 101.3 kPa, 68 °F, and Actual Oxygen

Table 4: Pentane EMISSIONS TABLE - US EPA Method 18

Source: Michigan Foam RTO

RWDI Project # 2401306

Parameter	Test 1	Test 2	Test 3	Average
Date	19-Dec-23	19-Dec-23	19-Dec-23	--
Start Time:	10:44 to 11:39	12:20	13:47 to 14:39	--
Stop Time:	11:52 to 11:57	13:19	14:48 to 14:55	--
Duration (mins):	60	60	60	--
Inlet RTO THC Concentration (as Pentane) (ppm_d):				
	32727.0	8608.0	6314.0	15883.0
Inlet RTO THC Concentration (as Pentane) (mg/m³_d):				
	98141.6	25813.6	18934.4	47629.9
Inlet RTO THC Concentration (as pentane) (lb/hr_d):				
	41.7	15.4	8.5	21.9
Inlet RTO Flow Rate (dscfm):				
	113	159	120	131
Inlet RTO Flow Rate (dm³/s):				
	0.05	0.08	0.06	0.06
Moisture (%):				
	53.1%	53.2%	54.7%	53.7%
Outlet Flow Rate (dscfm):				
	2,976	3,143	3,084	3,068
Outlet Flow Rate (dm³/s):				
	1.40	1.48	1.45	1.44
Moisture:				
	2.9%	3.0%	3.5%	3.1%
Outlet THC Concentration (as pentane) (ppm_d):				
	638.00	306.00	265.00	403.00
Outlet THC Concentration (as pentane) (mg/m³_d):				
	1913.23	917.63	794.68	1208.51
Outlet THC Concentration (as propane) (lb/hr_d):				
	21.24	10.77	9.14	13.72
Destruction Efficiency (THC) (%):				
	49.0%	30.2%	-7.0%	24.1%

Note: "d" indicated based on dry conditions

Table 5: THC EMISSIONS TABLE

Source: Michigan Foam RTO

RWDI Project # 2401306

Parameter	Test 1	Test 2	Test 3	Average
Date	19-Dec-23	19-Dec-23	19-Dec-23	--
Start Time:	10:44 to 11:39	12:20	13:47 to 14:39	--
Stop Time:	11:52 to 11:57	13:19	14:48 to 14:55	--
Duration (mins):	60	60	60	--
Inlet RTO THC Concentration Diluted (as propane) (ppm _w):	392.6	239.7	173.2	268.5
Inlet RTO THC Concentration Undiluted (as propane) (ppm _w):	39263.6	23966.4	17321.1	26850.4
Inlet RTO THC Concentration (as propane) (ppm _d):	83699.9	51177.4	38244.9	57707.4
Inlet RTO THC Concentration (as Carbon) (ppm _d):	251099.8	153532.3	114734.8	173122.3
Inlet RTO THC Concentration (as Pentane) (ppm _d):	50220.0	30706.5	22947.0	34624.5
Inlet RTO THC Concentration (as Pentane) (mg/m ³ _d):	150599.4	92082.4	68813.2	103831.6
Inlet RTO THC Concentration (as pentane) (lb/hr _d):	64.0	55.0	31.0	50.0
Inlet RTO Flow Rate (dscfm):	113	159	120	131
Inlet RTO Flow Rate (dm ³ /s):	0.05	0.08	0.06	0.06
Moisture (%):	53.1%	53.2%	54.7%	53.7%
Outlet Flow Rate (dscfm):	2,976	3,143	3,084	3,068
Outlet Flow Rate (dm ³ /s):	1.40	1.48	1.45	1.44
Moisture:	2.9%	3.0%	3.5%	3.1%
Outlet THC Concentration (as propane) (ppm _w):	1076.58	658.75	549.51	761.61
Outlet THC Concentration (as propane) (ppm _d):	1108.96	679.05	569.50	785.84
Outlet THC Concentration (as carbon) (ppm _d):	3326.89	2037.15	1708.51	2357.52
Outlet THC Concentration (as pentane) (ppm _d):	665.38	407.43	341.70	471.50
Outlet THC Concentration (as pentane) (mg/m ³ _d):	1995.33	1221.80	1024.69	1413.94
Outlet THC Concentration (as propane) (lb/hr _d):	22.16	14.34	11.78	16.09
Destruction Efficiency (THC) (%):	65.4%	73.9%	62.0%	67.1%

Note: "d" indicated based on dry conditions

FIGURES

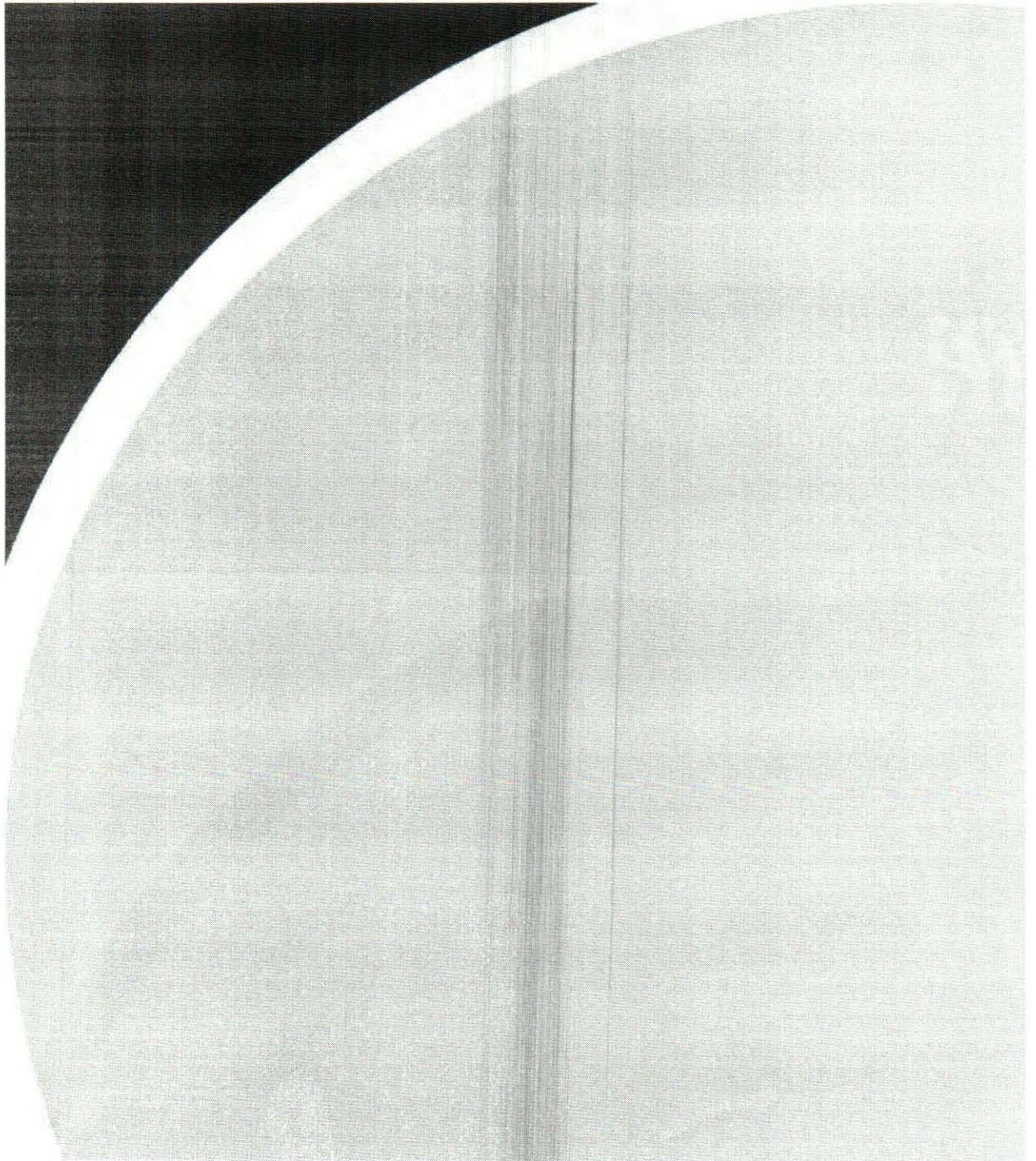
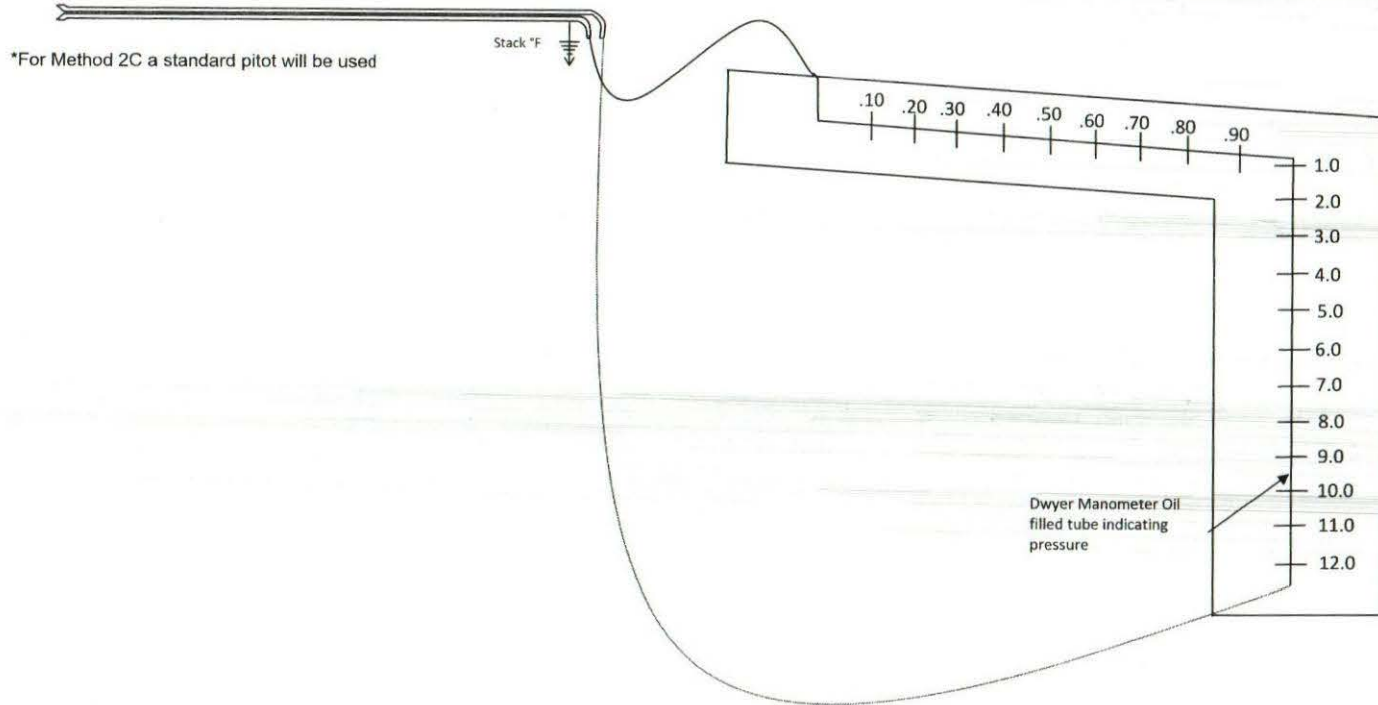




Figure No. #1: Schematic of USEPA Method 2 or 2C



USEPA Method 2 and 2C

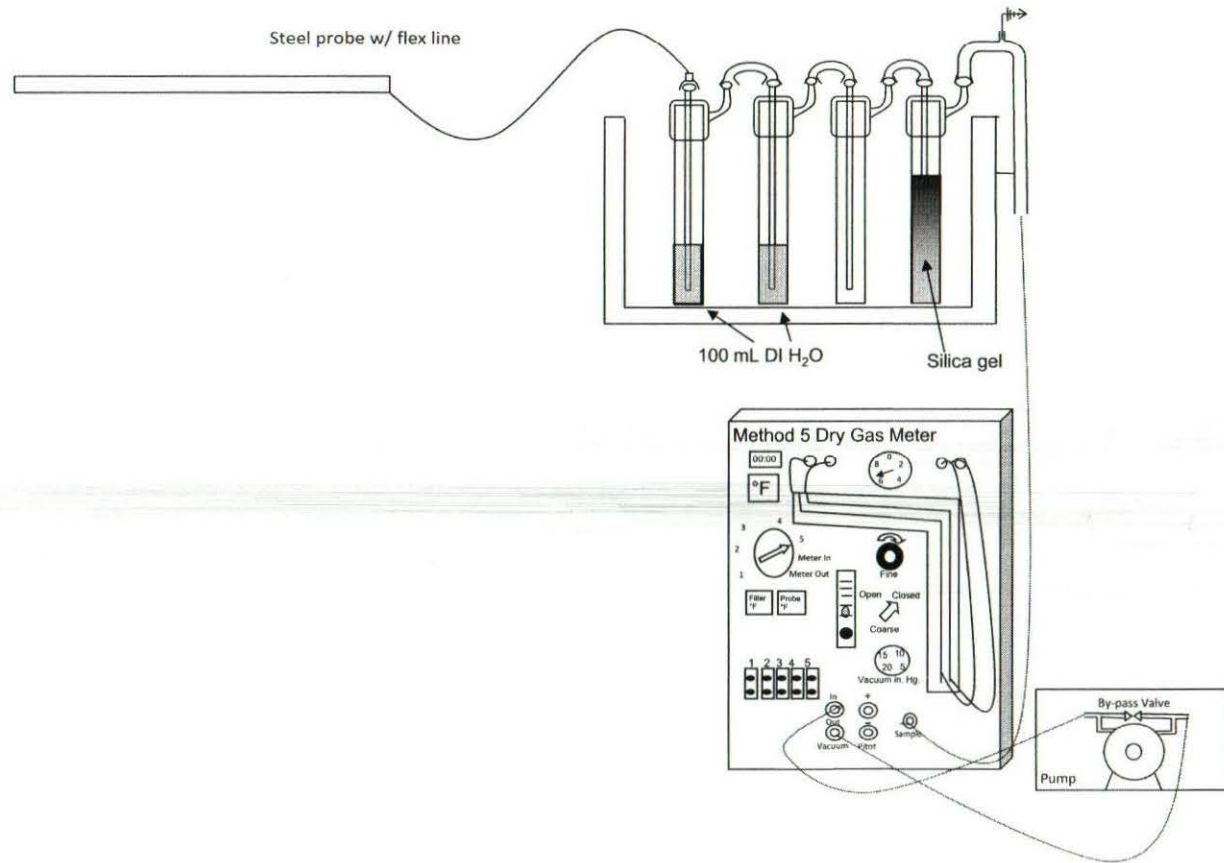
Michigan Foam
Grand Rapids, Michigan
RTO

19-Dec-23





Figure No. 2: Schematic of US EPA Method 4



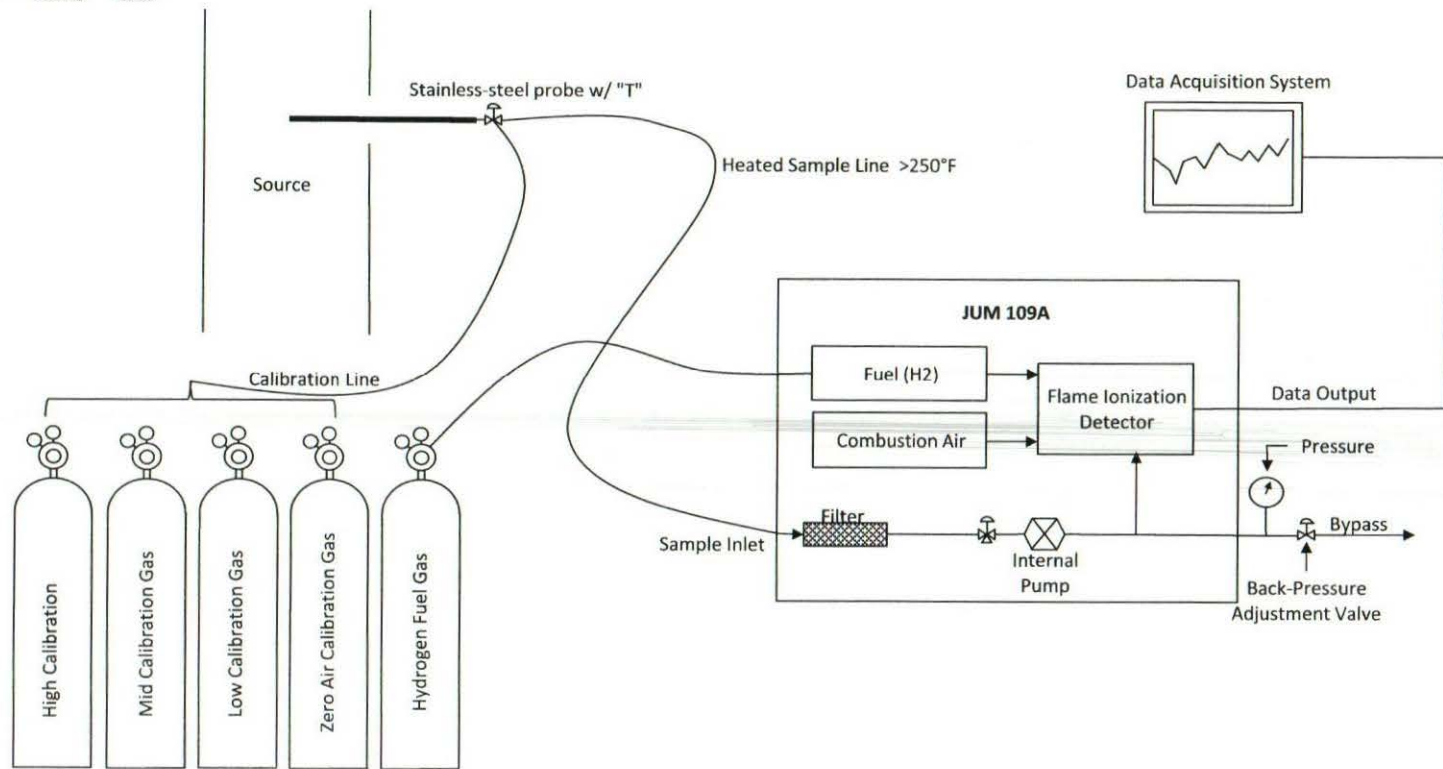
USEPA Method 4
Michigan Foam
Grand Rapids, Michigan
RTO

19-Dec-23





Figure No. 3: USEPA Method 25A Schematic



USEPA Method 25A

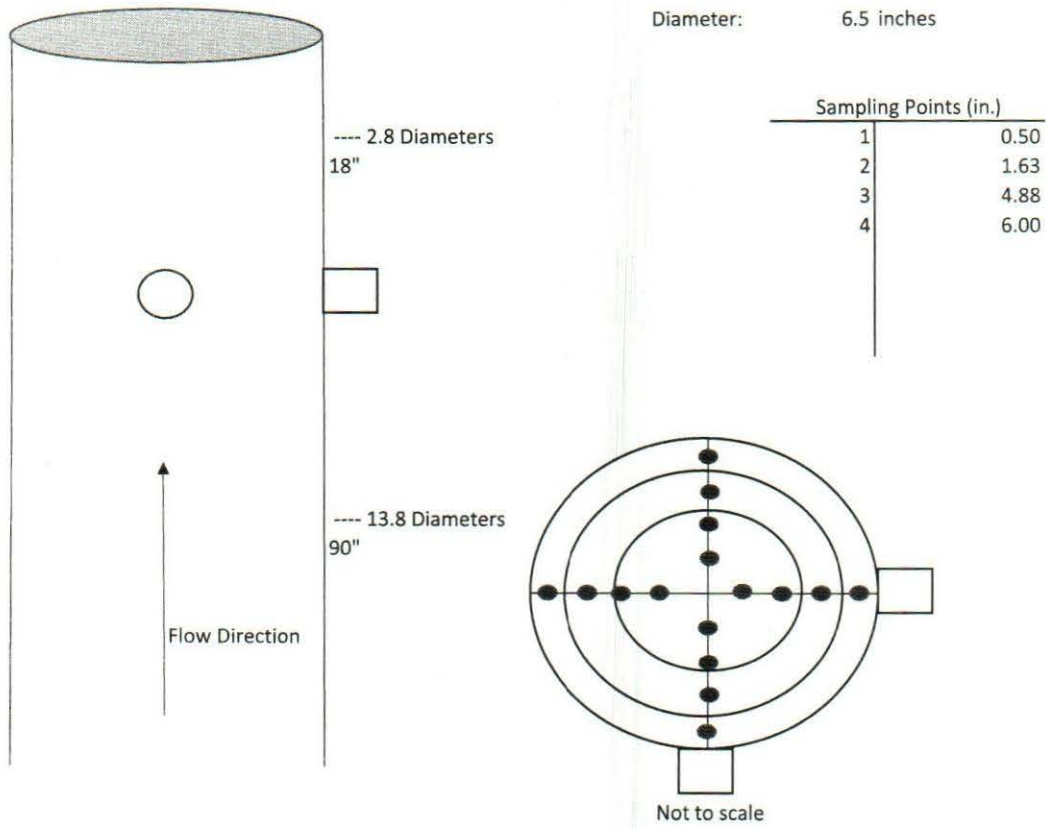
Michigan Foam
Grand Rapids, Michigan
RTO

19-Dec-23





Figure No. 4: RTO Inlet

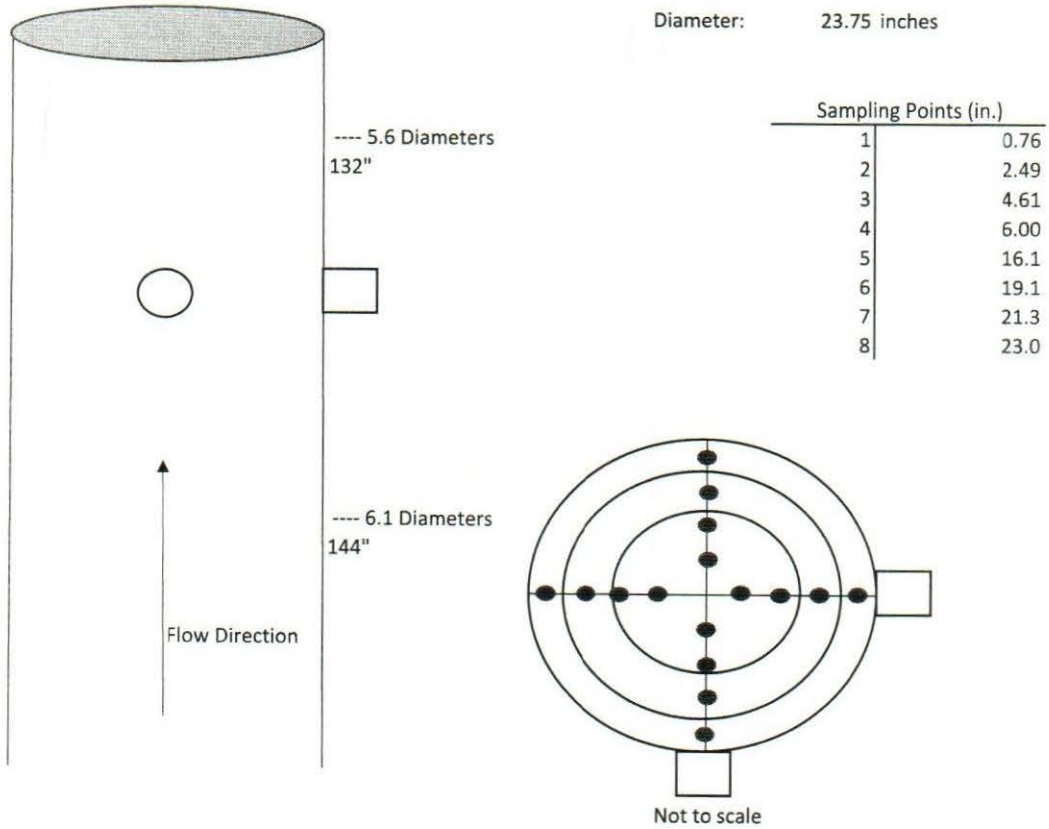


RTO Inlet
Michigan Foam
Grand Rapids, Michigan

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309



Figure No. 5: RTO Outlet



RTO Outlet
Michigan Foam
Grand Rapids, Michigan

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309