

FINAL REPORT



FORD MOTOR COMPANY

DEARBORN, MICHIGAN

DEARBORN TRUCK PLANT (DTP): PARTICULATE MATTER TESTING REPORT

RWDI #2300810

January 13, 2023

SUBMITTED TO

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Ford Motor Company
Dearborn Truck Plant
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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by Ford Motor Company (Ford) to complete the emission sampling program at their Dearborn Truck Plant (DTP) located 3001 Miller Road, Dearborn, Michigan. DTP operates an automobile assembly plant which produces the F-150. Testing was executed as required by Permit to Install A8648-2022 and MI-ROP-A8 following the test plan attached in **Appendix F**.

The approved Source Testing Plan covered the following eight (8) sources:

- Prime Interior Robots (Stack 20)
- Clearcoat Observation (Stack 47)
- Clearcoat Cut-in Robots E1 (Stack 42)
- Clearcoat Cut-in Robots E2 (Stack 45)
- Basecoat Robots E1 (Stack 28)
- Basecoat Robots E2 (Stack 27)
- Carbon Wheel
- RTO

As discussed with EGLE, the Scuff Booth source was not in operation during testing.

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**DEARBORN TRUCK PLANT: COMPLIANCE REPORT
FORD MOTOR COMPANY**



RWDI#2300810
January 13, 2023

Table i: Average Emission Data – Particulate Testing

Source	Parameter	Emission Rate
		Average
Prime Interior Robots – Stack 20	PM (lb/hr)	0.80
	PM (lb/1,000 lbs wet)	0.0030
	PM (gr/dscf)	1.58x10 ⁻³
	PM (gr/1000 dscf)	1.58
	PM (lb/vehicle)	0.0110
Clearcoat Observation – Stack 47	PM (lb/hr)	0.13
	PM (lb/1,000 lbs wet)	0.00075
	PM (gr/dscf)	3.94x10 ⁻⁴
	PM (gr/1000 dscf)	0.39
	PM (lb/vehicle)	0.0044
Clearcoat Cut-in Robots – E1 – Stack 42	PM (lb/hr)	0.20
	PM (lb/1,000 lbs wet)	0.0007
	PM (gr/dscf)	3.80x10 ⁻⁴
	PM (gr/1000 dscf)	0.38
	PM (lb/vehicle)	0.0058
Clearcoat Cut-in Robots – E2 – Stack 45	PM (lb/hr)	0.82
	PM (lb/1,000 lbs wet)	0.002
	PM (gr/dscf)	1.22x10 ⁻³
	PM (gr/1000 dscf)	1.22
	PM (lb/vehicle)	0.0320
Basecoat Robots – E1 – Stack 28	PM (lb/hr)	0.31
	PM (lb/1,000 lbs wet)	0.0022
	PM (gr/dscf)	1.17x10 ⁻³
	PM (gr/1000 dscf)	1.17
	PM (lb/vehicle)	0.0091
Basecoat Robots – E2 – Stack 27	PM (lb/hr)	0.25
	PM (lb/1,000 lbs wet)	0.0020
	PM (gr/dscf)	1.04x10 ⁻³
	PM (gr/1000 dscf)	1.04
	PM (lb/vehicle)	0.0013
Carbon Wheel	PM (lb/hr)	0.21
	PM (lb/1,000 lbs wet)	0.0008
	PM (gr/dscf)	4.15x10 ⁻⁴
	PM (gr/1000 dscf)	0.42
	PM (lb/vehicle)	0.0018

**DEARBORN TRUCK PLANT: COMPLIANCE REPORT
FORD MOTOR COMPANY**

RWDI#2300810
January 13, 2023



Source	Parameter	Emission Rate
		Average
RTO	PM (lb/hr)	0.75
	PM (lb/1,000 lbs wet)	0.0032
	PM (gr/dscf)	1.69×10^{-3}
	PM (gr/1000 dscf)	1.69
	PM (lb/vehicle)	0.0065



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- Appendix D:** Example Calculations
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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by Ford Motor Company (Ford) to complete the emission sampling program at their Dearborn Truck Plant (DTP) located 3001 Miller Road, Dearborn, Michigan. DTP operates an automobile assembly plant which produces the F-150. Testing was executed as required by Permit to Install A8648-2022 and MI-ROP-A8. A copy of the Source Testing Plan and State of Michigan Department of Environment, Great Lakes and Energy (EGLE) correspondence is provided in **Appendix F**.

The approved Source Testing Plan covered the following eight (8) sources:

- Prime Interior Robots (Stack 20)
- Clearcoat Observation (Stack 47)
- Clearcoat Cut-in Robots E1 (Stack 42)
- Clearcoat Cut-in Robots E2 (Stack 45)
- Basecoat Robots E1 (Stack 28)
- Basecoat Robots E2 (Stack 27)
- RTO
- Carbon Wheel

As discussed with EGLE, the Scuff Booth source was not in operation during testing.

1.1 Location and Dates of Testing

The test program was completed the week of November 14th and November 21st, 2022. Testing was completed on November 22nd, 2022.

1.2 Purpose of Testing

The testing was conducted to verify compliance with Permit to Install A8648-2022 and MI-ROP-A8.

1.3 Description of Source

FG-CONTROLS – Two zeolite concentrators followed by a thermal oxidizer for control of VOC emissions from the EU-ECOAT dip tank, EU-GUIDECOAT booth automatic sections, and EU-TOPCOAT clearcoat automatic sections; and regenerative thermal oxidizer (RTO) for control of VOC emissions from the EU-ECOAT curing oven, EU-GUIDECOAT oven, and EU-TOPCOAT ovens. (**Sources Carbon Wheel and RTO**)



2 SUMMARY OF RESULTS

2.1 Operating Data

Ford personnel made sure the sources were operating correctly and production was at acceptable capacity.

2.2 Applicable Permit Number

A8648-2022 and MI-ROP-A8

3 SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

See 1.3 for further description of the process.

3.2 Process Flow Sheet or Diagram (if applicable)

A process flowsheet can be obtained upon request.

3.3 Type and Quantity of Raw and Finished Materials

Top/basecoat color paints, protective coatings, and electro deposition primer.

3.4 Normal Rated Capacity of Process

The plant operates at a maximum of 60 jobs per hour.

3.5 Process Instrumentation Monitored During the Test

For the RTO and Zeolite Carbon Wheel, the temperature set-point and actual temperatures were recorded for each test. For all sources, production counts processed during each test are included. This process data can be found in **Appendix A**.



4.1.3 USEPA Method 3 – “Gas Analysis for the Determination of Dry Molecular Weight”

USEPA Method 3 is used for the determination of CO₂ and O₂ concentrations and dry molecular weight of a sample of effluent gas stream of a fossil-fuel combustion process or other process. A Fyrite analyzer was used in the analysis by introducing sample gas to each the CO₂ and O₂ during each test. Each Fyrite has a specific indicating chemical for either CO₂ or O₂ and introducing sample gas creates a reaction which indicates the percentage of the respected gas. Sample gas is introduced to the Fyrite using a one-way squeeze bulb, and then mixed multiple times with the specified chemical. The results are then used to calculate the dry molecular weight of the sample gas.

4.1.4 USEPA Method 4 – “Determination of Moisture Content in Stack Gases”

USEPA Method 4 is used to determine the moisture content of stack gas. Moisture is determined via direct condensation. In the case of determining moisture content during an isokinetic test, a gas sample is drawn through a probe and filter, then through a series of impingers (impinger type and contents vary depending on the isokinetic method) and dropped to a temperature below 68° Fahrenheit to ensure all moisture is removed from the sample. The impingers are analyzed gravimetrically pre and post test to determine total moisture gain. Moisture content is then calculated based on moisture gain and total sample volume passed through the impingers.

4.1.5 USEPA Method 5/202 – “Sampling for Particulate Matter and Condensable Particulate Matter”

Particulate matter (PM) was sampled following procedures outlined in USEPA Method 5 with an unheated probe and filter to keep stack temperatures under 85°F. The sample is drawn from the stack isokinetically. Following each test, a leak check was performed, and the samples were recovered following USEPA Method 5. USEPA Method 202 was only used if the filter temperature exceeded 85°F, which was only on the RTO.

4.2 Description of Recovery and Analytical Procedures

Recoveries followed USEPA Method 5 and 202 for applicable sources.



5 TEST RESULTS AND DISCUSSION

5.1 Detailed Results

Table 5.1.1: Table of Results

Source	Parameter	Emission Rate
		Average
Prime Interior Robots – Stack 20	PM (lb/hr)	0.80
	PM (lb/1,000 lbs wet)	0.0030
	PM (gr/dscf)	1.58x10 ⁻³
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	PM (lb/vehicle)	0.0058
Clearcoat Cut-in Robots – E2 – Stack 45	PM (lb/hr)	0.82
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Basecoat Robots – E2 – Stack 27	PM (lb/hr)	0.25
	PM (lb/1,000 lbs wet)	0.0020
	PM (gr/dscf)	1.04x10 ⁻³
	PM (gr/1000 dscf)	1.04
	PM (lb/vehicle)	0.0013



5.7 Calibration Sheets

Calibration sheets can be found in **Appendix C**.

5.8 Sample Calculations

Sample calculations can be found in **Appendix D**.

5.9 Field Data Sheets

Field data sheets can be found in **Appendix B**.

5.10 Laboratory Data

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

TABLE

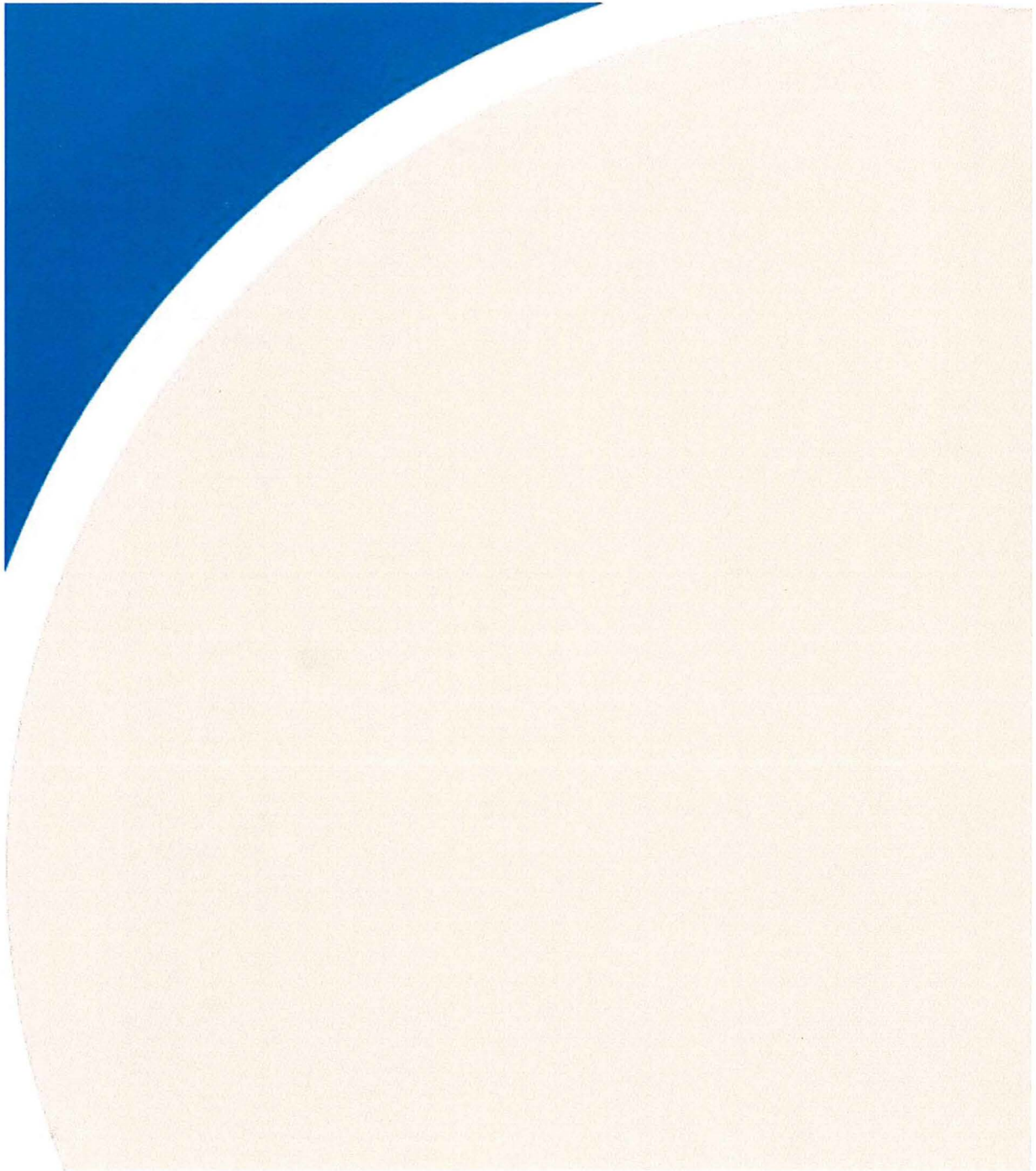


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FIGURES

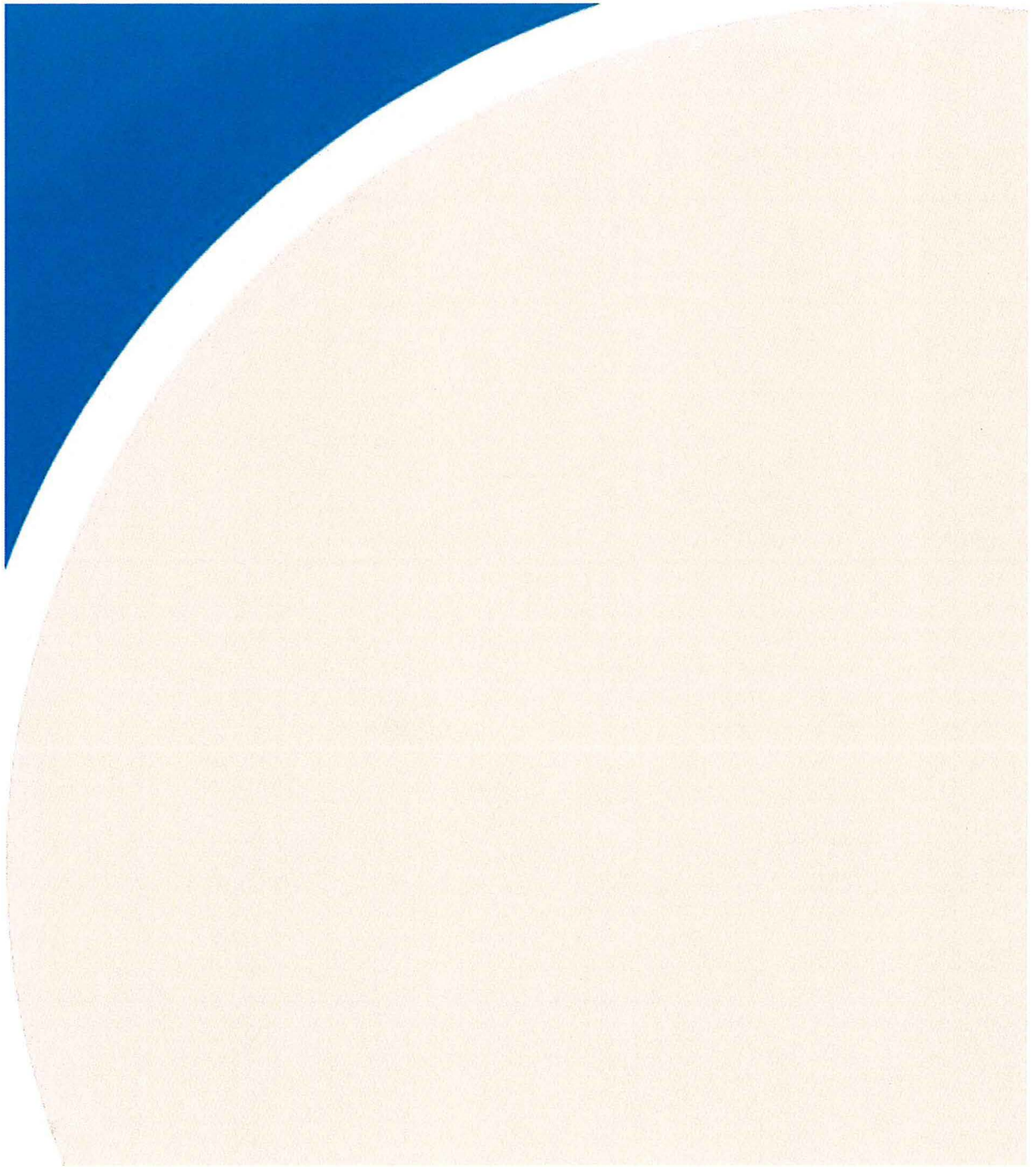




Figure No. 1

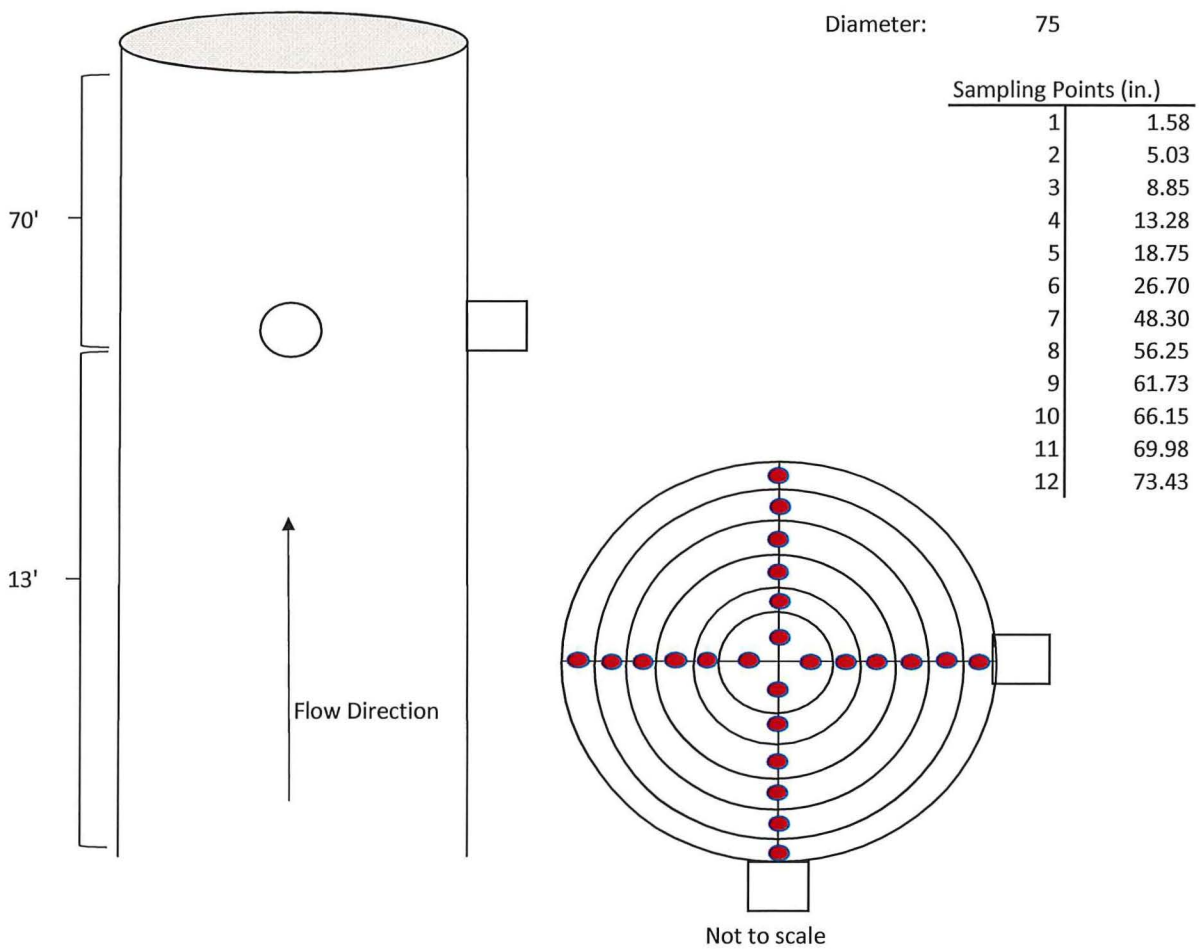




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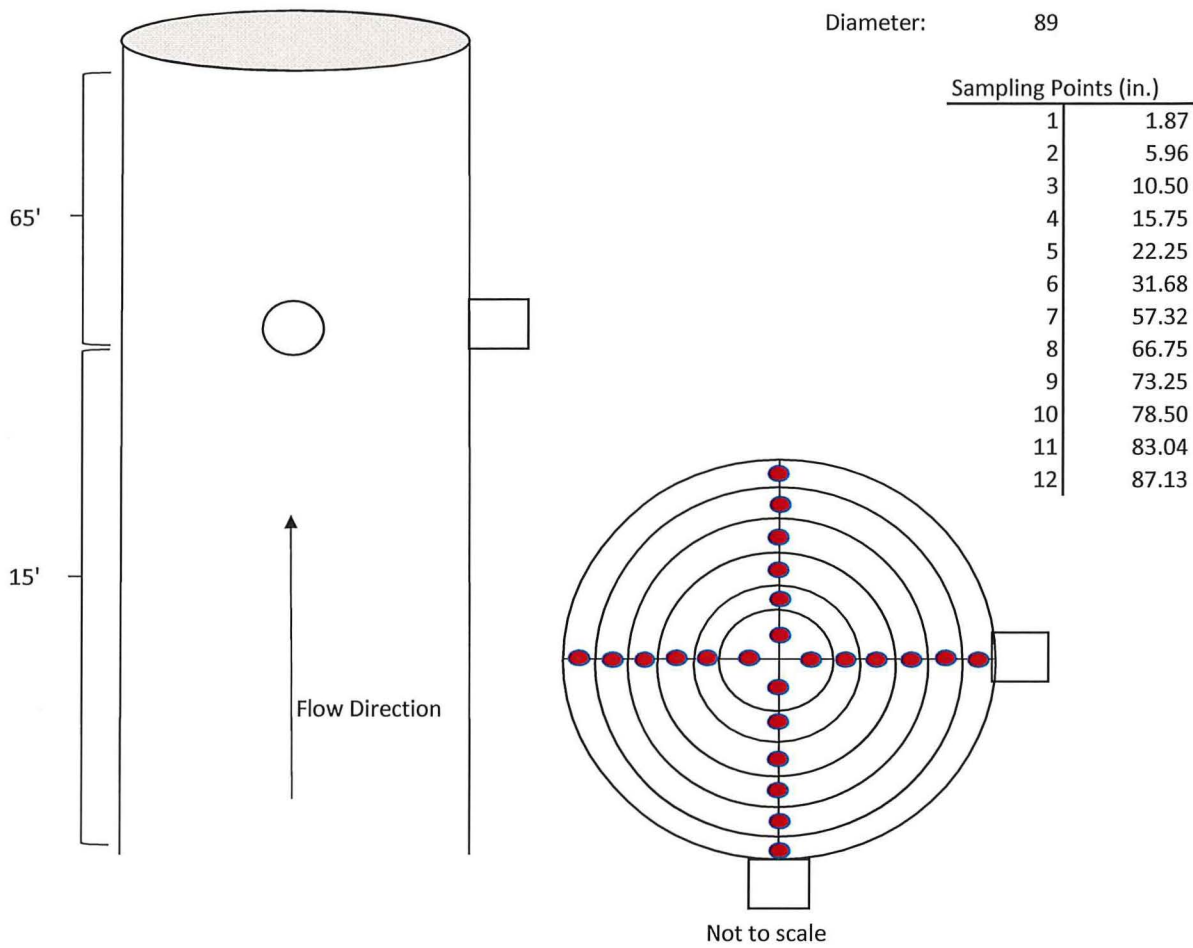




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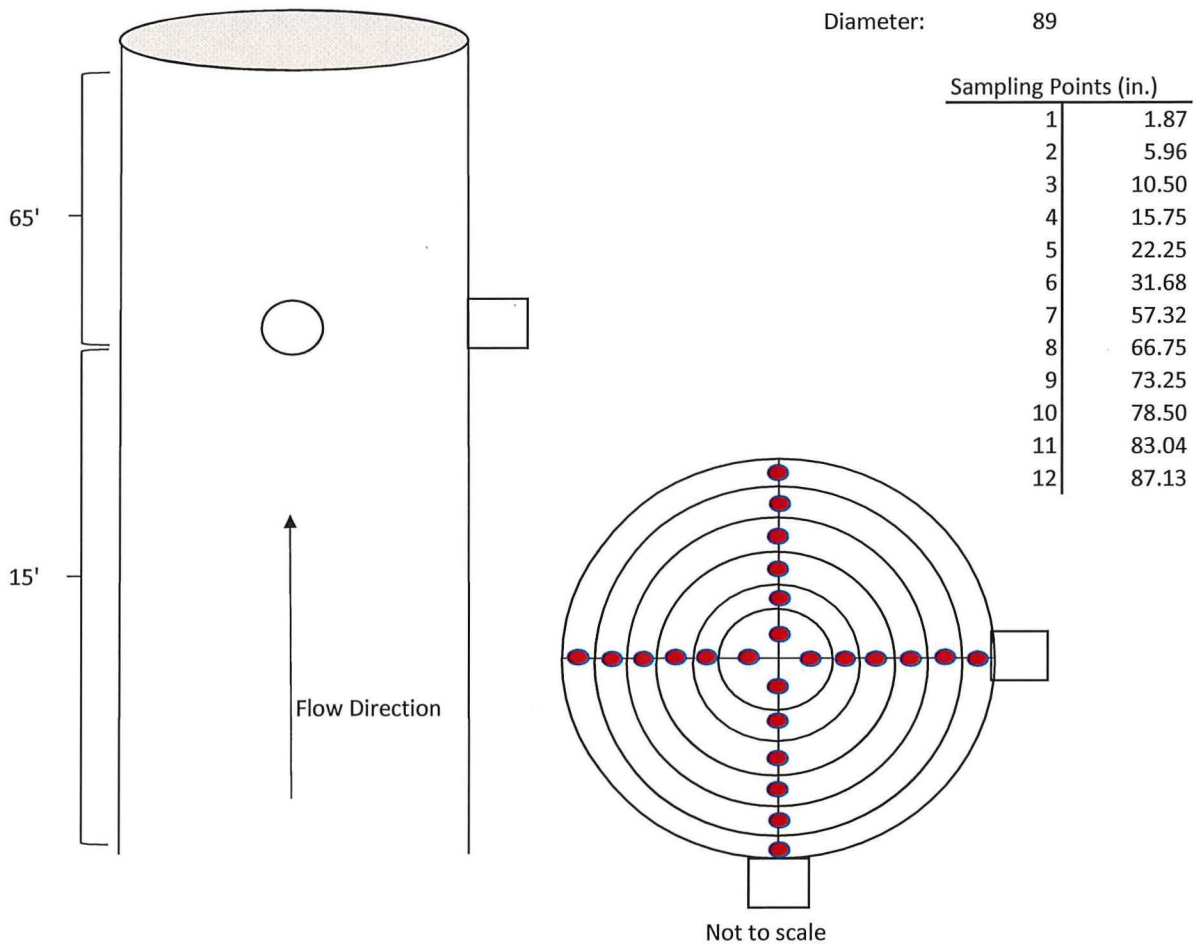
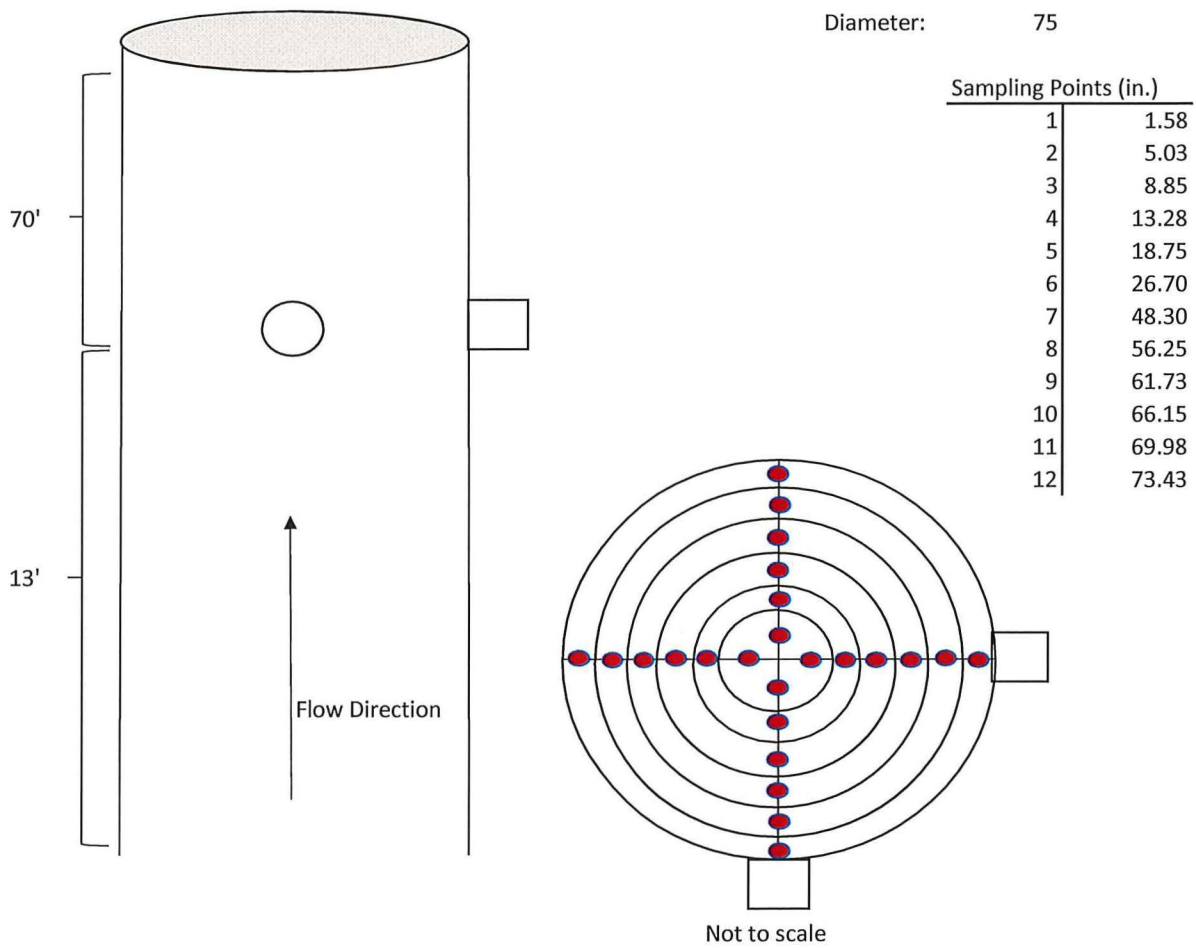




Figure No. 5



Basecoat E1 - 28
Ford Motor Company
Dearborn Truck Plant
Dearborn, Michigan

Date:
Week of November 14, 2022

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309



Figure No. 6

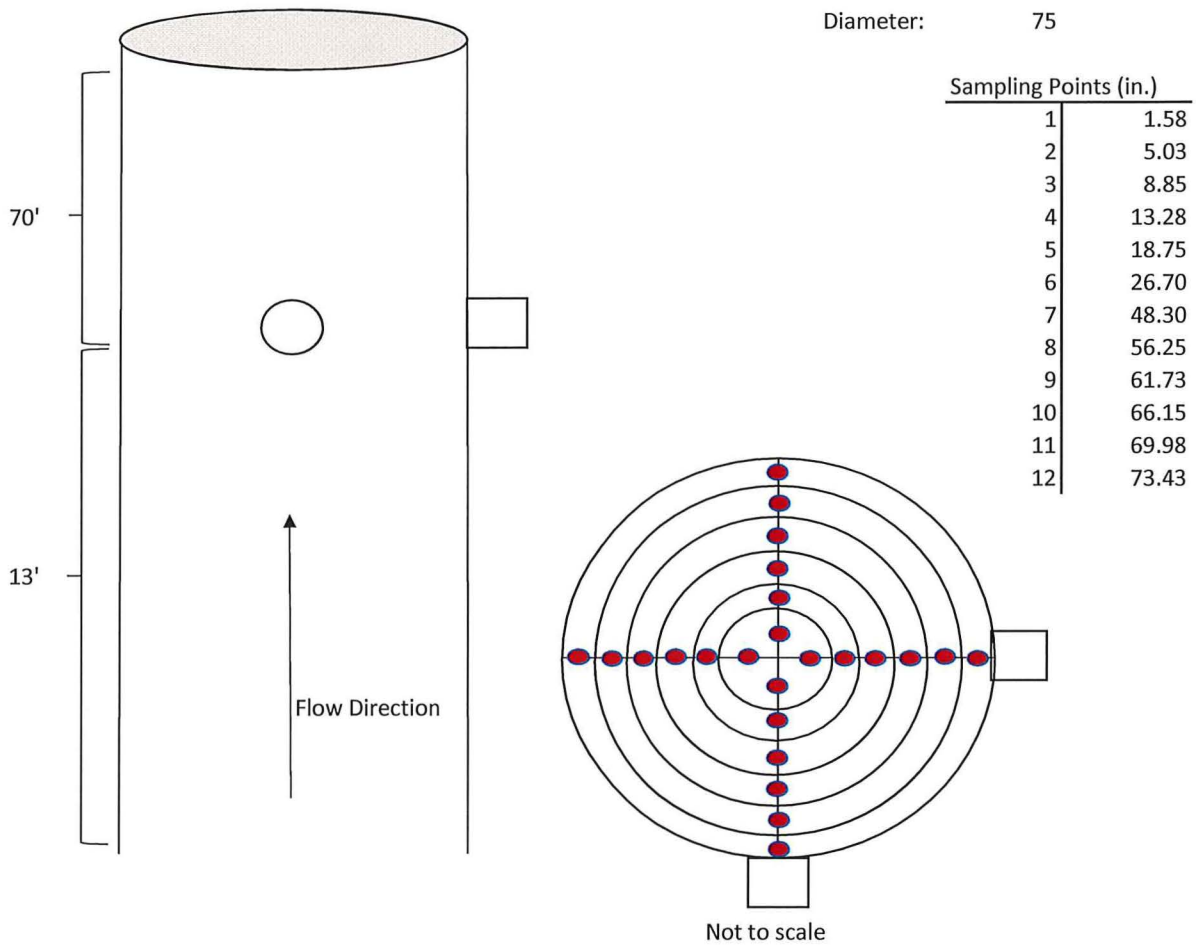
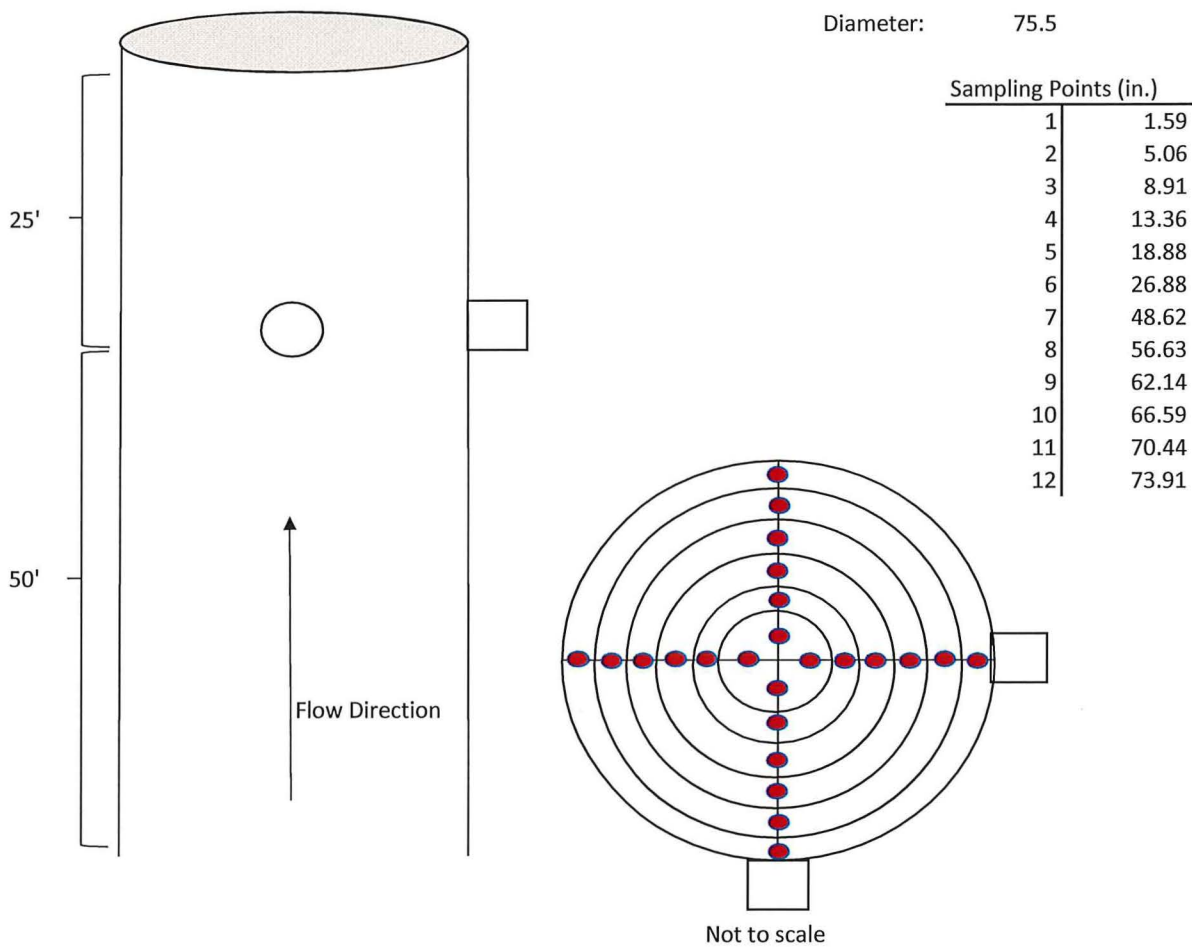




Figure No. 7



Carbon Wheel
Ford Motor Company
Dearborn Truck Plant
Dearborn, Michigan

Date:
Week of November 14, 2022

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309

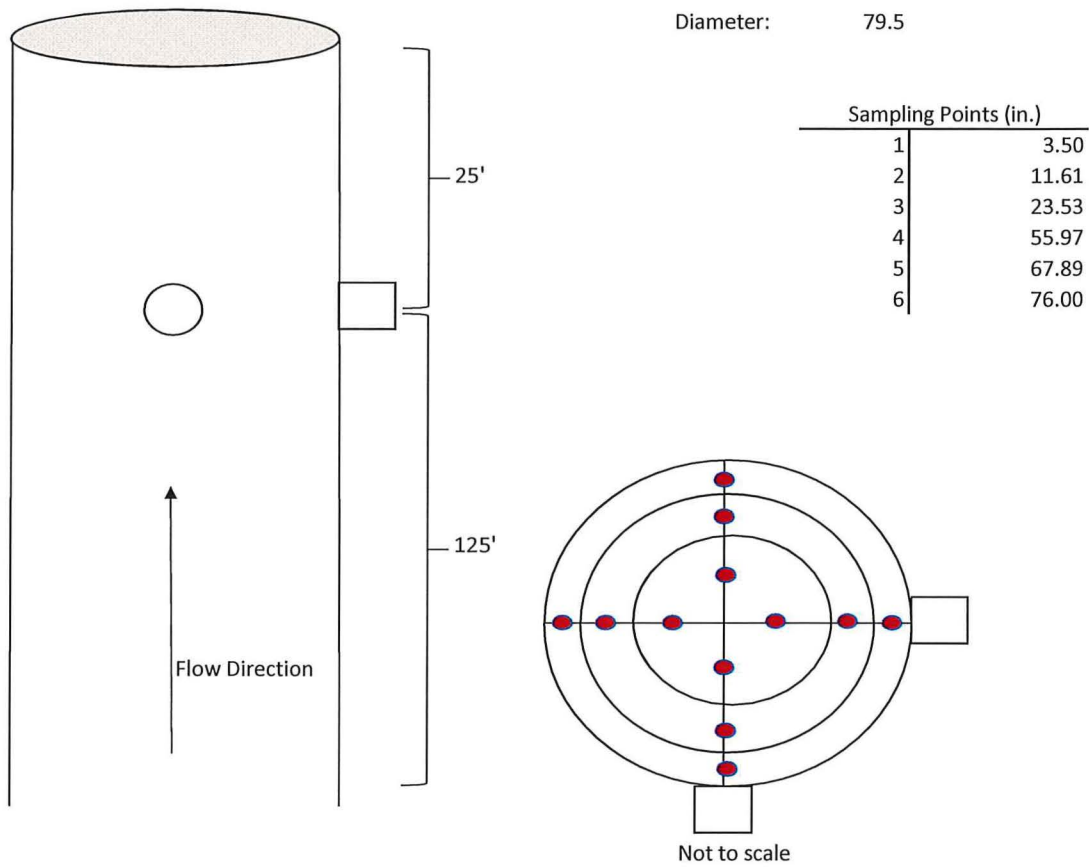
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Figure No. 8



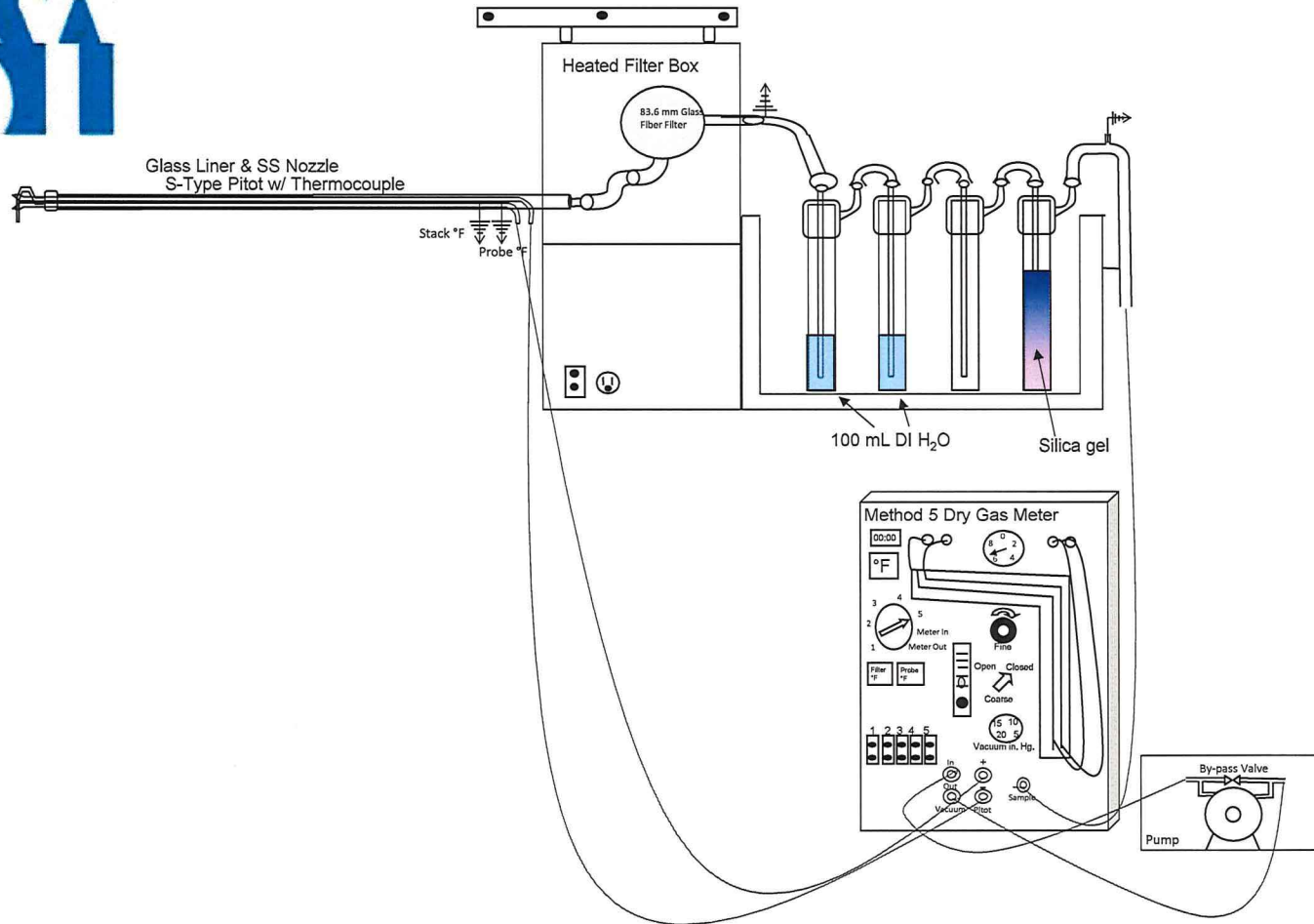
RTO
Ford Motor Company
Dearborn Truck Plant
Dearborn, Michigan

Date:
Week of November 21, 2022

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309



Figure No. 9

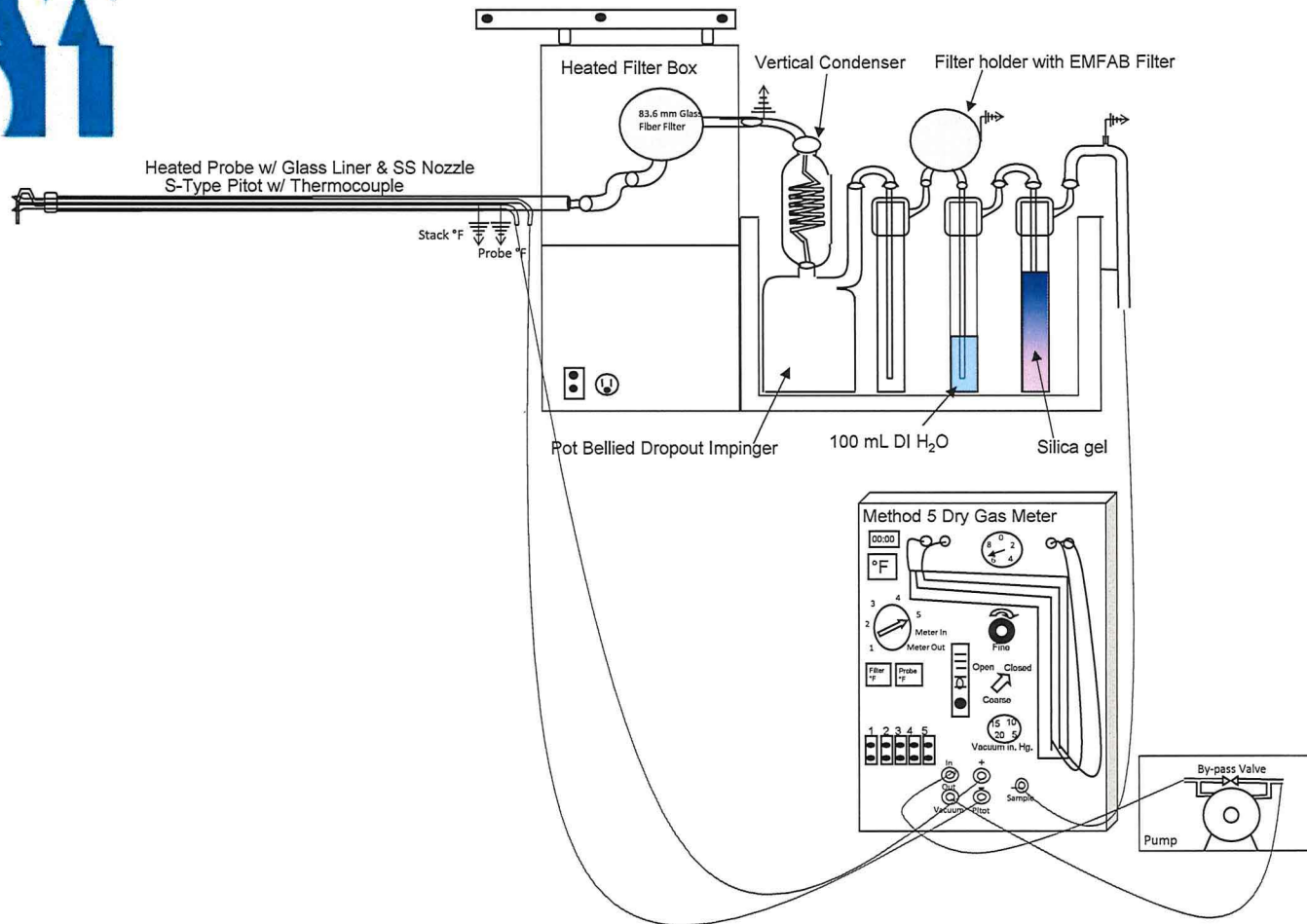


USEPA Method 5
Ford Motor Company
Dearborn Truck Plant
Dearborn, Michigan





Figure No. 10



USEPA Method 5/202

Ford Motor Company
Dearborn Truck Plant
Dearborn, Michigan

