

FINAL REPORT



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FCA US LLC

WARREN, MICHIGAN

**WARREN TRUCK ASSEMBLY PLANT (WTAP) - WEST PAINT SHOP:
RE-TEST SOURCE TESTING PROGRAM PARTICULATE MATTER
FOR CONCENTRATOR, TUTONE OBSERVATION, AND BASECOAT
OBSERVATION**

RWDI #2205370

August 17, 2022

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FCA US LLC
RWDI#2205370
August 17, 2022



EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Warren Truck Assembly Plant (WTAP) located at 21500 Mound Road, Warren, Michigan. The Source Testing Program focused on the West Paint Shop (WPS). WTAP WPS operates an automobile assembly plant that produces the Jeep Wagoneer. Per Permit to Install (PTI) 13-19B, this Source Testing Program covered the required testing of the following three (3) sources:

- EUPRIMERWEST - PM/PM₁₀/PM_{2.5} emissions from EUPRIMERWEST observation zone. Testing was completed on source SVPRMOBSWEST.
- EUTOPCOATWEST - PM/PM₁₀/PM_{2.5} emissions from Basecoat observation zone. Testing was completed on source SVBCOBSWEST (Basecoat).
- EUTOPCOATWEST - PM emissions from sources SVBTHCONCWEST. Testing was completed on the Concentrator exhaust.

This testing was completed on June 20th-21st, 2022 and was a retest from the testing conducted during the weeks of February 14th and 21st, 2022. FCA conducted equipment maintenance on the noted sources and re-tested to determine the reduction of PM/PM₁₀/PM_{2.5} emissions. The original report was submitted to EGLE on April 22, 2022.

WTAP recorded the production rate of vehicles processed during each particulate test from each of the sources. Testing was successfully completed while all process equipment was operating under normal operating conditions.

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A summary of the results can be found in the **Tables** section of this report.

Table i: Average Emission Data – Particulate Testing (PM/PM₁₀/PM_{2.5})

Source	Parameter	Emission Rate			
		Run 1	Run 2	Run 3	Average
SVPRMOBSWEST (Tutone Observation)	PM	0.0016 lb/1000 lb gas _(wet)	0.0016 lb/1000 lb gas _(wet)	0.0021 lb/1000 lb gas _(wet)	0.0018 lb/1000 lb gas _(wet)
	PM ₁₀	0.165 lb/hr	0.159 lb/hr	0.122 lb/hr	0.149 lb/hr
	PM _{2.5}	0.107 lb/hr	0.059 lb/hr	0.003 lb/hr	0.056 lb/hr
SVBCOBSWEST (Basecoat Observation)	PM	0.0017 lb/1000 lb gas _(wet)	0.0018 lb/1000 lb gas _(wet)	0.0013 lb/1000 lb gas _(wet)	0.0016 lb/1000 lb gas _(wet)
	PM ₁₀	0.102 lb/hr	0.092 lb/hr	0.049 lb/hr	0.081 lb/hr
	PM _{2.5}	0.062 lb/hr	0.041 lb/hr	0.008 lb/hr	0.037 lb/hr
SVBTHCONCWEST (Concentrator)	PM	0.0001 lb/1000 lb gas _(wet)	0.0001 lb/1000 lb gas _(wet)	0.0002 lb/1000 lb gas _(wet)	0.0001 lb/1000 lb gas _(wet)
	PM	0.024 lb/hr	0.024 lb/hr	0.048 lb/hr	0.032 lb/hr



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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Warren Truck Assembly Plant (WTAP) located at 21500 Mound Road, Warren, Michigan. The Source Testing Program focused on the West Paint Shop (WPS). WTAP WPS operates an automobile assembly plant that produces the Jeep Wagoneer. Per Permit to Install (PTI) 13-19B, this Source Testing Program covered the required testing of the following three (3) sources:

- EUPRIMERWEST - PM/PM₁₀/PM_{2.5} emissions from EUPRIMERWEST observation zone. Testing was completed on source SVPRMOBSWEST
- EUTOPCOATWEST - PM/PM₁₀/PM_{2.5} emissions from Basecoat observation zone. Testing was completed on source SVBCOBSWEST (Basecoat).
- EUTOPCOATWEST - PM emissions from sources SVBTHCONCWEST. Testing was completed on the Concentrator exhaust.

This testing was completed on June 20th-21st, 2022 and was a retest from the testing conducted during the weeks of February 14th and 21st, 2022. FCA conducted equipment maintenance on the noted sources and re-tested to determine the reduction of PM/PM₁₀/PM_{2.5} emissions. The original test report was submitted to EGLE on April 22, 2022.

WTAP recorded the production rate of vehicles processed during each particulate test from each of the sources. Testing was successfully completed while all process equipment was operating under normal operating conditions.

2 PROCESS DESCRIPTION

WTAP operates an automobile assembly plant that produces the Jeep Wagoneer models in the West Paint Shop and the Classic Ram 1500 series trucks in the East Paint Shop for FCA US LLC. This program focused only on the West Paint Shop. This Source Testing Program included the required compliance testing for particulate matter of the observation zones (Primer and Basecoat) and the concentrator. Additional information for process emissions can be found in **Appendix A**.



3 SAMPLING LOCATIONS AND METHODS

3.1 Sampling Location

This following table summarizes the sampling locations.

Table 3.1.1: Summary of the Stack Characteristics

Source	Parameter	Diameter	Approximate Duct Diameters from Flow Disturbance	Number of Ports	Points per Traverse	Total Points per Test	Anticipated Stack Temperature
SVPRMOBSWEST	PM/PM ₁₀ /PM _{2.5}	36"	~7 downstream and >8 upstream	2	6	12 PM/Flow	~80°F
SVBCOBSWEST	PM/PM ₁₀ /PM _{2.5}	36"	~8 downstream and >8 upstream	2	6	12 PM/Flow	~80°F
SVBTHCONCWEST	PM	68"	~3.5 downstream and >4.5 upstream	2	12	24 PM/Flow	~80°F

3.2 Test Methodology

3.2.1 Velocity, Temperature and Volumetric Flow Rate Determination

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. 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 was determined following calculations outlined in U.S. EPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight". The stack was assumed to be at ambient conditions for the determination of the dry molecular weight. Stack moisture content was determined through direct condensation and according to U.S. EPA Method 4, "Determination of Moisture Content of Stack Gases".



3.2.2 Sampling for Particulate Matter (PM, PM₁₀ and PM_{2.5})

Particulate matter (PM/PM₁₀/PM_{2.5}) was sampled following procedures outlined in U.S. EPA Method 201A and Method 5. Since the filter temperature did not exceed 85°F, Method 202 was not used for the analysis.

As stated in Method 202, *"If the gas filtration temperature exceeds 30°C (85°F) and you must measure both the filterable and condensable (material that condenses after passing through a filter) components of total primary (direct) PM emissions to the atmosphere, then you must combine the procedures in this method with the procedures in Method 201A of appendix M to this part for measuring filterable PM. However, if the gas filtration temperature never exceeds 30°C (85°F), then use of this method is not required to measure total primary PM"*.

For the observation zone exhausts (Primer and Basecoat), the tests were 120 minutes in duration using Method 201A. For the Concentrator exhaust, the tests were 240 minutes and completed following U.S. EPA Method 5. After discussions with EGLE, a water-cooled probe was used to keep the filterable temperature under 85°F during the PM testing on the concentrator source.

3.3 Quality Assurance/Quality Control Measures

Applicable quality assurance measures were implemented during the sampling program to ensure the integrity of the results. These measures included detailed documentation of field data, equipment calibrations for all measured parameters, completion of Chain of Custody forms when submitting laboratory samples, and submission of field blank samples to the laboratories.

All samplers were bench tested and calibrated in RWDI's office prior to field deployment. For each sample collected with a Method 5 sampling train, both pre- and post- leak checks were conducted by plugging the inlet and drawing a vacuum of equal to or greater than the vacuum recorded during the test. Dry gas meter reading leakage rates greater than 4 percent of the average sampling rate or 0.00057 m³/min (0.02 cfm), whichever is less, were considered unacceptable. Similar leak check procedures for pitot tube and pressure lines were also conducted. Daily temperature sensor audits were completed by noting the ambient temperature, as measured by a reference thermometer, and comparing these values to those obtained from the stack sensor. Leak checks for each test were documented on the field data sheets presented in the applicable appendices for each sample parameter.

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4 RESULTS

The average emission results are presented in this section of this report. **Table 1** presents a summary of the parameters and methodology used in this sampling program. Detailed information regarding each particulate test can be found in **Appendices B through E**.

Laboratory results are included in **Appendix F**. All calibration information for the equipment used for this study is included in **Appendix G**. Sample calculations are included in **Appendix H**. Production data is summarized in **Appendix I**.

4.1 Discussion of Results

Sampling was completed from Jun 20th-21st, 2022. PM/PM₁₀/PM_{2.5} was measured (U.S. EPA Method 201A and Method 5). The results have been summarized below in **Table 4.1.1 and 4.1.2**. Concentrations were corrected to reference conditions of 68 °F, and 29.92 in.Hg. Operating conditions during the sampling were monitored by FCA personnel. All equipment was operated under normal representative operating conditions.

Table 4.1.1: Average Emission Data – Particulate Testing (PM/PM₁₀/PM_{2.5})

Source	Parameter	Emission Rate			
		Run 1	Run 2	Run 3	Average
SVPRMOBSWEST (Tutone Observation)	PM	0.0016 lb/1000 lb gas _(wet)	0.0016 lb/1000 lb gas _(wet)	0.0021 lb/1000 lb gas _(wet)	0.0018 lb/1000 lb gas _(wet)
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SVBCOBSWEST (Basecoat Observation)	PM	0.0017 lb/1000 lb gas _(wet)	0.0018 lb/1000 lb gas _(wet)	0.0013 lb/1000 lb gas _(wet)	0.0016 lb/1000 lb gas _(wet)
	PM ₁₀	0.102 lb/hr	0.092 lb/hr	0.049 lb/hr	0.081 lb/hr
	PM _{2.5}	0.062 lb/hr	0.041 lb/hr	0.008 lb/hr	0.037 lb/hr
SVBTHCONCWEST (Concentrator)	PM	0.00008 lb/1000 lb gas _(wet)	0.000008 lb/1000 lb gas _(wet)	0.00016 lb/1000 lb gas _(wet)	0.00010 lb/1000 lb gas _(wet)
	PM	0.024 lb/hr	0.024 lb/hr	0.048 lb/hr	0.032 lb/hr



5 OPERATING CONDITIONS

Operating conditions during sampling were monitored by WTAP personnel. Contact was maintained between the operator and the sampling team. A member of the RWDI sampling team contacted the operator before each test, to ensure that the process was at normal representative operating conditions.

6 CONCLUSIONS

Testing was successfully completed from June 20th-21st, 2022. All parameters were tested in accordance with referenced methodologies.

FIGURES

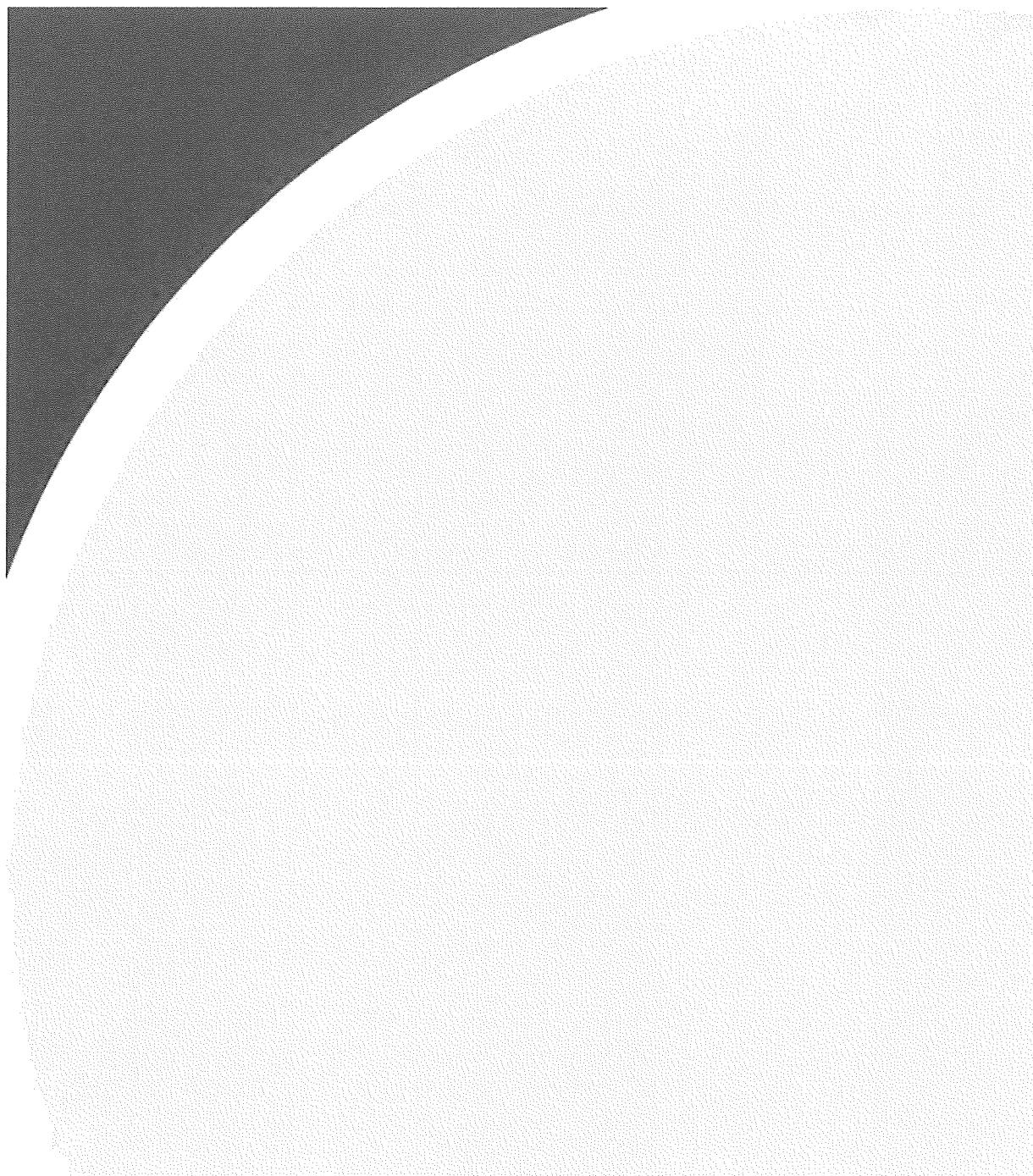


Figure No. 1

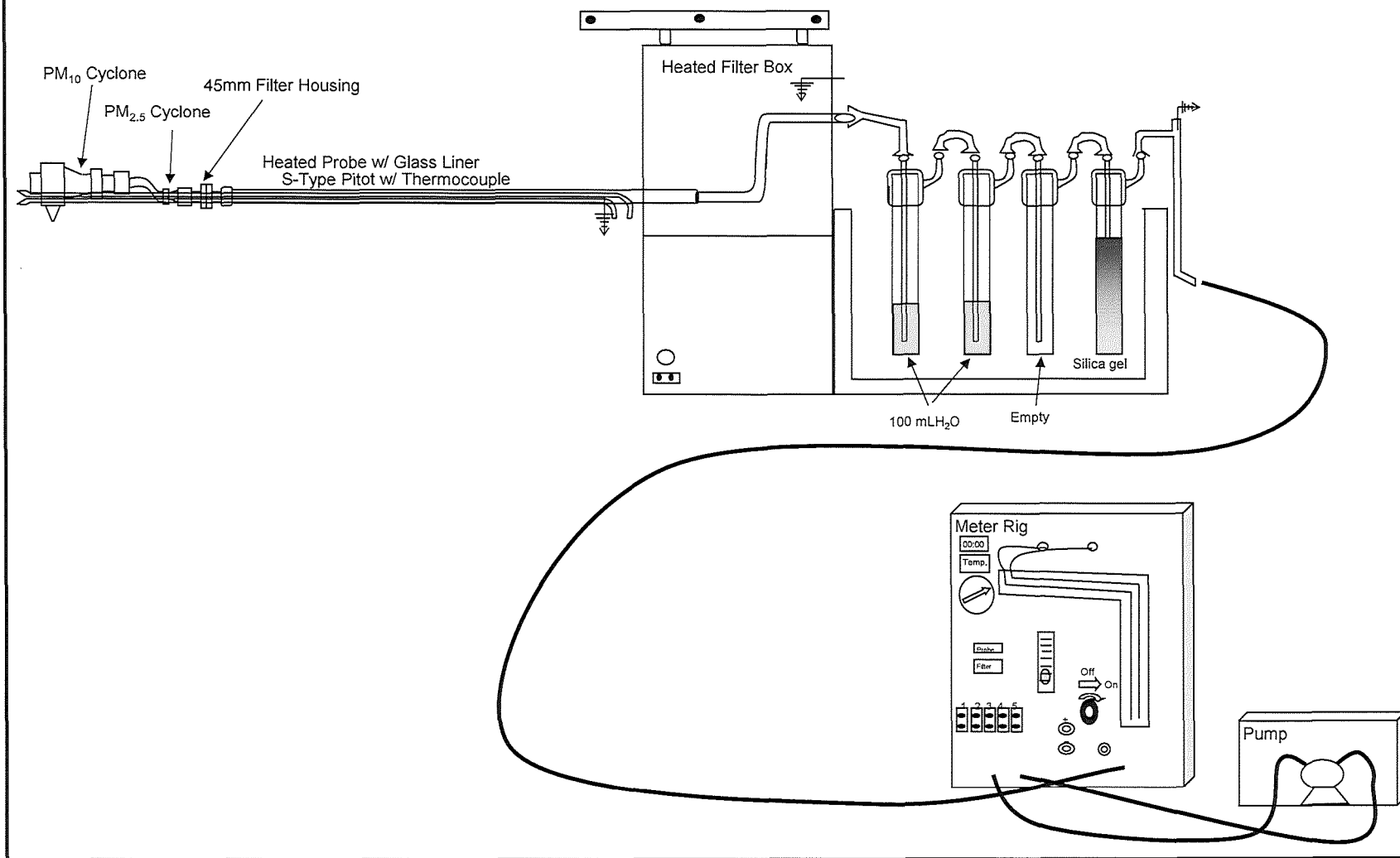
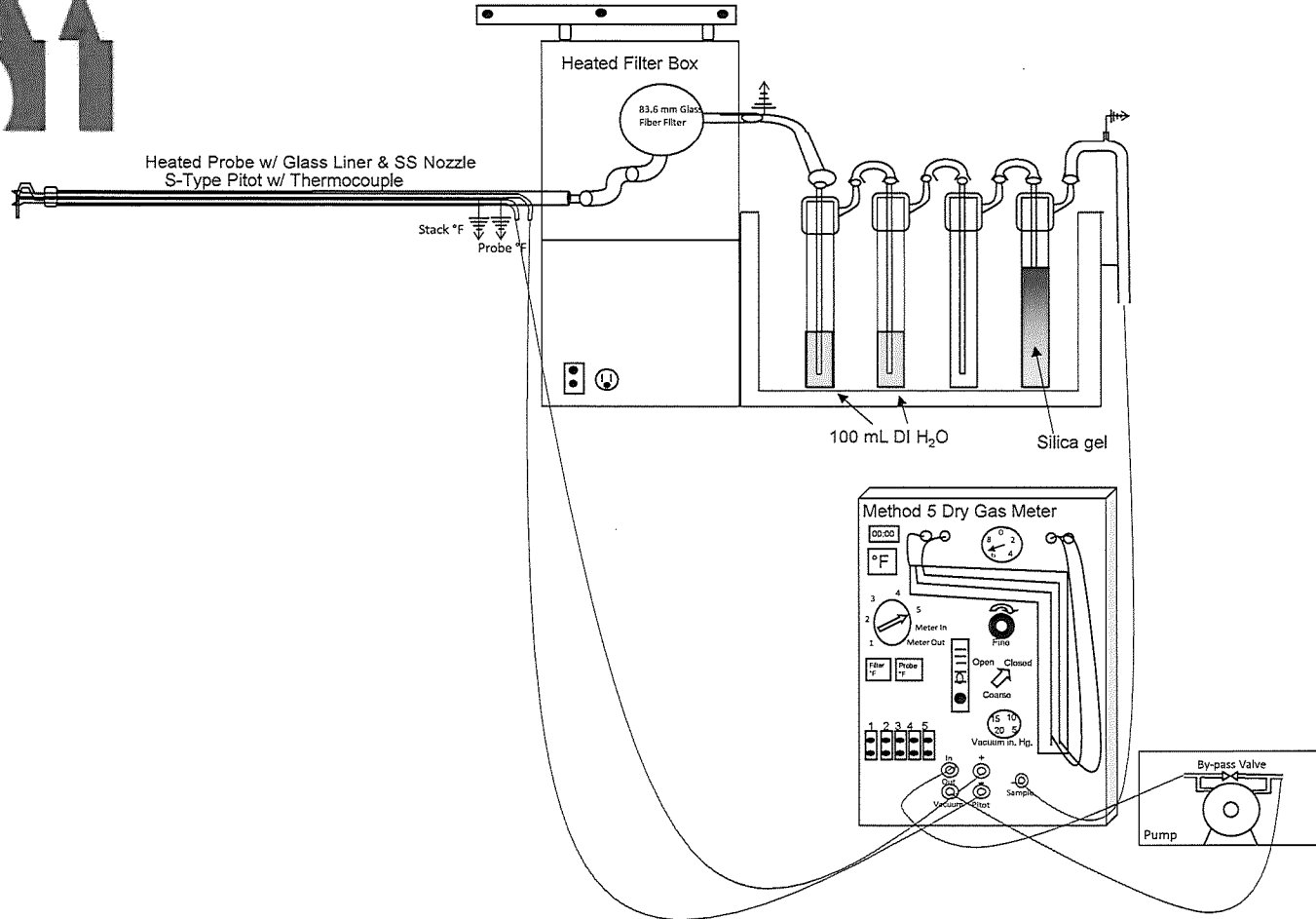




Figure No. 2



USEPA Method 5

FCA

Warren Truck Assembly Plant - West

Warren, Michigan

June 20-21, 2022



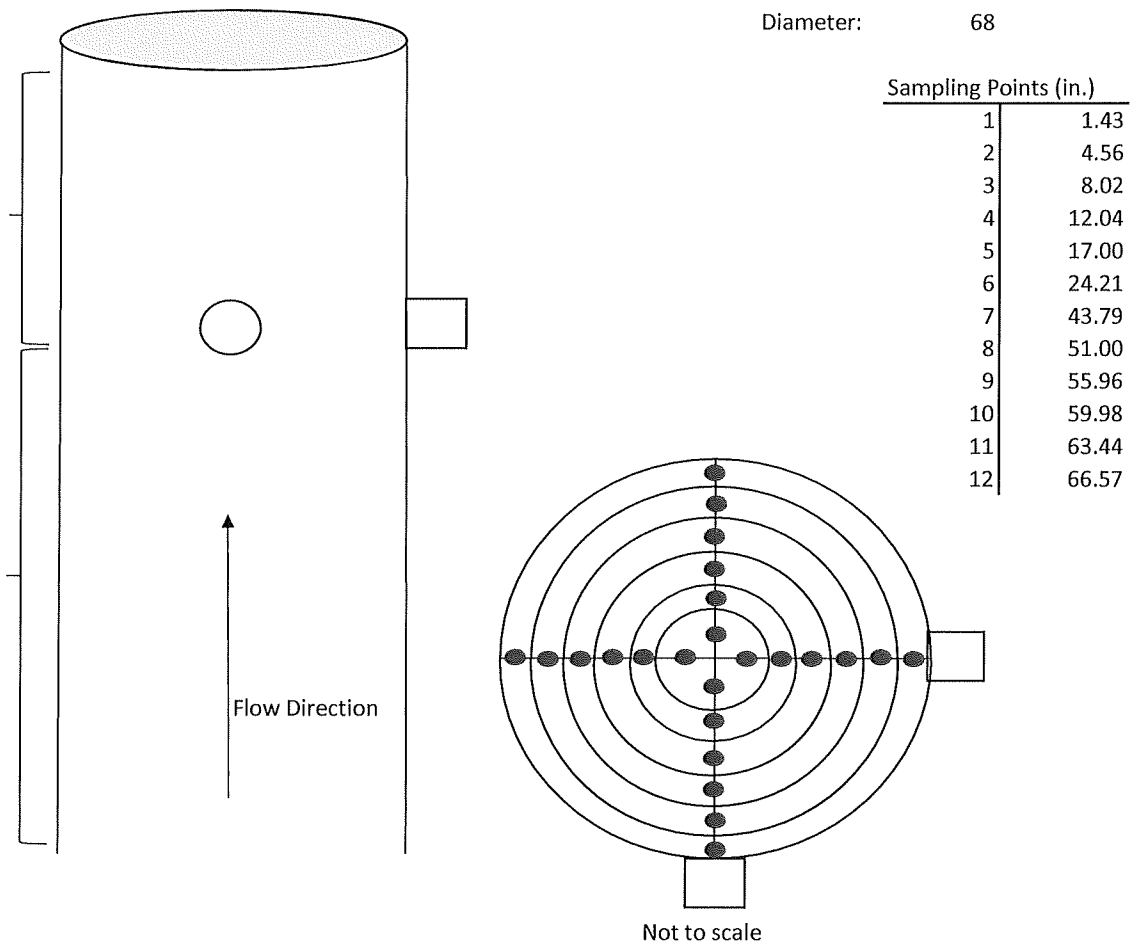
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Figure No. 3



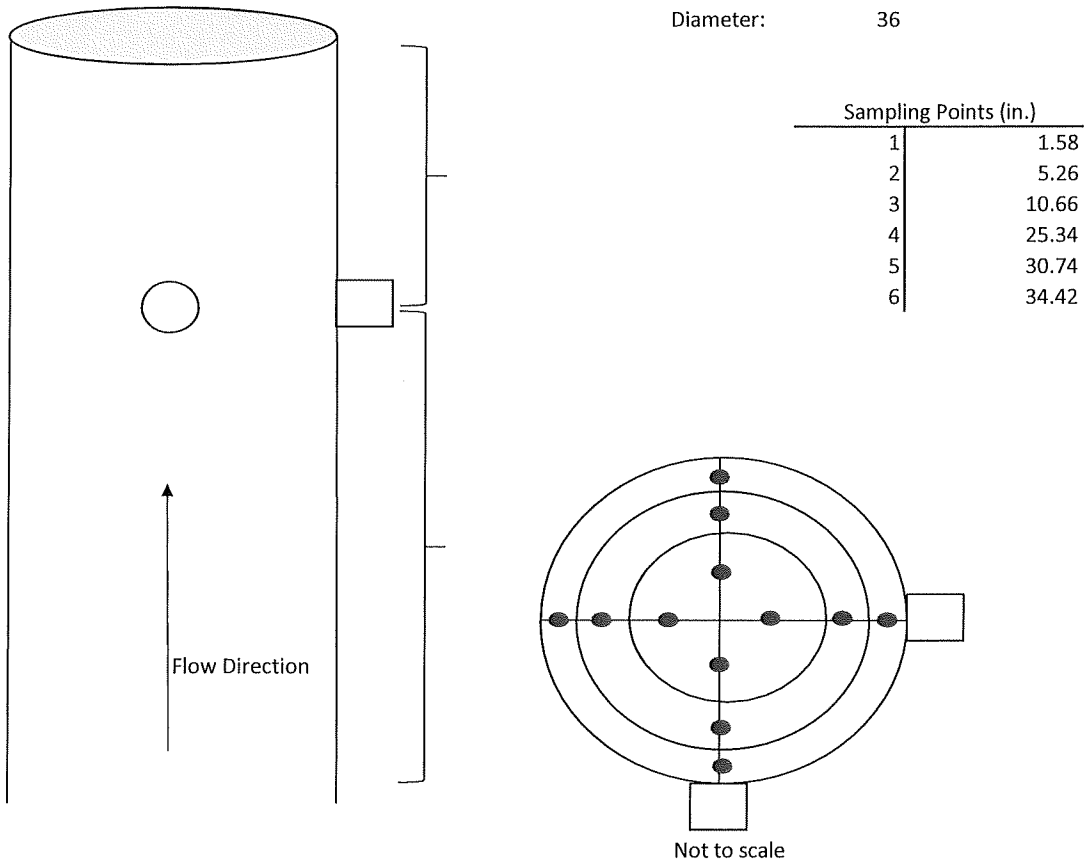
Concentrator
FCA
WTAP West
Warren, Michigan

Date:
June 20-21, 2022

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309



Figure No. 4



Tutone
FCA
WTAP West
Warren, Michigan

Date:
June 20-21, 2022

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309

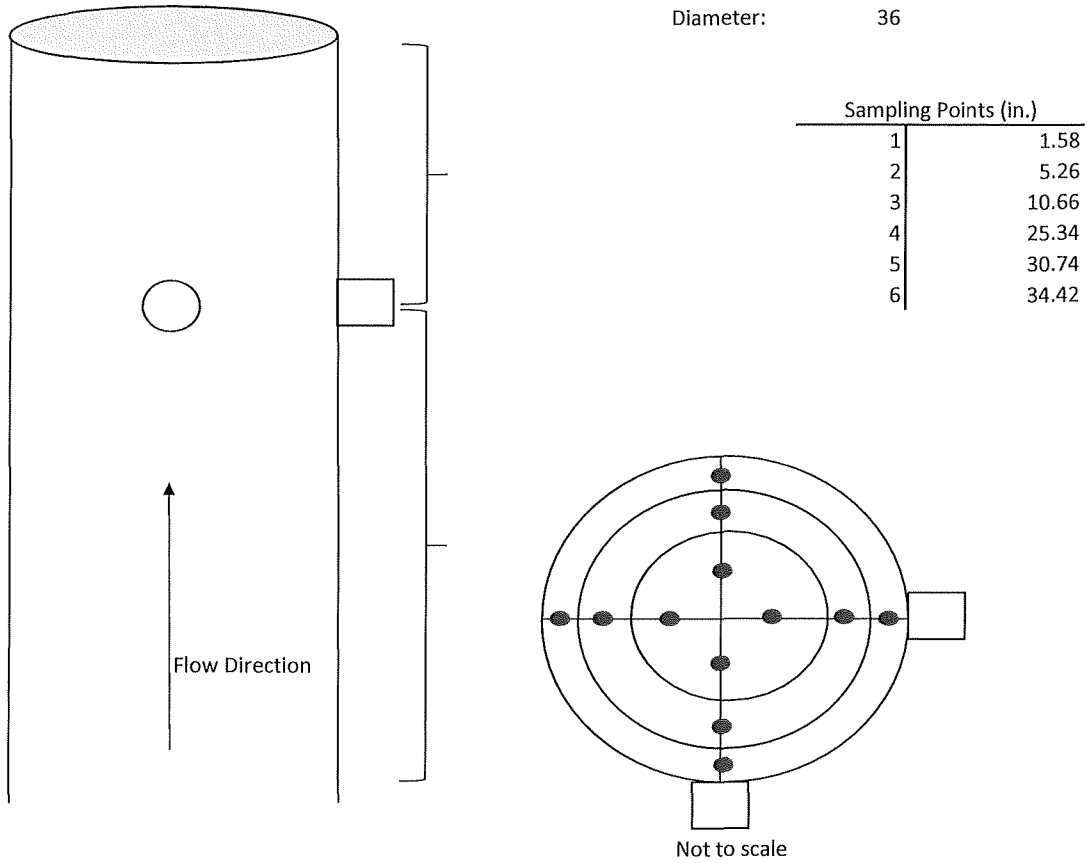
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Figure No. 5



Basecoat
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