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EXECUTIVE SUMMARY

Air Dynamics Testing, LLC. (Air Dynamics) was contracted by Aludyne Montague to sample air emissions at their facility located at 5353 Wilcox Street Montague, Michigan, on September 26th, 2023. The Chip Dryer Unit Afterburner Exhaust from Stack SV Oxidizer was tested to evaluate emissions of Particulate Matter, PM10, PM2.5 and Visible Emissions. The testing program was performed consistent with US EPA Methods 1-4, 9, and 5/202. The test results are summarized below in Table ES-1.

Table ES-1. Emissions Results Summary

Unit Tested	Test Parameter	Units	Result
Chip Dryer Unit	Filterable Particulate Matter	lbs/hr	0.34
	Total Particulate Matter/PM10/PM2.5 (Filterable + Condensable PM)	lbs/hr (PM10)	0.50
		lbs/hr (PM2.5)	0.50
	Visible Emissions	%	0.0

1.0 INTRODUCTION

Air Dynamics Testing, LLC. (Air Dynamics) has prepared this source test report on behalf of Aludyne Montague. Air Dynamics conducted source emissions testing on September 26th, 2023, at the 5353 Wilcox Street, facility in Montague, Michigan, in fulfillment of the submitted test plan for the unit Chip Dryer Unit Afterburner Exhaust from Stack SV Oxidizer to demonstrate compliance with Aludyne Montague's Permit issued by the Michigan Department of Environmental, Great Lakes, and Energy (EGLE).

Table 1-1 below presents the emission unit(s) and parameters that were tested. The test was conducted in accordance with approved Environmental Protection Agency (EPA) Registered Test Methods.

Table 1-1. Emissions Sampling Summary

TEST LOCATION	PARAMETER	TEST METHOD	# OF TEST RUNS	SAMPLE DURATION (MIN)	ANALYTICAL APPROACH
CHIP DRYER UNIT	EXHAUST FLOW	US EPA METHOD 1,2	4	60	PITOT TUBE
	EXHAUST TEMP	US EPA METHOD 1,2	4	60	THERMOCOUPLE
	O_2/CO_2	US EPA METHOD 3	4	60	FYRITE
	MOISTURE	US EPA METHOD 4	4	60	GRAVIMETRIC
	FILTERABLE PM	US EPA METHOD 5	4	60	GRAVIMETRIC
	VISIBLE EMISSIONS	US EPA METHOD 9	4	60	VE READER
	CONDENSABLE PM	US EPA METHOD 202	4	60	GRAVIMETRIC

Table 1-2. Project Personnel

Firm	Contact	Title	Phone No.
Air Dynamics	Dave Williams	Project Manager	885.839.8378
Air Dynamics	Andrew Martin	Field Team Leader	855.839.8378
Air Dynamics	Gage Hughes	Field Technician	855.839.8378
Air Dynamics	Elvis Garza	Field Technician	855.839.8378
Aludyne Montague	Kev Smith	SHE Manager	231.894.3420
Arcadis Consulting	Brad Saunders	Consultant	517.974.4441
EGLE	Dillion King	EQA	616.280.2092
EGLE	Eric Grinstern	EQA	616.558.0616

2.0 FACILITY DESCRIPTION AND SOURCE INFORMATION

2.1 Facility and Process Description

Aludyne Montague is located at 5353 Wilcox Street Montague, Michigan manufactures aluminum cast and machined automotive components.

3.0 SUMMARY OF EVENTS AND RESULTS

3.1 Site Test Plan

On August 15th, 2023, a protocol was submitted to EGLE with the test plan for conducting the testing on September 26th, 2023. Approval for the test plan was issued by EGLE on September 20th, 2023. Air Dynamics arrived September 25th to mobilize and set up equipment. The following day, Air Dynamics returned, and four (4) runs were completed.

3.2 Deviation from Test Plan

Although the CPM filter temperature was properly maintained for the duration of Run 1, due to an oversight, the temperature was not properly documented. EGLE requested that Run 1 be disregarded for the compliance demonstration. A fourth test run was therefore added to the test plan and Runs 2-4 were used for the compliance demonstration.

3.3 Results – Chip Dryer Unit

Air Dynamics conducted emissions sampling for particulate matter utilizing the aforementioned US EPA registered methods on September 26th, 2023. Table 3-1 displays detailed results of the test program.

Table 3-1. Results - Particulate Matter/PM10/PM2.5

Stack Gas Characteristics	Units	Run 2 09/26/23 (11:20 – 12:22)	Run 3 09/26/23 (13:00 – 14:04)	Run 4 09/26/23 (14:45 – 15:45)	Average
Filterable Concentration	(gr/dscf)	0.00523	0.00601	0.00544	0.00556
Filterable Emission Rate	(lbs/hr)	0.32	0.37	0.32	0.34
Condensable Concentration	(gr/dscf)	0.00238	0.00242	0.00357	0.00279
Condensable Emission Rate	(lbs/hr)	0.14	0.15	0.21	0.17
Filterable + Condensable Emission Rate	(lbs/hr)	0.46	0.52	0.53	0.50
Asphalt Production	(tons/hr)	1.12	1.13	1.29	1.18
Emission Factor of Total PM	(lbs/ton)	0.4138	0.4581	0.4105	0.4275
Actual Cubic Feet / Minute	(acfm)	11,362	11,712	10,635	11,236
Dry Standard Cubic Feet / Minute	(dscfm)	7,103	7,183	6,833	7,040
Avg. Stack Temp.	(deg. F)	342.2	349.2	339.9	343.8
Stack Gas Velocity	(feet/sec)	33.91	34.95	31.74	33.53
Isokinetics (Vn/Vs)	(%)	95.8	99.3	97.3	97.5
Moisture of Stack Gas	(%)	3.6	4.6	1.2	3.2
Sample Volume	$(ft^3)_{std}$	39.7	42.5	39.8	40.7

4.0 METHODOLOGY

The sampling procedures used by Air Dynamics were performed according to Title 40 CFR Part 60 Appendix A and are as follows:

Table 4-1. Sampling Procedures

Method	Description
US EPA Method 1	Determination of Velocity Traverses for Stationary Sources
US EPA Method 2	Determination of Stack Gas Velocity and Volumetric Flow Rate
US EPA Method 3	Gas Analysis for the Determination of Molecular Weight
US EPA Method 4	Determination of Moisture Content in Stack Gas
US EPA Method 5	Determination of Particulate Matter Emissions
US EPA Method 9	Determination of Visible Emissions
US EPA Method 202	Determination of Condensable Particulate Matter

4.1 Sample Point Determination-EPA Method 1

Sampling point locations were determined according to EPA Reference Method 1.

Table 4-2. Sampling Points

Locations	Dimensions	Ports	Points Per Port	Total Points
Chip Dryer Unit	32" ID	2	6	12

4.2 Velocity and Volumetric Flow Rate – EPA Method 2

EPA Method 2 was used to determine the gas velocity and flow rate at the stack. Each set of velocity determinations included the measurement of gas velocity pressure and gas temperature at each of the Method 1 determined traverse points. The velocity pressures were measured with a Type S pitot tube. Gas temperature measurements were made with a Type K thermocouple and digital pyrometer.

4.3 Gas Composition and Molecular Weight – EPA Method 3

The oxygen and carbon dioxide concentrations were determined in accordance with EPA Method 3 using a Fyrite analyzer. The remaining stack gas constituent was assumed to be nitrogen for the stack gas molecular weight determination.

4.4 Moisture Content – EPA Method 4

The flue gas moisture content at the testing locations was determined in accordance with EPA Method 4. The gas moisture was determined by quantitatively measuring condensed moisture in the chilled impingers and silica absorption. The amount of moisture condensed was determined gravimetrically. A dry gas meter was used to measure the volume of gas sampled. Moisture content is used to determine stack gas velocity.

4.5 Determination of Filterable PM– EPA Method 5

Particulate matter (PM) was withdrawn isokinetically from the source and collected on a glass fiber filter maintained at a temperature of 120 ± 14°C (248 ± 25°F) or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator for a particular application. The PM mass, which includes any material that condenses at or above the filtration temperature, was determined gravimetrically after the removal of uncombined water. A diagram of the Method 5 train is shown below in Figure 4-1.

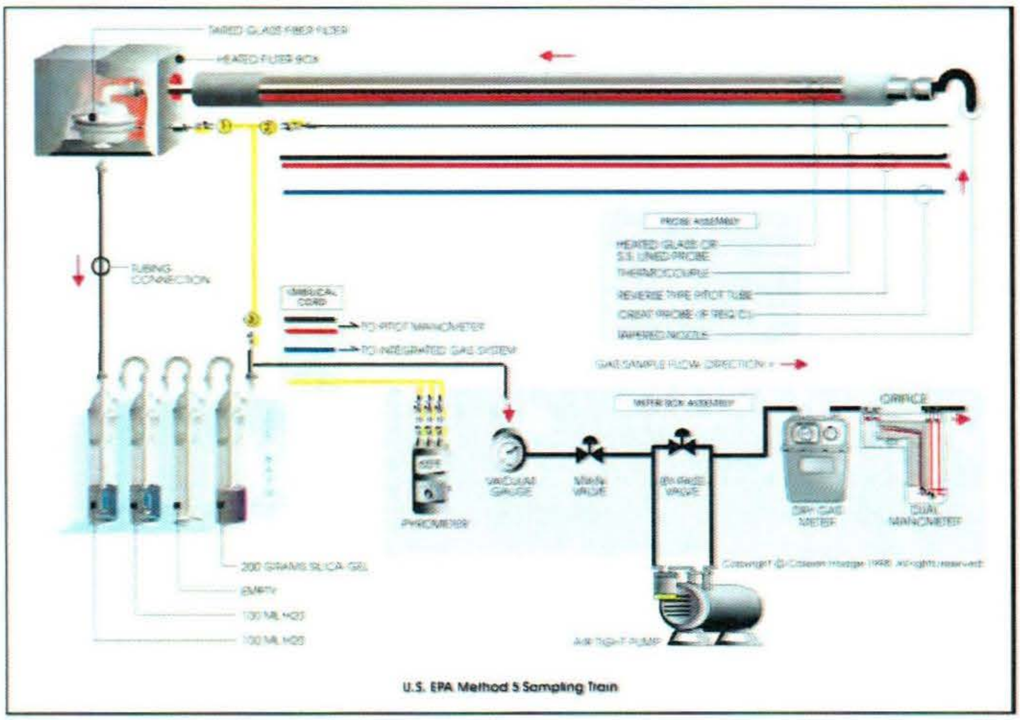

Figure 4-1. Method 5 Sampling Train

4.6 Visible Emissions – EPA Method 9

Stack opacity readings are taken for 60 minutes at 15 second intervals for NSPS and 30 minutes at 15 second intervals for state permitted, non-federal sources, by a certified visible emissions reader. The visible emissions reading are conducted during each of the particulate test runs. The results are reported as an average opacity reading for the testing period. A copy of the visible reader's current certification is included in the Appendix.

4.7 Determination of Condensable PM – EPA Method 202

The CPM was collected in dry impingers after filterable PM was collected on a filter maintained as specified in either Method 5 of Appendix A-3 to part 60, Method 17 of Appendix A-6 to part 60, or Method 201A of Appendix M. The organic and aqueous fractions of the impingers and an out-of-stack CPM filter were then desiccated and weighed by a subcontracted lab. The total of the impinger fractions and the CPM filter represents the CPM. A diagram of the Method 202 sampling train is presented below in Figure 4-2.

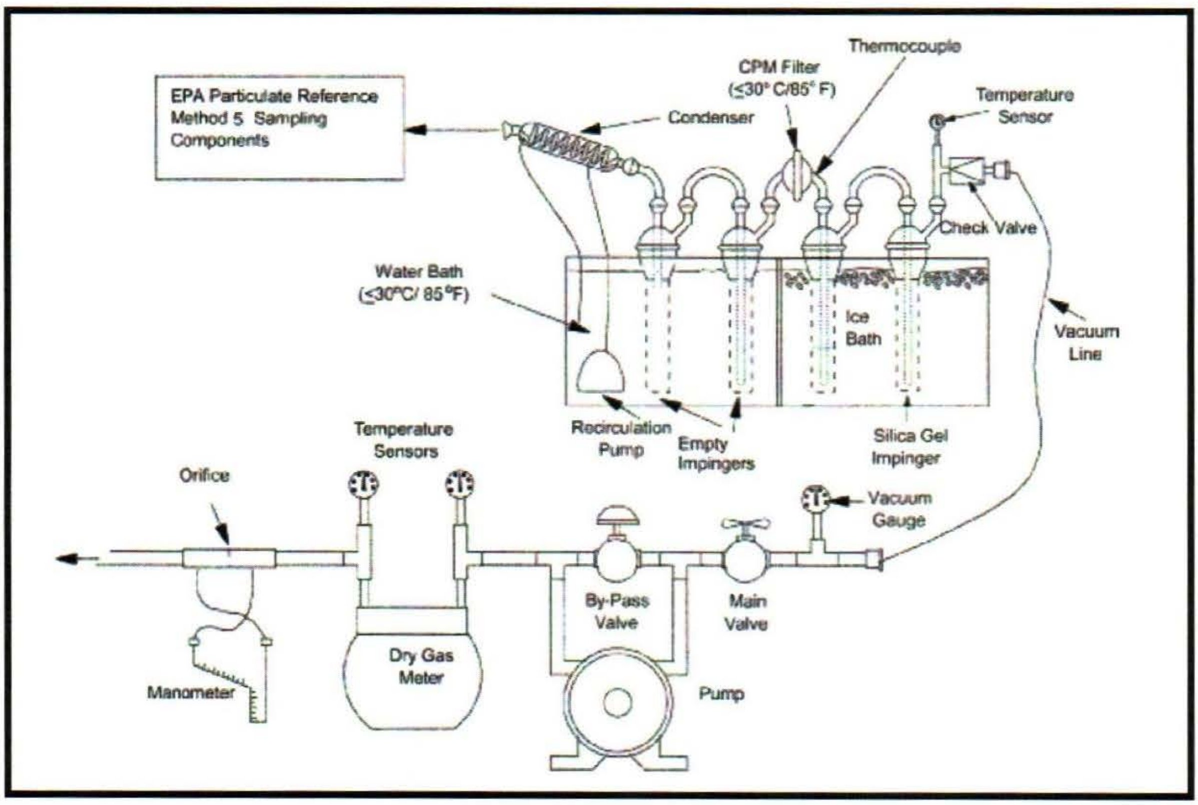

Figure 4-2 Method 202 Sampling Train

5.0 AIR DYNAMICS QUALITY ASSURANCE AND QUALITY CONTROL

5.1 Sampling Protocol

Air Dynamics Testing (Air Dynamics) is organized to facilitate sample management, analytical performance management, and data management. Personnel are assigned specific tasks to ensure implementation of the quality assurance/quality control (QA/QC) program. The Senior Project Manager in charge of air emission measurement projects reports directly to the Director of Air Analysis Services and are the QA officers responsible for program effectiveness and compliance.

The analysts perform the data reduction, analyses, and initial data review. Each analyst must check and initial their work, making certain that it is complete, determining that any instrumentation utilized has been properly calibrated, and ensuring that the analysis has been performed within the QA/QC limits.

The Senior Project Manager evaluates and verifies the data submitted by the analysts, verifies that the data and documentation are complete, confirms that all analysis has been performed within QA criteria specific to each method, checks calculations, assembles and signs the data package, and reviews the final report.

5.2 Equipment Maintenance and Calibration

The Field Supervisor and Field Technicians are in charge of routine maintenance and calibration of all source-testing equipment. Relevant calibration information is included in the Appendices of this report.

5.2.1 Equipment Maintenance

All major pieces of equipment have maintenance logs where all maintenance activities are recorded and documented. Table 5-1 shows routine maintenance that is performed on Air Dynamics source testing equipment.

Table 5-1. Test Equipment - Routine Maintenance Schedule

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	• Absence of leaks • Ability to draw vacuum within equipment specifications	Every 500 hours of operation or 6-months, whichever is less	• Visual inspection • Lubrication
Flow Meters	• Free mechanical movement • Absence of malfunction • Calibration within tolerance	Every 500 hours of operation or 6-months whichever is less	• Visual inspection • Clean • Calibrate
Electronic Instrumentation	• Absence of malfunction • Proper response to calibration gases and signals	As recommended by manufacturer or when required due to unacceptable limits	• Clean • Replace parts as necessary • Other recommended manufacturer service
Mobile Laboratory Sampling System	• Absence of leaks. • Sample lines clean and free of debris • Proper input flow rates to analyzers	At least once per month or sooner depending on nature of use.	• Change filters • Change gas dryer • Leak check • Check for contamination
Sample Lines	• Absence of soot and particulate buildup • Adequate sample flow	At least once per month or sooner depending on nature of use.	• Flush with solvents and water • Heat and purge line with nitrogen

5.2.2 Equipment Calibration

Current calibration information on equipment used during testing is included in the Appendices of this report.

The S-Type pitot tubes are calibrated initially upon purchase and then semiannually. Visual measurements are taken prior to each use to ensure accidental damage has not occurred. Measurements are performed using a micrometer and protractor.

Each temperature sensor is marked and identified. This is done by marking each thermocouple end connector with a number. The sensor is calibrated as a unit with the control box potentiometer and associated lead wire as an identified unit. Calibrations are performed initially and annually at three set-points over the range of expected temperatures for that particular thermocouple. A reference output-voltage/thermocouple calibrator is used as a temperature reference source for the multi-point calibrations.

The field barometer is adjusted initially and semiannually to within 0.1" Hg of the actual atmospheric pressure at the Air Dynamics laboratory facility in Indianapolis, Indiana. All dry gas field meters are calibrated before initial use. Once the meter is placed in operation, its calibration is checked after each test series or bimonthly, whichever is less. Dry gas meters are calibrated against a NIST reference meter or orifice.

The dry gas meter orifice is calibrated before its initial use and then annually. This calibration is performed during the calibration of the dry gas test meter. The unit is checked in the field after every series of tests using a field gas-meter check procedure.

Analytical balances are internally calibrated prior to use following the manufacturer's instructions. The balances are further checked using Class S-1 analytical weights prior to daily usage. Field top loading balances are checked with a field analytical weight prior to usage.

6.0 AIR DYNAMICS DATA REDUCTION VALIDATION AND REPORTING

The data presented in final reports are reviewed three times. First, the analyst reviews and certifies that the raw data complies with technical controls, documentation requirements, and standard group procedures. Second, the Senior Project Manager reviews and certifies that data packages comply to specifications for sample holding conditions, chain of custody, data documentation, and the final report is free of transcription errors. Third, a QA review is performed by additional senior personnel. This review thoroughly examines the entire completed data report. Once the review process is completed, the report is approved by Air Dynamics senior personnel and issued. All raw laboratory data and final reports are stored for a minimum of 5 years.

7.0 LIMITATIONS AND SIGNATURES

Air Dynamics Testing, LLC. (Air Dynamic's) services, data, opinions, and recommendations described in this report are for Client's sole and exclusive use, and the unauthorized use of or reliance on the data, opinions, or recommendations expressed herein by parties other than Air Dynamics's Client is prohibited without Air Dynamics's express written consent. The services described herein are limited to the specific project, property, and dates of Air Dynamics's work. No part of Air Dynamics's report shall be relied upon by any party to represent conditions at other times or properties. Air Dynamics will accept no responsibility for damages suffered by third parties as a result of reliance upon the data, opinions, or recommendations in this report.

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Air Dynamics has striven to perform the services in a manner consistent with that level of care and skill ordinarily exercised by other environmental consultants practicing in the same locality and under similar conditions existing at the time we performed our services. **No other warranty is either expressed or implied in this report or any other document generated in the course of performing Air Dynamics's services.**

Sincerely,
Air Dynamics Testing, LLC.

Mike Dicen

Mike Dicen, President
Senior Project Manager

Dave Williams

Dave Williams, QEP QSTI
Technical Director/V.P Operation