RECEIVED
OCT 26 2023
AIR QUALITY DIVISION

AIR EMISSION TEST REPORT FOR THE VERIFICATION OF PARTICULATE MATTER EMISSIONS FROM LATHE, GRINDING, AND BLASTING PROCESSES

Prepared for:

Nexteer Automotive Corporation
SRN A6175

ICT Project No.: 2200227
October 13, 2023

IMPACT COMPLIANCE & TESTING

A6175_TEST_20230912

Report Certification

AIR EMISSION TEST REPORT

FOR THE
VERIFICATION OF PARTICULATE MATTER EMISSIONS
FROM
LATHE, GRINDING, AND BLASTING PROCESSES

Nexteer Automotive Corporation
Saginaw, MI

The material and data in this document were prepared and reviewed under the supervision of the undersigned.

Report Prepared By:

Tyler J. Wilson Senior Project Manager Impact Compliance & Testing, Inc.

TABLE OF CONTENTS

List of Tables

List of Appendices

1.0 Introduction

Nexteer Automotive Corporation (Nexteer) operates lathe, grinding, and blasting (shot or sand) processes at its facility in Saginaw, Saginaw County, Michigan. The State of Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) has issued Nexteer, Renewable Operating Permit (ROP) No. MI-ROP-A6175-2022 for operation of these processes.

Air emission compliance testing was performed pursuant to conditions specified in ROP No. MI-ROP-A6175-2022 for the following emission units: EUBL11, EUCG03, EUCG07, and EUCG02.

The compliance testing presented in this report was performed by Impact Compliance & Testing, Inc. (ICT), a Michigan-based environmental consulting and testing company. ICT representatives Tyler Wilson and Christian Smith performed the field sampling and measurements September 12-14, 2023.

The compliance emission tests consisted of triplicate, one-hour sampling periods for filterable particulate matter (PM), for each emission unit. Exhaust gas velocity, moisture, oxygen (O_2) content, and carbon dioxide (CO_2) content were determined for each test period to calculate PM mass emission rates.

The exhaust gas sampling and analysis was performed using procedures specified in the Stack Test Protocol dated June 28, 2023, that was reviewed and approved by EGLE-AQD.

A copy of the EGLE-AQD test plan approval letter is provided in Appendix 1.

Questions regarding this air emission test report should be directed to:

Tyler J. Wilson
Senior Project Manager
Impact Compliance & Testing, Inc.
37660 Hills Tech Drive
Farmington Hills, MI 48331
(734) 357-8046
Tyler.Wilson@impactCandT.com

Ms. Nikita Patterson
Environmental Engineer
Nexteer Automotive Corporation
3900 East Holland Road
Saginaw, MI 48601-9494
(989) 757-4255
nikita.patterson@nexteer.com

2.0 Summary of Test Results and Operating Conditions

2.1 Purpose and Objective of the Tests

Conditions of ROP No. MI-ROP-A6175-2022 require Nexteer to test EUBL11, EUCG03, EUCG07, and EUCG02 for PM emissions. EUBL11, EUCG03, EUCG07, and EUCG02 were tested during this compliance test event.

Appendix 2 provides diagrams of the emission test sampling locations with actual stack dimension measurements.

2.2 Operating Conditions During the Compliance Tests

The testing was performed while the Nexteer emission units were operated at or near maximum routine operating conditions. Nexteer representatives provided process operating data in 10-minute increments for each test period.

Appendix 3 provides process operating data provided by Nexteer representatives for the test periods.

2.3 Summary of Air Pollutant Sampling Results

The gases exhausted from each emission unit were sampled for three (3) one-hour test periods during the compliance testing performed September 12-14, 2023.

Table 2.1 presents the average measured PM emission rates for each emission unit (average of the three test periods, per emission unit).

Test results for each one-hour sampling period and comparison to the permitted emission rates are presented in Section 6.0 of this report.

Table 2.1 Measured PM emission rates (three-test average, per emission unit)

	PM			
	Measured	Permit Limit	Measured	Permit Limit
Emission Unit	(lb/hr)		(lb/1,000 lb exhaust gas, dry basis)	
EUBL11	0.001	-	0.0003	***0.10***
EUCG03	0.03	-	0.001	***0.01***
EUCG07	0.03	***1.6***	0.001	***0.01***
EUCG02	0.03	***6.1***	0.001	***0.09***

3.0 Source and Sampling Location Description

3.1 General Process Description

EUBL11 consists of a blaster (shot or sand). An abrasive grit is used to clean and remove iron scale or burrs from wire, or various machined parts.

EUCG03 consists of twenty-nine (29) grinding stations used to remove excess metal from parts. The grinding action against the parts generates PM in the form of oil mist and grit.

EUCG07 consists of ten (10) grinding stations used to remove excess metal from parts. The grinding action against the parts generates PM in the form of oil mist and grit.

EUCG02 consists of eight (8) lathes used to remove excess metal from truck housings. A water-soluble oil is used to cool the tooling as well as flush away the metal grit from the part.

3.2 Rated Capacities and Air Emission Controls

EUBL11 has a blower with a design capacity of 5 HP and 2,000 CFM. PM emissions is controlled by a dust collector. The dust collector is rated for 99% control efficiency.

EUCG03 has a blower with a design capacity of 125 HP and 35,000 CFM. PM emissions is controlled by a wet scrubber. The wet scrubber is rated for 99% control efficiency.

EUCG07 has a blower with a design capacity of 125 HP and 16,000 CFM. PM emissions is controlled by a wet scrubber. The wet scrubber is rated for 99% control efficiency.

EUCG02 has a blower with a design capacity of 75 horsepower (HP) and 15,000 cubic feet per minute (CFM). PM emissions is controlled by a wet scrubber. The wet scrubber is rated for 99% control efficiency.

3.3 Sampling Locations

The exhaust gas for each emission unit is released to the atmosphere through a dedicated vertical exhaust stack with a vertical release point.

The exhaust stack sampling ports for EUBL11 are located in an individual, vertical exhaust stack, with an inner diameter of 11.0 inches. The stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location >119 inches (>10.8 duct diameters) upstream and >86.0 inches (>7.82 duct diameters) downstream from any flow disturbance and satisfies the USEPA Method 1 criteria for a representative sample location.

The exhaust stack sampling ports for EUCG03 are located in an individual, vertical exhaust stack, with an inner diameter of 50.0 inches. The stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location 68.0 inches (1.36 duct diameters) upstream and >100 inches (>2.00 duct diameters) downstream from any flow disturbance and satisfies the USEPA Method 1 criteria for a representative sample location.

The exhaust stack sampling ports for EUCG07 are located in an individual, vertical exhaust stack, with an inner diameter of 43.0 inches. The stack is equipped with two (2) sample

ports, opposed 90°, that provide a sampling location 48.0 inches (1.12 duct diameters) upstream and >94.0 inches (>2.19 duct diameters) downstream from any flow disturbance and satisfies the USEPA Method 1 criteria for a representative sample location.

The exhaust stack sampling ports for EUCG02 are located in an individual, vertical exhaust stack, with an inner diameter of 28.0 inches. The stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location 88.0 inches (3.14 duct diameters) upstream and >81.0 inches (>2.89 duct diameters) downstream from any flow disturbance and satisfies the USEPA Method 1 criteria for a representative sample location.

Individual traverse points were determined in accordance with USEPA Method 1.

4.0 Sampling and Analytical Procedures

A Stack Test Protocol for the air emission testing was reviewed and approved by EGLE-AQD. This section provides a summary of the sampling and analytical procedures that were used during the testing periods.

4.1 Summary of Sampling Methods

USEPA Method 1	Exhaust gas sample and velocity measurement locations were determined based on the physical stack arrangement and requirements in USEPA Method 1.
USEPA Method 2	Exhaust gas velocity pressure was determined using a Type-S Pitot tube connected to a red oil incline manometer; temperature was measured using a K-type thermocouple connected to the Pitot tube.
USEPA Method 2	Dry molecular weight was determined as specified in Section 8.6 of Method 2.
USEPA Method 4	Exhaust gas moisture was determined based on the water weight gain in chilled impingers.
USEPA Method 17	Exhaust gas filterable PM was determined using an isokinetic sample train with an unheated, in-stack filter.

4.2 Exhaust Gas Velocity Determination (USEPA Method 2)

Exhaust gas velocity was measured using USEPA Method 2 throughout each test period as part of the isokinetic sampling procedures. Velocity pressure measurements were performed at each stack traverse point using an S-type Pitot tube and red-oil manometer. Temperature measurements were performed at each traverse point using a K-type thermocouple and a calibrated digital thermometer.

Prior to performing the initial velocity traverse for each emission unit, the S-type Pitot tube and manometer lines were leak-checked at the test site. These checks were made by blowing into the impact opening of the Pitot tube until 3 or more inches of water were recorded on the manometer, then capping the impact opening and holding it closed for 15 seconds to ensure that it was leak free. The static pressure side of the Pitot tube was leak-checked using the same procedure.

The absence of significant cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at each velocity traverse point with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

Appendix 4 provides isokinetic data and field data sheets.

4.3 Exhaust Gas Molecular Weight Determination (USEPA Method 2)

Gases exhausted from the emission units are primarily captured process air and are expected to have ambient air concentrations of CO_2 and O_2. CO_2 and O_2 content for the exhaust gas streams were determined using a dry molecular weight of 29.00 per Section 8.6 in USEPA Method 2.

4.4 Exhaust Gas Moisture Content (USEPA Method 4)

Moisture content of the exhaust gas streams were determined in accordance with USEPA Method 4 using a chilled impinger sampling train (as part of the USEPA Method 17 PM sampling train). A sample of the exhaust gas was extracted at an isokinetic rate and moisture in the sample gas was collected in a chilled impinger train. At the conclusion of each sampling period the moisture gain in the impingers was determined gravimetrically by weighing each impinger to determine net weight gain. Moisture content was determined as a component of the sampling procedures for PM (i.e., not as a separate measurement train).

4.5 Measurement of PM in Exhaust Gas (USEPA Method 17)

A USEPA Method 17 sample train was used to measure PM for each exhaust gas. Exhaust gas was drawn at an isokinetic rate through a properly sized sampling nozzle, non-heated probe, and non-heated glass fiber particulate filter. The sampling nozzle and probe liner were constructed of stainless steel, with regards to the exhaust gas temperatures. Following the particulate filter, moisture was removed from the sample gas using chilled impingers and sample gas rate was measured using a calibrated dry gas meter.

At the end of each test period, the PM collected in the front half of the USEPA method 17 sample train (from the sampling nozzle to the non-heated filter) was recovered in accordance with the acetone rinse and brush procedures (6 rinses/brushes for metallic components) specified in USEPA Method 17. The impinger solutions were weighed gravimetrically for moisture content determination.

Prior to testing, the sampling nozzle and the front half of the filter housing were cleaned in accordance with the pretest preparation procedures specified in USEPA Method 17.

Solvent rinse samples were stored in appropriate containers (amber glass bottles with Teflon® screw cap liners), with the liquid level marked. Each sample bottle was clearly labeled with a unique identification number.

The laboratory PM analysis was conducted by Impact Compliance & Testing, Inc. (Holt, Michigan) according to the appropriate QA/QC procedures specified in USEPA Method 17.

Appendix 5 provides PM calculations. Appendix 6 provides a copy of the PM laboratory report.

5.0 QA/QC Activities

5.1 Flow Measurement Equipment

Prior to arriving onsite (or onsite prior to beginning compliance testing), the instruments used during the source test to measure exhaust gas properties and velocity (Pitot tube and scale) were calibrated to specifications in the sampling methods.

5.2 Particulate Matter Recovery and Analysis

All recovered PM samples were stored and transported in certified trace clean amber glass sample bottles with Teflon® lined caps. The liquid level on each bottle was marked with a permanent marker and the caps were secured closed with tape, prior to transporting. Acetone with a residue after evaporation of ≤0.001% was used for the analysis. Based on the very low PM catches (for all emission units), and no need for blank correction, a blank sample was not used for this test event.

5.3 Laboratory QA/QC Procedures

The PM analyses were conducted by ICT according to the appropriate QA/QC procedures specified in USEPA Method 17. Laboratory data sheets and PM catch weights are presented in the Laboratory Report in Appendix 6.

5.4 Isokinetic Sampling and Meter Box Calibrations

The dry gas meter sampling console used for PM and moisture testing was calibrated prior to and after the testing program. This calibration uses the critical orifice calibration technique presented in USEPA Method 5. The metering console calibration exhibited no data outside the acceptable ranges presented in USEPA Method 5.

The digital pyrometer in the metering console was calibrated using a NIST traceable Omega® Model CL 23A temperature calibrator.

The sampling rate for all test periods was within the allowable isokinetic variation (i.e. within 10% of the calculated isokinetic sampling rate required by USEPA Method 5).

Calibrations of the probes, pitot tubes, and nozzles satisfied USEPA Method 5 criteria.

Appendix 7 presents test equipment quality assurance data (calibration records for the meter box, pitot tubes, probes, nozzles, and scale).

6.0 Results

6.1 Test Results and Allowable Emission Limits

Air pollutant emission measurement results for each one-hour test period are presented in Tables 6.1-6.4.

The emission units have the following allowable emission limits specified in ROP No. MI-ROP-A6175-2022:

Emission Unit ID	PM Limit	
	(lb/hr)	(lb/1,000 lb exhaust gas, dry basis)
EUBL11	-	0.10
EUCG03	-	0.01
EUCG07	1.6	0.01
EUCG02	6.1	0.09

The measured PM emission rates for EUBL11, EUCG03, EUCG07, and EUCG02 are less than the allowable limits specified in ROP No. MI-ROP-A6175-2022.

6.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing for all pollutants was performed in accordance with USEPA methods and the approved Stack Test Protocol. The emission units were operated at or near maximum routine operating conditions, and no variations from normal operating conditions occurred during the test periods.

Since the blockage area of the in-stack filter exceeded 5% of the duct/stack cross sectional area for EUBL11, velocity measurements were performed at a separate sampling location, three (3) stack diameters downstream from the PM sampling location (to meet criteria listed in Section 8.1.2 of USEPA Method 17).

For EUCG03 and EUCG07, the rain caps/zero loss stacks were temporarily sealed with aluminum foil tape (at the point where the rain caps/zero loss stacks connected to the actual stacks) for the duration of testing, so that the rain caps/zero loss stacks acted as stack extensions during testing, to create sampling locations that met USEPA Method 1 criteria. See stack diagrams in Appendix 2 for a visual representation of the EUCG03 and EUCG07 exhaust stack sampling locations.

Slightly negative PM catches were measured for three (3) of the USEPA Method 17 filters (Test Nos. 2 & 3 for EUBL11; Test No. 1 for EUCG07). For those tests, "0" milligrams (mg) was used for the PM emissions calculations, rather than the measured negative value, to present a worst-case scenario for PM emissions.

Table 6.1 Measured exhaust gas conditions and PM emission rates for EUBL11

Test No. Test date Test period (24-hr clock)	1 9/12/2023 659-729; 736-806	2 9/12/2023 840-910; 915-945	3 9/12/2023 1008-1038; 1044-1114	Three Test Average
Exhaust Gas Composition				
CO_2 content (% vol)	0.0	0.0	0.0	0.0
O_2 content (% vol)	20.9	20.9	20.9	20.9
Moisture (% vol)	2.21	1.69	1.90	1.93
Exhaust gas temperature (°F)	82.7	84.2	84.8	83.9
Exhaust gas flowrate (dscfm)	964	957	969	963
Exhaust gas flowrate (scfm)	986	974	988	982
Particulate Matter				
Sample volume (dscf @ STP)	46.2	46.2	46.2	46.2
Filter catch (mg)	0.0	0.0	0.0	0.0
Acetone rinse catch (mg)	0.7	0.6	0.0	0.4
Total PM catch (mg)	0.7	0.6	0.0	0.4
PM emissions (lb/hr)	0.002	0.002	0.000	0.001
Permit limit (lb/hr)	-	-	-	-
PM emissions (lb/1,000 lb exhaust gas, dry basis)	0.0004	0.0004	0.0000	0.0003
Permit limit (lb/1,000 lb exhaust gas, dry basis)	-	-	-	*0.10*

Table 6.2 Measured exhaust gas conditions and PM emission rates for EUCG03

Test No. Test date Test period (24-hr clock)	1 9/13/2023 905-935; 940-1010	2 9/13/2023 1105-1135; 1139-1209	3 9/13/2023 1228-1258; 1302-1332	Three Test Average
Exhaust Gas Composition				
CO_2 content (% vol)	0.0	0.0	0.0	0.0
O_2 content (% vol)	20.9	20.9	20.9	20.9
Moisture (% vol)	1.67	1.25	1.88	1.60
Exhaust gas temperature (°F)	69.9	70.3	72.4	70.9
Exhaust gas flowrate (dscfm)	5,964	5,983	7,332	6,426
Exhaust gas flowrate (scfm)	6,065	6,059	7,473	6,532
Particulate Matter				
Sample volume (dscf @ STP)	44.4	44.3	43.9	44.2
Filter catch (mg)	0.5	1.6	1.1	1.1
Acetone rinse catch (mg)	0.5	0.3	0.3	0.4
Total PM catch (mg)	1.0	1.9	1.4	1.4
PM emissions (lb/hr)	0.02	0.03	0.03	0.03
Permit limit (lb/hr)	-	-	-	-
PM emissions (lb/1,000 lb exhaust gas, dry basis)	0.001	0.001	0.001	0.001
Permit limit (lb/1,000 lb exhaust gas, dry basis)	-	-	-	*0.01*

Table 6.3 Measured exhaust gas conditions and PM emission rates for EUCG07

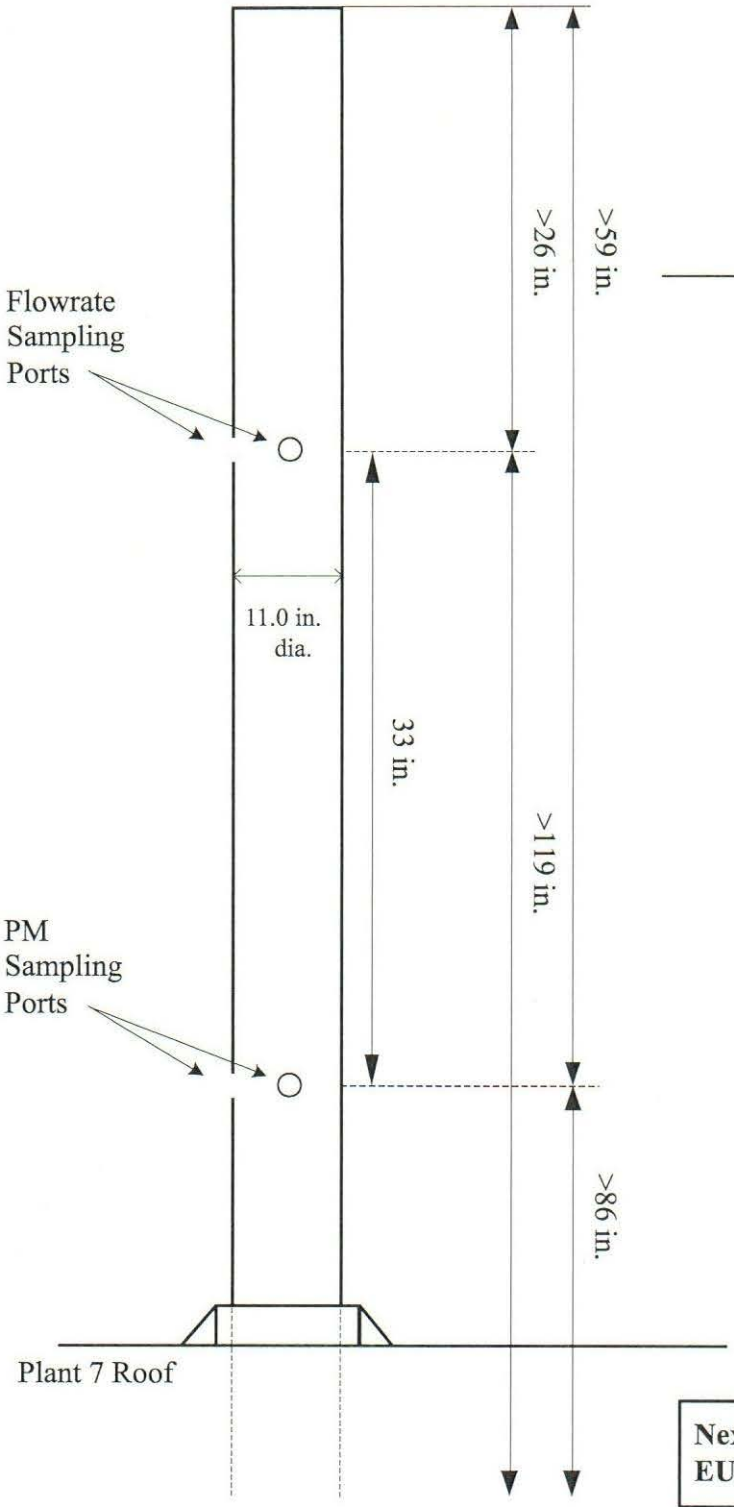
Test No. Test date Test period (24-hr clock)	1 9/13/2023 1537-1607; 1612-1642	2 9/13/2023 1655-1725; 1728-1758	3 9/13/2023 1842-1912; 1915-1945	Three Test Average
Exhaust Gas Composition				
CO_2 content (% vol)	0.0	0.0	0.0	0.0
O_2 content (% vol)	20.9	20.9	20.9	20.9
Moisture (% vol)	1.93	1.82	1.17	1.64
Exhaust gas temperature (°F)	67.1	68.6	70.5	68.7
Exhaust gas flowrate (dscfm)	13,807	13,775	13,766	13,783
Exhaust gas flowrate (scfm)	14,078	14,030	13,928	14,012
Particulate Matter				
Sample volume (dscf @ STP)	42.9	42.8	42.6	42.8
Filter catch (mg)	0.0	0.2	0.0	0.1
Acetone rinse catch (mg)	0.3	1.0	0.9	0.7
Total PM catch (mg)	0.3	1.2	0.9	0.8
PM emissions (lb/hr)	0.01	0.05	0.04	0.03
Permit limit (lb/hr)	-	-	-	*1.6*
PM emissions (lb/1,000 lb exhaust gas, dry basis)	0.000	0.001	0.001	0.001
Permit limit (lb/1,000 lb exhaust gas, dry basis)	-	-	-	*0.01*

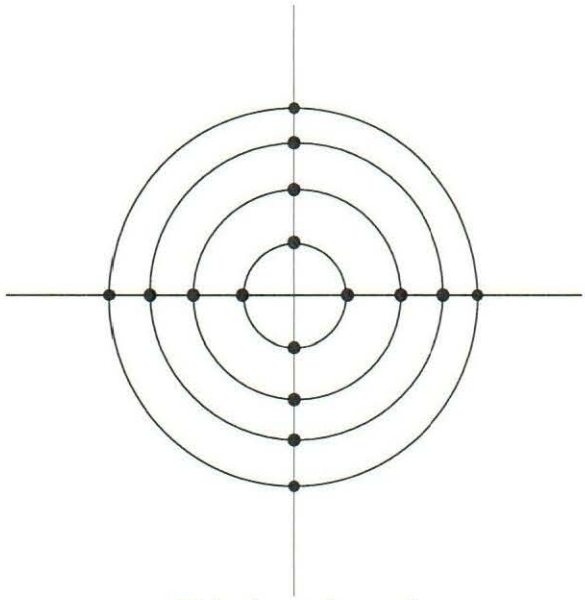
Table 6.4 Measured exhaust gas conditions and PM emission rates for EUCG02

Test No. Test date Test period (24-hr clock)	1 9/14/2023 747-817; 820-850	2 9/14/2023 935-1005; 1009-1039	3 9/14/2023 1113-1143; 1146-1216	Three Test Average
Exhaust Gas Composition				
CO_2 content (% vol)	0.0	0.0	0.0	0.0
O_2 content (% vol)	20.9	20.9	20.9	20.9
Moisture (% vol)	0.95	2.29	2.16	1.80
Exhaust gas temperature (°F)	70.0	72.0	72.8	71.6
Exhaust gas flowrate (dscfm)	7,579	7,495	7,473	7,516
Exhaust gas flowrate (scfm)	7,652	7,671	7,637	7,653
Particulate Matter				
Sample volume (dscf @ STP)	36.4	36.3	35.5	36.1
Filter catch (mg)	0.0	0.7	0.4	0.4
Acetone rinse catch (mg)	0.3	0.7	0.8	0.6
Total PM catch (mg)	0.3	1.4	1.2	1.0
PM emissions (lb/hr)	0.01	0.04	0.03	0.03
Permit limit (lb/hr)	-	-	-	*6.1*
PM emissions (lb/1,000 lb exhaust gas, dry basis)	0.000	0.001	0.001	0.001
Permit limit (lb/1,000 lb exhaust gas, dry basis)	-	-	-	*0.09*

APPENDIX 2

- Sampling Location Diagrams





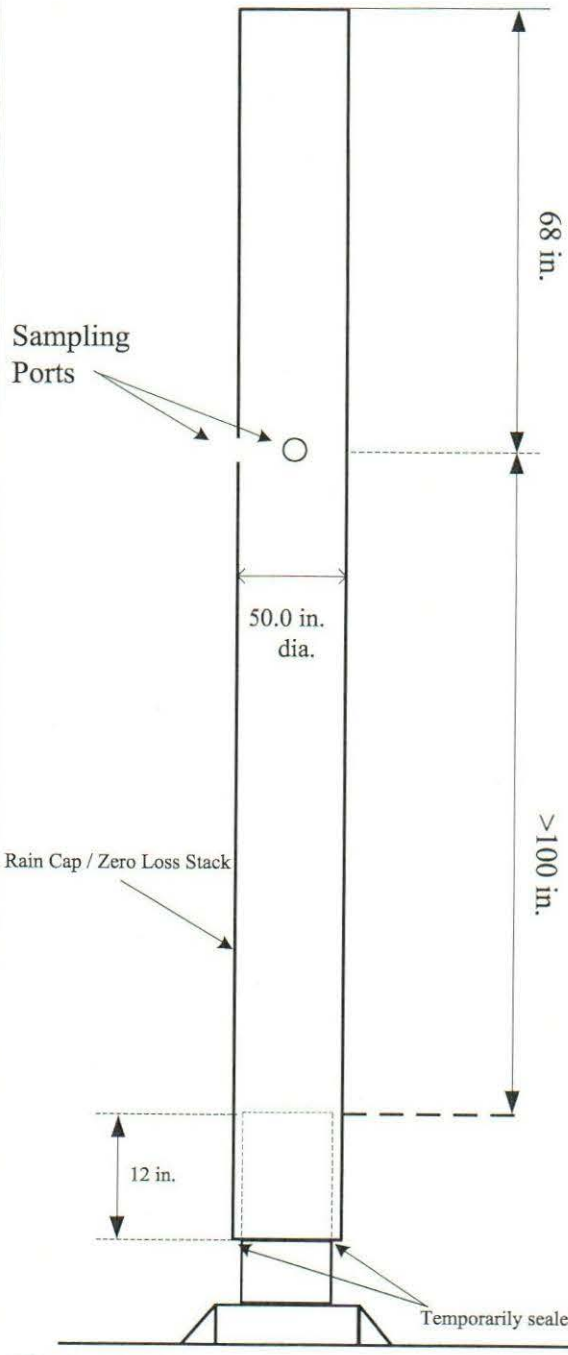
Velocity and sample locations as measured from stack wall

Pt	inch
1	0.50
2	1.16
3	2.13
4	3.54
5	7.45
6	8.87
7	9.85
8	10.50

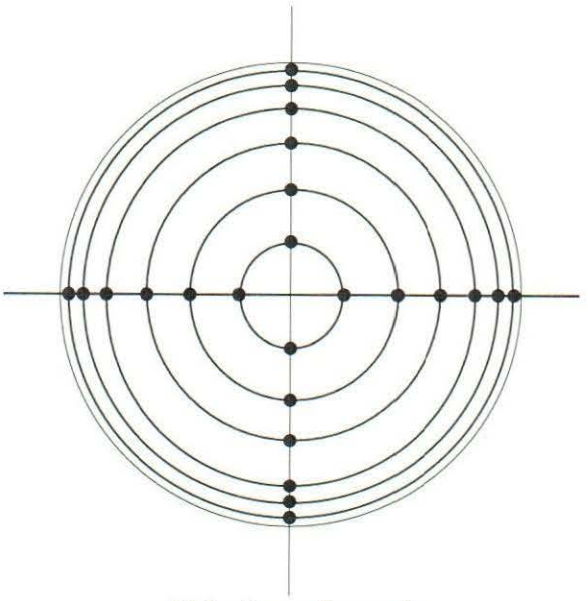
Nexteer Automotive Corporation
EUBL11 Stack Diagram

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE + TESTING



Plant 4 Roof



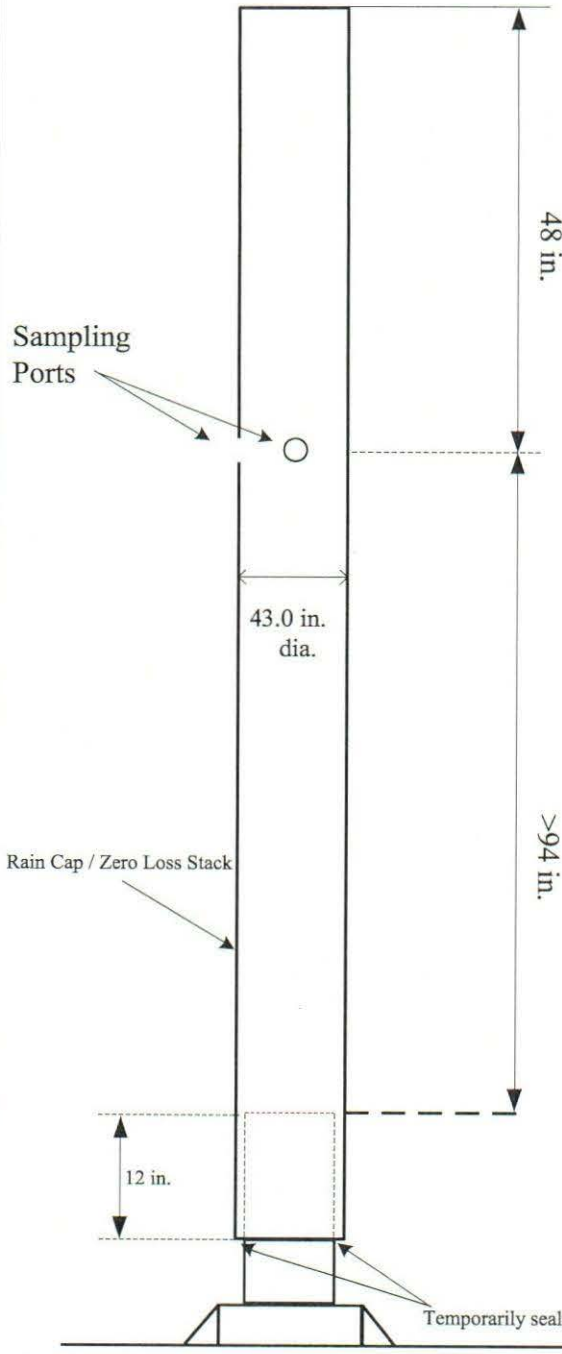
Velocity and sample locations as measured from stack wall

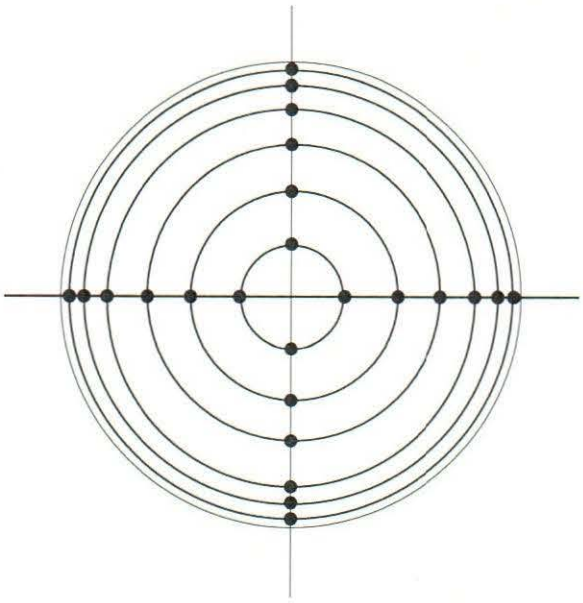
Pt	inch
1	1.05
2	3.35
3	5.90
4	8.85
5	12.50
6	17.80
7	32.20
8	37.50
9	41.15
10	44.10
11	46.65
12	48.95

Nexteer Automotive Corporation
EUCG03 Stack Diagram

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE & TESTING





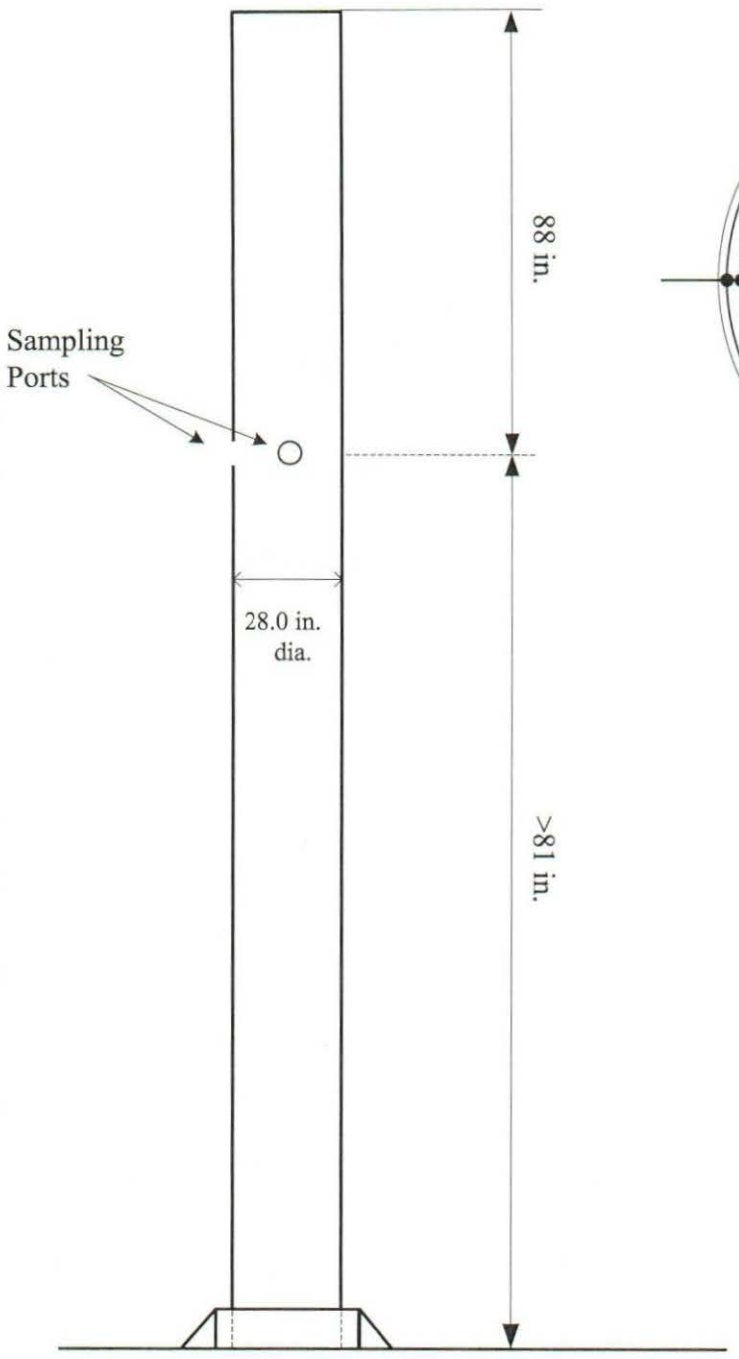
Velocity and sample locations as measured from stack wall

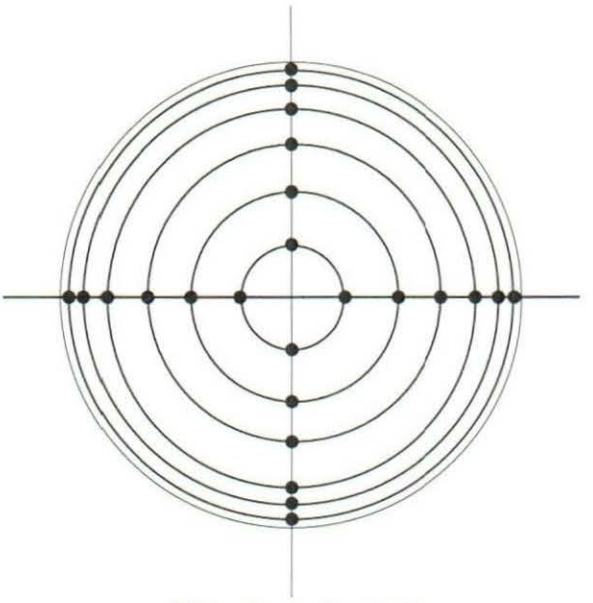
Pt	inch
1	0.90
2	2.88
3	5.07
4	7.61
5	10.75
6	15.31
7	27.69
8	32.25
9	35.39
10	37.93
11	40.12
12	42.10

Nexteer Automotive Corporation
EUCG07 Stack Diagram

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE + TESTING





Velocity and sample locations as measured from stack wall

Pt	inch
1	0.59
2	1.88
3	3.30
4	4.96
5	7.00
6	9.97
7	18.03
8	21.00
9	23.04
10	24.70
11	26.12
12	27.41

Nexteer Automotive Corporation
EUCG02 Stack Diagram

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE & TESTING