AIRx Testing Services, Inc.

Date Tested: March 24, 2021
Date Issued: April 13, 2021
Revision Number: - -

COMPLIANCE SOURCE TEST REPORT:
ONE (1) HOT OIL HEATER
ALL AMERICAN ASPHALT – IRVINE FACILITY
SCAQMD A/N 622276
ID #082207

STID: PR21045

STA Received: 4/23/2021

Source Location:
ALL AMERICAN ASPHALT
10600 Jeffrey Road
Irvine, California 92602

Submitted to:
ALL AMERICAN ASPHALT
P.O. Box 2229
Corona, California 91719

Attention: John Gardner

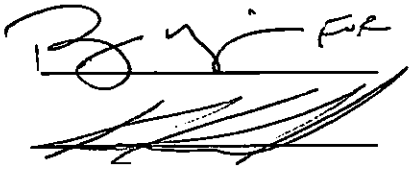
For Submittal to:
South Coast Air Quality Management District
21854 Copley Drive
Diamond Bar, California 91765-4178

Prepared By:
AIRx Testing Services, Inc.
2472 Eastman Avenue Unit #34
Ventura, CA 93003

Job Number
1064

Laboratory Report Number
221-028

Test Team Leader
Ken Kennepohl



Tom Porter, Vice President of Testing Services

Ken Kennepohl, Project Engineer

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1.0 SUMMARY

Source Tested:	All American Asphalt Hot Oil Heater - Crumb Rubber Plant
Test Location:	All American Asphalt 10600 Jeffrey Road Irvine, California
Test Requested by:	SCAQMD
Test Objectives	Determine for compliance reporting: Emissions of NOx & CO for SCAQMD Rule 1146 & Rule 441
Test Performed by:	AIRx Testing Services, Inc.
Personnel:	Ken Kennepohl & Ferodie Torres
Test Methodology:	O2, NOx, CO2 & CO: SCAQMD Method 100.1
Test Observed by:	--
Plant Contact:	John Gardner
Facility ID Number:	082207
SCAQMD Application Number:	622276
SCAQMD Permit Number:	N/A

2.0 INTRODUCTION

AIRx Testing Services, Inc. was contracted by All American Asphalt to conduct source testing on one (1) oil heater located at their facility located at 10600 Jeffrey Road, Irvine, California.

Source testing was conducted by AIRx Testing Services, Inc. personnel on March 24, 2021 to measure carbon monoxide, oxides of nitrogen and oxygen emissions from a natural gas fired hot oil heater. The testing was performed at a low load of **32.6%** operating load & maximum operating load of **98%**. The subject testing was performed to show compliance with SCAQMD Rule 1146 & Rule 441. The test program was conducted by Ken Kennepohl & Ferodie Torres with AIRx Testing Services, Inc. Arrangements for the testing were made through John Gardner with All American Asphalt.

3.0 SOURCE PROCESS AND EQUIPMENT DESCRIPTION

The device is identified as follows:

Modification of the current 7,600,000 BTU/Hr Process Oil Heater by installation of a 4,500,000 BTU/HR CEI Enterprises, Model HDI-400, Natural Gas Fired Low NOx Burner, Power Flame, Model NP2R-G-520, with Flue Gas Recirculation, and a 10-Hp blower.

The subject unit is equipped with a 20 inch round exhaust stack with a 1 inch sample port located 42 inches upstream of any disturbance and 20 inches downstream from the stack exit.

4.0 TEST PROCEDURES

The source testing was conducted according to applicable SCAQMD test methodology. SCAQMD Method 100.1 was followed for carbon monoxide, oxides of nitrogen, carbon dioxide and oxygen determinations.

SAMPLING AND ANALYTICAL PROCEDURES

STACK GAS ANALYSIS: Samples of the stack gas were taken through a heated sample line from the exhaust stack to an iced water dropout and then to a stack gas conditioner yielding a conditioned gas to a point of <37F and analyzed for oxides of nitrogen, oxygen and carbon monoxide using SCAQMD 100.1. The oxygen was determined by a Servomex Model 1400 paramagnetic analyzer. The carbon monoxide was analyzed with an API Model 300EM infrared analyzer with a gas correlation filter system. The oxides of nitrogen were analyzed with an API Model 200EH chemilumescent analyzer. The Carbon Dioxide concentrations was determined by using a Servomex Model 1400 NDIR analyzer. Data was recorded with a data acquisition system and also on a 10" strip chart. Data was reduced to show one (1) minute averages using appropriate spreadsheets. A 30 minute run was performed on the hot oil heater exhaust stack for the determination of emissions concentrations at each of two load conditions of maximum and less than 35% as per Rule 1146.

Three (3) point calibration error checks using two (2) span gases and zero gas were performed before and after each emissions concentration run. Additionally, bias check (probe tip) calibrations were performed at the beginning and end of each test and used for correcting analyzer measurements. For details of the sampling and measurement systems please refer to the attachments.

EXHAUST FLOW RATE: The stack exhaust flow rate was calculated using the fuel expansion factor of natural gas (EPA 8710 dscf/MMBtu), the measured fuel consumption rate and the measured effluent O2 concentrations. All values were calculated at SCAQMD standard conditions (60^{O}F & 29.92 in. Hg).

SCAQMD Methods 1.1-4.1 were utilized as well to determine exhaust flow rate and moisture content. The reference method data was used in the mass calculations.

The fuel usage was recorded by AIRx personnel from the existing dedicated fuel meter. The "F" Factor for the lb/MMBTU calculation was taken from EPA Method 19 - Table 19.1. The fuel meter readings were assumed to be corrected to standard conditions of 29.92 "Hg and 60^{O}F.

5.0 TEST RESULTS AND DISCUSSION

The testing for carbon monoxide, oxides of nitrogen, carbon dioxide and oxygen were conducted while the unit was operating at two operating conditions: low load of less than 35% and maximum load.

The results of the emissions tests are presented on pages 5-2 & 5-3.

AIRX TESTING SERVICES, INC.

SUMMARY OF SOURCE TEST RESULTS

All American Asphalt
Irvine
3/24/2021

Hot Oil Heater Low

CONSTITUENT	RESULTS	*ALLOWABLE*
Oxides of Nitrogen (NOx)		
ppmv	**2.6**	**-**
ppmv @ 3% O2	**4.1**	***9***
lb/hr	**0.0064**	**-**
lb/MMBtu	**0.0051**	**-**
Carbon Monoxide (CO) ***(Actual Observed)***		
ppmv	**0.1**	**-**
ppmv @ 3% O2	**0.1**	***400***
lb/hr	**0.000076**	**-**
lb/MMBtu	**0.000060**	**-**
Carbon Monoxide (CO) ***(20% Full Scale)***		
ppmv	**< 2.0**	**-**
ppmv @ 3% O2	**< 3.2**	***400***
lb/hr	**< 0.0030**	**-**
lb/MMBtu	**< 0.0024**	**-**
Oxygen, ***percent***	**9.5**	**-**
Exhaust Flowrate, ***dscfm***	**337**	**-**
Fuel Usage, dscfm	**23.3**	**-**
Heat Input during Test	**32.6%**	**< 35%**

AIRX TESTING SERVICES, INC.

SUMMARY OF SOURCE TEST RESULTS

All American Asphalt
Irvine
3/24/2021
Maximum
Hot Oil Heater max

CONSTITUENT	RESULTS	*ALLOWABLE*
Oxides of Nitrogen (NOx)		
ppmv	**2.1**	**-**
ppmv @ 3% O2	**3.0**	***9***
lb/hr	**0.015**	**-**
lb/MMBtu	**0.0037**	**-**
Carbon Monoxide (CO) ***(Actual Observed)***		
ppmv	**0.1**	**-**
ppmv @ 3% O2	**0.2**	***400***
lb/hr	**0.00051**	**-**
lb/MMBtu	**0.00012**	**-**
Carbon Monoxide (CO) ***(20% Full Scale)***		
ppmv	**< 2.0**	**-**
ppmv @ 3% O2	**< 2.9**	***400***
lb/hr	**< 0.0088**	**-**
lb/MMBtu	**< 0.0022**	**-**
Oxygen, ***percent***	**8.5**	**-**
Exhaust Flowrate, ***dscfm***	**998**	**-**
Fuel Usage, dscfm	**70.0**	**-**
Heat Input during Test	**98%**	**-**

6.0 QUALITYASSURANCE

Quality control procedures used during the continuous emissions portion of the test included the use of nonreactive stainless steel and Teflon sample lines and fittings, a sample system that operates under positive rather than negative pressure, pre-test and post test leak checks, zero and span calibrations, multi-range linearity checks, system calibration and interference checks. Zero and Span drift errors were corrected by using the zero and span values obtained during each sample run from the initial and final calibrations. During the test runs, the total sample flow rates and pressures from the sample extraction and conditioning system and flows to the analyzers were normal, indicating good equipment operation. The sample gas conditioning unit was maintained at <37°F. The field data sheets in Appendix A summarize the performance of the CEMS during this source test.

The analyzers used for the continuous emissions monitoring of CO, Nox, CO2 and O2 have been approved by the California Air Resources Board. The analyzers were calibrated before and after each test run to ensure the validity of the test and a probe tip calibration through the entire sampling system (systems check) was also done to determine if any interference was caused by the sampling system. No interferences were detected. The zero and calibration gases were prepared to SCAQMD specifications for Method 100.1. Certification of analysis for the calibration gases used during this test is provided in Appendix A.

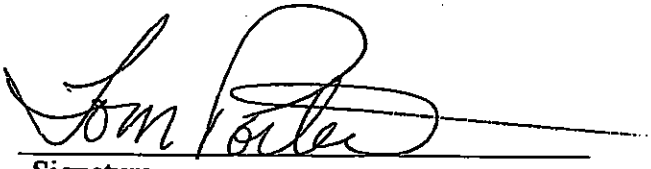
AIRx Testing Services, Inc.

CONFLICT OF INTEREST NEGATIVE DECLARATION

AIRx Testing is an independent emissions testing contractor.

AIRx Testing maintains that no conflict of interest exists between the partners and employees of AIRx Testing, and the partners, employees or interests involved in the facility detailed in this report.

INDEPENDENT CONTRACTOR



Signature

Tom Porter – Vice President

4/13/2021

Date of Signature

APPENDIX A METHOD 100.1

CONTINUOUS EMISSIONS MONITORING - CARB METHOD 100

Client : All American Asphalt
Site : Irvine
Unit : Hot Oil Heater Low

Date : 3/24/2021
Job# : 7019
Lab# : 213-039

FIELD DATA

Test Length 60 mins. Points -

Standard Temperature, T std: 60 ° *F*

Drift Corrected Emissions Data

	NOx	2.61	ppmv
20% FS	CO	< 2.0	ppmv
Actual	CO	0.05	ppmv
	O2	9.54	%

Flow Data

Q std	337	dscfm

Equations used:
NOx or CO @ 3% O2 = [ppmv] * (17.9/(20.9-O2%))
T Factor = (10^-6*(29.92/(21.85*(460+Tstd)))*60
lb/hr = [ppmv] * Q std * MW * (T Factor)
lb/MMBtu = F-Factor*lb/hr/(60*Qstd)*20.9/(20.9-O2)
MW NOx = 46; MW CO = 28

CALCULATED EMISSIONS

	NOx	**2.61**	**ppmv**
		4.11	**ppmv @ 3% O2**
		0.0064	**lb/hr**
		0.0051	**lb/MMBtu**
Actual	**CO**	**< 0.05**	**ppmv**
		< 0.08	**ppmv @ 3% O2**
		< 0.000076	**lb/hr**
		< 0.000060	**lb/MMBtu**
20% FS	**CO**	**< 2.0**	**ppmv**
		< 3.2	**ppmv @ 3% O2**
		< 0.0030	**lb/hr**
		< 0.0024	**lb/MMBtu**

CONTINUOUS EMISSIONS MONITORING - CARB METHOD 100

Client : All American Asphalt
Site : Irvine
Unit : Hot Oil Heater max

Date : 3/24/2021
Job# : 7019
Lab# : 213-039

FIELD DATA

Test Length 60 mins. Points -

Standard Temperature, T std: 60 ° *F*

Drift Corrected Emissions Data

	NOx	2.09	ppmv
20% FS	CO	< 2.0	ppmv
Actual	CO	0.12	ppmv
	O2	8.49	%

Flow Data

Q std	998	dscfm

Equations used:
NOx or CO @ 3% O2 = [ppmv] * (17.9/(20.9-O2%))
T Factor = (10^-6*(29.92/(21.85*(460+Tstd)))*60
lb/hr = [ppmv] * Q std * MW * (T Factor)
lb/MMBtu = F-Factor*lb/hr/(60*Qstd)*20.9/(20.9-O2)
MW NOx = 46; MW CO = 28

CALCULATED EMISSIONS

Actual	NOx	2.09	ppmv
		3.02	ppmv @ 3% O2
		0.015	lb/hr
		0.0037	lb/MMBtu
Actual	CO	0.1	ppmv
		0.2	ppmv @ 3% O2
		0.00051	lb/hr
		0.00012	lb/MMBtu
20% FS	CO	< 2.0	ppmv
		< 2.9	ppmv @ 3% O2
		< 0.0088	lb/hr
		< 0.0022	lb/MMBtu

SCAQMD Method 100.1 Linearity
All American Asphalt
Source: Hot Oil Heater
Lab No.: 221-028
Test Date: 3-24-2021

PRETEST
LEAK CHECK

** LINEARITY CHECK **

RANGE :	25 O2	10 CO	5 NOx	10 CO2
ZERO				
Instrument	0.0	0.0	0.0	0.0
Cylinder	0.0	0.0	0.0	0.0
Difference (%)	0.0	-0.1	0.0	-0.1
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)	0.0	0.0	0.0	0.0
MID LEVEL				
Instrument	12.0	3.9	2.1	4.0
Cylinder	12.0	3.89	2.10	4.01
Difference (%)	-0.2	-0.3	-0.2	-0.2
HIGH LEVEL				
Instrument	20.1	8.1	4.0	7.9
Cylinder	20.1	8.12	4.04	7.93
Difference (%)	0.0	0.3	0.2	0.0

POST TEST
LEAK CHECK

	25 O2	10 CO	5 NOx	10 CO2
ZERO				
Instrument	0.0	0.0	0.0	0.0
Cylinder	0.0	0.0	0.0	0.0
Difference (%)	-0.1	-0.3	-0.8	-0.4
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)	0.0	0.0	0.0	0.0
MID LEVEL				
Instrument	12.0	3.9	2.1	4.0
Cylinder	12.0	3.89	2.10	4.01
Difference (%)	0.0	-0.3	0.0	0.2
HIGH LEVEL				
Instrument	20.1	8.1	4.0	7.9
Cylinder	20.1	8.12	4.04	7.93
Difference (%)	0.0	0.3	0.4	0.2

SYSTEM BIAS PreTest	
NOx	
2.1	
2.10	
0.2	
pass	
O2	
12.0	
12.0	
0.0	
pass	
CO	
3.8	
3.89	
0.5	
pass	
CO2	
4.0	
4.01	
-0.1	
Post test	
NOx	
2.1	
2.09	
-0.6	
pass	
O2	
12.0	
12.0	
0.0	
pass	
CO	
3.9	
3.84	
-0.7	
pass	
CO2	
4.0	
4.03	
0.0	
pass	

STRATIFICATION TEST

POINT	SAMPLE CONC. NOX	O2
c		
A-1		
c	TRAVERSED	
A-2		
c		
A-3		
c		
A-4		
c		
c		
B-1		
c		
B-2		
c		
B-3		
c		
B-4		
c		
AVERAG	0	#DIV/0!
SAMP. PT.		

System Response Time (seconds)

	#1	#2	#3
Upscale			
NOx			
CO			
O2			
CO2			
Downscale			
NOx			
CO			
O2			
CO2			

NO2 to NO Converter Efficiency (%)

	cylinder	instr.	efficienc
ppm	19.0	18.1	95.0

EMISSIONS TEST - SCAQMD Method 100.1

Date: 3/24/2021 Page : 1 of 2

**** Test Information ****

Client: All American Asphalt
County: SCAQMD
Site(s): Irvine
Unit(s): Hot Oil Heater Low

**** Personnel ****

AIRx: FT/KK
Client: JG
APCD: None

Run Length:	60	Inlet ( )	Outlet(X)	Fuel ( )	HC's( )	
		S.T.(X)	E.I.( )	Data( )	H2S ( )	NH3 ( )

**** Instrument Information ****

Instrument	"On"	Unit#	Make/Model
Outlet NOx:	1	1	API 200EH
O2:	1	12	Servomex 1400
CO:	1	3	API 300EM
CO2:	1	9	Servomex 1440

**** Calibration Information ****

	Units	Zero	Span	Range	Gas Cyl.#	Gas Flow
NOx:	ppmv	0	2.10	5	DT0027640	1
NOx:	ppmv	0	4.04	5	DT0035144	1
NOx:	ppmv	0	20.2	25	CC724456	1
O2:	%	0	12.0	25	CC134279	0.6
O2:	%	0	20.1	25	CC144381	0.6
CO:	ppmv	0	3.89	10	CC28151	1
CO:	ppmv	0	8.12	10	CC196750	1
NO2	ppmv	0	19.0	25	CC3240	1
CO2:	%	0	4.01	10	CC134279	0.6
CO2:	%	0	7.93	10	CC144381	0.6

**** Recorder Information ****

Recorder Type: Soltec 6 pin 10 cm/hr

		Chanl.	Pen Type	Color
Outlet NOx:	ppmv	1	Cont.	Black
O2:	%	2	Cont.	Green
CO:	ppmv	3	Cont.	Purple
CO2:	%	4	Cont.	Blue

EMISSIONS TEST - CARB Method 100

Date: 3/24/2021
Client: All American Asphalt
Site: Irvine

Unit : Hot Oil Heater Low
Run Number : 1

**** Measured Emissions Components and Calibration Gas Concentrations ****

Source:	Outlet	Outlet	Outlet	Outlet
Component:	NOx	O2	CO	CO2
Units:	ppmv	%	ppmv	%
Span Gas Conc:	2.10	12.0	3.89	4.01
Analyzer Range:	5	25	10	10

Start Run @: 8:40
End Run @: 9:10

**** Initial Calibration Values ****

Bias Zero:	0.0	0.0	0.0	0.0
Bias Span:	2.1	12.0	3.8	4.0

**** Raw Emission Data ****

					NOx ppmv @ 3% O2	CO ppmv @ 3% O2
8:40	2.48	9.58	0.01	6.18	3.9	0.0
8:41	2.54	9.58	0.01	6.18	4.0	0.0
8:42	2.53	9.58	0.00	6.18	4.0	0.0
8:43	2.51	9.58	0.01	6.18	4.0	0.0
8:44	2.51	9.58	0.01	6.18	4.0	0.0
8:45	2.57	9.58	0.01	6.18	4.1	0.0
8:46	2.47	9.58	0.01	6.18	3.9	0.0
8:47	2.56	9.58	0.01	6.18	4.0	0.0
8:48	2.65	9.58	0.01	6.17	4.2	0.0
8:49	2.60	9.57	0.01	6.17	4.1	0.0
8:50	2.50	9.58	0.01	6.18	4.0	0.0
8:51	2.61	9.59	0.01	6.18	4.1	0.0
8:52	2.63	9.60	0.01	6.19	4.2	0.0
8:53	2.67	9.66	0.01	6.22	4.3	0.0
8:54	2.73	9.67	0.01	6.23	4.4	0.0
8:55	2.61	10.43	0.01	6.23	4.7	0.0
8:56	2.73	10.19	0.01	6.24	4.6	0.0
8:57	2.65	9.68	0.03	6.25	4.2	0.0
8:58	2.69	9.65	0.08	6.25	4.3	0.1
8:59	2.72	9.65	0.01	6.25	4.3	0.0
9:00	2.57	9.57	0.03	6.21	4.1	0.0
9:01	2.63	9.44	0.06	6.13	4.1	0.1
9:02	2.67	9.36	0.11	6.08	4.1	0.2
9:03	2.50	9.31	0.13	6.04	3.9	0.2
9:04	2.62	9.28	0.15	6.02	4.0	0.2
9:05	2.68	9.25	0.11	6.01	4.1	0.2
9:06	2.57	9.24	0.15	6.00	3.9	0.2
9:07	2.52	9.24	0.10	6.00	3.9	0.2
9:08	2.56	9.24	0.12	6.00	3.9	0.2
9:09	2.59	9.24	0.18	6.00	4.0	0.3
9:10	2.52	9.24	0.15	6.00	3.9	0.2
Raw Avg:	**2.59**	**9.55**	**0.05**	**6.14**	**4.1**	**0.1**

**** Final Calibration Values ****

Bias Zero:	0.0	0.0	0.0	0.0
Bias Span:	2.1	12.0	3.9	4.0
zero drift, %:	-0.2	-0.1	0.0	0.0
span drift, %:	0.2	0.1	0.5	0.0

**** System Bias / Drift Corrected Emissions ****

Average:	**2.61**	**9.54**	**0.05**	**6.12**

Avg= (RawAvg-Avg Zero Response)*SpanConc/(Avg Span Response-Avg Zero Response)

CO 3.84 CC128151

CO2 4.01 O2 11.97

NO2 2.1 DT0027640

CO 8.12 CC196750

CO2 7.93 O2 20.4

Nox 4.04 DT0035144

Initial Internal Linearity Cal

NO2 19.01 CC3240 Nox 0.25

Nox 20.2 CC124456

NO_2 to NO converter

CO

O2

NOx

CO2

Start
Run
30%
8:40

CO
3.89

CO2
4.01

O2
11.97

NOx
2.1

Initial Gas Cal

All
American
Asphalt
221-028
3-24-21
10 [illegible]
[illegible]
KK

NOx 0-5
O2 0-25
CO2 0-10
CO 0-10

Stp
29.96

ARX TESTING SERVICES Inc.

C.E.M. TEMPERATURE DATA

Facility: All Hawaiian Hospital

Date: 3-24-21

Job No: 221-028

Run #: 1 30%

Source: Oil Heater

Probe Temp. Settings: 250 deg. F

Heated Line Temp. Settings: 250 deg. F

		TEMPERATURES Deg. F		
	TIME	Condenser Outlet	Probe	Teflon Line
1	0	34	252	255
2	5	34	254	253
3	10	35	253	256
4	15	35	250	256
5	20	35	251	254
6	25	34	254	254
7	30	35	252	255
8				
9				
10				
11				
12				
13				
14				
15				

EMISSIONS TEST - SCAQMD Method 100.1

Date: 3/24/2021

**** Test Information ****

Client: All American Asphalt
County: SCAQMD
Site(s): Irvine
Unit(s): Hot Oil Heater max

**** Personnel ****

AIRx: FT/KK
Client: JG
APCD: None

Run Length:	60	Inlet ( )	Outlet(X)	Fuel ( )	HC's( )	
		S.T.(X)	E.I.( )	Data( )	H2S ( )	NH3 ( )

**** Instrument Information ****

Instrument	"On"	Unit#	Make/Model
Outlet NOx:	1	1	API 200EH
O2:	1	12	Servomex 1400
CO:	1	3	API 300EM
CO2:	1	9	Servomex 1440

**** Calibration Information ****

	Units	Zero	Span	Range	Gas Cyl.#	Gas Flow
NOx:	ppmv	0	2.10	5	DT0027640	1
NOx:	ppmv	0	4.04	5	DT0035144	1
NOx:	ppmv	0	20.2	25	CC724456	1
O2:	%	0	12.0	25	CC134279	0.6
O2:	%	0	20.1	25	CC144381	0.6
CO:	ppmv	0	3.89	10	CC28151	1
CO:	ppmv	0	8.12	10	CC196750	1
NO2	ppmv	0	19.0	25	CC3240	1
CO2:	%	0	4.01	10	CC134279	0.6
CO2:	%	0	7.93	10	CC144381	0.6

**** Recorder Information ****

Recorder Type: Soltec 6 pin 10 cm/hr

		Chanl.	Pen Type	Color
Outlet NOx:	ppmv	1	Cont.	Black
O2:	%	2	Cont.	Green
CO:	ppmv	3	Cont.	Purple
CO2:	%	4	Cont.	Blue

EMISSIONS TEST - CARB Method 100

Date: 3/24/2021 Page : 2 of 2
Client: All American Asphalt Unit : Hot Oil Heater max
Site: Irvine Run Number : 1

**** Measured Emissions Components and Calibration Gas Concentrations ****

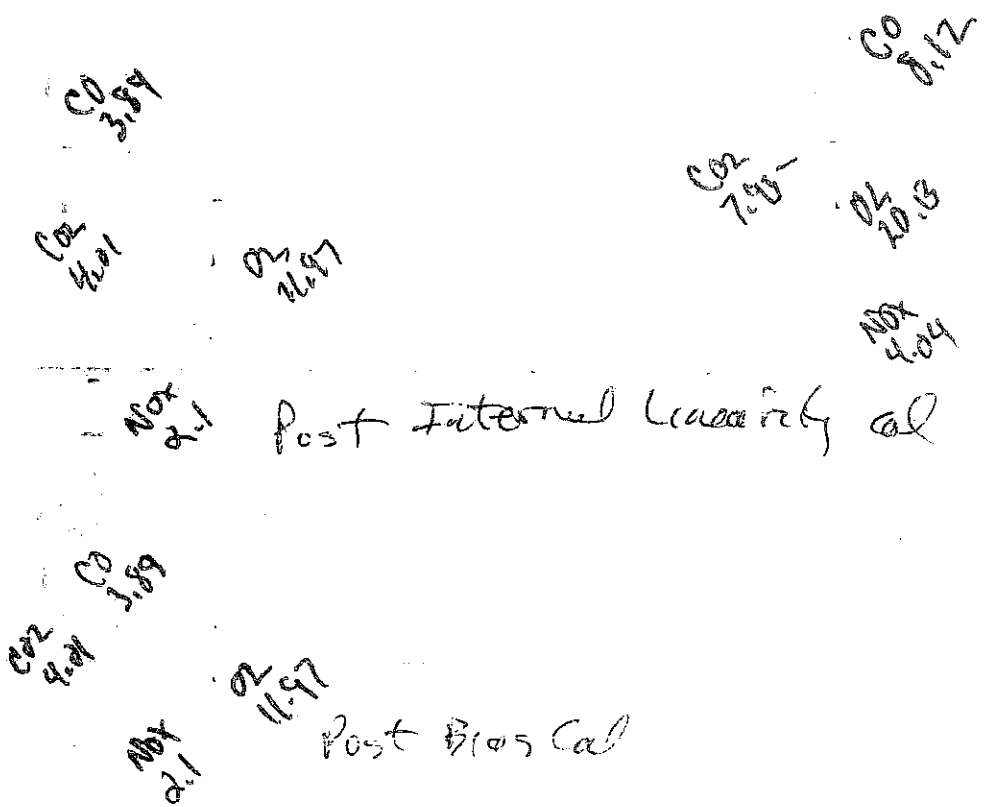
Source:	Outlet	Outlet	Outlet	Outlet	Start Run @: 9:40	
Component:	NOx	O2	CO	CO2	End Run @: 10:10	
Units:	ppmv	%	ppmv	%		
Span Gas Conc:	2.10	12.0	3.89	4.01		
Analyzer Range:	5	25	10	10		
**** Initial Calibration Values ****						
Bias Zero:	0.0	0.0	0.0	0.0	NOx ppmv @ 3% O2	CO ppmv @ 3% O2
Bias Span:	2.1	12.0	3.9	4.0		
**** Raw Emission Data ****						
9:40	2.06	8.40	0.18	6.70	3.0	0.3
9:41	2.02	8.40	0.13	6.70	2.9	0.2
9:42	2.06	8.40	0.07	6.70	2.9	0.1
9:43	2.06	8.40	0.15	6.70	3.0	0.2
9:44	2.01	8.40	0.14	6.70	2.9	0.2
9:45	2.13	8.40	0.12	6.70	3.1	0.2
9:46	2.13	8.40	0.11	6.70	3.1	0.2
9:47	2.08	8.40	0.11	6.70	3.0	0.2
9:48	2.06	8.40	0.13	6.70	3.0	0.2
9:49	2.06	8.40	0.13	6.70	3.0	0.2
9:50	2.13	8.40	0.12	6.70	3.1	0.2
9:51	2.14	8.40	0.12	6.70	3.1	0.2
9:52	2.03	8.40	0.12	6.70	2.9	0.2
9:53	2.04	8.40	0.11	6.70	2.9	0.2
9:54	2.13	8.40	0.13	6.70	3.1	0.2
9:55	1.99	8.40	0.08	6.70	2.9	0.1
9:56	2.10	8.97	0.14	6.70	3.3	0.2
9:57	1.99	10.75	0.07	6.71	4.4	0.2
9:58	2.02	8.40	0.06	6.70	2.9	0.1
9:59	2.05	8.39	0.07	6.70	2.9	0.1
10:00	2.16	8.39	0.06	6.70	3.1	0.1
10:01	2.06	8.39	0.12	6.70	3.0	0.2
10:02	2.14	8.39	0.15	6.70	3.1	0.2
10:03	2.15	8.39	0.16	6.70	3.1	0.2
10:04	2.12	8.39	0.08	6.70	3.0	0.1
10:05	2.08	8.39	0.10	6.70	3.0	0.2
10:06	2.15	8.39	0.13	6.70	3.1	0.2
10:07	2.23	8.39	0.11	6.70	3.2	0.2
10:08	2.23	8.39	0.14	6.70	3.2	0.2
10:09	2.17	8.39	0.13	6.70	3.1	0.2
10:10	2.23	8.39	0.12	6.70	3.2	0.2
Raw Avg:	**2.10**	**8.49**	**0.12**	**6.70**	**3.1**	**0.2**
**** Final Calibration Values ****						
Bias Zero:	0.0	0.0	0.0	0.0		
Bias Span:	2.1	12.0	3.9	4.0		
zero drift, %:	0.0	0.0	0.0	0.0		
span drift, %:	0.6	0.0	0.2	0.0		
**** System Bias / Drift Corrected Emissions ****						
Average:	**2.09**	**8.49**	**0.12**	**6.67**		

Avg= (RawAvg-Avg Zero Response)*SpanConc/(Avg Span Response-Avg Zero Response)

Start
R-2
MAX 9:40
562
29.7

CO 3.89
CO2 4.01
NOx 2.1
O2 11.97
Internal cal

CO 3.89
CO2 4.01
NOx 2.1
O2 11.97
Bias cal


CO 3.89
CO2 4.01
O2 11.97
NOx 2.1
Post Internal Linearity Cal
CO 3.89
CO2 4.01
O2 11.97
NOx 2.1
Post Bias Cal
CO 8.12
CO2 7.00
O2 10.3
NOx 4.04

AIRX TESTING SERVICES Inc.

C.E.M. TEMPERATURE DATA

Facility: Hill Mountain Asphalt

Date: 3-24-21

Job No: 21-028

Run #: 2 MAX

Source: D.C Heater

Probe Temp. Settings: 250 deg. F

Heated Line Temp. Settings: 250 deg. F

		TEMPERATURES Deg. F		
	TIME	Condenser Outlet	Probe	Teflon Line
1	0	35	252	255
2	5	35	250	256
3	10	35	253	257
4	15	36	251	254
5	20	36	250	255
6	25	34	250	254
7	30	35	252	255
8				
9				
10				
11				
12				
13				
14				
15				

Job Number	221-028
Run Number	1
Client	All American Asphalt
Plant	Irvine
Unit	Heater
Operator	Ken Kennepohl
Start Timestamp	3/24/2021 7:32

Raw Data

Timestamp (s)	NOX (ppm)	CO (ppm)	O2 (%)	CO2 (%)	
7:33	0.00	0.01	0.01	0.01	Zero;
7:34	0.01	0.01	0.03	0.01	
7:35	0.01	0.01	0.03	0.01	
7:36	2.23	0.01	0.52	0.01	
7:37	16.65	0.00	0.22	0.01	
7:38	19.13	0.01	0.06	0.01	
7:39	20.18	0.01	0.05	0.01	Nox 20.2;
7:40	12.52	0.01	0.04	0.01	
7:41	0.09	0.01	0.04	0.01	
7:42	0.12	0.01	0.05	0.04	
7:43	4.51	0.01	1.95	0.04	
7:44	8.81	0.01	2.13	0.04	
7:45	17.64	0.01	2.13	0.04	
7:46	18.05	0.01	0.80	0.04	NO2 18.05;
7:47	10.30	0.01	0.06	0.04	
7:48	2.02	0.01	0.00	0.01	
7:49	0.61	0.01	0.00	0.01	
7:50	0.01	0.01	0.00	0.01	All Zero;
7:51	0.06	0.01	0.00	0.01	
7:52	1.57	0.04	0.72	0.01	
7:53	2.51	0.02	0.06	0.01	
7:54	3.17	0.01	0.01	0.01	
7:55	4.03	0.01	0.04	0.01	High Nox;
7:56	4.01	0.01	0.12	0.01	
7:57	2.34	0.00	0.01	0.01	
7:58	2.11	0.00	0.00	0.04	Low Nox;
7:59	1.80	0.01	13.04	4.71	
8:00	0.92	0.01	20.14	7.93	High O2 Co2;
8:01	0.36	0.01	20.02	7.93	
8:02	0.11	0.01	15.34	5.80	
8:03	0.08	0.01	12.03	4.11	
8:04	0.04	0.01	12.01	4.03	Low O2 Co2;
8:05	0.05	2.29	4.46	1.54	
8:06	0.04	5.23	1.37	0.64	
8:07	0.04	7.77	0.24	0.08	
8:08	0.02	8.02	0.10	0.05	
8:09	0.01	8.09	0.17	0.03	High CO;
8:10	0.01	6.62	0.10	0.03	
8:11	0.01	4.45	0.08	0.01	
8:12	0.01	4.36	0.01	0.01	
8:13	0.01	4.13	0.01	0.01	

8:14	0.01	4.00	0.01	0.01			
8:15	0.01	3.92	0.01	0.01	Low CO;		
8:16	0.01	3.33	0.01	0.01			
8:17	0.01	0.74	0.01	0.01			
8:18	0.01	0.37	0.01	0.01			
8:19	0.01	0.00	4.36	0.01			
8:20	0.01	0.04	2.57	0.01			
8:21	0.01	0.00	0.03	0.01	Bias Zero;		
8:22	0.01	0.00	0.01	0.01			
8:23	0.04	0.00	0.01	0.01			
8:24	0.01	0.03	0.05	0.01			
8:25	1.02	0.00	0.31	0.08			
8:26	2.09	0.00	0.32	0.08	Nox Bias;		
8:27	1.99	0.00	1.36	0.34			
8:28	1.59	0.00	11.51	3.75			
8:29	0.28	0.00	11.97	4.03	O2 Co2 Bias;		
8:30	0.10	0.00	11.91	4.02			
8:31	0.15	1.79	1.33	0.55			
8:32	0.06	3.84	0.00	0.01	CO Bais;		
8:33	0.06	3.43	0.00	0.00			
8:34	0.17	0.62	0.01	0.00			
8:35	0.18	0.02	0.07	0.02	NOX (Corr) (ppm)	CO (Corr) (ppm)	
8:36	0.91	0.00	3.36	0.08	1.03	0.00	
8:37	2.12	0.01	0.88	0.07	1.90	0.01	
8:38	2.12	0.01	0.08	0.08	1.82	0.01	
8:39	2.12	0.01	0.08	0.08	1.82	0.01	
8:40	2.48	0.01	9.58	6.18	3.92	0.01	
8:41	2.54	0.01	9.58	6.18	4.02	0.01	
8:42	2.53	0.00	9.58	6.18	4.00	0.01	
8:43	2.51	0.01	9.58	6.18	3.97	0.01	
8:44	2.51	0.01	9.58	6.18	3.97	0.01	
8:45	2.57	0.01	9.58	6.18	4.07	0.01	
8:46	2.47	0.01	9.58	6.18	3.90	0.01	
8:47	2.56	0.01	9.58	6.18	4.04	0.01	
8:48	2.65	0.01	9.58	6.17	4.18	0.01	
8:49	2.60	0.01	9.57	6.17	4.11	0.01	
8:50	2.50	0.01	9.58	6.18	3.96	0.01	
8:51	2.61	0.01	9.59	6.18	4.12	0.01	
8:52	2.63	0.01	9.60	6.19	4.17	0.01	
8:53	2.67	0.01	9.66	6.22	4.25	0.01	
8:54	2.73	0.01	9.67	6.23	4.36	0.01	
8:55	2.61	0.01	10.43	6.23	4.67	0.01	PC;
8:56	2.73	0.01	10.19	6.24	4.59	0.01	
8:57	2.65	0.03	9.68	6.25	4.23	0.04	
8:58	2.69	0.08	9.65	6.25	4.28	0.13	
8:59	2.72	0.01	9.65	6.25	4.32	0.01	
9:00	2.57	0.03	9.57	6.21	4.06	0.04	
9:01	2.63	0.06	9.44	6.13	4.10	0.10	
9:02	2.67	0.11	9.36	6.08	4.14	0.18	
9:03	2.50	0.13	9.31	6.04	3.86	0.20	
9:04	2.62	0.15	9.28	6.02	4.03	0.23	

9:05	2.68	0.11	9.25	6.01	4.12	0.16
9:06	2.57	0.15	9.24	6.00	3.94	0.24
9:07	2.52	0.10	9.24	6.00	3.87	0.16
9:08	2.56	0.12	9.24	6.00	3.93	0.19
9:09	2.59	0.18	9.24	6.00	3.98	0.27
9:10	2.52	0.15	9.24	6.00	3.87	0.23
9:11	2.51	0.15	9.24	6.00		
9:12	0.83	0.11	9.25	6.00		
9:13	0.29	0.01	0.03	0.04		
9:14	0.00	0.00	0.01	0.01	Bias Zero;	
9:15	0.00	0.00	0.02	0.02		
9:16	0.01	0.03	0.05	0.03		
9:17	1.02	0.00	0.31	0.08		
9:18	2.09	0.00	0.32	0.08	Nox Bias;	
9:19	1.99	0.00	1.36	0.34		
9:20	1.59	0.00	11.51	3.75		
9:21	0.28	0.00	11.97	4.03	O2 Co2 Bias;	
9:22	0.10	0.00	11.91	4.02		
9:23	0.15	1.79	1.33	0.55		
9:24	0.06	3.89	0.00	0.01	CO Bais;	
9:25	0.01	3.48	0.00	0.00		
9:26	0.01	3.43	0.00	0.00		
9:27	0.01	0.00	0.00	0.01	Zero In;	
9:28	0.26	0.00	0.00	0.01		
9:29	1.57	0.00	0.01	0.00		
9:30	2.08	0.01	0.01	0.00	Nox In;	
9:31	2.02	0.01	0.41	0.12		
9:32	1.39	0.01	10.37	3.63		
9:33	0.39	0.01	11.97	4.03	O2 CO2 In;	
9:34	0.16	0.23	12.00	3.99		
9:35	0.01	0.72	5.42	1.92		
9:36	0.00	3.63	0.06	0.03		
9:37	0.00	3.91	0.02	0.00	CO In;	
9:38	0.00	2.33	0.01	0.00		
9:39	1.60	0.76	6.83	5.96	NOX (Corr) (ppm)	CO (Corr) (ppm)
9:40	2.06	0.18	8.40	6.70	2.95	0.26
9:41	2.02	0.13	8.40	6.70	2.89	0.19
9:42	2.06	0.07	8.40	6.70	2.94	0.11
9:43	2.06	0.15	8.40	6.70	2.95	0.22
9:44	2.01	0.14	8.40	6.70	2.88	0.19
9:45	2.13	0.12	8.40	6.70	3.05	0.18
9:46	2.13	0.11	8.40	6.70	3.05	0.15
9:47	2.08	0.11	8.40	6.70	2.98	0.16
9:48	2.06	0.13	8.40	6.70	2.95	0.18
9:49	2.06	0.13	8.40	6.70	2.95	0.18
9:50	2.13	0.12	8.40	6.70	3.05	0.17
9:51	2.14	0.12	8.40	6.70	3.07	0.17
9:52	2.03	0.12	8.40	6.70	2.91	0.17
9:53	2.04	0.11	8.40	6.70	2.92	0.16
9:54	2.13	0.13	8.40	6.70	3.05	0.18
9:55	1.99	0.08	8.40	6.70	2.85	0.11

9:56	2.10	0.14	8.97	6.70	3.32	0.22	PC;
9:57	1.99	0.07	10.75	6.71	4.42	0.19	
9:58	2.02	0.06	8.40	6.70	2.89	0.09	
9:59	2.05	0.07	8.39	6.70	2.93	0.10	
10:00	2.16	0.06	8.39	6.70	3.09	0.09	
10:01	2.06	0.12	8.39	6.70	2.95	0.16	
10:02	2.14	0.15	8.39	6.70	3.07	0.21	
10:03	2.15	0.16	8.39	6.70	3.07	0.23	
10:04	2.12	0.08	8.39	6.70	3.04	0.12	
10:05	2.08	0.10	8.39	6.70	2.98	0.15	
10:06	2.15	0.13	8.39	6.70	3.08	0.18	
10:07	2.23	0.11	8.39	6.70	3.19	0.15	
10:08	2.23	0.14	8.39	6.70	3.19	0.19	
10:09	2.17	0.13	8.39	6.70	3.11	0.19	
10:10	2.23	0.12	8.39	6.70	3.20	0.17	
10:11	2.15	0.12	8.39	6.70	3.07	0.18	
10:12	0.04	0.00	0.05	0.01			
10:13	0.00	0.00	0.00	0.01	Bias Zero;		
10:14	0.26	0.00	0.00	0.01			
10:15	1.57	0.01	0.10	0.03			
10:16	2.12	0.01	0.25	0.09	Bias Nox;		
10:17	1.12	0.01	0.41	0.12			
10:18	1.39	0.01	10.37	3.63			
10:19	0.39	0.01	11.97	4.03	O2 CO2 Bias;		
10:20	0.16	0.01	12.00	3.99			
10:21	0.04	0.72	5.42	1.92			
10:22	0.02	3.63	0.08	0.03			
10:23	0.01	3.91	0.01	0.01	CO Bias;		
10:24	0.00	2.33	0.01	0.01			
10:25	0.00	0.48	0.01	0.01			
10:26	0.00	0.00	0.00	0.01	All Zero;		
10:27	0.07	0.01	0.00	0.01			
10:28	1.29	0.01	0.01	0.01			
10:29	2.10	0.01	0.21	0.09	Low Nox;		
10:30	1.95	0.01	0.18	0.07			
10:31	2.12	0.01	0.19	0.07			
10:32	3.10	0.01	0.07	0.02			
10:33	4.02	0.01	0.01	0.01	High Nox;		
10:34	3.87	0.00	0.00	0.01			
10:35	3.65	0.00	7.14	2.25			
10:36	1.14	0.00	11.89	3.90			
10:37	0.23	0.00	11.98	3.99	Low O2 Co2;		
10:38	0.10	0.00	12.38	4.08			
10:39	0.01	0.00	19.79	7.37			
10:40	0.01	0.02	20.13	7.91	High O2 Co2;		
10:41	0.00	1.03	4.16	2.15			
10:42	0.00	3.57	0.06	0.20			
10:43	0.00	3.92	0.02	0.16	Low CO;		
10:44	0.00	3.94	0.04	0.16			
10:45	0.01	5.91	0.06	0.15			
10:46	0.01	7.89	0.03	0.15			

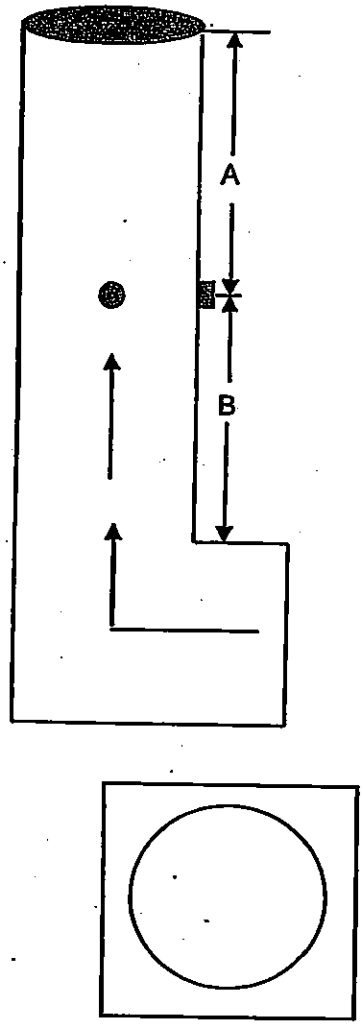
10:47	0.01	8.09	0.03	0.15	High CO;

AIRX TESTING SERVICES Inc.

STACK DIAGRAM

Client: ALL AMERICAN
Site: IRVINE
Unit: OIL HEATER

Date: 03.23.21
Client #: 1064
Lab #: 221.028



"A" Side: 20 (in)=Dia: 1.0
"B" Side: 42 (in)=Dia: 2.0
Diameter: 20 inches
Port Size: 1 inches
Port Offset: 2 inches
Stack Area: ____ sq feet
Port Type: M

Total Traverse Points: ____

Points per Port	Distance inches	w/Offset inches
1	0.64	2.64
2	2.10	4.10
3	3.80	5.80
4	6.46	8.46
5	13.54	15.54
6	16.12	18.12
7	17.90	19.90
8	19.36	21.36

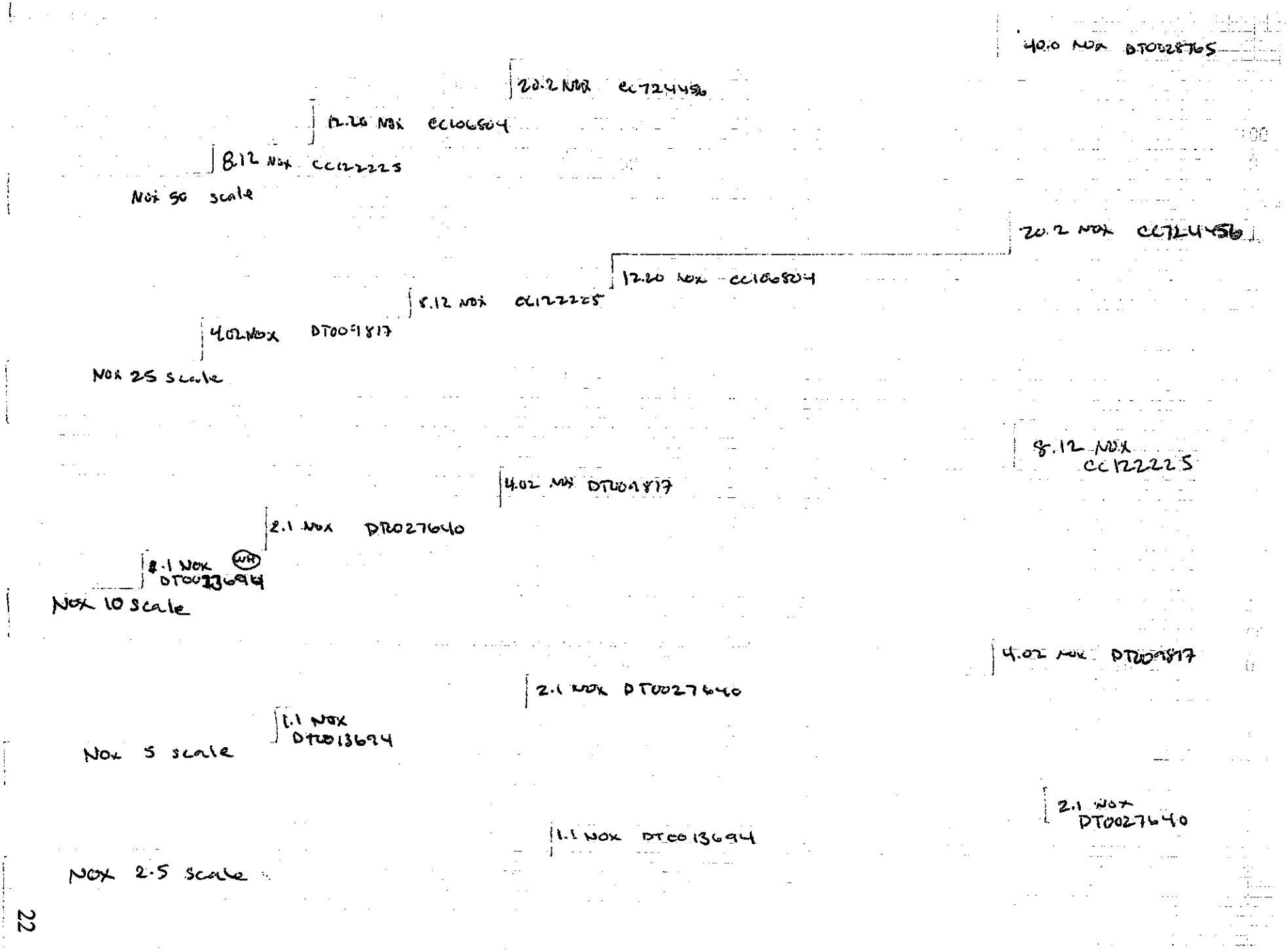
AIRx Testing NOx - API 200EH 1/5/2021
Semi- Annual Linearity @ 2.5 & 5 ppm Ranges

Range = 2.5

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
1.1	1.10	0.0 %	DT0013694
2.1	2.10	0.0 %	DT0027640

Range = 5

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
1.1	1.1	0.0 %	DT0013694
2.1	2.095	-0.1 %	DT0027640
4.02	3.985	-0.7 %	DT009817


40.0 NOx DT0028765
20.2 NOx CC724456
12.20 NOx CC1066804
8.12 NOx CC122225
NOx 50 scale
20.2 NOx CC724456
12.20 NOx CC1066804
8.12 NOx CC122225
4.02 NOx DT009817
NOx 25 scale
8.12 NOx CC122225
4.02 NOx DT009817
2.1 NOx DT0027640
2.1 NOx DT0013694
NOx 10 Scale
4.02 NOx DT009817
2.1 NOx DT0027640
1.1 NOx DT0013694
NOx 5 scale
2.1 NOx DT0027640
1.1 NOx DT0013694
NOx 2.5 scale

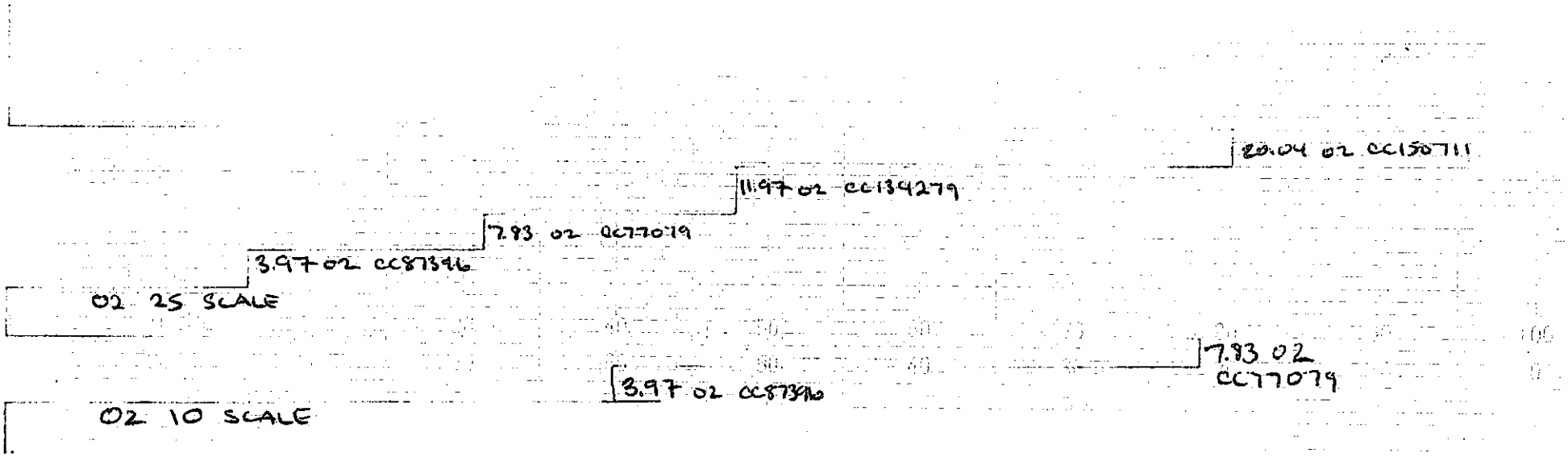
AIRx Testing O2 - Servomex 1400 1/5/2021
Semi- Annual Linearity @ 10 & 25 % Ranges

Range = 10

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
3.97	3.96	0.1 %	CC87396
7.83	7.83	0.0 %	CC77079

Range = 25

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
3.97	3.95	-0.1 %	CC87396
7.83	7.83	0.0 %	CC77079
11.97	11.98	0.0 %	CC134279
20.04	20.05	0.0 %	CC150711


11.97 02 CC139279
7.93 02 CC77079
3.97 02 CC87396
02 25 SCALE
20.04 02 CC150711
7.93 02
CC77079
3.97 02 CC87396
02 10 SCALE

AIRx Testing CO - API 300EM 1/5/2021
Semi- Annual Linearity @ 10,25,50,100 & 200 ppm Ranges

Range = 10

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
3.89	3.89	0.00 %	CC28151
8.02	8.02	0.00 %	DT0020113

Range = 25

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
3.89	3.93	0.14 %	CC28151
8.02	8.10	0.32 %	DT0020113
12.11	12.15	0.16 %	CC7493
20.5	20.48	-0.10 %	DT0012296

Range = 50

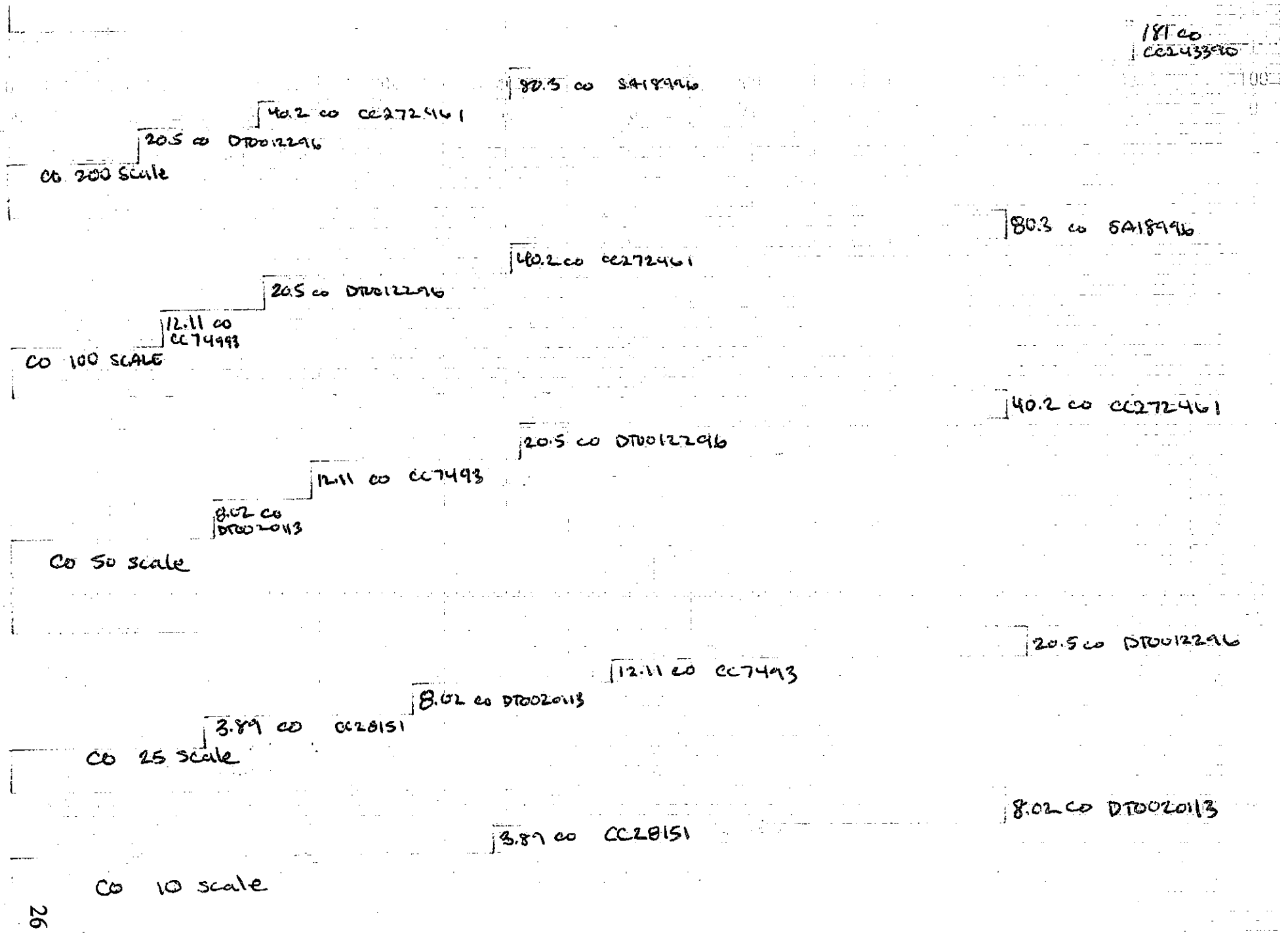
Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
8.02	8.15	0.26 %	DT0020113
12.11	12.15	0.08 %	CC7493
20.5	20.55	0.10 %	DT0012296
40.2	40.15	-0.10 %	CC272461

Range = 100

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
12.11	12.20	0.09 %	CC7493
20.5	20.6	0.10 %	DT0012296
40.2	40.3	0.10 %	CC272461
80.3	80.3	0.00 %	SA18996

Range = 200

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
20.5	20.60	0.05 %	DT0012296
40.2	40.20	0.00 %	CC272461
80.3	80.80	0.25 %	SA18996
181	181	0.00 %	CC243390


181 co
CC243590
80.3 co SA18996
40.2 co CC272461
20.5 co DT00122796
CO 200 Scale
80.3 co SA18996
40.2 co CC272461
20.5 co DT00122796
12.11 co
CC74993
CO 100 SCALE
40.2 co CC272461
20.5 co DT00122796
12.11 co CC7493
8.02 co
DT00120113
CO 50 scale
20.5 co DT00122796
12.11 co CC7493
8.02 co DT00120113
3.89 co CC28151
CO 25 scale
8.02 co DT00120113
3.89 co CC28151
CO 10 scale

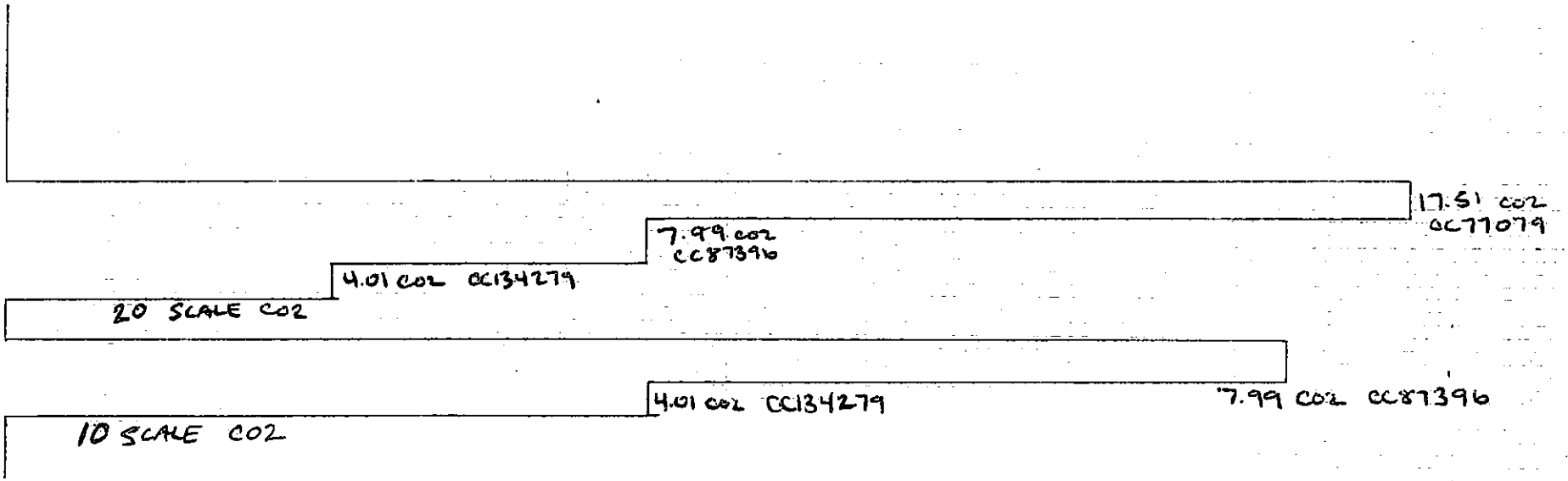
AIRx Testing CO2 - Servomex 1440 1/5/2021
Semi- Annual Linearity @ 10 & 20 % Ranges

Range = 10

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
4.01	4.00	0.1 %	CC134279
7.99	8.00	0.1 %	CC87396

Range = 20

Actual Concentration	Avg. Analyzer Response	Error % of Range	Cylinder #
4.01	4.04	0.2 %	CC134279
7.99	8	0.0 %	CC87396
17.51	17.48	-0.2 %	CC77079


17.51 CO2
CC77079
7.99 CO2
CC87396
4.01 CO2 CC134279
20 SCALE CO2
4.01 CO2 CC134279
7.99 CO2 CC87396
10 SCALE CO2

PRAXAIR
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Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles, CA 90058
Tel: 323-585-2154
Fax: 714-542-6689

Customer & Order Information:

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD,
OXNARD, CA 93030-7224

Praxair Order Number: **71263547**
Customer PO Number: **79252704**

Certificate Issuance Date: **3/4/2020**

Certification Date: **4/4/2020**
Lot Number: **70086005802**
Part Number: **NI NO2.2MM-AS**
DocNumber: **196523**
Expiration Date: **4/3/2021**

CERTIFICATE OF ANALYSIS
Certified Master

Component	Requested Concentration (Molar)	Certified Concentration (Molar)	Analytical Reference	Analytical Uncertainty
Nitric oxide	**2.2 ppm**	**2.1 ppm**	**1**	**± 0.2 ppm Abs.**
Nitrogen	**Balance**	**Balance**		

Cylinder Style: **AS**
Cylinder Pressure @ 70 F: **2000 psig**
Cylinder Volume: **143 ft3**
Valve Outlet Connection: **CGA 660**
Cylinder Number(s): **DT0027640**
For Reference Only: **NOx 2.1 ppm**

Fill Date: **3/27/2020**
Analysis Date: **4/3/2020**

Filling Method: **Gravimetric**

Analyst: **Henry Koung**

Approved Signer: **Leeanna Flores**

Key to Analytical Techniques:

Reference	Analytical Instrument - Analytical Principle	Reference Standard
1	Thermo Electron 42i-LS S/N 1030645077 - Chemiluminescence	NO/N2 4.95 ppm#.DT0026850, Expiration Date: 09/26/2021, Traceable to PRM#APEX1236603

The gas calibration cylinder standard prepared by Praxair Distribution, Inc. is considered a certified standard. It is prepared by gravimetric, volumetric, or partial pressure techniques. The calibration standard provided is certified against Praxair Distribution, Inc. Reference Materials which are traceable to the International System of Units (SI) through either weights traceable to the National Institute of Standards and Technology (NIST) or Measurement Canada, or through NIST Standard Reference Materials or equivalent where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted. Analytical uncertainty is expressed as a Relative % unless otherwise noted.

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DocNumber: 297346

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PGVP ID: F22020

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD
OXNARD CA 93030-7224

Certificate Issuance Date: 01/18/2020
Praxair Order Number: 71200500
Part Number: NI NO4ME-AS
Customer PO Number: 78188373

Fill Date: 01/03/2020
Lot Number: 70086000305
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

Expiration Date:	01/18/2023	NIST Traceable
Cylinder Number:	DT0035144	Expanded Uncertainty
4.01 ppm	Nitric oxide	± 0.6 %
Balance	Nitrogen	

ProSpec EZ Cert

For Reference Only: *NOx 4.04 ppm*

Certification Information: *Certification Date:* 01/18/2020 *Term:* 36 Months *Expiration Date:* 01/18/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. *Component:* Nitric oxide

Requested Concentration: 4 ppm
Certified Concentration: 4.01 ppm
Instrument Used: Thermo Electron 42i-LS S/N 1030645077
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 01/13/2020

First Analysis Data:						Date	01/11/2020
Z: 0	R: 5.06	C: 4.01	Conc: 4.01				
R: 5.05	Z: 0	C: 4.02	Conc: 4.02				
Z: 0	C: 4.02	R: 5.06	Conc: 4.02				
UOM: ppm			Mean Test Assay:	4.02	ppm		

Reference Standard: Type / Cylinder #: GMIS / CC499176
Concentration / Uncertainty: 5.06 ppm ±0.51%
Expiration Date: 09/26/2021
Traceable to: SRM # / Sample # / Cylinder #: PRM#APEX1236603 / n/a /
SRM Concentration / Uncertainty: 10.00 ppm / ± 0.05 ppm
SRM Expiration Date: 09/03/2020

Second Analysis Data:						Date	01/18/2020
Z: 0	R: 5.06	C: 4	Conc: 4				
R: 5.06	Z: 0	C: 4	Conc: 4				
Z: 0	C: 4	R: 5.05	Conc: 4				
UOM: ppm			Mean Test Assay:	4	ppm		

Analyzed By: Henry Koung

Certified By: Leeanna Flores

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DocNumber: 253580

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22019

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD
OXNARD CA 93030

Certificate Issuance Date: 06/27/2019
Praxair Order Number: 70998286
Part Number: NI NO20ME-AS
Customer PO Number: 76981976

Fill Date: 06/07/2019
Lot Number: 70086915805
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	06/27/2022	NIST Traceable
Cylinder Number:	CC724456	Expanded Uncertainty
20.1 ppm	Nitric oxide	± 0.5 %
Balance	Nitrogen	

For Reference Only: *NOx 20.2 ppm*

Certification Information: *Certification Date:* 06/27/2019 *Term:* 36 Months *Expiration Date:* 06/27/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** Nitric oxide

Requested Concentration: 20 ppm
Certified Concentration: 20.1 ppm
Instrument Used: Thermo Electron 42i-LS S/N 1030645077
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 06/10/2019

Reference Standard: Type / Cylinder #: GMIS / CC2919
Concentration / Uncertainty: 19.90 ppm ±0.504%
Expiration Date: 03/28/2022
Traceable to: SRM # / Sample # / Cylinder #: APEX1161149 / NA / APEX1161149
SRM Concentration / Uncertainty: 20.03 ppm / ±0.10 ppm
SRM Expiration Date: 01/27/2020

First Analysis Data:				Date 06/20/2019
Z: 0	R: 19.9	C: 20	Conc: 20	
R: 19.88	Z: 0	C: 20.1	Conc: 20.1	
Z: 0	C: 20.1	R: 19.91	Conc: 20.1	
UOM: ppm		Mean Test Assay:	20.1	ppm

Second Analysis Data:				Date 06/27/2019
Z: 0	R: 19.9	C: 20.1	Conc: 20.1	
R: 19.89	Z: 0	C: 20.2	Conc: 20.2	
Z: 0	C: 20.1	R: 19.89	Conc: 20.1	
UOM: ppm		Mean Test Assay:	20.1	ppm

Analyzed By Henry Koung

Certified By Leeanna Flores

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Los Angeles, CA 90058
Tel: 323-585-2154
Fax: 714-542-6689

Customer & Order Information:

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD,
OXNARD, CA 93030-7224

Praxair Order Number: **71378203**
Customer PO Number: **79369772**

Certificate Issuance Date: **7/10/2020**

Certification Date: **7/10/2020**
Lot Number: **70086018201**
Part Number: **NI NX20MP-AS**
DocNumber: **232651**
Expiration Date: **7/10/2021**

CERTIFICATE OF ANALYSIS
Primary Standard

Component	Requested Concentration (Molar)	Certified Concentration (Molar)	Analytical Reference	Analytical Uncertainty
Nitrogen dioxide (as NOx)	**20 ppm**	**19.01 ppm**	**1**	**± 1%**
Nitrogen	**Balance**	**Balance**		

Cylinder Style: **AS**
Cylinder Pressure @ 70 F: **2000 psig**
Cylinder Volume: **142 ft3**
Valve Outlet Connection: **CGA 660**
Cylinder Number(s): **CC3240**

Fill Date: **6/30/2020**
Analysis Date: **7/10/2020**

Filling Method: **Gravimetric**

Comments: **This mixture contains 2% Oxygen.**

Analyst: **Leeanna Flores**

Approved Signer: **Henry Koung**

Key to Analytical Techniques:

Reference	Analytical Instrument - Analytical Principle
1	MKS MG2031 - FTIR

The gas calibration cylinder standard prepared by Praxair Distribution, Inc. is considered a certified standard. It is prepared by gravimetric, volumetric, or partial pressure techniques. The calibration standard provided is certified against Praxair Distribution, Inc. Reference Materials which are traceable to the International System of Units (SI) through either weights traceable to the National Institute of Standards and Technology (NIST) or Measurement Canada, or through NIST Standard Reference Materials or equivalent where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted. Analytical uncertainty is expressed as a Relative % unless otherwise noted.

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DocNumber: 229037

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Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22018

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD
OXNARD CA 93030

Certificate Modification Date: 11/15/2018
Praxair Order Number: 70784150
Part Number: EV NICOOXE90-AS

Fill Date: 11/09/2018
Lot Number: 70085831305
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	11/15/2026	NIST Traceable
Cylinder Number:	CC134279	Expanded Uncertainty
4.01 %	Carbon dioxide	± 0.4 %
11.97 %	Oxygen	± 0.1 %
Balance	Nitrogen	

Certification Information:

Certification Date: 11/15/2018 *Term:* 96 Months *Expiration Date:* 11/15/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** **Carbon dioxide**

Requested Concentration: 4 %
Certified Concentration: 4.01 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 10/23/2018

First Analysis Data:						Date	11/15/2018
Z:	0	R:	6.96	C:	4	Conc:	4
R:	6.96	Z:	0	C:	4.01	Conc:	4.01
Z:	0	C:	4.01	R:	6.96	Conc:	4.01
UOM:	%			Mean Test Assay:			4.01 %

Reference Standard: Type / Cylinder #: GMIS / CC243762
Concentration / Uncertainty: 6.96 % ±0.208%
Expiration Date: 06/07/2023
Traceable to: SRM # / Sample # / Cylinder #: SRM 1674b / 7-H-07 / FF10631
SRM Concentration / Uncertainty: 6.944% / ± 0.013%
SRM Expiration Date: 06/17/2019

Second Analysis Data:						Date	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			%

2. ***Component:*** **Oxygen**

Requested Concentration: 12 %
Certified Concentration: 11.97 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 11/05/2018

First Analysis Data:						Date	11/15/2018
Z:	0	R:	20.86	C:	11.96	Conc:	11.96
R:	20.86	Z:	0	C:	11.97	Conc:	11.97
Z:	0	C:	11.97	R:	20.86	Conc:	11.97
UOM:	%			Mean Test Assay:			11.97 %

Reference Standard: Type / Cylinder #: GMIS / CC75874
Concentration / Uncertainty: 20.86 % ±0.111%
Expiration Date: 11/07/2025
Traceable to: SRM # / Sample # / Cylinder #: SRM 2659a / 71-E-19 / FF22331
SRM Concentration / Uncertainty: 20.863% / ±0.021%
SRM Expiration Date: 08/23/2021

Second Analysis Data:						Date	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			%

Analyzed By: Danielle Burns

Certified By: Jose Vasquez

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22015

DocNumber: 000081223

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE OXNARD CA
455 E WOOLEY RD
OXNARD CA 930300

Praxair Order Number: 31577381
Customer P. O. Number: 05587065
Customer Reference Number:

Fill Date: 6/18/2015
Part Number: EV NICDOXE98-AS
Lot Number: 109516909
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	6/23/2023	NIST Traceable
Cylinder Number:	CC144381	Analytical Uncertainty:
7.93 %	CARBON DIOXIDE	± 0.5 %,
20.13 %	OXYGEN	± 0.1 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 6/23/2015 *Term:* 96 Months *Expiration Date:* 6/23/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 8 %
Certified Concentration: 7.93 %
Instrument Used: Horiba VIA-510 S/N 2807014
Analytical Method: NDIR
Last Multipoint Calibration: 6/15/2015

First Analysis Data: Date: 6/23/2015

Z:	0	R:	9.87	C:	7.93	Conc:	7.927
R:	9.87	Z:	0	C:	7.93	Conc:	7.927
Z:	0	C:	7.93	R:	9.88	Conc:	7.927

UOM: % Mean Test Assay: 7.927 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA17695
Ref. Std. Conc: 9.87%
Ref. Std. Traceable to SRM #: 1674b
SRM Sample #: 7-H-07
SRM Cylinder #: FF10631

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

2. Component: OXYGEN

Requested Concentration: 20 %
Certified Concentration: 20.13 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 5/29/2015

First Analysis Data: Date: 6/23/2015

Z:	0	R:	19.88	C:	20.12	Conc:	20.127
R:	19.9	Z:	0	C:	20.12	Conc:	20.127
Z:	0	C:	20.12	R:	19.9	Conc:	20.127

UOM: % Mean Test Assay: 20.127 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA16022
Ref. Std. Conc: 19.90%
Ref. Std. Traceable to SRM #: 2659a
SRM Sample #: 71-E-19
SRM Cylinder #: FF22331

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

Analyzed by: Ying Yu

Certified by: Jack Fu

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DocNumber: 253974

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PGVP ID: F22019

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PRAXAIR PKG OXNARD CA HPS
455 E WOOLEY RD
OXNARD CA 93030

Certificate Issuance Date: 06/27/2019
Praxair Order Number: 70998288
Part Number: NI CO4ME-AS
Customer PO Number: 76981976

Fill Date: 06/12/2019
Lot Number: 70086916303
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	06/21/2027	NIST Traceable
Cylinder Number:	CC28151	Expanded Uncertainty
3.89 ppm	Carbon monoxide	± 1.0 %
Balance	Nitrogen	

Certification Information:

Certification Date: 06/21/2019 *Term:* 96 Months *Expiration Date:* 06/21/2027

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** **Carbon monoxide**

Requested Concentration: 4 ppm
Certified Concentration: 3.89 ppm
Instrument Used: MKS Multigas 2031 FTIR
Analytical Method: FTIR
Last Multipoint Calibration: 06/18/2019

First Analysis Data: **Date** 06/21/2019

Z: 0	R: 5.056	C: 3.889	Conc:	3.88	
R: 5.053	Z: 0	C: 3.911	Conc:	3.9	
Z: 0	C: 3.893	R: 5.087	Conc:	3.89	
UOM: ppm		Mean Test Assay:		3.89	ppm

Reference Standard: Type / Cylinder #: GMIS / SA13564
Concentration / Uncertainty: 5.055 ppm ±0.553%
Expiration Date: 09/05/2026
Traceable to: SRM # / Sample # / Cylinder #: SRM 1677c / 5-J-42 / CAL015337
SRM Concentration / Uncertainty: 9.825 PPM / ±0.047 PPM
SRM Expiration Date: 06/24/2024

Second Analysis Data: **Date**

Z: 0	R: 0	C: 0	Conc:	0	
R: 0	Z: 0	C: 0	Conc:	0	
Z: 0	C: 0	R: 0	Conc:	0	
UOM: ppm		Mean Test Assay:			ppm

Analyzed By: Brandon Aguilar

Certified By: Jose Vasquez

PRAXAIR

Praxair
5700 South Alameda Street
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Tel: (323) 585-2154 Fax:(714) 542-6689
PGVP ID: F22015

DocNumber: 000087119

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE OXNARD CA
455 E WOOLEY RD
OXNARD CA 930300

Praxair Order Number: 33101951
Customer P. O. Number: 05830311
Customer Reference Number:

Fill Date: 11/21/2015
Part Number: NI C08ME-AS
Lot Number: 109532508
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	11/30/2023	NIST Traceable Analytical Uncertainty:
Cylinder Number:	CC196760	
8.12 ppm	CARBON MONOXIDE	± 0.8 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 11/30/2015 *Term:* 96 Months *Expiration Date:* 11/30/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON MONOXIDE

Requested Concentration: 8 ppm
Certified Concentration: 8.12 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method: NDIR
Last Multipoint Calibration: 11/13/2015

First Analysis Date:						Date: 11/30/2015
Z: 0	R: 84	C: 67.4	Conc: 8.134			
R: 84.2	Z: 0	C: 67.2	Conc: 8.11			
Z: 0	C: 67.2	R: 84.1	Conc: 8.11			
UOM: ppm		Mean Test Assay:	8.118 ppm			

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC130322
Ref. Std. Conc: 10.15 ppm
Ref. Std. Traceable to SRM # : 1677c
SRM Sample # : 5-J-42
SRM Cylinder # : CAL015337

Second Analysis Date:						Date:
Z: 0	R: 0	C: 0	Conc: 0			
R: 0	Z: 0	C: 0	Conc: 0			
Z: 0	C: 0	R: 0	Conc: 0			
UOM: ppm		Mean Test Assay:	0 ppm			

Analyzed by: Ying Yu

Certified by: Jack Fu (Jack Fu)

SOURCE EMISSION INSTRUMENTATION LIST

CARBON DIOXIDE

Unit No. - 3:
Manufacturer: ACS (Fugi)
Model No.: 3300
Serial No.: N8M6611T
Method: NDIR
Range (%) 0-5 & 20

Unit No. - 4:
Manufacturer: ACS (Fugi)
Model No.: 3300
Serial No.: N9C5479T
Method: NDIR
Range (%) 0-5 & 20

Unit No. - 5:
Manufacturer: Milton-Roy (Fugi)
Model No.: 3300
Serial No.: N2EO363T
Method: NDIR
Range (%) 10/20/25

Unit No. - 6:
Manufacturer: Horiba
Model No.: 3400
Serial No.: N1P7019T
Method: NDIR
Range (%) 0- 20

Unit No. - 7:
Manufacturer: Servomex
Model No.: 1400
Serial No.: 01415/B7-103
Method: NDIR
Range (%) 0-10

Unit No. - 8:
Manufacturer: Servomex
Model No.: 1400
Serial No.: X1415/B202
Method: NDIR
Range (%) 0-10

AIR X TESTING

SOURCE EMISSION INSTRUMENTATION LIST

CARBON MONOXIDE

Unit No. - 1: Manufacturer: Model No.: Serial No.: Method: Range (ppmv	 API 300 EM 239 NDIR/GFC 0-5, 10, 25, 50, 100, 250, 500, 1000, 2500, 5000	**Unit No. - 2:** Manufacturer: Model No.: Serial No.: Method: Range (ppmv	 API 300 EM 240 NDIR/GFC 0-5, 10, 25, 50, 100, 250, 500, 1000, 2500, 5000
Unit No. - 3: Manufacturer: Model No.: Serial No.: Method: Range (ppmv	 API 300 EM 104 NDIR/GFC 0-5, 10, 25, 50, 100, 250, 500, 1000, 2500, 5000	**Unit No - 5:** Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48H 25184-219 NDIR/GFC 0-50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000
Unit No. - 6: Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48H 29031-233 NDIR/GFC 0-50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000	**Unit No. - 7:** Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Siemens Ultramat 21p AO4-254 NDIR 0-300
Unit No. - 10: Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48H 38391-257 NDIR/GFC 0-50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000	**Unit No. - 11:** Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48H 35226-249 NDIR/GFC 0-50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000
Unit No - 13: Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48 48-15970-159 NDIR/GFC 0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000	**Unit No - 14:** Manufacturer: Model No.: Serial No.: Method: Range (ppmv)	 Thermo Environmental (TECO) 48 48-23925-213 NDIR/GFC 0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000

SOURCE EMISSION INSTRUMENTATION LIST

OXIDES OF NITROGEN

Unit No. - 1: Manufacturer: API Model No.: 200 EH Serial No.: 233 Method: Chemiluminescence Range (ppmv) 0-5000	**Unit No. - 6:** Manufacturer: API Model No.: 200 A Serial No.: 1013 Method: Chemiluminescence Range (ppmv) 0-50
Unit No. - 2: Manufacturer: API Model No.: 200 EH Serial No.: 234 Method: Chemiluminescence Range (ppmv) 0-5000	**Unit No. - 7:** Manufacturer: Thermo Environmental (TECO) Model No.: 10AR Serial No.: 25559-221 Method: Chemiluminescence Range (ppmv) 0-2.5, 10, 25, 100, 250, 1000, 2500, 10000
Unit No. - 3: Manufacturer: API Model No.: 200 EH Serial No.: 109 Method: Chemiluminescence Range (ppmv) 0-5000	**Unit No. - 8:** Manufacturer: Thermo Environmental (TECO) Model No.: 10AR Serial No.: 38586-258 Method: Chemiluminescence Range (ppmv) 0-2.5, 10, 25, 100, 250, 1000, 2500, 10000
Unit No. - 4: Manufacturer: API Model No.: 200 EH Serial No.: 442 Method: Chemiluminescence Range (ppmv) 0-5000	
Unit No. - 5: Manufacturer: API Model No.: 200 EH Serial No.: 441 Method: Chemiluminescence Range (ppmv) 0-5000	

AIR TESTING

SOURCE EMISSION INSTRUMENTATION LIST

OXYGEN

Unit No. - 5:	
Manufacturer:	Teledyne
Model No.:	320-AX
Serial No.:	108743
Method:	Electrochemical
Range (%)	0-5, 10, 25

Unit No. - 7:	
Manufacturer:	Teledyne
Model No.:	320-AX
Serial No.:	108742
Method:	Electrochemical
Range (%)	0-5, 10, 25

Unit No. - 9:	
Manufacturer:	Servomex
Model No.:	1400
Serial No.:	01420/B701/730
Method:	Paramagnetic
Range (%)	0-25, 100

Unit No. - 10:	
Manufacturer:	Servomex
Model No.:	1400
Serial No.:	01420/B308
Method:	Paramagnetic
Range (%)	0-25

Unit No. - 11:	
Manufacturer:	Teledyne
Model No.:	320-A
Serial No.:	111211
Method:	Electrochemical
Range (%)	0-5, 10, 25

Unit No. - 12:	
Manufacturer:	Servomex
Model No.:	1400
Serial No.:	01420/B7103
Method:	Paramagnetic
Range (%)	0-25, 100

Unit No. - 13:	
Manufacturer:	Servomex
Model No.:	1400
Serial No.:	X1420/B707
Method:	Paramagnetic
Range (%)	0-25

AIR TESTING

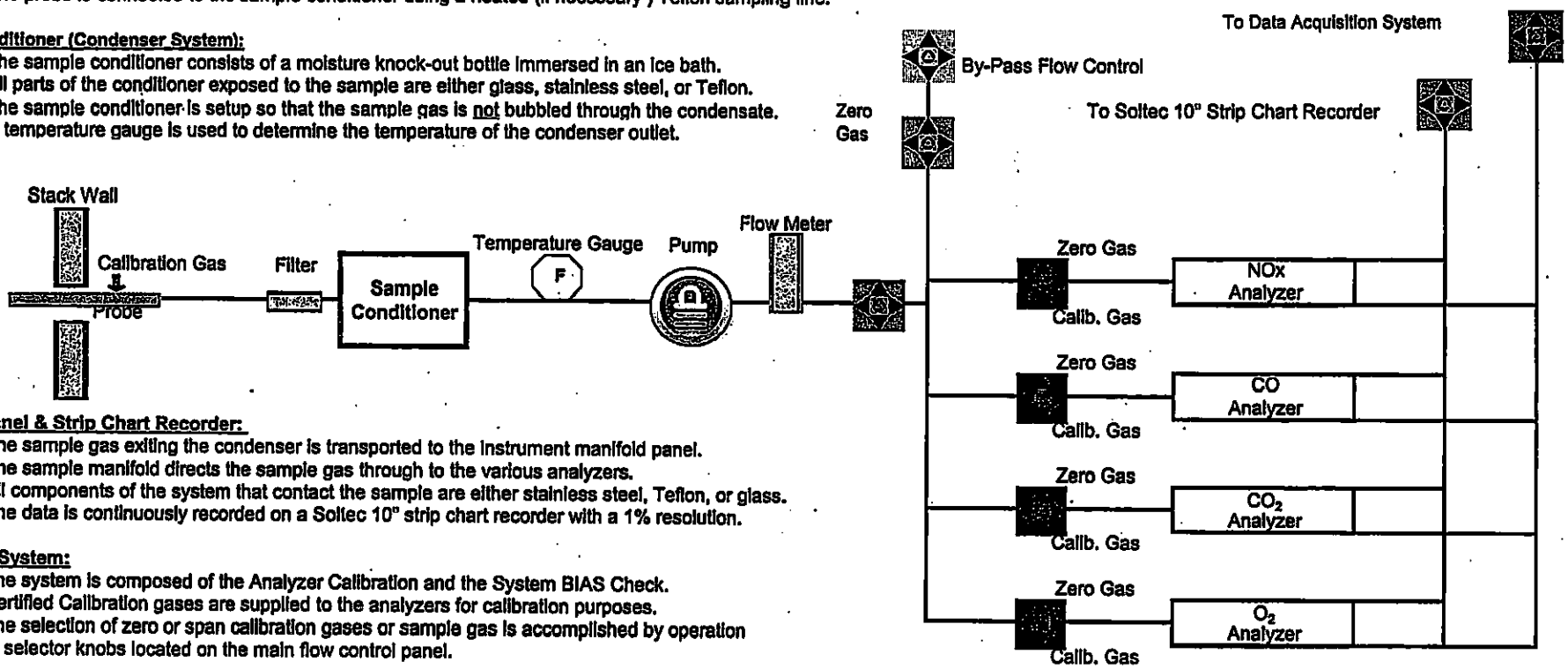
Method 100 – Sample Train Assembly

Probe:

1. AIRx Testing Services, Inc. uses a stainless steel sampling probe.
2. The probe is connected to the sample conditioner using a heated (if necessary) Teflon sampling line.

Sample Conditioner (Condenser System):

1. The sample conditioner consists of a moisture knock-out bottle immersed in an ice bath.
2. All parts of the conditioner exposed to the sample are either glass, stainless steel, or Teflon.
3. The sample conditioner is setup so that the sample gas is not bubbled through the condensate.
4. A temperature gauge is used to determine the temperature of the condenser outlet.



Manifold Panel & Strip Chart Recorder:

1. The sample gas exiting the condenser is transported to the instrument manifold panel.
2. The sample manifold directs the sample gas through to the various analyzers.
3. All components of the system that contact the sample are either stainless steel, Teflon, or glass.
4. The data is continuously recorded on a Soltec 10" strip chart recorder with a 1% resolution.

Calibration System:

1. The system is composed of the Analyzer Calibration and the System BIAS Check.
2. Certified Calibration gases are supplied to the analyzers for calibration purposes.
3. The selection of zero or span calibration gases or sample gas is accomplished by operation of selector knobs located on the main flow control panel.

Nitrogen Oxides: – Chemiluminescent Analyzer: Based on the chemiluminescent reaction of NO and ozone to form NO_2 in an excited state. Light emission is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration. The output is in units of ppmv.

Carbon Monoxide – Non-Dispersive Infrared (NDIR) Analyzer: Radiation from an infrared source is passed through a narrow band-pass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The infrared radiation exits the sample cell and falls on a solid state infrared detector. The output is in units of ppmv.

Oxygen – Electrochemical Analyzer: Oxygen in the flue gas sample diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode and an electric current proportional to the concentration of oxygen is produced. The output is in units of percent O_2 by volume.

Carbon Dioxide – Non Dispersive Infrared (NDIR) Analyzer: The instrument measures the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wavelength absorbed by CO_2) and a sample cell through which the sample gas flows continuously. The output is in units of percent CO_2 by volume.

SCAQMD Method 100.1
Procedures For Continuous Gaseous Emission Sampling

Principle: A sample of an exhaust gas stream is continuously extracted, conditioned, and conveyed to instrumental analyzers for the determination of:

SO2 concentration using ultraviolet analyzer
NOx concentration using chemiluminescent analyzer
O2 concentration using electrochemical (fuel cell) type analyzer
CO concentration using non-dispersive infrared analyzer
CO2 concentration using non-dispersive infrared analyzer

Applicability:
Stationary Source Gas Streams flowing in ducts, stacks, and flues
Alternative to SCAQMD reference methods 3.1, 4.1, 7.1, 10.1

Range:
The analytical ***range is selected so that the sample gas concentration for each run is between 20 and 95% of the range, for 95% of the test period.***

Sensitivity:
The minimum detectable limit shall be less than 2% of the range (i.e. range is 20000 ppm, MDL shall be less than 400 ppm)

Measurement system: Sample interface, Gas analyzer, Data acquisition
Probe, Sample pump, Probe calibration system, Barometer
Sample line: Teflon (to moisture removal system, heated to prevent condensation)
Sample conditioning: reduce moisture content to below a dewpoint of 35°F.
Sample transport lines: Teflon (from moisture removal system to sample gas manifold).
Particulate filter: to prevent accumulation of particulate in the measurement system
Sample flow rate control: control valve + rotameter
Sample gas manifold: Divert a portion of the gas stream to the analyzer and the remainder to the bypass vent
Gas analyzer: SO2, NOx, O2, CO2, CO. An NO2 to NO converter is not necessary if data is presented to demonstrate that the NO2 portion of the exhaust gas is less than 5% of the total NOx concentration.
Data recorder: strip chart recorder, analog computer, digital recorder. Resolution or readability should be 0.5% of range. Sampling measurements should be obtained at a minimum of 1-minute intervals.
Interference response sampling system: Introduce an interference test gas to the analyzer. The analyzer zero should be given a positive offset prior to the test to allow measurement of a negative interference.
Pitot tubes: Method 1.1 and 1.2
Differential Pressure gauges: Method 1.1 and 1.2
Sample gas moisture content equipment: Method 4.1
Vacuum gauge: leak checking
Thermocouple: temperature stack gas

Range: Upper limit of the gas concentration measurement range displayed on the data recorder

Calibration gas (CalGas): A gas of known concentration in an inert diluent gas
- High-Range: 80 to 100% of the range
- Mid-Range: 40 to 60% of the range
- Zero gas: impurity concentration < 0.25% of the range → Nitrogen

Analyzer calibration error: The difference between the known concentration of the CalGas and the gas concentration exhibited by the gas analyzer when the CalGas is introduced directly to the analyzer.
Performance Spec: less than 2% of the range for the zero, mid-range, and high-range CalGas.

Sampling system BIAS: The difference between the gas concentrations exhibited by the measurement system when CalGas is introduced at the sampling probe tip filter and when the same CalGas is introduced directly to the analyzer.
Performance Spec: less than 5% of the range for the zero, mid-range, and high-range CalGas.

Zero Drift: The difference in the measurement system responses at a zero concentration level during the initial calibration, and final calibration check after a test.
No adjustment to the measurement system is allowed at that point.
Performance Spec: less than 3% of the range over the period of each run.

Calibration Drift: The difference in the measurement system responses at a mid-range concentration level during the initial calibration and final calibration check after a test.
No adjustment to the measurement system is allowed at that point.
Performance Spec: less than 3% of the range over the period of each run.

Response time: the time required for the system to display 95% of a step change in gas concentration on the data recorder.

Interference response: The output response of the measurement system to a component in the sample gas, other than the gas component being measured.
Performance Spec: For example, an SO2 analyzer should respond no more than 30 ppm when the NO2 concentration in the sample gas is 2000 ppm.

- SO2 analyzer: NO2 →2000/30, NH3 → 1000000/0
- CO2 analyzer: H2O → 10000/1, CO → 15000/1, CH4 → 20000/1
- CO analyzer: H2O → 200000/1, CO2 → 500000/1, SO2, NO, NO2, HC, H2O → 1000000/1

Calibration Curve: A graph establishing the relationship between the analyzer response and the actual CalGas concentration introduced to the analyzer.

Linearity: Maximum deviation as a percent of range, between a mid range calibration reading and the reading predicted by a straight line drawn between high-range and zero gas calibration points.
Performance Spec: less than 1% of the range for the pretest and post test values.

Measurement System Performance Test Procedures:

- ***Cleaning of sample train:*** Flush probe, lines and conditioner with DW, then acetone. Dry with filtered dry air.
- ***Allow Continuous Analyzers to warm up***
- ***Sampling system preparation:*** assemble sample train as shown in Fig 100.1-1, 100.1-2 and 100.1-3. Leak check the vacuum side of the assembly to a minimum of 20" of Hg (gauge). The sampling system should hold 20" of Hg vacuum for 5 minutes with less than 1" Hg loss. Check the pressure side of the system with liquid soap solution and correct any leaks.
- ***Allowable modifications:*** probe heating element can be eliminated if stack is at or below ambient temperature and condensation is not observed. Pitot tube can be eliminated if flow measurements are not required.
- ***Calibrate analyzers and data recorders:*** introduce CalGases directly to the instruments and make all necessary adjustments to calibrate the analyzer and data recorder. Adjust system components to achieve manufacturer's recommended sampling rates.

- ***Analyzer calibration error check:*** at the beginning and end of each test run
  1. Introduce zero, mid-range, high range CalGas
  2. Make no adjustments to the system except those necessary to achieve the correct flow rate.
  3. Record the analyzer responses to each CalGas on a form similar to 100.1-4
  4. If invalid calibration is exhibited (> 2% of the range), take corrective action and repeat check.

- ***Instrument response time:*** establish during semi-annual certification

- ***Sampling system BIAS check:*** **Mandatory**
  1. Backflush gas through the probe as necessary to prevent particulate buildup
  2. Zero, and either mid-range or high-range (whichever is closest to effluent concentration)
  3. Introduce upscale CalGas and record concentration on a form similar to 100.1-5
  4. Introduce zero CalGas and record concentration
  5. Make no adjustments to the system except those necessary to achieve the correct flow rate.
  6. If invalid calibration is exhibited (> 5% of the range), take corrective action and repeat check.
  7. If adjustments are required, repeat the analyzer calibration error check, then the sampling system BIAS check.

- ***NO2 to NO conversion check:*** EPA Method 20 or gas mixture of NO2 in air

Emission Test Procedure:

- Traverse stack to determine presence of stratification
- Single-point gas sampling is acceptable if gas composition is homogenous (<10% variation)
- Determine moisture content and velocity pressures **or** Mass flow rate may be obtained by stochiometric and gas composition relations
- ***Chart recorder label:*** turn on strip chart recorder and label the chart as to pollutant, source, range, calibration cylinder ID number, certified expiration date, zero and upper range calibration settings, chart speeds, date, time and operator.
- ***Sample probe traverse and minimum sampling time:***

1. Insert probe in stack
2. determine if single point sampling is acceptable
3. If traverse is required, leave the probe at each traverse point for at least the system response time + 1 minute.
4. Minimum sampling time of 60 minute is recommended. See District Rules and Regulations and permit conditions for special requirements.
5. When test duration exceeds one hour, conduct zero and span checks every 2 hours. Adjust settings as necessary, mark strip charts and record in log books.

- ***Zero and Calibration DRIFT Tests:***

1. Immediately preceding and following each run, or if adjustments are necessary during the run, repeat the sampling system BIAS procedure. Make no adjustments to the system until after the DRIFT checks are completed. Record the information on a form similar to Figure 100.1-5.
2. If run is invalid (sampling system BIAS specs exceeded), repeat entire procedure before repeating run.
3. If both the zero and upscale calibration values are within the sampling system BIAS specs, then use the average of the initial and final BIAS check values to calculate the gas concentration for the run.
4. If the zero or upscale calibration DRIFT exceeds the DRIFT limits, repeat entire procedure before conducting additional runs.

- ***Post Run Leak Check:***

APPENDIX B FUEL DATA SHEETS

"F" FACTOR EXHAUST GAS FLOWRATE CALCULATION

Client : All American Asphalt
Site : Irvine
Unit : Hot Oil Heater Low

Date : 3/24/2021
Job# : 7019
Lab# : 213-039

"F" Factor, Q(std): 8710 dscf/MMBTU

Standard Temperature, T std: 60 deg. F

	Run #1
Oxygen, %	9.54
Fuel Usage, dscfm (avg)	23.3
MMBTU/min	0.024
Stack Gas Flowrate, dscfm	392

formulae:

MMBTU/min = (Fuel Usage * 1050 Btu/ft3)/10^6
Flowrate ("F" Factor) = "F" Factor * MMBTU/min * (20.9/(20.9-O2))

"F" FACTOR EXHAUST GAS FLOWRATE CALCULATION

Client : All American Asphalt
Site : Irvine
Unit : Hot Oil Heater max

Date : 3/24/2021
Job# : 7019
Lab# : 213-039

"F" Factor, Q(std): 8710 dscf/MMBTU

Standard Temperature, T std: 60 deg. F

	Run #1
Oxygen, %	8.49
Fuel Usage, dscfm (avg)	70.0
MMBTU/min	0.074
Stack Gas Flowrate, dscfm	1078

formulae:

MMBTU/min = (Fuel Usage * 1050 Btu/ft3)/10^6
Flowrate ("F" Factor) = "F" Factor * MMBTU/min * (20.9/(20.9-O2))

Asphalt Plant - Field Record Sheet

Client: All American Asphalt
Location: Ekwok

Test Date: 3-24-21
Lab #: 221-028
Plant Operator: –

Meter #1	
Serial #:	–
Maufacturer:	Honeywell
Units:	(ccf) mcf mmcf other:
Description:	Totalizer
Temp. Cor.:	(Yes) No
Pres. Cor.:	(Yes) No

Meter #2	
Serial #:	–
Maufacturer:	Elster
Units:	(ccf) mcf mmcf other:
Description:	Analog
Temp. Cor.:	Yes (No)
Pres. Cor.:	Yes (No)

Total Fuel Consumption:	Run #1	Run #2	Run #3
High	7x100=700/30=23.3 CFM	21x100=2100/30=70	
Low			

Total Production During:	Run #1	Run #2	Run #3
High	32.66%	98%	
Low			

Run # 30%	Time	Meter Read Meter #1	Meter Read Meter #2	Plant Production TPH	Rap Production TPH	Rubber Production TPH / %
1	8:41	453945	34936			
2	8:51	453948	34937			
3	9:01	453950	34938			
4	9:11	453952	34939			
MWK						
1	9:39	453452	34939			
2	9:49	453459	34942			
3	9:59	453466	34946			
4	10:09	453473	34949			

APPENDIX C METHODS 1- 4 DATA SHEETS

CARB Method 1-4 Flow Rate Determination Calculations

Client :	All American Asphalt	Date :	3/24/2021
Site :	Irvine	Job # :	1064
Unit :	Hot Oil Heater Low	Lab # :	221-028
Run # :	1	Temp (Tstd):	60

*** SOURCE FIELD DATA***

Pbar	Barometer	29.96
Y	Meter Calibration Fac.	1.0078
Cp	Pitot Calibration Fac.	0.84
Pg	Stack Static Pressure(in. H2O)	-0.01
dcO2	Dry Concentration Oxygen	9.5
dcCO2	Dry Concentration Carbon Monoxide	6.1
tsd	Area Standard Temperature (deg F)	*60*
ts	Temperature of Stack Gas (deg.F)	239.9
tm	Temperature of Meter (deg.F)	68.3
Delta P	Delta P Average (in H2O)	0.240
sqrtDP	Average Square root Delta P	0.490
Vw	Total Volume of Condensable water (g)	3.0
Vm	Dry gas Volume Measured (dcf)	21.819
Ds	Stack Diameter (in.)	20
Time	Sample duration (min)	30

*** INTERMEDIATE CALCULATIONS***

Ps	Absolute Stack Pressure (in.Hg)	29.96	Ps =Pbar+Pg/13.6
Tstd	Area Standard Temperature (deg R)	520	Tstd =tsd+460
Ts	Temperature of Stack Gas (deg.R)	699.9	Ts =ts+460
Tm	Temperature of Meter (deg.R)	528.3	Tm =tm+460
Vwstd	Volume of water vapor standard (scf)	0.14	Vwstd =Vlc*.04715
Vmstd	Sample gas volume (dscf)	2.5113	Vmstd =Vm*Y*(Tstd/Tm)*((Pbar+DH/13.6)/29.92)
Bws	Moisture Content Stack Gas	5.33%	Bws =Vwstd/(Vwstd+Vmstd)
dcN2	Dry Concentration Nitrogen	84.3	dcN2=100-((dcO2)+(dcCO2))
Md	Molecular Weight Stack Gas (dry)	29.361	Md =(dcCO2*0.44)+(dcO2*0.32)+(dcN2*0.28)
Ms	Molecular Weight Stack Gas (wet)	28.755	Ms =(Md*(1-Bws))+18*Bws
As	Area of Stack (Ft^2)	2.18	As =3.141592654*(Ds/12)^2/4

*** RESULTS***

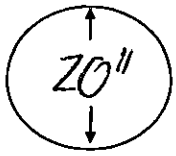
Vs	Stack Gas Velocity (ft/sec)	31.7	Vs =85.49*Cp*sqrtDp*(SQRT(Ts/(Ps*Ms)))
Qa	Stack Gas Flow Rate (Acfm)	4,150	Qa =Vs*60*As
Qstd	Stack Gas Flow Rate (Dscfm)	337	Qstd =60*(1-Bws)*Vs*As*(Tstd/Ts)*(Ps/29.92)

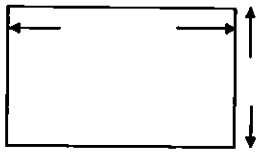
AIR X TESTING

Plant :	All American Asphalt	Amb. Temp :	54°	Nozzle :	318
Location :	Tulsa	Pbar :	29.96	Prob Heat :	—
Unit :	Oil Heater	Pitot :	MT	Wind Vel. :	~~0~~ 0-10
Date :	3-24-21	Pyro :	MT	Static Press. :	-.01
Run # :	1 LOW	Mag Δ P :	111 bkg	O2 :	9.5
Cold Box :	3	Mag Δ H :	1.75 bkg	CO2 :	6.1
Meter # :	J	% H2O :	—	Engineer :	KK
Meter Factor :	1.0078	Box Heat :	—	Technician :	ET

Stack Dia. : 20
"A" : 24
"B" : 24
Port Size : 1
Offset : 2
M / F : F

Stack Sample Port Location





Imp.	Gross	Tare	Total
1	689.0	682.6	
2	615.4	615.3	
3	581.9	580.5	
4	698.3	697.0	

Filter 1 : 310

START TIME: 8:40 END TIME: 9:10 "K" FACTOR: Filter 2 :

Point No.	Traverse Distance	Time Minutes	Stack °F	Δ P	√Δ P	Dry Gas Meter Volume	Δ H In H2O	Inlet ° F	Outlet ° F	Impinger Exit° F	Meter Vacuum	Filter Temp.°F	Probe Temp.°F	Cyl. Flow
1	.64	0	238	.23		463.126	1.75	67	64	49	3			0
2	2.10	5	238	.24		466.8	1.75	70	65	49	3			0
3	3.80	10	240	.25		470.4	1.75	71	66	50	3			0
4	6.46	15	241	.26		474.0	1.75	72	66	50	3			2
5	13.54	20	241	.25		477.7	1.75	72	67	50	3			0
6	16.12	25	240	.24		481.6	1.75	73	67	50	3			0
7	17.90	30	240	.23		484.945								0
8	19.36		238	.22										0
9			242	.23										2
10			241	.23										0
11			241	.24										0
12			241	.24										2
13			241	.25										0
14			240	.26										5
15			239	.24										0
16			238	.23										0
Average:		30	239.9		0.490	21.819	1.75		68.3		3			

Leak Checks : Pitots

Pre	Top	Bottom
ΔP	0/4.0	0/3.8

Post	Top	Bottom
ΔP	0/4.2	0/3.8

Sample Train Leak Check

CFM : .002 In. HG : 17
CFM : .000 In. HG : 5

CARB Method 1-4 Flow Rate Determination Calculations

Client :	All American Asphalt	Date :	3/24/2021
Site :	Irvine	Job # :	1064
Unit :	Hot Oil Heater max	Lab # :	221-028
Run # :	1	Temp (Tstd):	60

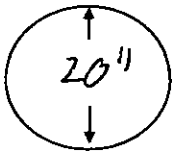
	*** SOURCE FIELD DATA***		
Pbar	Barometer	29.96	
Y	Meter Calibration Fac.	1.0078	
Cp	Pitot Calibration Fac.	0.84	
Pg	Stack Static Pressure(in. H2O)	-0.02	
dcO2	Dry Concentration Oxygen	8.5	
dcCO2	Dry Concentration Carbon Monoxide	6.7	
tsd	Area Standard Temperature (deg F)	*60*	
ts	Temperature of Stack Gas (deg.F)	400.2	
tm	Temperature of Meter (deg.F)	73.1	
Delta P	Delta P Average (in H2O)	2.554	
sqrtDP	Average Square root Delta P	1.598	
Vw	Total Volume of Condensable water (g)	2.6	
Vm	Dry gas Volume Measured (dcf)	22.115	
Ds	Stack Diameter (in.)	20	
Time	Sample duration (min)	30	
	*** INTERMEDIATE CALCULATIONS***		
Ps	Absolute Stack Pressure (in.Hg)	29.96	Ps =Pbar+Pg/13.6
Tstd	Area Standard Temperature (deg R)	520	Tstd =tsd+460
Ts	Temperature of Stack Gas (deg.R)	860.2	Ts =ts+460
Tm	Temperature of Meter (deg.R)	533.1	Tm =tm+460
Vwstd	Volume of water vapor standard (scf)	0.12	Vwstd =Vlc*.04715
Vmstd	Sample gas volume (dscf)	2.5227	Vmstd =Vm*Y*(Tstd/Tm)*((Pbar+DH/13.6)/29.92)
Bws	Moisture Content Stack Gas	4.63%	Bws =Vwstd/(Vwstd+Vmstd)
dcN2	Dry Concentration Nitrogen	84.8	dcN2=100-((dcO2)+(dcCO2))
Md	Molecular Weight Stack Gas (dry)	29.407	Md =(dcCO2*0.44)+(dcO2*0.32)+(dcN2*0.28)
Ms	Molecular Weight Stack Gas (wet)	28.879	Ms =(Md*(1-Bws))+18*Bws
As	Area of Stack (Ft^2)	2.18	As =3.141592654*(Ds/12)^2/4
	*** RESULTS***		
Vs	Stack Gas Velocity (ft/sec)	114.4	Vs =85.49*Cp*sqrtDp*(SQRT(Ts/(Ps*Ms)))
Qa	Stack Gas Flow Rate (Acfm)	14,976	Qa =Vs*60*As
Qstd	Stack Gas Flow Rate (Dscfm)	998	Qstd =60*(1-Bws)*Vs*As*(Tstd/Ts)*(Ps/29.92)

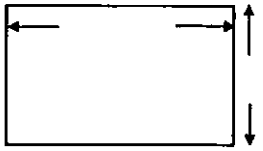
AIR X TESTING

Plant:	All American Asphalt	Amb. Temp:	56	Nozzle:	3/8
Location:	Irvine	Pbar:	29.96	Prob Heat:	
Unit:	Ors Heater	Pitot:	NT	Wind Vel.:	0-10
Date:	3-24-21	Pyro:	KT	Static Press.:	-02
Run #:	2 MRX	Mag Δ P:	MAGNO	O2:	8.5
Cold Box:	4	Mag Δ H:	MAGNO	CO2:	6.7
Meter #:	5	% H2O:	—	Engineer:	KK
Meter Factor:	1.0038	Box Heat:	—	Technician:	KK

Stack Dia.: 20
"A": 30
"B": 42
Port Size: 1
Offset: 2
M / F: 1

Stack Sample Port Location





Imp.	Gross	Tare	Total
1	646.9	646.8	
2	629.9	629.7	
3	538.3	538.1	
4	794.2	792.1	

Filter 1: _____ 2.6

Filter 2: _____

START TIME: 9:39 END TIME: 10:09 "K" FACTOR: _____

Point No.	Traverse Distance	Time Minutes	Stack °F	Δ P	√Δ P	Dry Gas Meter Volume	Δ H In H2O	Inlet ° F	Outlet ° F	Impinger Exit° F	Meter Vacuum	Filter Temp.°F	Probe Temp.°F	Cyl. Flow
1	1.64	0	387	2.55		485.280	1.75	70	68	50	3			
2	12.16	5	392	2.55		488.7	1.75	73	70	50	3			
3	3.80	10	394	2.56		492.6	1.75	75	73	50	3			
4	6.46	15	397	2.57		496.7	1.75	76	73	49	3			
5	13.54	20	396	2.56		499.9	1.75	76	73	50	3			
6	16.12	25	405	2.55		503.6	1.75	77	73	51	3			
7	17.90	30	404	2.55		507.395								
8	19.36		402	2.54										
1			399	2.54										
2			401	2.55										
3			402	2.56										
4			404	2.57										
5			406	2.52										
6			407	2.57										
7			405	2.56										
8			402	2.54										
Average:		30	400.2		1.598	32.115	1.75		23.1		3.0			

Leak Checks: Pitots

Pre	Top	Bottom
ΔP	0/4.2	0/-38

Post	Top	Bottom
ΔP	0/4.3	0/-46

Sample Train Leak Check

CFM:	0.00	In. HG:	15	
CFM:	0.00	In. HG:	5	

Method 1: Sample and Velocity Traverses for Stationary Sources

Principle:

To aid in the representative measurements of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas.

Not applicable when:

1) The flow is cyclonic,
2) The stack is smaller than 0.30 meter (12 in.) or 0.071 m^2 (113 $in.^2$)
3) The measurement site is < 2 diameter downstream or < ½ diameter upstream from a flow disturbance

Rectangular stack: → Equivalent diameter: De = 2LW / (L+W)

Cyclonic flow: → May exist after such devices as cyclones, demisters and venturi scrubbers.

- If the pitot reading is not zero at the 0° reference, rotate the pitot tube until a null reading is obtained.
- Record the value of the rotation angle (α) to the nearest degree.
- Repeat for each traverse point.
- If the average value of α is < 20°, flow is not cyclonic (EPA, CARB)
- If the average value of α is < 10°, flow is not cyclonic (SCAQMD)

Note

- For stacks > 24 in., no traverse point shall be located within 1 in. of the stack wall
- For stacks < 24 in., no traverse point shall be located within ½ in. of the stack wall

EPA Method 2, CARB 2, SCAQMD Method 2.1

Determination of Stack gas Velocity and Volumetric Flow Rate

Principle: The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S or standard pitot tube.

Not applicable when:

1) The flow is cyclonic
2) The stack is smaller than 0.30 meter (12 in.) or 0.071 m^2 (113 $in.^2$);
3) The measurement site is < 2 diameter downstream or ½ diameter upstream from a flow disturbance.

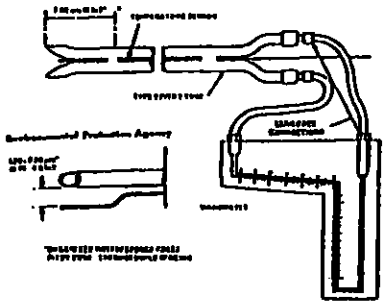
What to do when confronted with one of these three situations:
→ install straightening vanes;
→calculate volumetric flow rate stochiometrically;
→ move to another measurement site where flow is acceptable.

Apparatus

- Type S Pitot Tube → shall have known coefficient and identification number engraved on it
- Differential Pressure Gauge → inclined manometer
- Temperature Gauge → Thermocouple
- Barometer
- Gas density determination equipment → Method 3 (gas molecular weight), Method 4 or 5 (moisture)

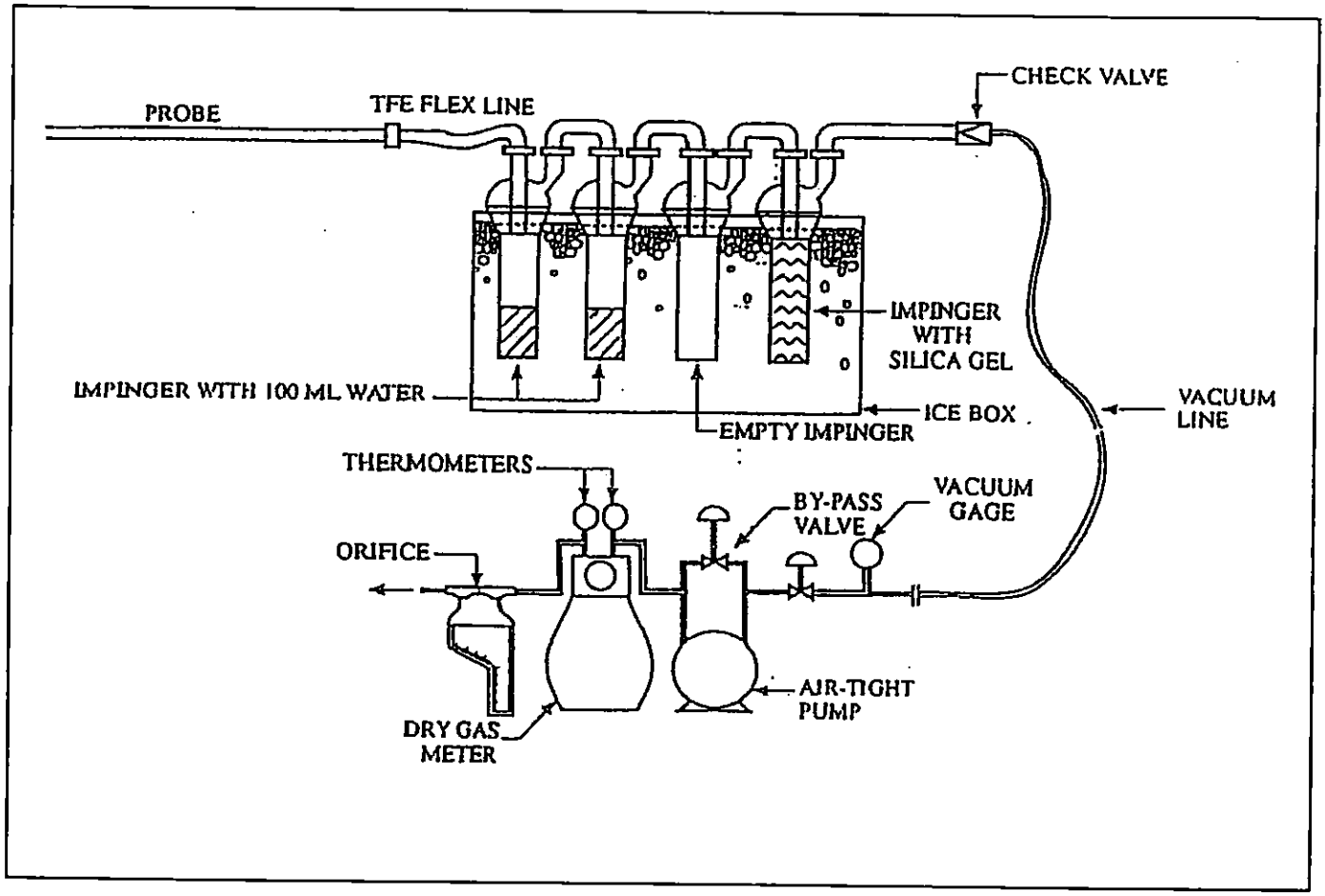
Procedure

- Set up as as shown in the figure;
- Conduct leak check:
  1. blow thru pitot impact opening until at least 3 inches H_2O velocity pressure registers
  2. Close off impact opening; The pressure shall remain stable for 15 seconds
  3. Do the same for the static pressure side, except using suction to obtain the minimum 3 inches
- Level and zero the manometer
- Measure the velocity head and temperature at the traverse points; conduct a post-test leak check
- Measure the static pressure in the stack (one reading is enough)
- Determine the atmospheric pressure
- Determine stack gas molecular weight:
  1. For combustion processes → perform independent measurements for O_2, CO_2 and H_2O concentration
  2. For processes emiting essentially air → use 29 g/mole



The stack gas velocity is determined from the measured average velocity head, the measured dry concentrations of O_2 and CO_2 and the measured concentration of H_2O.

EPA Method 4, SCAQMD Method 4.1, CARB Method 4



DRY GAS METER CALIBRATION

Standard Pressure	29.92	in. hg.	Unit Number J
Standard Temperature	60	F	Date: 1/4/2021
Ambient pressure	29.96	in. hg.	Leak Check: .004 @ 20"
Ambient temperature	65	F	

	WET GAS		DRY GAS	Temperature					
ΔH in. H20	TIME min.	VOL. cf	VOL. in/out cf	W.G. AVG F	D.G. IN F	D.G. OUT F	D.G. AVG. F	*Y	†ΔH@ in. H20
			818.537		62.0	61.0			
0.75	9.94	5.000	823.518	61.0	63.0	61.0	61.8	1.0034	1.6419
			823.518		61.0	61.0			
0.75	9.94	5.000	828.501	61.0	63.0	62.0	61.8	1.0030	1.6419
			828.501		62.0	62.0			
0.75	9.96	5.000	833.444	61.0	64.0	62.0	62.5	1.0126	1.6462
			833.512		63.0	62.0			
1.50	7.30	5.000	838.487	61.0	63.0	62.0	62.5	1.0042	1.7686
			838.487		63.0	63.0			
1.50	7.32	5.000	843.461	61.0	64.0	62.0	63.0	1.0054	1.7766
			843.461		63.0	63.0			
1.50	7.32	5.000	848.434	61.5	64.0	63.0	63.3	1.0051	1.7792
			848.513		64.0	63.0			
2.25	5.92	5.000	853.466	61.5	64.0	63.0	63.5	1.0078	1.7447
			853.466		64.0	63.0			
2.25	5.92	5.000	858.419	62.0	65.0	64.0	64.0	1.0078	1.7464
			858.419		65.0	64.0			
2.25	5.95	5.000	863.374	62.0	65.0	64.0	64.5	1.0083	1.7625
			863.444		65.0	64.0			
3.00	5.18	5.000	868.382	63.0	66.0	64.0	64.8	1.0085	1.7871
			868.382		65.0	64.0			
3.00	5.18	5.000	873.313	63.0	66.0	64.0	64.8	1.0099	1.7871
			873.313		66.0	64.0			
3.00	5.15	5.000	878.248	63.0	66.0	64.0	64.8	1.0091	1.7664
			878.275		66.0	64.0			
3.75	4.63	5.000	883.190	63.0	66.0	64.0	65.0	1.0119	1.7838
			883.190		65.0	64.0			
3.75	4.62	5.000	888.098	64.0	65.0	64.0	64.5	1.0104	1.7846
			888.098		65.0	64.0			
3.75	4.62	5.000	893.008	64.0	65.0	64.0	64.5	1.0100	1.7846
						AVERAGE		1.0078	1.7468

Validity checks:

Meter Factor: 1.0078

* Y(max - min) ≤.02 ? √

† | ΔH@ - ΔH@ avg. | ≤ .20 in. H20 ? √

ΔH@ : 1.7468

Calibration by: FT Reviewed by: KK

EQUATIONS USED:

Y= (VWG*PBAR*(TDGavg.+460))/((VDG*(PBAR+(ΔH/13.6))*(TWGavg.+460))

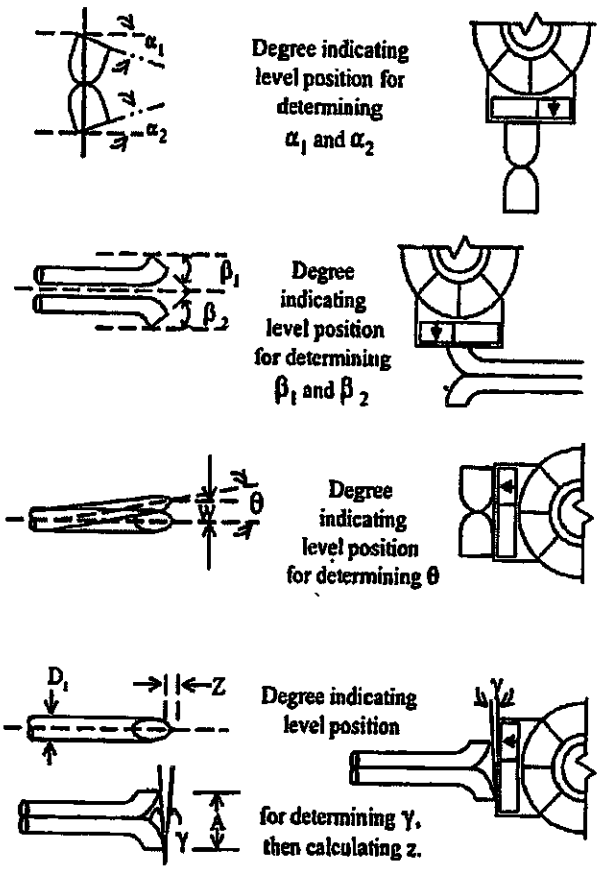
ΔH@ = ((0.0319*ΔH)/(PBAR*(TDGavg+460))*(((TWG+460)*T)/VWG)^2

TYPE S PITOT TUBE INSPECTION SHEET

CAL DATE: 1/5/2021

NEXT DUE DATE: Jul-21

PITOT ID: PT-HT



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	2	$-10° \leq \alpha1 \leq +10°$
α2	2	$-10° \leq \alpha2 \leq +10°$
β1	3	$-5° \leq \beta1 \leq +5°$
β2	2	$-5° \leq \beta2 \leq +5°$
γ	1	NA
θ	3	NA
Z = A (tan γ)	0.015	≤ 0.125 in.
W = A (tan θ)	0.045	≤ 0.031 in.
Dt	0.375	$0.188 \leq Dt \leq 0.375$
A	0.85	NA
A/2/(Dt)	1.13	$1.05 \leq PA/Dt \leq 1.5$

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: FT **Date:** 1/5/2021

PYROMETER CALIBRATION

Date: 1/5/2021 Unit: HT-1

Point	* Standard Temperature *Tstd* deg. F	Pyrometer Temperature *Tpyr* deg. F	Error %
1 Ambient	65	65	0.10%
2 Ice	32	32	0.02%
3 Boil	212	210	0.30%

Std. Corr. Factor 1.000

Calibration by: FT *Standard ID: T-1

Reviewed by: KK

Measurement Control Systems
1331 South Lyon Street
Santa Ana, CA 92705
800.826.1682
mcsmeters.com

Serial Number	77003573
Test Date	2/3/2021
Record No	4304

Gas Meter Accuracy Certification

Customer	ALL AMERICAN ASPHALT
Meter	American Meter 3.5M RABO 2" Rotary
Meter Location	RUBBER PLANT-IRVINE
Options	MINI MAX-PT

Customer P/O No.	
Job No.	11525
RGA No.	S/C
Technician - License No.	
RUDY LUCERO	30278

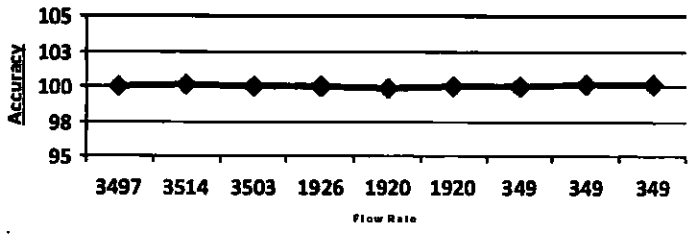
Totalizer Readings		Units	Capacity	Turbine Meter Spin (seconds)	Test Status
Before Test	31032 x 100	Cubic Feet	3500 (cfh)		As Found/As Left
After Test	31041 x 100	ODO Multiplier	100	N/A	Next Test Date 2/3/2022

Dresser Model 5m Prover				Customer Meter			
Test No	Flow Rate	Test Amount	Prover Amt %	Meter Reading	Meter Error	Meter Accuracy	Correction Factor
1	3497	100.00	100.05	99.950	-0.05%	99.95	1.0005
2	3514	100.00	99.87	100.130	0.13%	100.13	0.9987
3	3503	100.00	100.00	100.000	0.00%	100.00	1.0000
4	1926	100.00	99.96	100.040	0.04%	100.04	0.9996
5	1920	100.00	100.08	99.920	-0.08%	99.92	1.0008
6	1920	100.00	99.99	100.010	0.01%	100.01	0.9999
7	349	20.00	99.95	20.010	0.05%	100.05	0.9995
8	349	20.00	99.91	20.018	0.09%	100.09	0.9991
9	349	20.00	99.87	20.026	0.13%	100.13	0.9987

Overall Average Accuracy is 100.036%
Overall Correction Factor is 0.9996%

Test Report - Pass

Test Medium - Atmospheric Air



Additional Information	Approved By:

60

All Tests where performed to the AGA Gas Measurement Manual, Section 12.2 Transfer Prover Certification Traceable to NIST No. 6216