FLUOROMONOMERS
MANUFACTURING PROCESS
DIVISION STACK EMISSIONS TEST REPORT
TEST DATES: 16 AND 17 JANUARY 2019

THE CHEMOURS COMPANY
FAYETTEVILLE, NORTH CAROLINA

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W.O. No. 15418.002.009

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1. INTRODUCTION

1.1 FACILITY AND BACKGROUND INFORMATION

The Chemours Fayetteville Works (Chemours) is located in Bladen County, North Carolina, approximately 10 miles south of the city of Fayetteville. Chemours operating areas on the site include the Fluoromonomers, IXM and Polymers Processing Aid (PPA) manufacturing areas, Wastewater Treatment, and Powerhouse.

Chemours contracted Weston Solutions, Inc. (Weston) to perform HFPO Dimer Acid Fluoride, captured as HFPO Dimer Acid, emission testing on the Division Stack at the facility. Testing was performed on 16 and 17 January 2019 and generally followed the "Emission Test Protocol" reviewed and approved by the North Carolina Department of Environmental Quality (NCDEQ). This report provides the results from the emission test program.

1.2 TEST OBJECTIVES

The specific objectives for this test program were as follows:

- Measure the emissions concentrations and mass emissions rates of HFPO Dimer Acid Fluoride from the Division stack which is located in the Fluoromonomers process area.
- Monitor and record process and emissions control data in conjunction with the test program.
- Provide representative emissions data.

1.3 TEST PROGRAM OVERVIEW

During the emissions test program, the concentrations and mass emissions rates of HFPO Dimer Acid were measured at the Division Stack.

Table 1-1 provides a summary of the test location and the parameters that were measured along with the sampling/analytical procedures that were followed.

Section 2 provides a summary of test results. A description of the processes is provided in Section 3. Section 4 provides a description of the test location. The sampling and analytical procedures are provided in Section 5. Detailed test results and discussion are provided in Section 6.

Appendix C includes the summary reports for the laboratory analytical results. The full laboratory data package is provided in electronic format and on CD with each hard copy.

Table 1-1
Sampling Plan for Division Stack Testing

Sampling Point & Location	**Division Stack**				
Number of Tests:	3				
Parameters To Be Tested:	HFPO Dimer Acid (HFPO-DA)	Volumetric Flow Rate and Gas Velocity	Carbon Dioxide	Oxygen	Water Content
Sampling or Monitoring Method	EPA M-0010	EPA M1, M2, M3A, and M4 in conjunction with M-0010 tests	EPA M3/3A		EPA M4 in conjunction with M-0010 tests
Sample Extraction/ Analysis Method(s):	LC/MS/MS	NA[6]	NA		NA
Sample Size	≥ 1.5m^3	NA	NA	NA	NA
Total Number of Samples Collected[1]	3	3	3	3	3
Reagent Blanks (Solvents, Resins)[1]	1 set	0	0	0	0
Field Blank Trains[1]	0 per source	0	0	0	0
Proof Blanks[1]	1 per train	0	0	0	0
Trip Blanks[1,2]	1 set	0	0	0	
Lab Blanks	1 per fraction[3]	0	0	0	0
Laboratory or Batch Control Spike Samples (LCS)	1 per fraction[3]	0	0	0	0
Laboratory or Batch Control Spike Sample Duplicate (LCSD)	1 per fraction[3]	0	0	0	0
Media Blanks	1 set[4]	0	0	0	0
Isotope Dilution Internal Standard Spikes	Each sample	0	0	0	0
Total No. of Samples	6[5]	3	3	3	3

Key:

[1] Sample collected in field.

[2] Trip blanks include one XAD-2 resin module and one methanol sample per sample shipment.

[3] Lab blank and LCS/LCSD includes one set per analytical fraction (front half, back half and condensate).

[4] One set of media blank archived at laboratory at media preparation.

[5] Actual number of samples collected in field.

[6] Not applicable.

2. SUMMARY OF TEST RESULTS

A total of three test runs were performed on the Division stack. Table 2-1 provides a summary of the HFPO Dimer Acid emissions test results. Detailed test results summaries are provided in Section 6.

It is important to note that emphasis is being placed on the characterization of the emissions based on the stack test results. Research conducted in developing the protocol for stack testing HFPO Dimer Acid Fluoride, HFPO Dimer Acid Ammonium Salt and HFPO Dimer Acid realized that the resulting testing, including collection of the air samples and extraction of the various fraction of the sampling train, would result in all three compounds being expressed as simply the HFPO Dimer Acid. However, it should be understood that the total HFPO Dimer Acid results provided on Table 2-1 and in this report include a percentage of each of the three compounds.

Table 2-1
Summary of HFPO Dimer Acid Test Results

Source	**Run No.**	**Emission Rates**	
		lb/hr	**g/sec**
Division Stack	1	4.70E-03	5.92E-04
	2	4.90E-03	6.17E-04
	3	4.45E-03	5.60E-04
	Average	4.68E-03	5.90E-04

3. PROCESS DESCRIPTIONS

The Fluoromonomers area is included in the scope of this test program.

3.1 FLUOROMONOMERS

These facilities produce a family of fluorocarbon compounds used to produce Chemours products such as Nafion®, Krytox®, and Viton®, as well as sales to outside customers.

Process emissions are vented to the Division waste gas scrubber system (which includes the secondary scrubber) and vents to the Carbon Bed and then onto the Division Stack. VE North building air also vents to the Carbon Bed and then onto the Division Stack.

3.2 PROCESS OPERATIONS AND PARAMETERS

The following table is a summary of the operation and products from the specific areas tested.

Source	Operation/Product	Batch or Continuous
VE North	PSEPVE	Condensation is continuous. Agitated Bed Reactor and Refining are batch.
HFPO Tower	HFPO	Continuous.

During the test program, the following parameters were monitored by Chemours and are included in Appendix A.

- Fluoromonomers Process
  - VEN Precurser Rate
  - VEN Condensation Rate
  - VEN ABR Rate
  - HFPO

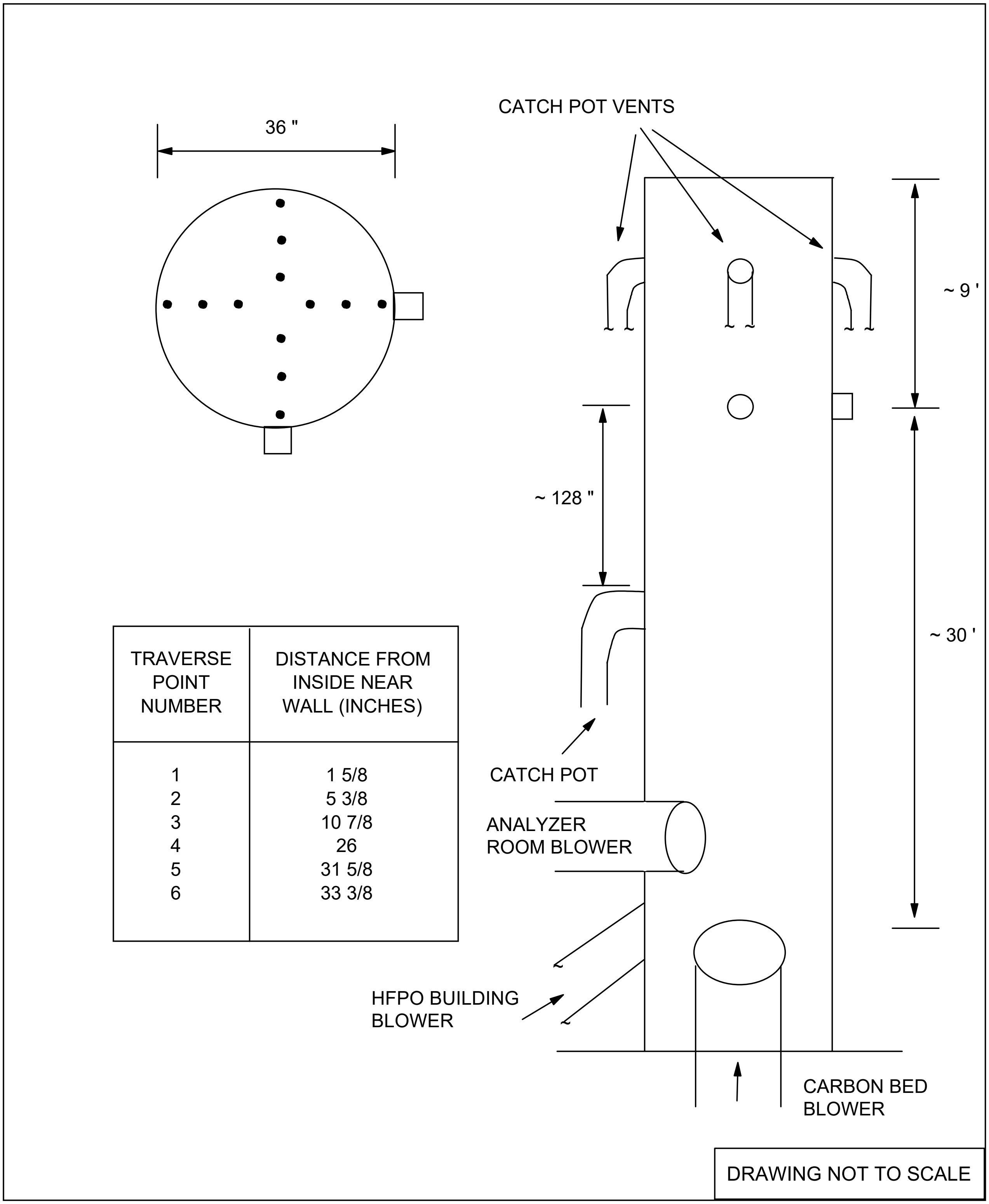
4. DESCRIPTION OF TEST LOCATIONS

4.1 DIVISION STACK

Two 6-inch ID test ports were installed on the 36-inch ID fiberglass stack as shown below. The four vents that enter the top of the stack and the one vent ~11 feet below are catch pots which, under normal process operations, do not discharge to the stack. They are used to vent process gas to the stack in the event of a process upset and are not considered a flow contributor or a disturbance.

Per EPA Method 1, a total of 12 traverse points (six per axis) were used for M-0010 isokinetic sampling. Figure 4-1 provides a schematic of the test ports and traverse point locations.

Location	**Distance from Flow Disturbance**	
	Downstream (B)	**Upstream (A)**
Division Stack	30 feet > 10 duct diameters	9 feet > 3 diameters



TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE NEAR WALL (INCHES)
1	1 5/8
2	5 3/8
3	10 7/8
4	26
5	31 5/8
6	33 3/8

FIGURE 4-1
DIVISION STACK TEST PORT
AND TRAVERSE POINT LOCATIONS

5. SAMPLING AND ANALYTICAL METHODS

5.1 STACK GAS SAMPLING PROCEDURES

The purpose of this section is to describe the stack gas emissions sampling trains and to provide details of the stack sampling and analytical procedures utilized during the emissions test program.

5.1.1 Pre-Test Determinations

Preliminary test data were obtained at each test location. Stack geometry measurements were measured and recorded, and traverse point distances verified. A preliminary velocity traverse was performed utilizing a calibrated S-type pitot tube and an inclined manometer to determine velocity profiles. Flue gas temperatures were observed with a calibrated direct readout panel meter equipped with a chromel-alumel thermocouple. Preliminary water vapor content was estimated by wet bulb/dry bulb temperature measurements.

A check for the presence or absence of cyclonic flow was previously conducted at the test location. The cyclonic flow checks were negative (< 20°) verifying that the test location was acceptable for testing.

Preliminary test data was used for nozzle sizing and sampling rate determinations for isokinetic sampling procedures.

Calibration of probe nozzles, pitot tubes, metering systems, and temperature measurement devices was performed as specified in Section 5 of EPA Method 5 test procedures.

5.2 STACK PARAMETERS

5.2.1 EPA Method 0010

The sampling train utilized to perform the HFPO Dimer Acid sampling was an EPA Method 0010 train (see Figure 5-1). The Method 0010 consisted of a borosilicate nozzle that attached directly to a heated borosilicate probe. In order to minimize possible thermal degradation of the HFPO Dimer Acid, the probe and particulate filter were heated above stack temperature to minimize water vapor condensation before the filter. The probe was connected directly to a heated borosilicate filter holder containing a solvent extracted glass fiber filter.

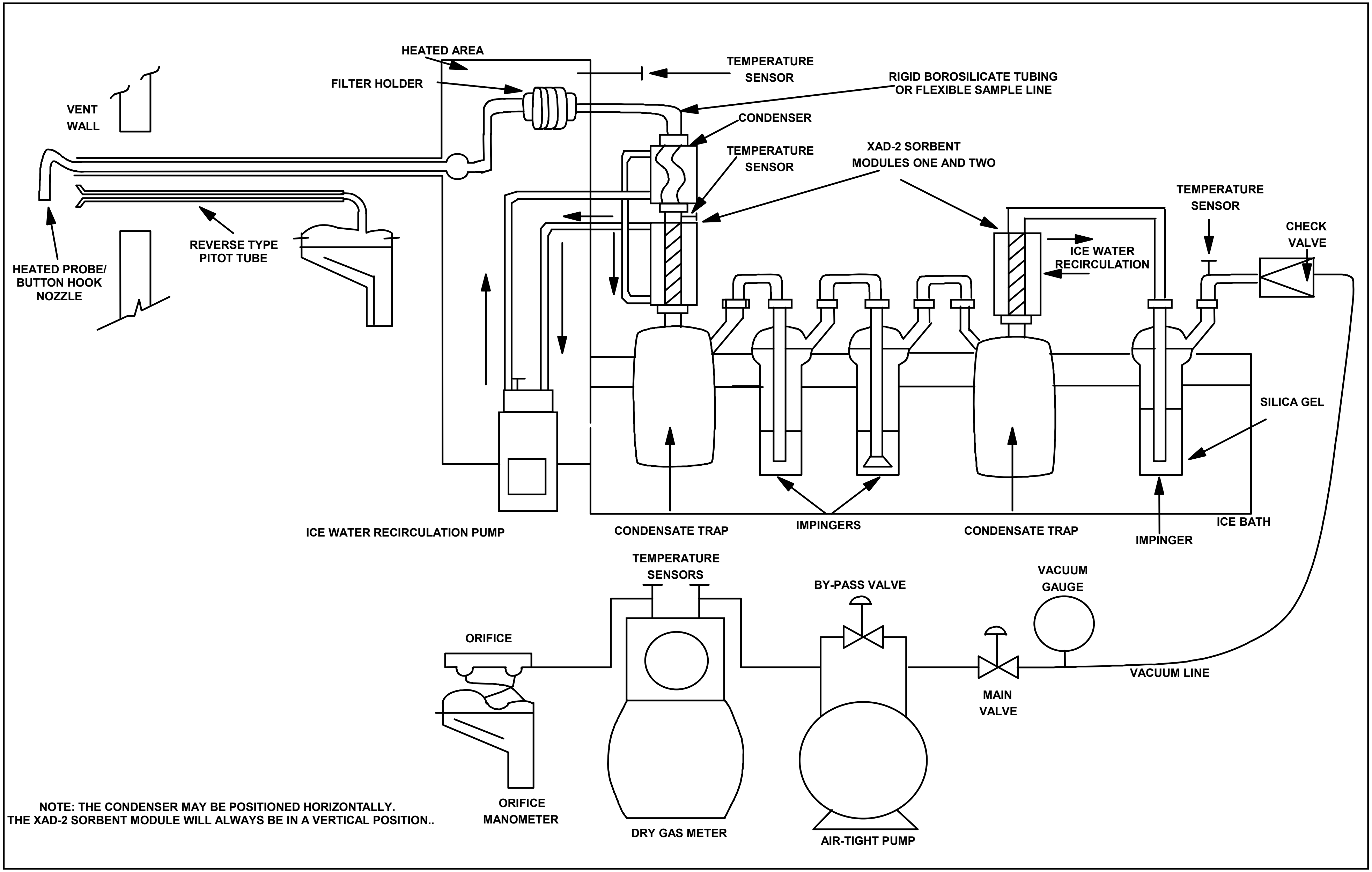


FIGURE 5-1
EPA METHOD 0010 SAMPLING TRAIN

A section of borosilicate glass or flexible polyethylene tubing connected the filter holder exit to a Grahm (spiral) type ice water-cooled condenser, an ice water-jacketed sorbent module containing approximately 40 grams of XAD-2 resin. The XAD-2 resin tube was equipped with an inlet temperature sensor. The XAD-2 resin trap was followed by a condensate knockout impinger and a series of two impingers that contained 100 milliliters of high purity distilled water. The train also included a second XAD-2 resin trap behind the impinger section to evaluate possible sampling train breakthrough. Each XAD-2 resin trap was connected to a 1-liter condensate knockout trap. The final impinger contained 300 grams of dry pre-weighed silica gel. All impingers and the condensate traps were maintained in an ice bath. Ice water was continuously circulated in the condenser and both XAD-2 modules to maintain method-required temperature. A control console with a leakless vacuum pump, a calibrated orifice, and dual inclined manometers was connected to the final impinger via an umbilical cord to complete the sample train.

HFPO Dimer Acid Fluoride (CAS No. 2062-98-8) that is present in the stack gas is expected to be captured in the sampling train along with HFPO Dimer Acid (CAS No. 13252-13-6). HFPO Dimer Acid Fluoride underwent hydrolysis instantaneously in water in the sampling train and during the sample recovery step, and was converted to HFPO Dimer Acid such that the amount of HFPO Dimer Acid emissions represented a combination of both HFPO Dimer Acid Fluoride and HFPO Dimer Acid.

During sampling, gas stream velocities were measured by attaching a calibrated S-type pitot tube into the gas stream adjacent to the sampling nozzle. The velocity pressure differential was observed immediately after positioning the nozzle at each traverse point, and the sampling rate adjusted to maintain isokineticity at 100% ± 10. Flue gas temperature was monitored at each point with a calibrated panel meter and thermocouple. Isokinetic test data was recorded at each traverse point during all test periods, as appropriate. Leak checks were performed on the sampling apparatus according to reference method instructions, prior to and following each run, component change (if required) or during midpoint port changes.

5.2.2 EPA Method 0010 Sample Recovery

At the conclusion of each test, the sampling train was dismantled, the openings sealed, and the components transported to the field laboratory trailer for recovery.

A consistent procedure was employed for sample recovery:

1. The two XAD-2 covered (to minimize light degradation) sorbent modules (1 and 2) were sealed and labeled.

2. The glass fiber filter(s) were removed from the holder with tweezers and placed in a polyethylene container along with any loose particulate and filter fragments.

3. The particulate adhering to the internal surfaces of the nozzle, probe and front half of the filter holder were rinsed with a solution of methanol and ammonium hydroxide into a polyethylene container while brushing a minimum of three times until no visible particulate remains. Particulate adhering to the brush was rinsed with methanol/ ammonium hydroxide into the same container. The container was sealed.

4. The volume of liquid collected in the first condensate trap was measured, the value recorded, and the contents poured into a polyethylene container.

5. All train components between the filter exit and the first condensate trap were rinsed with methanol/ammonium hydroxide. The solvent rinse was placed in a separate polyethylene container and sealed.

6. The volume of liquid in impingers one and two, and the second condensate trap, were measured, the values recorded, and the sample was placed in the same container as Step 4 above, then sealed.

7. The two impingers, condensate trap, and connectors were rinsed with methanol/ ammonium hydroxide. The solvent sample was placed in a separate polyethylene container and sealed.

8. The silica gel in the final impinger was weighed and the weight gain value recorded.

9. Site (reagent) blank samples of the methanol/ammonium hydroxide, XAD resin, filter and distilled water were retained for analysis.

Each container was labeled to clearly identify its contents. The height of the fluid level was marked on the container of each liquid sample to provide a reference point for a leakage check during transport. All samples were maintained cool.

See Figure 5-2 for a schematic of the Method 0010 sample recovery process.

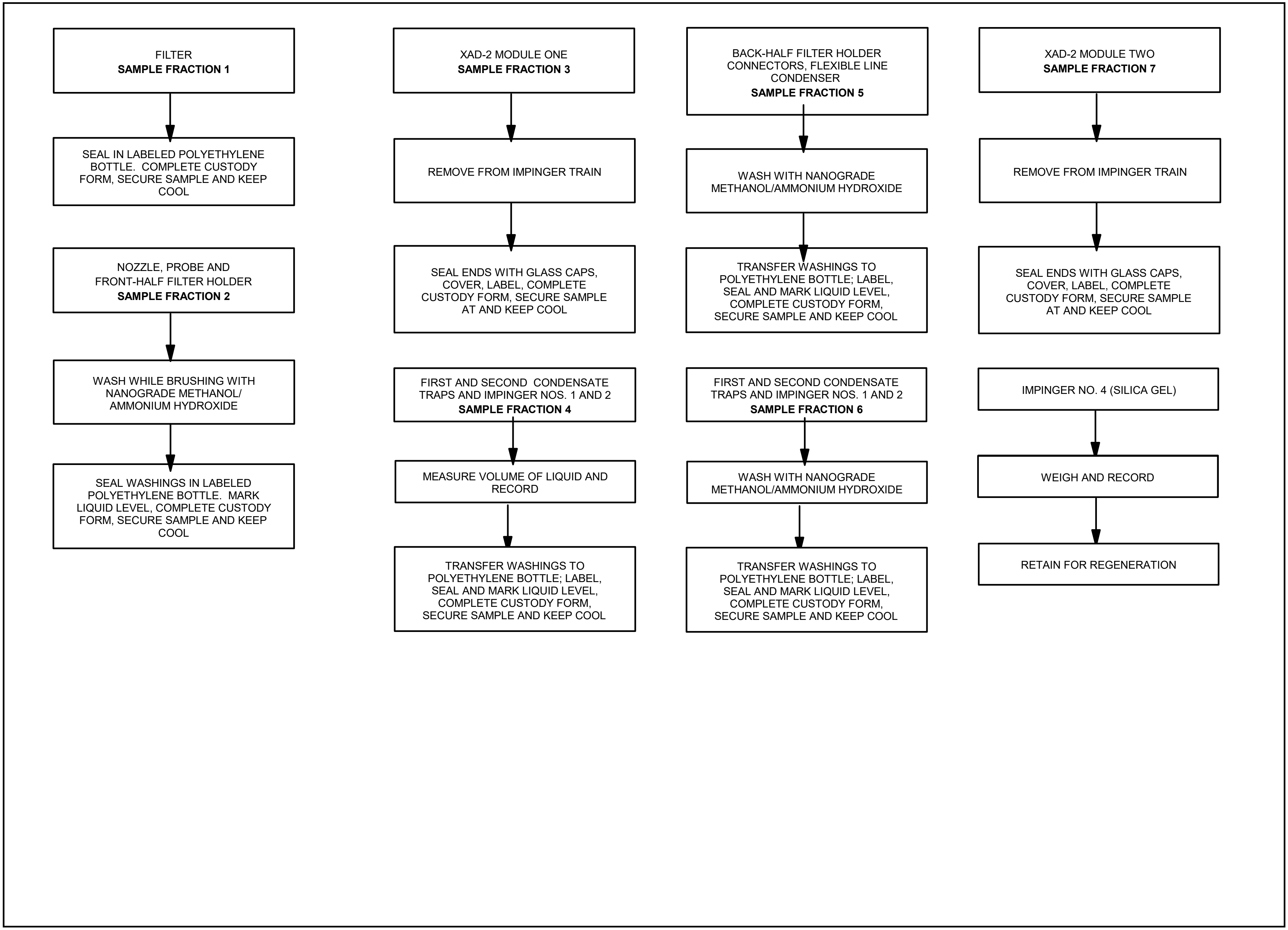


FIGURE 5-2
HFPO DIMER ACID SAMPLE RECOVERY PROCEDURES FOR METHOD 0010

IASDATA\CHEMOURS\15418.002.009\FIGURE 5-2 EPA 0010

5.2.3 EPA Method 0010 Sample Analysis

Method 0010 sampling trains resulted in four separate analytical fractions for HFPO Dimer Acid analysis according to SW-846 Method 3542:

- Front-half Composite—comprised of the particulate filter, and the probe, nozzle, and front-half of the filter holder solvent rinses;
- Back-half Composite—comprised of the first XAD-2 resin material and the back-half of the filter holder with connecting glassware solvent rinses;
- Condensate Composite—comprised of the aqueous condensates and the contents of impingers one and two with solvent rinses;
- Breakthrough XAD-2 Resin Tube—comprised of the resin tube behind the series of impingers.

The second XAD-2 resin material was analyzed separately to evaluate any possible sampling train HFPO-DA breakthrough.

The front-half and back-half composites and the second XAD-2 resin material were placed in polypropylene wide-mouth bottles and tumbled with methanol containing 5% NH_4OH for 18 hours. Portions of the extracts were processed analytically for the HFPO dimer acid by liquid chromatography and duel mass spectroscopy (HPLC/MS/MS). The condensate composite was concentrated onto a solid phase extraction (SPE) cartridge followed by desorption from the cartridge using methanol. Portions of those extracts were also processed analytically by HPLC/MS/MS.

Samples were spiked with isotope dilution internal standard (IDA) at the commencement of their preparation to provide accurate assessments of the analytical recoveries. Final data was corrected for IDA standard recoveries.

TestAmerica developed detailed procedures for the sample extraction and analysis for HFPO Dimer Acid. These procedures were incorporated into the test protocol.

5.3 GAS COMPOSITION

The Weston mobile laboratory equipped with instrumental analyzers was used to measure carbon dioxide (CO_2) and oxygen (O_2) concentrations. A diagram of the Weston sampling system is presented in Figure 5-3.

The sample was collected at the exhaust of the Method 0010 sampling system. At the end of the line, a tee permitted the introduction of calibration gas. The sample was drawn through a heated Teflon® sample line to the sample conditioner. The output from the sampling system was recorded electronically, and one minute averages were recorded and displayed on a data logger.

Each analyzer was set up and calibrated internally by introduction of calibration gas standards directly to the analyzer from a calibration manifold. The calibration manifold is designed with an atmospheric vent to release excess calibration gas and maintained the calibration at ambient pressure. The direct calibration sequence consisted of alternate injections of zero and mid-range gases with appropriate adjustments until the desired responses were obtained. The high-range standards were then introduced in sequence without further adjustment.

The sample line integrity was verified by performing a bias test before and after each test period. The sampling system bias test consisted of introducing the zero gas and one up-range calibration standard in excess to the valve at the probe end when the system was sampling normally. The excess calibration gas flowed out through the probe to maintain ambient sampling system pressure. Calibration gas supply was regulated to maintain constant sampling rate and pressure. Instrument bias check response was compared to internal calibration responses to insure sample line integrity and to calculate a bias correction factor after each run using the ratio of the measured concentration of the bias gas certified by the calibration gas supplier.

The oxygen and carbon dioxide content of each stack gas was measured according to EPA Method 3A procedures which incorporate the latest updates of EPA Method 7E. A Servomex Model 4900 analyzer (or equivalent) was used to measure oxygen content. A Servomex Model 4900 analyzer (or equivalent) was used to measure carbon dioxide content of the stack gas. Both analyzers were calibrated with EPA Protocol gases prior to the start of the test program and performance was verified by sample bias checks before and after each test run.

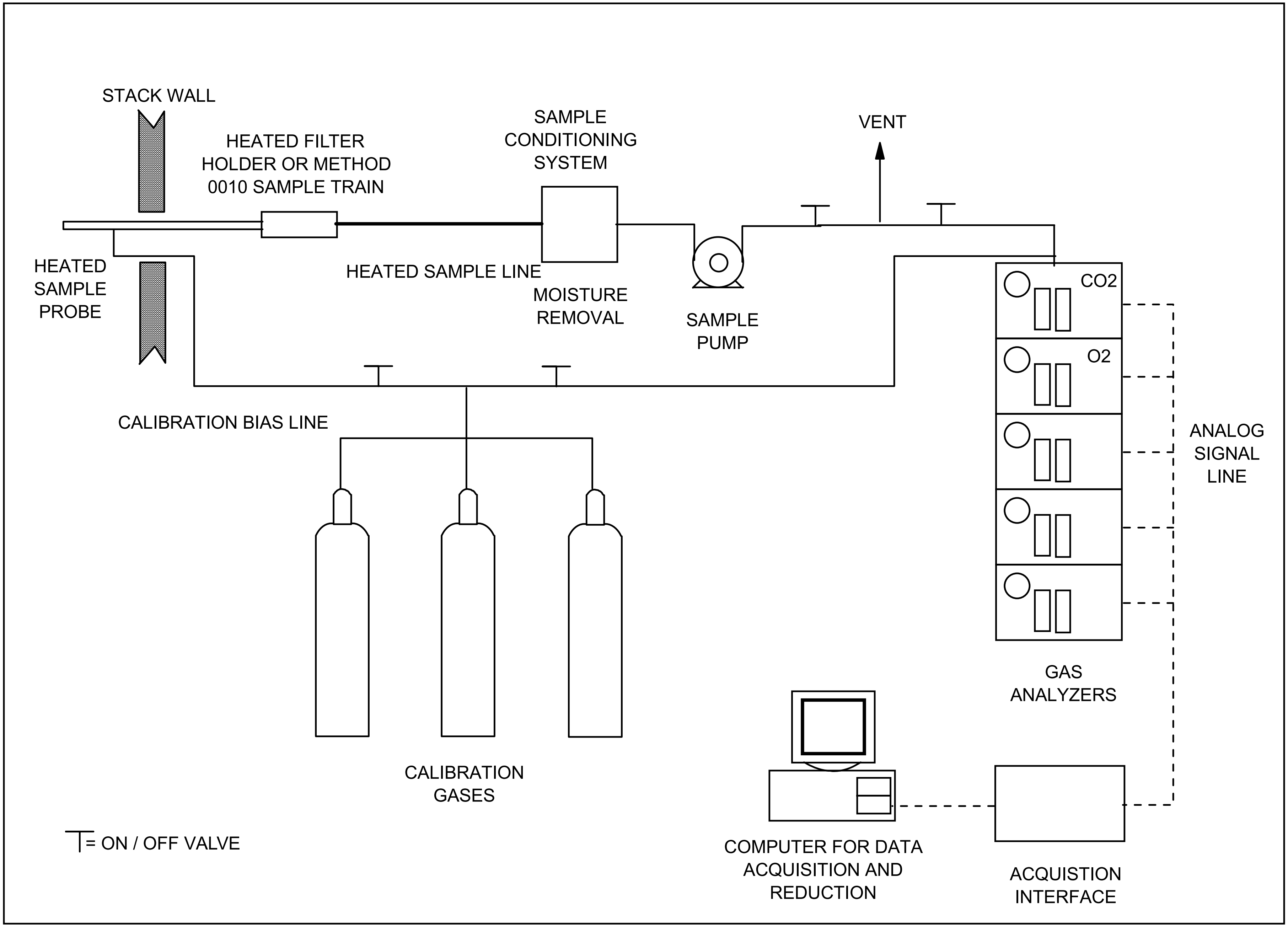


FIGURE 5-3
WESTON SAMPLING SYSTEM

6. DETAILED TEST RESULTS AND DISCUSSION

Each test was a minimum of 96 minutes in duration. A total of three test runs were performed at each location.

Table 6-1 provides detailed test data and test results for the Division stack.

The Method 3A sampling indicated that the O_2 and CO_2 concentrations were at ambient air levels (20.9% O_2, 0% CO_2), therefore, 20.9% O_2 and 0% CO_2 values were used in all calculations.

TABLE 6-1
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
DIVISION STACK

Test Data			
Run number	1	2	4
Location	Divison Stack	Divison Stack	Divison Stack
Date	1/16/19	1/16/19	1/17/19
Time period	0941-1140	1312-1513	0842-1035
SAMPLING DATA:			
Sampling duration, min.	96.0	96.0	96.0
Nozzle diameter, in.	0.160	0.160	0.160
Cross sectional nozzle area, sq.ft.	0.000140	0.000140	0.000140
Barometric pressure, in. Hg	30.15	30.06	30.18
Avg. orifice press. diff., in H_2O	1.14	1.13	1.15
Avg. dry gas meter temp., deg F	49.1	59.2	40.9
Avg. abs. dry gas meter temp., deg. R	509	519	501
Total liquid collected by train, ml	21.5	21.1	21.6
Std. vol. of H_2O vapor coll., cu.ft.	1.0	1.0	1.0
Dry gas meter calibration factor	1.0069	1.0069	1.0069
Sample vol. at meter cond., dcf	53.660	53.775	53.146
Sample vol. at std. cond., dscf (1)	56.604	55.451	57.033
Percent of isokinetic sampling	98.5	98.0	97.9
GAS STREAM COMPOSITION DATA:			
CO_2, % by volume, dry basis	0.0	0.0	0.0
O_2, % by volume, dry basis	20.9	20.9	20.9
N_2, % by volume, dry basis	79.1	79.1	79.1
Molecular wt. of dry gas, lb/lb mole	28.84	28.84	28.84
H_20 vapor in gas stream, prop. by vol.	0.018	0.018	0.018
Mole fraction of dry gas	0.982	0.982	0.982
Molecular wt. of wet gas, lb/lb mole	28.65	28.65	28.65
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:			
Static pressure, in. H_2O	-0.70	-0.70	-0.70
Absolute pressure, in. Hg	30.10	30.01	30.13
Avg. temperature, deg. F	44	46	37
Avg. absolute temperature, deg.R	504	506	497
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	12	12
Avg. gas stream velocity, ft./sec.	69.0	68.4	69.0
Stack/duct cross sectional area, sq.ft.	7.07	7.07	7.07
Avg. gas stream volumetric flow, wacf/min.	29268	29016	29252
Avg. gas stream volumetric flow, dscf/min.	30315	29840	30735

(1) Standard conditions = 68 deg. F. (20 deg. C.) and 29.92 in Hg (760 mm Hg)

TABLE 6-1 (cont.)
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
DIVISION STACK

TEST DATA			
Run number	1	2	3
Location	Divison Stack	Divison Stack	Divison Stack
Date	1/16/19	1/16/19	1/17/19
Time period	0941-1140	1312-1513	0842-1035
LABORATORY REPORT DATA, ug.			
HFPO Dimer Acid	66.35	68.82	62.45
EMISSION RESULTS, ug/dscm.			
HFPO Dimer Acid	41.38	43.82	38.66
EMISSION RESULTS, lb/dscf.			
HFPO Dimer Acid	2.58E-09	2.74E-09	2.41E-09
EMISSION RESULTS, lb/hr.			
HFPO Dimer Acid	4.70E-03	4.90E-03	4.45E-03
EMISSION RESULTS, g/sec.			
HFPO Dimer Acid	5.92E-04	6.17E-04	5.60E-04

APPENDIX A
PROCESS OPERATIONS DATA

Date **1/16/2019**

Time	800				900				1000				1100				1200				1300				1400				1500				1600			
Stack Testing								RUN 1 941-1140															RUN 2 - 1312-1513													
HFPO	🟦																												🟦							
VEN Product	PSEPVE																																			
VEN Precursor	🟩			🟩			🟩				🟩												🟩										🟩			
VEN Condensation (HFPO)	🟩			🟩			🟩				🟩												🟩										🟩			
VEN ABR					🟩											🟩																				
VEN Refining																																				
Stripper Column Vent																																				
Division WGS Recirculation Flow	14000 kg/h																																			
Division WGS Inlet Flow	80 kg/h				107 kg/h																															

Date **1/17/2019**

Time	800				900				1000				1100			
Stack Testing				0842-1035 (Run 3)												
HFPO	🟦															
VEN Product	PSEPVE															
VEN Precursor	🟩											🟩				
VEN Condensation (HFPO)	🟩															
VEN ABR	🟩															
VEN Refining	Batch															
Stripper Column Vent																
Division WGS Recirculation Flow	14000 kg/h															
Division WGS Inlet Flow	100 kg/h															

APPENDIX B
RAW AND REDUCED TEST DATA

CHEMOURS - FAYETTEVILLE, NC
INPUTS FOR HFPO DIMER ACID CALCULATIONS
DIVISION STACK

Test Data			
Run number	1	2	3
Location	Divison Stack	Divison Stack	Divison Stack
Date	1/16/19	1/16/19	1/17/19
Time period	0941-1140	1312-1513	0842-1035
Operator	MW	MW	MW
Inputs For Calcs.			
Sq. rt. delta P	1.25716	1.24191	1.26546
Delta H	1.1436	1.1278	1.1545
Stack temp. (deg.F)	43.6	45.7	37.0
Meter temp. (deg.F)	49.1	59.2	40.9
Sample volume (act.)	53.660	53.775	53.146
Barometric press. (in.Hg)	30.15	30.06	30.18
Volume H_2O imp. (ml)	10.0	9.0	9.0
Weight change sil. gel (g)	11.5	12.1	12.6
% CO_2	0.0	0.0	0.0
% O_2	20.9	20.9	20.9
% N_2	79.1	79.1	79.1
Area of stack (sq.ft.)	7.070	7.070	7.070
Sample time (min.)	96.0	96.0	96.0
Static pressure (in.H_2O)	-0.70	-0.70	-0.70
Nozzle dia. (in.)	0.160	0.160	0.160
Meter box cal.	1.0069	1.0069	1.0069
Cp of pitot tube	0.84	0.84	0.84
Traverse points	12	12	12

Sample and Velocity Traverse Point Data Sheet - Method 1

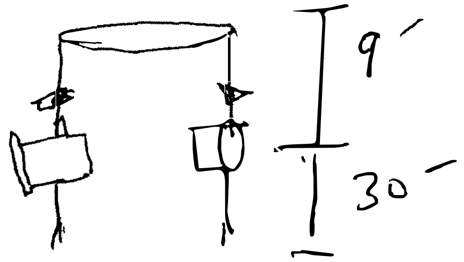
Client CHCMOURS
Loaction/Plant Fayetteville N.C
Source Division STACK
Operator MW/KS
Date 1/22/12
W.O. Number 15418.002.002

Duct Type	☒ Circular	☐	Rectangular Duct	Indicate appropriate type	
Traverse Type	☒ Particulate Traverse	☐	Velocity Traverse	☐ CEM Traverse	

Distance from far wall to outside of port (in.) = C	54
Port Depth (in.) = D	12 1/4
Depth of Duct, diameter (in.) = C-D	37
Area of Duct (ft²) 3/07/12 7.07 MD	~~2466~~
Total Traverse Points	12
Total Traverse Points per Port	6
Port Diameter (in.) —(Flange-Threaded-Hole)	4"
Monorail Length	8'
Rectangular Ducts Only	
Width of Duct, rectangular duct only (in.)	
Total Ports (rectangular duct only)	
Equivalent Diameter = (2*L*W)/(L+W)	

Flow Disturbances	
Upstream - A (ft)	12 9'
Downstream - B (ft)	18 30'
Upstream - A (duct diameters)	2
Downstream - B (duct diameters)	8

Diagram of Stack



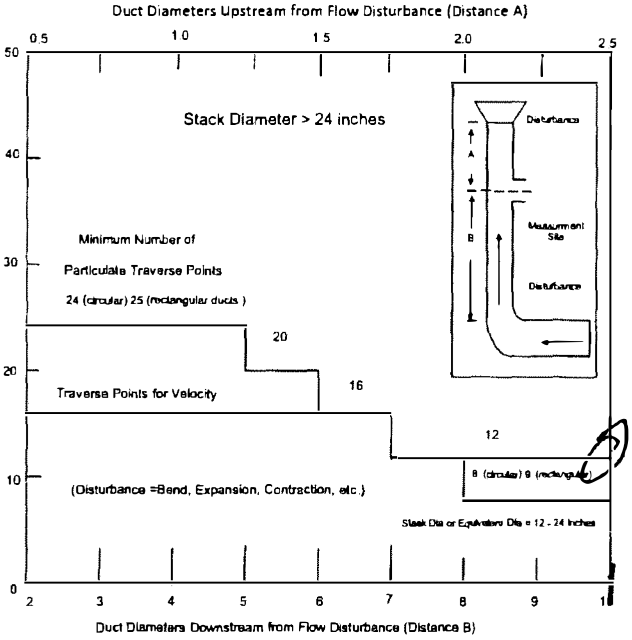
Traverse Point Locations

Traverse Point	% of Duct	Distance from Inside Duct Wall (in)	Distance from Outside of Port (in)
1	4.4	1.62	19 3/8 20 1/8
2	14.6	5.40	23 1/4 24 3/8
3	29.6	10.95	28 7/8 29 7/8
4	70.4	26.04	44.0 45
5	85.4	31.59	49 3/8 50 5/8
6	95.6	35.37	53 1/4 54 3/8
7			
8			
9			
10			
11			
12			

CEM 3 Point(Long Measurment Line) Stratificaton Point Locations

1	0.167		
2	0.50		
3	0.833		

Note: If stack dia < 12 inch use EPA Method 1A
(Sample port upstream of pitot port)
Note: If stack dia >24" then adjust traverse point to 1 inch from wall
If stack dia <24" then adjust traverse point to 0.5 inch from wall



Traverse Point Location Percent of Stack -Circular

Traverse Location Point	1	2	3	4	5	6	7	8	9	10	11	12
1		14.6		6.7		4.4		3.2		2.6		2.1
2		85.4		25		14.6		10.5		8.2		6.7
3				75		29.6		19.4		14.6		11.8
4				93.3		70.4		32.3		22.6		17.7
5						85.4		67.7		34.2		25
6						95.6		80.6		65.8		35.6
7								89.5		77.4		64.4
8								96.8		85.4		75
9										91.8		82.3
10										97.4		88.2
11												93.3
12												97.9

Traverse Point Location Percent of Stack -Rectangular

Traverse Location Point	1	2	3	4	5	6	7	8	9	10	11	12
1		25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2		75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3			83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4				87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5					90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6						91.7	78.6	68.8	61.1	55.0	50.0	45.8
7							92.9	81.3	72.2	65.0	59.1	54.2
8								93.8	83.3	75.0	68.2	62.5
9									94.4	85.0	77.3	70.8
10										95.0	86.4	79.2
11											95.5	87.5
12												95.8

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

0.684

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K Factor ~~0.655~~ MPW

Client: Chemours
W.O.#: 15418
Project ID: Chemours
Mode/Source ID: Division
Samp. Loc. ID: STK
Run No.ID: 1
Test Method ID: M0010
Date ID: 16JAN2019
Source/Location: Division Stack
Sample Date: 1/16/19 ✓
Baro. Press (in Hg): 30.15 ✓
Operator: MW WINCILER ✓

Stack Conditions

	Assumed	Actual
% Moisture	22.0	
Impinger Vol (ml)		
Silica gel (g)		
CO2, % by Vol	0.1 ✓	
O2, % by Vol	20.3 ✓	
Temperature (°F)	40	
Meter Temp (°F)	40	
Static Press (in H_2O)	-0.72 ✓	-0.7
Ambient Temp (°F)	~40	

Meter Box ID: 12
Meter Box Y: 1.0069 ✓
Meter Box Del H: 1.8812
Probe ID / Length: P 695 / 5'
Probe Material: Boro
Pitot / Thermocouple ID: P 695
Pitot Coefficient: 0.84
Nozzle ID: 0-160
Nozzle Measurements: 0.160 | 0.160 | 0.160
Avg Nozzle Dia (in): 0.160 ✓
Area of Stack (ft²): 7.07 ✓
Sample Time: 96 ✓
Total Traverse Pts: 12 ✓

	Initial	Mid-Point	Final
Sample Train (ft³)	0.001	0.001	0.001
Leak Check @ (in Hg)	0.15	0.6	0.6
Pitot leak check good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no
Pitot Inspection good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no
Method 3 System good	yes / no	yes / no	yes / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	36	54
Reference Temp	37	53
Pass/Fail (+/- 2°)	[✓ Pass] / Fail	[✓ Pass] / Fail
Temp Change Response ?	[✓ yes] / no	[✓ yes] / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	0941			278.115									
1	4		1.4	0.957	280.13	40	35	258	255	66	3	66		
1	8		1.5	1.03	282.51	40	35	258	255	66	3	66		
2	12		1.8	1.28	285.10	40	35	255	255	62	3	62	←	0713
2	16		1.8	1.28	286.96	40	35	255	255	62	4	62		← New
3	20		1.9	1.35	289.51	40	40	255	255	60	4	60		K. FACTOR
3	24		1.9	1.35	292.10	44	45	255	255	60	5	60		
4	28		1.8	1.28	294.35	44	48	255	251	60	5	60		
4	32		1.8	1.28	296.55	44	50	255	251	54	5	54		27.160
5	36		1.6	1.14	299.00	44	51	255	251	54	5	54		
5	40		1.6	1.14	301.15	44	51	254	254	51	5	51		
6	44		1.2	0.855	303.25	44	51	254	255	51	5	51		
6	48	1029	1.2	0.855	305.278	40	51	253	253	51	5	51		
		1052			305.400									
1	4		1.5	1.09	307.43	50	54	255	255	55	3	55		← 0.728
1	8		1.5	1.09	309.60	48	54	255	255	55	3	54		K-FACTOR
2	12		1.8	1.31	312.00	44	54	251	251	48	5	48		
2	16		1.8	1.31	314.44	44	54	251	251	48	5	48		
3	20		1.9	1.38	317.21	44	54	251	251	44	5	44		
3	24		1.9	1.38	319.24	44	54	251	251	42	5	42		26.500
4	28		1.8	1.31	321.05	45	54	251	251	40	5	40		
4	32		1.8	1.31	324.68	45	54	250	250	40	5	40		
5	30		1.5	1.09	326.14	45	54	251	251	40	4	40		
5	40	328.18	1.5	1.09	~~326.52~~ MPW	45	55	251	251	40	4	40		
6	44		0.90	0.65	330.60	44	55	248	248	40	3	40		
6	48	1140	0.90	0.65	331.900	44	55	248	248	40	3	40		
			Avg Delta P ✓ 1.59583	Avg Delta H ✓ 1.14363	Total Volume ✓ 53.660	Avg Ts ✓ 43.5	Avg Tm ✓ 49	Min/Max 248/	Min/Max 248/255	Max 66	Max Vac 5	Min/Max 40/66		
			Avg Sqrt Delta P ✓ 1.25716	Avg Sqrt Del H 1.06410	Comments:	43.58	49.08	250						

EPA Method 0010 from EPA SW-846

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

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K Factor 0.720

Client	Chemours
W.O.#	
Project ID	CHEMOURS
Mode/Source ID	
Samp. Loc. ID	STK
Run No.ID	2
Test Method ID	M0010
Date ID	16JAN2019
Source/Location	Division Stack
Sample Date	1/16/19 ✓
Baro. Press (in Hg)	30.06 ✓
Operator	MW WINKELER ✓

Stack Conditions

	Assumed	Actual
% Moisture	≈2.0	
Impinger Vol (ml)		9.0
Silica gel (g)		12.1
CO2, % by Vol	0.1 ✓	
O2, % by Vol	20.8 ✓	
Temperature (°F)	≈ 40	
Meter Temp (°F)	≈ 50	
Static Press (in H_2O)	-0.70 ✓	-0.7
Ambient Temp (°F)	MW ~~45~~ 55	

Meter Box ID	12
Meter Box Y	1.0069 ✓
Meter Box Del H	1.8812
Probe ID / Length	P695 / 5'
Probe Material	Boro
Pitot / Thermocouple ID	P695 / ~~5~~ MW
Pitot Coefficient	0.84
Nozzle ID	G160
Avg Nozzle Dia (in)	0.160 ✓
Area of Stack (ft^2)	7.07 ✓
Sample Time	96 ✓
Total Traverse Pts	12 ✓

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.001	0.001
Leak Check @ (in Hg)	15	7	7
Pitot good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no
Orsat good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	50	51
Reference Temp	50	51
Pass/Fail (+/- 2°)	[✓ Pass] / Fail	[✓ Pass] / Fail
Temp Change Response	[✓ yes] / no	[✓ yes] / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (°F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)	COMMENTS
	0	1312			332.125									
B 1	4		1.5	1.08	334.85	47	NA	55	259	255	51	4	51	
1	8		1.5	1.08	336.75	47		55	259	255	45	4	45	
2	12		1.7	1.22	338.80	43		55	259	255	41	4	41	
2	16		1.7	1.22	341.23	43		56	258	255	40	5	40	27.365
3	20		1.8	1.29	343.66	44		56	255	255	41	5	41	
3	24		1.8	1.29	346.44	44		56	255	254	41	5	41	
4	28		1.8	1.29	348.30	45		56	255	254	41	5	41	
4	32		1.9	1.36	350.70	45		57	254	255	41	5	41	
5	36		1.5	1.08	352.65	45		60	254	254	43	4	43	
5	40		1.5	1.08	355.10	45		60	254	254	43	4	43	
6	44		1.2	0.864	357.15	45		60	254	253	43	3	43	
6	48	1400	1.2	0.864	359.490	45		60	254	253	43	3	43	
		1425			359.600									
A 1	4		1.4	1.00	361.25	45		60	254	253	43	3	43	26.410
1	8		1.4	1.00	364.11	45		60	254	253	43	3	43	
2	12		1.7	1.22	366.20	45		61	254	253	45	4	45	
2	16		1.7	1.22	368.73	45		61	254	253	46	5	46	
3	20		1.9	1.41	371.01	47		61	255	255	46	5	46 ←	0.745
3	24		1.9	1.41	373.58	47		61	255	255	46	5	46	K-Factor
4	28		1.7	1.26	376.0	47		61	255	255	47	4	47	
4	32		1.7	1.26	378.21	47		62	254	253	47	4	47	
5	36		1.4	1.04	380.52	47		62	254	253	47	4	47	
5	40		1.4	1.04	382.86	47		62	255	255	47	4	47	
6	44		1.0	0.745	384.64	48		62	255	254	47	3	47	
6	48	~~8:4530~~ mw	1.0	0.745	386.010	48		62	255	254	48	3	48	
		1513	Avg ~~Sqrt~~ Delta P ✓ 1.55417	Avg Delta H ✓ 1.12783	Total Volume 53.775	Avg Ts ✓ 45.7	Avg Tm 59.2		Min/Max 254/259	Min/Max 253/255	Max Temp 51	Max Vac 5	Max Temp 51	
				Avg Sqrt Del H ✓ 1.05806	Comments:									

$\sqrt{\Delta P}$ = 1.24191 ✓

EPA Method 0010 from EPA SW-846

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

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K Factor 0.721

Client: Chemours
W.O.#:
Project ID: CHEMOURS
Mode/Source ID:
Samp. Loc. ID: STK
Run No.ID: 3
Test Method ID: M0010
Date ID: 16JAN2019
Source/Location: Division Stack
Sample Date: 1/17/19 ✓
Baro. Press (in Hg): 30.18
Operator: MR WINKELER ✓

Stack Conditions

	Assumed	Actual
% Moisture	≈1.5	
Impinger Vol (ml)		9
Silica gel (g)		12.6
CO2, % by Vol	0.1 ✓	
O2, % by Vol	20.8 ✓	
Temperature (°F)	≈40	
Meter Temp (°F)	≈40	
Static Press (in H_2O)	-0.70 ✓	-0.7
Ambient Temp (°F)	≈ 36	

Meter Box ID: 12
Meter Box Y: 1.0069 ✓
Meter Box Del H: 1.8812
Probe ID / Length: P695 / 5
Probe Material: Boro
Pitot / Thermocouple ID: P695 / 695
Pitot Coefficient: 0.84
Nozzle ID: G160
Avg Nozzle Dia (in): 0.160 ✓
Area of Stack (ft^2): 7.07 ✓
Sample Time: 96
Total Traverse Pts: 12 ✓

Leak Checks	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.001	0.001
Leak Check @ (in Hg)	@15	@7	@7
Pitot good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no
Orsat good	[✓ yes] / no	[✓ yes] / no	[✓ yes] / no

Temp Check	Pre-Test Set	Post-Test Set
Meter Box Temp	36	48
Reference Temp	36	47
Pass/Fail (+/- 2°)	[✓ Pass] / Fail	[✓ Pass] / Fail
Temp Change Response	[✓ yes] / no	[✓ yes] / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Δ P (in H_2O)	ORIFICE PRESSURE Δ H (in H_2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM INLET TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (°F)	IMPINGER EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (°F)	COMMENTS
	0	0842			387.510									
B 1	4		1.5	1.08	389.61	34	NA	33	255	249	60	4	60	
1	8		1.5	1.08	391.32	34		34	255	251	63	4	63	
2	12		1.7	1.22	393.52	35		36	255	258	63	5	63	
2	16		1.7	1.22	396.51	35		36	255	258	63	5	63	
3	20		1.8	1.29	398.50	35		37	259	258	63	5	63	26.48
3	24		1.8	1.29	400.86	35		37	259	258	63	5	63	
4	28		1.8	1.29	403.28	36		38	259	258	63	5	63	
4	32		1.8	1.29	405.28	37		38	258	258	63	5	63	
5	36		1.4	1.00	407.83	36		38	255	255	63	4	63	
5	40		1.4	1.00	410.00	36		38	254	253	62	4	62	
6	44		1.3	0.937	411.92	36		39	254	253	62	4	62	
6	48	0930	1.3	0.937	413.990	37		39	252	253	62	3	62	
		0947			414.135									
A 1	4		1.5	1.08	416.27	39		39	255	255	65	4	65	
1	8		1.5	1.08	418.52	39		39	255	255	65	4	65	
2	12		1.7	1.22	420.70	37		44	255	255	63	5	63	26.666
2	16		1.7	1.22	422.91	37		44	255	255	63	5	63	
3	20		1.9	1.36	425.26	37		45	255	255	63	5	63	
3	24		1.9	1.36	427.66	37		45	255	254	63	5	63	
4	28		1.9	1.36	430.07	38		46	255	258	62	5	62	
4	32		1.9	1.36	432.51	38		46	258	258	62	5	62	
5	36		1.5	1.08	434.75	39		47	258	258	61	5	61	
5	40		1.5	1.08	436.70	40		48	258	258	62	5	62	
6	44		1.3	0.937	438.78	40		48	258	258	63	5	63	
6	48	1035	1.3	0.937	440.801	40		48	257	257	64	5	64	
			Avg Sqrt Delta P 1.26546	Avg Delta H ✓ 1.15450	Total Volume ✓ 53.146	Avg Ts 36.9 37.0 ✓	Avg Tm 90.9 ✓		Min/Max. 254/255	Min/Max 249/258	Max Temp 65	Max Vac 5	Max Temp	
				Avg Sqrt Del H 1.07222 ✓	Comments:									

ΔP AVG = 1.60833 ✓

EPA Method 0010 from EPA SW-846

SAMPLE RECOVERY FIELD DATA
EPA Method 0010 - HFPO Dimer Acid

Client: Chemours
Location/Plant: Fayetteville, NC
W.O. #:
Source & Location: Division Stack

Run No. 1
Sample Date: 1/16/19
Recovery Date: 1/16/19
Sample I.D.: Chemours - Division - STK - 1 - M0010 -
Analyst: ADM/CW
Filter Number: NA

	Impinger 1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20						Silica Gel	
Final	2	101	102	5				210	316.5	
Initial	0	100	100	0				200 ✓	300	✓
Gain	2	1	2	5				10	16.5	26.5

Impinger Color: Clear
Silica Gel Condition: Good
Labeled? ✓ ✓ ✓
Sealed? ✓

Run No. 2
Sample Date: 1/16/19
Recovery Date: 1/16/19
Sample I.D.: Chemours - Division - STK - 2 - M0010 -
Analyst: DMM/CW
Filter Number: NA

	Impinger 1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20						Silica Gel	
Final	16	93	96	4					312.1	
Initial	0	100	100	0				200 ✓	300	[illegible] ✓
Gain	16	-7	-4	4				9 ✓	12.1	21.1

Impinger Color: Clear
Silica Gel Condition: Good
Labeled? ✓ ✓ ✓ 21.1
Sealed? ✓

Run No. 3
Sample Date: 1/17/19
Recovery Date: 1/17/19
Sample I.D.: Chemours - Division - STK - 3 - M0010 -
Analyst: PMM/CW
Filter Number: NA

	Impinger 1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20						Silica Gel	
Final	2	103	102	2				209	312.6	
Initial	0	100	100	0				200	300	
Gain	2	3	2	2				9	12.6	21.6

Impinger Color: Clear
Silica Gel Condition: Good
Labeled? ✓ ✓ ✓
Sealed? ✓

Check COC for Sample IDs of Media Blanks

WESTON SOLUTIONS

METHODS AND ANALYZERS

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

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ent Folders.A-F\Chemours Fayetteville\15418.002.009 Fayetteville Jan 2019 Carbon Bed Test\Data\Division\011619

Program Version: 2.1, built 19 May 2017 **File Version:** 2.03
Computer: WSWCAIRSERVICES **Trailer:** 27
Analog Input Device: Keithley KUSB-3108

Channel 1

Analyte	**O_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**25.0**
Span Concentration, %	**21.0**

Channel 2

Analyte	**CO_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**20.0**
Span Concentration, %	**16.6**

CALIBRATION DATA

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Start Time: 07:51

O_2

Method: EPA 3A
Calibration Type: Linear Zero and High Span

Calibration Standards

%	**Cylinder ID**
12.0	CC18055
21.0	SG9169108

Calibration Results

Zero	5 mv
Span, 21.0 %	7991 mv

Curve Coefficients

Slope	**Intercept**
380.3	5

CO_2

Method: EPA 3A
Calibration Type: Linear Zero and High Span

Calibration Standards

%	**Cylinder ID**
8.9	CC18055
16.6	SG9169108

Calibration Results

Zero	5 mv
Span, 16.6 %	8383 mv

Curve Coefficients

Slope	**Intercept**
505.3	5

CALIBRATION ERROR DATA

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Start Time: 07:51

O_2

Method: EPA 3A
Span Conc. 21.0 %
Slope 380.3 **Intercept** 5.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
12.0	12.0	0.0	0.0	Pass
21.0	21.0	0.0	0.0	Pass

CO_2

Method: EPA 3A
Span Conc. 16.6 %
Slope 505.3 **Intercept** 5.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
8.9	8.6	-0.3	-1.8	Pass
16.6	16.6	0.0	0.0	Pass

BIAS
Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Start Time: 07:58

O_2
Method: EPA 3A
Span Conc. 21.0 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

CO_2
Method: EPA 3A
Span Conc. 16.6 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	8.6	8.5	-0.1	-0.6	Pass

RUN DATA

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Time	O_2 %	CO_2 %
	Port A	
09:41	20.9	0.0
09:42	20.8	0.0
09:43	20.8	0.1
09:44	20.9	0.1
09:45	20.9	0.1
09:46	20.9	0.1
09:47	20.9	0.1
09:48	20.9	0.1
09:49	20.9	0.1
09:50	20.9	0.1
09:51	20.9	0.1
09:52	20.9	0.1
09:53	20.9	0.1
09:54	20.9	0.1
09:55	20.9	0.1
09:56	20.9	0.1
09:57	20.9	0.1
09:58	20.9	0.1
09:59	20.9	0.1
10:00	20.9	0.1
10:01	20.9	0.1
10:02	20.9	0.1
10:03	20.9	0.1
10:04	20.9	0.1
10:05	20.9	0.1
10:06	20.9	0.1
10:07	21.0	0.1
10:08	20.9	0.1
10:09	21.0	0.1
10:10	21.0	0.1
10:11	21.0	0.1
10:12	21.0	0.1
10:13	21.0	0.1
10:14	21.0	0.1
10:15	21.0	0.1
10:16	21.0	0.1
10:17	21.0	0.1
10:18	21.0	0.1
10:19	21.0	0.1

RUN DATA

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Time	O_2 %	CO_2 %
10:20	21.0	0.1
10:21	21.0	0.1
10:22	21.0	0.1
10:23	21.0	0.1
10:24	21.0	0.1
10:25	20.9	0.1
10:26	21.0	0.1
10:27	21.0	0.1
10:28	21.0	0.1
10:29	21.0	0.1
	Port B	
10:52	20.9	0.0
10:53	20.9	0.0
10:54	20.9	0.1
10:55	20.9	0.1
10:56	20.9	0.1
10:57	20.9	0.1
10:58	20.9	0.1
10:59	20.9	0.1
11:00	20.9	0.1
11:01	20.9	0.1
11:02	20.9	0.1
11:03	20.9	0.1
11:04	20.9	0.1
11:05	20.9	0.1
11:06	20.9	0.1
11:07	20.9	0.1
11:08	20.9	0.1
11:09	21.0	0.1
11:10	21.0	0.1
11:11	21.0	0.1
11:12	21.0	0.1
11:13	21.0	0.1
11:14	21.0	0.1
11:15	21.0	0.1
11:16	21.0	0.1
11:17	21.0	0.1
11:18	21.0	0.1
11:19	21.0	0.1
11:20	21.0	0.1

RUN DATA
Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Time	O_2 %	CO_2 %
11:21	21.0	0.1
11:22	21.0	0.1
11:23	21.0	0.1
11:24	21.0	0.1
11:25	21.0	0.1
11:26	21.0	0.1
11:27	21.0	0.1
11:28	21.0	0.1
11:29	21.0	0.1
11:30	21.0	0.1
11:31	21.0	0.1
11:32	21.0	0.1
11:33	21.0	0.1
11:34	21.0	0.1
11:35	21.0	0.1
11:36	21.0	0.1
11:37	21.0	0.1
11:38	21.0	0.1
11:39	21.0	0.1
11:40	21.0	0.1
	End Run 1	
Avgs	**21.0**	**0.1**

RUN SUMMARY

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

	O_2	CO_2
Method	EPA 3A	EPA 3A
Conc. Units	%	%

Time: 09:40 to 11:40

Run Averages

	21.0	0.1

Pre-run Bias at 07:58

Zero Bias	0.0	0.0
Span Bias	12.0	8.5
Span Gas	12.0	8.9

Post-run Bias at 12:04

Zero Bias	0.0	0.1
Span Bias	12.0	8.5
Span Gas	12.0	8.9

Run averages corrected for the average of the pre-run and post-run bias

	21.0	0.0

BIAS AND CALIBRATION DRIFT

Number 2

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Start Time: 12:04

O_2

Method: EPA 3A
Span Conc. 21.0 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

*Bias No. 1

CO_2

Method: EPA 3A
Span Conc. 16.6 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.6	Pass
Span	8.6	8.5	-0.1	-0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.1	0.1	0.6	Pass
Span	8.5	8.5	0.0	0.0	Pass

*Bias No. 1

RUN DATA

Number 2

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Time	O_2 %	CO_2 %
	Port A	
13:12	20.8	0.0
13:13	20.8	0.0
13:14	20.9	0.0
13:15	20.9	0.0
13:16	20.9	0.1
13:17	20.9	0.1
13:18	20.9	0.1
13:19	20.9	0.1
13:20	20.9	0.1
13:21	20.9	0.1
13:22	20.9	0.1
13:23	20.9	0.1
13:24	20.9	0.1
13:25	20.9	0.1
13:26	20.9	0.1
13:27	20.9	0.1
13:28	20.9	0.1
13:29	20.9	0.1
13:30	20.9	0.1
13:31	20.9	0.1
13:32	20.9	0.1
13:33	20.9	0.1
13:34	20.9	0.1
13:35	20.9	0.1
13:36	20.9	0.1
13:37	20.9	0.1
13:38	20.9	0.1
13:39	20.9	0.1
13:40	20.9	0.1
13:41	20.9	0.1
13:42	20.9	0.1
13:43	20.9	0.1
13:44	20.9	0.1
13:45	20.9	0.1
13:46	20.9	0.1
13:47	20.9	0.1
13:48	20.9	0.1
13:49	20.9	0.1
13:50	20.9	0.1

RUN DATA

Number 2

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **16 Jan 2019**

Time	O_2 %	CO_2 %
13:51	20.9	0.1
13:52	20.9	0.1
13:53	20.9	0.1
13:54	20.9	0.1
13:55	20.9	0.1
13:56	20.9	0.1
13:57	20.9	0.1
13:58	20.9	0.1
13:59	20.9	0.1
14:00	20.9	0.1
	Port B	
14:25	20.8	0.0
14:26	20.8	0.0
14:27	20.9	0.1
14:28	20.9	0.1
14:29	20.9	0.1
14:30	20.9	0.1
14:31	20.9	0.1
14:32	20.9	0.1
14:33	20.9	0.1
14:34	20.9	0.1
14:35	20.9	0.1
14:36	20.9	0.1
14:37	20.9	0.1
14:38	20.9	0.1
14:39	20.9	0.1
14:40	20.9	0.1
14:41	20.9	0.1
14:42	20.9	0.1
14:43	20.9	0.1
14:44	20.9	0.1
14:45	20.9	0.1
14:46	20.9	0.1
14:47	20.9	0.1
14:48	20.9	0.1
14:49	20.9	0.1
14:50	20.9	0.1
14:51	20.9	0.1
14:52	20.9	0.1
14:53	20.9	0.1

RUN DATA

Number 2

Client:	**Chemours**	Project Number:	**15418.002.009**
Location:	**CHEMOURS**	Operator:	**CW**
Source:	**Division Stack**	Date:	**16 Jan 2019**

Calibration **1**

Time	O_2 %	CO_2 %
14:54	20.9	0.1
14:55	20.9	0.1
14:56	20.9	0.1
14:57	20.9	0.1
14:58	20.9	0.1
14:59	20.9	0.1
15:00	20.9	0.1
15:01	20.9	0.1
15:02	20.9	0.1
15:03	20.9	0.1
15:04	20.9	0.1
15:05	20.9	0.1
15:06	20.9	0.1
15:07	20.9	0.1
15:08	20.9	0.1
15:09	20.9	0.1
15:10	20.9	0.1
15:11	20.9	0.1
15:12	20.9	0.1
15:13	20.9	0.1
	End Run 2	
Avgs	**20.9**	**0.1**

RUN SUMMARY

Number 2

Client:	**Chemours**	Project Number:	**15418.002.009**
Location:	**CHEMOURS**	Operator:	**CW**
Source:	**Division Stack**	Date:	**16 Jan 2019**

Calibration **1**

	O_2	CO_2
Method	EPA 3A	EPA 3A
Conc. Units	%	%

Time: 13:11 to 15:13

Run Averages

	20.9	0.1

Pre-run Bias at 12:04

Zero Bias	0.0	0.1
Span Bias	12.0	8.5
Span Gas	12.0	8.9

Post-run Bias at 15:16

Zero Bias	0.0	0.0
Span Bias	12.0	8.5
Span Gas	12.0	8.9

Run averages corrected for the average of the pre-run and post-run bias

	20.9	0.0

BIAS AND CALIBRATION DRIFT

Number 3

Client:	**Chemours**	Project Number:	**15418.002.009**
Location:	**CHEMOURS**	Operator:	**CW**
Source:	**Division Stack**	Date:	**16 Jan 2019**

Calibration **1**

Start Time: 15:16

O_2

Method: EPA 3A

Span Conc. 21.0 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

*Bias No. 2

CO_2

Method: EPA 3A

Span Conc. 16.6 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	8.6	8.5	-0.1	-0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.1	0.0	-0.1	-0.6	Pass
Span	8.5	8.5	0.0	0.0	Pass

*Bias No. 2

METHODS AND ANALYZERS

Client:	**Chemours**	Project Number:	**15418.002.009**
Location:	**CHEMOURS**	Operator:	**CW**
Source:	**Division Stack**	Date:	**17 Jan 2019**

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Program Version: 2.1, built 19 May 2017 **File Version:** 2.03
Computer: WSWCAIRSERVICES **Trailer:** 27
Analog Input Device: Keithley KUSB-3108

Channel 1

Analyte	**O_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**25.0**
Span Concentration, %	**21.0**

Channel 2

Analyte	**CO_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**20.0**
Span Concentration, %	**16.6**

CALIBRATION DATA

Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

Start Time: 07:32

O_2

Method: EPA 3A
Calibration Type: Linear Zero and High Span

Calibration Standards

%	**Cylinder ID**
12.0	CC18055
21.0	SG9169108

Calibration Results

Zero	8 mv
Span, 21.0 %	8020 mv

Curve Coefficients

Slope	**Intercept**
381.5	8

CO_2

Method: EPA 3A
Calibration Type: Linear Zero and High Span

Calibration Standards

%	**Cylinder ID**
8.9	CC18055
16.6	SG9169108

Calibration Results

Zero	1 mv
Span, 16.6 %	8293 mv

Curve Coefficients

Slope	**Intercept**
500.1	1

CALIBRATION ERROR DATA

Number 1

Client:	**Chemours**	Project Number:	**15418.002.009**
Location:	**CHEMOURS**	Operator:	**CW**
Source:	**Division Stack**	Date:	**17 Jan 2019**

Calibration **1**

Start Time: 07:32

O_2
Method: EPA 3A
Span Conc. 21.0 %
Slope 381.5 **Intercept** 8.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
12.0	12.0	0.0	0.0	Pass
21.0	21.0	0.0	0.0	Pass

CO_2
Method: EPA 3A
Span Conc. 16.6 %
Slope 500.1 **Intercept** 1.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
8.9	8.6	-0.3	-1.8	Pass
16.6	16.6	0.0	0.0	Pass

BIAS
Number 1

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

Start Time: 07:36

O_2
Method: EPA 3A
Span Conc. 21.0 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

CO_2
Method: EPA 3A
Span Conc. 16.6 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	8.6	8.5	-0.1	-0.6	Pass

RUN DATA
Number 3

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

Time	O_2 %	CO_2 %
	Port A	
08:42	20.9	0.0
08:43	20.9	0.0
08:44	20.9	0.0
08:45	20.9	0.0
08:46	20.9	0.1
08:47	20.9	0.1
08:48	20.9	0.1
08:49	20.9	0.1
08:50	20.9	0.1
08:51	20.9	0.1
08:52	20.9	0.1
08:53	20.9	0.1
08:54	20.9	0.1
08:55	21.0	0.1
08:56	20.9	0.1
08:57	21.0	0.1
08:58	21.0	0.1
08:59	21.0	0.1
09:00	21.0	0.1
09:01	21.0	0.1
09:02	20.9	0.1
09:03	20.9	0.1
09:04	21.0	0.1
09:05	20.9	0.1
09:06	20.9	0.1
09:07	21.0	0.1
09:08	20.9	0.1
09:09	21.0	0.1
09:10	21.0	0.1
09:11	21.0	0.1
09:12	21.0	0.1
09:13	21.0	0.1
09:14	21.0	0.1
09:15	21.0	0.1
09:16	21.0	0.1
09:17	21.0	0.1
09:18	21.0	0.1
09:19	21.0	0.1
09:20	21.0	0.1

RUN DATA

Number 3

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

Time	O_2 %	CO_2 %
09:21	21.0	0.1
09:22	21.0	0.1
09:23	21.0	0.1
09:24	21.0	0.1
09:25	21.0	0.1
09:26	21.0	0.1
09:27	21.0	0.1
09:28	21.0	0.1
09:29	21.0	0.1
09:30	21.0	0.1
	Port B	
09:47	20.8	0.0
09:48	20.8	0.0
09:49	20.8	0.1
09:50	20.9	0.1
09:51	20.9	0.1
09:52	20.9	0.1
09:53	20.9	0.1
09:54	20.9	0.1
09:55	20.9	0.1
09:56	20.9	0.1
09:57	20.9	0.1
09:58	21.0	0.1
09:59	21.0	0.1
10:00	20.9	0.1
10:01	21.0	0.1
10:02	21.0	0.1
10:03	21.0	0.1
10:04	21.0	0.1
10:05	21.0	0.1
10:06	21.0	0.1
10:07	21.0	0.1
10:08	21.0	0.1
10:09	21.0	0.1
10:10	21.0	0.1
10:11	21.0	0.1
10:12	21.0	0.1
10:13	21.0	0.1
10:14	21.0	0.1
10:15	21.0	0.1

RUN DATA

Number 3

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

Time	O_2 %	CO_2 %
10:16	21.0	0.1
10:17	21.0	0.1
10:18	21.0	0.1
10:19	21.0	0.1
10:20	21.0	0.1
10:21	21.0	0.1
10:22	21.0	0.1
10:23	21.0	0.1
10:24	21.0	0.1
10:25	21.0	0.1
10:26	21.0	0.1
10:27	21.0	0.1
10:28	21.0	0.1
10:29	21.0	0.1
10:30	21.0	0.1
10:31	21.0	0.1
10:32	21.0	0.1
10:33	21.0	0.1
10:34	21.0	0.1
10:35	21.0	0.1
	End Run 3	
Avgs	**21.0**	**0.1**

RUN SUMMARY

Number 3

Client: **Chemours**
Location: **CHEMOURS**
Source: **Division Stack**

Calibration **1**

Project Number: **15418.002.009**
Operator: **CW**
Date: **17 Jan 2019**

	O_2	CO_2
Method	EPA 3A	EPA 3A
Conc. Units	%	%

Time: 08:41 to 10:35

Run Averages

	21.0	0.1

Pre-run Bias at 07:36

Zero Bias	0.0	0.0
Span Bias	12.0	8.5
Span Gas	12.0	8.9

Post-run Bias at 10:43

Zero Bias	0.0	0.1
Span Bias	12.0	8.4
Span Gas	12.0	8.9

Run averages corrected for the average of the pre-run and post-run bias

	21.0	0.0

BIAS AND CALIBRATION DRIFT

Number 2

Client:	**Chemours**		Project Number:	**15418.002.009**
Location:	**CHEMOURS**		Operator:	**CW**
Source:	**Division Stack**	Calibration **1**	Date:	**17 Jan 2019**

Start Time: 10:43

O_2

Method: EPA 3A

Span Conc. 21.0 %

Bias Results

Standard Gas	**Cal. %**	**Bias %**	**Difference %**	**Error %**	**Status**
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

Calibration Drift

Standard Gas	**Initial* %**	**Final %**	**Difference %**	**Drift %**	**Status**
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	12.0	0.0	0.0	Pass

*Bias No. 1

CO_2

Method: EPA 3A

Span Conc. 16.6 %

Bias Results

Standard Gas	**Cal. %**	**Bias %**	**Difference %**	**Error %**	**Status**
Zero	0.0	0.1	0.1	0.6	Pass
Span	8.6	8.4	-0.2	-1.2	Pass

Calibration Drift

Standard Gas	**Initial* %**	**Final %**	**Difference %**	**Drift %**	**Status**
Zero	0.0	0.1	0.1	0.6	Pass
Span	8.5	8.4	-0.1	-0.6	Pass

*Bias No. 1

APPENDIX C
LABORATORY ANALYTICAL REPORT

Note: The analytical report is included on the attached CD.

Client Sample ID: Q-1877,1878 DIV STACK R1 M0010 FH

Lab Sample ID: 140-14017-1

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**12.0**		0.126	0.0136	ug/Sample		01/23/19 14:18	02/01/19 10:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*50 - 200*	*01/23/19 14:18*	*02/01/19 10:50*	*1*

Client Sample ID: Q-1879,1880,1882 DIV STACK R1 M0010 BH

Lab Sample ID: 140-14017-2

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**54.1**		0.500	0.100	ug/Sample		01/22/19 10:37	01/30/19 11:49	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*75*	*D*	*50 - 200*	*01/22/19 10:37*	*01/30/19 11:49*	*2*

Client Sample ID: Q-1881 DIV STACK R1 M0010 IMP 1,2&3 CONDENSATE

Lab Sample ID: 140-14017-3

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0964**	**J H**	0.210	0.0107	ug/Sample		01/30/19 04:42	02/04/19 11:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*88*		*50 - 200*	*01/30/19 04:42*	*02/04/19 11:11*	*1*

Client Sample ID: Q-1883 DIV STACK R1 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-14017-4

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.150**	**J**	0.200	0.0400	ug/Sample		01/22/19 10:37	01/30/19 11:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*77*		*50 - 200*	*01/22/19 10:37*	*01/30/19 11:53*	*1*

Client Sample Results

Client Sample ID: Q-1884,1885 DIV STACK R2 M0010 FH

Lab Sample ID: 140-14017-5

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train
Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**9.22**		0.102	0.0110	ug/Sample		01/23/19 14:18	02/01/19 10:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*96*		*50 - 200*	*01/23/19 14:18*	*02/01/19 10:53*	*1*

Client Sample ID: Q-1886,1887,1889 DIV STACK R2 M0010 BH

Lab Sample ID: 140-14017-6

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train
Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**59.6**		0.900	0.180	ug/Sample		01/22/19 10:37	01/30/19 11:56	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*82*	*D*	*50 - 200*	*01/22/19 10:37*	*01/30/19 11:56*	*4*

Client Sample ID: Q-1888 DIV STACK R2 M0010 IMP 1,2&3 CONDENSATE

Lab Sample ID: 140-14017-7

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train
Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND	H	0.218	0.0111	ug/Sample		01/30/19 04:42	02/04/19 11:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*87*		*50 - 200*	*01/30/19 04:42*	*02/04/19 11:15*	*1*

Client Sample ID: Q-1890 DIV STACK R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-14017-8

Date Collected: 01/16/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train
Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.200	0.0400	ug/Sample		01/22/19 10:37	01/30/19 11:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*76*		*50 - 200*	*01/22/19 10:37*	*01/30/19 11:59*	*1*

Client Sample Results

Client Sample ID: Q-1891,1892 DIV STACK R3 M0010 FH

Lab Sample ID: 140-14017-9

Date Collected: 01/17/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**1.93**		0.101	0.0109	ug/Sample		01/23/19 14:18	02/01/19 10:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*103*		*50 - 200*	*01/23/19 14:18*	*02/01/19 10:56*	*1*

Client Sample ID: Q-1893,1894,1896 DIV STACK R3 M0010 BH

Lab Sample ID: 140-14017-10

Date Collected: 01/17/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**60.1**		0.800	0.160	ug/Sample		01/22/19 10:37	01/30/19 12:02	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*67*	*D*	*50 - 200*	*01/22/19 10:37*	*01/30/19 12:02*	*4*

Client Sample ID: Q-1895 DIV STACK R3 M0010 IMP 1,2&3 CONDENSATE

Lab Sample ID: 140-14017-11

Date Collected: 01/17/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.115**	**J**	0.222	0.0113	ug/Sample		01/30/19 04:42	02/04/19 11:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*50 - 200*	*01/30/19 04:42*	*02/04/19 11:18*	*1*

Client Sample ID: Q-1897 DIV STACK R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-14017-12

Date Collected: 01/17/19 00:00
Date Received: 01/20/19 10:00
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.306**		0.200	0.0400	ug/Sample		01/22/19 10:37	01/30/19 12:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*85*		*50 - 200*	*01/22/19 10:37*	*01/30/19 12:06*	*1*

APPENDIX D
SAMPLE CALCULATIONS

SAMPLE CALCULATIONS FOR
HFPO DIMER ACID (METHOD 0010)

Client: Chemours **Plant: Fayetteville, NC**
Test Number: Run 3 **Test Date: 1/17/19**
Test Location: Divison Stack **Test Period: 0842-1035**

1. HFPO Dimer Acid concentration, lbs/dscf.

$$\mathrm{Conc1} = \frac{W \times 2.2046 \times 10^{-9}}{Vm(std)}$$

$$\mathrm{Conc1} = \frac{62.5 \times 2.2046 \times 10\text{-}9}{57.033}$$

Conc1 = 2.41E-09

Where:

W = Weight of HFPO Dimer Acid collected in sample in ug.

Conc1 = Division Stack HFPO Dimer Acid concentration, lbs/dscf.

2.2046×10^{-9} = Conversion factor from ug to lbs.

2. HFPO Dimer Acid concentration, ug/dscm.

Conc2 = W / (Vm(std) x 0.02832)

Conc2 = 62.5 / (57.033 x 0.02832)

Conc2 = 3.87E+01

Where:

Conc2 = Division Stack HFPO Dimer Acid concentration, ug/dscm.

0.02832 = Conversion factor from cubic feet to cubic meters.

3. HFPO Dimer Acid mass emission rate, lbs/hr.

$MR1_{(Outlet)}$ = Conc1 x Qs(std) x 60 min/hr

$MR1_{(Outlet)}$ = 2.41E-09 x 30735 x 60

$MR1_{(Outlet)}$ = 4.45E-03

Where:

$MR1_{(Outlet)}$ = Division Stack HFPO Dimer Acid mass emission rate, lbs/hr.

4. HFPO Dimer Acid mass emission rate, g/sec.

$MR2_{(Outlet)}$ = PMR1 x 453.59 / 3600

$MR2_{(Outlet)}$ = 4.45E-03 x 453.59 /3600

$MR2_{(Outlet)}$ = 5.60E-04

Where:

$MR2_{(Outlet)}$ = Division Stack HFPO Dimer Acid mass emission rate, g/sec.

453.6 = Conversion factor from pounds to grams.

3600 = Conversion factor from hours to seconds.

EXAMPLE CALCULATIONS FOR
VOLUMETRIC FLOW AND MOISTURE AND ISOKINETICS

Client: Chemours
Test Number: Run 3
Test Location: Division Stack

Facility: Fayetteville, NC
Test Date: 1/17/19
Test Period: 842-1035

1. Volume of dry gas sampled at standard conditions (68 deg F, 29.92 in. Hg), dscf.

$$\text{Vm(std)} = \frac{17.64 \times Y \times Vm \times \left(Pb + \dfrac{\text{delta H}}{13.6} \right)}{(Tm + 460)}$$

$$\text{Vm(std)} = \frac{17.64 \times 1.0069 \times 53.146 \times \left(30.18 + \dfrac{1.155}{13.6} \right)}{40.92 + 460} = 57.033$$

Where:

Vm(std) = Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Vm = Volume of gas sample measured by the dry gas meter at meter conditions, dcf.
Pb = Barometric Pressure, in Hg.
delt H = Average pressure drop across the orifice meter, in H_2O
Tm = Average dry gas meter temperature , deg F.
Y = Dry gas meter calibration factor.
17.64 = Factor that includes ratio of standard temperature (528 deg R) to standard pressure (29.92 in. Hg), deg R/in. Hg.
13.6 = Specific gravity of mercury.

2. Volume of water vapor in the gas sample corrected to standard conditions, scf.

Vw(std) = (0.04707 x Vwc) + (0.04715 x Wwsg)

Vw(std) = (0.04707 x 9.0) + (0.04715 x 12.6) = 1.02

Where:

Vw(std) = Volume of water vapor in the gas sample corrected to standard conditions, scf.
Vwc = Volume of liquid condensed in impingers, ml.
Wwsg = Weight of water vapor collected in silica gel, g.
0.04707 = Factor which includes the density of water (0.002201 lb/ml), the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant 21.85 (in. Hg) (ft^3)/lb-mole)(deg R); absolute temperature at standard conditions (528 deg R), absolute pressure at standard conditions (29.92 in. Hg), ft^3/ml.
0.04715 = Factor which includes the molecular weight of water (18.0 lb/lb-mole), the ideal gas constant 21.85 (in. Hg) (ft^3)/lb-mole)(deg R); absolute temperature at standard conditions (528 deg R), absolute pressure at standard conditions (29.92 in. Hg), and 453.6 g/lb, ft^3/g.

3. Moisture content

$$bws = \frac{Vw(std)}{Vw(std) + Vm(std)}$$

$$bws = \frac{1.02}{1.02 + 57.033} = 0.018$$

Where:

bws = Proportion of water vapor, by volume, in the gas stream, dimensionless.

4. Mole fraction of dry gas.

Md = 1 - bws

Md = 1 - 0.018 = 0.982

Where:

Md = Mole fraction of dry gas, dimensionless.

5. Dry molecular weight of gas stream, lb/lb-mole.

MWd = (0.440 x % CO_2) + (0.320 x % O_2) + (0.280 x (% N_2 + % CO))

MWd = (0.440 x 0.0) + (0.320 x 20.9) + (0.280 x (79.1 + 0.00))

MWd = 28.84

Where:

MWd = Dry molecular weight , lb/lb-mole.
% CO2 = Percent carbon dioxide by volume, dry basis.
% O_2 = Percent oxygen by volume, dry basis.
% N_2 = Percent nitrogen by volume, dry basis.
% CO = Percent carbon monoxide by volume, dry basis.
0.440 = Molecular weight of carbon dioxide, divided by 100.
0.320 = Molecular weight of oxygen, divided by 100.
0.280 = Molecular weight of nitrogen or carbon monoxide, divided by 100.

6. Actual molecular weight of gas stream (wet basis), lb/lb-mole.

MWs = (MWd x Md) + (18 x (1 - Md))

MWs = (28.84 x 0.982) +(18 (1 - 0.982)) = 28.65

Where:

MWs = Molecular weight of wet gas, lb/lb-mole.
18 = Molecular weight of water, lb/lb-mole.

7. Average velocity of gas stream at actual conditions, ft/sec.

$$\text{Vs} = 85.49 \text{ x Cp x } ((\text{delt p})^{1/2})\text{avg x } \left(\frac{\text{Ts (avg)}}{\text{Ps x MWs}} \right)^{1/2}$$

$$\text{Vs} = 85.49 \text{ x } 0.84 \text{ x } 1.26546 \text{ x } \left(\frac{497}{30.13 \text{ x } 28.65} \right)^{1/2} = 69.0$$

Where:

Vs = Average gas stream velocity, ft/sec.

85.49 = Pitot tube constant, ft/sec x $\frac{(\text{lb/lb-mole})(\text{in. Hg})^{1/2}}{(\text{deg R})(\text{in } H_2O)}$

Cp = Pitot tube coefficient, dimensionless.

Ts = Absolute gas stream temperature, deg R = Ts, deg F + 460.

Ps = Absolute gas stack pressure, in. Hg. = Pb + $\frac{\text{P(static)}}{13.6}$

delt p = Velocity head of stack, in. H_2O.

8. Average gas stream volumetric flow rate at actual conditions, wacf/min.

Qs(act) = 60 x Vs x As

Qs(act) = 60 x 69.0 x 7.07 = 29252

Where:

Qs(act) = Volumetric flow rate of wet stack gas at actual conditions, wacf/min.

As = Cross-sectional area of stack, ft^2.

60 = Conversion factor from seconds to minutes.

9. Average gas stream dry volumetric flow rate at standard conditions, dscf/min.

$$\text{Qs(std)} = 17.64 \text{ x Md x } \frac{\text{Ps}}{\text{Ts}} \text{ x Qs(act)}$$

$$\text{Qs(std)} = 17.64 \text{ x } 0.982 \text{ x } \frac{30.13}{497.0} \text{ x } 29252$$

Qs(std) = 30735

Where:

Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min.

10. Isokinetic variation calculated from intermediate values, percent.

$$I = \frac{17.327 \times Ts \times Vm(std)}{Vs \times O \times Ps \times Md \times (Dn)^2}$$

$$I = \frac{17.327 \times 497 \times 57.033}{69.0 \times 96 \times 30.13 \times 0.982 \times (0.160)^2} = 97.9$$

Where:

I = Percent of isokinetic sampling.

O = Total sampling time, minutes.

Dn = Diameter of nozzle, inches.

17.327 = Factor which includes standard temperature (528 deg R), standard pressure (29.92 in. Hg), the formula for calculating area of circle $D^{2/4}$, conversion of square feet to square inches (144), conversion of seconds to minutes (60), and conversion to percent (100), $\frac{(\text{in. Hg})(\text{in}^2)(\text{min})}{(\text{deg R})(\text{ft}^2)(\text{sec})}$

APPENDIX E
EQUIPMENT CALIBRATION RECORDS

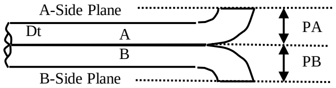
Type S Pitot Tube Inspection Data Form

Pitot Tube Identification Number: **P-695**

Inspection Date 1/5/18 Individual Conducting Inspection PM

If all Criteria PASS
Cp is equal to 0.84

PASS/FAIL



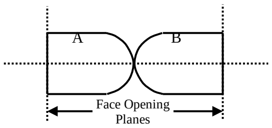
$1.05\ D_t < P < 1.5\ D_t$

PA must Equal PB

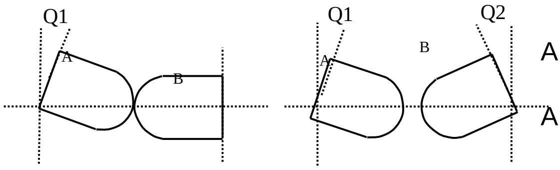
Distance to A Plane (PA) - inches 0.46 PASS

Distance to B Plane (PB) - inches 0.46 PASS

Pitot OD (D_t) - inches 0.375



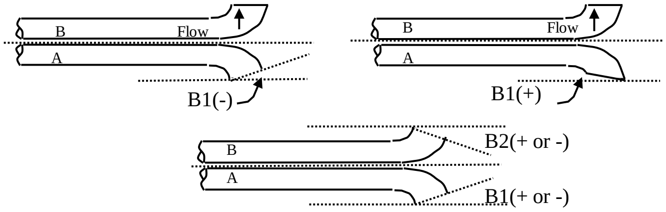
Are Open Faces Aligned Perpendicular to the Tube Axis ● YES ○ NO PASS



Q1 and Q2 must be $\leq 10^o$

Angle of Q1 from vertical A Tube-degrees (absolute) 0 PASS

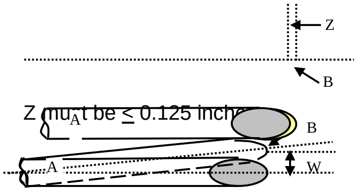
Angle of Q2 from vertical B Tube-degrees (absolute) 1 PASS



B1 or B2 must be $\leq 5^o$

Angle of B1 from vertical A Tube-degrees (absolute) 0 PASS

Angle of B1 from vertical B Tube-degrees (absolute) 0 PASS

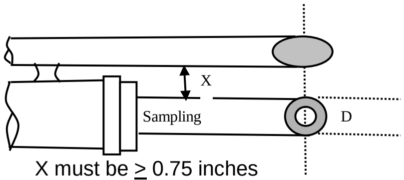


Z must be $\leq$ 0.125 inches

W must be $\leq$ 0.03125 inches

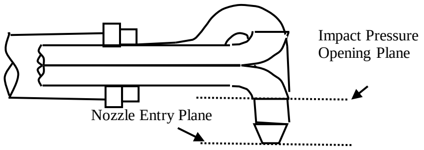
Horizontal offset between A and B Tubes (Z) - inches 0.006 PASS

Vertical offset between A and B Tubes (W) - inches 0.018 PASS

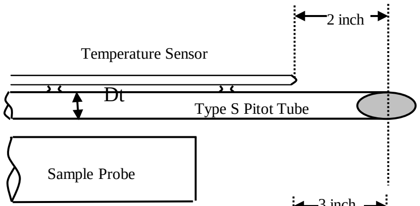


X must be $\geq$ 0.75 inches

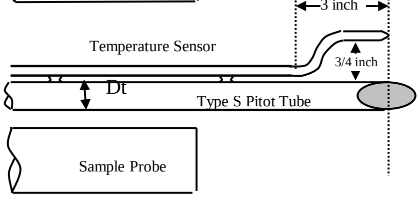
Distance between Sample Nozzle and Pitot (X) - inches 0.78 PASS



Impact Pressure Opening Plane is above the Nozzle Entry Plane ● YES ○ NO ○ NA



Thermocouple meets the Distance Criteria in the adjacent figure ● YES ○ NO ○ NA



Thermocouple meets the Distance Criteria in the adjacent figure ○ YES ○ NO ● NA

Long Cal and Temperature Cal Datasheet for Standard Dry Gas Meter Console

Calibrator MDW
Meter Box Number 12
Ambient Temp 72
Date 10-Sep-18
Wet Test Meter Number P-2952
Temp Reference Source Thermocouple Simulator (Accuracy +/- 1°F)
Dry Gas Meter Number 14244707

Baro Press, in Hg (Pb) 29.96

Setting	Gas Volume		Temperatures			Calibration Results	
Orifice Manometer in H_20 (ΔH)	**Wet Test Meter ft^3 (Vw)**	**Dry gas Meter ft^3 (Vd)**	**Wet Test Meter °F (Tw)**	**Dry Gas Meter Outlet, °F (Td_o)**	**Time, min (O)**	**Y**	**ΔH**
0.5	5.0	885.853	73.0	75.00	12.60	1.0097	1.7823
		890.822		76.00			
		4.969		75.50			
1.0	5.0	892.810	73.0	76.00	9.1	1.0071	1.8559
		897.795		77.00			
		4.985		76.50			
1.5	10.0	898.799	73.0	77.00	15.20	1.0036	1.9381
		908.810		78.00			
		10.011		77.50			
2.0	10.0	915.870	73.0	78.00	13.1	1.0094	1.9158
		925.830		79.00			
		9.960		78.50			
3.0	10.0	926.870	73.0	79.00	10.70	1.0048	1.9137
		936.870		80.00			
		10.000		79.50			
						1.0069	**1.8812**

Vw - Gas Volume passing through the wet test meter
Vd - Gas Volume passing through the dry gas meter
Tw - Temp of gas in the wet test meter
Tdi - Temp of the inlet gas of the dry gas meter
Tdo - Temp of the outlet gas of the dry gas meter
Td - Average temp of the gas in the dry gas meter

0 - Time of calibration run
Pb - Barometric Pressure
ΔH - Pressure differential across orifice
Y - Ratio of accuracy of wet test meter to dry gas meter

$$Y = \frac{Vw * Pb * (td + 460)}{Vd * \left[Pb + \frac{(\Delta H)}{13.6}\right] * (tw + 460)}$$

$$\Delta H = \left[\frac{0.0317 * \Delta H}{Pb * (td + 460)}\right] * \left[\frac{(tw + 460) * O}{Vw}\right]^2$$

Reference Temperature	Temperature Reading from Individual Thermocouple Input [1]						Average Temperature Reading	Temp Difference [2] (%)
Select Temperature ○ °C ● °F	Channel Number							
	1	2	3	4	5	6		
32	32	32	32	32	32	32	32.0	0.0%
212	212	212	212	212	212	212	212.0	0.0%
932	932	932	932	932	932	932	932.0	0.0%
1832	1834	1834	1834	1834	1834	1834	1834.0	-0.1%

[1] - Channel Temps must agree with +/- 5°F or 3°C

[2] - Acceptable Temperature Difference less than 1.5 %

$$\text{Temp Diff} = \left[\frac{(\text{Reference Temp}(°F) + 460) - (\text{Test Temp}(°F) + 460)}{\text{Reference Temp}(°F) + 460}\right]$$

Y Factor Calibration Check Calculation

MODIFIED METHOD 0010 TEST TRAIN

DIVISION STACK

METER BOX NO. 12

1/16/2019 + 1/17/2019

	Run 1	Run 2	Run 3
MWd = Dry molecular weight source gas, lb/lb-mole.			
0.32 = Molecular weight of oxygen, divided by 100.			
0.44 = Molecular weight of carbon dioxide, divided by 100.			
0.28 = Molecular weight of nitrogen or carbon monoxide, divided by 100.			
% CO_2 = Percent carbon dioxide by volume, dry basis.	0.0	0.0	0.0
% O_2 = Percent oxygen by volume, dry basis.	20.9	20.9	20.9

MWd = (0.32 * O_2) + (0.44 * CO_2) + (0.28 * (100 - (CO_2 + O_2)))

MWd = (0.32 * 20.9) + (0.44 * 0) + (0.28 * (100 - (0 + 20.9)))

MWd = (6.69) + (0.00) + (22.15)

MWd = 28.84 28.84 28.84

Tma = Source Temperature, absolute(°R)			
Tm = Average dry gas meter temperature , deg F.	49.1	59.2	40.9

Tma = Ts + 460

Tma = 49.08 + 460

Tma = 509.08 519.21 500.92

Ps = Absolute meter pressure, inches Hg.			
13.60 = Specific gravity of mercury.			
delta H = Avg pressure drop across the orifice meter during sampling, in H2O	1.14	1.13	1.15
Pb = Barometric Pressure, in Hg.	30.15	30.06	30.18

Pm = Pb + (delta H / 13.6)

Pm = 30.15 + (1.143625 / 13.6)

Pm = 30.23 30.14 30.26

Yqa = dry gas meter calibration check value, dimensionless.			
0.03 = (29.92/528)(0.75)2 (in. Hg/°/R) cfm2.			
29.00 = dry molecular weight of air, lb/lb-mole.			
Vm = Volume of gas sample measured by the dry gas meter at meter conditions, dcf.	53.660	53.775	53.146
Y = Dry gas meter calibration factor (based on full calibration)	1.0069	1.0069	1.0069
Delta H@ = Dry Gas meter orifice calibration coefficient, in. H2O.	1.8812	1.8812	1.8812
avg SQRT Delta H = Avg SQRT press. drop across the orifice meter during sampling , in. H_2O	1.0641	1.0581	1.0722
O = Total sampling time, minutes.	96	96	96

Yqa = (O / Vm) * SQRT (0.0319 * Tma * 29) / (Delta H@ * Pm * MWd) * avg SQRT Delta H

Yqa = (96.00 / 53.66) * SQRT (0.0319 * 509.08 * 29) / (1.88 * 30.23 * 28.84) * 1.06

Yqa = 1.789 * SQRT 470.953 / 1,639.865 * 1.06

Yqa = 1.0202 1.0238 1.0291

Diff = Absolute difference between Yqa and Y	1.32	1.68	2.20

Diff = ((Y - Yqa) / Y) * 100

Diff = ((1.0069 - 1.020) / 1.0069) * 100

Average Diff = 1.73

Allowable = 5.0

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
600 Union Landing Road
Cinnaminson, NJ 08077-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI79E15A00E4	Reference Number:	82-401288926-1
Cylinder Number:	CC18055	Cylinder Volume:	150.5 CF
Laboratory:	124 - Riverton (SAP) - NJ	Cylinder Pressure:	2015 PSIG
PGVP Number:	B52018	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Sep 04, 2018

Expiration Date: Sep 04, 2026

Certification performed in accordance with “EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)” document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	9.000 %	8.864 %	G1	+/- 0.7% NIST Traceable	09/04/2018
OXYGEN	12.00 %	12.00 %	G1	+/- 0.4% NIST Traceable	09/04/2018
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060629	CC413730	13.359 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 09, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA 510-CO2-19GYCXEG	NDIR	Aug 09, 2018
Horiba MPA 510-O2-7TWMJ041	Paramagnetic	Aug 09, 2018

Triad Data Available Upon Request

Signature on file

Approved for Release

Airgas Specialty Gases
Airgas USA, LLC
600 Union Landing Road
Cinnaminson, NJ 08077-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI62E15A0224	Reference Number:	82-401044874-1
Cylinder Number:	SG9169108	Cylinder Volume:	157.2 CF
Laboratory:	124 - Riverton (SAP) - NJ	Cylinder Pressure:	2015 PSIG
PGVP Number:	B52017	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Nov 18, 2017

Expiration Date: Nov 18, 2025

Certification performed in accordance with “EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)” document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	17.00 %	16.58 %	G1	+/- 0.7% NIST Traceable	11/18/2017
OXYGEN	21.00 %	21.00 %	G1	+/- 0.5% NIST Traceable	11/18/2017
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061336	CC360792	11.002 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2018
NTRM	09061415	CC273526	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA 510-CO2-19GYCXEG	NDIR	Oct 30, 2017
Horiba MPA 510-O2-7TWMJ041	Paramagnetic	Oct 27, 2017

Triad Data Available Upon Request

Signature on file

Approved for Release

INTERFERENCE CHECK

Date: 12/4/14-12/5/14
Analyzer Type: Servomex - O_2
Model No: 4900
Serial No: 49000-652921
Calibration Span: 21.09 %
Pollutant: 21.09% O_2 - CC418692

INTERFERENT GAS	ANALYZER RESPONSE		% OF CALIBRATION SPAN[a]
	INTERFERENT GAS RESPONSE (%)	INTERFERENT GAS RESPONSE, WITH BACKGROUND POLLUTANT (%)	
CO_2 (30.17% CC199689)	0.00	-0.01	0.00
NO (445 ppm CC346681)	0.00	0.02	0.11
NO_2 (23.78 ppm CC500749)	NA	NA	NA
N_2O (90.4 ppm CC352661)	0.00	0.05	0.24
CO (461.5 ppm XC006064B)	0.00	0.02	0.00
SO_2 (451.2 ppm CC409079)	0.00	0.05	0.23
CH_4 (453.1 ppm SG901795)	NA	NA	NA
H_2 (552 ppm ALM048043)	0.00	0.09	0.44
HCl (45.1 ppm CC17830)	0.00	0.03	0.14
NH_3 (9.69 ppm CC58181)	0.00	0.01	0.03
TOTAL INTERFERENCE RESPONSE			**1.20**
METHOD SPECIFICATION			**< 2.5%**

(a) The larger of the absolute values obtained for the interferent tested with and without the pollutant present was used in summing the interferences.

Chad Walker

INTERFERENCE CHECK

Date: 12/4/14-12/5/14
Analyzer Type: Servomex - CO_2
Model No: 4900
Serial No: 49000-652921
Calibration Span: 16.65%
Pollutant: 16.65% CO_2 - CC418692

INTERFERENT GAS	ANALYZER RESPONSE		% OF CALIBRATION SPAN(a)
	INTERFERENT GAS RESPONSE (%)	INTERFERENT GAS RESPONSE, WITH BACKGROUND POLLUTANT (%)	
CO_2 (30.17% CC199689)	NA	NA	NA
NO (445 ppm CC346681)	0.00	0.02	0.10
NO_2 (23.78 ppm CC500749)	0.00	0.00	0.02
N_2O (90.4 ppm CC352661)	0.00	0.01	0.04
CO (461.5 ppm XC006064B)	0.00	0.01	0.00
SO_2 (451.2 ppm CC409079)	0.00	0.11	0.64
CH_4 (453.1 ppm SG901795)	0.00	0.07	0.44
H_2 (552 ppm ALM048043)	0.00	0.04	0.22
HCl (45.1 ppm CC17830)	0.10	0.06	0.60
NH_3 (9.69 ppm CC58181)	0.00	0.02	0.14
TOTAL INTERFERENCE RESPONSE			**2.19**
METHOD SPECIFICATION			**< 2.5%**

(a) The larger of the absolute values obtained for the interferent tested with and without the pollutant present was used in summing the interferences.

Chad Walker

Chad Walker

BALANCE CALIBRATION LOG

Balance ID:

Date	Initials	Calibration Weight	Measured Weight(1)	Maintenance and Adjustments
1/16/19	CSW	500.0	499.6	NA Chemours
1/17/19	CSW	500.0	499.6	NA Chemours
1/18/19	Wf	500.0	499.7	NA Chemours
1/19/19	Wf	500.0	499.7	NA Chemours

(1) Must be within ± 0.5 grams of calibration weight

APPENDIX F
LIST OF PROJECT PARTICIPANTS

The following WESTON employees participated in this project.

Paul Meeter	Senior Project Manager
Steve Rathfon	Team Member
Matt Winkeler	Team Member
Chad Walker	Team Member