FLUOROMONOMERS MANUFACTURING PROCESS SCRUBBER EFFICIENCY TEST REPORT TEST DATES: 6 AND 7 DECEMBER 2018

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6 February 2019

W.O. No. 15418.002.008

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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 Scrubber at the facility. Testing was performed on 6 and 7 December 2018 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.

A single test run was previously performed on 14 November 2018. The VE North process was not operating at typical conditions and no further testing was performed during that mobilization. That test run (run number 1) was considered not representative and is not included in this report. The subsequent three test run series was therefore labeled test runs 2, 3 and 4.

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 waste gas scrubber inlet and outlet which are located in the Fluoromonomers process area.
- Calculate the scrubber removal efficiency for HFPO Dimer Acid.
- 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 three locations.

Table 1-1 provides a summary of the test locations 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 locations. 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 packages are provided in electronic format and on CD with each hard copy.

Table 1-1
Sampling Plan for Division Scrubber Testing

Sampling Point & Location	**Division Scrubber**				
Number of Tests:	9 (3 Scrubber inlet, 3 Carbon Bed outlet, 3 Division stack)				
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]	9	9	9	9	9
Reagent Blanks (Solvents, Resins)[1]	1 set	0	0	0	0
Field Blank Trains[1]	1 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	13[5]	9	9	9	9

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 scrubber inlet and outlet (stack). Table 2-1 provides a summary of the HFPO Dimer Acid emissions test results and scrubber removal efficiencies. 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 Scrubber Test Results

	Inlet		Outlet(1)		Removal Efficiency
	g/sec	lb/hr	g/sec	lb/hr	%
Division Waste Gas Scrubber					
R2	3.59E-2	2.85E-1	3.43E-2	2.72E-1	4.4
R3	6.17E-3	4.90E-2	9.66E-3	7.67E-2	NC
R4	6.11E-3	4.85E-2	1.75E-2	1.39E-1	NC
Average	1.60E-2	1.27E-1	2.05E-2	1.63E-1	NC

(1) The scrubber outlet mass rates are derived from the HFPO Dimer Acid (Adjusted Emissions) calculated by subtracting the measured Carbon Bed outlet mass rates from the measured Division Stack mass rates.

NC = Not calculated

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.

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
Division	PPVE	Semi-continuous – Condensation is a continuous Agitated Bed Reactor, Refining (ether column) is batch

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

4. DESCRIPTION OF TEST LOCATIONS

4.1 DIVISION SCRUBBER INLET

The Division scrubber inlet consists of a nominal 3-inch ID vertical pipe equipped with a single ¼-inch OD sample port. Due to the small size of the inlet pipe and sample port, non-isokinetic sampling was performed at a single point inside the pipe. Gas flow rates were recorded by a CHEMOURS mass flow meter mounted on the inlet piping. See Figure 4-1.

4.2 DIVISION STACK (DIVISION SCRUBBER OUTLET)

The Division Scrubber outlet emissions were measured at the Division stack and were determined by subtracting the emissions measured from the Carbon Bed exit (which also exhausts to the Division stack) from the total emissions measured at the 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 4-2 provides a schematic of the test ports and traverse point locations.

4.3 VINYL ETHERS NORTH CARBON BED OUTLET

The fiberglass reinforced plastic (FRP) duct at the outlet of the Division carbon bed is 34-inch ID. The test ports are located as shown below. Based on EPA Method 1, a total of 24 traverse points (12 per port) were required for HFPO Dimer Acid sampling at the test location. Figure 4-3 provides a schematic of the test port and traverse port locations.

Location	Distance from Flow Disturbance	
	Downstream (B)	Upstream (A)
Carbon Bed Outlet	58 inches > 1.7 duct diameters	57 inches > 1.5 duct diameters
Division Stack	30 feet > 10 duct diameters	9 feet > 3 diameters

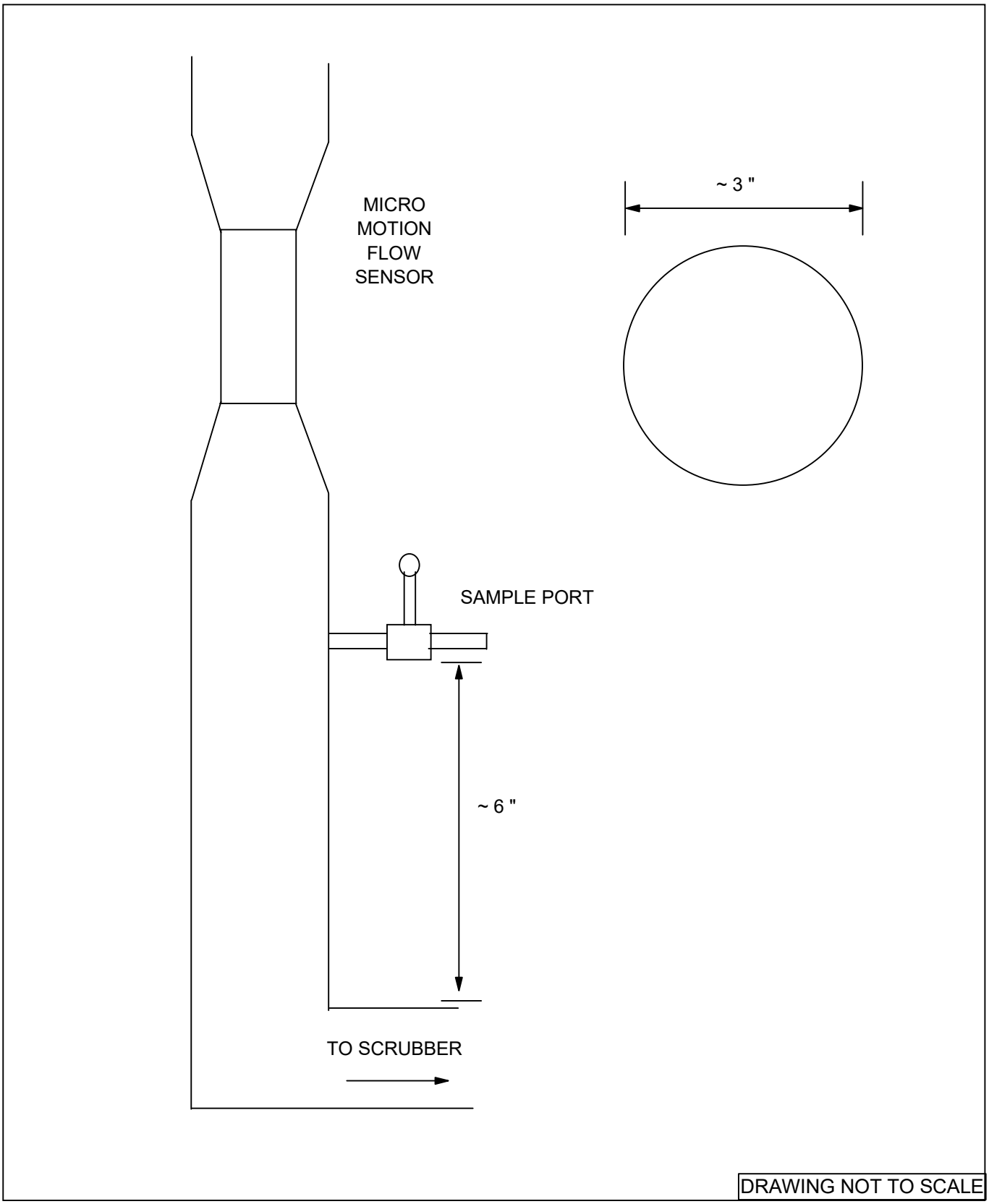
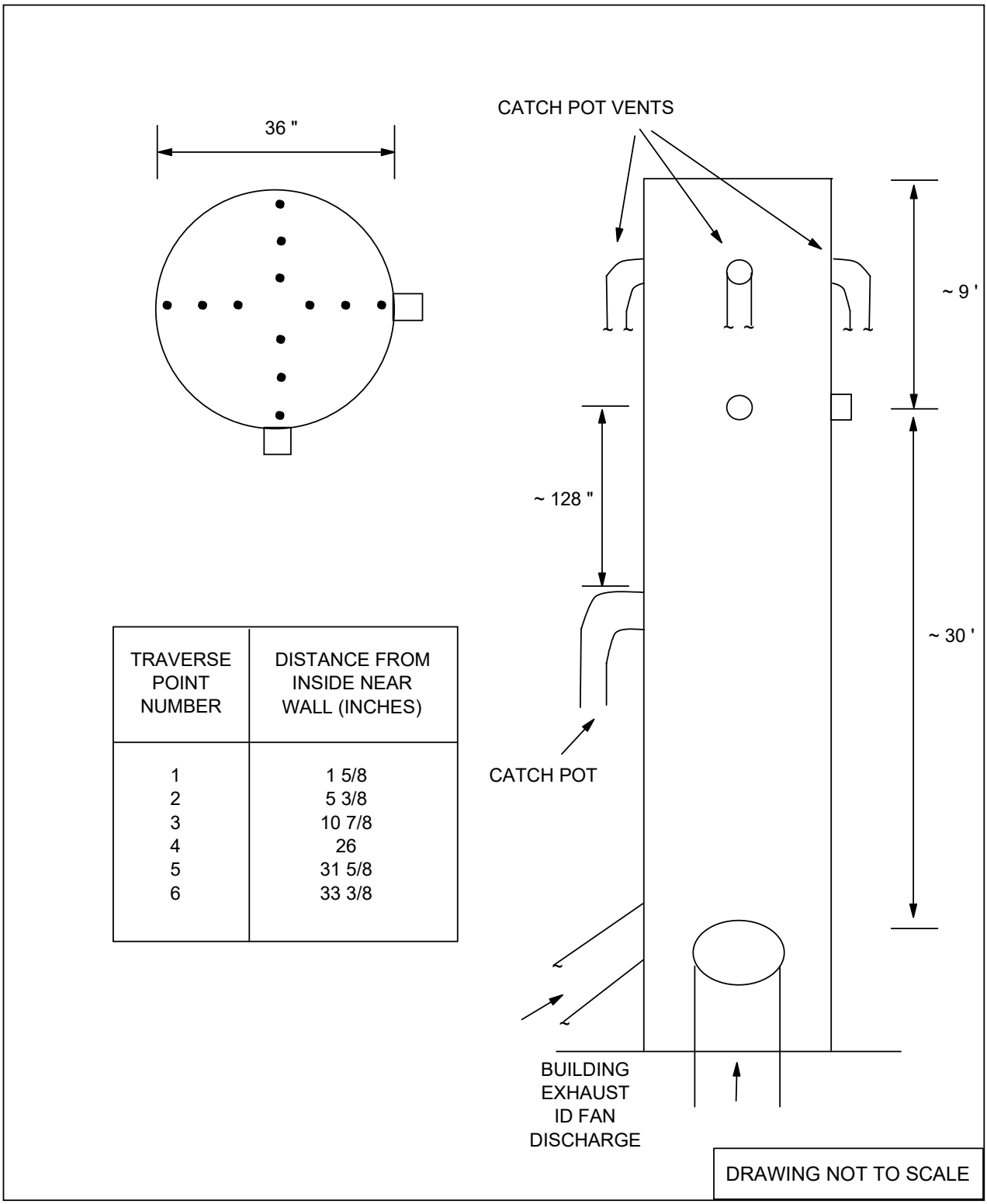


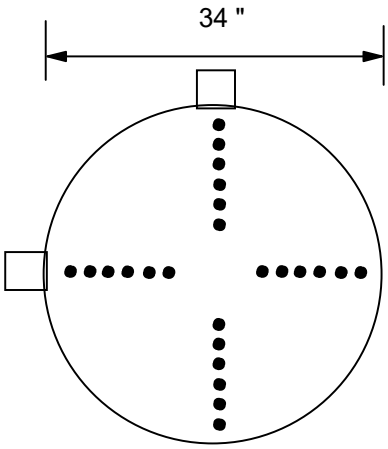
FIGURE 4-1
DIVISION SCRUBBER INLET SCHEMATIC



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 4-2
DIVISION STACK TEST PORT
AND TRAVERSE POINT LOCATIONS

IASDATA\CHEMOURS\15418.002.008\FIGURE 4-2 DIVISION STACK



TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE NEAR WALL (INCHES)
1	3/4
2	2 1/4
3	4
4	6
5	8 1/2
6	12 1/8
7	21 5/8
8	25 1/2
9	28
10	30
11	31 3/4
12	33 1/4

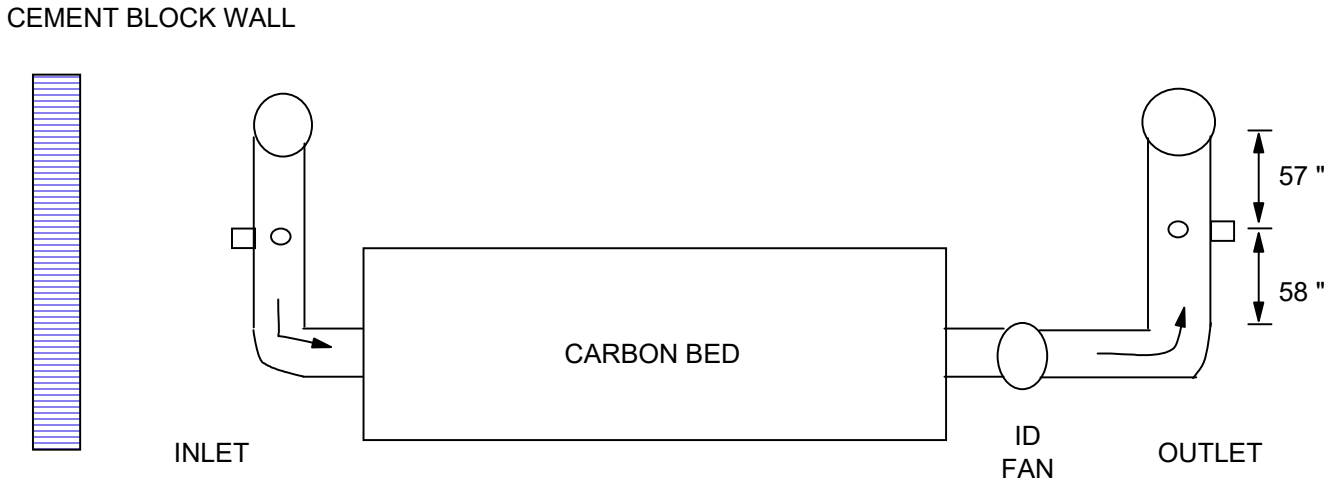


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FIGURE 4-3
VE NORTH PROCESS CARBON BED OUTLET SCHEMATIC

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 had previously been conducted at each test location. The cyclonic flow checks were negative (< 20°) verifying that the test locations were 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 at the outlet locations 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

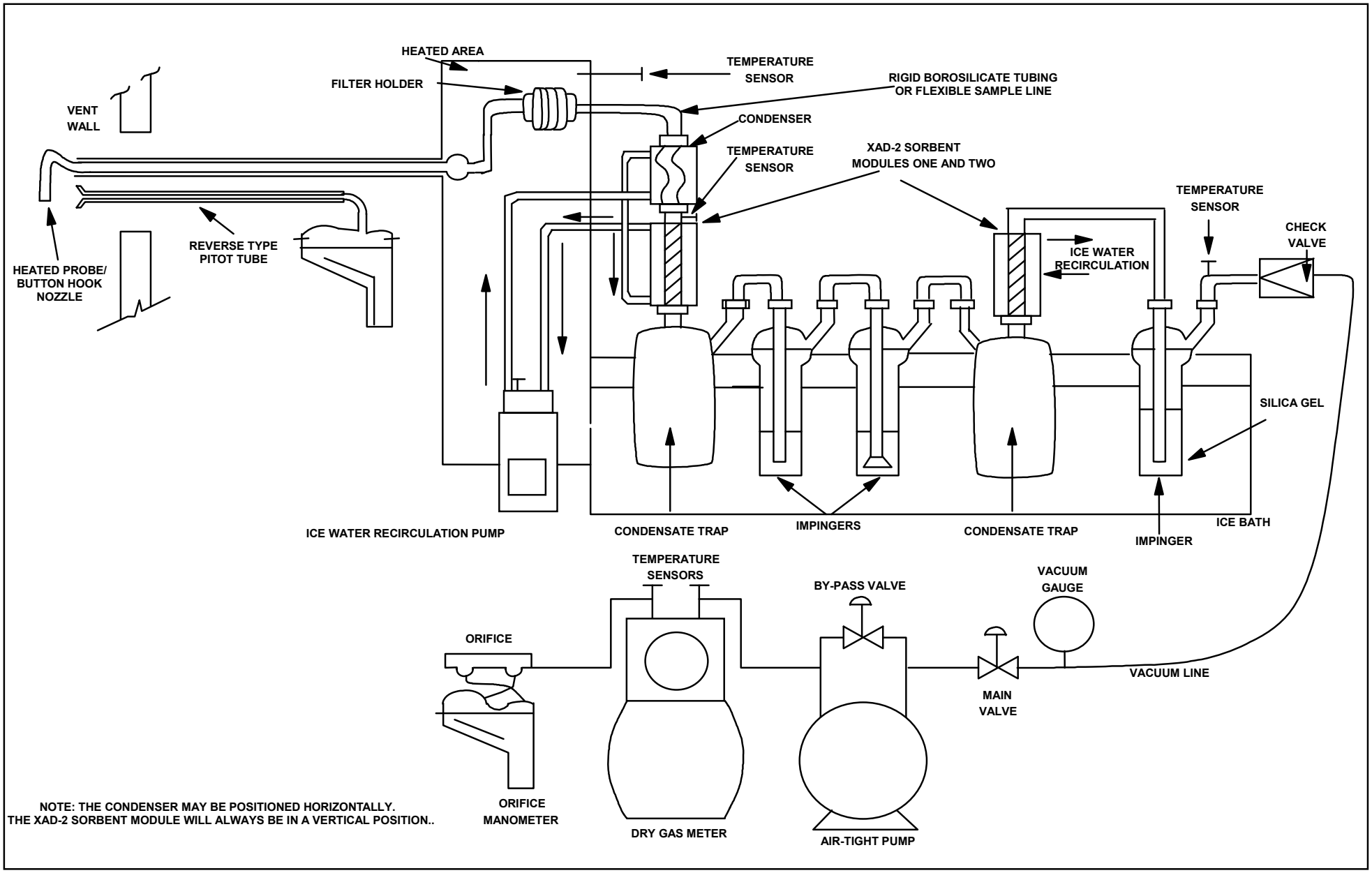


FIGURE 5-1
EPA METHOD 0010 SAMPLING TRAIN

IASDATA\CHEMOURS\15418.002.008\FIGURE 5-1 METHOD 0010

connected directly to a heated borosilicate filter holder containing a solvent extracted glass fiber filter.

A section of borosilicate glass [or flexible polyethylene tubing (Division stack and carbon bed outlet only)] 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-ml 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-L 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 undergoes hydrolysis instantaneously in water in the sampling train and during the sample recovery step and will be converted to HFPO Dimer Acid such that the amount of HFPO Dimer Acid emissions represents 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 ± 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 and 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.

During each test campaign, a Method 0010 blank train was set up near the test location, leak-checked and recovered along with the respective sample train. Following sample recovery, all samples were transported to TestAmerica Laboratories, Inc. (TestAmerica) for sample extraction and analysis.

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

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- 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.

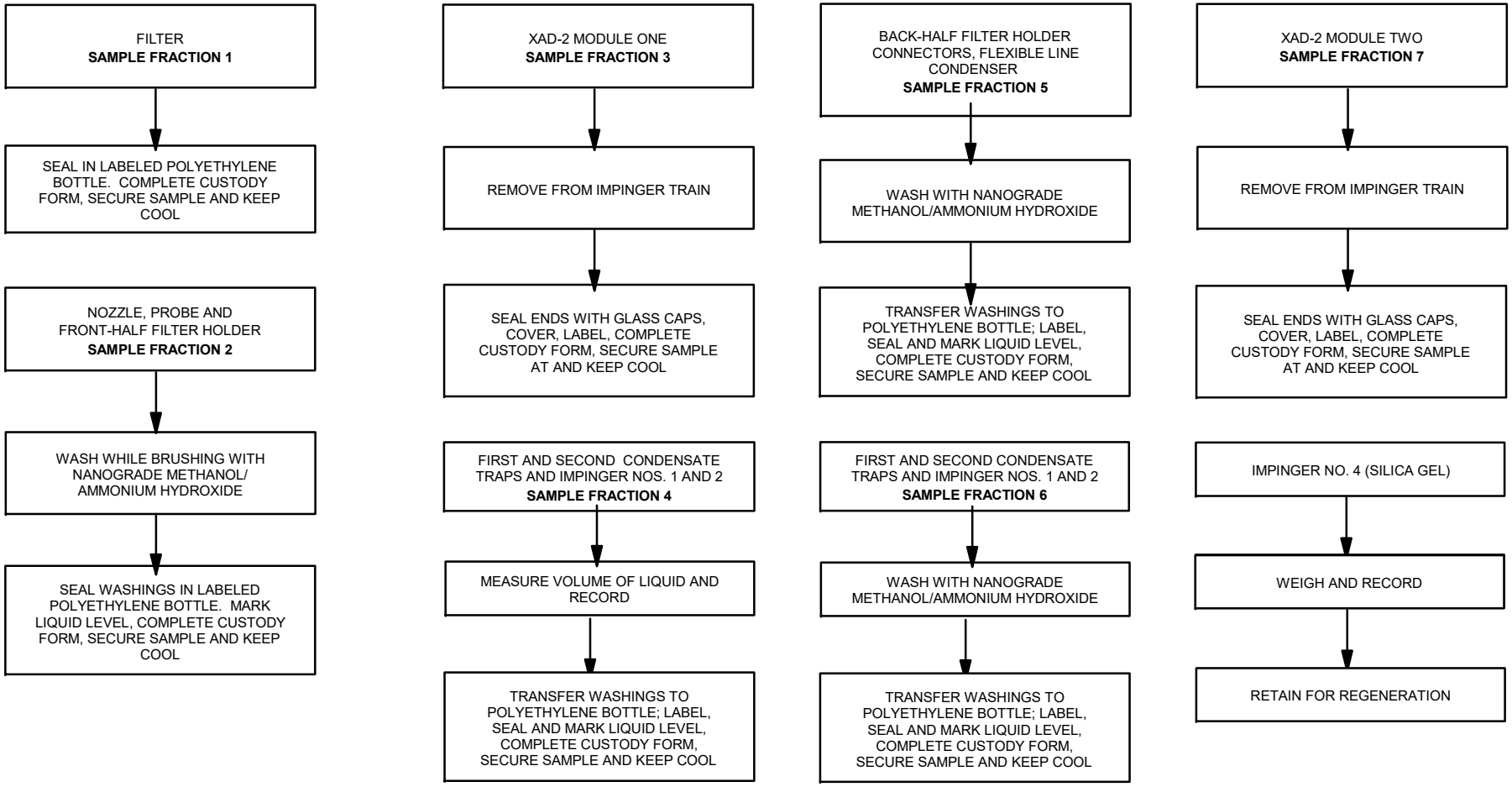


FIGURE 5-2
HFPO DIMER ACID SAMPLE RECOVERY PROCEDURES FOR METHOD 0010

IASDATA\CHEMOURS\15418.002.008\FIGURE 5-2 EPA 0010

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 DIVISION SCRUBBER INLET

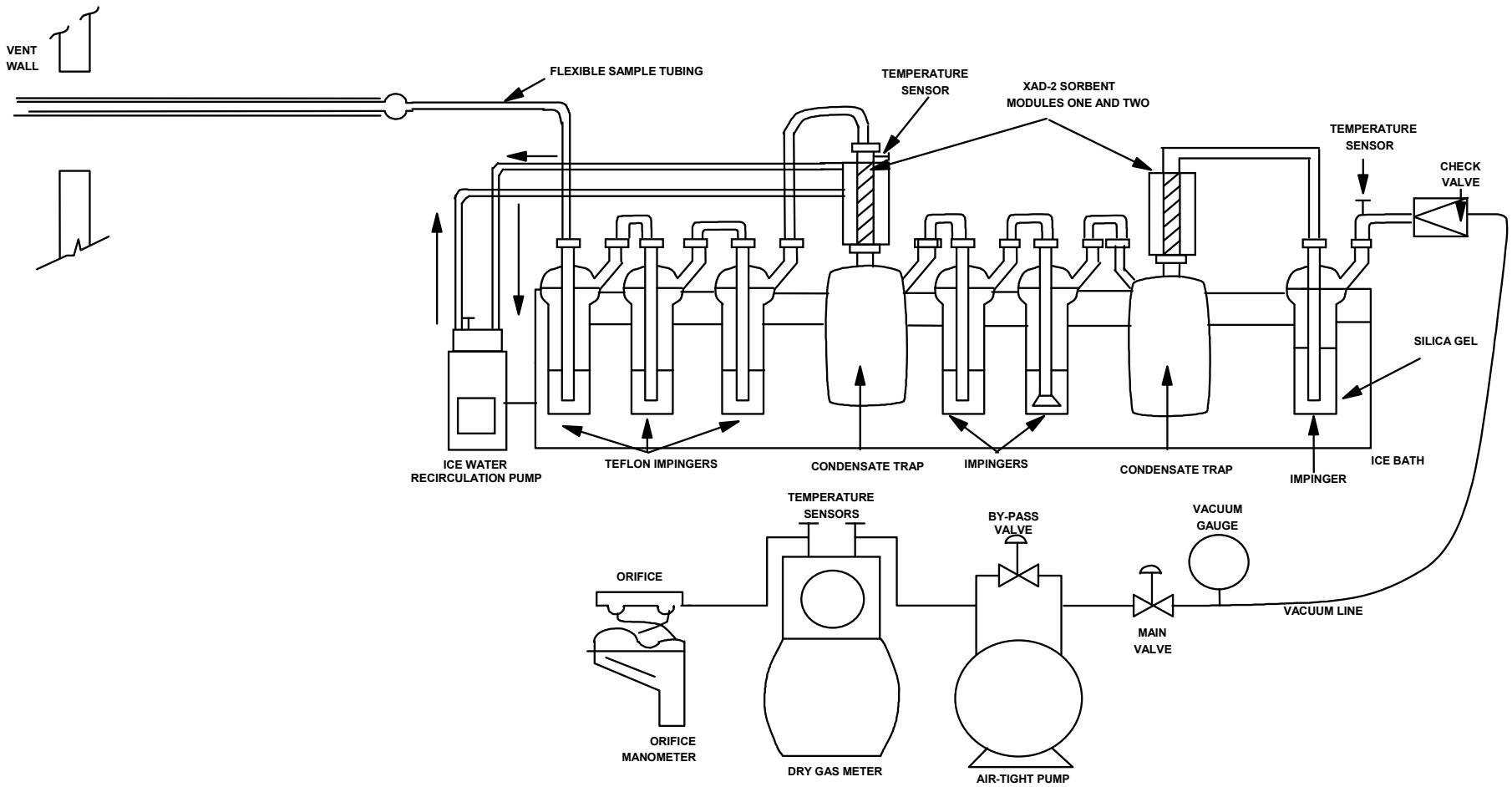
The purpose of this section is to describe the Division scrubber inlet sampling train and to provide details of the sampling and analytical procedures utilized during the emissions test program.

Due to the anticipated elevated levels of HFPO Dimer Acid at the scrubber inlet, the previously used EPA Method 0010 train was modified. In addition, the small diameter scrubber inlet vent and associated vent access were not conducive to isokinetic sampling. As a result, the EPA Method 0010 HFPO Dimer Acid sample train was modified for non-isokinetic low volume sampling.

5.3.1 Modified EPA Method 0010

The sampling train utilized to perform the HFPO Dimer Acid sampling at the Division scrubber inlet was a modified EPA Method 0010 train (see Figure 5-3). The modified Method 0010 train consisted of an unheated section of tubing (SS, Teflon® or plastic) to be used as the sample probe.

The section of tubing connected directly to a series of three Teflon® impingers, each containing 400 ml of KOH solution and then connected to 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 containing 100 mls of high-purity distilled water. The train included a



NOTE:THE XAD-2 SORBENT MODULE WILL ALWAYS BE IN A VERTICAL POSITION.

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FIGURE 5-3
MODIFIED EPA METHOD 0010 SAMPLING TRAIN
WASTE GAS SCRUBBER INLET

IASDATA\CHEMOURS\15418.002.008\FIGURE 5-3 MODIFIED METHOD 0010

second XAD-2 resin trap behind the impinger section to evaluate possible sampling train breakthrough. Each XAD-2 resin trap was connected to a 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 XAD-2 module 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.

Leak checks were performed on the sampling apparatus according to reference method instructions, prior to and following each run, component change (if required).

5.3.2 Modified 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. Any particulate adhering to the internal surfaces of the front tubing section (probe) to the initial Teflon® impinger was rinsed with distilled water into a polyethylene container. The container was sealed.

3. The volume of each Teflon® impinger was measured. The contents of the first two Teflon® impingers were combined and the impingers and connectors rinsed with distilled water. This sample and rinse were combined with the sample collected in Step 2 above and the container was sealed.

4. The third Teflon® impinger contents and associated distilled water rinse were sealed in a separate container.

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

6. All train components starting with the first Teflon® impinger to the first condensate trap were rinsed with methanol/ammonium hydroxide. The solvent rinse was placed in the same container as Step 4 above and sealed.

7. The volume of liquid in impingers one and two, and the second condensate trap, was measured, the values recorded, and the sample was placed in the same container as Step 5 above and sealed.

8. The two impingers, condensate traps, and connectors were rinsed with methanol/ ammonium hydroxide. The sample was placed in the same container as Step 6 above and sealed.

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

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

Each container was labeled to clearly identify its contents. All samples were maintained cool.

See Figure 5-4 for a schematic of the M0010 sample recovery process.

5.3.3 Modified EPA Method 0010 – Sample Analysis

The modified Method 0010 sampling train described above resulted in six separate analytical fractions for HFPO Dimer Acid analysis according to SW-846 Method 3542:

- Initial two Teflon® Impingers – comprised of the contents of impingers one and two and the probe and impinger rinses;
- Final Teflon® Impinger – comprised of the impinger three contents and the rinses;
- Back-half Composite—comprised of the first XAD-2 resin material;
- Condensate Composite—comprised of the aqueous condensates and the contents of impingers one and two;
- The solvent rinses for the condensate traps and impingers;
- 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.

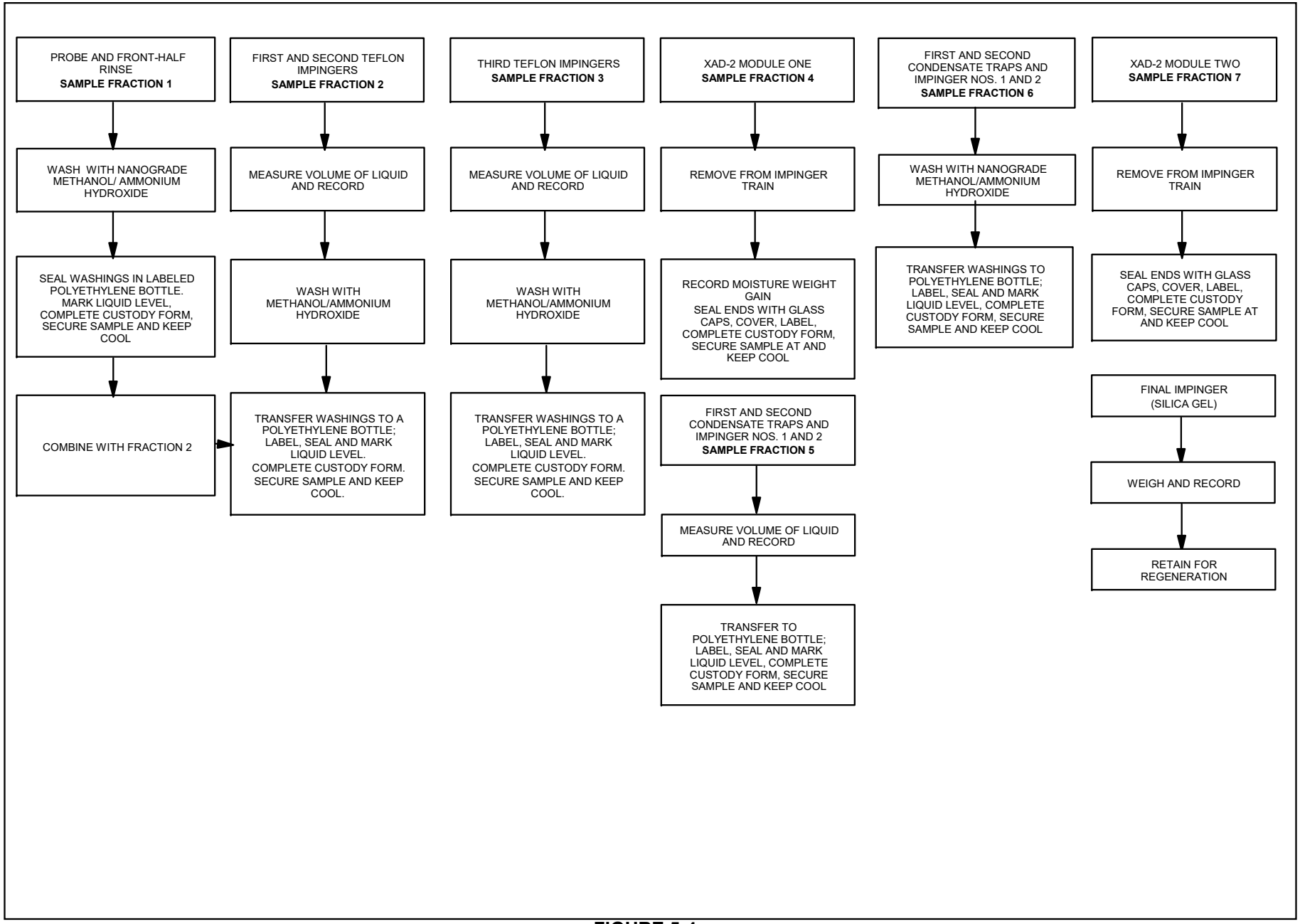

FIGURE 5-4
HFPO DIMER ACID SAMPLE RECOVERY PROCEDURES FOR MODIFIED METHOD 0010
WASTE GAS SCRUBBER INLET

IASDATA\CHEMOURS\15418.002.008\FIGURE 5-4 MODIFIED EPA 0010

The individual sample 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 the final extracts were processed analytically by HPLC/MS/MS.

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

5.4 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 5-5.

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.

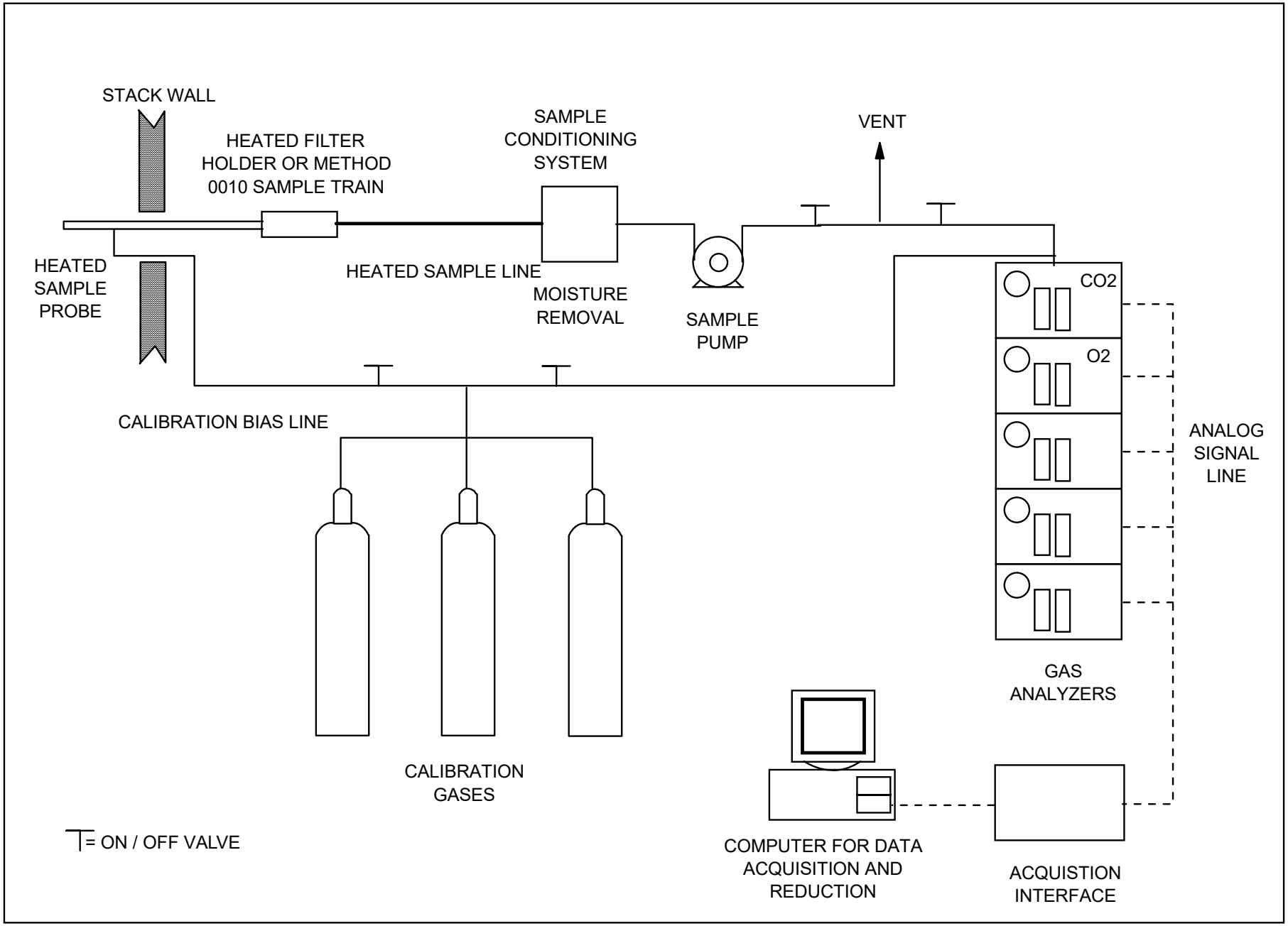

FIGURE 5-5
WESTON SAMPLING SYSTEM

IASDATA\CHEMOURS\15418.002.008\FIGURE 5-5 WESTON SAMPLING SYSTEM

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.

6. DETAILED TEST RESULTS AND DISCUSSION

Preliminary testing of inlet samples to the scrubbers and the associated analytical results required significant sample dilution to bring the HFPO Dimer Acid concentration within instrument calibration, therefore, sample times and sample volumes were reduced for the formal test program. This was approved by the North Carolina Department of Environmental Quality (NCDEQ).

Each test was a minimum of 90 minutes in duration. A total of three test runs were performed at each location.

Tables 6-1 through 6-3 provide detailed test data and test results for the Scrubber inlet, the Carbon Bed outlet and the Division stack, respectively.

The Method 3A sampling on all sources 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.

The Division stack includes emissions from the Carbon Bed outlet. These emissions have been subtracted from the Division stack results.

The waste gas scrubber inlet location presents many sampling and analytical challenges. The vertical duct is nominal 3 inch ID with a ¼-inch ID sample port. Due to the small size, isokinetic sampling cannot be performed. This may have resulted in a bias of unknown value. In addition, gas volumetric flow rates are not measured using standard EPA Method 2 equipment. However, volumetric flow is measured by the Chemours flow meter. The flow meter is calibrated to the mole weight of nitrogen which cannot be verified by actual gas composition sampling, and therefore may also lead to an additional bias. The gas stream is also known to contain elevated concentrations of HF, and this required additional sampling train modifications to mitigate the effects of HF on the pH of the impinger solutions by adding KOH impingers to the first portion of the sample train. Although this modification appeared to help control the pH, a method validation study for this sampling and analytical approach has not been performed. Additional concerns for sampling at this location include the process variability and how that may affect

sample parameters, the inability to confirm laminar verses cyclonic flow, and the accurate collection of particulates, if present, all add to the potential bias of the test results. In conclusion, the waste gas scrubber inlet sample location and associated test results are outside approved sampling procedures, and the above deviations from approved procedures have been and continue to result in variable data sets and should not be used for regulatory compliance purposes.

All three test runs performed at the VE North Carbon Bed Outlet were below the acceptance criteria for isokinetic sampling (90 to 110%). This was due to the dry gas meter calibration factor used at that sample location shifting prior to the performance of the tests. The post-test calibration check revealed that the calibration factor was off by approximately 10%. The post-test calibration acceptance criteria is 5%. Please note that this could potentially result in an over estimate of larger diameter particulate captured on the sample train filter. However, the sample location is after the Carbon Bed, therefore, larger size particulate was not expected. In addition, the results have been reported using the post-test calibration factor for each test run which results in a more conservative (lower) calculation of removal efficiency.

TABLE 6-1
CHEMOURS-FAYETTEVILLE, NC
INPUTS FOR HFPO DIMER ACID CALCULATIONS
VE NORTH SCRUBBER INLET

TEST DATA			
Test run number	2	3	4
Location	VEN Scrubber Inlet	VEN Scrubber Inlet	VEN Scrubber Inlet
Test date	12/06/18	12/06/18	12/07/18
Test time period	0906-1141	1356-1547	0842-1038
SAMPLING DATA			
Duration, minutes	96	96	96
Average dry gas meter press. in. H2O	1.81	2.00	2.00
Average dry gas meter temp. deg. F	46.35	50.75	52.40
Average absolute meter temp. deg. R	506.4	510.8	512.4
Sample vol. at meter cond., dcl	96.123	96.115	96.072
Meter box calibration, Y	1.0088	1.0088	1.0088
Barometric pressure, in. Hg	30.38	30.38	30.38
Sample volume, dscl (1)	103.077	102.228	101.854
Sample volume, dscf (1)	3.63972	3.610	3.597
VOLUMETRIC FLOW RATE			
Avg. gas stream volumetric flow, kg/hr (from Chemours)	111.0	111.0	108.0
Avg. gas stream density, g/liter (from Chemours)	1.204	1.204	1.204
Avg. gas stream volumetric flow, liters/hr	92192.7	92192.7	89701.0
Avg. gas stream volumetric flow, dscf/min.	54.265	54.265	52.798

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

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

TEST DATA			
Run number	2	3	4
Location	VEN Scrubber Inlet	VEN Scrubber Inlet	VEN Scrubber Inlet
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
LABORATORY REPORT DATA, ug.			
HFPO Dimer Acid	144464	24629	24980.4
EMISSION RESULTS, ug/dscm.			
HFPO Dimer Acid	1.40E+06	2.41E+05	2.45E+05
EMISSION RESULTS, lb/dscf.			
HFPO Dimer Acid	8.75E-05	1.50E-05	1.53E-05
EMISSION RESULTS, lb/hr.			
HFPO Dimer Acid	2.85E-01	4.90E-02	4.85E-02
EMISSION RESULTS, g/sec.			
HFPO Dimer Acid	3.59E-02	6.17E-03	6.11E-03

TABLE 6-2
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
VE NORTH CARBON BED OUTLET

Test Data			
Run number	2	3	4
Location	VEN-CBed Outlet	VEN-CBed Outlet	VEN-CBed Outlet
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
SAMPLING DATA:			
Sampling duration, min.	96.0	96.0	96.0
Nozzle diameter, in.	0.215	0.215	0.215
Cross sectional nozzle area, sq.ft.	0.000252	0.000252	0.000252
Barometric pressure, in. Hg	30.38	30.38	30.38
Avg. orifice press. diff., in H_2O	1.62	1.58	1.59
Avg. dry gas meter temp., deg F	39.8	51.5	47.0
Avg. abs. dry gas meter temp., deg. R	500	511	507
Total liquid collected by train, ml	17.7	16.5	19.1
Std. vol. of H_2O vapor coll., cu.ft.	0.8	0.8	0.9
Dry gas meter calibration factor	1.1203	1.0679	1.0873
Sample vol. at meter cond., dcf	50.751	53.181	52.139
Sample vol. at std. cond., dscf [(1)]	61.203	59.734	60.149
Percent of isokinetic sampling	90.7	90.3	90.2
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.	0.013	0.013	0.015
Mole fraction of dry gas	0.987	0.987	0.985
Molecular wt. of wet gas, lb/lb mole	28.69	28.70	28.68
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:			
Static pressure, in. H_2O	3.50	3.50	3.50
Absolute pressure, in. Hg	30.64	30.64	30.64
Avg. temperature, deg. F	69	77	74
Avg. absolute temperature, deg.R	529	537	534
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	24	24	24
Avg. gas stream velocity, ft./sec.	46.1	45.9	46.0
Stack/duct cross sectional area, sq.ft.	6.31	6.31	6.31
Avg. gas stream volumetric flow, wacf/min.	17456	17359	17419
Avg. gas stream volumetric flow, dscf/min.	17578	17238	17368

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

TABLE 6-2 (cont.)
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
VE NORTH CARBON BED OUTLET

TEST DATA			
Run number	2	3	4
Location	VEN-CBed Outlet	VEN-CBed Outlet	VEN-CBed Outlet
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
LABORATORY REPORT DATA, ug.			
HFPO Dimer Acid	56.55	47.54	49.94
EMISSION RESULTS, ug/dscm.			
HFPO Dimer Acid	32.62	28.10	29.32
EMISSION RESULTS, lb/dscf.			
HFPO Dimer Acid	2.04E-09	1.75E-09	1.83E-09
EMISSION RESULTS, lb/hr.			
HFPO Dimer Acid	2.15E-03	1.81E-03	1.91E-03
EMISSION RESULTS, g/sec.			
HFPO Dimer Acid	2.70E-04	2.28E-04	2.40E-04

TABLE 6-3
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
VE-NORTH DIVISION STACK

Test Data			
Run number	2	3	4
Location	Divison-Stack	Divison-Stack	Divison-Stack
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
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	30.38	30.23	30.25
Avg. orifice press. diff., in H_2O	1.27	1.25	1.17
Avg. dry gas meter temp., deg F	57.5	58.0	55.6
Avg. abs. dry gas meter temp., deg. R	517	518	516
Total liquid collected by train, ml	9.4	10.1	9.3
Std. vol. of H_2O vapor coll., cu.ft.	0.4	0.5	0.4
Dry gas meter calibration factor	1.0150	1.0150	1.0150
Sample vol. at meter cond., dcf	59.384	59.402	57.068
Sample vol. at std. cond., dscf [(1)]	62.615	62.257	60.120
Percent of isokinetic sampling	104.6	102.4	100.5
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.	0.007	0.008	0.007
Mole fraction of dry gas	0.993	0.992	0.993
Molecular wt. of wet gas, lb/lb mole	28.76	28.75	28.76
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:			
Static pressure, in. H_2O	-0.70	-0.70	-0.70
Absolute pressure, in. Hg	30.33	30.18	30.20
Avg. temperature, deg. F	64	70	67
Avg. absolute temperature, deg.R	524	530	527
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	12	12
Avg. gas stream velocity, ft./sec.	73.3	75.9	74.2
Stack/duct cross sectional area, sq.ft.	7.07	7.07	7.07
Avg. gas stream volumetric flow, wacf/min.	31113	32188	31472
Avg. gas stream volumetric flow, dscf/min.	31567	32060	31565

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

TABLE 6-3 (cont.)
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF HFPO DIMER ACID TEST DATA AND TEST RESULTS
VE-NORTH DIVISION STACK

TEST DATA			
Run number	2	3	4
Location	Divison-Stack	Divison-Stack	Divison-Stack
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
LABORATORY REPORT DATA, ug.			
HFPO Dimer Acid	4117.81	1152.46	2026.97
EMISSION RESULTS, ug/dscm.			
HFPO Dimer Acid	2321.9	653.6	1190.4
EMISSION RESULTS, lb/dscf.			
HFPO Dimer Acid	1.45E-07	4.08E-08	7.43E-08
EMISSION RESULTS, lb/hr.			
HFPO Dimer Acid	2.75E-01	7.85E-02	1.41E-01
HFPO Dimer Acid (From Carbon Bed Exit)	2.15E-03	1.81E-03	1.91E-03
HFPO Dimer Acid (Adjusted Emissions)	2.72E-01	7.67E-02	1.39E-01
HFPO Dimer Acid (Scrubber Inlet)	2.85E-01	4.90E-02	4.85E-02
EMISSION RESULTS, g/sec.			
HFPO Dimer Acid	3.46E-02	9.88E-03	1.77E-02
HFPO Dimer Acid (From Carbon Bed Exit)	2.70E-04	2.28E-04	2.40E-04
HFPO Dimer Acid (Adjusted Emissions)	3.43E-02	9.66E-03	1.75E-02
Scrubber Removal Efficiency, %	4.4	NC	NC

APPENDIX A
PROCESS OPERATIONS DATA

| Date | 12/6/2018 | | |

APPENDIX B
RAW AND REDUCED TEST DATA

CHEMOURS-FAYETTEVILLE, NC
INPUTS FOR HFPO DIMER ACID CALCULATIONS
VE NORTH SCRUBBER INLET

TEST DATA			
Test run number	2	3	4
Location	VEN Scrubber Inlet	VEN Scrubber Inlet	VEN Scrubber Inlet
Test date	12/06/18	12/06/18	12/07/18
Test time period	0906-1141	1356-1547	0842-1038
SAMPLING DATA			
Duration, minutes	96	96	96
Average dry gas meter press. in. H2O	1.81	2.00	2.00
Average dry gas meter temp. deg. F	46.35	50.75	52.40
Average absolute meter temp. deg. R	506.4	510.8	512.4
Sample vol. at meter cond., dcl	96.123	96.115	96.072
Meter box calibration, Y	1.0088	1.0088	1.0088
Barometric pressure, in. Hg	30.38	30.38	30.38
Sample volume, dscl (1)	103.077	102.228	101.854
Sample volume, dscf (1)	3.63972	3.610	3.597
VOLUMETRIC FLOW RATE			
Avg. gas stream volumetric flow, kg/hr (from Chemours)	111.0	111.0	108.0
Avg. gas stream density, g/liter (from Chemours)	1.204	1.204	1.204
Avg. gas stream volumetric flow, liters/hr	92192.7	92192.7	89701.0
Avg. gas stream volumetric flow, dscf/min.	54.265	54.265	52.798

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

TABLE 6-2
CHEMOURS - FAYETTEVILLE, NC
INPUTS FOR HFPO DIMER ACID CALCULATIONS
VE NORTH CARBON BED OUTLET

Test Data			
Run number	2	3	4
Location	VEN-CBed Outlet	VEN-CBed Outlet	VEN-CBed Outlet
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
Operator	RS/AS	RS/AS	RS/AS
Inputs For Calcs.			
Sq. rt. delta P	0.82791	0.81744	0.82242
Delta H	1.6196	1.5833	1.5938
Stack temp. (deg.F)	69.5	77.3	74.0
Meter temp. (deg.F)	39.8	51.5	47.0
Sample volume (act.)	50.751	53.181	52.139
Barometric press. (in.Hg)	30.38	30.38	30.38
Volume H_2O imp. (ml)	3.7	-1.1	2.2
Weight change sil. gel (g)	14.0	17.6	16.9
% 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.)	6.305	6.305	6.305
Sample time (min.)	96.0	96.0	96.0
Static pressure (in.H_2O)	3.50	3.50	3.50
Nozzle dia. (in.)	0.215	0.215	0.215
Meter box cal.	1.1203	1.0679	1.0873
Cp of pitot tube	0.84	0.84	0.84
Traverse points	24	24	24

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

Test Data			
Run number	2	3	4
Location	Divison-Stack	Divison-Stack	Divison-Stack
Date	12/06/18	12/06/18	12/07/18
Time period	0906-1141	1356-1547	0842-1038
Operator	MW	MW	MW
Inputs For Calcs.			
Sq. rt. delta P	1.31825	1.35151	1.32589
Delta H	1.2714	1.2466	1.1720
Stack temp. (deg.F)	63.6	70.4	67.3
Meter temp. (deg.F)	57.5	58.0	55.6
Sample volume (act.)	59.384	59.402	57.068
Barometric press. (in.Hg)	30.38	30.23	30.25
Volume H_2O imp. (ml)	-3.0	-2.6	-2.1
Weight change sil. gel (g)	12.4	12.7	11.4
% 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.	1.0150	1.0150	1.0150
Cp of pitot tube	0.84	0.84	0.84
Traverse points	12	12	12

FIELD DATA SHEET

Method 0010 - HFPO Dimer Acid

Client	Chemours	Run No.	2 ~~1~~ (4)	Meter Box ID	VOST 5		
W.O.#	15418.002.008.0001	Test Method	Modifeid Method 0010	Meter Box Y	1.0688	Set One	NA
Project ID	Chemours	Date	(4) 12-6-18 ~~13-Nov-18~~	Probe ID/Length		Set Two	
Mode/Source ID	WGS Inlet	Baro. Press (in Hg)	30.38	Probe Material	~~Tef~~ Plastic	Set Three	
Samp. Loc.	Inlet	Ambient Temp (°F)	45			Set Four	
Source	WG Scrubber	Operator	41			Field Blank	
		Sample Time	96				

Comments: Initial Probe Leak check roto @ 0
Final Probe Leak check roto @ 0 Initial
0 in Hg Final

Leak Checks (liters/min @ in Hg Vac)

Set One	Set Two	Set Three	Set Four
		NA	

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	ORIFICE PRESSURE Delta H (in H_2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°C)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	FIRST COND. EXIT TEMP (°F)	SECOND COND. EXIT TEMP (°C)		COMMENTS
	0	0906			0.000				(4)				
	5		1.0	1.2	~~0.000~~		34		~~+2.0~~	43			4.0 (4)
	10		1.2	1.4	9.8		36		2.0	45			
	15		1.3	1.8	15.0		38		2.0	43			
	20		1.2	1.8	20.0		41		2.0	43			
	25		1.2	1.8	24.9		43		2.0	43			
	30		1.2	1.8	30.0		45		2.0	43			
	35		1.2	1.8	35.0		46		2.0	44			
	40		1.2	1.8	40.0		47		2.0	44			
	45		1.2	1.8	44.8		47		2.0	45			0954 stop
	50		1.2	1.8	50.0		48		2.0	44			1053 start
	55		1.2	1.9	55.1		50		2.0	45			
	60		1.2	1.8	60.1		50		2.0	45			
	65		1.2	1.8	65.0		50		2.0	46			
	70		1.2	1.8	70.0		51		2.0	46			
	75		1.2	1.8	75.0		51		2.0	46			
	80		1.2	1.8	80.0		50		2.0	45			
	85		1.2	1.8	84.9		50		2.0	45			
	90		1.2	1.8	89.0		50		2.0	46			
	95		1.2	1.8	94.9		50		2.0	46			
	96	1141	1.2	1.8	96.123		50		2.0	46			
				Avg Delta H 1.81	Total Volume		Avg Tm 46.35	Max Temp	Max Vac	Max Temp	Max Temp		

WESTON SOLUTIONS

SK

FIELD DATA SHEET

Method 0010 - HFPO Dimer Acid

Client	Chemours	Run No.	3	Meter Box ID	VOST 5		
W.O.#	15418.002.008.0001	Test Method	Modifeid Method 0010	Meter Box Y	1.0088	Set One	
Project ID	Chemours	Date	12-6-18 ~~13-Nov-18~~	Probe ID/Length	- -	Set Two	NA
Mode/Source ID	WGS Inlet	Baro. Press (in Hg)	30.38	Probe Material	Plastic	Set Three	
Samp. Loc.	Inlet	Ambient Temp (°F)	50			Set Four	
Source	WG Scrubber	Operator	CH			Field Blank	
		Sample Time	0.008 96				

Comments: Initial Probe Leak check roto @ 0
Final Probe Leak check roto @ 0 0.008

Leak Checks (liters/min @ in Hg Vac)

	Set One	Set Two	Set Three	Set Four
Initial			NA	
Final				

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	ORIFICE PRESSURE Delta H (in H_2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°C)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	FIRST COND. EXIT TEMP (°C)	SECOND COND. EXIT TEMP (°C)		COMMENTS
	0			CH	0.000					°F			
1356	5	1356'	1.2	+2.0	4.9		49		2.0	45			
	10		1.2	2.0	10.0		49		2.0	44			
	15		1.2	2.0	15.0		49		2.0	45			
	20		1.2	2.0	20.0		49		2.0	45			
	25		1.2	2.0	25.0		50		2.0	45			
	30		1.2	2.0	30.1		50		2.0	44			
	35		1.2	2.0	35.1		50		2.0	44			
	40		1.2	2.0	40.1		51		2.0	45			
	45		1.2	2.0	44.9		51		2.0	45			1444 stop
	50		1.2	2.0	50.0		51		2.0	46			1459 start
	55		1.2	2.0	55.0		52		2.0	46			
	60		1.2	2.0	60.0		52		2.0	47			
	65		1.2	2.0	64.9		52		2.0	46			
	70		1.2	2.0	69.9		52		2.0	47			
	75		1.2	2.0	75.0		52		2.0	46			
	80		1.2	2.0	80.0		52		2.0	46			
	85		1.2	2.0	85.1		51		2.0	46			
	90		1.2	2.0	90.2		51		2.0	46			
	95		1.2	2.0	95.1		51		2.0	46			
	96	1547'	1.2	2.0	96.115		51		2.0	46			
				Avg Delta H	Total Volume	Avg Tm		Max Temp	Max Vac	Max Temp	Max Temp		
				2.0		50.75							

WESTON SOLUTIONS

SA

FIELD DATA SHEET

Method 0010 - HFPO Dimer Acid

Client	Chemours	Run No.	4	Meter Box ID	VOST 5		
W.O.#	15418.002.008.0001	Test Method	Modifeid Method 0010	Meter Box Y	1.0088	Set One	
Project ID	Chemours	Date	13-Nov-18	Probe ID/Length	– / –	Set Two	
Mode/Source ID	WGS Inlet	Baro. Press (in Hg)	30.38	Probe Material	plastic	Set Three	
Samp. Loc.	Inlet	Ambient Temp (°F)	45			Set Four	
Source	WG Scrubber	Operator	CH			Field Blank	
		Sample Time	96				

Comments: Initial Probe Leak check roto @ 0, 0.008
Final Probe Leak check [illegible] 0.0[illegible]
[illegible] Final

Leak Checks (liters/min @ in Hg Vac)

	Set One	Set Two	Set Three	Set Four
Initial				
Final				

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	ORIFICE PRESSURE Delta H (in H_2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°C)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	FIRST COND. EXIT TEMP (°C)	SECOND COND. EXIT TEMP (°C)		COMMENTS
	0	0842			0.000								
	5		1.2	2.0	4.9		47		2.0	49			
	10		1.2	2.0	9.9		48		2.0	48			
	15		1.2	2.0	14.9		49		2.0	47			
	20		1.2	2.0	20.0		49		2.0	47			
	25		1.2	2.0	25.0		49		2.0	47			
	30		1.2	2.0	30.1		50		2.0	47			
	35		1.2	2.0	35.1		51		2.0	47			
	40		1.2	2.0	40.1		52		2.0	48			
	45		1.2	2.0	45.0		52		2.0	48			0930 stop
	50		1.2	2.0	50.1		52		2.0	48			0950 start
	55		1.2	2.0	55.0		53		2.0	50			
	60		1.2	2.0	60.0		54		2.0	49			
	65		1.2	2.0	65.0		54		2.0	50			
	70		1.2	2.0	70.0		55		2.0	50			
	75		1.2	2.0	74.9		55		2.0	49			
	80		1.2	2.0	79.9		55		2.0	50			
	85		1.2	2.0	85.0		55		2.0	50			
	90		1.2	2.0	90.1		56		2.0	50			
	95		1.2	2.0	95.1		56		2.0	49			
	96	1038	1.2	2.0	96.072		56		2.0	49			
				Avg Delta H	Total Volume	Avg Tm		Max Temp	Max Vac	Max Temp	Max Temp		
				2.0		52.4							

WESTON SOLUTIONS

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client	Chemours	W.O. #	15418.002
Location/Plant	Fayetteville, NC	Source & Loaction	Waste Gas Scrubber Inlet

Run No. 2 — Sample Date 12/6/18 — Recovery Date 12/6/18

Sample I.D. Chemours - WGS - IN - 2 - M0010 - — Analyst Dan — Filter Number N/A

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20			KOH	KOH	KOH	Silica Gel	
Final	2	104	98	4	4	404 / 2	400 / 400	0	314.0	
Initial	0	100	100	0	0	400 / 0	400 / 400	0	300	
Gain	2	4	-2	4	4	4 / 2	0 / 0	0 / 18	14.0	

Impinger Color: clear — Labeled? ✓

Silica Gel Condition: ~~Poor~~ Good — Sealed? ✓

Run No. 3 — Sample Date 12/6/18 — Recovery Date 12/6/18

Sample I.D. Chemours - WGS - IN - 3 - M0010 - — Analyst Dan — Filter Number N/A

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20			KOH	KOH	KOH	Silica Gel	
Final	2	101	99	4	4	428 / 4	408 / 420	2	302.4	
Initial	0	100	100	0	0	400 / 0	400 / 400	0	300	
Gain	2	1	-1	4	4	30 / 4	8 / 20	2 / 64	9.4	

Impinger Color: clear — Labeled? ✓

Silica Gel Condition: Good — Sealed? ✓

Run No. 4 — Sample Date 12/7/18 — Recovery Date 12/7/18

Sample I.D. Chemours - WGS - IN - 4 - M0010 - — Analyst Dan — Filter Number N/A

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20			KOH	KOH	KOH	Silica Gel	
Final	2	102	100	2	0	420 / 3	440 / 405	2	320.2	
Initial	0	100	100	0	0	400 / 0	400 / 400	0	300	
Gain	2	2	0	2	0	20 / 3	40 / 5	2 / 76	20.2	

Impinger Color: clear — Labeled? ✓

Silica Gel Condition: Good — Sealed? ✓

Check COC for Sample IDs of Media Blanks

WESTON SOLUTIONS

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Page 1 of 1

Client	Chemours
W.O.#	15418.002
Project ID	Chemours
Mode/Source ID	Carbon Bed
Samp. Loc. ID	OUT
Run No.ID	2 ~~2.1~~ KA
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Carbon Bed Outlet
Sample Date	12/6/18
Baro. Press (in Hg)	30.38
Operator	KA/AJ

Stack Conditions

	Assumed	Actual
% Moisture	4	
Impinger Vol (ml)		3.7
Silica gel (g)		18.0
CO2, % by Vol	0.0	0
O2, % by Vol	20.9	20.9
Temperature (°F)	50	69.458
Meter Temp (°F)	50	39.792
Static Press (in H_2O)	3.5	3.5
Ambient Temp (°F)	29	

Meter Box ID	23		
Meter Box Y	0.9952		
Meter Box Del H	2.3554		
Probe ID / Length	P711	6'	
Probe Material	Boro		
Pitot / Thermocouple ID			
Pitot Coefficient	0.84		
Nozzle ID	.215		
Nozzle Measurements	.215	.215	.215
Avg Nozzle Dia (in)	.215		
Area of Stack (ft^2)	6.305		
Sample Time	96		
Total Traverse Pts	24		

K Factor 2.3

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.000	0.000	0.000
Leak Check @ (in Hg)	12"	8"	11"
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		
Reference Temp		
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	0906			76.313									
A 1	4		.75	1.7	78.3	63	33	117	113	32	4	27		
2	8		.86	2.0	80.6	~~N65~~ KA	33	118	114	35	4	24		
3	12		.83	1.9	82.8	64	34	116	112	35	4	32		
4	16		~~.81~~ .80	1.8	85.0	67	34	116	111	37	4	29		
5	20		.76	1.7	87.1	67	34	116	111	40	4	29		
6	24		.74	1.7	89.2	67	34	116	111	42	4	29		
7	28		.72	1.7	91.4	67	35	117	111	40	4	30		
8	32		.55	1.3	93.3	68	36	117	112	42	3	32		
9	36		.48	1.1	95.0	68	36	117	112	43	3	32		
10	40		.44	1.0	96.5	69	37	116	111	43	3	34		
11	44		.40	.92	97.9	69	37	116	111	43	2	33		
12	48	0954	.37	.85	99.417	68	38	117	112	43	2	35		
					99.437					N/A				.02 - Leak Check
B 1	4	1053	.44	1.0	101.0	64	39	117	112	41	2	37		
2	8		.44	1.0	102.5	72	44	117	111	41	2	40		
3	12		.47	1.1	104.1	72	44	117	112	41	2	40		
4	16		.49	1.1	106.2	72	44	117	111	42	2	39		
5	20		.52	1.2	108.1	72	44	117	112	42	2	43		
6	24		.60	1.4	110.1	73	45	117	111	47	2	46		
7	28		.90	2.1	112.7	73	45	117	111	48	4	48		
8	32		1.0	2.3	115.4	73	45	117	112	50	4	50		
9	36		1.1	2.5	118.3	73	45	117	111	51	5	50		
10	40		1.1	2.5	121.4	74	46	117	111	52	5	48		
11	44		1.1	2.5	124.1	73	46	116	110	51	5	48		
12	48	1141	1.1	2.5	127.084	74	47	117	111	52	5	48		
			Avg Delta P .828	Avg Delta H 1.620	Total Volume 50.751	Avg Ts 69.458	Avg Tm 39.792	Min/Max 116/118	Min/Max 110/114	Max 52	Max Vac 5	Min/Max 27/50		
			Avg Sqrt Delta P .907	Avg Sqrt Del H 1.254	Comments:									

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

SR

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Page 1 of 1

Client	Chemours
W.O.#	15418.002
Project ID	Chemours
Mode/Source ID	Carbon Bed
Samp. Loc. ID	OUT
Run No.ID	3 ~~32~~ KA
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Carbon Bed Outlet
Sample Date	6 Dec 18
Baro. Press (in Hg)	30.38
Operator	KA/AS

Stack Conditions

	Assumed	Actual
% Moisture	4	
Impinger Vol (ml)		41
Silica gel (g)		12.6
CO2, % by Vol	0.0	0.0
O2, % by Vol	20.9	20.9
Temperature (°F)	68	77.25
Meter Temp (°F)	50	51.458
Static Press (in H_2O)	3.5	3.5
Ambient Temp (°F)	43	

Meter Box ID	23	
Meter Box Y	0.9852	
Meter Box Del H	2.3554	
Probe ID / Length	P711	6'
Probe Material	Boro	
Pitot / Thermocouple ID		
Pitot Coefficient	0.84	
Nozzle ID	.215	
Nozzle Measurements	.215	.215 .215
Avg Nozzle Dia (in)	.215	
Area of Stack (ft^2)	6.508	
Sample Time	96	
Total Traverse Pts	24	

K Factor 2.3

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.004	0.002	0.000
Leak Check @ (in Hg)	13"	10"	10"
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		
Reference Temp		
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 (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	1356			129.150									
A 1	4		.82	1.9	131.2	77	49	116	112	47	4	40		
2	8		.83	1.9	133.6	76	49	117	113	48	4	41		
3	12		.80	1.8	136.0	77	49	117	112	50	4	41		
4	16		.78	1.8	138.4	76	50	116	111	53	4	40		
5	20		.75	1.7	140.7	77	50	117	112	55	4	41		
6	24		.72	1.7	143.1	77	50	116	110	57	4	41		
7	28		.53	1.2	145.1	77	51	117	114	59	3	41		
8	32		.48	1.1	146.4	77	51	117	112	58	3	42		
9	36		.43	.99	148.8	77	51	117	112	57	3	44		
10	40		.41	.94	150.4	77	~~NA~~ 51	117	112	57	3	43		
11	44		.38	.87	152.1	77	51	116	110	56	3	44		
12	48	1444	.35	.81	153.696	76	52	117	112	57	2	45		
														.017-LeakCheck
B 1	4	1459	.43	.99	155.3	70	51	117	110	52	2	47		
2	8		.44	1.0	157.1	78	52	116	111	51	2	47		
3	12		.48	1.1	158.9	78	52	117	111	53	2	47		
4	16		.53	1.2	160.9	77	53	117	111	54	2	47		
5	20		.55	1.3	162.9	78	52	117	112	57	2	48		
6	24		.60	1.4	165.0	79	53	116	111	57	3	47		
7	28		.90	2.1	167.7	79	53	117	111	57	3	47		
8	32		.97	2.2	170.5	79	52	117	111	59	4	46		
9	36		1.1	2.5	173.5	79	53	116	111	58	5	46		
10	40		1.1	2.5	176.6	79	53	117	112	58	5	46		
11	44		1.1	2.5	179.4	79	54	116	111	59	5	46		
12	48	1547	1.1	2.5	182.348	79	53	117	111	59	5	47		
			Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max		
			.817	~~.542~~	53.181	77.25	51.458	116/117	110/114	59	5	48		
			Avg Sqrt Delta P	Avg Sqrt Del H										
			.691	~~.219~~										

Comments:

1.5833
1.2379

EPA Method 0010 from EPA SW-846

WESTON SOLUTIONS

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ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Page 1 of 1

Client	Chemours
W.O.#	15418.002.008.001
Project ID	Chemours
Mode/Source ID	Carbon Bed
Samp. Loc. ID	OUT
Run No.ID	4
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Carbon Bed Outlet
Sample Date	7 Dec 18
Baro. Press (in Hg)	30.38
Operator	KA/AS

Stack Conditions

	Assumed	Actual
% Moisture	4	
Impinger Vol (ml)		2.2
Silica gel (g)		16.8
CO_2, % by Vol	0.0	0.0
O_2, % by Vol	20.9	20.9
Temperature (°F)	67	
Meter Temp (°F)	54	47.042
Static Press (in H_2O)	3.5	3.5
Ambient Temp (°F)	38	

Meter Box ID	23		
Meter Box Y	0.9852		
Meter Box Del H	2.3554		
Probe ID / Length	P711	6'	
Probe Material	Boro		
Pitot / Thermocouple ID			
Pitot Coefficient	0.84		
Nozzle ID	.215		
Nozzle Measurements	.215	.215	.215
Avg Nozzle Dia (in)	.215		
Area of Stack (ft^2)	6.305		
Sample Time	96		
Total Traverse Pts	24		

K Factor 2.3

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.000	0.000	0.003
Leak Check @ (in Hg)	12"	10"	11"
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		
Reference Temp		
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 (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	0842			184.444									
A 1	4		.93	2.1	186.9	72	41	117	114	38	3	44		
2	8		.89	2.0	189.4	69	42	117	112	41	3	34		
3	12		.84	1.9	191.8	71	44	116	112	45	3	33		
4	16		.79	1.8	194.1	72	44	116	111	48	3	35		
5	20		.74	1.7	196.4	72	44	117	111	51	3	32		
6	24		.72	1.7	198.6	72	44	117	112	51	2	33		
7	28		.57	1.3	200.6	72	44	117	112	53	2	34		
8	32		.49	1.1	202.3	74	45	117	111	53	2	35		
9	36		.45	1.0	204.0	75	45	117	111	53	2	35		
10	40		.41	.94	205.6	75	45	117	111	52	2	34		
11	44		.40	.92	207.2	75	45	117	111	52	2	35		
12	48	0930	.37	.85	208.718	75	45	117	112	52	2	35		
					208.749	KA								031 - Leak Check
B 1	4	0950	.42	.97	210.4	70	45	117	113	47	2	34		
2	8		.42	.97	212.1	74	45	117	112	48	2	36		
3	12		.45	1.0	213.7	75	46	117	111	49	2	35		
4	16		.49	1.1	215.6	74	49	117	110	52	2	39		
5	20		.53	1.2	217.5	75	49	117	111	53	2	44		
6	24		.61	1.4	219.6	76	51	117	112	55	2	46		
7	28		.88	2.0	222.1	76	52	117	111	56	3	47		
8	32		1.0	2.3	224.7	76	52	117	111	56	3	47		
9	36		1.1	2.5	227.3	77	52	117	111	58	3	48		
10	40		1.1	2.5	231.1	77	53	116	111	59	3	50		
11	44		1.1	2.5	233.6	77	53	116	110	60	3	51		
12	48	1038	1.1	2.5	236.614	76	54	117	111	60	3	52		
			Avg Delta P .700	Avg Delta H 1.594	Total Volume 52.139	Avg Ts 74.042	Avg Tm 47.042	Min/Max 116/117	Min/Max 110/114	Max 60	Max Vac 3	Min/Max 32/52		
			Avg Sqrt Delta P .822	Avg Sqrt Del H 1.241	Comments:									

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

SA

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | W.O. #: 15418.002
Location/Plant: Fayetteville, NC | Source & Location: Carbon Bed Outlet

Run No. 2 | Sample Date 12/6/18 | Recovery Date 12/6/18
Sample I.D. Chemours - Carbon Bed - OUT - 2 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	0	104	98	0	297.8	305.2			314.0	
Initial	0	100	100	0	296.8	304.5			300	
Gain	0	4	-2	0	1.0	0.7		3.7	14.0	17.7

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Run No. 3 | Sample Date 12/6/18 | Recovery Date 12/6/18
Sample I.D. Chemours - Carbon Bed - OUT - 3 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	0	94	105		313.6	297.1			~~313.6~~	317.6
Initial	0	100	100	0	313.5	297.3			300	
Gain	0	-6	5	0	0.1	-0.2		-1.1	17.6	16.5

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Run No. 4 | Sample Date 12/7/18 | Recovery Date 12/7/18
Sample I.D. Chemours - Carbon Bed - OUT - 4 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	0	99	103	0	299.7	299.0			316.9	
Initial	0	100	100	0	299.4	299.1			300	
Gain	0	-1	3	0	0.3	-0.1		2.2	16.9	19.1

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Check COC for Sample IDs of Media Blanks

WESTON SOLUTIONS

SN

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | W.O. #: 15418.002

Location/Plant: Fayetteville, NC | Source & Loaction: ~~Division Stack - Stack~~ Carbon Bed Out

Run No. BT | Sample Date 12/6/18 | Recovery Date 12/6/18

Sample I.D. Chemours - ~~Division Stack - STK - 2 - M0010 -~~ Carbon Bed-OUT-BlankTrain | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	0	100	100	0	320.3	300.1			~~312.4~~ 300.0	
Initial	0	100	100	0	318.5	299.2			300	
Gain	0	0	0	0	1.8	0.9			0	2.7

Impinger Color: Clear | Labeled? ✓

Silica Gel Condition: 100% Blue | Sealed? ✓

Run No. — | Sample Date _____ | Recovery Date _____

Sample I.D. Chemours - Division Stack - STK - 3 - M0010 - | Analyst _____ | Filter Number _____

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20						Silica Gel	
Final										
Initial		100	100						300	
Gain										

Impinger Color _____ | Labeled? _____

Silica Gel Condition _____ | Sealed? _____

Run No. — | Sample Date _____ | Recovery Date _____

Sample I.D. Chemours - Division Stack - STK - 4 - M0010 - | Analyst _____ | Filter Number _____

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20						Silica Gel	
Final										
Initial		100	100						300	
Gain										

Impinger Color _____ | Labeled? _____

Silica Gel Condition _____ | Sealed? _____

Check COC for Sample IDs of Media Blanks

WESTON SOLUTIONS

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

MR Page 1 of 1 0.775

Client	Chemours
W.O.#	15418.002
Project ID	Chemours
Mode/Source ID	Division Stack
Samp. Loc. ID	STK
Run No.ID	2
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Division Stack Stack
Sample Date	12/06/18
Baro. Press (in Hg)	30.35
Operator	MR WINKELER

Stack Conditions

	Assumed	Actual
% Moisture	≈2.0	
Impinger Vol (ml)		43 ~~0.5~~
Silica gel (g)		12.4
CO2, % by Vol	0.1	0.0
O2, % by Vol	20.8	20.9
Temperature (°F)	≈70	
Meter Temp (°F)	≈70	
Static Press (in H_2O)	-0.70	-0.70
Ambient Temp (°F)	≈ 33	

Meter Box ID	A014	
Meter Box Y	1.015	
Meter Box Del H	1.762	
Probe ID / Length	P702	5'
Probe Material	Boro	
Pitot / Thermocouple ID	702	
Pitot Coefficient	0.84	G160
Nozzle ID	MR ~~G160~~ ~~H197~~	
Nozzle Measurements	~~0.159~~ ~~0.160~~ ~~0.160~~	
Avg Nozzle Dia (in)	MR ~~0.191~~ ~~0.160~~ MR	
Area of Stack (ft^2)	0.160	7.07
Sample Time	96	
Total Traverse Pts	12	

MR K Factor ~~0.363~~ 0.380 MR

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.015	0.015
Leak Check @ (in Hg)	✓15	✓8	✓8
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	40	67
Reference Temp	39	66
Pass/Fail (+/- 2°)	Pass / Fail	Pass / Fail
Temp Change Response ?	yes / no	yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (start time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	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	0906	0.75	0.581	918.916					45				
B 1	4	MR	~~0.67~~	~~0.285~~	921.325	57	48	249	249	~~255~~	~~45~~	40		
1	8		0.80	0.620	923.300	57	48	250	255	~~25~~ 44	5	40		
2	12		1.3	1.01	925.60	60	51	251	256	40	6	38		
2	16		1.5	1.16	927.32	61	52	249	255	39	6	38		30.21
3	20		1.7	1.32	930.50	61	52	249	255	39	6	38		
3	24		1.8	1.39	933.06	62	55	250	249	39	6	38		
4	28		2.0	1.55	935.82	62	56	251	255	41	7	38		
4	32		2.1	1.62	938.28	62	56	251	255	41	7	38		
5	36		1.5	1.16	941.39	63	58	250	255	42	6	38		
5	40		1.8	1.39	943.29	63	58	250	250	42	7 MR	38		
6	44		2.1	1.62	946.33	63	58	251	251	42	7	38		K-FACTOR
6	48	0954	2.1	1.62	949.125	63	58	251	251	43	7	38		
		1053		1.35	949.525									0.679
A 1	4		2.0 MR	~~0.782~~	951.56	65	58	243	241	48	5	42	←	~~0.391~~
1	8		2.0	1.35	954.42	65	58	245	245	48	5	42	MR	
2	12		2.1	1.42	956.910	65	59	250	250	48	5	42		MR
2	16		2.1	1.42	959.600	65	59	251	251	48	5	40	MR	
3	20		2.2	1.49	962.12	66	61	250	250	48	5	40	←	~~K-FACTOR~~
3	24		2.2	1.49	965.13	66	61	251	251	45	6	41		~~0.463~~
4	28		2.1	1.42 ~~0.970~~ MR	967.32	66	61	251	251	45	6	42	←	MR
4	32		2.1	1.42	970.60	66	61	251	251	45	7	42		
5	36		1.9	1.26	972.51	67	62	255	255	45	7	42	←	K-FACTOR
5	40		1.9	1.26	975.00	67	63	255	255	46	6	43		0.664
6	44		1.2	0.796	976.95	67	63	255	250	46	5	43		
6	48	1141	1.2	0.796	978.700	67	63	256	250	46	5	43		29.175
			Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max		
			1.76875	1.2714	59.384	63.6	57.5	243/23	244/25	48	7	43		
			Avg Sqrt Delta P	Avg Sqrt Del H	Comments:									
			1.31825	1.11833										

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Page 1 of 1

Client	Chemours
W.O.#	15418.002
Project ID	Chemours
Mode/Source ID	Division Stack
Samp. Loc. ID	STK
Run No.ID	3
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Division Stack Stack
Sample Date	12/03/18
Baro. Press (in Hg)	30.23
Operator	MR WINKELAR

Stack Conditions

	Assumed	Actual
% Moisture	≈2.0	
Impinger Vol (ml)		0 ~2.5
Silica gel (g)		13.7
CO2, % by Vol	0.1	0.2
O2, % by Vol	20.8	20.9
Temperature (°F)	≈60	
Meter Temp (°F)	≈57	
Static Press (in H_2O)	-0.70	-.20
Ambient Temp (°F)	≈52	

Meter Box ID	A014		
Meter Box Y	1.015		
Meter Box Del H	1.762		
Probe ID / Length	706	5'	
Probe Material	Boro		
Pitot / Thermocouple ID	P706		
Pitot Coefficient	0.84		
Nozzle ID	G160		
Nozzle Measurements	0.158	0.160	0.160
Avg Nozzle Dia (in)	0.160		
Area of Stack (ft^2)	1.07		
Sample Time	96		
Total Traverse Pts	12		

K Factor 0.683

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.001	0.015
Leak Check @ (in Hg)	<15	<6	<7
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	57	58
Reference Temp	57	57
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 (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	1356			979.356									
B 1	4		1.5	1.02	981.26	70	56	249	244	46	4	45		
1	8		1.5	1.02	983.28	70	57	251	252	44	4	42		
2	12		1.6	1.09	986.25	70	56	249	249	42	4	42		
2	16		1.6	1.09	988.42	70	57	250	250	42	4	42		
3	20		1.8	1.22	990.90	70	57	249	245	42	5	42	29.376	
3	24		1.8	1.22	993.94	70	57	251	251	42	5	42		
4	28		1.9	1.29	995.96	70	58	248	247	42	5	42		
4	32		1.9	1.29	998.40	70	58	248	247	42	5	42		
5	36		2.0	1.36	1001.25	70	58	250	252	42	5	42		
5	40		2.0	1.36	1003.55	70	58	250	252	42	5	42		
6	44		1.9	1.29	1006.16	70	59	244	245	42	5	42		
6	48	1444	1.9	1.29	1008.732	70	59	252	243	42	5	42		
		1459			8.874									
A 1	4		1.4	0.956	10.00	70	59	250	253	45	4	44		
1	8		1.4	0.956	13.08	70	59	250	250	45	4	44		
2	12		1.8	1.22	15.71	71	59	250	250	45	4	43		
2	16		1.8	1.22	18.10	71	59	250	251	44	5	43		
3	20		2.1	1.43	20.72	71	59	251	252	44	5	43		
3	24		2.1	1.43	23.35	71	59	255	255	44	5	43	30.026	
4	28		2.1	1.43	26.01	71	58	254	254	42	5	42		
4	32		2.1	1.43	29.05	71	58	254	254	42	5	42		
5	36		2.0	1.36	31.36	71	58	255	243	42	5	42		
5	40		2.0	1.36	33.84	71	58	254	249	42	5	42		
6	44		1.9	1.29	36.54	71	58	249	255	42	5	42		
6	48	1547	1.9	1.29	38.900	71	58	254	253	42	5	42		
			Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max		
			1.83333	1.24633	59.402	70.7	58	244 / 255	243 /	46	5	45		
			Avg Sqrt Delta P	Avg Sqrt Del H	Comments:									
			1.35151	1.11434										

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Client	Chemours
W.O.#	15418.002
Project ID	Chemours
Mode/Source ID	Division Stack
Samp. Loc. ID	STK
Run No.ID	4
Test Method ID	M0010
Date ID	3DEC2018
Source/Location	Division Stack Stack
Sample Date	12/07/18
Baro. Press (in Hg)	30.25
Operator	WINKLER MB

Stack Conditions

	Assumed	Actual
% Moisture	±1.0	
Impinger Vol (ml)		-2.1
Silica gel (g)		164
CO2, % by Vol	0.1	0.0
O2, % by Vol	20.8	20.9
Temperature (°F)	≈60	
Meter Temp (°F)	≈36	
Static Press (in H_2O)	-0.7	-.7
Ambient Temp (°F)	≈ 36	

Meter Box ID	A014	
Meter Box Y	1.015	
Meter Box Del H	1.762	
Probe ID / Length	706	5
Probe Material	Boro	
Pitot / Thermocouple ID	P 706	
Pitot Coefficient	0.84	
Nozzle ID	G-160	
Nozzle Measurements	0.160	0.161 / 0.161
Avg Nozzle Dia (in)	0.161	
Area of Stack (ft^2)	7.07	
Sample Time	96	
Total Traverse Pts	12	

K Factor 0.664

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.015	0.015
Leak Check @ (in Hg)	e15	e2	e7
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	38
Reference Temp	35	38
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 (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
		0	0842			39.350									
B	1	4		2.1	1.39	41.67	65	44	249	245	42	5	42		
	1	8		1.7	1.12	44.00	65	44	250	250	42	5	42		
	2	12		1.9	1.26	46.43	66	48	250	250	42	5	42		28.100
	2	16		1.9	1.26	49.34	66	48	250	250	42	5	42		
	3	20		2.0	1.32	51.91	66	50	252	252	40	6	40		
	3	24		2.0	1.32	54.01	66	52	252	252	40	6	40		
	4	28		2.0	1.32	56.56	66	52	250	250	40	6	40		
	4	32		1.9	1.26	59.01	67	54	251	251	40	6	40		
	5	36		1.6	1.06	61.86	67	54	251	250	40	5	40		LK CHK
	5	40		1.6	1.06	63.51	67	54	249	249	40	5	40		0.2000
	6	44		1.1	0.730	65.46	67	54	250	250	40	5	39		
	6	48	0930	1.1	0.73	67.350	67	54	250	250	40	5	39		
			0950			67.550									
A	1	4		1.4	0.929	69.40	67	57	254	255	43	4	43		
	1	8		1.4	0.929	71.59	67	57	254	255	43	4	43		28.97
	2	12		1.9	1.26	74.23	67	57	255	255	44	5	44		
	2	16		1.9	1.26	76.77	68	60	251	251	44	5	43		
	3	20		2.0	1.32	79.37	68	60	251	252	44	5	43		
	3	24		2.0	1.32	82.00	68	60	252	248	40	6	39		
	4	28		2.1	1.39	84.50	69	60	252	248	40	6	39		
	4	32		2.1	1.39	87.15	69	63	252	250	40	6	39		
	5	36		1.8	1.19	89.56	69	63	251	250	40	5	39		
	5	40		1.8	1.19	92.02	69	63	250	250	40	5	38		
	6	44		1.6	1.06	94.20	69	63	250	250	40	5	38		
	6	48	1038	1.6	1.06	96.518	69	63	250	250	40	5	38		
				Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max		
				1.77083	~~1.16557~~	57.078	67.3	55.6	249/255	245/255	44	6	38/44		
				Avg Sqrt Delta P	Avg Sqrt Del H	Comments:									
				1.32588	~~1.07565~~										

Avg- 1.172

√Avg- 1.07870

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | W.O. #: 15418.002
Location/Plant: Fayetteville, NC | Source & Location: Division Stack Stack

Run No. 2 | Sample Date 12/6/18 | Recovery Date 12/6/18
Sample I.D. Chemours - Division Stack - STK - 2 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	0	95	102	0	307.5	303.6			312.4	
Initial	0	100	100	0	307.5	303.6			300	
Gain	0	-5	2		0	0		-3	12.4	9.4

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Run No. 3 | Sample Date 12/6/18 | Recovery Date 12/6/18
Sample I.D. Chemours - Division Stack - STK - 3 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20		XAD-1	XAD-2			Silica Gel	
Final	0	98	100		295.1	291.6			312.7	
Initial	0	100	100		295.1	292.2			300	
Gain	0	-2	0		0	-0.6		-2.6	12.7	10.1

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Run No. 4 | Sample Date 12/7/18 | Recovery Date 12/~~7~~/18
Sample I.D. Chemours - Division Stack - STK - 4 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20		XAD-1	XAD-2			Silica Gel	
Final	0	96	102	0	300.9	302.2			311.4	
Initial	0	100	100	0	300.0	303.2			300	
Gain	0	-4	2	0	0.9	-1.0		-2.1	11.4	~~14.3~~ 9.3

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 90% Blue | Sealed? ✓

Check COC for Sample IDs of Media Blanks

WESTON SOLUTIONS

METHODS AND ANALYZERS

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

Project Number: **15418.002.008**
Operator: **SED**
Date: **4 Dec 2018**

File: C:\Documents and Settings\Administrator\Desktop\12042018 CHEMOURS.cem
Program Version: 2.1, built 19 May 2017 **File Version:** 2.02
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 2

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

Project Number: **15418.002.008**
Operator: **SED**
Date: **5 Dec 2018**

Start Time: 07:36

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	13 mv
Span, 21.0 %	8002 mv

Curve Coefficients

Slope	Intercept
380.4	13

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	46 mv
Span, 16.6 %	5522 mv

Curve Coefficients

Slope	Intercept
330.3	46

CALIBRATION ERROR DATA

Number 2

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

Calibration **1**

Project Number: **15418.002.008**
Operator: **SED**
Date: **5 Dec 2018**

Start Time: 07:36

O_2
Method: EPA 3A
Span Conc. 21.0 %
Slope 381.2 **Intercept** -0.0

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 333.5 **Intercept** 4.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
8.9	8.9	0.0	0.0	Pass
16.6	16.6	0.0	0.0	Pass

BIAS
Number 2

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

Calibration **2**

Project Number: **15418.002.008**
Operator: **SED**
Date: **5 Dec 2018**

Start Time: 07:40

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	8.9	8.9	0.0	0.0	Pass

RUN DATA

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

Calibration **2**

Project Number: **15418.002.008**
Operator: **SED**
Date: **5 Dec 2018**

Time	O_2 %	CO_2 %
RESPONSE TIMES		
07:42:48	14.2	0.0
07:42:58	20.1	0.0
07:43:08	8.5	0.1
07:43:18	0.7	0.1
O2/CO2 UP		
07:43:28	0.0	0.1
07:43:38	0.0	0.1
07:43:48	0.0	0.1
07:43:58	0.0	0.1
07:44:08	2.1	1.2
07:44:18	9.9	6.6
07:44:28	11.7	8.4
07:44:38	11.9	8.7
O2/CO2 DOWN		
07:44:48	11.9	8.7
07:44:58	11.9	8.7
07:45:08	11.9	8.7
07:45:18	11.9	8.7
07:45:28	6.5	4.9
07:45:38	0.5	0.9
07:45:48	0.0	0.1
END		
07:45:58	0.0	0.0
Avgs	**6.7**	**3.3**

CALIBRATION DATA

Number 3

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

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Start Time: 07:31

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	23 mv
Span, 21.0 %	7999 mv

Curve Coefficients

Slope	Intercept
379.8	23

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	32 mv
Span, 16.6 %	5523 mv

Curve Coefficients

Slope	Intercept
331.2	32

CALIBRATION ERROR DATA

Number 3

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

Calibration **1**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Start Time: 07:31

O_2
Method: EPA 3A
Span Conc. 21.0 %
Slope 381.2 **Intercept** -0.0

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 333.5 **Intercept** 4.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
8.9	8.9	0.0	0.0	Pass
16.6	16.6	0.0	0.0	Pass

BIAS AND CALIBRATION DRIFT

Number 3

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Start Time: 07:39

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	8.9	8.9	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	8.9	8.9	0.0	0.0	Pass

*Bias No. 2

RUN DATA

Number 2

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
	RUN 2	
09:06	20.9	0.0
09:07	20.9	0.0
09:08	20.9	0.0
09:09	20.9	0.0
09:10	20.9	0.0
09:11	20.9	0.1
09:12	20.9	0.1
09:13	20.9	0.1
09:14	20.9	0.1
09:15	20.9	0.1
09:16	20.9	0.1
09:17	20.9	0.1
09:18	21.0	0.1
09:19	21.0	0.1
09:20	20.9	0.1
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
09:31	21.0	0.1
09:32	21.0	0.1
09:33	21.0	0.1
09:34	21.0	0.1
09:35	21.0	0.1
09:36	21.0	0.1
09:37	21.0	0.1
09:38	21.0	0.1
09:39	21.0	0.1
09:40	21.0	0.1
09:41	21.0	0.1
09:42	21.0	0.1
09:43	21.0	0.1
09:44	21.0	0.1
09:45	21.0	0.1

RUN DATA

Number 2

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
09:46	21.0	0.1
09:47	21.0	0.1
09:48	21.0	0.1
09:49	21.0	0.1
09:50	21.0	0.1
09:51	21.0	0.1
09:52	21.0	0.1
09:53	21.0	0.1
09:54	21.0	0.1
09:55	21.0	0.0
09:56	21.0	0.0
09:57	21.0	0.0
09:58	21.0	0.0
09:59	20.9	0.0
10:00	20.9	0.0
10:01	20.9	0.0
10:02	20.9	0.0
10:03	20.9	0.0
10:04	20.9	0.0
10:05	20.9	0.0
10:06	20.9	0.0
10:07	20.9	0.0
10:08	20.9	0.0
10:09	20.9	0.0
10:10	20.9	0.0
10:11	20.9	0.0
10:12	20.9	0.0
10:13	20.9	0.0
10:14	20.9	0.0
10:15	20.9	0.0
10:16	20.9	0.0
10:17	20.9	0.0
10:18	20.9	0.0
10:19	20.9	0.0
10:20	20.9	0.0
10:21	20.9	0.0
10:22	20.9	0.0
10:23	20.9	0.0
10:24	20.9	0.0
10:25	20.9	0.0
10:26	20.9	0.0

RUN DATA

Number 2

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
10:27	20.9	0.0
10:28	20.9	0.0
10:29	20.9	0.0
10:30	20.9	0.0
10:31	20.9	0.0
10:32	20.9	0.0
10:33	20.9	0.0
10:34	20.9	0.0
10:35	20.9	0.0
10:36	20.9	0.0
10:37	20.9	0.0
10:38	20.9	0.0
10:39	20.9	0.0
10:40	20.9	0.0
10:41	20.9	0.0
10:42	20.9	0.0
10:43	20.9	0.0
10:44	20.9	0.0
10:45	20.9	0.0
10:46	20.9	0.0
10:47	20.9	0.0
10:48	20.9	0.0
10:49	20.9	0.0
10:50	20.9	0.0
10:51	20.9	0.0
10:52	20.9	0.0
10:53	20.9	0.0
10:54	20.9	0.0
10:55	20.9	0.0
10:56	20.9	0.0
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

WESTON SOLUTIONS

RUN DATA

Number 2

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
11:08	20.9	0.1
11:09	20.9	0.1
11:10	20.9	0.1
11:11	20.9	0.1
11:12	20.9	0.1
11:13	20.9	0.1
11:14	20.9	0.1
11:15	20.9	0.0
11:16	20.9	0.1
11:17	20.9	0.0
11:18	21.0	0.0
11:19	21.0	0.0
11:20	21.0	0.0
11:21	21.0	0.0
11:22	21.0	0.0
11:23	21.0	0.0
11:24	21.0	0.0
11:25	21.0	0.0
11:26	21.0	0.0
11:27	21.0	0.0
11:28	21.0	0.0
11:29	21.0	0.0
11:30	21.0	0.0
11:31	21.0	0.0
11:32	21.0	0.0
11:33	21.0	0.0
11:34	21.0	0.0
11:35	21.0	0.0
11:36	21.0	0.0
11:37	21.0	0.0
11:38	21.0	0.0
11:39	21.0	0.0
11:40	21.0	0.0
11:41	21.0	0.0
Avgs	**20.9**	**0.0**

RUN SUMMARY

Number 2

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

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

Time: 09:05 to 11:41

Run Averages

	20.9	0.0

Pre-run Bias at 07:39

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

Post-run Bias at 11:42

Zero Bias	0.0	0.1
Span Bias	12.0	8.8
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 4

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Start Time: 11:42

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. 3

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	8.9	8.8	-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	8.9	8.8	-0.1	-0.6	Pass

*Bias No. 3

RUN DATA

Number 3

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
	RUN 3	
13:56	20.8	0.0
13:57	20.8	0.0
13:58	20.9	0.0
13:59	20.9	0.1
14:00	20.9	0.1
14:01	20.9	0.1
14:02	20.9	0.1
14:03	20.9	0.1
14:04	20.9	0.1
14:05	20.9	0.1
14:06	20.9	0.1
14:07	20.9	0.1
14:08	20.9	0.1
14:09	20.9	0.1
14:10	20.9	0.1
14:11	20.9	0.1
14:12	20.9	0.0
14:13	20.9	0.0
14:14	20.9	0.0
14:15	20.9	0.0
14:16	20.9	0.0
14:17	20.9	0.0
14:18	20.9	0.0
14:19	20.9	0.1
14:20	20.9	0.1
14:21	20.9	0.0
14:22	20.9	0.0
14:23	20.9	0.0
14:24	20.9	0.0
14:25	20.9	0.0
14:26	20.9	0.0
14:27	20.9	0.0
14:28	20.9	0.0
14:29	20.9	0.0
14:30	20.9	0.0
14:31	20.9	0.0
14:32	20.9	0.0
14:33	20.9	0.0
14:34	20.9	0.0
14:35	20.9	0.0

RUN DATA

Number 3

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
14:36	20.9	0.0
14:37	20.9	0.0
14:38	20.9	0.0
14:39	20.9	0.0
14:40	20.9	0.0
14:41	20.9	0.0
14:42	20.9	0.0
14:43	20.9	0.0
14:44	20.9	0.0
14:45	20.9	0.0
14:46	20.9	0.0
14:47	20.9	0.0
14:48	20.9	0.0
14:49	20.9	0.0
14:50	20.9	0.0
14:51	20.9	0.0
14:52	20.9	0.0
14:53	20.9	0.0
14:54	20.9	0.0
14:55	20.9	0.0
14:56	20.9	0.0
14:57	20.9	0.0
14:58	20.9	0.0
14:59	20.9	0.0
15:00	20.9	0.0
15:01	20.9	0.0
15:02	20.9	0.0
15:03	20.9	0.0
15:04	20.9	0.0
15:05	20.9	0.0
15:06	20.9	0.0
15:07	20.9	0.0
15:08	20.9	0.0
15:09	20.9	0.0
15:10	20.9	0.0
15:11	20.9	0.0
15:12	20.9	0.0
15:13	20.9	0.0
15:14	20.9	0.0
15:15	20.9	0.0
15:16	20.9	0.0

RUN DATA

Number 3

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Time	O_2 %	CO_2 %
15:17	20.9	0.0
15:18	20.9	0.0
15:19	20.9	0.0
15:20	20.9	0.0
15:21	20.9	0.0
15:22	20.9	0.0
15:23	20.9	0.0
15:24	20.9	0.0
15:25	20.9	0.0
15:26	20.9	0.0
15:27	20.9	0.0
15:28	20.9	0.0
15:29	20.9	0.0
15:30	20.9	0.0
15:31	20.9	0.0
15:32	20.9	0.0
15:33	20.9	0.0
15:34	20.9	0.0
15:35	20.9	0.0
15:36	20.9	0.0
15:37	20.9	0.0
15:38	20.9	0.0
15:39	20.9	0.0
15:40	20.9	0.0
15:41	20.9	0.0
15:42	20.9	0.0
15:43	20.9	0.0
15:44	20.9	0.0
15:45	20.9	0.0
15:46	20.9	0.0
15:47	20.9	0.0
Avgs	**20.9**	**0.0**

RUN SUMMARY

Number 3

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

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

Time: 13:55 to 15:47

Run Averages

	20.9	0.0

Pre-run Bias at 11:42

Zero Bias	0.0	0.1
Span Bias	12.0	8.8
Span Gas	12.0	8.9

Post-run Bias at 15:49

Zero Bias	0.0	0.0
Span Bias	12.0	8.8
Span Gas	12.0	8.9

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

	20.9	0.0

WESTON SOLUTIONS

BIAS AND CALIBRATION DRIFT

Number 5

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **6 Dec 2018**

Start Time: 15:49

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. 4

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	8.9	8.8	-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	8.8	8.8	0.0	0.0	Pass

*Bias No. 4

BIAS AND CALIBRATION DRIFT

Number 6

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **7 Dec 2018**

Start Time: 07:30

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	11.9	-0.1	-0.5	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.0	11.9	-0.1	-0.5	Pass

*Bias No. 5

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	8.9	8.8	-0.1	-0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	8.8	8.8	0.0	0.0	Pass

*Bias No. 5

WESTON SOLUTIONS

RUN DATA

Number 4

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **7 Dec 2018**

Time	O_2 %	CO_2 %
	RUN 4	
09:12	21.0	0.0
09:13	20.9	0.0
09:14	21.0	0.0
09:15	21.0	0.0
09:16	21.0	0.0
09:17	20.9	0.0
09:18	21.0	0.0
09:19	20.9	0.0
09:20	21.0	0.0
09:21	21.0	0.0
09:22	21.0	0.0
09:23	21.0	0.0
09:24	21.0	0.0
09:25	21.0	0.0
09:26	21.0	0.0
09:27	21.0	0.0
09:28	21.0	0.0
09:29	21.0	0.0
09:51	20.9	0.0
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	20.9	0.1
10:00	21.0	0.1
10:01	21.0	0.1
10:02	21.0	0.1
10:03	20.9	0.1
10:04	21.0	0.1
10:05	21.0	0.1
10:06	21.0	0.1
10:07	20.9	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

WESTON SOLUTIONS

RUN DATA

Number 4

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **7 Dec 2018**

Time	O_2 %	CO_2 %
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
10:20	21.0	0.1
10:21	21.0	0.1
10:22	21.0	0.1
10:23	20.9	0.1
10:24	20.9	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
10:36	21.0	0.1
Avgs	**21.0**	**0.1**

RUN SUMMARY

Number 4

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **7 Dec 2018**

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

Time: 09:11 to 10:36

Run Averages

21.0	0.1

Pre-run Bias at 07:30

Zero Bias	0.0	0.0
Span Bias	11.9	8.8
Span Gas	12.0	8.9

Post-run Bias at 10:53

Zero Bias	0.1	0.0
Span Bias	12.0	8.8
Span Gas	12.0	8.9

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

21.1	0.1

BIAS AND CALIBRATION DRIFT

Number 7

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

Calibration **3**

Project Number: **15418.002.008**
Operator: **SED**
Date: **7 Dec 2018**

Start Time: 10:53

O_2
Method: EPA 3A
Span Conc. 21.0 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.5	Pass
Span	12.0	12.0	0.0	0.0	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.1	0.1	0.5	Pass
Span	11.9	12.0	0.1	0.5	Pass

*Bias No. 6

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	8.9	8.8	-0.1	-0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	8.8	8.8	0.0	0.0	Pass

*Bias No. 6

APPENDIX C
LABORATORY ANALYTICAL REPORT

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

Chemours Division Stack Scrubber Inlet Test Analytical Report
TestAmerica Job No. 140-13598-1
December 19, 2018

The following samples exceeded the Method 8321A calibration range for HFPO-DA and required that dilution of the extracts be performed:

- E-2357, 2358 DIV VEN Scrubber Inlet R2 M0010 Back Half Composite (XAD-2 Resin and Glassware Rinses)

The original analysis concentration which displays the "E" flag is provided with the data set indicating that the value provided is estimated. The $^{13}C_3$ – HFPO-DA isotope dilution internal standard (IDA) recovery percentage (%) however, is provided with this analysis run.

A second analysis concentration displays an accurate concentration of the HFPO-DA in the diluted sample extract, but the value is uncorrected for the IDA recovery percentage from the original matrix. The recovery percentage presented with the second concentration represents a post-spike of IDA to benchmark the instrument quantification of native HFPO-DA.

Final recovery-corrected concentrations of the native HFPO-DA are provided by calculation using the original recovery value of the IDA and the diluted extract values of the native HFPO-DA. The final concentrations are calculated as follows:

- Q-1449, 1452 DIV VEN Scrubber Inlet R1 M0010 Back Half Composite (XAD-2 Resin and Glassware Rinses)

$$(61200\,ug) \times \left(\frac{92}{123}\right) = 45776\,ug$$

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2354 DIV VEN SCRUBBER INLET R2 M0010 IMPINGER #1 & RINSES

Lab Sample ID: 140-13598-1

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	16400	E	22.8	1.16	ug/Sample		12/11/18 11:33	12/17/18 08:41	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*10*	*X D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 08:41*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	20800		833	42.5	ug/Sample		12/18/18 04:34	12/28/18 09:42	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*66*	*D*	*50 - 200*	*12/18/18 04:34*	*12/28/18 09:42*	*10*

Client Sample ID: E-2355 DIV VEN SCRUBBER INLET R2 M0010 IMPINGER #2 & RINSES

Lab Sample ID: 140-13598-2

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	24700	E	24.3	1.24	ug/Sample		12/11/18 11:33	12/17/18 08:45	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*41*	*X D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 08:45*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	38000		1250	63.8	ug/Sample		12/18/18 04:34	12/28/18 09:45	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*98*	*D*	*50 - 200*	*12/18/18 04:34*	*12/28/18 09:45*	*10*

Client Sample ID: E-2356 DIV VEN SCRUBBER INLET R2 M0010 IMPINGER #3 & RINSES

Lab Sample ID: 140-13598-3

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	31400	E	28.0	1.43	ug/Sample		12/11/18 11:33	12/17/18 08:48	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*66*	*D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 08:48*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	39300		1250	63.8	ug/Sample		12/18/18 04:34	12/28/18 09:48	10

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2356 DIV VEN SCRUBBER INLET R2 M0010 IMPINGER #3 & RINSES

Lab Sample ID: 140-13598-3

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	102	D	50 - 200	12/18/18 04:34	12/28/18 09:48	10

Client Sample ID: E-2357,2358 DIV VEN SCRUBBER INLET R2 M0010 XAD-2 RESIN TUBE & RINSE

Lab Sample ID: 140-13598-4

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	23600	E	22.5	4.50	ug/Sample		12/10/18 10:15	12/17/18 10:06	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	123	D	50 - 200	12/10/18 10:15	12/17/18 10:06	100

Method: 8321A - PFOA and PFOS - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	61200		1140	227	ug/Sample		12/18/18 04:39	12/28/18 10:04	10

→ 45,776

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	92	D	50 - 200	12/18/18 04:39	12/28/18 10:04	10

Client Sample ID: E-2359 DIV VEN SCRUBBER INLET R2 M0010 IMPINGER COMPOSITE

Lab Sample ID: 140-13598-5

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	517		3.00	0.153	ug/Sample		12/11/18 11:33	12/17/18 08:51	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	62	D	50 - 200	12/11/18 11:33	12/17/18 08:51	10

Client Sample ID: E-2360 DIV VEN SCRUBBER INLET R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13598-6

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	71.4		0.400	0.0800	ug/Sample		12/10/18 10:15	12/17/18 10:09	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	7	X D	50 - 200	12/10/18 10:15	12/17/18 10:09	2

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2361 DIV VEN SCRUBBER INLET R3 M0010 IMPINGER #1 & RINSES

Lab Sample ID: 140-13598-7

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**7170**	E	27.0	1.38	ug/Sample		12/11/18 11:33	12/17/18 08:54	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*7*	*X D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 08:54*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**5360**		500	25.5	ug/Sample		12/18/18 04:34	12/28/18 09:51	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*52*	*D*	*50 - 200*	*12/18/18 04:34*	*12/28/18 09:51*	*10*

Client Sample ID: E-2362 DIV VEN SCRUBBER INLET R3 M0010 IMPINGER #2 & RINSES

Lab Sample ID: 140-13598-8

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**9470**	E	23.5	1.20	ug/Sample		12/11/18 11:33	12/17/18 08:58	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*37*	*X D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 08:58*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**12300**		500	25.5	ug/Sample		12/18/18 04:34	12/28/18 09:54	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*85*	*D*	*50 - 200*	*12/18/18 04:34*	*12/28/18 09:54*	*10*

Client Sample ID: E-2363 DIV VEN SCRUBBER INLET R3 M0010 IMPINGER #3 & RINSES

Lab Sample ID: 140-13598-9

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**5980**		30.0	1.53	ug/Sample		12/11/18 11:33	12/17/18 09:01	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*75*	*D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 09:01*	*50*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2364,2365 DIV VEN SCRUBBER INLET R3 M0010 XAD-2 RESIN TUBE & RINSE

Lab Sample ID: 140-13598-10

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	3.67		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*25*	*X*	*50 - 200*	*12/10/18 10:15*	*12/17/18 10:13*	*1*

Client Sample ID: E-2366 DIV VEN SCRUBBER INLET R3 M0010 IMPINGER COMPOSITE

Lab Sample ID: 140-13598-11

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	6.48		0.285	0.0145	ug/Sample		12/11/18 11:33	12/17/18 09:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*44*	*X*	*50 - 200*	*12/11/18 11:33*	*12/17/18 09:04*	*1*

Client Sample ID: E-2367 DIV VEN SCRUBBER INLET R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13598-12

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	979		10.0	2.00	ug/Sample		12/10/18 10:15	12/17/18 10:16	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*71*	*D*	*50 - 200*	*12/10/18 10:15*	*12/17/18 10:16*	*50*

Client Sample ID: E-2368 DIV VEN SCRUBBER INLET R4 M0010 IMPINGER #1 & RINSES

Lab Sample ID: 140-13598-13

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	9420	E	27.8	1.42	ug/Sample		12/11/18 11:33	12/17/18 09:11	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*5*	*X D*	*50 - 200*	*12/11/18 11:33*	*12/17/18 09:11*	*50*

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	6240		500	25.5	ug/Sample		12/18/18 04:34	12/28/18 09:58	10

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2368 DIV VEN SCRUBBER INLET R4 M0010 IMPINGER #1 & RINSES

Lab Sample ID: 140-13598-13

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	47	D X	50 - 200	12/18/18 04:34	12/28/18 09:58	10

Client Sample ID: E-2369 DIV VEN SCRUBBER INLET R4 M0010 IMPINGER #2 & RINSES

Lab Sample ID: 140-13598-14

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	7700	E	25.3	1.29	ug/Sample		12/11/18 11:33	12/17/18 09:14	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	29	X D	50 - 200	12/11/18 11:33	12/17/18 09:14	50

Method: 8321A - HFPO-DA - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	7990		500	25.5	ug/Sample		12/18/18 04:34	12/28/18 10:01	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	82	D	50 - 200	12/18/18 04:34	12/28/18 10:01	10

Client Sample ID: E-2370 DIV VEN SCRUBBER INLET R4 M0010 IMPINGER #3 & RINSES

Lab Sample ID: 140-13598-15

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	6820		56.9	2.90	ug/Sample		12/11/18 12:13	12/17/18 09:24	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	80	D	50 - 200	12/11/18 12:13	12/17/18 09:24	100

Client Sample ID: E-2371,2372 DIV VEN SCRUBBER INLET R4 M0010 XAD-2 RESIN TUBE & RINSE

Lab Sample ID: 140-13598-16

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	3690		20.0	4.00	ug/Sample		12/10/18 10:15	12/17/18 10:22	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	74	D	50 - 200	12/10/18 10:15	12/17/18 10:22	100

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Scrubber Inlet - M0010

TestAmerica Job ID: 140-13598-1

Client Sample ID: E-2373 DIV VEN SCRUBBER INLET R4 M0010 IMPINGER COMPOSITE

Lab Sample ID: 140-13598-17

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**220**		1.95	0.0995	ug/Sample		12/11/18 12:13	12/17/18 09:27	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*64*	*D*	*50 - 200*	*12/11/18 12:13*	*12/17/18 09:27*	*5*

Client Sample ID: E-2374 DIV VEN SCRUBBER INLET R4 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13598-18

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**20.4**		0.400	0.0800	ug/Sample		12/10/18 10:15	12/17/18 10:26	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*13*	*X D*	*50 - 200*	*12/10/18 10:15*	*12/17/18 10:26*	*2*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Divsion Stack Carbon Bed Outlet - M0010

TestAmerica Job ID: 140-13603-1

Client Sample ID: Q-2254,2255 DIV VEN CARBON BED OUTLET R2 M0010 FH

Lab Sample ID: 140-13603-1

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**54.2**		0.505	0.0545	ug/Sample		12/11/18 05:24	12/17/18 08:25	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*115*	*D*	*50 - 200*	*12/11/18 05:24*	*12/17/18 08:25*	*5*

Client Sample ID: Q-2256,2257,2259 DIV VEN CARBON BED OUTLET R2 M0010 BH

Lab Sample ID: 140-13603-2

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**2.24**		0.325	0.0650	ug/Sample		12/11/18 05:22	12/17/18 11:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*86*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:24*	*1*

Client Sample ID: Q-2258 DIV VEN CARBON BED OUTLET R2 M0010 IMPINGERS 1,2&3 CONDENSATE

Lab Sample ID: 140-13603-3

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.200	0.0102	ug/Sample		12/11/18 12:13	12/17/18 09:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:50*	*1*

Client Sample ID: Q-2260 DIV VEN CARBON BED OUTLET R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13603-4

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.108**	J	0.200	0.0400	ug/Sample		12/11/18 05:22	12/17/18 11:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*80*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:28*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Divsion Stack Carbon Bed Outlet - M0010

TestAmerica Job ID: 140-13603-1

Client Sample ID: Q-2261,2262 DIV VEN CARBON BED OUTLET R3 M0010 FH

Lab Sample ID: 140-13603-5

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**47.1**		0.503	0.0543	ug/Sample		12/11/18 05:24	12/17/18 08:28	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*108*	*D*	*50 - 200*	*12/11/18 05:24*	*12/17/18 08:28*	*5*

Client Sample ID: Q-2263,2264,2266 DIV VEN CARBON BED OUTLET R3 M0010 BH

Lab Sample ID: 140-13603-6

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.382**		0.325	0.0650	ug/Sample		12/11/18 05:22	12/17/18 11:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*91*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:31*	*1*

Client Sample ID: Q-2265 DIV VEN CARBON BED OUTLET R3 M0010 1,2&3 CONDENSATE

Lab Sample ID: 140-13603-7

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.200	0.0102	ug/Sample		12/11/18 12:13	12/17/18 09:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:53*	*1*

Client Sample ID: Q-2267 DIV VEN CARBON BED OUTLET R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13603-8

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0603**	J	0.200	0.0400	ug/Sample		12/11/18 05:22	12/17/18 11:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*86*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:34*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Divsion Stack Carbon Bed Outlet - M0010

TestAmerica Job ID: 140-13603-1

Client Sample ID: Q-2270,2271,2273 DIV VEN CARBON BED OUTLET R4 M0010 BH

Lab Sample ID: 140-13603-10

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.343**		0.325	0.0650	ug/Sample		12/11/18 05:22	12/17/18 11:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*95*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:37*	*1*

Client Sample ID: Q-2272 DIV VEN CARBON BED OUTLET R4 M0010 IMPINGERS 1,2&3 CONDENSATE

Lab Sample ID: 140-13603-11

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.200	0.0102	ug/Sample		12/11/18 12:13	12/17/18 09:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*95*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:56*	*1*

Client Sample ID: Q-2274 DIV VEN CARBON BED OUTLET R4 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13603-12

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
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		12/11/18 05:22	12/17/18 11:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*89*		*50 - 200*	*12/11/18 05:22*	*12/17/18 11:41*	*1*

R4 FH?

49.6 ng / Sample per avail

From: Adkins, Courtney <Courtney.Adkins@testamericainc.com>
Sent: Wednesday, December 19, 2018 4:06 PM
To: Meeter, Paul M.
Subject: RE: latest and greatest test scope for January

**** External Email ****

Thanks! **Also, that missing sample result on the CB outlet is 49.6ug/sample**. I can't run the report yet, but I'll have a summary report tomorrow. That just leaves us with the Scrubber inlet.

Thanks,

Courtney Adkins
(865) 291-3019

From: Meeter, Paul M. [mailto:Paul.Meeter@WestonSolutions.com]
Sent: Wednesday, December 19, 2018 4:02 PM
To: Adkins, Courtney
Subject: RE: latest and greatest test scope for January

-External Email-

Courtney, I think 46 XADs would be enough but bring 48 if you want. 24 of the 90mm GFF should be plenty. 2 gallons of each liquid should be OK too.
Thanks,
Paul

From: Adkins, Courtney [mailto:Courtney.Adkins@testamericainc.com]
Sent: Monday, December 17, 2018 8:57 AM
To: Meeter, Paul M. <Paul.Meeter@WestonSolutions.com>
Subject: RE: latest and greatest test scope for January

**** External Email ****

Paul,

Take a look at my proposed media and reagent amounts and let me know what you think:

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Stack - M0010

TestAmerica Job ID: 140-13602-1

Client Sample ID: M-2285,2286 DIV VEN R2 M0010 FH

Lab Sample ID: 140-13602-1
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**27.4**		0.202	0.0218	ug/Sample		12/11/18 05:24	12/17/18 08:15	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*113*	*D*	*50 - 200*	*12/11/18 05:24*	*12/17/18 08:15*	*2*

Client Sample ID: M-2287,2288,2290 DIV VEN R2 M0010 BH

Lab Sample ID: 140-13602-2
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**4090**		30.0	6.00	ug/Sample		12/10/18 10:15	12/17/18 10:52	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*95*	*D*	*50 - 200*	*12/10/18 10:15*	*12/17/18 10:52*	*100*

Client Sample ID: M-2289 DIV VEN R2 M0010 IMPINGERS 1,2&3 CONDENSATE

Lab Sample ID: 140-13602-3
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0665**	J	0.190	0.00969	ug/Sample		12/11/18 12:13	12/17/18 09:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*85*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:37*	*1*

Client Sample ID: M-2291 DIV VEN R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13602-4
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.346**		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*59*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:58*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Stack - M0010

TestAmerica Job ID: 140-13602-1

Client Sample ID: M-2292,2293 DIV VEN R3 M0010 FH

Lab Sample ID: 140-13602-5
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**10.8**		0.101	0.0109	ug/Sample		12/11/18 05:24	12/17/18 08:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*108*		*50 - 200*	*12/11/18 05:24*	*12/17/18 08:19*	*1*

Client Sample ID: M-2294,2295,2297 DIV VEN R3 M0010 BH

Lab Sample ID: 140-13602-6
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**1140**		13.8	2.75	ug/Sample		12/10/18 10:15	12/17/18 11:02	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*83*	*D*	*50 - 200*	*12/10/18 10:15*	*12/17/18 11:02*	*50*

Client Sample ID: M-2296 DIV VEN R3 M0010 IMPINGERS 1,2&3 CONDENSATE

Lab Sample ID: 140-13602-7
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**1.16**		0.200	0.0102	ug/Sample		12/11/18 12:13	12/17/18 09:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*85*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:40*	*1*

Client Sample ID: M-2298 DIV VEN R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13602-8
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.504**		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 11:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*77*		*50 - 200*	*12/10/18 10:15*	*12/17/18 11:05*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Division Stack - M0010

TestAmerica Job ID: 140-13602-1

Client Sample ID: M-2299,2300 DIV VEN R4 M0010 FH

Lab Sample ID: 140-13602-9
Matrix: Air

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**25.8**		0.152	0.0164	ug/Sample		12/11/18 05:24	12/17/18 08:22	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*112*	*D*	*50 - 200*	*12/11/18 05:24*	*12/17/18 08:22*	*2*

Client Sample ID: M-2301,2302,2304 DIV VEN R4 M0010 BH

Lab Sample ID: 140-13602-10
Matrix: Air

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**2000**		15.0	3.00	ug/Sample		12/11/18 05:22	12/17/18 11:18	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*91*	*D*	*50 - 200*	*12/11/18 05:22*	*12/17/18 11:18*	*50*

Client Sample ID: M-2303 DIV VEN R4 M0010 IMPINGERS 1,2&3 CONDENSATE

Lab Sample ID: 140-13602-11
Matrix: Air

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.207**		0.200	0.0102	ug/Sample		12/11/18 12:13	12/17/18 09:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*88*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:46*	*1*

Client Sample ID: M-2305 DIV VEN R4 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-13602-12
Matrix: Air

Date Collected: 12/07/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.963**		0.200	0.0400	ug/Sample		12/11/18 05:22	12/17/18 11:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*45*	*X*	*50 - 200*	*12/11/18 05:22*	*12/17/18 11:21*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Carbon Bed Outlet QC Samples - M0010

TestAmerica Job ID: 140-13600-1

Client Sample ID: E-2375,2376 DIV QC M0010 QC FH BT

Lab Sample ID: 140-13600-1
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0575**		0.0260	0.00281	ug/Sample		12/11/18 05:24	12/17/18 08:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*100*		*50 - 200*	*12/11/18 05:24*	*12/17/18 08:12*	*1*

Client Sample ID: E-2377,2378,2380 DIV QC M0010 QC BH BT

Lab Sample ID: 140-13600-2
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.526**		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*80*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:29*	*1*

Client Sample ID: E-2379 DIV QC M0010 IMPINGERS 1,2&3 CONDENSATE BT

Lab Sample ID: 140-13600-3
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.00117**	J	0.00250	0.000128	ug/Sample		12/11/18 12:13	12/17/18 09:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*95*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:30*	*1*

Client Sample ID: E-2381 DIV QC M0010 BREAKTHROUGH XAD-2 RESIN TUBE BT

Lab Sample ID: 140-13600-4
Matrix: Air

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.159**	J	0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*87*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:32*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Carbon Bed Outlet QC Samples - M0010

TestAmerica Job ID: 140-13600-1

Client Sample ID: E-2382 DIV QC M0010 DI WATER RB — Lab Sample ID: 140-13600-5

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - HFPO-DA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.000961**	J	0.00250	0.000128	ug/Sample		12/11/18 12:13	12/17/18 09:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*118*		*50 - 200*	*12/11/18 12:13*	*12/17/18 09:33*	*1*

Client Sample ID: E-2383 DIV QC M0010 MEOH WITH 5% NH4OH RB — Lab Sample ID: 140-13600-6

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.552**		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*102*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:35*	*1*

Client Sample ID: E-2384 DIV QC M0010 XAD-2 RESIN TUBE RB — Lab Sample ID: 140-13600-7

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.433**		0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:39*	*1*

Client Sample ID: E-2385 DIV QC M0010 MEOH WITH 5% NH4OH TB — Lab Sample ID: 140-13600-8

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0302**		0.0250	0.00500	ug/Sample		12/10/18 10:15	12/17/18 10:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*112*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:42*	*1*

Client Sample Results

Client: Chemours Company FC, LLC The
Project/Site: Carbon Bed Outlet QC Samples - M0010

TestAmerica Job ID: 140-13600-1

Client Sample ID: E-2386 DIV QC M0010 XAD-2 RESIN TUBE TB

Lab Sample ID: 140-13600-9

Date Collected: 12/06/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.135	J	0.200	0.0400	ug/Sample		12/10/18 10:15	12/17/18 10:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*90*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:45*	*1*

Client Sample ID: E-2387 DIV QC M0010 COMBINED GLASSWARE RINSES (MEOH/5% NH4OH) PB

Lab Sample ID: 140-13600-10

Date Collected: 12/05/18 00:00
Date Received: 12/08/18 07:30
Sample Container: Air Train

Matrix: Air

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.492		0.0250	0.00500	ug/Sample		12/10/18 10:15	12/17/18 10:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*102*		*50 - 200*	*12/10/18 10:15*	*12/17/18 10:49*	*1*

APPENDIX D
SAMPLE CALCULATIONS

EXAMPLE CALCULATIONS FOR VOLUMETRIC FLOW AND MOISTURE AND ISOKINETICS

Client: Chemours
Test Number: Run 4
Test Location: Divison-Stack

Facility: Fayetteville, NC
Test Date: 12/07/18
Test Period: 0842-1038

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

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

$$Vm(std) = \frac{17.64 \times 1.0150 \times 57.068 \times \left(30.25 + \frac{1.172}{13.6} \right)}{55.58 + 460} = 28.76$$

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 -2.1) + (0.04715 x 11.4) = 0.44

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

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

$$bws = \frac{0.44}{0.44 + 60.120} = 0.007$$

Where:

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

4. Mole fraction of dry gas.

Md = 1 - bws

Md = 1 - 0.007 = 0.993

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 0.993) +(18 (1 - 0.993)) = 28.76

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.

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

$$Vs = 85.49 \times 0.84 \times 1.32589 \times \left(\frac{527}{30.20 \times 28.76} \right)^{\wedge}1/2 = 74.2$$

Where:

Vs =	Average gas stream velocity, ft/sec.
85.49 =	Pitot tube constant, ft/sec x $\frac{(lb/lb\text{-}mole)(in.\ Hg)^{1/2}}{(deg\ R)(in\ H_2O)}$
Cp =	Pitot tube coefficient, dimensionless.
Ts =	Absolute gas stream temperature, deg R = Ts, deg F + 460.
Ps =	Absolute gas stack pressure, in. Hg. = Pb + $\frac{P(static)}{13.6}$
delt p =	Velocity head of stack, in. H_2O.

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

$$Qs(act) = 60 \times Vs \times As$$

$$Qs(act) = 60 \times 74.2 \times 7.07 = 31472$$

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.

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

$$Qs(std) = 17.64 \times 0.993 \times \frac{30.20}{527.3} \times 31472$$

$$Qs(std) = 31565$$

Where:

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

10. Isokinetic variation calculated from intermediate values, percent.

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

$$I = \frac{}{74.2 \times 96 \times 30.20 \times 0.993 \times (0.160)^2} = 100.5$$

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), $\frac{(in.\ Hg)(in^2)(min)}{(deg\ R)(ft^2)(sec)}$

SAMPLE CALCULATIONS FOR
HFPO DIMER ACID (METHOD 0010)

Client: Chemours
Test Number: Run 4
Test Location: Divison-Stack

Plant: Fayetteville, NC
Test Date: 12/07/18
Test Period: 0842-1038

1. HFPO Dimer Acid concentration, lbs/dscf.

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

$$\text{Conc1} = \frac{2027.0 \times 2.2046 \times 10\text{-}9}{60.120}$$

Conc1 = 7.43E-08

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 = 2027.0 / (60.120 x 0.02832)

Conc2 = 1.19E+03

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

$MR1_{(Outlet)}$ = 7.43E-08 x 31565 x 60

$MR1_{(Outlet)}$ = 1.41E-01

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

$MR2_{(Outlet)}$ = 1.41E-01 x 453.59 /3600

$MR2_{(Outlet)}$ = 1.77E-02

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.

APPENDIX E
EQUIPMENT CALIBRATION RECORDS

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:	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

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

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

WESTON SOLUTIONS
Integrated Air Services

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings in colored boxes below, other columns are automatically calculated.

					INITIAL	FINAL	AVG (P_{bar})
DATE:	7/18/18	METER SERIAL #:	358341	BAROMETRIC PRESSURE (in Hg):	29.14	29.14	29.14
METER PART #:	AO14	CRITICAL ORIFICE SET SERIAL #:	1331s & 1825	Calibrated by:	JAW		

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	AMBIENT F°	DGM F° INITIAL	FINAL	Avg DGM F° T_m	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	(4) $\Delta H_@$
8	1	0.2313	23.5	791.190	800.825	9.635	85	83	83	83	32	0.26	9.132	9.241	1.012	1.664
12	2	0.3277	22	773.724	791.190	17.466	83	81	83	82	41	0.55	16.597	16.806	1.013	1.753
16	3	0.4349	21	765.328	773.724	8.396	83	81	81	81	15	0.98	8.002	8.16	1.020	1.780
19	4	0.5142	20	732.718	765.328	32.610	81	79	81	80	50	1.30	31.161	32.219	1.034	1.689
24	5	0.6742	18	720.492	732.718	12.226	80	78	79	79	14	2.40	11.748	11.84	1.008	1.826
30	6	0.8108	16.5	685.000	720.492	35.492	79	73	78	76	34	3.50	34.390	34.611	1.006	1.858
														AVG =	1.015	1.762

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Individual Y's .02 from average?	**PASS**
Individual $\Delta H_@$ values 0.15 from average?	**PASS**
Average Y value +/-.02 of 1.000?	**PASS**

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Next Calibration Due By:	**7/18/2019**

(4) $\Delta H_@ = \dfrac{\Delta H\, 0.0319\, T_m\, \theta^2}{P_{bar}\, Y^2\, V_m^2}$

Y Factor Calibration Check Calculation

MODIFIED METHOD 0010 TEST TRAIN
VE NORTH DIVISION STACK
METER BOX NO. AO14
12/6/2018 + 12/7/2018

	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(^oR)			
Tm = Average dry gas meter temperature , deg F.	57.5	58.0	55.6

$$Tma = Ts + 460$$

$$Tma = 57.46 + 460$$

Tma =	517.46	518.00	515.58

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	1.27	1.25	1.17
Pb = Barometric Pressure, in Hg.	30.38	30.23	30.25

$$Pm = Pb + (delta\ H / 13.6)$$

$$Pm = 30.38 + (1.271375 / 13.6)$$

Pm =	30.47	30.32	30.34

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.	59.384	59.402	57.068
Y = Dry gas meter calibration factor (based on full calibration)	1.0150	1.0150	1.0150
Delta H@ = Dry Gas meter orifice calibration coefficient, in. H2O.	1.7620	1.7620	1.7620
avg SQRT Delta H = Avg SQRT press. drop across the orifice meter during sampling , in. H_2O	1.1183	1.1145	1.0787
O = Total sampling time, minutes.	96	96	96

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

$$Yqa = (96.00 / 59.38) * SQRT (0.0319 * 517.46 * 29) / (1.76 * 30.47 * 28.84) * 1.12$$

$$Yqa = 1.617 * SQRT\ 478.701 / 1{,}548.151 * 1.12$$

Yqa =	1.0053	1.0045	1.0094

Diff = Absolute difference between Yqa and Y	0.96	1.03	0.55

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

$$Diff = ((1.015 - 1.005) / 1.015) * 100$$

Average Diff = 0.85

Allowable = 5.0

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

Calibrator MDW

Date 25-Sep-18

Meter Box Number 23

Wet Test Meter Number P-2952

Dry Gas Meter Number 17087349

Ambient Temp 72

Temp Reference Source Thermocouple Simulator (Accuracy +/- 1°F)

Baro Press, in Hg (Pb)	30.29

Setting	Gas Volume		Temperatures					Calibration Results	
Orifice Manometer	Wet Test Meter	Dry gas Meter	Wet Test Meter	Dry Gas Meter					
in H_20 (ΔH)	ft^3 (Vw)	ft^3 (Vd)	°F (Tw)	Outlet, °F (Td_o)	Inlet, °F (Td_i)	Average, °F (Td)	Time, min (O)	Y	ΔH
0.5	5.0	15.866	72.0	72.00	72.00	72.5	14.0	0.9995	2.1805
		20.867		73.00	73.00				
		5.001		72.50	72.50				
1.0	5.0	21.860	72.0	73.00	73.00	73.5	10.6	0.9925	2.4953
		26.900		74.00	74.00				
		5.040		73.50	73.50				
1.5	10.0	27.975	72.0	75.00	75.00	75.5	16.9	0.9808	2.3697
		38.201		76.00	76.00				
		10.226		75.50	75.50				
2.0	10.0	39.355	72.0	76.00	76.00	76.0	14.6	0.9830	2.3559
		49.555		76.00	76.00				
		10.200		76.00	76.00				
3.0	10.0	50.614	72.0	76.00	76.00	76.5	12.0	0.9701	2.3755
		60.955		77.00	77.00				
		10.341		76.50	76.50				
							Average	**0.9852**	**2.3554**

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	33		32.2	0.0%
212	212	213	213	212	213		212.6	-0.1%
932	931	932	931	932	933		931.8	0.0%
1832	1831	1833	1833	1832	1833		1832.4	0.0%

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
VE NORTH CARBON BED OUTLET
METER BOX NO. 23
12/6/2018 + 12/7/2018

	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.	39.8	51.5	47.0

$$Tma = Ts + 460$$

$$Tma = 39.79 + 460$$

Tma =	499.79	511.46	507.04

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	1.62	1.58	1.59
Pb = Barometric Pressure, in Hg.	30.38	30.38	30.38

$$Pm = Pb + (delta\ H / 13.6)$$

$$Pm = 30.38 + (1.61958333333333 / 13.6)$$

Pm =	30.50	30.50	30.50

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.	50.751	53.181	52.139
Y = Dry gas meter calibration factor (based on full calibration)	0.9852	0.9852	0.9852
Delta H@ = Dry Gas meter orifice calibration coefficient, in. H2O.	2.3554	2.3554	2.3554
avg SQRT Delta H = Avg SQRT press. drop across the orifice meter during sampling , in. H_2O	1.2536	1.2379	1.2410
O = Total sampling time, minutes.	96	96	96

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

$$Yqa = (96.00 / 50.75) * SQRT (0.0319 * 499.79 * 29) / (2.36 * 30.50 * 28.84) \quad * 1.25$$

$$Yqa = 1.892 * SQRT\ 462.357 / 2{,}071.570 \quad * 1.25$$

Yqa =	1.1203	1.0679	1.0873

Diff = Absolute difference between Yqa and Y	13.71	8.39	10.36

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

$$Diff = ((0.9852 - 1.120) / 0.9852) * 100$$

Average Diff = 10.82

Allowable = 5.0

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

Calibrator PM
Date 29-Nov-18
VOST Box Number VOST 5
Wet Test Meter Number 10BB-1
Dry Gas Meter Number 3605443
Ambient Temp 72
Temp Reference Source Thermocouple Simulator (Accuracy +/- 1°F)

Setting			Gas Volume		Temperatures				Baro Press, in Hg (Pb)	29.75
Liters per minute	Roto-meter	Orifice Manometer in H_20 (ΔH)	Wet Test Meter liters (Vw)	Dry gas Meter liters (Vd)	Wet Test Meter °F (Tw)	Dry Gas Meter Outlet, °C (Td_o)	Dry Gas Meter Inlet, °C (Td_i)	Dry Gas Meter Average, °F (Td)	Time, min (O)	Results Y
0.50	0.70	0.45	5.0	0.000	72.5	20.00	20.00	68.5	10.2	1.0137
				4.890		20.50	20.50			
				4.890		20.25	21.60			
1.00	1.20	0.85	10.0	0.000	72.5	20.50	20.50	69.5	10.0	1.0154
				9.772		21.00	21.00			
				9.772		20.75	22.80			
1.5	1.7	1.2	15.0	0.000	72.5	22.20	22.20	72.0	11.0	1.0118
				14.768		22.20	22.20			
				14.768		22.20	22.20			
2.0	2.3	2.0	20.0	0.000	72.5	22.80	22.80	73.0	20.0	0.9943
				20.034		22.80	22.80			
				20.034		22.80	22.80			
									Average	**1.0088**

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		
0	0	0	0	0			0.0	0.0%
100	100	100	100	100			100.0	0.0%
500	500	500	500	500			500.0	0.0%
1000	1000	1000	1000	1000			1000.0	0.0%

1 - Channel Temps must agree with +/- 5°F or 3°C
2 - Acceptable Temperature Difference less than 1.5 %

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

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.

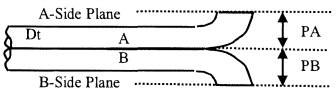
Chad Walker

Type S Pitot Tube Inspection Data Form

Pitot Tube Identification Number: **P-711**

Inspection Date 5/30/18 Individual Conducting Inspection SR

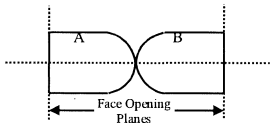
If all Criteria PASS
Cp is equal to 0.84



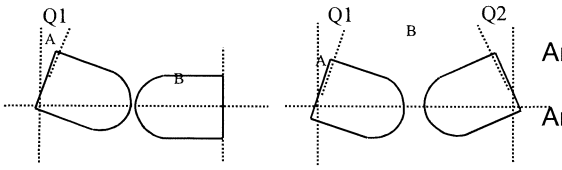
1.05 D_t < P < 1.5 D_t

PA must Equal PB

		PASS/FAIL
Distance to A Plane (PA) - inches	0.458	PASS
Distance to B Plane (PB) - inches	0.458	PASS
Pitot OD (D_t) - inches	0.375	

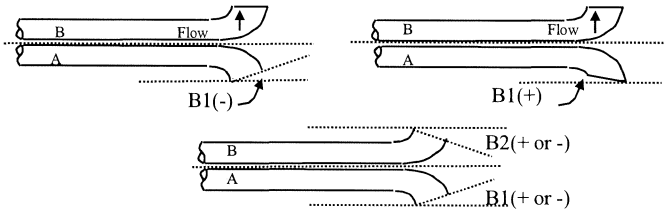


Are Open Faces Aligned Perpendicular to the Tube Axis — ◉ YES ○ NO — PASS



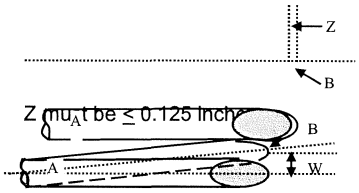
Q1 and Q2 must be ≤ 10°

Angle of Q1 from vertical A Tube- degrees (absolute)	0	PASS
Angle of Q2 from vertical B Tube- degrees (absolute)	0	PASS



B1 or B2 must be ≤ 5°

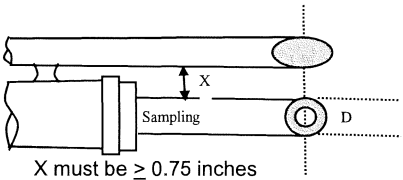
Angle of B1 from vertical A Tube- degrees (absolute)	0	PASS
Angle of B1 from vertical B Tube- degrees (absolute)	0	PASS



Z must be ≤ 0.125 inch

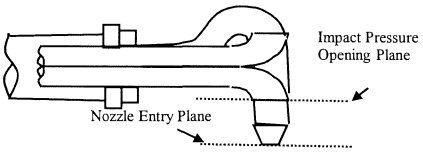
W must be ≤ 0.03125 inches

Horizontal offset between A and B Tubes (Z) - inches	0.009	PASS
Vertical offset between A and B Tubes (W) - inches	0.026	PASS

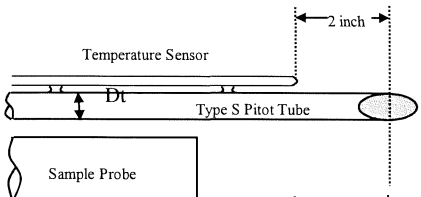


X must be ≥ 0.75 inches

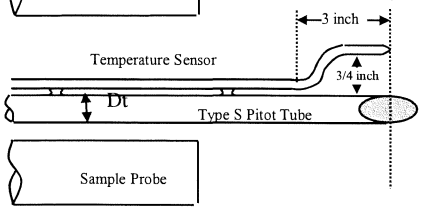
Distance between Sample Nozzle and Pitot (X) - inches	0.87	PASS



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

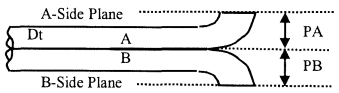
P-711 all in one.MOD

Type S Pitot Tube Inspection Data Form

Pitot Tube Identification Number: **P-706**

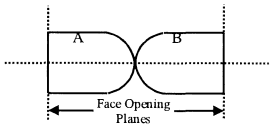
Inspection Date 6/15/18 Individual Conducting Inspection KS

If all Criteria PASS
Cp is equal to 0.84

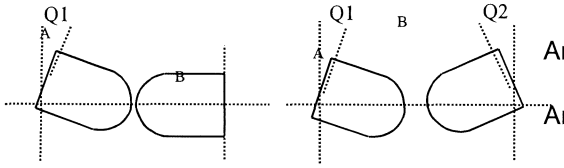


		PASS/FAIL
Distance to A Plane (PA) - inches	0.45	PASS
Distance to B Plane (PB) - inches	0.45	PASS
Pitot OD (D_t) - inches	0.375	

$1.05\ D_t < P < 1.5\ D_t$ PA must Equal PB

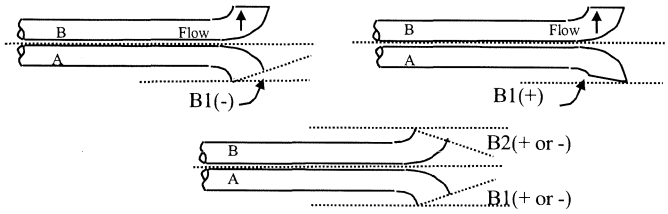


Are Open Faces Aligned Perpendicular to the Tube Axis: ◉ YES ○ NO — PASS



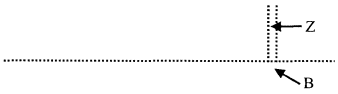
Q1 and Q2 must be ≤ 10°

Angle of Q1 from vertical A Tube-degrees (absolute)	0	PASS
Angle of Q2 from vertical B Tube-degrees (absolute)	0	PASS

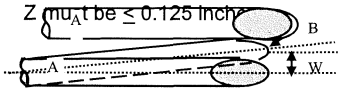


Angle of B1 from vertical A Tube-degrees (absolute)	0	PASS
Angle of B1 from vertical B Tube-degrees (absolute)	0	PASS

B1 or B2 must be ≤ 5°

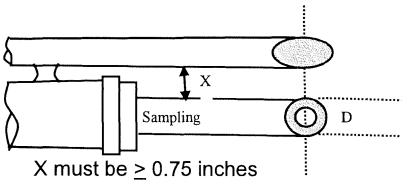


Z must be ≤ 0.125 inch



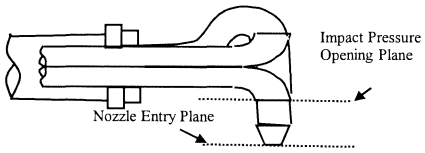
W must be ≤ 0.03125 inches

Horizontal offset between A and B Tubes (Z) - inches	0.006	PASS
Vertical offset between A and B Tubes (W) - inches	0.012	PASS

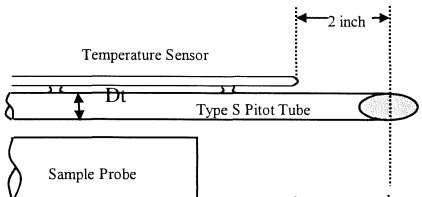


X must be ≥ 0.75 inches

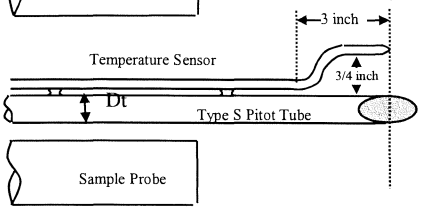
Distance between Sample Nozzle and Pitot (X) - inches	0.79	PASS



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

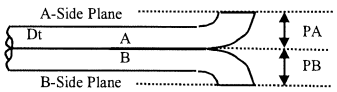
P-706 all in one.MOD

Type S Pitot Tube Inspection Data Form

Pitot Tube Identification Number: **P-702**

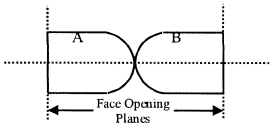
Inspection Date 5/30/18 Individual Conducting Inspection SR

If all Criteria PASS
Cp is equal to 0.84

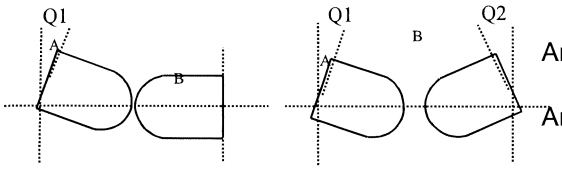


		PASS/FAIL
Distance to A Plane (PA) - inches	0.472	PASS
Distance to B Plane (PB) - inches	0.472	PASS
Pitot OD (D_t) - inches	0.375	

$1.05\ D_t < P < 1.5\ D_t$ PA must Equal PB

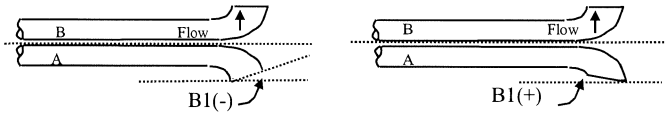


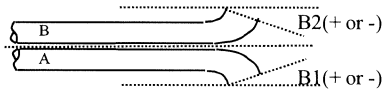
Are Open Faces Aligned Perpendicular to the Tube Axis: (●) YES ( ) NO — PASS



Angle of Q1 from vertical A Tube- degrees (absolute)	0	PASS
Angle of Q2 from vertical B Tube- degrees (absolute)	0	PASS

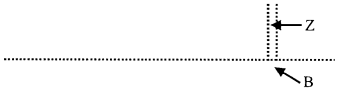
Q1 and Q2 must be $\leq 10^{\circ}$



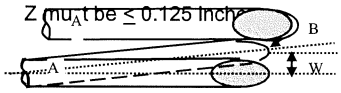


Angle of B1 from vertical A Tube- degrees (absolute)	0	PASS
Angle of B1 from vertical B Tube- degrees (absolute)	0	PASS

B1 or B2 must be $\leq 5^{\circ}$

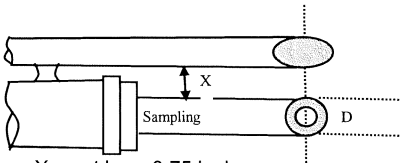


Z must be $\leq$ 0.125 inches



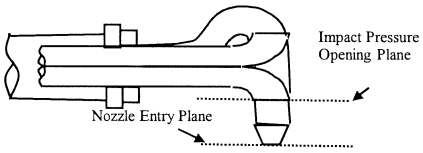
W must be $\leq$ 0.03125 inches

Horizontal offset between A and B Tubes (Z) - inches	0.01	PASS
Vertical offset between A and B Tubes (W) - inches	0.023	PASS

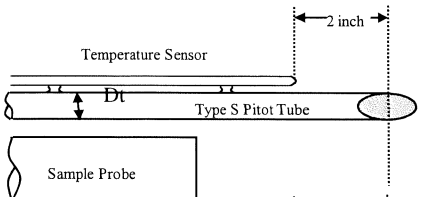


X must be $\geq$ 0.75 inches

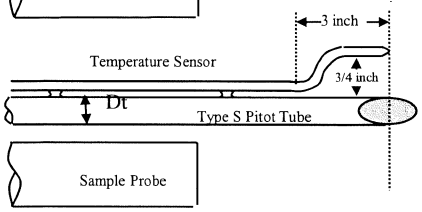
Distance between Sample Nozzle and Pitot (X) - inches	0.92	PASS



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

P-702 all in one.MOD

APPENDIX F
LIST OF PROJECT PARTICIPANTS

The following WESTON employees participated in this project.

Paul Meeter	Senior Project Manager
Wes Fritz	Team Member
Chris Hartsky	Team Member
Austin Squires	Team Member
Steve Dryden	Team Member
Matt Winkeler	Team Member
Kris Ansley	Team Member
Jacob Little	Team Member