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The Chemours Company – Fayetteville, North Carolina

Document type

Report

Date

August 2020

SOURCE EMISSIONS TESTING OF THE POLYMER PROCESS AID CARBON BED

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SOURCE EMISSIONS TESTING OF THE POLYMER PROCESS AID CARBON BED

Project name	**PFAS Emissions Testing**
Project no.	**32619/75812**
Recipient	**Christel Compton**
Document type	**Report**
Version	**1**
Date	**August 5, 2020**
Prepared by	**Patrick Grady, Project Associate**
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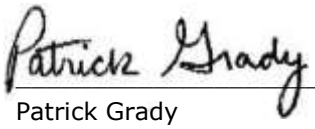
This report has been reviewed and to the best of our knowledge the report is complete, and the results presented herein are accurate, error free, legible, and representative of the actual emissions measured during testing.



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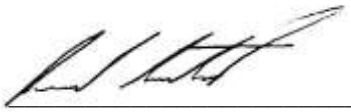

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1. INTRODUCTION AND BACKGROUND

O'Brien & Gere Engineers, Inc., a Ramboll Company (Ramboll) was retained by The Chemours Company (Chemours) to conduct source emissions testing at its facility located in Fayetteville, North Carolina. Ramboll has prepared the following test report summarizing the results of the testing on behalf of Chemours.

1.1 Testing Objective

As provided in their Title V Air Permit, Chemours is required to evaluate hexafluoro-propylene oxide-dimer acid (HFPO-DA) emissions from a carbon bed adsorber at the Fayetteville Works facility. The objective of this test program was to collect field sample data from the inlet and outlet to the carbon bed serving the Polymer Process Aid (PPA) area to determine carbon bed replacement frequency.

The source emissions test program was performed on June 24, 2020. Messrs. Patrick Grady, Jeff Sheldon, Steve Milo, Nate Woolley and Antonio Anderson of Ramboll conducted the emissions testing. Ms. Christel Compton and Mr. Edward Vega coordinated process operations with the emissions testing. Dr. William Anderson of Europhins/Test America was present to assist with the testing and serve as sample custodian. There were no representatives from any of the regulatory agencies present to observe the field test program.

This report presents a description of the sources tested, a summary of the scope of work conducted, sampling methods used, QA/QC procedures, and emission test results. The following section lists the testing program's participants and their contact information.

1.2 Emissions Testing Program Participants

Facility

Name:	The Chemours Company
Site Address:	22828 Hwy 87 W Fayetteville, NC 28306
Contact:	Christel E. Compton
e-mail:	christel.e.compton@chemours.com

Source Testing Firm

Name:	Ramboll
Address:	7600 Morgan Road Liverpool, NY 13090
Contact:	Patrick Grady
e-mail:	Patrick.grady@ramboll.com

Sample Analysis Laboratory

Name:	Eurofins TestAmerica, Knoxville
Address:	5815 Middlebrook Pike Knoxville, Tennessee 37921
Contact:	Courtney Adkins
e-mail:	courtney.adkins@testamericainc.com

2. PROCESS DESCRIPTION

This section provides a description of the PPA process.

2.1 Process Description

The PPA facility produces surfactants used to produce fluoropolymer products, such as Teflon® at other Chemours facilities, as well as sales to outside producers of fluoropolymers.
Process streams are vented to a caustic wet scrubber (ACD-A1), a carbon bed and exhausted through a process stack (AEP-A1). The process inside the building is under negative pressure and the building air is vented to the carbon bed and the process stack (AEP-A1).

2.2 Operating Conditions During Testing

Source emissions testing was performed during normal operations of the PPA process. Facility personnel monitored and recorded process operations during the testing. These operating data were provided to Ramboll and are included in Appendix A of this report.

3. SUMMARY OF TEST PROGRAM

This section provides a summary of the testing scope of work conducted. Test methods used during the sampling program can be found in Section 4 of this report.

3.1 Test Program Summary

Emissions testing was conducted simultaneously at the inlet and outlet of the PPA carbon bed in order to evaluate potential emissions and removal efficiencies of HFPO-DA. The testing at each location was conducted in triplicate and each test run was 96 minutes in duration. Results of the source emission testing are reported in units of milligrams per dry standard cubic meter (mg/dscm) and pounds per hour (lb/hr).

4. SAMPLING AND ANALYTICAL PROCEDURES

This section provides a description of the test methods that were utilized during the test program.

4.1 Test Methods

The test procedures were conducted in accordance with the most recent updates to the United States Environmental Protection Agency (USEPA) Reference Methods (RM) described in 40 CFR 60; Appendix A.

RM 1:	Sample and velocity traverses for stationary sources
RM 2:	Determination of stack gas velocity and volumetric flow rate (Type S pitot tube)
RM 3:	Determination of oxygen and carbon dioxide concentrations in emissions from stationary sources
RM 4:	Determination of moisture content in stationary sources
Modified 0010:	Determination of PFAS emissions from stationary sources (modified)

4.2 Sampling Locations

The sampling ports at the 34-inch inside diameter (ID) carbon bed inlet duct are located approximately 60 inches (1.8 diameters) downstream of a bend and approximately 42 inches (1.2 diameters) upstream of the carbon bed. Test ports in the 30-inch ID carbon bed outlet stack are located approximately 12 feet (4.8 diameters) downstream of the nearest disturbance and approximately 30 feet (12 diameters) upstream from the stack exit. A total of 12 traverse points were sampled on each diameter during each test run for a total of 24 traverse points. Traverse points were located in accordance with USEPA RM 1. Schematics of the sample locations along with traverse point locations are provided in Appendix A.

4.3 Gas Velocity and Volumetric Flow Rate

Velocity was evaluated from differential pressure measurements using a stainless-steel Type-S pitot tube and oil manometer in accordance with USEPA RMs 1 and 2. These methods were conducted in conjunction with each test run. Exhaust gas volumetric flow rate in units of dry standard cubic feet per minute (dscfm) were derived from velocity, temperature, molecular weight, and moisture measurements. Pollutant mass emission rates (lb/hr) were calculated using these volumetric flow rate data and pollutant concentrations.

4.4 Oxygen and Carbon Dioxide Concentrations

Concentrations of oxygen (O_2) and carbon dioxide (CO_2) were evaluated at both locations in accordance with modified USEPA RM 3 procedures using a Fyrite® combustion analyzer. A grab sample was collected and introduced into the Fyrite® for O_2 and CO_2 analysis.

4.5 Moisture Content

The moisture content of the sample trains was quantified utilizing procedures identified in USEPA RM 4. A sample of gas was continuously collected from each traverse point using a dry gas meter stack sampling system along with a series of impingers. The moisture content of the gas was measured as a change in the volume of the water collected in each impinger solution and the increased weight of the desiccant during the sampling period.

4.6 HFPO-DA Emissions

HFPO-DA emissions were evaluated in accordance with a modified USEPA Method 0010. The sample train consisted of a stainless-steel nozzle attached directly to a heated borosilicate glass-lined probe. The probe was connected directly to a heated borosilicate glass filter holder containing a solvent-extracted glass fiber filter. In order to minimize possible thermal degradation of the HFPO-DA, the probe and particulate filter were heated to just above stack temperature to minimize water vapor condensation before the filter. The filter holder exit was connected to a water-cooled coil condenser followed by a water-cooled sorbent module containing approximately 40 grams of XAD-2 resin. The XAD-2 inlet temperature was monitored to ensure that the module is maintained at a temperature below 20°C.

The XAD-2 resin trap was followed by a condensate knockout impinger and a series of two impingers each containing 100-ml of high purity deionized water. The water impingers were followed by another condensate knockout impinger equipped with a second XAD-2 resin trap to account for any sample breakthrough. The final impinger contained approximately 250 grams of dry pre-weighed silica gel. The water impingers and condensate impingers were submerged in an ice bath through the duration of the testing. The water in the ice bath was also used to circulate around the coil condenser and the XAD-2 resin traps.

Exhaust gases were extracted from the sample locations isokinetically using a metering console equipped with a vacuum pump, a calibrated orifice, oil manometer and probe/filter heat controllers.

4.6.1 HFPO-DA Sample Train and Equipment Preparation

Prior to conducting the field work the following procedures were conducted to prepare the field sampling glassware and sample recovery tools.

1. Wash all glassware, brushes, and ancillary tools with low residue soap and hot water.
2. Rinse all glassware, brushes, and ancillary tools three (3) times with D.I. H_20.
3. Bake glassware (with the exception of probe liners) at 450°C for approximately 2 hours, (XAD-2 resin tube glassware will be cleaned by Eurofins/TestAmerica by this same procedure).
4. Solvent rinse three (3) times all glassware, brushes, and ancillary tools with the following sequence of solvents: acetone, methylene chloride, hexane, and methanol.
5. Clean glassware and tools will be sealed in plastic bags or aluminum foil for transport to the sampling site.
6. Squirt bottles will be new dedicated bottles of known history and dedicated to the D.I. Water and methanol/ammonium hydroxide (MeOH/ 5% NH_4OH) solvent contents. Squirt bottles will be labelled with the solvent content it contains.

4.6.2 HFPO-DA Sample Train Recovery

Following completion of each test run, the sample probe, nozzle and front-half of the filter holder were brushed and rinsed three times each with the MeOH/ 5% NH_4OH solution (Container #1). The glass fiber filter was removed from its housing and transferred to a polyethylene bottle (Container #2). Any particulate matter and filter fibers which adhered to the filter holder and gasket were also placed in Container #2. The XAD-2 resin trap was sealed, labelled and placed in an iced sample cooler. The back-half of the filter holder, coil condenser condensate trap and connecting glassware were rinsed with the same MeOH/ 5% NH_4OH solution and placed in Container #3.

The volume of water collected in the second and third impingers was measured for moisture determinations and then placed in Container #4. Impingers #2 and #3 were then rinsed with the MeOH/ 5% NH_4OH solution and placed in Container #5. The second (breakthrough) XAD-2 resin trap was sealed, labelled and placed in an iced sample cooler. The second condensate trap was rinsed with the MeOH/ 5% NH_4OH solution and placed in Container #5. The contents of the fifth impinger were placed in its original container and weighed for moisture determinations.

Containers were sealed with Teflon® tape[1] and labeled with the appropriate sample information. Samples remained chilled until analysis. HFPO-DA analysis was conducted using liquid chromatography/dual mass spectrometry (LC/MS/MS).

[1] The tape is used to seal the *outside* of the container and does not come into contact with the sample contents. This procedure was confirmed as appropriate by the analytical laboratory.

5. EMISSIONS TEST RESULTS

A detailed summary of the test results is presented in Table 1 in the appendix. Supporting field data and calculations can be found in Appendix C. The laboratory report is presented in Appendix D. A brief discussion of the test results is presented below.

5.1 Emission Test Results

Note that the front-half fraction of the samples for all test runs at the carbon bed inlet and test Run 1 at the carbon bed outlet exceeded the analytical calibration range. These samples were diluted and re-analyzed and a revised value was calculated using the dilution factor. Due to the high value of the dilution factor and under advisement from the laboratory HFPO-DA emissions were calculated using the undiluted laboratory results. Further discussion of the laboratory procedures is provided in Appendix D.

Table 1 presents a detailed summary of the HFPO-DA test results. HFPO-DA concentrations at the carbon bed inlet ranged from 1.51E-02 mg/dscm to 1.22E+02 mg/dscm and averaged 4.07E+01 mg/dscm. Corresponding mass emissions of HFPO-DA ranged from 6.19E-04 lb/hr to 5.01E+00 lb/hr and averaged 1.67E+00 lb/hr.

Concentrations of HFPO-DA at the carbon bed outlet ranged from 1.08E-03 mg/dscm to 3.70E-02 mg/dscm and averaged 1.38E-02 mg/dscm. Mass emission rates of HFPO-DA from the carbon bed outlet ranged from 4.75E-05 lb/hr to 1.47E-03 lb/hr and averaged 5.53E-04 lb/hr. The resulting HFPO-DA removal efficiency of the PPA carbon bed ranged from 79 percent to greater than 99 percent and averaged greater than 99 percent.

5.2 Discussion and Conclusion

There were no process operating or sampling problems encountered during the field testing that impacted the test results. Therefore, all test data are believed to be representative of actual emissions in evidence during the test program. It should be noted that during Run No. 3 the PPA facility was venting HFPO-DAF ISO.

6. QUALITY ASSURANCE/QUALITY CONTROL

QA/QC was based on the recommended QA/QC procedures of the various sampling and analytical methods that were used for the test program. This section summarizes the pertinent QA/QC procedures that were employed during the emissions testing program.

6.1 Equipment Calibration

An important aspect of pre-sampling preparations is the inspection and calibration of all equipment planned to be used for the field effort. Equipment is inspected for proper operation and durability prior to calibration. Calibration of equipment is conducted in accordance with the procedures outlined in the USEPA document entitled "Quality Assurance Handbook for Air Pollution Measurement Systems; Volume III—Stationary Source Specific Methods" (EPA-600/4-77-027b). Equipment calibration is performed in accordance with USEPA guidelines and/or manufacturer's recommendations. Examples of the typical calibration requirements of the field equipment being used are as follows:

- Pitot tubes (QA Handbook Section 3.1.2, pp. 1-13) - measured for appropriate spacing and dimensions or calibrate in a wind tunnel. Rejection criteria given on the calibration sheet. Post-test check - inspect for damage.
- Probe nozzles (QA Handbook Section 3.4.2, pg. 19) - make three measurements of the nozzle ID (to the nearest 0.001 in.) using different diameters with a micrometer. Difference between the high and low values should not exceed 0.004 in. Post-test check - inspect for damage.
- Thermocouples (QA Handbook Section 3.4.2, pp. 15-18) - verify against a mercury-in-glass thermometer at two or more points including the anticipated measurement range. Acceptance limits - impinger ±2°F; DGM ±5.4°F; stack ±1.5 percent of stack temperature.
- Dry gas meters (QA Handbook Section 3.4.2, pp. 1-12) - Dry gas meters are calibrated using critical orifices. The procedure entails four runs using four separate critical orifices running at an actual vacuum 1-2 in. greater than the theoretical critical vacuum. The minimum sample volume required per orifice is 5 ft^3. Meter boxes are calibrated annually and then verified by use of the alternative USEPA RM 5 post-test calibration procedure. This procedure is referenced as Approved Alternate Method ALT-009 (June 21, 1994) by USEPA's Emission Measurement Center. The average Y-value obtained by this method must be within 5% of the initial Y-value.

6.2 Equipment Leak Checks

Pitot tube leak checks were conducted in accordance with USEPA RM 2. Leak checks were conducted on the HFPO-DA sample trains prior to and following each test run in accordance with the procedures outlined in USEPA RM 5, Sections 8.4.1 and 8.4.2.

6.3 Reagent Blanks and Field Blanks

A field blank for the Modified USEPA RM 0010 sample train was collected as part of the test program. The blank train was assembled and set-up near one of the carbon bed outlet test locations and as close to the outlet sample train as possible. The blank train remained in place for the duration of the sampling run. The blank train was heated to the same temperature as used

for the outlet sampling train, and the impinger portion of the train was iced down and chilled water circulated through the coil condenser as described in SW-846 Method 0010. The blank train was recovered in the same location, and by the same procedures as the actual sampling trains.

Additionally, a proof blank train rinse sample was collected one time during the sampling campaign. The glassware components of the train received a thorough solvent rinse after samples were recovered and put away for a sampling run. This secondary rinse was used to prove that the sampling breakdown collection processes capture all HFPO-DA material, and generally leave none of the target analytes uncaptured on the sample glassware. All sampling train glassware parts, including brushes and other tools used, were thoroughly rinsed with MeOH / 5% NH_4OH solution to evaluate the general rinsing efficiency of the sampling train recovery process.

Reagent blanks of the diH_2O used in the sample trains and MeOH/5% NH_4OH solution used for sample recovery were also submitted to the laboratory for analysis along with the field samples. Note that the field blank train and proof blank was collected during sampling of the Vinyl Ethers South carbon bed. Results of the field blank, proof blank and reagent blanks and are included with the laboratory reports in Appendix D.

6.4 Test Data and Report Review

Test data input and emission calculations were double-checked for accuracy. The test results were reviewed by senior personnel for reasonableness and accuracy. The final report was peer reviewed by senior personnel and certified by the project manager.

TABLES

Table 1
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed
Fayetteville, North Carolina

Run Identification	Run 1	Run 2	Run 3	Average	Run 1	Run 2	Run 3	Average
Source ID:		Carbon Bed Inlet				Carbon Bed Outlet		
Run Date	24Jun20	24Jun20	24Jun20		24Jun20	24Jun20	24Jun20	
Start/Stop Time	1000-1144	1230-1413	1455-1646		1000-1143	1230-1413	1455-1637	
Exhaust Gas Conditions								
Temperature (deg. F)	80	82	84	**82**	83	85	89	**85**
Moisture (volume %)	1.5	1.4	1.7	**1.5**	1.7	1.7	2.5	**1.9**
Oxygen (dry volume %)	20.9	20.9	20.9	**20.9**	20.9	20.9	20.9	**20.90**
Carbon Dioxide (dry volume %)	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	**0.00**
Volumetric Flow Rate								
acfm	11,430	11,544	11,531	**11,502**	11,825	11,452	11,315	**11,531**
dscfm	10,956	11,021	10,949	**10,975**	11,324	10,932	10,638	**10,965**
HFPO - Dimer Acid								
mg/dscm	1.51E-02	1.59E-02	1.22E+02	**4.07E+01**	1.08E-03	3.36E-03	3.70E-02	**1.38E-02**
lb/hr	6.19E-04	6.55E-04	5.01E+00	**1.67E+00**	4.57E-05	1.38E-04	1.47E-03	**5.53E-04**
Carbon Bed Removal Efficiency								
percent	93	79	>99.9	>99.9				

APPENDIX A
PROCESS OPERATING DATA

Date	6/24/2020												
Time	900				1000				1100				
Stack Testing					Run 1 -1000-1144								
A/F column Feed Ratev (pounds per hour)													
903 Distillation (pounds per hour)													
DAF ISO Venting													
Charging water to Hyd - venting													
Charging Sulfuric acid - venting													
Hydrolysis - Wash Tank pressure Transfer to Hydrolysis													
Hydrolysis - Phase Settle													
Vap heels pressure transfer													
Vap cycle													
Venting after press tran from North/South Acid tank to Hyd													
DAF tran to Hyd - venting during transfer													
Hydrolysis - transfer to Waste Acid Trailer													
Wash Tk to Vaporizer pressure transfer (new 8-2019)													
Scrubber Recirculation Flow					38.2 gpm								
Scrubber dP					1.0 inwc								

Date	6/24/2020									
Time	900					1300				
Stack Testing				Run 2 - 1230-1413						
A/F column Feed Ratev (pounds per hour)										
903 Distillation (pounds per hour)										
DAF ISO Venting										
Charging water to Hyd - venting										
Charging Sulfuric acid - venting										
Hydrolysis - Wash Tank pressure Transfer to Hydrolysis										
Hydrolysis - Phase Settle										
Vap heels pressure transfer										
Vap cycle										
Venting after press tran from North/South Acid tank to Hyd										
DAF tran to Hyd - venting during transfer										
Hydrolysis - transfer to Waste Acid Trailer										
Wash Tk to Vaporizer pressure transfer (new 8-2019)										
Scrubber Recirculation Flow				38.0 gpm						
Scrubber dP				1.0 inwc						

Date	6/24/2020										
Time				1500				1600			
Stack Testing			Run 3 - 1455-1646								
A/F column Feed Ratev (pounds per hour)											
903 Distillation (pounds per hour)											
DAF ISO Venting											
Charging water to Hyd - venting											
Charging Sulfuric acid - venting											
Hydrolysis - Wash Tank pressure Transfer to Hydrolysis											
Hydrolysis - Phase Settle											
Vap heels pressure transfer											
Vap cycle											
Venting after press tran from North/South Acid tank to Hyd											
DAF tran to Hyd - venting during transfer											
Hydrolysis - transfer to Waste Acid Trailer											
Wash Tk to Vaporizer pressure transfer (new 8-2019)											
Scrubber Recirculation Flow			36.6 to 38.0 gpm								
Scrubber dP			0.9 to 1.1 ijnwc								

APPENDIX B
SCHEMATICS OF THE TEST LOCATIONS

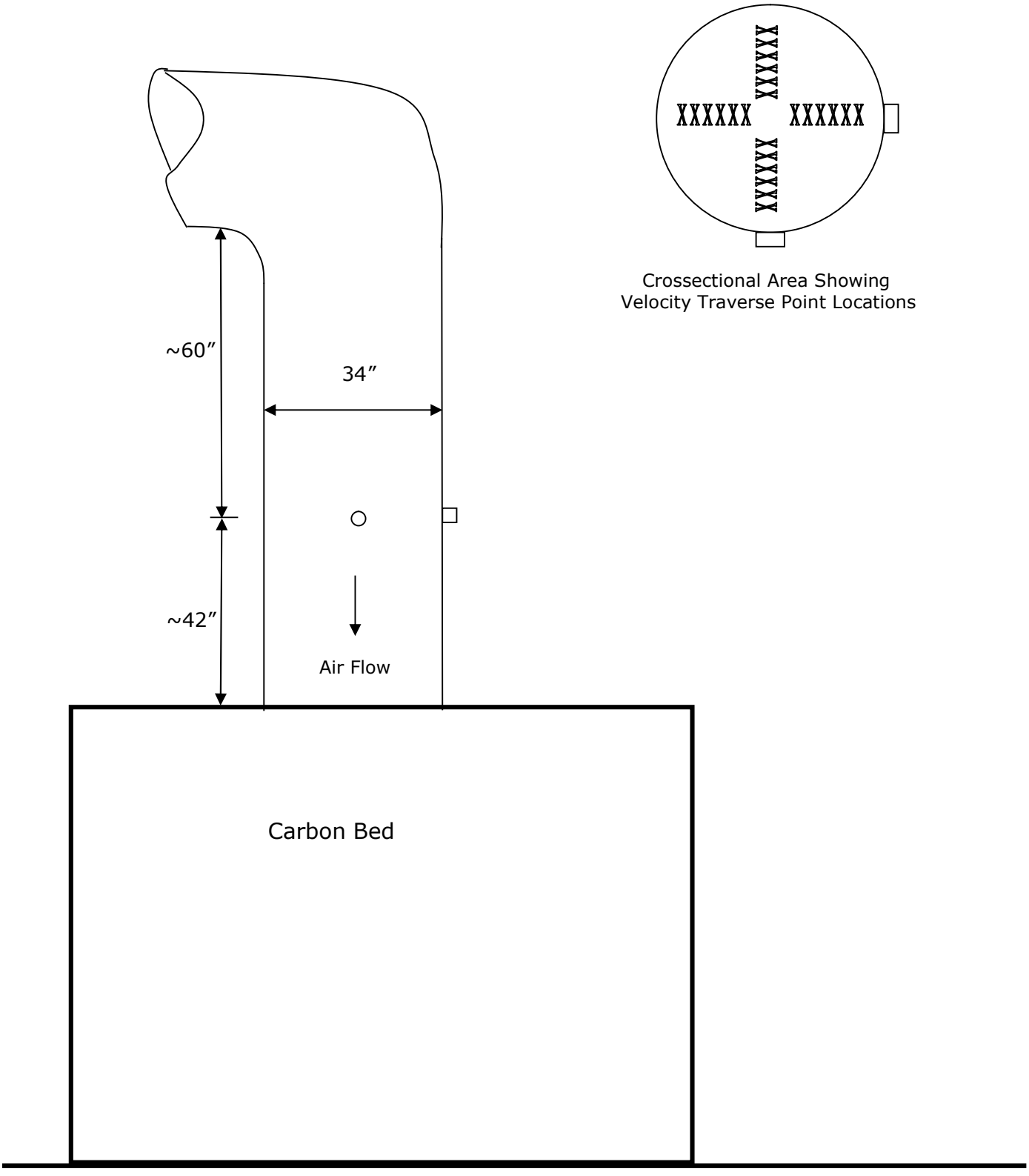

Figure 1
Carbon Bed Inlet Sampling Location
Polymer Process Aid
The Chemours Company
Fayetteville, North Carolina

Sample Traverse Point Locations for Circular Stacks

Facility: The Chemours Company

Source Identification: PPA Carbon Bed inlet

Stack Diameter: 34 inches

Sampling Locations: 1.8 diameters downstream
1.2 diameters upstream

Minimum Number of Traverse points as specified by EPA Method 1: 24

Number of traverse points sampled: 24

Traverse Point Number	Percent of Stack Diameter From Inside Wall	Distance in Inches From Inside Wall*
1	2.1	1.0
2	6.7	2.3
3	11.8	4.0
4	17.7	6.0
5	25.0	8.5
6	35.6	12.1
7	64.4	21.9
8	75.0	25.5
9	82.3	28.0
10	88.2	30.0
11	93.3	31.7
12	97.9	34.0

*Traverse points located within 1.00" to the stack wall for stacks having an inside diameter greater than 24" will be relocated as well as traverse points located within 0.50 inches to the stack wall on stacks with a 24" ID or less to meet criteria.

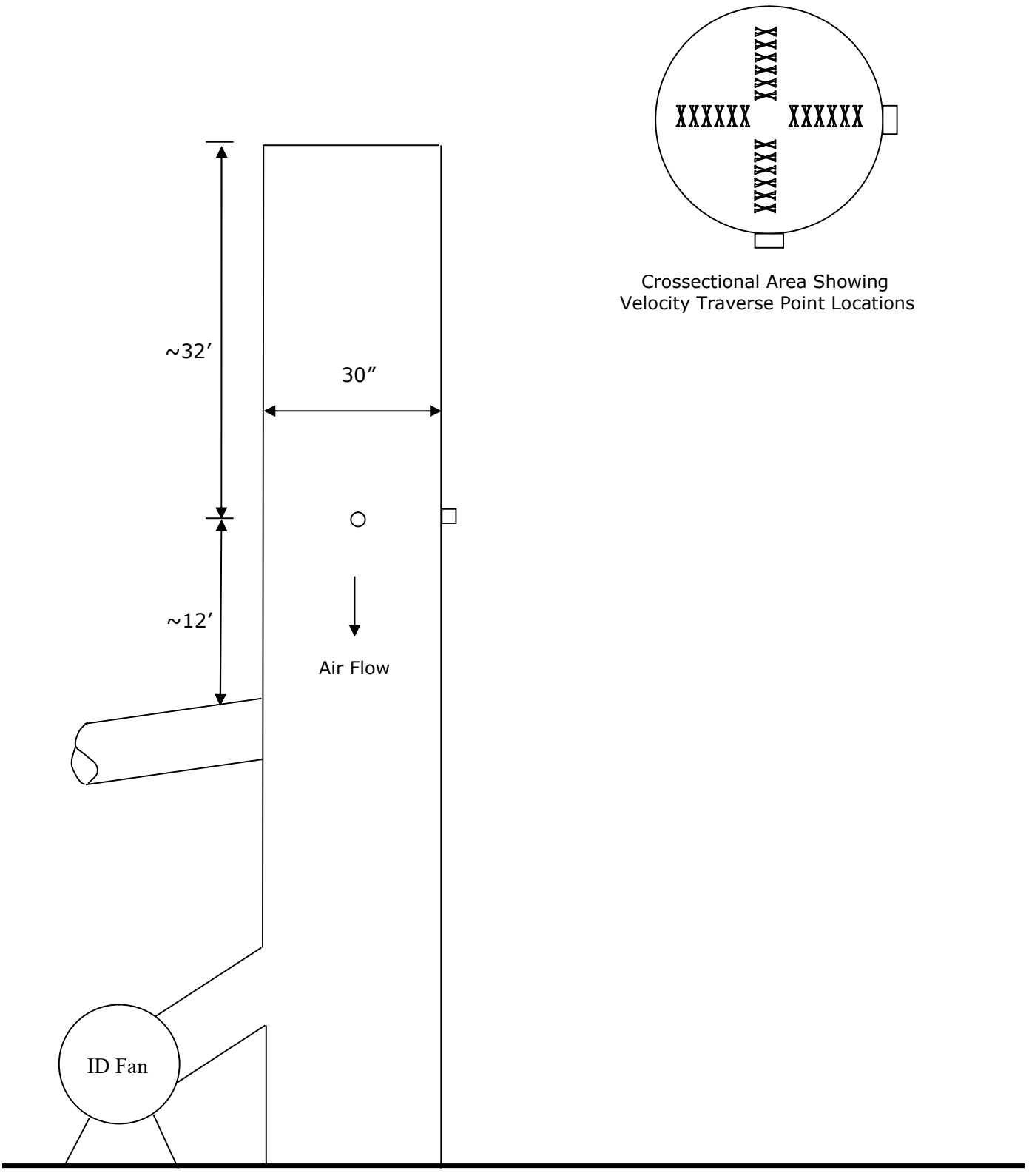

Figure 2
Carbon Bed Outlet Sampling Location
Polymer Process Aid
The Chemours Company
Fayetteville, North Carolina

Sample Traverse Point Locations for Circular Stacks

Facility: The Chemours Company

Source Identification: PPA Carbon Bed Outlet

Stack Diameter: 30 inches

Sampling Locations: 4.8 diameters downstream
12 diameters upstream

Minimum Number of Traverse points as specified by EPA Method 1: 24

Number of traverse points sampled: 24

Traverse Point Number	Percent of Stack Diameter From Inside Wall	Distance in Inches From Inside Wall*
1	2.1	1.0
2	6.7	2.0
3	11.8	3.5
4	17.7	5.3
5	25.0	7.5
6	35.6	10.7
7	64.4	19.3
8	75.0	22.5
9	82.3	24.7
10	88.2	26.5
11	93.3	28.0
12	97.9	29.0

*Traverse points located within 1.00" to the stack wall for stacks having an inside diameter greater than 24" will be relocated as well as traverse points located within 0.50 inches to the stack wall on stacks with a 24" ID or less to meet criteria.

APPENDIX C
FIELD DATA AND CALCULATIONS

PPA Carbon Bed Inlet Field Test Data

Field Data Summary
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Inlet
Fayetteville, North Carolina

	Run 1							Run 2							Run 3					
Traverse	**Stack**	**Delta**	**Delta**	**Tm(F)**		**SQRT**		**Stack**	**Delta**	**Delta**	**Tm(F)**		**SQRT**		**Stack**	**Delta**	**Delta**	**Tm(F)**		**SQRT**
Point	**Temp(F)**	**P**	**H**	**in**	**out**	**Delta P**		**Temp(F)**	**P**	**H**	**in**	**out**	**Delta P**		**Temp(F)**	**P**	**H**	**in**	**out**	**Delta P**
A1	78	0.31	1.02	77	77	0.5568		83	0.14	0.46	87	86	0.3742		84	0.24	0.79	95	93	0.4899
2	79	0.27	0.89	78	78	0.5196		82	0.14	0.46	89	87	0.3742		84	0.24	0.79	96	93	0.4899
3	79	0.27	0.89	79	77	0.5196		82	0.14	0.46	89	87	0.3742		84	0.27	0.89	96	93	0.5196
4	79	0.27	0.89	81	78	0.5196		82	0.18	0.59	90	87	0.4243		84	0.27	0.89	97	93	0.5196
5	79	0.27	0.89	83	78	0.5196		82	0.20	0.66	91	87	0.4472		84	0.27	0.89	98	93	0.5196
6	79	0.27	0.89	84	78	0.5196		82	0.25	0.82	92	87	0.5000		84	0.27	0.89	98	93	0.5196
7	79	0.32	1.08	86	79	0.5657		82	0.35	1.15	93	87	0.5916		84	0.33	1.09	98	93	0.5745
8	79	0.34	1.12	87	79	0.5831		82	0.38	1.25	95	88	0.6164		84	0.35	1.15	99	93	0.5916
9	79	0.34	1.12	88	80	0.5831		82	0.39	1.28	95	88	0.6245		84	0.35	1.15	99	93	0.5916
10	79	0.37	1.22	88	80	0.6083		82	0.40	1.32	96	88	0.6325		84	0.37	1.22	100	93	0.6083
11	79	0.37	1.22	89	81	0.6083		82	0.39	1.28	96	89	0.6245		84	0.37	1.22	100	93	0.6083
12	79	0.37	1.22	89	81	0.6083		82	0.39	1.28	97	89	0.6245		84	0.37	1.22	100	93	0.6083
B1	80	0.12	0.39	87	82	0.3464		83	0.25	0.82	91	89	0.5000		84	0.14	0.46	97	93	0.3742
2	80	0.12	0.39	88	83	0.3464		82	0.18	0.62	95	90	0.4243		84	0.14	0.46	97	93	0.3742
3	80	0.13	0.43	88	83	0.3606		82	0.28	0.92	95	90	0.5292		84	0.14	0.46	96	93	0.3742
4	80	0.15	0.50	88	83	0.3873		82	0.27	0.89	96	90	0.5196		84	0.16	0.52	96	93	0.4000
5	80	0.18	0.60	88	83	0.4243		82	0.27	0.89	96	90	0.5196		84	0.22	0.73	96	93	0.4690
6	80	0.22	0.73	89	84	0.4690		83	0.29	0.96	97	90	0.5385		84	0.25	0.82	96	93	0.5000
7	80	0.31	1.03	89	84	0.5568		83	0.32	1.05	97	90	0.5657		84	0.34	1.12	96	93	0.5831
8	80	0.35	1.15	89	84	0.5916		83	0.34	1.12	97	91	0.5831		84	0.37	1.22	96	93	0.6083
9	80	0.37	1.22	90	85	0.6083		83	0.34	1.12	98	91	0.5831		84	0.37	1.22	96	92	0.6083
10	80	0.40	1.32	91	87	0.6325		83	0.37	1.22	98	91	0.6083		84	0.37	1.22	97	92	0.6083
11	81	0.40	1.32	91	87	0.6325		83	0.37	1.22	98	91	0.6083		84	0.37	1.22	97	92	0.6083
12	81	0.40	1.32	91	87	0.6325		83	0.37	1.22	99	92	0.6083		84	0.37	1.22	98	92	0.6083
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
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						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
Average	80	0.29	0.95	87	82	0.5291		82	0.29	0.96	94	89	0.5332		84	0.29	0.95	97	93	0.5315

Test Data Summary and Calculations
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Inlet
Fayetteville, North Carolina

Parameter	**Run 1**	**Run 2**	**Run 3**
Run Date	6/24/20	6/24/20	6/24/20
Start/Stop Time	1000-1144	1230-1413	1155-1646
Duration of Run, Minutes	96	96	96
Ave. Nozzle Diameter, inches	0.244	0.244	0.244
Pitot Calibration Factor, CF	0.84	0.84	0.84
Meter Gamma	0.993	0.993	0.993
Meter Delta H, inches of H2O	1.82	1.82	1.82
Stack Diameter, inches	34	34	34
Rectangular Width, inches	0	0	0
Rectangular Length, inches	0	0	0
Stack Area, sq.ft.	6.30	6.30	6.30
Barometric Pressure, inches of Hg	29.9	29.9	29.9
Static Pressure, inches of H2O	-1.8	-1.8	-1.8
Dry Gas Meter Sample Volume, (VM)ft3			
Initial	934.339	984.83	37.408
Final	984.685	1036.852	88.973
Total Volume	50.253	51.956	51.523
Ave. Stack Temperature, Ts(F)	79.5	82.4	84.0
Ave. Meter Temperature, Tm(F)	84.1	91.7	95.0
Ave. Run Delta H, inches of H2O	0.95	0.96	0.95
Ave. Square Root of Delta P	0.5291	0.5332	0.5315
Moisture Data			
Volume of water collected, mls	3.4	3.2	4.4
Silica Gel, grams	12.8	12.000	13.2
Total Collected, mls	16.2	15.2	17.6
ORSAT Data			
%O2	20.90	20.90	20.90
%CO2	0.0	0.0	0.0
%CO			

Calculations

Vw(std), scf =	0.763	0.715	0.828
Vm(std), dscf =	48.507	49.459	48.751
Bws=	0.015	0.014	0.017
Md=	28.84	28.84	28.84
Ms=	28.67	28.68	28.65
Vs, ft/sec =	30.2	30.5	30.5
Qs, acfm =	11,430	11,544	11,531
Qs(std), dscfm =	10,956	11,021	10,949
Isokinetic Sampling Rate, %	90	91	90

Where:
An = area of the nozzle
As = area of the stack
Vw(std) = volume of water vapor in gas, standard conditions = 0.04707*Vlc
Vm(std) = vol. of gas sampled, standard conditions = 17.647 x Vm x gamma x [Pb + (dH/13.6)]/Tm(R)
Bws = water vapor in gas stream, proportion by volume = Vw(std)/(Vm(std) + Vw(std))
Md = molecular weight of stack gas, dry basis = (0.44 x%CO2) + (0.32 x%O2) + [0.28 x (%N2 + %CO)]
Ms = molecular weight of stack gas, wet basis = [Md x (1-Bws)] + (18.0 x Bws)
Vs = stack gas velocity = 85.49 x Cp x (avg. Sq.Rt. dP) x [Sq.Rt. (Ts(R))/(Ms x Ps)]
Qs = stack gas flow rate = Vs x As x 60
Qs(std) = stack gas flow rate, standard conditions = Qs x (1-Bws) x (528/(Ts(R)) x (Ps/29.92)
Isokinetic sampling rate = {(Ts(R)) x [(0.00267 x Vlc) + (Vm(std)/17.647)] x 100}/(Time x vs x Ps x An x60)

Results Summary
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Inlet
Fayetteville, North Carolina

Parameter:		Run 1				Run 2				Run 3				Average			
	Mol. Wt.	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr
HFPO - Dimer Acid	330	0.02072	1.51E-02	1.10E-03	6.19E-04	0.02223	1.59E-02	1.16E-03	6.55E-04	168.641	1.22E+02	8.90E+00	5.01E+00	56.23	4.07E+01	2.97E+00	1.67E+00

Where:
Pollutant Emission Concentration:
mg= total sample collected, milligrams
mg/dscm = milligrams of pollutant per dry standard cubic meter sampled = (mg/dscf) x (35.314 cubic feet/cubic meter)
ppm = parts per million =((mg/dscm x 24.04 liters/mol)/mol.wt))

Pollutant Emission Rate:
lb/hr = pounds of pollutant emitted per hour = mg/1000/[(453.59 g/lb)/(dscf)] x dscfm x 60 min/hr

Example Calculations

The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Inlet
Fayetteville, North Carolina
Note: Values are shown for example purposes only.

Vm,a = Dry gas volume at actual conditions (acf)

Initial gas meter volume:	934.339
Final gas meter volume:	984.685
Difference:	50.346

Vm,std = Volume of dry gas at standard conditions (dscf)

= 17.647x Vm, a x Gamma*[Pbar+(DeltaH/13.6)]/Tm(R)
= 17.647 x 0.000 x 0.993 x (29.90 + [(1.820 /13.6) / 544
= 48.507

Vl,c = Volume of water collected in impingers and silica gel (ml)

impinger catch (mls):	3
silica gel (g)	12.8
total:	16.2

Vw,std = Volume of water vapor in gas at standard conditions (cu.ft.)

= (0.04707) x (Vl,c)
= 0.04707 x 16.2
= 0.763

Bwo = Proportion by volume of water vapor in gas stream

= Vw,std/(Vw,std+Vm,std)
= 0.76 / (0.76 + 48.507)
= 0.015

Ps = Stack gas static pressure (in. Hg)

= St/13.6
= -1.80 / 13.6
= -0.132

Pa = Absolute stack gas pressure (in. Hg)

= Ps+Pbar
= -0.132 + 29.90
= 29.77

MFD = Dry mole fraction of stack gas

= 1-Bwo
= 1 - 0.015
= 0.985

Md = Dry molecular weight of stack gas (lb/lb-mol)

= (0.32 x %O2) + (0.44 x %CO2) + (0.28 x %N2)
= (0.32 x 20.90)+(0.44 x 0.00) + (0.28 x 79.10)
= 28.84

Mw = Wet molecular weight of stack gas (lb/lb-mol)

= (Md) x (MFD) + (0.18) x (Bwo*100)
= 28.84 x 0.985 + 0.18 x 1.54768
= 28.67

Example Calculations

The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Inlet
Fayetteville, North Carolina
Note: Values are shown for example purposes only.

Vs,avg = **Average stack gas velocity (fps)**
= Kp x (Cp) x (sqrt,deltaP) x sqrt((Ts + 460°R)/Mw*Pa))
= 85.48 x 0.84 x 0.53 x sqrt (0.63)
= 30.2

A **Cross sectional areas of stack (sq. ft)**
= pi/4*d^2
= 3.14159/4 x 2.83 ^2
= 6.30

Qa **Volumetric flow rate at actual conditions (acfm)**
= (60)sec/min(A)(Vs, avg)
= 60 x 6.3050 x 30.21
= 11,429

Qstd **Volumetric flow rate at standard conditions (scfm)**
= Qa x (528/Ts,avg + 460) x Pa/29.92
= 11,429 x (528 / 540) x 0.995
= 11,127

Qstd,dry **Volumetric flow rate at dry standard conditions per minute(dscfm)**
= Qstd x (1-Bwo)
= 11,127 x 0.9845
= 10,955

mg/dscm **HFPO-DA concentration**
= (mg/dscf) x 35.314 cu. ft./cu. meter
= (0.02 / 48.51) : 35.314
= 1.51E-02

lb/hr **HFPO-DA Mass Emission Rate**
= mg/1000/[(453.59 g/lb)/(dscf)] x dscfm x 60 min/hr
= 0.02 / 1,000 /[453.59) / 48.51)] x 10,956 x 60
= 6.19E-04

EPA Isokinetic Field Sheet

3.3

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	1	Pitot Number	P42
Location	Fayetteville, NC	Stack Diameter	34"	Pitot Coefficient	.84
Source	PPA Inlet	Barometric Pres.	29.90	Stack TC I.D.	P42
Date	6-24-20	Static Pressure	-1.8	Oven Box I.D.	5
Operators	JLS, AA	Meter Box #	5	Impinger Out I.D.	4
Start Time	1000	Meter delta H	1.82	Nozzle Size	.244
End Time	1144	Meter Gamma	.993	XAD Trap I.D.	—

Leak Check Rates	Sample Rate in.	Sample Rate cfm	Pitot +	Pitot -
Initial	10	.000	✓	✓
Mid	10	.000	✓	✓
Mid				
Final	10	.000	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit: Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet	Vacuum (in. hg)	Comments/Notes
A1	4	.21	1.02	934.339	78	95	85	66	66	77	77	3	
2	8	.27	.89	937 —	79	85	85	51	49	78	78	3	
3	12	.27	.89	938.60	79	85	86	50	49	79	77	3	
4	16	.27	.89	941.00	79	85	86	50	49	81	78	3	
5	20	.27	.89	942.70	79	85	86	50	49	83	78	3	
6	24	.27	.89	944.80	79	85	86	50	48	84	78	3	
7	28	.32	1.08	946.99	79	85	86	51	49	86	79	3	
8	32	.34	1.12	949.60	79	85	86	51	50	87	79	3	
9	36	.34	1.12	951.70	79	85	86	52	52	88	80	3	
10	40	.37	1.22	953.70	79	85	86	52	50	88	80	4	
11	44	.37	1.22	956.0	79	85	86	53	52	89	81	4	@ 1048
12	48	.37	1.22	958.40	79	85	86	54	54	89	81	4	961.077
B1	52	.12	.39	961.170	80	89	92	62	57	87	82	2	961.170
2	56	.12	.39	—	80	89	90	59	57	88	83	2	@ 1055
3	60	.13	.429	963.90	80	90	90	59	57	88	83	2	@ 1144
4	64	.15	.50	965.70	80	90	89	59	57	88	83	2	
5	68	.18	.60	967.20	80	89	89	60	59	88	83	2	
6	72	.22	.73	969.10	80	88	88	60	60	89	84	2	
7	76	.31	1.03	—	80	88	87	58	51	89	84	2	
8	80	.35	1.15	972.90	80	89	88	56	49	89	84	2	
9	84	.37	1.22	975 —	80	91	87	54	49	90	85	2	
10	88	.40	1.32	978 —	80	91	87	54	49	91	87	2	
11	92	.40	1.32	979.70	81	91	87	54	51	91	87	4	
12	96	.40	1.32	982.7	81	91	87	54	51	91	87	4	
				984.685									

Impinger Data (vol)		
#	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm)		
#	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data		
#	Number	Tare
1		
2		
3		

Molecular Weight Data (%		
#	O_2	CO_2
1		
2		
3		
Avg		

RAMBOLL

EPA Isokinetic Field Sheet

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	2	Pitot Number	P4.2
Location	Fayetteville, NC	Stack Diameter	34"	Pitot Coefficient	.84
Source	PPA INLET	Barometric Pres.	29.90	Stack TC I.D.	P4.2
Date	6.24.20	Static Pressure	-1.8	Oven Box I.D.	5
Operators	JLS, AA	Meter Box #	5	Impinger Out I.D.	4
Start Time	1230 / 1325	Meter delta H	1.82	Nozzle Size	.244
End Time	1318 / 1413	Meter Gamma	.993	XAD Trap I.D.	—

Leak Check Rates	Sample Rate in.	Sample Rate cfm	Pitot +	Pitot -
Initial	5	.000	✓	✓
Mid				
Mid	5	000		
Final	6	.000	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit: Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet	Vacuum (in. hg)	Comments/Notes
1	4	.14	.46	984.830	83	94	90	63	55	87	86	2	
2	8	.14	.46	987.01	82	91	88	56	45	89	87	2	
3	12	.14	.46	—	82	90	88	54	40	89	87	2	
4	16	.18	.59	989.5	82	90	89	50	38	90	87	2	
5	20	.20	.66	991.1	82	91	88	48	38	91	87	2	
6	24	.25	.82	993.0	82	90	87	46	39	92	87	2	
7	28	.35	1.15	995.0	82	90	86	46	39	93	87	2	
8	32	.38	1.25	997.3	82	89	87	46	40	95	88	2	LK CK
9	36	.39	1.28	999.8	82	89	88	46	37	95	88	2	1009.993
10	40	.40	1.32	1002.3	82	88	87	46	37	96	88	2	
11	44	.39	1.28	—	82	87	88	46	37	96	89	2	1010.649
12	48	.39	1.28	1009.983	82	88	87	46	38	97	89	2	
1	52	.25	.82	1010.049	83	86	87	57	49	91	89	2	1413
2	56	.19	.62	1011.1	82	85	86	47	41	95	90	2	
3	60	.28	.92	—	82	85	86	46	40	95	90	2	
4	64	.27	.89	1016.90	82	89	86	46	41	96	90	2	
5	68	.27	.89	1017.90	82	89	86	47	41	96	90	2	
6	72	.29	.96	—	83	90	87	48	42	97	90	2	
7	76	.32	1.05	1022.60	83	90	87	48	43	97	91	2	
8	80	.34	1.12	1024.99	83	90	88	48	43	97	91	2	
9	84	.34	1.12	1028 —	83	90	88	49	44	98	91	2	
10	88	.37	1.22	1029.70	83	90	89	49	43	98	91	2	
11	92	.37	1.22	1031.98	83	91	89	50	44	98	91	2	
12	96	.37	1.22	1035 —	83	92	90	50	43	99	92	2	
				1036.852									

Impinger Data (vol) #	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm) #	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data #	Number	Tare
1		
2		
3		

Molecular Weight Data (% #	O_2	CO_2
1		
2		
3		
Avg		

RAMBOLL

EPA Isokinetic Field Sheet

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	3	Pitot Number	P4.2
Location	Fayetteville, NC	Stack Diameter	84"	Pitot Coefficient	.84
Source	PPA INLET	Barometric Pres.	29.90	Stack TC I.D.	P4.2
Date	6-24-20	Static Pressure	-1.8	Oven Box I.D.	5
Operators	JTS, AA	Meter Box #	5	Impinger Out I.D.	4
Start Time	1455	Meter delta H	1.82	Nozzle Size	.244
End Time		Meter Gamma	.993	XAD Trap I.D.	—

Leak Check Rates				
	Sample Rate		Pitot	
	in.	cfm	+	-
Initial	7	.000	✓	✓
Mid	16	.000	✓	✓
Mid				
Final	10	.000	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit							Vacuum (in. hg)	Comments/Notes
					Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet		
1	4	.24	.79	37.408	84	93	91	54	45	95	93	3	
2	8	.24	.79	—	84	93	91	53	45	96	93	3	
3	12	.27	.89	41.60	84	93	91	53	41	96	93	3	
4	16	.27	.89	43.90	84	93	91	51	41	97	93	3	
5	20	.27	.89	—	84	93	91	51	45	98	93	3	
6	24	.27	.89	047.70	84	93	91	51	42	98	93	3	
7	28	.33	1.09	50.10	84	94	90	50	40	98	93	3	
8	32	.35	1.15	053.10	84	94	90	50	43	99	93	3	
9	36	.35	1.15	56. —	84	93	90	50	44	99	93	3	
10	40	.37	1.22	58 —	84	93	90	51	43	100	93	3	1543
11	44	.37	1.22	—	84	93	90	51	46	100	93	3	
12	48	.37	1.22	061.80	84	92	90	52	45	100	93	3	064.052
1	52	.14	.46	064.56	84	92	89	57	49	97	93	3	064.094
2	56	.14	.46	066.4	84	91	89	54	49	97	93	3	1549
3	60	.14	.46	67.20	84	91	89	55	51	96	93	3	
4	64	.16	.52	68.6	84	91	88	55	49	96	93	3	
5	68	.22	.73	70.3	84	91	88	54	49	96	93	3	
6	72	.25	.82	72.60	84	90	88	55	53	96	93	3	
7	76	.34	1.12	74.30	84	90	87	56	52	96	93	3	
8	80	.37	1.22	77.40	84	90	84	58	53	96	93	3	
9	84	.37	1.22	79.50	84	90	87	59	53	96	92	4	
10	88	.37	1.22	—	84	90	87	58	54	97	92	4	
11	92	.37	1.22	—	84	90	87	58	52	97	92	4	
12	96	.37	1.22	86.70	84	90	86	58	52	98	92	4	1646
				088.973									

Impinger Data (vol)		
#	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm)		
#	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data		
#	Number	Tare
1		
2		
3		

Molecular Weight Data (%		
#	O_2	CO_2
1		
2		
3		
Avg		

RAMBOLL

Sample Train Recovery Data Sheet

Client Chemours Location Fayetteville NC Source PPA Inlet ~~Outlet~~ Method M0010 Date 6/24/20

Run # 1

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	492.4	491.8	0.6
Impinger #2	760.4	760.8	-0.4
Impinger #3	760.2	759.8	0.4
Impinger #4	502.8	500.0	2.8
Impinger #5	890.8	878.0	12.8
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician PG

Run # 2

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	498.2	498.0	0.2
Impinger #2	781.6	781.6	0
Impinger #3	772.0	770.6	1.4
Impinger #4	469.0	467.4	1.6
Impinger #5	854.6	842.6	12.0
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician PG

Run # _____

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	498.8	498.8	0
Impinger #2	750.2	750.0	0.2
Impinger #3	776.0	775.6	0.4
Impinger #4	501.8	498.0	3.8
Impinger #5	903.8	890.6	13.2
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician PG

Nozzle Calibration Form

Plant I.D. Chemours Project No. 75812

Source I.D. Vinyl Ethers Personnel P. Grady

Date 6/22/20

Nozzle ID:	SS B
Diameter 1	.243
Diameter 2	.243
Diameter 3	.244
Average	.243

< 0.004" between high & low diameters

Cyclonic Flow Determination Data Sheet

Client	CHEMOURS	Stack Diameter	34"
Location	PPA INLET	Upstream Distance	—
Source	FAYETTEVILLE NC	Downstream Distance	—
Date	6-24-2020	Minimum Traverse Points	—
Operator	JLS, AA, EA	Port Collar Length	—

Leak Ck	Int.	✓	✓
	Post	✓	✓
Barometric Pressure		29.	
Probe ID		P4.2	
Velocity Guage ID		Box 5	
Static Pressure		-1.8	
Time		—	

Traverse Point Number	Point Position	Delta P (in. H20)	Stack Temp (°F)	Angle at Null
1				0
2				0
3				7
4				5
5				5
6				0
7				5
8				5
9				5
10				5
11				7
12				7
1				0
2				0
3				0
4				0
5				7
6				5
7				9
8				9
9				0
10				2
11				5
12				10

Traverse Point Number	Point Position	Delta P (in. H20)	Stack Temp (°F)	Angle at Null

PPA Carbon Bed Outlet Field Test Data

Field Data Summary
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Outlet
Fayetteville, North Carolina

	Run 1							Run 2							Run 3					
Traverse Point	Stack Temp(F)	Delta P	Delta H	Tm(F)		SQRT Delta P		Stack Temp(F)	Delta P	Delta H	Tm(F)		SQRT Delta P		Stack Temp(F)	Delta P	Delta H	Tm(F)		SQRT Delta P
				in	out						in	out						in	out	
A1	83	0.43	1.42	80	80	0.6557		83	0.43	1.42	89	89	0.6557		88	0.45	1.49	99	99	0.6708
2	82	0.43	1.42	81	81	0.6557		83	0.43	1.42	90	90	0.6557		88	0.45	1.49	99	99	0.6708
3	83	0.46	1.52	82	82	0.6782		84	0.45	1.49	91	91	0.6708		88	0.45	1.49	99	99	0.6708
4	82	0.48	1.58	84	84	0.6928		83	0.45	1.49	90	90	0.6708		88	0.46	1.52	98	98	0.6782
5	82	0.50	1.65	86	86	0.7071		84	0.47	1.55	91	91	0.6856		88	0.48	1.58	98	98	0.6928
6	82	0.51	1.68	87	87	0.7141		84	0.49	1.62	91	91	0.7000		88	0.48	1.58	99	99	0.6928
7	83	0.56	1.85	89	89	0.7483		84	0.52	1.72	92	92	0.7211		88	0.50	1.65	98	98	0.7071
8	83	0.57	1.88	90	90	0.7550		84	0.54	1.78	92	92	0.7348		88	0.48	1.58	98	98	0.6928
9	83	0.57	1.88	90	90	0.7550		84	0.52	1.72	91	91	0.7211		88	0.45	1.49	99	99	0.6708
10	83	0.54	1.78	90	90	0.7348		84	0.50	1.65	91	91	0.7071		88	0.43	1.42	99	99	0.6557
11	83	0.54	1.78	89	89	0.7348		84	0.49	1.62	90	90	0.7000		88	0.43	1.42	98	98	0.6557
12	83	0.54	1.78	89	89	0.7348		84	0.49	1.62	90	90	0.7000		88	0.43	1.42	98	98	0.6557
B1	83	0.39	1.29	89	89	0.6245		85	0.44	1.45	91	91	0.6633		89	0.41	1.35	99	99	0.6403
2	83	0.39	1.29	89	89	0.6245		86	0.44	1.45	92	92	0.6633		89	0.43	1.42	99	99	0.6557
3	83	0.43	1.42	88	88	0.6557		86	0.45	1.49	91	91	0.6708		89	0.43	1.42	99	99	0.6557
4	83	0.47	1.55	89	89	0.6856		85	0.45	1.49	91	91	0.6708		89	0.45	1.49	98	98	0.6708
5	83	0.47	1.55	89	89	0.6856		85	0.47	1.55	91	91	0.6856		89	0.47	1.55	98	98	0.6856
6	84	0.50	1.65	89	89	0.7071		85	0.49	1.62	91	91	0.7000		89	0.47	1.55	98	98	0.6856
7	83	0.54	1.78	89	89	0.7348		85	0.48	1.58	92	92	0.6928		89	0.50	1.65	98	98	0.7071
8	83	0.54	1.78	89	89	0.7348		85	0.45	1.49	92	92	0.6708		89	0.45	1.49	98	98	0.6708
9	83	0.52	1.72	89	89	0.7211		85	0.43	1.42	93	93	0.6557		90	0.43	1.42	98	98	0.6557
10	83	0.51	1.68	89	89	0.7141		86	0.41	1.35	93	93	0.6403		90	0.40	1.32	98	98	0.6325
11	83	0.51	1.68	89	89	0.7141		86	0.41	1.35	93	93	0.6403		90	0.40	1.32	97	97	0.6325
12	83	0.50	1.65	89	89	0.7071		86	0.41	1.35	94	94	0.6403		90	0.40	1.32	97	97	0.6325
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
						0.0000							0.0000							0.0000
Average	83	0.50	1.64	88	88	0.7032		85	0.46	1.53	91	91	0.6799		89	0.45	1.48	98	98	0.6683

Test Data Summary and Calculations
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Outlet
Fayetteville, North Carolina

Parameter	**Run 1**	**Run 2**	**Run 3**
Run Date	6/24/20	6/24/20	6/24/20
Start/Stop Time	1000-1143	1230-1413	1455-1637
Duration of Run, Minutes	96	96	96
Ave. Nozzle Diameter, inches	0.238	0.238	0.238
Pitot Calibration Factor, CF	0.84	0.84	0.84
Meter Gamma	1.013	1.013	1.013
Meter Delta H, inches of H2O	1.73	1.73	1.73
Stack Diameter, inches	30	30	30
Rectangular Width, inches	0	0	0
Rectangular Length, inches	0	0	0
Stack Area, sq.ft.	4.91	4.91	4.91
Barometric Pressure, inches of Hg	29.81	29.81	29.81
Static Pressure, inches of H2O	2.1	2.1	2.1
Dry Gas Meter Sample Volume, (VM)ft3			
Initial	247.995	316.78	382.543
Final	315.851	382.266	447.842
Total Volume	67.856	65.486	65.299
Ave. Stack Temperature, Ts(F)	82.9	84.6	88.7
Ave. Meter Temperature, Tm(F)	87.7	91.3	98.3
Ave. Run Delta H, inches of H2O	1.64	1.53	1.48
Ave. Square Root of Delta P	0.7032	0.6799	0.6683
Moisture Data			
Volume of water collected, mls	11.8	10	21.2
Silica Gel, grams	12.4	13.2	12.2
Total Collected, mls	24.2	23.2	33.4
ORSAT Data			
%O2	20.90	20.90	20.90
%CO2	0.0	0.0	0.0
%CO			
Calculations			
Vw(std), scf =	1.139	1.092	1.572
Vm(std), dscf =	66.292	63.535	62.555
Bws=	0.017	0.017	0.025
Md=	28.84	28.84	28.84
Ms=	28.65	28.65	28.57
Vs, ft/sec =	40.2	38.9	38.4
Qs, acfm =	11,825	11,452	11,315
Qs(std), dscfm =	11,324	10,932	10,638
Isokinetic Sampling Rate, %	97	96	97

Where:
An = area of the nozzle
As = area of the stack
Vw(std) = volume of water vapor in gas, standard conditions = 0.04707*Vlc
Vm(std) = vol. of gas sampled, standard conditions = 17.647 x Vm x gamma x [Pb + (dH/13.6)]/Tm(R)
Bws = water vapor in gas stream, proportion by volume = Vw(std)/(Vm(std) + Vw(std))
Md = molecular weight of stack gas, dry basis = (0.44 x%CO2) + (0.32 x%O2) + [0.28 x (%N2 + %CO)]
Ms = molecular weight of stack gas, wet basis = [Md x (1-Bws)] + (18.0 x Bws)
Vs = stack gas velocity = 85.49 x Cp x (avg. Sq.Rt. dP) x [Sq.Rt. (Ts(R))/(Ms x Ps)]
Qs = stack gas flow rate = Vs x As x 60
Qs(std) = stack gas flow rate, standard conditions = Qs x (1-Bws) x (528/(Ts(R)) x (Ps/29.92)
Isokinetic sampling rate = {(Ts(R)) x [(0.00267 x Vlc) + (Vm(std)/17.647)] x 100}/(Time x vs x Ps x An x60)

Results Summary
The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Outlet
Fayetteville, North Carolina

Parameter:		Run 1				Run 2				Run 3				Average			
	Mol. Wt.	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr	mg	mg/dscm	ppm	lb/hr
HFPO - Dimer Acid	330	0.00202	1.08E-03	7.84E-05	4.57E-05	0.00605	3.36E-03	2.45E-04	1.38E-04	0.06556	3.70E-02	2.70E-03	1.47E-03	0.02	1.38E-02	1.01E-03	5.53E-04

Where:
Pollutant Emission Concentration:
mg= total sample collected, milligrams
mg/dscm = milligrams of pollutant per dry standard cubic meter sampled = (mg/dscf) x (35.314 cubic feet/cubic meter)
ppm = parts per million =((mg/dscm x 24.04 liters/mol)/mol.wt))

Pollutant Emission Rate:
lb/hr = pounds of pollutant emitted per hour = mg/1000/[(453.59 g/lb)/(dscf)] x dscfm x 60 min/hr

Example Calculations

The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Outlet
Fayetteville, North Carolina
Note: Values are shown for example purposes only.

Vm,a = Dry gas volume at actual conditions (acf)

Initial gas meter volume:	247.995
Final gas meter volume:	315.851
Difference:	67.856

Vm,std = Volume of dry gas at standard conditions (dscf)

= 17.647x Vm, a x Gamma*[Pbar+(DeltaH/13.6)]/Tm(R)
= 17.647 x 0.000 x 1.013 x (29.81 + [(1.730 /13.6) / 548
= 66.292

Vl,c = Volume of water collected in impingers and silica gel (ml)

impinger catch (mls):	12
silica gel (g)	12.4
total:	24.2

Vw,std = Volume of water vapor in gas at standard conditions (cu.ft.)

= (0.04707) x (Vl,c)
= 0.04707 x 24.2
= 1.139

Bwo = Proportion by volume of water vapor in gas stream

= Vw,std/(Vw,std+Vm,std)
= 1.14 / (1.14 + 66.292)
= 0.017

Ps = Stack gas static pressure (in. Hg)

= St/13.6
= 2.10 / 13.6
= 0.154

Pa = Absolute stack gas pressure (in. Hg)

= Ps+Pbar
= 0.154 + 29.81
= 29.96

MFD = Dry mole fraction of stack gas

= 1-Bwo
= 1 - 0.017
= 0.983

Md = Dry molecular weight of stack gas (lb/lb-mol)

= (0.32 x %O2) + (0.44 x %CO2) + (0.28 x %N2)
= (0.32 x 20.90)+(0.44 x 0.00) + (0.28 x 79.10)
= 28.84

Mw = Wet molecular weight of stack gas (lb/lb-mol)

= (Md) x (MFD) + (0.18) x (Bwo*100)
= 28.84 x 0.983 + 0.18 x 1.68926
= 28.65

Example Calculations

The Chemours Company - Fayetteville Works
Polymer Process Aid Carbon Bed Outlet
Fayetteville, North Carolina
Note: Values are shown for example purposes only.

Vs,avg = **Average stack gas velocity (fps)**
= Kp x (Cp) x (sqrt,deltaP) x sqrt((Ts + 460°R)/Mw*Pa))
= 85.48 x 0.84 x 0.70 x sqrt (0.63)
= 40.1

A **Cross sectional areas of stack (sq. ft)**
= pi/4*d^2
= 3.14159/4 x 2.50 ^2
= 4.91

Qa **Volumetric flow rate at actual conditions (acfm)**
= (60)sec/min(A)(Vs, avg)
= 60 x 4.9087 x 40.15
= 11,824

Qstd **Volumetric flow rate at standard conditions (scfm)**
= Qa x (528/Ts,avg + 460) x Pa/29.92
= 11,824 x (528 / 543) x 1.001
= 11,518

Qstd,dry **Volumetric flow rate at dry standard conditions per minute(dscfm)**
= Qstd x (1-Bwo)
= 11,518 x 0.9831
= 11,323

mg/dscm **HFPO-DA concentration**
= (mg/dscf) x 35.314 cu. ft./cu. meter
= (0.002 / 66.29) x 35.314
= 1.08E-03

lb/hr **HFPO-DA Mass Emission Rate**
= mg/1000/[(453.59 g/lb)/(dscf)] x dscfm x 60 min/hr
= 0.002 / 1,000 /[453.59) / 66.29)] x 11,324 x 60
= 4.57E-05

EPA Isokinetic Field Sheet

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	1	Pitot Number	P4-3
Location	Fayetteville, NC	Stack Diameter	30"	Pitot Coefficient	0.84
Source	PPA Outlet	Barometric Pres.	29.81	Stack TC I.D.	7D
Date	6/24/20	Static Pressure	+2.1	Oven Box I.D.	2
Operators	SM/NW	Meter Box #	15	Impinger Out I.D.	1
Start Time	1000	Meter delta H	1.73	Nozzle Size	0.243238
End Time	1143	Meter Gamma	1.013	XAD Trap I.D.	SMA

Leak Check Rates				
	Sample Rate		Pitot	
	in.	cfm	+	-
Initial	10	0.001	✓	✓
Mid				
Mid				
Final	6	0.001	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit: Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet	Vacuum (in. hg)	Comments/Notes
A1	0	0.43	1.42	~~247.808~~	83	92	88	65	66	80	80	4.0	K: 3.3
2	4	0.43	1.42	250.6	82	86	87	49	62	81	81	4.0	MVI = 247.995
3	8	0.46	1.52	253.1	83	85	85	46	54	82	82	4.0	
4	12	0.48	1.58	255.9	82	87	85	46	54	84	84	4.5	
5	16	0.50	1.65	258.6	82	88	85	45	52	86	86	4.5	
6	20	0.51	1.68	261.4	82	88	85	44	52	87	87	4.5	
7	24	0.56	1.85	264.4	83	88	86	45	51	89	89	5.0	
8	28	0.57	1.88	267.4	83	86	85	46	55	90	90	5.0	
9	32	0.57	1.88	270.5	83	86	85	46	53	90	90	5.0	
10	36	0.54	1.78	273.7	83	88	86	48	54	90	90	5.0	
11	40	0.54	1.78	276.5	83	85	86	48	54	89	89	5.0	
12	44	0.54	1.78	279.5	83	85	85	48	53	89	89	5.0	Stop 1048 Restart 1054.5
B1	48	0.39	1.29	282.533	83	88	86	58	57	89	89	3.5	
2	52	0.39	1.29	285.1	83	89	86	50	63	89	89	3.5	
3	56	0.43	1.42	287.6	83	91	86	49	51	88	88	4.0	
4	1:00	0.47	1.55	290.1	83	91	87	49	51	89	89	4.5	
5	1:04	0.47	1.55	293.1	83	90	88	48	49	89	89	4.5	
6	1:08	0.50	1.65	295.4	84	91	89	51	52	89	89	5.0	
7	1:12	0.54	1.78	298.4	83	91	89	50	51	89	89	6.0	
8	1:16	0.54	1.78	301.4	83	92	89	51	52	89	89	6.0	
9	1:20	0.52	1.72	304.5	83	91	90	51	51	89	89	5.5	
10	1:24	0.51	1.68	307.3	83	91	90	52	52	89	89	5.5	
11	1:28	0.51	1.68	310.1	83	90	90	52	52	89	89	5.5	
12	1:32	0.50	1.65	312.9	83	90	91	52	52	89	89	5.5	
	1:36	-	-	315.851	-	-	-	-	-	-	-	-	

Impinger Data (vol)		
#	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm)		
#	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data		
#	Number	Tare
1		
2		
3		

Molecular Weight Data (%		
#	O_2	CO_2
1	20.9	0
2		
3		
Avg		

C:\Stack\Field Data Forms\[Isokinetic Field Sheet (Version)]

RAMBOLL

EPA Isokinetic Field Sheet

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	2	Pitot Number	P4-3
Location	Fayetteville, NC	Stack Diameter	30"	Pitot Coefficient	0.84
Source	PPA Outlet	Barometric Pres.	29.81	Stack TC I.D.	7D
Date	6/24/20	Static Pressure	+2.1	Oven Box I.D.	2
Operators	SM/NW/BG	Meter Box #	15	Impinger Out I.D.	I2-9
Start Time	1230	Meter delta H	1.73	Nozzle Size	0.248
End Time	1413	Meter Gamma	1.013	XAD Trap I.D.	SN

Leak Check Rates				
	Sample Rate		Pitot	
	in.	cfm	+	-
Initial	10	0.000	✓	✓
Mid				
Mid				
Final	8	0.000	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit							Vacuum (in. hg)	Comments/Notes
					Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet		
B 1	0	0.43	1.42	316.780	83	92	92	67	61	89	89	4.0	K = 3.3
2	4	0.43	1.42	319.1	83	92	92	59	55	90	90	4.0	
3	8	0.45	1.49	321.7	84	92	92	55	58	91	91	4.0	
4	12	0.45	1.49	324.4	83	91	91	52	59	90	90	4.5	
5	16	0.47	1.55	327.1	84	91	91	54	53	91	91	4.5	
6	20	0.49	1.62	329.9	84	90	91	53	55	91	91	4.5	
7	24	0.52	1.72	332.8	84	91	91	54	53	92	92	4.5	
8	28	0.54	1.78	335.6	84	90	91	54	47	92	92	4.5	
9	32	0.52	1.72	338.5	84	90	90	54	45	91	91	4.5	
10	36	0.50	1.65	341.4	84	90	92	54	45	91	91	4.5	
11	40	0.49	1.62	344.3	84	88	90	53	44	90	90	4.5	
12	44	0.49	1.62	347.2	84	90	90	53	52	90	90	4.5	
				349.984									Stop 1318
A 1	48	0.44	1.45	350.8	85	92	90	57	57	91	91	4.0	Restart 1325
2	52	0.44	1.45	352.7	86	93	90	51	56	92	92	4.0	
3	56	0.45	1.49	355.4	86	93	90	51	55	91	91	4.0	
4	1:00	0.45	1.49	358.0	85	91	87	48	47	91	91	4.0	
5	1:04	0.47	1.55	361.0	85	92	86	49	51	91	91	4.5	
6	1:08	0.49	1.62	363.6	85	93	86	49	49	91	91	4.5	
7	1:12	0.48	1.58	366.2	85	94	87	51	48	92	92	5.0	
8	1:16	0.45	1.49	369.0	85	94	88	49	55	92	92	5.0	
9	1:20	0.43	1.42	371.8	85	94	89	49	58	93	93	5.5	
10	1:24	0.41	1.35	374.7	86	93	90	49	55	93	93	5.5	
11	1:28	0.41	1.35	377.2	86	93	90	48	55	93	93	5.5	
12	1:32	0.41	1.35	379.6	86	92	91	48	55	94	94	5.5	
	1:36	-	-	382.266	-	-	-	-	-	-	-	-	

Impinger Data (vol)		
#	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm)		
#	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data		
#	Number	Tare
1		
2		
3		

Molecular Weight Data (%		
#	O_2	CO_2
1	20.9	0
2		
3		
Avg		

RAMBOLL

C:\Stack\Field Data Forms\Isokinetic\Isok Field Sheet.xm\Sheet1

EPA Isokinetic Field Sheet

Methods Performed: Modified 0010

Client	The Chemours Company	Run Number	3	Pitot Number	P4-3
Location	Fayetteville, NC	Stack Diameter	30"	Pitot Coefficient	0.84
Source	PPA Oven Hot	Barometric Pres.	29.81	Stack TC I.D.	7D
Date	6/24/20	Static Pressure	+2.1	Oven Box I.D.	2
Operators	SM/NW	Meter Box #	15	Impinger Out I.D.	1
Start Time	1455	Meter delta H	1.73	Nozzle Size	0.248
End Time	1637	Meter Gamma	1.013	XAD Trap I.D.	SM

Leak Check Rates	Sample Rate		Pitot	
	in.	cfm	+	-
Initial	10	0.001	✓	✓
Mid				
Mid				
Final	7	0.001	✓	✓

Sample Point	Sample Time (min)	Velocity Head (in. H_2O)	Orifice Setting (in. H_2O)	Meter Volume (ft^3)	Temperature Readings in Degrees Farenheit: Stack	Probe	Oven Box	Impinger	Aux	Meter Inlet	Meter Outlet	Vacuum (in. hg)	Comments/Notes
A1	0	0.45	1.49	382.543	88	98	98	67	48	99	99	@6.5.0	K=3.3
2	4	0.45	1.49	385.5	88	98	98	61	49	99	99	5.0	
3	8	0.45	1.49	388.2	88	97	97	58	53	99	99	5.0	
4	12	0.46	1.52	390.7	88	96	97	56	49	98	98	5.0	
5	16	0.48	1.58	393.5	88	96	97	55	48	98	98	5.5	
6	20	0.48	1.58	396.3	88	97	97	54	48	99	99	5.5	
7	24	0.50	1.65	399.1	88	95	97	52	52	98	98	6.0	
8	28	0.48	1.58	402.2	88	94	96	52	47	98	98	6.0	
9	32	0.45	1.49	404.9	88	93	95	52	50	99	99	5.5	
10	36	0.43	1.42	407.8	88	92	94	52	49	99	99	5.0	
11	40	0.43	1.42	410.7	88	92	93	52	52	98	98	5.0	
12	44	0.43	1.42	413.0	88	92	93	53	50	98	98	5.0	
													Stop 1543
B1	48	0.41	1.35	415.657	89	93	94	62	61	99	99	5.5	Restart 1549
2	52	0.43	1.42	418.3	89	93	93	56	55	99	99	5.5	
3	56	0.43	1.42	420.9	89	94	93	48	53	99	99	5.5	
4	60	0.45	1.49	423.8	89	93	92	47	57	98	98	5.5	
5	64	0.47	1.55	426.3	89	93	91	47	57	98	98	5.5	
6	68	0.47	1.55	@428.429.0	89	93	91	47	58	98	98	6.0	
7	72	0.50	1.65	431.9	89	93	90	48	55	98	98	6.0	
8	76	0.45	1.49	434.7	89	92	89	48	54	98	98	6.0	
9	80	0.43	1.42	437.6	90	91	@890	48	52	98	98	5.5	
10	84	0.40	1.32	440.5	90	90	90	49	58	98	98	5.5	
11	88	0.40	1.32	442.8	90	94	95	50	62	97	97	5.5	
12	92	0.40	1.32	445.2	90	93	97	51	59	97	97	5.5	
	96	-	-	447.842	-	-	-	-	-	-	-	-	

Impinger Data (vol)		
#	Initial	Final
1	0	
2	100	
3	100	
4	0	
5	SiGel	
6		

Silica Gel Data (gm)		
#	Initial	Final
1		
2		

Moisture Gain	
	ml.
	gm
	Total

Filter Data		
#	Number	Tare
1		
2		
3		

Molecular Weight Data (%		
#	O_2	CO_2
1		
2		
3		
Avg		

Sample Train Recovery Data Sheet

Client Chemours Location Fayetteville, NC Source PPA OUTLET Method M0010 Date 6/24/20

Run # 1

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	519.4	509.6	9.8
Impinger #2	693.0	693.2	-0.2
Impinger #3	786.6	787.0	-0.4
Impinger #4	521.2	518.8	2.4
Impinger #5	829.6	817.2	12.4
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician P.G

Run # 2

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	519.4	512.0	7.4
Impinger #2	808.0	809.0	-1.0
Impinger #3	764.2	764.0	0.2
Impinger #4	532.4	529.0	3.4
Impinger #5	851.0	837.8	13.2
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician PG

Run # 3

	Final ml or gm	Initial ml or gm	Net Gain
Impinger #1	526.4	508.2	18.2
Impinger #2	702.0	702.2	-0.2
Impinger #3	772.4	772.4	0.2
Impinger #4	521.6	518.6	3.0
Impinger #5	841.2	829.0	12.2
Impinger #6			
Impinger #7			
Impinger #8			
		Total Gain	ml/gm

Filter #1 _____
Filter #2 _____
Filter #3 _____
Run Start Time _____
Run End Time _____
Recovery Technician PG

Cyclonic Flow

Velocity Determination Data Sheet

Client	~~BASF~~ Chemours	Stack Diameter	42"
Location	~~Palmyra, Mo~~ Fayetteville	Barometric Pressure	
Source	~~Unit D~~ RBA Outlet	Probe ID	
Date	6/24/20	Velocity Guage ID	
Operator	SM/NW		

Leak Check	pos.	neg
Initial		
Post		

Run No. ~~Angle~~

Traverse Point Number	~~Delta P~~ (in. H20)	Stack Temp (°F)
B1	0	
2	7	
3	-2	
4	0	
5	2	
6	1	
7	0	
8	7	
9	-2	
10	0	
11	2	
12	1	
A1	-3	
2	-3	
3	-2	
4	-2	
5	-2	
6	-2	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	

Static Pressure	
Oxygen (%)	
Carbon Dioxide (%)	
Wet Bulb (°F)	
Dry Bulb (°F)	

Run No.

Traverse Point Number	Delta P (in. H20)	Stack Temp (°F)

Static Pressure	
Oxygen (%)	
Carbon Dioxide (%)	
Wet Bulb (°F)	
Dry Bulb (°F)	

Run No.

Traverse Point Number	Delta P (in. H20)	Stack Temp (°F)

Static Pressure	
Oxygen (%)	
Carbon Dioxide (%)	
Wet Bulb (°F)	
Dry Bulb (°F)	

Nozzle Calibration Form

Plant I.D. Chemours

Project No. 75812

Source I.D. Vinyl Ethers

Personnel P. Grady

Date 6/22/20

Nozzle ID:	SS A
Diameter 1	.244
Diameter 2	.245
Diameter 3	.244
Average	.244

< 0.004" between high & low diameters

SS D PPA OUTLET

.239
.238
.238

Avg. .238

K factor 3.3

APPENDIX D
LABORATORY DATA

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-19509-1
Client Project/Site: PPA Carbon Bed Inlet - HFPO-DA
Revision: 1

For:
The Chemours Company FC, LLC
c/o AECOM
Sabre Building, Suite 300
4051 Ogletown Road
Newark, Delaware 19713

Attn: Michael Aucoin

Authorized for release by:
7/14/2020 9:30:11 AM

Courtney Adkins, Project Manager II
(865)291-3000
courtney.adkins@testamericainc.com

Table of Contents

Definitions/Glossary

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
B	Compound was found in the blank and sample.
cn	Refer to Case Narrative for further detail
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 140-19509-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-19509-1

Sample Receipt

The samples were received on June 26, 2020 at 2:50 PM in good condition and properly preserved. The temperature of the cooler at receipt was 0.8º C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

LCMS

Method 537 (modified): Results for samples QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND (140-19509-11) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): Results for samples QF-2301,2302 M0010 PPA CB INLET R1 FH (140-19509-1), QF-2308,2309 M0010 PPA CB INLET R2 FH (140-19509-5) and QF-2315,2316 M0010 PPA CB INLET R3 FH (140-19509-9) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The method blanks for preparation batch 140-40652 and 140-40721 and analytical batch 140-40787 contained HFPO-DA above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method 537 (modified): The required dilution factor for the following samples were higher than could be achieved by "in vial" dilution, as it would dilute out the Isotope Dilution Analytes (IDA): QF-2301,2302 M0010 PPA CB INLET R1 FH (140-19509-1), QF-2308,2309 M0010 PPA CB INLET R2 FH (140-19509-5), QF-2315,2316 M0010 PPA CB INLET R3 FH (140-19509-9) and QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND (140-19509-11). As such, the dilution was achieved by taking a subsample of the undiluted extract, adding sufficient solvent, and re-spiking the extract with IDA.

Method 537 (modified): Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the following samples: QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND (140-19509-11). Since the high recovery is due to matrix interferences, the analytes associated with this IDA may have a low bias.

Method 537 (modified): The method blank for preparation batch 140-40669 and 140-40785 and analytical batch 140-40951 contained HFPO-DA above the reporting limit (RL). The entire sample was consumed during analysis or extraction, therefore, the data have been reported.

Method 537 (modified): Results for samples QF-2303,2304,2306 M0010 PPA CB INLET R1 BH (140-19509-2) and QF-2310,2311,2313 M0010 PPA CB INLET R2 BH (140-19509-6) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): Results for sample QF-2321 M0010 PPA CB INLET R3 BREAKTHROUGH XAD-2 RESIN TUBE (140-19509-12) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The required dilution factor for the following samples were higher than could be achieved by "in vial" dilution, as it would dilute out the Isotope Dilution Analytes (IDA): QF-2317,2318,2320 M0010 PPA CB INLET R3 BH (140-19509-10). As such, the dilution was achieved by taking a subsample of the undiluted extract, adding sufficient solvent, and re-spiking the extract with IDA.

Job ID: 140-19509-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Client Sample ID: QF-2301,2302 M0010 PPA CB INLET R1 FH
Lab Sample ID: 140-19509-1
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	18.1	E B	0.0496	0.0248	ug/Sample		06/30/20 07:30	07/05/20 19:39	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*351*	**5*	*25 - 150*	*06/30/20 07:30*	*07/05/20 19:39*	*50*

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	89.6	B	1.59	0.794	ug/Sample		06/30/20 07:30	07/07/20 13:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*		*25 - 150*	*06/30/20 07:30*	*07/07/20 13:37*	*1*

Client Sample ID: QF-2303,2304,2306 M0010 PPA CB INLET R1 BH
Lab Sample ID: 140-19509-2
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	2.61	B	0.0800	0.0800	ug/Sample		06/30/20 07:47	07/10/20 16:43	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*96*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:43*	*50*

Client Sample ID: QF-2305 M0010 PPA CB INLET R1 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19509-3
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0875	0.0875	ug/Sample		06/30/20 13:59	07/01/20 19:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*95*		*25 - 150*	*06/30/20 13:59*	*07/01/20 19:05*	*1*

Client Sample ID: QF-2307 M0010 PPA CB INLET R1 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19509-4
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.0127	B	0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 16:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*64*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:51*	*1*

Client Sample ID: QF-2308,2309 M0010 PPA CB INLET R2 FH
Lab Sample ID: 140-19509-5

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	19.7	E B	0.0496	0.0248	ug/Sample		06/30/20 07:30	07/05/20 19:48	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*282*	**5*	*25 - 150*	*06/30/20 07:30*	*07/05/20 19:48*	*50*

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	69.4	B	1.59	0.794	ug/Sample		06/30/20 07:30	07/07/20 13:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*		*25 - 150*	*06/30/20 07:30*	*07/07/20 13:46*	*1*

Client Sample ID: QF-2310,2311,2313 M0010 PPA CB INLET R2 BH
Lab Sample ID: 140-19509-6

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	2.43	B	0.0800	0.0800	ug/Sample		06/30/20 07:47	07/10/20 17:00	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*96*		*25 - 150*	*06/30/20 07:47*	*07/10/20 17:00*	*50*

Client Sample ID: QF-2312 M0010 PPA CB INLET R2 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19509-7

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.0896		0.0858	0.0858	ug/Sample		06/30/20 13:59	07/01/20 19:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*25 - 150*	*06/30/20 13:59*	*07/01/20 19:13*	*1*

Client Sample ID: QF-2314 M0010 PPA CB INLET R2 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19509-8

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.0133	B	0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 17:09	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*66*		*25 - 150*	*06/30/20 07:47*	*07/10/20 17:09*	*1*

Client Sample ID: QF-2315,2316 M0010 PPA CB INLET R3 FH
Lab Sample ID: 140-19509-9

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	20.1	E B	0.0500	0.0250	ug/Sample		06/30/20 07:30	07/05/20 19:57	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*1147*	**5*	*25 - 150*	*06/30/20 07:30*	*07/05/20 19:57*	*50*

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1300	B	10.0	5.00	ug/Sample		06/30/20 07:30	07/07/20 17:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*		*25 - 150*	*06/30/20 07:30*	*07/07/20 17:42*	*1*

Client Sample ID: QF-2317,2318,2320 M0010 PPA CB INLET R3 BH
Lab Sample ID: 140-19509-10

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	ND	cn	1250	1130	ug/Sample		06/30/20 07:47	07/11/20 13:34	1
HFPO-DA	168000	B	2000	2000	ug/Sample		06/30/20 07:47	07/11/20 13:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*92*		*25 - 150*	*06/30/20 07:47*	*07/11/20 13:34*	*1*
13C3 HFPO-DA	*87*		*25 - 150*	*06/30/20 07:47*	*07/11/20 13:34*	*1*

Client Sample ID: QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19509-11

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	619		4.38	4.38	ug/Sample		06/30/20 13:59	07/02/20 16:02	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*156*	**5*	*25 - 150*	*06/30/20 13:59*	*07/02/20 16:02*	*50*

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1820		17.5	17.5	ug/Sample		06/30/20 13:59	07/07/20 17:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*		*25 - 150*	*06/30/20 13:59*	*07/07/20 17:33*	*1*

Client Sample Results

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Client Sample ID: QF-2321 M0010 PPA CB INLET R3 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19509-12

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1.67	B	0.0800	0.0800	ug/Sample		06/30/20 07:47	07/11/20 12:59	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*87*		*25 - 150*	*06/30/20 07:47*	*07/11/20 12:59*	*50*

Default Detection Limits

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.00100	0.000500	ug/Sample
HFPO-DA	0.00160	0.00160	ug/Sample
HFPO-DA	0.000700	0.000700	ug/Sample
PFOA	0.00100	0.000900	ug/Sample

Isotope Dilution Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Air

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
		PFOA	HFPODA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)
140-19509-1	QF-2301,2302 M0010 PPA CB I		351 *5
140-19509-1 - DL	QF-2301,2302 M0010 PPA CB INLET R1 FH		93
140-19509-2	QF-2303,2304,2306 M0010 PPA CB INLET R1 BH		96
140-19509-3	QF-2305 M0010 PPA CB INLET R1 IMPINGERS 1,2&3 COND		95
140-19509-4	QF-2307 M0010 PPA CB INLET R1 BREAKTHROUGH XAD-2 RESIN TUBE		64
140-19509-5	QF-2308,2309 M0010 PPA CB INLET R2 FH		282 *5
140-19509-5 - DL	QF-2308,2309 M0010 PPA CB INLET R2 FH		93
140-19509-6	QF-2310,2311,2313 M0010 PPA CB INLET R2 BH		96
140-19509-7	QF-2312 M0010 PPA CB INLET R2 IMPINGERS 1,2&3 COND		92
140-19509-8	QF-2314 M0010 PPA CB INLET R2 BREAKTHROUGH XAD-2 RESIN TUBE		66
140-19509-9	QF-2315,2316 M0010 PPA CB INLET R3 FH		1147 *5
140-19509-9 - DL	QF-2315,2316 M0010 PPA CB INLET R3 FH		93
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 BH	92	87
140-19509-11	QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND		156 *5
140-19509-11 - DL	QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND		92
140-19509-12	QF-2321 M0010 PPA CB INLET R3 BREAKTHROUGH XAD-2 RESIN TUBE		87
LCS 140-40652/2-B	Lab Control Sample	76	77
LCS 140-40669/2-B	Lab Control Sample	63	69
LCS 140-40695/2-B	Lab Control Sample	91	98
LCSD 140-40652/3-B	Lab Control Sample Dup	80	76
LCSD 140-40669/3-B	Lab Control Sample Dup	85	71
LCSD 140-40695/3-B	Lab Control Sample Dup	90	95
MB 140-40652/14-B	Method Blank	79	73
MB 140-40652/1-B	Method Blank	81	77
MB 140-40669/14-B	Method Blank	89	71
MB 140-40669/1-B	Method Blank	83	72
MB 140-40695/14-B	Method Blank	92	93
MB 140-40695/1-B	Method Blank		93

Surrogate Legend

PFOA = 13C4 PFOA

HFPODA = 13C3 HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 140-40652/14-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40652

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	ND		0.00100	0.000900	ug/Sample		06/30/20 07:30	07/05/20 17:27	1
HFPO-DA	0.001330		0.00100	0.000500	ug/Sample		06/30/20 07:30	07/05/20 17:27	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*79*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:27*	*1*
13C3 HFPO-DA	*73*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:27*	*1*

Lab Sample ID: MB 140-40652/1-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40652

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	ND		0.00100	0.000900	ug/Sample		06/30/20 07:30	07/05/20 17:19	1
HFPO-DA	0.001856		0.00100	0.000500	ug/Sample		06/30/20 07:30	07/05/20 17:19	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*81*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:19*	*1*
13C3 HFPO-DA	*77*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:19*	*1*

Lab Sample ID: LCS 140-40652/2-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 40652

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PFOA			0.0200	0.01932		ug/Sample		97	60 - 140		
HFPO-DA			0.0200	0.02110		ug/Sample		106	60 - 140		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*76*		*25 - 150*
13C3 HFPO-DA	*77*		*25 - 150*

Lab Sample ID: LCSD 140-40652/3-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 40652

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PFOA			0.0200	0.01950		ug/Sample		98	60 - 140	1	30
HFPO-DA			0.0200	0.02297		ug/Sample		115	60 - 140	8	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*80*		*25 - 150*
13C3 HFPO-DA	*76*		*25 - 150*

Lab Sample ID: MB 140-40669/14-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40669

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	0.005777		0.00100	0.000900	ug/Sample		06/30/20 07:47	07/10/20 16:16	1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 140-40669/14-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40669

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.006674		0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 16:16	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*89*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:16*	*1*
13C3 HFPO-DA	*71*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:16*	*1*

Lab Sample ID: MB 140-40669/1-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40669

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	0.003658		0.00100	0.000900	ug/Sample		06/30/20 07:47	07/10/20 16:07	1
HFPO-DA	0.004252		0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 16:07	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*83*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:07*	*1*
13C3 HFPO-DA	*72*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:07*	*1*

Lab Sample ID: LCS 140-40669/2-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 40669

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PFOA			0.0200	0.02391		ug/Sample		120	60 - 140		
HFPO-DA			0.0200	0.02442		ug/Sample		122	60 - 140		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*63*		*25 - 150*
13C3 HFPO-DA	*69*		*25 - 150*

Lab Sample ID: LCSD 140-40669/3-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 40669

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PFOA			0.0200	0.02446		ug/Sample		122	60 - 140	2	30
HFPO-DA			0.0200	0.01915		ug/Sample		96	60 - 140	24	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*85*		*25 - 150*
13C3 HFPO-DA	*71*		*25 - 150*

Lab Sample ID: MB 140-40695/14-B
Matrix: Air
Analysis Batch: 40723

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	ND		0.000700	0.000700	ug/Sample		06/30/20 13:59	07/01/20 17:01	1
HFPO-DA	ND		0.000700	0.000700	ug/Sample		06/30/20 13:59	07/01/20 17:01	1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	92		25 - 150	06/30/20 13:59	07/01/20 17:01	1
13C3 HFPO-DA	93		25 - 150	06/30/20 13:59	07/01/20 17:01	1

Lab Sample ID: MB 140-40695/1-B — **Client Sample ID: Method Blank**
Matrix: Air — **Prep Type: Total/NA**
Analysis Batch: 40723 — **Prep Batch: 40695**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.000700	0.000700	ug/Sample		06/30/20 13:59	07/01/20 16:51	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	93		25 - 150	06/30/20 13:59	07/01/20 16:51	1

Lab Sample ID: LCS 140-40695/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Air — **Prep Type: Total/NA**
Analysis Batch: 40723 — **Prep Batch: 40695**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PFOA			0.0100	0.009538		ug/Sample		95	60 - 140		
HFPO-DA			0.0100	0.008513		ug/Sample		85	60 - 140		

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	91		25 - 150
13C3 HFPO-DA	98		25 - 150

Lab Sample ID: LCSD 140-40695/3-B — **Client Sample ID: Lab Control Sample Dup**
Matrix: Air — **Prep Type: Total/NA**
Analysis Batch: 40723 — **Prep Batch: 40695**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PFOA			0.0100	0.009952		ug/Sample		100	60 - 140	4	30
HFPO-DA			0.0100	0.009504		ug/Sample		95	60 - 140	11	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C4 PFOA	90		25 - 150
13C3 HFPO-DA	95		25 - 150

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

LCMS

Prep Batch: 40652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-1 - DL	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	None	
140-19509-1	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	None	
140-19509-5	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	None	
140-19509-5 - DL	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	None	
140-19509-9 - DL	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	None	
140-19509-9	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	None	
MB 140-40652/14-B	Method Blank	Total/NA	Air	None	
MB 140-40652/1-B	Method Blank	Total/NA	Air	None	
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 40669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-2	QF-2303,2304,2306 M0010 PPA CB INLET R1 B	Total/NA	Air	None	
140-19509-4	QF-2307 M0010 PPA CB INLET R1 BREAKTHR(	Total/NA	Air	None	
140-19509-6	QF-2310,2311,2313 M0010 PPA CB INLET R2 B	Total/NA	Air	None	
140-19509-8	QF-2314 M0010 PPA CB INLET R2 BREAKTHR(	Total/NA	Air	None	
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 B	Total/NA	Air	None	
140-19509-12	QF-2321 M0010 PPA CB INLET R3 BREAKTHR(	Total/NA	Air	None	
MB 140-40669/14-B	Method Blank	Total/NA	Air	None	
MB 140-40669/1-B	Method Blank	Total/NA	Air	None	
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 40695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-3	QF-2305 M0010 PPA CB INLET R1 IMPINGERS	Total/NA	Air	None	
140-19509-7	QF-2312 M0010 PPA CB INLET R2 IMPINGERS	Total/NA	Air	None	
140-19509-11	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	None	
140-19509-11 - DL	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	None	
MB 140-40695/14-B	Method Blank	Total/NA	Air	None	
MB 140-40695/1-B	Method Blank	Total/NA	Air	None	
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Cleanup Batch: 40700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-3	QF-2305 M0010 PPA CB INLET R1 IMPINGERS	Total/NA	Air	Split	40695
140-19509-7	QF-2312 M0010 PPA CB INLET R2 IMPINGERS	Total/NA	Air	Split	40695
140-19509-11 - DL	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	Split	40695
140-19509-11	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	Split	40695
MB 140-40695/14-B	Method Blank	Total/NA	Air	Split	40695
MB 140-40695/1-B	Method Blank	Total/NA	Air	Split	40695
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	Split	40695
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40695

Cleanup Batch: 40721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-1 - DL	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	Split	40652
140-19509-1	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	Split	40652
140-19509-5 - DL	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	Split	40652

LCMS (Continued)

Cleanup Batch: 40721 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-5	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	Split	40652
140-19509-9 - DL	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	Split	40652
140-19509-9	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	Split	40652
MB 140-40652/14-B	Method Blank	Total/NA	Air	Split	40652
MB 140-40652/1-B	Method Blank	Total/NA	Air	Split	40652
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	Split	40652
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40652

Analysis Batch: 40723

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-3	QF-2305 M0010 PPA CB INLET R1 IMPINGERS	Total/NA	Air	537 (modified)	40700
140-19509-7	QF-2312 M0010 PPA CB INLET R2 IMPINGERS	Total/NA	Air	537 (modified)	40700
MB 140-40695/14-B	Method Blank	Total/NA	Air	537 (modified)	40700
MB 140-40695/1-B	Method Blank	Total/NA	Air	537 (modified)	40700
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40700
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40700

Analysis Batch: 40759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-11	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	537 (modified)	40700

Cleanup Batch: 40785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-2	QF-2303,2304,2306 M0010 PPA CB INLET R1 B	Total/NA	Air	Split	40669
140-19509-4	QF-2307 M0010 PPA CB INLET R1 BREAKTHR(	Total/NA	Air	Split	40669
140-19509-6	QF-2310,2311,2313 M0010 PPA CB INLET R2 B	Total/NA	Air	Split	40669
140-19509-8	QF-2314 M0010 PPA CB INLET R2 BREAKTHR(	Total/NA	Air	Split	40669
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 B	Total/NA	Air	Split	40669
140-19509-12	QF-2321 M0010 PPA CB INLET R3 BREAKTHR(	Total/NA	Air	Split	40669
MB 140-40669/14-B	Method Blank	Total/NA	Air	Split	40669
MB 140-40669/1-B	Method Blank	Total/NA	Air	Split	40669
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	Split	40669
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40669

Analysis Batch: 40787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-1	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	537 (modified)	40721
140-19509-5	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	537 (modified)	40721
140-19509-9	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	537 (modified)	40721
MB 140-40652/14-B	Method Blank	Total/NA	Air	537 (modified)	40721
MB 140-40652/1-B	Method Blank	Total/NA	Air	537 (modified)	40721
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40721
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40721

Cleanup Batch: 40818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-1 - DL	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	Dilution	40721
140-19509-5 - DL	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	Dilution	40721
140-19509-9 - DL	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	Dilution	40721

QC Association Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

LCMS

Analysis Batch: 40859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-1 - DL	QF-2301,2302 M0010 PPA CB INLET R1 FH	Total/NA	Air	537 (modified)	40818
140-19509-5 - DL	QF-2308,2309 M0010 PPA CB INLET R2 FH	Total/NA	Air	537 (modified)	40818
140-19509-9 - DL	QF-2315,2316 M0010 PPA CB INLET R3 FH	Total/NA	Air	537 (modified)	40818
140-19509-11 - DL	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	537 (modified)	40865

Cleanup Batch: 40865

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-11 - DL	QF-2319 M0010 PPA CB INLET R3 IMPINGERS	Total/NA	Air	Dilution	40700

Analysis Batch: 40951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-2	QF-2303,2304,2306 M0010 PPA CB INLET R1 B	Total/NA	Air	537 (modified)	40785
140-19509-4	QF-2307 M0010 PPA CB INLET R1 BREAKTHR(	Total/NA	Air	537 (modified)	40785
140-19509-6	QF-2310,2311,2313 M0010 PPA CB INLET R2 B	Total/NA	Air	537 (modified)	40785
140-19509-8	QF-2314 M0010 PPA CB INLET R2 BREAKTHR(	Total/NA	Air	537 (modified)	40785
MB 140-40669/14-B	Method Blank	Total/NA	Air	537 (modified)	40785
MB 140-40669/1-B	Method Blank	Total/NA	Air	537 (modified)	40785
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40785
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40785

Cleanup Batch: 40953

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 B	Total/NA	Air	Dilution	40785

Analysis Batch: 40957

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 B	Total/NA	Air	537 (modified)	40953
140-19509-12	QF-2321 M0010 PPA CB INLET R3 BREAKTHR(	Total/NA	Air	537 (modified)	40785

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Client Sample ID: QF-2301,2302 M0010 PPA CB INLET R1 FH
Lab Sample ID: 140-19509-1
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	141 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			71 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 19:39	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		1 Sample	141 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		71 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		6.25 uL	10000 uL	40818	07/06/20 13:27	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40859	07/07/20 13:37	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2303,2304,2306 M0010 PPA CB INLET R1 BH
Lab Sample ID: 140-19509-2
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40951	07/10/20 16:43	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2305 M0010 PPA CB INLET R1 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19509-3
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.008 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 19:05	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2307 M0010 PPA CB INLET R1 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19509-4
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:51	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Client Sample ID: QF-2308,2309 M0010 PPA CB INLET R2 FH

Lab Sample ID: 140-19509-5

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	141 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			71 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 19:48	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		1 Sample	141 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		71 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		6.25 uL	10000 uL	40818	07/06/20 13:27	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40859	07/07/20 13:46	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2310,2311,2313 M0010 PPA CB INLET R2 BH

Lab Sample ID: 140-19509-6

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40951	07/10/20 17:00	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2312 M0010 PPA CB INLET R2 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-19509-7

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.00816 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 19:13	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2314 M0010 PPA CB INLET R2 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-19509-8

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 17:09	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Client Sample ID: QF-2315,2316 M0010 PPA CB INLET R3 FH

Lab Sample ID: 140-19509-9

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	136 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			68 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 19:57	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		1 Sample	136 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		68 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		1 uL	10000 uL	40818	07/06/20 13:27	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40859	07/07/20 17:42	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2317,2318,2320 M0010 PPA CB INLET R3 BH

Lab Sample ID: 140-19509-10

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Cleanup	Dilution			0.008 uL	10000 uL	40953	07/10/20 17:08	JRC	TAL KNX
Total/NA	Analysis	537 (modified)		1			40957	07/11/20 13:34	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-19509-11

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.008 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40759	07/02/20 16:02	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		0.008 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		50 uL	10000 uL	40865	07/07/20 14:41	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40859	07/07/20 17:33	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Client Sample ID: QF-2321 M0010 PPA CB INLET R3 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-19509-12

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40957	07/11/20 12:59	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40652/14-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:27	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40652/1-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:19	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40669/14-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:16	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40669/1-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:07	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-40695/14-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:01	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-40695/1-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 16:51	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40652/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:36	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40669/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:25	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40695/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:10	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40652/3-B
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:45	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40669/3-B
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:34	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40695/3-B
Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:19	JRC	TAL KNX
	Instrument ID: LCA									

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: The Chemours Company FC, LLC
Job ID: 140-19509-1
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
ANAB	ISO/IEC 17025	L2311	02-14-22
Arkansas DEQ	State	88-0688	06-17-21
California	State	2423	06-30-21
Colorado	State	TN00009	02-28-21
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	07-01-21
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	11-01-20
Kentucky (DW)	State	90101	01-01-21
Louisiana	NELAP	LA110001	12-31-12 *
Louisiana	NELAP	83979	06-30-21
Louisiana (DW)	State	LA019	12-31-20
Maryland	State	277	03-31-21
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-20
New Hampshire	NELAP	299919	01-17-21
New Jersey	NELAP	TN001	07-01-21
New York	NELAP	10781	03-31-21
North Carolina (DW)	State	21705	07-31-20
North Carolina (WW/SW)	State	64	12-31-20
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	09-01-20
Oregon	NELAP	TNI0189	01-02-21
Pennsylvania	NELAP	68-00576	12-31-20
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-20
Virginia	NELAP	460176	09-15-20
Washington	State	C593	01-19-21
West Virginia (DW)	State	9955C	01-01-21
West Virginia DEP	State	345	05-01-21
Wisconsin	State	998044300	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL KNX
Dilution	Dilution and Re-fortification of Standards	None	TAL KNX
None	Leaching Procedure	TAL SOP	TAL KNX
None	Leaching Procedure for Condensate	TAL SOP	TAL KNX
None	Leaching Procedure for XAD	TAL SOP	TAL KNX
Split	Source Air Split	None	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Inlet - HFPO-DA

Job ID: 140-19509-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-19509-1	QF-2301,2302 M0010 PPA CB INLET R1 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-2	QF-2303,2304,2306 M0010 PPA CB INLET R1 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-3	QF-2305 M0010 PPA CB INLET R1 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-4	QF-2307 M0010 PPA CB INLET R1 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-5	QF-2308,2309 M0010 PPA CB INLET R2 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-6	QF-2310,2311,2313 M0010 PPA CB INLET R2 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-7	QF-2312 M0010 PPA CB INLET R2 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-8	QF-2314 M0010 PPA CB INLET R2 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-9	QF-2315,2316 M0010 PPA CB INLET R3 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-10	QF-2317,2318,2320 M0010 PPA CB INLET R3 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-11	QF-2319 M0010 PPA CB INLET R3 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19509-12	QF-2321 M0010 PPA CB INLET R3 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	

Request for Analysis/Chain-of-Custody – RFA/COC #001
The Chemours Company – Fayetteville Works Facility
HFPO-DA and PFOA Testing on PPA Carbon Bed Inlet

eurofins | Environment Testing TestAmerica

Project Identification:	Chemours Emissions Test
Client Name:	The Chemours Company FC, LLC
Client Contact:	Ms. Christel Compton Office: (910) 678-1213 Cell: (910) 975-3386
TestAmerica Project Manager:	Ms. Courtney Adkins Office: (865) 291-3019
TestAmerica Program Manager:	Mr. Billy Anderson Office: (865) 291-3080 Cell: (865) 206-9004

Laboratory Deliverable Turnaround Requirements:	
Analytical Due Date: (Review-Released Data)	21 Days from Lab Receipt
Data Package Due Date:	28 Days from Lab Receipt

Analytical Testing QC Requirements:
The Legend for Project-Specific Quality Control Testing is designated in the "QC" column as follows: "BT" = Blank Train, "RB" = Reagent Blank, "MS" = Matrix Spike, "MSD" = Matrix Spike Duplicate, "DUP" = Duplicate, "PB" = Proof Blank, "TB" = Trip Blank

Laboratory Destination:	Eurofins TestAmerica 5815 Middlebrook Pike Knoxville, TN 37921
Lab Phone Number:	865.291.3000
Courier:	Hand Deliver

Project Deliverables:
Report analytical results on TALS Report form Std_Tal_L4. Include "Field Sample Number", "Sample Type", and "Run Number" on all TALS Reports.

Analytical Parameter:	Holding Time Requirements:	Preservation Requirements:
HFPO-DA (CAS No. 13252-13-6) & PFOA (CAS No. 335-67-1)	14 Days to Extraction; 40 Days to Analysis	Cool, 4°C

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
QF-2301 PPA CB Inlet R1 M0010 Filter	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.
QF-2302 PPA CB Inlet R1 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *QF-2301*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.
QF-2303 PPA CB Inlet R1 M0010 XAD-2 Resin Tube	1	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.

140-19509 Chain of Custody

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
QF-2304 PPA CB Inlet R1 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *QF-2303*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
QF-2305 PPA CB Inlet R1 M0010 Impingers 1,2 & 3 Condensate	1	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
QF-2306 PPA CB Inlet R1 M0010 Impinger Glassware MeOH Rinse (Combine with *QF-2303*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
QF-2307 PPA CB Inlet R1 M0010 Breakthrough XAD-2 Resin Tube	1	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.
QF-2308 PPA CB Inlet R2 M0010 Filter	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.
QF-2309 PPA CB Inlet R2 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *QF-2308*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
QF-2310 PPA CB Inlet R2 M0010 XAD-2 Resin Tube	2	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.
QF-2311 PPA CB Inlet R2 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *QF-2310*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
QF-2312 PPA CB Inlet R2 M0010 Impingers 1,2 & 3 Condensate	2	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
QF-2313 PPA CB Inlet R2 M0010 Impinger Glassware MeOH Rinse (Combine with *QF-2310*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
QF-2314 PPA CB Inlet R2 M0010 Breakthrough XAD-2 Resin Tube	2	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.
QF-2315 PPA CB Inlet R3 M0010 Filter	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
QF-2316 PPA CB Inlet R3 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *QF-2315*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.
QF-2317 PPA CB Inlet R3 M0010 XAD-2 Resin Tube	3	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.
QF-2318 PPA CB Inlet R3 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *QF-2317*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
QF-2319 PPA CB Inlet R3 M0010 Impingers 1,2 & 3 Condensate	3	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
QF-2320 PPA CB Inlet R3 M0010 Impinger Glassware MeOH Rinse (Combine with *QF-2317*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
QF-2321 PPA CB Inlet R3 M0010 Breakthrough XAD-2 Resin Tube	3	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.

Sample Receipt Log and Condition of the Samples Upon Receipt:

Please fill in the following information:	Comments (Please write "NONE" if no comment applicable)
(1) Record the identities of any samples that were listed on the RFA but were not found in the sample shipment.	NONE
(2) Record the sample shipping cooler temperature of all coolers transporting samples listed on this RFA:	ET 0.8/CT 0.8 C
(3) Record any apparent sample loss/breakage.	NONE
(4) Record any unidentified samples transported with this shipment of samples:	NONE
(5) Indicate if all samples were received according to the project's required specifications (i.e. no nonconformances):	HAND DELIVERED, NO CUSTODY SEALS

Custody Transfer:

	Name	Company	Date/Time
Relinquished By:	Patricia Dandy	Ramboll	6/25/20 21:00
Accepted By:	Wm. C. Anderson	Eurofins T.A.	6/25/20 21:00
Relinquished By:	Wm. C. Anderson	Eurofins T.A.	6/26/20 14:50
Accepted By:	[signature]	FTA KNX	6.26.20 14:50
Relinquished By:			
Accepted By:			
Relinquished By:			
Accepted By:			

Loc: 140
19509

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓		✓	☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?			✓	☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6°C, VOST: 10°C) Thermometer ID : SC68 Correction factor: 0.0	✓ ✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓ ✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓ ✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓		✓	☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	✓			☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓ ✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓ ✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 14004326 PM Instructions:

Sample Receiving Associate: Date: 6-28-20

QA026R32.doc, 062719

7/14/2020 (Rev. 1)

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ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-19510-1
Client Project/Site: PPA Carbon Bed Outlet - HFPO-DA
Revision: 1

For:
The Chemours Company FC, LLC
c/o AECOM
Sabre Building, Suite 300
4051 Ogletown Road
Newark, Delaware 19713

Attn: Michael Aucoin

Authorized for release by:
7/14/2020 9:29:19 AM

Courtney Adkins, Project Manager II
(865)291-3000
courtney.adkins@testamericainc.com

Table of Contents

Definitions/Glossary

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 140-19510-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-19510-1

Sample Receipt

The samples were received on June 26, 2020 at 2:50 PM in good condition and properly preserved. The temperature of the cooler at receipt was 0.4º C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

LCMS

Method 537 (modified): Results for samples S-2119 M0010 PPA CB OUTLET R3 IMPINGERS 1,2&3 COND (140-19510-11) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): Results for samples S-2101,2102 M0010 PPA CB OUTLET R1 FH (140-19510-1), S-2108,2109 M0010 PPA CB OUTLET R2 FH (140-19510-5) and S-2115,2116 M0010 PPA CB OUTLET R3 FH (140-19510-9) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The method blanks for preparation batch 140-40652 and 140-40721 and analytical batch 140-40787 contained HFPO-DA above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method 537 (modified): The required dilution factor for the following samples were higher than could be achieved by "in vial" dilution, as it would dilute out the Isotope Dilution Analytes (IDA): S-2115,2116 M0010 PPA CB OUTLET R3 FH (140-19510-9). As such, the dilution was achieved by taking a subsample of the undiluted extract, adding sufficient solvent, and re-spiking the extract with IDA.

Method 537 (modified): The method blank for preparation batch 140-40669 and 140-40785 and analytical batch 140-40951 contained HFPO-DA above the reporting limit (RL). The entire sample was consumed during analysis or extraction, therefore, the data have been reported.

Method 537 (modified): Results for samples S-2103,2104,2106 M0010 PPA CB OUTLET R1 BH (140-19510-2), S-2110,2111,2113 M0010 PPA CB OUTLET R2 BH (140-19510-6), S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH (140-19510-10) and S-2121 M0010 PPA CB OUTLET R3 BREAKTHROUGH XAD-2 RESIN TUBE (140-19510-12) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method 537 (modified): The required dilution factor for the following samples were higher than could be achieved by "in vial" dilution, as it would dilute out the Isotope Dilution Analytes (IDA): S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH (140-19510-10). As such, the dilution was achieved by taking a subsample of the undiluted extract, adding sufficient solvent, and re-spiking the extract with IDA.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: S-2101,2102 M0010 PPA CB OUTLET R1 FH
Lab Sample ID: 140-19510-1

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1.65	B	0.0500	0.0250	ug/Sample		06/30/20 07:30	07/05/20 20:06	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*79*		*25 - 150*	*06/30/20 07:30*	*07/05/20 20:06*	*50*

Client Sample ID: S-2103,2104,2106 M0010 PPA CB OUTLET R1 BH
Lab Sample ID: 140-19510-2

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.343	B	0.0160	0.0160	ug/Sample		06/30/20 07:47	07/10/20 17:53	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*79*		*25 - 150*	*06/30/20 07:47*	*07/10/20 17:53*	*10*

Client Sample ID: S-2105 M0010 PPA CB OUTLET R1 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-3

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0823	0.0823	ug/Sample		06/30/20 13:59	07/02/20 14:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*86*		*25 - 150*	*06/30/20 13:59*	*07/02/20 14:42*	*1*

Client Sample ID: S-2107 M0010 PPA CB OUTLET R1 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19510-4

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.0278	B	0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 18:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*70*		*25 - 150*	*06/30/20 07:47*	*07/10/20 18:02*	*1*

Client Sample ID: S-2108,2109 M0010 PPA CB OUTLET R2 FH
Lab Sample ID: 140-19510-5

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	5.77	B	0.0500	0.0250	ug/Sample		06/30/20 07:30	07/05/20 20:15	50

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Client Sample ID: S-2108,2109 M0010 PPA CB OUTLET R2 FH
Lab Sample ID: 140-19510-5
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	84		25 - 150	06/30/20 07:30	07/05/20 20:15	50

Client Sample ID: S-2110,2111,2113 M0010 PPA CB OUTLET R2 BH
Lab Sample ID: 140-19510-6
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.243	B	0.0160	0.0160	ug/Sample		06/30/20 07:47	07/10/20 18:11	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	85		25 - 150	06/30/20 07:47	07/10/20 18:11	10

Client Sample ID: S-2112 M0010 PPA CB OUTLET R2 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-7
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0840	0.0840	ug/Sample		06/30/20 13:59	07/01/20 19:40	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	95		25 - 150	06/30/20 13:59	07/01/20 19:40	1

Client Sample ID: S-2114 M0010 PPA CB OUTLET R2 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19510-8
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.0397	B	0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 18:19	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	64		25 - 150	06/30/20 07:47	07/10/20 18:19	1

Client Sample ID: S-2115,2116 M0010 PPA CB OUTLET R3 FH
Lab Sample ID: 140-19510-9
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	20.6	E B	0.0500	0.0250	ug/Sample		06/30/20 07:30	07/05/20 20:50	50

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	487	*5	25 - 150	06/30/20 07:30	07/05/20 20:50	50

Client Sample ID: S-2115,2116 M0010 PPA CB OUTLET R3 FH
Lab Sample ID: 140-19510-9

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	161	B	2.00	1.00	ug/Sample		06/30/20 07:30	07/07/20 13:28	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*91*		*25 - 150*	*06/30/20 07:30*	*07/07/20 13:28*	*1*

Client Sample ID: S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH
Lab Sample ID: 140-19510-10

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	18.1	E B	0.0800	0.0800	ug/Sample		06/30/20 07:47	07/10/20 18:28	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*695*	**5*	*25 - 150*	*06/30/20 07:47*	*07/10/20 18:28*	*50*

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	353	B	3.20	3.20	ug/Sample		06/30/20 07:47	07/13/20 14:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*90*		*25 - 150*	*06/30/20 07:47*	*07/13/20 14:58*	*1*

Client Sample ID: S-2119 M0010 PPA CB OUTLET R3 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-11

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	25.5		0.402	0.402	ug/Sample		06/30/20 13:59	07/02/20 16:12	5

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*90*		*25 - 150*	*06/30/20 13:59*	*07/02/20 16:12*	*5*

Client Sample ID: S-2121 M0010 PPA CB OUTLET R3 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19510-12

Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1.36	B	0.0800	0.0800	ug/Sample		06/30/20 07:47	07/10/20 18:46	50

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*99*		*25 - 150*	*06/30/20 07:47*	*07/10/20 18:46*	*50*

Default Detection Limits

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.00100	0.000500	ug/Sample
HFPO-DA	0.00160	0.00160	ug/Sample
HFPO-DA	0.000700	0.000700	ug/Sample

Isotope Dilution Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Job ID: 140-19510-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Air

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
		PFOA	HFPODA
Lab Sample ID	Client Sample ID	(25-150)	(25-150)
140-19510-1	S-2101,2102 M0010 PPA CB OI		79
140-19510-2	S-2103,2104,2106 M0010 PPA CB OUTLET R1 BH		79
140-19510-3	S-2105 M0010 PPA CB OUTLE R1 IMPINGERS 1,2&3 COND		86
140-19510-4	S-2107 M0010 PPA CB OUTLE R1 BREAKTHROUGH XAD-2 RESIN TUBE		70
140-19510-5	S-2108,2109 M0010 PPA CB OUTLET R2 FH		84
140-19510-6	S-2110,2111,2113 M0010 PPA CB OUTLET R2 BH		85
140-19510-7	S-2112 M0010 PPA CB OUTLE R2 IMPINGERS 1,2&3 COND		95
140-19510-8	S-2114 M0010 PPA CB OUTLE R2 BREAKTHROUGH XAD-2 RESIN TUBE		64
140-19510-9	S-2115,2116 M0010 PPA CB OUTLET R3 FH		487 *5
140-19510-9 - DL	S-2115,2116 M0010 PPA CB OUTLET R3 FH		91
140-19510-10	S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH		695 *5
140-19510-10 - DL	S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH		90
140-19510-11	S-2119 M0010 PPA CB OUTLE R3 IMPINGERS 1,2&3 COND		90
140-19510-12	S-2121 M0010 PPA CB OUTLE R3 BREAKTHROUGH XAD-2 RESIN TUBE		99
LCS 140-40652/2-B	Lab Control Sample	76	77
LCS 140-40669/2-B	Lab Control Sample	63	69
LCS 140-40695/2-B	Lab Control Sample		98
LCSD 140-40652/3-B	Lab Control Sample Dup	80	76
LCSD 140-40669/3-B	Lab Control Sample Dup	85	71
LCSD 140-40695/3-B	Lab Control Sample Dup		95
MB 140-40652/14-B	Method Blank	79	73
MB 140-40669/14-B	Method Blank	89	71
MB 140-40669/1-B	Method Blank		72
MB 140-40695/14-B	Method Blank		93
MB 140-40695/1-B	Method Blank		93

Surrogate Legend

PFOA = 13C4 PFOA
HFPODA = 13C3 HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 140-40652/14-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40652

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	ND		0.00100	0.000900	ug/Sample		06/30/20 07:30	07/05/20 17:27	1
HFPO-DA	0.001330		0.00100	0.000500	ug/Sample		06/30/20 07:30	07/05/20 17:27	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*79*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:27*	*1*
13C3 HFPO-DA	*73*		*25 - 150*	*06/30/20 07:30*	*07/05/20 17:27*	*1*

Lab Sample ID: LCS 140-40652/2-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 40652

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PFOA	0.0200	0.01932		ug/Sample		97	60 - 140
HFPO-DA	0.0200	0.02110		ug/Sample		106	60 - 140

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*76*		*25 - 150*
13C3 HFPO-DA	*77*		*25 - 150*

Lab Sample ID: LCSD 140-40652/3-B
Matrix: Air
Analysis Batch: 40787

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 40652

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PFOA	0.0200	0.01950		ug/Sample		98	60 - 140	1	30
HFPO-DA	0.0200	0.02297		ug/Sample		115	60 - 140	8	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*80*		*25 - 150*
13C3 HFPO-DA	*76*		*25 - 150*

Lab Sample ID: MB 140-40669/14-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40669

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PFOA	0.005777		0.00100	0.000900	ug/Sample		06/30/20 07:47	07/10/20 16:16	1
HFPO-DA	0.006674		0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 16:16	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*89*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:16*	*1*
13C3 HFPO-DA	*71*		*25 - 150*	*06/30/20 07:47*	*07/10/20 16:16*	*1*

Lab Sample ID: MB 140-40669/1-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40669

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.004252		0.00160	0.00160	ug/Sample		06/30/20 07:47	07/10/20 16:07	1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	72		25 - 150	06/30/20 07:47	07/10/20 16:07	1

Lab Sample ID: LCS 140-40669/2-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 40669

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
PFOA			0.0200	0.02391		ug/Sample		120	60 - 140		
HFPO-DA			0.0200	0.02442		ug/Sample		122	60 - 140		

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	63		25 - 150
13C3 HFPO-DA	69		25 - 150

Lab Sample ID: LCSD 140-40669/3-B
Matrix: Air
Analysis Batch: 40951

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 40669

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PFOA			0.0200	0.02446		ug/Sample		122	60 - 140	2	30
HFPO-DA			0.0200	0.01915		ug/Sample		96	60 - 140	24	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C4 PFOA	85		25 - 150
13C3 HFPO-DA	71		25 - 150

Lab Sample ID: MB 140-40695/14-B
Matrix: Air
Analysis Batch: 40723

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.000700	0.000700	ug/Sample		06/30/20 13:59	07/01/20 17:01	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	93		25 - 150	06/30/20 13:59	07/01/20 17:01	1

Lab Sample ID: MB 140-40695/1-B
Matrix: Air
Analysis Batch: 40723

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 40695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.000700	0.000700	ug/Sample		06/30/20 13:59	07/01/20 16:51	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	93		25 - 150	06/30/20 13:59	07/01/20 16:51	1

Lab Sample ID: LCS 140-40695/2-B
Matrix: Air
Analysis Batch: 40723

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 40695

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
HFPO-DA			0.0100	0.008513		ug/Sample		85	60 - 140		

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C3 HFPO-DA	98		25 - 150

Lab Sample ID: LCSD 140-40695/3-B
Matrix: Air
Analysis Batch: 40723

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 40695

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
HFPO-DA			0.0100	0.009504		ug/Sample		95	60 - 140	11	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C3 HFPO-DA	95		25 - 150

LCMS

Prep Batch: 40652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-1	S-2101,2102 M0010 PPA CB OUTLET R1 FH	Total/NA	Air	None	
140-19510-5	S-2108,2109 M0010 PPA CB OUTLET R2 FH	Total/NA	Air	None	
140-19510-9 - DL	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	None	
140-19510-9	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	None	
MB 140-40652/14-B	Method Blank	Total/NA	Air	None	
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 40669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-2	S-2103,2104,2106 M0010 PPA CB OUTLET R1 I	Total/NA	Air	None	
140-19510-4	S-2107 M0010 PPA CB OUTLET R1 BREAKTHF	Total/NA	Air	None	
140-19510-6	S-2110,2111,2113 M0010 PPA CB OUTLET R2 I	Total/NA	Air	None	
140-19510-8	S-2114 M0010 PPA CB OUTLET R2 BREAKTHF	Total/NA	Air	None	
140-19510-10	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	None	
140-19510-10 - DL	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	None	
140-19510-12	S-2121 M0010 PPA CB OUTLET R3 BREAKTHF	Total/NA	Air	None	
MB 140-40669/14-B	Method Blank	Total/NA	Air	None	
MB 140-40669/1-B	Method Blank	Total/NA	Air	None	
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 40695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-3	S-2105 M0010 PPA CB OUTLET R1 IMPINGERS	Total/NA	Air	None	
140-19510-7	S-2112 M0010 PPA CB OUTLET R2 IMPINGERS	Total/NA	Air	None	
140-19510-11	S-2119 M0010 PPA CB OUTLET R3 IMPINGERS	Total/NA	Air	None	
MB 140-40695/14-B	Method Blank	Total/NA	Air	None	
MB 140-40695/1-B	Method Blank	Total/NA	Air	None	
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Cleanup Batch: 40700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-3	S-2105 M0010 PPA CB OUTLET R1 IMPINGERS	Total/NA	Air	Split	40695
140-19510-7	S-2112 M0010 PPA CB OUTLET R2 IMPINGERS	Total/NA	Air	Split	40695
140-19510-11	S-2119 M0010 PPA CB OUTLET R3 IMPINGERS	Total/NA	Air	Split	40695
MB 140-40695/14-B	Method Blank	Total/NA	Air	Split	40695
MB 140-40695/1-B	Method Blank	Total/NA	Air	Split	40695
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	Split	40695
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40695

Cleanup Batch: 40721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-1	S-2101,2102 M0010 PPA CB OUTLET R1 FH	Total/NA	Air	Split	40652
140-19510-5	S-2108,2109 M0010 PPA CB OUTLET R2 FH	Total/NA	Air	Split	40652
140-19510-9	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	Split	40652
140-19510-9 - DL	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	Split	40652
MB 140-40652/14-B	Method Blank	Total/NA	Air	Split	40652
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	Split	40652
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40652

LCMS

Analysis Batch: 40723

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-7	S-2112 M0010 PPA CB OUTLET R2 IMPINGERS	Total/NA	Air	537 (modified)	40700
MB 140-40695/14-B	Method Blank	Total/NA	Air	537 (modified)	40700
MB 140-40695/1-B	Method Blank	Total/NA	Air	537 (modified)	40700
LCS 140-40695/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40700
LCSD 140-40695/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40700

Analysis Batch: 40759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-3	S-2105 M0010 PPA CB OUTLET R1 IMPINGERS	Total/NA	Air	537 (modified)	40700
140-19510-11	S-2119 M0010 PPA CB OUTLET R3 IMPINGERS	Total/NA	Air	537 (modified)	40700

Cleanup Batch: 40785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-2	S-2103,2104,2106 M0010 PPA CB OUTLET R1 I	Total/NA	Air	Split	40669
140-19510-4	S-2107 M0010 PPA CB OUTLET R1 BREAKTHR	Total/NA	Air	Split	40669
140-19510-6	S-2110,2111,2113 M0010 PPA CB OUTLET R2 I	Total/NA	Air	Split	40669
140-19510-8	S-2114 M0010 PPA CB OUTLET R2 BREAKTHR	Total/NA	Air	Split	40669
140-19510-10	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	Split	40669
140-19510-10 - DL	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	Split	40669
140-19510-12	S-2121 M0010 PPA CB OUTLET R3 BREAKTHR	Total/NA	Air	Split	40669
MB 140-40669/14-B	Method Blank	Total/NA	Air	Split	40669
MB 140-40669/1-B	Method Blank	Total/NA	Air	Split	40669
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	Split	40669
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	Split	40669

Analysis Batch: 40787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-1	S-2101,2102 M0010 PPA CB OUTLET R1 FH	Total/NA	Air	537 (modified)	40721
140-19510-5	S-2108,2109 M0010 PPA CB OUTLET R2 FH	Total/NA	Air	537 (modified)	40721
140-19510-9	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	537 (modified)	40721
MB 140-40652/14-B	Method Blank	Total/NA	Air	537 (modified)	40721
LCS 140-40652/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40721
LCSD 140-40652/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40721

Cleanup Batch: 40818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-9 - DL	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	Dilution	40721

Analysis Batch: 40859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-9 - DL	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Total/NA	Air	537 (modified)	40818

Analysis Batch: 40951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-2	S-2103,2104,2106 M0010 PPA CB OUTLET R1 I	Total/NA	Air	537 (modified)	40785
140-19510-4	S-2107 M0010 PPA CB OUTLET R1 BREAKTHR	Total/NA	Air	537 (modified)	40785
140-19510-6	S-2110,2111,2113 M0010 PPA CB OUTLET R2 I	Total/NA	Air	537 (modified)	40785
140-19510-8	S-2114 M0010 PPA CB OUTLET R2 BREAKTHR	Total/NA	Air	537 (modified)	40785
140-19510-10	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	537 (modified)	40785
140-19510-12	S-2121 M0010 PPA CB OUTLET R3 BREAKTHR	Total/NA	Air	537 (modified)	40785
MB 140-40669/14-B	Method Blank	Total/NA	Air	537 (modified)	40785

LCMS (Continued)

Analysis Batch: 40951 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 140-40669/1-B	Method Blank	Total/NA	Air	537 (modified)	40785
LCS 140-40669/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	40785
LCSD 140-40669/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	40785

Analysis Batch: 40985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-10 - DL	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	537 (modified)	40986

Cleanup Batch: 40986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19510-10 - DL	S-2117,2118,2120 M0010 PPA CB OUTLET R3 I	Total/NA	Air	Dilution	40785

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Client Sample ID: S-2101,2102 M0010 PPA CB OUTLET R1 FH
Lab Sample ID: 140-19510-1
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	148 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			74 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 20:06	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2103,2104,2106 M0010 PPA CB OUTLET R1 BH
Lab Sample ID: 140-19510-2
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		10			40951	07/10/20 17:53	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2105 M0010 PPA CB OUTLET R1 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-3
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.00851 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40759	07/02/20 14:42	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2107 M0010 PPA CB OUTLET R1 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19510-4
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 18:02	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Client Sample ID: S-2108,2109 M0010 PPA CB OUTLET R2 FH
Lab Sample ID: 140-19510-5
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	198 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			99 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 20:15	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2110,2111,2113 M0010 PPA CB OUTLET R2 BH
Lab Sample ID: 140-19510-6
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		10			40951	07/10/20 18:11	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2112 M0010 PPA CB OUTLET R2 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-7
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.00833 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 19:40	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2114 M0010 PPA CB OUTLET R2 BREAKTHROUGH XAD-2 RESIN TUBE
Lab Sample ID: 140-19510-8
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 18:19	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Client Sample ID: S-2115,2116 M0010 PPA CB OUTLET R3 FH
Lab Sample ID: 140-19510-9
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	202 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			101 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40787	07/05/20 20:50	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		1 Sample	202 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		101 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		5 uL	10000 uL	40818	07/06/20 13:27	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40859	07/07/20 13:28	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH
Lab Sample ID: 140-19510-10
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40951	07/10/20 18:28	JRC	TAL KNX
	Instrument ID: LCA									
Total/NA	Prep	None	DL		1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split	DL		180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Cleanup	Dilution	DL		5 uL	10000 uL	40986	07/13/20 13:27	JRC	TAL KNX
Total/NA	Analysis	537 (modified)	DL	1			40985	07/13/20 14:58	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: S-2119 M0010 PPA CB OUTLET R3 IMPINGERS 1,2&3 COND
Lab Sample ID: 140-19510-11
Date Collected: 06/24/20 00:00
Matrix: Air
Date Received: 06/26/20 14:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			0.0087 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		5			40759	07/02/20 16:12	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Job ID: 140-19510-1

Client Sample ID: S-2121 M0010 PPA CB OUTLET R3 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-19510-12

Date Collected: 06/24/20 00:00
Date Received: 06/26/20 14:50

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		50			40951	07/10/20 18:46	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40652/14-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:27	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40669/14-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:16	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40669/1-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:07	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-40695/14-B

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:01	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Job ID: 140-19510-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-40695/1-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 16:51	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40652/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:36	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40669/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:25	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-40695/2-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:10	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40652/3-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	50 mL	40652	06/30/20 07:30	DWS	TAL KNX
Total/NA	Cleanup	Split			25 mL	10 mL	40721	07/01/20 10:14	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40787	07/05/20 17:45	JRC	TAL KNX
	Instrument ID: LCA									

Lab Chronicle

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40669/3-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	360 mL	40669	06/30/20 07:47	DWS	TAL KNX
Total/NA	Cleanup	Split			180 mL	10 mL	40785	07/05/20 06:33	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40951	07/10/20 16:34	JRC	TAL KNX
	Instrument ID: LCA									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-40695/3-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			1 Sample	10 mL	40695	06/30/20 13:59	DWS	TAL KNX
Total/NA	Cleanup	Split			10 mL	10 mL	40700	06/30/20 15:36	DWS	TAL KNX
Total/NA	Analysis	537 (modified)		1			40723	07/01/20 17:19	JRC	TAL KNX
	Instrument ID: LCA									

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
ANAB	ISO/IEC 17025	L2311	02-14-22
Arkansas DEQ	State	88-0688	06-17-21
California	State	2423	06-30-21
Colorado	State	TN00009	02-28-21
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	07-01-21
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	11-01-20
Kentucky (DW)	State	90101	01-01-21
Louisiana	NELAP	LA110001	12-31-12 *
Louisiana	NELAP	83979	06-30-21
Louisiana (DW)	State	LA019	12-31-20
Maryland	State	277	03-31-21
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-20
New Hampshire	NELAP	299919	01-17-21
New Jersey	NELAP	TN001	07-01-21
New York	NELAP	10781	03-31-21
North Carolina (DW)	State	21705	07-31-20
North Carolina (WW/SW)	State	64	12-31-20
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	09-01-20
Oregon	NELAP	TNI0189	01-02-21
Pennsylvania	NELAP	68-00576	12-31-20
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-20
Virginia	NELAP	460176	09-15-20
Washington	State	C593	01-19-21
West Virginia (DW)	State	9955C	01-01-21
West Virginia DEP	State	345	05-01-21
Wisconsin	State	998044300	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: The Chemours Company FC, LLC
Job ID: 140-19510-1
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL KNX
Dilution	Dilution and Re-fortification of Standards	None	TAL KNX
None	Leaching Procedure	TAL SOP	TAL KNX
None	Leaching Procedure for Condensate	TAL SOP	TAL KNX
None	Leaching Procedure for XAD	TAL SOP	TAL KNX
Split	Source Air Split	None	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: The Chemours Company FC, LLC
Project/Site: PPA Carbon Bed Outlet - HFPO-DA

Job ID: 140-19510-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-19510-1	S-2101,2102 M0010 PPA CB OUTLET R1 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-2	S-2103,2104,2106 M0010 PPA CB OUTLET R1 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-3	S-2105 M0010 PPA CB OUTLET R1 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-4	S-2107 M0010 PPA CB OUTLET R1 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-5	S-2108,2109 M0010 PPA CB OUTLET R2 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-6	S-2110,2111,2113 M0010 PPA CB OUTLET R2 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-7	S-2112 M0010 PPA CB OUTLET R2 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-8	S-2114 M0010 PPA CB OUTLET R2 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-9	S-2115,2116 M0010 PPA CB OUTLET R3 FH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-10	S-2117,2118,2120 M0010 PPA CB OUTLET R3 BH	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-11	S-2119 M0010 PPA CB OUTLET R3 IMPINGERS 1,2&3 COND	Air	06/24/20 00:00	06/26/20 14:50	
140-19510-12	S-2121 M0010 PPA CB OUTLET R3 BREAKTHROUGH XAD-2 RESIN TUBE	Air	06/24/20 00:00	06/26/20 14:50	

Request for Analysis/Chain-of-Custody – RFA/COC #002
The Chemours Company – Fayetteville Works Facility
HFPO-DA and PFOA Testing on PPA Carbon Bed Outlet

eurofins | Environment Testing TestAmerica

Project Identification:	Chemours Emissions Test
Client Name:	The Chemours Company FC, LLC
Client Contact:	Ms. Christel Compton Office: (910) 678-1213 Cell: (910) 975-3386
TestAmerica Project Manager:	Ms. Courtney Adkins Office: (865) 291-3019
TestAmerica Program Manager:	Mr. Billy Anderson Office: (865) 291-3080 Cell: (865) 206-9004

Laboratory Deliverable Turnaround Requirements:	
Analytical Due Date: (Review-Released Data)	21 Days from Lab Receipt
Data Package Due Date:	28 Days from Lab Receipt

Analytical Testing QC Requirements:
The Legend for Project-Specific Quality Control Testing is designated in the "QC" column as follows: "BT" = Blank Train, "RB" = Reagent Blank, "MS" = Matrix Spike, "MSD" = Matrix Spike Duplicate, "DUP" = Duplicate, "PB" = Proof Blank, "TB" = Trip Blank

Laboratory Destination:	Eurofins TestAmerica 5815 Middlebrook Pike Knoxville, TN 37921
Lab Phone Number:	865.291.3000
Courier:	Hand Deliver

Project Deliverables:
Report analytical results on TALS Report form Std_Tal_L4. Include "Field Sample Number", "Sample Type", and "Run Number" on all TALS Reports.

Analytical Parameter:	Holding Time Requirements:	Preservation Requirements:
HFPO-DA (CAS No. 13252-13-6) & PFOA (CAS No. 335-67-1)	14 Days to Extraction; 40 Days to Analysis	Cool, 4°C

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
S-2101 PPA CB Outlet R1 M0010 Filter	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.
S-2102 PPA CB Outlet R1 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *S-2101*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.
S-2103 PPA CB Outlet R1 M0010 XAD-2 Resin Tube	1	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.

140-19510 Chain of Custody

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
S-2104 PPA CB Outlet R1 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *S-2103*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
S-2105 PPA CB Outlet R1 M0010 Impingers 1,2 & 3 Condensate	1	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
S-2106 PPA CB Outlet R1 M0010 Impinger Glassware MeOH Rinse (Combine with *S-2103*)	1	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
S-2107 PPA CB Outlet R1 M0010 Breakthrough XAD-2 Resin Tube	1	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.
S-2108 PPA CB Outlet R2 M0010 Filter	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.
S-2109 PPA CB Outlet R2 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *S-2108*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
S-2110 PPA CB Outlet R2 M0010 XAD-2 Resin Tube	2	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.
S-2111 PPA CB Outlet R2 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *S-2110*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
S-2112 PPA CB Outlet R2 M0010 Impingers 1,2 & 3 Condensate	2	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
S-2113 PPA CB Outlet R2 M0010 Impinger Glassware MeOH Rinse (Combine with *S-2110*)	2	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
S-2114 PPA CB Outlet R2 M0010 Breakthrough XAD-2 Resin Tube	2	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.
S-2115 PPA CB Outlet R3 M0010 Filter	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Particulate Filter (90 mm Whatman Glass Microfiber)** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Front-Half Probe Rinse to assist the solvent extraction of the Filter sample. Analyze for HFPO-DA and PFOA.

Field Sample No./Sample Coding ID	Run No.	Sample Collection Date	Project QC Require-ments	Sample Bottle/ Container	Sample Type/Analysis	Analytical Specifications
S-2116 PPA CB Outlet R3 M0010 FH of Filter Holder & Probe MeOH Rinse (Combine with *S-2115*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Front Half of Filter Holder & Probe Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the Filter extraction.
S-2117 PPA CB Outlet R3 M0010 XAD-2 Resin Tube	3	6/24/20		XAD-2 Resin Tube	**XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level. Use the Back-Half Glassware Rinse and the Impinger Glassware Methanol Rinse to assist the solvent extraction of the XAD-2 resin sample. Analyze for HFPO-DA and PFOA.
S-2118 PPA CB Outlet R3 M0010 BH of Filter Holder & Coil Condenser MeOH Rinse (Combine with *S-2117*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Back Half of Filter Holder & Coil Condenser Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample and the Impinger Glassware Methanol Rinse in the XAD-2 Resin extraction. Analyze for HFPO-DA and PFOA.
S-2119 PPA CB Outlet R3 M0010 Impingers 1,2 & 3 Condensate	3	6/24/20		1 Liter HDPE Wide-Mouth Bottle	**Impinger #1, #2 & #3 Condensate** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Measure the total volume of the Impinger Composite. Analyze for HFPO-DA and PFOA.
S-2120 PPA CB Outlet R3 M0010 Impinger Glassware MeOH Rinse (Combine with *S-2117*)	3	6/24/20		250 mL HDPE Wide-Mouth Bottle	**Impinger Glassware Methanol/5% Ammonium Hydroxide Rinse** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Use this solvent sample in the XAD-2 Resin Extraction.
S-2121 PPA CB Outlet R3 M0010 Breakthrough XAD-2 Resin Tube	3	6/24/20		XAD-2 Resin Tube	**Breakthrough XAD-2 Resin Tube** Method 0010 Train HFPO-DA & PFOA Analysis	**Knoxville**: Spike sample with the Isotope Dilution Internal Standard (IDIS) at the regular level and perform the regular XAD-2 Resin Extraction. Analyze for HFPO-DA and PFOA.

Sample Receipt Log and Condition of the Samples Upon Receipt:

Please fill in the following information:	Comments (Please write "NONE" if no comment applicable)
(1) Record the identities of any samples that were listed on the RFA but were not found in the sample shipment.	NONE
(2) Record the sample shipping cooler temperature of all coolers transporting samples listed on this RFA:	RT 0.4 / CT 0.4°C
(3) Record any apparent sample loss/breakage.	NONE
(4) Record any unidentified samples transported with this shipment of samples:	NONE
(5) Indicate if all samples were received according to the project's required specifications (i.e. no nonconformances):	HAND DELIVERED, NO CUSTODY SEALS

Custody Transfer:

	Name	Company	Date/Time
Relinquished By:	Patrick Mundy	Ramboll	6/25/20 21:00
Accepted By:	M. C. Anderson	Eurofins T.A.	6/25/20 21:00
Relinquished By:	M. C. Anderson	Eurofins T.A.	6/26/20 14:50
Accepted By:		FEDEX	6.26.20 14:50
Relinquished By:			
Accepted By:			
Relinquished By:			
Accepted By:			

Loc: 140
19510

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓		✓	☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?			✓	☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : SC68 Correction factor: 0.0	✓ ✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓ ✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?			✓	☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓ ✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓ ✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			//	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			//	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 140004326 PM Instructions:

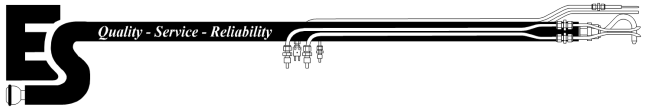
Sample Receiving Associate: Date: 6-28-20

QA026R32.doc, 062719

APPENDIX E
EQUIPMENT CALIBRATION DATA

Pretest Equipment Calibration Data

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES



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 data and information in the **GREEN** cells, YELLOW cells are calculated.

					INITIAL	FINAL	AVG (P_{bar})
DATE:	4/1/2020	METER SERIAL #:	MB5	BAROMETRIC PRESSURE (in Hg):	29.83	29.83	29.83
METER PART #:		CRITICAL ORIFICE SET SERIAL #:	1393				

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	FINAL	DGM OUTLET INITIAL	FINAL	DGM AVG	ELAPSED TIME (MIN) q	DGM DH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y % Diff to Average Y	Y % Diff with other orifices	$DH_@$
11	1	0.306	23	18.604	24.691	6.087	67.3	66	68	66	67	66.75	15.00	0.49	6.0916	5.9644	0.979			1.74
	2	0.306																		
	3	0.306																		
																	AVG =	0.979	-1.43	-1.04
16	1	0.4268	21.5	66.222	71.863	5.641	69	73	73	71	71	72	10.00	1	5.5965	5.5370	0.989			1.82
	2	0.4268																		
	3	0.4268																		
																	AVG =	0.989	-0.40	1.05
18	1	0.4961	21	30.186	36.697	6.511	68.1	69	70	68	69	69	10.00	1.4	6.5027	6.4416	0.991			1.90
	2	0.4961																		
	3	0.4961																		
																	AVG =	0.991	-0.27	0.12
26	1	0.7131	18	46.170	55.444	9.274	68.5	72	73	69	70	71	10.00	2.8	9.2590	9.2557	1.000			1.84
	2	0.7131																		
	3	0.7131																		
																	AVG =	1.000	0.64	0.91
31	1	0.8358	17	55.444	66.222	10.778	68.8	73	75	70	71	72.25	10.00	3.8	10.7616	10.8452	1.008			1.81
	2	0.8358																		
	3	0.8358																		
																	AVG =	1.008	1.46	1.73

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.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.993

AVERAGE $DH_@$ = 1.82

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= 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) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= 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

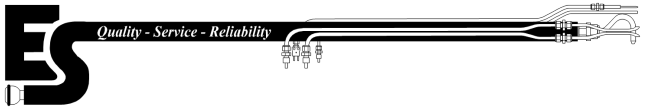
(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

$$DH_@ = \left(\frac{0.75\ q}{V_{cr(std)}}\right)^2 DH \left(\frac{V_{m(std)}}{V_m}\right)$$

RAMBOLL

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES



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 data and information in the **GREEN** cells, YELLOW cells are calculated.

DATE:	1/14/2020	METER SERIAL #:	MB 15	BAROMETRIC PRESSURE (in Hg):	INITIAL 30.27 / FINAL 30.27 / AVG (P_{bar}) 30.27
METER PART #:		CRITICAL ORIFICE SET SERIAL #:	1393		

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) q	DGM DH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y % Diff to Average Y	Y % Diff with other orifices	$DH_@$
11	1	0.306	23.5	240.408	246.224	5.816	70.4	65	67	65	67	66	15.00	0.5	5.9147	6.0346	1.020			1.77
	2	0.306																		
	3	0.306																		
																AVG =	1.020	0.68	1.04	
16	1	0.4268	22.5	246.224	251.697	5.473	70.4	67	68	67	68	67.5	10.00	1	5.5568	5.6113	1.010			1.81
	2	0.4268																		
	3	0.4268																		
																AVG =	1.010	-0.35	-1.03	
18	1	0.4961	20.5	251.697	257.984	6.287	70.5	68	70	68	70	69	10.00	1.2	6.3682	6.5218	1.024			1.61
	2	0.4961																		
	3	0.4961																		
																AVG =	1.024	1.06	1.87	
26	1	0.7131	17.5	257.984	267.179	9.195	70.9	70	71	70	71	70.5	10.00	2.7	9.3212	9.3709	1.005			1.75
	2	0.7131																		
	3	0.7131																		
																AVG =	1.005	-0.79	-0.21	
31	1	0.8358	17.5	267.179	277.971	10.792	71.1	71	73	71	73	72	10.03	3.6	10.9329	11.0142	1.007			1.70
	2	0.8358																		
	3	0.8358																		
																AVG =	1.007	-0.59	0.21	

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.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.013

AVERAGE $DH_@$ = 1.73

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= 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) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= 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) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

$$DH_@ = \left(\frac{0.75\ q}{V_{cr(std)}}\right)^2 DH \left(\frac{V_{m(std)}}{V_m}\right)$$

RAMBOLL

Initial Oven Box Thermocouple Calibration

ID Number	Ice Bath			Ambient			Hot Water Bath			Technician	Date Performed
	Reference Temperature (^{o}R)	Thermocouple Temperature (^{o}R)	Deviation*	Reference Temperature (^{o}R)	Thermocouple Temperature (^{o}R)	Deviation*	Reference Temperature (^{o}R)	Thermocouple Temperature (^{o}R)	Deviation*		
OB-1	491.67	492.67	0.2%	524.67	523.67	-0.2%	671.67	673.67	0.3%	JLS	01/17/20
OB-2	491.67	492.67	0.2%	524.67	524.67	0.0%	671.67	669.67	-0.3%	JLS	01/17/20
OB-3	491.67	492.67	0.2%	524.67	524.67	0.0%	671.67	669.67	-0.3%	JLS	01/17/20
OB-4	491.67	493.67	0.4%	524.67	524.67	0.0%	671.67	670.67	-0.1%	JLS	01/17/20
OB-A	491.67	492.67	0.2%	524.67	526.67	0.4%	671.67	673.67	0.3%	JLS	01/17/20
OB-B	491.67	492.67	0.2%	524.67	526.67	0.4%	671.67	672.67	0.1%	JLS	01/17/20
OB-5	491.67	494.67	0.6%	524.67	523.67	-0.2%	671.67	669.67	-0.3%	JLS	01/17/20
OB-C	491.67	492.67	0.2%	524.67	525	0.0%	671.67	673.67	0.3%	JLS	01/17/20
OB-6	491.67	493.67	0.4%	524.67	525	0.0%	671.67	669.67	-0.3%	JLS	01/17/20
OB-7	491.67	494.67	0.6%	524.67	525	0.0%	671.67	671.67	0.0%	JLS	01/17/20
OB-E	491.67	494	0.4%	524.67	528	0.6%	671.67	668.67	-0.4%	JLS	01/17/20
OB-10	491.67	493.67	0.4%	524.67	525.67	0.2%	671.67	671.67	0.0%	JLS	01/17/20
OB-11	491.67	493.67	0.4%	524.67	525.67	0.2%	671.67	671.67	0.0%	JLS	01/17/20

Reference Thermocouple: Fluke S/N: 83450033 or S/N 90460057 traceable to the Untied States National Institute of Standards and Technology

*Acceptable Deviation: 1.5%

Initial Impinger Outlet Thermocouple Calibration

ID Number	Ice Bath			Ambient			Hot Water Bath			Technician	Date Performed
	Reference Temperature (^{o}Rk)	Thermocouple Temperature (^{o}Rk)	Deviation*	Reference Temperature (^{o}Rk)	Thermocouple Temperature (^{o}Rk)	Deviation*	Reference Temperature (^{o}Rk)	Thermocouple Temperature (^{o}Rk)	Deviation*		
IO-1	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	670.67	-0.1%	JLS	01/30/20
IO-2	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	671.67	0.0%	JLS	01/30/20
IO-3	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	670.67	-0.1%	JLS	01/30/20
IO-4	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	669.67	-0.3%	JLS	01/30/20
IO-5	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	671.67	0.0%	JLS	01/30/20
IO-6	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	672.67	0.1%	JLS	01/30/20
IO-7	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	670.67	-0.1%	JLS	01/30/20
IO-8	491.67	493.67	0.4%	527.67	527.67	0.0%	671.67	669.67	-0.3%	JLS	01/30/20
IO-9	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	672.67	0.1%	JLS	01/30/20
IO-10	491.67	492.67	0.2%	527.67	526.67	-0.2%	671.67	672.67	0.1%	JLS	01/30/20
IO-11	491.67	493.67	0.4%	527.67	527.67	0.0%	671.67	672.67	0.1%	JLS	01/30/20
IO-12	491.67	492.67	0.2%	527.67	526.67	-0.2%	671.67	672.67	0.1%	JLS	01/30/20
IO-13	NA			NA			NA			JLS	01/30/20
IO-14	491.67	494.67	0.6%	527.67	526.67	-0.2%	671.67	670.67	-0.1%	JLS	01/30/20
IO-15	491.67	493.67	0.4%	527.67	527.67	0.0%	671.67	670.67	-0.1%	JLS	01/30/20
IO-16	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	671.67	0.0%	JLS	01/30/20
IO-17	NA			NA			NA			JLS	01/30/20
IO-18	491.67	493.67	0.4%	527.67	527.67	0.0%	671.67	669.67	-0.3%	JLS	01/30/20
IO-19	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	671.67	0.0%	JLS	01/30/20
IO-19	491.67	493.67	0.4%	527.67	526.67	-0.2%	671.67	671.67	0.0%	JLS	01/30/20

Reference Thermocouple: Fluke S/N: 83450033 or S/N 90460057 traceable to the Untied States National Institute of Standards and Technology
*Acceptable Deviation: 1.5%

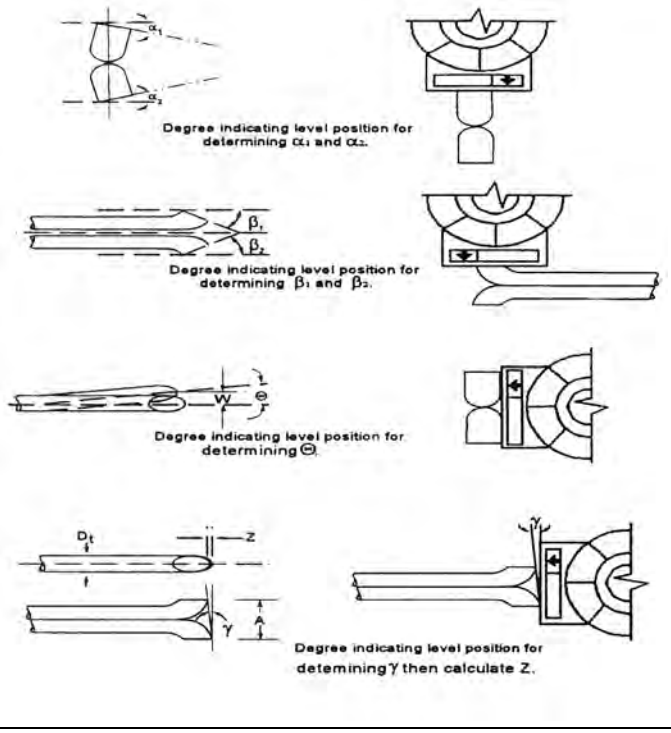
Initial Sample Probe Calibration Form

Probe ID: P4-2/TC-5D | Date: 06/16/20 | Technician: P. Grady

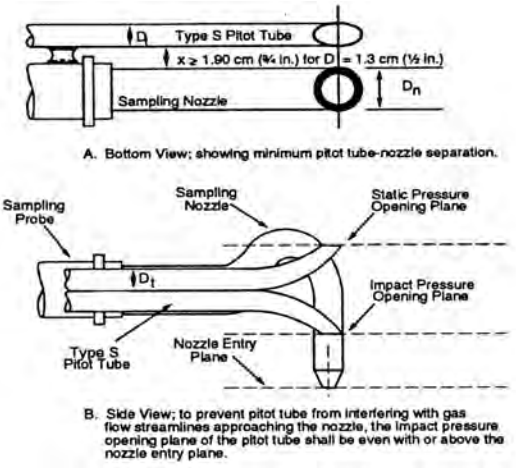
"S" Type Pitot Calibration

Is the Pitot Level and Perpindicular?	Yes
Is There any Obstruction?	No
Is the Pitot Damaged	No
α_1 ($-10^o = \alpha_1 = +10^o$)	2
α_2 ($-10^o = \alpha_2 = +10^o$)	1
$ß_1$ ($-5^o = ß_1 = +5^o$)	1
$ß_2$ ($-5^o = ß_2 = +5^o$)	1
γ	1
Θ	0
z = A Tan γ (< 0.125")	0.011
W = A Tan Θ (< 0.03125")	0.0000
D_t (3/16 = D_t = 3/8")	0.251
A	0.650
A/2D_t (1.05 = P_A/D_t = 1.5)	1.295

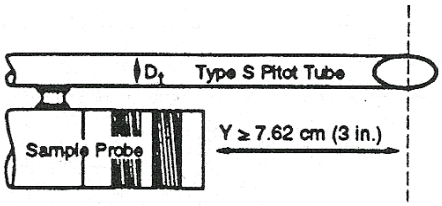
Source: Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods. EPA/600/R-94/038c, September 30, 1994



Verification of "S" Type Pitot, Thermocouple and Nozzle Placement



Does X Exceed 0.75 inches?	Yes
Does Y Exceed 3 inches?	NA



Thermocouple Calibration

	Ice Bath ^oR			Ambient ^oR			Boiling Water ^oR		
	1	2	3	1	2	3	1	2	3
Reference Temp	492.3	492.3	492.3	533.4	533.4	533.4	671.5	671.5	671.5
Thermocouple Temp	492.9	492.8	492.8	532.7	532.6	532.7	673.1	673	673
Difference (%)	0.1	0.1	0.1	-0.1	-0.1	-0.1	0.2	0.2	0.2

Temperature values must be within 1.5% of reference temperature

I certify that the probe ID P4-2/TC-5D meets or exceeds all specifications, criteria and/or applicable design features and is herby assigned a pitot tube calibration factor C_p of 0.84.

Certified By: P. Grady Date: 06/16/20

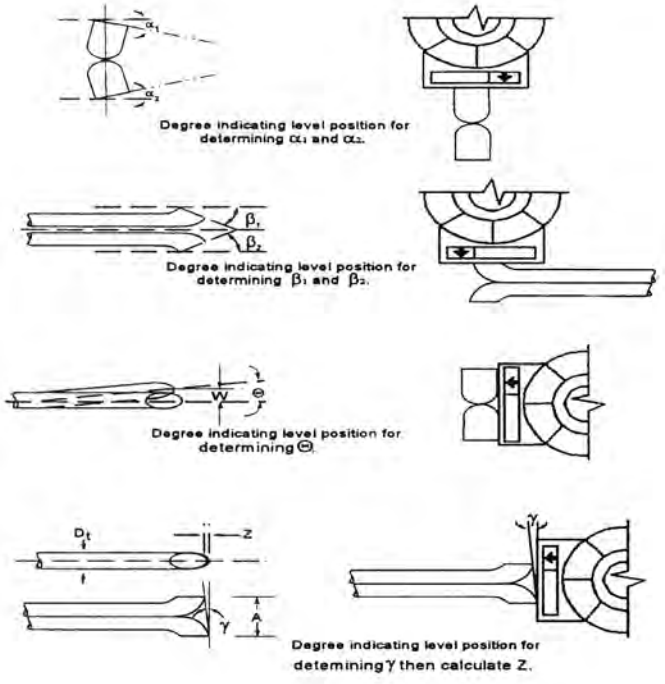
Initial Sample Probe Calibration Form

Probe ID: P4-3/TC-7D | Date: 06/16/20 | Technician: P. Grady

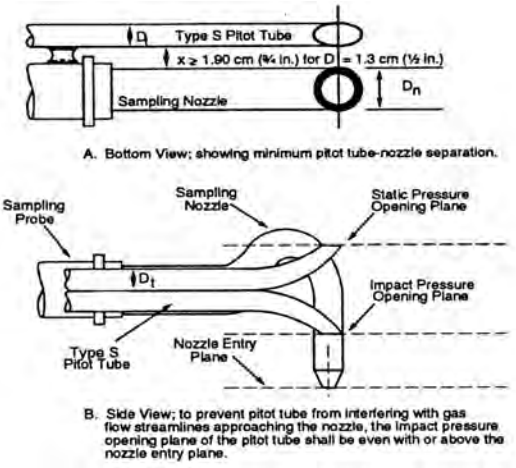
"S" Type Pitot Calibration

Is the Pitot Level and Perpindicular?	Yes
Is There any Obstruction?	No
Is the Pitot Damaged	No
α_1 ($-10^o = \alpha_1 = +10^o$)	1
α_2 ($-10^o = \alpha_2 = +10^o$)	0
$ß_1$ ($-5^o = ß_1 = +5^o$)	1
$ß_2$ ($-5^o = ß_2 = +5^o$)	1
γ	1
Θ	1
z = A Tan γ (< 0.125")	0.011
W = A Tan Θ (< 0.03125")	0.0110
D_t (3/16 = D_t = 3/8")	0.251
A	0.628
A/2D_t (1.05 = P_A/D_t = 1.5)	1.251

Source: Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods. EPA/600/R-94/038c, September 30, 1994

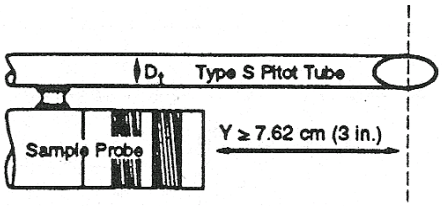


Verification of "S" Type Pitot, Thermocouple and Nozzle Placement



Does X Exceed 0.75 inches? Yes

Does Y Exceed 3 inches? NA



Thermocouple Calibration

	Ice Bath °R			Ambient °R			Boiling Water °R		
	1	2	3	1	2	3	1	2	3
Reference Temp	492.3	492.3	492.3	533.4	533.4	533.4	671.5	671.5	671.5
Thermocouple Temp	492.7	492.6	492.6	533.1	533.2	533.2	671.8	671.8	671.8
Difference (%)	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.0

Temperature values must be within 1.5% of reference temperature

I certify that the probe ID P4-3/TC-7D meets or exceeds all specifications, criteria and/or applicable design features and is herby assigned a pitot tube calibration factor C_p of 0.84.

Certified By: P. Grady Date: 06/16/20

Post Test Equipment Calibration Data

POST TEST DRY GAS METER CALIBRATION

DATE:	06/12/20	METER BOX #:	5	BAROMETRIC PRESSURE (in Hg):	INITIAL 29.97	FINAL 29.97	AVG (P_{bar}) 29.97
TECHNICIAN:	A. Anderson	CRITICAL ORIFICE SET SERIAL #:	1393				

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	TEMPERATURES °F DGM INLET INITIAL	TEMPERATURES °F DGM INLET FINAL	TEMPERATURES °F DGM OUTLET INITIAL	TEMPERATURES °F DGM OUTLET FINAL	TEMPERATURES °F DGM AVG	ELAPSED TIME (MIN) q	DGM DH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y % Diff to Average Y	$DH_@$
	1																		
	2																		
	3																		
																AVG =			
18	1	0.4961	21	321.955	328.473	6.518	72	71	72	69	70	70.5	10.00	1.3	6.5201	6.4480	0.989	0.29	1.76
	2	0.4961	21	328.473	335.038	6.565	72	72	72	70	70	71	10.00	1.3	6.5609	6.4480	0.983	-0.33	1.76
	3	0.4961	21	335.038	341.579	6.541	72	72	72	70	70	71	10.00	1.3	6.5369	6.4480	0.986	0.04	1.76
																AVG =	0.986		
	1																		
	2																		
	3																		
																AVG =			

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.986

PRE-DETERMINED DRY GAS METER CALIBRATION FACTOR, Y = 0.993

PERCENT DIFFERENCE = -0.7

POST TEST DRY GAS METER CALIBRATION

DATE:	06/30/20	METER BOX #:	15	BAROMETRIC PRESSURE (in Hg):	INITIAL 29.96	FINAL 29.96	AVG (P_{bar}) 29.96
TECHNICIAN:	A. Anderson	CRITICAL ORIFICE SET SERIAL #:	1393				

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) q	DGM DH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y % Diff to Average Y	$DH_@$
	1																		
	2																		
	3																		
																AVG =			
18	1	0.4961	21.5	450.407	456.830	6.423	72	70	70	70	70	70	10.00	1.3	6.4289	6.4459	1.003	-0.13	1.76
	2	0.4961	21.5	456.830	462.883	6.053	72	70	71	70	71	70.5	10.00	1.3	6.0529	6.4459	1.065	6.07	1.76
	3	0.4961	21.5	462.883	469.715	6.832	72	71	71	71	71	71	10.00	1.3	6.8254	6.4459	0.944	-5.94	1.76
																AVG =	1.004		
	1																		
	2																		
	3																		
																AVG =			

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.004

PRE-DETERMINED DRY GAS METER CALIBRATION FACTOR, Y = 1.013

PERCENT DIFFERENCE = -0.9

Post-Test Sample Probe Calibration Form

Probe ID P4-2

Visual Inspection

Do pitot tips appear to be damaged?	NO
Do thermocouple wires appear broken or shorted?	NO
Do all components appear to be in good condition?	YES

Post-Test Thermocouple Calibration

Reference Temperature ^{O}F	Thermocouple Temperature ^{O}F	Difference ^{O}F
77	77	0

Reference Thermocouple: Fluke S/N: 83450033 traceable to the Untied States National Institute of Standards and Technology

Accepatable Deviation +/- 2 ^{O}F

x Acceptable

Unacceptable

Date 06/30/20

Technician AA

Post-Test Sample Probe Calibration Form

Probe ID P4-3/TC-7D

Visual Inspection

Do pitot tips appear to be damaged?	NO
Do thermocouple wires appear broken or shorted?	NO
Do all components appear to be in good condition?	YES

Post-Test Thermocouple Calibration

Reference Temperature ^{O}F	Thermocouple Temperature ^{O}F	Difference ^{O}F
77	78	1

Reference Thermocouple: Fluke S/N: 83450033 traceable to the Untied States National Institute of Standards and Technology

Accepatable Deviation +/- 2 ^{O}F

x	Acceptable
	Unacceptable

Date 06/30/20 Technician AA