THERMAL OXIDIZER CONTROL EFFICIENCY TEST REPORT
TEST DATES: 3-4 JANUARY 2020

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THE CHEMOURS COMPANY

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Weston Solutions, Inc. (WESTON®) is a commercial laboratory operating within full accreditation of the Louisiana Environmental Laboratory Accreditation Program under Certificate Number 03024. The qualifications to provide defensible quality data as a certified commercial environmental testing firm as Agency Interest No. 30815 was granted by the Louisiana Department of Environmental Quality under the Louisiana Administrative Code of LAC 33.1 Chapter 45 et al.

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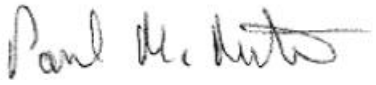

Paul M. Meeter
Weston Solutions, Inc.

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1. INTRODUCTION

1.1 FACILITY AND BACKGROUND INFORMATION

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

This report presents the results of per- and poly-fluoroalkyl substance (PFAS) control efficiency (CE) pretesting of the newly installed thermal oxidizer system.

Chemours contracted Weston Solutions, Inc. (Weston) to perform testing for HFPO Dimer Acid Fluoride (as HFPO Dimer Acid) and other target PFAS compounds on the Thermal Oxidizer inlet and stack at the facility. Testing was performed on 3-4 January 2020 and generally followed the "Thermal Oxidizer Test Plan" reviewed and approved by the North Carolina Department of Environmental Quality (NCDEQ).

1.2 TEST OBJECTIVES

The specific objectives for this test program were as follows:

- Measure the Thermal Oxidizer inlet mass feed rates and stack emissions rates of the following target PFAS compounds: Hexafluoropropylene oxide (HFPO Monomer), Hexafluoropropylene Dimer Acid (HFPO-DA), Hexafluoropropylene Dimer Acid Fluoride (HFPO-DAF), Carbonyl Difluoride (COF2) and Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether (Fluoroether E-1).
- Using these data, calculate the Thermal Oxidizer control efficiency (CE) for the target PFAS compounds.
- Monitor and record process data in conjunction with the test program.
- Provide representative emissions data.

Note: The target compound Fluoroether E-1 was added to the testing scope subsequent to preparation of the test plan.

1.3 TEST PROGRAM OVERVIEW

During the emissions test program, the concentrations and mass emissions rates of HFPO Dimer Acid and other target PFAS compounds were measured at the Thermal Oxidizer inlet (monomer side only; polymer line not yet in service) and stack.

Tables 1-1 and 1-2 provide a summary of the test locations and the parameters that were measured along with the sampling/analytical procedures that were followed.

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

Appendix A includes process operation data. Raw and reduced test data is included in Appendix B. Appendix C includes the summary reports for the laboratory analytical results including both the emissions test samples and the process samples. Appendix D includes sample calculations. Equipment calibration records are included in Appendix E. A list of Weston project participants is included in Appendix F.

Table 1-1
Sampling Plan for Thermal Oxidizer Stack

Sampling Point & Location	**Thermal Oxidizer Stack**					
Number of Tests:	6 (3 MM18 and 3 M0010)					
Parameters To Be Tested:	HFPO Dimer Acid (HFPO-DA)	HFPO-DAF; HFPO Monomer; Fluoroether E-1; COF2	Volumetric Flow Rate and Gas Velocity	Carbon Dioxide	Oxygen	Water Content
Sampling or Monitoring Method	EPA M-0010	Modified EPA M-18	EPA M1 and M2 in conjunction with M-0010 tests	EPA M3A		EPA M4 in conjunction with M-0010 tests
Sample Extraction/ Analysis Method(s):	LC/MS/MS	GC/MS	NA	NA		NA
Sample Size	≥ 3m[3]	≥ 9ft[3]	NA	NA	NA	NA
Total Number of Samples Collected[1]	3	3	3	3	3	3
Reagent Blanks (Solvents, Resins)[1]	1 set	1 set	0	0	0	0
Field Blank Trains[1]	1 per source	1 per source	0	0	0	0
Proof Blanks[1]	1 per train	1 per train	0	0	0	0
Trip Blanks[1,2]	0 sets	0 sets	0	0	0	0
Lab Blanks	1 per fraction[3]	1 per fraction[3]	0	0	0	0
Laboratory or Batch Control Spike Samples (LCS)	1 per fraction[3]	1 per fraction[3]	0	0	0	0
Laboratory or Batch Control Spike Sample Duplicate (LCSD)	1 per fraction[3]	1 per fraction[3]	0	0	0	0
Media Blanks	1 set[4]	1 set[4]	0	0	0	0
Isotope Dilution Internal Standard Spikes	Each sample	Each sample	0	0	0	0
Total No. of Samples	6[5]	6[5]	3	3	3	3

Key:

[1] Sample collected in field.

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

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

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

[5] Actual number of samples collected in field.

Table 1-2
Sampling Plan for Thermal Oxidizer Inlet

Sampling Point & Location	**Thermal Oxidizer Inlet**
Number of Tests:	3
Parameters To Be Tested:	HFPO-DAF; HFPO Monomer; Fluoroether E-1; HFPO-DA; COF2
Sampling or Monitoring Method	Modified EPA M-18
Sample Extraction/ Analysis Method(s):	GC/MS and LC/MS/MS
Sample Size	$\geq 2ft^3$
Total Number of Samples Collected[1]	3
Reagent Blanks (Solvents, Resins)[1]	1 set
Field Blank Trains[1]	1 per source
Proof Blanks[1]	1 per train
Trip Blanks[1,2]	0 sets
Lab Blanks	1 per fraction[3]
Laboratory or Batch Control Spike Samples (LCS)	1 per fraction[3]
Laboratory or Batch Control Spike Sample Duplicate (LCSD)	1 per fraction[3]
Media Blanks	1 set[4]
Isotope Dilution Internal Standard Spikes	Each sample
Total No. of Samples	6[5]

Key:

[1] Sample collected in field.

[2] Trip blanks include one methanol sample per sample shipment.

[3] Lab blank and LCS/LCSD includes one set per analytical fraction.

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

[5] Actual number of samples collected in field.

2. SUMMARY OF TEST RESULTS

A total of three MM18 runs were performed on the Thermal Oxidizer inlet (monomer side only; polymer line not yet in service). A total of three MM18 and three M0010 test runs were performed on the Thermal Oxidizer stack. Table 2-1 provides a summary of the emissions test results and Thermal Oxidizer control efficiency. Tables 2-2, 2-3 and 2-4 provide summaries of the target PFAS compound emissions test results associated with MM18 at the Thermal Oxidizer stack and the Thermal Oxidizer inlet, respectively. Detailed test results summaries are provided in Section 6.

Table 2-1
Summary of Thermal Oxidizer Control Efficiency Test Results

	Inlet	Stack	Control Efficiency
	lb/hr	lb/hr	%
R1	9.53E+01	≤1.24E-04	≥99.99987
R2	7.77E+01	≤1.24E-04	≥99.99984
R3	7.96E+01	≤1.36E-04	≥99.99983
Average	8.42E+01	≤1.28E-04	≥99.99985

Note: The control efficiency is calculated using the sum of the mass emission rates in lb/hr of HFPO, HFPO-DA, HFPO-DAF, COF2, and Fluoroether E-1.
Fluoroether E-1 was not detected in the Run 2 Thermal Oxidizer inlet samples. Therefore, a value of zero (0) was used for the Fluoroether E-1 input to calculate the total PFAS target compound control efficiency (CE).

Samples taken using MM18 were analyzed for the following volatile organic compounds ("target PFAS compounds"): HFPO Monomer, HFPO-DA, HFPO-DAF, COF2, and Fluoroether E-1. Results of MM18 target PFAS compound analysis for the Thermal Oxidizer stack and Thermal Oxidizer inlet are provided in Tables 2-2, 2-3 and 2-4.

Table 2-2
Summary of MM18 Target Compound Thermal Oxidizer Stack Test Results

Target Compound*	Thermal Oxidizer Stack MM18 Run 1		Thermal Oxidizer Stack MM18 Run 2		Thermal Oxidizer Stack MM18 Run 3	
	g/sec	lb/hr	g/sec	lb/hr	g/sec	lb/hr
HFPO-DAF	<3.39E-06	<2.69E-05	<3.39E-06	<2.69E-05	<4.03E-06	<3.20E-05
HFPO Monomer	<1.54E-07	<1.22E-06	<1.53E-07	<1.21E-06	<1.82E-07	<1.45E-06
Fluoroether E-1	<1.76E-07	<1.40E-06	<1.75E-07	<1.39E-06	<2.08E-07	<1.66E-06
COF2	<1.03E-05	<8.21E-05	<1.03E-05	<8.15E-05	<1.22E-05	<9.72E-05

Note: Any < values were below the laboratory analysis detection limits. Emission rates were calculated using the method detection limit (MDL) for the first analytical fraction of the target compound.
*The Thermal Oxidizer stack MM18 samples were not analyzed for HFPO-DA.

Table 2-3
Summary of M0010 HFPO-DA Thermal Oxidizer Stack Test Results

Target Compound	Thermal Oxidizer Stack M0010 Run 1		Thermal Oxidizer Stack M0010 Run 2		Thermal Oxidizer Stack M0010 Run 3	
	g/sec	lb/hr	g/sec	lb/hr	g/sec	lb/hr
HFPO-DA	1.59E-06	1.26E-05	1.68E-06	1.33E-05	5.15E-07	4.09E-06

Table 2-4
Summary of MM18 Target Compound Thermal Oxidizer Inlet Test Results

Target Compound	Thermal Oxidizer Inlet MM18 Run 1		Thermal Oxidizer Inlet MM18 Run 2		Thermal Oxidizer Inlet MM18 Run 3	
	g/sec	lb/hr	g/sec	lb/hr	g/sec	lb/hr
HFPO-DAF	4.11E-01	3.26E+00	3.53E-01	2.81E+00	2.83E-01	2.25E+00
HFPO Monomer	6.10E-01	4.85E+00	2.08E+00	1.65E+01	2.55E+00	2.03E+01
HFPO-DA	3.69E-02	2.93E-01	1.59E-02	1.27E-01	3.51E-02	2.79E-01
Fluoroether E-1	1.08E-02	8.59E-02	<8.59E-02	<6.82E-01	1.49E-01	1.19E+00
COF2	1.09E+01	8.68E+01	7.34E+00	5.83E+01	7.00E+00	5.56E+01

Note: Any < values were below the laboratory analysis detection limits. Emission rates were calculated using the method detection limit (MDL) for the first analytical fraction of the target compound.

3. PROCESS DESCRIPTIONS

The thermal oxidizer and associated four-stage scrubber are identified in the Air Quality Permit respectively as control devices NCD-Q1 and NCD-Q2. The thermal oxidizer is a 10 million BTU per hour (MMBtu/hr), natural gas-fired device. Waste gases from the manufacturing operations collected via header systems are compressed and delivered by pipeline to the thermal oxidizer for destruction of the entrained PFAS compounds. The thermal oxidizer emissions are treated in the scrubber system to control hydrogen fluoride (HF) generated from PFAS compound combustion. The scrubber consists of a four-stage packed bed column with three water scrubbing stages and one caustic scrubbing stage.

3.1 PROCESS OPERATIONS AND PARAMETERS

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

Source	Operation/Product	Batch or Continuous
VEN	PPVE	Condensation is continuous. Agitated Bed Reactor and Refining are batch.
VES	PMVE/PEVE	Semi-continuous – Condensation is continuous. Two Agitated Bed Reactors are batch for 30-40 mins at end of each run. Refining (ether column) is batch

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

- Thermal Oxidizer
  - Waste Gas Feed Rate
  - Thermal Oxidizer Combustion Temperature
  - Scrubber Stage 4 Recycle Rate
  - Scrubber Stage 4 Recycle pH

4. DESCRIPTION OF TEST LOCATIONS

4.1 THERMAL OXIDIZER STACK

Two 4-inch ID test ports are installed on the 18-inch ID stack as shown below.

Per EPA Method 1, a total of 8 traverse points (four per axis) were used for M-0010 isokinetic sampling. Figure 4-1 provides a schematic of the test ports and traverse point locations.

The EPA Method 18 sample was collected at a constant rate at a single point at the approximate center of the stack.

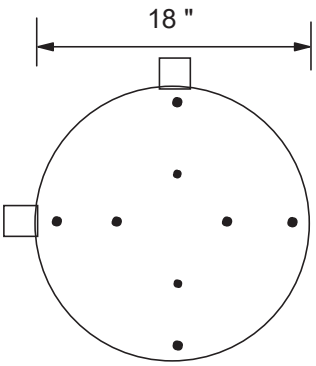
Location	Distance from Flow Disturbance	
	Downstream (B)	Upstream (A)
Thermal Oxidizer Stack	38.5 feet 25.67 duct diameters	36.5 feet 23 duct diameters

4.2 THERMAL OXIDIZER INLET

Two 3-inch waste gas feed lines are installed from the accumulator tanks to the thermal oxidizer. The lines are sampled separately.* Sampling is conducted at permanently installed sampling probes, which include a nozzle centered in the line and oriented into the stream flow. The configuration includes Swagelok® connectors that allow for connection of a sampling train. The ball valves allow for starting and stopping the flow of pressurized gas. The “bleed” connection allows for a connection to a compressed nitrogen line to purge and clear the sampling point of any buildup of liquid or debris prior to sampling.

*Only one waste gas feed line (monomer line) was sampled during the Thermal Oxidizer test campaign. The polymer line was not yet in service.

Figure 4-2 provides a schematic of the sampling location.



TRAVERSE POINT NUMBER	DISTANCE FROM INSIDE NEAR WALL (INCHES)
1	1 1/4
2	4 1/2
3	13 1/2
4	16 3/4

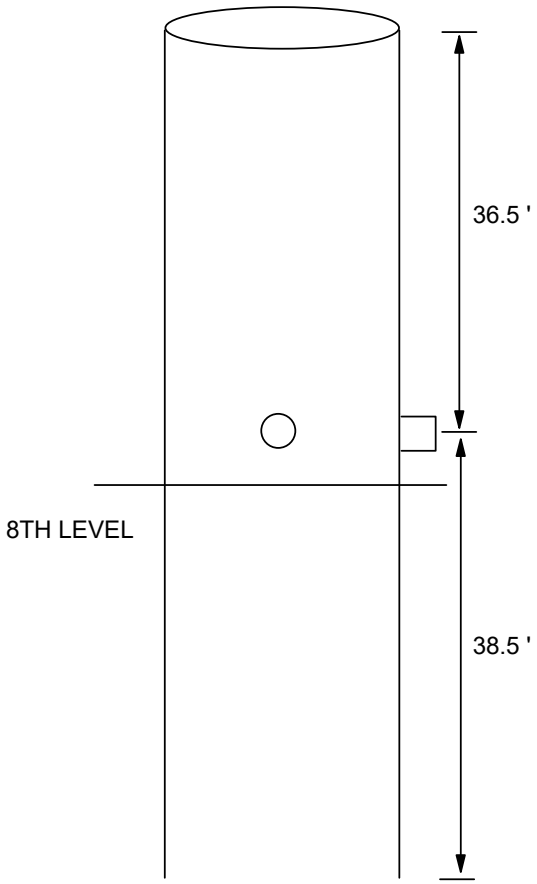


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FIGURE 4-1
THERMAL OXIDIZER STACK TEST PORT AND TRAVERSE POINT LOCATION

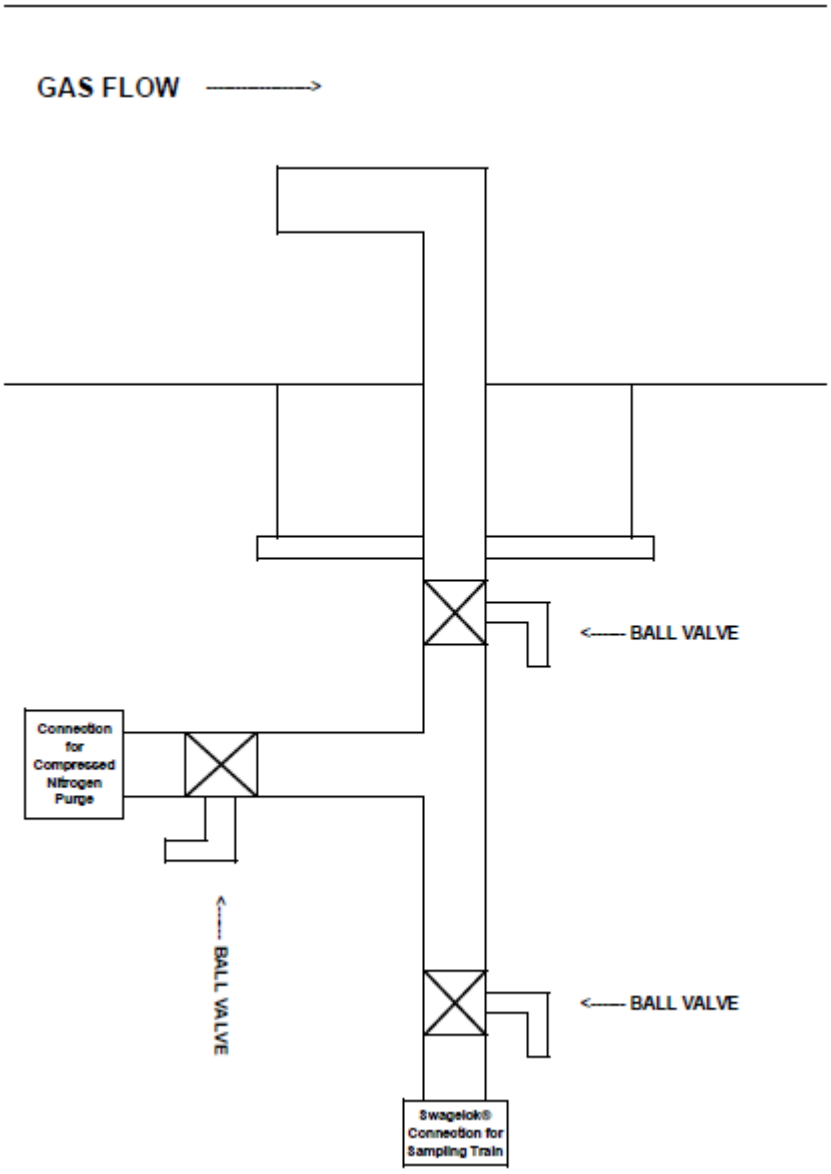


Figure 4-2

Thermal Oxidizer Inlet Sampling Location

5. SAMPLING AND ANALYTICAL METHODS

5.1 STACK GAS SAMPLING PROCEDURES

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

5.1.1 Pre-Test Determinations

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

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

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

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

5.2 STACK PARAMETERS

5.2.1 EPA Method 0010

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

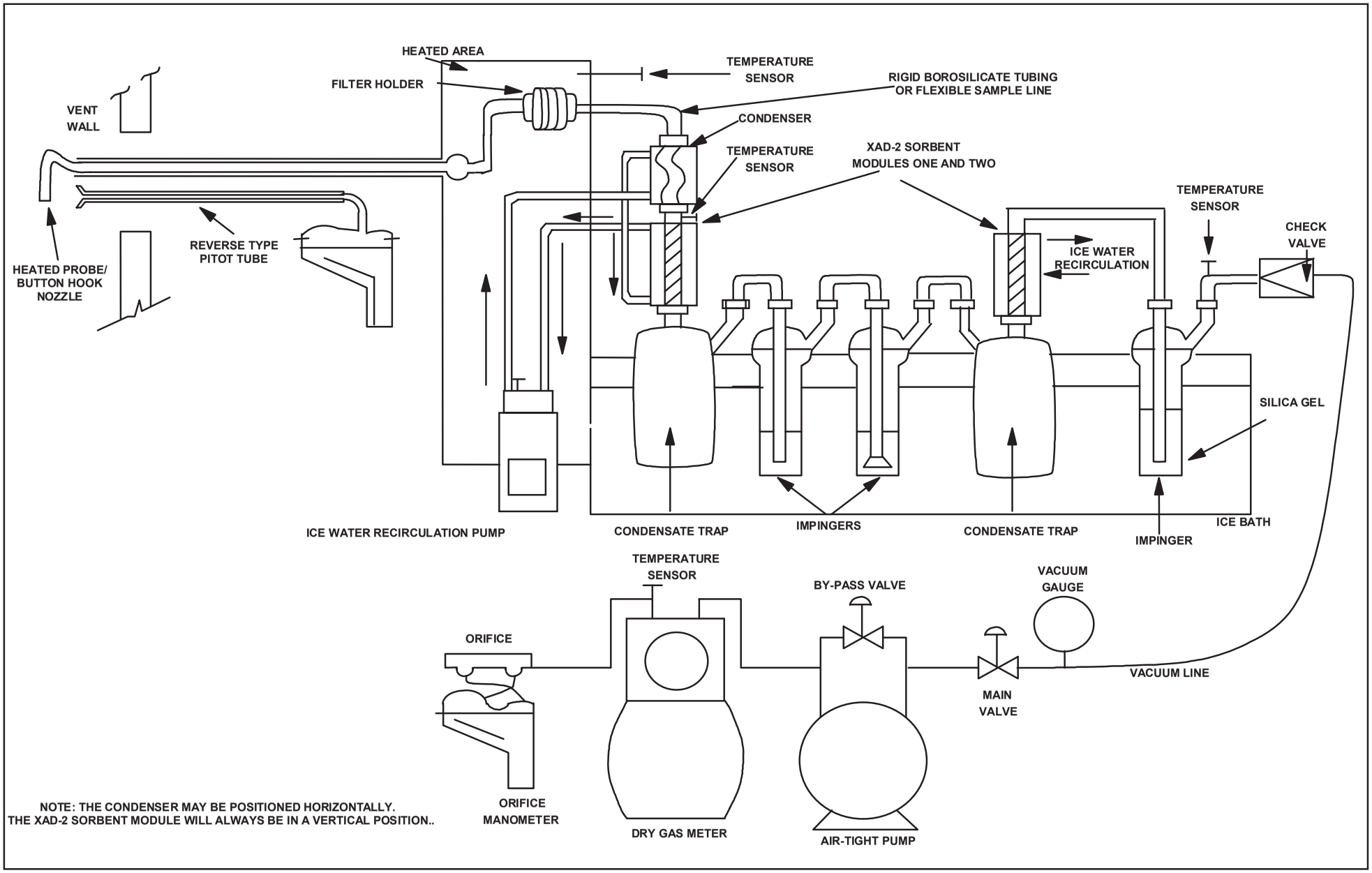


FIGURE 5-1
EPA METHOD 0010 SAMPLING TRAIN

IASDATA\CHEMOURS\15418.002.019/FIGURE 5-1 METHOD 0010

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

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

5.2.2 EPA Method 0010 Sample Recovery

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

A consistent procedure was employed for sample recovery:

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

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

3. The particulate adhering to the internal surfaces of the nozzle, probe and front half of the filter holder were rinsed with a solution of methanol and ammonium hydroxide into a

polyethylene container while brushing a minimum of three times until no visible particulate remained. Particulate adhering to the brush was rinsed with methanol/ ammonium hydroxide into the same container. The container was sealed.

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

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

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

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

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

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

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

Following sample recovery, all samples were transported to Eurofins TestAmerica (TestAmerica) for sample extraction and analysis.

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

5.2.3 EPA Method 0010 Sample Analysis

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

- Front-half Composite—comprised of the particulate filter, and the probe, nozzle, and front-half of the filter holder solvent rinses;

- Back-half Composite—comprised of the first XAD-2 resin material and the back-half of the filter holder with connecting glassware solvent rinses;

- Condensate Composite—comprised of the aqueous condensates and the contents of impingers one and two with solvent rinses;

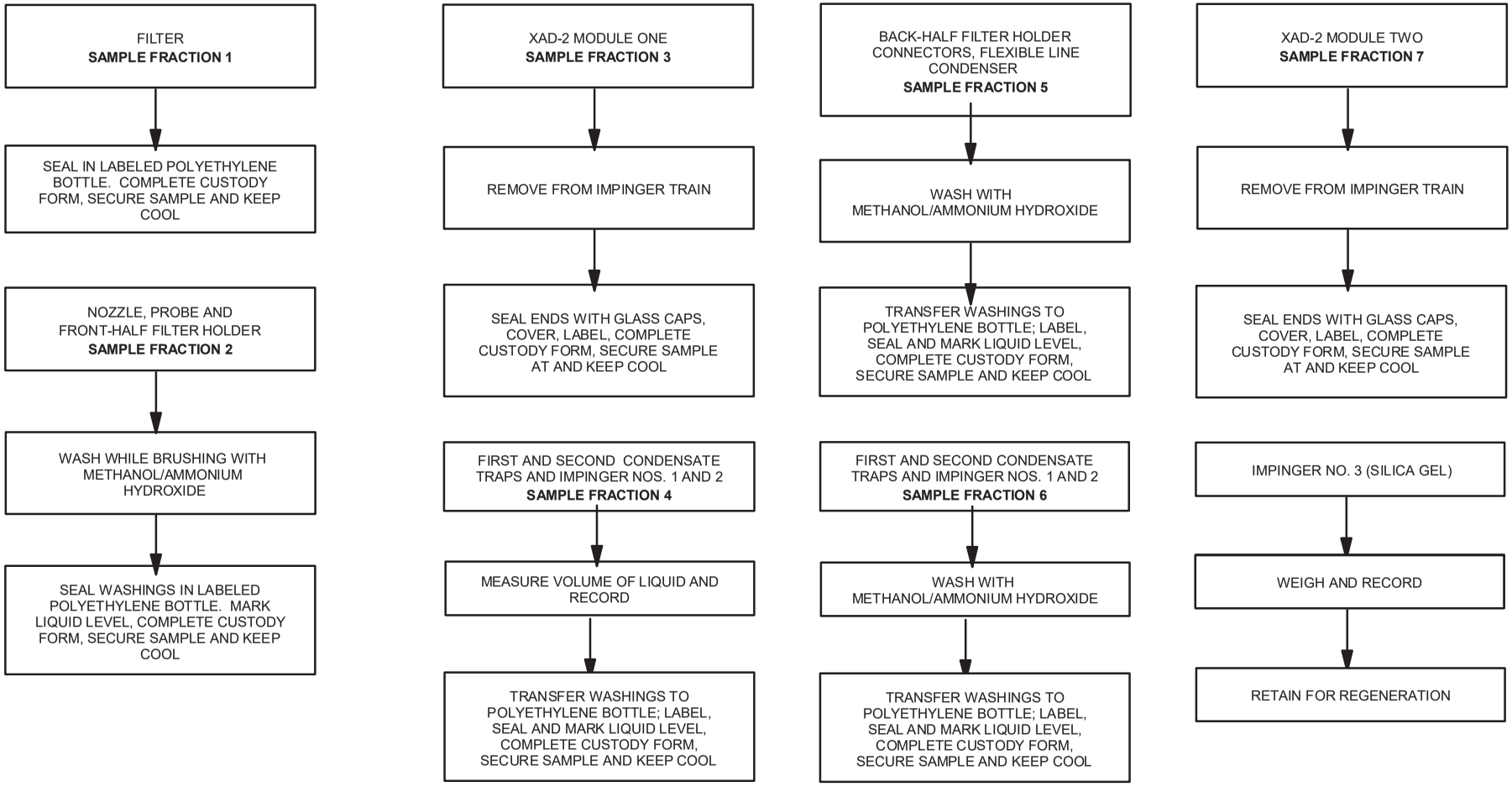
- Breakthrough XAD-2 Resin Tube—comprised of the resin tube behind the series of impingers.

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

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

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

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



SAMPLE RECOVERY PROCEDURES FOR METHOD 0010

IASDATA\CHEMOURS\15418.002.019\FIGURE 5-2 EPA 0010

5.3 STACK GAS MM18

A second sampling train utilized to perform the target PFAS compound sampling at the Thermal Oxidizer stack location was a modified EPA Method 18 train using full size Teflon® impingers. All impingers contained 100 mL of methanol and approximately five boiling chips. See Figure 5-3 for the modified EPA Method 18 sampling train.

The version of the modified Method 18 utilized to sample stack gas included an extra impinger not depicted in Figure 5-3. Impinger 1 was placed in an ice water bath. The purpose of impinger 1 was to remove moisture from the sampled gas before the subsequent impingers. Impingers 2-7 were maintained in a dry ice/methanol bath. Sampling time during each test run was 180 minutes (sampled concurrently with the stack gas Method 0010) at a rate of approximately ≥1.5 liters per minute. Each impinger was recovered separately and included a methanol rinse of each impinger and connector.

The impinger contents and rinses were analyzed separately. Each sample was analyzed by EPA SW-846 Method 8260B for COF2, HFPO-DAF, HFPO Monomer, and Fluoroether E-1 by Gas Chromatography/Mass Spectrometry (GC/MS).

During the Thermal Oxidizer test campaign, a blank train was set up near the stack location, leak-checked and recovered along with the respective sample train. Following sample recovery, all samples were transported to TestAmerica for sample extraction and analysis.

5.4 INLET GAS MM18

A modified EPA Method 18 train was utilized at the waste gas accumulation tanks to measure the target PFAS compound feed composition to the Thermal Oxidizer inlet. The sampling train used full size Teflon® impingers. Impingers 1-6 each contained 100 mL of methanol and approximately five boiling chips. See Figure 5-3 for the modified EPA Method 18 sampling train.

The impingers were maintained in a dry ice/methanol bath. Sampling time during each test run was >180 minutes (sampled concurrently with the stack gas Method 0010) at a rate of

approximately 0.5 liters per minute. Each impinger was recovered separately and included a methanol rinse of each impinger and connector.

The impinger contents and rinses were analyzed separately. Each sample was analyzed by EPA SW-846 Method 8260B for COF2, HFPO-DAF, HFPO Monomer, and Fluoroether E-1 by Gas Chromatography/Mass Spectrometry (GC/MS). Each sample was also analyzed by EPA SW-846 Method 8321A for HFPO-DA by Liquid Chromatography, Tandem Mass Spectrometry (LC/MS/MS).

During the Thermal Oxidizer test campaign, a blank train was set up near the inlet location, leak-checked and recovered along with the respective sample train. Following sample recovery, all samples were transported to TestAmerica for sample extraction and analysis.

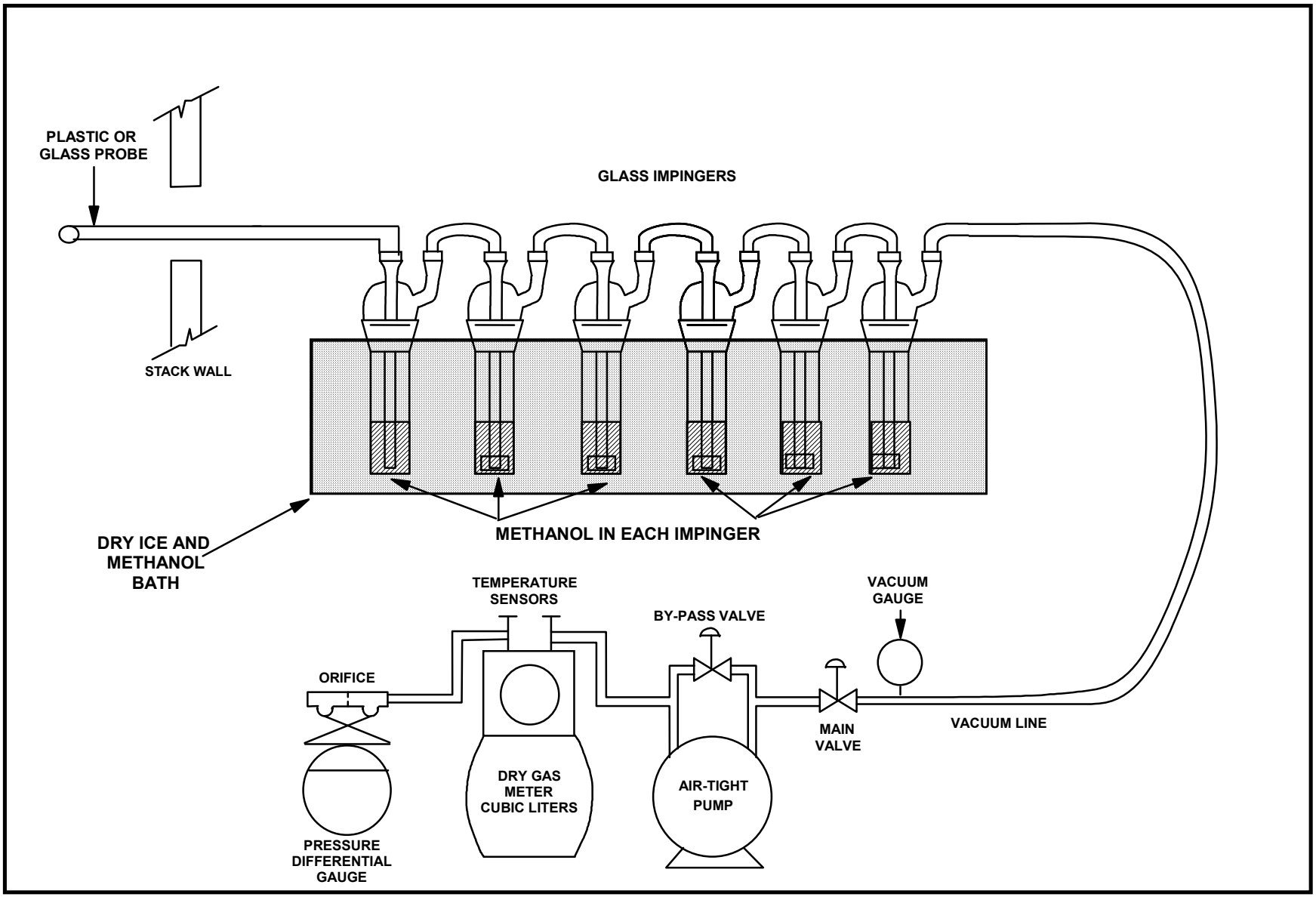


FIGURE 5-3
MODIFIED EPA METHOD 18 SAMPLING TRAIN FOR PFAS COMPOUNDS

5.5 STACK GAS COMPOSITION

The Weston mobile laboratory equipped with instrumental analyzers was used to measure carbon dioxide (CO_2) and oxygen (O_2) concentrations. A diagram of the Weston sampling system is presented in Figure 5-4.

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

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

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

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

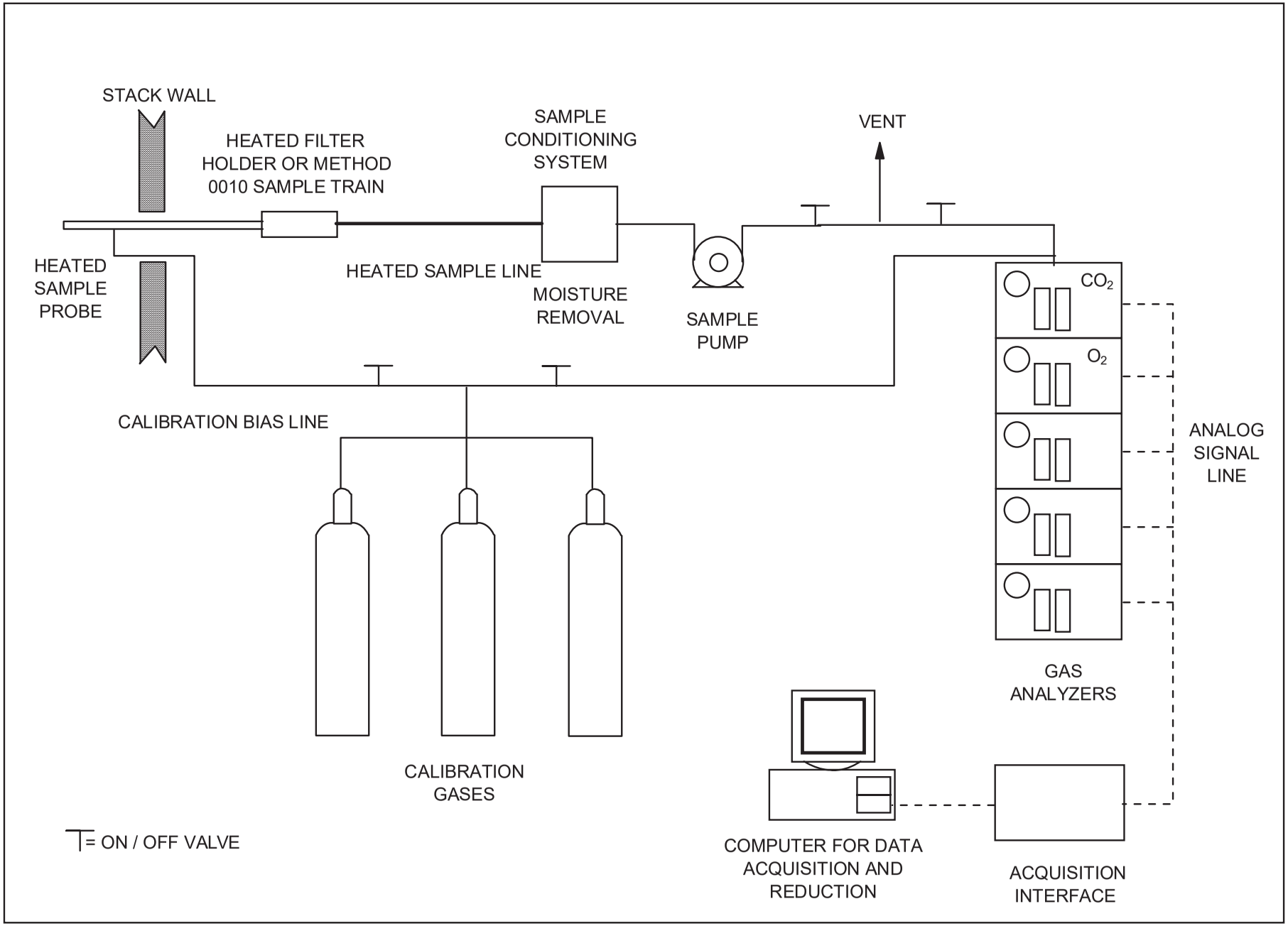


FIGURE 5-4
WESTON SAMPLING SYSTEM

I:\ASDATA\CHEMOURS\15418.002.019\FIGURE 5-4 WESTON SAMPLING SYSTEM

5.6 INLET GAS COMPOSITION

The inlet gas (waste gas) was comprised of nitrogen and organic vapors. This stream was anhydrous. The flow rate of waste gas to the Thermal Oxidizer was continuously measured via mass flow meters. The modified EPA Method 18 train was used to determine the time-integrated composition of the waste gas feed stream during each sampling run.

The Method 18 train utilized to sample the waste gas stream condenses the entrained organic vapors. Therefore, the gas volume measured by the dry gas meter connected to the Method 18 sampling train was the nitrogen less the organic vapors.

The pre-and post-test differential impinger masses were used to determine the mass of condensed vapors in the sampled gas. The total mass of the sampled gas was determined by summing the mass of the condensed organic vapors fraction and the calculated mass of the dry gas fraction measured via the dry gas meter assuming all dry gas flow was 100% nitrogen.

Impinger analysis was used to determine the mass of the target PFAS compounds captured by the Method 18 sampling train. The analysis results are used to calculate the mass of each target PFAS compound per total mass of gas sampled. The mass feed rate of each PFAS compound to the Thermal Oxidizer was then determined by multiplying this mass concentration measured via Method 18 by the waste gas flow rate measured via the system's mass flow meters. For purposes of control efficiency (CE) determinations, zero was used for any non-detect values of the target PFAS compounds; no credit was taken for non-detect values.

6. DETAILED TEST RESULTS AND DISCUSSION

Each test was a minimum of 180 minutes in duration. A total of three M0010 and three MM18 test runs were performed at the Thermal Oxidizer stack. A total of three MM18 test runs were performed at the Thermal Oxidizer inlet (monomer side only; polymer line not yet in service).

Table 6-1 provides detailed M0010 test data and test results for Thermal Oxidizer stack. Table 6-2 provides detailed MM18 test data and test results for the Thermal Oxidizer stack. Table 6-3 provides detailed MM18 test data and test results for the Thermal Oxidizer inlet.

The Thermal Oxidizer control efficiency was calculated based upon the five target PFAS compound mass emission rates in lb/hr as measured at the inlet and stack.

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

Test Data			
Run number	1	2	3
Location	Thermal Oxidizer Stack	Thermal Oxidizer Stack	Thermal Oxidizer Stack
Date	1/3/2020	1/4/2020	1/4/2020
Time period	1615-1935	1010-1325	1440-1755
SAMPLING DATA:			
Sampling duration, min.	180	180	180
Nozzle diameter, in.	0.235	0.235	0.235
Cross sectional nozzle area, sq.ft.	0.000301	0.000301	0.000301
Barometric pressure, in. Hg	29.78	29.74	29.63
Avg. orifice press. diff., in H_2O	1.56	1.56	1.57
Avg. dry gas meter temp., deg F	72.5	58.1	64.5
Avg. abs. dry gas meter temp., deg. R	533	518	525
Total liquid collected by train, ml	112.6	70.6	60.0
Std. vol. of H_2O vapor coll., cu.ft.	5.3	3.3	2.8
Dry gas meter calibration factor	0.9834	0.9834	0.9834
Sample vol. at meter cond., dcf	132.805	131.564	132.973
Sample vol. at std. cond., dscf [(1)]	129.329	131.511	130.818
Percent of isokinetic sampling	101.4	102.1	101.6
GAS STREAM COMPOSITION DATA:			
CO_2, % by volume, dry basis	4.4	4.2	3.6
O_2, % by volume, dry basis	14.6	14.7	15.2
N_2, % by volume, dry basis	81.0	81.1	81.2
Molecular wt. of dry gas, lb/lb mole	29.29	29.26	29.18
H_20 vapor in gas stream, prop. by vol.	0.039	0.025	0.021
Mole fraction of dry gas	0.961	0.975	0.979
Molecular wt. of wet gas, lb/lb mole	28.84	28.98	28.95
GAS STREAM VELOCITY AND VOLUMETRIC FLOW DATA:			
Static pressure, in. H_2O	-0.30	-0.30	-0.30
Absolute pressure, in. Hg	29.76	29.72	29.61
Avg. temperature, deg. F	85	73	77
Avg. absolute temperature, deg.R	545	533	537
Pitot tube coefficient	0.84	0.84	0.84
Total number of traverse points	12	8	8
Avg. gas stream velocity, ft./sec.	42.4	41.2	41.5
Stack/duct cross sectional area, sq.ft.	1.77	1.77	1.77
Avg. gas stream volumetric flow, wacf/min.	4491	4373	4403
Avg. gas stream volumetric flow, dscf/min.	4159	4199	4195

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

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

TEST DATA			
Run number	1	2	3
Location	Thermal Oxidizer Stack	Thermal Oxidizer Stack	Thermal Oxidizer Stack
Date	1/3/2020	1/4/2020	1/4/2020
Time period	1615-1935	1010-1325	1440-1755
LABORATORY REPORT DATA, ug.			
HFPO Dimer Acid	2.97	3.15	0.96
EMISSION RESULTS, ug/dscm.			
HFPO Dimer Acid	0.81	0.85	0.26
EMISSION RESULTS, lb/dscf.			
HFPO Dimer Acid	5.06E-11	5.28E-11	1.62E-11
EMISSION RESULTS, lb/hr.			
HFPO Dimer Acid	1.26E-05	1.33E-05	4.09E-06
EMISSION RESULTS, g/sec.			
HFPO Dimer Acid	1.59E-06	1.68E-06	5.15E-07

TABLE 6-2
CHEMOURS-FAYETTEVILLE, NC
INPUTS FOR TARGET COMPOUND CALCULATIONS
THERMAL OXIDIZER STACK

TEST DATA			
Test run number	1	2	3
Location	Thermal Oxidizer Stack	Thermal Oxidizer Stack	Thermal Oxidizer Stack
Test date	1/3/2020	1/4/2020	1/4/2020
Test time period	1615-1935	1010-1325	1440-1755
Operator	SR	SR	SR
SAMPLING DATA			
Duration, minutes	180	180	180
Average dry gas meter press. in. H2O	1.47	1.49	1.50
Average dry gas meter temp. deg. F	76.38	63.10	66.87
Average absolute meter temp. deg. R	536.4	523.1	526.9
Sample vol. at meter cond., dcl	269.786	271.765	270.270
Meter box calibration, Y	1.0088	1.0088	1.0088
Barometric pressure, in. Hg	29.78	29.74	29.63
Sample volume, dscl (1)	267.514	275.959	271.482
Sample volume, dscf (1)	9.446	9.744	9.586
VOLUMETRIC FLOW RATE			
Avg. gas stream volumetric flow, dscf/min.	4,159	4,199	4,195

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

TABLE 6-2 (cont.)
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF TARGET COMPOUND TEST DATA AND TEST RESULTS

TEST DATA						
Run number		1		2		3
Location		Thermal Oxidizer Stack		Thermal Oxidizer Stack		Thermal Oxidizer Stack
Date		1/3/2020		1/4/2020		1/4/2020
Time period		1615-1935		1010-1325		1440-1755
LABORATORY REPORT DATA, ug.						
HFPO-DAF	<	0.462	<	0.472	<	0.553
HFPO Monomer	<	0.021	<	0.021	<	0.025
Fluoroether E-1	<	0.024	<	0.024	<	0.029
Carbonyl Difluoride	<	1.410	<	1.430	<	1.680
EMISSION RESULTS, ug/dscm.						
HFPO-DAF	<	1.73E+00	<	1.71E+00	<	2.04E+00
HFPO Monomer	<	7.85E-02	<	7.72E-02	<	9.21E-02
Fluoroether E-1	<	8.97E-02	<	8.84E-02	<	1.05E-01
Carbonyl Difluoride	<	5.27E+00	<	5.18E+00	<	6.19E+00
EMISSION RESULTS, lb/dscf.						
HFPO-DAF	<	1.08E-10	<	1.07E-10	<	1.27E-10
HFPO Monomer	<	4.90E-12	<	4.82E-12	<	5.75E-12
Fluoroether E-1	<	5.60E-12	<	5.52E-12	<	6.58E-12
Carbonyl Difluoride	<	3.29E-10	<	3.24E-10	<	3.86E-10
EMISSION RESULTS, lb/hr.						
HFPO-DAF	<	2.69E-05	<	2.69E-05	<	3.20E-05
HFPO Monomer	<	1.22E-06	<	1.21E-06	<	1.45E-06
Fluoroether E-1	<	1.40E-06	<	1.39E-06	<	1.66E-06
Carbonyl Difluoride	<	8.21E-05	<	8.15E-05	<	9.72E-05
EMISSION RESULTS, g/sec.						
HFPO-DAF	<	3.39E-06	<	3.39E-06	<	4.03E-06
HFPO Monomer	<	1.54E-07	<	1.53E-07	<	1.82E-07
Fluoroether E-1	<	1.76E-07	<	1.75E-07	<	2.08E-07
Carbonyl Difluoride	<	1.03E-05	<	1.03E-05	<	1.22E-05

TABLE 6-3
CHEMOURS-FAYETTEVILLE, NC
INPUTS FOR TARGET COMPOUND CALCULATIONS
THERMAL OXIDIZER INLET

TEST DATA			
Test run number	1	2	3
Location	Thermal Oxidizer Inlet	Thermal Oxidizer Inlet	Thermal Oxidizer Inlet
Test date	1/3/2020	1/4/2020	1/4/2020
Test time period	1615-1935	1010-1325	1440-1755
Operator	JM/CH	JM/CH	JM/CH
SAMPLING DATA			
Duration, minutes	200	195	195
Average dry gas meter press. in. H2O	0.60	0.80	0.80
Average dry gas meter temp. deg. F	75.73	63.13	68.15
Average absolute meter temp. deg. R	535.7	523.1	528.2
Sample vol. at meter cond., dcl	50.060	97.504	97.294
Meter box calibration, Y	1.0000	1.0000	1.0000
Barometric pressure, in. Hg	29.88	29.84	29.73
Sample volume, dscl (1)	49.325	98.303	96.800
Mass of sample gas, Kg	0.05741	0.11442	0.11268
VOLUMETRIC FLOW RATE			
Avg. gas stream volumetric flow, kg/hr (from Chemours)	234.3	201.0	204.3
Total weight gain in impingers, Kg	0.0731	0.1259	0.1083
Total Mass collected, Kg	0.1305	0.2403	0.2210

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

TABLE 6-3 (cont.)
CHEMOURS - FAYETTEVILLE, NC
SUMMARY OF TARGET COMPOUND TEST DATA AND TEST RESULTS

TEST DATA				
Run number	1		2	3
Location	Thermal Oxidizer Inlet		Thermal Oxidizer Inlet	Thermal Oxidizer Inlet
Date	1/3/2020		1/4/2020	1/4/2020
Time period	1615-1935		1010-1325	1440-1755
LABORATORY REPORT DATA, ug.				
HFPO-DAF	824090		1522000	1103380
HFPO Monomer	1224500		8967000	9955000
Fluoroether E-1	21700	<	370000	581500
HFPO Dimer Acid	74130		68680	136660
Carbonyl Difluoride	21935400		31600000	27286200
Total Target Compounds, Kg	0.02408		0.04216	0.03906
Total Impinger and Gas sample Mass, KG	0.1305		0.2403	0.2210
Total Mass Sampled per Total Mass	0.1845		0.1754	0.1768
EMISSION RESULTS, lb/hr.				
HFPO-DAF	3.26E+00		2.81E+00	2.25E+00
HFPO Monomer	4.85E+00		1.65E+01	2.03E+01
Fluoroether E-1	8.59E-02	<	6.82E-01	1.19E+00
HFPO Dimer Acid	2.93E-01		1.27E-01	2.79E-01
Carbonyl Difluoride	8.68E+01		5.83E+01	5.56E+01
Total Target Compounds	9.53E+01		7.77E+01	7.96E+01
EMISSION RESULTS, g/sec.				
HFPO-DAF	4.11E-01		3.53E-01	2.83E-01
HFPO Monomer	6.10E-01		2.08E+00	2.55E+00
Fluoroether E-1	1.08E-02	<	8.59E-02	1.49E-01
HFPO Dimer Acid	3.69E-02		1.59E-02	3.51E-02
Carbonyl Difluoride	1.09E+01		7.34E+00	7.00E+00
Total Target Compounds	1.20E+01		9.79E+00	1.00E+01

Note: Fluoroether E-1 was not detected in the Run 2 Thermal Oxidizer inlet samples. Therefore, a value of zero (0) was used for the Fluoroether E-1 input to calculate the total PFAS target compounds.

APPENDIX A
PROCESS OPERATIONS DATA

Date: 1/3/2020

Time	1600							1700							1800							1900						
Stack Testing		RUN 1 - 1615-1935																									
HFPO																											
VEN Product	PPVE																										
VEN Precursor																											
VEN Condensation (HFPO)																											
VEN ABR																										Burnout	
VEN Refining																											
Stripper Column Vent																											
VES Product	PM/PE																										
VES Precursor																											
VES Condensation (HFPO)																											
VES ABR (East)																											
VES ABR (West)																											
VES Refining																											
Dimer ISO Venting			Venting						Venting					Venting							Venting						
E2 Production																											
Polymers - Recycle Still	DOWN																										
Polymers Polymerization																											
Polymers Line 4 Extrusion																											
Polymers Line 3 Extrusion																											

Date: 1/4/2020

Time	1000	1100	1200	1300	1400	1500	1600	1700	1800
Stack Testing		RUN 2 1010-1325				RUN 3 1440-1755			
HFPO									
VEN Product	PPVE								
VEN Precursor									
VEN Condensation (HFPO)									
VEN ABR		Burnout							
VEN Refining	80 kg/h								
Stripper Column Vent									
VES Product	PM/PE								
VES Precursor									26 kg/h
VES Condensation (HFPO)									50 kg/h
VES ABR (East)					Burnout				
VES ABR (West)									
VES Refining									
Dimer ISO Venting	Venting	Venting	Venting	Venting	Venting	Venting	Venting	Venting	Venting
E2 Production									
Polymers - Recycle Still	DOWN								
Polymers Polymerization									
Polymers Line 4 Extrusion									
Polymers Line 3 Extrusion									

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
Average	2012	517	44307	88.5	8.00
Maximum	2013	535	44660	89.2	8.01
Minimum	2011	484	43971	87.8	7.98
St Dev	0	9	95	0.2	0.01
1/3/2020 16:15:00	2011.39	520.89	44180.793	88.23	7.99
1/3/2020 16:16:00	2011.72	514.61	44283.773	88.43	7.99
1/3/2020 16:17:00	2011.73	513.37	44394.454	88.65	7.99
1/3/2020 16:18:00	2011.75	519.78	44501.131	88.87	7.99
1/3/2020 16:19:00	2011.9	522.13	44335.111	88.54	7.99
1/3/2020 16:20:00	2011.74	521.38	44226.714	88.32	7.99
1/3/2020 16:21:00	2011.69	522.61	44196.016	88.26	7.99
1/3/2020 16:22:00	2011.48	523.9	44293.333	88.45	8
1/3/2020 16:23:00	2012.21	518.57	44388.176	88.64	7.99
1/3/2020 16:24:00	2012.5	517.95	44449.842	88.76	7.99
1/3/2020 16:25:00	2012.23	523.95	44471.997	88.81	7.99
1/3/2020 16:26:00	2012.19	524.71	44306.586	88.48	7.99
1/3/2020 16:27:00	2012.28	529.15	44153.202	88.17	7.99
1/3/2020 16:28:00	2011.69	522.27	44182.096	88.23	7.99
1/3/2020 16:29:00	2011.68	522.64	44227.337	88.32	7.99
1/3/2020 16:30:00	2011.74	514.91	44306.472	88.48	8
1/3/2020 16:31:00	2012.46	521.9	44206.881	88.28	8
1/3/2020 16:32:00	2012.27	524.52	44232.475	88.33	7.99
1/3/2020 16:33:00	2011.69	532.47	44285.17	88.44	8
1/3/2020 16:34:00	2011.17	528.36	44428.506	88.72	7.99
1/3/2020 16:35:00	2011.97	526.75	44398.671	88.66	7.99
1/3/2020 16:36:00	2011.44	520.44	44377.817	88.62	7.99
1/3/2020 16:37:00	2011.94	519.82	44270.664	88.41	7.99
1/3/2020 16:38:00	2012	525.56	44272.62	88.41	7.99
1/3/2020 16:39:00	2011.74	529.03	44265.775	88.40	7.99
1/3/2020 16:40:00	2012.21	527.72	44353.115	88.57	7.99
1/3/2020 16:41:00	2011.96	531.47	44242.404	88.35	7.99
1/3/2020 16:42:00	2011.7	534.52	44296.466	88.46	7.99
1/3/2020 16:43:00	2011.44	528.91	44260.694	88.39	7.99
1/3/2020 16:44:00	2011.48	526.03	44308.684	88.48	7.99
1/3/2020 16:45:00	2011.7	525.24	44433.974	88.73	7.99
1/3/2020 16:46:00	2012.2	524.24	44401.475	88.67	7.99
1/3/2020 16:47:00	2012.21	529.01	44309.492	88.48	7.99
1/3/2020 16:48:00	2011.47	530.18	44171.902	88.21	7.99
1/3/2020 16:49:00	2011.44	528.6	44176.071	88.22	7.99
1/3/2020 16:50:00	2011.67	522.73	44213.154	88.29	7.99
1/3/2020 16:51:00	2011.47	527.89	44313.469	88.49	7.99
1/3/2020 16:52:00	2011.74	524.1	44341.432	88.55	7.99

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/3/2020 16:53:00	2011.63	518.31	44370.113	88.61	7.99
1/3/2020 16:54:00	2011.75	517.31	44239.799	88.35	7.99
1/3/2020 16:55:00	2011.96	520.36	44246.305	88.36	7.99
1/3/2020 16:56:00	2011.47	524.84	44210.335	88.29	7.99
1/3/2020 16:57:00	2012.2	524.26	44372.006	88.61	7.99
1/3/2020 16:58:00	2011.7	524.28	44391.845	88.65	7.99
1/3/2020 16:59:00	2011.44	530.71	44391.14	88.65	7.99
1/3/2020 17:00:00	2011.97	529.66	44412.071	88.69	7.98
1/3/2020 17:01:00	2011.67	528.43	44276.787	88.42	7.99
1/3/2020 17:02:00	2011.97	528.12	44353.249	88.57	7.99
1/3/2020 17:03:00	2011.48	528.24	44405.597	88.68	7.99
1/3/2020 17:04:00	2011.66	524.84	44512.864	88.89	8
1/3/2020 17:05:00	2011.47	520.15	44374.478	88.61	7.99
1/3/2020 17:06:00	2011.7	520.91	44381.919	88.63	7.99
1/3/2020 17:07:00	2011.97	524.25	44329.916	88.53	8
1/3/2020 17:08:00	2012.47	523.82	44225.137	88.32	7.99
1/3/2020 17:09:00	2011.47	527.89	44285.357	88.44	7.99
1/3/2020 17:10:00	2011.59	529.41	44361.543	88.59	7.99
1/3/2020 17:11:00	2012.45	523.96	44320.432	88.51	7.99
1/3/2020 17:12:00	2011.7	526.32	44505.703	88.88	7.99
1/3/2020 17:13:00	2011.87	523.38	44383.37	88.63	7.99
1/3/2020 17:14:00	2011.7	515.2	44219.676	88.31	7.99
1/3/2020 17:15:00	2011.97	518.93	44174.95	88.22	7.99
1/3/2020 17:16:00	2011.94	518.38	44395.893	88.66	7.99
1/3/2020 17:17:00	2012	523.08	44252.771	88.37	7.99
1/3/2020 17:18:00	2011.7	518.64	44381.581	88.63	7.99
1/3/2020 17:19:00	2011.7	529.44	44236.624	88.34	7.99
1/3/2020 17:20:00	2011.59	519.98	44183.895	88.23	7.99
1/3/2020 17:21:00	2011.99	521.32	44358.98	88.58	7.99
1/3/2020 17:22:00	2011.67	518.72	44391.661	88.65	7.99
1/3/2020 17:23:00	2011.44	521.06	44243.946	88.35	7.99
1/3/2020 17:24:00	2011.47	524.66	44251.385	88.37	7.99
1/3/2020 17:25:00	2011.7	523.74	44160.542	88.19	7.99
1/3/2020 17:26:00	2011.17	522.72	44212.281	88.29	8
1/3/2020 17:27:00	2012.2	522.25	44407.378	88.68	8
1/3/2020 17:28:00	2011.94	518.88	44387.844	88.64	8
1/3/2020 17:29:00	2011.74	516.91	44370.874	88.61	7.99
1/3/2020 17:30:00	2011.93	520.7	44396.833	88.66	8
1/3/2020 17:31:00	2011.84	522.84	44211.605	88.29	8
1/3/2020 17:32:00	2011.23	524.04	44276.437	88.42	8
1/3/2020 17:33:00	2011.67	522.47	44197.922	88.26	8
1/3/2020 17:34:00	2011.44	522.47	44259.399	88.38	8
1/3/2020 17:35:00	2011.7	516.92	44351.883	88.57	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/3/2020 17:36:00	2011.67	524.45	44286.063	88.44	8
1/3/2020 17:37:00	2011.77	522.39	44221.071	88.31	8
1/3/2020 17:38:00	2012.2	516.8	44261.748	88.39	8
1/3/2020 17:39:00	2011.47	514.26	44381.522	88.63	7.99
1/3/2020 17:40:00	2012.43	516.08	44275.555	88.42	7.99
1/3/2020 17:41:00	2011.47	516.01	44231.486	88.33	8
1/3/2020 17:42:00	2011.93	519.58	44348.622	88.56	8
1/3/2020 17:43:00	2011.74	521.17	44363.21	88.59	8
1/3/2020 17:44:00	2011.44	513.58	44483.619	88.83	8
1/3/2020 17:45:00	2011.96	516.89	44269.665	88.40	8
1/3/2020 17:46:00	2011.71	517.52	44125.474	88.12	8
1/3/2020 17:47:00	2011.97	520.4	44332.178	88.53	8
1/3/2020 17:48:00	2011.47	518.8	44259.835	88.39	8
1/3/2020 17:49:00	2012.2	517.99	44295.445	88.46	8
1/3/2020 17:50:00	2011.7	520.95	44375.304	88.62	8
1/3/2020 17:51:00	2011.67	519.27	44348.665	88.56	8
1/3/2020 17:52:00	2011.73	516.46	44385.599	88.64	8
1/3/2020 17:53:00	2011.48	521.8	44322.65	88.51	8
1/3/2020 17:54:00	2011.39	526.77	44389.544	88.64	8
1/3/2020 17:55:00	2011.94	521.81	44219.183	88.30	8
1/3/2020 17:56:00	2012.01	526.25	44253.103	88.37	8
1/3/2020 17:57:00	2011.69	520.66	44160.773	88.19	7.99
1/3/2020 17:58:00	2011.71	526.92	44271.485	88.41	7.99
1/3/2020 17:59:00	2011.93	520.19	44348.802	88.56	8
1/3/2020 18:00:00	2011.97	515.31	44459.912	88.78	8
1/3/2020 18:01:00	2011.51	517.87	44318.73	88.50	8
1/3/2020 18:02:00	2011.94	521.46	44219.801	88.31	8
1/3/2020 18:03:00	2011.44	519.31	44293.051	88.45	8
1/3/2020 18:04:00	2011.7	515.94	44309.987	88.49	8
1/3/2020 18:05:00	2011.21	519.05	44267.463	88.40	8
1/3/2020 18:06:00	2011.66	522.84	44268.943	88.40	8
1/3/2020 18:07:00	2011.7	515.87	44232.967	88.33	8
1/3/2020 18:08:00	2011.46	515.87	44316.042	88.50	8
1/3/2020 18:09:00	2011.85	519.95	44410.492	88.69	8
1/3/2020 18:10:00	2011	512.92	44346.005	88.56	8
1/3/2020 18:11:00	2011.69	515.29	44249.984	88.37	8.01
1/3/2020 18:12:00	2012.47	513.84	44210.269	88.29	8.01
1/3/2020 18:13:00	2011.77	524.65	44212.348	88.29	8.01
1/3/2020 18:14:00	2011.42	517.32	44315.214	88.50	8
1/3/2020 18:15:00	2011.65	511.98	44236.075	88.34	8
1/3/2020 18:16:00	2011.74	510.03	44455.967	88.78	8
1/3/2020 18:17:00	2011.46	514.25	44614.264	89.09	8
1/3/2020 18:18:00	2011.7	517.7	44659.511	89.18	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/3/2020 18:19:00	2012.46	510.78	44578.844	89.02	8
1/3/2020 18:20:00	2011.74	509.38	44383.991	88.63	8
1/3/2020 18:21:00	2012.19	511.8	44202.647	88.27	8
1/3/2020 18:22:00	2012.47	510.36	43971.23	87.81	8
1/3/2020 18:23:00	2011.5	511.21	44129.411	88.12	8
1/3/2020 18:24:00	2011.44	514.38	44435.692	88.74	8
1/3/2020 18:25:00	2012.46	513.74	44516.388	88.90	8
1/3/2020 18:26:00	2011.72	513.11	44435.691	88.74	8
1/3/2020 18:27:00	2011.95	522.49	44331.791	88.53	8
1/3/2020 18:28:00	2012.47	508.83	44203.504	88.27	8
1/3/2020 18:29:00	2011.44	514.14	44210.329	88.29	8
1/3/2020 18:30:00	2011.48	516.8	44228.492	88.32	8
1/3/2020 18:31:00	2011.7	508.68	44400.188	88.67	8
1/3/2020 18:32:00	2011.7	511.71	44456.016	88.78	8
1/3/2020 18:33:00	2011.99	516.5	44380.58	88.63	8
1/3/2020 18:34:00	2012.17	519.6	44276.385	88.42	8
1/3/2020 18:35:00	2011.48	517.21	44198.291	88.26	8
1/3/2020 18:36:00	2011.7	513.09	44136.316	88.14	8
1/3/2020 18:37:00	2011.66	517.18	44198.626	88.26	8
1/3/2020 18:38:00	2011.73	513.13	44383.944	88.63	8
1/3/2020 18:39:00	2011.75	510.3	44384.577	88.63	8
1/3/2020 18:40:00	2011.95	508.16	44244.684	88.36	8
1/3/2020 18:41:00	2011.39	519.77	44357.439	88.58	8
1/3/2020 18:42:00	2011.48	516.36	44321.981	88.51	8
1/3/2020 18:43:00	2011.7	515.99	44323.819	88.51	8
1/3/2020 18:44:00	2011.66	507.89	44345.323	88.56	8
1/3/2020 18:45:00	2012.23	510.52	44375.879	88.62	8
1/3/2020 18:46:00	2011.48	509.83	44318.689	88.50	8
1/3/2020 18:47:00	2011.66	510.84	44296.283	88.46	8
1/3/2020 18:48:00	2011.48	515.47	44191.186	88.25	8
1/3/2020 18:49:00	2011.92	516.7	44227.085	88.32	8
1/3/2020 18:50:00	2011.77	519.14	44258.224	88.38	8
1/3/2020 18:51:00	2011.95	521.42	44381.084	88.63	8
1/3/2020 18:52:00	2011.44	519.96	44338.784	88.54	8
1/3/2020 18:53:00	2011.68	516.01	44287.684	88.44	8
1/3/2020 18:54:00	2011.97	510.65	44211.602	88.29	8
1/3/2020 18:55:00	2012.28	510.07	44238.317	88.34	8
1/3/2020 18:56:00	2012.32	512.37	44295.43	88.46	8
1/3/2020 18:57:00	2011.9	506.33	44335.193	88.54	8
1/3/2020 18:58:00	2011.86	511.77	44235.045	88.34	8
1/3/2020 18:59:00	2012.01	516.37	44218.007	88.30	8
1/3/2020 19:00:00	2012.19	511.2	44325.928	88.52	8
1/3/2020 19:01:00	2011.95	513.08	44359.462	88.58	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/3/2020 19:02:00	2011.72	512.2	44277.633	88.42	8
1/3/2020 19:03:00	2011.67	509.84	44311.987	88.49	8
1/3/2020 19:04:00	2012.14	507.73	44283.593	88.43	8
1/3/2020 19:05:00	2011.46	512.21	44199.539	88.26	8
1/3/2020 19:06:00	2011.81	506.73	44236.13	88.34	8
1/3/2020 19:07:00	2011.97	502.2	44342.367	88.55	8.01
1/3/2020 19:08:00	2011.44	505.33	44465.042	88.80	8.01
1/3/2020 19:09:00	2011.69	510.61	44413.593	88.69	8.01
1/3/2020 19:10:00	2011.79	508.91	44245.19	88.36	8.01
1/3/2020 19:11:00	2011.91	504.42	44242.783	88.35	8.01
1/3/2020 19:12:00	2012.07	505.01	44309.169	88.48	8
1/3/2020 19:13:00	2011.97	505.85	44344.452	88.55	8
1/3/2020 19:14:00	2011.19	497.77	44238.683	88.34	8
1/3/2020 19:15:00	2011.76	508.98	44252.241	88.37	8
1/3/2020 19:16:00	2011.65	498.93	44279.834	88.43	8
1/3/2020 19:17:00	2012	506.86	44302.69	88.47	8.01
1/3/2020 19:18:00	2011.99	503.13	44389.932	88.65	8.01
1/3/2020 19:19:00	2012.68	503.4	44457.589	88.78	8.01
1/3/2020 19:20:00	2012.89	501.17	44335.57	88.54	8.01
1/3/2020 19:21:00	2012.57	504.98	44316.518	88.50	8.01
1/3/2020 19:22:00	2012.8	502.91	44328.761	88.52	8.01
1/3/2020 19:23:00	2012.63	492.59	44299.4	88.46	8.01
1/3/2020 19:24:00	2012.07	488.73	44197.724	88.26	8.01
1/3/2020 19:25:00	2012.52	501.16	44202.135	88.27	8.01
1/3/2020 19:26:00	2012.99	504.49	44258.748	88.38	8.01
1/3/2020 19:27:00	2012.4	501.08	44313.189	88.49	8.01
1/3/2020 19:28:00	2011.84	494.6	44290.41	88.45	8.01
1/3/2020 19:29:00	2012.48	494.92	44172.653	88.21	8.01
1/3/2020 19:30:00	2012.77	492.97	44294.465	88.45	8.01
1/3/2020 19:31:00	2012.43	489.44	44333.967	88.53	8
1/3/2020 19:32:00	2012.3	484.42	44270.49	88.41	8.01
1/3/2020 19:33:00	2011.94	488.87	44243.8	88.35	8.01
1/3/2020 19:34:00	2012	484.45	44249.563	88.36	8.01

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
Average	2014	443	44181	88.2	8.00
Maximum	2018	526	44535	88.9	8.02
Minimum	2011	320	43906	87.7	7.76
St Dev	1	63	92	0.2	0.03
1/4/2020 10:10:00	2013.85	523.23	44200.675	88.27	8
1/4/2020 10:11:00	2014.63	518.67	44156.346	88.18	7.99
1/4/2020 10:12:00	2014.41	519.54	44066.105	88.00	7.99
1/4/2020 10:13:00	2014.26	517.3	44207.511	88.28	7.99
1/4/2020 10:14:00	2013.81	524.46	44400.295	88.67	7.99
1/4/2020 10:15:00	2014.01	520.94	44460.692	88.79	7.99
1/4/2020 10:16:00	2013.85	521.01	44246.457	88.36	7.99
1/4/2020 10:17:00	2013.8	513.48	44118.413	88.10	7.99
1/4/2020 10:18:00	2014	521.79	43939.721	87.75	7.99
1/4/2020 10:19:00	2013.63	521.91	44025.727	87.92	7.99
1/4/2020 10:20:00	2013.88	524.07	44262.146	88.39	7.99
1/4/2020 10:21:00	2013.81	515.63	44300.729	88.47	7.99
1/4/2020 10:22:00	2013.88	515.74	44194.286	88.25	7.99
1/4/2020 10:23:00	2014.32	512.81	44107.171	88.08	7.99
1/4/2020 10:24:00	2013.85	511.39	43943.865	87.75	7.99
1/4/2020 10:25:00	2014.08	515.28	44147.386	88.16	7.99
1/4/2020 10:26:00	2013.81	521.86	44182.106	88.23	7.99
1/4/2020 10:27:00	2013.31	518.76	44279.415	88.42	7.99
1/4/2020 10:28:00	2013.03	516.8	44260.822	88.39	7.99
1/4/2020 10:29:00	2013.31	518.88	44171.388	88.21	7.99
1/4/2020 10:30:00	2013.52	522.09	44159.662	88.19	7.99
1/4/2020 10:31:00	2013.22	526.32	44232.273	88.33	7.99
1/4/2020 10:32:00	2012.99	523.71	44270.713	88.41	7.99
1/4/2020 10:33:00	2013.13	522.23	44241.281	88.35	7.99
1/4/2020 10:34:00	2013.24	520.41	44111.229	88.09	7.99
1/4/2020 10:35:00	2012.75	521.21	44200.452	88.27	7.99
1/4/2020 10:36:00	2012.91	512.19	44173.125	88.21	7.99
1/4/2020 10:37:00	2013.34	515.76	44226.956	88.32	7.99
1/4/2020 10:38:00	2013.78	517.47	44211.002	88.29	7.99
1/4/2020 10:39:00	2013.55	517.78	44125.001	88.12	7.99
1/4/2020 10:40:00	2013.34	518.93	44314.819	88.50	7.99
1/4/2020 10:41:00	2013.38	508.98	44233.324	88.33	7.99
1/4/2020 10:42:00	2013.51	510.57	44223.64	88.31	7.99
1/4/2020 10:43:00	2012.74	506.85	44272.934	88.41	7.99
1/4/2020 10:44:00	2012.75	502.64	44117.574	88.10	7.99
1/4/2020 10:45:00	2012.14	505.35	44143.387	88.15	7.99
1/4/2020 10:46:00	2012.58	509.36	44238.687	88.34	7.99
1/4/2020 10:47:00	2013.12	502.14	44312.548	88.49	7.99

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 10:48:00	2013.41	497.87	44200.771	88.27	7.99
1/4/2020 10:49:00	2013	502.66	44197.017	88.26	7.99
1/4/2020 10:50:00	2013.16	503.5	44162.6	88.19	7.99
1/4/2020 10:51:00	2013.07	499.8	44125.689	88.12	7.99
1/4/2020 10:52:00	2013.76	496.73	44165.932	88.20	7.99
1/4/2020 10:53:00	2013.53	493.71	44129.848	88.13	7.99
1/4/2020 10:54:00	2012.97	495.39	44171.844	88.21	7.99
1/4/2020 10:55:00	2013.06	504.56	44246.34	88.36	7.99
1/4/2020 10:56:00	2012.76	487.95	44285.941	88.44	7.99
1/4/2020 10:57:00	2012.83	489.4	44061.148	87.99	7.99
1/4/2020 10:58:00	2013.16	490.54	44127.141	88.12	7.99
1/4/2020 10:59:00	2013.33	486.62	44162.006	88.19	7.99
1/4/2020 11:00:00	2012.96	485.66	44237.424	88.34	7.99
1/4/2020 11:01:00	2013.3	492.28	44329.184	88.52	7.99
1/4/2020 11:02:00	2013.81	489.8	44195.027	88.26	7.99
1/4/2020 11:03:00	2013.06	485.37	44120.285	88.11	8
1/4/2020 11:04:00	2012.97	490.15	44146.127	88.16	8
1/4/2020 11:05:00	2013.55	484.07	44319.463	88.50	8
1/4/2020 11:06:00	2013.59	486.99	44362.002	88.59	8
1/4/2020 11:07:00	2013.01	487.64	44241.54	88.35	7.99
1/4/2020 11:08:00	2012.65	487.34	44129.822	88.13	8
1/4/2020 11:09:00	2012.9	483.28	44064.793	88.00	8
1/4/2020 11:10:00	2012.81	478.74	44113.147	88.09	8
1/4/2020 11:11:00	2013.17	474.37	44188.522	88.24	8
1/4/2020 11:12:00	2013.22	476.77	44227.353	88.32	7.99
1/4/2020 11:13:00	2013.81	473.69	44088.243	88.04	8
1/4/2020 11:14:00	2013.34	468.26	44197.873	88.26	8
1/4/2020 11:15:00	2013.49	489.43	44282.601	88.43	8
1/4/2020 11:16:00	2013.83	471.36	44183.944	88.23	8
1/4/2020 11:17:00	2014.33	469.1	44207.535	88.28	8
1/4/2020 11:18:00	2013.81	466.71	44131.777	88.13	7.99
1/4/2020 11:19:00	2013.81	462.67	44063.528	87.99	7.99
1/4/2020 11:20:00	2013.83	472.14	44113.148	88.09	7.99
1/4/2020 11:21:00	2014.06	471.91	44162.514	88.19	8
1/4/2020 11:22:00	2013.81	474.9	44304.718	88.47	8
1/4/2020 11:23:00	2013.83	471.11	44212.072	88.29	8
1/4/2020 11:24:00	2014.33	469.75	44126.921	88.12	8
1/4/2020 11:25:00	2013.61	465.36	44091.968	88.05	8
1/4/2020 11:26:00	2014.23	468.45	44018.132	87.90	8
1/4/2020 11:27:00	2014.34	470.19	44108.292	88.08	8
1/4/2020 11:28:00	2014.39	473.2	44257.111	88.38	8
1/4/2020 11:29:00	2013.99	469.57	44230.399	88.33	8
1/4/2020 11:30:00	2014.55	461.74	44120.676	88.11	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 11:31:00	2014.03	455.71	44240.593	88.35	7.99
1/4/2020 11:32:00	2013.99	467.64	44340.899	88.55	7.99
1/4/2020 11:33:00	2013.84	471.21	44230.373	88.33	8
1/4/2020 11:34:00	2014.33	469.89	44108.958	88.08	7.99
1/4/2020 11:35:00	2013.82	466.57	44207.85	88.28	8
1/4/2020 11:36:00	2014.54	468.94	44180.88	88.23	8
1/4/2020 11:37:00	2015.07	470.3	44212.516	88.29	7.99
1/4/2020 11:38:00	2015.21	464.18	44140.637	88.15	8
1/4/2020 11:39:00	2014.88	458.29	44168.116	88.20	7.99
1/4/2020 11:40:00	2014.88	458.99	44153.229	88.17	8
1/4/2020 11:41:00	2014.61	454.03	44250.417	88.37	8
1/4/2020 11:42:00	2014.61	452.65	44352.372	88.57	7.99
1/4/2020 11:43:00	2014.61	463.54	44156.692	88.18	7.99
1/4/2020 11:44:00	2014.88	456.01	44194.024	88.25	7.99
1/4/2020 11:45:00	2014.88	454.67	44093.766	88.05	7.99
1/4/2020 11:46:00	2014.88	457.76	44103.266	88.07	8
1/4/2020 11:47:00	2014.68	451.13	44262.251	88.39	8
1/4/2020 11:48:00	2014.6	455.8	44285.072	88.44	8
1/4/2020 11:49:00	2014.08	456.32	44225.901	88.32	8
1/4/2020 11:50:00	2014.02	456	44168.841	88.20	8
1/4/2020 11:51:00	2014.4	452.46	44091.697	88.05	8
1/4/2020 11:52:00	2014.01	454.33	44125.36	88.12	8
1/4/2020 11:53:00	2014.08	448.19	44180.984	88.23	8
1/4/2020 11:54:00	2014.15	444.77	44279.208	88.42	8
1/4/2020 11:55:00	2013.81	442.78	44195.543	88.26	8
1/4/2020 11:56:00	2013.81	451.61	44189.763	88.25	8
1/4/2020 11:57:00	2013.81	453.6	44145.731	88.16	8
1/4/2020 11:58:00	2013.35	446.93	44170.982	88.21	8
1/4/2020 11:59:00	2013.54	446.39	44037.262	87.94	8
1/4/2020 12:00:00	2012.75	446.43	44023.477	87.91	8
1/4/2020 12:01:00	2012.95	448.3	44187.804	88.24	8
1/4/2020 12:02:00	2013.08	445.72	44242.209	88.35	8
1/4/2020 12:03:00	2012.76	442.36	44253.663	88.37	8
1/4/2020 12:04:00	2013.17	449.99	44191.021	88.25	8
1/4/2020 12:05:00	2012.38	433.04	44106.594	88.08	8
1/4/2020 12:06:00	2012.82	437.8	44127.157	88.12	8
1/4/2020 12:07:00	2012.74	439.74	44097.564	88.06	8
1/4/2020 12:08:00	2012.49	440.77	44166.876	88.20	8
1/4/2020 12:09:00	2012.75	437.77	44134.998	88.14	8
1/4/2020 12:10:00	2013.22	436.2	44252.582	88.37	8
1/4/2020 12:11:00	2013.36	435.77	44239.29	88.34	8
1/4/2020 12:12:00	2013.2	437.49	44254.949	88.38	8
1/4/2020 12:13:00	2013.1	439.58	44089.67	88.05	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 12:14:00	2012.74	435.86	44011.32	87.89	8
1/4/2020 12:15:00	2012.74	435.29	44074.389	88.01	8
1/4/2020 12:16:00	2012.23	439.11	44172.848	88.21	8
1/4/2020 12:17:00	2013.15	440.81	44169.439	88.20	8
1/4/2020 12:18:00	2013.01	437.88	44241.942	88.35	8.01
1/4/2020 12:19:00	2012.75	435.58	44185.128	88.24	8.01
1/4/2020 12:20:00	2012.22	434.18	44122.755	88.11	8.01
1/4/2020 12:21:00	2012.76	436.58	44193.734	88.25	8.01
1/4/2020 12:22:00	2013.27	440.42	44200.285	88.27	8.01
1/4/2020 12:23:00	2013.21	437.32	44114.73	88.10	8
1/4/2020 12:24:00	2012.82	435.94	44125.997	88.12	8.01
1/4/2020 12:25:00	2011.96	426.64	44307.455	88.48	8.01
1/4/2020 12:26:00	2013.2	430.84	44047.274	87.96	8.01
1/4/2020 12:27:00	2012.83	430.9	44091.21	88.05	8
1/4/2020 12:28:00	2012.75	431.57	44194.4	88.25	8.01
1/4/2020 12:29:00	2013.2	438.43	44173.029	88.21	8.01
1/4/2020 12:30:00	2013.09	438.78	44196.229	88.26	8.01
1/4/2020 12:31:00	2012.75	430.79	44144.383	88.15	8.01
1/4/2020 12:32:00	2012.75	434.83	44175.843	88.22	8.01
1/4/2020 12:33:00	2013.61	434.54	44236.806	88.34	8.01
1/4/2020 12:34:00	2013.09	435.19	44067.615	88.00	8
1/4/2020 12:35:00	2012.67	423.47	44106.587	88.08	8.01
1/4/2020 12:36:00	2013.37	426.2	44296.661	88.46	8.01
1/4/2020 12:37:00	2013.27	424.73	44288.085	88.44	8.01
1/4/2020 12:38:00	2012.75	413.88	44189.845	88.25	8.01
1/4/2020 12:39:00	2013.28	413.62	44091.927	88.05	8.01
1/4/2020 12:40:00	2013.21	410.51	43940.924	87.75	8.01
1/4/2020 12:41:00	2013.1	391.62	44086.023	88.04	8.01
1/4/2020 12:42:00	2014.18	375.4	44243.616	88.35	8.01
1/4/2020 12:43:00	2014.94	353.5	44197.991	88.26	8.01
1/4/2020 12:44:00	2016.93	338.38	44156.403	88.18	8.02
1/4/2020 12:45:00	2017	338.38	44308.537	88.48	8.02
1/4/2020 12:46:00	2017.55	337.59	44069.037	88.00	8.02
1/4/2020 12:47:00	2017.54	331.52	44184.13	88.23	8.02
1/4/2020 12:48:00	2017.2	328.15	44181.831	88.23	8.02
1/4/2020 12:49:00	2017.54	324.73	44162.444	88.19	8.02
1/4/2020 12:50:00	2017.36	322.87	44102.748	88.07	8.02
1/4/2020 12:51:00	2017.01	319.62	44221.71	88.31	8.02
1/4/2020 12:52:00	2017.55	322.23	44217.126	88.30	8.02
1/4/2020 12:53:00	2017.54	325.31	44045.211	87.96	8.02
1/4/2020 12:54:00	2017	324.72	44184.357	88.23	8.01
1/4/2020 12:55:00	2016.81	324.97	44170.412	88.21	8.01
1/4/2020 12:56:00	2016.39	325.78	44245.746	88.36	7.98

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 12:57:00	2016.29	325.21	44147.801	88.16	7.91
1/4/2020 12:58:00	2015.49	327.79	44117.404	88.10	7.83
1/4/2020 12:59:00	2015.13	328.65	44141.867	88.15	7.76
1/4/2020 13:00:00	2014.88	331.64	44177.033	88.22	7.83
1/4/2020 13:01:00	2014.88	335.14	44274.264	88.41	8
1/4/2020 13:02:00	2014.88	334.56	44073.696	88.01	8.01
1/4/2020 13:03:00	2014.88	336.07	44207.757	88.28	8
1/4/2020 13:04:00	2014.61	333.76	44258.158	88.38	8
1/4/2020 13:05:00	2014.87	335.12	44208.789	88.28	8
1/4/2020 13:06:00	2014.08	334.58	44203.543	88.27	8
1/4/2020 13:07:00	2013.9	342.09	44209.532	88.28	8
1/4/2020 13:08:00	2013.81	345.72	44113.786	88.09	8
1/4/2020 13:09:00	2013.63	346.46	44151.535	88.17	8
1/4/2020 13:10:00	2013.46	341.9	44192.612	88.25	8
1/4/2020 13:11:00	2013.81	337.71	44202.172	88.27	8
1/4/2020 13:12:00	2013.55	334	44338.178	88.54	8
1/4/2020 13:13:00	2013.55	333.12	44182.178	88.23	8
1/4/2020 13:14:00	2013.86	337.78	44079.392	88.02	8
1/4/2020 13:15:00	2013.04	341.02	43941.936	87.75	8
1/4/2020 13:16:00	2012.57	342.4	44016.91	87.90	8
1/4/2020 13:17:00	2012.66	348.27	44117.895	88.10	8
1/4/2020 13:18:00	2012.03	354.12	44262.894	88.39	8
1/4/2020 13:19:00	2011.73	350.87	44323.191	88.51	8
1/4/2020 13:20:00	2012.31	349.41	44234.318	88.33	8
1/4/2020 13:21:00	2011.74	359.77	43905.795	87.68	8
1/4/2020 13:22:00	2011.19	364.07	44351.013	88.57	8
1/4/2020 13:23:00	2010.63	363.55	44535.102	88.94	8
1/4/2020 13:24:00	2010.63	368.49	44337.629	88.54	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
Average	2011	450	44230	88.3	8.00
Maximum	2014	468	44502	88.9	8.03
Minimum	2004	389	43887	87.6	7.97
St Dev	2	13	109	0.2	0.02
1/4/2020 14:40:00	2008.22	395.15	44144.229	88.15	8.01
1/4/2020 14:41:00	2008.2	389.36	44157.878	88.18	8.01
1/4/2020 14:42:00	2009.03	391.75	44254.271	88.37	8.01
1/4/2020 14:43:00	2008.77	390.81	44429.54	88.72	8.01
1/4/2020 14:44:00	2008.72	398.23	44459.083	88.78	8.01
1/4/2020 14:45:00	2009.07	402.87	44225.067	88.32	8.01
1/4/2020 14:46:00	2008.5	408.11	43886.633	87.64	8.01
1/4/2020 14:47:00	2009.24	416.24	43918.535	87.70	8.01
1/4/2020 14:48:00	2008.59	431.74	44269.783	88.41	8.01
1/4/2020 14:49:00	2007.19	426.19	44349.264	88.56	8.01
1/4/2020 14:50:00	2007.42	443.55	44417.292	88.70	8.01
1/4/2020 14:51:00	2006.73	451.3	44238.737	88.34	8.01
1/4/2020 14:52:00	2006.55	442.59	44204.293	88.27	8.01
1/4/2020 14:53:00	2006.38	446.55	44137.948	88.14	8.01
1/4/2020 14:54:00	2005.62	450.88	44099.414	88.06	8.01
1/4/2020 14:55:00	2005.16	453.84	44148.543	88.16	8.02
1/4/2020 14:56:00	2005.28	452.02	44276.573	88.42	8.02
1/4/2020 14:57:00	2005.28	453.43	44187.471	88.24	8.02
1/4/2020 14:58:00	2004.34	454.56	44297.749	88.46	8.02
1/4/2020 14:59:00	2004.49	458.25	44058.261	87.98	8.02
1/4/2020 15:00:00	2004.63	460	44128.279	88.12	8.02
1/4/2020 15:01:00	2006.11	462.78	44107.349	88.08	8.03
1/4/2020 15:02:00	2006.38	460.61	44002.867	87.87	8.03
1/4/2020 15:03:00	2006.75	454.6	44254.364	88.37	8.03
1/4/2020 15:04:00	2006.56	455.7	44298.234	88.46	8.03
1/4/2020 15:05:00	2006.45	458.25	44324.627	88.51	8.03
1/4/2020 15:06:00	2007.17	456.43	44304.752	88.48	8.03
1/4/2020 15:07:00	2008.17	453.84	44097.2	88.06	8.03
1/4/2020 15:08:00	2009.37	455.14	43920.745	87.71	8.03
1/4/2020 15:09:00	2009.64	458.62	44101.46	88.07	8.02
1/4/2020 15:10:00	2009.76	454.67	44460.142	88.79	8.02
1/4/2020 15:11:00	2010.56	452.14	44356.748	88.58	8.02
1/4/2020 15:12:00	2010.63	451.25	44353.589	88.57	8.02
1/4/2020 15:13:00	2010.89	444.06	44199.229	88.26	8.02
1/4/2020 15:14:00	2011.37	450.28	43920.801	87.71	8.02
1/4/2020 15:15:00	2011.42	460.71	44087.691	88.04	8.02
1/4/2020 15:16:00	2011.42	445.99	44252.988	88.37	8.02
1/4/2020 15:17:00	2011.62	454.13	44420.117	88.71	8.02

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 15:18:00	2012.29	448.57	44437.148	88.74	8.02
1/4/2020 15:19:00	2012.16	446	44310.798	88.49	8.02
1/4/2020 15:20:00	2012.75	446.53	44096.749	88.06	8.02
1/4/2020 15:21:00	2013.15	444.76	44197.041	88.26	8.01
1/4/2020 15:22:00	2013.09	444.45	44233.95	88.33	8.01
1/4/2020 15:23:00	2011.93	443.48	44167.926	88.20	8.02
1/4/2020 15:24:00	2011.69	450.25	44207.569	88.28	8.02
1/4/2020 15:25:00	2011.93	448.77	44316.947	88.50	8.02
1/4/2020 15:26:00	2011.71	444.33	44200.355	88.27	8.02
1/4/2020 15:27:00	2011.69	447.93	44080.646	88.03	8.02
1/4/2020 15:28:00	2011.95	450.6	44347.419	88.56	8.02
1/4/2020 15:29:00	2011.95	450.75	44135.209	88.14	8.02
1/4/2020 15:30:00	2011.82	442.73	44128.354	88.12	8.02
1/4/2020 15:31:00	2012.47	447.66	44132.04	88.13	8.02
1/4/2020 15:32:00	2012.5	453.14	44312.617	88.49	8.02
1/4/2020 15:33:00	2011.69	445.42	44405.9	88.68	8.02
1/4/2020 15:34:00	2011.69	445.2	44264.778	88.40	8.01
1/4/2020 15:35:00	2012.3	445.75	44175.242	88.22	8.02
1/4/2020 15:36:00	2012.22	435.3	44281.405	88.43	8.02
1/4/2020 15:37:00	2012.33	441.52	44335.76	88.54	8.01
1/4/2020 15:38:00	2012.06	441.78	44213.163	88.29	8.01
1/4/2020 15:39:00	2012.35	439.21	44104.928	88.08	8.01
1/4/2020 15:40:00	2011.96	440.13	44272.521	88.41	8.01
1/4/2020 15:41:00	2012.22	443.67	44302.267	88.47	8.01
1/4/2020 15:42:00	2011.4	442.68	44248.448	88.36	8.01
1/4/2020 15:43:00	2011.85	439.91	44247.053	88.36	8.01
1/4/2020 15:44:00	2012.51	446.05	44175.203	88.22	8.01
1/4/2020 15:45:00	2013.42	442.4	44107.618	88.08	8.01
1/4/2020 15:46:00	2012.88	438.9	44287.077	88.44	8.01
1/4/2020 15:47:00	2013.13	445.73	44277.085	88.42	8.01
1/4/2020 15:48:00	2012.82	447.16	44388.834	88.64	8.01
1/4/2020 15:49:00	2012.97	445.52	44155.16	88.18	8.01
1/4/2020 15:50:00	2012.75	447.22	44112.28	88.09	8
1/4/2020 15:51:00	2013.01	451.88	44178.664	88.22	8.01
1/4/2020 15:52:00	2012.75	444.95	44186.292	88.24	8.01
1/4/2020 15:53:00	2012.75	453.9	44163.035	88.19	8.01
1/4/2020 15:54:00	2013.17	449.43	44236.026	88.34	8.01
1/4/2020 15:55:00	2012.71	446.66	44198.781	88.26	8.01
1/4/2020 15:56:00	2012.23	445.62	44180.137	88.23	8
1/4/2020 15:57:00	2012.59	442.94	44200.281	88.27	8
1/4/2020 15:58:00	2012.11	446.09	44086.133	88.04	8
1/4/2020 15:59:00	2012.06	443.65	44208.914	88.28	8
1/4/2020 16:00:00	2011.85	444.58	44290.618	88.45	8

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 16:01:00	2012.75	446.98	44185.161	88.24	8
1/4/2020 16:02:00	2011.95	447.42	44122.595	88.11	8
1/4/2020 16:03:00	2012.32	444.11	44230.201	88.33	8
1/4/2020 16:04:00	2011.16	438.85	44303.213	88.47	8
1/4/2020 16:05:00	2012.37	443.1	44413.506	88.69	8
1/4/2020 16:06:00	2012.06	445.74	44364.423	88.59	8
1/4/2020 16:07:00	2011.95	443.34	44286.417	88.44	8
1/4/2020 16:08:00	2011.24	445.44	44108.218	88.08	8
1/4/2020 16:09:00	2011.33	442.82	44075.115	88.02	7.99
1/4/2020 16:10:00	2011	440.01	44299.877	88.47	8
1/4/2020 16:11:00	2010.89	452.56	44305.182	88.48	8
1/4/2020 16:12:00	2010.47	443.03	44207.728	88.28	8
1/4/2020 16:13:00	2010.66	448.38	44266.666	88.40	8
1/4/2020 16:14:00	2011.41	445.93	44267.753	88.40	7.99
1/4/2020 16:15:00	2011.04	442.38	44150.864	88.17	7.99
1/4/2020 16:16:00	2011.69	444.98	44146.805	88.16	7.99
1/4/2020 16:17:00	2011.69	446.95	44248.638	88.36	8
1/4/2020 16:18:00	2012.37	444.43	44192.497	88.25	8
1/4/2020 16:19:00	2012.33	449.38	44220.105	88.31	7.99
1/4/2020 16:20:00	2011.69	451.44	44164.002	88.19	7.99
1/4/2020 16:21:00	2012.11	453.42	44139.538	88.15	7.99
1/4/2020 16:22:00	2012.48	448.27	44240.425	88.35	7.99
1/4/2020 16:23:00	2011.8	453.17	44156.866	88.18	7.99
1/4/2020 16:24:00	2011.42	455.59	44313.306	88.49	7.99
1/4/2020 16:25:00	2012.22	453.88	44275.542	88.42	7.99
1/4/2020 16:26:00	2011.95	458.15	44299.697	88.46	7.99
1/4/2020 16:27:00	2011.95	452.41	44234.531	88.33	8
1/4/2020 16:28:00	2012.37	450.44	44251.531	88.37	7.99
1/4/2020 16:29:00	2013.43	448.94	44143.933	88.15	8
1/4/2020 16:30:00	2013.13	447.82	44036.908	87.94	7.99
1/4/2020 16:31:00	2012.75	447.3	44229.534	88.32	7.99
1/4/2020 16:32:00	2013.69	450.06	44261.006	88.39	7.99
1/4/2020 16:33:00	2012.87	449.89	44406.241	88.68	7.99
1/4/2020 16:34:00	2012.86	452.6	44383.815	88.63	7.99
1/4/2020 16:35:00	2013.58	449.03	43995.612	87.86	7.99
1/4/2020 16:36:00	2013.02	445.25	44161.388	88.19	7.99
1/4/2020 16:37:00	2012.87	449.75	44305.252	88.48	7.98
1/4/2020 16:38:00	2012.75	453.46	44234.937	88.34	7.98
1/4/2020 16:39:00	2013.28	455.66	44200.143	88.27	7.98
1/4/2020 16:40:00	2013.02	453.1	44502.157	88.87	7.99
1/4/2020 16:41:00	2013.02	454.15	44326.013	88.52	7.98
1/4/2020 16:42:00	2012.75	458.46	44228.618	88.32	7.98
1/4/2020 16:43:00	2013.28	453.69	44177.395	88.22	7.98

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 16:44:00	2012.6	452.59	44200.187	88.27	7.98
1/4/2020 16:45:00	2011.95	454.7	44396.248	88.66	7.98
1/4/2020 16:46:00	2012.23	450.12	44423.857	88.71	7.98
1/4/2020 16:47:00	2012.75	456.32	44318.246	88.50	7.98
1/4/2020 16:48:00	2013.28	458.28	44179.658	88.23	7.98
1/4/2020 16:49:00	2013.28	454.11	44119.745	88.11	7.98
1/4/2020 16:50:00	2012.75	454.5	44034.572	87.94	7.98
1/4/2020 16:51:00	2012.61	452.68	44075.035	88.02	7.98
1/4/2020 16:52:00	2012.36	450.37	44318.853	88.50	7.98
1/4/2020 16:53:00	2012.61	455.58	44286.423	88.44	7.98
1/4/2020 16:54:00	2011.95	453.91	44395.752	88.66	7.98
1/4/2020 16:55:00	2011.69	449.56	44222.824	88.31	7.98
1/4/2020 16:56:00	2011.95	455.26	44269.469	88.40	7.98
1/4/2020 16:57:00	2011.69	458.21	44179.797	88.23	7.98
1/4/2020 16:58:00	2011.69	454.69	44270.076	88.41	7.98
1/4/2020 16:59:00	2011.69	451.34	44301.342	88.47	7.98
1/4/2020 17:00:00	2011.28	459.92	44198.323	88.26	7.98
1/4/2020 17:01:00	2011.56	458.39	44378.767	88.62	7.98
1/4/2020 17:02:00	2011.01	465.72	44340.621	88.55	7.98
1/4/2020 17:03:00	2009.69	458.88	44258.073	88.38	7.98
1/4/2020 17:04:00	2009.7	464.66	44194.151	88.25	7.98
1/4/2020 17:05:00	2010.62	447.78	44163.66	88.19	7.98
1/4/2020 17:06:00	2010.09	455.77	44297.182	88.46	7.98
1/4/2020 17:07:00	2010.36	463.47	44302.576	88.47	7.99
1/4/2020 17:08:00	2010.49	461.6	44204.034	88.27	7.99
1/4/2020 17:09:00	2009.83	459.11	44256.778	88.38	7.99
1/4/2020 17:10:00	2010.5	460.97	44240.562	88.35	7.99
1/4/2020 17:11:00	2010.67	461.38	44202.545	88.27	7.99
1/4/2020 17:12:00	2011.25	458.4	44082.008	88.03	7.99
1/4/2020 17:13:00	2011.83	457.98	44206.697	88.28	7.98
1/4/2020 17:14:00	2012.08	455.18	44313.676	88.49	7.98
1/4/2020 17:15:00	2011.16	453.41	44328.305	88.52	7.98
1/4/2020 17:16:00	2011.42	456.61	44380.668	88.63	7.98
1/4/2020 17:17:00	2011.83	460.97	44232.428	88.33	7.98
1/4/2020 17:18:00	2011.55	458.61	44072.405	88.01	7.98
1/4/2020 17:19:00	2011.69	457.3	44099.294	88.06	7.98
1/4/2020 17:20:00	2011.82	460.48	44194.351	88.25	7.98
1/4/2020 17:21:00	2012.08	460.95	44352.648	88.57	7.98
1/4/2020 17:22:00	2011.69	462.32	44365.507	88.60	7.98
1/4/2020 17:23:00	2011.56	463.7	44183.947	88.23	7.98
1/4/2020 17:24:00	2012.08	467.6	44245.101	88.36	7.98
1/4/2020 17:25:00	2011.69	462.38	44226.168	88.32	7.97
1/4/2020 17:26:00	2012.22	456.9	44284.742	88.44	7.98

	Combustion Chamber Temp	Monomers Gas Feed Rate	Stage 4 rate	Stage 4 rate	Stage 4 pH
units	F	lb/h	lb/h	gpm	
Tag	A40937TC	A41756FC	A41255FG	calculated	A41261XC
1/4/2020 17:27:00	2011.95	454.1	44201.598	88.27	7.98
1/4/2020 17:28:00	2012.22	464.95	44226.359	88.32	7.97
1/4/2020 17:29:00	2011.69	466	44220.528	88.31	7.97
1/4/2020 17:30:00	2011.69	461.23	44244.344	88.35	7.97
1/4/2020 17:31:00	2011.42	464.48	44230.409	88.33	7.98
1/4/2020 17:32:00	2012.22	463.64	44273.842	88.41	7.98
1/4/2020 17:33:00	2012.09	461.3	44236.784	88.34	7.98
1/4/2020 17:34:00	2012.48	462.05	44338.655	88.54	7.98
1/4/2020 17:35:00	2011.95	456.24	44265.713	88.40	7.97
1/4/2020 17:36:00	2012.22	457.13	44094.442	88.06	7.97
1/4/2020 17:37:00	2011.82	460.76	44098.07	88.06	7.97
1/4/2020 17:38:00	2012.08	455.49	44269.625	88.40	7.97
1/4/2020 17:39:00	2011.69	459.86	44241.382	88.35	7.97
1/4/2020 17:40:00	2011.75	458.86	44291.139	88.45	7.97
1/4/2020 17:41:00	2012.15	460.59	44323.509	88.51	7.98
1/4/2020 17:42:00	2012.35	466.95	44445.066	88.76	7.98
1/4/2020 17:43:00	2011.69	463.24	44402.155	88.67	7.98
1/4/2020 17:44:00	2012.35	462.6	44244.72	88.36	7.98
1/4/2020 17:45:00	2012.48	461.64	44065.819	88.00	7.98
1/4/2020 17:46:00	2012.09	464.56	44094.445	88.06	7.98
1/4/2020 17:47:00	2011.03	461.41	44158.92	88.18	7.98
1/4/2020 17:48:00	2011.02	461.15	44266.474	88.40	7.98
1/4/2020 17:49:00	2011.56	467.8	44197.781	88.26	7.99
1/4/2020 17:50:00	2011.15	467.36	44287.181	88.44	7.99
1/4/2020 17:51:00	2010.76	462.55	44266.712	88.40	7.98
1/4/2020 17:52:00	2011.55	462.3	44198.065	88.26	7.98
1/4/2020 17:53:00	2011.42	463.47	44283.843	88.43	7.98
1/4/2020 17:54:00	2011.29	466.64	44430.684	88.73	7.98

APPENDIX B
RAW AND REDUCED TEST DATA

Sample and Velocity Traverse Point Data Sheet - Method 1

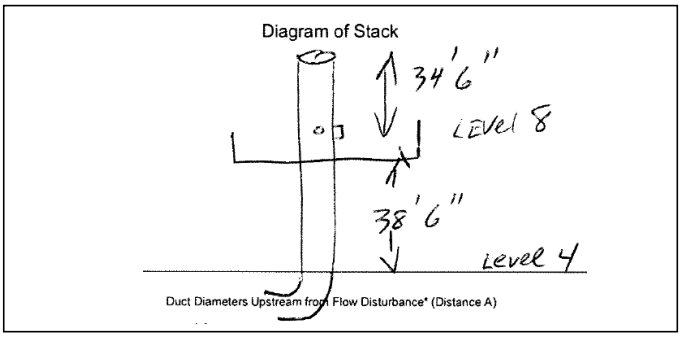
Client	Chemours	Operator	SR
Loaction/Plant	Fayetteville, NC	Date	3-Jan-20
Source	Thermal Oxidizer Outlet	W.0. Number	15418.002.019.0001

Duct Type	☑ Circular	☐ Rectangular Duct	Indicate appropriate type
Traverse Type	☑ Particulate Traverse	☐ Velocity Traverse	☑ Cem Traverse

Distance from far wall to outside of port (in.) = C	36.0
Port Depth (in.) = D	18.0
Depth of Duct, diameter (in.) = C-D	18
Area of Duct (ft^2)	1.767
Total Traverse Points	8
Total Traverse Points per Port	4

Rectangular Ducts Only	
Width of Duct, rectangular duct only (in.)	
Total Ports (rectangular duct only)	

Flow Disturbances	
Upstream - A (ft)	34.5
Downstream - B (ft)	38.5
Upstream - A (duct diameters)	23.00
Downstream - B (duct diameters)	25.67

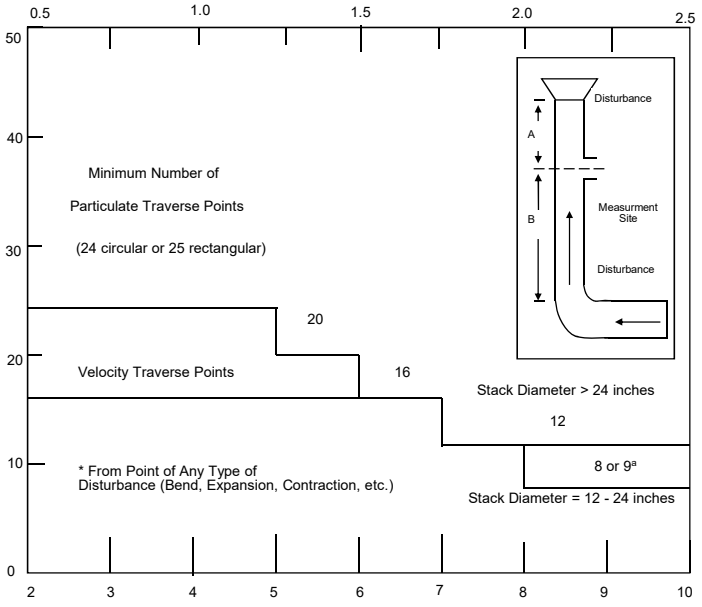


Traverse Point Locations

Traverse Point	% of Duct	Distance from Inside Duct Wall (in)	Distance from Outside of Port (in)	Distance from Outside of Port (in)
1	6.7	1.21	19.21	19 2/8
2	25.0	4.50	22.50	22 4/8
3	75.0	13.50	31.50	31 4/8
4	93.3	16.79	34.79	34 6/8
5				
6				
7				
8				
9				
10				
11				
12				

CEM 3 Point (Long Measurement Line) Statification Point Locations

1	16.7	3.01	21.01	21
2	50.0	9.00	27.00	27
3	83.3	14.99	32.99	33



Note:If stack dia<24 inches adjust traverse points to 0.5 inches from wall

Note:If stack dia>24 inches adjust traverse points to 1.0 inches from wall

Equivalent Diameter = (2*L*W)/(L+W)

Traverse Point Location Percent of Stack -Circular

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

Traverse Point Location Percent of Stack -Rectangular

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

Rectangular Stack Points & Matrix
9 - 3 x 3
12 - 4 x 3
16 - 4 x 4
20 - 5 x 4
25 - 5 x 5
30 - 6 x 5
36 - 6 x 6
42 - 7 x 6
49 - 7 x 7

Determination of Stack Gas Velocity - Method 2

Client: CHEMOURS - FAYETTEVILLE Operator: MW 2020 Pitot Coeff (Cp): 0.87
Location/Plant: FAYETTEVILLE, NC. Date: 1/03/2019 Stack Area, ft² (As): 1.767
Source: THERMAL OXIDIZER W.O. Number: Pitot Tube/Thermo ID: P-74

Run Number	1 PM		
Time	1528		
Barometric Press, in Hg (Pb)	29.78		
Static Press, in H_2O (Pstatic)	-0.30		
Source Moisture, % (BWS)			
O_2, %			
CO_2, %			

Cyclonic Flow Determination		Traverse Location		Leak Check good ? (Y) N		Leak Check good ? Y / N		Leak Check good ? Y / N	
Delta P at 0°	Angle yeilding zero Delta P	Port	Point	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)	Delta P	Source Temp, F° (Ts)
0	<5	A	1	~~0.05~~	81				
0	<5		2	0.59	84				
0			3	0.59	84				
0			4	0.57	84				
0			5	0.56	87				
0			6	0.50	88				
0		B	1	0.50	87				
0	<5		2	0.54	88				
0	<5		3	0.56	88				
0	<5		4	0.56	88				
0			5	0.56	88				
0			6	0.52	88				
					~~86.7~~ MW				
Avg Angle		Avg Delta P & Temp		0.55333	86.7				
		avg √DeltaP		0.743862					
Average gas stream velocity, ft/sec.									
Vol. flow rate @ actual conditions, wacf/min									
Vol. flow rate at standard conditions, dscf/min									

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

$MWs = (MWd * (1 - (BWS/100))) + (18 * (BWS/100))$

$Tsa = Ts + 460$

$Ps = Pb + (Pstatic/13.6)$

$Vs = 85.49 * Cp * avg\sqrt{DeltaP} * \sqrt{Tsa/(Ps * MWs)}$

$Qs(act) = 60 * Vs * As$

$Qs(std) = 17.64 * (1 - (BWS/100)) * (Ps/Tsa) * Qs(act)$

MWd = Dry molecular weight source gas, lb/lb-mole.
MWs = Wet molecular weight source gas, lb/lb-mole.
Tsa = Source Temperature, absolute(oR)
Ps = Absolute stack static pressure, inches Hg.
Vs = Average gas stream velocity, ft/sec.
Qs(act) = Volumetric flow rate of wet stack gas at actual, wacf/min
Qs(std) = Volumetric flow rate of dry stack gas at standard conditions, dscf/min

Note: Micromanometer is required if:
(A) The average Delta P readings are less than 0.05 inches of water.
(B) For traverses of 12 or more points, more than 10% of the Delta P readings are below 0.05 inches of water.
(C) For traverses of less than 12 points, more than one Delta P readings is below 0.05 inches of water.

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ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

		Stack Conditions	Assumed	Actual
Client	Chemours	% Moisture	~~28~~ 4.3	
W.O.#	15418.002.019	Impinger Vol (ml)		
Project ID	Chemours	Silica gel (g)		
Mode/Source ID	Thermal Oxidizer	CO2, % by Vol	3.0	
Samp. Loc. ID	STK	O2, % by Vol	19.0	
Run No.ID	1	Temperature (°F)	~~82~~ 88	
Test Method ID	M0010	Meter Temp (°F)	75	
Date ID	DEC2019	Static Press (in H_2O)	-0.30 ✓	-0.30
Source/Location	Thermal Oxidizer Stack			
Sample Date	1/03/2020			
Baro. Press (in Hg)	29.78 ✓	Ambient Temp (°F)	75	
Operator	MW WINKELER			

Meter Box ID	32		
Meter Box Y	0.9834		
Meter Box Del H	1.7175		
Probe ID / Length	561	3'	Sample Train (ft^3)
Probe Material	Boro		Leak Check @ (in Hg)
Pitot / Thermocouple ID	P361		Pitot leak check good
Pitot Coefficient	0.84 ✓		Pitot Inspection good
Nozzle ID	G235		Method 3 System good
Nozzle Measurements	G235	0.235 / 0.233	Temp Check
Avg Nozzle Dia (in)	0.234 ✓		Meter Box Temp
Area of Stack (ft^2)	1.767		Reference Temp
Sample Time	180 ✓		Pass/Fail (+/- 2°)
Total Traverse Pts	12 ✓		Temp Change Response ?

K Factor 2.841

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.001	0.003
Leak Check @ (in Hg)	e15	e5	e6
Pitot leak check good	(yes) / no	(yes) / no	(yes) / no
Pitot Inspection good	(yes) / no	(yes) / no	(yes) / no
Method 3 System good	yes / no	yes / no	yes / no
	Pre-Test Set		Post-Test Set
Meter Box Temp	75		69
Reference Temp	74		68
Pass/Fail (+/- 2°)	(Pass) / Fail		(Pass) / Fail
Temp Change Response ?	(yes) / no		(yes) / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	1615 ✓			949.820									
A 1	5		0.59	1.67	953.510	87	75	90	89	67	5	65		
1	10		0.59	1.67	957.70	88	75	91	89	65	5	60		
1	15		0.59	1.67	961.25	87	75	91	89	65	5	60		
2	20		0.56	1.59	964.99	87	75	90	91	65	5	60		
2	25		0.56	1.59	968.80	87	75	90	92	65	5	60		
2	30		0.56	1.59	972.60	87	75	90	92	65	5	60		
3	35		0.55	1.56	976.40	87	75	90	92	63	5	60		
3	40		0.55	1.56	979.64	87	74	90	92	61	5	58		
3	45		0.55	1.56	983.30	87	74	90	91	61	5	58		
4	50		0.56	1.59	986.90	87	74	90	91	60	5	55		
4	55		0.55	1.56	990.80	87	74	90	91	60	5	55		
4	60		0.56	1.59	994.47	87	74	90	88	60	5	57		
5	65		0.54	1.53	998.10	86	74	90	92	60	5	58		
5	70		0.54	1.53	1001.87	86	74	90	92	60	5	58		
5	75		0.54	1.53	1005.42	86	74	90	92	60	5	58		
6	80		0.50	1.42	1008.60	86	74	90	92	62	5	59		
6	85		0.50	1.42	1012.50	86	74	90	92	61	5	60		
6	90	1745	0.50	1.42	1016.040	86	74	91	91	62	5	60		66.22

Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max
~~0.55028~~	~~1.56500~~	32.805 ✓	84.5	72.5	91	92	67	5	57 / 65
Avg Sqrt Delta P	Avg Sqrt Del H	Comments:			89	89			
~~0.74809~~	~~1.25100~~								

EPA Method 0010 from EPA SW-846

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Avg $\sqrt{\Delta P}$ = 0.74056 ✓ Avg Delta P 0.54889 ✓ Avg Delta H 1.5611 ✓ Avg $\sqrt{\Delta H}$ = 1.24896 ✓

ISOKINETIC FIELD DATA SHEET — EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | Operator: MD WINKELER
Source: Thermal Oxidizer | Run No.: 1
Sample Loc.: Stack | Date: 1/03/2020 | K Factor: 2.84

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)	COMMENTS
	0	1805			16.180								
B 1	5		0.60	1.70	20.30	84	72	90	92	67	5	58	
1	10		0.59	1.67	24.00	84	72	90	92	66	5	58	
1	15		0.59	1.67	27.83	84	72	90	92	66	5	58	
2	20		0.56	1.60	31.40	84	72	90	92	63	5	58	← 2.87
2	25		0.56	1.60	35.28	84	72	90	92	63	5	58	
2	30		0.56	1.60	38.40	84	72	90	92	63	5	58	
3	35		0.55	1.57	42.45	84	72	90	92	63	5	58	
3	40		0.55	1.57	46.36	84	72	90	92	63	5	58	
3	45		0.56	1.60	49.90	83	70	90	92	63	5	58	
4	50		0.54	1.54	53.80	82	70	90	89	63	5	59	
4	55		0.54	1.54	57.88	82	70	90	89	63	5	59	
4	60		0.54	1.54	61.41	82	70	90	90	61	5	59	← 2.87
5	65		0.56	1.60	65.10	82	70	90	90	61	5	59	
5	70		0.56	1.60	68.70	82	70	90	91	61	5	59	
5	75		0.56	1.60	72.47	80	69	90	90	61	5	59	
6	80		0.50	1.43	75.64	79	69	90	90	61	5	59	
6	~~85~~		0.50	1.43	79.10	79	69	90	90	62	5	58	
6	90	1935 ✓	0.45	1.29	82.765	79	69	90	90	63	5	60	
						66.585 ✓							

Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
0.55028	1.56500								
Avg Sqrt Delta P	Avg Sqrt Del H	Comments:							

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

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		Stack Conditions						
Client	Chemours		Assumed	Actual	Meter Box ID	32		
W.O.#	15418.002.019				Meter Box Y	0.9834		
Project ID	Chemours	% Moisture	24		Meter Box Del H	1.715	1.775	
Mode/Source ID	Thermal Oxidizer	Impinger Vol (ml)		343	Probe ID / Length	8561	3	Sample Train (ft³)
Samp. Loc. ID	STK	Silica gel (g)		36.3	Probe Material	Boro		Leak Check @ (in Hg)
Run No.ID	2	CO2, % by Vol	3	4.2	Pitot / Thermocouple ID	8561		Pitot leak check good
Test Method ID	M0010	O2, % by Vol	19	14.7	Pitot Coefficient	0.84 ✓		Pitot Inspection good
Date ID	DEC2019	Temperature (°F)	≈85		Nozzle ID	G235		Method 3 System good
Source/Location	Thermal Oxidizer Stack	Meter Temp (°F)	≈60		Nozzle Measurements	0.235	0.235 0.235	**Temp Check**
Sample Date	1/04/20 ✓	Static Press (in H_2O)	−0.30	−0.30	Avg Nozzle Dia (in)	0.235 ✓		Meter Box Temp
Baro. Press (in Hg)	29.74 ✓				Area of Stack (ft²)	2.41	1.767	Reference Temp
Operator	MW, WINKELER	Ambient Temp (°F)	≈57		Sample Time	180 ✓		Pass/Fail (+/- 2°)
					Total Traverse Pts	12 ✓		Temp Change Response ?

K Factor 2.85

	Initial	Mid-Point	Final
	5.000	5.001	5.001
	.15	.16	.16
	(yes) / no	(yes) / no	(yes) / no
	(yes) / no	yes / no	(yes) / no
	yes / no	yes / no	yes / no
	Pre-Test Set		Post-Test Set
	57		60
	56		59
	(Pass) / Fail		(Pass) / Fail
	yes / no		yes / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	1010 ✓			83.152									
A-1	4.5		0.59	1.68	86.60	73	57	100	100	56	4	56		
1	9		0.59	1.68	90.33	73	57	100	100	56	4	56		
10-1	13.5		0.59	1.69	93.17	73	57	100	100	59	4	55		
15-1	18.0		0.57	1.62	96.70	73	57	100	100	59	4	55		
20-1	22.5		0.57	1.62	100.03	73	52	100	102	59	4	55		K-Factor
25-2	27		0.55	1.61	103.10	72	52	100	100	63	4	59	←	2.94
2	31.5		0.55	1.61	106.17	72	52	100	100	63	4	59		
3-2	36		0.59	1.61	109.3	72	52	100	100	62	4	59		
35-2	40.5		0.55	1.61	113.10	72	52	100	100	62	4	59		
40-2	45		0.55	1.61	116.10	72	52	100	100	62	4	59		
45-3	49.5		0.50	1.47	120.05	72	57	100	100	62	4	57		
50-3	54.0		0.50	1.47	122.8	72	57	100	100	62	4	57		
55-3	58.5		0.50	1.47	126.3	72	57	100	100	60	4	50		
60-3	63		0.50	1.47	129.5	72	57	100	100	60	4	50		
65-4	67.5		0.50	1.47	132.3	72	57	100	100	60	4	50		
	67		0.50	1.47	135.9	72	57	100	100	60	4	50		
70-4	71.5		0.50	1.47	139.0	73	54	100	100	60	4	50		
75-4	76		0.50	1.47	142.30	73	54	100	100	60	4	50		
80-4	80.5		0.50	1.47	145.52	73	59	100	100	60	4	50		
85-4	145	1140	0.50	1.47	148.754	73	59	100	100	60	4	50		✓
90-5	MW													65.69
	2/6/20													

	Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max
	~~0.53760~~	~~1.55850~~	~~131.600~~	~~73~~	~~57~~	101	98 / 102	64	5	54 / 60
	Avg Sqrt Delta P	Avg Sqrt Del H	Comments:							
	~~0.73283~~ ✓	~~1.24847~~	131.564 ✓	72.5 ✓	58.1 ✓					

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Avg $\sqrt{DP}$ = 0.73054 Avg DP 0.53425 ✓ Avg DH 1.55750 ✓ Avg $\sqrt{DH}$ = 1.24749 53 ✓

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

Page ___ of ___

Client: Chemours | Operator: MA

Source: Thermal Oxidizer | Run No.: 2

Sample Loc.: Stack | Date: 1/04/2020 | K Factor: 2.924

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)	COMMENTS
	0	1155			148.815								
B 5 1	4.5		0.58	1.70	151.55	73	60	100	100	57	5	54	
10 1	9		0.58	1.70	154.90	73	60	100	100	57	5	54	
15 1	13.5		0.58	1.70	157.71	73	60	100	100	57	5	54	
20 1	18.0		0.57	1.67	161.91	73	60	100	100	57	5	55	
1	22.5		0.57	1.67	165.27	73	60	100	100	60	5	58	
25 2	27		0.55	1.61	168.81	73	60	100	100	60	5	58	
30 2	31.5		0.55	1.61	172.12	73	60	100	100	62	5	58	
35 2	36		0.55	1.61	175.51	73	61	100	100	62	5	54	
2	40.5		0.55	1.61	179.00	73	61	100	100	62	5	58	
40 2	45		0.55	1.61	182.39	73	61	100	101	62	5	58	
45 3	4.5		0.52	1.52	185.51	72	61	100	100	62	5	58	
50 3	9		0.52	1.52	188.65	72	61	100	100	62	5	59	
3	13.5		0.52	1.52	191.99	72	61	100	100	63	5	60	
55 3	18		0.52	1.52	195.40	72	61	100	100	63	5	58	
60 3	22.5		0.50	1.47	198.71	72	61	100	100	63	5	58	
65 4	27		0.50	1.47	201.4	72	61	100	98	63	5	59	
70 4	31.5		0.49	1.44	205.0	72	61	100	101	63	5	59	
75 4	36		0.49	1.44	208.3	72	61	100	99	63	5	59	
80 4	40.5		0.49	1.44	211.75	72	61	100	100	64	5	59	
85 4	45	1325	0.49	1.44	214.775	73	61	100	100	64	5	59	
90													65.900
	MA												
	3/4/20												

Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp
Avg Sqrt Delta P	Avg Sqrt Del H	Comments:							

ISOKINETIC FIELD DATA SHEET

EPA Method 0010 - HFPO Dimer Acid

		Stack Conditions	Assumed	Actual
Client	Chemours			
W.O.#	15418.002.019			
Project ID	Chemours	% Moisture	≈2	
Mode/Source ID	Thermal Oxidizer	Impinger Vol (ml)		23.9
Samp. Loc. ID	STK	Silica gel (g)		36.1
Run No.ID	3	CO2, % by Vol	4.2%	
Test Method ID	M0010	O2, % by Vol	14.7%	
Date ID	DEC2019	Temperature (°F)	≈75	
Source/Location	Thermal Oxidizer Stack	Meter Temp (°F)	≈65	
Sample Date	11/04/20 ✓	Static Press (in H_2O)	-0.30	-0.20
Baro. Press (in Hg)	~~29.75~~ 29.63 ✓	Ambient Temp (°F)	≈62	
Operator	MW WINKELER ✓			

Meter Box ID	32		
Meter Box Y	0.9834 ✓		
Meter Box Del H	1.717		
Probe ID / Length	561	3'	Sample Train (ft^3)
Probe Material	Boro		Leak Check @ (in Hg)
Pitot / Thermocouple ID	P561		Pitot leak check good
Pitot Coefficient	0.84 ✓		Pitot Inspection good
Nozzle ID	G235		Method 3 System good
Nozzle Measurements	0.235	0.235 / 0.235	**Temp Check**
Avg Nozzle Dia (in)	0.235 ✓		Meter Box Temp
Area of Stack (ft^2)	~~2.41~~	1.767	Reference Temp
Sample Time	180 ✓		Pass/Fail (+/- 2°)
Total Traverse Pts	9 ✓		Temp Change Response ?

K Factor 2.90

	Initial	Mid-Point	Final
Sample Train (ft^3)	0.001	0.001	0.001
Leak Check @ (in Hg)	≈15	≈6	≈7
Pitot leak check good	~~yes~~ / no	yes / no	~~yes~~ / no
Pitot Inspection good	~~yes~~ / no	yes / no	~~yes~~ / no
Method 3 System good	yes / no	yes / no	~~yes~~ / no
Temp Check	Pre-Test Set		Post-Test Set
Meter Box Temp	60		65
Reference Temp	59		64
Pass/Fail (+/- 2°)	~~Pass~~ / Fail		~~Pass~~ / Fail
Temp Change Response ?	~~yes~~ / no		~~yes~~ / no

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft^3)	STACK TEMP (°F)	DGM OUTLET TEMP (oF)	PROBE TEMP (oF)	FILTER BOX TEMP (F)	IMPINGER EXIT TEMP (oF)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)		COMMENTS
	0	1440 ✓		1.68	214.926									
B 5 1	4.5		0.58	~~1.72~~	216.22	75	63	100	99	65	5	62		
10 1	9		0.58	1.75 1.68	221.50	75	63	100	99	62	5	62		—
15 1	13.5		0.58	1.68	225.19	75	63	100	101	62	5	62		
20 1	18		0.59	1.68	228.26	76	63	100	101	62	5	61		
25 1	22.5		0.58	1.68	232.06	76	63	100	101	62	5	61		
30 2	27		0.55	1.59	235.47	76	63	100	100	62	5	61		K. Fouth
35 2	31.5		0.55	1.59	238.72	77	63	100	100	62	5	60		
40 2	36		0.55	1.62	242.24	77	63	100	100	62	5	55		← 2.96
45 2	40.5		0.55	1.62	245.40	77	64	100	100	62	5	50		
50 2	45		0.55	1.62	248.42	77	64	100	100	61	4	41		
55 3	41.5		0.52	1.53	252.57	77	64	100	100	61	4	42		
60 3	9		0.52	1.53	255.30	77	64	100	100	61	4	40		
3	13.5		0.52	1.53	258.20	77	64	100	100	61	4	41		
653	18		0.52	1.53	261.78	77	64	100	100	61	4	42		
70 3	22.5		0.52	1.53	265.43	77	65	100	100	61	5	~~50~~ 45		
75 4	27		0.48	1.42	268.80	77	65	100	100	61	5	42		
80 4	31.5		0.48	1.42	271.33	77	65	100	100	61	5	48		
85 4	36		0.48	1.42	275.61	77	65	100	100	61	5	48		
4	40.5		0.48	1.42	277.70	77	65	101	101	61	5	50		
904	45	1610	0.48	1.42	280.899	77	65	101	101	61	5	50		
	3/61/20													65.973
			Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max	Max Vac	Min/Max		
			0.53550	1.57375	152.973	76	65	100/101	98/101	65	5	40/62		
			Avg Sqrt Delta P	Avg Sqrt Del H	Comments:									
			~~0.731779~~	~~1.254949~~		76.5	64.5							

WESTON SOLUTIONS

EPA Method 0010 from EPA SW-846

2.50

Avg $\sqrt{\Delta P}$ = 0.73092 ✓ Avg DP 0.53475 ✓ Avg DH 1.57150 ✓ Avg $\sqrt{\Delta H}$ = 1.25308 ✓55

ISOKINETIC FIELD DATA SHEET — EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | Operator: MW WINKELER
Source: Thermal Oxidizer | Run No.: 3
Sample Loc.: Stack | Date: 1/04/2020 | K Factor: 2.96

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	VELOCITY PRESSURE Delta P (in H2O)	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (ft³)	STACK TEMP (°F)	DGM OUTLET TEMP (°F)	PROBE TEMP (°F)	FILTER BOX TEMP (F)	IMPING EXIT TEMP (°F)	SAMPLE TRAIN VAC (in Hg)	XAD EXIT TEMP (F)	COMMENTS
	0	1625			281.000								
A 1	4.5		0.58	1.71	284.55	77	66	100	99	62	5	62	
10 1	9		0.57	1.68	288.00	77	66	100	99	62	5	60	
15 1	13.5		0.57	1.68	291.53	77	66	100	100	61	5	57	
20 1	18		0.57	1.68	294.63	77	66	100	100	61	5	57	
25 1	22.5		0.57	1.68	297.84	77	66	100	100	61	5	57	
30 2	27		0.55	1.62	301.40	77	66	101	100	61	5	57	
35 2	31.5		0.55	1.62	304.90	77	66	100	100	61	5	57	
40 2	36		0.55	1.62	308.40	77	65	100	100	61	5	57	
45 2	40.5		0.55	1.62	312.90	77	65	100	100	61	5	57	
50 2	45		0.55	1.62	315.70	77	65	100	100	62	5	57	
55 3	41.5		0.55	1.62	318.87	77	65	100	100	62	5	57	
60 3	9		0.52	1.53	322.50	76	65	100	100	62	5	57	
65 3	13.5		0.52	1.53	325.72	76	65	100	99	64	5	57	
70 3	18		0.52	1.53	328.81	76	65	100	99	64	5	55	
75 3	22.5		0.52	1.53	331.65	76	65	100	99	63	4	55	
80 4	27		0.50	1.48	335.45	76	64	100	98	62	4	55	
85 4	31.5		0.50	1.48	338.44	76	64	100	98	62	5	54	
4	36		0.50	1.48	341.34	76	64	100	99	58	5	54	
4	40.5		0.50	1.48	344.63	76	64	100	99	58	4	54	
90 4	45	1755	0.50	1.48	348.000	75	64	100	100	58	4	54	
	MW 3/6/20												67.000
			Avg Delta P	Avg Delta H	Total Volume	Avg Ts	Avg Tm	Min/Max	Min/Max	Max Temp	Max Vac	Max Temp	
			Avg Sqrt Delta P	Avg Sqrt Del H	Comments:								

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client: Chemours | W.O. #: 15418.002.019
Location/Plant: Fayetteville, NC | Source & Location: Thermal Oxidizer Stack

Run No. 1 | Sample Date 1/3/20 | Recovery Date 1/3/20
Sample I.D. Chemours - Thermal Oxidizer - STK - 4 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	~~Empty~~	XAD-1	XAD-2			Silica Gel	
Final	72	100	100	0	360.9	373.2			327.5	
Initial	0	100	100	0	347.5	373.5			300	
Gain	72	0	0	0	13.4	~~-0.2~~ -0.3		85.1 ✓	27.5 ✓	

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 3/4 Spent | Sealed? ✓

Run No. 2 | Sample Date 1/4/20 | Recovery Date 1/4/20
Sample I.D. Chemours - Thermal Oxidizer - STK - 5 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	30	96	100	0	369.3	361.5			336.3	
Initial	0	100	100	0	360.9	361.6			300	
Gain	30	-4	0	0	8.4	-0.1		34.3 ✓	36.3 ✓	

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 3/4 Spent | Sealed? ✓

Run No. 3 | Sample Date 1/4/20 | Recovery Date 1/4/20
Sample I.D. Chemours - Thermal Oxidizer - STK - 6 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	Empty	XAD-1	XAD-2			Silica Gel	
Final	34	90	90	0	371.8	350.8			336.1	
Initial	0	100	100	0	362.1	350.6			300	
Gain	34	-10	-10	0	9.7	0.2		23.9 ✓	36.1 ✓	

Impinger Color: Clear | Labeled? ✓
Silica Gel Condition: 50% Spent | Sealed? ✓

Check COC for Sample IDs of Media Blanks

371.8

SAMPLE RECOVERY FIELD DATA

EPA Method 0010 - HFPO Dimer Acid

Client	Chemours	W.O. #	15418.002.019
Location/Plant	Fayetteville, NC	Source & Location	Thermal Oxidizer Stack

Run No. ~~FWF~~ Blank Train | Sample Date 1/4/20 | Recovery Date 1/4/20

Sample I.D. Chemours - Thermal Oxidizer - STK - 1 - M0010 - | Analyst WF | Filter Number —

	Impinger									
	1	2	3	4	5	6	7	Imp.Total	8	Total
Contents	Empty	HPLC H20	HPLC H20	empty	XAD 1	XAD2			Silica Gel	
Final	0	100	100	0	365.4	365.1			300	
Initial	0	100	100	0	365.3	365.1			300	
Gain	0	0	0	0	0.1	0			0	

Impinger Color: Clear | Labeled? ✓

Silica Gel Condition: 100% Blue | Sealed? ✓

Run No. 2 | Sample Date _____ | Recovery Date _____

Sample I.D. Chemours - Thermal Oxidizer - STK - 2 - M0010 - | Analyst _____ | Filter Number _____

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

Impinger Color _____ | Labeled? _____

Silica Gel Condition _____ | Sealed? _____

Run No. 3 | Sample Date _____ | Recovery Date _____

Sample I.D. Chemours - Thermal Oxidizer - STK - 3 - M0010 - | Analyst _____ | Filter Number _____

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

Impinger Color _____ | Labeled? _____

Silica Gel Condition _____ | Sealed? _____

Check COC for Sample IDs of Media Blanks

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	1	Meter Box ID	Vost 8
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	~~1.014~~ ✓ 1.0088
Project ID	CHEM-F	Date	11/26/20 ~~Dec. 2019~~ ✓	Probe ID/Length	Leak Check @ (in Hg) 0.007, 1 Hg
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	29.78 ✓	Probe Material	Pitot leak check good ~~yes / no~~ yes / no ~~yes / no~~
Samp. Loc.	Stack	Ambient Temp (°F)			
Source	TO Stack	Operator	SR ✓		
		Sample Time			

Comments: Initial Probe Leak check: 0.0 @ 7 in Hg

Final Probe Leak check:

TRAVERSE POINT NO.	SAMPLE TIME (min)	PORT CHANGE TIME (min)	ORIFICE METER SETTING	ORIFICE PRESSURE (Delta H (in H2O)	DRY GAS METER READING	DRY GAS METER TEMP (°F)	ORIFICE TEMP (°F)	TRAIN VAC (in Hg)	IMPINGER OUTLET TEMP (°F)		COMMENTS
	0	1015 ✓			0.000						
	5		1.5	1.0	7.4	80	WA	1.5	-103		
	10		1.5	1.0	~~7.5~~ 150	80		1.5	-103		
	15		1.5	1.2	21.9	79		1.5	-103		
	20		1.5	1.4	29.9	79		1.5	-103		
	25		1.5	1.6	36.9	79		1.5	-102		
	30		1.5	1.9	43.9	79		1.5	-103		
	35	1.5		1.2	52.7	78		1.5	-102		
	40	1.5		1.2	59.6	78		1.5	-103		
	45	1.5		1.0	66.3	78		1.5	-103		
	50	1.5		1.0	75.0	78		1.5	-103		
	55	1.5		1.0	82.7	78		2.0	-103		
	60	1.5		1.4	89.6	78		2.0	-103		
	65	1.5		1.6	98.2	78		2.0	-103		
	70		1.5	1.6	105.3	78		2.0	-102		
	75		1.5	1.6	112.2	78		2.0	-103		
	80		1.5	1.6	119.4	78		2.0	-103		
	85		1.5	1.6	127.6	78		2.0	-103		
	90	1745	1.5	1.6	134 893	77		2.0	-104		
	~~5~~ 460		—	—	(30) 134 893	0.000		—	—		
(30)	~~10~~ 5	1805	1.5	1.6	7.5	76		2.0	-105		
	~~15~~ 10		1.5	1.6	15.6	76		2.0	-106		
	~~20~~ 15		1.5	1.4	22.9	77		2.0	-106		
	20		1.5	1.4	30.1	~~78~~ 76		2.0	-105		
				Avg Delta H	Total Volume	Avg Tm	Max Temp	Max Vac	Max Temp		

ISOKINETIC FIELD DATA SHEET — MM 18 - HFPO Dimer Acid

Client: Chemours | Operator: SL
Samp. Loc.: Stack | Run No.: 1
Source: TO Stack | Date: ~~Dec 2019~~ 1/3/20

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
	20											
	25		1.5	1.4	372	WA	75	WA	20	-106		
	30		1.5	1.4	45.2		75		2.0	-107		
	35		1.5	1.6	52.9		75		2.0	-107		
	40		1.5	1.6	60.2		75		2.0	-107		
	45		1.5	1.4	68.1		74		2.0	-107		
	50		1.5	1.4	75.3		74		2.0	-107		
	55		1.5	1.2	82.2		73		2.0	-107		
	60		1.5	1.4	89.8		73		2.0	-107		
	65		1.5	1.6	97.0		73		2.0	-107		
	70		1.5	1.6	105.0		73		2.0	-107		
	75		1.5	1.2	113.1		73		2.0	-107		
	80		1.5	1.4	120.4		72		2.0	-106		
	85		1.5	1.6	128.2		72		2.0	-106		
	90	1935	1.5	1.6	134.893		72		2.0	-106		
				Avg Delta H	Total Volume	Avg Tm	Max Temp		Max Vac	Max Temp		
				1.47	269.746	76.38			2.0	-102		

Comments:

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	2	Meter Box ID	Vost 8		
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	~~1.014~~ 1.0088		
Project ID	CHEM-F	Date	11/7/20 ~~Dec. 2019~~	Probe ID/Length		Leak Check @ (in Hg)	0.006 / ~~0.000~~ 07
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	29.74	Probe Material		Pitot leak check good	yes / ~~no~~ / ~~yes / no~~ / yes / no
Samp. Loc.	Stack	Ambient Temp (°F)					
Source	TO Stack	Operator	SP				
		Sample Time					

Comments: Initial Probe Leak check:

Final Probe Leak check:

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (start #/no)	ROTAMETER SETTING	ORIFICE PRESSURE (Delta H (in H2O)	DRY GAS METER READING (liters)	RGM INLET TEMP (°C)	RGM OUTLET TEMP (°C)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	IMPINGER EXIT TEMP (°C)		COMMENTS
	0	1016 ✓			0.000					0		
	5		1.5	1.2	7.2	NA	61	NA	2.0	-107		
	10		1.5	1.6	14.9		62		2.0	-108		
	15		1.5	1.4	22.8		62		2.0	-108		
	20		1.5	1.9	30.0		62		2.0	-106		
	25		1.5	1.6	37.2		62		2.0	-107		
	30		1.5	1.7	45.9		62		2.0	-106		
	35		1.5	1.6	54.5		62		2.0	-106		
	40		1.5	1.6	63.2		62		2.0	-106		
	45		1.5	1.4	69.5		63		2.0	-106		
	50		1.5	1.2	75.3		63		2.0	-106		
	53		1.5	1.6	82.5		62		2.0	-106		
	60		1.5	1.4	90.1		62		2.0	-106		
	65		1.5	1.4	97.1		62		2.0	-105		
	70		1.5	1.6	104.6		62		2.0	-105		
	75		1.5	1.6	112.1		63		2.0	-105		
	80		1.5	1.6	119.6		62		2.0	-106		
	85		1.5	1.6	127.4		63		2.0	-105		
	90		1.5	1.4	135.534		63		2.0	-105		
	0		-	-	0.000		-		-	-		
	5		1.5	1.6	8.2		64		2.0	-105		
	10		1.5	1.4	15.3		63		2.0	-106		
	15		1.5	1.6	22.5		64		2.0	-106		
	20		1.5	1.6	30.0		64		2.0	-106		
				Avg Delta H	Total Volume		Avg Tm	Max Temp	Max Vac	Max Temp		
				1.49	271.765		63.1					

WESTON SOLUTIONS

ISOKINETIC FIELD DATA SHEET   MM 18 - HFPO Dimer Acid

Client	Chemours	Operator	SP
Samp. Loc.	Stack	Run No.	2
Source	TO Stack	Date	~~Dec 2019~~ 1/14/20

TRAVERSE POINT-NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
	20											
	25		1.5	1.4	37.6	NA	64	NA	2.0	-106		
	30		1.5	1.4	45.0		64		2.0	-106		
	35		1.5	1.4	52.7		64		2.0	-106		
	40		1.5	1.4	60.0		64		2.0	-106		
	45		1.5	1.6	67.8		64		2.0	-106		
	50		1.5	1.4	74.9		64		2.0	-106		
	55		1.5	1.4	82.5		64		2.0	-106		
	60		1.5	1.6	89.9		64		2.0	-106		
	65		1.5	1.4	97.1		64		2.0	-106		
	70		1.5	1.4	104.9		64		2.0	-106		
	75		1.5	1.4	112.5		64		2.0	-106		
	80		1.5	1.6	120.4		65		2.0	-106		
	85		1.5	1.4	128.6		64		2.0	-106		
	90	1325 ✓	1.5	1.6	136.231		64		2.0	-106		
				Avg Delta H	Total Volume	Avg Tm		Max Temp	Max Vac	Max Temp -105		

WESTON SOLUTIONS

Comments:

amd

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	3	Meter Box ID	1.0078				
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	~~1.014~~ 1.0088				
Project ID	CHEM-F	Date	~~Dec 2019~~ 1/14/20 ✓	Probe ID/Length			Leak Check @ (in Hg)	.0127	~~.005~~ @ 6
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	~~29.03~~ ✓	Probe Material			Pitot leak check good	~~yes / no~~	yes / no	yes / no
Samp. Loc.	Stack	Ambient Temp (°F)							
Source	TO Stack	Operator	SK ✓						
		Sample Time							

Comments: Initial Probe Leak check:

Final Probe Leak check:

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	ORIFICE PRESSURE DIFF. (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	IMPINGER BATH TEMP (°F)		COMMENTS
	0	1440 ✓			0.000							
	5		1.5	1.4	7.6	N/A	67	N/A	2.0	-101		
	10		1.5	1.6	15.1		67		2.0	-102		
	15		1.5	1.6	22.6		66		2.0	-102		
	20		1.5	1.6	30.2		66		2.0	-102		
	25		1.5	1.6	37.8		66		2.0	-103		
	30		1.5	1.6	45.3		66		2.0	-103		
	35		1.5	1.6	52.8		65		2.0	-104		
	40		1.5	1.6	60.5		66		2.0	-105		
	45		1.5	1.6	69.0		66		2.0	-104		
	50		1.5	1.6	75.10		66		2.0	-104		
	55		1.5	1.6	82.5		66		2.0	-104		
	60		1.5	1.6	90.0		66		2.0	-104		
	65		1.5	1.6	97.5		66		2.0	-104		
	70		1.5	1.6	105.0		66		2.0	-104		
	75		1.5	1.6	112.5		66		2.0	-104		
	~~80~~ 80		1.5	1.4	120.0		66		2.0	-103		
	~~85~~ 85		1.5	1.4	127.5		66		2.0	-103		
	90		1.5	1.4	135.011		65		2.0	-103		
	0	1625	-	-	0.000		-		-	-		
	5		1.5	1.4	8.5		68		2.0	-104		
	10		1.5	1.6	15.0		69		2.0	-104		
	15		1.5	1.6	22.5		68		2.0	-104		
	20		1.5	1.4	30.1		68		2.0	-104		
				Avg Delta H	Total Volume		Avg Tm	Max Temp	Max Vac	Max Temp		

ISOKINETIC FIELD DATA SHEET　　MM 18 - HFPO Dimer Acid

Client: Chemours　　Operator: SR
Samp. Loc.: Stack　　Run No.: 3
Source: TO Stack　　Date: ~~Dec. 2019~~ 1/14/20

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
	20											
	25		1.5	1.4	37.5	NA	68	NA	2.0	-103		
	30		1.5	1.4	45.0		68		2.0	-103		
	35		1.5	1.4	52.6		68		2.0	-103		
	40		1.5	1.4	60.3		68		2.0	-103		
	45		1.5	1.6	67.0		68		2.0	-103		
	50		1.5	1.6	74.1		67		2.0	-103		
	55		1.5	1.6	82.0		67		2.0	-103		
	60		1.5	1.6	90.0		67		2.0	-103		
	65		1.5	1.4	97.4		68		2.0	-103		
	70		1.5	1.4	104.6		68		2.0	-103		
	75		1.5	1.2	113.1		68		2.0	-102		
	80		1.5	1.2	120.4		66		2.0	-102		
	85		1.5	1.4	127.9		66		2.0	-102		
	90	1755 ✓	1.5	1.4	135.259		66		2.0	-101		

	Avg Delta H	Total Volume	Avg Tm	Max Temp	Max Vac	Max Temp	
1.5	1.50	27027	66.87			-101	

WESTON SOLUTIONS

Comments:

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	1	Meter Box ID	VOST 9		
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	1.000 ✓		
Project ID	CHEM-F	Date	1/3/2020 ~~Dec. 2019~~ ✓	Probe ID/Length	4FT	Leak Check @ (in Hg)	Good
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	29.88 ✓	Probe Material	TFE	Pitot leak check good	NA ~~yes / no~~ ~~yes / no~~ ~~yes / no~~
Samp. Loc.	TO Inlet	Ambient Temp (°F)					
Source	Monomers	Operator	Mills/HARBEY ✓				
		Sample Time					

Comments: Initial Probe Leak check: ~~Bad~~ Good 0.004@6
Final Probe Leak check: ~~Bad~~ Good 0.007@3

TRAVERSE POINT NO	SAMPLE TIME (min)	CLOCK TIME (start/stop)	ROTAMETER SETTING	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (L)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°F)		COMMENTS
	0	1615 (start)			0.000							
	5	1620 ✓	0.3	0.6	1.6	NA	79	<1	NA	-102		
	10		0.3	0.6	3.3		79	<1		-102		
	15		0.4	0.6	4.6		79	1		-101		
	20		0.4	0.6	5.5		77	2		-101		
	25		0.4	0.6	6.5		79	2		-101		
	30		0.4	0.6	7.5		79	3		-101		
	35		0.4	0.6	8.2		79	3		-100		
	40		0.4	0.6	9.9		78	3		-101		
	45		0.4	0.6	11.4		78	3		-101		
	50		0.4	0.6	12.7		78	3		-101		
	55		0.4	0.6	14.2		78	3		-101		
	60		0.4	0.6	15.3		78	3		-100		
	65		0.4	0.6	16.0		77	3		-101		
	70		0.4	0.6	17.2		76	3		-100		
	75		0.4	0.6	18.2		76	3		-100		
	80		0.4	0.6	19.4		76	3		-100		
	85		0.4	0.6	21.2		76	3		-100		
	90		0.4	0.6	22.4		76	3		-100		
	95		0.4	0.6	23.7		76	3		-100		
	100		0.4	0.6	25.2		76	3		-100		
	105		0.4	0.6	26.9		75	3		-100		
	110		0.4	0.6	27.8		75	3		-100		
	115		0.4	0.6	28.8		75	3		-100		
				Avg Delta H	Total Volume	Avg Tm		Max Temp	Max Vac	Max Temp		
										-100		

ISOKINETIC FIELD DATA SHEET — MM 18 - HFPO Dimer Acid

Client: Chemours | Operator: CH / JM
Samp. Loc.: TO Inlet | Run No.: ~~6~~ 1
Source: Monomers | Date: ~~Dec. 2019~~ 01/03/14 2020

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
					28.6							
	120		0.4	0.6	29.7	NA	75	NA	3	~100		
	125		0.4	0.6	31.0		75		3	~100		
	130		0.4	0.6	32.5		75		3	~100		
	135		0.4	0.6	33.6		75		3	~100		
	140		0.4	0.6	34.8		75		3	~100		
	145		0.4	0.6	36.3		75		3	~100		
	150		0.4	0.6	37.8		75		3	~100		
	155		0.4	0.6	38.7		74		3	~100		
	160		0.4	0.6	39.6		74		3	~100		
	165		0.4	0.6	41.1		74		3	~100		
	170		0.4	0.6	42.6		73		3	~100		
	175		0.4	0.6	43.5		72		3	~100		
	180		0.4	0.6	44.8		72		3	~100		
	185		0.4	0.6	46.2		72		3	~100		
	190		0.4	0.6	47.4		72		3	~100		
	195		0.4	0.6	48.7		72		3	~100		
	200	1935 ✓	0.4	0.6	50.060		72		3	~100		
				Avg Delta H ✓	Total Volume ✓		Avg Tm ✓	Max Temp	Max Vac	Max Temp		
				0.6	50.060		75.13		3			

Comments:

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	2	Meter Box ID	VOST 9			
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	1.000 ✓			
Project ID	CHEM-F	Date	✓ 1/4/2020 ~~Dec. 2019~~	Probe ID/Length	4ft	Leak Check @ (in Hg)	Good	
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	29.84 ✓	Probe Material	TFE	Pitot leak check good	NA	~~yes / no~~ ~~yes / no~~ ~~yes / no~~
Samp. Loc.	TO Inlet	Ambient Temp (°F)						
Source	Monomers	Operator	Mills/Harsky ✓					
		Sample Time						

Comments: Initial Probe Leak check: Good 0.008 @ 5

Final Probe Leak check: Good 0.005 @ 2

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (military time)	ROTAMETER SETTING	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (dcf)	IMPACT TEMP (°C)	DGM EXHAUST TEMP (°C)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C)		COMMENTS
	0	1010 ✓			0.000					0		
	5		0.5	0.8	2.5	NA	62	NA	<1	-101		
	10		0.5	0.8	4.9		62		<1	-101		
	15		0.5	0.8	7.4		62		<1	-100		
	20		0.5	0.8	10.2		62		<1	-100		
	25		0.6	0.8	12.6		62		<1	-100		
	30		0.5	0.8	15.1		62		<1	-100		
	35		0.5	0.8	17.6		62		<1	-100		
	40		0.5	0.8	20.0		62		<1	-100		
	45		0.5	0.8	22.5		62		<1	-100		
	50		0.5	0.8	25.5		63		<1	-100		
	55		0.5	0.8	27.7		63		<1	-100		
	60		0.5	0.8	30.0		63		<1	-100		
	65		0.5	0.8	32.5		63		<1	-101		
	70		0.5	0.8	35.0		63		<1	-100		
	75		0.5	0.8	37.3		63		<1	-100		
	80		0.5	0.8	39.9		63		<1	-100		
	85		0.5	0.8	42.4		63		<1	-100		
	90		0.5	0.8	45.0		63		<1	-100		
	95		0.5	0.8	47.4		63		<1	-101		
	100		0.5	0.8	50.0		63		<1	-101		
	105		0.5	0.8	52.4		63		<1	-101		
	110		0.5	0.8	54.9		63		<1	-101		
	115		0.5	0.8	57.5		63		<1	-101		
				Avg Delta H	Total Volume	Avg Tm		Max Temp	Max Vac	Max Temp		

ISOKINETIC FIELD DATA SHEET — MM 18 - HFPO Dimer Acid

Client: Chemours | Operator: Hartsky / Mills
Samp. Loc.: TO Inlet | Run No.: 2
Source: Monomers | Date: 1/4/2020 ~~Dec. 2019~~

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
	120		0.5	0.8	60.0		64		<1	-10		
	125		0.5	0.8	62.5		64		<1	-10		
	130		0.5	0.8	65.0		64		<1	-10		
	135		0.5	0.8	67.5		63		<1	-10		
	140		0.5	0.8	70.0		63		<1	-10		
	145		0.5	0.8	72.5		63		<1	-10		
	150		0.5	0.8	75.0		64		<1	-10		
	155		0.5	0.8	77.5		64		<1	-10		
	160		0.5	0.8	79.8		64		<1	-10		
	165		0.5	0.8	82.3		64		<1	-10		
	170		0.5	0.8	85.0		64		<1	-10		
	175		0.5	0.8	87.5		64		<1	-10		
	180		0.5	0.8	90.0		64		<1	-10		
	185		0.5	0.8	92.6		64		<1	-10		
	190		0.5	0.8	95.0		64		<1	-10		
	195	1325 ✓	0.5	0.8	97.504		65		<1	-10		
				Avg Delta H ✓ 0.8	Total Volume ✓ 97.504		Avg Tm ✓ 63 13	Max Temp	Max Vac 1	Max Temp -10		

Comments:

FIELD DATA SHEET

MM 18 - HFPO Dimer Acid

Client	Chemours	Run No.	3	Meter Box ID	9		
W.O.#	15418.002.019	Test Method	Modified M18	Meter Box Y	1.000		
Project ID	CHEM-F	Date	1-4-20 ~~Dec. 2019~~	Probe ID/Length		Leak Check @ (in Hg)	Good
Mode/Source ID	Thermal Oxidizer	Baro. Press (in Hg)	29.73	Probe Material		Pitot leak check good	NA ~~yes / no~~ yes / no yes / no
Samp. Loc.	TO Inlet	Ambient Temp (°F)					
Source	Monomers	Operator	Hartsky / M. Ills ✓				
		Sample Time					

Comments: Initial Probe Leak check: Good 0.009 @ 6
Final Probe Leak check: Good 0.004 @ 2

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plan Y1440 ④)	ROTOMETER SETTING	ORIFICE PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	PROBE TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP		COMMENTS
										(°C)		
	0	1435			0.000					0		
	5		0.5	0.8	2.4		68		<1	-100		
	10		0.5	0.8	5.0		68		<1	-100		
	15		0.5	0.8	7.5		68		<1	-102		
	20		0.5	0.8	9.9		68		<1	-100		
	25		0.5	0.8	12.4		68		<1	-100		
	30		0.5	0.8	15.0		68		<1	-100		
	35		0.5	0.8	17.4		68		<1	-100		
	40		0.5	0.8	20.1		68		<1	-101		
	45		0.5	0.8	22.5		68		<1	-101		
	50		0.5	0.8	25.0		68		<1	-101		
	55		0.5	0.8	27.4		68		<1	-101		
	60		0.5	0.8	29.9		68		<1	-101		
	65		0.5	0.8	32.4		68		<1	-101		
	70		0.5	0.8	35.0		68		<1	-101		
	75		0.5	0.8	37.5		68		<1	-101		
	80		0.5	0.8	40.0		68		<1	-101		
	85		0.5	0.8	42.5		68		<1	-101		
	90		0.5	0.8	45.0		69		<1	-100		1610 Port change
	95		0.5	0.8	47.4		69		<1	-100		↓
	100		0.5	0.8	49.9		69		<1	-100		1625
	105		0.5	0.8	52.4		69		<1	-100		
	110		0.5	0.8	54.8		69		<1	-100		
	115		0.5	0.8	57.8		69		<1	-100		
				Avg Delta H	Total Volume		Avg Tm	Max Temp	Max Vac	Max Temp		
										~100		

ISOKINETIC FIELD DATA SHEET MM 18 - HFPO Dimer Acid

Client	Chemours	Operator	Mills/Hartsky
Samp. Loc.	TO Inlet	Run No.	3
Source	Monomers	Date	1/4/2020 ~~Dec. 2019~~

TRAVERSE POINT NO.	SAMPLE TIME (min)	CLOCK TIME (plant time)	ROTOMETER SETTING	VELOCITY PRESSURE Delta H (in H2O)	DRY GAS METER READING (liters)	DGM INLET TEMP (°C)	DGM OUTLET TEMP (°F)	STACK TEMP (°C)	SAMPLE TRAIN VAC (in Hg)	METHANOL BATH TEMP (°C/F)		COMMENTS
	115				57.8							
	120		0.5	0.8	60.1		69		<1	~100		
	125		0.5	0.8	62.5		69		<1	~100		
	130		0.5	0.8	65		69		<1	~100		
	135		0.5	0.8	67.5		69		<1	~100		
	140		0.5	0.8	69.9		69		<1	~100		
	145		0.5	0.8	72.5		69		<1	~100		
	150		0.5	0.8	75.1		69		<1	~100		
	155		0.5	0.8	77.7		68		<1	~100		
	160		0.5	0.8	79.9		68		<1	~100		
	165		0.5	0.8	82.4		68		<1	~100		
	170		0.5	0.8	85.1		67		<1	~100		
	175		0.5	0.8	87.8		67		<1	~100		
	180		0.5	0.8	90.2		67		<1	~100		
	185		0.5	0.8	92.5		67		<1	~100		
	190		0.5	0.8	95.2		67		<1	~100		
1755	195		0.5	0.8	97.294		66		<1	~100		

	Avg Delta H	Total Volume	Avg Tm	Max Temp	Max Vac	Max Temp	
WESTON SOLUTIONS	0.8	97.294	68.15		1	~100	

Comments:

METHODS AND ANALYZERS

Client: **Chemours**
Location: **Fayetteville, NC**
Source: **Thermal Oxidizer Outlet**

Project Number: **15418.002.019.0001**
Operator: **SR**
Date: **3 Jan 2020**

File: C:\Documents and Settings\Administrator\Desktop\15418 Chemours TO January 2020.cem
Program Version: 2.1, built 19 May 2017 **File Version:** 2.02
Computer: WSWCAIRSERVICES **Trailer:** 27
Analog Input Device: Keithley KUSB-3108

Channel 1

Analyte	**O_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**25.0**
Span Concentration, %	**21.3**

Channel 2

Analyte	**CO_2**
Method	**EPA 3A**, Using Bias
Analyzer Make, Model & Serial No.	**Servomex 4900**
Full-Scale Output, mv	**10000**
Analyzer Range, %	**20.0**
Span Concentration, %	**17.1**

CALIBRATION DATA

Number 1

Client: **Chemours**
Location: **Fayetteville, NC**
Source: **Thermal Oxidizer Outlet**

Project Number: **15418.002.019.0001**
Operator: **SR**
Date: **3 Jan 2020**

Start Time: 10:45

O_2

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

Calibration Standards

%	**Cylinder ID**
12.0	ALM056900
21.3	ALM047628

Calibration Results

Zero	7 mv
Span, 21.3 %	8123 mv

Curve Coefficients

Slope	**Intercept**
381.9	7

CO_2

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

Calibration Standards

%	**Cylinder ID**
8.9	ALM056900
17.1	ALM047628

Calibration Results

Zero	-9 mv
Span, 17.1 %	8533 mv

Curve Coefficients

Slope	**Intercept**
501.0	-9

CALIBRATION ERROR DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Start Time: 10:45

O_2
Method: EPA 3A
Span Conc. 21.3 %
Slope 381.9 **Intercept** 7.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
12.0	12.1	0.1	0.5	Pass
21.2	21.2	0.0	0.0	Pass

CO_2
Method: EPA 3A
Span Conc. 17.1 %
Slope 501.0 **Intercept** -9.0

Standard %	Result %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	Pass
8.9	8.7	-0.2	-1.2	Pass
17.0	17.0	0.0	0.0	Pass

BIAS

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Start Time: 12:26

O_2
Method: EPA 3A
Span Conc. 21.3 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.5	Pass
Span	12.1	12.0	-0.1	-0.5	Pass

CO_2
Method: EPA 3A
Span Conc. 17.1 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.6	Pass
Span	8.7	8.7	0.0	0.0	Pass

RUN DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Time	O_2 %	CO_2 %
16:18	14.6	4.0
16:19	14.4	4.3
16:20	14.3	4.4
16:21	14.3	4.5
16:22	14.3	4.6
16:23	14.3	4.6
16:24	14.3	4.6
16:25	14.3	4.6
16:26	14.3	4.6
16:27	14.3	4.6
16:28	14.4	4.6
16:29	14.4	4.6
16:30	14.4	4.6
16:31	14.4	4.6
16:32	14.3	4.6
16:33	14.4	4.6
16:34	14.4	4.6
16:35	14.4	4.6
16:36	14.4	4.7
16:37	14.4	4.7
16:38	14.4	4.7
16:39	14.3	4.7
16:40	14.4	4.6
16:41	14.3	4.6
16:42	14.4	4.6
16:43	14.4	4.6
16:44	14.4	4.6
16:45	14.3	4.6
16:46	14.3	4.7
16:47	14.3	4.7
16:48	14.4	4.7
16:49	14.4	4.6
16:50	14.3	4.6
16:51	14.3	4.7
16:52	14.3	4.7
16:53	14.3	4.7
16:54	14.4	4.7
16:55	14.3	4.7
16:56	14.3	4.7
16:57	14.3	4.7

RUN DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Time	O_2 %	CO_2 %
16:58	14.4	4.7
16:59	14.4	4.7
17:00	14.4	4.7
17:01	14.4	4.7
17:02	14.4	4.7
17:03	14.4	4.7
17:04	14.4	4.7
17:05	14.4	4.7
17:06	14.4	4.7
17:07	14.4	4.7
17:08	14.4	4.7
17:09	14.4	4.7
17:10	14.4	4.7
17:11	14.4	4.7
17:12	14.4	4.7
17:13	14.4	4.7
17:14	14.4	4.7
17:15	14.4	4.7
17:16	14.4	4.7
17:17	14.4	4.7
17:18	14.4	4.7
17:19	14.4	4.7
17:20	14.4	4.7
17:21	14.4	4.7
17:22	14.4	4.7
17:23	14.4	4.7
17:24	14.4	4.7
17:25	14.4	4.7
17:26	14.4	4.7
17:27	14.4	4.7
17:28	14.4	4.7
17:29	14.4	4.7
17:30	14.4	4.7
17:31	14.4	4.7
17:32	14.4	4.7
17:33	14.4	4.7
17:34	14.4	4.7
17:35	14.4	4.7
17:36	14.4	4.7
17:37	14.4	4.7

RUN DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Time	O_2 %	CO_2 %
17:38	14.4	4.7
17:39	14.4	4.7
17:40	14.4	4.7
17:41	14.4	4.7
17:42	14.4	4.7
17:43	14.4	4.7
17:44	14.4	4.7
17:45	14.6	4.6
17:46	14.6	4.5
18:08	14.6	4.3
18:09	14.5	4.4
18:10	14.4	4.5
18:11	14.5	4.5
18:12	14.5	4.5
18:13	14.5	4.5
18:14	14.7	4.5
18:15	14.8	4.4
18:16	14.8	4.3
18:17	14.7	4.3
18:18	14.7	4.4
18:19	14.7	4.4
18:20	14.7	4.4
18:21	14.7	4.4
18:22	14.7	4.4
18:23	14.7	4.4
18:24	14.7	4.4
18:25	14.7	4.4
18:26	14.7	4.4
18:27	14.7	4.4
18:28	14.7	4.4
18:29	14.7	4.4
18:30	14.7	4.4
18:31	14.7	4.4
18:32	14.7	4.4
18:33	14.7	4.4
18:34	14.7	4.4
18:35	14.7	4.4
18:36	14.7	4.4
18:37	14.8	4.4
18:38	14.7	4.4

RUN DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Time	O_2 %	CO_2 %
18:39	14.7	4.4
18:40	14.7	4.4
18:41	14.7	4.4
18:42	14.7	4.4
18:43	14.7	4.4
18:44	14.8	4.4
18:45	14.8	4.4
18:46	14.8	4.4
18:47	14.7	4.4
18:48	14.7	4.4
18:49	14.8	4.4
18:50	14.9	4.3
18:51	14.9	4.3
18:52	15.0	4.2
18:53	15.0	4.2
18:54	15.0	4.2
18:55	15.0	4.2
18:56	15.0	4.2
18:57	15.0	4.2
18:58	15.0	4.2
18:59	15.0	4.1
19:00	15.0	4.2
19:01	15.0	4.2
19:02	15.0	4.2
19:03	15.0	4.2
19:04	15.0	4.2
19:05	15.0	4.2
19:06	15.0	4.2
19:07	15.0	4.2
19:08	15.0	4.2
19:09	15.0	4.2
19:10	15.0	4.2
19:11	15.0	4.2
19:12	15.0	4.2
19:13	15.0	4.2
19:14	15.0	4.2
19:15	15.0	4.2
19:16	15.0	4.2
19:17	15.0	4.2
19:18	15.0	4.2

RUN DATA

Number 1

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Time	O_2 %	CO_2 %
19:19	15.0	4.2
19:20	15.0	4.2
19:21	15.0	4.2
19:22	15.0	4.2
19:23	15.0	4.2
19:24	15.0	4.2
19:25	15.0	4.2
19:26	15.0	4.2
19:27	15.0	4.2
19:28	15.0	4.2
19:29	15.0	4.2
19:30	15.0	4.2
19:31	15.1	4.2
19:32	15.2	4.1
19:33	15.2	4.1
19:34	15.2	4.1
19:35	15.2	4.1
Avgs	**14.6**	**4.5**

RUN SUMMARY

Number 1

Client:	**Chemours**	Project Number:	**15418.002.019.0001**
Location:	**Fayetteville, NC**	Operator:	**SR**
Source:	**Thermal Oxidizer Outlet**	Calibration **1**	Date: **3 Jan 2020**

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

Time: 16:17 to 19:35

Run Averages

14.6	4.5

Pre-run Bias at 12:26

Zero Bias	0.1	0.1
Span Bias	12.0	8.7
Span Gas	12.0	8.9

Post-run Bias at 20:07

Zero Bias	0.1	0.4
Span Bias	12.1	8.9
Span Gas	12.0	8.9

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

14.6	4.4

BIAS AND CALIBRATION DRIFT

Number 2

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **3 Jan 2020**

Start Time: 20:07

O_2
Method: EPA 3A
Span Conc. 21.3 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.5	Pass
Span	12.1	12.1	0.0	0.0	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.1	0.1	0.0	0.0	Pass
Span	12.0	12.1	0.1	0.5	Pass

*Bias No. 1

CO_2
Method: EPA 3A
Span Conc. 17.1 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.4	0.4	2.3	Pass
Span	8.7	8.9	0.2	1.2	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.1	0.4	0.3	1.8	Pass
Span	8.7	8.9	0.2	1.2	Pass

*Bias No. 1

BIAS AND CALIBRATION DRIFT

Number 3

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Start Time: 07:45

O_2
Method: EPA 3A
Span Conc. 21.3 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.1	11.9	-0.2	-0.9	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.1	0.0	-0.1	-0.5	Pass
Span	12.1	11.9	-0.2	-0.9	Pass

*Bias No. 2

CO_2
Method: EPA 3A
Span Conc. 17.1 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.3	0.3	1.8	Pass
Span	8.7	8.8	0.1	0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.4	0.3	-0.1	-0.6	Pass
Span	8.9	8.8	-0.1	-0.6	Pass

*Bias No. 2

RUN DATA

Number 2

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
10:17	14.1	4.7
10:18	14.1	4.7
10:19	14.1	4.8
10:20	14.1	4.8
10:21	14.1	4.8
10:22	14.1	4.8
10:23	14.1	4.8
10:24	14.1	4.8
10:25	14.1	4.8
10:26	14.1	4.8
10:27	14.2	4.8
10:28	14.2	4.8
10:29	14.2	4.7
10:30	14.2	4.8
10:31	14.2	4.8
10:32	14.2	4.8
10:33	14.2	4.8
10:34	14.2	4.8
10:35	14.2	4.8
10:36	14.2	4.8
10:37	14.2	4.8
10:38	14.2	4.8
10:39	14.2	4.8
10:40	14.3	4.8
10:41	14.3	4.8
10:42	14.3	4.7
10:43	14.2	4.7
10:44	14.3	4.7
10:45	14.3	4.7
10:46	14.3	4.7
10:47	14.3	4.7
10:48	14.3	4.7
10:49	14.3	4.7
10:50	14.3	4.7
10:51	14.3	4.7
10:52	14.3	4.7
10:53	14.3	4.7
10:54	14.3	4.7
10:55	14.3	4.7
10:56	14.3	4.7

RUN DATA

Number 2

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
10:57	14.3	4.7
10:58	14.4	4.7
10:59	14.4	4.7
11:00	14.3	4.7
11:01	14.3	4.7
11:02	14.4	4.6
11:03	14.4	4.6
11:04	14.4	4.6
11:05	14.4	4.6
11:06	14.4	4.6
11:07	14.4	4.6
11:08	14.4	4.5
11:09	14.4	4.5
11:10	14.4	4.5
11:11	14.4	4.5
11:12	14.4	4.5
11:13	14.4	4.6
11:14	14.4	4.5
11:15	14.4	4.5
11:16	14.4	4.5
11:17	14.4	4.5
11:18	14.4	4.5
11:19	14.4	4.5
11:20	14.4	4.5
11:21	14.4	4.5
11:22	14.4	4.5
11:23	14.4	4.5
11:24	14.4	4.5
11:25	14.4	4.5
11:26	14.5	4.5
11:27	14.5	4.5
11:28	14.5	4.5
11:29	14.5	4.5
11:30	14.5	4.5
11:31	14.5	4.5
11:32	14.5	4.5
11:33	14.5	4.5
11:34	14.5	4.5
11:35	14.5	4.5
11:36	14.5	4.5

RUN DATA

Number 2

Client: **Chemours**
Location: **Fayetteville, NC**
Source: **Thermal Oxidizer Outlet**
Calibration **1**
Project Number: **15418.002.019.0001**
Operator: **SR**
Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
11:37	14.5	4.4
11:38	14.5	4.4
11:39	14.5	4.4
11:40	14.5	4.4
11:41	14.5	4.4
11:59	14.6	4.1
12:00	14.6	4.2
12:01	14.6	4.3
12:02	14.6	4.3
12:03	14.6	4.3
12:04	14.6	4.3
12:05	14.6	4.3
12:06	14.6	4.3
12:07	14.6	4.3
12:08	14.6	4.3
12:09	14.6	4.3
12:10	14.6	4.2
12:11	14.6	4.2
12:12	14.6	4.2
12:13	14.7	4.2
12:14	14.7	4.2
12:15	14.7	4.2
12:16	14.7	4.2
12:17	14.7	4.2
12:18	14.7	4.2
12:19	14.7	4.2
12:20	14.7	4.2
12:21	14.7	4.2
12:22	14.7	4.2
12:23	14.7	4.2
12:24	14.7	4.2
12:25	14.7	4.2
12:26	14.7	4.2
12:27	14.7	4.2
12:28	14.7	4.2
12:29	14.7	4.2
12:30	14.7	4.2
12:31	14.7	4.2
12:32	14.7	4.2
12:33	14.7	4.2

RUN DATA

Number 2

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
12:34	14.7	4.2
12:35	14.7	4.2
12:36	14.7	4.2
12:37	14.7	4.1
12:38	14.7	4.1
12:39	14.7	4.1
12:40	14.7	4.1
12:41	14.7	4.1
12:42	14.8	4.1
12:43	14.7	4.1
12:44	14.8	4.0
12:45	14.8	4.0
12:46	14.9	3.9
12:47	14.9	3.8
12:48	14.9	3.8
12:49	14.9	3.8
12:50	14.9	3.8
12:51	14.9	3.8
12:52	14.9	3.8
12:53	15.0	3.7
12:54	15.0	3.7
12:55	15.0	3.7
12:56	15.0	3.7
12:57	15.0	3.7
12:58	15.0	3.7
12:59	15.0	3.7
13:00	15.0	3.7
13:01	15.0	3.7
13:02	15.0	3.7
13:03	15.0	3.7
13:04	15.0	3.7
13:05	15.0	3.7
13:06	15.0	3.7
13:07	15.0	3.7
13:08	15.0	3.7
13:09	15.0	3.7
13:10	15.0	3.7
13:11	15.0	3.7
13:12	15.0	3.7
13:13	15.0	3.7

RUN DATA

Number 2

Client: **Chemours**
Location: **Fayetteville, NC**
Source: **Thermal Oxidizer Outlet**
Calibration **1**
Project Number: **15418.002.019.0001**
Operator: **SR**
Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
13:14	15.0	3.7
13:15	15.0	3.7
13:16	15.0	3.7
13:17	15.0	3.7
13:18	15.0	3.7
13:19	15.0	3.7
13:20	15.0	3.7
13:21	15.0	3.7
13:22	15.0	3.7
13:23	15.0	3.8
13:24	15.0	3.8
13:25	15.0	3.8
Avgs	**14.6**	**4.3**

RUN SUMMARY

Number 2

Client:	**Chemours**	Project Number:	**15418.002.019.0001**
Location:	**Fayetteville, NC**	Operator:	**SR**
Source:	**Thermal Oxidizer Outlet** Calibration **1**	Date:	**4 Jan 2020**

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

Time: 10:16 to 13:25

Run Averages

14.6	4.3

Pre-run Bias at 07:45

Zero Bias	0.0	0.3
Span Bias	11.9	8.8
Span Gas	12.0	8.9

Post-run Bias at 13:29

Zero Bias	0.0	0.2
Span Bias	11.9	8.8
Span Gas	12.0	8.9

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

14.7	4.2

BIAS AND CALIBRATION DRIFT

Number 4

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Start Time: 13:29

O_2
Method: EPA 3A
Span Conc. 21.3 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.0	0.0	0.0	Pass
Span	12.1	11.9	-0.2	-0.9	Pass

Calibration Drift

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

*Bias No. 3

CO_2
Method: EPA 3A
Span Conc. 17.1 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.2	0.2	1.2	Pass
Span	8.7	8.8	0.1	0.6	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.3	0.2	-0.1	-0.6	Pass
Span	8.8	8.8	0.0	0.0	Pass

*Bias No. 3

RUN DATA

Number 3

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
14:46	15.1	3.6
14:47	15.1	3.6
14:48	15.0	3.6
14:49	15.0	3.7
14:50	15.0	3.7
14:51	15.0	3.8
14:52	15.0	3.8
14:53	15.0	3.8
14:54	15.0	3.8
14:55	14.9	3.8
14:56	14.9	3.8
14:57	14.9	3.8
14:58	14.8	3.8
14:59	14.8	3.8
15:00	14.8	3.9
15:01	14.8	3.8
15:02	14.9	3.8
15:03	14.9	3.8
15:04	14.9	3.8
15:05	14.9	3.8
15:06	14.8	3.8
15:07	14.9	3.8
15:08	14.9	3.8
15:09	14.9	3.8
15:10	14.9	3.8
15:11	14.9	3.8
15:12	14.9	3.8
15:13	14.9	3.8
15:14	14.9	3.8
15:15	14.9	3.8
15:16	14.9	3.8
15:17	14.9	3.8
15:18	14.9	3.8
15:19	14.9	3.8
15:20	14.9	3.8
15:21	14.9	3.8
15:22	14.9	3.8
15:23	14.9	3.8
15:24	14.9	3.8
15:25	14.9	3.8

RUN DATA

Number 3

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
15:26	14.9	3.8
15:27	14.9	3.8
15:28	14.9	3.8
15:29	14.9	3.8
15:30	14.9	3.8
15:31	14.9	3.7
15:32	14.9	3.7
15:33	14.9	3.8
15:34	14.9	3.8
15:35	15.0	3.7
15:36	15.0	3.7
15:37	15.0	3.7
15:38	15.0	3.7
15:39	15.0	3.7
15:40	15.0	3.7
15:41	15.0	3.7
15:42	15.0	3.7
15:43	15.0	3.7
15:44	15.0	3.7
15:45	15.0	3.7
15:46	15.0	3.7
15:47	15.0	3.7
15:48	15.0	3.7
15:49	15.0	3.7
15:50	15.0	3.7
15:51	15.0	3.7
15:52	15.0	3.7
15:53	15.0	3.7
15:54	15.0	3.7
15:55	15.0	3.7
15:56	15.0	3.7
15:57	15.0	3.7
15:58	15.0	3.7
15:59	15.0	3.7
16:00	15.0	3.7
16:01	15.0	3.7
16:02	15.0	3.7
16:03	15.0	3.7
16:04	15.0	3.7
16:05	15.0	3.7

RUN DATA

Number 3

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
16:06	15.0	3.7
16:07	15.0	3.7
16:08	15.0	3.7
16:09	15.0	3.7
16:10	15.0	3.7
16:28	14.9	3.6
16:29	14.9	3.7
16:30	14.9	3.7
16:31	14.9	3.7
16:32	14.9	3.7
16:33	14.9	3.7
16:34	14.9	3.7
16:35	14.9	3.8
16:36	15.0	3.8
16:37	14.9	3.7
16:38	15.0	3.8
16:39	15.0	3.7
16:40	15.0	3.7
16:41	15.0	3.8
16:42	14.9	3.8
16:43	15.0	3.8
16:44	15.0	3.8
16:45	15.0	3.8
16:46	15.0	3.8
16:47	15.0	3.7
16:48	15.0	3.8
16:49	14.9	3.8
16:50	15.0	3.8
16:51	15.0	3.8
16:52	15.0	3.8
16:53	15.0	3.8
16:54	15.0	3.8
16:55	15.0	3.8
16:56	15.0	3.8
16:57	15.0	3.8
16:58	15.0	3.8
16:59	15.1	3.8
17:00	15.4	3.7
17:01	15.4	3.5
17:02	15.4	3.5

RUN DATA

Number 3

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
17:03	15.4	3.5
17:04	15.4	3.5
17:05	15.4	3.5
17:06	15.4	3.5
17:07	15.4	3.5
17:08	15.4	3.5
17:09	15.4	3.5
17:10	15.4	3.5
17:11	15.4	3.5
17:12	15.4	3.5
17:13	15.4	3.5
17:14	15.4	3.5
17:15	15.4	3.5
17:16	15.4	3.5
17:17	15.4	3.5
17:18	15.4	3.5
17:19	15.4	3.5
17:20	15.4	3.5
17:21	15.4	3.5
17:22	15.4	3.5
17:23	15.3	3.5
17:24	15.3	3.6
17:25	15.4	3.6
17:26	15.4	3.5
17:27	15.4	3.6
17:28	15.4	3.6
17:29	15.4	3.6
17:30	15.4	3.6
17:31	15.4	3.6
17:32	15.3	3.6
17:33	15.3	3.6
17:34	15.3	3.6
17:35	15.3	3.6
17:36	15.4	3.6
17:37	15.4	3.6
17:38	15.3	3.6
17:39	15.3	3.6
17:40	15.3	3.6
17:41	15.3	3.6
17:42	15.3	3.6

RUN DATA

Number 3

Client: **Chemours**
Location: **Fayetteville, NC**
Source: **Thermal Oxidizer Outlet**
Calibration **1**
Project Number: **15418.002.019.0001**
Operator: **SR**
Date: **4 Jan 2020**

Time	O_2 %	CO_2 %
17:43	15.3	3.6
17:44	15.3	3.6
17:45	15.3	3.6
17:46	15.3	3.6
17:47	15.4	3.6
17:48	15.3	3.6
17:49	15.3	3.6
17:50	15.3	3.6
17:51	15.3	3.6
17:52	15.3	3.6
17:53	15.3	3.6
17:54	15.3	3.6
Avgs	**15.1**	**3.7**

RUN SUMMARY

Number 3

Client:	**Chemours**	Project Number:	**15418.002.019.0001**
Location:	**Fayetteville, NC**	Operator:	**SR**
Source:	**Thermal Oxidizer Outlet**	Calibration **1**	Date: **4 Jan 2020**

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

Time: 14:45 to 17:54

Run Averages

15.1	3.7

Pre-run Bias at 13:29

Zero Bias	0.0	0.2
Span Bias	11.9	8.8
Span Gas	12.0	8.9

Post-run Bias at 17:56

Zero Bias	0.1	0.3
Span Bias	12.0	8.7
Span Gas	12.0	8.9

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

15.2	3.6

BIAS AND CALIBRATION DRIFT

Number 5

Client: **Chemours** | Project Number: **15418.002.019.0001**
Location: **Fayetteville, NC** | Operator: **SR**
Source: **Thermal Oxidizer Outlet** | Calibration **1** | Date: **4 Jan 2020**

Start Time: 17:56

O_2
Method: EPA 3A
Span Conc. 21.3 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.1	0.1	0.5	Pass
Span	12.1	12.0	-0.1	-0.5	Pass

Calibration Drift

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

*Bias No. 4

CO_2
Method: EPA 3A
Span Conc. 17.1 %

Bias Results

Standard Gas	Cal. %	Bias %	Difference %	Error %	Status
Zero	0.0	0.3	0.3	1.8	Pass
Span	8.7	8.7	0.0	0.0	Pass

Calibration Drift

Standard Gas	Initial* %	Final %	Difference %	Drift %	Status
Zero	0.2	0.3	0.1	0.6	Pass
Span	8.8	8.7	-0.1	-0.6	Pass

*Bias No. 4

APPENDIX C
LABORATORY ANALYTICAL REPORT

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Job Number: 140-17804-1

Job Description: TO Pre-Test Stack - M0010

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
1/31/2020 10:58 AM

Courtney M Adkins, Project Manager II
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
01/31/2020

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Table of Contents

Definitions/Glossary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - M0010

Job ID: 140-17804-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
X	Surrogate is outside control limits

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - M0010

Job ID: 140-17804-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
None	Leaching Procedure	TAL SOP	TAL SAC
None	Leaching Procedure for Condensate	TAL SOP	TAL SAC
None	Leaching Procedure for XAD	TAL SOP	TAL SAC
Preparation	Dilution	None	TAL SAC
Split	Source Air Split	None	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - M0010

Job ID: 140-17804-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17804-1	M-1077,1078 TO PT STACK R1 M0010 FH	Air	01/03/20 00:00	01/06/20 07:30	
140-17804-2	M-1079,1080,1082 TO PT STACK R1 M0010 BH	Air	01/03/20 00:00	01/06/20 07:30	
140-17804-3	M-1081 TO PT STACK R1 M0010 IMPINGERS 1,2&3 COND	Air	01/03/20 00:00	01/06/20 07:30	
140-17804-4	M-1083 TO PT STACK R1 M0010 BREAKTHROUGH XAD-2 RESIN TUBE	Air	01/03/20 00:00	01/06/20 07:30	
140-17804-5	M-1084,1085 TO PT STACK R2 M0010 FH	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-6	M-1086,1087,1089 TO PT STACK R2 M0010 BH	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-7	M-1088 TO PT STACK R2 M0010 IMPINGERS 1,2&3 COND	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-8	M-1090 TO PT STACK R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-9	M-1091,1092 TO PT STACK R3 M0010 FH	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-10	M-1093,1094,1096 TO PT STACK R3 M0010 BH	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-11	M-1095 TO PT STACK R3 M0010 IMPINGERS 1,2&3 COND	Air	01/04/20 00:00	01/06/20 07:30	
140-17804-12	M-1097 TO PT STACK R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE	Air	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17804-1

Sample Receipt

The samples were received on 1/6/2020 7:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.2º 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.

Method 0010/Method 3542 Sampling Train Preparation

Train fractions were extracted and prepared for analysis in TestAmerica's Knoxville laboratory. Extracts and condensate samples were forwarded to the Sacramento laboratory for PFAS analysis. All results are reported in "Total ng" per sample.

LCMS

Method 537 (modified): The method blank for preparation batch 320-349286 and 320-349292 and analytical batch 320-349892 contained HFPO-DA above the reporting limit (RL). Associated sample was not re-extracted due to limited sample volume. (MB 320-349286/1-B)

Method 537 (modified): The method blank for preparation batch 320-349142, 320-349467 and 320-349993 and analytical batch 320-350539 contained HFPO-DA above the reporting limit (RL). Associated sample was not re-extracted due to limited sample volume. (MB 320-349142/1-C)

Method 537 (modified): The method blank for preparation batch 320-349285, 320-349466 and 320-349737 contained HFPO-DA above the reporting limit (RL). The samples associated with this method blank had detections above the reporting limit for this target compound. The samples was reported due to insufficient sample to perform a re-extraction.

Method 537 (modified): Surrogate recovery for 13C8 PFOA and 13C8 PFOS, in the following samples were below control limits: M-1079,1080,1082 TO PT STACK R1 M0010 BH (140-17804-2) and M-1093,1094,1096 TO PT STACK R3 M0010 BH (140-17804-10). The field surrogates are not used to quantitate the target analytes. Samples were re-analyzed with concurring results.

Organic Prep

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

Notes

The XAD-2 (or Backhalf) Fraction of the sampling trains display low level detectable quantities of several PFAS compounds that are likely due to background levels present in the resin material present from the manufacturer. The various sampling and laboratory blanks processed for this project consistently show the presence of the same fingerprint pattern of PFAS compounds at approximately the same concentration. Therefore, a general conclusion should be considered that when the same relative levels of PFAS compounds are observed to be present in the Back-half fractions or the Breakthrough XAD-2 resin portions of the three test run data set, the "hits" are most likely due to background and not derived from the stack gas.
Additionally, for low nanogram level PFAS Modified Method 5 Sampling Train applications, when the associated XAD-2 fraction method blank contains a concentrations of PFAS compound greater than the minimum calibration level, a positive result in the associated sample will be flagged with a "B" data flag. The PFAS results for the associated method blanks and field quality control sample data should be evaluated by the client to assess whether the project specific background levels of PFAS compounds are significant, and how to incorporate them into associated stack emissions calculations. Blank subtraction may be necessary, and presenting data with and without blank subtraction may be advisable.

Breakthrough from the Modified Method 0010 Sampling Train for PFAS compounds will be measured by the percentage (%) concentration of a specific PFAS target analyte determined to be present in the Breakthrough XAD-2 resin module of a test run. If the concentration of a specific PFAS compound is ≤30% of the sum of the concentrations determined for the other three (3) fractions of the sampling train, then sampling breakthrough is determined not to have occurred. Also, no breakthrough will be determined to have occurred if < 250 µg of a target analyte is collected on all fractions of a sampling train. Breakthrough the sampling train implies that sample loss through the train has occurred and results in a negative bias to the sample results

LCMS

Prep Batch: 349142

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-2	M-1079,1080,1082 TO PT STACK R1 M0010 BH	Total/NA	Air	None	
140-17804-4	M-1083 TO PT STACK R1 M0010 BREAKTHRO	Total/NA	Air	None	
140-17804-6	M-1086,1087,1089 TO PT STACK R2 M0010 BH	Total/NA	Air	None	
140-17804-8	M-1090 TO PT STACK R2 M0010 BREAKTHRO	Total/NA	Air	None	
140-17804-10	M-1093,1094,1096 TO PT STACK R3 M0010 BH	Total/NA	Air	None	
140-17804-12	M-1097 TO PT STACK R3 M0010 BREAKTHRO	Total/NA	Air	None	
MB 320-349142/1-C	Method Blank	Total/NA	Air	None	
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 349285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-1	M-1077,1078 TO PT STACK R1 M0010 FH	Total/NA	Air	None	
140-17804-5	M-1084,1085 TO PT STACK R2 M0010 FH	Total/NA	Air	None	
140-17804-9	M-1091,1092 TO PT STACK R3 M0010 FH	Total/NA	Air	None	
MB 320-349285/1-C	Method Blank	Total/NA	Air	None	
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 349286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-3	M-1081 TO PT STACK R1 M0010 IMPINGERS 1	Total/NA	Air	None	
140-17804-7	M-1088 TO PT STACK R2 M0010 IMPINGERS 1	Total/NA	Air	None	
140-17804-11	M-1095 TO PT STACK R3 M0010 IMPINGERS 1	Total/NA	Air	None	
MB 320-349286/1-B	Method Blank	Total/NA	Air	None	
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Cleanup Batch: 349292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-3	M-1081 TO PT STACK R1 M0010 IMPINGERS 1	Total/NA	Air	Preparation	349286
140-17804-7	M-1088 TO PT STACK R2 M0010 IMPINGERS 1	Total/NA	Air	Preparation	349286
140-17804-11	M-1095 TO PT STACK R3 M0010 IMPINGERS 1	Total/NA	Air	Preparation	349286
MB 320-349286/1-B	Method Blank	Total/NA	Air	Preparation	349286
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	Preparation	349286
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	Preparation	349286

Cleanup Batch: 349466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-1	M-1077,1078 TO PT STACK R1 M0010 FH	Total/NA	Air	Split	349285
140-17804-5	M-1084,1085 TO PT STACK R2 M0010 FH	Total/NA	Air	Split	349285
140-17804-9	M-1091,1092 TO PT STACK R3 M0010 FH	Total/NA	Air	Split	349285
MB 320-349285/1-C	Method Blank	Total/NA	Air	Split	349285
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	Split	349285
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	Split	349285

Cleanup Batch: 349467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-2	M-1079,1080,1082 TO PT STACK R1 M0010 BH	Total/NA	Air	Split	349142
140-17804-4	M-1083 TO PT STACK R1 M0010 BREAKTHRO	Total/NA	Air	Split	349142
140-17804-6	M-1086,1087,1089 TO PT STACK R2 M0010 BH	Total/NA	Air	Split	349142

LCMS (Continued)

Cleanup Batch: 349467 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-8	M-1090 TO PT STACK R2 M0010 BREAKTHRO	Total/NA	Air	Split	349142
140-17804-10	M-1093,1094,1096 TO PT STACK R3 M0010 BH	Total/NA	Air	Split	349142
140-17804-12	M-1097 TO PT STACK R3 M0010 BREAKTHRO	Total/NA	Air	Split	349142
MB 320-349142/1-C	Method Blank	Total/NA	Air	Split	349142
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	Split	349142
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	Split	349142

Cleanup Batch: 349737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-1	M-1077,1078 TO PT STACK R1 M0010 FH	Total/NA	Air	Preparation	349466
140-17804-5	M-1084,1085 TO PT STACK R2 M0010 FH	Total/NA	Air	Preparation	349466
140-17804-9	M-1091,1092 TO PT STACK R3 M0010 FH	Total/NA	Air	Preparation	349466
MB 320-349285/1-C	Method Blank	Total/NA	Air	Preparation	349466
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	Preparation	349466
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	Preparation	349466

Analysis Batch: 349892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-349286/1-B	Method Blank	Total/NA	Air	537 (modified)	349292
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	349292
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349292

Cleanup Batch: 349993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-2	M-1079,1080,1082 TO PT STACK R1 M0010 BH	Total/NA	Air	Preparation	349467
140-17804-4	M-1083 TO PT STACK R1 M0010 BREAKTHRO	Total/NA	Air	Preparation	349467
140-17804-6	M-1086,1087,1089 TO PT STACK R2 M0010 BH	Total/NA	Air	Preparation	349467
140-17804-8	M-1090 TO PT STACK R2 M0010 BREAKTHRO	Total/NA	Air	Preparation	349467
140-17804-10	M-1093,1094,1096 TO PT STACK R3 M0010 BH	Total/NA	Air	Preparation	349467
140-17804-12	M-1097 TO PT STACK R3 M0010 BREAKTHRO	Total/NA	Air	Preparation	349467
MB 320-349142/1-C	Method Blank	Total/NA	Air	Preparation	349467
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	Preparation	349467
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	Preparation	349467

Analysis Batch: 350539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-349142/1-C	Method Blank	Total/NA	Air	537 (modified)	349993
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	537 (modified)	349993
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349993

Analysis Batch: 351192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-3	M-1081 TO PT STACK R1 M0010 IMPINGERS 1	Total/NA	Air	537 (modified)	349292
140-17804-7	M-1088 TO PT STACK R2 M0010 IMPINGERS 1	Total/NA	Air	537 (modified)	349292

Analysis Batch: 351202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-2	M-1079,1080,1082 TO PT STACK R1 M0010 BH	Total/NA	Air	537 (modified)	349993
140-17804-6	M-1086,1087,1089 TO PT STACK R2 M0010 BH	Total/NA	Air	537 (modified)	349993
140-17804-10	M-1093,1094,1096 TO PT STACK R3 M0010 BH	Total/NA	Air	537 (modified)	349993
140-17804-12	M-1097 TO PT STACK R3 M0010 BREAKTHRO	Total/NA	Air	537 (modified)	349993

QC Association Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - M0010

Job ID: 140-17804-1

LCMS

Analysis Batch: 351279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-1	M-1077,1078 TO PT STACK R1 M0010 FH	Total/NA	Air	537 (modified)	349737
140-17804-5	M-1084,1085 TO PT STACK R2 M0010 FH	Total/NA	Air	537 (modified)	349737
140-17804-9	M-1091,1092 TO PT STACK R3 M0010 FH	Total/NA	Air	537 (modified)	349737
MB 320-349285/1-C	Method Blank	Total/NA	Air	537 (modified)	349737
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	537 (modified)	349737
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349737

Analysis Batch: 351476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-4	M-1083 TO PT STACK R1 M0010 BREAKTHRO	Total/NA	Air	537 (modified)	349993
140-17804-8	M-1090 TO PT STACK R2 M0010 BREAKTHRO	Total/NA	Air	537 (modified)	349993

Analysis Batch: 351885

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17804-11	M-1095 TO PT STACK R3 M0010 IMPINGERS 1	Total/NA	Air	537 (modified)	349292

Client Sample ID: M-1077,1078 TO PT STACK R1 M0010 FH

Lab Sample ID: 140-17804-1

Date Collected: 01/03/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1000	B	49.5	48.6	ng/Sample		01/07/20 09:50	01/16/20 17:15	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*55*		*25 - 150*	*01/07/20 09:50*	*01/16/20 17:15*	*100*

Client Sample ID: M-1079,1080,1082 TO PT STACK R1 M0010 BH

Lab Sample ID: 140-17804-2

Date Collected: 01/03/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1240	B	5.00	4.90	ng/Sample		01/06/20 16:25	01/16/20 02:36	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*38*		*25 - 150*	*01/06/20 16:25*	*01/16/20 02:36*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*50*		*50 - 150*	*01/06/20 16:25*	*01/16/20 02:36*	*10*
13C8 PFOS	*47*	*X*	*50 - 150*	*01/06/20 16:25*	*01/16/20 02:36*	*10*

Client Sample ID: M-1081 TO PT STACK R1 M0010 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-17804-3

Date Collected: 01/03/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	714	B	5.00	4.90	ng/Sample		01/07/20 05:30	01/15/20 23:26	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*84*		*25 - 150*	*01/07/20 05:30*	*01/15/20 23:26*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*0.07*	*X*	*50 - 150*	*01/07/20 05:30*	*01/15/20 23:26*	*10*
13C8 PFOS	*0*	*X*	*50 - 150*	*01/07/20 05:30*	*01/15/20 23:26*	*10*

Client Sample ID: M-1083 TO PT STACK R1 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-17804-4

Date Collected: 01/03/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	11.6	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/17/20 14:14	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*84*		*25 - 150*	*01/06/20 16:25*	*01/17/20 14:14*	*1*

Client Sample ID: M-1083 TO PT STACK R1 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-17804-4

Date Collected: 01/03/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	0.01	X	50 - 150	01/06/20 16:25	01/17/20 14:14	1
13C8 PFOS	0	X	50 - 150	01/06/20 16:25	01/17/20 14:14	1

Client Sample ID: M-1084,1085 TO PT STACK R2 M0010 FH

Lab Sample ID: 140-17804-5

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	669	B	4.96	4.86	ng/Sample		01/07/20 09:50	01/16/20 16:45	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	86		25 - 150	01/07/20 09:50	01/16/20 16:45	10

Client Sample ID: M-1086,1087,1089 TO PT STACK R2 M0010 BH

Lab Sample ID: 140-17804-6

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	1530	B	50.0	49.0	ng/Sample		01/06/20 16:25	01/16/20 04:36	100

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	44		25 - 150	01/06/20 16:25	01/16/20 04:36	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	54		50 - 150	01/06/20 16:25	01/16/20 04:36	100
13C8 PFOS	50		50 - 150	01/06/20 16:25	01/16/20 04:36	100

Client Sample ID: M-1088 TO PT STACK R2 M0010 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-17804-7

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	931	B	5.00	4.90	ng/Sample		01/07/20 05:30	01/15/20 23:46	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	95		25 - 150	01/07/20 05:30	01/15/20 23:46	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	0.09	X	50 - 150	01/07/20 05:30	01/15/20 23:46	10
13C8 PFOS	0	X	50 - 150	01/07/20 05:30	01/15/20 23:46	10

Client Sample ID: M-1090 TO PT STACK R2 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-17804-8

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	22.3	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/17/20 14:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*77*		*25 - 150*	*01/06/20 16:25*	*01/17/20 14:24*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*0.005*	*X*	*50 - 150*	*01/06/20 16:25*	*01/17/20 14:24*	*1*
13C8 PFOS	*0*	*X*	*50 - 150*	*01/06/20 16:25*	*01/17/20 14:24*	*1*

Client Sample ID: M-1091,1092 TO PT STACK R3 M0010 FH

Lab Sample ID: 140-17804-9

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	252	B	4.94	4.84	ng/Sample		01/07/20 09:50	01/16/20 16:55	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*82*		*25 - 150*	*01/07/20 09:50*	*01/16/20 16:55*	*10*

Client Sample ID: M-1093,1094,1096 TO PT STACK R3 M0010 BH

Lab Sample ID: 140-17804-10

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	530	B	5.00	4.90	ng/Sample		01/06/20 16:25	01/16/20 02:46	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*48*		*25 - 150*	*01/06/20 16:25*	*01/16/20 02:46*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*44*	*X*	*50 - 150*	*01/06/20 16:25*	*01/16/20 02:46*	*10*
13C8 PFOS	*36*	*X*	*50 - 150*	*01/06/20 16:25*	*01/16/20 02:46*	*10*

Client Sample ID: M-1095 TO PT STACK R3 M0010 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-17804-11

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Air Train

Matrix: Air

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	172	B	5.00	4.90	ng/Sample		01/07/20 05:30	01/20/20 15:33	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*87*		*25 - 150*	*01/07/20 05:30*	*01/20/20 15:33*	*10*

Client Sample ID: M-1095 TO PT STACK R3 M0010 IMPINGERS 1,2&3 COND

Lab Sample ID: 140-17804-11

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*0.08*	*X*	*50 - 150*	*01/07/20 05:30*	*01/20/20 15:33*	*10*
13C8 PFOS	*0*	*X*	*50 - 150*	*01/07/20 05:30*	*01/20/20 15:33*	*10*

Client Sample ID: M-1097 TO PT STACK R3 M0010 BREAKTHROUGH XAD-2 RESIN TUBE

Lab Sample ID: 140-17804-12

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	9.98	B	5.00	4.90	ng/Sample		01/06/20 16:25	01/16/20 02:56	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*51*		*25 - 150*	*01/06/20 16:25*	*01/16/20 02:56*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*0.05*	*X*	*50 - 150*	*01/06/20 16:25*	*01/16/20 02:56*	*10*
13C8 PFOS	*0*	*X*	*50 - 150*	*01/06/20 16:25*	*01/16/20 02:56*	*10*

Default Detection Limits

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - M0010

Job ID: 140-17804-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.500	0.490	ng/Sample

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ANALYTICAL REPORT

Job Number: 140-17805-1

Job Description: TO Pre-Test Stack - M0010 QC Samples

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
1/31/2020 11:01 AM

Courtney M Adkins, Project Manager II
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01/31/2020

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Definitions/Glossary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
X	Surrogate is outside control limits

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
None	Leaching Procedure	TAL SOP	TAL SAC
None	Leaching Procedure for Condensate	TAL SOP	TAL SAC
None	Leaching Procedure for XAD	TAL SOP	TAL SAC
Preparation	Dilution	None	TAL SAC
Split	Source Air Split	None	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

None = None

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17805-1	R-1977,1978 TO PT STACK QC M0010 FH BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-2	R-1979,1980,1982 TO PT STACK QC M0010 BH BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-3	R-1981 TO PT STACK QC M0010 IMPINGERS 1,2&3 COND BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-4	R-1983 TO PT STACK QC M0010 BREAKTHROUGH XAD-2 RESIN TUBE BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-5	R-1984 TO PT STACK QC M0010 MEOH RB	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-6	R-1985 TO PT STACK QC M0010 PROOF BLANK	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-7	A-6961 MEDIA CHECK XAD	Air	01/04/20 00:00	01/06/20 07:30	
140-17805-8	A-6962 MEDIA CHECK FILTER	Air	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17805-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM 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.

Method 0010/Method 3542 Sampling Train Preparation

Train fractions were extracted and prepared for analysis in TestAmerica's Knoxville laboratory. Extracts and condensate samples were forwarded to the Sacramento laboratory for PFAS analysis. All results are reported in "Total ng" per sample.

LCMS

Method 537 (modified): The method blank for preparation batch 320-349286 and 320-349292 and analytical batch 320-349892 contained HFPO-DA above the reporting limit (RL). Associated sample was not re-extracted due to limited sample volume. (MB 320-349286/1-B)

Method 537 (modified): The method blank for preparation batch 320-349142, 320-349467 and 320-349993 and analytical batch 320-350539 contained HFPO-DA above the reporting limit (RL). Associated sample was not re-extracted due to limited sample volume. (MB 320-349142/1-C)

Method 537 (modified): The method blank for preparation batch 320-349285, 320-349466 and 320-349737 contained HFPO-DA above the reporting limit (RL). The samples associated with this method blank had detections above the reporting limit for this target compound. The samples was reported due to insufficient sample to perform a re-extraction.

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

Organic Prep

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

Notes

The XAD-2 (or Backhalf) Fraction of the sampling trains display low level detectable quantities of several PFAS compounds that are likely due to background levels present in the resin material present from the manufacturer. The various sampling and laboratory blanks processed for this project consistently show the presence of the same fingerprint pattern of PFAS compounds at approximately the same concentration. Therefore, a general conclusion should be considered that when the same relative levels of PFAS compounds are observed to be present in the Back-half fractions or the Breakthrough XAD-2 resin portions of the three test run data set, the "hits" are most likely due to background and not derived from the stack gas.
Additionally, for low nanogram level PFAS Modified Method 5 Sampling Train applications, when the associated XAD-2 fraction method blank contains a concentrations of PFAS compound greater than the minimum calibration level, a positive result in the associated sample will be flagged with a "B" data flag. The PFAS results for the associated method blanks and field quality control sample data should be evaluated by the client to assess whether the project specific background levels of PFAS compounds are significant, and how to incorporate them into associated stack emissions calculations. Blank subtraction may be necessary, and presenting data with and without blank subtraction may be advisable.

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

LCMS

Prep Batch: 349142

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-2	R-1979,1980,1982 TO PT STACK QC M0010 BH	Total/NA	Air	None	
140-17805-4	R-1983 TO PT STACK QC M0010 BREAKTHRO	Total/NA	Air	None	
140-17805-5	R-1984 TO PT STACK QC M0010 MEOH RB	Total/NA	Air	None	
140-17805-6	R-1985 TO PT STACK QC M0010 PROOF BLAN	Total/NA	Air	None	
140-17805-7	A-6961 MEDIA CHECK XAD	Total/NA	Air	None	
MB 320-349142/1-C	Method Blank	Total/NA	Air	None	
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 349285

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-1	R-1977,1978 TO PT STACK QC M0010 FH BT	Total/NA	Air	None	
140-17805-8	A-6962 MEDIA CHECK FILTER	Total/NA	Air	None	
MB 320-349285/1-C	Method Blank	Total/NA	Air	None	
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	None	

Prep Batch: 349286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-3	R-1981 TO PT STACK QC M0010 IMPINGERS 1	Total/NA	Air	None	
MB 320-349286/1-B	Method Blank	Total/NA	Air	None	
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	None	
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	None	

Cleanup Batch: 349292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-3	R-1981 TO PT STACK QC M0010 IMPINGERS 1	Total/NA	Air	Preparation	349286
MB 320-349286/1-B	Method Blank	Total/NA	Air	Preparation	349286
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	Preparation	349286
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	Preparation	349286

Cleanup Batch: 349466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-1	R-1977,1978 TO PT STACK QC M0010 FH BT	Total/NA	Air	Split	349285
140-17805-8	A-6962 MEDIA CHECK FILTER	Total/NA	Air	Split	349285
MB 320-349285/1-C	Method Blank	Total/NA	Air	Split	349285
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	Split	349285
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	Split	349285

Cleanup Batch: 349467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-2	R-1979,1980,1982 TO PT STACK QC M0010 BH	Total/NA	Air	Split	349142
140-17805-4	R-1983 TO PT STACK QC M0010 BREAKTHRO	Total/NA	Air	Split	349142
140-17805-5	R-1984 TO PT STACK QC M0010 MEOH RB	Total/NA	Air	Split	349142
140-17805-6	R-1985 TO PT STACK QC M0010 PROOF BLAN	Total/NA	Air	Split	349142
140-17805-7	A-6961 MEDIA CHECK XAD	Total/NA	Air	Split	349142
MB 320-349142/1-C	Method Blank	Total/NA	Air	Split	349142
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	Split	349142
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	Split	349142

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

LCMS

Cleanup Batch: 349737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-1	R-1977,1978 TO PT STACK QC M0010 FH BT	Total/NA	Air	Preparation	349466
140-17805-8	A-6962 MEDIA CHECK FILTER	Total/NA	Air	Preparation	349466
MB 320-349285/1-C	Method Blank	Total/NA	Air	Preparation	349466
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	Preparation	349466
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	Preparation	349466

Analysis Batch: 349892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-349286/1-B	Method Blank	Total/NA	Air	537 (modified)	349292
LCS 320-349286/2-B	Lab Control Sample	Total/NA	Air	537 (modified)	349292
LCSD 320-349286/3-B	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349292

Cleanup Batch: 349993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-2	R-1979,1980,1982 TO PT STACK QC M0010 BH	Total/NA	Air	Preparation	349467
140-17805-4	R-1983 TO PT STACK QC M0010 BREAKTHRO	Total/NA	Air	Preparation	349467
140-17805-5	R-1984 TO PT STACK QC M0010 MEOH RB	Total/NA	Air	Preparation	349467
140-17805-6	R-1985 TO PT STACK QC M0010 PROOF BLAN	Total/NA	Air	Preparation	349467
140-17805-7	A-6961 MEDIA CHECK XAD	Total/NA	Air	Preparation	349467
MB 320-349142/1-C	Method Blank	Total/NA	Air	Preparation	349467
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	Preparation	349467
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	Preparation	349467

Analysis Batch: 350539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-349142/1-C	Method Blank	Total/NA	Air	537 (modified)	349993
LCS 320-349142/2-C	Lab Control Sample	Total/NA	Air	537 (modified)	349993
LCSD 320-349142/3-C	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349993

Analysis Batch: 350543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-349285/1-C	Method Blank	Total/NA	Air	537 (modified)	349737
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	537 (modified)	349737
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349737

Analysis Batch: 351192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-3	R-1981 TO PT STACK QC M0010 IMPINGERS 1	Total/NA	Air	537 (modified)	349292

Analysis Batch: 351202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-2	R-1979,1980,1982 TO PT STACK QC M0010 BH	Total/NA	Air	537 (modified)	349993
140-17805-7	A-6961 MEDIA CHECK XAD	Total/NA	Air	537 (modified)	349993

Analysis Batch: 351206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-5	R-1984 TO PT STACK QC M0010 MEOH RB	Total/NA	Air	537 (modified)	349993
140-17805-6	R-1985 TO PT STACK QC M0010 PROOF BLAN	Total/NA	Air	537 (modified)	349993

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

LCMS

Analysis Batch: 351279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-1	R-1977,1978 TO PT STACK QC M0010 FH BT	Total/NA	Air	537 (modified)	349737
MB 320-349285/1-C	Method Blank	Total/NA	Air	537 (modified)	349737
LCS 320-349285/2-C	Lab Control Sample	Total/NA	Air	537 (modified)	349737
LCSD 320-349285/3-C	Lab Control Sample Dup	Total/NA	Air	537 (modified)	349737

Analysis Batch: 351476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-4	R-1983 TO PT STACK QC M0010 BREAKTHRO	Total/NA	Air	537 (modified)	349993

Analysis Batch: 351846

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17805-8	A-6962 MEDIA CHECK FILTER	Total/NA	Air	537 (modified)	349737

Client Sample ID: R-1977,1978 TO PT STACK QC M0010 FH BT
Lab Sample ID: 140-17805-1

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	40.8	B	5.00	4.90	ng/Sample		01/07/20 09:50	01/16/20 17:05	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*59*		*25 - 150*	*01/07/20 09:50*	*01/16/20 17:05*	*10*

Client Sample ID: R-1979,1980,1982 TO PT STACK QC M0010 BH BT
Lab Sample ID: 140-17805-2

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	249	B	5.00	4.90	ng/Sample		01/06/20 16:25	01/16/20 03:06	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*68*		*25 - 150*	*01/06/20 16:25*	*01/16/20 03:06*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*79*		*50 - 150*	*01/06/20 16:25*	*01/16/20 03:06*	*10*
13C8 PFOS	*71*		*50 - 150*	*01/06/20 16:25*	*01/16/20 03:06*	*10*

Client Sample ID: R-1981 TO PT STACK QC M0010 IMPINGERS 1,2&3 COND BT
Lab Sample ID: 140-17805-3

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	14.2	B	0.500	0.490	ng/Sample		01/07/20 05:30	01/15/20 23:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*83*		*25 - 150*	*01/07/20 05:30*	*01/15/20 23:06*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*0.01*	*X*	*50 - 150*	*01/07/20 05:30*	*01/15/20 23:06*	*1*
13C8 PFOS	*0*	*X*	*50 - 150*	*01/07/20 05:30*	*01/15/20 23:06*	*1*

Client Sample ID: R-1983 TO PT STACK QC M0010 BREAKTHROUGH XAD-2 RESIN TUBE BT
Lab Sample ID: 140-17805-4

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	4.57	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/17/20 14:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*70*		*25 - 150*	*01/06/20 16:25*	*01/17/20 14:34*	*1*

Client Sample ID: R-1983 TO PT STACK QC M0010 BREAKTHROUGH XAD-2 RESIN TUBE BT

Lab Sample ID: 140-17805-4

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA	0.01	X	50 - 150	01/06/20 16:25	01/17/20 14:34	1
13C8 PFOS	0	X	50 - 150	01/06/20 16:25	01/17/20 14:34	1

Client Sample ID: R-1984 TO PT STACK QC M0010 MEOH RB

Lab Sample ID: 140-17805-5

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	0.887	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/16/20 12:05	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	80		25 - 150	01/06/20 16:25	01/16/20 12:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA				01/06/20 16:25	01/16/20 12:05	1
13C8 PFOS				01/06/20 16:25	01/16/20 12:05	1

Client Sample ID: R-1985 TO PT STACK QC M0010 PROOF BLANK

Lab Sample ID: 140-17805-6

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	32.9	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/16/20 12:15	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	88		25 - 150	01/06/20 16:25	01/16/20 12:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA				01/06/20 16:25	01/16/20 12:15	1
13C8 PFOS				01/06/20 16:25	01/16/20 12:15	1

Client Sample ID: A-6961 MEDIA CHECK XAD

Lab Sample ID: 140-17805-7

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	2.10	B	0.500	0.490	ng/Sample		01/06/20 16:25	01/16/20 02:25	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	86		25 - 150	01/06/20 16:25	01/16/20 02:25	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 PFOA				01/06/20 16:25	01/16/20 02:25	1
13C8 PFOS				01/06/20 16:25	01/16/20 02:25	1

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

Client Sample ID: A-6962 MEDIA CHECK FILTER
Lab Sample ID: 140-17805-8
Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Air Train

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.500	0.490	ng/Sample		01/07/20 09:50	01/20/20 14:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*53*		*25 - 150*	*01/07/20 09:50*	*01/20/20 14:33*	*1*

Default Detection Limits

Client: The Chemours Company FC, LLC
Job ID: 140-17805-1
Project/Site: TO Pre-Test Stack - M0010 QC Samples

Method: 537 (modified) - Fluorinated Alkyl Substances

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.500	0.490	ng/Sample

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ANALYTICAL REPORT

Job Number: 140-17806-1

Job Description: TO Pre-Test Stack - MM18

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
3/12/2020 11:45 AM

Courtney M Adkins, Project Manager II
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
03/12/2020
Revision: 1

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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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - MM18

Job ID: 140-17806-1

Method	Method Description	Protocol	Laboratory
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL KNX
MeOH Prep	Methanol Impinger Preparation	None	TAL KNX

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

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: TO Pre-Test Stack - MM18

Job ID: 140-17806-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17806-1	A-6963 R1 PT TO STACK-PRE IMPINGER/MEO RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-2	A-6964 R1 PT TO STACK-IMP #1/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-3	A-6965 R1 PT TO STACK-IMP #2/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-4	A-6966 R1 PT TO STACK-IMP #3/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-5	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-6	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-7	A-6969 R1 PT TO STACK-IMP #6/MEOH RINSE	Air	01/03/20 00:00	01/06/20 07:30	
140-17806-8	A-6970 R2 PT TO STACK-IMP #1/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-9	A-6971 R2 PT TO STACK-IMP #2/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-10	A-6972 R2 PT TO STACK-IMP #3/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-11	A-6973 R2 PT TO STACK-IMP #4/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-12	A-6974 R2 PT TO STACK-IMP #5/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-13	A-6975 R2 PT TO STACK-IMP #6/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-14	A-6975B R2 PT TO STACK-IMP #7/MEOH RINS	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-15	A-6976 R3 PT TO STACK-IMP #1/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-16	A-6977 R3 PT TO STACK-IMP #2/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-17	A-6978 R3 PT TO STACK-IMP #3/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-18	A-6979 R3 PT TO STACK-IMP #4/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-19	A-6980 R3 PT TO STACK-IMP #5/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-20	A-6981 R3 PT TO STACK-IMP #6/MEOH RINSE	Air	01/04/20 00:00	01/06/20 07:30	
140-17806-21	A-6981B R3 PT TO STACK-IMP #7/MEOH RINS	Air	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17806-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM in good condition and properly preserved. The temperature of the cooler at receipt was 0.2º C.

Receipt Exceptions

The following sample was listed on the Chain of Custody (COC); however, no sample was received: A-6981B R3 PT TO STACK-IMP #7/MEOH RINSE (140-17806-21).

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.

GC/MS VOA

Impinger Sample Preparation and Analysis: Impinger samples were analyzed for the volatile organic target analytes by purge and trap GCMS using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MS-0015, based on the following method:

· SW-846 8260B, “Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)”

Each sample is prepared by adding a known amount of sample to the purge water in a purge and trap vessel and spiking with internal standards, surrogates, and matrix spike analytes (as needed). Volatile compounds are introduced into the gas chromatograph by the purge and trap method. The components are separated using the chromatograph and detected using a mass spectrometer, which provides both qualitative and quantitative information.

Impinger sample results were calculated using the following equation:

Concentration, µg/sample = (C × DF × W × Vt) / (Va)
Where:
C = On-column concentration, µg/L
DF = Dilution factor
W = Volume of water purged, L
Vt = Methanol extract final volume, µL
Va = Volume of extract analyzed, µL

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

GC/MS VOA

Analysis Batch: 36521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17806-1	A-6963 R1 PT TO STACK-PRE IMPINGER/MEO	Total/NA	Air	8260B SIM	36522
140-17806-2	A-6964 R1 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	8260B SIM	36522
140-17806-3	A-6965 R1 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	8260B SIM	36522
140-17806-4	A-6966 R1 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	8260B SIM	36522
140-17806-5	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	8260B SIM	36522
MB 140-36522/2-A	Method Blank	Total/NA	Air	8260B SIM	36522
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	8260B SIM	36522
140-17806-5 MS	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	8260B SIM	36522
140-17806-5 MSD	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	8260B SIM	36522

Prep Batch: 36522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17806-1	A-6963 R1 PT TO STACK-PRE IMPINGER/MEO	Total/NA	Air	MeOH Prep	
140-17806-2	A-6964 R1 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-3	A-6965 R1 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-4	A-6966 R1 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-5	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	MeOH Prep	
MB 140-36522/2-A	Method Blank	Total/NA	Air	MeOH Prep	
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	MeOH Prep	
140-17806-5 MS	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-5 MSD	A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	MeOH Prep	

Prep Batch: 36568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17806-6	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-7	A-6969 R1 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-8	A-6970 R2 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-9	A-6971 R2 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-10	A-6972 R2 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-11	A-6973 R2 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-12	A-6974 R2 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-13	A-6975 R2 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-14	A-6975B R2 PT TO STACK-IMP #7/MEOH RINS	Total/NA	Air	MeOH Prep	
140-17806-15	A-6976 R3 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-16	A-6977 R3 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-17	A-6978 R3 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-18	A-6979 R3 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-19	A-6980 R3 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-20	A-6981 R3 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-21	A-6981B R3 PT TO STACK-IMP #7/MEOH RINS	Total/NA	Air	MeOH Prep	
MB 140-36568/2-A	Method Blank	Total/NA	Air	MeOH Prep	
LCS 140-36568/1-A	Lab Control Sample	Total/NA	Air	MeOH Prep	
140-17806-6 MS	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	MeOH Prep	
140-17806-6 MSD	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	MeOH Prep	

Analysis Batch: 36569

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17806-6	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-7	A-6969 R1 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-8	A-6970 R2 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-9	A-6971 R2 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	8260B SIM	36568

GC/MS VOA (Continued)

Analysis Batch: 36569 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17806-10	A-6972 R2 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-11	A-6973 R2 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-12	A-6974 R2 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-13	A-6975 R2 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-14	A-6975B R2 PT TO STACK-IMP #7/MEOH RINS	Total/NA	Air	8260B SIM	36568
140-17806-15	A-6976 R3 PT TO STACK-IMP #1/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-16	A-6977 R3 PT TO STACK-IMP #2/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-17	A-6978 R3 PT TO STACK-IMP #3/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-18	A-6979 R3 PT TO STACK-IMP #4/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-19	A-6980 R3 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-20	A-6981 R3 PT TO STACK-IMP #6/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-21	A-6981B R3 PT TO STACK-IMP #7/MEOH RINS	Total/NA	Air	8260B SIM	36568
MB 140-36568/2-A	Method Blank	Total/NA	Air	8260B SIM	36568
LCS 140-36568/1-A	Lab Control Sample	Total/NA	Air	8260B SIM	36568
140-17806-6 MS	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	8260B SIM	36568
140-17806-6 MSD	A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE	Total/NA	Air	8260B SIM	36568

Client Sample ID: A-6963 R1 PT TO STACK-PRE IMPINGER/MEOH RINSE

Lab Sample ID: 140-17806-1

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.41	1.41	ug/Sample		01/06/20 11:35	01/07/20 00:34	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.462	0.462	ug/Sample		01/06/20 11:35	01/07/20 00:34	1
2-MTP as HFPO	ND		0.0210	0.0210	ug/Sample		01/06/20 11:35	01/07/20 00:34	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0240	0.0240	ug/Sample		01/06/20 11:35	01/07/20 00:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:34*	*1*
Dibromofluoromethane (Surr)	*86*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:34*	*1*

Client Sample ID: A-6964 R1 PT TO STACK-IMP #1/MEOH RINSE

Lab Sample ID: 140-17806-2

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.02	2.02	ug/Sample		01/06/20 11:35	01/07/20 00:59	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.666	0.666	ug/Sample		01/06/20 11:35	01/07/20 00:59	1
2-MTP as HFPO	ND		0.0301	0.0301	ug/Sample		01/06/20 11:35	01/07/20 00:59	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0345	0.0345	ug/Sample		01/06/20 11:35	01/07/20 00:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:59*	*1*
Dibromofluoromethane (Surr)	*86*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:59*	*1*

Client Sample ID: A-6965 R1 PT TO STACK-IMP #2/MEOH RINSE

Lab Sample ID: 140-17806-3

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.69	1.69	ug/Sample		01/06/20 11:35	01/07/20 01:23	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.558	0.558	ug/Sample		01/06/20 11:35	01/07/20 01:23	1
2-MTP as HFPO	ND		0.0252	0.0252	ug/Sample		01/06/20 11:35	01/07/20 01:23	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0289	0.0289	ug/Sample		01/06/20 11:35	01/07/20 01:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/06/20 11:35*	*01/07/20 01:23*	*1*
Dibromofluoromethane (Surr)	*86*		*50 - 150*	*01/06/20 11:35*	*01/07/20 01:23*	*1*

Client Sample ID: A-6966 R1 PT TO STACK-IMP #3/MEOH RINSE

Lab Sample ID: 140-17806-4

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.58	1.58	ug/Sample		01/06/20 11:35	01/07/20 01:48	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.522	0.522	ug/Sample		01/06/20 11:35	01/07/20 01:48	1
2-MTP as HFPO	ND		0.0236	0.0236	ug/Sample		01/06/20 11:35	01/07/20 01:48	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0270	0.0270	ug/Sample		01/06/20 11:35	01/07/20 01:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/07/20 01:48*	*1*
Dibromofluoromethane (Surr)	*81*		*50 - 150*	*01/06/20 11:35*	*01/07/20 01:48*	*1*

Client Sample ID: A-6967 R1 PT TO STACK-IMP #4/MEOH RINSE

Lab Sample ID: 140-17806-5

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.63	1.63	ug/Sample		01/06/20 11:35	01/07/20 02:12	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.538	0.538	ug/Sample		01/06/20 11:35	01/07/20 02:12	1
2-MTP as HFPO	ND		0.0244	0.0244	ug/Sample		01/06/20 11:35	01/07/20 02:12	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0279	0.0279	ug/Sample		01/06/20 11:35	01/07/20 02:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/07/20 02:12*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/06/20 11:35*	*01/07/20 02:12*	*1*

Client Sample ID: A-6968 R1 PT TO STACK-IMP #5/MEOH RINSE

Lab Sample ID: 140-17806-6

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.64	1.64	ug/Sample		01/07/20 11:49	01/07/20 13:47	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.540	0.540	ug/Sample		01/07/20 11:49	01/07/20 13:47	1
2-MTP as HFPO	ND		0.0245	0.0245	ug/Sample		01/07/20 11:49	01/07/20 13:47	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0280	0.0280	ug/Sample		01/07/20 11:49	01/07/20 13:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*50 - 150*	*01/07/20 11:49*	*01/07/20 13:47*	*1*
Dibromofluoromethane (Surr)	*80*		*50 - 150*	*01/07/20 11:49*	*01/07/20 13:47*	*1*

Client Sample ID: A-6969 R1 PT TO STACK-IMP #6/MEOH RINSE

Lab Sample ID: 140-17806-7

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.85	1.85	ug/Sample		01/07/20 11:49	01/07/20 14:12	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.610	0.610	ug/Sample		01/07/20 11:49	01/07/20 14:12	1
2-MTP as HFPO	ND		0.0276	0.0276	ug/Sample		01/07/20 11:49	01/07/20 14:12	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0316	0.0316	ug/Sample		01/07/20 11:49	01/07/20 14:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*50 - 150*	*01/07/20 11:49*	*01/07/20 14:12*	*1*
Dibromofluoromethane (Surr)	*79*		*50 - 150*	*01/07/20 11:49*	*01/07/20 14:12*	*1*

Client Sample ID: A-6970 R2 PT TO STACK-IMP #1/MEOH RINSE

Lab Sample ID: 140-17806-8

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.43	1.43	ug/Sample		01/07/20 11:49	01/07/20 14:37	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.472	0.472	ug/Sample		01/07/20 11:49	01/07/20 14:37	1
2-MTP as HFPO	ND		0.0213	0.0213	ug/Sample		01/07/20 11:49	01/07/20 14:37	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0244	0.0244	ug/Sample		01/07/20 11:49	01/07/20 14:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*50 - 150*	*01/07/20 11:49*	*01/07/20 14:37*	*1*
Dibromofluoromethane (Surr)	*80*		*50 - 150*	*01/07/20 11:49*	*01/07/20 14:37*	*1*

Client Sample ID: A-6971 R2 PT TO STACK-IMP #2/MEOH RINSE

Lab Sample ID: 140-17806-9

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.82	1.82	ug/Sample		01/07/20 11:49	01/07/20 15:01	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.601	0.601	ug/Sample		01/07/20 11:49	01/07/20 15:01	1
2-MTP as HFPO	ND		0.0272	0.0272	ug/Sample		01/07/20 11:49	01/07/20 15:01	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0311	0.0311	ug/Sample		01/07/20 11:49	01/07/20 15:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:01*	*1*
Dibromofluoromethane (Surr)	*84*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:01*	*1*

Client Sample ID: A-6972 R2 PT TO STACK-IMP #3/MEOH RINSE
Lab Sample ID: 140-17806-10

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.74	1.74	ug/Sample		01/07/20 11:49	01/07/20 15:26	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.571	0.571	ug/Sample		01/07/20 11:49	01/07/20 15:26	1
2-MTP as HFPO	ND		0.0259	0.0259	ug/Sample		01/07/20 11:49	01/07/20 15:26	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0296	0.0296	ug/Sample		01/07/20 11:49	01/07/20 15:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:26*	*1*
Dibromofluoromethane (Surr)	*86*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:26*	*1*

Client Sample ID: A-6973 R2 PT TO STACK-IMP #4/MEOH RINSE
Lab Sample ID: 140-17806-11

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.58	1.58	ug/Sample		01/07/20 11:49	01/07/20 15:50	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.521	0.521	ug/Sample		01/07/20 11:49	01/07/20 15:50	1
2-MTP as HFPO	ND		0.0236	0.0236	ug/Sample		01/07/20 11:49	01/07/20 15:50	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0270	0.0270	ug/Sample		01/07/20 11:49	01/07/20 15:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:50*	*1*
Dibromofluoromethane (Surr)	*87*		*50 - 150*	*01/07/20 11:49*	*01/07/20 15:50*	*1*

Client Sample ID: A-6974 R2 PT TO STACK-IMP #5/MEOH RINSE
Lab Sample ID: 140-17806-12

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.69	1.69	ug/Sample		01/07/20 11:49	01/07/20 16:15	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.555	0.555	ug/Sample		01/07/20 11:49	01/07/20 16:15	1
2-MTP as HFPO	ND		0.0252	0.0252	ug/Sample		01/07/20 11:49	01/07/20 16:15	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0288	0.0288	ug/Sample		01/07/20 11:49	01/07/20 16:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*50 - 150*	*01/07/20 11:49*	*01/07/20 16:15*	*1*
Dibromofluoromethane (Surr)	*89*		*50 - 150*	*01/07/20 11:49*	*01/07/20 16:15*	*1*

Client Sample ID: A-6975 R2 PT TO STACK-IMP #6/MEOH RINSE

Lab Sample ID: 140-17806-13

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.66	1.66	ug/Sample		01/07/20 11:49	01/07/20 16:39	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.546	0.546	ug/Sample		01/07/20 11:49	01/07/20 16:39	1
2-MTP as HFPO	ND		0.0247	0.0247	ug/Sample		01/07/20 11:49	01/07/20 16:39	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0283	0.0283	ug/Sample		01/07/20 11:49	01/07/20 16:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/07/20 11:49*	*01/07/20 16:39*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/07/20 11:49*	*01/07/20 16:39*	*1*

Client Sample ID: A-6975B R2 PT TO STACK-IMP #7/MEOH RINSE

Lab Sample ID: 140-17806-14

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.74	1.74	ug/Sample		01/07/20 11:49	01/07/20 17:04	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.572	0.572	ug/Sample		01/07/20 11:49	01/07/20 17:04	1
2-MTP as HFPO	ND		0.0259	0.0259	ug/Sample		01/07/20 11:49	01/07/20 17:04	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0296	0.0296	ug/Sample		01/07/20 11:49	01/07/20 17:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:04*	*1*
Dibromofluoromethane (Surr)	*89*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:04*	*1*

Client Sample ID: A-6976 R3 PT TO STACK-IMP #1/MEOH RINSE

Lab Sample ID: 140-17806-15

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.68	1.68	ug/Sample		01/07/20 11:49	01/07/20 17:28	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.553	0.553	ug/Sample		01/07/20 11:49	01/07/20 17:28	1
2-MTP as HFPO	ND		0.0250	0.0250	ug/Sample		01/07/20 11:49	01/07/20 17:28	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0286	0.0286	ug/Sample		01/07/20 11:49	01/07/20 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:28*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:28*	*1*

Client Sample ID: A-6977 R3 PT TO STACK-IMP #2/MEOH RINSE
Lab Sample ID: 140-17806-16

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.31	2.31	ug/Sample		01/07/20 11:49	01/07/20 17:53	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.759	0.759	ug/Sample		01/07/20 11:49	01/07/20 17:53	1
2-MTP as HFPO	ND		0.0343	0.0343	ug/Sample		01/07/20 11:49	01/07/20 17:53	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0393	0.0393	ug/Sample		01/07/20 11:49	01/07/20 17:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:53*	*1*
Dibromofluoromethane (Surr)	*89*		*50 - 150*	*01/07/20 11:49*	*01/07/20 17:53*	*1*

Client Sample ID: A-6978 R3 PT TO STACK-IMP #3/MEOH RINSE
Lab Sample ID: 140-17806-17

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.20	2.20	ug/Sample		01/07/20 11:49	01/07/20 18:17	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.725	0.725	ug/Sample		01/07/20 11:49	01/07/20 18:17	1
2-MTP as HFPO	ND		0.0328	0.0328	ug/Sample		01/07/20 11:49	01/07/20 18:17	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0375	0.0375	ug/Sample		01/07/20 11:49	01/07/20 18:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*50 - 150*	*01/07/20 11:49*	*01/07/20 18:17*	*1*
Dibromofluoromethane (Surr)	*89*		*50 - 150*	*01/07/20 11:49*	*01/07/20 18:17*	*1*

Client Sample ID: A-6979 R3 PT TO STACK-IMP #4/MEOH RINSE
Lab Sample ID: 140-17806-18

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.91	1.91	ug/Sample		01/07/20 11:49	01/07/20 18:42	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.627	0.627	ug/Sample		01/07/20 11:49	01/07/20 18:42	1
2-MTP as HFPO	ND		0.0284	0.0284	ug/Sample		01/07/20 11:49	01/07/20 18:42	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0325	0.0325	ug/Sample		01/07/20 11:49	01/07/20 18:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*50 - 150*	*01/07/20 11:49*	*01/07/20 18:42*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/07/20 11:49*	*01/07/20 18:42*	*1*

Client Sample ID: A-6980 R3 PT TO STACK-IMP #5/MEOH RINSE
Lab Sample ID: 140-17806-19

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.82	1.82	ug/Sample		01/07/20 11:49	01/07/20 19:07	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.597	0.597	ug/Sample		01/07/20 11:49	01/07/20 19:07	1
2-MTP as HFPO	ND		0.0271	0.0271	ug/Sample		01/07/20 11:49	01/07/20 19:07	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0310	0.0310	ug/Sample		01/07/20 11:49	01/07/20 19:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:07*	*1*
Dibromofluoromethane (Surr)	*89*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:07*	*1*

Client Sample ID: A-6981 R3 PT TO STACK-IMP #6/MEOH RINSE
Lab Sample ID: 140-17806-20

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.90	1.90	ug/Sample		01/07/20 11:49	01/07/20 19:31	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.624	0.624	ug/Sample		01/07/20 11:49	01/07/20 19:31	1
2-MTP as HFPO	ND		0.0283	0.0283	ug/Sample		01/07/20 11:49	01/07/20 19:31	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0324	0.0324	ug/Sample		01/07/20 11:49	01/07/20 19:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:31*	*1*
Dibromofluoromethane (Surr)	*87*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:31*	*1*

Client Sample ID: A-6981B R3 PT TO STACK-IMP #7/MEOH RINSE
Lab Sample ID: 140-17806-21

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.26	2.26	ug/Sample		01/07/20 11:49	01/07/20 19:56	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.744	0.744	ug/Sample		01/07/20 11:49	01/07/20 19:56	1
2-MTP as HFPO	ND		0.0337	0.0337	ug/Sample		01/07/20 11:49	01/07/20 19:56	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0386	0.0386	ug/Sample		01/07/20 11:49	01/07/20 19:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:56*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/07/20 11:49*	*01/07/20 19:56*	*1*

Default Detection Limits

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Stack - MM18

Job ID: 140-17806-1

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Prep: MeOH Prep

Analyte	RL	MDL	Units
2-MTP as HFPO	0.00250	0.00250	ug/Sample
Carbonyl Difluoride	0.200	0.200	ug/Sample
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	0.00250	0.00250	ug/Sample
HFPO dimer, methyl ester as HFPO-DAF	0.0500	0.0500	ug/Sample

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ANALYTICAL REPORT

Job Number: 140-17807-1

Job Description: TO Pre-Test Stack - MM18 QC Samples

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
3/12/2020 12:11 PM

Courtney M Adkins, Project Manager II
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(865)291-3000
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03/12/2020
Revision: 1

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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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17807-1
Project/Site: TO Pre-Test Stack - MM18 QC Samples

Method	Method Description	Protocol	Laboratory
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL KNX
MeOH Prep	Methanol Impinger Preparation	None	TAL KNX

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

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
Job ID: 140-17807-1
Project/Site: TO Pre-Test Stack - MM18 QC Samples

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17807-1	E-1334 QC PT TO STACK MM-18 IMP #1/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-2	E-1335 QC PT TO STACK MM-18 IMP #2/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-3	E-1336 QC PT TO STACK MM-18 IMP #3/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-4	E-1337 QC PT TO STACK MM-18 IMP #4/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-5	E-1338 QC PT TO STACK MM-18 IMP #5/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-6	E-1339 QC PT TO STACK MM-18 IMP #6/MEOH RINSES BT	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-8	E-1340 QC PT TO STACK MM-18 MEOH RB	Air	01/04/20 00:00	01/06/20 07:30	
140-17807-9	E-1341 QC PT TO STACK MM-18 MEOH PROC BLANK	Air	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17807-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM in good condition and properly preserved. The temperature of the cooler at receipt was 0.2º 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.

GC/MS VOA

Impinger Sample Preparation and Analysis: Impinger samples were analyzed for the volatile organic target analytes by purge and trap GCMS using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MS-0015, based on the following method:

· SW-846 8260B, “Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)”

Each sample is prepared by adding a known amount of sample to the purge water in a purge and trap vessel and spiking with internal standards, surrogates, and matrix spike analytes (as needed). Volatile compounds are introduced into the gas chromatograph by the purge and trap method. The components are separated using the chromatograph and detected using a mass spectrometer, which provides both qualitative and quantitative information.

Impinger sample results were calculated using the following equation:

Concentration, µg/sample = (C × DF × W × Vt) / (Va)
Where:
C = On-column concentration, µg/L
DF = Dilution factor
W = Volume of water purged, L
Vt = Methanol extract final volume, µL
Va = Volume of extract analyzed, µL

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

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17807-1
Project/Site: TO Pre-Test Stack - MM18 QC Samples

GC/MS VOA

Analysis Batch: 36521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17807-1	E-1334 QC PT TO STACK MM-18 IMP #1/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-2	E-1335 QC PT TO STACK MM-18 IMP #2/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-3	E-1336 QC PT TO STACK MM-18 IMP #3/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-4	E-1337 QC PT TO STACK MM-18 IMP #4/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-5	E-1338 QC PT TO STACK MM-18 IMP #5/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-6	E-1339 QC PT TO STACK MM-18 IMP #6/MEOH	Total/NA	Air	8260B SIM	36522
140-17807-8	E-1340 QC PT TO STACK MM-18 MEOH RB	Total/NA	Air	8260B SIM	36522
140-17807-9	E-1341 QC PT TO STACK MM-18 MEOH PROC	Total/NA	Air	8260B SIM	36522
MB 140-36522/2-A	Method Blank	Total/NA	Air	8260B SIM	36522
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	8260B SIM	36522

Prep Batch: 36522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17807-1	E-1334 QC PT TO STACK MM-18 IMP #1/MEOH	Total/NA	Air	MeOH Prep	
140-17807-2	E-1335 QC PT TO STACK MM-18 IMP #2/MEOH	Total/NA	Air	MeOH Prep	
140-17807-3	E-1336 QC PT TO STACK MM-18 IMP #3/MEOH	Total/NA	Air	MeOH Prep	
140-17807-4	E-1337 QC PT TO STACK MM-18 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17807-5	E-1338 QC PT TO STACK MM-18 IMP #5/MEOH	Total/NA	Air	MeOH Prep	
140-17807-6	E-1339 QC PT TO STACK MM-18 IMP #6/MEOH	Total/NA	Air	MeOH Prep	
140-17807-8	E-1340 QC PT TO STACK MM-18 MEOH RB	Total/NA	Air	MeOH Prep	
140-17807-9	E-1341 QC PT TO STACK MM-18 MEOH PROC	Total/NA	Air	MeOH Prep	
MB 140-36522/2-A	Method Blank	Total/NA	Air	MeOH Prep	
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	MeOH Prep	

Client Sample ID: E-1334 QC PT TO STACK MM-18 IMP #1/MEOH RINSES BT

Lab Sample ID: 140-17807-1

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.98	2.98	ug/Sample		01/06/20 11:35	01/06/20 19:37	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.984	0.984	ug/Sample		01/06/20 11:35	01/06/20 19:37	1
2-MTP as HFPO	ND		0.0445	0.0445	ug/Sample		01/06/20 11:35	01/06/20 19:37	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0509	0.0509	ug/Sample		01/06/20 11:35	01/06/20 19:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*50 - 150*	*01/06/20 11:35*	*01/06/20 19:37*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/06/20 19:37*	*1*

Client Sample ID: E-1335 QC PT TO STACK MM-18 IMP #2/MEOH RINSES BT

Lab Sample ID: 140-17807-2

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.99	1.99	ug/Sample		01/06/20 11:35	01/06/20 20:01	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.653	0.653	ug/Sample		01/06/20 11:35	01/06/20 20:01	1
2-MTP as HFPO	ND		0.0295	0.0295	ug/Sample		01/06/20 11:35	01/06/20 20:01	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0338	0.0338	ug/Sample		01/06/20 11:35	01/06/20 20:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:01*	*1*
Dibromofluoromethane (Surr)	*81*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:01*	*1*

Client Sample ID: E-1336 QC PT TO STACK MM-18 IMP #3/MEOH RINSES BT

Lab Sample ID: 140-17807-3

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		2.04	2.04	ug/Sample		01/06/20 11:35	01/06/20 20:26	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.674	0.674	ug/Sample		01/06/20 11:35	01/06/20 20:26	1
2-MTP as HFPO	ND		0.0305	0.0305	ug/Sample		01/06/20 11:35	01/06/20 20:26	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0349	0.0349	ug/Sample		01/06/20 11:35	01/06/20 20:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:26*	*1*
Dibromofluoromethane (Surr)	*83*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:26*	*1*

Client Sample ID: E-1337 QC PT TO STACK MM-18 IMP #4/MEOH RINSES BT

Lab Sample ID: 140-17807-4

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.64	1.64	ug/Sample		01/06/20 11:35	01/06/20 20:51	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.541	0.541	ug/Sample		01/06/20 11:35	01/06/20 20:51	1
2-MTP as HFPO	ND		0.0245	0.0245	ug/Sample		01/06/20 11:35	01/06/20 20:51	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0281	0.0281	ug/Sample		01/06/20 11:35	01/06/20 20:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:51*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/06/20 20:51*	*1*

Client Sample ID: E-1338 QC PT TO STACK MM-18 IMP #5/MEOH RINSES BT

Lab Sample ID: 140-17807-5

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.58	1.58	ug/Sample		01/06/20 11:35	01/06/20 21:15	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.517	0.517	ug/Sample		01/06/20 11:35	01/06/20 21:15	1
2-MTP as HFPO	ND		0.0234	0.0234	ug/Sample		01/06/20 11:35	01/06/20 21:15	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0268	0.0268	ug/Sample		01/06/20 11:35	01/06/20 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*50 - 150*	*01/06/20 11:35*	*01/06/20 21:15*	*1*
Dibromofluoromethane (Surr)	*83*		*50 - 150*	*01/06/20 11:35*	*01/06/20 21:15*	*1*

Client Sample ID: E-1339 QC PT TO STACK MM-18 IMP #6/MEOH RINSES BT

Lab Sample ID: 140-17807-6

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.47	1.47	ug/Sample		01/06/20 11:35	01/06/20 21:40	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.486	0.486	ug/Sample		01/06/20 11:35	01/06/20 21:40	1
2-MTP as HFPO	ND		0.0220	0.0220	ug/Sample		01/06/20 11:35	01/06/20 21:40	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0252	0.0252	ug/Sample		01/06/20 11:35	01/06/20 21:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/06/20 21:40*	*1*
Dibromofluoromethane (Surr)	*85*		*50 - 150*	*01/06/20 11:35*	*01/06/20 21:40*	*1*

Client Sample ID: E-1340 QC PT TO STACK MM-18 MEOH RB
Lab Sample ID: 140-17807-8

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.60	1.60	ug/Sample		01/06/20 11:35	01/06/20 18:22	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.528	0.528	ug/Sample		01/06/20 11:35	01/06/20 18:22	1
2-MTP as HFPO	ND		0.0238	0.0238	ug/Sample		01/06/20 11:35	01/06/20 18:22	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0273	0.0273	ug/Sample		01/06/20 11:35	01/06/20 18:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*50 - 150*	*01/06/20 11:35*	*01/06/20 18:22*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/06/20 18:22*	*1*

Client Sample ID: E-1341 QC PT TO STACK MM-18 MEOH PROOF BLANK
Lab Sample ID: 140-17807-9

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.13	1.13	ug/Sample		01/06/20 11:35	01/06/20 18:47	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.372	0.372	ug/Sample		01/06/20 11:35	01/06/20 18:47	1
2-MTP as HFPO	ND		0.0168	0.0168	ug/Sample		01/06/20 11:35	01/06/20 18:47	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0192	0.0192	ug/Sample		01/06/20 11:35	01/06/20 18:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*50 - 150*	*01/06/20 11:35*	*01/06/20 18:47*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/06/20 18:47*	*1*

Default Detection Limits

Client: The Chemours Company FC, LLC
Job ID: 140-17807-1
Project/Site: TO Pre-Test Stack - MM18 QC Samples

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Prep: MeOH Prep

Analyte	RL	MDL	Units
2-MTP as HFPO	0.00250	0.00250	ug/Sample
Carbonyl Difluoride	0.200	0.200	ug/Sample
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	0.00250	0.00250	ug/Sample
HFPO dimer, methyl ester as HFPO-DAF	0.0500	0.0500	ug/Sample

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ANALYTICAL REPORT

Job Number: 140-17809-1

Job Description: TO Pre-Test Inlet - MM18

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
3/12/2020 1:09 PM

Courtney M Adkins, Project Manager II
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(865)291-3000
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03/12/2020
Revision: 1

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Definitions/Glossary

Client: The Chemours Company FC, LLC
Job ID: 140-17809-1
Project/Site: TO Pre-Test Inlet - MM18

Qualifiers

LCMS

Qualifier	Qualifier Description
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Inlet - MM18

Job ID: 140-17809-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL KNX
8321A	PFOA and PFOS	SW846	TAL DEN
MeOH Prep	Methanol Impinger Preparation	None	TAL KNX
None	Leaching Procedure	TAL SOP	TAL DEN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

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: TO Pre-Test Inlet - MM18

Job ID: 140-17809-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17809-1	D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-2	D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-3	D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-4	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-5	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-6	D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH RINSES	Air	01/03/20 00:00	01/06/20 07:30	
140-17809-7	D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-8	D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-9	D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-10	D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-11	D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-12	D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-13	D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-14	D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-15	D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-16	D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-17	D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	
140-17809-18	D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH RINSES	Air	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17809-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM 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.

GC/MS VOA

Impinger Sample Preparation and Analysis: Impinger samples were analyzed for the volatile organic target analytes by purge and trap GCMS using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MS-0015, based on the following method:

· SW-846 8260B, "Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"

Each sample is prepared by adding a known amount of sample to the purge water in a purge and trap vessel and spiking with internal standards, surrogates, and matrix spike analytes (as needed). Volatile compounds are introduced into the gas chromatograph by the purge and trap method. The components are separated using the chromatograph and detected using a mass spectrometer, which provides both qualitative and quantitative information.

Impinger sample results were calculated using the following equation:

Concentration, µg/sample = (C × DF × W × Vt) / (Va)
Where:
C = On-column concentration, µg/L
DF = Dilution factor
W = Volume of water purged, L
Vt = Methanol extract final volume, µL
Va = Volume of extract analyzed, µL

Method 8260B: The following samples were diluted to bring the concentration of target analytes within the calibration range: D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH RINSES (140-17809-1), D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH RINSES (140-17809-4), D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH RINSES (140-17809-7), D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH RINSES (140-17809-10), D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH RINSES (140-17809-11), D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH RINSES (140-17809-12) and D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH RINSES (140-17809-13). Elevated reporting limits (RLs) are provided.

Method 8260B: Due to the matrix, the initial volume used for the following sample deviated from the standard procedure: D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH RINSES (140-17809-5). The reporting limits (RLs) have been adjusted proportionately.

Method 8260B: The following samples were diluted to bring the concentration of target analytes within the calibration range: D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH RINSES (140-17809-2), D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH RINSES (140-17809-3), D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH RINSES (140-17809-8), D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH RINSES (140-17809-9), D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH RINSES (140-17809-14), D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH RINSES (140-17809-15), D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH RINSES (140-17809-16), D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH RINSES (140-17809-17) and D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH RINSES (140-17809-18). Elevated reporting limits (RLs) are provided.

Method 8260B: Due to the matrix, the initial volume used for the following sample deviated from the standard procedure: D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH RINSES (140-17809-6). The reporting limits (RLs) have been adjusted proportionately.

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

LCMS

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

GC/MS VOA

Prep Batch: 36580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-1	D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	MeOH Prep	
140-17809-2	D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	MeOH Prep	
140-17809-3	D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	MeOH Prep	
140-17809-4	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17809-5	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	MeOH Prep	
140-17809-6	D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	MeOH Prep	
140-17809-7	D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	MeOH Prep	
140-17809-8	D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	MeOH Prep	
140-17809-9	D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	MeOH Prep	
140-17809-10	D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17809-11	D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	MeOH Prep	
140-17809-12	D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	MeOH Prep	
140-17809-13	D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	MeOH Prep	
140-17809-14	D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	MeOH Prep	
140-17809-15	D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	MeOH Prep	
140-17809-16	D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17809-17	D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	MeOH Prep	
140-17809-18	D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	MeOH Prep	
MB 140-36580/2-A	Method Blank	Total/NA	Air	MeOH Prep	
LCS 140-36580/1-A	Lab Control Sample	Total/NA	Air	MeOH Prep	
140-17809-4 MS	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17809-4 MSD	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	MeOH Prep	
140-17809-5 MS	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	MeOH Prep	
140-17809-5 MSD	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	MeOH Prep	

Analysis Batch: 36600

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-1	D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8260B	36580
140-17809-4	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8260B	36580
140-17809-5	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8260B	36580
140-17809-7	D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8260B	36580
140-17809-10	D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8260B	36580
140-17809-11	D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8260B	36580
140-17809-12	D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8260B	36580
140-17809-13	D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8260B	36580
MB 140-36580/2-A	Method Blank	Total/NA	Air	8260B	36580
LCS 140-36580/1-A	Lab Control Sample	Total/NA	Air	8260B	36580
140-17809-4 MS	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8260B	36580
140-17809-4 MSD	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8260B	36580
140-17809-5 MS	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8260B	36580
140-17809-5 MSD	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8260B	36580

Analysis Batch: 36646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-2	D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8260B	36580
140-17809-3	D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8260B	36580
140-17809-6	D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8260B	36580
140-17809-8	D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8260B	36580
140-17809-9	D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8260B	36580
140-17809-14	D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8260B	36580
140-17809-15	D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8260B	36580

GC/MS VOA (Continued)

Analysis Batch: 36646 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-16	D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8260B	36580
140-17809-17	D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8260B	36580
140-17809-18	D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8260B	36580

LCMS

Analysis Batch: 481729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
DLCK 280-481729/13	Lab Control Sample	Total/NA	Air	8321A	

Prep Batch: 482466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-1	D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	None	
140-17809-2	D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	None	
140-17809-3	D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	None	
140-17809-4	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	None	
140-17809-5	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	None	
140-17809-6	D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	None	
140-17809-7	D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	None	
140-17809-8	D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	None	
140-17809-9	D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	None	
140-17809-10	D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	None	
140-17809-11	D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	None	
140-17809-12	D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	None	
140-17809-13	D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	None	
140-17809-14	D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	None	
140-17809-15	D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	None	
140-17809-16	D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	None	
140-17809-17	D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	None	
140-17809-18	D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	None	
MB 280-482466/14-A	Method Blank	Total/NA	Air	None	
MB 280-482466/1-A	Method Blank	Total/NA	Air	None	
LCS 280-482466/2-A	Lab Control Sample	Total/NA	Air	None	
LCSD 280-482466/3-A	Lab Control Sample Dup	Total/NA	Air	None	

Analysis Batch: 482802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-1	D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8321A	482466
140-17809-2	D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8321A	482466
140-17809-3	D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8321A	482466
140-17809-4	D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8321A	482466
140-17809-5	D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8321A	482466
140-17809-6	D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8321A	482466
140-17809-7	D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8321A	482466
140-17809-8	D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8321A	482466
140-17809-9	D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8321A	482466
140-17809-10	D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8321A	482466
140-17809-11	D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8321A	482466
140-17809-12	D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8321A	482466
140-17809-13	D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH	Total/NA	Air	8321A	482466
140-17809-14	D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH	Total/NA	Air	8321A	482466

LCMS (Continued)

Analysis Batch: 482802 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17809-15	D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH	Total/NA	Air	8321A	482466
140-17809-16	D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH	Total/NA	Air	8321A	482466
140-17809-17	D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH	Total/NA	Air	8321A	482466
140-17809-18	D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH	Total/NA	Air	8321A	482466
MB 280-482466/14-A	Method Blank	Total/NA	Air	8321A	482466
MB 280-482466/1-A	Method Blank	Total/NA	Air	8321A	482466
LCS 280-482466/2-A	Lab Control Sample	Total/NA	Air	8321A	482466
LCSD 280-482466/3-A	Lab Control Sample Dup	Total/NA	Air	8321A	482466

Client Sample ID: D-2734 R1 PT TO FEED LINE #1 IMP #1/MEOH RINSES

Lab Sample ID: 140-17809-1

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**21000000**		799000	799000	ug/Sample		01/07/20 15:09	01/08/20 17:20	100
HFPO dimer, methyl ester as HFPO-DAF	**701000**		262000	262000	ug/Sample		01/07/20 15:09	01/08/20 17:20	100
2-MTP as HFPO	**416000**		237000	237000	ug/Sample		01/07/20 15:09	01/08/20 17:20	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		271000	271000	ug/Sample		01/07/20 15:09	01/08/20 17:20	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 160*	*01/07/20 15:09*	*01/08/20 17:20*	*100*
4-Bromofluorobenzene (Surr)	*94*		*57 - 152*	*01/07/20 15:09*	*01/08/20 17:20*	*100*
Dibromofluoromethane (Surr)	*94*		*62 - 134*	*01/07/20 15:09*	*01/08/20 17:20*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/08/20 17:20*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**34000**		218	43.7	ug/Sample		01/09/20 09:30	01/13/20 10:46	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*68*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 10:46*	*10*

Client Sample ID: D-2735 R1 PT TO FEED LINE #1 IMP #2/MEOH RINSES

Lab Sample ID: 140-17809-2

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**894000**		29100	29100	ug/Sample		01/07/20 15:09	01/10/20 12:13	100
HFPO dimer, methyl ester as HFPO-DAF	**84800**		9580	9580	ug/Sample		01/07/20 15:09	01/10/20 12:13	100
2-MTP as HFPO	**426000**		8670	8670	ug/Sample		01/07/20 15:09	01/10/20 12:13	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	**21700**		9930	9930	ug/Sample		01/07/20 15:09	01/10/20 12:13	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 160*	*01/07/20 15:09*	*01/10/20 12:13*	*100*
4-Bromofluorobenzene (Surr)	*94*		*57 - 152*	*01/07/20 15:09*	*01/10/20 12:13*	*100*
Dibromofluoromethane (Surr)	*95*		*62 - 134*	*01/07/20 15:09*	*01/10/20 12:13*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 12:13*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**22200**		160	32.0	ug/Sample		01/09/20 09:30	01/13/20 10:50	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*96*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 10:50*	*10*

Client Sample ID: D-2736 R1 PT TO FEED LINE #1 IMP #3/MEOH RINSES

Lab Sample ID: 140-17809-3

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**41400**		18200	18200	ug/Sample		01/07/20 15:09	01/10/20 12:37	100
HFPO dimer, methyl ester as HFPO-DAF	**22100**		5990	5990	ug/Sample		01/07/20 15:09	01/10/20 12:37	100
2-MTP as HFPO	**229000**		5420	5420	ug/Sample		01/07/20 15:09	01/10/20 12:37	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		6210	6210	ug/Sample		01/07/20 15:09	01/10/20 12:37	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/10/20 12:37*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/10/20 12:37*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 12:37*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 12:37*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**6650**		62.7	12.5	ug/Sample		01/09/20 09:30	01/13/20 10:53	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*97*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 10:53*	*10*

Client Sample ID: D-2737 R1 PT TO FEED LINE #1 IMP #4/MEOH RINSES

Lab Sample ID: 140-17809-4

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		11400	11400	ug/Sample		01/07/20 15:09	01/08/20 20:28	100
HFPO dimer, methyl ester as HFPO-DAF	**10800**		3760	3760	ug/Sample		01/07/20 15:09	01/08/20 20:28	100
2-MTP as HFPO	**81100**		3410	3410	ug/Sample		01/07/20 15:09	01/08/20 20:28	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		3900	3900	ug/Sample		01/07/20 15:09	01/08/20 20:28	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 160*	*01/07/20 15:09*	*01/08/20 20:28*	*100*
4-Bromofluorobenzene (Surr)	*93*		*57 - 152*	*01/07/20 15:09*	*01/08/20 20:28*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/08/20 20:28*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/08/20 20:28*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**6300**		39.0	7.80	ug/Sample		01/09/20 09:30	01/13/20 10:57	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*85*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 10:57*	*10*

Client Sample ID: D-2738 R1 PT TO FEED LINE #1 IMP #5/MEOH RINSES

Lab Sample ID: 140-17809-5

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		10800	10800	ug/Sample		01/07/20 15:09	01/08/20 20:53	100
HFPO dimer, methyl ester as HFPO-DAF	**5390**		3540	3540	ug/Sample		01/07/20 15:09	01/08/20 20:53	100
2-MTP as HFPO	**40400**		3210	3210	ug/Sample		01/07/20 15:09	01/08/20 20:53	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		3670	3670	ug/Sample		01/07/20 15:09	01/08/20 20:53	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 160*	*01/07/20 15:09*	*01/08/20 20:53*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/08/20 20:53*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/08/20 20:53*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/08/20 20:53*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**3460**		36.7	7.33	ug/Sample		01/09/20 09:30	01/13/20 11:01	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*92*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:01*	*10*

Client Sample ID: D-2739 R1 PT TO FEED LINE #1 IMP #6/MEOH RINSES

Lab Sample ID: 140-17809-6

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		11700	11700	ug/Sample		01/07/20 15:09	01/10/20 13:02	100
HFPO dimer, methyl ester as HFPO-DAF	ND		3870	3870	ug/Sample		01/07/20 15:09	01/10/20 13:02	100
2-MTP as HFPO	**32000**		3500	3500	ug/Sample		01/07/20 15:09	01/10/20 13:02	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		4010	4010	ug/Sample		01/07/20 15:09	01/10/20 13:02	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 160*	*01/07/20 15:09*	*01/10/20 13:02*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/10/20 13:02*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 13:02*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 13:02*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**1520**		40.1	8.03	ug/Sample		01/09/20 09:30	01/13/20 11:05	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*102*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:05*	*10*

Client Sample ID: D-2740 R2 PT TO FEED LINE #1 IMP #1/MEOH RINSES

Lab Sample ID: 140-17809-7

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	30300000		1080000	1080000	ug/Sample		01/07/20 15:09	01/08/20 18:50	100
HFPO dimer, methyl ester as HFPO-DAF	1460000		357000	357000	ug/Sample		01/07/20 15:09	01/08/20 18:50	100
2-MTP as HFPO	3130000		323000	323000	ug/Sample		01/07/20 15:09	01/08/20 18:50	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		370000	370000	ug/Sample		01/07/20 15:09	01/08/20 18:50	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 160*	*01/07/20 15:09*	*01/08/20 18:50*	*100*
4-Bromofluorobenzene (Surr)	*93*		*57 - 152*	*01/07/20 15:09*	*01/08/20 18:50*	*100*
Dibromofluoromethane (Surr)	*94*		*62 - 134*	*01/07/20 15:09*	*01/08/20 18:50*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/08/20 18:50*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	36100		299	59.8	ug/Sample		01/09/20 09:30	01/13/20 11:09	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*66*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:09*	*10*

Client Sample ID: D-2741 R2 PT TO FEED LINE #1 IMP #2/MEOH RINSES

Lab Sample ID: 140-17809-8

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	1190000		140000	140000	ug/Sample		01/07/20 15:09	01/10/20 13:27	100
HFPO dimer, methyl ester as HFPO-DAF	62000		46100	46100	ug/Sample		01/07/20 15:09	01/10/20 13:27	100
2-MTP as HFPO	1830000		41700	41700	ug/Sample		01/07/20 15:09	01/10/20 13:27	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		47800	47800	ug/Sample		01/07/20 15:09	01/10/20 13:27	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 160*	*01/07/20 15:09*	*01/10/20 13:27*	*100*
4-Bromofluorobenzene (Surr)	*93*		*57 - 152*	*01/07/20 15:09*	*01/10/20 13:27*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 13:27*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 13:27*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	16100		153	30.6	ug/Sample		01/09/20 09:30	01/13/20 11:17	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:17*	*10*

Client Sample ID: D-2742 R2 PT TO FEED LINE #1 IMP #3/MEOH RINSES

Lab Sample ID: 140-17809-9

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**110000**		106000	106000	ug/Sample		01/07/20 15:09	01/10/20 13:51	100
HFPO dimer, methyl ester as HFPO-DAF	ND		35000	35000	ug/Sample		01/07/20 15:09	01/10/20 13:51	100
2-MTP as HFPO	**1180000**		31700	31700	ug/Sample		01/07/20 15:09	01/10/20 13:51	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		36300	36300	ug/Sample		01/07/20 15:09	01/10/20 13:51	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 160*	*01/07/20 15:09*	*01/10/20 13:51*	*100*
4-Bromofluorobenzene (Surr)	*96*		*57 - 152*	*01/07/20 15:09*	*01/10/20 13:51*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/10/20 13:51*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/10/20 13:51*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**7490**		73.2	14.6	ug/Sample		01/09/20 09:30	01/13/20 11:21	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*84*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:21*	*10*

Client Sample ID: D-2743 R2 PT TO FEED LINE #1 IMP #4/MEOH RINSES

Lab Sample ID: 140-17809-10

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		103000	103000	ug/Sample		01/07/20 15:09	01/08/20 14:52	100
HFPO dimer, methyl ester as HFPO-DAF	ND		33700	33700	ug/Sample		01/07/20 15:09	01/08/20 14:52	100
2-MTP as HFPO	**1030000**		30500	30500	ug/Sample		01/07/20 15:09	01/08/20 14:52	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		34900	34900	ug/Sample		01/07/20 15:09	01/08/20 14:52	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/08/20 14:52*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/08/20 14:52*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/08/20 14:52*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/08/20 14:52*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**5220**		70.5	14.1	ug/Sample		01/09/20 09:30	01/13/20 11:25	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*86*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:25*	*10*

Client Sample ID: D-2744 R2 PT TO FEED LINE #1 IMP #5/MEOH RINSES

Lab Sample ID: 140-17809-11

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Matrix: Air

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		98900	98900	ug/Sample		01/07/20 15:09	01/08/20 14:28	100
HFPO dimer, methyl ester as HFPO-DAF	ND		32500	32500	ug/Sample		01/07/20 15:09	01/08/20 14:28	100
2-MTP as HFPO	**926000**		29400	29400	ug/Sample		01/07/20 15:09	01/08/20 14:28	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		33700	33700	ug/Sample		01/07/20 15:09	01/08/20 14:28	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/08/20 14:28*	*100*
4-Bromofluorobenzene (Surr)	*97*		*57 - 152*	*01/07/20 15:09*	*01/08/20 14:28*	*100*
Dibromofluoromethane (Surr)	*90*		*62 - 134*	*01/07/20 15:09*	*01/08/20 14:28*	*100*
Toluene-d8 (Surr)	*99*		*71 - 139*	*01/07/20 15:09*	*01/08/20 14:28*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**2740**		68.1	13.6	ug/Sample		01/09/20 09:30	01/13/20 11:32	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*89*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:32*	*10*

Client Sample ID: D-2745 R2 PT TO FEED LINE #1 IMP #6/MEOH RINSES

Lab Sample ID: 140-17809-12

Date Collected: 01/04/20 00:00
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Matrix: Air

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		87900	87900	ug/Sample		01/07/20 15:09	01/08/20 14:03	100
HFPO dimer, methyl ester as HFPO-DAF	ND		29000	29000	ug/Sample		01/07/20 15:09	01/08/20 14:03	100
2-MTP as HFPO	**871000**		26200	26200	ug/Sample		01/07/20 15:09	01/08/20 14:03	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		30000	30000	ug/Sample		01/07/20 15:09	01/08/20 14:03	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 160*	*01/07/20 15:09*	*01/08/20 14:03*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/08/20 14:03*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/08/20 14:03*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/08/20 14:03*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**1030**		6.07	1.21	ug/Sample		01/09/20 09:30	01/13/20 11:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*79*		*50 - 200*	*01/09/20 09:30*	*01/13/20 11:36*	*1*

Client Sample ID: D-2746 R3 PT TO FEED LINE #1 IMP #1/MEOH RINSES

Lab Sample ID: 140-17809-13

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	26400000		967000	967000	ug/Sample		01/07/20 15:09	01/08/20 20:04	100
HFPO dimer, methyl ester as HFPO-DAF	1010000		318000	318000	ug/Sample		01/07/20 15:09	01/08/20 20:04	100
2-MTP as HFPO	8420000		288000	288000	ug/Sample		01/07/20 15:09	01/08/20 20:04	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	534000		330000	330000	ug/Sample		01/07/20 15:09	01/08/20 20:04	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 160*	*01/07/20 15:09*	*01/08/20 20:04*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/08/20 20:04*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/08/20 20:04*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/08/20 20:04*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	90800		1320	264	ug/Sample		01/09/20 09:30	01/13/20 11:44	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*72*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:44*	*50*

Client Sample ID: D-2747 R3 PT TO FEED LINE #1 IMP #2/MEOH RINSES

Lab Sample ID: 140-17809-14

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	732000		21800	21800	ug/Sample		01/07/20 15:09	01/10/20 14:16	100
HFPO dimer, methyl ester as HFPO-DAF	52600		7190	7190	ug/Sample		01/07/20 15:09	01/10/20 14:16	100
2-MTP as HFPO	262000		6510	6510	ug/Sample		01/07/20 15:09	01/10/20 14:16	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	36300		7450	7450	ug/Sample		01/07/20 15:09	01/10/20 14:16	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/10/20 14:16*	*100*
4-Bromofluorobenzene (Surr)	*95*		*57 - 152*	*01/07/20 15:09*	*01/10/20 14:16*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 14:16*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 14:16*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	14500		120	23.9	ug/Sample		01/09/20 09:30	01/13/20 11:48	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*87*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:48*	*10*

Client Sample ID: D-2748 R3 PT TO FEED LINE #1 IMP #3/MEOH RINSES

Lab Sample ID: 140-17809-15

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	122000		21500	21500	ug/Sample		01/07/20 15:09	01/10/20 14:40	100
HFPO dimer, methyl ester as HFPO-DAF	18700		7090	7090	ug/Sample		01/07/20 15:09	01/10/20 14:40	100
2-MTP as HFPO	260000		6420	6420	ug/Sample		01/07/20 15:09	01/10/20 14:40	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	11200		7350	7350	ug/Sample		01/07/20 15:09	01/10/20 14:40	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 160*	*01/07/20 15:09*	*01/10/20 14:40*	*100*
4-Bromofluorobenzene (Surr)	*94*		*57 - 152*	*01/07/20 15:09*	*01/10/20 14:40*	*100*
Dibromofluoromethane (Surr)	*90*		*62 - 134*	*01/07/20 15:09*	*01/10/20 14:40*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/10/20 14:40*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	10100		147	29.4	ug/Sample		01/09/20 09:30	01/13/20 11:52	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*79*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:52*	*50*

Client Sample ID: D-2749 R3 PT TO FEED LINE #1 IMP #4/MEOH RINSES

Lab Sample ID: 140-17809-16

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	32200		22700	22700	ug/Sample		01/07/20 15:09	01/10/20 15:05	100
HFPO dimer, methyl ester as HFPO-DAF	13400		7480	7480	ug/Sample		01/07/20 15:09	01/10/20 15:05	100
2-MTP as HFPO	271000		6770	6770	ug/Sample		01/07/20 15:09	01/10/20 15:05	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		7750	7750	ug/Sample		01/07/20 15:09	01/10/20 15:05	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/10/20 15:05*	*100*
4-Bromofluorobenzene (Surr)	*93*		*57 - 152*	*01/07/20 15:09*	*01/10/20 15:05*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 15:05*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/10/20 15:05*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	9170		155	31.0	ug/Sample		01/09/20 09:30	01/13/20 11:56	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*101*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 11:56*	*50*

Client Sample ID: D-2750 R3 PT TO FEED LINE #1 IMP #5/MEOH RINSES

Lab Sample ID: 140-17809-17

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		23300	23300	ug/Sample		01/07/20 15:09	01/10/20 15:32	100
HFPO dimer, methyl ester as HFPO-DAF	**8680**		7660	7660	ug/Sample		01/07/20 15:09	01/10/20 15:32	100
2-MTP as HFPO	**325000**		6930	6930	ug/Sample		01/07/20 15:09	01/10/20 15:32	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		7940	7940	ug/Sample		01/07/20 15:09	01/10/20 15:32	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 160*	*01/07/20 15:09*	*01/10/20 15:32*	*100*
4-Bromofluorobenzene (Surr)	*94*		*57 - 152*	*01/07/20 15:09*	*01/10/20 15:32*	*100*
Dibromofluoromethane (Surr)	*92*		*62 - 134*	*01/07/20 15:09*	*01/10/20 15:32*	*100*
Toluene-d8 (Surr)	*98*		*71 - 139*	*01/07/20 15:09*	*01/10/20 15:32*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**7750**		159	31.8	ug/Sample		01/09/20 09:30	01/13/20 12:00	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*86*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 12:00*	*50*

Client Sample ID: D-2751 R3 PT TO FEED LINE #1 IMP #6/MEOH RINSES

Lab Sample ID: 140-17809-18

Date Collected: 01/04/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		24700	24700	ug/Sample		01/07/20 15:09	01/10/20 15:57	100
HFPO dimer, methyl ester as HFPO-DAF	ND		8140	8140	ug/Sample		01/07/20 15:09	01/10/20 15:57	100
2-MTP as HFPO	**417000**		7360	7360	ug/Sample		01/07/20 15:09	01/10/20 15:57	100
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		8430	8430	ug/Sample		01/07/20 15:09	01/10/20 15:57	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*70 - 160*	*01/07/20 15:09*	*01/10/20 15:57*	*100*
4-Bromofluorobenzene (Surr)	*92*		*57 - 152*	*01/07/20 15:09*	*01/10/20 15:57*	*100*
Dibromofluoromethane (Surr)	*93*		*62 - 134*	*01/07/20 15:09*	*01/10/20 15:57*	*100*
Toluene-d8 (Surr)	*97*		*71 - 139*	*01/07/20 15:09*	*01/10/20 15:57*	*100*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**4340**		33.7	6.74	ug/Sample		01/09/20 09:30	01/13/20 12:04	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*84*	*D*	*50 - 200*	*01/09/20 09:30*	*01/13/20 12:04*	*10*

Default Detection Limits

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Inlet - MM18

Job ID: 140-17809-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Prep: MeOH Prep

Analyte	RL	MDL	Units
2-MTP as HFPO	2.50	2.50	ug/Sample
Carbonyl Difluoride	10.0	10.0	ug/Sample
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	2.50	2.50	ug/Sample
HFPO dimer, methyl ester as HFPO-DAF	2.50	2.50	ug/Sample

Method: 8321A - PFOA and PFOS

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.100	0.0200	ug/Sample

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ANALYTICAL REPORT

Job Number: 140-17808-1

Job Description: TO Pre-Test Inlet - MM18 QC Samples

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
3/12/2020 12:48 PM

Courtney M Adkins, Project Manager II
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03/12/2020
Revision: 1

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Definitions/Glossary

Client: The Chemours Company FC, LLC
Job ID: 140-17808-1
Project/Site: TO Pre-Test Inlet - MM18 QC Samples

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17808-1
Project/Site: TO Pre-Test Inlet - MM18 QC Samples

Method	Method Description	Protocol	Laboratory
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL KNX
8321A	PFOA and PFOS	SW846	TAL DEN
MeOH Prep	Methanol Impinger Preparation	None	TAL KNX
None	Leaching Procedure	TAL SOP	TAL DEN

Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL SOP = TestAmerica Laboratories, Standard Operating Procedure

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

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

Sample Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17808-1
Project/Site: TO Pre-Test Inlet - MM18 QC Samples

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17808-1	P-2290 QC PT TO FEED LINES-IMP #1/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-2	P-2291 QC PT TO FEED LINES-IMP #2/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-3	P-2292 QC PT TO FEED LINES-IMP #3/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-4	P-2293 QC PT TO FEED LINES-IMP #4/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-5	P-2294 QC PT TO FEED LINES-IMP #5/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-6	P-2295 QC PT TO FEED LINES-IMP #6/MEOH RINSES BT	Air	01/03/20 00:00	01/06/20 07:30	
140-17808-7	P-2296 QC PT TO MEOH RB	Air	01/03/20 00:00	01/06/20 07:30	

Job Narrative
140-17808-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM in good condition and properly preserved. The temperature of the cooler at receipt was 0.9º 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.

GC/MS VOA

Impinger Sample Preparation and Analysis: Impinger samples were analyzed for the volatile organic target analytes by purge and trap GCMS using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MS-0015, based on the following method:

· SW-846 8260B, “Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)”

Each sample is prepared by adding a known amount of sample to the purge water in a purge and trap vessel and spiking with internal standards, surrogates, and matrix spike analytes (as needed). Volatile compounds are introduced into the gas chromatograph by the purge and trap method. The components are separated using the chromatograph and detected using a mass spectrometer, which provides both qualitative and quantitative information.

Impinger sample results were calculated using the following equation:

Concentration, µg/sample = (C × DF × W × Vt) / (Va)
Where:
C = On-column concentration, µg/L
DF = Dilution factor
W = Volume of water purged, L
Vt = Methanol extract final volume, µL
Va = Volume of extract analyzed, µL

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

QC Association Summary

Client: The Chemours Company FC, LLC
Job ID: 140-17808-1
Project/Site: TO Pre-Test Inlet - MM18 QC Samples

GC/MS VOA

Analysis Batch: 36521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17808-1	P-2290 QC PT TO FEED LINES-IMP #1/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-2	P-2291 QC PT TO FEED LINES-IMP #2/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-3	P-2292 QC PT TO FEED LINES-IMP #3/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-4	P-2293 QC PT TO FEED LINES-IMP #4/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-5	P-2294 QC PT TO FEED LINES-IMP #5/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-6	P-2295 QC PT TO FEED LINES-IMP #6/MEOH F	Total/NA	Air	8260B SIM	36522
140-17808-7	P-2296 QC PT TO MEOH RB	Total/NA	Air	8260B SIM	36522
MB 140-36522/2-A	Method Blank	Total/NA	Air	8260B SIM	36522
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	8260B SIM	36522

Prep Batch: 36522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17808-1	P-2290 QC PT TO FEED LINES-IMP #1/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-2	P-2291 QC PT TO FEED LINES-IMP #2/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-3	P-2292 QC PT TO FEED LINES-IMP #3/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-4	P-2293 QC PT TO FEED LINES-IMP #4/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-5	P-2294 QC PT TO FEED LINES-IMP #5/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-6	P-2295 QC PT TO FEED LINES-IMP #6/MEOH F	Total/NA	Air	MeOH Prep	
140-17808-7	P-2296 QC PT TO MEOH RB	Total/NA	Air	MeOH Prep	
MB 140-36522/2-A	Method Blank	Total/NA	Air	MeOH Prep	
LCS 140-36522/1-A	Lab Control Sample	Total/NA	Air	MeOH Prep	

LCMS

Analysis Batch: 481729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
DLCK 280-481729/13	Lab Control Sample	Total/NA	Air	8321A	

Prep Batch: 482465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17808-1	P-2290 QC PT TO FEED LINES-IMP #1/MEOH F	Total/NA	Air	None	
140-17808-2	P-2291 QC PT TO FEED LINES-IMP #2/MEOH F	Total/NA	Air	None	
140-17808-3	P-2292 QC PT TO FEED LINES-IMP #3/MEOH F	Total/NA	Air	None	
140-17808-4	P-2293 QC PT TO FEED LINES-IMP #4/MEOH F	Total/NA	Air	None	
140-17808-5	P-2294 QC PT TO FEED LINES-IMP #5/MEOH F	Total/NA	Air	None	
140-17808-6	P-2295 QC PT TO FEED LINES-IMP #6/MEOH F	Total/NA	Air	None	
140-17808-7	P-2296 QC PT TO MEOH RB	Total/NA	Air	None	
MB 280-482465/1-A	Method Blank	Total/NA	Air	None	
LCS 280-482465/2-A	Lab Control Sample	Total/NA	Air	None	
LCSD 280-482465/3-A	Lab Control Sample Dup	Total/NA	Air	None	

Analysis Batch: 482801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17808-1	P-2290 QC PT TO FEED LINES-IMP #1/MEOH F	Total/NA	Air	8321A	482465
140-17808-2	P-2291 QC PT TO FEED LINES-IMP #2/MEOH F	Total/NA	Air	8321A	482465
140-17808-3	P-2292 QC PT TO FEED LINES-IMP #3/MEOH F	Total/NA	Air	8321A	482465
140-17808-4	P-2293 QC PT TO FEED LINES-IMP #4/MEOH F	Total/NA	Air	8321A	482465
140-17808-5	P-2294 QC PT TO FEED LINES-IMP #5/MEOH F	Total/NA	Air	8321A	482465
140-17808-6	P-2295 QC PT TO FEED LINES-IMP #6/MEOH F	Total/NA	Air	8321A	482465
140-17808-7	P-2296 QC PT TO MEOH RB	Total/NA	Air	8321A	482465
MB 280-482465/1-A	Method Blank	Total/NA	Air	8321A	482465

LCMS (Continued)

Analysis Batch: 482801 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 280-482465/2-A	Lab Control Sample	Total/NA	Air	8321A	482465
LCSD 280-482465/3-A	Lab Control Sample Dup	Total/NA	Air	8321A	482465

Client Sample ID: P-2290 QC PT TO FEED LINES-IMP #1/MEOH RINSES BT

Lab Sample ID: 140-17808-1

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**28.5**		1.66	1.66	ug/Sample		01/06/20 11:35	01/06/20 22:04	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.544	0.544	ug/Sample		01/06/20 11:35	01/06/20 22:04	1
2-MTP as HFPO	**5.12**		0.0246	0.0246	ug/Sample		01/06/20 11:35	01/06/20 22:04	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0282	0.0282	ug/Sample		01/06/20 11:35	01/06/20 22:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:04*	*1*
Dibromofluoromethane (Surr)	*96*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:04*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	**0.0126**	**J**	0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*113*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:03*	*1*

Client Sample ID: P-2291 QC PT TO FEED LINES-IMP #2/MEOH RINSES BT

Lab Sample ID: 140-17808-2

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	**2.93**		1.65	1.65	ug/Sample		01/06/20 11:35	01/06/20 22:31	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.542	0.542	ug/Sample		01/06/20 11:35	01/06/20 22:31	1
2-MTP as HFPO	**3.24**		0.0245	0.0245	ug/Sample		01/06/20 11:35	01/06/20 22:31	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0281	0.0281	ug/Sample		01/06/20 11:35	01/06/20 22:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:31*	*1*
Dibromofluoromethane (Surr)	*86*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:31*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*116*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:07*	*1*

Client Sample ID: P-2292 QC PT TO FEED LINES-IMP #3/MEOH RINSES BT

Lab Sample ID: 140-17808-3

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.67	1.67	ug/Sample		01/06/20 11:35	01/06/20 22:56	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.550	0.550	ug/Sample		01/06/20 11:35	01/06/20 22:56	1
2-MTP as HFPO	**4.18**		0.0249	0.0249	ug/Sample		01/06/20 11:35	01/06/20 22:56	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0285	0.0285	ug/Sample		01/06/20 11:35	01/06/20 22:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:56*	*1*
Dibromofluoromethane (Surr)	*88*		*50 - 150*	*01/06/20 11:35*	*01/06/20 22:56*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*116*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:11*	*1*

Client Sample ID: P-2293 QC PT TO FEED LINES-IMP #4/MEOH RINSES BT

Lab Sample ID: 140-17808-4

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.83	1.83	ug/Sample		01/06/20 11:35	01/06/20 23:20	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.602	0.602	ug/Sample		01/06/20 11:35	01/06/20 23:20	1
2-MTP as HFPO	**5.80**		0.0272	0.0272	ug/Sample		01/06/20 11:35	01/06/20 23:20	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0312	0.0312	ug/Sample		01/06/20 11:35	01/06/20 23:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/06/20 23:20*	*1*
Dibromofluoromethane (Surr)	*84*		*50 - 150*	*01/06/20 11:35*	*01/06/20 23:20*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*113*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:15*	*1*

Client Sample ID: P-2294 QC PT TO FEED LINES-IMP #5/MEOH RINSES BT

Lab Sample ID: 140-17808-5

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.74	1.74	ug/Sample		01/06/20 11:35	01/06/20 23:45	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.571	0.571	ug/Sample		01/06/20 11:35	01/06/20 23:45	1
2-MTP as HFPO	**4.91**		0.0259	0.0259	ug/Sample		01/06/20 11:35	01/06/20 23:45	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0296	0.0296	ug/Sample		01/06/20 11:35	01/06/20 23:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*50 - 150*	*01/06/20 11:35*	*01/06/20 23:45*	*1*
Dibromofluoromethane (Surr)	*85*		*50 - 150*	*01/06/20 11:35*	*01/06/20 23:45*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*115*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:18*	*1*

Client Sample ID: P-2295 QC PT TO FEED LINES-IMP #6/MEOH RINSES BT

Lab Sample ID: 140-17808-6

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		1.71	1.71	ug/Sample		01/06/20 11:35	01/07/20 00:10	1
HFPO dimer, methyl ester as HFPO-DAF	ND		0.562	0.562	ug/Sample		01/06/20 11:35	01/07/20 00:10	1
2-MTP as HFPO	**4.39**		0.0254	0.0254	ug/Sample		01/06/20 11:35	01/07/20 00:10	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0291	0.0291	ug/Sample		01/06/20 11:35	01/07/20 00:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:10*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/07/20 00:10*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*115*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:22*	*1*

Client Sample ID: P-2296 QC PT TO MEOH RB
Lab Sample ID: 140-17808-7

Date Collected: 01/03/20 00:00
Matrix: Air
Date Received: 01/06/20 07:30
Sample Container: Plastic 250ml - unpreserved

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		3.14	3.14	ug/Sample		01/06/20 11:35	01/06/20 19:12	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.03	1.03	ug/Sample		01/06/20 11:35	01/06/20 19:12	1
2-MTP as HFPO	ND		0.0468	0.0468	ug/Sample		01/06/20 11:35	01/06/20 19:12	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		0.0536	0.0536	ug/Sample		01/06/20 11:35	01/06/20 19:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*50 - 150*	*01/06/20 11:35*	*01/06/20 19:12*	*1*
Dibromofluoromethane (Surr)	*82*		*50 - 150*	*01/06/20 11:35*	*01/06/20 19:12*	*1*

Method: 8321A - PFOA and PFOS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		0.0250	0.00500	ug/Sample		01/09/20 09:30	01/13/20 10:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*115*		*50 - 200*	*01/09/20 09:30*	*01/13/20 10:26*	*1*

Default Detection Limits

Client: The Chemours Company FC, LLC
Job ID: 140-17808-1
Project/Site: TO Pre-Test Inlet - MM18 QC Samples

Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Prep: MeOH Prep

Analyte	RL	MDL	Units
2-MTP as HFPO	0.00250	0.00250	ug/Sample
Carbonyl Difluoride	0.200	0.200	ug/Sample
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	0.00250	0.00250	ug/Sample
HFPO dimer, methyl ester as HFPO-DAF	0.0500	0.0500	ug/Sample

Method: 8321A - PFOA and PFOS

Prep: None

Analyte	RL	MDL	Units
HFPO-DA	0.100	0.0200	ug/Sample

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ANALYTICAL REPORT

Job Number: 140-17811-1

Job Description: TO Pre-Test Process Samples

Contract Number: LBIO-67048

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

Attention: Michael Aucoin

Approved for release.
Courtney M Adkins
Project Manager II
3/12/2020 1:33 PM

Courtney M Adkins, Project Manager II
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
03/12/2020
Revision: 1

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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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Method Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Process Samples

Job ID: 140-17811-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL KNX
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC
5030B	Purge and Trap	SW846	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Process Samples

Job ID: 140-17811-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-17811-1	Q-2331 R1 PT TO MAKEUP WATER	Water	01/03/20 00:00	01/06/20 07:30	
140-17811-3	Q-2333 R1 PT TO MAKEUP WATER	Waste	01/03/20 00:00	01/06/20 07:30	
140-17811-4	Q-2334 R1 PT TO HF ACID STREAM	Water	01/03/20 00:00	01/06/20 07:30	
140-17811-6	Q-2336 R1 PT TO HF ACID STREAM	Waste	01/03/20 00:00	01/06/20 07:30	
140-17811-7	Q-2340 R1 PT TO STAGE 4 PURGE	Water	01/03/20 00:00	01/06/20 07:30	
140-17811-9	Q-2342 R1 PT TO STAGE 4 PURGE	Waste	01/03/20 00:00	01/06/20 07:30	
140-17811-10	Q-2343 R2 PT TO MAKEUP WATER	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-12	Q-2345 R2 PT TO MAKEUP WATER	Waste	01/04/20 00:00	01/06/20 07:30	
140-17811-13	Q-2346 R2 PT TO HF ACID STREAM	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-15	Q-2348 R2 PT TO HF ACID STREAM	Waste	01/04/20 00:00	01/06/20 07:30	
140-17811-16	Q-2352 R2 PT TO STAGE 4 PURGE	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-18	Q-2354 R2 PT TO STAGE 4 PURGE	Waste	01/04/20 00:00	01/06/20 07:30	
140-17811-19	Q-2355 R3 PT TO MAKEUP WATER	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-21	Q-2357 R3 PT TO MAKEUP WATER	Waste	01/04/20 00:00	01/06/20 07:30	
140-17811-22	Q-2358 R3 PT TO HF ACID STREAM	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-24	Q-2360 R3 PT TO HF ACID STREAM	Waste	01/04/20 00:00	01/06/20 07:30	
140-17811-25	Q-2364 R3 PT TO STAGE 4 PURGE	Water	01/04/20 00:00	01/06/20 07:30	
140-17811-27	Q-2366 R3 PT TO STAGE 4 PURGE	Waste	01/04/20 00:00	01/06/20 07:30	

Job Narrative
140-17811-1

Sample Receipt

The samples were received on January 6, 2020 at 7:30 AM in good condition and properly preserved. The temperatures of the 2 coolers at receipt time were 0.9º C and 1.3º 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.

GC/MS VOA

Waste Sample Preparation and Analysis: Waste sample was analyzed for the volatile organic target analytes by purge and trap GCMS using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MS-0015, based on the following method:

· SW-846 8260B, “Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)”

Each sample is prepared by adding a known amount of sample to methanol. A portion of the methanol extract is added to the purge water and spiking with surrogates and matrix spike analytes (as needed). Volatile compounds are introduced into the gas chromatograph by the purge and trap method. The components are separated using the chromatograph and detected using a mass spectrometer, which provides both qualitative and quantitative information.

Waste sample results were calculated using the following equation:

Concentration ug/g or mg/kg = (C × DF × W × Vt) / (Va × Ws)

Where:
C = On-column concentration, µg/L
DF = Dilution factor
W = Volume of water purged, L
Vt = Methanol extract final volume, µL
Va = Volume of extract analyzed, µL
Ws = Weight of sample extracted, g

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

LCMS

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

QC Association Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Process Samples

Job ID: 140-17811-1

GC/MS VOA

Prep Batch: 36716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-3	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	5030B	
140-17811-6	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	5030B	
140-17811-9	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	5030B	
140-17811-12	Q-2345 R2 PT TO MAKEUP WATER	Total/NA	Waste	5030B	
140-17811-15	Q-2348 R2 PT TO HF ACID STREAM	Total/NA	Waste	5030B	
140-17811-18	Q-2354 R2 PT TO STAGE 4 PURGE	Total/NA	Waste	5030B	
140-17811-21	Q-2357 R3 PT TO MAKEUP WATER	Total/NA	Waste	5030B	
140-17811-24	Q-2360 R3 PT TO HF ACID STREAM	Total/NA	Waste	5030B	
140-17811-27	Q-2366 R3 PT TO STAGE 4 PURGE	Total/NA	Waste	5030B	
MB 140-36716/2-A	Method Blank	Total/NA	Waste	5030B	
LCS 140-36716/1-A	Lab Control Sample	Total/NA	Waste	5030B	
140-17811-3 MS	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	5030B	
140-17811-3 MSD	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	5030B	
140-17811-6 MS	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	5030B	
140-17811-6 MSD	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	5030B	
140-17811-9 MS	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	5030B	
140-17811-9 MSD	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	5030B	

Analysis Batch: 36729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-3	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	8260B	36716
140-17811-6	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	8260B	36716
140-17811-9	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	8260B	36716
140-17811-12	Q-2345 R2 PT TO MAKEUP WATER	Total/NA	Waste	8260B	36716
140-17811-15	Q-2348 R2 PT TO HF ACID STREAM	Total/NA	Waste	8260B	36716
140-17811-18	Q-2354 R2 PT TO STAGE 4 PURGE	Total/NA	Waste	8260B	36716
140-17811-21	Q-2357 R3 PT TO MAKEUP WATER	Total/NA	Waste	8260B	36716
140-17811-24	Q-2360 R3 PT TO HF ACID STREAM	Total/NA	Waste	8260B	36716
140-17811-27	Q-2366 R3 PT TO STAGE 4 PURGE	Total/NA	Waste	8260B	36716
MB 140-36716/2-A	Method Blank	Total/NA	Waste	8260B	36716
LCS 140-36716/1-A	Lab Control Sample	Total/NA	Waste	8260B	36716
140-17811-3 MS	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	8260B	36716
140-17811-3 MSD	Q-2333 R1 PT TO MAKEUP WATER	Total/NA	Waste	8260B	36716
140-17811-6 MS	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	8260B	36716
140-17811-6 MSD	Q-2336 R1 PT TO HF ACID STREAM	Total/NA	Waste	8260B	36716
140-17811-9 MS	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	8260B	36716
140-17811-9 MSD	Q-2342 R1 PT TO STAGE 4 PURGE	Total/NA	Waste	8260B	36716

LCMS

Prep Batch: 350707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-4	Q-2334 R1 PT TO HF ACID STREAM	Total/NA	Water	3535	
140-17811-13	Q-2346 R2 PT TO HF ACID STREAM	Total/NA	Water	3535	
140-17811-22	Q-2358 R3 PT TO HF ACID STREAM	Total/NA	Water	3535	
MB 320-350707/5-A	Method Blank	Total/NA	Water	3535	
LCS 320-350707/6-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-350707/7-A	Lab Control Sample Dup	Total/NA	Water	3535	
140-17811-4 DU	Q-2334 R1 PT TO HF ACID STREAM	Total/NA	Water	3535	

QC Association Summary

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Process Samples

Job ID: 140-17811-1

LCMS

Prep Batch: 351312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-1	Q-2331 R1 PT TO MAKEUP WATER	Total/NA	Water	3535	
140-17811-7 - DL	Q-2340 R1 PT TO STAGE 4 PURGE	Total/NA	Water	3535	
140-17811-10	Q-2343 R2 PT TO MAKEUP WATER	Total/NA	Water	3535	
140-17811-16	Q-2352 R2 PT TO STAGE 4 PURGE	Total/NA	Water	3535	
140-17811-19	Q-2355 R3 PT TO MAKEUP WATER	Total/NA	Water	3535	
140-17811-25	Q-2364 R3 PT TO STAGE 4 PURGE	Total/NA	Water	3535	
MB 320-351312/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-351312/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-351312/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
140-17811-1 DU	Q-2331 R1 PT TO MAKEUP WATER	Total/NA	Water	3535	
140-17811-7 DU - DL	Q-2340 R1 PT TO STAGE 4 PURGE	Total/NA	Water	3535	

Analysis Batch: 351640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-351312/1-A	Method Blank	Total/NA	Water	537 (modified)	351312
LCS 320-351312/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	351312
LCSD 320-351312/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	351312

Analysis Batch: 351774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-1	Q-2331 R1 PT TO MAKEUP WATER	Total/NA	Water	537 (modified)	351312
140-17811-7 - DL	Q-2340 R1 PT TO STAGE 4 PURGE	Total/NA	Water	537 (modified)	351312
140-17811-10	Q-2343 R2 PT TO MAKEUP WATER	Total/NA	Water	537 (modified)	351312
140-17811-16	Q-2352 R2 PT TO STAGE 4 PURGE	Total/NA	Water	537 (modified)	351312
140-17811-19	Q-2355 R3 PT TO MAKEUP WATER	Total/NA	Water	537 (modified)	351312
140-17811-25	Q-2364 R3 PT TO STAGE 4 PURGE	Total/NA	Water	537 (modified)	351312
140-17811-1 DU	Q-2331 R1 PT TO MAKEUP WATER	Total/NA	Water	537 (modified)	351312
140-17811-7 DU - DL	Q-2340 R1 PT TO STAGE 4 PURGE	Total/NA	Water	537 (modified)	351312

Analysis Batch: 351914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-13	Q-2346 R2 PT TO HF ACID STREAM	Total/NA	Water	537 (modified)	350707
140-17811-22	Q-2358 R3 PT TO HF ACID STREAM	Total/NA	Water	537 (modified)	350707
MB 320-350707/5-A	Method Blank	Total/NA	Water	537 (modified)	350707
LCS 320-350707/6-A	Lab Control Sample	Total/NA	Water	537 (modified)	350707
LCSD 320-350707/7-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	350707

Analysis Batch: 352040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-17811-4	Q-2334 R1 PT TO HF ACID STREAM	Total/NA	Water	537 (modified)	350707
140-17811-4 DU	Q-2334 R1 PT TO HF ACID STREAM	Total/NA	Water	537 (modified)	350707

Client Sample ID: Q-2331 R1 PT TO MAKEUP WATER

Lab Sample ID: 140-17811-1
Date Collected: 01/03/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	51		3.8	1.4	ng/L		01/16/20 17:56	01/20/20 08:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*97*		*25 - 150*	*01/16/20 17:56*	*01/20/20 08:32*	*1*

Client Sample ID: Q-2333 R1 PT TO MAKEUP WATER

Lab Sample ID: 140-17811-3
Date Collected: 01/03/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.34	4.34	mg/Kg		01/14/20 10:22	01/14/20 16:55	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.37	1.37	mg/Kg		01/14/20 10:22	01/14/20 16:55	1
2-MTP as HFPO	ND		1.24	1.24	mg/Kg		01/14/20 10:22	01/14/20 16:55	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.42	1.42	mg/Kg		01/14/20 10:22	01/14/20 16:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*72 - 144*	*01/14/20 10:22*	*01/14/20 16:55*	*1*
4-Bromofluorobenzene (Surr)	*94*		*62 - 144*	*01/14/20 10:22*	*01/14/20 16:55*	*1*
Dibromofluoromethane (Surr)	*95*		*72 - 138*	*01/14/20 10:22*	*01/14/20 16:55*	*1*
Toluene-d8 (Surr)	*96*		*75 - 137*	*01/14/20 10:22*	*01/14/20 16:55*	*1*

Client Sample ID: Q-2334 R1 PT TO HF ACID STREAM

Lab Sample ID: 140-17811-4
Date Collected: 01/03/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	26000		1300	470	ng/L		01/14/20 12:35	01/21/20 11:22	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*69*		*25 - 150*	*01/14/20 12:35*	*01/21/20 11:22*	*10*

Client Sample ID: Q-2336 R1 PT TO HF ACID STREAM

Lab Sample ID: 140-17811-6
Date Collected: 01/03/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.58	4.58	mg/Kg		01/14/20 10:22	01/14/20 17:19	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.45	1.45	mg/Kg		01/14/20 10:22	01/14/20 17:19	1
2-MTP as HFPO	ND		1.31	1.31	mg/Kg		01/14/20 10:22	01/14/20 17:19	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.50	1.50	mg/Kg		01/14/20 10:22	01/14/20 17:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*72 - 144*	*01/14/20 10:22*	*01/14/20 17:19*	*1*
4-Bromofluorobenzene (Surr)	*95*		*62 - 144*	*01/14/20 10:22*	*01/14/20 17:19*	*1*
Dibromofluoromethane (Surr)	*95*		*72 - 138*	*01/14/20 10:22*	*01/14/20 17:19*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 17:19*	*1*

Client Sample ID: Q-2340 R1 PT TO STAGE 4 PURGE

Lab Sample ID: 140-17811-7

Date Collected: 01/03/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	140		7.4	2.8	ng/L		01/16/20 17:56	01/20/20 09:33	2

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*109*		*25 - 150*	*01/16/20 17:56*	*01/20/20 09:33*	*2*

Client Sample ID: Q-2342 R1 PT TO STAGE 4 PURGE

Lab Sample ID: 140-17811-9

Date Collected: 01/03/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.41	4.41	mg/Kg		01/14/20 10:22	01/14/20 17:44	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.40	1.40	mg/Kg		01/14/20 10:22	01/14/20 17:44	1
2-MTP as HFPO	ND		1.27	1.27	mg/Kg		01/14/20 10:22	01/14/20 17:44	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.45	1.45	mg/Kg		01/14/20 10:22	01/14/20 17:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*72 - 144*	*01/14/20 10:22*	*01/14/20 17:44*	*1*
4-Bromofluorobenzene (Surr)	*95*		*62 - 144*	*01/14/20 10:22*	*01/14/20 17:44*	*1*
Dibromofluoromethane (Surr)	*95*		*72 - 138*	*01/14/20 10:22*	*01/14/20 17:44*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 17:44*	*1*

Client Sample ID: Q-2343 R2 PT TO MAKEUP WATER

Lab Sample ID: 140-17811-10

Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	59		3.7	1.4	ng/L		01/16/20 17:56	01/20/20 08:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*114*		*25 - 150*	*01/16/20 17:56*	*01/20/20 08:52*	*1*

Client Sample ID: Q-2345 R2 PT TO MAKEUP WATER

Lab Sample ID: 140-17811-12

Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.47	4.47	mg/Kg		01/14/20 10:22	01/14/20 18:08	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.41	1.41	mg/Kg		01/14/20 10:22	01/14/20 18:08	1
2-MTP as HFPO	ND		1.28	1.28	mg/Kg		01/14/20 10:22	01/14/20 18:08	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.46	1.46	mg/Kg		01/14/20 10:22	01/14/20 18:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*72 - 144*	*01/14/20 10:22*	*01/14/20 18:08*	*1*
4-Bromofluorobenzene (Surr)	*93*		*62 - 144*	*01/14/20 10:22*	*01/14/20 18:08*	*1*
Dibromofluoromethane (Surr)	*94*		*72 - 138*	*01/14/20 10:22*	*01/14/20 18:08*	*1*
Toluene-d8 (Surr)	*96*		*75 - 137*	*01/14/20 10:22*	*01/14/20 18:08*	*1*

Client Sample ID: Q-2346 R2 PT TO HF ACID STREAM

Lab Sample ID: 140-17811-13
Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	140		140	54	ng/L		01/14/20 12:35	01/20/20 19:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*93*		*25 - 150*	*01/14/20 12:35*	*01/20/20 19:02*	*1*

Client Sample ID: Q-2348 R2 PT TO HF ACID STREAM

Lab Sample ID: 140-17811-15
Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.31	4.31	mg/Kg		01/14/20 10:22	01/14/20 18:33	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.36	1.36	mg/Kg		01/14/20 10:22	01/14/20 18:33	1
2-MTP as HFPO	ND		1.23	1.23	mg/Kg		01/14/20 10:22	01/14/20 18:33	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.41	1.41	mg/Kg		01/14/20 10:22	01/14/20 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*72 - 144*	*01/14/20 10:22*	*01/14/20 18:33*	*1*
4-Bromofluorobenzene (Surr)	*95*		*62 - 144*	*01/14/20 10:22*	*01/14/20 18:33*	*1*
Dibromofluoromethane (Surr)	*95*		*72 - 138*	*01/14/20 10:22*	*01/14/20 18:33*	*1*
Toluene-d8 (Surr)	*96*		*75 - 137*	*01/14/20 10:22*	*01/14/20 18:33*	*1*

Client Sample ID: Q-2352 R2 PT TO STAGE 4 PURGE

Lab Sample ID: 140-17811-16
Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	20		3.6	1.3	ng/L		01/16/20 17:56	01/20/20 09:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*119*		*25 - 150*	*01/16/20 17:56*	*01/20/20 09:02*	*1*

Client Sample ID: Q-2354 R2 PT TO STAGE 4 PURGE

Lab Sample ID: 140-17811-18
Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.34	4.34	mg/Kg		01/14/20 10:22	01/14/20 18:57	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.37	1.37	mg/Kg		01/14/20 10:22	01/14/20 18:57	1
2-MTP as HFPO	ND		1.24	1.24	mg/Kg		01/14/20 10:22	01/14/20 18:57	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.42	1.42	mg/Kg		01/14/20 10:22	01/14/20 18:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*72 - 144*	*01/14/20 10:22*	*01/14/20 18:57*	*1*
4-Bromofluorobenzene (Surr)	*94*		*62 - 144*	*01/14/20 10:22*	*01/14/20 18:57*	*1*
Dibromofluoromethane (Surr)	*94*		*72 - 138*	*01/14/20 10:22*	*01/14/20 18:57*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 18:57*	*1*

Client Sample ID: Q-2355 R3 PT TO MAKEUP WATER
Lab Sample ID: 140-17811-19
Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	24		3.7	1.4	ng/L		01/16/20 17:56	01/20/20 09:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*101*		*25 - 150*	*01/16/20 17:56*	*01/20/20 09:13*	*1*

Client Sample ID: Q-2357 R3 PT TO MAKEUP WATER
Lab Sample ID: 140-17811-21
Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.52	4.52	mg/Kg		01/14/20 10:22	01/14/20 19:22	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.43	1.43	mg/Kg		01/14/20 10:22	01/14/20 19:22	1
2-MTP as HFPO	ND		1.29	1.29	mg/Kg		01/14/20 10:22	01/14/20 19:22	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.48	1.48	mg/Kg		01/14/20 10:22	01/14/20 19:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*72 - 144*	*01/14/20 10:22*	*01/14/20 19:22*	*1*
4-Bromofluorobenzene (Surr)	*94*		*62 - 144*	*01/14/20 10:22*	*01/14/20 19:22*	*1*
Dibromofluoromethane (Surr)	*93*		*72 - 138*	*01/14/20 10:22*	*01/14/20 19:22*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 19:22*	*1*

Client Sample ID: Q-2358 R3 PT TO HF ACID STREAM
Lab Sample ID: 140-17811-22
Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	ND		130	47	ng/L		01/14/20 12:35	01/20/20 19:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*76*		*25 - 150*	*01/14/20 12:35*	*01/20/20 19:12*	*1*

Client Sample ID: Q-2360 R3 PT TO HF ACID STREAM
Lab Sample ID: 140-17811-24
Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.31	4.31	mg/Kg		01/14/20 10:22	01/14/20 19:47	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.36	1.36	mg/Kg		01/14/20 10:22	01/14/20 19:47	1
2-MTP as HFPO	ND		1.23	1.23	mg/Kg		01/14/20 10:22	01/14/20 19:47	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.41	1.41	mg/Kg		01/14/20 10:22	01/14/20 19:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*72 - 144*	*01/14/20 10:22*	*01/14/20 19:47*	*1*
4-Bromofluorobenzene (Surr)	*93*		*62 - 144*	*01/14/20 10:22*	*01/14/20 19:47*	*1*
Dibromofluoromethane (Surr)	*94*		*72 - 138*	*01/14/20 10:22*	*01/14/20 19:47*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 19:47*	*1*

Client Sample ID: Q-2364 R3 PT TO STAGE 4 PURGE
Lab Sample ID: 140-17811-25
Date Collected: 01/04/20 00:00
Matrix: Water
Date Received: 01/06/20 07:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPO-DA	16		3.7	1.4	ng/L		01/16/20 17:56	01/20/20 09:23	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*116*		*25 - 150*	*01/16/20 17:56*	*01/20/20 09:23*	*1*

Client Sample ID: Q-2366 R3 PT TO STAGE 4 PURGE
Lab Sample ID: 140-17811-27
Date Collected: 01/04/20 00:00
Matrix: Waste
Date Received: 01/06/20 07:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonyl Difluoride	ND		4.36	4.36	mg/Kg		01/14/20 10:22	01/14/20 20:11	1
HFPO dimer, methyl ester as HFPO-DAF	ND		1.38	1.38	mg/Kg		01/14/20 10:22	01/14/20 20:11	1
2-MTP as HFPO	ND		1.25	1.25	mg/Kg		01/14/20 10:22	01/14/20 20:11	1
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	ND		1.43	1.43	mg/Kg		01/14/20 10:22	01/14/20 20:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*72 - 144*	*01/14/20 10:22*	*01/14/20 20:11*	*1*
4-Bromofluorobenzene (Surr)	*94*		*62 - 144*	*01/14/20 10:22*	*01/14/20 20:11*	*1*
Dibromofluoromethane (Surr)	*93*		*72 - 138*	*01/14/20 10:22*	*01/14/20 20:11*	*1*
Toluene-d8 (Surr)	*97*		*75 - 137*	*01/14/20 10:22*	*01/14/20 20:11*	*1*

Default Detection Limits

Client: The Chemours Company FC, LLC
Project/Site: TO Pre-Test Process Samples

Job ID: 140-17811-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Prep: 5030B

Analyte	RL	MDL	Units
2-MTP as HFPO	1.20	1.20	mg/Kg
Carbonyl Difluoride	5.00	5.00	mg/Kg
Heptafluoropropyl 1,2,2,2-tetrafluoroethyl ether	1.20	1.20	mg/Kg
HFPO dimer, methyl ester as HFPO-DAF	1.20	1.20	mg/Kg

Method: 537 (modified) - Fluorinated Alkyl Substances

Prep: 3535

Analyte	RL	MDL	Units
HFPO-DA	4.0	1.5	ng/L

Chemours – Fayetteville, NC
Thermal Oxidizer Monomer Waste Gas Feed Line #1 Impinger Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
D - 2734	1	Impinger Contents #1	657.0	597.5	59.5	0.0
D - 2735	1	Impinger Contents #2	628.4	605.8	22.6	1.0
D - 2736	1	Impinger Contents #3	593.3	607.2	-13.9	2.0
D - 2737	1	Impinger Contents #4	611.5	609.6	1.9	3.0
D - 2738	1	Impinger Contents #5	604.4	602.7	1.7	3.0
D - 2739	1	Impinger Contents #6	634.3	633.0	1.3	3.0
				Net Weight Gain (g):	**73.1**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Monomer Waste Gas Feed Line #1 Impinger Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
D - 2740	2	Impinger Contents #1	703.4	604.2	99.2	0.0
D - 2741	2	Impinger Contents #2	615.3	602.9	12.4	0.0
D - 2742	2	Impinger Contents #3	609.1	604.3	4.8	1.0
D - 2743	2	Impinger Contents #4	607.4	603.8	3.6	1.0
D - 2744	2	Impinger Contents #5	603.8	600.8	3.0	1.0
D - 2745	2	Impinger Contents #6	638.4	635.5	2.9	1.0
				Net Weight Gain (g):	**125.9**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Monomer Waste Gas Feed Line #1 Impinger Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
D - 2746	3	Impinger Contents #1	702.0	597.5	104.5	0.0
D - 2747	3	Impinger Contents #2	607.3	603.5	3.8	1.0
D - 2748	3	Impinger Contents #3	598.3	599.0	-0.7	3.0
D - 2749	3	Impinger Contents #4	601.1	600.7	0.4	3.0
D - 2750	3	Impinger Contents #5	600.2	598.3	1.9	3.0
D - 2751	3	Impinger Contents #6	637.8	639.4	-1.6	3.0
				Net Weight Gain (g):	**108.3**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Stack Gas Impinger Samples including Field QC Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
A - 6964	1	Impinger Contents #1	576.3	560.0[3]	16.3	
A - 6965	1	Impinger Contents #2	607.2	604.1[3]	3.1	
A - 6966	1	Impinger Contents #3	600.5	598.7[3]	1.8	
A - 6967	1	Impinger Contents #4	604.5	603.9[3]	0.6	
A - 6968	1	Impinger Contents #5	606.7	605.5	1.2	
A - 6969	1	Impinger Contents #6	610.7	610.3[3]	0.4	
	1	Impinger Contents #7	586.2	606.0	-19.8	
				Net Weight Gain (g):	**3.6**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

(3) *Duct Tape used for labels fell off due to icing. 5 Labels X 0.7 g/Label = 3.5 g.*
3.6 g + 3.5 g = 7.1 g estimated weight gain of sampling train.

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Stack Gas Impinger Samples including Field QC Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
A - 6970	2	Impinger Contents #1	581.4	597.1	-15.7	
A - 6971	2	Impinger Contents #2	622.3	607.7	14.6	
A - 6972	2	Impinger Contents #3	607.3	603.4	3.9	
A - 6973	2	Impinger Contents #4	605.8	604.0	1.8	
A - 6974	2	Impinger Contents #5	603.5	602.4	1.1	
A - 6975	2	Impinger Contents #6	603.2	602.4	0.8	
	2	Impinger Contents #7	603.4	602.6	0.8	
				Net Weight Gain (g):	**7.3**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Stack Gas Impinger Samples including Field QC Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
A - 6976	3	Impinger Contents #1	584.9	596.8	-11.9	
A - 6977	3	Impinger Contents #2	625.6	608.4	17.2	
A - 6978	3	Impinger Contents #3	608.1	604.9	3.2	
A - 6979	3	Impinger Contents #4	604.1	602.4	1.7	
A - 6980	3	Impinger Contents #5	605.5	604.6	0.9	
A - 6981	3	Impinger Contents #6	604.3	603.4	0.9	
	3	Impinger Contents #7	605.2	604.5	0.7	
				Net Weight Gain (g):	**12.7**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Chemours – Fayetteville, NC
Thermal Oxidizer Stack Gas Impinger Samples including Field QC Samples
Modified Method 18 Trains for Target Analytes
Field Sheet for Individual Impinger Weights excluding Methanol Rinses
December 2019 Pretest

Field Sample No.	Run No.	Sample Description	Final Weight (g)	Initial Weight[1] (g)	Sample Weight (g)	pH[2]
E - 1334	QC/BT	Impinger Contents #1	603.6	603.6	0.0	
E - 1335	QC/BT	Impinger Contents #2	610.6	610.4	0.2	
E - 1336	QC/BT	Impinger Contents #3	600.6	600.8	-0.2	
E - 1337	QC/BT	Impinger Contents #4	605.1	605.5	-0.4	
E - 1338	QC/BT	Impinger Contents #5	599.7	600.0	-0.3	
E - 1339	QC/BT	Impinger Contents #6	601.7	601.7	0.0	
	QC/BT	Impinger Contents #7	601.5	601.5	0.0	
				Net Weight Gain (g):	**-0.7**	

Notes:

(1) *Please place 100 mLs of MeOH in each impinger to start the test run, add several boiling chips and record the weight. MeOH impingers are to be post-weighed prior to rinses being added.*

(2) *Note that pH strips should be wetted prior to pH tests, and post weights and train rinses should be performed before pH measurements are performed. Strips should not be directly dipped into MM-18 Train samples, but treated with drops of the impinger samples to prevent contamination of the samples with materials on the strips.*

The Target Analyte List (TAL) is as follows:

HFPO-DA
HFPO-DAF
Fluoroether E-1
HFPO
Carbonyl Di-fluoride
Perfluoroacetyl fluoride (PAF)
pH
Total Fluorine
HF

Abbreviations/Acronyms:
BT = Blank Train
QC = Quality Control
RB = Reagent Blank

APPENDIX D
SAMPLE CALCULATIONS

TARGET PFAS COMPOUND CONTROL EFFICIENCY CALCULATIONS FOR TABLE 2-1

Inlet

	R1	R2	R3	
EMISSION RESULTS, lb/hr.				
HFPO-DAF	3.2615551	2.806395621	2.24897957	
HFPO Monomer	4.846284047	16.53413241	20.29091665	
Fluoroether E-1	0.085883515	< 0.682238095 *	1.18525043	
HFPO Dimer Acid	0.293389168	0.126638141	0.278549138	
Carbonyl Difluoride	86.8151728	58.26682105	55.61647514	
	9.53E+01	**7.77E+01**	**7.96E+01**	8.42E+01

Stack

	R1	R2	R3	
EMISSION RESULTS, lb/hr.				
HFPO-DAF	< 2.69066E-05	< 2.69E-05	< 3.20103E-05	
HFPO Monomer	< 1.22303E-06	< 1.21E-06	< 1.44712E-06	
HFPO Dimer Acid	1.26142E-05	1.33139E-05	4.08931E-06	
Carbonyl Difluoride	< 8.21175E-05	< 8.15102E-05	< 9.72464E-05	
Fluoroether E-1	< 1.39774E-06	< 1.3908E-06	< 1.6555E-06	
	≤ 1.24E-04	**≤ 1.24E-04**	**≤ 1.36E-04**	1.28E-04
CONTROL EFFICIENCY	99.99987	99.99984	99.9998286	99.99985

*Fluoroether E-1 was not detected in the Run 2 Thermal Oxidizer inlet samples. Therefore, a value of zero (0) was used for the Fluoroether E-1 input to calculate the total PFAS target compounds.

SAMPLE CALCULATIONS FOR
HFPO DIMER ACID (METHOD 0010)

Client: Chemours | **Plant: Fayetteville, NC**
Test Number: Run 3 | **Test Date: 1/4/2020**
Test Location: Thermal Oxidizer Stack | **Test Period: 1440-1755**

1. HFPO Dimer Acid concentration, lbs/dscf.

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

$$Conc1 = \frac{1.0 \times 2.2046 \times 10\text{-}9}{130.818}$$

Conc1 = 1.62E-11

Where:

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

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

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

2. HFPO Dimer Acid concentration, ug/dscm.

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

Conc2 = 1.0 / (130.818 x 0.02832)

Conc2 = 2.60E-01

Where:

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

0.02832 = Conversion factor from cubic feet to cubic meters.

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

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

$MR1_{(Outlet)}$ = 1.62E-11 x 4195 x 60

$MR1_{(Outlet)}$ = 4.09E-06

Where:

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

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

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

$MR2_{(Outlet)}$ = 4.09E-06 x 453.59 /3600

$MR2_{(Outlet)}$ = 5.15E-07

Where:

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

453.6 = Conversion factor from pounds to grams.

3600 = Conversion factor from hours to seconds.

EXAMPLE CALCULATIONS FOR
VOLUMETRIC FLOW AND MOISTURE AND ISOKINETICS

Client: Chemours	Facility: Fayetteville, NC
Test Number: Run 3	Test Date: 1/4/2020
Test Location: Thermal Oxidizer Stack	Test Period: 1440-1755

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

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

$$Vm(std) = \frac{17.64 \times 0.9834 \times 132.973 \times \left(29.63 + \frac{1.572}{13.6} \right)}{64.50 + 460} = 130.818$$

Where:

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

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

$$Vw(std) = (0.04707 \times Vwc) + (0.04715 \times Wwsg)$$

$$Vw(std) = (0.04707 \times 23.9) + (0.04715 \times 36.1) = 2.83$$

Where:

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

3. Moisture content

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

$$bws = \frac{2.83}{2.83 + 130.818} = 0.021$$

Where:

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

4. Mole fraction of dry gas.

Md = 1 - bws

Md = 1 - 0.021 = 0.979

Where:

Md = Mole fraction of dry gas, dimensionless.

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

$MWd = (0.440 \times \% CO_2) + (0.320 \times \% O_2) + (0.280 \times (\% N_2 + \% CO))$

MWd = (0.440 x 3.6) + (0.320 x 15.2) + (0.280 x (81.2 + 0.00))

MWd = 29.18

Where:

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

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

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

MWs = (29.18 x 0.979) +(18 (1 - 0.979)) = 28.95

Where:

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

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

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

$$Vs = 85.49 \times 0.84 \times 0.73092 \times \left(\frac{537}{29.61 \times 28.95} \right)^{\wedge}1/2 = 41.5$$

Where:

Vs = Average gas stream velocity, ft/sec.

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

Cp = Pitot tube coefficient, dimensionless.

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

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

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

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

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

$$Qs(act) = 60 \times 41.5 \times 1.77 = 4403$$

Where:

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

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

60 = Conversion factor from seconds to minutes.

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

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

$$Qs(std) = 17.64 \times 0.979 \times \frac{29.61}{536.5} \times 4403$$

$$Qs(std) = 4195$$

Where:

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

10. Isokinetic variation calculated from intermediate values, percent.

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

$$I = \frac{17.327 \times 537 \times 130.818}{41.5 \times 180 \times 29.61 \times 0.979 \times (0.235)^{\wedge}2} = 101.6$$

Where:

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

SAMPLE CALCULATIONS FOR TOTAL TARGET COMPOUNDS

Client: Chemours | Plant: Fayetteville

Test Number: Run 1 | Test Date: 1/3/2020

Test Location: Thermal Oxidizer Inlet (Monomer) | Test Period: 1615-1935

INLET TARGET COMPOUND FEED RATE

The waste gas feed rates to the thermal oxidizer are measured by mass flow meters. To determine the target compound feed rates, the waste gas feed sampling and analysis data reduced to yield mass of target compound per total mass concentrations. From the modified Method 18 sampling train recovery data, the total mass of organic vapors condensed is determined from the sum of the changes in the impinger masses:

$$\Delta IM_{TOT} = \Delta IM_1 + \Delta IM_2 + \Delta IM_3 + \Delta IM_4 + \Delta IM_5 + \Delta IM_6$$

$$73.1 = 59.5 + 22.8 + -13.9 + 1.9 + 1.7 + 1.3$$

$$73.1\ g = 0.0731\ kg$$

Where: ΔIM_{TOT} = Total impinger mass change

ΔIM_N = Individual impinger mass changes (Impingers 1-6).

From the modified Method 18 sampling train fraction analysis, the total mass of all target compounds is determined from sum of the individual impinger analyses:

$$C_{TOT} = C_1 + C_2 + C_3 + C_4 + C_5 + C_6$$

$$24079820 = 22151000 + 1448700 + 299150 + 98200 + 49250 + 33520$$

$$24079820\ ug = 0.02408\ kg$$

Where: C_{TOT} = Total mass of all target compounds

C_N = Individual mass analysis results (Impingers 1-6).

From the modified Method 18 sampling train dry gas metering system data, the mass of dry gas sampled is determined:

$$DG_M = V_{M(STP)} * MW_G / MV_{STP}$$

$$57 = 49.325 * 28 / 24.055$$

$$57\ g = 0.057\ kg$$

Where: DG_M = Dry gas mass

$V_{M(STP)}$ = Dry gas meter measured volume at STP

MW_G = Dry gas molecular weight (28)

MV = Molar volume (volume per mole of gas at STP) (24.055)

STP = Standard temperature and pressure (20º C and 1 ATM)

Because the carrier gas for the waste gas header system is nitrogen, a dry gas molecular weight of 28 may be reasonably assumed.

The total mass of organic vapor and dry gas sampled is:

$$M_{TOT} = DG_M + \Delta IM_{TOT}$$

$$0.1305 = 0.057 + 0.0731$$

Where: M_{TOT} = Total organic vapor and dry gas mass sampled (kg)

ΔIM_{TOT} = Total impinger mass change

DG_M = Dry gas mass.

The mass of target compound per total mass is:

$$FC_C = C_{TOT}/M_{TOT}$$

$$0.1845 = 0.02408/0.1305$$

Where: FC_C = Feed concentration of target compound in mass/total mass

C_{TOT} = Total mass of target compound

M_{TOT} = Total mass of organic vapor and dry gas mass sampled

The mass feed rate of the target compound is:

$$FR_C = FC_C * MF$$

$$43.2284 \text{ (kg/hr)} = 0.1845*234.3$$

$$95.303 \text{ (lb/hr)} = 43.2284 \text{ (kg/hr)}$$

Where: FR_C = Mass feed rate of target compound (lb/hr)

FC_C = Feed concentration of target compound in mass/total mass

MF = Mass feed rate measured by mass flow meter.

APPENDIX E
EQUIPMENT CALIBRATION RECORDS

INTERFERENCE CHECK

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

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

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

Chad Walker

INTERFERENCE CHECK

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

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

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

Chad Walker

DRY GAS METER CALIBRATION REPORT
Box 32

Customer: Weston Solutions Date: March 27, 2019

Console Serial # 2381 Console Model # C-5000 SOL

DGM Model # S-275 DGM SN # 18100293 Reference Meter S/N 16300942

Barometric Pressure, P_b: 30.12 in. Hg Tested at: 0 in. Hg - Vacuum

Standard Pressure : 29.92 in. Hg Standard Temperature : 528 °R

	1	2	3	Units
Orifice Manometer Setting, ΔH	2.00	0.75	6.00	in. H_2O
Elapsed Time	14	22	8	min.
Reference Meter				
Final Volume Reading	069.903	081.075	092.929	ft^3
Initial Volume Reading	058.660	070.214	081.710	ft^3
Total Gas Volume, V_w	11.243	10.861	11.219	ft^3
Temperature, Initial	66.8	66.8	67.7	°F
Temperature, Final	66.8	67.5	67.8	°F
Avg Temperature, T_w	66.8	67.2	67.8	°F
Dry Gas Meter				
Final Volume Reading	082.220	093.515	105.476	ft^3
Initial Volume Reading	070.874	082.530	094.149	ft^3
Total Gas Volume, V_m	11.346	10.985	11.327	ft^3
Average Temperature, Initial	67.4	67.9	68.1	°F
Average Temperature, Final	67.9	68.1	68.4	°F
Avg Temperature, T_m	67.7	68.0	68.3	°F
ΔH (a)	1.7295	1.7174	1.7057	**Avg. ΔH(a)** **1.7175**
ΔH (a) Tolerance Check	OK	OK	OK	
Gamma, Y	0.9867	0.9875	0.9761	**Avg. Y** **0.9834**
Gamma Tolerance Check	OK	OK	OK	

Calibration Performed By:

$$\Delta H_{(a)} = \frac{0.0319\,\Delta H}{P_b\,(T_m + 460)} \left[\frac{(T_w + 460)\,\theta}{V_w} \right]^2$$

$$Y = \frac{V_w P_b (T_m + 460)}{V_m (P_b + \Delta H / 13.6)(T_w + 460)}$$

Y Factor Calibration Check Calculation

MODIFIED METHOD 0010 TEST TRAIN
THERMAL OXIDIZER STACK
METER BOX NO. 32
1/3/2020 & 1/4/2020

	Run 1	Run 2	Run 3
MWd = Dry molecular weight source gas, lb/lb-mole.			
0.32 = Molecular weight of oxygen, divided by 100.			
0.44 = Molecular weight of carbon dioxide, divided by 100.			
0.28 = Molecular weight of nitrogen or carbon monoxide, divided by 100.			
% CO_2 = Percent carbon dioxide by volume, dry basis.	4.4	4.2	3.6
% O_2 = Percent oxygen by volume, dry basis.	14.6	14.7	15.2

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

$$MWd = (0.32 * 14.6) + (0.44 * 4.4) + (0.28 * (100 - (4.4 + 14.6)))$$

$$MWd = (4.67) + (1.94) + (22.68)$$

MWd =	29.29	29.26	29.18

Tma = Source Temperature, absolute(^oR)			
Tm = Average dry gas meter temperature , deg F.	72.5	58.1	64.5

$$Tma = Ts + 460$$

$$Tma = 72.53 + 460$$

Tma =	532.53	518.10	524.50

Ps = Absolute meter pressure, inches Hg.			
13.60 = Specific gravity of mercury.			
delta H = Avg pressure drop across the orifice meter during sampling, in H2O	1.56	1.56	1.57
Pb = Barometric Pressure, in Hg.	29.78	29.74	29.63

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

$$Pm = 29.78 + (1.56111111111111 / 13.6)$$

Pm =	29.89	29.85	29.75

Yqa = dry gas meter calibration check value, dimensionless.			
0.03 = (29.92/528)(0.75)2 (in. Hg/°/R) cfm2.			
29.00 = dry molecular weight of air, lb/lb-mole.			
Vm = Volume of gas sample measured by the dry gas meter at meter conditions, dcf.	132.805	131.564	132.973
Y = Dry gas meter calibration factor (based on full calibration)	0.9834	0.9834	0.9834
Delta H@ = Dry Gas meter orifice calibration coefficient, in. H2O.	1.7175	1.7175	1.7175
avg SQRT Delta H = Avg SQRT press. drop across the orifice meter during sampling , in. H_2O	1.2490	1.2475	1.2531
O = Total sampling time, minutes.	180	180	180

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

$$Yqa = (180.00 / 132.81) * SQRT (0.0319 * 532.53 * 29) / (1.72 * 29.89 * 29.29) * 1.25$$

$$Yqa = 1.355 * SQRT\ 492.641 / 1,503.531 * 1.25$$

Yqa =	0.9690	0.9647	0.9676

Diff = Absolute difference between Yqa and Y	1.46	1.90	1.61

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

$$Diff = ((0.9834 - 0.969) / 0.9834) * 100$$

Average Diff = 1.66

Allowable = 5.0

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

Calibrator MDW | **VOST Box Number** VOST 8 | **Ambient Temp** 73

Date 21-Sep-19 | **Wet Test Meter Number** 10BB-1 | **Temp Reference Source** Thermocouple Simulator (Accuracy +/- 1°F)

Dry Gas Meter Number 3602380

Setting			Gas Volume		Temperatures				Baro Press, in Hg (Pb)	30.08
			Wet Test Meter	Dry gas Meter	Wet Test Meter	Dry Gas Meter				Results
Liters per minute	Roto-meter	Orifice Manometer in H_20 (ΔH)	liters (Vw)	liters (Vd)	°F (Tw)	Outlet, °C (Td_o)	Inlet, °C (Td_i)	Average, °F (Td)	Time, min (O)	Y
0.25	0.25	0.00	3.0	0.000	72.0	24.00	24.00	75.0	11.8	1.0060
				2.999		24.00	24.00			
				2.999		24.00	24.00			
0.50	0.50	0.35	9.0	0.000	72.0	24.00	24.00	75.0	17.8	1.0093
				8.960		24.00	24.00			
				8.960		24.00	24.00			
1.0	1.0	1.00	10.0	0.000	72.0	24.00	24.00	75.0	10.0	1.0099
				9.934		24.00	24.00			
				9.934		24.00	24.00			
2.0	2.0	1.70	19.0	0.000	72.0	24.00	24.00	71.0	9.9	1.0099
				18.700		24.00	24.00			
				18.700		24.00	24.00			
									Average	**1.0088**

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

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

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

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

Reference Temperature	Temperature Reading from Individual Thermocouple Input [1]						Average Temperature Reading	Temp Difference [2] (%)
Select Temperature ○ °C ◉ °F	Channel Number							
	1	2	3	4	5	6		
32	32	32	32	32			32.0	0.0%
212	212	212	212	212			212.0	0.0%
932	932	932	932	932			932.0	0.0%
1832	1829	1829	1829	1829			1829.0	0.1%

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

2 - Acceptable Temperature Difference less than 1.5 %

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

Post Test Calibration

Calibrator PM | **Box Number** 8 | **Client** Chemours

Date 19-Feb-20 | **Wet Test Meter Number** 10BB-1 | **Location/Plant** Fayetteville, NC

Dry Gas Meter Number 3602380 | **PreTest Y** 1.0088

Setting			Gas Volume		Temperatures				Baro Press, in Hg (Pb)	29.91
Liters per minute	Roto-meter	Orifice Manometer in H_20 (ΔH)	Wet Test Meter liters (Vw)	Dry gas Meter liters (Vd)	Wet Test Meter °F (Tw)	Dry Gas Meter (Outlet) Start, °F (Td_o)	End, °F (Td_o)	Average, °F (Td)	Time, min (O)	Results Y
0.30	0.30	0.35	4.50	0.000 4.448 4.448	70.5	70.00	72.00	71.0	13.6	1.0118
0.30	0.30	0.35	3.50	0.000 3.427 3.427	70.5	72.00	73.00	72.5	10.6	1.0243
0.30	0.30	0.35	3.50	0.000 3.435 3.435	70.5	73.00	73.00	73.0	10.6	1.0228
									Average	**1.0196**
									Difference[1]	**0.0108**

1 - Tolerance for Y is less than 0.0500

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

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

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

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

UNI-VOS Console Calibration
VOST 9

Quality - Service - Reliability

ENVIRONMENTAL SUPPLY COMPANY

Console Model Number :	UNI-VOS-ACD
Console Serial Number :	1720-D

Calibration Date : March 26, 2019

DGM Model Number :	Actaris ACD G1.6
DGM Serial Number :	0000317

Digital Counter	
Model Number :	Red Lion Cub 5000
Scale Factor :	1.8709
CPL :	534.5

Standard Pressure (in Hg)	Standard Temperature (°K)
29.92	293

Reference Meter	
Model Number :	Shinagawa W-NK-1A
Serial Number :	538789
Y_c :	1.000

	Digital Volume UNI-VOS Console							Reference Meter							
				DGM Temperatures											
Flow Rate (lpm)	DGM Counter	Volume (liters)	Volume (std liters)	Initial (°C)	Final (°C)	AVG (°C)	DGM Pressure (in H_2O)	Volume Initial (liters)	Volume Final (liters)	Volume Total (liters)	Temp (°C)	Bar. Pressure (in Hg)	Y_c	Y_c Avg	% deviation
2.00	4323	8.088	8.078	20.6	20.7	20.6	2.40	571.917	580.047	8.130	20.3	29.77	1.000	1.000	0.0
	4325	8.092	8.079	20.7	20.7	20.7	2.40	580.047	588.179	8.132	20.4	29.77	1.000		0.0
	4324	8.090	8.075	20.8	20.9	20.8	2.40	588.179	596.307	8.128	20.4	29.77	1.000		0.0
1.00	4490	8.400	8.366	20.9	21.0	20.9	1.20	596.724	605.183	8.459	20.4	29.80	1.006	1.003	-0.3
	4547	8.507	8.469	21.0	21.1	21.0	1.20	605.183	613.649	8.466	20.5	29.80	0.994		0.9
	4490	8.400	8.359	21.2	21.2	21.2	1.20	613.649	622.123	8.474	20.5	29.80	1.008		-0.5
0.50	4374	8.183	8.132	21.2	21.2	21.2	0.75	622.298	630.439	8.141	20.5	29.80	0.995	0.997	0.2
	4395	8.223	8.168	21.3	21.4	21.3	0.75	630.439	638.605	8.166	20.5	29.80	0.994		0.3
	4366	8.168	8.113	21.4	21.4	21.4	0.75	638.605	646.783	8.178	20.5	29.80	1.002		-0.5

Y_c Avg	1.000

signature

03/26/19
date

Post Test Calibration

Calibrator PM | **Box Number** 9 | **Client** Chemours

Date 20-Feb-20 | **Wet Test Meter Number** 10BB-1 | **Location/Plant** Fayetteville, NC

Dry Gas Meter Number 317 | **PreTest Y** 1.0000

Setting			Gas Volume		Temperatures				Baro Press, in Hg (Pb)	30.15
Liters per minute	Roto-meter	Orifice Manometer in H_20 (ΔH)	Wet Test Meter liters (Vw)	Dry gas Meter liters (Vd)	Wet Test Meter °F (Tw)	Dry Gas Meter (Outlet) Start, °F (Td_o)	End, °F (Td_o)	Average, °F (Td)	Time, min (O)	Results Y
0.50	0.50	0.55	5.10	0.000 5.087 5.087	70.5	67.00	68.00	67.5	13.5	0.9956
0.50	0.50	0.55	4.20	0.000 4.193 4.193	70.5	68.00	69.00	68.5	10.2	0.9966
0.50	0.50	0.55	4.20	0.000 4.183 4.183	70.5	69.00	69.00	69.0	10.2	0.9999
									Average	**0.9973**
									Difference[1]	**0.0027**

1 - Tolerance for Y is less than 0.0500

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

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

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

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

Airgas Specialty Gases
Airgas USA, LLC
6141 Easton Road
Bldg 1
Plumsteadville, PA 18949
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI79E15A00E4	Reference Number:	160-401590223-1
Cylinder Number:	ALM056900	Cylinder Volume:	150.5 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12019	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Sep 09, 2019

Expiration Date: Sep 09, 2027

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	9.000 %	8.921 %	G1	+/- 0.5% NIST Traceable	09/09/2019
OXYGEN	12.00 %	12.01 %	G1	+/- 0.4% NIST Traceable	09/09/2019
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	102505	K025852	7.016 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	Jan 13, 2022
NTRM	102909	k021729	9.967 % OXYGEN/NITROGEN	0.30%	Apr 19, 2022

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA VA5011 T5V6VU9P NDIR CO2	NDIR	Aug 19, 2019
SIEMENS OXYMAT 6 - W5951 - O2	PARAMAGNETIC	Aug 27, 2019

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

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

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI62E15A0224	Reference Number:	82-401288925-1
Cylinder Number:	ALM047628	Cylinder Volume:	157.2 CF
Laboratory:	124 - Riverton (SAP) - NJ	Cylinder Pressure:	2015 PSIG
PGVP Number:	B52018	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Sep 04, 2018

Expiration Date: Sep 04, 2026

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

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

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	17.00 %	17.05 %	G1	+/- 0.7% NIST Traceable	09/04/2018
OXYGEN	21.00 %	21.25 %	G1	+/- 0.5% NIST Traceable	09/04/2018
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060804	CC415400	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019
NTRM	09061420	CC273671	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

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

Triad Data Available Upon Request

Signature on file
Approved for Release

Type S Pitot Tube Inspection Data Form

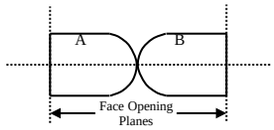
Pitot Tube Identification Number: **P-561**

If all Criteria PASS
Cp is equal to 0.84

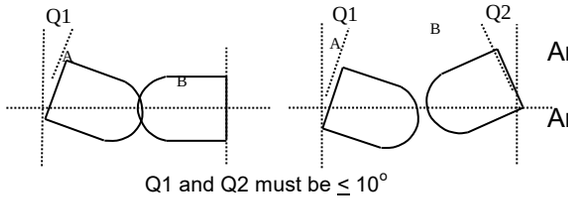
Inspection Date 2/7/18 Individual Conducting Inspection KS

		PASS/FAIL
Distance to A Plane (PA) - inches	0.476	PASS
Distance to B Plane (PB) - inches	0.476	PASS
Pitot OD (D_t) - inches	0.375	

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

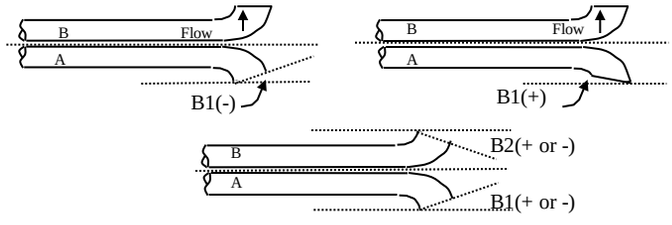


Are Open Faces Aligned Perpendicular to the Tube Axis: (●) YES ( ) NO — PASS



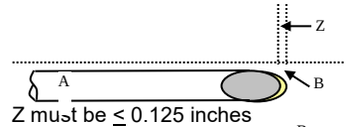
Angle of Q1 from vertical A Tube- degrees (absolute)	3	PASS
Angle of Q2 from vertical B Tube- degrees (absolute)	2	PASS

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



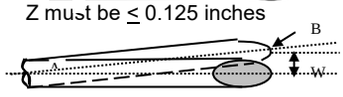
Angle of B1 from vertical A Tube- degrees (absolute)	1	PASS
Angle of B1 from vertical B Tube- degrees (absolute)	2	PASS

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



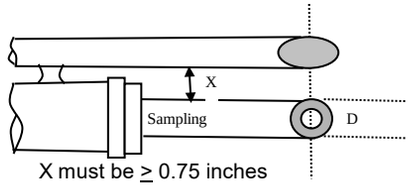
Z must be $\leq$ 0.125 inches

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



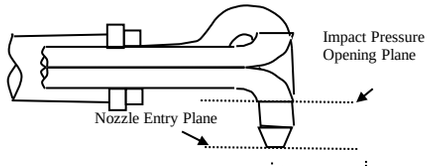
W must be $\leq$ 0.03125 inches

Vertical offset between A and B Tubes (W) - inches	0.028	PASS

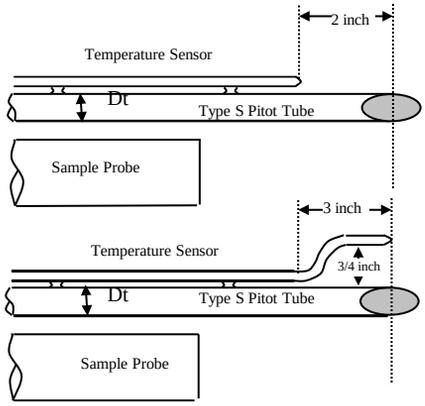


X must be $\geq$ 0.75 inches

Distance between Sample Nozzle and Pitot (X) - inches	0.879	PASS



Impact Pressure Opening Plane is above the Nozzle Entry Plane: (●) YES ( ) NO ( ) NA



Thermocouple meets the Distance Criteria in the adjacent figure: (●) YES ( ) NO ( ) NA

Thermocouple meets the Distance Criteria in the adjacent figure: ( ) YES ( ) NO (●) NA

APPENDIX F
LIST OF PROJECT PARTICIPANTS

The following WESTON employees participated in this project.

Paul Meeter	Senior Project Manager
Wes Fritz	Senior Project Manager
Matt Winkeler	Team Member
Steve Rathfon	Team Member
Nick Guarino	Team Member
Jack Mills	Team Member
Chris Hartsky	Team Member
Austin Squires	Team Member