REPORT OF
AIR POLLUTION SOURCE TESTING
OF AN ETHYLENE OXIDE EMISSION-CONTROL SYSTEM
OPERATED BY STERIGENICS, INC.
IN GRAND PRAIRIE, TEXAS
ON MAY 9, 2017

Submitted to:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P. O. Box 13087
Austin, Texas 78711-3087

Submitted by:

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Permit Number 51907

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Prepared on:

June 8, 2017

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1.0 INTRODUCTION

On Tuesday, May 9, 2017, ECSi performed air pollution source testing of an ethylene oxide (EtO) emission-control system operated by Sterigenics, Inc. in Grand Prairie, Texas. The control system tested was a Maxon Catalytic Oxidizer, which is used to control emissions from five commercial EtO sterilizer backvents, and one aeration room. The purpose of the testing program was to evaluate continued compliance with the conditions established in the Air Quality Permit granted to Sterigenics, Inc. by the Texas Commission on Environmental Quality (TCEQ).

2.0 EQUIPMENT

The gas-sterilization system is comprised of five commercial sterilizers, all discharging through liquid-ring vacuum pumps to an Advanced Air Technologies packed-tower acid scrubber emission control device. One aeration room and five sterilization chamber backvents are all discharged to a Maxon catalytic oxidizer emission-control device. The gas-sterilization and emission-control equipment currently consists of the following:

- Three Vacudyne commercial ethylene oxide gas sterilizers, each comprised of a steam-heated sterilization chamber (30 pallet capacity), and a Dekker 3-pump oil-sealed liquid ring recirculating vacuum pump skid (two 50 hp liquid ring pumps, plus one 25 hp booster pump);

- Two Trumbo commercial ethylene oxide gas sterilizers, each comprised of a steam-heated sterilization chamber (30 pallet capacity), and a Dekker 3-pump oil-sealed liquid ring recirculating vacuum pump skid (one 50 hp liquid ring pump, plus one 25 hp booster pump);

- One 12,200 square foot aeration room, comprised of a heated aeration chamber and an exhaust system.

Sterilizer vacuum pump emissions are controlled by:

- One Advanced Air Technologies Safe Cell I emission-control system, comprised of a packed-tower chemical scrubber, equipped with a packed reaction/interface column, a scrubber fluid recirculation system (2 recirculation pumps - 1 primary and 1 backup - each @ 350 gpm and 15 hp), and two scrubber fluid reaction/storage tanks.

Aeration and backvent emissions are controlled by:

- One Maxon catalytic oxidizer, 15,000 SCFM, equipped with a prefilter, a gas-fired heater, a reactive catalyst bed, and an exhaust blower.

3.0 TESTING

EtO source testing was conducted in accordance with the procedures outlined in USEPA CFR40, Part 63.365. EtO concentration measurement for each test run was conducted simultaneously at the inlet and outlet of the catalytic oxidizer during chamber backvent, and during a one-hour interval of the 24-hour aeration process. A total of three chamber backvent test runs, and three one-hour aeration test runs, were performed.

During backvent and aeration testing, EtO concentration at the inlet and the outlet of the catalytic oxidizer were determined using direct source sample injection into the gas chromatograph (GC). All backvent and aeration testing was performed using freshly sterilized product. The testing program was conducted in accordance with the procedures outlined in the following sections.

4.0 RULE/COMPLIANCE REQUIREMENTS

The EtO gas-sterilization system at Sterigenics, Inc. was tested to evaluate compliance with the requirements specified in the TCEQ Permit. The current testing was performed to demonstrate continued compliance with the following requirement:

- Aeration and backvent emissions must be discharged to control equipment which achieves an EtO emission-reduction efficiency of at least 99.0%, or an outlet EtO concentration of no greater than 1 ppmv.

Testing is required to demonstrate compliance with these requirements. Source testing of the emission-control device is required initially, and may be required periodically thereafter.

5.0 TEST METHOD REFERENCE

5.1 INTRODUCTION

The testing procedures outlined herein are based on USEPA source-sampling methods. EtO control efficiency testing was conducted by USEPA CFR40, Part 63.365, and in accordance with TCEQ requirements. EtO concentration measurement for each test run was conducted simultaneously at the inlet and outlet of the catalytic oxidizer during chamber backvent, and during a one-hour interval of the 24-hour aeration process. A total of three chamber backvent test runs, and three one-hour aeration test runs, were performed.

During backvent and aeration testing, EtO concentration at the inlet and the outlet of the catalytic oxidizer were determined using direct source sample injection into the gas chromatograph (GC). All backvent and aeration testing was performed using freshly sterilized product.

Operation and documentation of process conditions was performed by personnel from Sterigenics, Inc. using existing monitoring instruments installed by the manufacturer of the equipment to be tested. In accordance with TCEQ requirements, and the procedures established in USEPA CFR40, Part 63, Subpart O, the following parameter was recorded: catalyst bed operating temperature.

5.2 CONTROL EFFICIENCY MEASUREMENT

During backvent and aeration testing, EtO concentration at the inlet and outlet of the catalytic oxidizer were determined using direct source sample injection into the GC. Since the source gas flow is identical at the inlet and outlet of the catalytic oxidizer control-efficiency of EtO during aeration and backvent was calculated by comparing the concentration of EtO vented to the system inlet to the concentration of EtO vented from the system outlet.

During the backvent and aeration phases, vented gas was analyzed by an SRI, Model 8610, portable gas chromatograph (GC), equipped with the following: dual, heated sample loops and injectors; dual columns; and dual detectors. A flame ionization detector (FID) was used to quantify inlet EtO concentration, and a photoionization detector (PID) was used to quantify low-level EtO concentration at the emission-control device outlet.

5.3 SAMPLE TRANSPORT

Source gas was pumped to the GC at approximately 1000 cubic centimeters per minute (cc/min) from the sampling ports through two lengths of Teflon® sample line, each with a nominal volume of approximately 75 cubic centimeters (cc) and an outer diameter of 0.25 inch. At the inlet, the sampling port was located in the common backvent/aeration discharge duct, upstream of the oxidizer. At the outlet of the catalytic oxidizer, sampling ports were located in the exhaust stack downstream of the catalyst bed.

5.4 GC INJECTION

Source-gas samples were then injected into the GC which was equipped with two heated sampling loops, each containing a volume of approximately 2cc and maintained at 100 degrees Celsius (C). Injections occurred at approximately five minute intervals during the aeration-phase testing. Helium was the carrier gas for both the FID and PID.

5.5 GC CONDITIONS

The packed columns for the GC were both operated at 80 degrees C. The columns were stainless steel, 6 feet long, 0.125 inch outer diameter, packed with 1 percent SP-1000 on 60/80 mesh Carbopack B. During the analysis, the FID was operated at 250 degrees C. The support gases for the FID were helium (99.999% pure), hydrogen (99.995% pure) and air (99.9999% pure). Any unused sample gas was vented from the GC system back to the inlet of the control device being tested.

5.6 CALIBRATION STANDARDS

The FID was calibrated for mid-range part-per-million-by-volume (ppmv) level analysis using gas proportions similar to the following:

1) 100 ppmv EtO, balance nitrogen
2) 50 ppmv EtO, balance nitrogen (audit gas)
3) 10 ppmv EtO, balance nitrogen
4) 1 ppmv EtO, balance nitrogen

The PID was calibrated for low-range ppmv level analyses using gas proportions similar to the following:

1) 100 ppmv EtO, balance nitrogen
2) 50 ppmv EtO, balance nitrogen (audit gas)
3) 10 ppmv EtO, balance nitrogen
4) 1 ppmv EtO, balance nitrogen

Each of these calibration standards was in a separate, certified manufacturer's cylinder. Copies of the calibration gas laboratory certificates are attached as Appendix I.

5.7 SAMPLING DURATION

Backvent testing was performed in conjunction with normal production operations, during the chamber exhaust venting which is conducted for each sterilization chamber upon conclusion of the sterilization cycle, immediately prior to and during chamber unloading. Backvent sampling duration was 15 minutes for each of the three test runs.

Since aeration is a 24-hour process at this facility, with constant discharge flow from the aeration chambers to the emission-control system, aeration testing consisted of three 1-hour test runs. Each test run was performed with freshly sterilized product in the aeration chambers.

5.8 CONTROL-EFFICIENCY CALCULATIONS

Control efficiency of EtO was calculated for aeration and backvent. Results of the control-efficiency testing are presented in Section 8.0, and in Tables 1 and 2.

6.0 TEST SCENARIO

The backvent and aeration testing was performed during normal process load conditions. Three backvent and three aeration test runs were conducted in series to verify the performance of the emission-control device. The testing schedule was as follows:

1) Testing equipment was set up and calibrated.
2) Backvent Phase Test Run #1 was conducted with one freshly sterilized production load. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
3) Aeration Phase Test Run #1 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
4) Aeration Phase Test Run #2 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
5) Backvent Phase Test Run #2 was conducted with one freshly sterilized production load. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
6) Aeration Phase Test Run #3 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
7) Backvent Phase Test Run #3 was conducted with one freshly sterilized production load. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
8) Post calibration check was performed, testing equipment was packed.

7.0 QA/QC

7.1 FIELD TESTING QUALITY ASSURANCE

At the beginning of the test, the sampling system was leak checked at a vacuum of 15 inches of mercury. The sampling system was considered leak free when the flow indicated by the rotameters fell to zero.

At the beginning of the test, a system blank was analyzed to ensure that the sampling system was free of EtO. Ambient air was introduced at the end of the heated sampling line and drawn through the sampling system line to the GC for analysis. The resulting chromatogram also provided a background level for non-EtO components (i.e. ambient air, carbon dioxide, water vapor) which are present in the source gas stream due to the ambient dilution air which is drawn into the emission-control device, and due to the destruction of EtO by the emission-control device which produces carbon dioxide and water vapor. This chromatogram, designated AMB, is included with the calibration data in Appendix A.

7.2 CALIBRATION PROCEDURES

The GC system was calibrated at the beginning and conclusion of each day's testing. Using the Peaksimple II analytical software, a point-to-point calibration curve was constructed for each detector. A gas cylinder of similar composition as the calibration gases, but certified by a separate supplier, was used to verify calibration gas composition and GC performance.

All calibration gases and support gases used were of the highest purity and quality available. A copy of the laboratory certification for each calibration gas is attached as Appendix I.

8.0 TEST RESULTS

The catalytic oxidizer was found to have an average EtO control efficiency of 99.98 percent for backvent, and an average EtO control efficiency of 99.97 percent for aeration. In accordance with state and federal requirements, backvent and aeration discharge streams must be vented to control equipment with an EtO emission-reduction efficiency of at least 99 percent. The catalytic oxidizer met this requirement.

The test results are summarized in Tables 1 and 2. These tables include results for EtO control efficiency of the emission-control device. Chromatograms and chromatographic supporting data are attached as Appendices A through G. Copies of field data and calculation worksheets are attached as Appendix H.

TABLES

TABLE 1
ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE OPERATED BY STERIGENICS, INC. IN GRAND PRAIRIE, TEXAS ON MAY 9, 2017

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	921	47.0	0.01	99.9787
1	922	46.1	0.01	99.9783
1	923	64.2	0.01	99.9844
1	924	46.2	0.01	99.9784
1	925	42.5	0.01	99.9765
1	926	43.2	0.01	99.9769
1	928	40.5	0.01	99.9753
1	929	39.9	0.01	99.9749
1	930	37.2	0.01	99.9731
1	931	38.4	0.01	99.9740
1	932	37.4	0.01	99.9733
1	934	40.4	0.01	99.9752
2(4)	1135	31.3	0.01	99.9681
2	1136	33.7	0.01	99.9703
2	1137	77.1	0.01	99.9870
2	1138	45.8	0.01	99.9782
2	1139	38.3	0.01	99.9739
2	1140	34.5	0.01	99.9710
2	1141	34.0	0.01	99.9706
2	1143	34.3	0.01	99.9708
2	1144	33.0	0.01	99.9697
2	1146	34.4	0.01	99.9709
2	1147	32.1	0.01	99.9688
2	1149	33.4	0.01	99.9701
3(5)	1259	41.0	0.01	99.9756
3	1300	64.7	0.01	99.9845
3	1301	117	0.01	99.9915
3	1302	73.1	0.01	99.9863
3	1303	51.8	0.01	99.9807
3	1304	46.1	0.01	99.9783
3	1306	44.8	0.01	99.9777
3	1307	42.4	0.01	99.9764
3	1308	40.9	0.01	99.9756
3	1309	39.0	0.01	99.9744
3	1310	38.1	0.01	99.9738
3	1312	36.2	0.01	99.9724
TIME-WEIGHTED AVERAGE:		**45.00**	**0.0100**	**99.9760**
		TCEQ REQUIRED CONTROL EFFICIENCY:		**99%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Backvent Phase Test Run #1 started at 9:20, ended at 9:35.
(4) - Backvent Phase Test Run #2 started at 9:59, ended at 10:14.
(5) - Backvent Phase Test Run #3 started at 12:58, ended at 13:13.
(6) - During backvent testing, the average recorded catalyst bed temperature was 315 deg F

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TABLE 2
ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE OPERATED BY STERIGENICS, INC. IN GRAND PRAIRIE, TEXAS ON MAY 9, 2017

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	937	38.0	0.01	99.9737
1	942	41.1	0.01	99.9757
1	947	39.4	0.01	99.9746
1	952	37.5	0.01	99.9733
1	957	35.4	0.01	99.9718
1	1002	35.2	0.01	99.9716
1	1007	38.7	0.01	99.9742
1	1012	38.4	0.01	99.9740
1	1017	37.0	0.01	99.9730
1	1022	35.1	0.01	99.9715
1	1027	37.0	0.01	99.9730
1	1032	34.9	0.01	99.9713
2(4)	1037	35.4	0.01	99.9718
2	1042	33.6	0.01	99.9702
2	1047	33.5	0.01	99.9701
2	1052	31.4	0.01	99.9682
2	1057	31.1	0.01	99.9678
2	1102	31.9	0.01	99.9687
2	1107	30.4	0.01	99.9671
2	1112	34.3	0.01	99.9708
2	1117	31.6	0.01	99.9684
2	1122	34.0	0.01	99.9706
2	1127	32.1	0.01	99.9688
2	1132	30.9	0.01	99.9676
3(5)	1155	32.9	0.01	99.9696
3	1200	32.8	0.01	99.9695
3	1205	31.2	0.01	99.9679
3	1210	28.4	0.01	99.9648
3	1215	30.1	0.01	99.9668
3	1220	26.9	0.01	99.9628
3	1225	27.4	0.01	99.9635
3	1230	26.6	0.01	99.9624
3	1235	27.0	0.01	99.9630
3	1240	31.6	0.01	99.9684
3	1245	32.6	0.01	99.9693
3	1250	30.5	0.01	99.9672
TIME-WEIGHTED AVERAGE:		**33.22**	**0.0100**	**99.9695**
		TCEQ REQUIRED CONTROL EFFICIENCY:		**99%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Aeration Phase Test Run #1 started at 9:35, ended at 10:35.
(4) - Aeration Phase Test Run #2 started at 10:35, ended at 11:35.
(5) - Aeration Phase Test Run #3 started at 11:53, ended at 12:53.
(6) - During aeration testing, the average recorded catalyst bed temperature was 315 deg F

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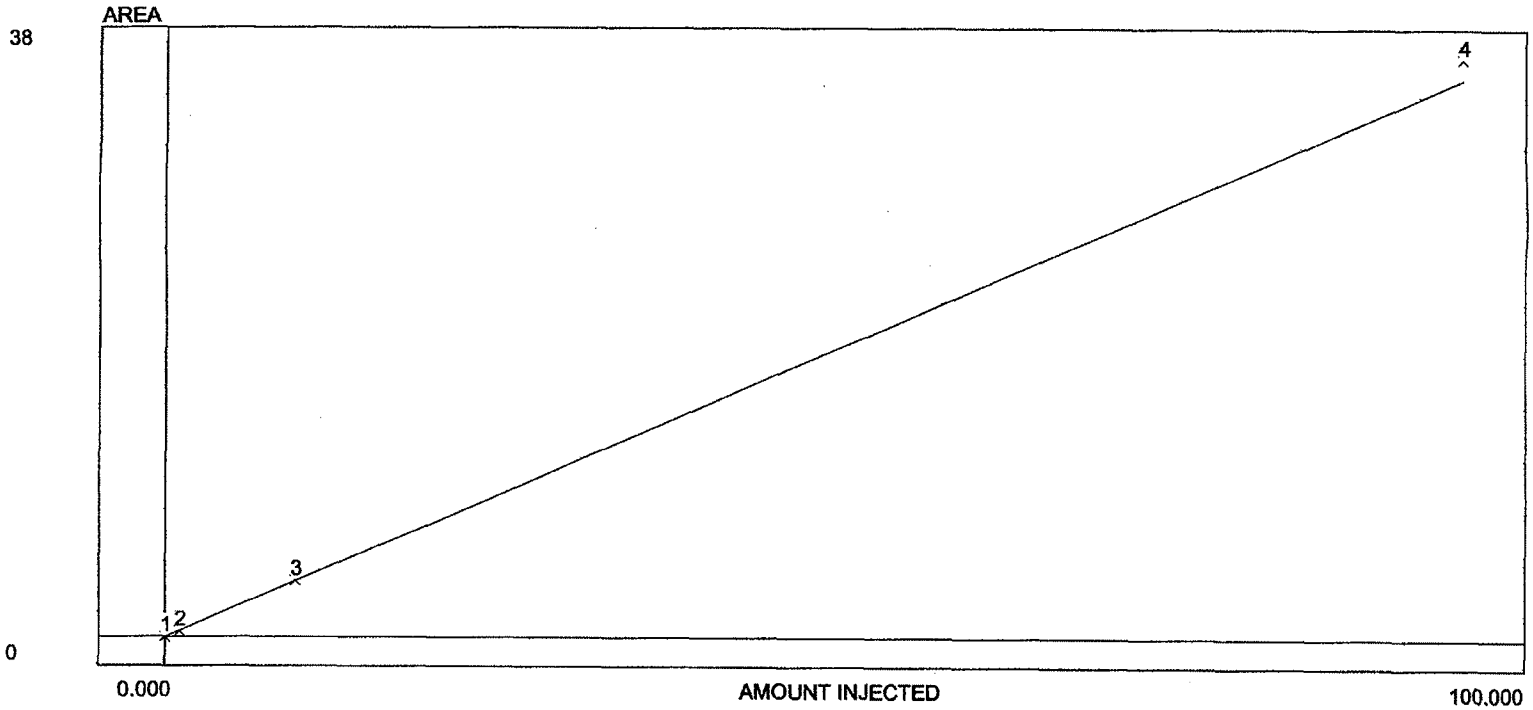
APPENDICES

APPENDIX A

Calibration Data

Peak	Name	Start	End	Calibration	Int.Std	Units
1	Dead Vol / Air	0.000	0.350		0.000	
2	Ambient H2O	0.350	0.480		0.000	
3	Ethylene Oxide	0.480	0.600	C:\peak359\1Ster	0.00017	ppm
4	Acetaldehyde	0.600	0.800		0.000	
5	CO2	0.800	1.000		0.000	

Calibration file: C:\peak359\1SterGP2017.cal



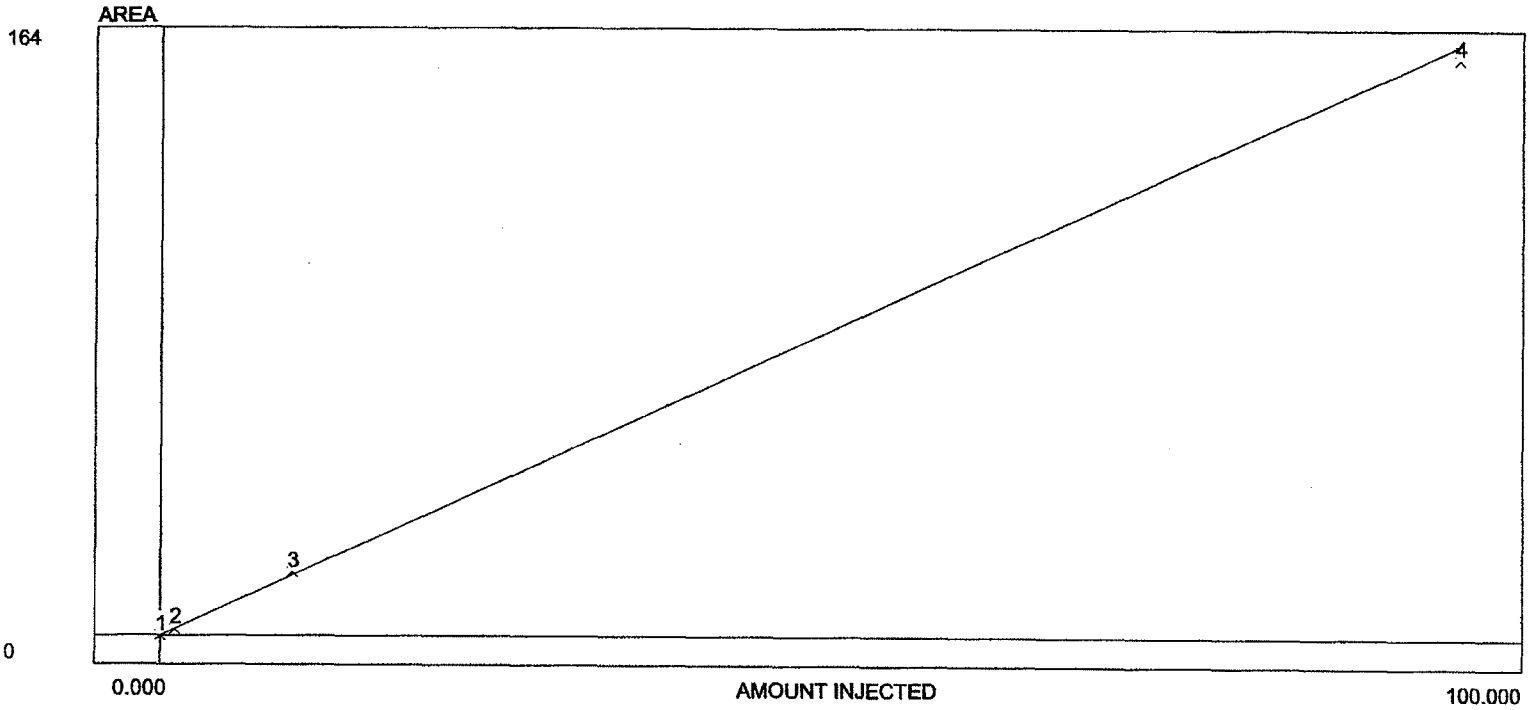
Avg slope of curve: 0.36
Y-axis intercept: 0.00
Linearity: 1.00
Number of levels: 4
SD/rel SD of CF's: 0.2/66.9
Y=0.3646X
r2: 1.0000
Last calibrated: Tue May 09 08:04:45 2017

Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	0.380	1.100	0.345	0.380	N/A	N/A
3	3.740	10.100	0.370	3.740	N/A	N/A
4	37.800	100.000	0.378	37.800	N/A	N/A

Component file: CO2-100.cpt

Peak	Name	Start	End	Calibration	Int.Std	Units
1	Dead Vol / Air	0.000	0.350		0.000	
2	Ambient H2O	0.350	0.480		0.000	
3	Ethylene Oxide	0.480	0.600	C:\peak359\2Ster	0.00017	ppm
4	Acetaldehyde	0.600	0.800		0.000	
5	CO2	0.800	1.000		0.000	

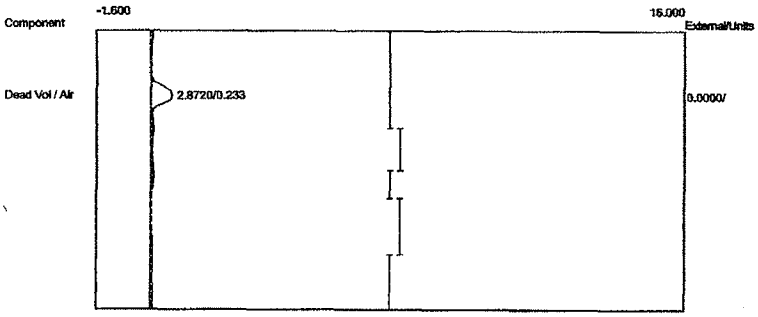
Calibration file: C:\peak359\2SterGP2017.cal



Avg slope of curve: 1.68
Y-axis intercept: 0.00
Linearity: 1.00
Number of levels: 4
SD/rel SD of CF's: 0.8/66.8
Y=1.6796X
r2: 0.9999
Last calibrated: Tue May 09 08:03:55 2017

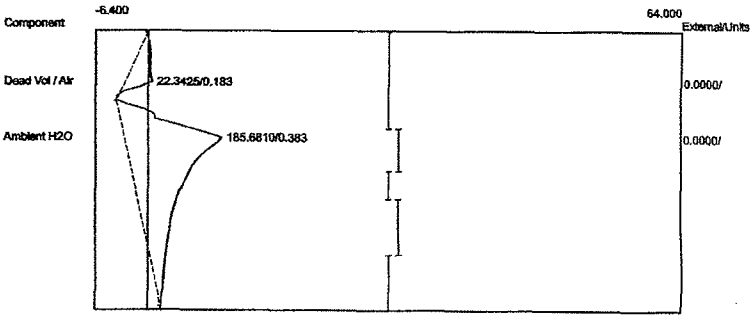
Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	1.800	1.100	1.636	1.800	N/A	N/A
3	17.800	10.100	1.762	17.800	N/A	N/A
4	164.000	100.000	1.640	164.000	N/A	N/A

Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/08/2017 11:21:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



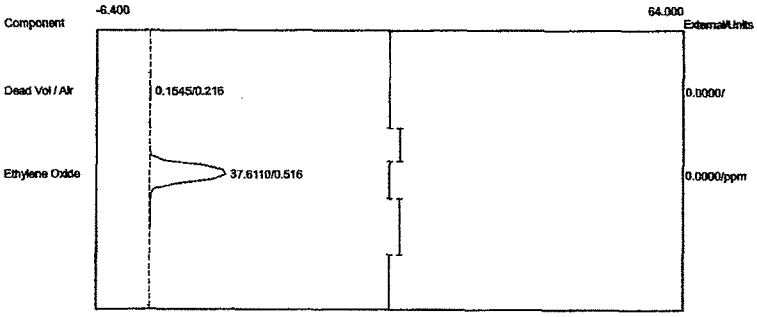
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.8720	0.0000	
		2.8720	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/08/2017 11:21:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



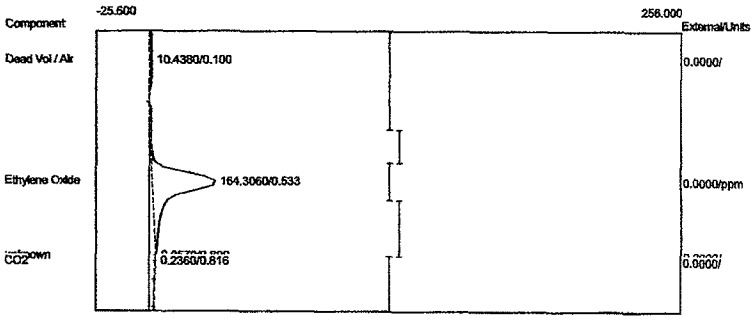
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	22.3425	0.0000	
Ambient H2O	0.383	185.6810	0.0000	
		208.0235	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:09:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C01.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



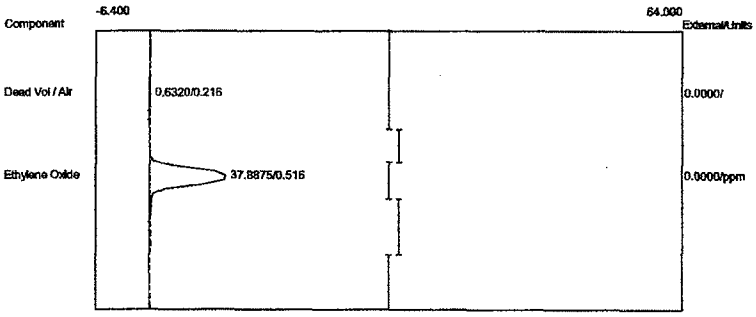
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	0.1545	0.0000	
Ethylene Oxide	0.516	37.6110	0.0000	ppm
		37.7655	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:09:10
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C01.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



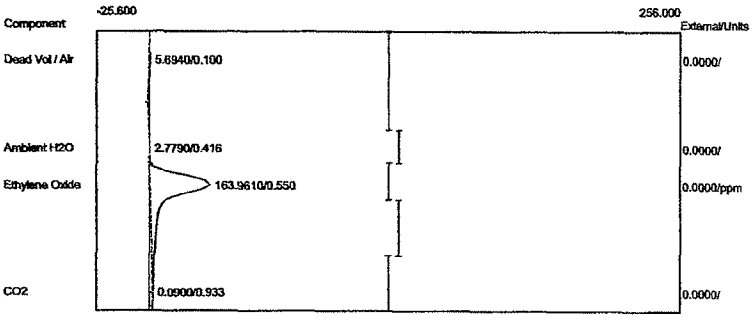
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	10.4380	0.0000	
Ethylene Oxide	0.533	164.3060	0.0000	ppm
CO2	0.816	0.2360	0.0000	
		174.9800	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:14:44
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C02.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



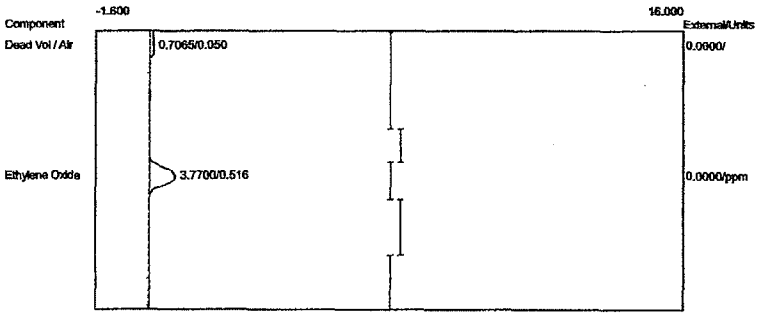
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	0.6320	0.0000	
Ethylene Oxide	0.516	37.8875	0.0000	ppm
		38.5195	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:14:44
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C02.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



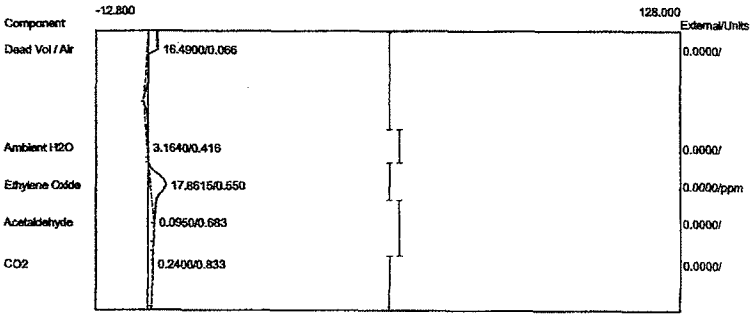
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	5.6940	0.0000	
Ambient H2O	0.416	2.7790	0.0000	
Ethylene Oxide	0.550	163.9610	0.0000	ppm
CO2	0.933	0.0900	0.0000	
		172.5240	0.0000	

Lab name: ECOI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:24:26
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C03.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



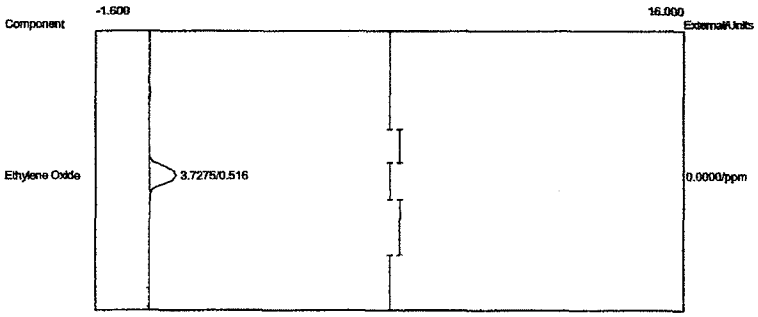
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	0.7065	0.0000	
Ethylene Oxide	0.516	3.7700	0.0000	ppm
		4.4765	0.0000	

Lab name: ECOI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:24:26
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C03.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



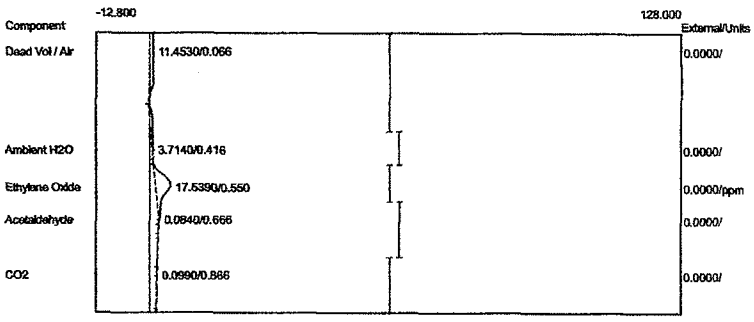
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	16.4900	0.0000	
Ambient H2O	0.416	3.1640	0.0000	
Ethylene Oxide	0.550	17.8615	0.0000	ppm
Acetaldehyde	0.683	0.0950	0.0000	
CO2	0.833	0.2400	0.0000	
		37.8505	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:27:39
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C04.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



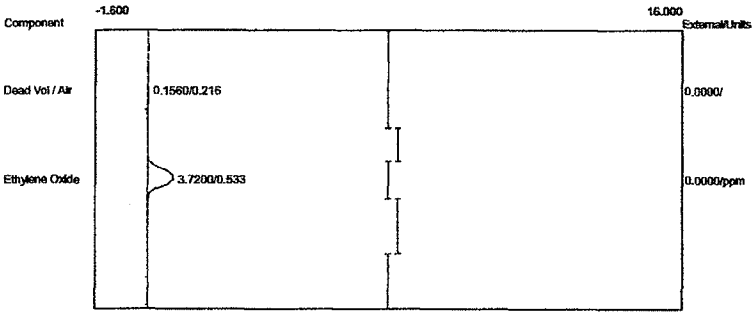
Component	Retention	Area	External	Units
Ethylene Oxide	0.516	3.7275	0.0000	ppm
		3.7275	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:27:39
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C04.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



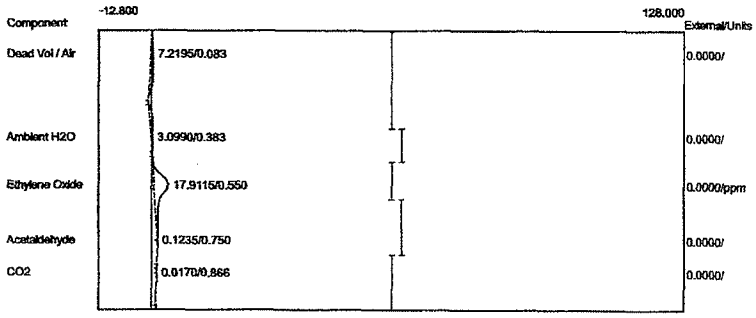
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	11.4530	0.0000	
Ambient H2O	0.416	3.7140	0.0000	
Ethylene Oxide	0.550	17.5390	0.0000	ppm
Acetaldehyde	0.666	0.0840	0.0000	
CO2	0.866	0.0990	0.0000	
		32.8890	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:31:54
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C05.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



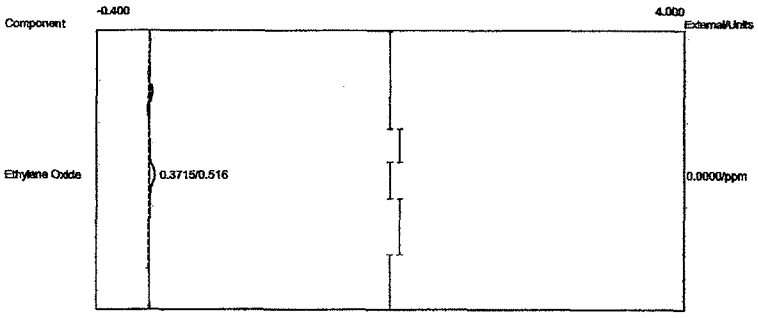
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	0.1560	0.0000	
Ethylene Oxide	0.533	3.7200	0.0000	ppm
		3.8760	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:31:54
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C05.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



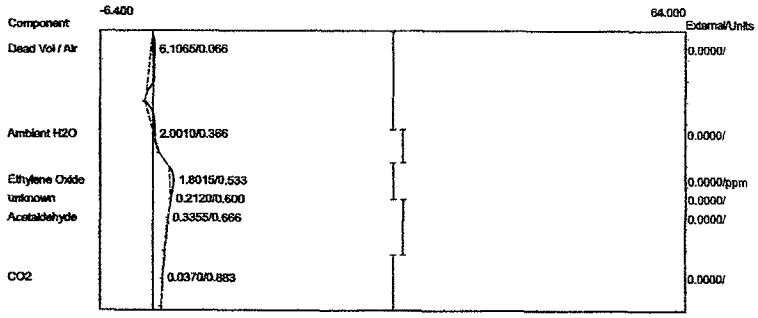
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	7.2195	0.0000	
Ambient H2O	0.383	3.0990	0.0000	
Ethylene Oxide	0.550	17.9115	0.0000	ppm
Acetaldehyde	0.750	0.1235	0.0000	
CO2	0.866	0.0170	0.0000	
		28.3705	0.0000	

Lab name: ECI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:40:32
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C06.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



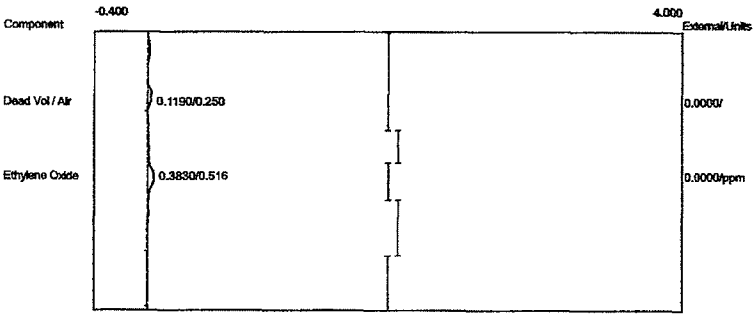
Component	Retention	Area	External	Units
Ethylene Oxide	0.516	0.3715	0.0000	ppm
		0.3715	0.0000	

Lab name: ECI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:40:32
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C06.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



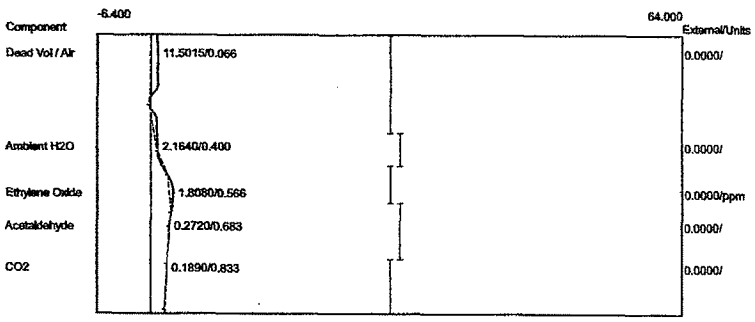
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	6.1065	0.0000	
Ambient H2O	0.366	2.0010	0.0000	
Ethylene Oxide	0.533	1.8015	0.0000	ppm
Acetaldehyde	0.666	0.3355	0.0000	
CO2	0.883	0.0370	0.0000	
		10.2815	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:44:41
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C07.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



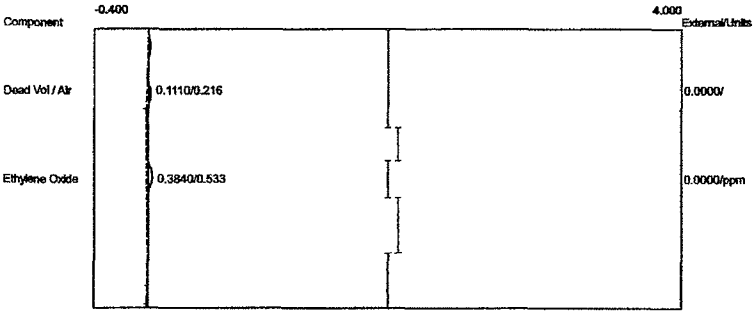
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	0.1190	0.0000	
Ethylene Oxide	0.516	0.3830	0.0000	ppm
		0.5020	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:44:41
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C07.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



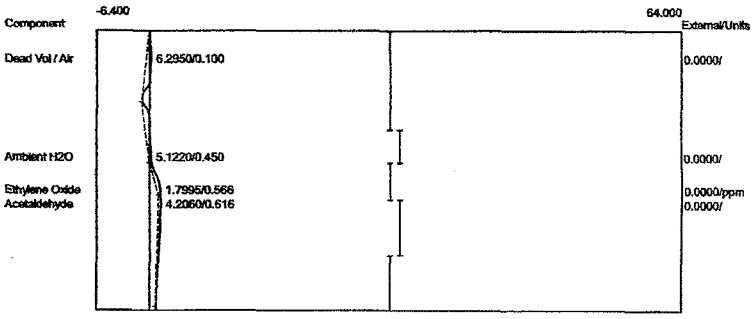
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	11.5015	0.0000	
Ambient H2O	0.400	2.1640	0.0000	
Ethylene Oxide	0.566	1.8080	0.0000	ppm
Acetaldehyde	0.683	0.2720	0.0000	
CO2	0.833	0.1890	0.0000	
		15.9345	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:50:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C08.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



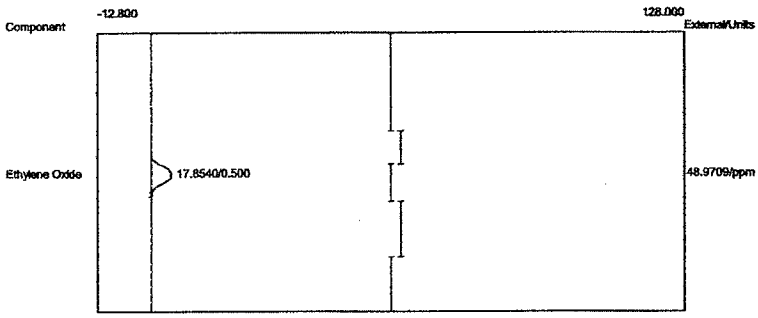
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	0.1110	0.0000	
Ethylene Oxide	0.533	0.3840	0.0000	ppm
		0.4950	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:50:13
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C08.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



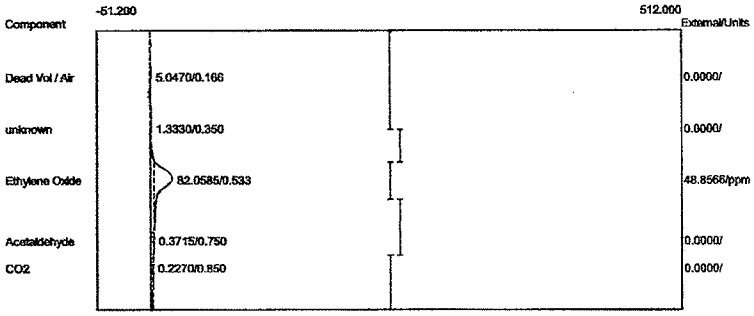
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	6.2950	0.0000	
Ambient H2O	0.450	5.1220	0.0000	
Ethylene Oxide	0.566	1.7995	0.0000	ppm
Acetaldehyde	0.616	4.2060	0.0000	
		17.4225	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:58:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C09.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



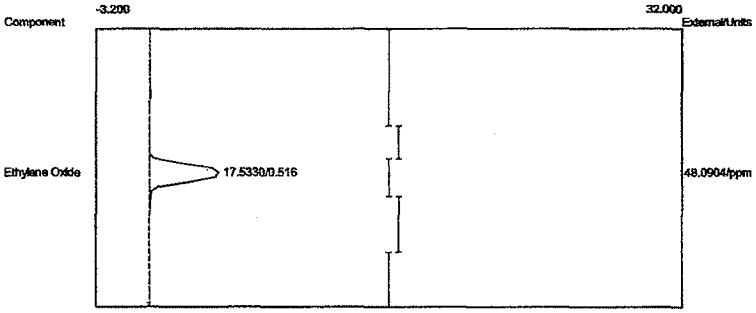
Component	Retention	Area	External	Units
Ethylene Oxide	0.500	17.8540	48.9709	ppm
		17.8540	48.9709	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PreCal
Analysis date: 05/09/2017 05:58:10
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C09.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



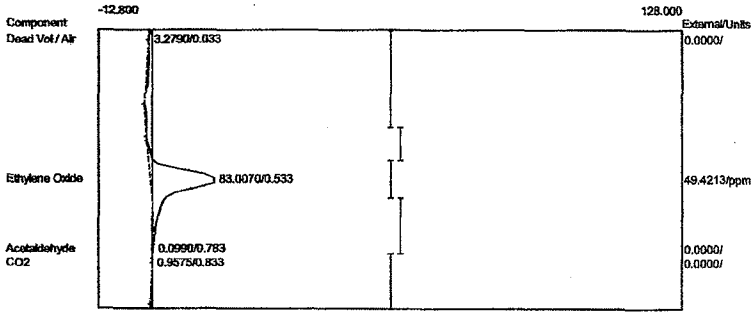
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	5.0470	0.0000	
Ethylene Oxide	0.533	82.0585	48.8566	ppm
Acetaldehyde	0.750	0.3715	0.0000	
CO2	0.850	0.2270	0.0000	
		87.7040	48.8566	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PostCal
Analysis date: 05/09/2017 15:30:31
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-C10.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



Component	Retention	Area	External	Units
Ethylene Oxide	0.516	17.5330	48.0904	ppm
		17.5330	48.0904	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: PostCal
Analysis date: 05/09/2017 15:30:31
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-C10.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer

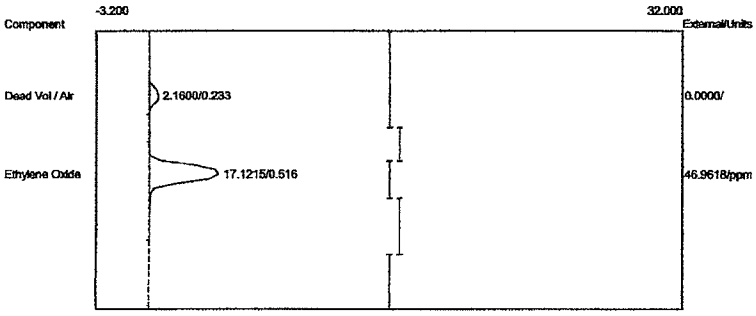


Component	Retention	Area	External	Units
Dead Vol / Air	0.033	3.2790	0.0000	
Ethylene Oxide	0.533	83.0070	49.4213	ppm
Acetaldehyde	0.783	0.0990	0.0000	
CO2	0.833	0.9575	0.0000	
		87.3425	49.4213	

APPENDIX B

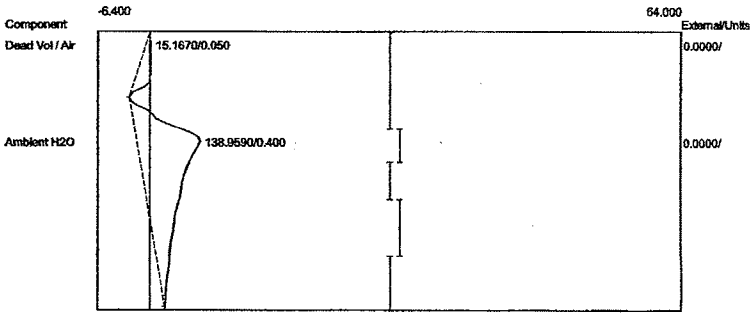
Run #1 Chromatograms - Backvent

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:21:24
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



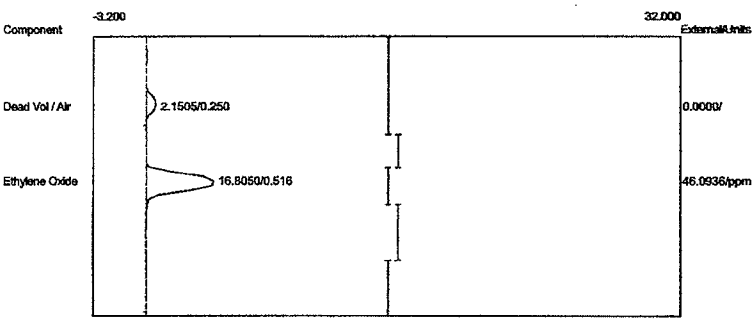
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1600	0.0000	
Ethylene Oxide	0.516	17.1215	46.9618	ppm
		19.2815	46.9618	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:21:24
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



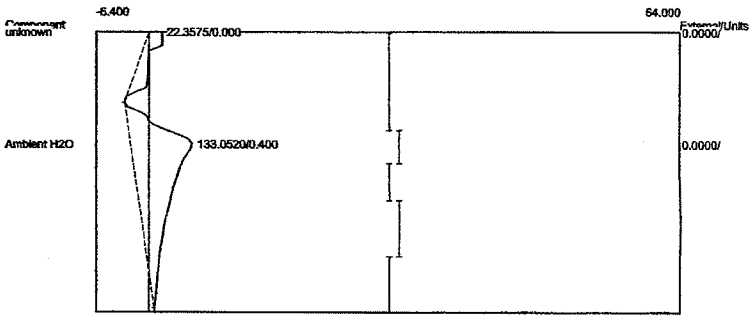
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	15.1670	0.0000	
Ambient H2O	0.400	138.9590	0.0000	
		154.1260	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:22:29
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



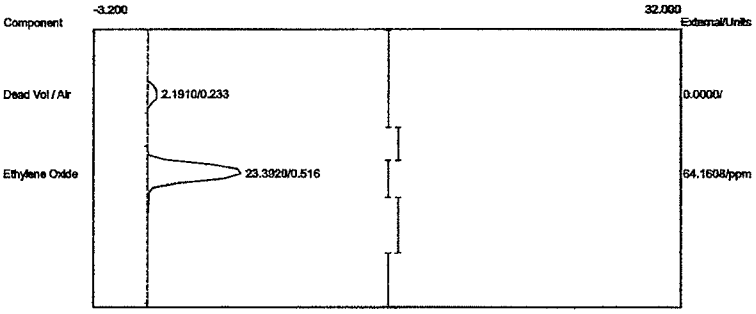
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1505	0.0000	
Ethylene Oxide	0.516	16.8050	46.0936	ppm
		18.9555	46.0936	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:22:29
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



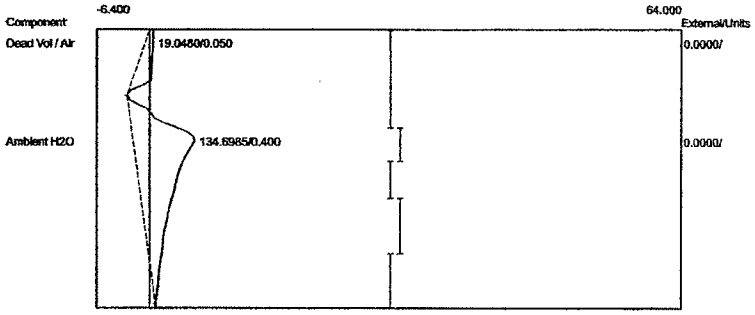
Component	Retention	Area	External	Units
Ambient H2O	0.400	133.0520	0.0000	
		133.0520	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:23:35
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



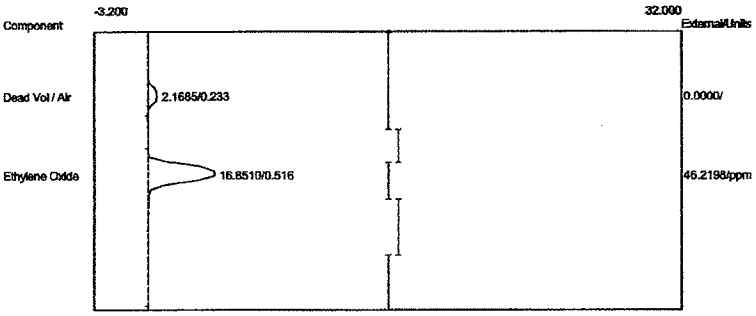
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1910	0.0000	
Ethylene Oxide	0.516	23.3920	64.1608	ppm
		25.5830	64.1608	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:23:35
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



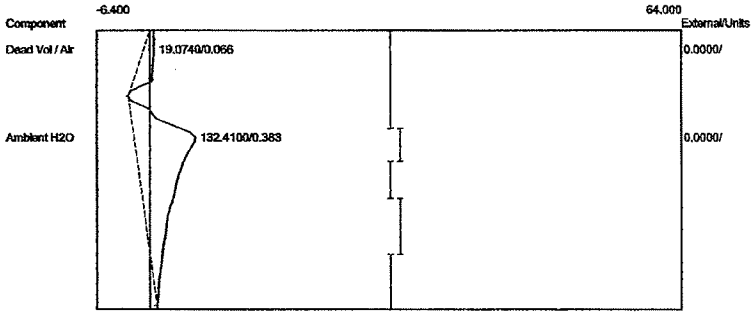
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	19.0480	0.0000	
Ambient H2O	0.400	134.6985	0.0000	
		153.7465	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:24:41
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



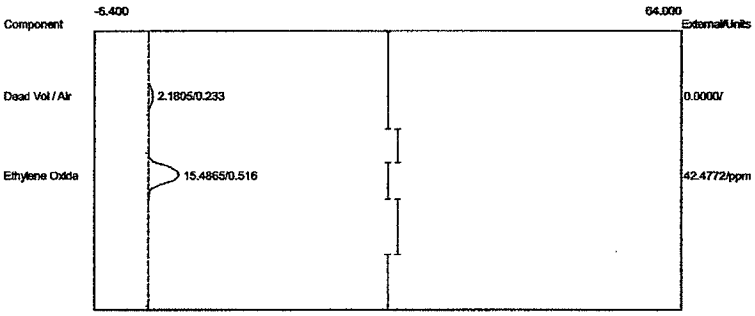
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1685	0.0000	
Ethylene Oxide	0.516	16.8510	46.2198	ppm
		19.0195	46.2198	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:24:41
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



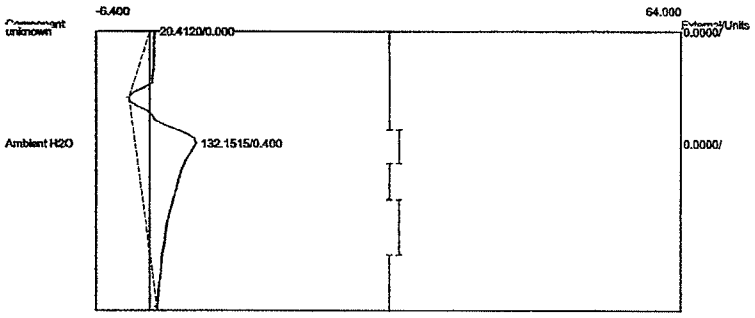
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	19.0740	0.0000	
Ambient H2O	0.383	132.4100	0.0000	
		151.4840	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:25:46
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



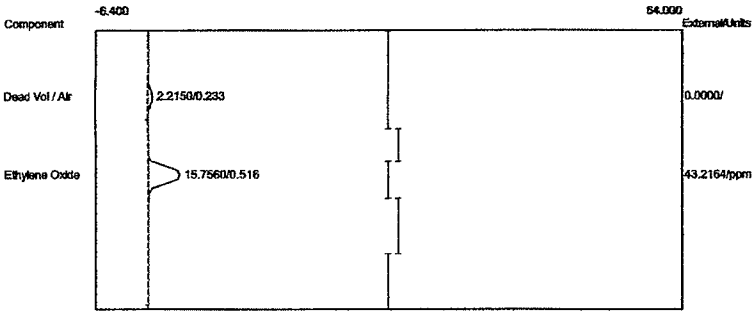
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1805	0.0000	
Ethylene Oxide	0.516	15.4865	42.4772	ppm
		17.6670	42.4772	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:25:46
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



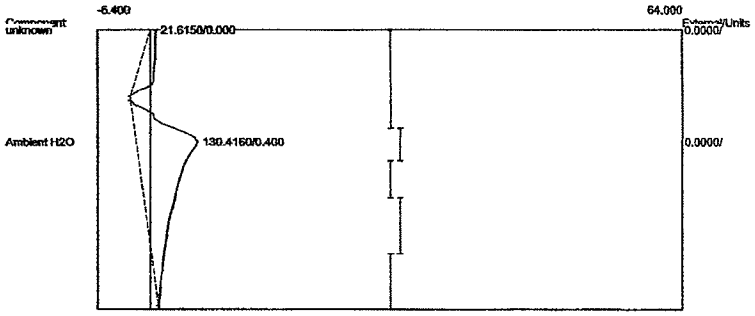
Component	Retention	Area	External	Units
Ambient H2O	0.400	132.1515	0.0000	
		132.1515	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:26:50
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



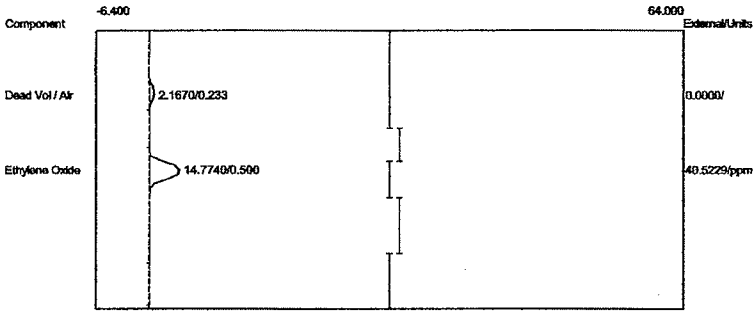
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.2150	0.0000	
Ethylene Oxide	0.516	15.7560	43.2164	ppm
		17.9710	43.2164	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:26:50
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



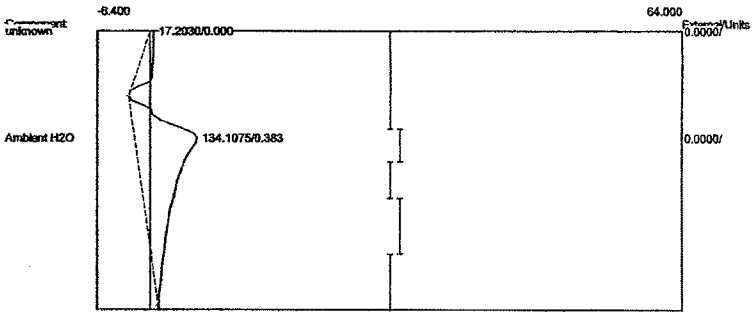
Component	Retention	Area	External	Units
Ambient H2O	0.400	130.4160	0.0000	
		130.4160	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:28:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



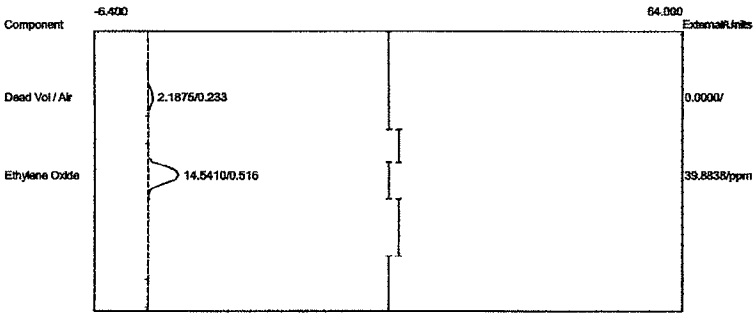
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1670	0.0000	
Ethylene Oxide	0.500	14.7740	40.5229	ppm
		16.9410	40.5229	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:28:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



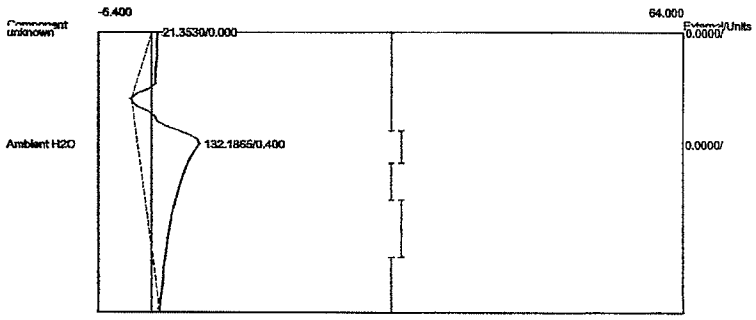
Component	Retention	Area	External	Units
Ambient H2O	0.383	134.1075	0.0000	
		134.1075	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:29:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



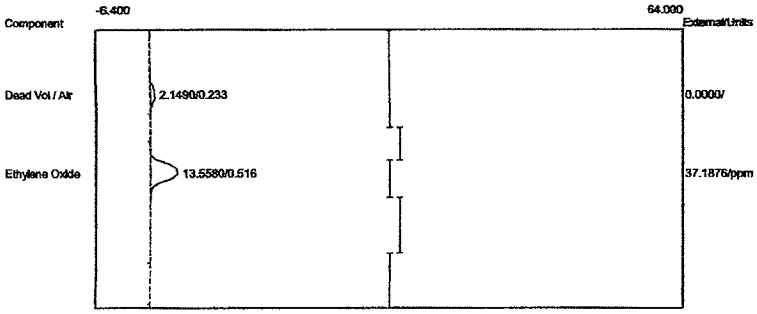
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1875	0.0000	
Ethylene Oxide	0.516	14.5410	39.8838	ppm
		16.7285	39.8838	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:29:13
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



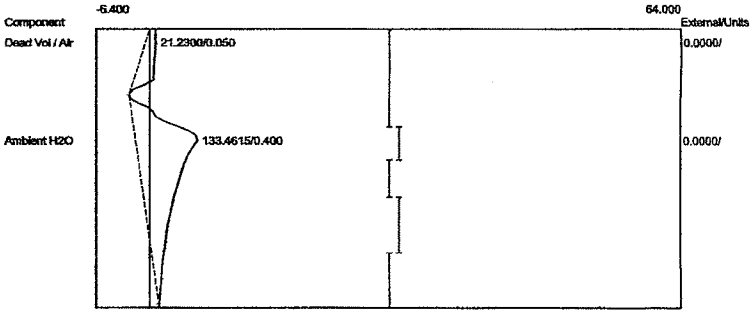
Component	Retention	Area	External	Units
Ambient H2O	0.400	132.1865	0.0000	
		132.1865	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:30:19
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



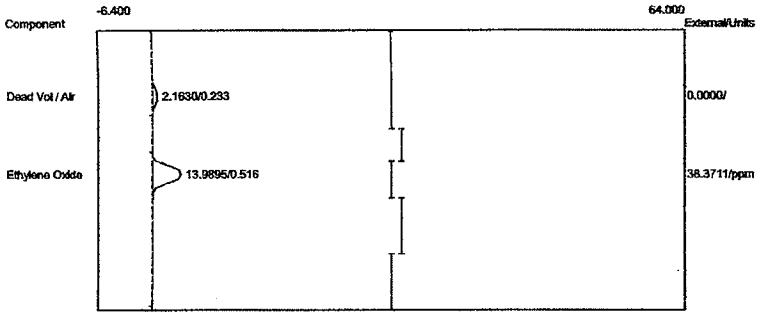
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1490	0.0000	
Ethylene Oxide	0.516	13.5580	37.1876	ppm
		15.7070	37.1876	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:30:19
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



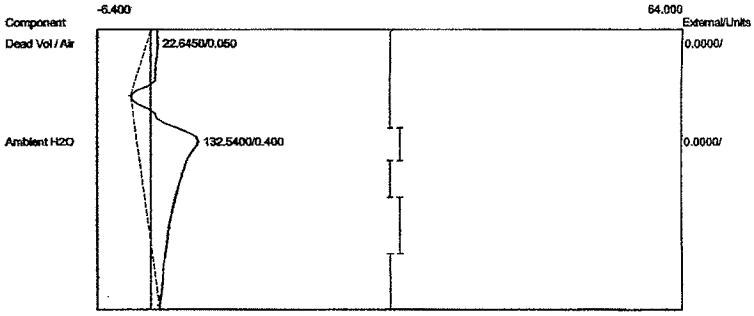
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	21.2300	0.0000	
Ambient H2O	0.400	133.4615	0.0000	
		154.6915	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:31:25
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



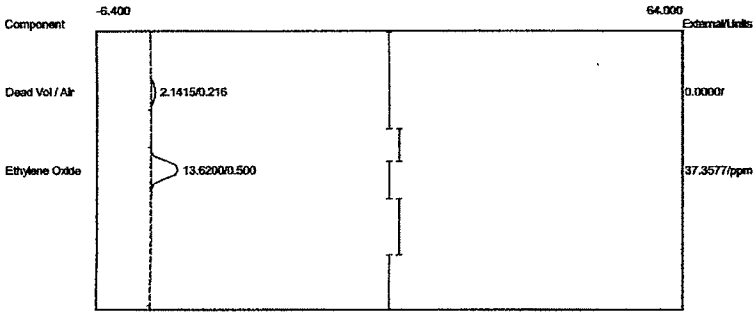
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1630	0.0000	
Ethylene Oxide	0.516	13.9895	38.3711	ppm
		16.1525	38.3711	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:31:25
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



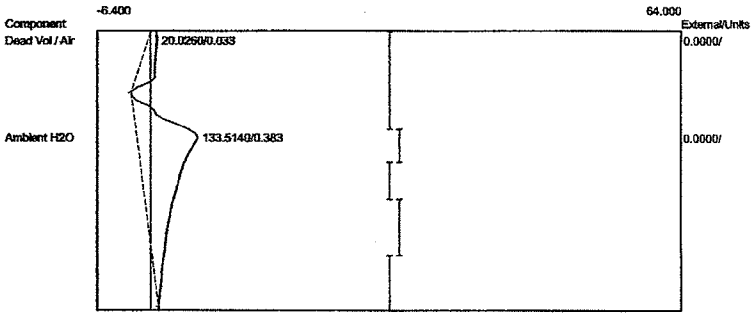
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	22.6450	0.0000	
Ambient H2O	0.400	132.5400	0.0000	
		155.1850	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:32:32
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



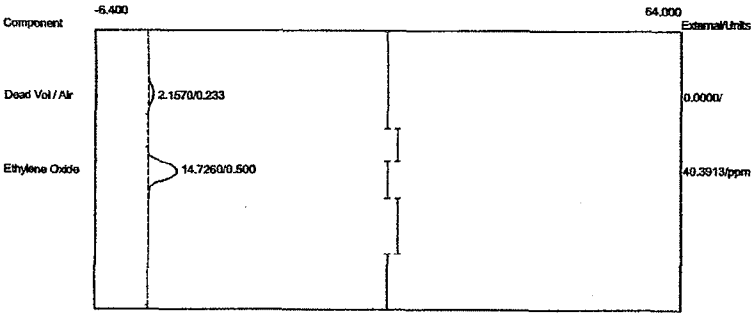
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	2.1415	0.0000	
Ethylene Oxide	0.500	13.6200	37.3577	ppm
		15.7615	37.3577	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:32:32
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



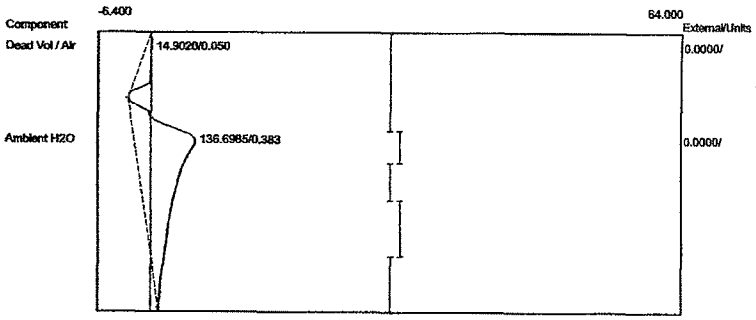
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	20.0260	0.0000	
Ambient H2O	0.383	133.5140	0.0000	
		153.5400	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:34:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1B12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1570	0.0000	
Ethylene Oxide	0.500	14.7260	40.3913	ppm
		16.8830	40.3913	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#1
Analysis date: 05/09/2017 09:34:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1B12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer

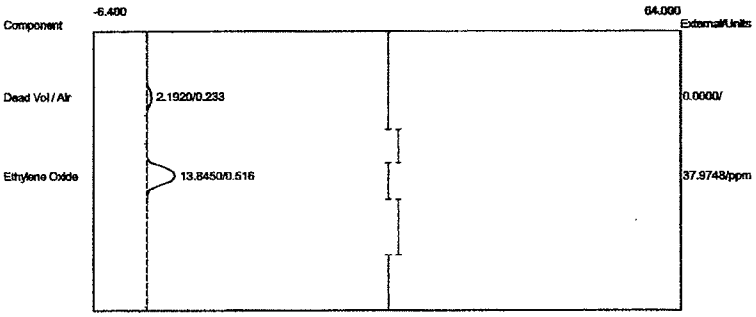


Component	Retention	Area	External	Units
Dead Vol / Air	0.050	14.9020	0.0000	
Ambient H2O	0.383	136.6985	0.0000	
		151.6005	0.0000	

APPENDIX C

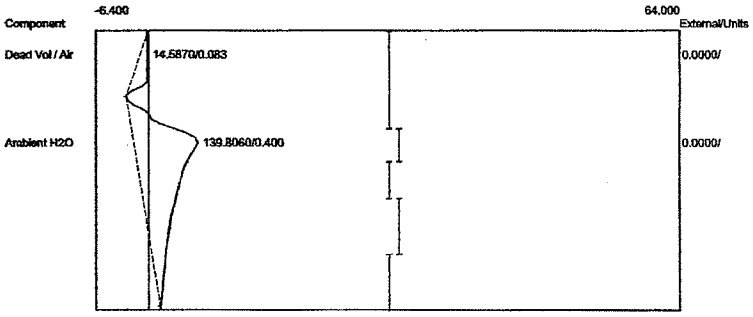
Run #1 Chromatograms - Aeration

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:37:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



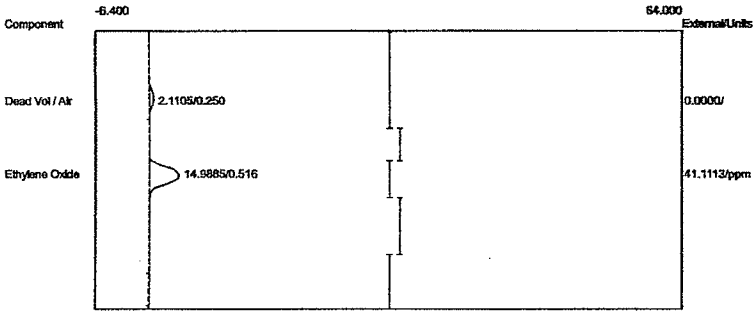
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1920	0.0000	
Ethylene Oxide	0.516	13.8450	37.9748	ppm
		16.0370	37.9748	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:37:10
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



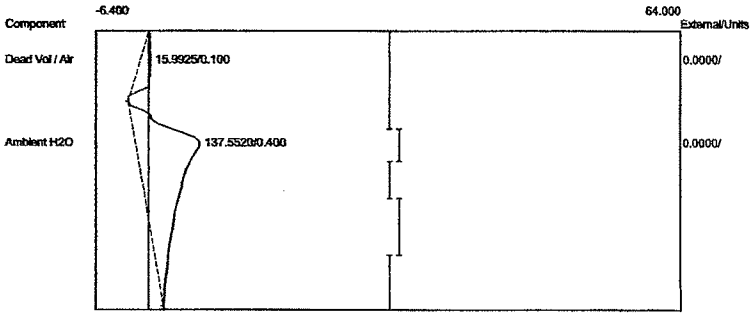
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	14.5870	0.0000	
Ambient H2O	0.400	139.8060	0.0000	
		154.3930	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:42:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



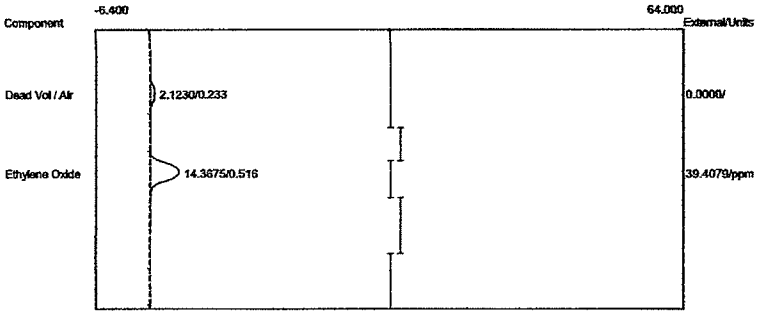
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1105	0.0000	
Ethylene Oxide	0.516	14.9885	41.1113	ppm
		17.0990	41.1113	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:42:06
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



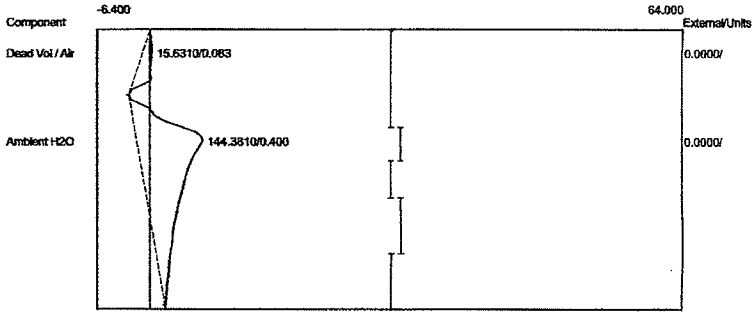
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	15.9925	0.0000	
Ambient H2O	0.400	137.5520	0.0000	
		153.5445	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:47:50
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



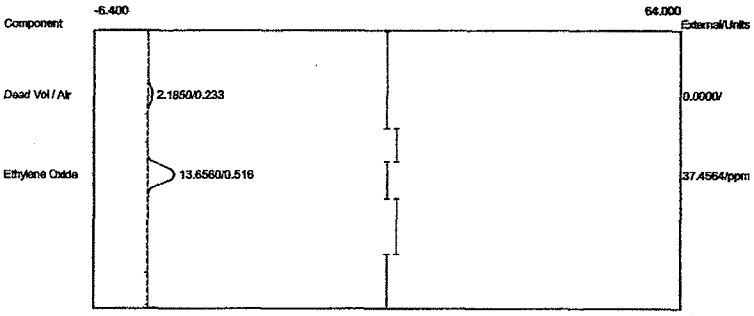
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1230	0.0000	
Ethylene Oxide	0.516	14.3675	39.4079	ppm
		16.4905	39.4079	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:47:50
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



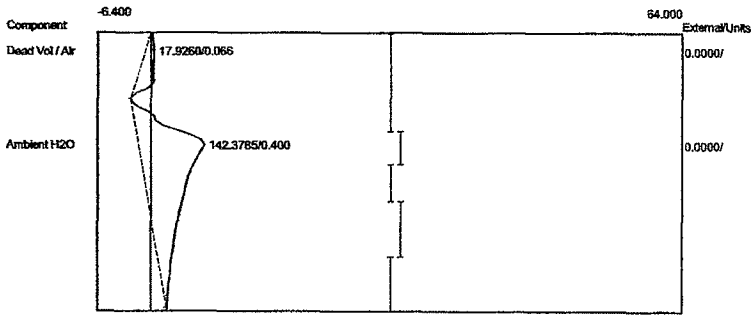
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.6310	0.0000	
Ambient H2O	0.400	144.3810	0.0000	
		160.0120	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:52:01
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



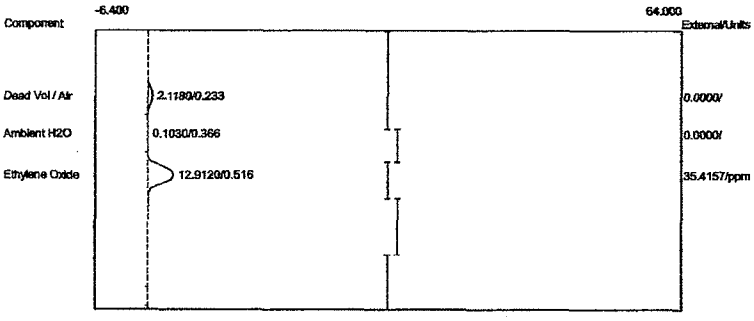
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1850	0.0000	
Ethylene Oxide	0.516	13.6560	37.4564	ppm
		15.8410	37.4564	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:52:01
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



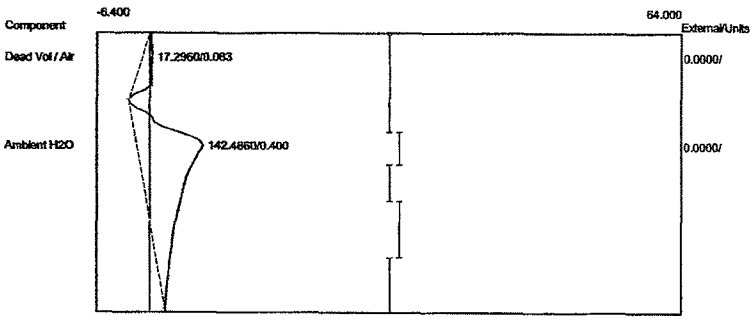
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.9260	0.0000	
Ambient H2O	0.400	142.3785	0.0000	
		160.3045	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:57:07
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



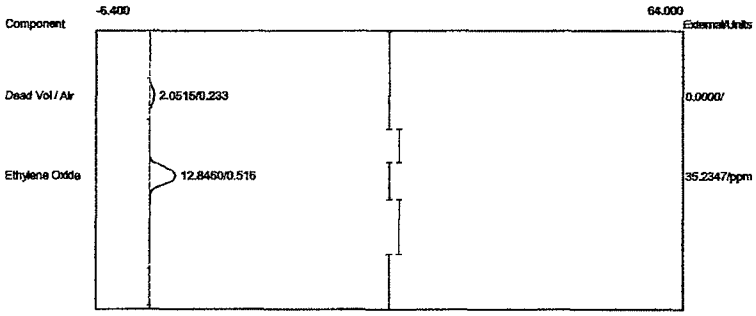
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1180	0.0000	
Ambient H2O	0.366	0.1030	0.0000	
Ethylene Oxide	0.516	12.9120	35.4157	ppm
		15.1330	35.4157	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 09:57:07
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



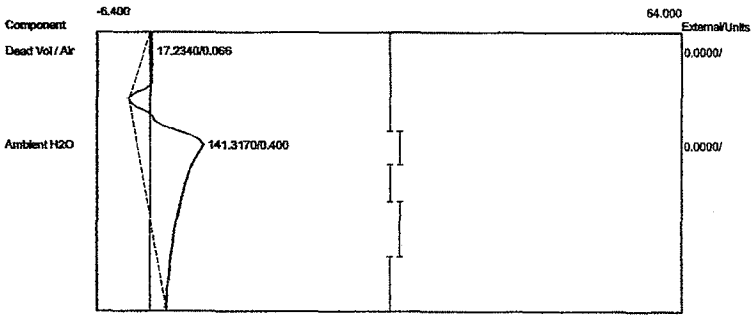
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.2960	0.0000	
Ambient H2O	0.400	142.4860	0.0000	
		159.7820	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:02:11
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



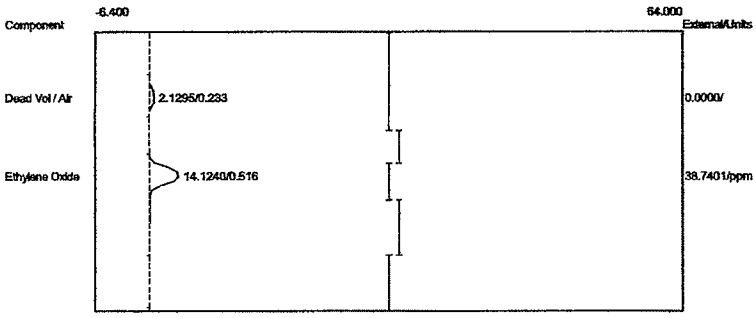
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0515	0.0000	
Ethylene Oxide	0.516	12.8460	35.2347	ppm
		14.8975	35.2347	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:02:11
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



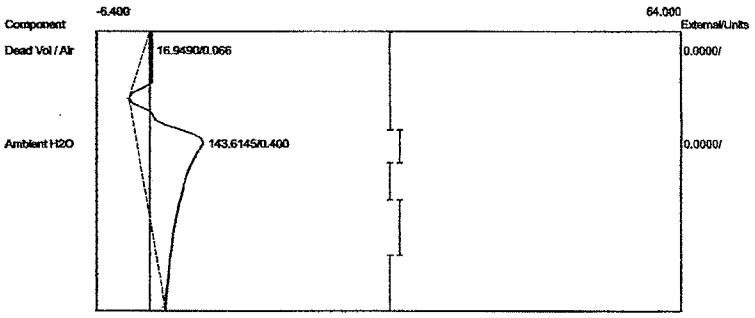
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.2340	0.0000	
Ambient H2O	0.400	141.3170	0.0000	
		158.5510	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:07:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



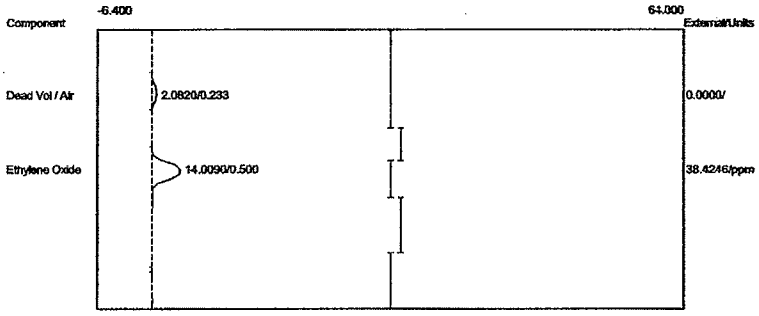
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1295	0.0000	
Ethylene Oxide	0.516	14.1240	38.7401	ppm
		16.2535	38.7401	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:07:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



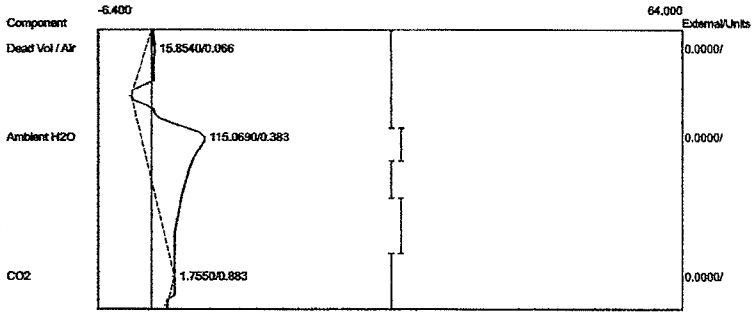
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	16.9490	0.0000	
Ambient H2O	0.400	143.6145	0.0000	
		160.5635	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:12:03
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



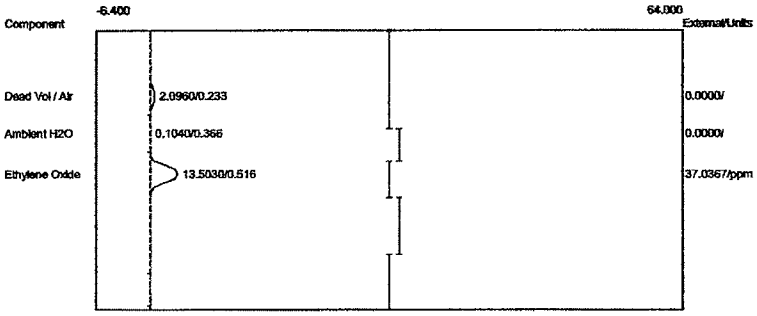
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0820	0.0000	
Ethylene Oxide	0.500	14.0090	38.4246	ppm
		16.0910	38.4246	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:12:03
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



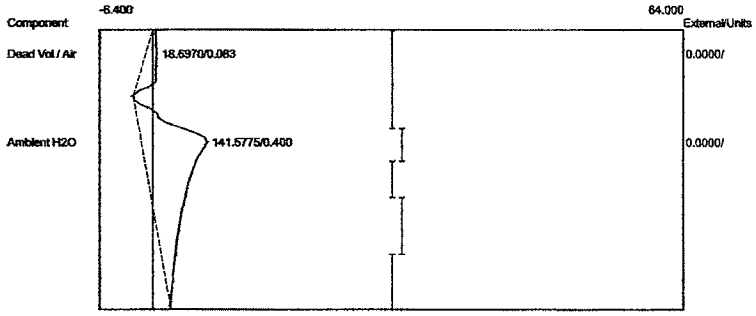
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	15.8540	0.0000	
Ambient H2O	0.383	115.0690	0.0000	
CO2	0.883	1.7550	0.0000	
		132.6780	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:17:07
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



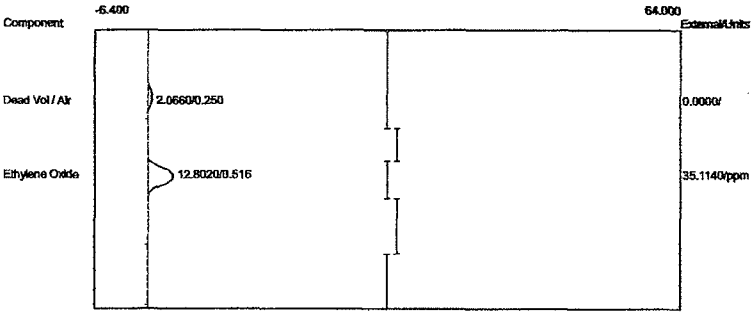
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0960	0.0000	
Ambient H2O	0.366	0.1040	0.0000	
Ethylene Oxide	0.516	13.5030	37.0367	ppm
		15.7030	37.0367	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:17:07
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



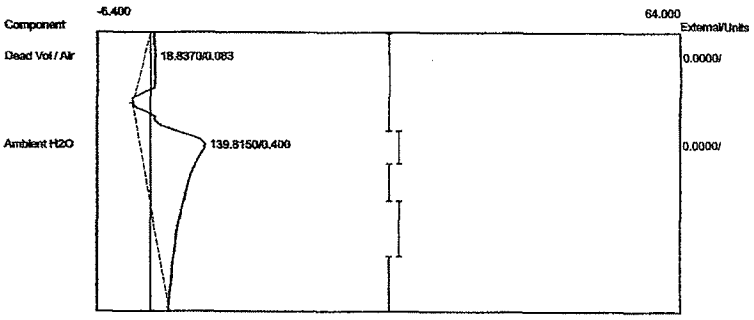
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.6970	0.0000	
Ambient H2O	0.400	141.5775	0.0000	
		160.2745	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:22:41
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



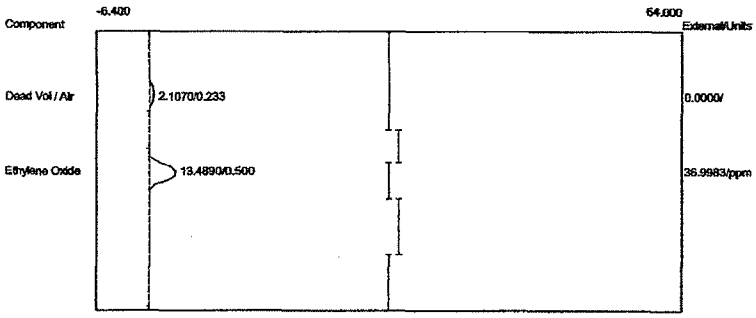
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.0660	0.0000	
Ethylene Oxide	0.516	12.8020	35.1140	ppm
		14.8680	35.1140	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:22:41
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



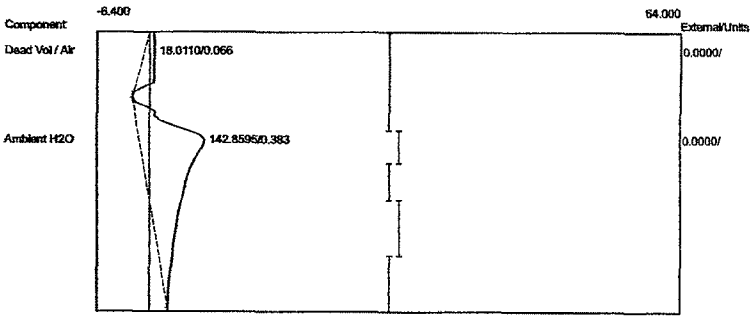
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.8370	0.0000	
Ambient H2O	0.400	139.8150	0.0000	
		158.6520	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:27:12
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



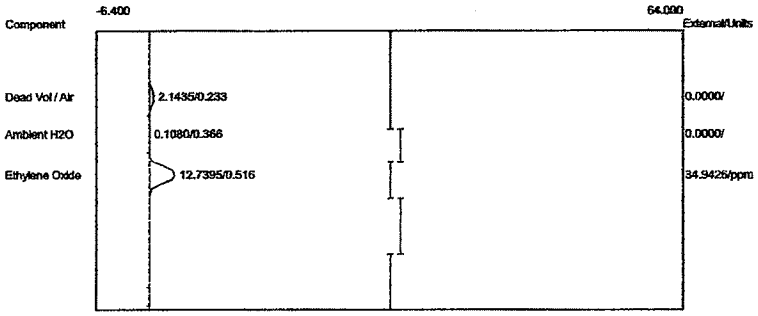
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1070	0.0000	
Ethylene Oxide	0.500	13.4890	36.9983	ppm
		15.5960	36.9983	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:27:12
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



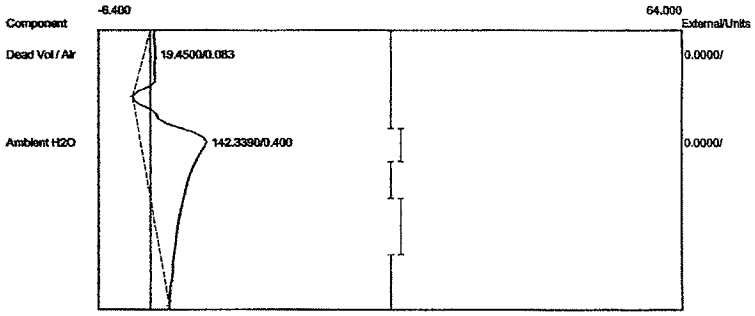
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	18.0110	0.0000	
Ambient H2O	0.383	142.8595	0.0000	
		160.8705	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:32:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-1A12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1435	0.0000	
Ambient H2O	0.366	0.1080	0.0000	
Ethylene Oxide	0.516	12.7395	34.9426	ppm
		14.9910	34.9426	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#1
Analysis date: 05/09/2017 10:32:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-1A12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer

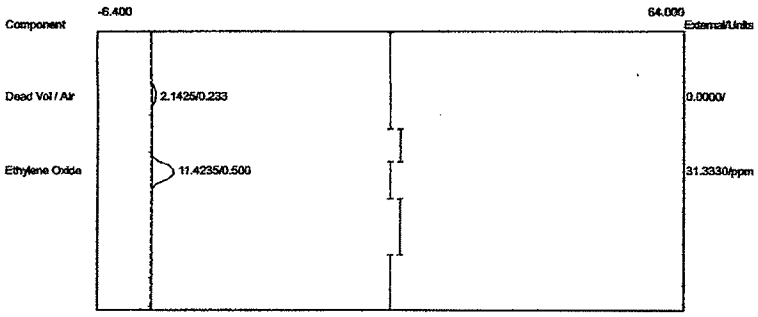


Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.4500	0.0000	
Ambient H2O	0.400	142.3390	0.0000	
		161.7890	0.0000	

APPENDIX D

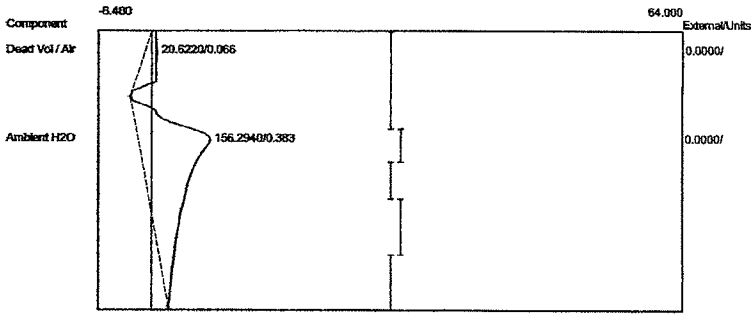
Run #2 Chromatograms - Backvent

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:35:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



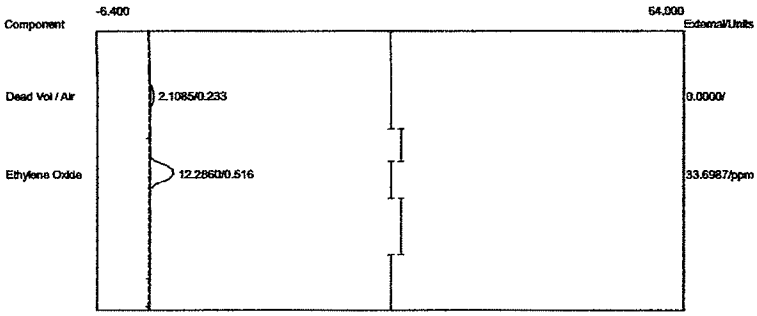
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1425	0.0000	
Ethylene Oxide	0.500	11.4235	31.3330	ppm
		13.5660	31.3330	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:35:06
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



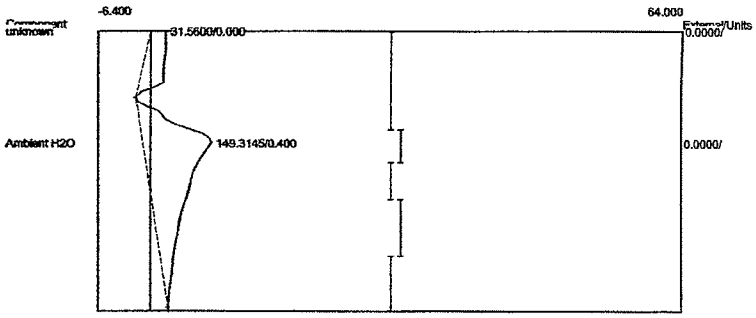
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	20.6220	0.0000	
Ambient H2O	0.383	156.2940	0.0000	
		176.9160	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:36:11
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



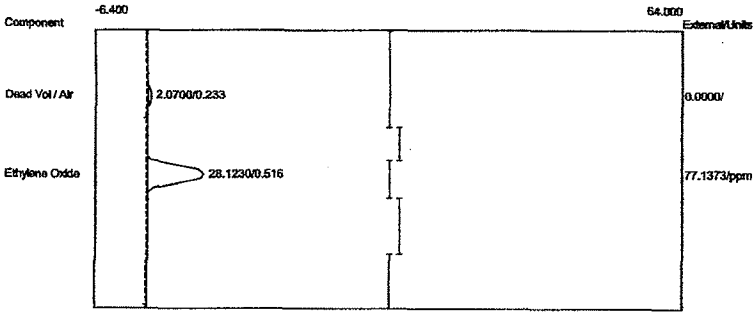
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1085	0.0000	
Ethylene Oxide	0.516	12.2860	33.6987	ppm
		14.3945	33.6987	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:36:11
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



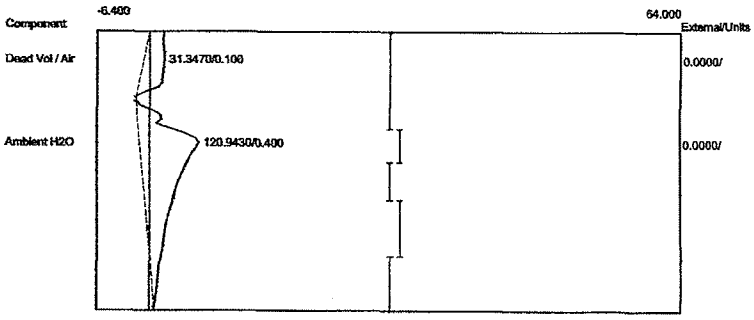
Component	Retention	Area	External	Units
Ambient H2O	0.400	149.3145	0.0000	
		149.3145	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:37:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



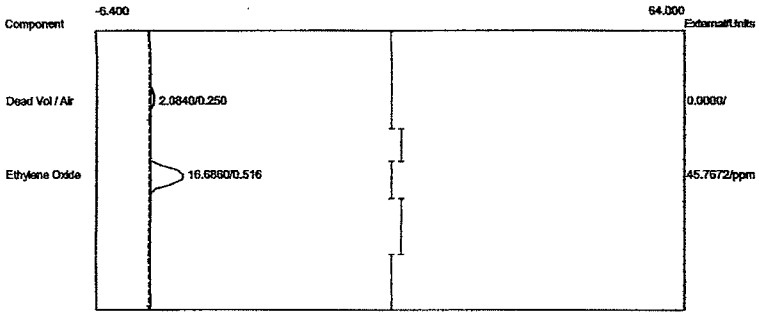
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0700	0.0000	
Ethylene Oxide	0.516	28.1230	77.1373	ppm
		30.1930	77.1373	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:37:21
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



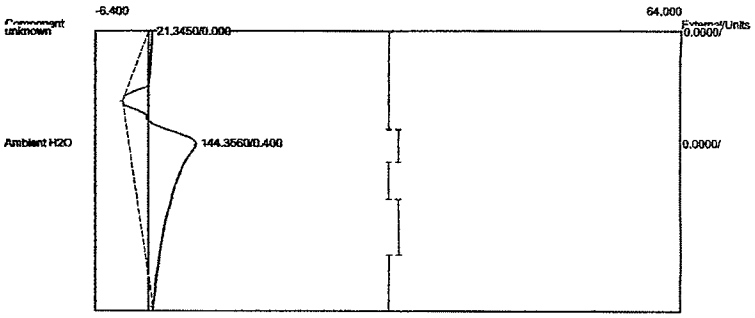
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	31.3470	0.0000	
Ambient H2O	0.400	120.9430	0.0000	
		152.2900	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:38:29
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



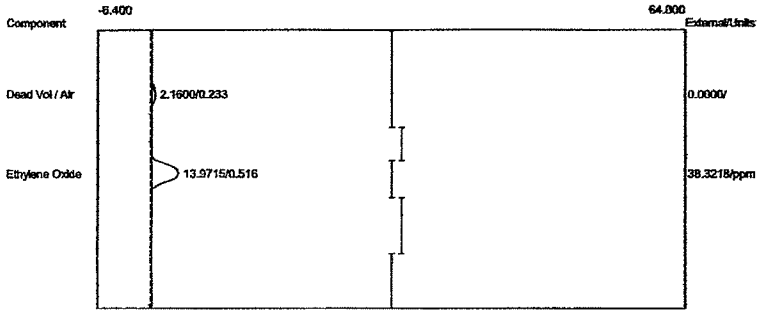
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.0840	0.0000	
Ethylene Oxide	0.516	16.6860	45.7672	ppm
		18.7700	45.7672	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:38:29
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



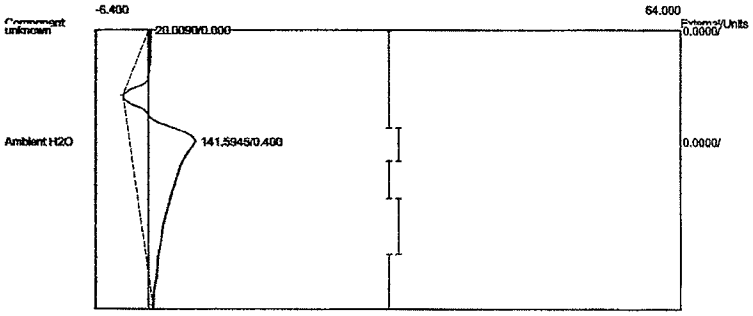
Component	Retention	Area	External	Units
Ambient H2O	0.400	144.3560	0.0000	
		144.3560	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:39:36
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



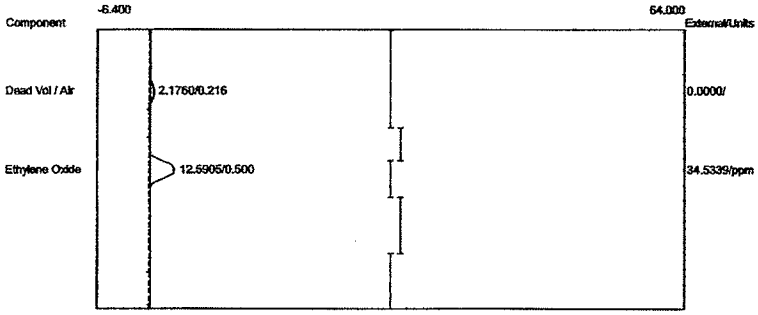
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1600	0.0000	
Ethylene Oxide	0.516	13.9715	38.3218	ppm
		16.1315	38.3218	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:39:36
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



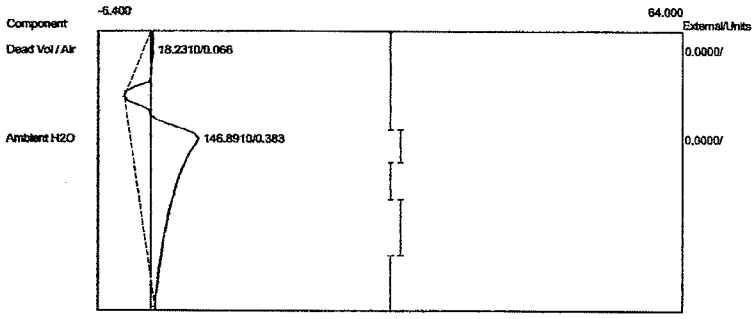
Component	Retention	Area	External	Units
Ambient H2O	0.400	141.5945	0.0000	
		141.5945	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:40:42
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



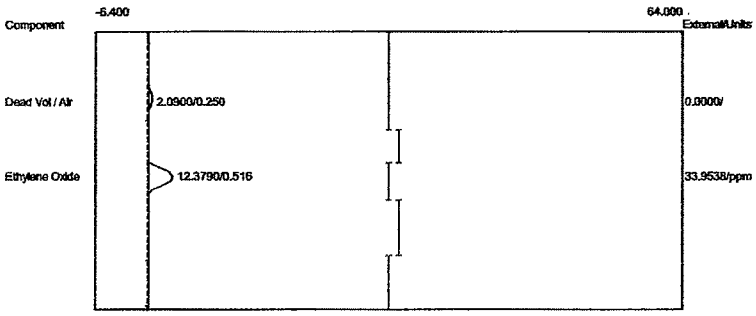
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	2.1760	0.0000	
Ethylene Oxide	0.500	12.5905	34.5339	ppm
		14.7665	34.5339	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:40:42
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



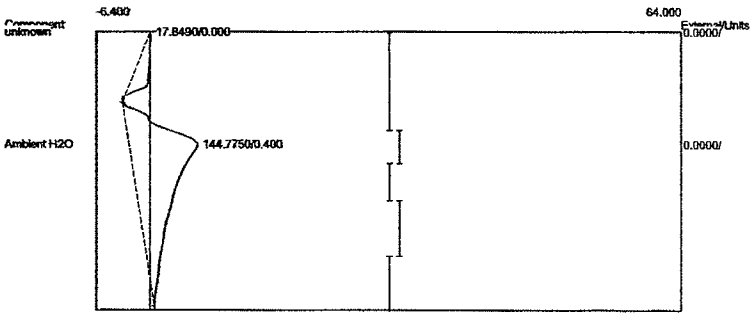
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	18.2310	0.0000	
Ambient H2O	0.383	146.8910	0.0000	
		165.1220	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:41:54
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



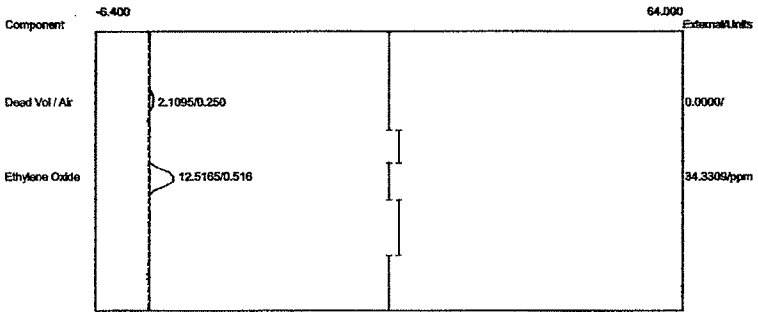
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.0900	0.0000	
Ethylene Oxide	0.516	12.3790	33.9538	ppm
		14.4690	33.9538	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:41:54
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



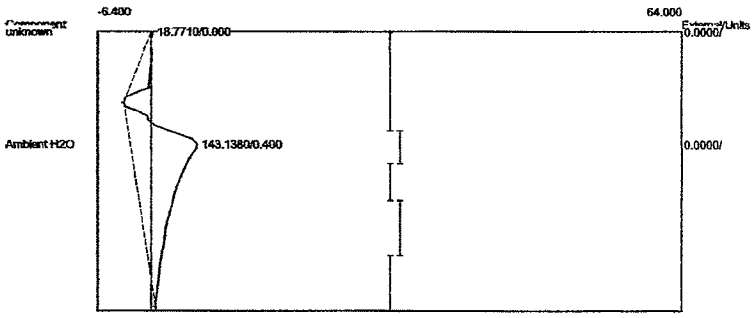
Component	Retention	Area	External	Units
Ambient H2O	0.400	144.7750	0.0000	
		144.7750	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:43:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



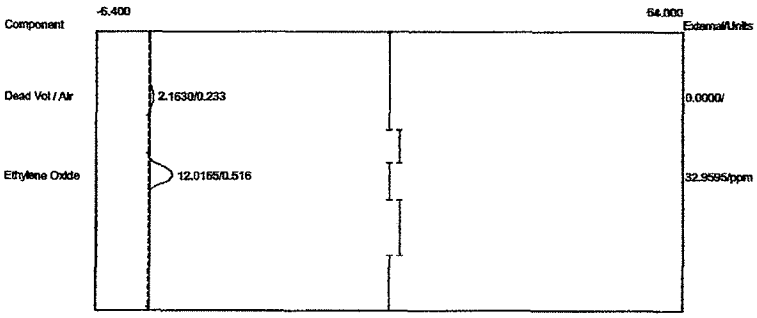
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1095	0.0000	
Ethylene Oxide	0.516	12.5165	34.3309	ppm
		14.6260	34.3309	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:43:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



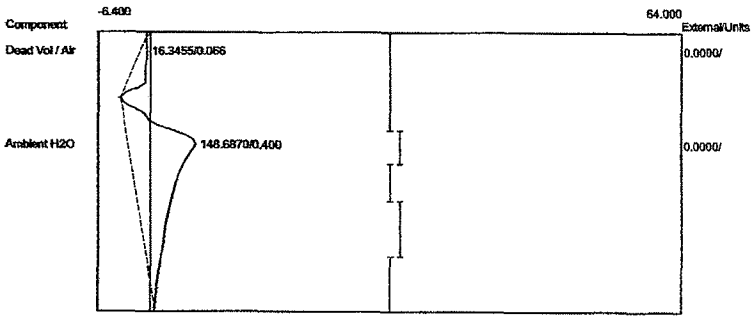
Component	Retention	Area	External	Units
Ambient H2O	0.400	143.1380	0.0000	
		143.1380	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:44:40
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



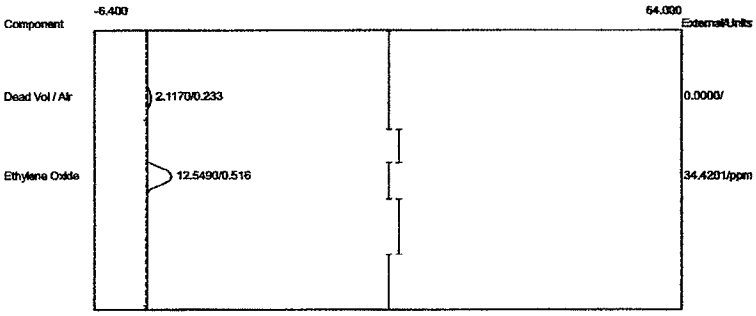
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1630	0.0000	
Ethylene Oxide	0.516	12.0165	32.9595	ppm
		14.1795	32.9595	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:44:40
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



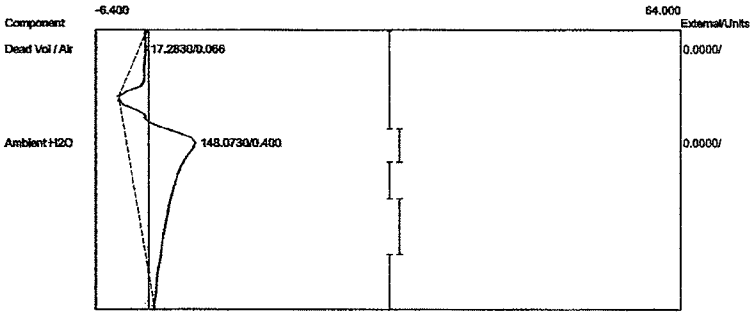
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	16.3455	0.0000	
Ambient H2O	0.400	148.6870	0.0000	
		165.0325	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:46:19
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



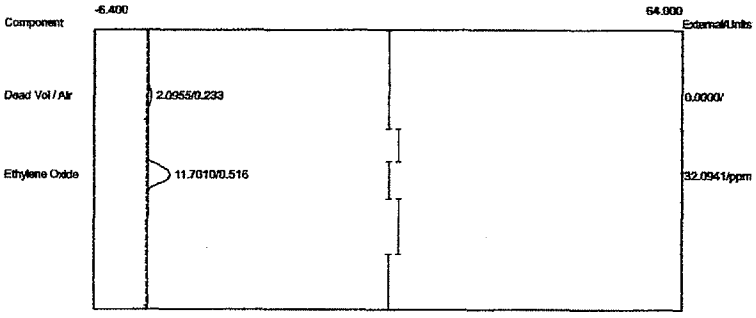
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1170	0.0000	
Ethylene Oxide	0.516	12.5490	34.4201	ppm
		14.6660	34.4201	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:46:19
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



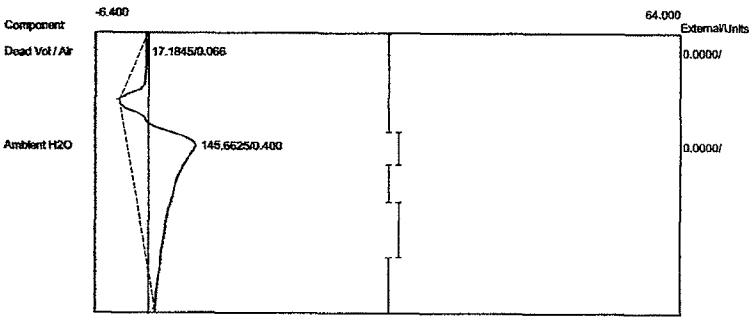
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.2830	0.0000	
Ambient H2O	0.400	148.0730	0.0000	
		165.3560	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:47:53
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



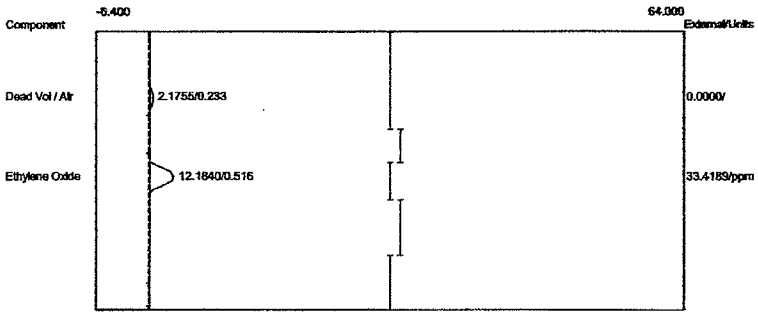
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0955	0.0000	
Ethylene Oxide	0.516	11.7010	32.0941	ppm
		13.7965	32.0941	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:47:53
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



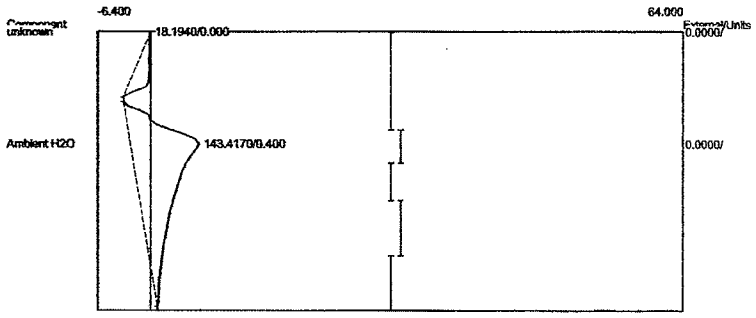
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.1845	0.0000	
Ambient H2O	0.400	145.6625	0.0000	
		162.8470	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:49:14
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2B12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1755	0.0000	
Ethylene Oxide	0.516	12.1840	33.4189	ppm
		14.3595	33.4189	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#2
Analysis date: 05/09/2017 11:49:14
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2B12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer

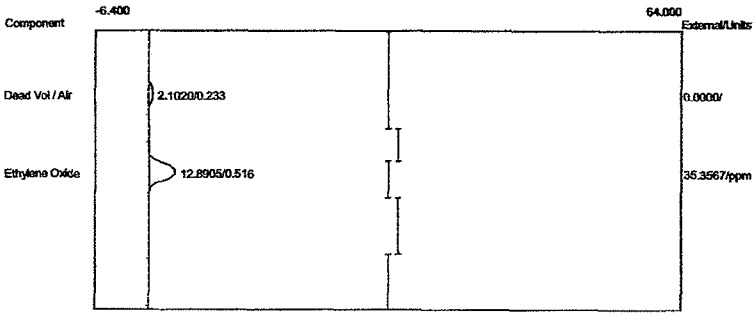


Component	Retention	Area	External	Units
Ambient H2O	0.400	143.4170	0.0000	
		143.4170	0.0000	

APPENDIX E

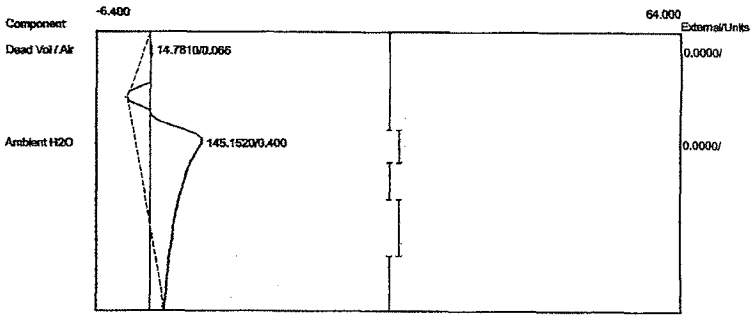
Run #2 Chromatograms - Aeration

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:37:32
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



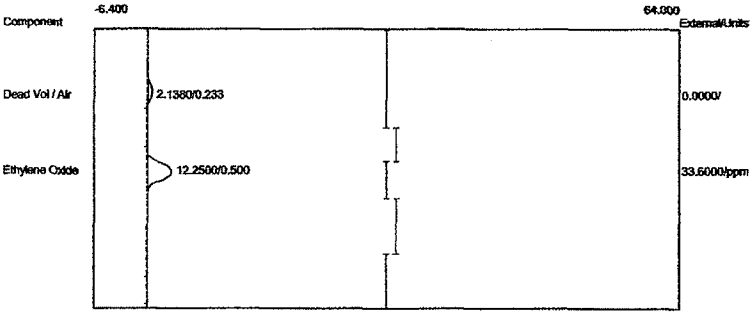
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1020	0.0000	
Ethylene Oxide	0.516	12.8905	35.3567	ppm
		14.9925	35.3567	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:37:32
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



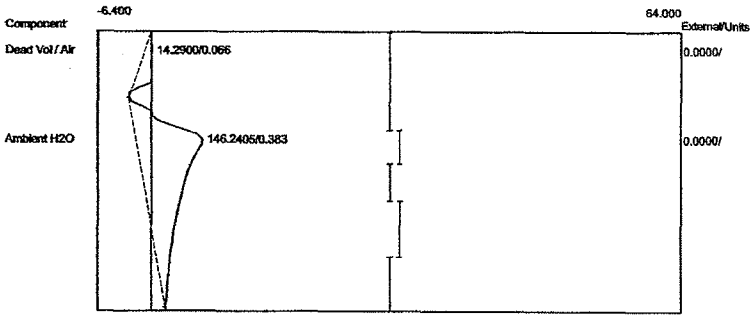
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.7810	0.0000	
Ambient H2O	0.400	145.1520	0.0000	
		159.9330	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:42:03
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



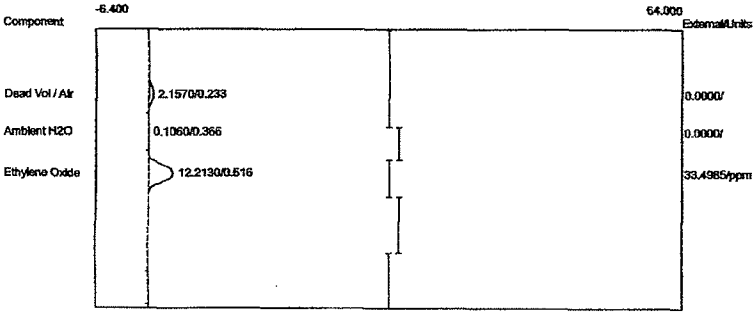
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1380	0.0000	
Ethylene Oxide	0.500	12.2500	33.6000	ppm
		14.3880	33.6000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:42:03
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



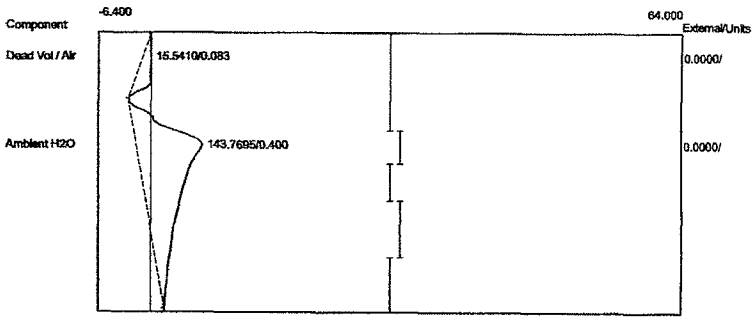
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.2900	0.0000	
Ambient H2O	0.383	146.2405	0.0000	
		160.5305	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:47:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



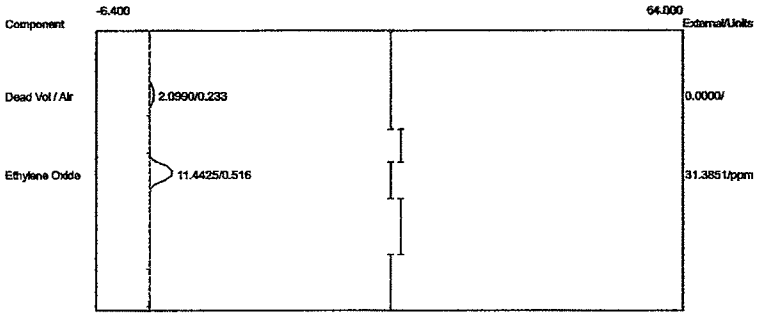
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1570	0.0000	
Ambient H2O	0.366	0.1060	0.0000	
Ethylene Oxide	0.516	12.2130	33.4985	ppm
		14.4760	33.4985	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:47:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



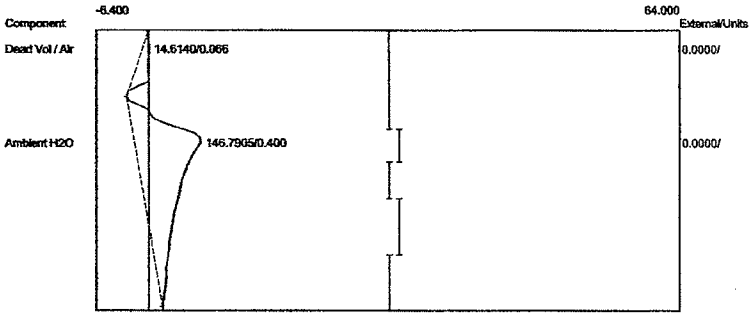
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.5410	0.0000	
Ambient H2O	0.400	143.7695	0.0000	
		159.3105	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:52:16
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



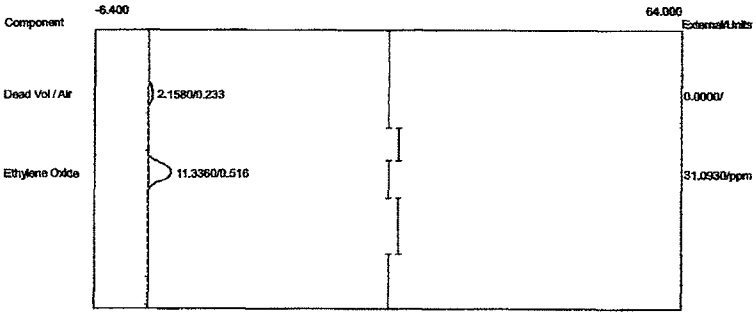
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0990	0.0000	
Ethylene Oxide	0.516	11.4425	31.3851	ppm
		13.5415	31.3851	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:52:16
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



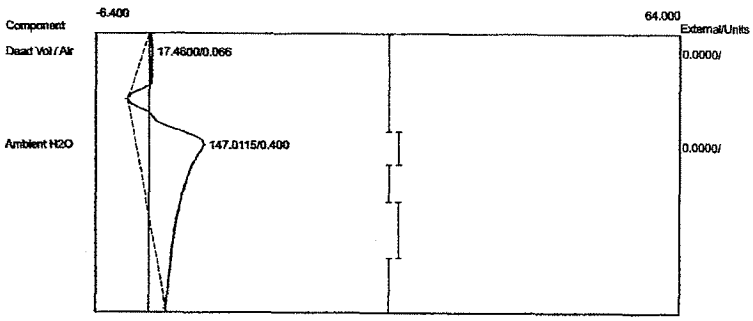
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.6140	0.0000	
Ambient H2O	0.400	146.7905	0.0000	
		161.4045	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:57:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



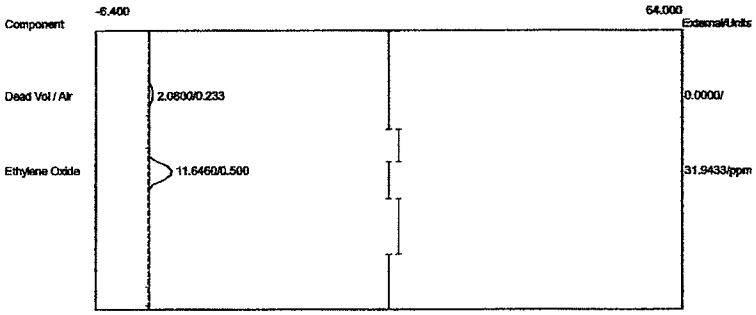
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1580	0.0000	
Ethylene Oxide	0.516	11.3360	31.0930	ppm
		13.4940	31.0930	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 10:57:21
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



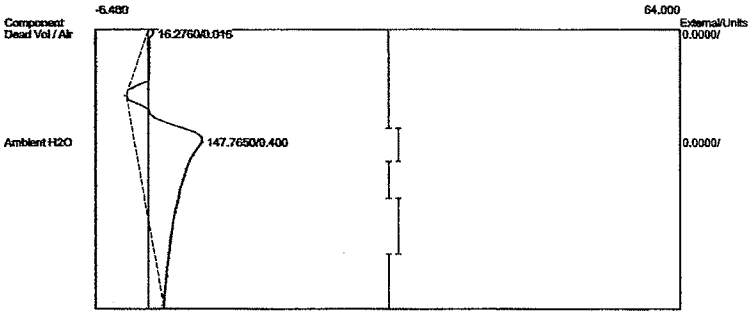
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.4600	0.0000	
Ambient H2O	0.400	147.0115	0.0000	
		164.4715	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:02:33
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



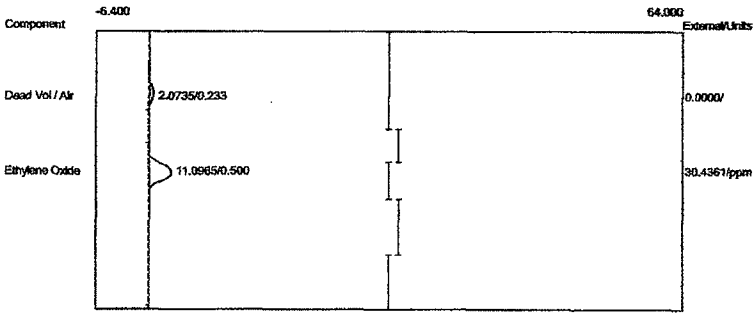
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0800	0.0000	
Ethylene Oxide	0.500	11.6460	31.9433	ppm
		13.7260	31.9433	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:02:33
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



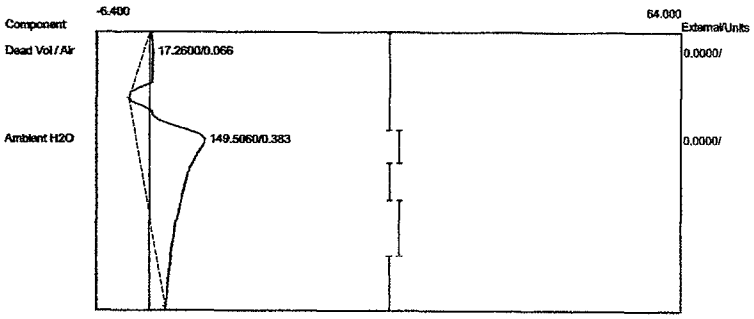
Component	Retention	Area	External	Units
Dead Vol / Air	0.016	16.2760	0.0000	
Ambient H2O	0.400	147.7650	0.0000	
		164.0410	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:07:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



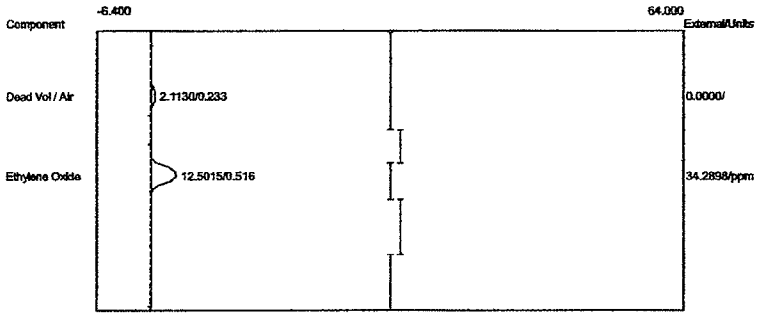
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0735	0.0000	
Ethylene Oxide	0.500	11.0965	30.4361	ppm
		13.1700	30.4361	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:07:13
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



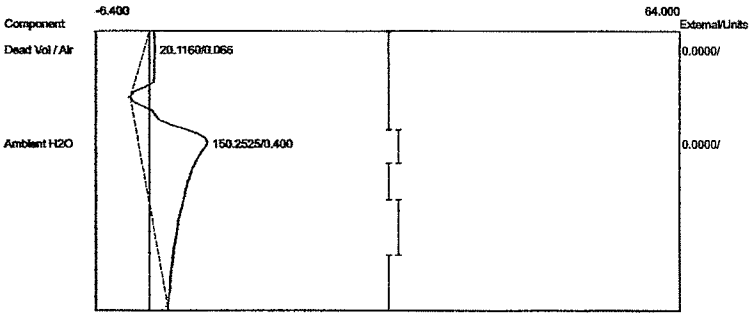
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	17.2600	0.0000	
Ambient H2O	0.383	149.5060	0.0000	
		166.7660	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:12:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



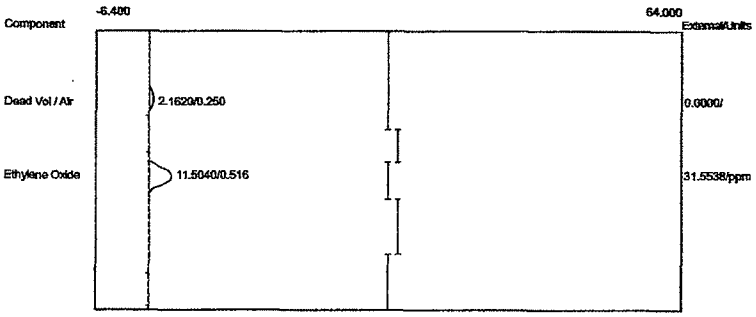
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1130	0.0000	
Ethylene Oxide	0.516	12.5015	34.2898	ppm
		14.6145	34.2898	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:12:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



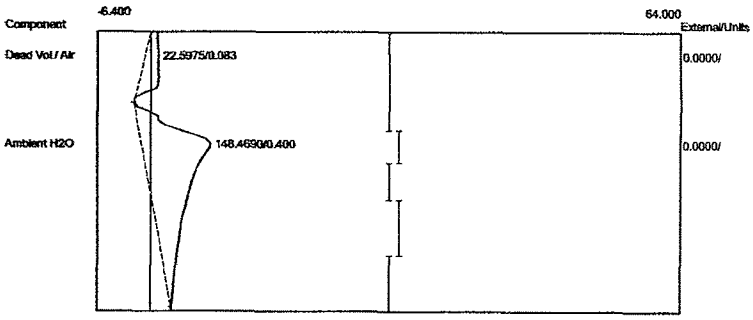
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	20.1160	0.0000	
Ambient H2O	0.400	150.2525	0.0000	
		170.3685	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:17:16
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



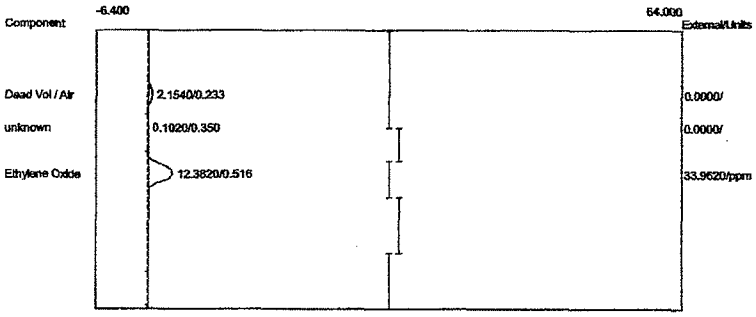
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1620	0.0000	
Ethylene Oxide	0.516	11.5040	31.5538	ppm
		13.6660	31.5538	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:17:16
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



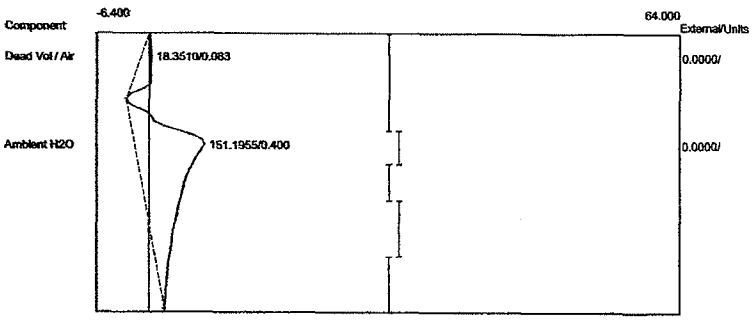
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	22.5975	0.0000	
Ambient H2O	0.400	148.4690	0.0000	
		171.0665	0.0000	

Lab name: ECI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:22:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



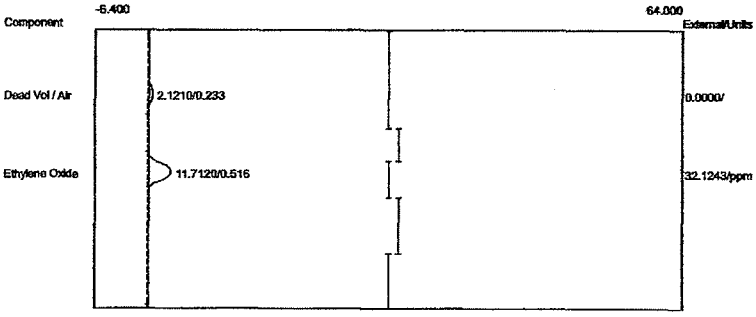
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1540	0.0000	
Ethylene Oxide	0.516	12.3820	33.9620	ppm
		14.5360	33.9620	

Lab name: ECI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:22:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



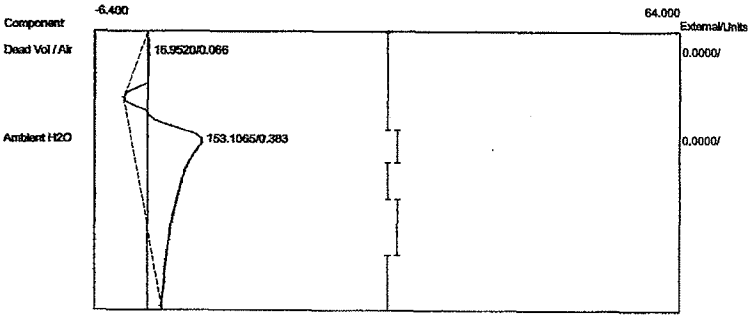
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.3510	0.0000	
Ambient H2O	0.400	151.1955	0.0000	
		169.5465	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:27:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



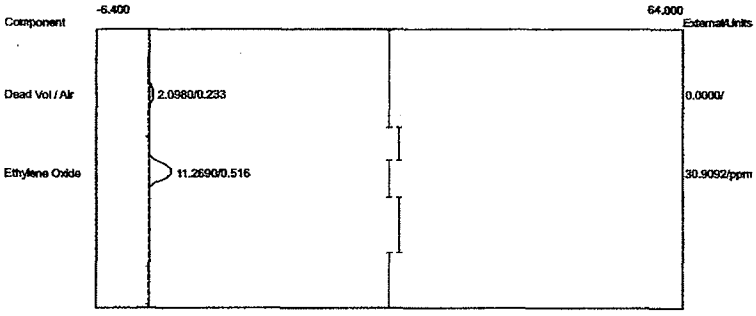
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1210	0.0000	
Ethylene Oxide	0.516	11.7120	32.1243	ppm
		13.8330	32.1243	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:27:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



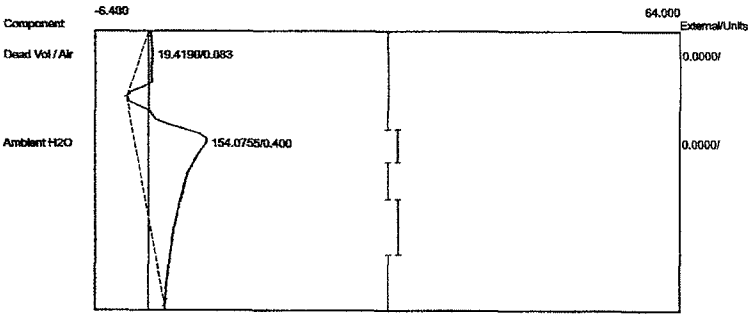
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	16.9520	0.0000	
Ambient H2O	0.383	153.1065	0.0000	
		170.0585	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:32:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-2A12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0980	0.0000	
Ethylene Oxide	0.516	11.2690	30.9092	ppm
		13.3670	30.9092	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#2
Analysis date: 05/09/2017 11:32:06
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-2A12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer

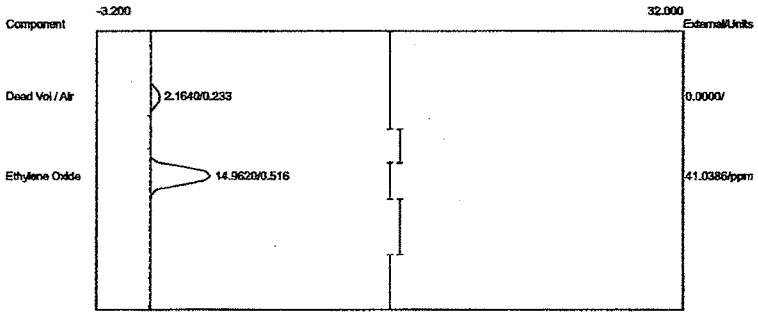


Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.4190	0.0000	
Ambient H2O	0.400	154.0755	0.0000	
		173.4945	0.0000	

APPENDIX F

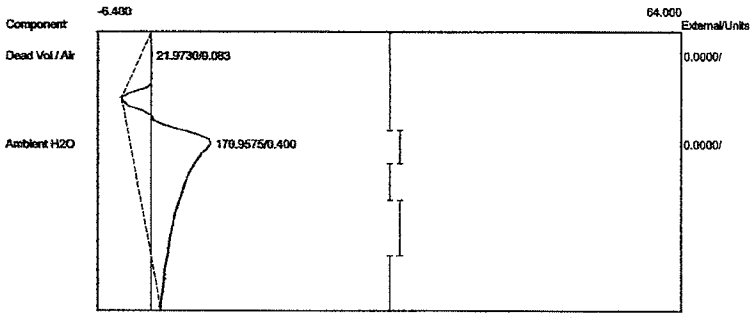
Run #3 Chromatograms - Backvent

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 12:59:11
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



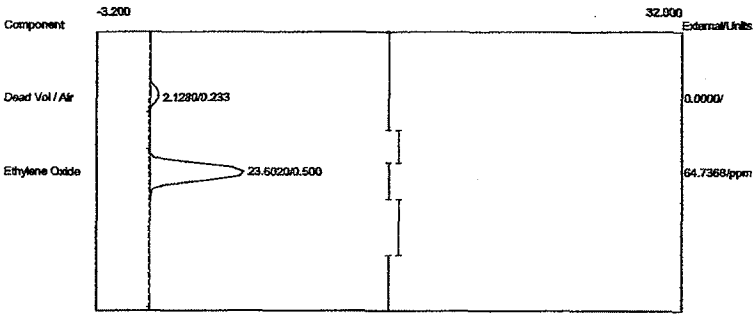
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1640	0.0000	
Ethylene Oxide	0.516	14.9620	41.0386	ppm
		17.1260	41.0386	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 12:59:11
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



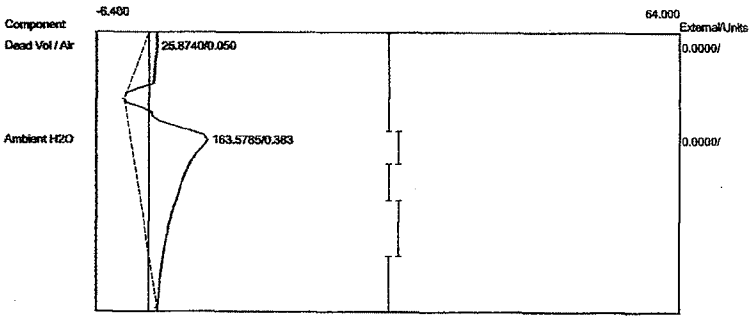
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	21.9730	0.0000	
Ambient H2O	0.400	170.9575	0.0000	
		192.9305	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:00:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



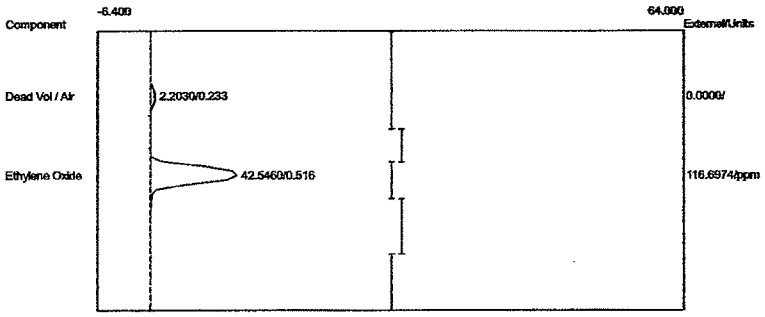
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1280	0.0000	
Ethylene Oxide	0.500	23.6020	64.7368	ppm
		25.7300	64.7368	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:00:15
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



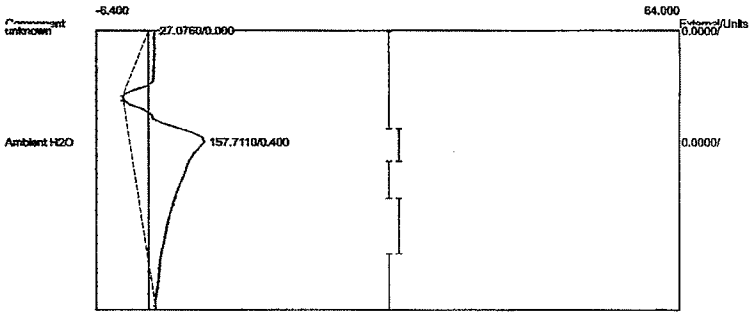
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	25.8740	0.0000	
Ambient H2O	0.383	163.5785	0.0000	
		189.4525	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:01:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



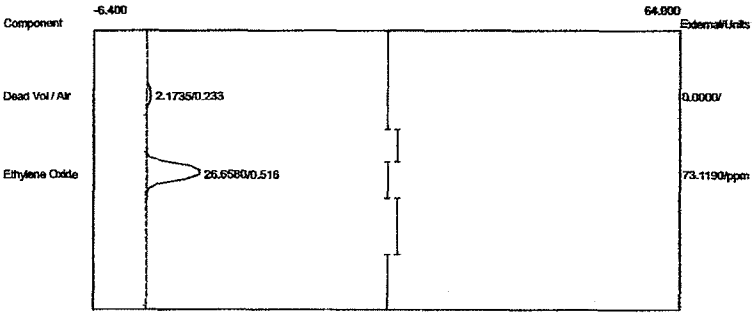
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.2030	0.0000	
Ethylene Oxide	0.516	42.5460	116.6974	ppm
		44.7490	116.6974	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:01:21
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



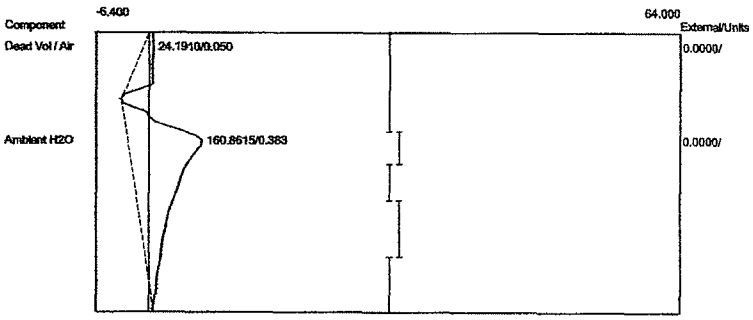
Component	Retention	Area	External	Units
Ambient H2O	0.400	157.7110	0.0000	
		157.7110	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:02:25
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



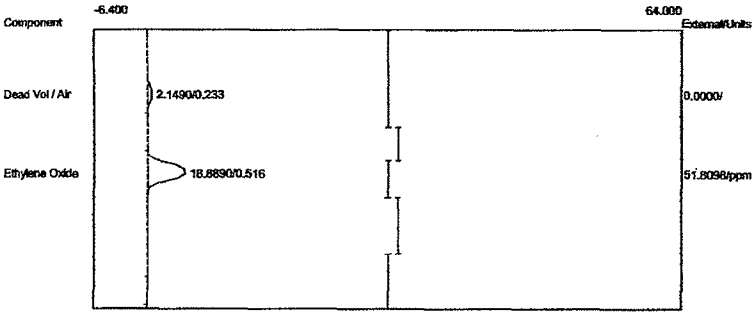
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1735	0.0000	
Ethylene Oxide	0.516	26.6580	73.1190	ppm
		28.8315	73.1190	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:02:25
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



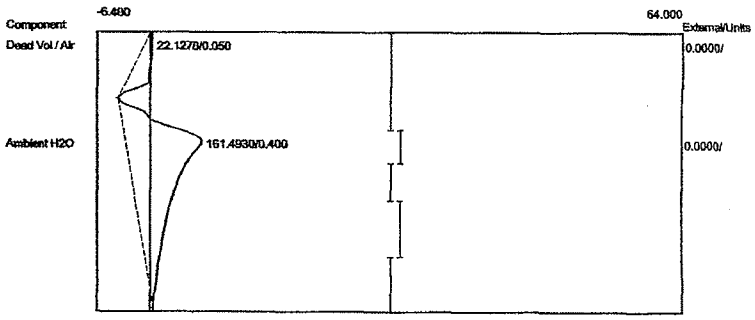
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	24.1910	0.0000	
Ambient H2O	0.383	160.8615	0.0000	
		185.0525	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:03:39
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



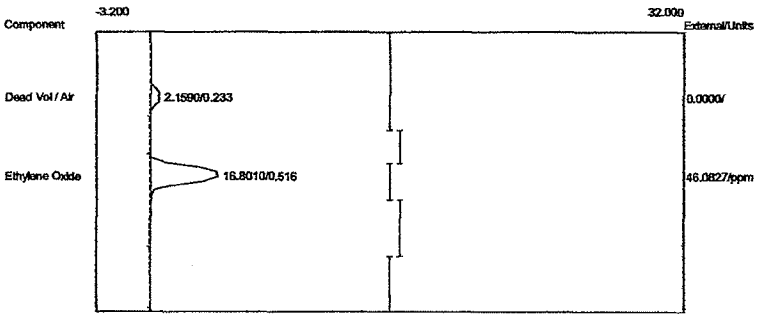
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1490	0.0000	
Ethylene Oxide	0.516	18.8890	51.8098	ppm
		21.0380	51.8098	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:03:39
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



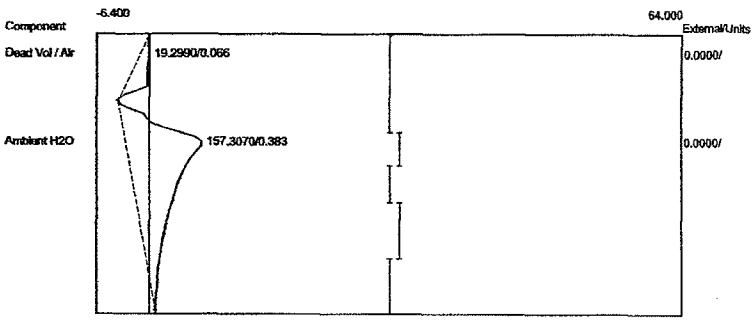
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	22.1270	0.0000	
Ambient H2O	0.400	161.4930	0.0000	
		183.6200	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:04:59
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



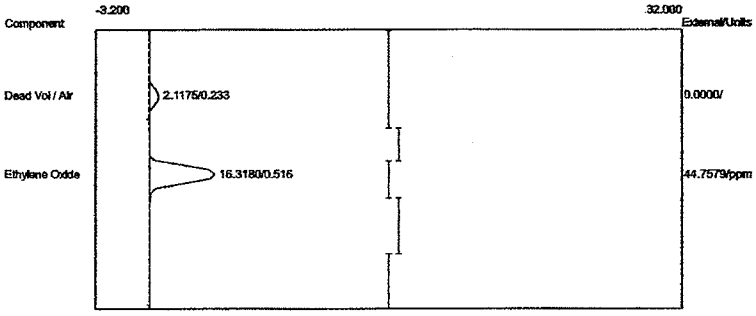
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1590	0.0000	
Ethylene Oxide	0.516	16.8010	46.0827	ppm
		18.9600	46.0827	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:04:59
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



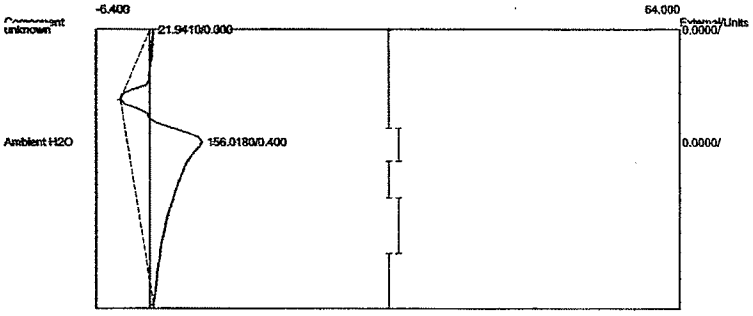
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	19.2990	0.0000	
Ambient H2O	0.383	157.3070	0.0000	
		176.6060	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:06:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



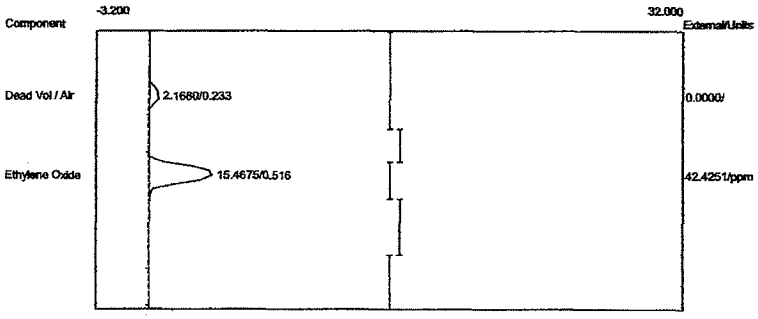
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1175	0.0000	
Ethylene Oxide	0.516	16.3180	44.7579	ppm
		18.4355	44.7579	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:06:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



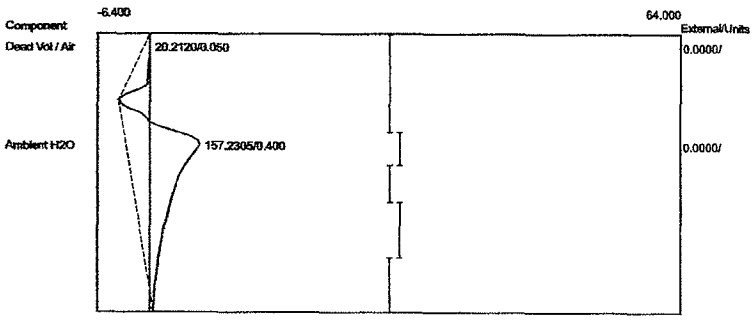
Component	Retention	Area	External	Units
Ambient H2O	0.400	156.0180	0.0000	
		156.0180	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:07:20
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



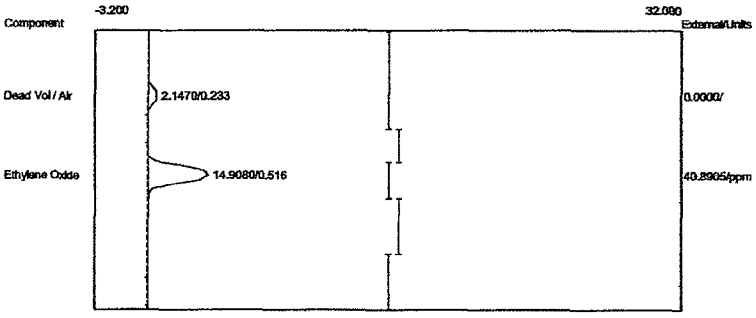
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1680	0.0000	
Ethylene Oxide	0.516	15.4675	42.4251	ppm
		17.6355	42.4251	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:07:20
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



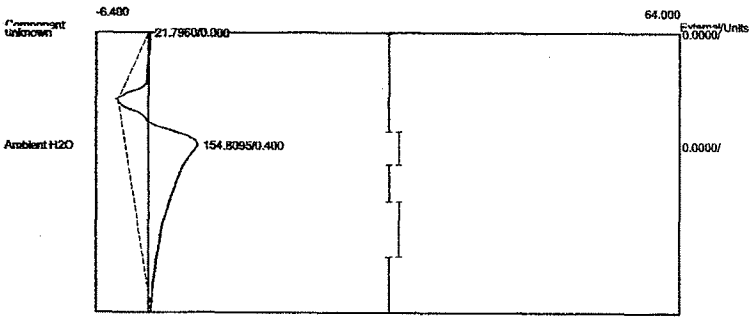
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	20.2120	0.0000	
Ambient H2O	0.400	157.2305	0.0000	
		177.4425	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:08:28
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



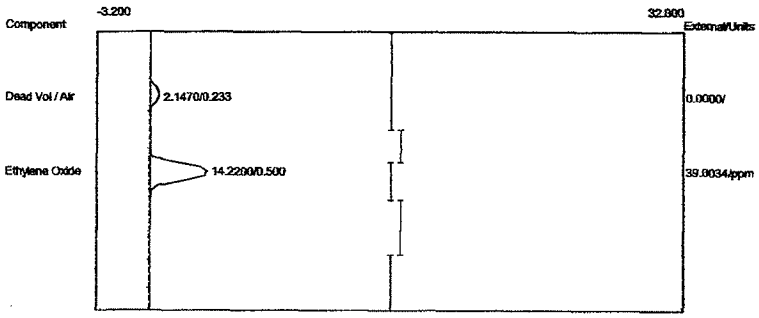
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1470	0.0000	
Ethylene Oxide	0.516	14.9080	40.8905	ppm
		17.0550	40.8905	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:08:28
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



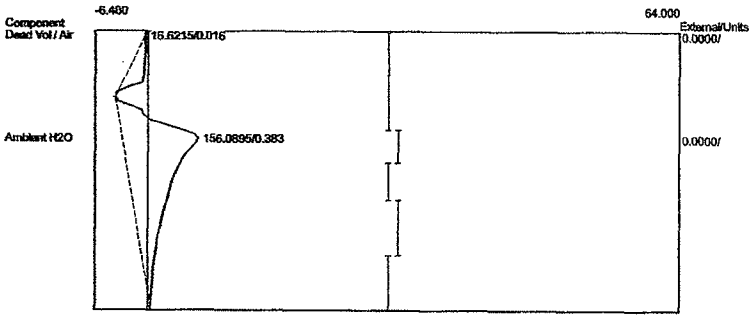
Component	Retention	Area	External	Units
Ambient H2O	0.400	154.8095	0.0000	
		154.8095	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:09:45
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



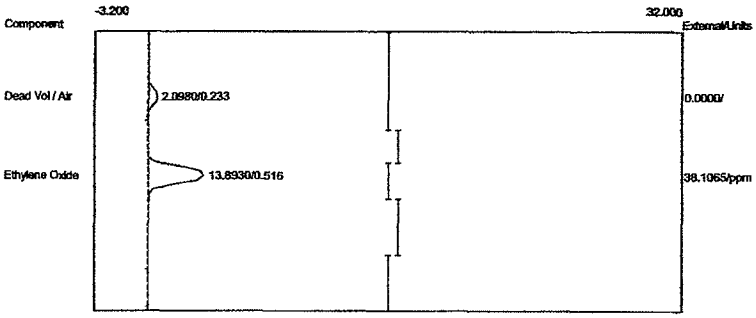
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1470	0.0000	
Ethylene Oxide	0.500	14.2200	39.0034	ppm
		16.3670	39.0034	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:09:45
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



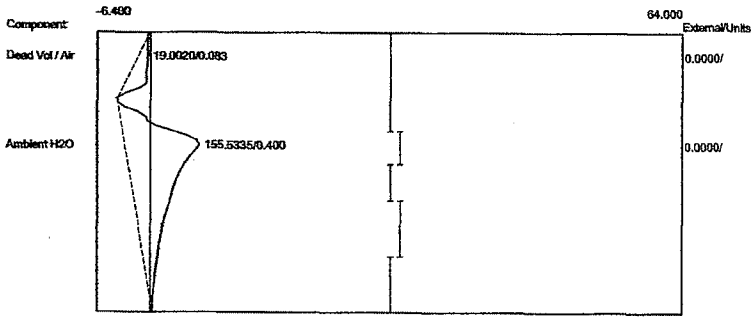
Component	Retention	Area	External	Units
Dead Vol / Air	0.016	16.6215	0.0000	
Ambient H2O	0.383	156.0895	0.0000	
		172.7110	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:10:59
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



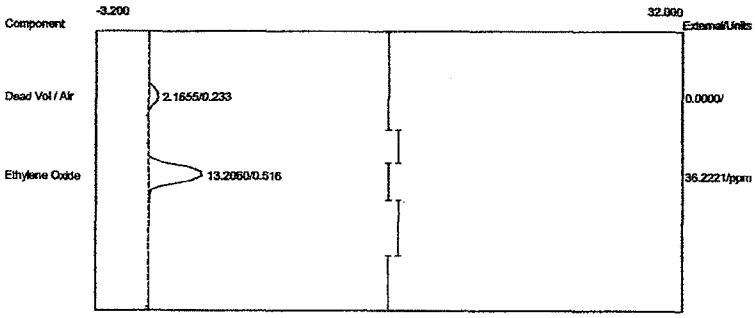
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.0980	0.0000	
Ethylene Oxide	0.516	13.8930	38.1065	ppm
		15.9910	38.1065	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:10:59
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



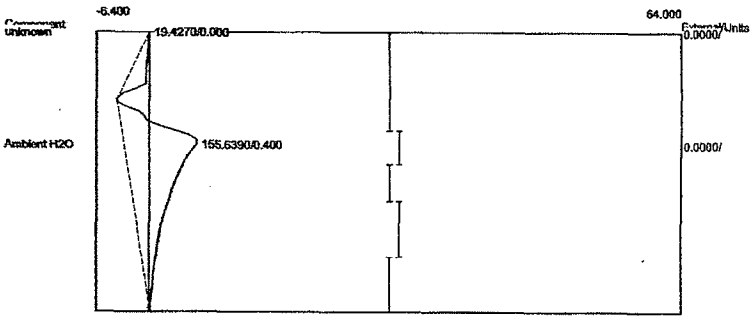
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.0020	0.0000	
Ambient H2O	0.400	155.5335	0.0000	
		174.5355	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:12:07
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3B12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1655	0.0000	
Ethylene Oxide	0.516	13.2060	36.2221	ppm
		15.3715	36.2221	

Client: Sterigenics - Grand Prairie
Client ID: Backvent#3
Analysis date: 05/09/2017 13:12:07
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3B12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer

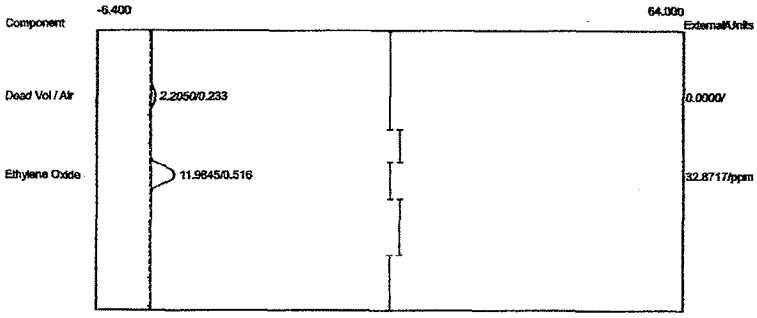


Component	Retention	Area	External	Units
Ambient H2O	0.400	155.6390	0.0000	
		155.6390	0.0000	

APPENDIX G

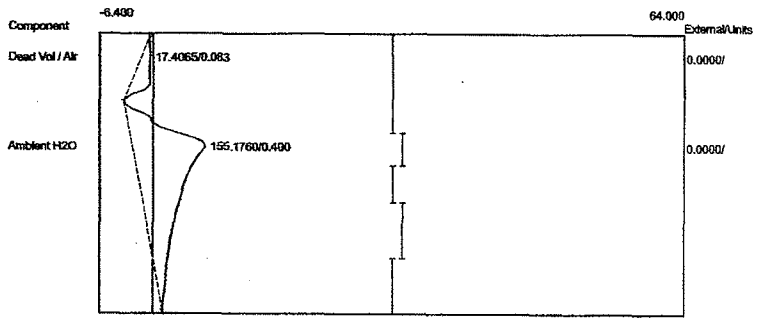
Run #3 Chromatograms - Aeration

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 11:55:16
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A01.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



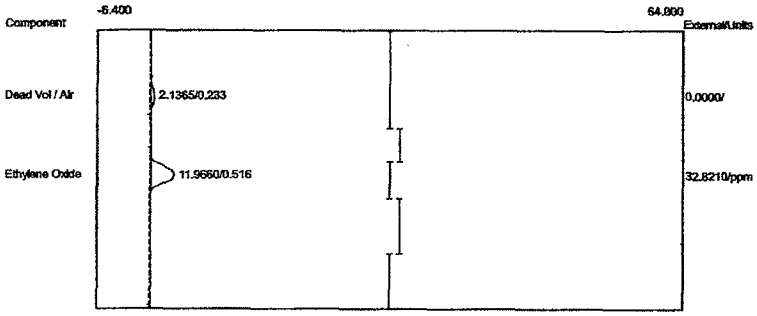
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.2050	0.0000	
Ethylene Oxide	0.516	11.9845	32.8717	ppm
		14.1895	32.8717	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 11:55:16
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A01.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



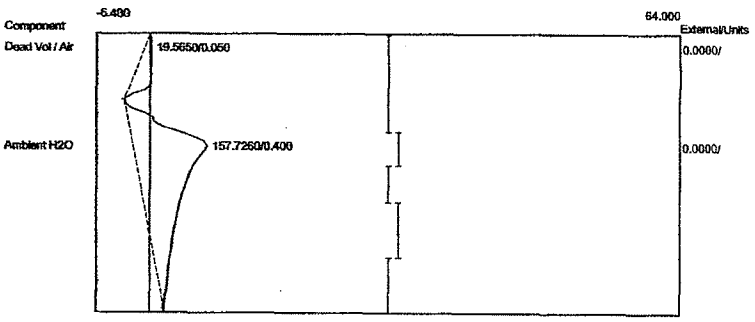
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.4065	0.0000	
Ambient H2O	0.400	155.1760	0.0000	
		172.5825	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:00:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A02.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



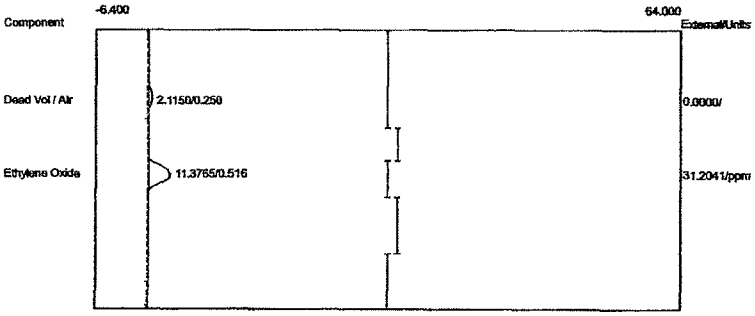
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1365	0.0000	
Ethylene Oxide	0.516	11.9660	32.8210	ppm
		14.1025	32.8210	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:00:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A02.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



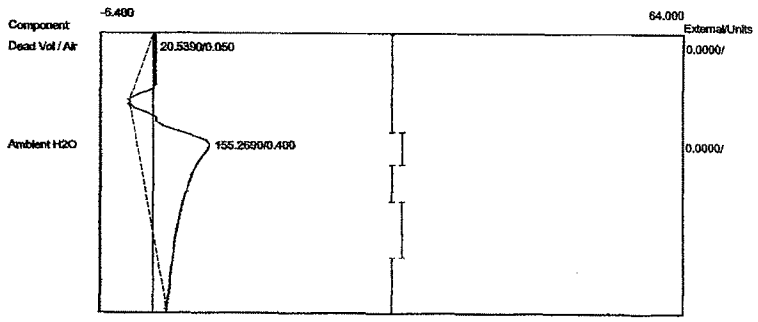
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	19.5650	0.0000	
Ambient H2O	0.400	157.7260	0.0000	
		177.2910	0.0000	

Lab name: ECC
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:05:18
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A03.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



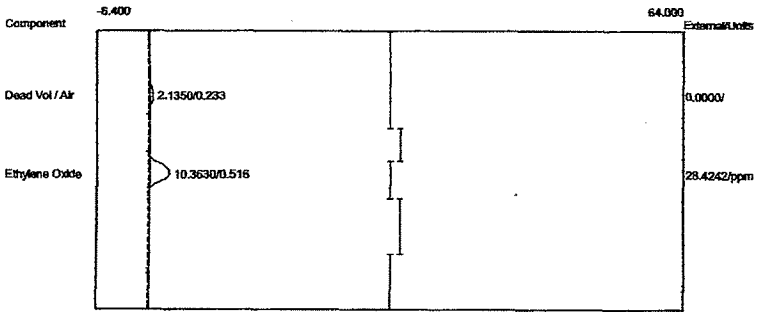
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1150	0.0000	
Ethylene Oxide	0.516	11.3765	31.2041	ppm
		13.4915	31.2041	

Lab name: ECC
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:05:18
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A03.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



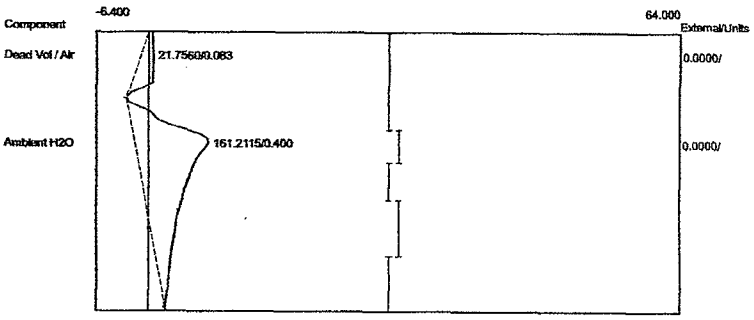
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	20.5390	0.0000	
Ambient H2O	0.400	155.2690	0.0000	
		175.8080	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:10:23
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A04.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



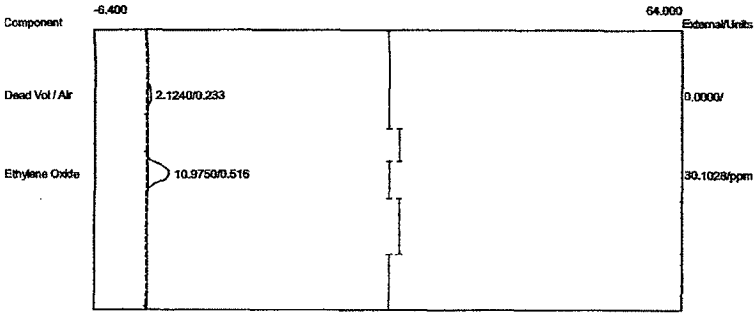
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1350	0.0000	
Ethylene Oxide	0.516	10.3630	28.4242	ppm
		12.4980	28.4242	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:10:23
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A04.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



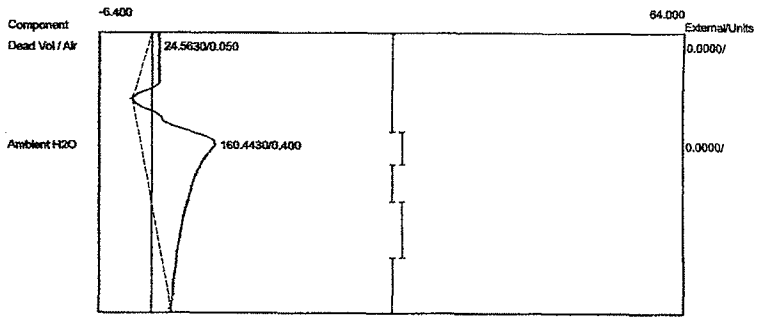
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	21.7560	0.0000	
Ambient H2O	0.400	161.2115	0.0000	
		182.9675	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:15:02
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A05.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



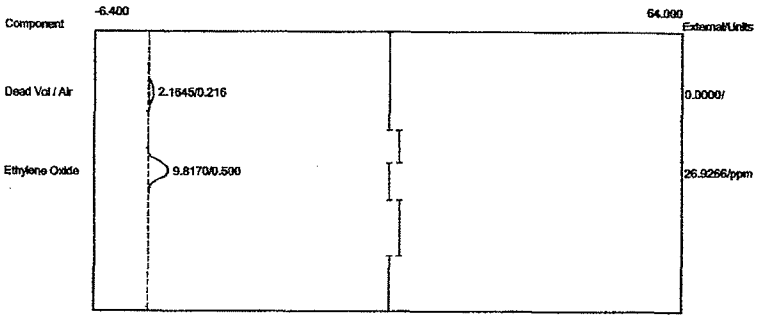
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1240	0.0000	
Ethylene Oxide	0.516	10.9750	30.1028	ppm
		13.0990	30.1028	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:15:02
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A05.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



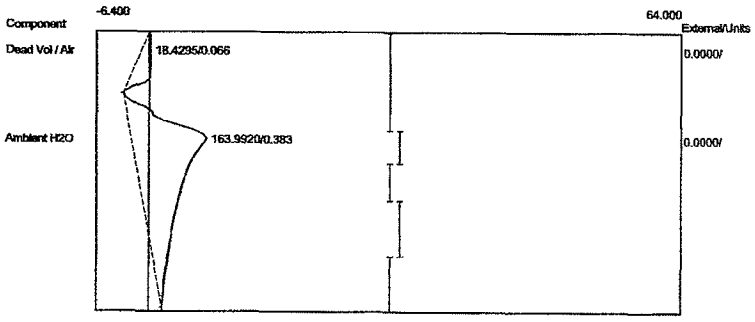
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	24.5630	0.0000	
Ambient H2O	0.400	160.4430	0.0000	
		185.0060	0.0000	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:20:18
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A06.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



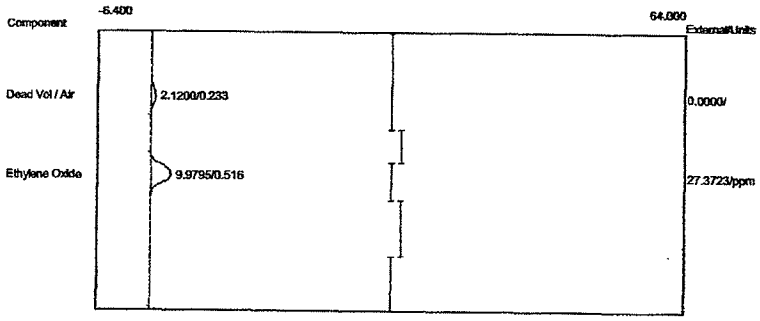
Component	Retention	Area	External	Units
Dead Vol / Air	0.216	2.1645	0.0000	
Ethylene Oxide	0.500	9.8170	26.9266	ppm
		11.9815	26.9266	

Lab name: ECSI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:20:18
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A06.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



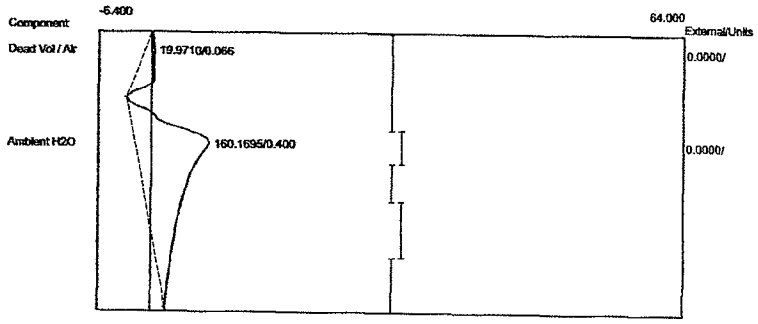
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	18.4295	0.0000	
Ambient H2O	0.383	163.9920	0.0000	
		182.4215	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:25:02
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A07.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



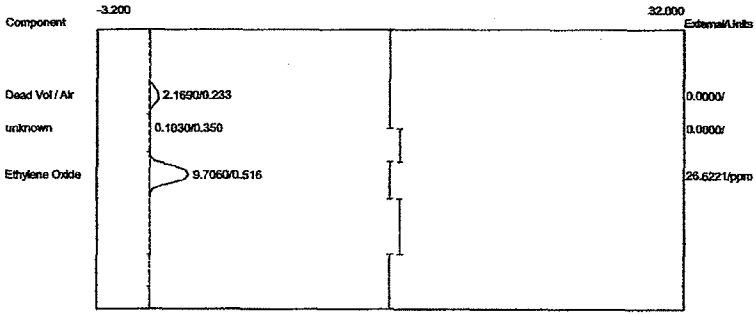
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1200	0.0000	
Ethylene Oxide	0.516	9.9795	27.3723	ppm
		12.0995	27.3723	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:25:02
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A07.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



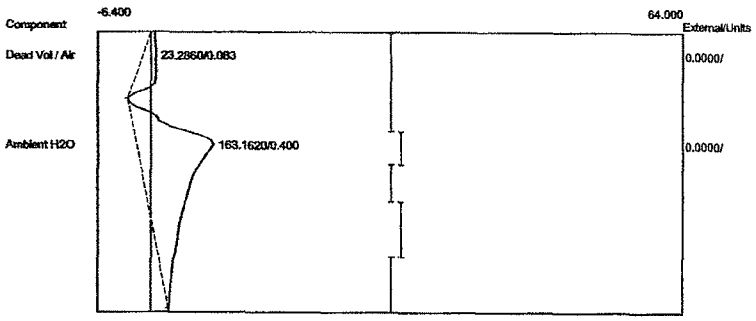
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	19.9710	0.0000	
Ambient H2O	0.400	160.1695	0.0000	
		180.1405	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:30:37
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A08.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



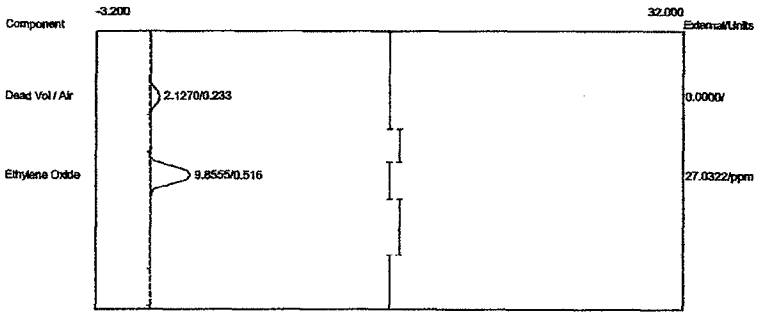
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1690	0.0000	
Ethylene Oxide	0.516	9.7060	26.6221	ppm
		11.8750	26.6221	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:30:37
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A08.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



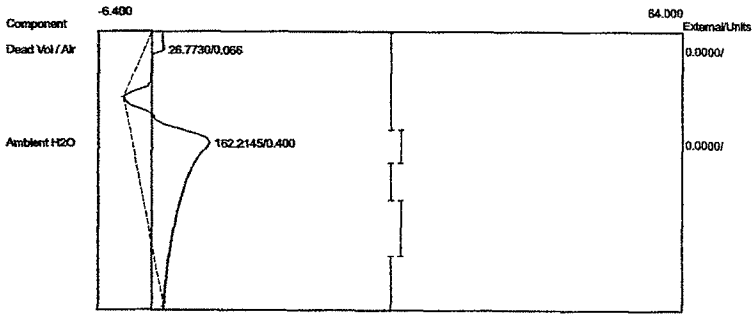
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	23.2860	0.0000	
Ambient H2O	0.400	163.1620	0.0000	
		186.4480	0.0000	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:35:31
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A09.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



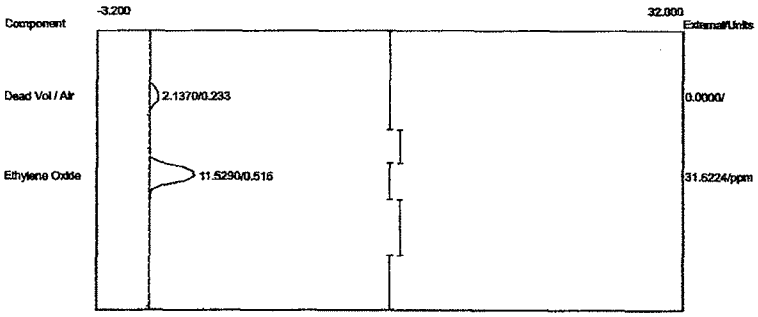
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1270	0.0000	
Ethylene Oxide	0.516	9.8555	27.0322	ppm
		11.9825	27.0322	

Lab name: ECCI
Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:35:31
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A09.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



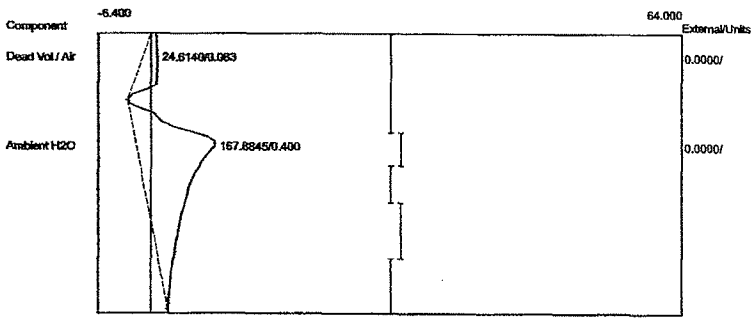
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	26.7730	0.0000	
Ambient H2O	0.400	162.2145	0.0000	
		188.9875	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:40:14
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A10.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



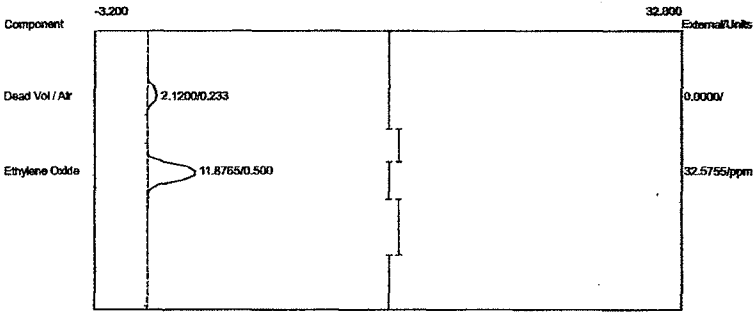
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1370	0.0000	
Ethylene Oxide	0.516	11.5290	31.6224	ppm
		13.6660	31.6224	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:40:14
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A10.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



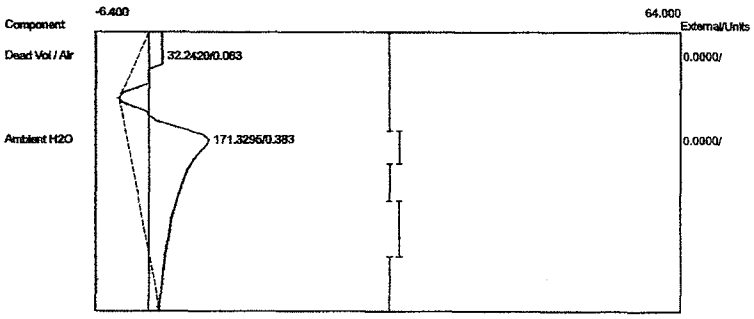
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	24.6140	0.0000	
Ambient H2O	0.400	167.8845	0.0000	
		192.4985	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:45:45
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A11.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



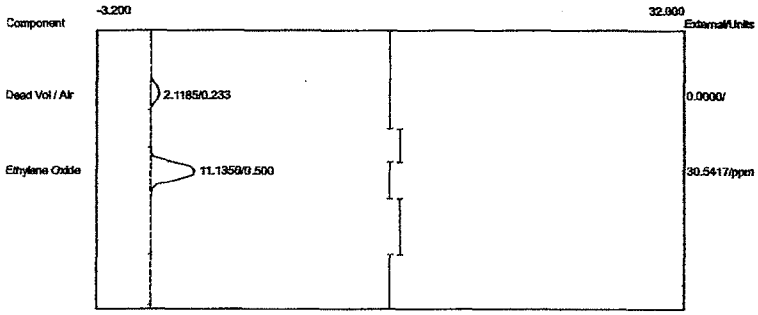
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1200	0.0000	
Ethylene Oxide	0.500	11.8765	32.5755	ppm
		13.9965	32.5755	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:45:45
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A11.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



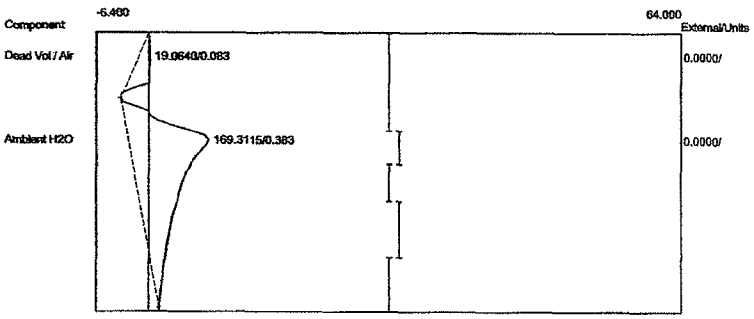
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	32.2420	0.0000	
Ambient H2O	0.383	171.3295	0.0000	
		203.5715	0.0000	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:50:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterGP2017-3A12.CHR (c:\peak359)
Sample: Oxidizer Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	2.1185	0.0000	
Ethylene Oxide	0.500	11.1350	30.5417	ppm
		13.2535	30.5417	

Client: Sterigenics - Grand Prairie
Client ID: Aeration#3
Analysis date: 05/09/2017 12:50:10
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterGP2017-3A12.CHR (c:\peak359)
Sample: Oxidizer Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.0640	0.0000	
Ambient H2O	0.383	169.3115	0.0000	
		188.3755	0.0000	

APPENDIX H

Field Data and Calculation Worksheets

EtO Calibrations

Site: STERIGENICS - GRAND PRAIRIE, TX

Date: 5/9/2017

INLET - FID

ppm	0	1.10	10.1	100	1,000	10,080		AUDIT
Area 1	0	0.372	3.77	37.6				48.8
Area 2	0	0.383	3.73	37.9				READS
Area 3	0	0.384	3.72	37.8				49.0
AVG.	0	0.380	3.74	37.8	#DIV/0!	#DIV/0!	Dev.	0.4%

OUTLET - PID

ppm	0	1.10	10.1	100		AUDIT
Area 1	0	1.80	17.9	164		48.8
Area 2	0	1.81	17.5	164		READS
Area 3	0	1.80	17.9	164		48.9
AVG.	0	1.80	17.8	164	Dev.	0.2%

LOD Calculation EtO								
STERIGENICS - GRAND PRAIRIE, TX								
5/9/2017								
			Y =	A	+	m	x	
Outlet			ppm =	4.30E-03	+	0.611747	x area	
Lowest Cal Gas				R2	=	0.99995		
				Corr. Coeff.	=	0.99998		
	Area	**Calc ppm**		LOD	=	|A| + 3s		
	1.800	1.105	ppm	LOD	=	0.015	ppm	
	1.810	1.112	ppm					
	1.800	1.105	ppm					
AVG		**1.107**	ppm					
Std Dev, s		**0.004**	ppm					
				1/2 LOD	**=**	**0.007**	**ppm**	
			Y =	A	+	m	x	
Inlet			ppm =	#DIV/0!	+	#DIV/0!	x area	
Lowest Cal Gas								
	Area	**Calc ppm**		LOD	=	|A| + 3s		
	0.37	#DIV/0!	ppm	LOD	=	#DIV/0!	ppm	
	0.38	#DIV/0!	ppm					
	0.38	#DIV/0!	ppm					
AVG		**#DIV/0!**	ppm					
Std Dev		**#DIV/0!**	ppm					
				1/2 LOD	**=**	**######**	**ppm**	

ETHYLENE OXIDE SOURCE TEST/CALIBRATION DATA

Client: Steriscenics - Grand Prairie TX

Source Tested: Maxon Catalytic Oxidizer Date: 5/9/17

PRE CALIBRATION

Inlet (FID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO			
	Area Counts #1	.372	3.77	37.6					
	Area Counts #2/3	~~.383~~ .384	~~3.73~~ 3.8	37.9					
	Average Area	.380	3.74	37.8					
	Audit Standard (48.8 ppmv) Result					49.0 ✓			
Outlet (PID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO					
	Area Counts #1	~~1.80~~	17.9	164					
	Area Counts #2/3	~~1.81~~ 1.80	~~17.5~~ 17.9	164					
	Average Area	1.80	17.8	164					
	Audit Standard (48.8 ppmv) Result					48.9 ✓			

	Run #1	Run #2	Run #3
Backvent start/stop:	0920/0935	1135/1150	1258/1313
Aeration start/stop:	0935/1035	1035/1135	1153/1253

P_{bar}: — EtO Usage (lbs/yr): —

$\%H_2O$: — Cycles Per Week: —

POST CALIBRATION

Inlet (FID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO			
	Area Counts #1								
	Area Counts #2								
	Average Area								
	Audit Standard (48.8 ppmv) Result					48.1 ✓			
Outlet (PID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO					
	Area Counts #1								
	Area Counts #2								
	Average Area								
	Audit Standard (48.8 ppmv) Result					49.4 ✓			

ECSi

APPENDIX I

Gas Certifications

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

500 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-001
Item No.: 02020001310TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CAL4448
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	1.10	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: MT

DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	1.	PPM	1.10	PPM	10.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1300 PSIG
Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

00 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-003
Item No.: 02020001320TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM003232
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	10.1	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: MT
MT

DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	10.	PPM	10.1	PPM	1.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1400 PSIG
Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

500 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-004
Item No.: 02020001330TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM011385
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	100.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCully BLM

DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	100.	PPM	100.	PPM	.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1400 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

600 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-005
Item No.: 02020001340TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM002810
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	1,000.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCully BLM

DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	1,000.	PPM	1,000.	PPM	.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1300 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

00 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-006
Item No.: 02020001340TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM005787
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	10,080.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCully
BLM

DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	10,000.	PPM	10,080.	PPM	.8	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 800 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFICATE OF ANALYSIS

Customer Name:	ECSi, Inc.	**Cylinder Number:**	SA25925
Stock or Analyzer Tag Number:	N/A	**Product Class:**	Certified Standard
Customer Reference:	Verbal- Dan	**Cylinder - Contents[1]:**	28 CF @ 2000 PSI
MESA Reference:	104448	**Cylinder-CGA:**	A006-HP-BR/350
Date of Certification:	4/20/2016	**Analysis Method:**	GC-TCD/FID
Recommended Shelf Life:	2 Years	**Preparation Method:**	Gravimetric

Component	Requested Concentration[2]	Reported Concentration[2,3]
Ethylene Oxide	50 ppm	48.8 ppm
Nitrogen	Balance	Balance

Authorized Signature:

1. The fill pressure shown on the COA is as originally quoted. The fill pressure measured by the customer may differ from the fill pressure originally quoted due to temperature effects, compressibility of the individual components when blended together in the cylinder, gauge accuracy or reduction in content volume before shipping as a result of samples withdrawn for laboratory QC necessary to ensure product quality.
2. Unless otherwise stated, concentrations are given in molar units.
3. Vapor pressure mixes are blended at a sufficiently low pressure so as to eliminate phase separation under most low temperature conditions encountered during transport or storage. However, it is generally recommended that cylinders containing vapor pressure restricted mixes be placed on the floor in a horizontal position and rolled back and forth to improve homogeneity of the gas phase mixture before being put into service.

Analytical Gas Standards are prepared and analyzed using combinations of NIST traceable weights, SRM's provided by NIST, or internal gas standards that have been verified for accuracy using procedures published by the US-EPA. Pure gases are analyzed and certified for purity using minor component Analytical Gas Standards prepared according to the methods specified above. Balances are calibrated to NIST test weights covered by NIST test number 822/256175/96. Reference Certification #'s: 163/W, 830/N and 3280. Calibration methods are in conformance with MIL-STD 45662A.

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