AIR CP_ 100810928_ RP_ 20170622_ STACK TEST

REPORT OF
AIR POLLUTION SOURCE TESTING
OF AN ETHYLENE OXIDE EMISSION-CONTROL SYSTEM
OPERATED BY STERIS ISOMEDIX SERVICES
IN EL PASO, TEXAS
ON JUNE 22, 2017

TCEQ - Region 6
El Paso, Texas
RECEIVED
JUL 26 2017

Submitted to:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
401 E. Franklin Blvd., Suite 560
El Paso, Texas 79901-1206

Submitted for:

STERIS ISOMEDIX SERVICES
1435 Isomedix Place
El Paso, Texas 79936

Permit Number 19348

Prepared by:

ECSi
PO Box 848
San Clemente, California 92674-0848

Prepared on:

July 19, 2017

ECSi

CONTACT SUMMARY

CLIENT

Mr. Raymond Doerr
Environmental Compliance Manager
STERIS ISOMEDIX SERVICES
1880 Industrial Drive
Libertyville, Illinois 60048

Phone: (847)367-5275
FAX: (847)367-5644
email: Raymond_Doerr@steris.com

TEST DATE

June 22, 2017

REGULATORY AGENCY

Mr. John Williams
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
401 E. Franklin Blvd., Suite 560
El Paso, Texas 79901-1206

Phone: (915)834-4949
FAX: (915)834-4940
email: jwilliams@tceq.state.tx.us

TESTING CONTRACTOR

Daniel P. Kremer
Project Manager
ECSi, Inc.
PO Box 848
San Clemente, California 92674-0848

Phone: (949)400-9145
FAX: (949)281-2169
email: dankremer@ecsi1.com

ECSi

TABLE OF CONTENTS

		PAGE NO.
CONTACT SUMMARY		i
TABLE OF CONTENTS		ii
LIST OF TABLES		iii
LIST OF APPENDICES		iv
1.0	INTRODUCTION	1
2.0	EQUIPMENT	2
3.0	TESTING	3
4.0	RULE/COMPLIANCE REQUIREMENTS	4
5.0	TEST METHOD REFERENCE	5
5.1	Summary/Introduction	5
5.2	Volumetric Flow Measurement	5
5.3	EtO Mass-Emissions Measurement	6
5.4	Sample Transport	6
5.5	GC Injection	6
5.6	GC Conditions	6
5.7	Calibration Standards	7
5.8	Sampling Duration	7
5.9	Mass-Emissions Calculations	7
6.0	TEST SCENARIO	9
7.0	QA/QC	10
7.1	Field Testing Quality Assurance	10
7.2	Calibration Procedures	10
8.0	TEST RESULTS	11
TABLES		12
APPENDICES		15

ECSi

LIST OF TABLES

TABLE	DESCRIPTION	PAGE NO.
1	Ethylene Oxide Control Efficiency – Abator #1	13
2	Ethylene Oxide Control Efficiency – Abator #2	14

ECSi

2.0 EQUIPMENT

The gas-sterilization system is comprised of four batch-cycle sterilization chambers, each discharged through a vacuum pump to a Glygen Scrubber System. Sterilized product is transferred into two aeration rooms, each discharged to its own dedicated catalytic oxidizer emission control device. The gas-sterilization and emission-control equipment consists of the following:

- Four commercial gas sterilizers, 13-pallet, each consisting of a heated, 2100 cubic foot interior volume sterilization chamber, a vacuum pump chamber evacuation system, and a backdraft valve exhaust vent;
- Two aeration rooms, one primary and one secondary, each comprised of a heated aeration chamber and a chamber exhaust system.

The sterilizer vacuum pump emissions are controlled by:

- Two individual Glygen Scrubber two-stage control devices, each attached to two of the four sterilizer chambers (Glygen System #1 for Sterilizers 1 and 2, Glygen System #2 for Sterilizers 3 and 4). Each individual Glygen unit consists of a 128 cubic foot tank with ceramic diffusers that allow the vapors from the sterilization chamber vacuum pump to be bubbled through and acidic scrubbing liquid.

Emissions from the aeration process are controlled by:

- One Donaldson EtO Abator System (primary aeration), 9,000 SCFM, equipped with a prefilter, an electric heater, an exhaust gas heat exchanger, a reactive catalyst bed, and an exhaust blower.

- One Donaldson EtO Abator System (secondary aeration), 4,500 SCFM, equipped with a prefilter, an electric heater, an exhaust gas heat exchanger, a reactive catalyst bed, and an exhaust blower.

3.0 TESTING

EtO source testing was performed in accordance with the procedures outlined in USEPA CFR40, Part 63.365. EtO emissions monitoring were conducted simultaneously at the inlet and outlet of the each Abator during the aeration process. A total of three aeration-phase test runs were performed for each Abator, for a total of six test runs.

During aeration-phase testing, EtO emissions at the inlet and the outlet of the Abators were determined using direct source sample injection into the gas chromatograph (GC). All aeration testing was performed with freshly sterilized product in the aeration chambers. 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 STERIS Isomedix Services 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:

* The aeration emissions must be discharged to control equipment with an EtO emission-reduction efficiency of at least 99 % by weight, or with reduction of outlet EtO emissions to less than 1 ppmv.

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

5.0 TEST METHOD REFERENCE

5.1 INTRODUCTION

EtO source testing was conducted in accordance with the procedures outlined in USEPA CFR40, Part 63.365. EtO emissions monitoring were conducted simultaneously at the inlet and outlet of the each Abator during the aeration process. A total of three aeration-phase test runs were performed for each Abator, for a total of six test runs.

During aeration-phase testing, EtO emissions at the inlet and the outlet of the Abators were determined using direct source sample injection into the gas chromatograph (GC). All aeration testing was performed with freshly sterilized product in the aeration chambers.

Operation and documentation of process conditions was performed by personnel from STERIS Isomedix Services 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 for each of the two Abators.

5.2 VOLUMETRIC FLOW MEASUREMENT

Exhaust gas flow at the outlet of the Abators was determined by EPA Method 2C using a standard pitot tube and an inclined-oil manometer. Sampling ports were installed in accordance with EPA Method 1, and were located far enough from any flow disturbances to permit accurate flow measurement.

Temperature measurements were obtained from a type K thermocouple and thermometer attached to the sampling probe. Exhaust gas composition was assumed to be air and small amounts of water vapor. Water vapor content was determined during the test using a wet bulb/dry bulb psychrometer. Water vapor was negligible, at about 3 percent.

5.3 CONTROL EFFICIENCY AND MASS EMISSIONS MEASUREMENT

During aeration-phase testing, EtO emissions at the inlet and outlet of each Abator were determined using direct source sample injection into the GC. The mass of EtO discharged to the inlet and from the outlet was determined using the equation shown below in Section 5.9. Mass-mass control-efficiency of EtO during aeration was calculated by comparing the mass of EtO discharged to the Abator inlet to the mass of EtO discharged from the Abator outlet.

During aeration, source 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 emissions, and a photoionization detector (PID) was used to quantify low-level EtO emissions at the emission-control device outlet.

5.4 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 immediately upstream of the Abator catalyst bed. At the outlet of each Abator, sampling ports were located in the exhaust stack.

5.5 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.

5.6 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.

5.7 CALIBRATION STANDARDS

The FID was calibrated for low to mid-range part-per-million-by-volume (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

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 F.

5.8 SAMPLING DURATION

Aeration-phase EtO measurements were taken for a 60-minute time period for each test run. A total of six test runs were performed. Testing was performed with freshly sterilized product in the aeration process.

5.9 CONTROL-EFFICIENCY/MASS-EMISSIONS CALCULATIONS

Mass emissions of EtO during aeration were calculated using the following equation:

$$MassRate = (VolFlow)(MolWt)(ppmv\ EtO/10^6)/(MolVol)$$

Where:

MassRate	=	EtO mass flow rate, pounds per minute
VolFlow	=	Corrected volumetric flow rate, standard cubic feet per minute at 68 degrees F
MolWt	=	44.05 pounds EtO per pound mole
ppmv EtO	=	EtO concentration, parts per million by volume
10^6	=	Conversion factor, ppmv per "cubic foot per cubic foot"
MolVol	=	385.32 cubic feet per pound mole at one atmosphere and 68 degrees F

Mass-mass control efficiency of EtO was calculated for aeration. Results of the control-efficiency testing are presented in Tables 1 and 2.

6.0 TEST SCENARIO

All testing was performed with freshly sterilized product in the aeration chambers. Three aeration phase test runs were performed for each Abator, for a total of six test runs. The testing schedule was as follows:

1) Testing equipment was set up and calibrated.
2) Abator #1 Aeration Test Run #1 was performed. Sampling was conducted at the inlet and the outlet of Abator #1.
3) Abator #2 Aeration Test Run #1 was performed. Sampling was conducted at the inlet and the outlet of Abator #2.
4) Abator #1 Aeration Test Run #2 was performed. Sampling was conducted at the inlet and the outlet of Abator #1.
5) Abator #2 Aeration Test Run #2 was performed. Sampling was conducted at the inlet and the outlet of Abator #2.
6) Abator #1 Aeration Test Run #3 was performed. Sampling was conducted at the inlet and the outlet of Abator #1.
7) Abator #2 Aeration Test Run #3 was performed. Sampling was conducted at the inlet and the outlet of Abator #2.
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 F.

8.0 TEST RESULTS

For the three test runs performed, Abator #1 was found to have an average EtO control efficiency of 99.92 percent for aeration. Abator #2 was found to have an average EtO control efficiency of 99.96 percent for aeration. In accordance with state and federal requirements, aeration discharge streams must be vented to control equipment with an EtO emission-reduction efficiency of at least 99 percent by weight. Both emission-control devices met this requirement.

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

TABLES

TABLE 1
ETHYLENE OXIDE CONTROL EFFICIENCY
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (ABATOR #1)
OPERATED BY STERIS ISOMEDIX SERVICES
IN EL PASO, TEXAS
ON JUNE 22, 2017

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	1424	11.5	0.01	99.9130
1	1429	11.7	0.01	99.9145
1	1434	11.5	0.01	99.9130
1	1439	12.4	0.01	99.9194
1	1444	11.7	0.01	99.9145
1	1449	11.3	0.01	99.9115
1	1454	11.4	0.01	99.9123
1	1459	11.4	0.01	99.9123
1	1504	11.8	0.01	99.9153
1	1509	12.1	0.01	99.9174
1	1514	12.6	0.01	99.9206
1	1519	12.2	0.01	99.9180
TIME-WEIGHTED AVERAGE:		**11.80**	**0.0100**	**99.9152**
2(4)	1524	13.7	0.01	99.9270
2	1529	13.9	0.01	99.9281
2	1534	13.7	0.01	99.9270
2	1539	14.2	0.01	99.9296
2	1544	14.1	0.01	99.9291
2	1549	13.2	0.01	99.9242
2	1554	13.2	0.01	99.9242
2	1559	12.6	0.01	99.9206
2	1604	12.2	0.01	99.9180
2	1609	12.3	0.01	99.9187
2	1614	12.0	0.01	99.9167
2	1619	12.0	0.01	99.9167
TIME-WEIGHTED AVERAGE:		**13.09**	**0.0100**	**99.9233**
3(5)	1624	12.1	0.01	99.9174
3	1629	11.8	0.01	99.9153
3	1634	11.3	0.01	99.9115
3	1639	11.1	0.01	99.9099
3	1644	11.6	0.01	99.9138
3	1649	11.6	0.01	99.9138
3	1654	10.8	0.01	99.9074
3	1659	11.9	0.01	99.9160
3	1704	11.1	0.01	99.9099
3	1709	11.7	0.01	99.9145
3	1714	11.5	0.01	99.9130
3	1719	11.4	0.01	99.9123
TIME-WEIGHTED AVERAGE:		**11.49**	**0.0100**	**99.9129**
			AVERAGE CONTROL EFFICIENCY:	**99.9171**
			TCEQ REQUIRED CONTROL EFFICIENCY:	**99.0**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Primary Aeration Run #1 started at 14:22, ended at 15:22.
(4) - Primary Aeration Run #2 started at 15:22, ended at 16:22.
(5) - Primary Aeration Run #3 started at 16:22, ended at 17:22.

ECSi

TABLE 2
ETHYLENE OXIDE CONTROL EFFICIENCY
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (ABATOR #2)
OPERATED BY STERIS ISOMEDIX SERVICES
IN EL PASO, TEXAS
ON JUNE 22, 2017

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	1426	22.2	0.01	99.9550
1	1431	22.1	0.01	99.9548
1	1436	18.8	0.01	99.9468
1	1441	23.6	0.01	99.9576
1	1446	23.4	0.01	99.9573
1	1451	21.8	0.01	99.9541
1	1456	22.9	0.01	99.9563
1	1501	22.8	0.01	99.9561
1	1506	26.0	0.01	99.9615
1	1511	22.9	0.01	99.9563
1	1516	22.7	0.01	99.9559
1	1521	24.4	0.01	99.9590
TIME-WEIGHTED AVERAGE:		**22.80**	**0.0100**	**99.9559**
2(4)	1526	26.6	0.01	99.9624
2	1531	24.3	0.01	99.9588
2	1536	23.4	0.01	99.9573
2	1541	23.4	0.01	99.9573
2	1546	23.3	0.01	99.9571
2	1551	23.1	0.01	99.9567
2	1556	22.6	0.01	99.9558
2	1601	22.5	0.01	99.9556
2	1606	23.1	0.01	99.9567
2	1611	22.6	0.01	99.9558
2	1616	22.4	0.01	99.9554
2	1621	22.4	0.01	99.9554
TIME-WEIGHTED AVERAGE:		**23.31**	**0.0100**	**99.9570**
3(5)	1626	22.0	0.01	99.9545
3	1631	22.0	0.01	99.9545
3	1636	22.6	0.01	99.9558
3	1641	22.2	0.01	99.9550
3	1646	22.0	0.01	99.9545
3	1651	21.8	0.01	99.9541
3	1656	22.6	0.01	99.9558
3	1701	21.6	0.01	99.9537
3	1706	22.0	0.01	99.9545
3	1711	21.7	0.01	99.9539
3	1716	22.4	0.01	99.9554
3	1721	21.5	0.01	99.9535
TIME-WEIGHTED AVERAGE:		**22.03**	**0.0100**	**99.9546**
			AVERAGE CONTROL EFFICIENCY:	**99.9558**
			TCEQ REQUIRED CONTROL EFFICIENCY:	**99.0**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Secondary Aeration Run #1 started at 14:24, ended at 15:24.
(4) - Secondary Aeration Run #2 started at 15:24, ended at 16:24.
(5) - Secondary Aeration Run #3 started at 16:24, ended at 17:24.

ECSi

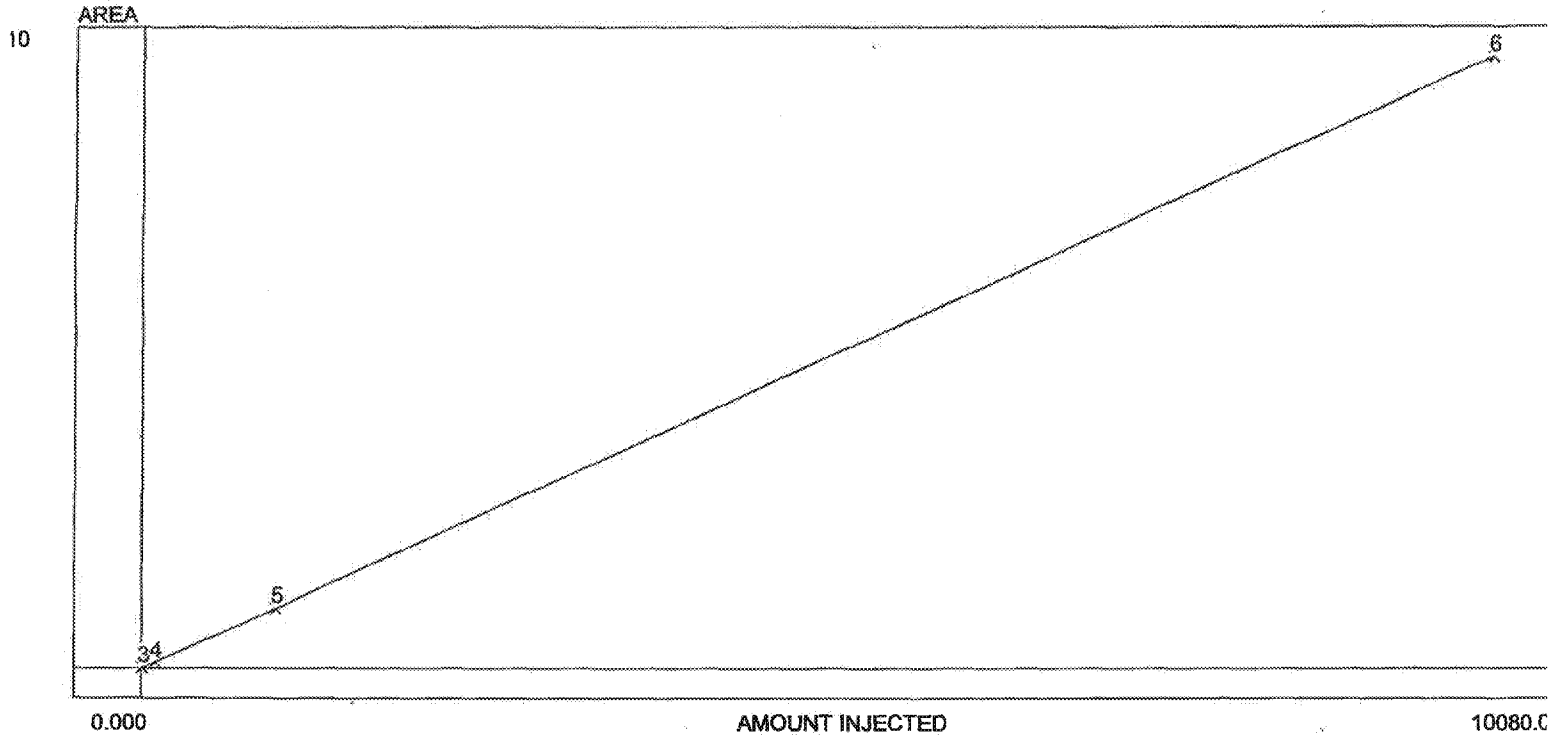
APPENDICES

APPENDIX A

Calibration Data

ak	Name	Start	End	Calibration	Int.Std	Units
	Dead Vol / Air	0.000	0.300		0.000	
	Ambient H2O	0.300	0.450		0.000	
	Ethylene Oxide	0.450	0.550	C:\peak359\1Ster	0.00001	ppm
	Acetaldehyde	0.550	0.800		0.000	
	CO2	0.800	1.000		0.000	

libration file: C:\peak359\1SterisEP2017.cal

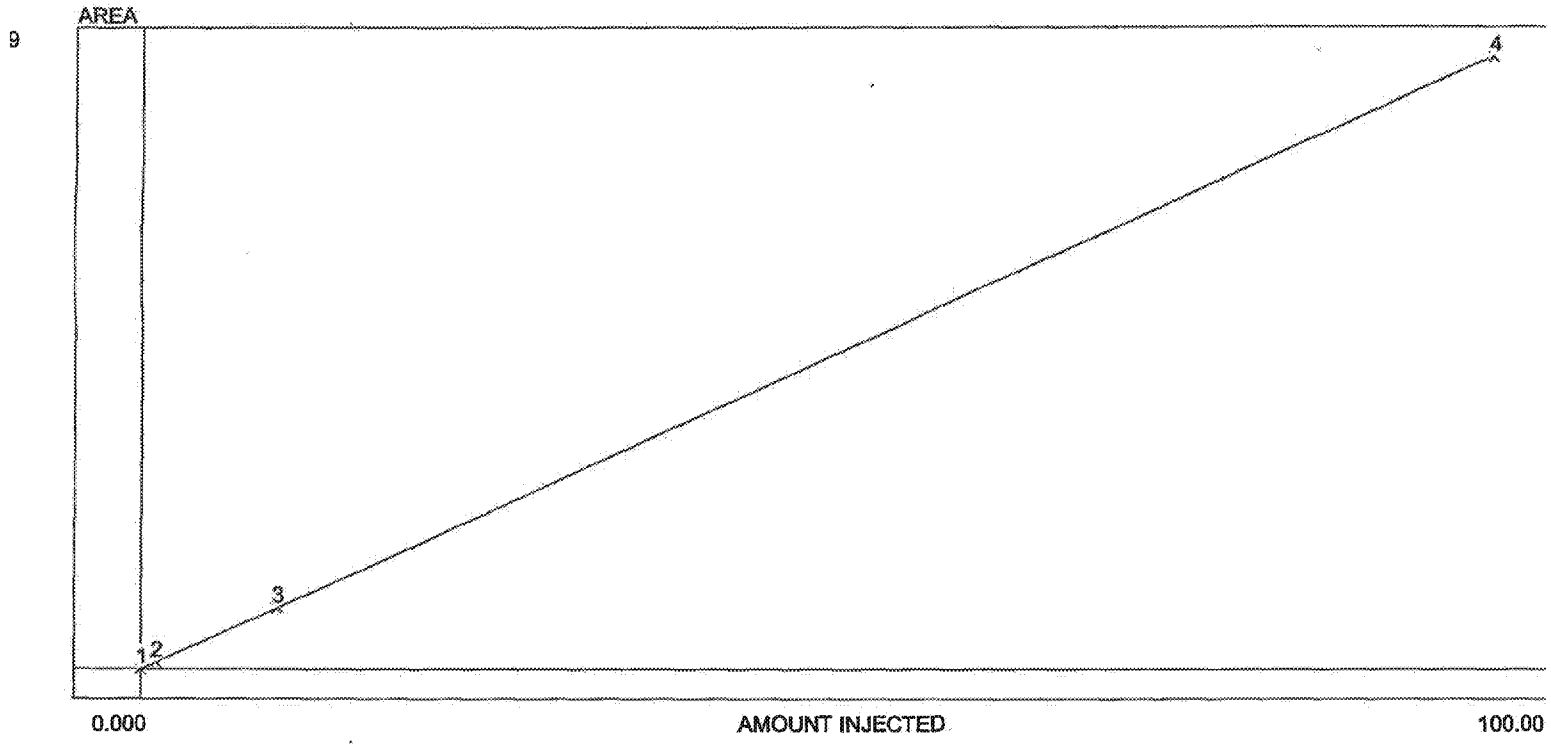


ı slope of curve: 0.41
ıxis intercept: 0.00
earity: 1.00
nber of levels: 6
/rel SD of CF's: 0.2/49.0
).4080X
1.0000
ıt calibrated: Thu Jun 22 12:56:31 2017

Area/ht.	Amount	CF	Current	Previous #1	Previous #2
0.000	0.000	0.000	0.000	N/A	N/A
0.449	1.100	0.408	0.449	N/A	N/A
4.120	10.100	0.408	4.120	N/A	N/A
40.800	100.000	0.408	40.800	N/A	N/A
408.000	1000.000	0.408	408.000	N/A	N/A
4110.000	10080.000	0.408	4110.000	N/A	N/A

ak	Name	Start	End	Calibration	Int.Std	Units
	Dead Vol / Air	0.000	0.300		0.000	
	Ambient H2O	0.300	0.450		0.000	
	Ethylene Oxide	0.450	0.550	C:\peak359\2Ster	0.000017	ppm
	Acetaldehyde	0.550	0.800		0.000	
	CO2	0.800	1.000		0.000	

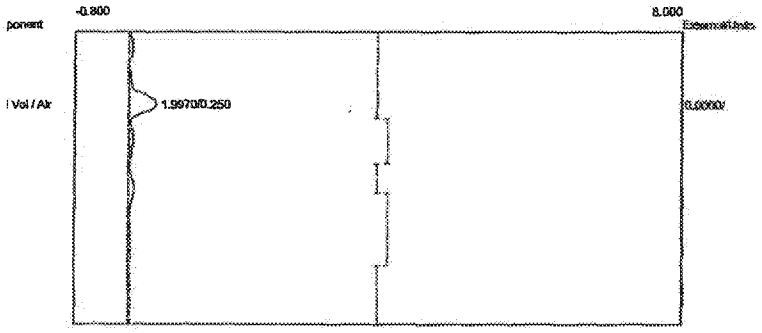
ıibration file: C:\peak359\2SterisEP2017.cal



ɜ slope of curve: 1.49
ıxis intercept: -0.00
earity: 1.00
mber of levels: 4
/rel SD of CF's: 0.7/66.7
1.4920X
1.0000
ɜt calibrated: Thu Jun 22 12:55:09 2017

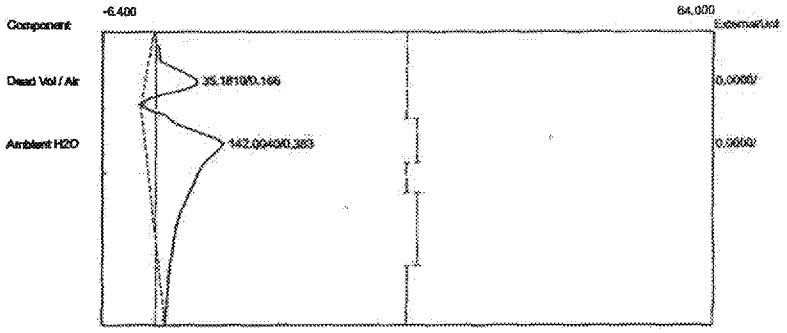
Area/ht.	Amount	CF	Current	Previous #1	Previous #2
0.000	0.000	0.000	0.000	N/A	N/A
1.640	1.100	1.491	1.640	N/A	N/A
15.100	10.100	1.495	15.100	N/A	N/A
149.000	100.000	1.490	149.000	N/A	N/A

Client: Steris/Isomedix - El Paso
Client ID: PreCal
nalysis date: 06/22/2017 12:31:57
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



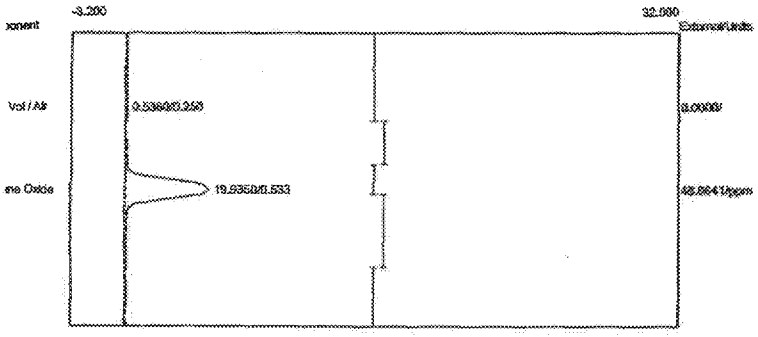
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.9970	0.0000	
		1.9970	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: PreCal
Analysis date: 06/22/2017 12:31:57
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: 2SterisEP2017-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



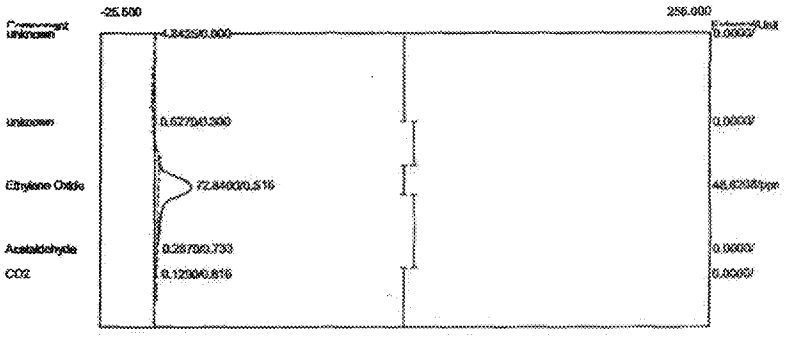
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	35.1810	0.0000	
Ambient H2O	0.383	142.0040	0.0000	
		177.1850	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: PreCal
nalysis date: 06/22/2017 12:51:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-Audit.CHR (c:\peak359)
Sample: 48.8 ppm EtO
Operator: D. Kremer



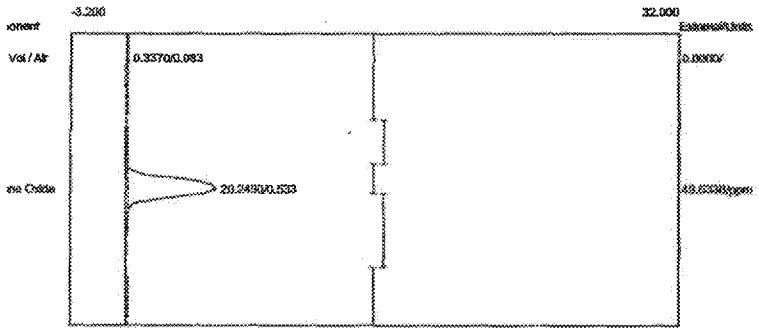
Component	Retention	Area	External	Units
ad Vol / Air	0.250	0.5360	0.0000	
ylene Oxide	0.533	19.9350	48.8641	ppm
		20.4710	48.8641	

Client: Steris/Isomedix - El Paso
Client ID: PreCal
Analysis date: 06/22/2017 12:51:21
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: 2SterisEP2017-Audit.CHR (c:\peak359)
Sample: 48.8 ppm EtO
Operator: D. Kremer



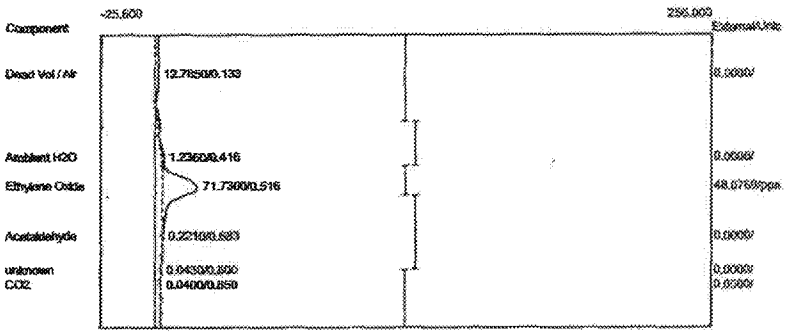
Component	Retention	Area	External	Units
Ethylene Oxide	0.516	72.8400	48.8208	ppm
Acetaldehyde	0.733	0.2870	0.0000	
CO2	0.816	0.1290	0.0000	
		73.2560	48.8208	

Client: Steris/Isomedix - El Paso
Client ID: PostCal
ıalysis date: 06/22/2017 16:57:36
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-PAudit.CHR (c:\peak359)
Sample: 48.8 ppm EtO
Operator: D. Kremer



Component	Retention	Area	External	Units
ad Vol / Air	0.083	0.3370	0.0000	
ylene Oxide	0.533	20.2490	49.6338	ppm
		20.5860	49.6338	

Client: Steris/Isomedix - El Paso
Client ID: PostCal
Analysis date: 06/22/2017 16:57:36
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: 2SterisEP2017-PAudit.CHR (c:\peak359)
Sample: 48.8 ppm EtO
Operator: D. Kremer

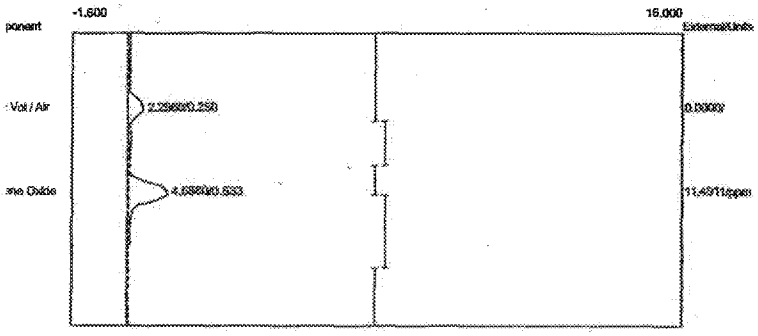


Component	Retention	Area	External	Units
Dead Vol / Air	0.133	12.7850	0.0000	
Ambient H2O	0.416	1.2360	0.0000	
Ethylene Oxide	0.516	71.7300	48.0769	ppm
Acetaldehyde	0.683	0.2210	0.0000	
CO2	0.850	0.0400	0.0000	
		86.0120	48.0769	

APPENDIX B

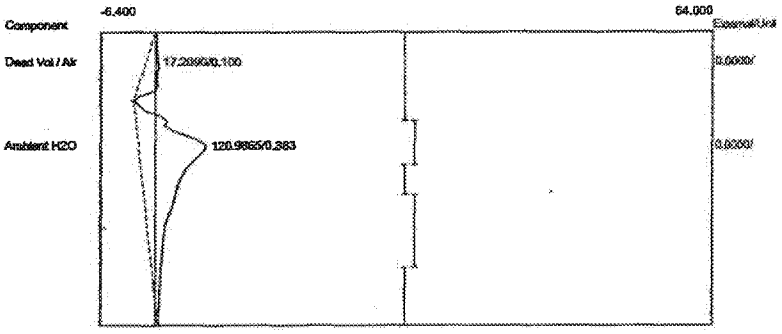
Run #1 Chromatograms – Abator #1 & #2

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:24:09
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A01.CHR (c:\peak359)
Sample: Abator 1 Inlet
Operator: D. Kremer



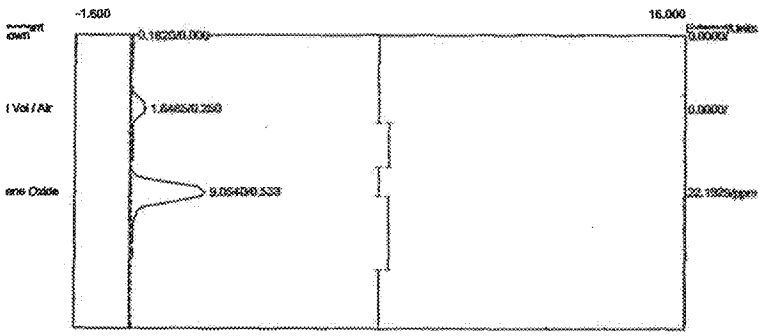
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.2980	0.0000	
ıylene Oxide	0.533	4.6880	11.4911	ppm
		6.9860	11.4911	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:24:09
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: 2SterisEP2017-1A01.CHR (c:\peak359)
Sample: Abator 1 Outlet
Operator: D. Kremer



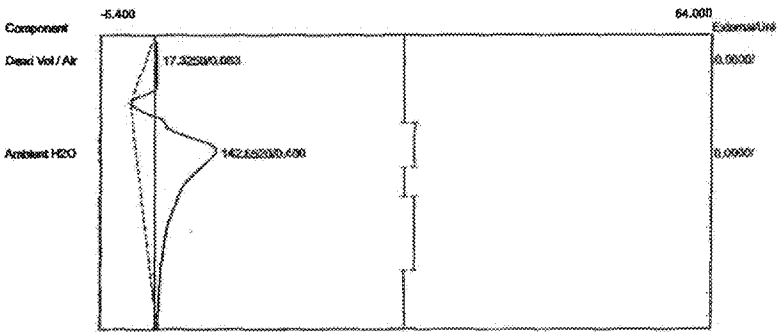
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	17.2090	0.0000	
Ambient H2O	0.383	120.9865	0.0000	
		138.1955	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:26:02
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: 1SterisEP2017-1A02.CHR (c:\peak359)
Sample: Abator 2 Inlet
Operator: D. Kremer



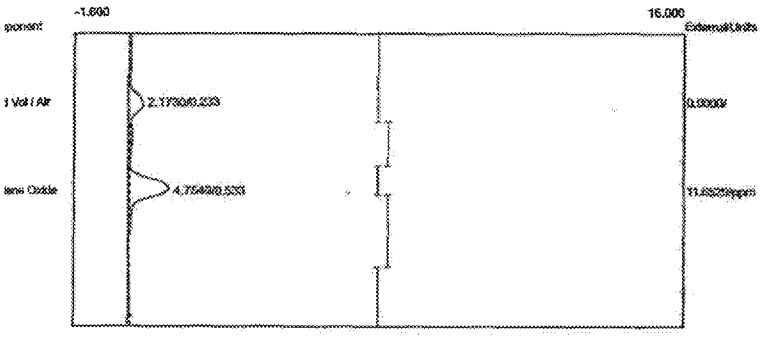
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6485	0.0000	
ylene Oxide	0.533	9.0540	22.1929	ppm
		10.7025	22.1929	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:26:02
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: 2SterisEP2017-1A02.CHR (c:\peak359)
Sample: Abator 2 Outlet
Operator: D. Kremer



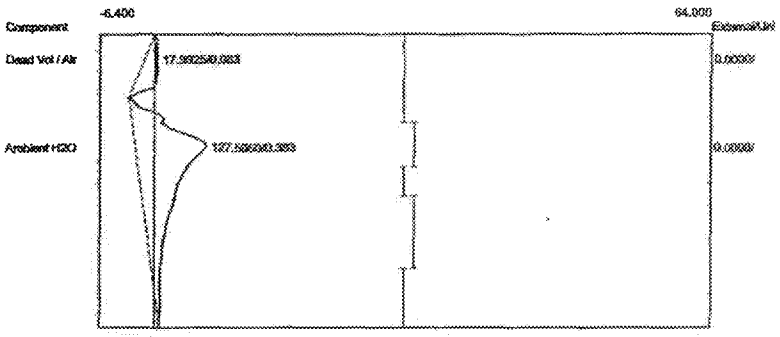
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.3250	0.0000	
Ambient H2O	0.400	142.6520	0.0000	
		159.9770	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:29:11
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: 1SterisEP2017-1A03.CHR (c:\peak359)
Sample: Abator 1 Inlet
Operator: D. Kremer



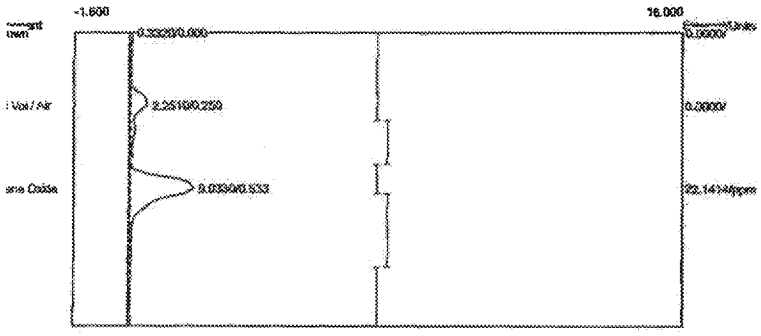
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.1730	0.0000	
ylene Oxide	0.533	4.7540	11.6529	ppm
		6.9270	11.6529	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:29:11
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: 2SterisEP2017-1A03.CHR (c:\peak359)
Sample: Abator 1 Outlet
Operator: D. Kremer



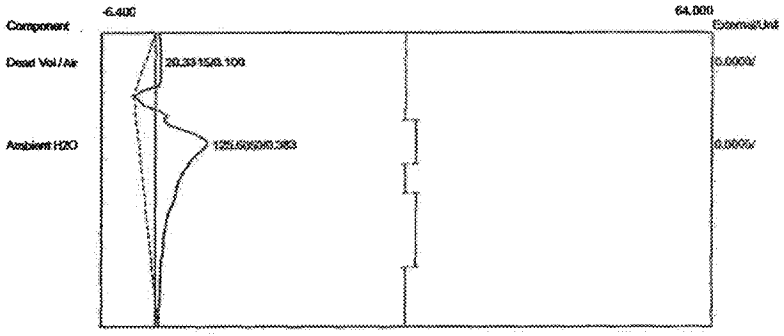
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.9925	0.0000	
Ambient H2O	0.383	127.5060	0.0000	
		145.4985	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:31:59
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: 1SterisEP2017-1A04.CHR (c:\peak359)
Sample: Abator 2 Inlet
Operator: D. Kremer



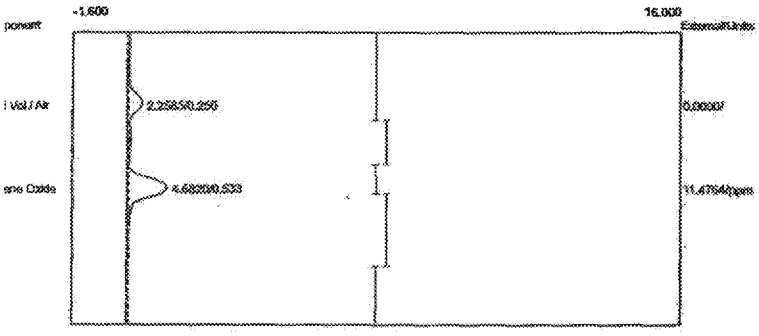
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.2510	0.0000	
yiene Oxide	0.533	9.0330	22.1414	ppm
		11.2840	22.1414	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:31:59
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: 2SterisEP2017-1A04.CHR (c:\peak359)
Sample: Abator 2 Outlet
Operator: D. Kremer



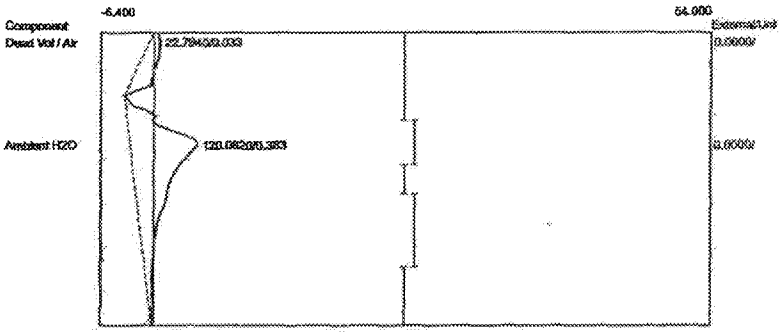
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	20.3315	0.0000	
Ambient H2O	0.383	125.6050	0.0000	
		145.9365	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:34:14
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: 1SterisEP2017-1A05.CHR (c:\peak359)
Sample: Abator 1 Inlet
Operator: D. Kremer



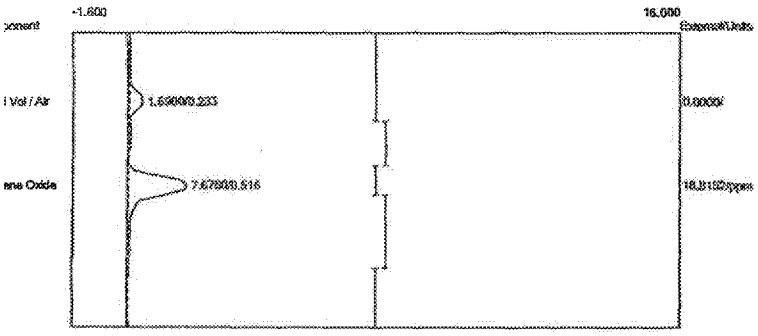
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.2585	0.0000	
ylene Oxide	0.533	4.6820	11.4764	ppm
		6.9405	11.4764	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:34:14
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: 2SterisEP2017-1A05.CHR (c:\peak359)
Sample: Abator 1 Outlet
Operator: D. Kremer



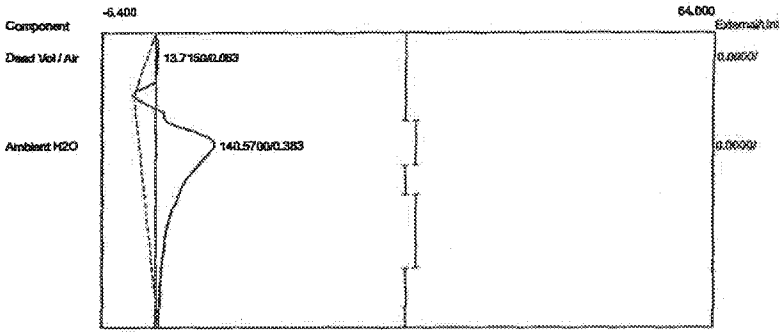
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	22.7940	0.0000	
Ambient H2O	0.383	120.0820	0.0000	
		142.8760	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:36:06
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: 1SterisEP2017-1A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



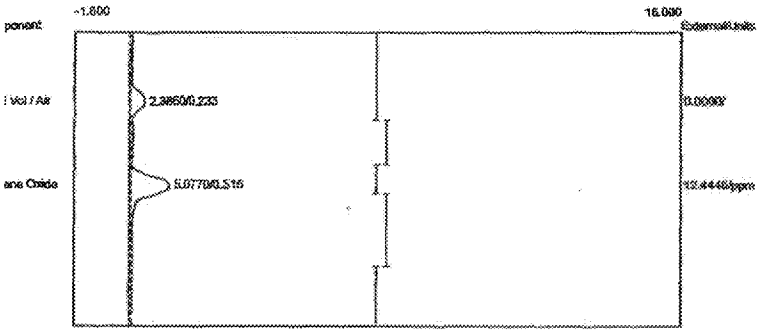
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6900	0.0000	
ylene Oxide	0.516	7.6760	18.8152	ppm
		9.3660	18.8152	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:36:06
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: 2SterisEP2017-1A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



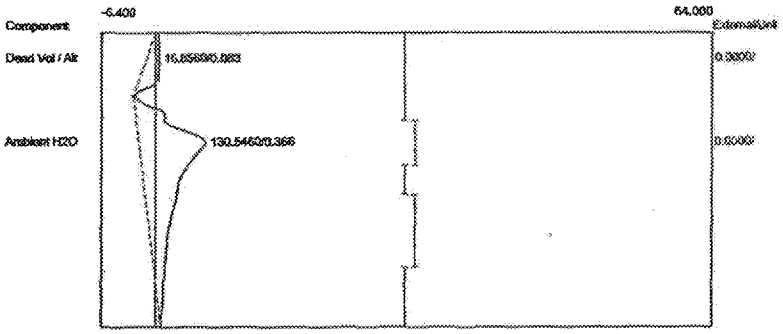
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	13.7150	0.0000	
Ambient H2O	0.383	140.5700	0.0000	
		154.2850	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:39:34
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: 1SterisEP2017-1A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



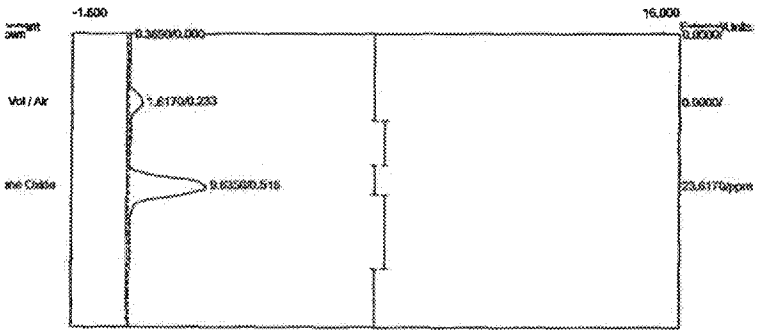
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.3860	0.0000	
ıylene Oxide	0.516	5.0770	12.4446	ppm
		7.4630	12.4446	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:39:34
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: 2SterisEP2017-1A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



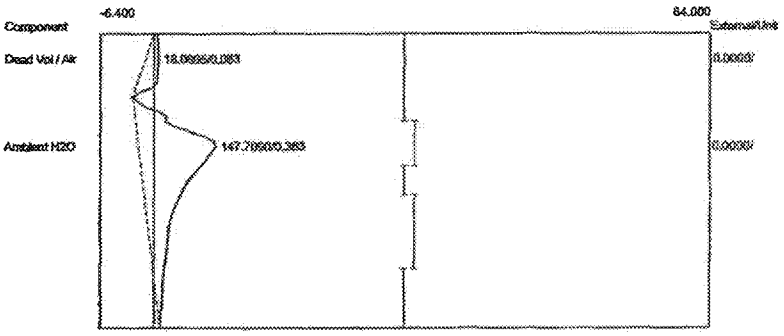
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	16.8560	0.0000	
Ambient H2O	0.366	130.5460	0.0000	
		147.4020	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:41:27
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



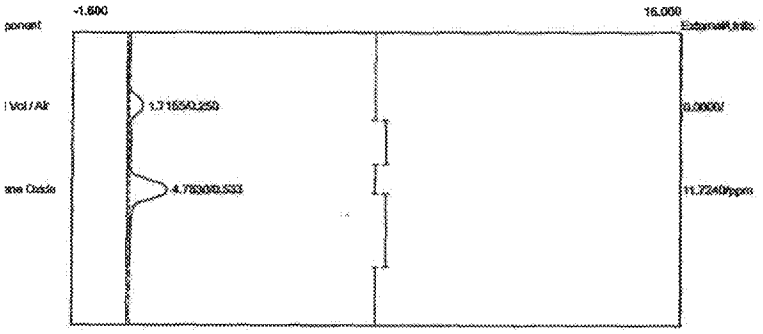
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6170	0.0000	
ylene Oxide	0.516	9.6350	23.6170	ppm
		11.2520	23.6170	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:41:27
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: 2SterisEP2017-1A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



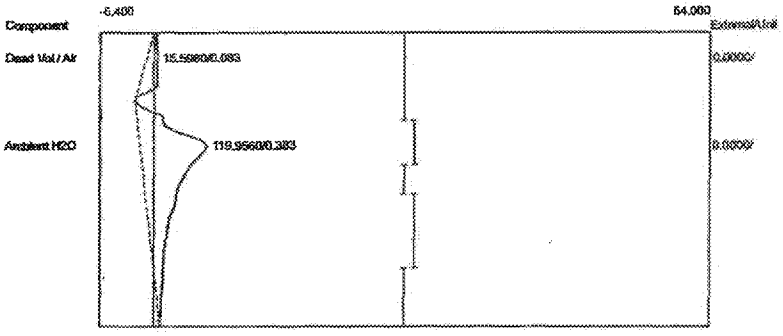
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.0895	0.0000	
Ambient H2O	0.383	147.7090	0.0000	
		165.7985	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:44:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



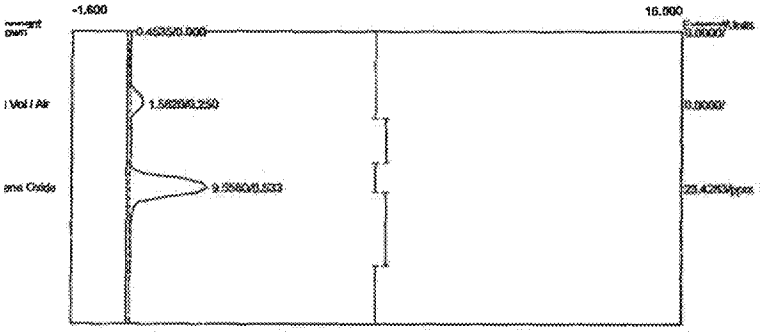
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.7155	0.0000	
ylene Oxide	0.533	4.7830	11.7240	ppm
		6.4985	11.7240	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:44:10
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: 2SterisEP2017-1A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



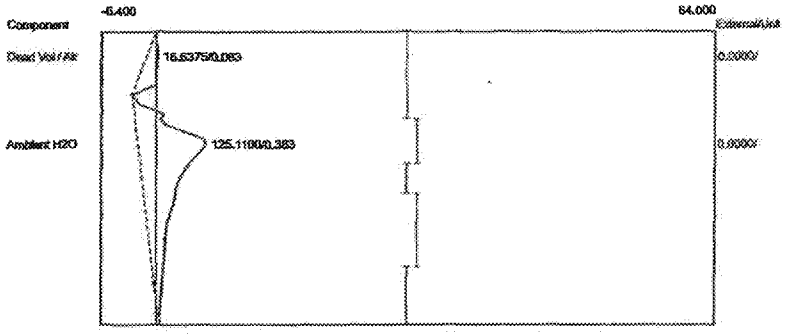
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.5980	0.0000	
Ambient H2O	0.383	119.9560	0.0000	
		135.5540	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:46:47
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



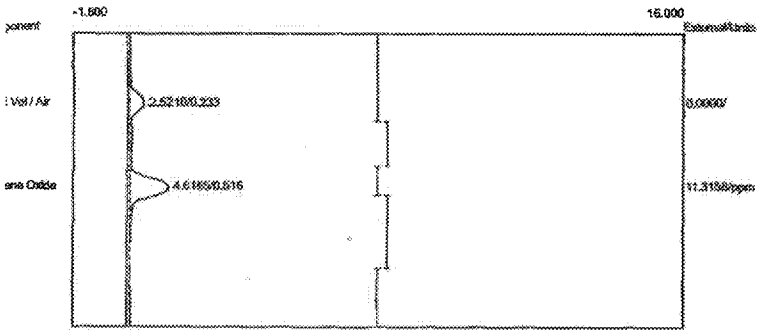
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.5820	0.0000	
ylene Oxide	0.533	9.5580	23.4283	ppm
		11.1400	23.4283	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:46:47
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: 2SterisEP2017-1A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



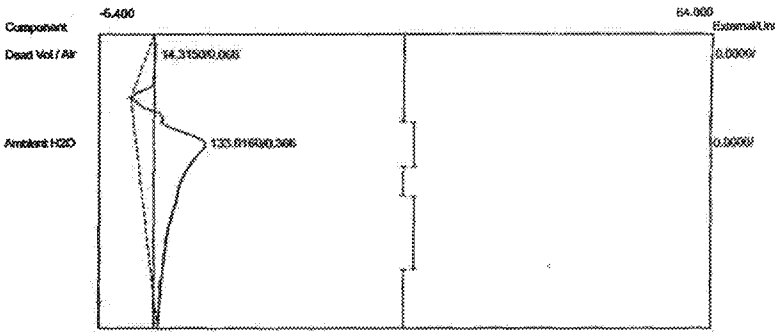
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	16.6375	0.0000	
Ambient H2O	0.383	125.1100	0.0000	
		141.7475	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:49:42
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



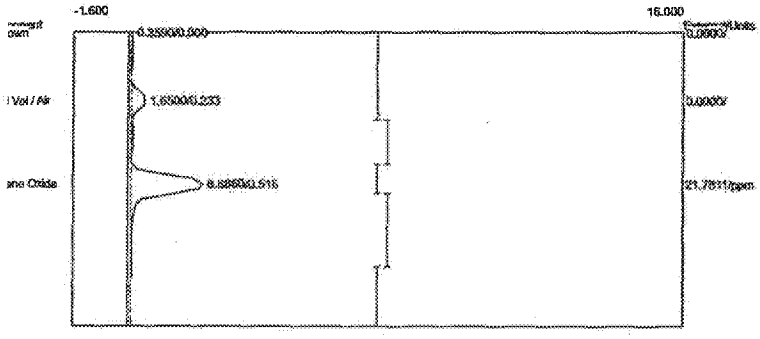
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.5210	0.0000	
ıylene Oxide	0.516	4.6165	11.3158	ppm
		7.1375	11.3158	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:49:42
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: 2SterisEP2017-1A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



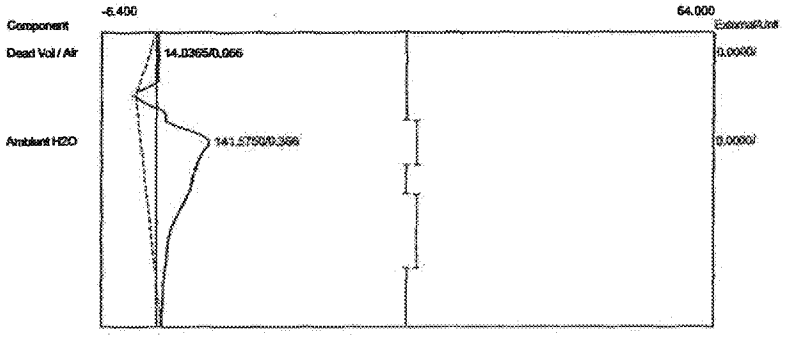
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.3150	0.0000	
Ambient H2O	0.366	133.0160	0.0000	
		147.3310	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:51:29
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



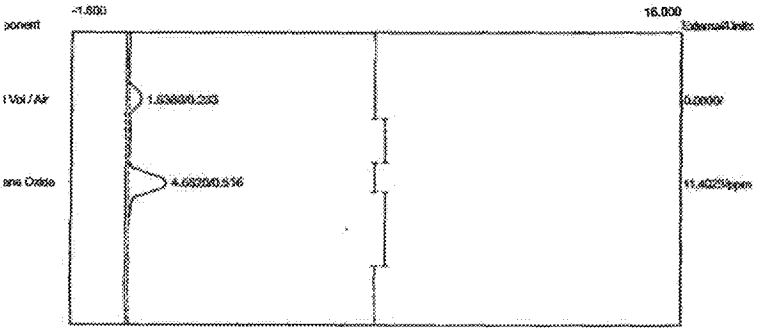
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6500	0.0000	
ylene Oxide	0.516	8.8860	21.7811	ppm
		10.5360	21.7811	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:51:29
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: 2SterisEP2017-1A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



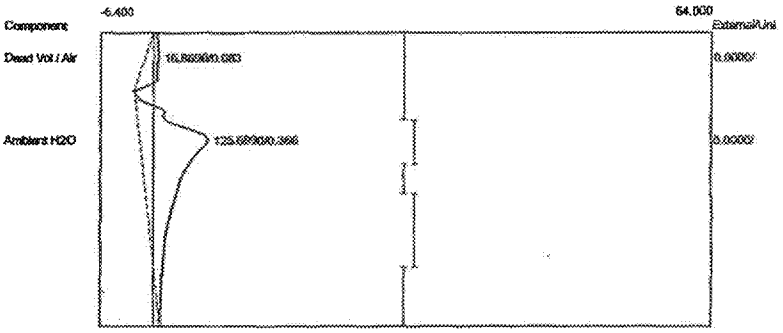
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.0365	0.0000	
Ambient H2O	0.366	141.5750	0.0000	
		155.6115	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:54:06
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: 1SterisEP2017-1A13.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



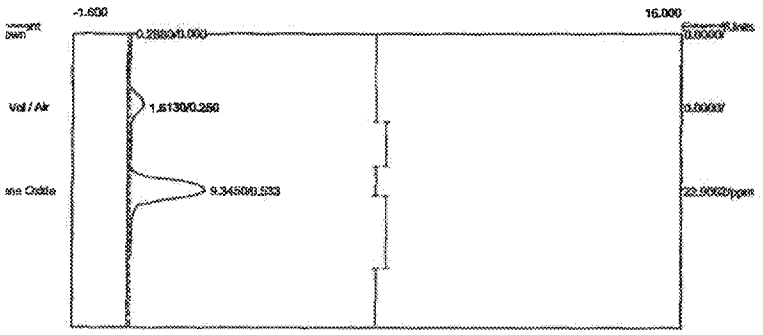
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6380	0.0000	
ylene Oxide	0.516	4.6520	11.4029	ppm
		6.2900	11.4029	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:54:06
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: 2SterisEP2017-1A13.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



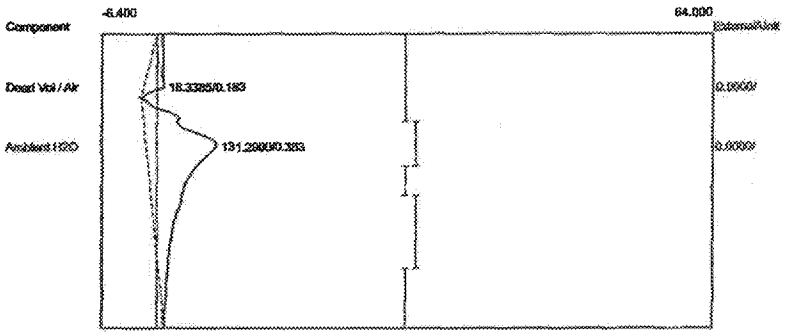
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	16.8690	0.0000	
Ambient H2O	0.366	125.6990	0.0000	
		142.5680	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:56:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A14.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



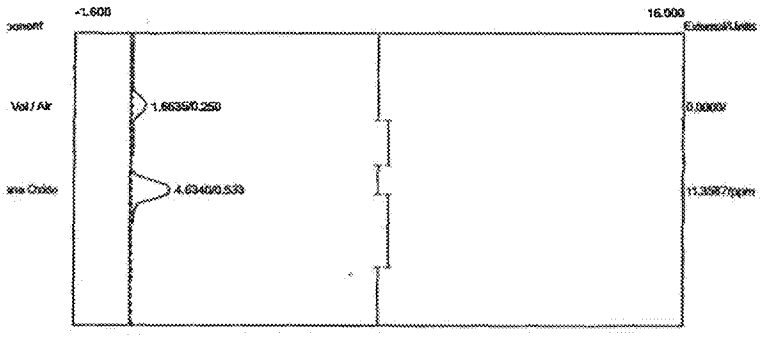
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6130	0.0000	
ylene Oxide	0.533	9.3450	22.9062	ppm
		10.9580	22.9062	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:56:06
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: 2SterisEP2017-1A14.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



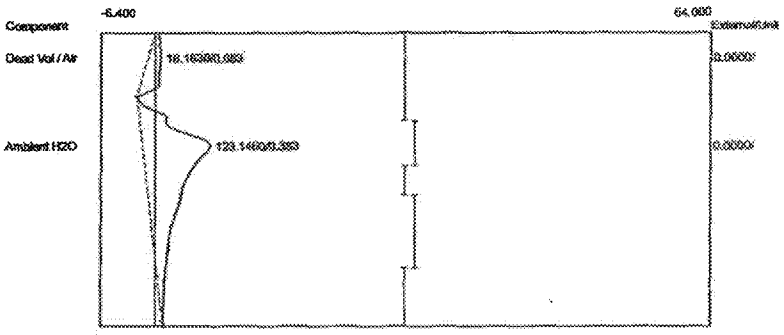
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	18.3385	0.0000	
Ambient H2O	0.383	131.2900	0.0000	
		149.6285	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 13:59:02
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A15.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



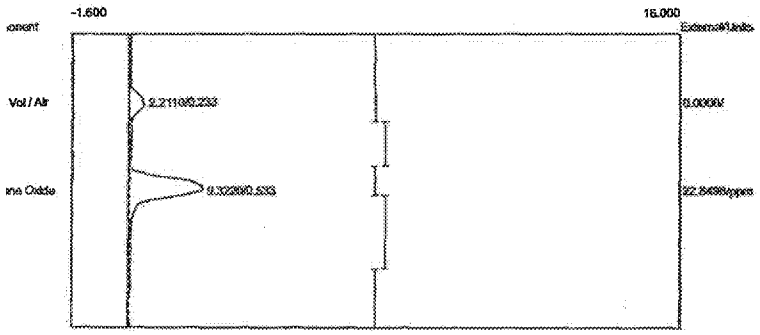
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6635	0.0000	
ıylene Oxide	0.533	4.6340	11.3587	ppm
		6.2975	11.3587	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 13:59:02
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: 2SterisEP2017-1A15.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



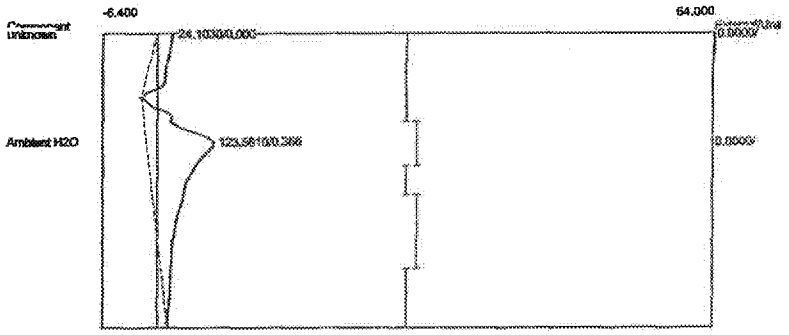
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.1630	0.0000	
Ambient H2O	0.383	123.1460	0.0000	
		141.3090	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:01:19
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A16.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



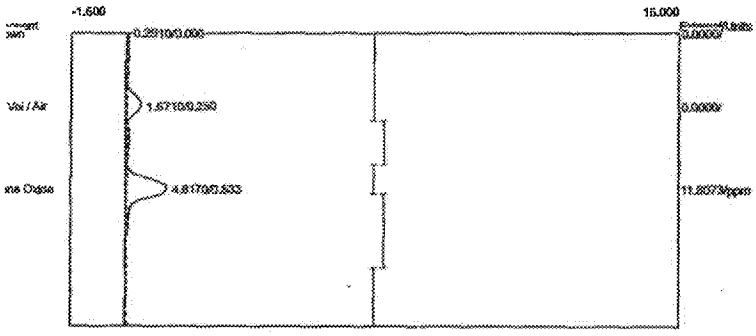
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.2110	0.0000	
ylene Oxide	0.533	9.3220	22.8498	ppm
		11.5330	22.8498	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:01:19
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: 2SterisEP2017-1A16.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



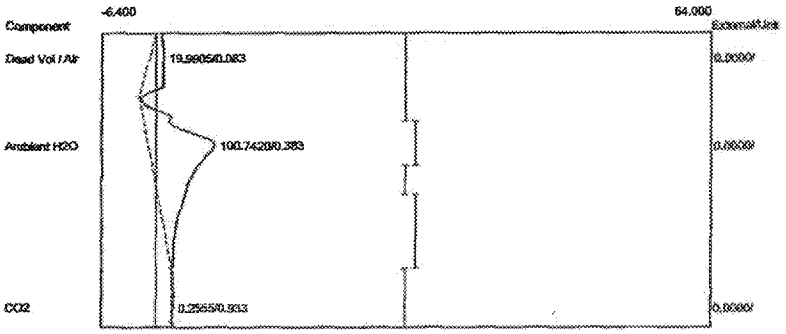
Component	Retention	Area	External	Units
Ambient H2O	0.366	123.5610	0.0000	
		123.5610	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:04:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A17.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



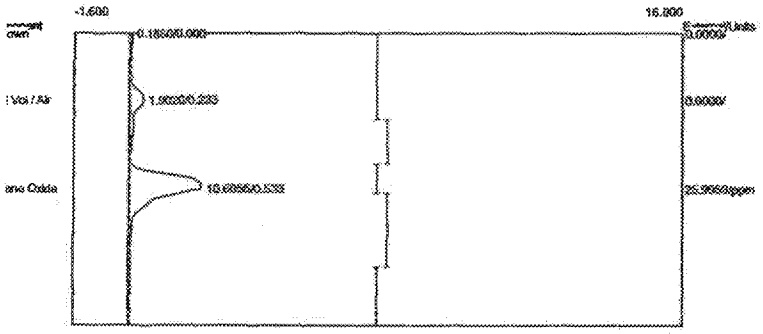
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6710	0.0000	
ylene Oxide	0.533	4.8170	11.8073	ppm
		6.4880	11.8073	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:04:10
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: 2SterisEP2017-1A17.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



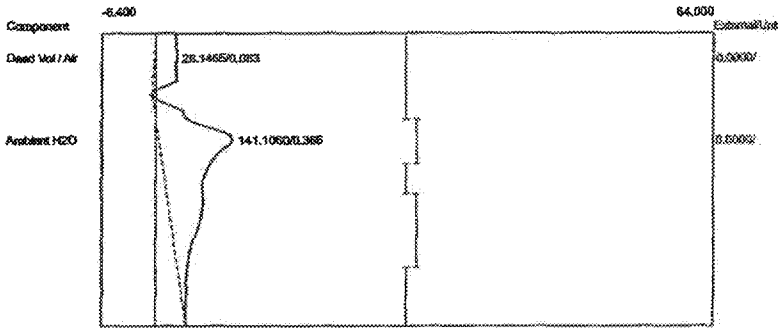
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.9905	0.0000	
Ambient H2O	0.383	100.7420	0.0000	
CO2	0.933	0.2555	0.0000	
		120.9880	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:06:03
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A18.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



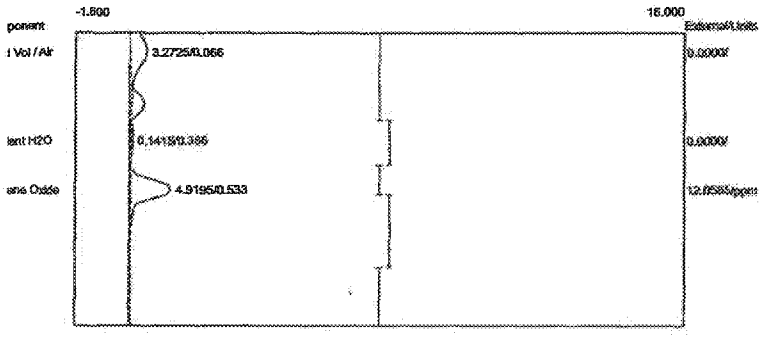
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.9020	0.0000	
ıylene Oxide	0.533	10.6055	25.9959	ppm
		12.5075	25.9959	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:06:03
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: 2SterisEP2017-1A18.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



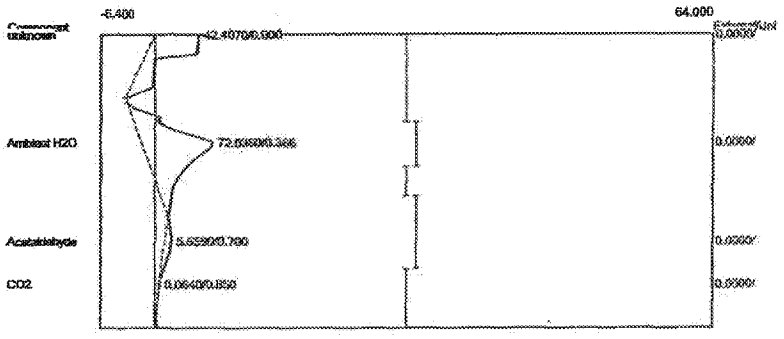
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	28.1465	0.0000	
Ambient H2O	0.366	141.1060	0.0000	
		169.2525	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:09:04
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: 1SterisEP2017-1A19.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



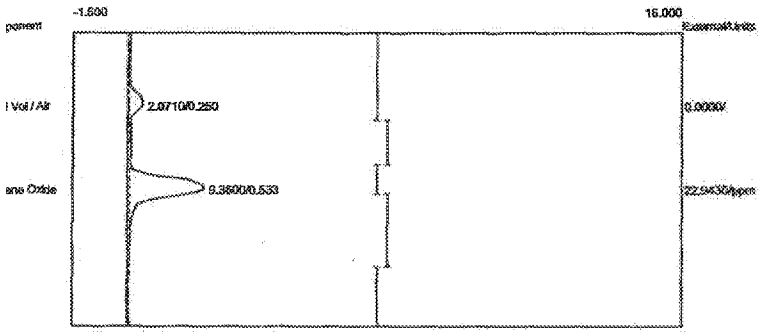
Component	Retention	Area	External	Units
ad Vol / Air	0.066	3.2725	0.0000	
bient H2O	0.366	0.1415	0.0000	
ylene Oxide	0.533	4.9195	12.0585	ppm
		8.3335	12.0585	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:09:04
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: 2SterisEP2017-1A19.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



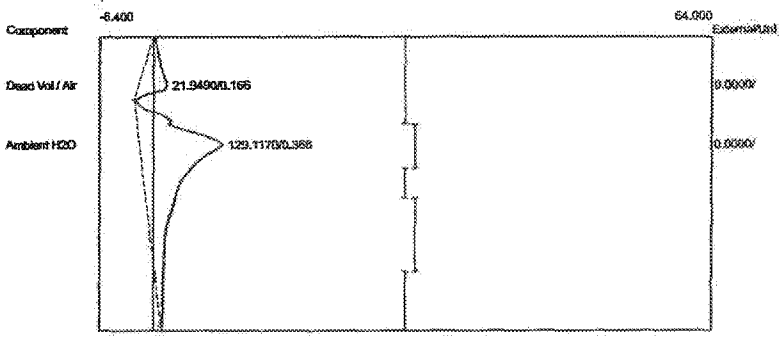
Component	Retention	Area	External	Units
Ambient H2O	0.366	72.0360	0.0000	
Acetaldehyde	0.700	5.6590	0.0000	
CO2	0.850	0.0640	0.0000	
		77.7590	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:11:08
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: 1SterisEP2017-1A20.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



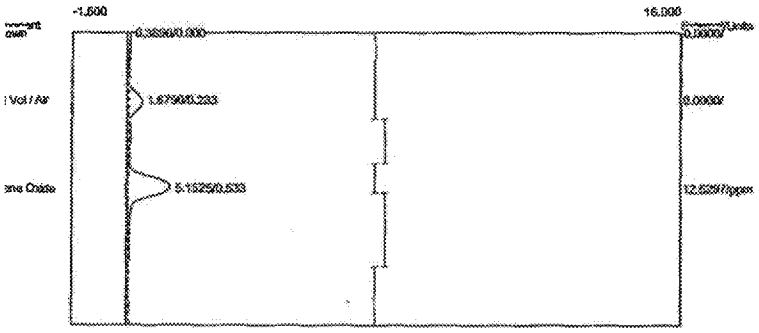
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.0710	0.0000	
ylene Oxide	0.533	9.3600	22.9430	ppm
		11.4310	22.9430	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:11:08
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: 2SterisEP2017-1A20.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



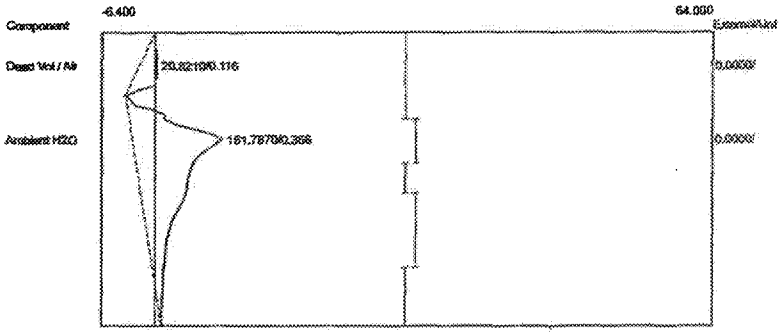
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	21.9490	0.0000	
Ambient H2O	0.366	129.1170	0.0000	
		151.0660	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:14:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A21.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



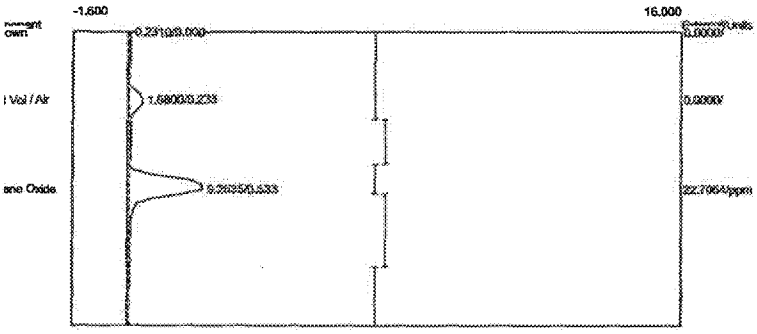
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6790	0.0000	
ylene Oxide	0.533	5.1525	12.6297	ppm
		6.8315	12.6297	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:14:08
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: 2SterisEP2017-1A21.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



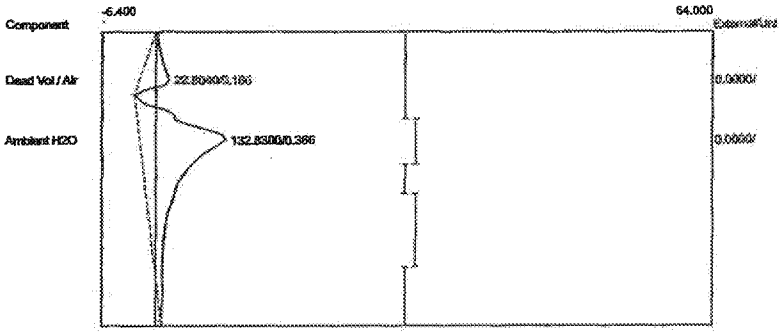
Component	Retention	Area	External	Units
Dead Vol / Air	0.116	20.8210	0.0000	
Ambient H2O	0.366	161.7870	0.0000	
		182.6080	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:16:12
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-1A22.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



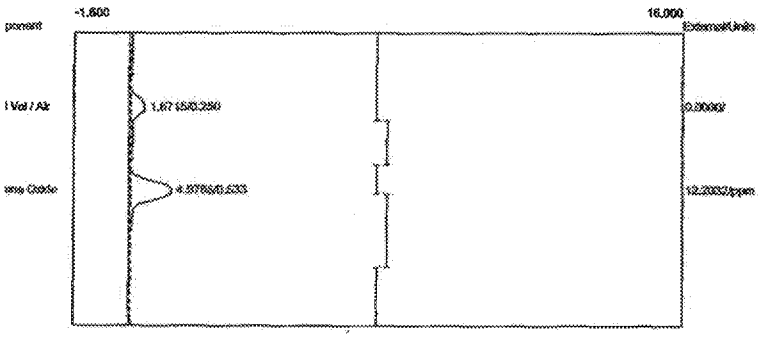
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6800	0.0000	
ıylene Oxide	0.533	9.2635	22.7064	ppm
		10.9435	22.7064	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:16:12
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: 2SterisEP2017-1A22.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



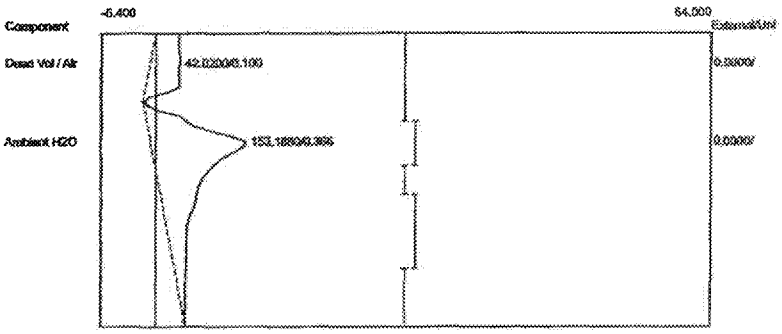
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	22.8040	0.0000	
Ambient H2O	0.366	132.8300	0.0000	
		155.6340	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:19:21
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: 1SterisEP2017-1A23.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



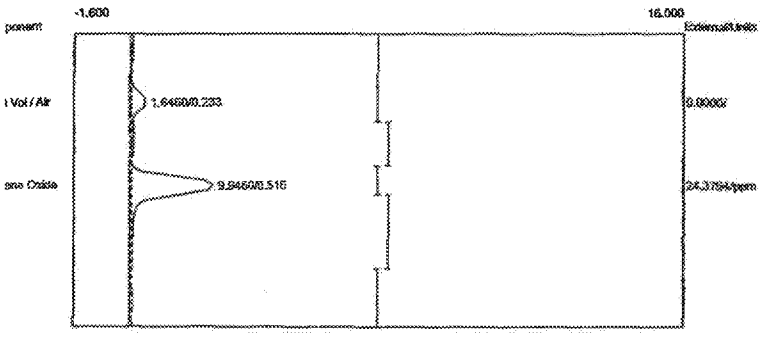
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6715	0.0000	
ylene Oxide	0.533	4.9785	12.2032	ppm
		6.6500	12.2032	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:19:21
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: 2SterisEP2017-1A23.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



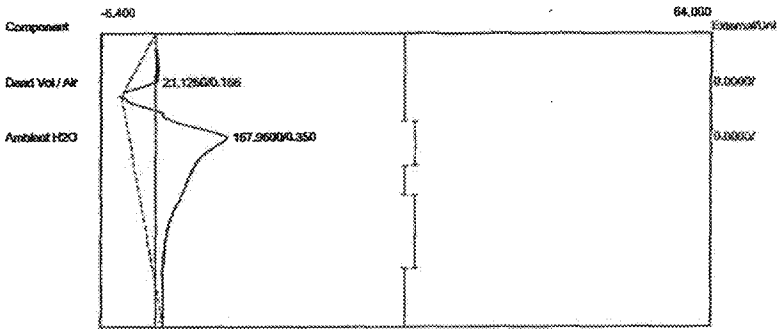
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	42.0200	0.0000	
Ambient H2O	0.366	153.1880	0.0000	
		195.2080	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
nalysis date: 06/22/2017 14:21:07
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: 1SterisEP2017-1A24.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6460	0.0000	
ylene Oxide	0.516	9.9460	24.3794	ppm
		11.5920	24.3794	

Client: Steris/Isomedix - El Paso
Client ID: Run#1Aer
Analysis date: 06/22/2017 14:21:07
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: 2SterisEP2017-1A24.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer

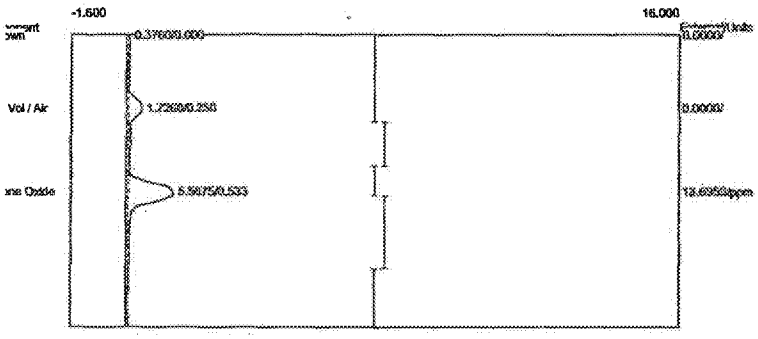


Component	Retention	Area	External	Units
Dead Vol / Air	0.166	21.1260	0.0000	
Ambient H2O	0.350	167.9600	0.0000	
		189.0860	0.0000	

APPENDIX C

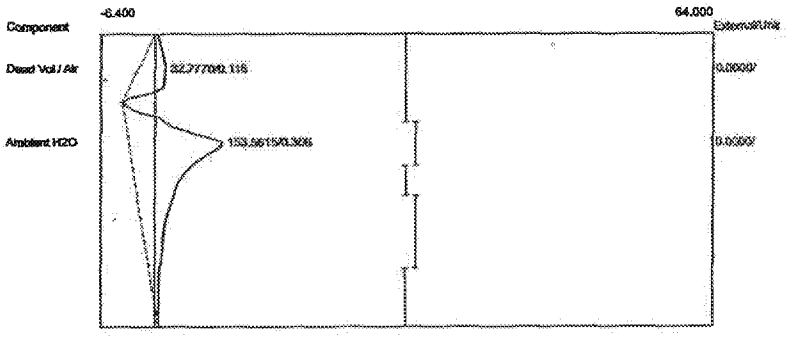
Run #2 Chromatograms – Abator #1 & #2

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:24:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



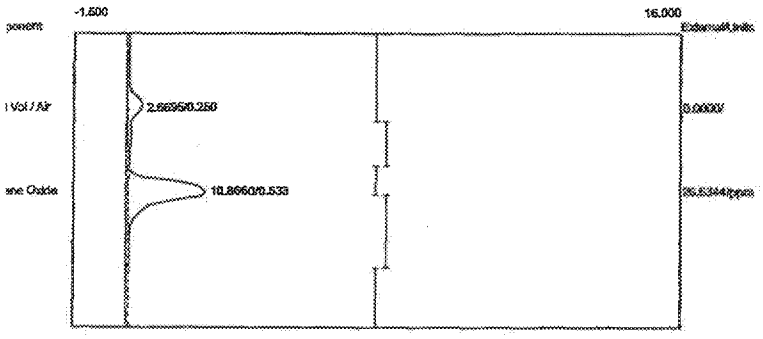
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.7260	0.0000	
ylene Oxide	0.533	5.5875	13.6959	ppm
		7.3135	13.6959	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:24:13
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: 2SterisEP2017-2A01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



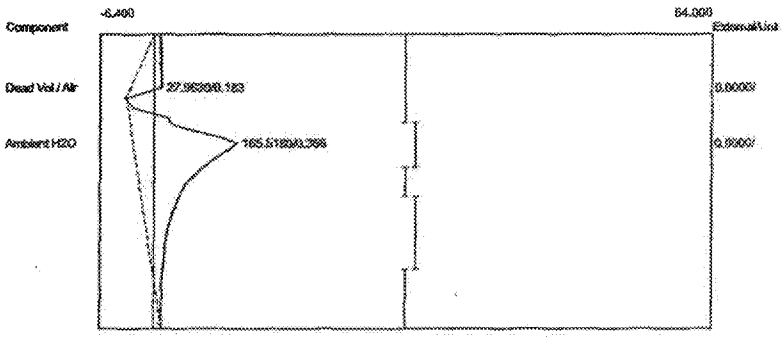
Component	Retention	Area	External	Units
Dead Vol / Air	0.116	32.7770	0.0000	
Ambient H2O	0.366	153.5615	0.0000	
		186.3385	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:26:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



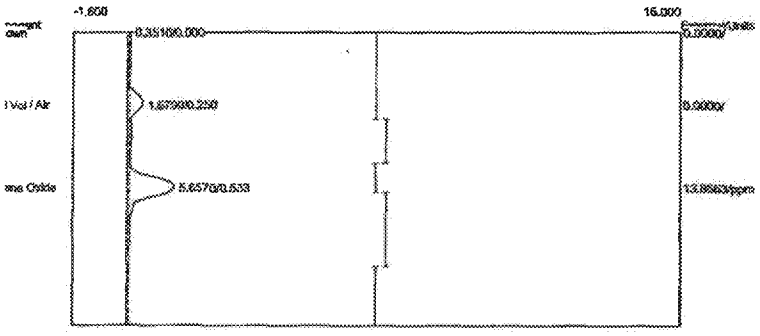
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.6695	0.0000	
ylene Oxide	0.533	10.8660	26.6344	ppm
		13.5355	26.6344	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:26:05
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: 2SterisEP2017-2A02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



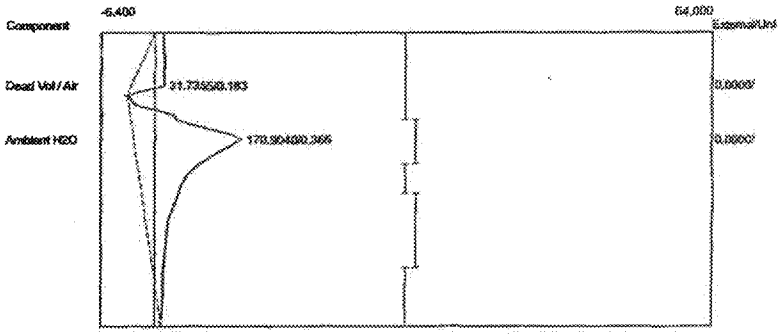
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	27.9630	0.0000	
Ambient H2O	0.366	165.5180	0.0000	
		193.4810	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:29:17
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: 1SterisEP2017-2A03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



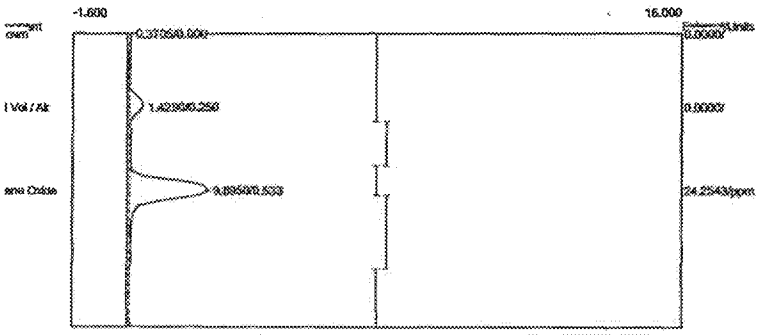
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6790	0.0000	
ylene Oxide	0.533	5.6570	13.8663	ppm
		7.3360	13.8663	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:29:17
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: 2SterisEP2017-2A03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



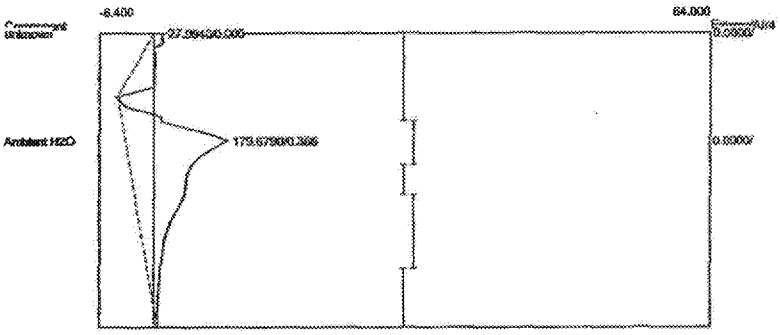
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	31.7355	0.0000	
Ambient H2O	0.366	170.9040	0.0000	
		202.6395	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:31:01
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: 1SterisEP2017-2A04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



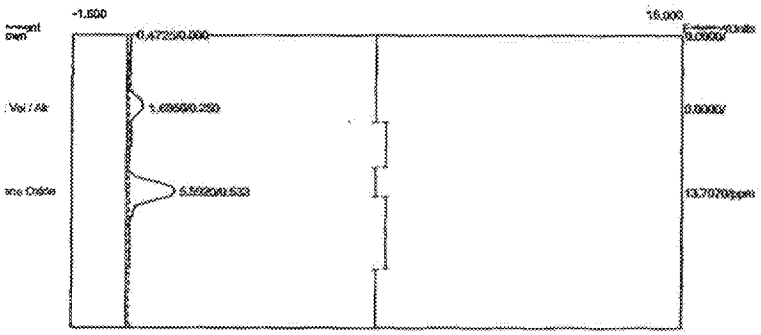
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.4290	0.0000	
ylene Oxide	0.533	9.8950	24.2543	ppm
		11.3240	24.2543	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:31:01
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: 2SterisEP2017-2A04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



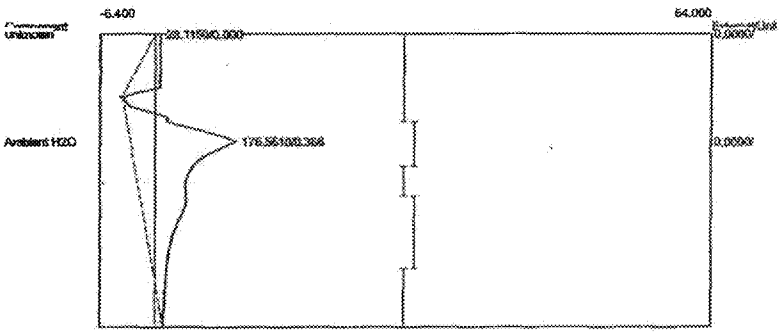
Component	Retention	Area	External	Units
Ambient H2O	0.366	179.6790	0.0000	
		179.6790	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:34:17
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



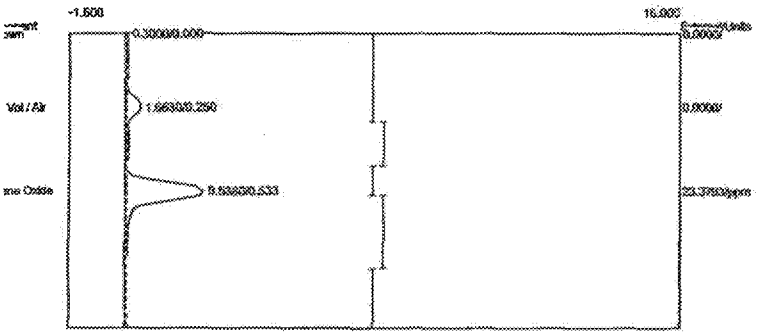
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6950	0.0000	
ylene Oxide	0.533	5.5920	13.7070	ppm
		7.2870	13.7070	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:34:17
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: 2SterisEP2017-2A05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



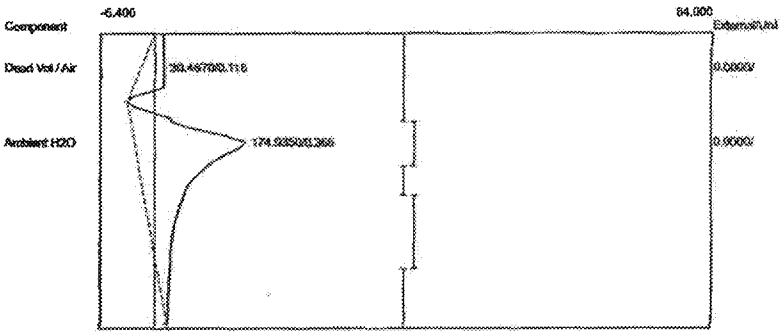
Component	Retention	Area	External	Units
Ambient H2O	0.366	176.5610	0.0000	
		176.5610	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:36:09
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



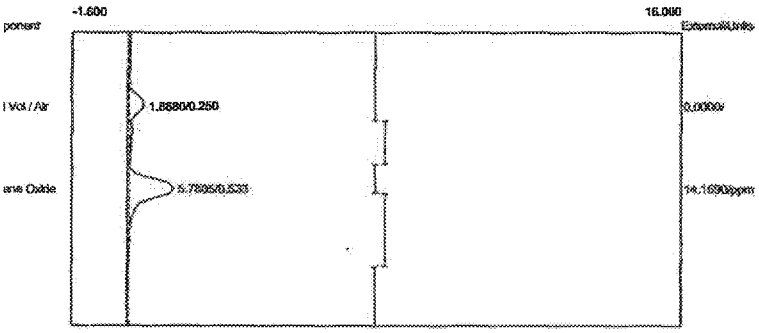
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6630	0.0000	
ylene Oxide	0.533	9.5380	23.3793	ppm
		11.2010	23.3793	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:36:09
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: 2SterisEP2017-2A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



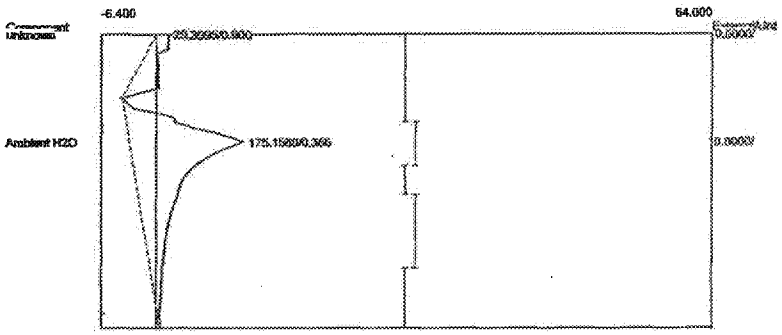
Component	Retention	Area	External	Units
Dead Vol / Air	0.116	30.4670	0.0000	
Ambient H2O	0.366	174.9350	0.0000	
		205.4020	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:39:30
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: 1SterisEP2017-2A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



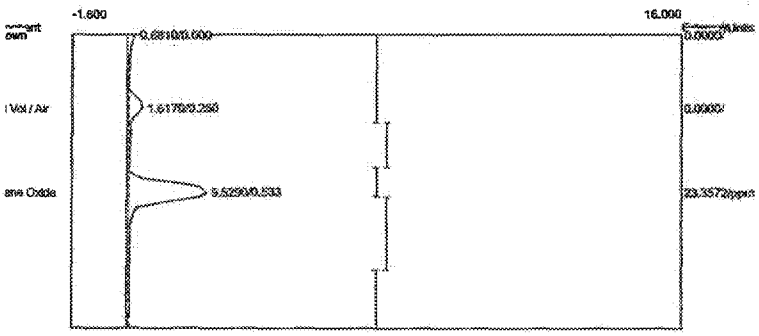
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.8680	0.0000	
ylene Oxide	0.533	5.7805	14.1690	ppm
		7.6485	14.1690	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:39:30
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: 2SterisEP2017-2A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



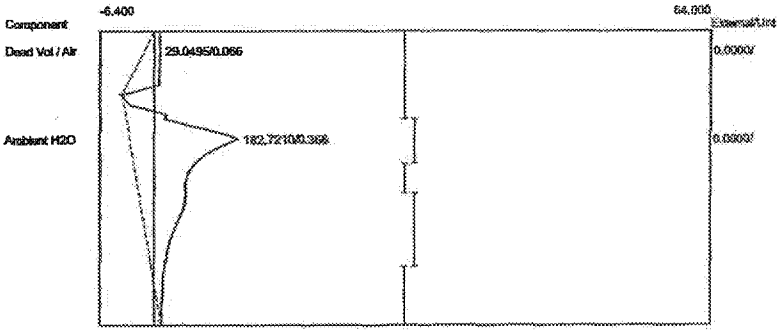
Component	Retention	Area	External	Units
Ambient H2O	0.366	175.1580	0.0000	
		175.1580	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:41:12
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: 1SterisEP2017-2A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



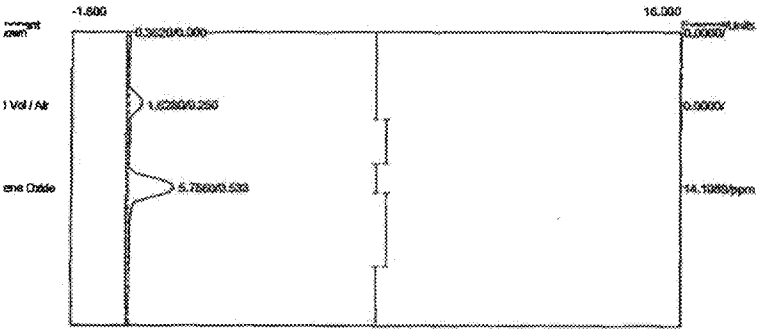
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6170	0.0000	
ylene Oxide	0.533	9.5290	23.3572	ppm
		11.1460	23.3572	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:41:12
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: 2SterisEP2017-2A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



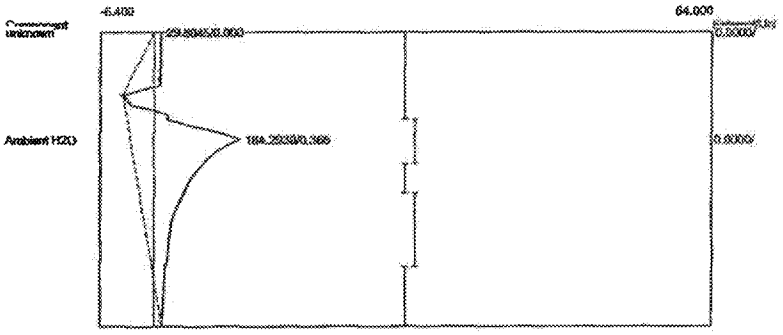
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	29.0495	0.0000	
Ambient H2O	0.366	182.7210	0.0000	
		211.7705	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:44:14
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: 1SterisEP2017-2A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



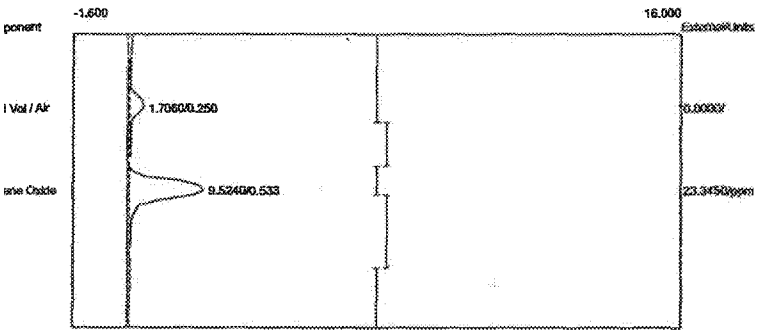
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6280	0.0000	
ıylene Oxide	0.533	5.7560	14.1089	ppm
		7.3840	14.1089	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:44:14
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: 2SterisEP2017-2A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



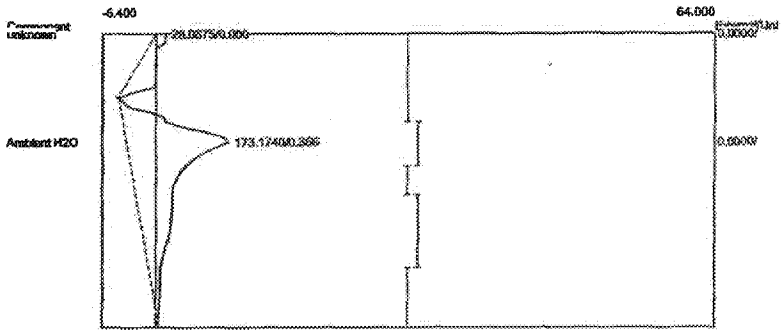
Component	Retention	Area	External	Units
Ambient H2O	0.366	184.2930	0.0000	
		184.2930	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:46:14
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: 1SterisEP2017-2A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



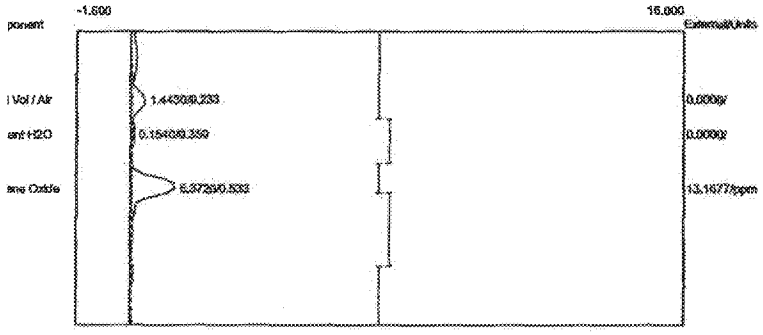
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.7060	0.0000	
ylene Oxide	0.533	9.5240	23.3450	ppm
		11.2300	23.3450	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:46:14
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: 2SterisEP2017-2A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



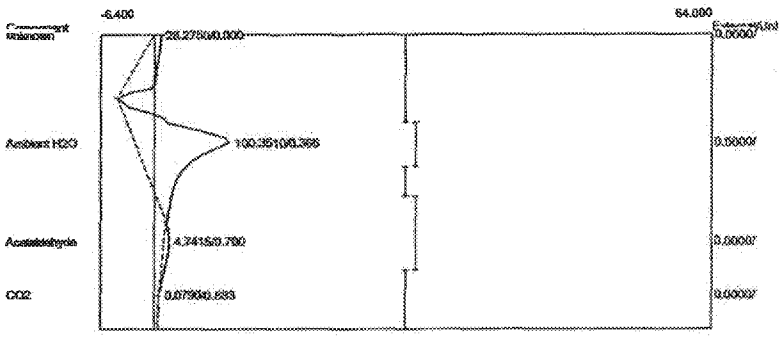
Component	Retention	Area	External	Units
Ambient H2O	0.366	173.1740	0.0000	
		173.1740	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:49:16
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: 1SterisEP2017-2A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



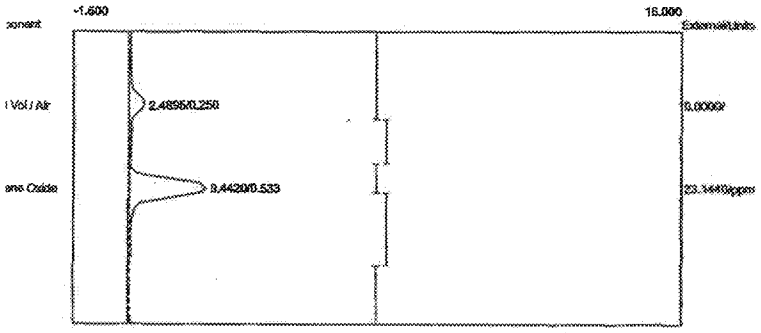
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.4430	0.0000	
ıbient H2O	0.350	0.1540	0.0000	
ıylene Oxide	0.533	5.3720	13.1677	ppm
		6.9690	13.1677	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:49:16
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: 2SterisEP2017-2A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



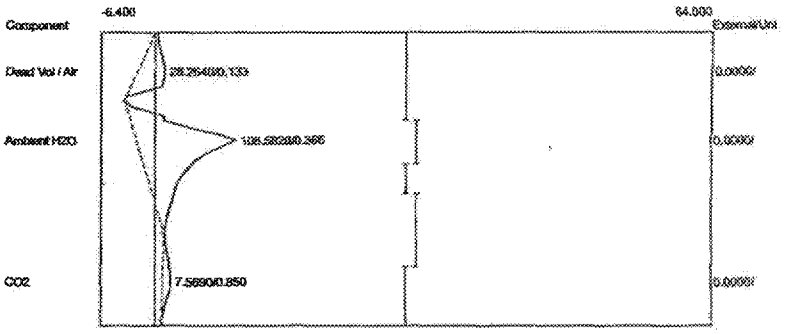
Component	Retention	Area	External	Units
Ambient H2O	0.366	100.3510	0.0000	
Acetaldehyde	0.700	4.7415	0.0000	
CO2	0.883	0.0790	0.0000	
		105.1715	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:51:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



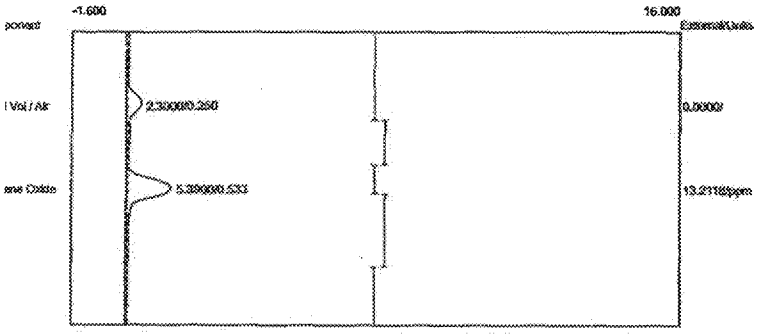
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.4895	0.0000	
ylene Oxide	0.533	9.4420	23.1440	ppm
		11.9315	23.1440	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:51:13
Method: Direct Injection
Description: CHANNEL 2 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterisEP2017-2A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



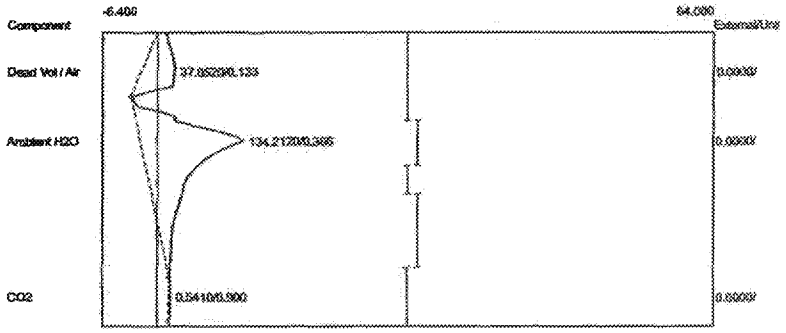
Component	Retention	Area	External	Units
Dead Vol / Air	0.133	28.2640	0.0000	
Ambient H2O	0.366	108.5820	0.0000	
CO2	0.850	7.5690	0.0000	
		144.4150	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:54:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A13.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



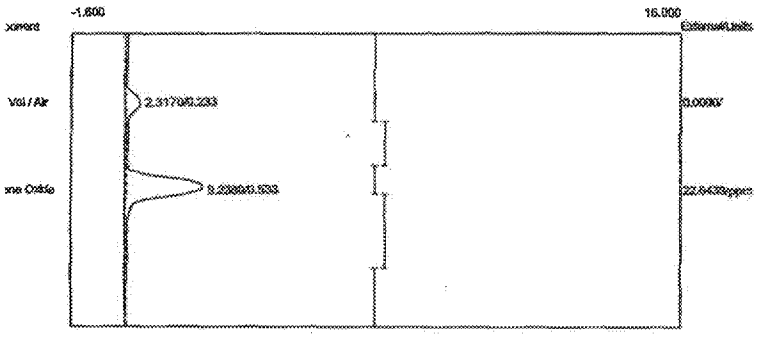
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.3000	0.0000	
ıylene Oxide	0.533	5.3900	13.2118	ppm
		7.6900	13.2118	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:54:21
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: 2SterisEP2017-2A13.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



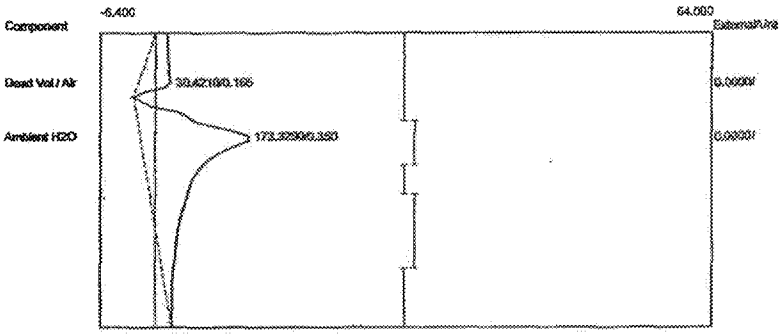
Component	Retention	Area	External	Units
Dead Vol / Air	0.133	37.0520	0.0000	
Ambient H2O	0.366	134.2120	0.0000	
CO2	0.900	0.5410	0.0000	
		171.8050	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:56:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A14.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



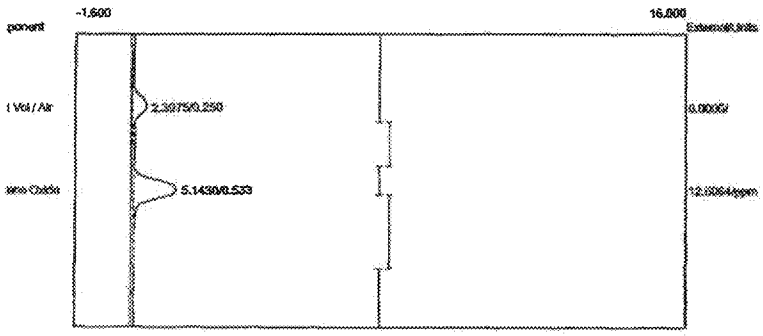
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.3170	0.0000	
ylene Oxide	0.533	9.2380	22.6439	ppm
		11.5550	22.6439	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:56:21
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: 2SterisEP2017-2A14.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



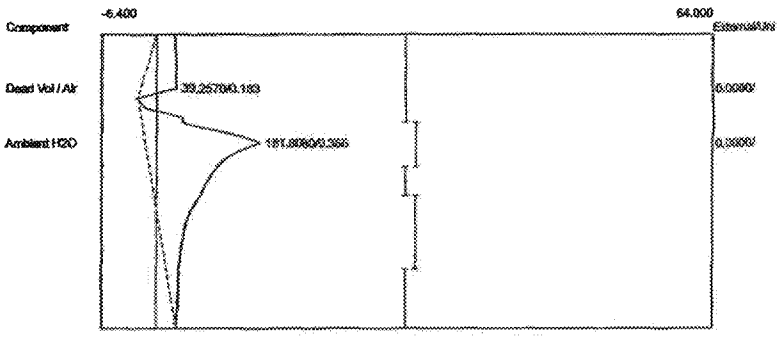
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	30.4210	0.0000	
Ambient H2O	0.350	173.3290	0.0000	
		203.7500	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 14:59:07
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: 1SterisEP2017-2A15.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



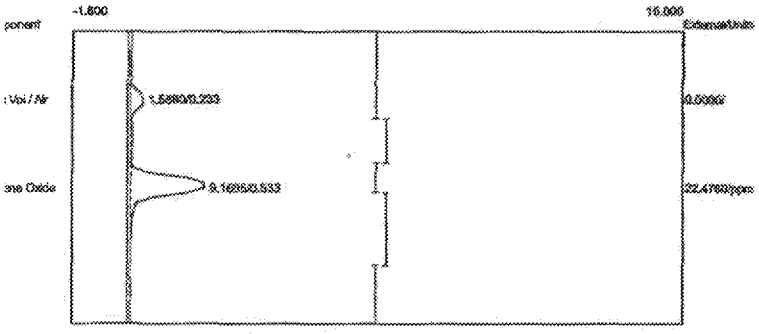
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.3975	0.0000	
ylene Oxide	0.533	5.1430	12.6064	ppm
		7.5405	12.6064	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 14:59:07
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: 2SterisEP2017-2A15.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



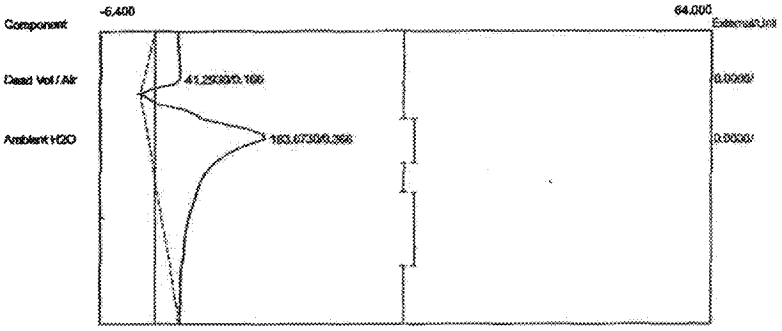
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	39.2570	0.0000	
Ambient H2O	0.366	181.8080	0.0000	
		221.0650	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:01:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A16.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



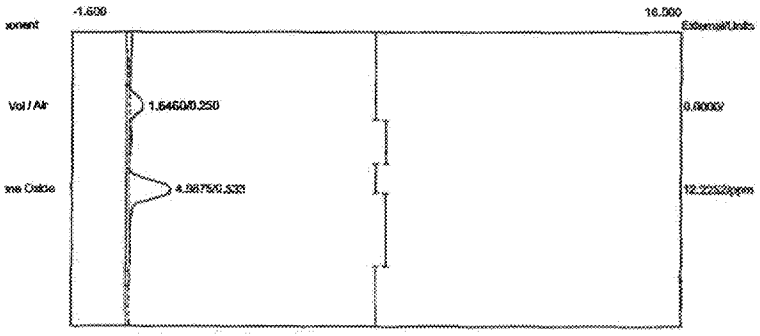
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.5880	0.0000	
ylene Oxide	0.533	9.1695	22.4760	ppm
		10.7575	22.4760	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:01:04
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: 2SterisEP2017-2A16.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



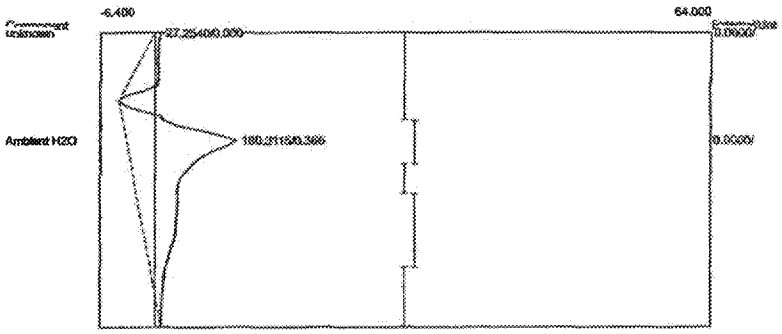
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	41.2930	0.0000	
Ambient H2O	0.366	183.6730	0.0000	
		224.9660	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:04:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A17.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



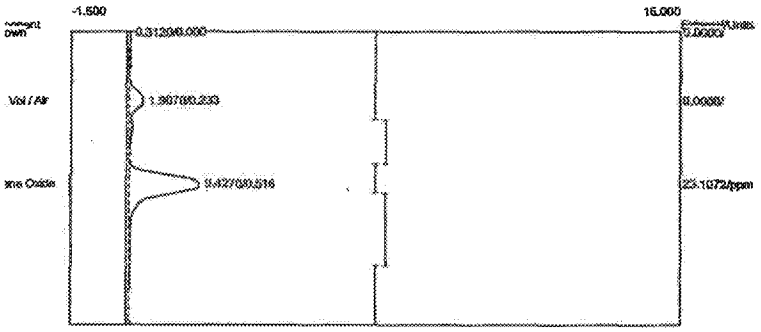
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6460	0.0000	
ıylene Oxide	0.533	4.9875	12.2252	ppm
		6.6335	12.2252	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:04:15
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: 2SterisEP2017-2A17.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



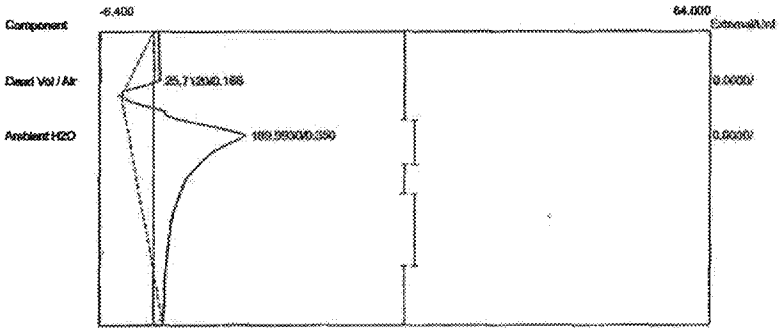
Component	Retention	Area	External	Units
Ambient H2O	0.366	180.3115	0.0000	
		180.3115	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:06:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A18.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



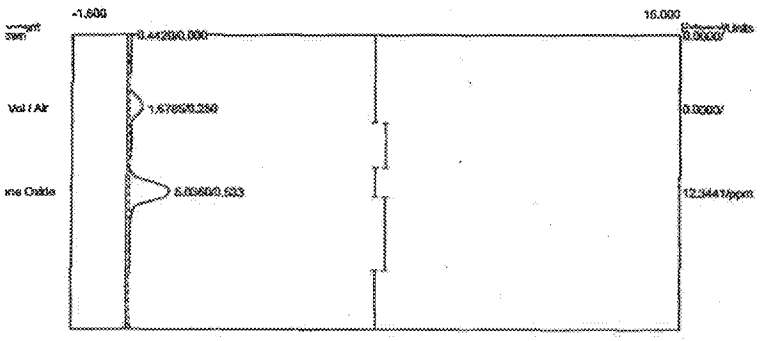
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.9070	0.0000	
ylene Oxide	0.516	9.4270	23.1072	ppm
		11.3340	23.1072	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:06:06
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: 2SterisEP2017-2A18.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



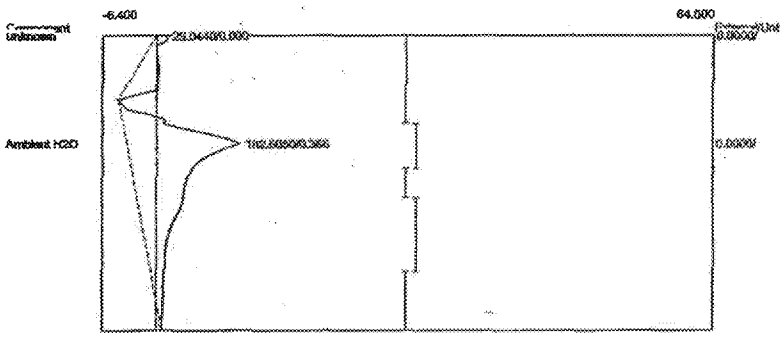
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	25.7120	0.0000	
Ambient H2O	0.350	189.9930	0.0000	
		215.7050	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:09:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A19.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



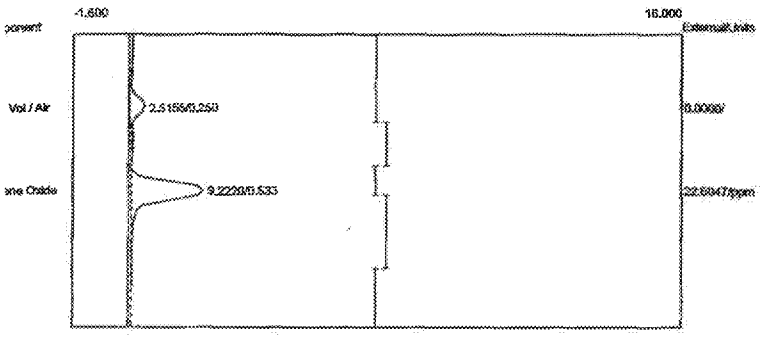
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6785	0.0000	
ylene Oxide	0.533	5.0360	12.3441	ppm
		6.7145	12.3441	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:09:15
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: 2SterisEP2017-2A19.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



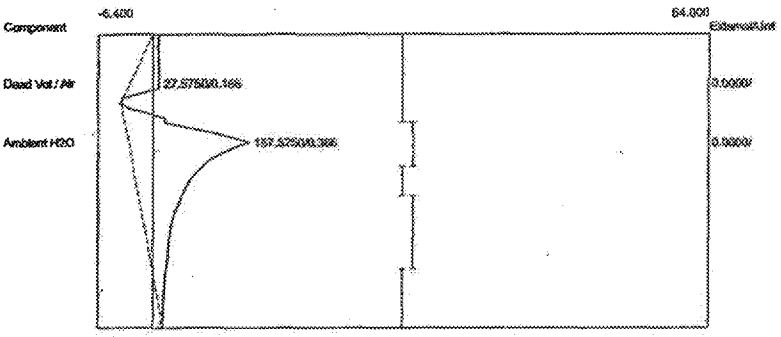
Component	Retention	Area	External	Units
Ambient H2O	0.366	182.6050	0.0000	
		182.6050	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:11:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A20.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



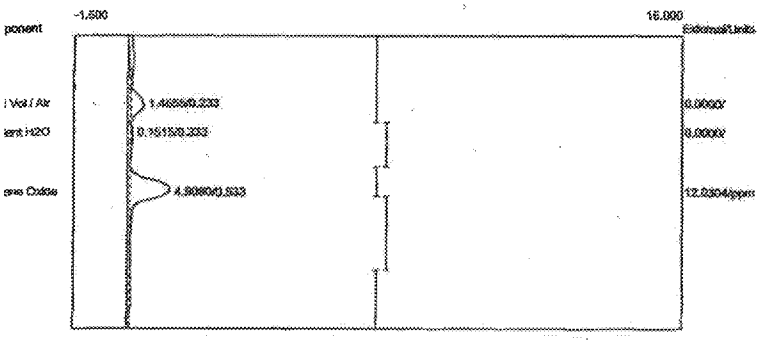
Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.5155	0.0000	
ylene Oxide	0.533	9.2220	22.6047	ppm
		11.7375	22.6047	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:11:05
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: 2SterisEP2017-2A20.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



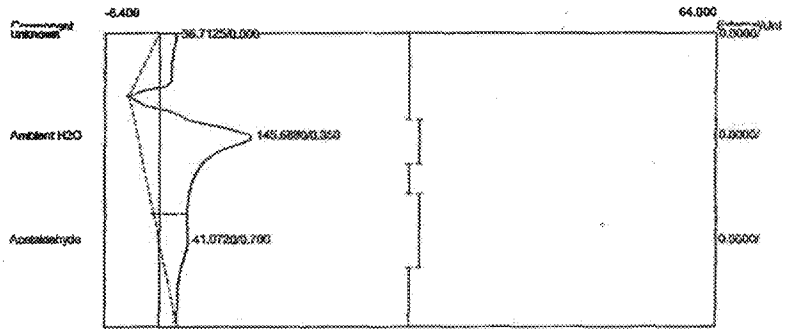
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	27.5750	0.0000	
Ambient H2O	0.366	187.5250	0.0000	
		215.1000	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:14:36
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: 1SterisEP2017-2A21.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



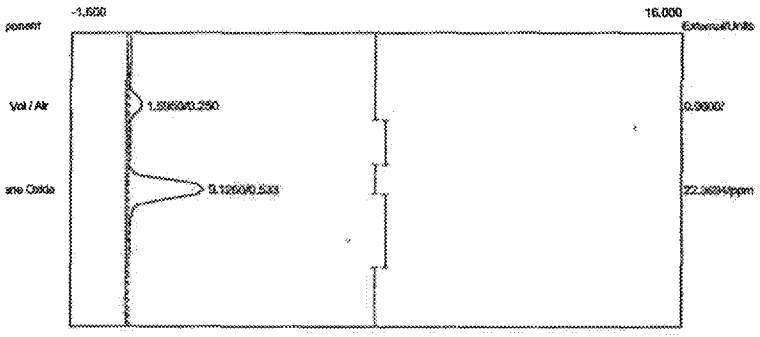
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.4655	0.0000	
ıbient H2O	0.333	0.1515	0.0000	
ıylene Oxide	0.533	4.9080	12.0304	ppm
		6.5250	12.0304	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:14:36
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: 2SterisEP2017-2A21.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



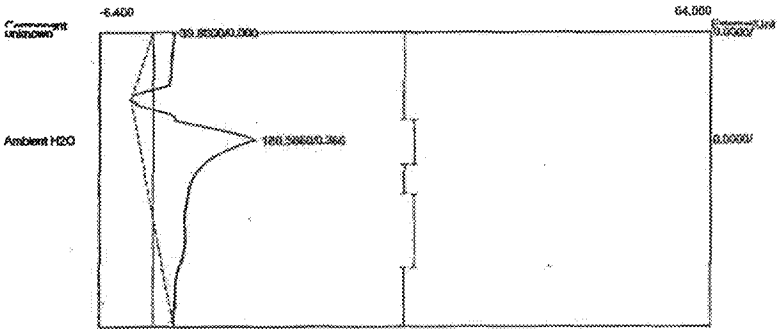
Component	Retention	Area	External	Units
Ambient H2O	0.350	145.6880	0.0000	
Acetaldehyde	0.700	41.0720	0.0000	
		186.7600	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:16:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-2A22.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



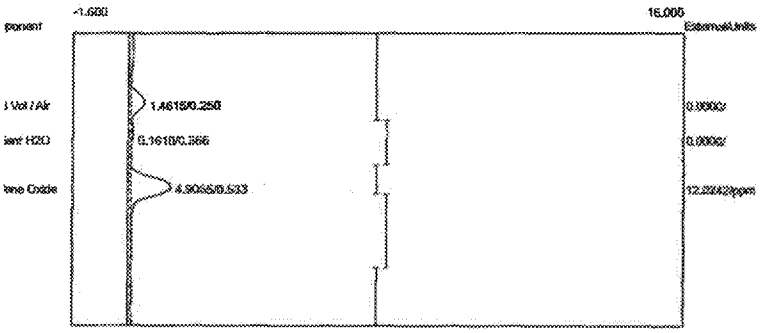
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.5950	0.0000	
ıylene Oxide	0.533	9.1260	22.3694	ppm
		10.7210	22.3694	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:16:10
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: 2SterisEP2017-2A22.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



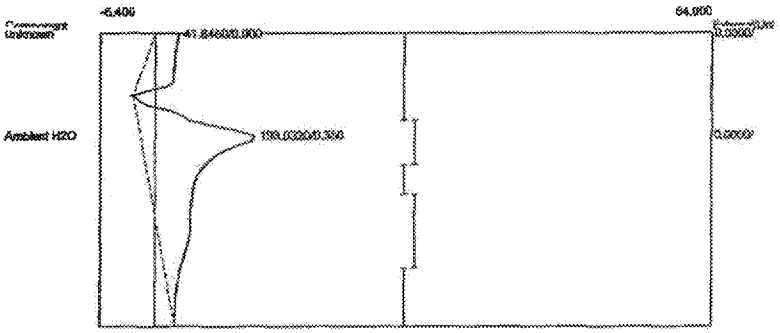
Component	Retention	Area	External	Units
Ambient H2O	0.366	180.5860	0.0000	
		180.5860	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:19:44
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: 1SterisEP2017-2A23.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



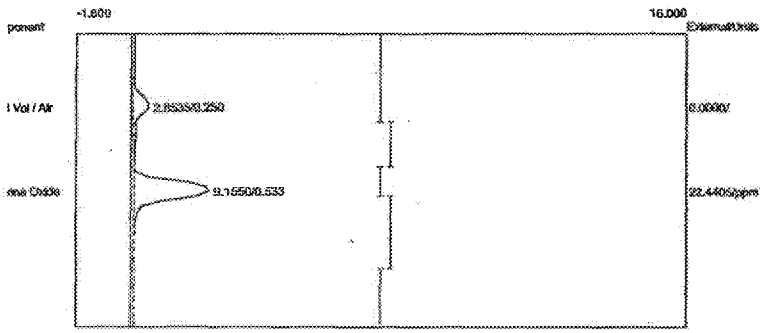
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.4615	0.0000	
bient H2O	0.366	0.1610	0.0000	
ylene Oxide	0.533	4.9055	12.0242	ppm
		6.5280	12.0242	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:19:44
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: 2SterisEP2017-2A23.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



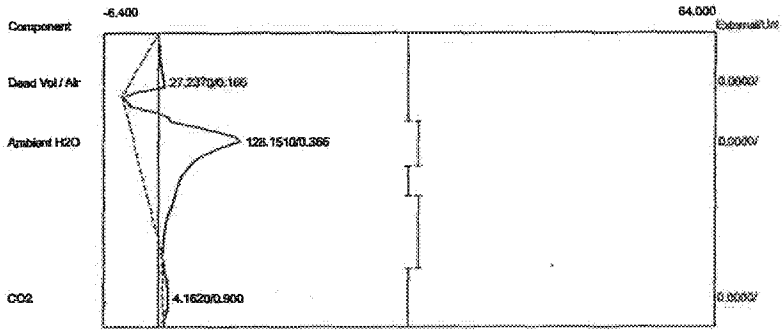
Component	Retention	Area	External	Units
Ambient H2O	0.350	193.0320	0.0000	
		193.0320	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
nalysis date: 06/22/2017 15:21:07
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: 1SterisEP2017-2A24.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
ad Vol / Air	0.250	2.8535	0.0000	
ylene Oxide	0.533	9.1550	22.4405	ppm
		12.0085	22.4405	

Client: Steris/Isomedix - El Paso
Client ID: Run#2Aer
Analysis date: 06/22/2017 15:21:07
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: 2SterisEP2017-2A24.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer

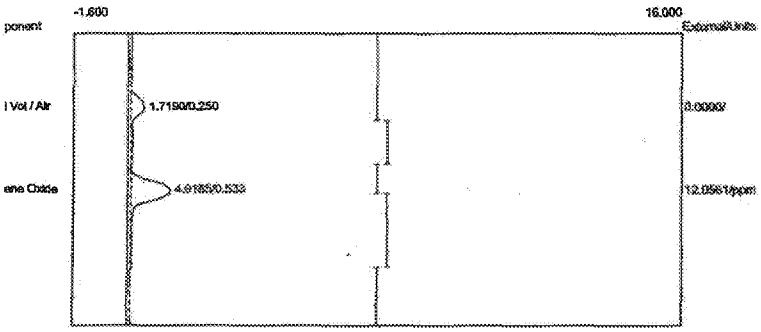


Component	Retention	Area	External	Units
Dead Vol / Air	0.166	27.2370	0.0000	
Ambient H2O	0.366	128.1510	0.0000	
CO2	0.900	4.1620	0.0000	
		159.5500	0.0000	

APPENDIX D

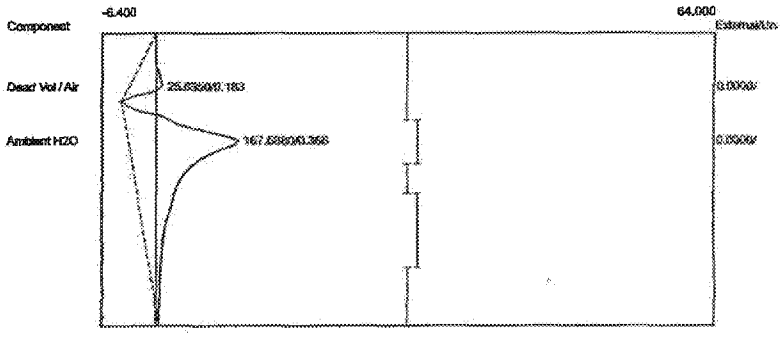
Run #3 Chromatograms – Abator #1 & #2

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:24:16
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: 1SterisEP2017-3A01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



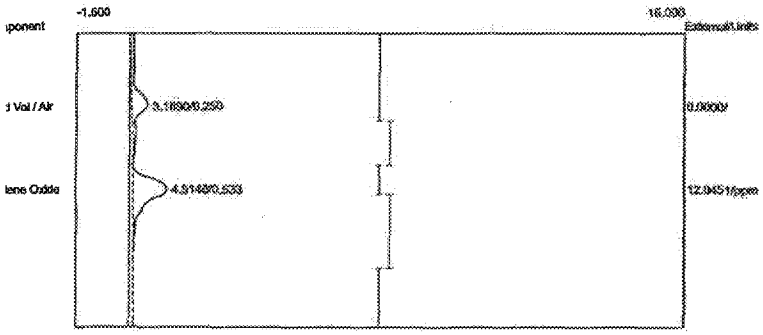
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.7190	0.0000	
ylene Oxide	0.533	4.9185	12.0561	ppm
		6.6375	12.0561	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:24:16
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: 2SterisEP2017-3A01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



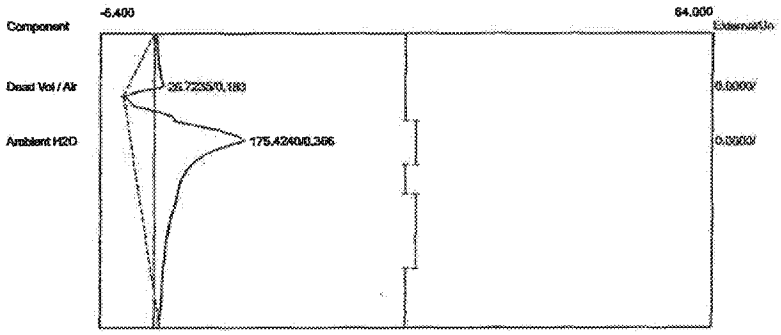
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	25.8350	0.0000	
Ambient H2O	0.366	167.6880	0.0000	
		193.5230	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:26:18
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: 1SterisEP2017-3A02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



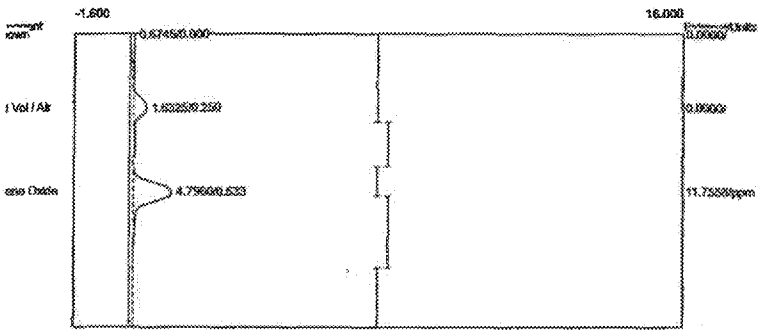
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.1890	0.0000	
ylene Oxide	0.533	4.9140	12.0451	ppm
		8.1030	12.0451	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:26:18
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: 2SterisEP2017-3A02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



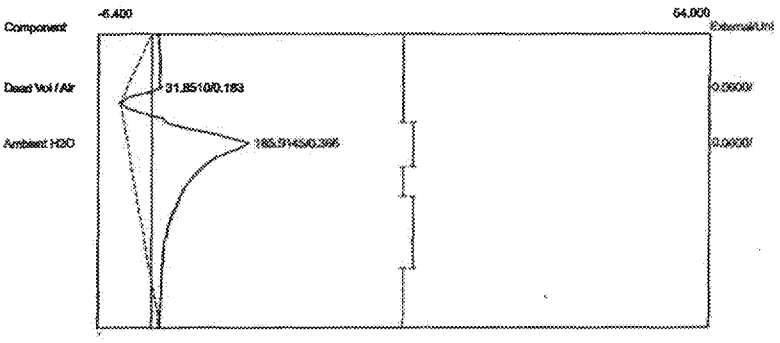
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	26.7235	0.0000	
Ambient H2O	0.366	175.4240	0.0000	
		202.1475	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:29:14
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: 1SterisEP2017-3A03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6325	0.0000	
ylene Oxide	0.533	4.7960	11.7558	ppm
		6.4285	11.7558	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:29:14
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: 2SterisEP2017-3A03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.183	31.8510	0.0000	
Ambient H2O	0.368	185.9145	0.0000	
		217.7655	0.0000	

LIST OF APPENDICES

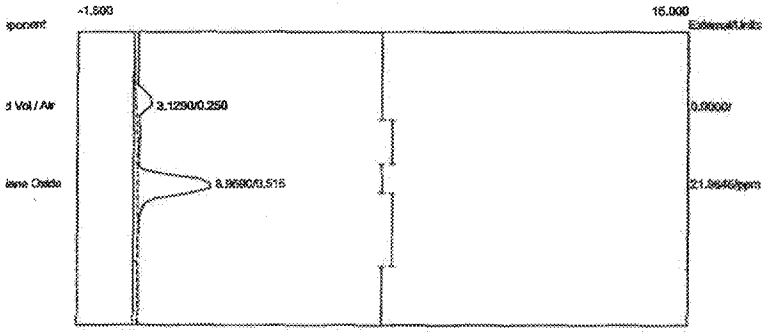
APPENDIX	DESCRIPTION	PAGE NO.
A	Calibration Data	A-1
B	Run #1 Chromatograms – Abator #1 & #2	B-1
C	Run #2 Chromatograms – Abator #1 & #2	C-1
D	Run #3 Chromatograms – Abator #1 & #2	D-1
E	Field Data and Calculation Worksheets	E-1
F	Calibration Gas Certificates	F-1

ECSi

1.0 INTRODUCTION

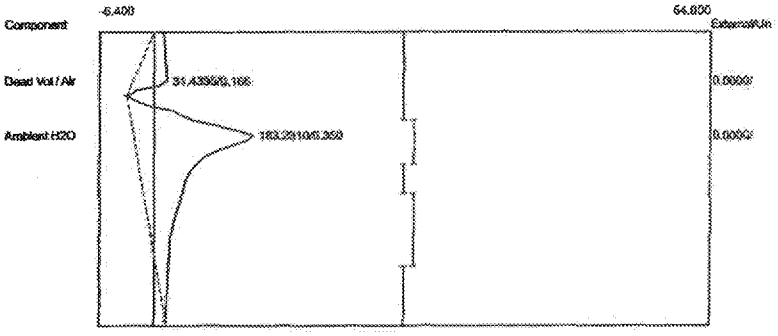
On Thursday, June 22, 2017, ECSi performed air pollution source testing of an ethylene oxide (EtO) emission-control system operated by STERIS Isomedix Services in El Paso, Texas. The control devices tested include two catalytic oxidizers, one of which is currently used to control emissions from the primary aeration process, and one of which is used to control emissions from the secondary aeration process. The purpose of the testing program was to evaluate continued compliance with the conditions established in the Air Quality Permit granted to STERIS Isomedix Services by the Texas Commission on Environmental Quality (TCEQ).

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:31:14
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: 1SterisEP2017-3A04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



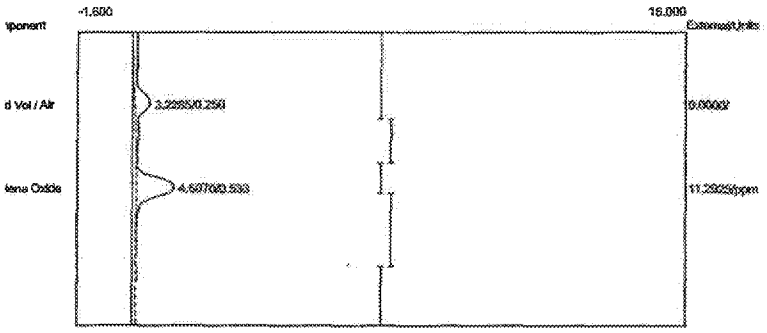
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.1290	0.0000	
ylene Oxide	0.516	8.9690	21.9846	ppm
		12.0980	21.9846	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:31:14
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: 2SterisEP2017-3A04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



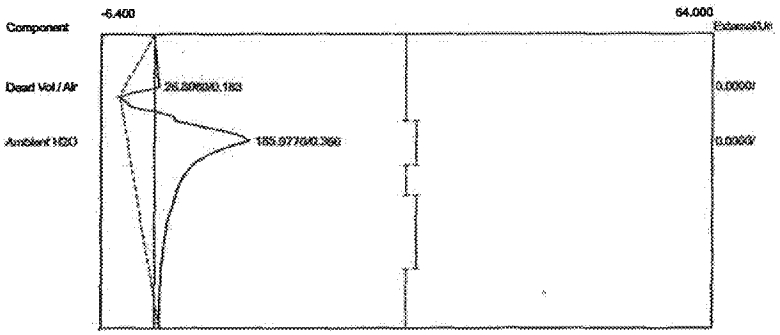
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	31.4395	0.0000	
Ambient H2O	0.350	183.2310	0.0000	
		214.6705	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:34:10
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: 1SterisEP2017-3A05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



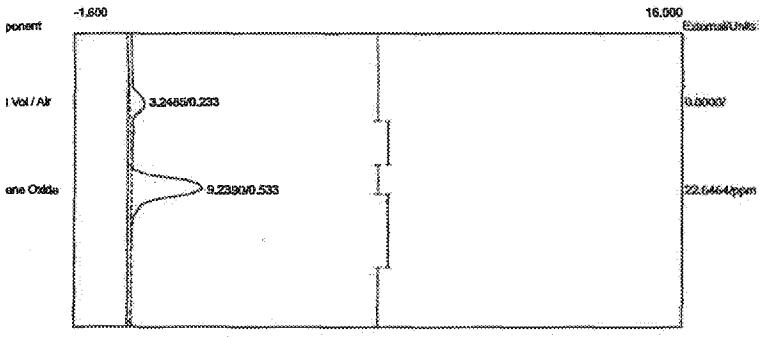
Component	Retention	Area	External	Units
ead Vol / Air	0.250	3.2285	0.0000	
hylene Oxide	0.533	4.6070	11.2925	ppm
		7.8355	11.2925	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:34:10
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: 2SterisEP2017-3A05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



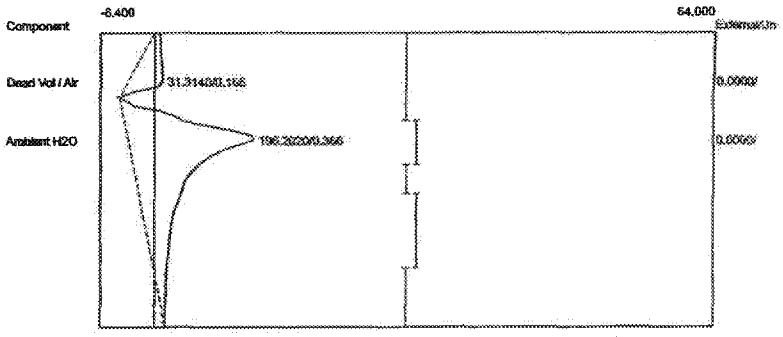
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	26.8080	0.0000	
Ambient H2O	0.366	185.9770	0.0000	
		212.7850	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:36:05
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: 1SterisEP2017-3A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



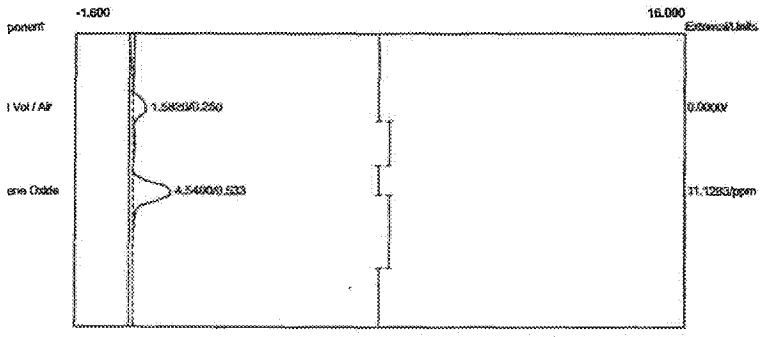
Component	Retention	Area	External	Units
ad Vol / Air	0.233	3.2485	0.0000	
ylene Oxide	0.533	9.2390	22.6464	ppm
		12.4875	22.6464	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:36:05
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: 2SterisEP2017-3A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



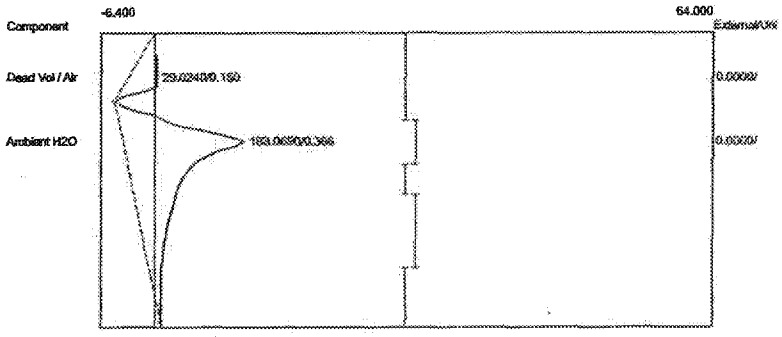
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	31.3140	0.0000	
Ambient H2O	0.366	196.2020	0.0000	
		227.5160	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:39:08
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: 1SterisEP2017-3A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



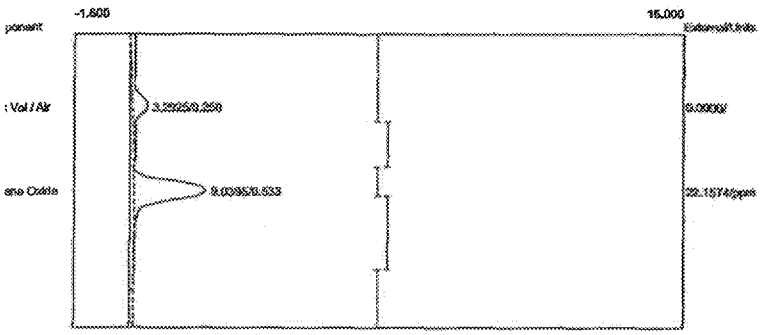
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.5820	0.0000	
ylene Oxide	0.533	4.5400	11.1283	ppm
		6.1220	11.1283	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:39:08
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: 2SterisEP2017-3A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



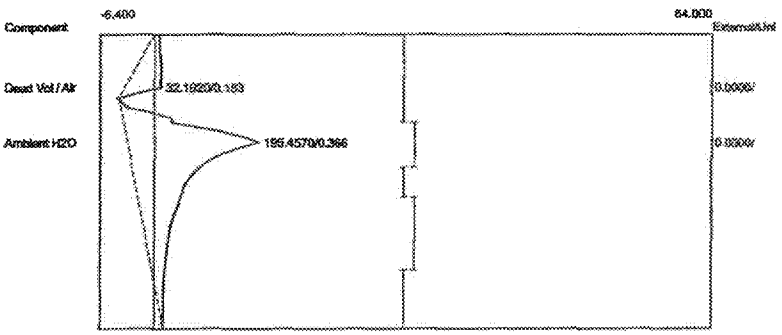
Component	Retention	Area	External	Units
Dead Vol / Air	0.150	29.0240	0.0000	
Ambient H2O	0.366	183.0690	0.0000	
		212.0930	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:41:02
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: 1SterisEP2017-3A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



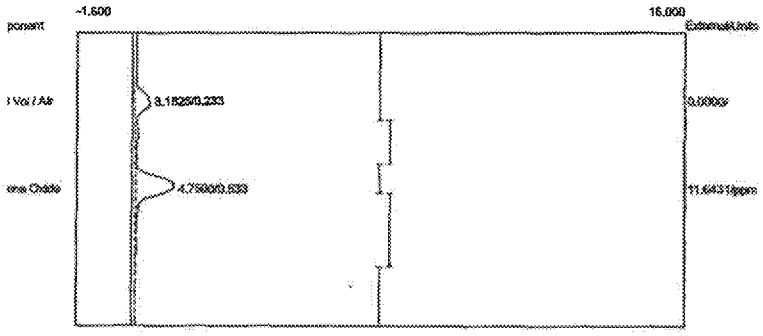
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.2925	0.0000	
ylene Oxide	0.533	9.0395	22.1574	ppm
		12.3320	22.1574	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:41:02
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: 2SterisEP2017-3A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



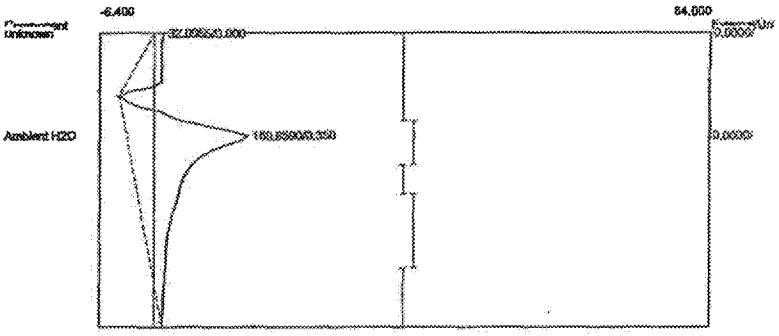
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	32.1920	0.0000	
Ambient H2O	0.366	195.4570	0.0000	
		227.6490	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:44:22
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: 1SterisEP2017-3A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



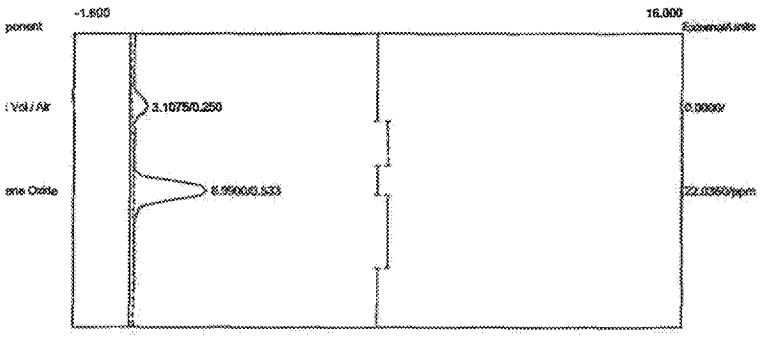
Component	Retention	Area	External	Units
ad Vol / Air	0.233	3.1825	0.0000	
ylene Oxide	0.533	4.7500	11.6431	ppm
		7.9325	11.6431	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:44:22
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: 2SterisEP2017-3A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



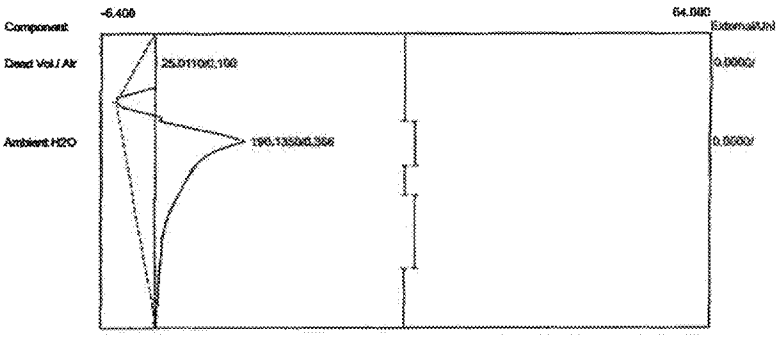
Component	Retention	Area	External	Units
Ambient H2O	0.350	189.8590	0.0000	
		189.8590	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:46:10
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: 1SterisEP2017-3A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



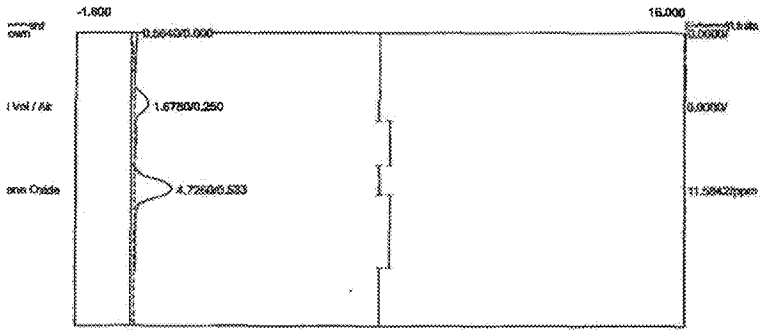
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.1075	0.0000	
ylene Oxide	0.533	8.9900	22.0360	ppm
		12.0975	22.0360	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:46:10
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: 2SterisEP2017-3A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



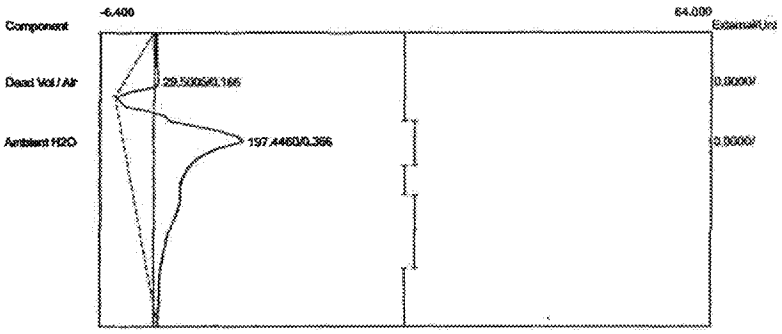
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	25.0110	0.0000	
Ambient H2O	0.366	190.1350	0.0000	
		215.1460	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:49:37
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-3A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



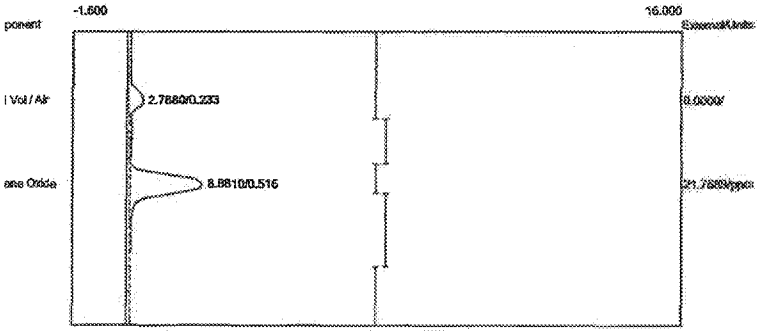
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6780	0.0000	
ıylene Oxide	0.533	4.7260	11.5842	ppm
		6.4040	11.5842	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:49:37
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: 2SterisEP2017-3A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



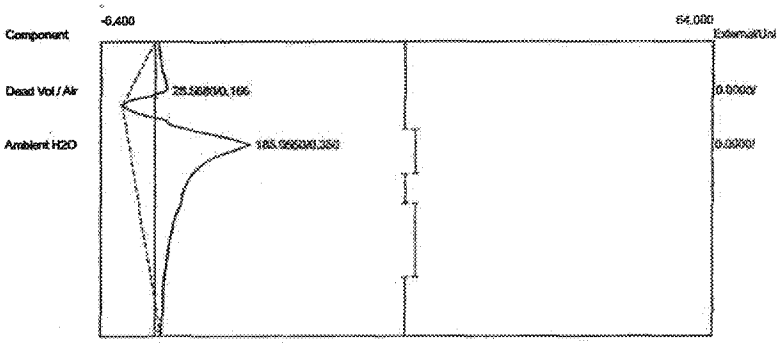
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	29.5005	0.0000	
Ambient H2O	0.366	197.4460	0.0000	
		226.9465	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:51:41
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: 1SterisEP2017-3A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



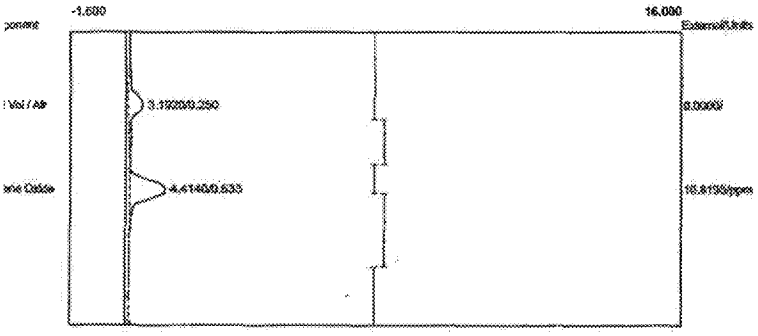
Component	Retention	Area	External	Units
ad Vol / Air	0.233	2.7880	0.0000	
ylene Oxide	0.516	8.8810	21.7689	ppm
		11.6690	21.7689	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:51:41
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: 2SterisEP2017-3A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



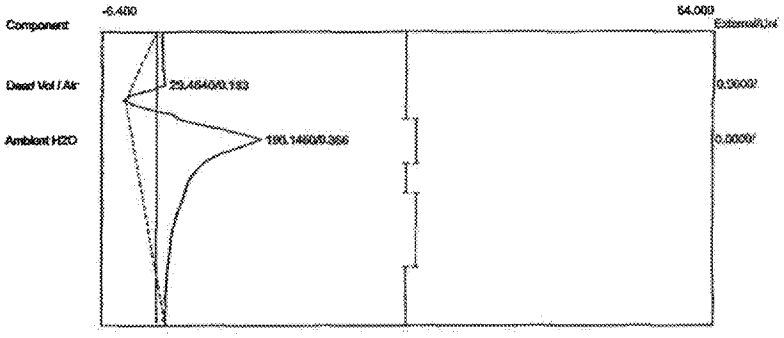
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	28.5680	0.0000	
Ambient H2O	0.350	185.0550	0.0000	
		213.6230	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:54:38
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-3A13.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



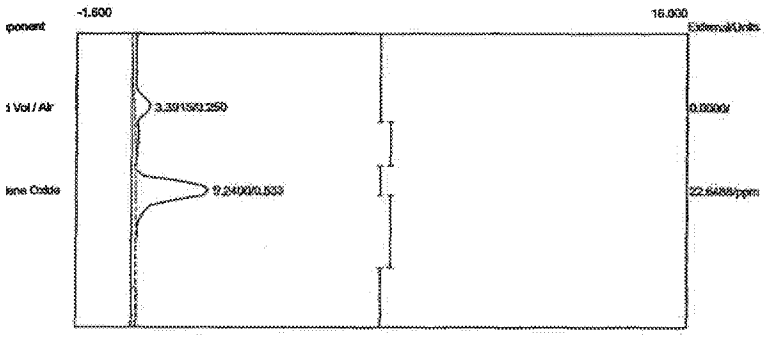
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.1920	0.0000	
ylene Oxide	0.533	4.4140	10.8195	ppm
		7.6060	10.8195	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:54:38
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: 2SterisEP2017-3A13.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



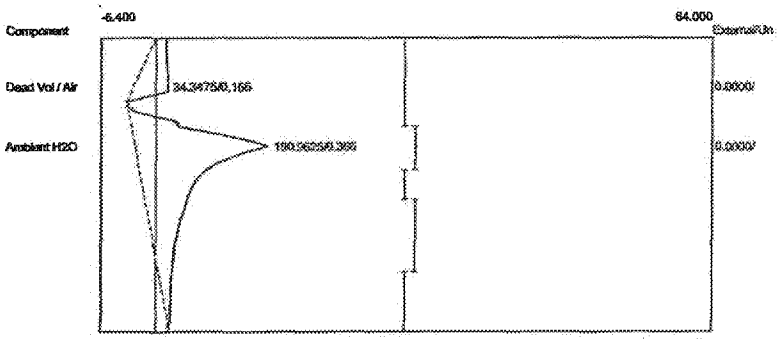
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	29.4640	0.0000	
Ambient H2O	0.366	190.1460	0.0000	
		219.6100	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:56:32
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: 1SterisEP2017-3A14.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



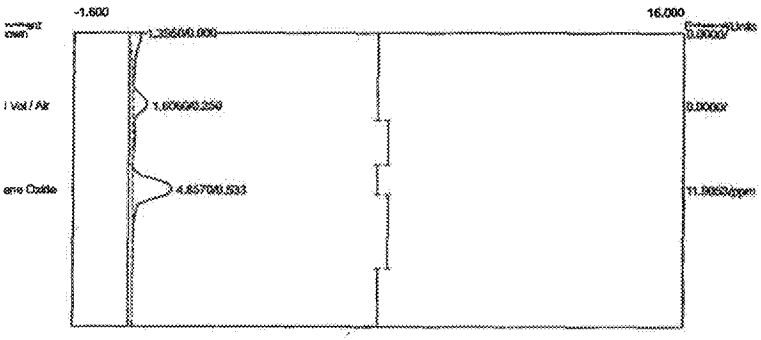
Component	Retention	Area	External	Units
ad Vol / Air	0.250	3.3915	0.0000	
ylene Oxide	0.533	9.2400	22.6488	ppm
		12.6315	22.6488	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:56:32
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: 2SterisEP2017-3A14.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



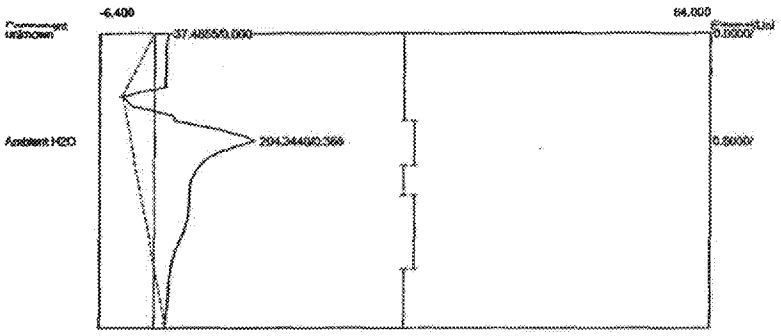
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	34.3475	0.0000	
Ambient H2O	0.366	190.9625	0.0000	
		225.3100	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 15:59:10
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: 1SterisEP2017-3A15.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



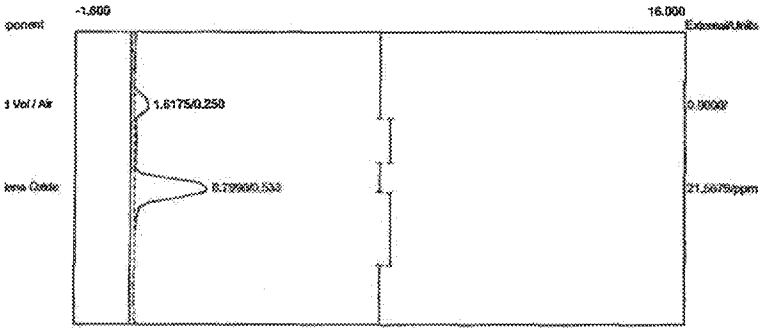
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6060	0.0000	
ylene Oxide	0.533	4.8570	11.9053	ppm
		6.4630	11.9053	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 15:59:10
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: 2SterisEP2017-3A15.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



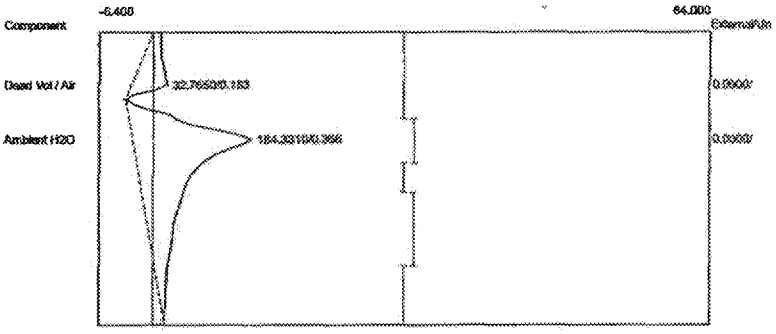
Component	Retention	Area	External	Units
Ambient H2O	0.366	204.3440	0.0000	
		204.3440	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:01:12
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: 1SterisEP2017-3A16.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



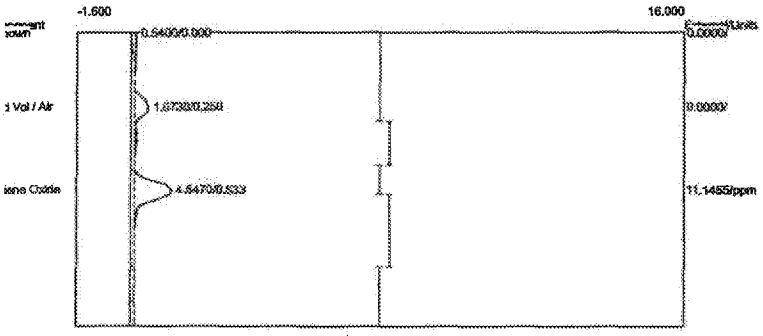
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6175	0.0000	
ylene Oxide	0.533	8.7990	21.5679	ppm
		10.4165	21.5679	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:01:12
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: 2SterisEP2017-3A16.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



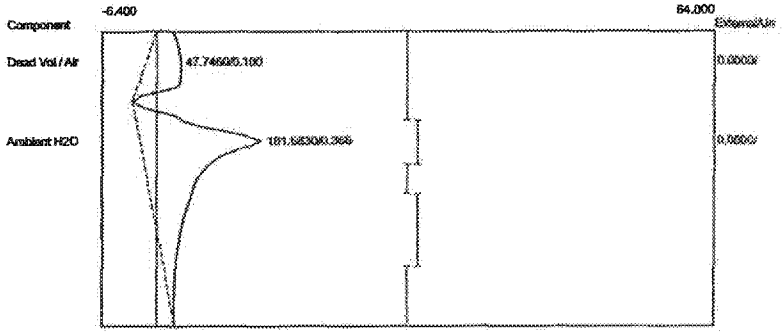
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	32.7650	0.0000	
Ambient H2O	0.366	184.3310	0.0000	
		217.0960	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:04:20
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: 1SterisEP2017-3A17.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



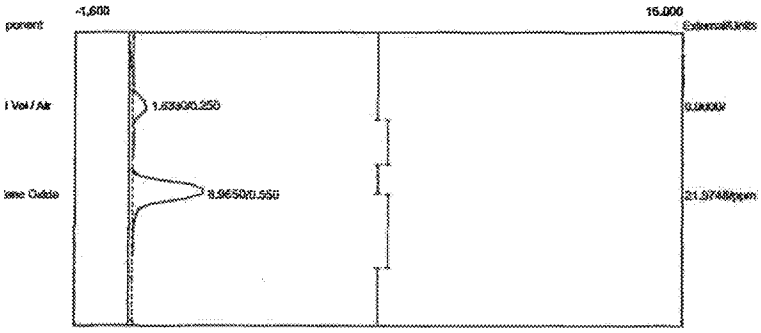
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6730	0.0000	
ylene Oxide	0.533	4.5470	11.1455	ppm
		6.2200	11.1455	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:04:20
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: 2SterisEP2017-3A17.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



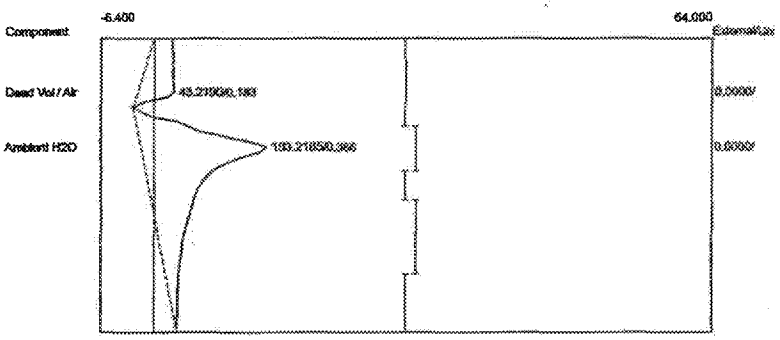
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	47.7460	0.0000	
Ambient H2O	0.366	181.6830	0.0000	
		229.4290	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:06:17
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: 1SterisEP2017-3A18.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



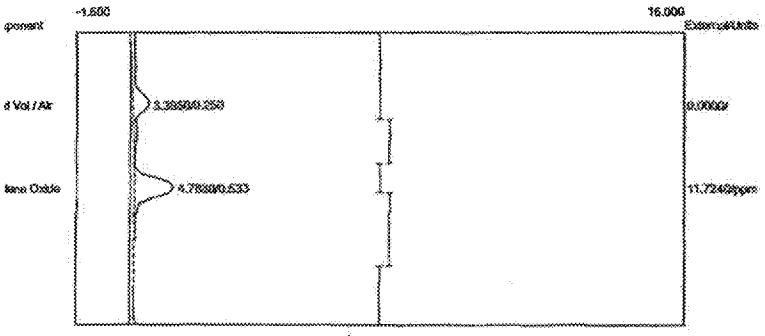
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6330	0.0000	
ylene Oxide	0.550	8.9650	21.9748	ppm
		10.5980	21.9748	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:06:17
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: 2SterisEP2017-3A18.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



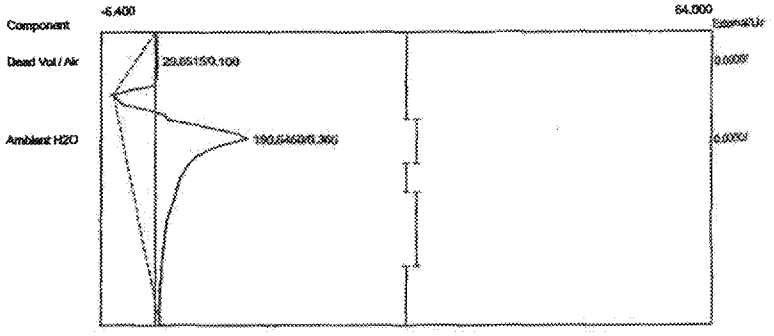
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	43.2190	0.0000	
Ambient H2O	0.366	193.2185	0.0000	
		236.4375	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:09:20
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: 1SterisEP2017-3A19.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



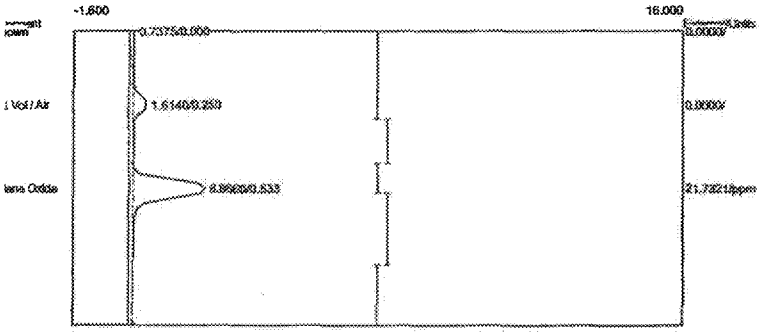
Component	Retention	Area	External	Units
ead Vol / Air	0.250	3.3950	0.0000	
ylene Oxide	0.533	4.7830	11.7240	ppm
		8.1780	11.7240	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:09:20
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: 2SterisEP2017-3A19.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



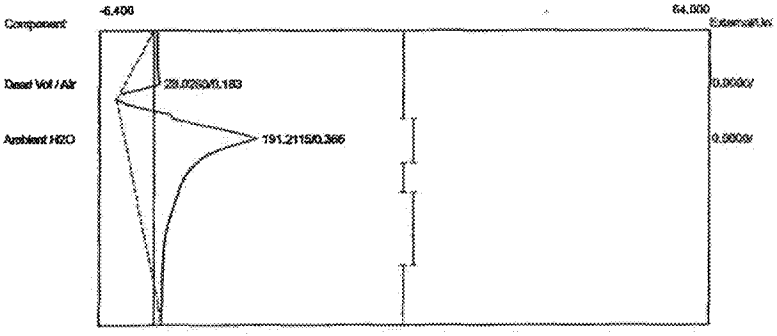
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	29.6515	0.0000	
Ambient H2O	0.366	190.6460	0.0000	
		220.2975	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:11:19
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: 1SterisEP2017-3A20.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



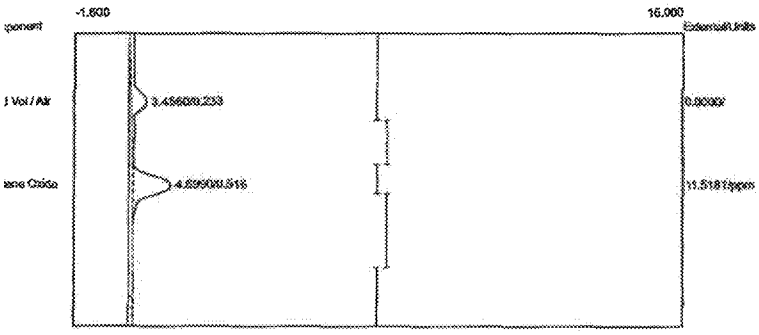
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6140	0.0000	
ylene Oxide	0.533	8.8660	21.7321	ppm
		10.4800	21.7321	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:11:19
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: 2SterisEP2017-3A20.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



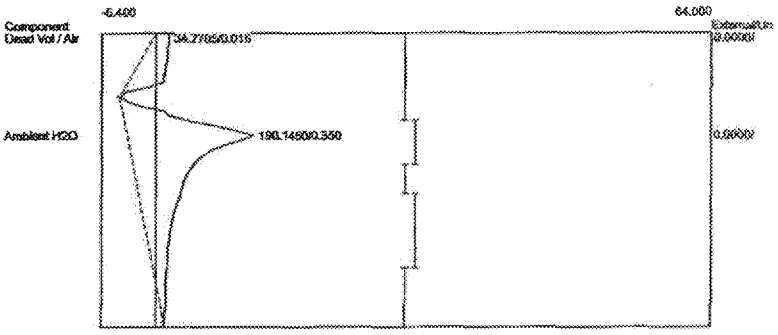
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	28.0260	0.0000	
Ambient H2O	0.366	191.2115	0.0000	
		219.2375	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:14:31
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: 1SterisEP2017-3A21.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



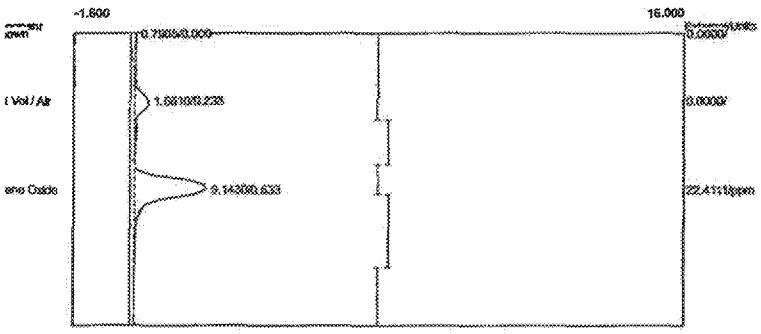
Component	Retention	Area	External	Units
ad Vol / Air	0.233	3.4560	0.0000	
ylene Oxide	0.516	4.6990	11.5181	ppm
		8.1550	11.5181	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:14:31
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: 2SterisEP2017-3A21.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



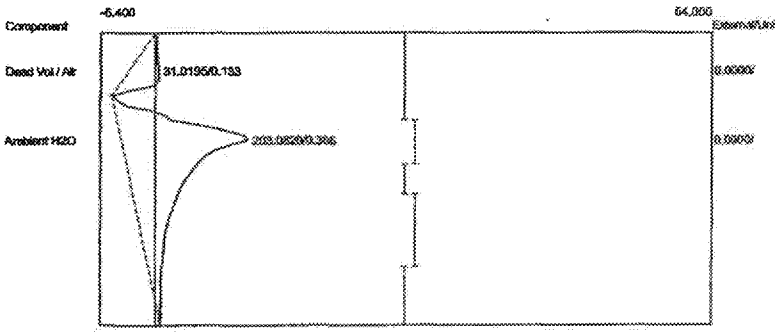
Component	Retention	Area	External	Units
Dead Vol / Air	0.016	34.7705	0.0000	
Ambient H2O	0.350	190.1450	0.0000	
		224.9155	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:16:20
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: 1SterisEP2017-3A22.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



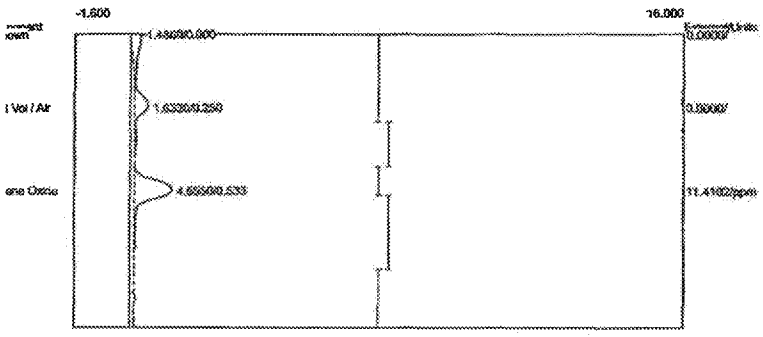
Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.6610	0.0000	
ylene Oxide	0.533	9.1430	22.4111	ppm
		10.8040	22.4111	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:16:20
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: 2SterisEP2017-3A22.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



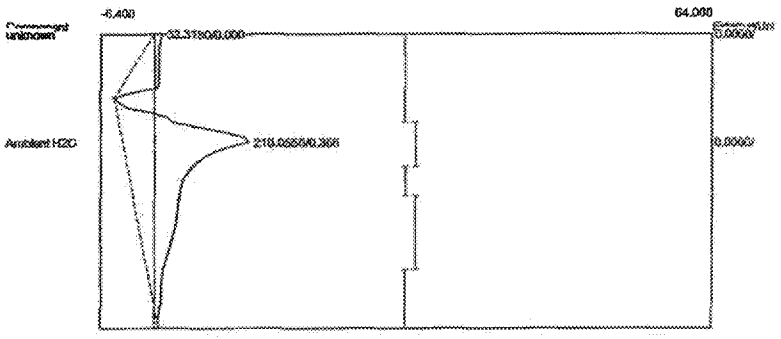
Component	Retention	Area	External	Units
Dead Vol / Air	0.133	31.0195	0.0000	
Ambient H2O	0.366	203.0820	0.0000	
		234.1015	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:19:41
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: 1SterisEP2017-3A23.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



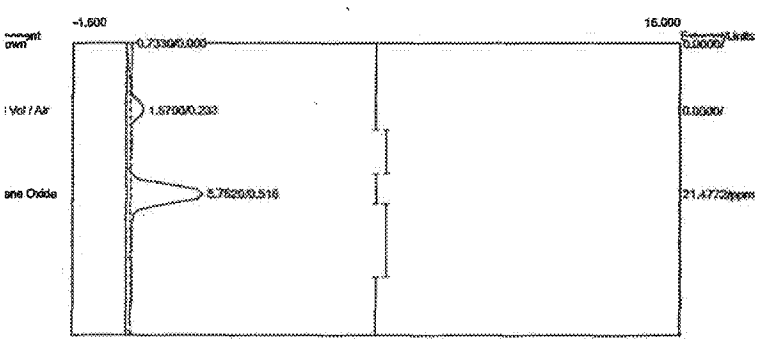
Component	Retention	Area	External	Units
ad Vol / Air	0.250	1.6330	0.0000	
ylene Oxide	0.533	4.6550	11.4102	ppm
		6.2880	11.4102	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:19:41
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: 2SterisEP2017-3A23.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



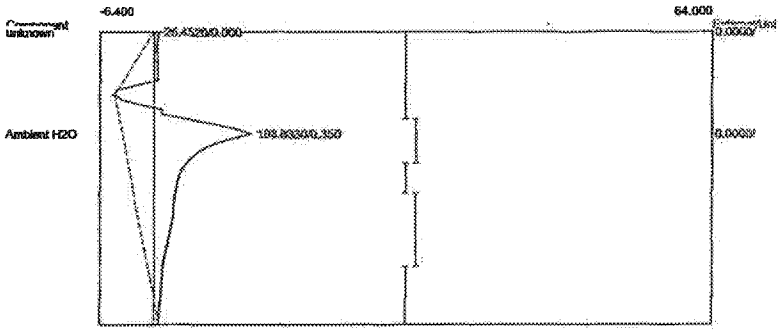
Component	Retention	Area	External	Units
Ambient H2O	0.366	210.0550	0.0000	
		210.0550	0.0000	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
nalysis date: 06/22/2017 16:21:18
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
:omponents: eto1-100.cpt
Data file: 1SterisEP2017-3A24.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
ad Vol / Air	0.233	1.5700	0.0000	
ıylene Oxide	0.516	8.7620	21.4772	ppm
		10.3320	21.4772	

Client: Steris/Isomedix - El Paso
Client ID: Run#3Aer
Analysis date: 06/22/2017 16:21:18
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: 2SterisEP2017-3A24.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Ambient H2O	0.350	198.8330	0.0000	
		198.8330	0.0000	

APPENDIX E

Field Data and Calculation Worksheets

ECSi

Ethylene Oxide Mass Emissions Data and Calculations

STERIS Isomedix Services - El Paso, TX - June 22, 2017
Abator #1 - Primary Aeration

DeltaP	SqRtDeltaP	Temp (F)	ppm EtO
	Run #1		
0.33	0.5745	249	0.01
0.33	0.5745	248	0.01
0.33	0.5745	249	0.01
0.33	0.5745	248	0.01
0.33	0.5745	249	0.01
0.33	0.5745	249	0.01
0.33	0.5745	248	0.01
0.33	0.5745	249	0.01
0.33	0.5745	250	0.01
0.33	0.5745	250	0.01
0.33	0.5745	249	0.01
0.33	0.5745	250	0.01
	Run #2		
0.33	0.5745	249	0.01
0.33	0.5745	249	0.01
0.33	0.5745	250	0.01
0.33	0.5745	250	0.01
0.33	0.5745	250	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	250	0.01
0.33	0.5745	250	0.01
0.33	0.5745	251	0.01
0.33	0.5745	250	0.01
0.33	0.5745	250	0.01
	Run #3		
0.33	0.5745	250	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	250	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
0.33	0.5745	251	0.01
Average =			
0.3300	0.5745	250	**0.0100**
	=	710	degR

1-%H2O =	0.972	
mw =	28.54	
stack ID =	30	in.
stack area =	4.91	sq. ft.
press =	25.80	in. Hg
Tstd =	528	deg R
Pstd =	29.92	in Hg
Cp =	0.99	
Kp =	85.49	
Velocity =	47.74	ft/sec
Flow =	**8747**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.000010**	**lbs/min**
EtO Mass Flow =	**0.000600**	**lbs/hour**

ECSi

Ethylene Oxide Mass Emissions Data and Calculations

STERIS Isomedix Services - El Paso, TX - June 22, 2017
Abator #2 - Secondary Aeration

DeltaP	SqRtDeltaP	Temp (F)	ppm EtO
	Run #1		
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	212	0.01
	Run #2		
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	214	0.01
0.32	0.5657	214	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	214	0.01
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
	Run #3		
0.32	0.5657	214	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	213	0.01
0.32	0.5657	212	0.01
0.32	0.5657	212	0.01
Average =			
0.3200	0.5657	213	**0.0100**
	=	673	degR

1-%H2O =	0.972	
mw =	28.54	
stack ID =	21	in.
stack area =	2.41	sq. ft.
press =	25.80	in. Hg
Tstd =	528	deg R
Pstd =	29.92	in Hg
Cp =	0.99	
Kp =	85.49	
Velocity =	45.78	ft/sec
Flow =	**4334**	**dscfm**
MWeto =	44.05	
MolVol =	385.32	
ppmv/ft3 =	1000000	
EtO Mass Flow =	**0.000005**	**lbs/min**
EtO Mass Flow =	**0.000297**	**lbs/hour**

ETHYLENE OXIDE SOURCE TEST/CALIBRATION DATA

Client: Steris/Isomedix-El Paso

Source Tested: 2 Donaldson EtO Abators (9000 & 4500 cfm) Date: 6/22/17

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								
	Area Counts #2								
	Average Area	0.449	4.12	40.8	408	4HQ			
	Audit Standard (48.8 ppmv) Result					48.9 ✓			
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	1.64	15.1	149					
	Audit Standard (48.8 ppmv) Result					48.8 ✓			

	Run #1	Run #2	Run #3				
Abator 1 start/stop:	1422/1522	1522/1622	1622/1722	P_{bar}:	25.80	EtO Usage (lbs/yr):	—
Abator 2 start/stop:	1424/1524	1524/1624	1624/1724	$\%H_2O$:	3	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					49.6 ✓			
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					48.1 ✓			

ECSi

APPENDIX F

Gas Certifications

ECSi

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.: 02-57164-001
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

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

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.: 02-57164-004
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

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.: 02-57164-005
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: _____ 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.

MESA Specialty Gases & Equipment
division of MESA International Technologies, Inc.
3619 Pendleton Avenue, Suite C ♦ Santa Ana, California 92704 ♦ USA
TEL: 714-434-7102 ♦ FAX: 714-434-8096 ♦ E-mail: mail@mesagas.com
On-line Catalog at www.mesagas.com