

# MAINSTREAM ENGINEERING CORP LETTER REPORT

## SCOPE OF WORK

In-Duct Ozone Testing of the In-duct Air Cleaner Model QT2730 (QwikPure TripleGuard)

## REPORT NUMBER

104496780CRT-002

## ISSUE DATE

08-March-2021

## [REVISED DATE]

None

## PAGES

2

## DOCUMENT CONTROL NUMBER

GFT-OP-10a (21-June-2019)

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**LETTER REPORT**

March 8<sup>th</sup>, 2021

Intertek Report No. 104496780CRT-002  
Intertek Project No. G104496780

Andrew Wagner  
MAINSTREAM ENGINEERING CORP  
200 Yellow Place  
Pines Industrial Center  
Rockledge, FL 32955-5327

Ph: (321) 305-5380  
email: awagner@mainstream-engr.com

**Subject:** In-Duct Ozone Testing of the In-duct Air Cleaner Model QT2730 (QwikPure TripleGuard)

Dear Mr. Andrew Wagner,

This letter report represents the results of our evaluation of the above referenced product(s) to the requirements contained in the following standards:

*CSA C22.2 No. 187:20, Electrostatic air cleaners, Section 7.6*

Samples provided to Intertek by Mainstream Engineering Corp were sent to Blue Heaven Technologies LLC. Blue Heaven Technologies LLC employees conducted their protocol for testing to Section 7.6 of CSA C22.2 No. 187:20, Electrostatic air cleaners. The reports from Blue Heaven Technologies LLC have been appended to this letter report.

Issuance of this letter report completes the testing covered by Intertek Project No. G104496780. If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact your dedicated Intertek Project Manager.

Completed by: Jacob Langenbacher

Title: Engineer

Signature:



Date 4/8/2021

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2820 S. English Station Road - Louisville, KY 40299  
Phone: (502) 357-0132

TEST NO. 21-151-1A

## Test Report - Ozone Emissions - Low Flow Rate

CSA Group - C22.2 No.187-20 - Section 7.5

Electrostatic In Duct Type Air Cleaners for Residential Use

page 1 of 2

### Test Unit Description

Customer: Intertek  
Manufacturer: Mainstream Engineering  
Model No.: QT2730 UV Air Sanitizer  
Serial Number: L202032A00002

NOTES: Unit is an in-duct UV Air Sanitizer meant for operation inside HVAC ductwork and includes a filter downstream from the light source.  
Run in Start: 3/22/2021 8:44 Run in End: 3/22/2021 9:14  
30 Minutes

The unit was tested at two flow rates. Low: 375 CFM and High: 3500 CFM. This report details performance at low flow.

### 8-Hour Ozone Emissions Test Results

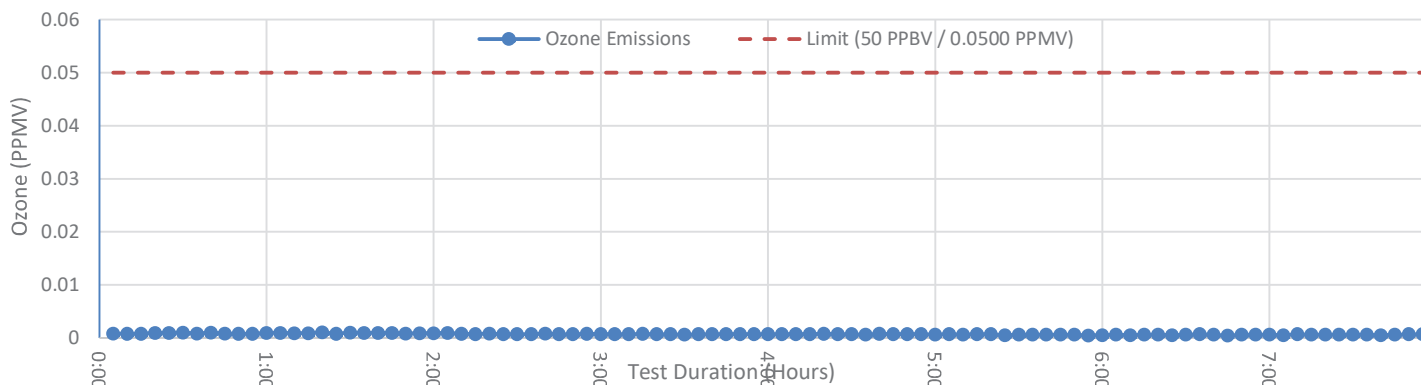
Test Date: 3/22/2021 Start Time: 3/22/2021 9:28 End Time: 3/22/2020 17:28

Average 8-Hr Background Concentration: 0.00068 PPM Maximum Allowed PASS / FAIL  
Average 8-Hr Downstream Concentration: 0.00139 PPM

Average 8 Hour Time Weighted Average (TWA) Ozone Concentration: 0.000715 PPM 0.0500 PPM PASS

Maximum Ozone Reading over 8-Hour Testing: 0.001755 PPM 0.0500 PPM PASS

8-Hour Ozone Concentration



### Test Equipment Information

	Model	Serial Number	Range
Upstream Ozone Analyzer:	2B Technologies Model: 205	2332DB	0.0000 - 0.1500 PPMV
Downstream Ozone Analyzer:	2B Technologies Model: 206	2331DB	0.0000 - 0.1500 PPMV
Temperature:	Dwyer RHP-2D11-LCD	M96797-E23W-A	-40 - 140 °F
Humidity:	Dwyer RHP-2D11-LCD	M96797-E23W-A	0 - 100% RH
Data Recorder:	Yokogawa DX112-3-2/M1	12VB31078	NA
Watt Transducer:	Ohio Semitronics, Inc. AGH-002E	20100694	0-1000 Watts

### Test Conditions

Unit was tested in a complete ASHRAE 52.2 Test Duct. Flow Rate was maintained at 375 CFM over the 8-hour test period. Test unit was mounted in between two 24" X 24" duct sections and sealed to be leak-free.

Average Test Flow Rate: 375.76 CFM

Average Test Temperature: 69.77 Deg F

Average Test Rel. Humidity: 54.24 %

### Requester Information

Test Requestor: Jacob Langenbacher Phone: 607-758-6446  
Company Name: Intertek Email: [jacob.langenbacher@intertek.com](mailto:jacob.langenbacher@intertek.com)  
Company Address: 3933 US Route 11; Cortland, NY 13045 Date Requested: 3/12/2021

### Test Operator Information

Test Performed by: Glen Toloczko CAFS Reviewed by: ES Completion Date: 4/6/2021



2820 S. English Station Road - Louisville, KY 40299  
Phone: (502) 357-0132

TEST NO. 21-151-1A

## Test Report - Ozone Emissions - Low Flow Rate

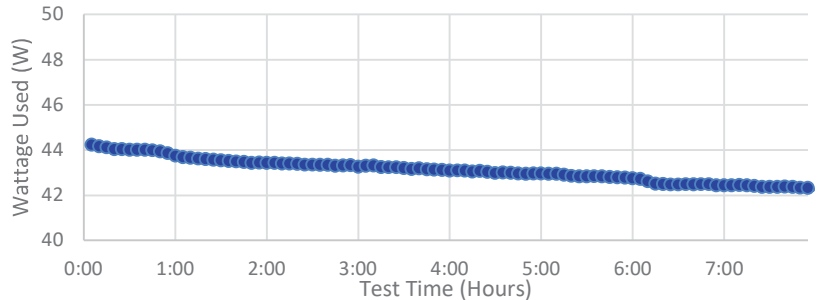
CSA Group - C22.2 No.187-20 - Section 7.5

page 2 of 2

### Device Energy Useage

Average Input Wattage **43.113 W**

Input Voltage **115 V**



### Photos

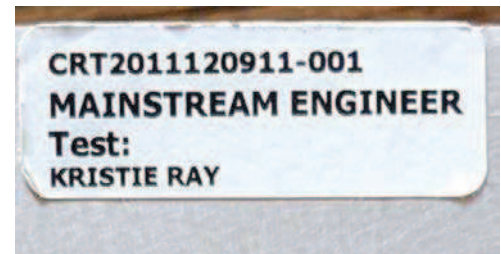
Upstream Side



Downstream Side



Unit Label



### Requester Information

Test Requestor: Jacob Langenbacher

Company Name: Intertek

Company Address: 3933 US Route 11; Cortland, NY 13045

Phone: 607-758-6446

Email: jacob.langenbacher@intertek.com

Date Requested: 3/12/2021

### Test Operator Information

Test Performed by: Glen Toloczko CAFS

Completion Date: 4/6/2021



2820 S. English Station Road - Louisville, KY 40299  
Phone: (502) 357-0132

TEST NO. 21-151-1B

## Test Report - Ozone Emissions - High Flow Rate

CSA Group - C22.2 No.187-20 - Section 7.5

Electrostatic In Duct Type Air Cleaners for Residential Use

page 1 of 2

### Test Unit Description

Customer: Intertek  
Manufacturer: Mainstream Engineering  
Model No.: QT2730 UV Air Sanitizer  
Serial Number: L202032A00002

NOTES: Unit is an in-duct UV Air Sanitizer meant for operation inside HVAC ductwork and includes a filter downstream from the light source.  
Run in Start: 3/22/2021 8:44 Run in End: 3/22/2021 9:14  
30 Minutes

The unit was tested at two flow rates. Low: 375 CFM and High: 3500 CFM. This report details performance at high flow.

### 8-Hour Ozone Emissions Test Results

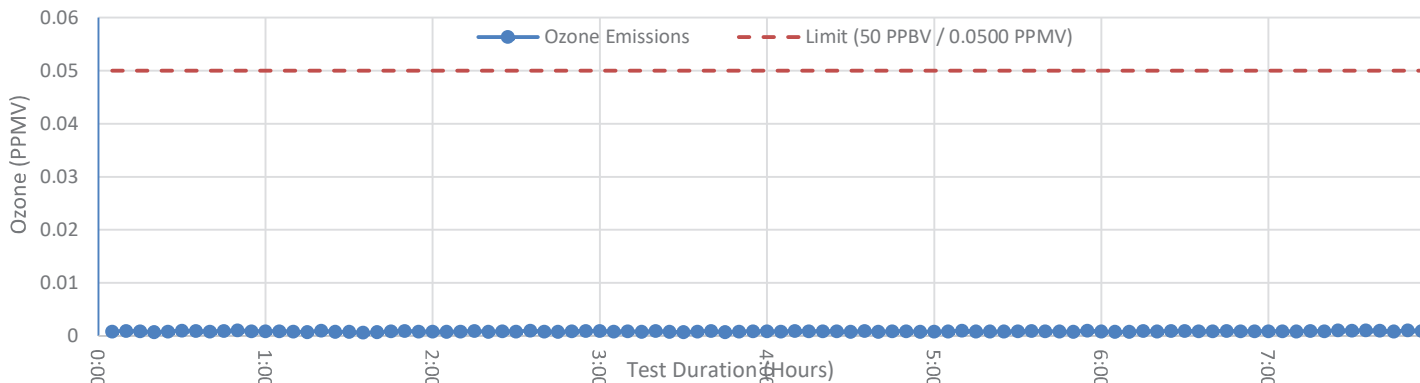
Test Date: 3/23/2021 Start Time: 3/23/2021 8:25 End Time: 3/23/2021 16:25

Average 8-Hr Background Concentration: 0.00201 PPM Maximum Allowed PASS / FAIL  
Average 8-Hr Downstream Concentration: 0.00289 PPM

Average 8 Hour Time Weighted Average (TWA) Ozone Concentration: 0.000881 PPM 0.0500 PPM PASS

Maximum Ozone Reading over 8-Hour Testing: 0.004343 PPM 0.0500 PPM PASS

8-Hour Ozone Concentration



### Test Equipment Information

	Model	Serial Number	Range
Upstream Ozone Analyzer:	2B Technologies Model: 205	2332DB	0.0000 - 0.1500 PPMV
Downstream Ozone Analyzer:	2B Technologies Model: 206	2331DB	0.0000 - 0.1500 PPMV
Temperature:	Dwyer RHP-2D11-LCD	M96797-E23W-A	-40 - 140 °F
Humidity:	Dwyer RHP-2D11-LCD	M96797-E23W-A	0 - 100% RH
Data Recorder:	Yokogawa DX112-3-2/M1	12VB31078	NA
Watt Transducer:	Ohio Semitronics, Inc. AGH-002E	20100694	0-1000 Watts

### Test Conditions

Unit was tested in a complete ASHRAE 52.2 Test Duct. Flow Rate was maintained at 3500 CFM over the 8-hour test period. Test unit was mounted in between two 24" X 24" duct sections and sealed to be leak-free.

Average Test Flow Rate: 3,480.49 CFM

Average Test Temperature: 76.00 Deg F

Average Test Rel. Humidity: 54.60 %

### Requester Information

Test Requestor: Jacob Langenbacher Phone: 607-758-6446  
Company Name: Intertek Email: [jacob.langenbacher@intertek.com](mailto:jacob.langenbacher@intertek.com)  
Company Address: 3933 US Route 11; Cortland, NY 13045 Date Requested: 3/12/2021

### Test Operator Information

Test Performed by: Glen Toloczko CAFS Reviewed by: ES Completion Date: 4/6/2021



2820 S. English Station Road - Louisville, KY 40299  
Phone: (502) 357-0132

TEST NO. 21-151-1B

## Test Report - Ozone Emissions - Low Flow Rate

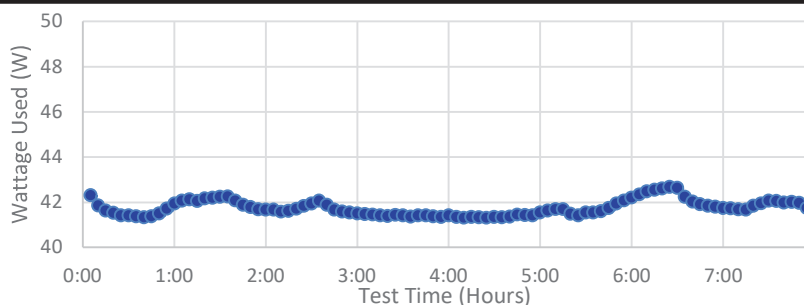
CSA Group - C22.2 No.187-20 - Section 7.5

page 2 of 2

### Device Energy Useage

Average Input Wattage **41.758 W**

Input Voltage **115 V**



### Photos

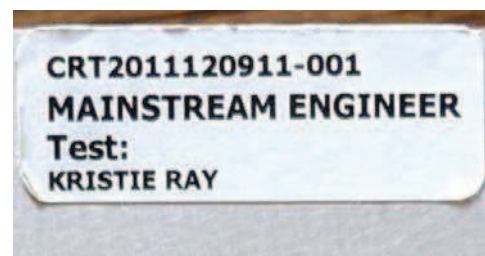
Upstream Side



Downstream Side



Unit Label



### Requester Information

Test Requestor: Jacob Langenbacher

Phone: 607-758-6446

Company Name: Intertek

Email: jacob.langenbacher@intertek.com

Company Address: 3933 US Route 11; Cortland, NY 13045

Date Requested: 3/12/2021

### Test Operator Information

Test Performed by: Glen Toloczko CAFS

Completion Date: 4/6/2021



# Mainstream Engineering Corp.

## OZONE TEST REPORT

### SCOPE OF WORK

Ozone Emissions Testing of Household Electrostatic Air Cleaners for Model: Qwikpure Tripleguard

### REPORT NUMBER

104496780CRT-001

### ISSUE DATE

3/31/2021

### PAGES

14

### QUOTE NUMBER

Qu-01121367-1

### DOCUMENT CONTROL NUMBER

GFT-OP-10o (16-Oct-2017)

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## TEST REPORT FOR MAINSTREAM ENGINEERING CORP.

Report No.: 104496780CRT-001

Date: March 31, 2021

Andrew Wagner  
Mainstream Engineering Corp.  
200 Yellow Place  
Pines Industrial Center  
Rockledge, FL 32955-5327  
USA

Phone: (321) 305-5380  
Email: awagner@mainstream-engr.com

### SECTION 1



#### SUMMARY

The representative sample(s) have been tested, investigated, and found to comply with the requirements of the following Standard(s):

Electrostatic Air Cleaners, UL 867, Section 40, Fifth Edition, August 4, 2011 revision: August 7, 2018

The equipment identified in this report has been found to meet the criteria for emittance of ozone not exceeding a concentration of 0.050 ppm. Furthermore, a second sample was not required to be tested, according to UL 867, as the first sample's maximum emissions were less than 0.030 ppm, which satisfies the exception in the Section 40.1.1.

This report completes our evaluation covered by Intertek Project Number G104496780 which has been authorized by Intertek quote number: Qu-01121367-1. If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the undersigned.

OZONE EMISSIONS SUMMARY			
Unit Power	FILTER(S)	O3/VOLTAGE SETTING	C(t) <sub>max</sub> [ppm]
ON	NA	-	0.002
Completed by:	Joseph Hartley	Reviewed by:	Jacob Langenbacher
Title:	Technician I	Title:	Engineer
Signature:		Signature:	
Date:	3/30/2021	Date:	3/31/2021

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## SECTION 2

### INDEX

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### CHAMBER EQUIPMENT INFORMATION

#### TEST EQUIPMENT LIST

Instrument	Model	Intertek Ctrl #	Cal Due Date
Teledyne – Advanced Pollution Instrumentation Ozone Calibrator	703E	O200	07-24-2021
Teledyne – Advanced Pollution Instrumentation Ozone Monitor	400E	O202	*
Vaisala – Temperature & Humidity Transducer	HMD-70Y	T1307	06-03-2021
Fluid Components International- Flow meter	ST75V	F463	10-12-2021

\* The 400E Ozone Monitor is calibrated using the 703E calibrator.

## SECTION 3

## UNIT UNDER TEST INFORMATION

MODEL INFORMATION			
Manufacturer:	Mainstream Engineering Corp.	Pre-Filter:	No
Model Number:	Qwikpure Tripleguard	HEPA Filter:	No
Production/Prototype/Design	Prototype	ESP Filter:	No
Fan Speeds:	NA	Carbon Filter:	No
O3/Voltage Settings:	-	UV Light:	Yes
O3 Monitor:	-	Ionizer:	No
Model Notes:	Unit has no fans or filter.		

RUN-IN TEST			
FIRST SAMPLE			
Run-in Start:	3/18/2021 2:15 PM	Run-in End:	3/20/2021 3:35 PM
Run-in Temperature:	77 +/-4	Tracking Number:	CRT2011120911-002
Serial Number:	L202032A00003	Manufacture Date:	NA
Sample Notes:			
SECOND SAMPLE			
Run-in Start:	NA	Run-in End:	NA
Run-in Temperature:	NA	Tracking Number	CRT2011120911-001
Serial Number	NA	Manufacture Date:	NA
Sample Notes:	Per the exception listed under clause 40.1.1 of UL 867, the second sample was not required to be tested.		

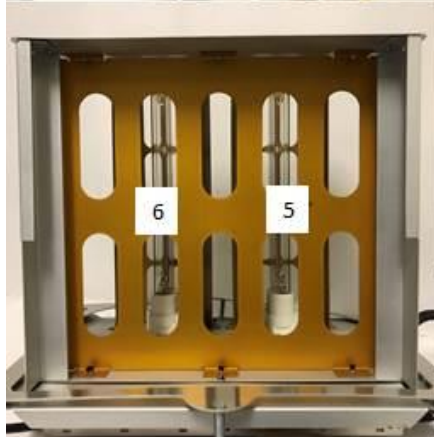
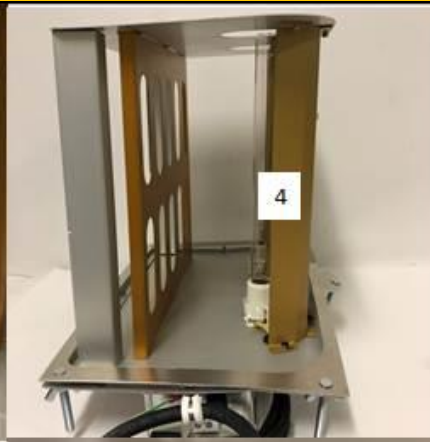
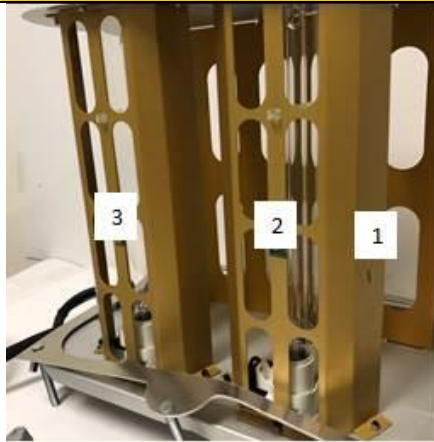
## SECTION 4

## PEAK OZONE TEST

## GRILL AND AIR PERIPHERY DIMENSIONS

		Date of Test:	3/20/2021
Grill Height:	See Notes	Air Periphery Height:	See Notes
Grill Width:	See Notes	Air Periphery Width:	See Notes
Estimated Grill Area:	160.1	Est. Air Periphery Area:	160.1
Notes:	Unit has 3 different facings with different dimensions. The side with points 1-4 is 7.75 x 9.00. The Side with Point 5-6 is 8.5 x 9.00. The side with point 7, there is a smaller are tested with the point in the center between the bulbs. Those dimensions are 5.75 x 2.75. Total are of all tested sides is 160.1 Sq. In.		

## PEAK LOCATION



Loc.	X	Y
-	[inches]	[inches]
1	3.63	0.00
2	2.13	0.00
3	-2.13	0.00
4	-3.63	0.00
5	1.75	0.00
6	-1.75	0.00
7	0.00	0.00
* Location measurements are coordinates in reference to the center point.		

PEAK OZONE CONCENTRATIONS (ppm)				
Location	<i>Without Filter(s)</i>			
	<i>ON</i>			
1	0.0009			
2	0.0010			
3	0.0009			
4	<b>0.0013</b>			
5	0.0002			
6	0.0003			
7	0.0000			

Note: Peak Ozone Test concentrations are shown with background subtracted.

## SECTION 5

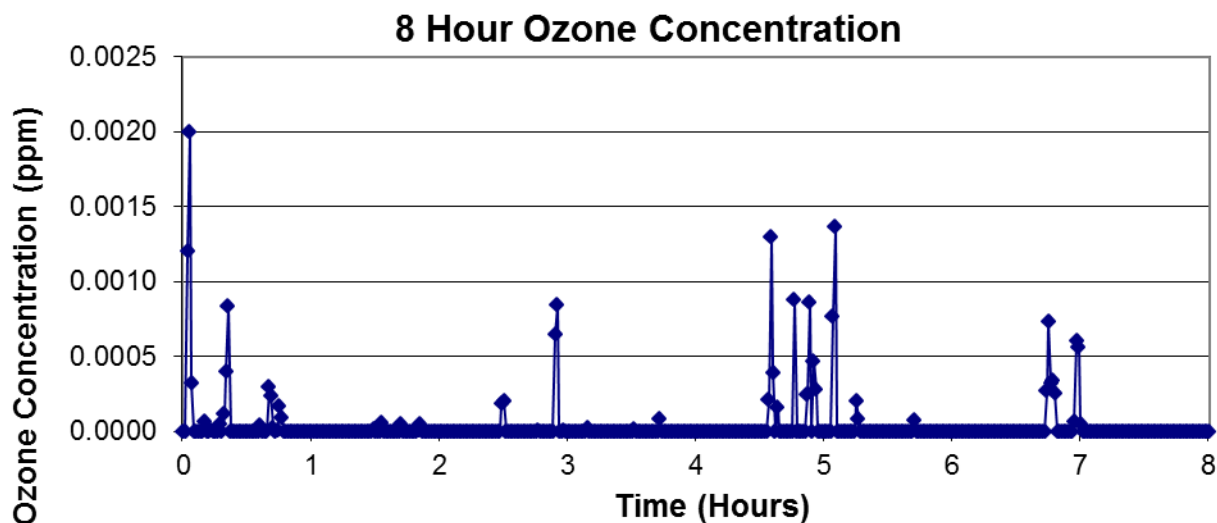
## MAX OZONE TEST

START DATE OF TEST: 3/20/2021

SAMPLE: First Sample

FAN SPEED: NA

FILTER(S): UV Lights ON



MAXIMUM OZONE TEST RESULTS							
	UL Ref.	Pass/Fail	Mean	Min	Max	Delta	Units
Background C(t) O3:	40.4.3	PASS	0.002	0.001	0.002	0.002	[ppm]
Test 1min C(t) O3:	40.1.2	PASS	0.000	0.000	<b>0.002</b>	0.002	[ppm]
Test 5min C(t) O3:	40.1.2	PASS	0.000	0.000	0.001	0.001	[ppm]
Chamber Temperature:	40.4.2	PASS	77	77	78	1	[degF]
Chamber Humidity:	40.4.2	PASS	50	49	52	3	[%RH]
Chamber Static Pressure:	-	PASS	0.02	0.02	0.09	0.08	["H2O]
Chamber Supply Air Flow:	-	-	20	19	20	1	[SCFM]
Required to Test 2nd Sample:	40.1.1	NO					
Test Duration:	*40.4.6	8 hours					

NOTES: Peak Test Location 4

**SECTION 6****APPENDIX****DATA FILES**

TEST NAME	RAW DATA FILE
Model Half Life	4451 Halflife ozonelog.csv
Max Ozone: ON w/o Filter	4452 ONWOF ozonelog.csv

**ATTACHMENT DOCUMENTS**

DOCUMENT	SOFT-COPY FILE NAME
ARB Application	NA
Chain of Custody: Sample 1	COC _CRT2011120911-002.pdf

**UUT PHOTOGRAPHS**

UUT



Nameplate

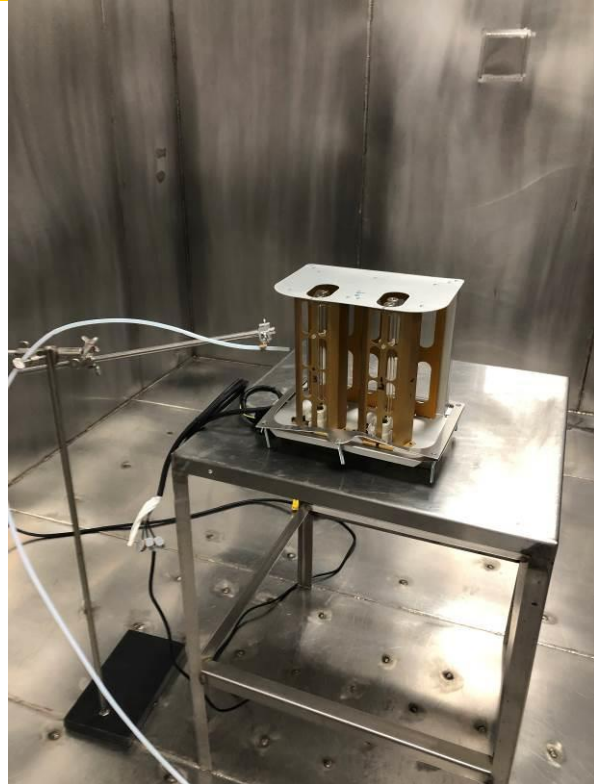


UUT PHOTOGRAPHS: PEAK TEST



Location 4  
ON

UUT PHOTOGRAPHS: MAX TEST



Location 4  
ON

**7.0 REVISION SUMMARY**

Date/Proj # Site ID	Project Handler/ Reviewer	Section	Description of Change
			None