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Order No. G103051457

Issued: 25 MAY 2017

Revised: None

**Report Number: 103051457CRT-001**

**Model Number: LAIFSU2**

**ARB Number: NA**

**RENDERED TO:**

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|                              |  |
|------------------------------|--|
| <u>Report Scope:</u>         | Ozone Emissions Testing of Household Electrostatic Air Cleaners.   |
| <u>Limitation Statement:</u> | The test data and results contained in this report are provided for client information and evaluation. No conclusions are drawn by Intertek.   |
| <u>Authorization:</u>        | The tests were authorized by signed Intercompany Agreement, Dated 05 May 2017.   |
| <u>Standard Used:</u>        | UL Standard for Safety for Electrostatic Air Cleaners, UL 867, Section 40, Ozone Test, Fifth Edition, August 4, 2011 with revisions to and including August 23, 2013.  |
| <u>Report Content:</u>       | <ol style="list-style-type: none"><li>1. Unit Under Test</li><li>2. Peak Ozone Test Results</li><li>3. Max Ozone Test Results</li><li>4. Chamber Equipment</li><li>5. Summary/Signatures</li><li>6. Appendix</li><li>7. Revision Summary</li></ol> |



## 1. Unit Under Test Information

### MODEL

|                             |   |                |     |
|-----------------------------|---|----------------|-----|
| Manufacturer:               | Sino Vantage Industrial LTD.                            | Pre-Filter:    | No  |
| Model Number:               | LAIFSU2   | HEPA Filter:   | No  |
| Production/Prototype/Design | Production  | ESP Filter:    | Yes |
| Fan Speeds:                 | NA  | Carbon Filter: | No  |
| O3/Voltage Settings:        | --  | UV Light:      | No  |
| O3 Monitor:                 | --  | Ionizer:       | Yes |
| Model Notes:                | ESP filter is an aluminum cylinder.<br>Model has no fan |                |     |

### FIRST SAMPLE

|                   |  |                     |                |
|-------------------|--|---------------------|----------------|
| Control Number:   | CRT1704261045-001  | Run-in Start:       | 5/1/2017 10:00 |
| Serial Number:    | NA   | Run-in End:         | 5/3/2017 11:00 |
| Manufacture Date: | NA   | Run-in Temperature: | 77 ± 4 degF    |
| Receive Date:     | 4/26/2017  |                     |                |
| Received Status:  | OK   |                     |                |
| Sample Notes:     | Sample has no nameplate, serial number or manufacturing date |                     |                |

### SECOND SAMPLE

|                   |  |                     |                |
|-------------------|--|---------------------|----------------|
| Control Number:   | CRT1704261045-002  | Run-in Start:       | 5/5/2017 11:00 |
| Serial Number:    | NA   | Run-in End:         | 5/7/2017 11:00 |
| Manufacture Date: | NA   | Run-in Temperature: | 77 ± 4 degF    |
| Receive Date:     | 4/26/2017  |                     |                |
| Received Status:  | OK   |                     |                |
| Sample Notes:     | Sample has no nameplate, serial number or manufacturing date |                     |                |

## 2. Peak Ozone Test Results

### GRILL AND AIR PERIPHERY DIMENSIONS

|                       |                   |                          |          |
|-----------------------|-------------------|--------------------------|----------|
|                       |                   | Date of Test:            | 5/4/2017 |
| Grill Height:         | NA                | Air Periphery Height:    | NA       |
| Grill Width:          | 3.75"             | Air Periphery Width:     | NA       |
| Estimated Grill Area: | 11"               | Est. Air Periphery Area: | NA       |
|                       |                   |                          |          |
| Notes:                | Model has no fan. |                          |          |

### PEAK LOCATIONS

[illegible]

\* Location measurements are coordinates in reference to the center point.

PEAK OZONE CONCENTRATIONS

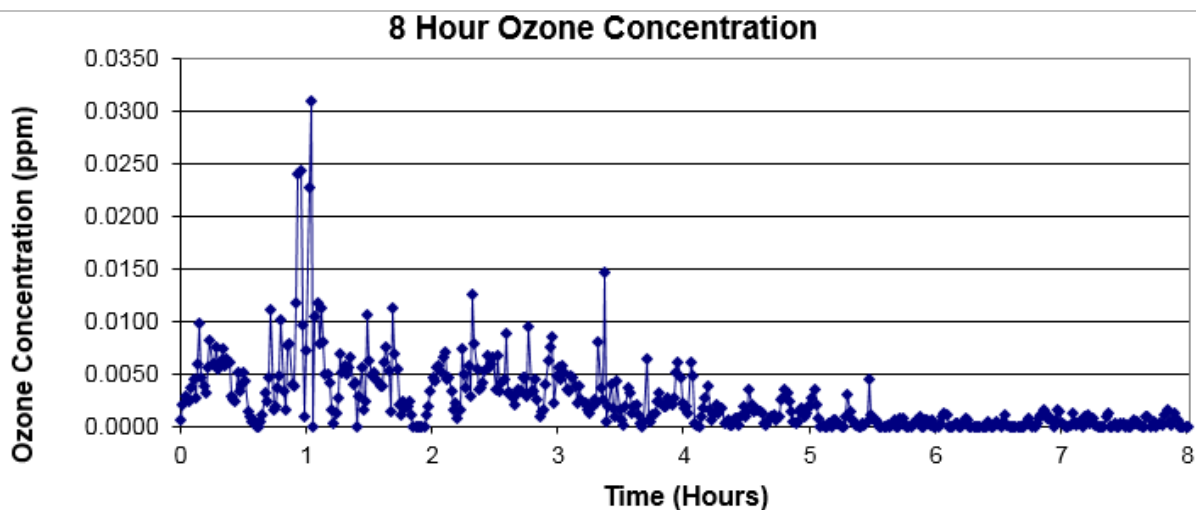
| Location | Unit 1        |               | Unit 2        |               |  |  |  |  |
|----------|---------------|---------------|---------------|---------------|--|--|--|--|
|          | Filter        | No Filter     | Filter        | No Filter     |  |  |  |  |
| 1        | 0.0007        | 0.0031        | 0.0023        | 0.0029        |  |  |  |  |
| 2        | 0.0007        | 0.0025        | 0.0007        | <b>0.0055</b> |  |  |  |  |
| 3        | <b>0.0027</b> | <b>0.0056</b> | 0.0056        | 0.0008        |  |  |  |  |
| 4        | 0.0020        | 0.0023        | <b>0.0062</b> | 0.0033        |  |  |  |  |
| 5        | 0.0001        | 0.0016        | 0.0040        | 0.0016        |  |  |  |  |
| 6        |               |               |               |               |  |  |  |  |
| 7        |               |               |               |               |  |  |  |  |
| 8        |               |               |               |               |  |  |  |  |
| 9        |               |               |               |               |  |  |  |  |
| 10       |               |               |               |               |  |  |  |  |
| 11       |               |               |               |               |  |  |  |  |
| 12       |               |               |               |               |  |  |  |  |
| 13       |               |               |               |               |  |  |  |  |
| 14       |               |               |               |               |  |  |  |  |
| 15       |               |               |               |               |  |  |  |  |

Notes:

- Ozone Concentrations less background level; in units of PPM.
- Peak concentration for each iteration is in **BOLD**.

### 3. Max Ozone Test Results

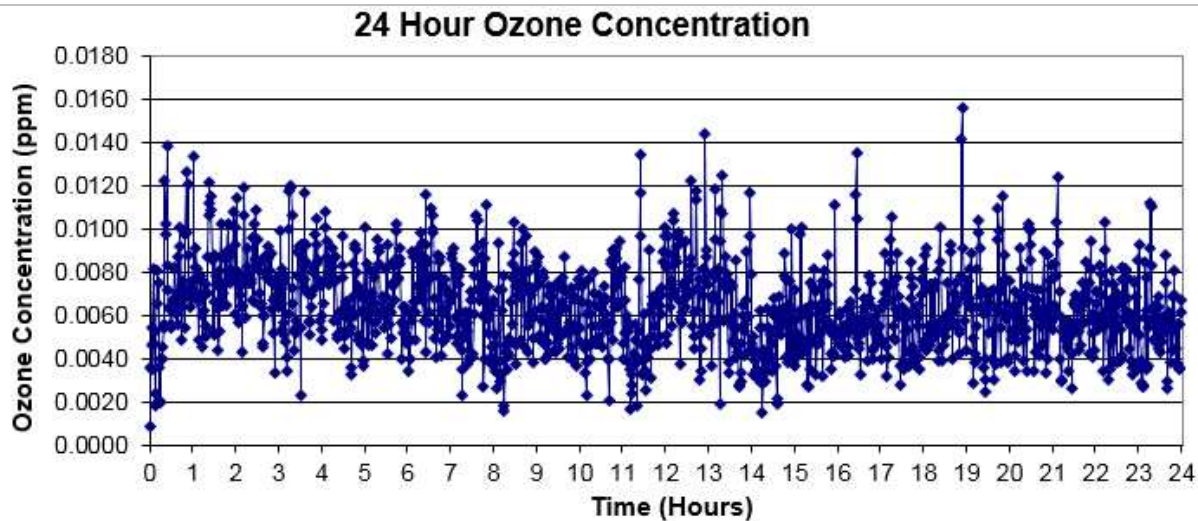
|                     |                         |
|---------------------|-------------------------|
| Start Date of Test: | 5/4/2017                |
| Sample:             | 1                       |
| Fan Speed:          | NA                      |
| Filter(s):          | Electrostatic Collector |



| MAXIMUM OZONE TEST RESULTS   |         |           |       |       |              |       |        |
|------------------------------|---------|-----------|-------|-------|--------------|-------|--------|
|                              | UL Ref. | Pass/Fail | Mean  | Min   | Max          | Delta | Units  |
| Background C(t) O3:          | 40.4.3  | PASS      | 0.001 | 0.000 | 0.002        | 0.001 | [ppm]  |
| Test 1min C(t) O3:           | 40.1.2  | PASS      | 0.002 | 0.000 | <b>0.031</b> | 0.031 | [ppm]  |
| Test 5min C(t) O3:           | 40.1.2  | PASS      | 0.002 | 0.000 | 0.015        | 0.015 | [ppm]  |
| Chamber Temperature:         | 40.4.2  | PASS      | 78    | 78    | 78           | 0     | [degF] |
| Chamber Humidity:            | 40.4.2  | PASS      | 50    | 48    | 51           | 3     | [%RH]  |
| Chamber Static Pressure:     | -       | PASS      | 0.02  | 0.01  | 0.02         | 0.01  | ["H2O] |
| Chamber Supply Air Flow:     | -       | -         | 20    | 20    | 20           | 0     | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1  | YES       |       |       |              |       |        |
| Test Duration:               | *40.4.6 | 8 hours   |       |       |              |       |        |

|        |                    |
|--------|--------------------|
| Notes: | Sample location #3 |
|--------|--------------------|

|                     |                                 |
|---------------------|---------------------------------|
| Start Date of Test: | 5/5/2017                        |
| Sample:             | 1                               |
| Fan Speed:          | NA                              |
| Filter(s):          | Electrostatic Collector removed |

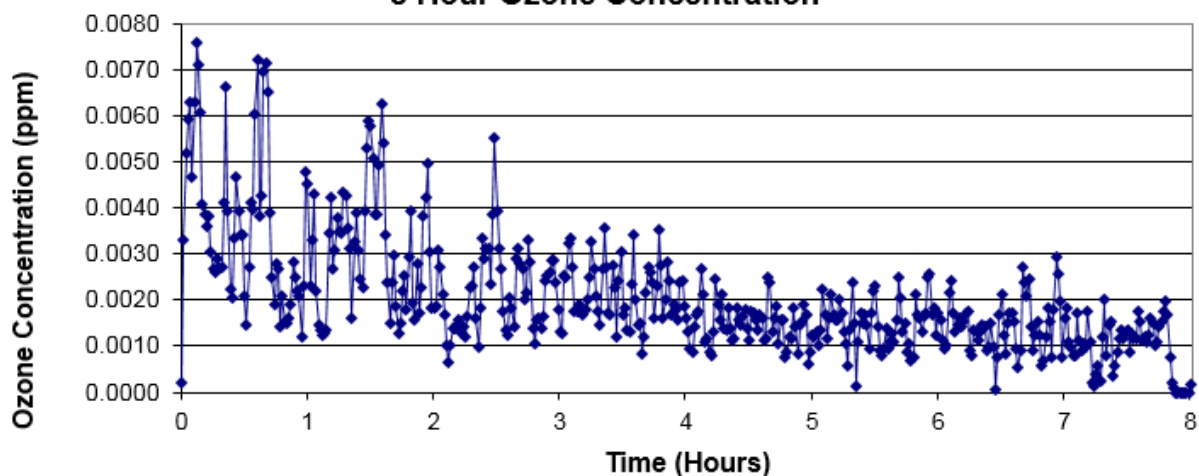


| MAXIMUM OZONE TEST RESULTS   |         |           |       |       |              |       |        |
|------------------------------|---------|-----------|-------|-------|--------------|-------|--------|
|                              | UL Ref. | Pass/Fail | Mean  | Min   | Max          | Delta | Units  |
| Background C(t) O3:          | 40.4.3  | PASS      | 0.001 | 0.001 | 0.001        | 0.001 | [ppm]  |
| Test 1min C(t) O3:           | 40.1.2  | PASS      | 0.006 | 0.001 | <b>0.016</b> | 0.015 | [ppm]  |
| Test 5min C(t) O3:           | 40.1.2  | PASS      | 0.006 | 0.001 | 0.011        | 0.010 | [ppm]  |
| Chamber Temperature:         | 40.4.2  | PASS      | 78    | 77    | 79           | 1     | [degF] |
| Chamber Humidity:            | 40.4.2  | PASS      | 50    | 49    | 51           | 2     | [%RH]  |
| Chamber Static Pressure:     | -       | PASS      | 0.02  | 0.01  | 0.03         | 0.02  | ["H2O] |
| Chamber Supply Air Flow:     | -       | -         | 20    | 20    | 20           | 0     | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1  | NO        |       |       |              |       |        |
| Test Duration:               | *40.4.6 | 24 hours  |       |       |              |       |        |

Notes: Sample location #3

Start Date of Test: 5/9/2017  
 Sample: 2  
 Fan Speed: NA  
 Filter(s): Electrostatic Collector

### 8 Hour Ozone Concentration

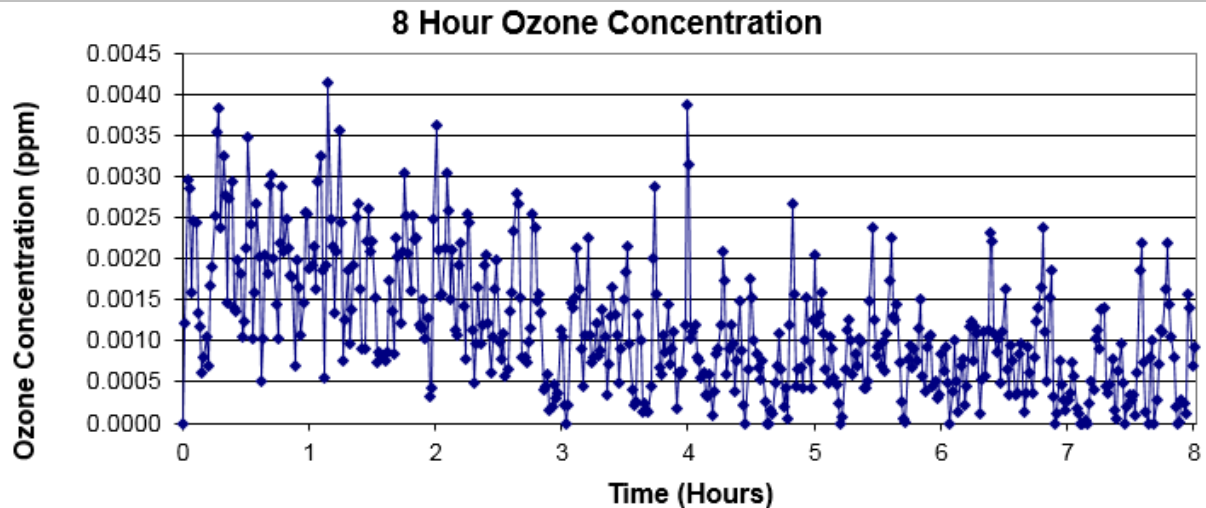


### MAXIMUM OZONE TEST RESULTS

|                              | UL Ref. | Pass/Fail | Mean  | Min   | Max          | Delta | Units  |
|------------------------------|---------|-----------|-------|-------|--------------|-------|--------|
| Background C(t) O3:          | 40.4.3  | PASS      | 0.001 | 0.000 | 0.001        | 0.001 | [ppm]  |
| Test 1min C(t) O3:           | 40.1.2  | PASS      | 0.002 | 0.000 | <b>0.008</b> | 0.008 | [ppm]  |
| Test 5min C(t) O3:           | 40.1.2  | PASS      | 0.002 | 0.000 | 0.006        | 0.006 | [ppm]  |
| Chamber Temperature:         | 40.4.2  | PASS      | 77    | 77    | 78           | 1     | [degF] |
| Chamber Humidity:            | 40.4.2  | PASS      | 50    | 50    | 51           | 1     | [%RH]  |
| Chamber Static Pressure:     | -       | PASS      | 0.02  | 0.01  | 0.03         | 0.02  | ["H2O] |
| Chamber Supply Air Flow:     | -       | -         | 20    | 20    | 20           | 0     | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1  | NO        |       |       |              |       |        |
| Test Duration:               | *40.4.6 | 8 hours   |       |       |              |       |        |

Notes: Sample Location #4

|                     |                                 |
|---------------------|---------------------------------|
| Start Date of Test: | 5/10/2017                       |
| Sample:             | 2                               |
| Fan Speed:          | NA                              |
| Filter(s):          | Electrostatic Collector removed |



| MAXIMUM OZONE TEST RESULTS   |         |           |       |       |              |       |        |
|------------------------------|---------|-----------|-------|-------|--------------|-------|--------|
|                              | UL Ref. | Pass/Fail | Mean  | Min   | Max          | Delta | Units  |
| Background C(t) O3:          | 40.4.3  | PASS      | 0.001 | 0.000 | 0.001        | 0.001 | [ppm]  |
| Test 1min C(t) O3:           | 40.1.2  | PASS      | 0.001 | 0.000 | <b>0.004</b> | 0.004 | [ppm]  |
| Test 5min C(t) O3:           | 40.1.2  | PASS      | 0.001 | 0.000 | 0.003        | 0.003 | [ppm]  |
| Chamber Temperature:         | 40.4.2  | PASS      | 77    | 77    | 77           | 1     | [degF] |
| Chamber Humidity:            | 40.4.2  | PASS      | 50    | 49    | 51           | 2     | [%RH]  |
| Chamber Static Pressure:     | -       | PASS      | 0.02  | 0.01  | 0.03         | 0.02  | ["H2O] |
| Chamber Supply Air Flow:     | -       | -         | 20    | 20    | 20           | 0     | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1  | NO        |       |       |              |       |        |
| Test Duration:               | *40.4.6 | 8 hours   |       |       |              |       |        |

|        |                    |
|--------|--------------------|
| Notes: | Sample Location #2 |
|--------|--------------------|





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Issued: 25 MAY 2017  
Revised: None

#### 4. Chamber Equipment Information

##### Test Equipment List

| Instrument  | Model   | Intertek Ctrl # | Cal Due Date |
|---|---------|-----------------|--------------|
| Teledyne – Advanced Pollution Instrumentation<br>Ozone Calibrator | 703E    | O204            | 4-2-2018     |
| Teledyne – Advanced Pollution Instrumentation<br>Ozone Monitor    | 400E    | O201            | *            |
| Vaisala – Temperature & Humidity Transducer                       | HMD-70Y | T1307           | 06-22-17     |
|   |         |                 |              |

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

## 5. Summary/Signatures

The test sample(s) documented in this report were tested in accordance to the standard(s) referenced in the first page of this report.

The representative sample(s) have been tested, investigated, and found to comply with the requirements of the UL Standard 867 Section 40, criteria of emitting a maximum ozone concentration of less than 0.050 ppm. Furthermore a second sample was required to be tested as the first sample's maximum emissions were not less than 0.030 ppm to satisfy the exception in the Section 40.1.1.

This report completes our evaluation covered by Intertek Project No. G103051457. 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.

Please note; this Report does not represent authorization for the use of any Intertek certification marks.

| OZONE EMISSIONS SUMMARY |           |                    |                           |
|-------------------------|-----------|--------------------|---------------------------|
| Sample                  | Filter(s) | O3/Voltage Setting | C(t) <sub>max</sub> [ppm] |
| Sample 1                | YES       | -                  | 0.031                     |
| Sample 1                | NO        | -                  | 0.016                     |
| Sample 2                | YES       | -                  | 0.008                     |
| Sample 2                | NO        | -                  | 0.004                     |

|               |   |              |   |
|---------------|---|--------------|---|
| Completed by: | Joseph Hartley  | Reviewed by: | Michael Hudon   |
| Title:        | Technician III  | Title:       | Team Lead   |
| Signature:    |  | Signature    |  |
| Date          | 5/23/2017   | Date:        | 5/25/2017   |

## 6. Appendix

### DATA FILES

| Test Name                     | Raw Data File                       |
|-------------------------------|-------------------------------------|
| Model Half Life               | 2293 Half life ozonelog.csv         |
| Model Half Life Sample 2      | 2297 Half life ozonelog.csv         |
| Max Ozone w/ Filter Sample 1  | 2294 max with filter.csv            |
| Max Ozone w/o Filter Sample 1 | 2295 Max no filter.csv              |
| Max Ozone w/ Filter Sample 2  | 2298 max with collector.csv         |
| Max Ozone w/o Filter Sample 2 | 2299 max test without collector.csv |

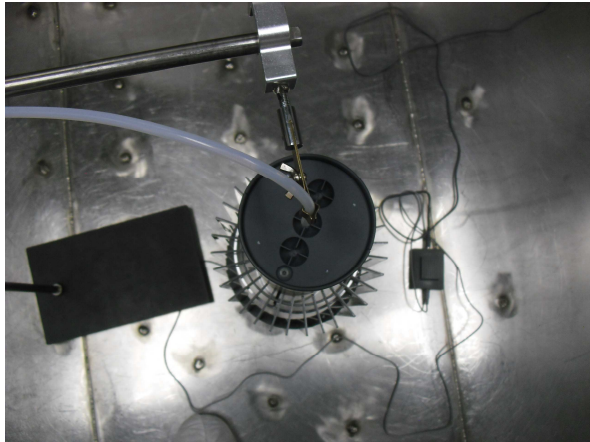
### ATTACHMENT DOCUMENTS

| Document                   | Soft-copy File Name           |
|----------------------------|-------------------------------|
| ARB Application            | NA                            |
| Chain of Custody: Sample 1 | COC_CRT1704261045-001,002.pdf |
| Chain of Custody: Sample 2 | COC_CRT1704261045-001,002.pdf |

### UUT PHOTOGRAPHS

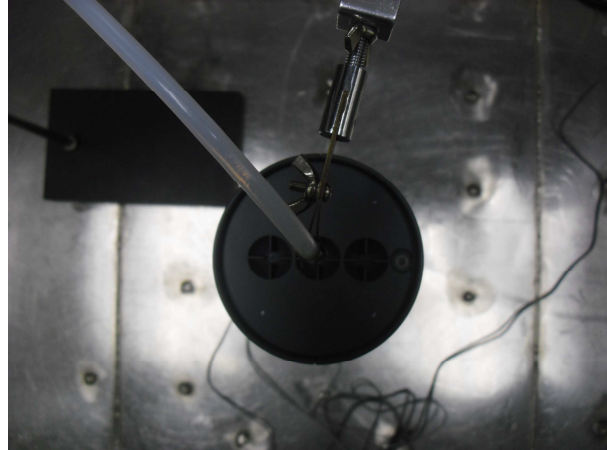
|   |   |
|---|---|
|  | <p style="text-align: center;"><b>NA</b></p> <p style="text-align: center;">Nameplate</p> |
| UUT   |   |

UUT PHOTOGRAPHS: PEAK TEST



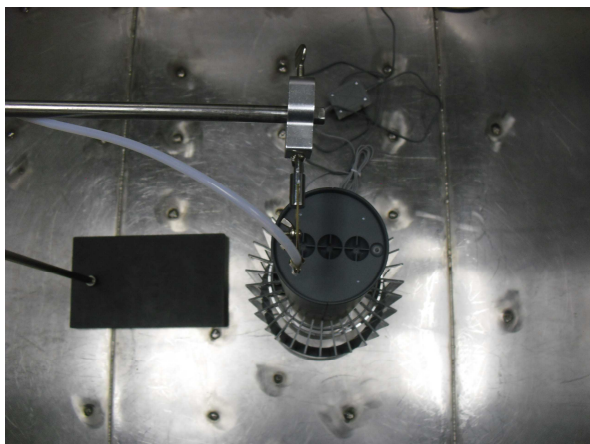
Sample Location #3

Sample 1 w/ Collector



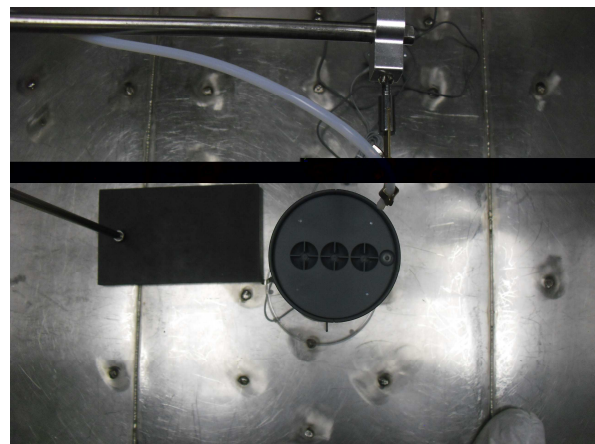
Sample Location #3

Sample 1 w/o collector



Sample Location #4

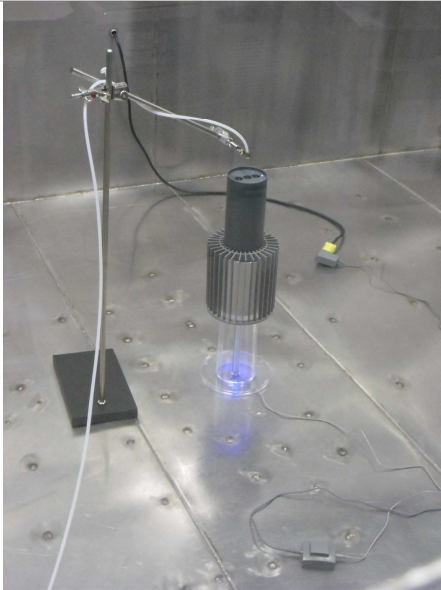
Sample 2 w/ Collector



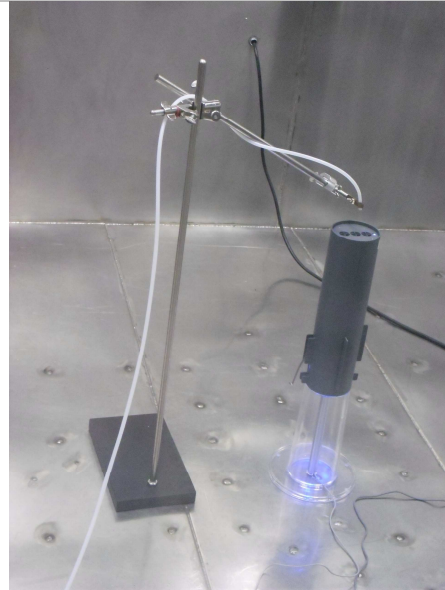
Sample Location #2

Sample 2 w/o Collector

**UUT PHOTOGRAPHS: MAX OZONE TEST**



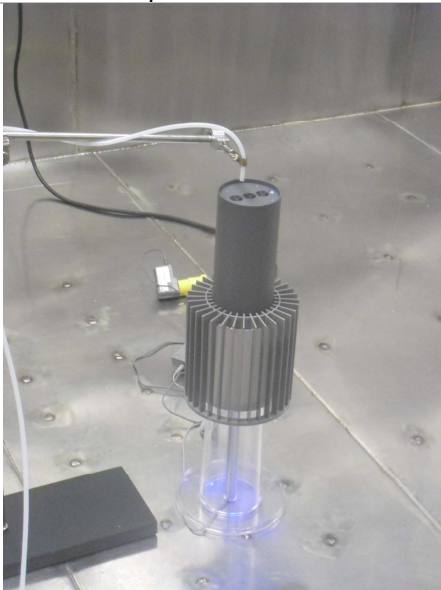
Sample Location #3



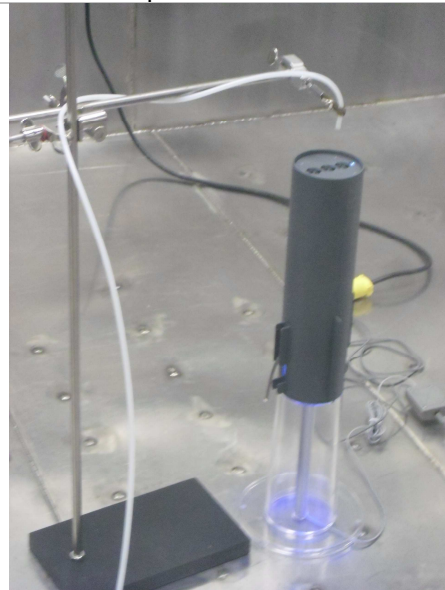
Sample Location #3

Sample 1 w/ Collector

Sample 1 w/o Collector



Sample Location #4



Sample Location #2

Sample 2 w/ Collector

Sample 2 w/o Collector



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Revised: None

| 7.0 Revision Summary       |                              |         |                       |
|----------------------------|------------------------------|---------|-----------------------|
|                            |                              |         |                       |
| Date/<br>Proj # Site<br>ID | Project Handler/<br>Reviewer | Section | Description of Change |
|                            |                              |         | None                  |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |
|                            |                              |         |                       |