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# Elfi Elektrofilter AB
# OZONE TEST REPORT

**SCOPE OF WORK**
Ozone Emissions Testing of Household Electrostatic Air Cleaners for Model: Elfi 900

**REPORT NUMBER**
103222910CRT-001B

**ISSUE DATE**
25-Oct-2017

**PAGES**
13

**QUOTE NUMBER**
Qu-00818587

**DOCUMENT CONTROL NUMBER**
GFT-OP-10o (16-Oct-2017)


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# TEST REPORT FOR ELFI ELEKTROFILTER AB

Report No.: 103222910CRT-001B
Date: October 26, 2017

## SECTION 1

## SUMMARY

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

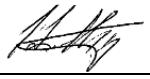
> *Electrostatic Air Cleaners, UL 867*, ***Section 40***, *Fifth Edition, August 4, 2011 revision: September 16, 2016. Unit*
>
> *IEC 60335-2-65 Clause 32.101, Household and similar electrical appliances – Safety –Part 2-65: Particular requirements for air-cleaning appliances.*

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 G103222910 which has been authorized by Intertek quote number: Qu-00818587. 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 above signed.

**OZONE EMISSIONS SUMMARY**

| FAN SPEED | FILTER(S) | 03/VOLTAGE SETTING | $C(t)_{max}$ [ppm] |
|---|---|---|---|
| High | YES | - | 0.001 |
| Low | YES | - | 0.001 |
| Low | NO | - | 0.001 |

| | | | |
|---|---|---|---|
| Completed by: | Joseph Hartley | Reviewed by: | Michael Hudon |
| Title: | Technician III | Title: | Engineering Team Lead |
| Signature: |  | Signature |  |
| Date | 10/25/2017 | Date: | 10/26/2017 |

## SECTION 2

## INDEX



## CHAMBER EQUIPMENT INFORMATION

TEST EQUIPMENT LIST

| Instrument | Model | Intertek Ctrl # | Cal Due Date |
|---|---|---|---|
| Teledyne – Advanced Pollution Instrumentation Ozone Calibrator | 703E | O204 | 04-02-2018 |
| Teledyne – Advanced Pollution Instrumentation Ozone Monitor | 400E | O201 | * |
| Vaisala – Temperature & Humidity Transducer | HMD-70Y | T1307 | 06-09-2018 |
| Fluid Components International- Flow meter | ST75V | D713 | 08-16-2018 |

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

## SECTION 3

# UNIT UNDER TEST INFORMATION

| MODEL INFORMATION | | | |
|---|---|---|---|
| Manufacturer: | Elfi Elektrofilter AB | Pre-Filter: | No |
| Model Number: | Elfi 900 | HEPA Filter: | Yes |
| Production/Prototype/ Design | Production | ESP Filter: | No |
| Fan Speeds: | 4 | Carbon Filter: | No |
| O3/Voltage Settings: | NA | UV Light: | No |
| O3 Monitor: | NA | Ionizer: | Yes |
| Model Notes: | | | |

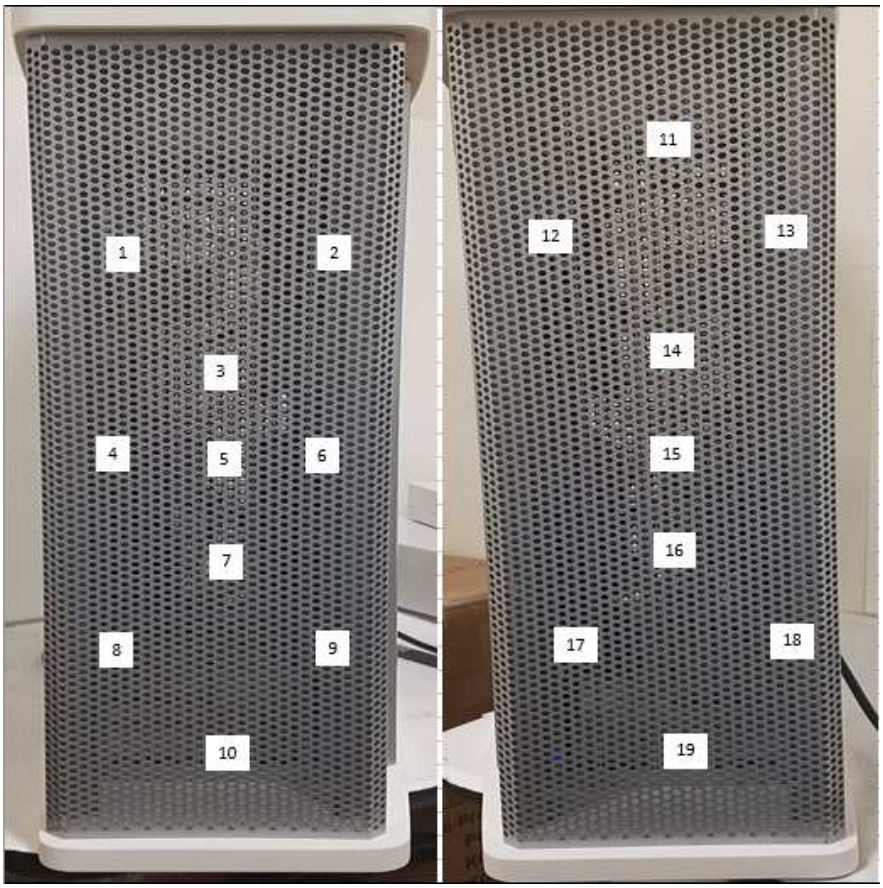
| RUN-IN TEST | | | |
|---|---|---|---|
| FIRST SAMPLE | | | |
| Run-in Start: | 10/11/2017 9:10 AM | Run-in End: | 10/14/2017 9:10 AM |
| Run-in Temperature: | 77 ± 4 degF | Tracking Number | CRT1709281020-008 |
| Serial Number: | EL90016400459 | | |
| Sample Notes: | | | |
| SECOND SAMPLE | | | |
| Run-in Start: | NA | Run-in End: | NA |
| Run-in Temperature: | NA | Tracking Number | CRT1709281020-007 |
| Serial Number | EL90016400458 | | |
| Sample Notes: | | | |

## SECTION 4

# PEAK OZONE TEST

| GRILL AND AIR PERIPHERY DIMENSIONS | | | |
|---|---|---|---|
| | | Date of Test: | 10/21/2017 |
| Grill Height: | 22.5625 | Air Periphery Height: | 22.5625 |
| Grill Width: | 6.750 | Air Periphery Width: | 6.750 |
| Estimated Grill Area: | 152.296 | Est. Air Periphery Area: | 152.296 |
| Notes: | Measurements are in Inches. Grill and Air periphery measurements were the same on both sides. The dimensions listed above a representative of one grill. Points 1-10 are on the left side of the unit facing forward, while 11-19 are on the right. | | |

**PEAK LOCATION**




| Loc. | X | Y |
|---|---|---|
| - | [inches] | [inches] |
| 1 | -2.125 | 5.5 |
| 2 | 2.125 | 5.5 |
| 3 | 0 | 2.625 |
| 4 | -2.125 | 0 |
| 5 | 0 | 0 |
| 6 | 2.125 | 0 |
| 7 | 0 | -3.125 |
| 8 | -2.125 | -5.5 |
| 9 | 2.125 | -5.5 |
| 10 | 0 | -8.75 |
| 11 | 0 | 8.25 |
| 12 | -2.25 | 5.75 |
| 13 | 2.25 | 5.75 |
| 14 | 0 | 3 |
| 15 | 0 | 0 |
| 16 | 0 | -3 |
| 17 | -2.25 | -5.5 |
| 18 | 2.25 | -5.5 |
| 19 | 0 | -8.5 |

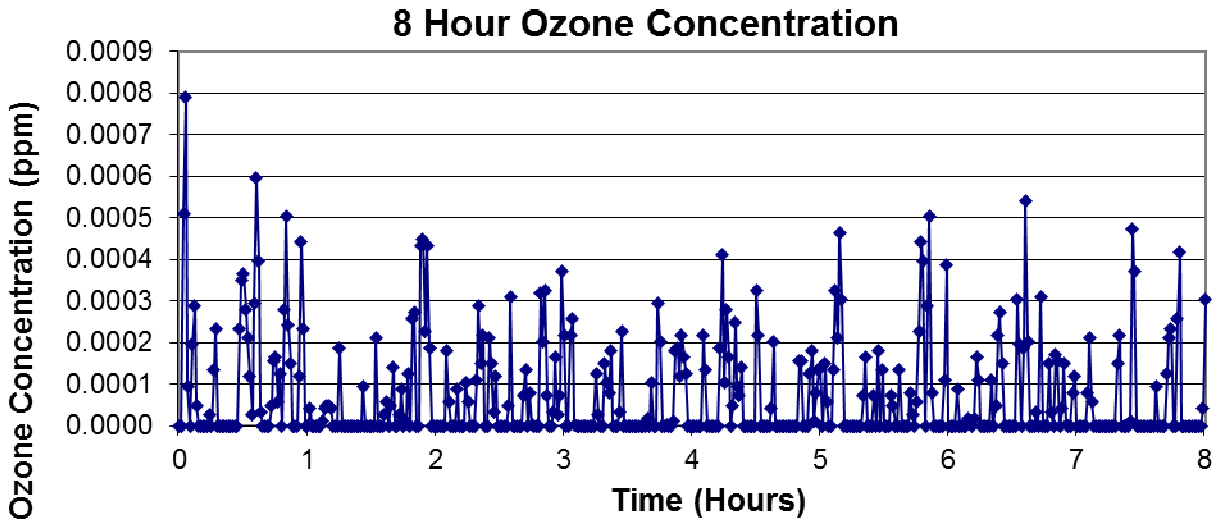
* Location measurements are coordinates in reference to the center point.

| PEAK OZONE CONCENTRATIONS (ppb) | | | | |
|---|---|---|---|---|
| Location | *With Filter(s)* | | *Without Filter(s)* | |
| | *Highest* | *Lowest* | *Lowest* | |
| 1 | 0.0006 | 0.0000 | 0.0007 | |
| 2 | 0.0001 | 0.0006 | 0.0006 | |
| 3 | 0.0003 | 0.0007 | 0.0003 | |
| 4 | 0.0002 | 0.0006 | 0.0006 | |
| 5 | 0.0008 | 0.0007 | 0.0005 | |
| 6 | 0.0001 | 0.0009 | 0.0005 | |
| 7 | 0.0007 | **0.0010** | 0.0009 | |
| 8 | 0.0004 | 0.0008 | 0.0001 | |
| 9 | 0.0006 | 0.0003 | 0.0005 | |
| 10 | 0.0003 | 0.0007 | 0.0010 | |
| 11 | 0.0006 | 0.0006 | 0.0005 | |
| 12 | 0.0006 | 0.0006 | 0.0002 | |
| 13 | 0.0006 | 0.0005 | 0.0005 | |
| 14 | 0.0008 | 0.0004 | 0.0002 | |
| 15 | 0.0008 | 0.0005 | 0.0009 | |
| 16 | 0.0005 | 0.0007 | **0.0012** | |
| 17 | 0.0005 | 0.0006 | 0.0004 | |
| 18 | 0.0007 | 0.0004 | 0.0006 | |
| 19 | **0.0014** | 0.0000 | 0.0000 | |

## SECTION 5

# MAX OZONE TEST

START DATE OF TEST: 10/21/2017
SAMPLE: First Sample
FAN SPEED: High
FILTER(S): HEPA Filter Installed

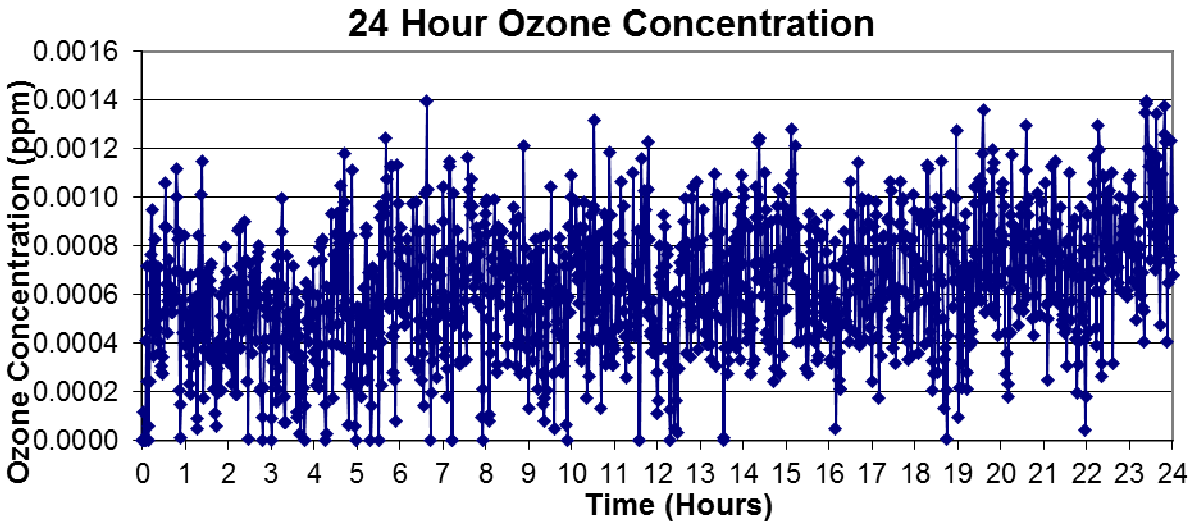



| MAXIMUM OZONE TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **UL Ref.** | **Pass/Fail** | **Mean** | **Min** | **Max** | **Delta** | **Units** |
| Background C(t) O3: | 40.4.3 | PASS | 0.001 | 0.001 | 0.001 | 0.001 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.000 | 0.000 | **0.001** | 0.001 | [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 | 50 | 1 | [%RH] |
| Chamber Static Pressure: | - | PASS | 0.02 | 0.00 | 0.03 | 0.03 | ["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: Peak Test Location 19

## MAX OZONE TEST

START DATE OF TEST: 10/22/2017
SAMPLE: First Sample
FAN SPEED: Low
FILTER(S): HEPA Filter Installed

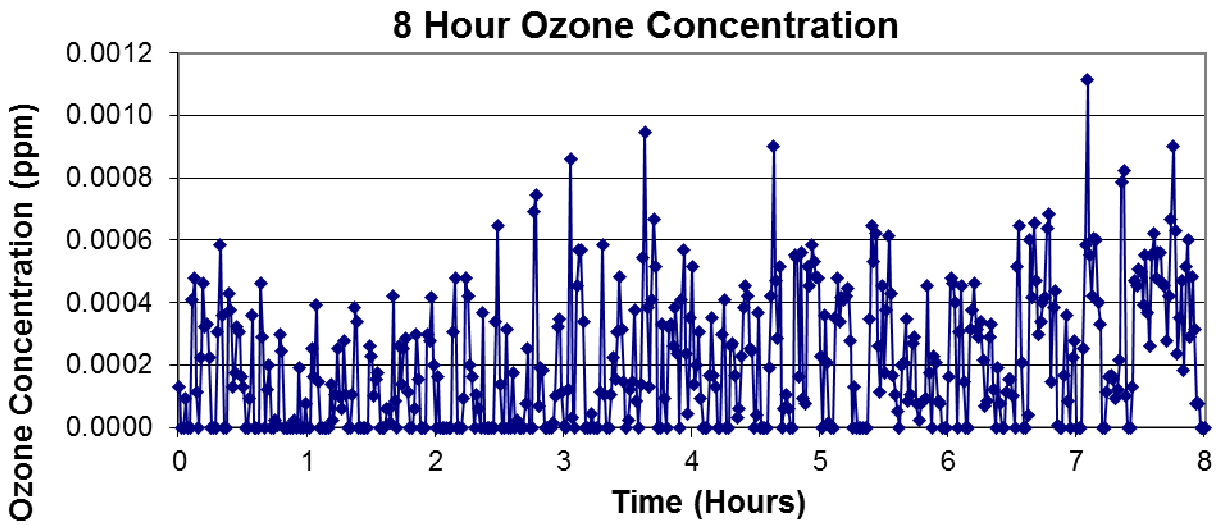



| MAXIMUM OZONE TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **UL Ref.** | **Pass/Fail** | **Mean** | **Min** | **Max** | **Delta** | **Units** |
| Background C(t) O3: | 40.4.3 | PASS | 0.001 | 0.001 | 0.001 | 0.001 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.001 | 0.000 | **0.001** | 0.001 | [ppm] |
| Test 5min C(t) O3: | 40.1.2 | PASS | 0.001 | 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 | 0.00 | 0.04 | 0.04 | ["H2O] |
| Chamber Supply Air Flow: | - | - | 20 | 19 | 20 | 0 | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | *40.4.6 | 24 hours | | | | | |

NOTES: Peak Test Location 7
Test used for compliance with IEC 60335-2-65 Clause 32.101

## MAX OZONE TEST

START DATE OF TEST: 10/23/2017
SAMPLE: First Sample
FAN SPEED: Low
FILTER(S): HEPA Filter 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 | 0.000 | 0.000 | **0.001** | 0.001 | [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 | 77 | 0 | [degF] |
| Chamber Humidity: | 40.4.2 | PASS | 50 | 50 | 51 | 1 | [%RH] |
| Chamber Static Pressure: | - | PASS | 0.02 | -0.01 | 0.05 | 0.05 | ["H2O] |
| Chamber Supply Air Flow: | - | - | 20 | 19 | 20 | 0 | [SCFM] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | *40.4.6 | 8 hours | | | | | |

NOTES: Peak Test Location 16

# SECTION 6
# APPENDIX

## DATA FILES

| TEST NAME | RAW DATA FILE |
|---|---|
| Model Half Life | 2376 Halflife |
| Max Ozone: High Speed w/ Filter | 2377 Max High with Filter.xls |
| Max Ozone: Low Speed w/ Filter | 2378 Max Low with Filters.xls |
| Max Ozone: Low Speed w/o Filter | 2379 Max Low wo filter.xls |

## ATTACHMENT DOCUMENTS

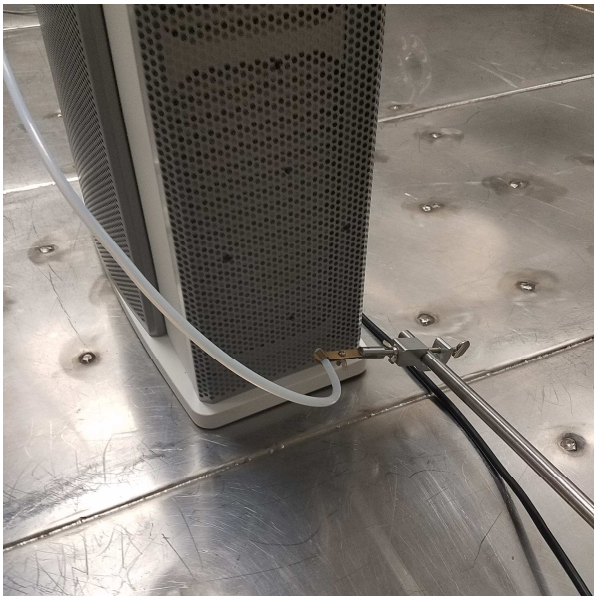
| DOCUMENT | SOFT-COPY FILE NAME |
|---|---|
| ARB Application | NA |
| Chain of Custody: Sample 1 | COC_CRT1709281020-008,007.pdf |
| Chain of Custody: Sample 2 | COC_CRT1709281020-008,007.pdf |

## UUT PHOTOGRAPHS

UUT

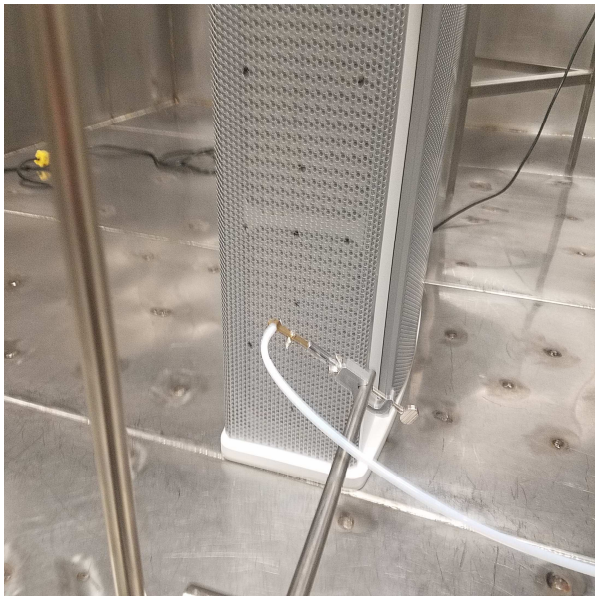

Nameplate - Production

## UUT PHOTOGRAPHS: PEAK TEST



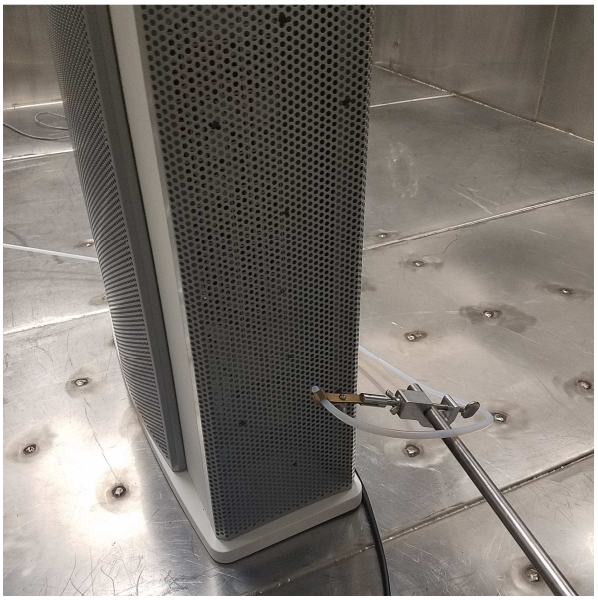
**Location 19**

HIGH SPEED w/ FILTER



**Location 7**

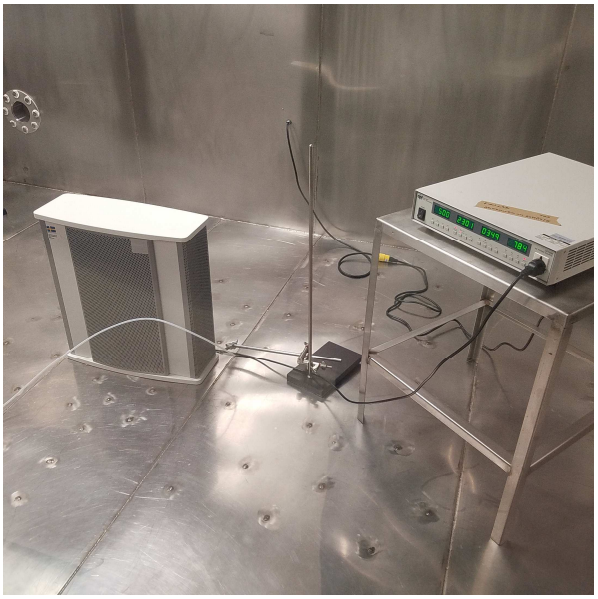
LOW SPEED w/ FILTER



**Location 16**

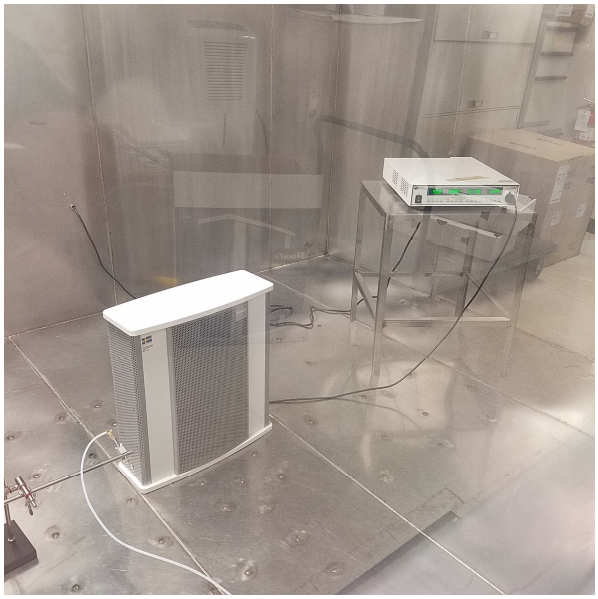
LOW SPEED w/o FILTER

## UUT PHOTOGRAPHS: MAX OZONE TESTS



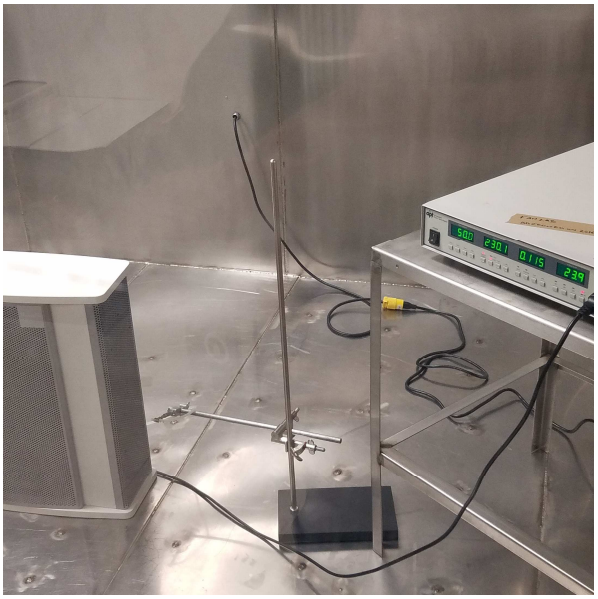
**Location 19**

HIGH SPEED w/ FILTER



**Location 7**

LOW SPEED w/ FILTER



**Location 16**

LOW SPEED w/o FILTER

## 7.0 REVISION SUMMARY

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