

Rainbow Purifiers LLC.

TEST REPORT

SCOPE OF WORKS

AHAM AC-1 2020 CADR Testing on Air Cleaner Model Luggable 20x25 7 Sickleflow Fan Configuration

REPORT NUMBER

105443787CRT-001B

ISSUE DATE

24-May-2023

REVISE DATE

TESTING LOCATION: Intertek Cortland, 3933 US Route 11, Cortland New York, 13045

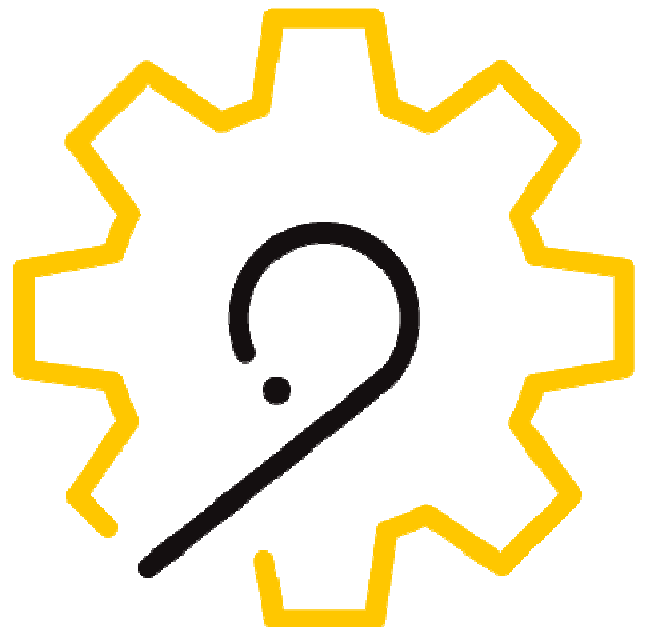
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RAINBOW PURIFIERS LLC.

Report No.: 105443787CRT-001B

Date: May 24, 2023

OBJECTIVE

To provide clean air delivery rate (CADR) result from testing accordance with ANSI/AHAM AC-1-2020 entitled, "Association of Home Appliance Manufacturers Method for Measuring Performance of Portable Household Electric Room Air Cleaners".

HYPOTHESIS

The CADR value is expected to be greater than the natural decay by more than two-times the measurements of uncertainty. This report is for internal use only. No conclusion will be determined by the data contain in this report.

For differentiating results, it is recommended a minimum of three representative samples are to be tested and results are to be a minimum of two times the measurement uncertainty.

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SECTION 2

OBJECTIVE

To provide clean air delivery rate (CADR) results from testing conducted according to the ANSI/AHAM AC-1 2020 test procedure at one operation mode for the pollutants: smoke, dust, & pollen.

ANSI/AHAM AC-1 2020 Limits of Measurability:

Dust CADR	10 - 600 cfm
Cigarette Smoke CADR	10 - 600 cfm
Pollen CADR	25 - 450 cfm

Accuracy:

Smoke & Dust 5.4 %

Pollen 7.3 %

Measurement Uncertainty:

Dust CADR	5.4%
Cigarette Smoke CADR	5.4%
Pollen CADR	7.3%

To determine repeatability of results, multiple samples (as many as needed) should be tested.

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SECTION 3 PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD	Measurement Uncertainty
Voltage	Line Voltage	Volts ac	Power Supply	0.064 V (Approx. 95 %, K=2)
Frequency	Line Frequency	Hz	Power Supply	0.5Hz (Approx.95 %, k=2)
Smoke	Smoke Particulate Conc.	Particles / CC	Smoke Solenoid	0.2 (Approx. 95 %, k=2)
Dust	Dust Particulate Conc.	Particles / CC	Dust Solenoid	0.2 (Approx. 95 %, k=2)
Pollen	Pollen Particulate Conc.	Particles / CC	Pollen Solenoid	0.2 (Approx. 95 %, k=2)
Time	Smoke Injection over Time	Seconds (s)	Chamber	0.45 s (Approx. 95 %, K=2)
Time	Dust Injection over Time	Seconds (s)	Chamber	0.45 s (Approx. 95 %, K=2)
Time	Pollen Injection over Time	Seconds (s)	Chamber	0.10 s (Approx. 95 %, K=2)

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD	MU
Temperature	Air Temperature	°F	DAQ, Vaisala Temperature Humidity Sensor	0.55 °F (Approx. 95 %, k=2)
Humidity	Relative Humidity	%	DAQ, Vaisala Temperature Humidity Sensor	2.1% (Approx. 95 %, K=2)
Wattage	Energy Consumption	Watts	DAQ, Yokogawa WT210 Power Analyzer	0.041 W (Approx. 95 %, K=2)
Smoke	Smoke Injection 0.1um to 1m total decay	Particles / CC	Chamber	0.2 (Approx. 95 %, k=2)
Dust	Dust Injection .5µm– 3 µm total decay	Particles / CC	Chamber	0.2 (Approx. 95 %, k=2)
Pollen	Pollen Injection 5 µm – 11 µm total decay	Particles / CC	Chamber	0.2 (Approx. 95 %, k=2)

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SECTION 4**SAMPLE ACQUISITION**

Samples Provided by Client.

SAMPLE #	DESCRIPTION	SERIAL #	PURCHASE LOCATION	DATE	CONDITION
Luggable 20x25 7 Sickleflow Fan	Air Cleaner	CRT2305100927-004	Sent in by Client	May 10, 2023	Sample Received from Client

SECTION 5**TECHNICAL STAFF**

#	Staff Name	Area of Expertise
1	Mike Podoliak	Proficient in Air Cleaner testing according to ANSI/AHAM AC-1 2020
2	Cory Keeney	Proficient in Air Cleaner testing according to ANSI/AHAM AC-1 2020
3	Nirali Patel	Qualified to review Air Cleaner testing according to ANSI/AHAM AC-1 2020

SECTION 6**EQUIPMENT LIST**

#	EQUIPMENT DESCRIPTION	MANUFACTURER'S NAME / MODEL # / SERIAL #	INTERTEK ASSET #	CALIBRATION DATE	CALIBRATION DUE
1	Aerodynamic Particle Sizer	TSI Inc. 3321	A261	6/3/2022	6/3/2023
2	Laser Aerosol Spectrometer	TSI 3340A	D708	11/28/2022	11/28/2023
3	Humidity/Temperature Sensor	Vaisala Inc. HMW31YB	T680	9/15/2022	9/15/2023
4	Power Analyzer	Yokogawa WT210	G065	9/15/2022	9/15/2023
5	Stopwatch	Control Company S/N:170715011	D715	12/1/2022	12/1/2023

Note: The equipment measurement uncertainty is stated in the Test Procedure.

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SECTION 7
TEST DATA

20 x 25 Sickleflow – 7 Fan Configuration DATA

Model/Configuration	Test Particulate	Natural Decay Rate (-)	CADR (FT ³ /Min)	CADR STDEV (FT ³ /Min)	Power (Watts)
Luggable 20x25 7 Sickleflow Fans – Continuous Speed CRT2305100927-004 Tested on Floor	Smoke	0.00224	259.3	1.7	9.9
	Dust	0.00509	323.2	2.3	10.0
	Pollen	0.13190	370.0	27.5	10.2

Model/Configuration	Test Particulate	Test Voltage V	Test Frequency Hz	Ambient Test Temperature °F	Ambient Humidity %RH
Luggable 20x25 7 Sickleflow Fans – Continuous Speed CRT2305100927-004 Tested on Floor	Smoke	120	60	71	41
	Dust	120	60	71	41
	Pollen	120	60	71	40

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SECTION 8

PHOTO



Unit in Test – SickelFlow Fans – 7 Fan Configuration

SECTION 9

CONCLUSION

The CADR value is greater than natural decay by more than two times the measurements uncertainty for Smoke, Dust and Pollen. This report is for internal use only. No conclusion will be determined by the data contained in this report.

For differentiating results, results a minimum of two times the measurement of uncertainty is needed. It is recommended a minimum of three representative samples are to be tested.

Cory Keeney

Tested by
Cory Keeney

Nirali Patel

Reviewer
Nirali Patel

SECTION 10

REVISION

Date/ Proj # Site ID	Project Handler/ Reviewer	Page No	Description of Change

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