



中国认可
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检测

TESTING
CNAS L0823



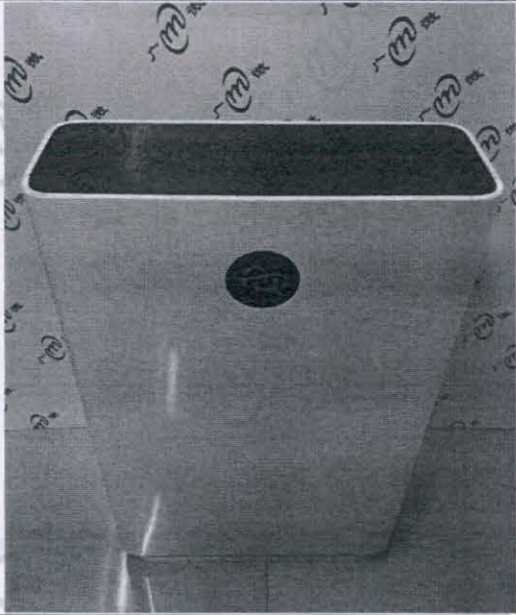
2015191101Z

Test No.KJ20171082

GUANGZHOU TESTING CENTER OF INDUSTRIAL MICROBIOLOGY

TEST REPORT

Date Received: August 19, 2017
Date Analyzed: September 13, 2017

Name of Sample	Air Purifier	Source of Sample	Delivery
Applicant	Air Quality Technology (Shanghai) Co., Ltd.	Client	Cai Kui
Manufacturer	Air Quality Technology (Shanghai) Co., Ltd.	Brand	Air Quality
Type and Specification	KJ400F-01A	Quantity of Sample	1PC
Date of Production	—	State of Sample	Machine
Batch Number	—	Packing of Sample	In box
Sample Picture			
Standard and Methods	1. Referring to GB/T 18801-2015 Air cleaner and customer requirements 2. GB21551.3-2010 Antibacterial and cleaning function for household and similar electrical appliances-Particular requirements of air cleaner		
Items of Analysis	1. CADR (Formaldehyde, Particulate) 2. CCM (Particulate) 3. Cleaning Energy Efficiency (Formaldehyde, Particulate) 4. Standby Power, Input Power 5. Killing Rate (<i>Staphylococcus albus</i> 8032) 6. Harmful Substances Release Amount (Ozone) 7. Noise		
Remarks	—		

To be continued



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SUMMARY OF THE TEST RESULTS

Test No.	Items of Analysis		Unit	Results
KJ20171082	CADR	Formaldehyde	m ³ /h	181.3
		Particulate		386.6
	CCM	Particulate	Interval Grading	P4
	Cleaning Energy Efficiency	Formaldehyde	m ³ /(h·W)	4.07
		Particulate		8.69
	Power	Standby Power	W	0.5
		Input Power		44.5
	Killing Rate	<i>Staphylococcus albus</i>	%	99.96
	Harmful Substances Release Amount	Ozone	mg/m ³	< 0.003
	Noise (The highest speed)	Average sound pressure level	dB(A)	48.0
		Acoustic power level		62.0
	Noise (Minimum speed)	Average sound pressure level		≤18.6
		Acoustic power level		≤32.6

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Method for Testing Air Delivery Rate of Gaseous Pollutant:

1. Testing Condition

- 1) Environment temperature: $(25 \pm 2) ^\circ\text{C}$
- 2) Environment humidity: $(50 \pm 10) \% \text{RH}$.

2. Testing Equipment

Test chamber (30 m^3), constant current atmospheric sampler, UV-VIS spectrophotometer.

3. Running State of the Machine

Set the switch to position "The highest speed".

4. Test Procedure

- 1) Place the air purifier into the chamber according to the standard's requirements. Set the air purifier to the particular running state. Make sure the air purifier runs normally, and then turn off the air purifier.
- 2) Purify the air in the chamber using the HEPA filter. Make sure the background concentration of the pollutants reaches a particular level, and then turn on the temperature and humidity control device. Keep the temperature and humidity control device running until the temperature and the humidity reaches the standard's requirement.
- 3) A certain amount of gaseous pollutant is added into the chamber using the gaseous pollutant generator. Turn off the gaseous pollutant generator while concentration of the pollutants reaches the standard's requirement.
- 4) Mix the gaseous pollutant for 10 min, and then turn off the ceiling mixing fan.
- 5) Sample the initial concentration after the fan is stopped.
- 6) Turn on the air purifier. Collect samples at 5-minute intervals for 60 minutes.
- 7) According to the step 1) ~ 6), without the air cleaner, test the natural decay.
- 8) The CADR should be test in the same way for 3 times, and it should be more than 24 h between every tests. The last test is taken for the final result.

Note 1. Before the test, the air purifier has been running for more than 1 h.

Note 2. The data less than the requirement of GB/T 18883 is invalid.

Note 3. If the valid data points is less than six, Crossed sampling can be used.

5. Computational Formula

$$\text{CADR} (\text{m}^3/\text{h}) = 60 \times (k_e - k_n) \times V$$

Where: k_e = total decay constant; k_n = natural decay constant; V = volume of the test chamber, m^3

Test Results

Number of Sample	Pollutant	Natural Decay Constant k_n (min^{-1})	Total Decay Constant k_e (min^{-1})	CADR (m^3/h)	Cleaning Energy Efficiency η [$\text{m}^3/(\text{h} \cdot \text{W})$]	Cleaning Energy Efficiency Grade
KJ20171082-1	Formaldehyde	0.0006	0.1013	181.3	4.07	High-efficiency grade

Note: High-efficiency grade: $\eta_{\text{formaldehyde}} \geq 1.00$

Qualified grade: $0.50 \leq \eta_{\text{formaldehyde}} < 1.00$

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Method for measuring clean air delivery rate of particulate:

1. Test object
Particulate ($\geq 0.3\mu\text{m}$)
2. Test conditions
 - 1) Environment temperature: $(25 \pm 2)^{\circ}\text{C}$
 - 2) Environment humidity: $(50 \pm 10)\% \text{ RH}$
3. Test equipment
Test chamber (30m^3), Laser particle counter, Diluter
4. Operation conditions of the machine
Set the switch to position "The highest speed".
5. Test procedures
 - 1) Place the air cleaner to be tested in the test chamber in accordance with standard request and set the air cleaner controls to the conditions for test. Test for proper operation, then turn off the air cleaner.
 - 2) Using the test chamber HEPA filter, allow the test chamber air to clean until the background concentration in the size range of $0.3\mu\text{m}$ to $10\mu\text{m}$ reaches a concentration of less than 1000 particles/L. Simultaneously operate the environmental control devices until the test chamber conditions.
 - 3) When an acceptable test chamber background concentration is achieved record the background concentration, turn off the test chamber environmental control system.
 - 4) Immediately light, then place one standard cigarette in the cigarette smoke generator, seal generator, open valve to chamber, to provide the required initial concentration ($2 \times 10^6 \sim 2 \times 10^7$ particles/L). Turn off air supply and close test chamber valve. Mix cigarette smoke for ten minutes after the initial concentration has been reached.
 - 5) Turning off ceiling mixing fan, begin to acquire the cigarette smoke particulate concentration. This test point is the initial concentration (C_0).
 - 6) Open the air cleaner and start the test as soon as the initial concentration of particulate matter is completed. Collect samples at two-minute intervals for 20 minutes.
 - 7) Test the natural decay according to the steps 1) ~ 6) , except that the air cleaner is unoperated.

6. Computational formula

$$\text{CADR } Q (\text{m}^3 / \text{h}) = 60 \times (k_e - k_n) \times V$$

Where: k_e = total decay constant; k_n = natural decay constant; V = volume of the test chamber, m^3

Test Results

Number of Sample	Pollutant	Natural decay constant k_n (min^{-1})	Total decay constant k_e (min^{-1})	CADR (m^3/h)	Cleaning energy efficiency [$\text{m}^3/(\text{h} \cdot \text{W})$]	Cleaning energy efficiency grade
KJ20171082-1	Particulate	0.0026	0.2174	386.6	8.69	High-efficiency grade

Note: High-efficiency grade: $\eta_{\text{particulate}} \geq 5.00$

Qualified grade: $2.00 \leq \eta_{\text{particulate}} < 5.00$

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The cumulative amount of cigarette smoke purification test:

1. Test object
Particulate ($\geq 0.3\mu\text{m}$)
2. Test equipment
Test chamber (3m^3 , for the acceleration test; 30m^3 , for the amount of clean air test), Dust detector, Laser particle counter, Diluter
3. Operation conditions of the machine
Set the switch to position "The highest speed".
4. Test procedures
 - 1) Testing the initial CADR of air cleaner based on the Appendix B of national standard GB/T 18801-2015.
 - 2) Place the air cleaner to be tested in the 3m^3 chamber according to the requirements of standard. Turn on air cleaner and ceiling mixing fan, then close the chamber door.
 - 3) Fifty cigarettes are continuously injected into 3m^3 chamber until the particle concentration to less than $0.035\text{mg}/\text{m}^3$, close the purifier, let stand at least 30 min, take out the purifier.
 - 4) Put air cleaner in 30m^3 test chamber, test the amount of clean air again.
 - 5) To repeat the step 2) ~ 4), obtain results of CADR with number of cigarettes 50, 150.
5. Interval Binning

Interval Binning	CCM _{particulate} (mg)
P1	$3000 \leq \text{CCM} < 5000$
P2	$5000 \leq \text{CCM} < 8000$
P3	$8000 \leq \text{CCM} < 12000$
P4	$12000 \leq \text{CCM}$

Note: The cumulate clean mass (CCM) of air cleaner should not be evaluated when the measured CCM is less than 3000mg.

Test Results:

Number of Sample	Test Number	Cumulative consumption of cigarettes (piece)	Cumulate clean mass of cigarettes PM _{2.5} weight (mg)	CADR (m ³ /h)	Percentage to the initial CADR (%)
KJ20171082-1	1	0	0	386.6	100.00
	2	50	4080	380.3	98.37
	3	150	12260	362.2	93.69
	CCM _{particulate} (mg)			>12000	
	Interval Binning			P4	

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Method for Testing Power:

1. Test Equipment
Power measuring instrument
2. Test Conditions
 - 1) Ambient temperature: 24.2 °C
 - 2) Ambient humidity: 53 %RH.
3. The Working Status of the Machine
Set the switch to position: "The highest speed".
4. Test Procedure
 - 1) Connecting the power and air purifier by power tester, stable in standby mode for at least 10 min after testing the standby power.
 - 2) Connecting the power and air purifier by power tester, stable under rated condition for at least 30 min after testing the input power.

Test Results

Number of Sample	Standby Power (W)	Input Power (W)
KJ20171082-1	0.5	44.5

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Method for testing air disinfection:

1. Test equipment

- 1) Test microorganism: *Staphylococcus albus*.
- 2) Microbial aerosol generator: PLG-2000
- 3) Culture media: NA
- 4) Sampling equipment: six-stage sieve sampler

2. Test conditions

- 1) The volume of the test chamber: 30 m³
- 2) Environment temperature: (20~25) °C
- 3) Environment humidity: (50~70) % RH

3. Operation conditions of the machine

Set the switch to position "The highest speed".

4. Test procedures

- 1) Get a Bacteria slant culture (4~7 generation) which is incubated at 37 °C, for 24 h, wash the culture from this slant with 10mL NB, filter the liquid culture by aseptic cotton buds, and dilute this inoculums with NB as appropriate.
- 2) The equipments are placed in the test chambers respectively, close the door, and open the HEPA filter. Simultaneously operate the environmental control devices until the experimental cabin temperature to be 20~25 °C, relative humidity to be 50~70 %RH, Turn off the chamber environmental control system.
- 3) Release microbial aerosol: turn on the microbial aerosol generator, release the microbial aerosol 15~20 min at 0.2MPa, operate the ceiling mixing fan, then turn off the fan after 10 min, and let stand for 15 min.
- 4) Original Bacteria aerosols collected by six-stage sieve sampler.
- 5) The air cleaner are adjusted to the highest air cleaning mode setting for test (Test group), Bacteria aerosols (control group and test group) are collected at 60min respectively.
- 6) Choose 2 NA plates (the same batch) as the negative control, and culture them on the same condition with the samples.
- 7) Run the test three times and take the mean as the final result.

5. Computational formula

$$\text{Natural decay rate } N_t(\%) = \frac{V_0 - V_t}{V_0} \times 100$$

Where: V_0 = Original Bacteria Count of Control group; V_t = Bacteria Count after Treatment of Control group.

$$\text{Killing Rate } K_t(\%) = \frac{V_1 \times (1 - N_t) - V_2}{V_1 \times (1 - N_t)} \times 100$$

Where: V_1 = Original Bacteria Count of test group; V_2 = Bacteria Count after Treatment of test group.

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Test results

Number of Sample	Test Bacteria	Test Time (min)	Test Number	Control group			Test group		Killing Rate K_t (%)
				Original Bacteria Count V_0 (cfu/m ³)	Bacteria Count after Treatment V_t (cfu/m ³)	Natural decay rate N_t (%)	Original Bacteria Count V_1 (cfu/m ³)	Bacteria Count after Treatment V_2 (cfu/m ³)	
KJ20171082-1	<i>Staphylococcus albus</i>	60	1	1.12×10^5	9.06×10^4	19.11	1.15×10^5	35	99.96
			2	1.16×10^5	9.14×10^4	21.21	1.19×10^5	35	99.96
			3	1.17×10^5	9.34×10^4	20.17	1.20×10^5	28	99.97
			Mean						99.96

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Method for Testing Harmful Substances Release Amount:

1. Test Equipment
Ozone Analyzer
2. Operation Conditions of the Machine
Set the switch to position "The highest speed".
3. Test Procedure
 - 1) Put the test sample into a clean space.
 - 2) Test the background concentration.
 - 3) Turn on the test unit. Test the ozone concentration at 5 cm distance away from the air outlet.

Test Results

Number of Sample	Items	Unit	Results	Standard Request (GB 21551.3-2010)
	Ozone			
KJ20171082-1	(5 cm away from the air outlet)	mg/m ³	< 0.003	≤ 0.10

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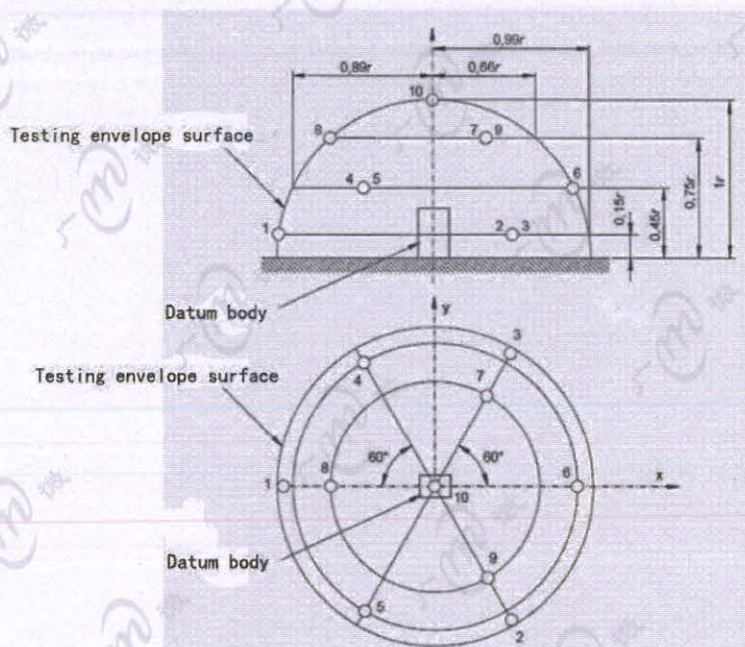
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Noise test method:

1. Test environment: semi-anechoic chamber; Background noise: 16.6 dB(A)
2. Environment temperature: 23.8 °C; Environment humidity: 58.3%RH
3. Testing envelope surface: rectangular hexahedron; testing radius: $r=2$ m. Test schematic diagrams are showed as follows:



Test Results

Number of Sample	Test gear	Average sound pressure level	Acoustic power level
		dB(A)	dB(A)
KJ20171082-1	The highest speed	48.0	62.0
	Minimum speed	≤ 18.6	≤ 32.6

*** End of report***

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