



PERFECT • PARTICULATES • PURIFICATION

**Technical Specification of
Perfect Particulates Purification
PPP Air Cleaning System
Model PPP-I200-01**

Green Breeze Limited

1. Background of PPP-I200-01

1.1 The Perfect Particulates Purification PPP Air cleaning system is built on the research of Medical Professionals and IAQ Specialists of Hong Kong

1.2 It is an air cleaning system with technology and designed 100% developed in HONG KONG

1.3 The technologies embedded inside the are the Award-Winning Technologies (Hong Kong Award for Industries – Technological Award 2019)

2. The technologies

2.1 The air cleaning system is flexible to tailor-fit for different application environment due to the adjustable airflow with the fitting of (a) different filter combination (b) different filter numbers and (c) different filter orientation and position; The air cleaning system and the filter(s) are embedded with multiple proprietary and technology patents as follows:

2.2 The air purifier is embedded with multiple proprietary and technology patents as follows:

2.2.1 The filter of the air purifier is employing the PMmagnet technology – Able to filter particulates matter small as 0.003 micron (proven by Scanning Electronic Microscopy) (Patent number: WO2019072151 (A1), CN106716023 (B))

2.2.2 The air purifier is capable to adapt with a patented double layers HEPA filter (+HEPA) (Patented Technology) (patent number: CN209399503 (U)

2.2.3 The air purifier is adapted with an AIRA technology on the air flow. (Patented Technology) (patent number: CN209399502 (U)

2.2.4 The KILL VIRUS filter type is adopted with Kill Virus technology which proved to effective killing bacteria and virus including MERS-Co

2.2 Designed Patent and Trademark

The overall technologies and design of the air cleaning system obtained the patents in PCT, HK and China.

3. General Specification

The body

3.1 The dimension of the air cleaning system is 400 x 390 x 720 mm.

3.2 Total weight of the air cleaning system is less than 17kg.

3.3 The air cleaning system is operated with a voltage 220 Volt, 50Hz, 1-phase AC electrical supply. The power consumption is 95 W.

3.4 The air inlet is located at both left and right sides of the air cleaning system unit. The air outlet is located at the top of the air cleaning system unit. Airflows in 3-dimensional manner are resulted.

3.5 Centrifugal fan, instead of Axial fan, is employed in order to maintain filtration efficiency and avoid dropping of air flow, even when the filters is fully coated with particulates pollutants.

3.6 The air cleaning system is equipped with ionizer, and the amount of ionizer shall not lead to the generation of ozone.

3.7 The air cleaning system contains handle at both sides.

3.8 The air cleaning system can be control by remote control.

- 3.9 The air cleaning system is linkable and controllable by WIFI and IoT.
- 3.10 The air cleaning system is flexible to fit-in air filter at any one of the following:
- 3.10.1 one-side (out of two sides) of the air inlet;
 - 3.10.2 two-sides of the air inlet
 - 3.10.3 top-side of the air outlet
 - 3.10.4 one-side (out of two sides) of the air inlet + top-side of the air outlet
 - 3.10.5 two-sides of the air inlet + top-side of the air outlet
- 3.11 The control panels of the air cleaning system contain a display monitor showing:

- 3.11.1 The airflow rate in different mode with four respective airflow
 - Silence
 - Low
 - High
 - Turbo

Upon the fitting of (a) different filter combination (b) different filter numbers and (c) different filter orientation and position; different airflow rate are resulted (refer to clause 3.18)

- 3.11.2 The timer function can be set to 1 hour, 2 hours, 4 hours, 8 hours, 24 hours round-the-clock (non-stop) operation by three ways: (a) through the control panel on the air purifier; (b) through the remote control of the air purifier; (c) through the mobile phone or tablet APP.
 - 3.11.3 When the timer is set by APP, the turning on or turn off timetable can be set
 - 3.11.4 When the timer is set by APP, the timer function is not restricted only to 1 hour, 2 hours, 4 hours, 8 hours, 24 hours round-the-clock (non-stop) operation, but any timing interval and duration.
 - 3.11.5 The display monitor showing the operation status of the air cleaning system: (i) Standby; (ii) Turning on & (iii) Turning off status
 - 3.11.6 The display monitor showing the ionizer is turning on or turning off
 - 3.11.7 The display monitor showing the Sleep Mode is turning or turning off; when the sleep mode is turning on, the light intensity of the control panel turns dim automatically
 - 3.11.8 The display monitor showing the filter life - when 90% of the filter capacity is consumed, i.e, 10% of the filter life is remained, an alert on the control panel will flash to remind user to change a filter soon.
 - 3.11.9 When connect the air cleaning system to the APP by WiFi, the filter life at different percentage remaining will be shown. Users can program to set any immediate action (such as sending alert notification to the user though SMS, or turning to a specific speed, etc) at specific filter life without additional cost.
 - 3.11.10 The display monitor showing the AUTOMATIC or MANUAL mode: - When the AUTOMATIC mode is turned, on, the control panel will displays the as "AUTO", the air cleaning system is running intelligently with it fan speed adjust automatically according to the air quality detected.
- 3.12 The Air cleaning system equipped with an air quality sensor to detect the air quality. Tri-colours LED will turn on to display the corresponding air quality levels. The air quality level is defined according to IAQ levels by EPD of HKSAR

Blue: Excellent Level and PM10 is less than 20 $\mu\text{g}/\text{m}^3$

Green: Good Level and is PM10 is less than 100 $\mu\text{g}/\text{m}^3$

Red: Out of Good Level and is PM10 is greater than 100 µg/m³

3.13. The PM2.5 level in numerical figures is also displayed on the control panel. The range of of PM2.5 being displayed is 0 - 999 µg/m³; resolution is 1 µg/m³; accuracy is 1 µg/m³.

3.14. The air cleaning system is equipped with interlock, when the any of the filter cover of the body unit is not properly closed, the interlock is triggered, and the air cleaning system is not allowed to be turned on.

3.15 The noise level of the air cleaning system at different airflow is:

- 3.13.1 Silence – 28 -32 dbA
- 3.13.2 Low – 39-42 dbA
- 3.13.3 High – 48 – 52 dbA
- 3.13.4 Turbo – 59 – 62 dbA

The filter & purification

3.14 The air cleaning system is flexible to equipped with different filter according to specific environment

3.15 The air cleaning system is equipped with four stage of air purification in general -

- 3.15.1 The front panel (washable) with slit to filter the big object
- 3.15.2 The durable and non-metallic Prefilter (washable) with which can stand for over 1000 washes
- 3.15.3 The core filter of different types to be fitted at any position as mentioned in clauses 3.10
- 3.15.4 Ionizer is serving at the last stage of purification. The amount of ionizer emitted is equivalent to 2.05×10^7 ion per cm³.

3.16 The core filter shall be as one of the following types:

Filter Name	Application Scenario	Core filter layers and details	Filter Efficiency for fine particulates	Equivalent to HEPA filter grade
A2 2-in-1 HEPA and formaldehyde removal filter	General purpose for all type of pollutants: particulates, formaldehyde or volatile organic compound, virus and bacterial (removal)	3 layers comprises of:- Coarse filter grade G2; HEPA filter layer;cv Activated Carbon;	> 99.995%	H14
KV Kill Virus Blue Filter	Specific purpose to removal and kill bacteria and virus removal	Two layers comprises of:- Kill VIRUS formula filter substrate HEPA filter layer	> 99.990%	H13

T	Filter specific for TVOC removal	Specific purpose for removal high concentration of formaldehyde and total volatile organic compounds	One layers Activated Carbon.	Not applicable as the filter is specific for TVOC removal
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3.17. Upon the fitting of (a) different filter combination (b) different filter numbers and (c) different filter orientation and position; different airflow rate as follows are resulted:

3.18.

Filter set type	Air Inlet filter - 1	Air Inlet filter 2	Air Outlet filter	Equivalent to HEPA filter grade in the system	Overall Airflow Rate
1	A2	-	-	> 99.995%	> 2200 cmh
2	A2	-	KV	> 99.999%	> 2000 cmh
3	A2	A2	-	> 99.995%	> 1600 cmh
4	A2	A2	KV	> 99.999%	> 1500 cmh
5	A2		T	> 99.995%	> 2200 cmh
6	A2	A2	T	> 99.995%	> 2200 cmh
7	KV			> 99.990%	> 2300 cmh
8	KV		KV	> 99.999%	> 2200 cmh
9	KV	KV		> 99.990%	> 2000 cmh
10	KV	KV	KV	> 99.999%	> 1600 cmh
11	KV		T	> 99.990%	> 2300 cmh
12	KV	KV	T	> 99.990%	> 2000 cmh
13	A2	KV		> 99.995%	> 1600 cmh
14	T			Not applicable	> 2300 cmh
15	T	T		Not applicable	> 2300 cmh
16	T		T	Not applicable	> 2300 cmh
17	T	T	T	Not applicable	> 2200 cmh
18	A2	T		> 99.995%	> 2200 cmh
20	KV	T		> 99.990%	> 2200 cmh
21	A2	KV	T	> 99.995%	> 1600 cmh
22	A2	T	KV	> 99.999%	> 2000 cmh
23	KV	T	T	> 99.990%	> 2200 cmh
24	KV	T	KV	> 99.999%	> 2100 cmh

4 Safety Certification

- 4.13 The amount of ozone emitted by the air cleaning system is negligible (less 0.003 ppm)
- 4.14 The air cleaning system is CE certified
- 4.15 The air cleaning system complied with RoSH requirement
- 4.16 The air cleaning system does not contain any materials that is potentially harmful to human including:
 - 4.16.1 no UV light, especially UV-C, which will be harmful to human and not recommended by WHO, will be used

- 4.16.2 The filter does not contain any titanium dioxide materials, to avoid potentially detachment of the materials to the environment
- 4.16.3 No heavy metal ion such as mercury or silver ion will be employed
- 4.16.4 The filter does not contains any harmful materials, such as silica, zeolite, asbestos, sepiolite and or diatomaceous earth.

5 Performance Certification

- 5.13 The CADR of the air cleaning system is certified according to US Standard ANSI/AHAM
- 5.14 The CADR of the air cleaning system is certified according to AC-I CADR testing by China National Laboratory according to Standard APIAC/LM 01-2015 and GB/T 18801-2015 standard for Air Cleaner.
- 5.15 The air cleaning system undergo testing for the Killing Rate (Staphylococcus albus 8032, Aspergillus niger ATCC16404), virus removal rate (E. Coli Phage Phi-X174), Mite antigen removal rate (Dust mote Der fl)
- 5.16 The CADR of the air cleaning system for PM2.5 is 1200 cmh
- 5.17 The CADR of the air cleaning system for PM10 is 1350 cmh
- 5.18 The CADR of the air cleaning system for formaldehyde is 460 cmh
- 5.19 The airborne bacteria removal of the air cleaning system is >99.99%

6 The air cleaning system complies with energy star conformity by independent accredited laboratory.

- 6.13 Per unit watt of power input, the CADR output is greater than 8 cmh; i.e., efficiency is 8cmh per watt input