



CONSUMERS ASSOCIATION OF SINGAPORE

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MEDIA RELEASE

For Immediate Release

25 September 2023

CASE tests air purifiers for ozone emissions and finds them within recommended guidelines

Consumers who are concerned about health risks associated with using air purifiers amidst recent concerns of haze in Singapore can be assured air purifiers on the market are safe to use. This comes after a test of air purifiers commissioned by the Consumers Association of Singapore (“CASE”) in August 2023 which found ozone emissions by all seven samples to be within the recommended limit. Exposure to excessive ozone can lead to respiratory conditions such as asthma, throat irritation, inflammation of airways and decline in lung function¹.

Background

Following forecasts that the return of El Nino phenomenon would lead to dry weather in neighbouring Sumatra and consequently hazy conditions in Singapore in the coming months, many consumers are expected to purchase and use air purifiers to remove pollutants from the air.

Air purifiers commonly employ electronic technologies to remove pollutants from the air. One such technology is ionisation employed by ozone air purifiers, which works by electrically charging oxygen (O₂) from the air to produce ozone (O₃). The third oxygen molecule from the resultant ozone binds itself to and eliminates the pollutant molecule.

Ozone may also be generated by air purifiers that use photocatalytic oxidisers, electrostatic precipitators, hydroxyl generators and ultraviolet (“UV”) light to remove pollutants from the air.

Given the health risks of excessive ozone to consumers and the expected increase in purchase and use of air purifiers, CASE commissioned a test to determine the level of ozone emissions by air purifiers sold locally.

¹ United States Environmental Protection Agency: <https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population>

Samples

In choosing the samples for the test, CASE took into account factors such as technology employed by the air purifier, whether the air purifier was likely to generate ozone, the air purifier's functionalities and price. Samples were purchased from physical departmental stores and online stores.

The list of samples is as follows:

1. Apure Apex Air Purifier Model A3B
2. Dyson Purifier Cool Air Purifier TP07
3. Europace Air Purifier Ultra Ion Plasma EPU3302W
4. Mistral MAPF32 Air Purifier
5. Sharp Plasmacluster Air Purifier 48M² FP-J60E-W
6. Sterra Moon True HEPA-13 Air Purifier (UV Technology)
7. Xiaomi Smart Purifier 4

Refer to Annex A for additional information on the samples.

Recommended Guidelines

The Singapore Standard SS 554: Code of Practice for Indoor Air Quality for Air-Conditioned Buildings recommends that ozone exposure should be limited to no more than 0.05 part per million ("ppm") over 8 hours.

This is also consistent with the National Environment Agency ("NEA")'s recommended limit for ozone exposure under its Guidelines for Good Indoor Air Quality in Office Premises and its List of Portable Air Cleaners Against COVID-19 Virus Aerosols².

Methodology and Test Results

The samples were tested in August 2023 using a methodology accredited by the Singapore Laboratory Accreditation Scheme administered by the Singapore Accreditation Council ("SAC-SINGLAS").

The samples were tested in a chamber with volume of 31 m³ under the following setting: (i) temperature at 25±5°C; and (ii) relative humidity at 65±15%. The samples were adjusted to settings commonly used by consumers. Where the samples come with ionisation and UV functions, they were activated during the test. Ozone concentration was monitored at around 5 cm from air flow outlet for 30 minutes.

The maximum levels of ozone emitted for all seven samples were found to be lower than 0.01 ppm, which were within the recommended limit of 0.05 ppm. As the levels of ozone emissions were constant over 30 minutes, it could be taken that the results would be the same over an eight-hour time period.

The test results can be found in Annex B.

² <https://www.nea.gov.sg/our-services/public-cleanliness/environmental-cleaning-guidelines/guidelines/list-of-portable-air-cleaners-against-covid-19-virus-aerosols>

Consumer Advice

Notwithstanding the test results, CASE advises consumers to take note of the following when purchasing and using air purifiers:

- Identify the air quality concerns (e.g. allergies, smoke or pet dander) they wish to address before they choose which air purifiers to purchase. Air purifiers generally utilise different technology to address different concerns. Opt for air purifiers with both high-efficiency particulate absorbing (“HEPA”) and carbon filters if they want to address haze and dry weather conditions.
- Choose air purifiers that rely on non-electronic technologies (e.g. HEPA or carbon filters) if they are concerned about ozone emission levels. These alternatives provide effective air purification without emitting ozone.
- Do research to understand the capabilities of the air purifier. Consider the manufacturer’s track record, certification and marketing claims against independent reviews and research.
- Use and maintain the air purifier in accordance with the manufacturer’s instruction manual and recommended settings.
- Stop use and seek medical attention immediately if they encounter issues with their respiratory systems such as asthma, throat irritation or inflammation of airways.

Conclusion

Mr Melvin Yong, President, CASE said: “Haze has plagued Singapore for years and purchase of air purifiers has seen an increase in recent years. Given the recent forecast of dry weather and hazy conditions in Singapore, we expect more consumers to purchase and use air purifiers in their home and at their office. There had been consumer concerns on ozone emissions by air purifiers. It is therefore reassuring to know that there are options in the local marketplace where the levels of ozone emissions are within the recommended limits.”

Melvin Yong
President
Consumers Association of Singapore

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About the Consumers Association of Singapore:

The Consumers Association of Singapore (“CASE”) is an independent, non-profit organisation that is committed to protecting consumers’ interest through information and education and promoting an environment of fair and ethical trade practices. One of its key achievements is in advocating for the Consumer Protection (Fair Trading) Act (“CPFTA”) which came into effect on 1 March 2004.

Annex A – Additional Information on Test Samples

S/No	Name	Price	Purchased From	Key Features (As Indicated on Packaging and Product Specification)
1	Apure Apex Air Purifier Model A3B	\$299	Apure's Online Store	<ul style="list-style-type: none"> • Medical Grade HEPA H13* Filter (Removes 99.97% of airborne particles) • Activated Charcoal Filter (Removes odour and PM*2.5 dust particles) • Pre-washable Filter (Removes larger particles and dissipates heat) • Negative Ion Activation
2	Dyson Purifier Cool Air Purifier TP07	\$699	Dyson's Online Store	<ul style="list-style-type: none"> • Captures dust, allergens and haze particles • Removes 99.95% of particles as small as PM* 0.1 • The HEPA H13* filter captures 99.95% of particles as small as 0.1 microns
3	Europace Air Purifier Ultra Ion Plasma EPU3302W	\$419	Courts	<ul style="list-style-type: none"> • Filtration System: Ultra Ion plasma filter • Others: UPI* Filter, CD*, E-Nano and Ion Filter, 4-Step Air Purification
4	Mistral MAPF32 Air Purifier	\$248	Best Denki	<ul style="list-style-type: none"> • Built-In Ioniser
5	Sharp Plasmacluster Air Purifier 48M ² FP-J60E-W	\$699	Courts	<ul style="list-style-type: none"> • Plasma Cluster Ion Density: 25,000 ions/cm
6	Sterra Moon True HEPA-13 Air Purifier (UV Technology)	\$279	Sterra's Online Store	<ul style="list-style-type: none"> • Kills 99.97% of bacteria and viruses with HEPA-13* filter • Neutralises foul odours with an Activate Carbon Layer • Absorbs formaldehyde, which is a deadly chemical found in gas stoves, furniture, floor, and walls • Reduces dust and removes allergens that may cause allergies or respiratory problems
7	Xiaomi Smart Purifier 4	\$279	Xiaomi's Store on Shopee	<ul style="list-style-type: none"> • Filter replacement reminders • 99.97% filtration of 0.3µm particles

Legend

CD: Coated Deodorisation

HEPA H13: Medical grade 13 high-efficiency particulate air filter

PM: Particulate matter (particles in the air)

UPI: Ultra plasma ion

Annex B – Test Findings

	Ozone level with						
Time (minutes)	Apure Apex Air Purifier Model A3B	Dyson Purifier Cool Air Purifier TP07	Europace Air Purifier Ultra Ion Plasma EPU3302W	Mistral MAPF32 Air Purifier	Sharp Plasmacluster Air Purifier 48M ² FP-J60E-W	Sterra Moon True HEPA-13 Air Purifier (UV Technology)	Xiaomi Smart Purifier 4
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Note:

1. The ozone level was at <0.01 ppm at default setting without the air purifiers.
2. The unit of measurement is in part(s) per million (“ppm”).
3. The recommended limit of ozone concentration is no more than 0.05 ppm.
4. As the level of ozone emissions were constant over 30 minutes, it could be taken that the results would be the same over an eight-hour time period.