



FACT SHEET

The science behind 5 types of air purifiers

In today's pandemic era, air purification is a crucial measure for protecting your employees and customers. However, there are a lot of portable air purifiers available on the market. How do you know which is right for your business?

Ambius wants to help you understand the science behind air purification. In this sheet, we profile 5 different types of purifiers so that you can make an informed decision.



HEPA FILTRATION PURIFIERS

These units use higher-rated, high-efficiency particulate air (HEPA) filters to trap airborne pathogens and contaminants, removing them from the air.

According to the U.S. Environmental Protection Agency, HEPA filters can remove at least 99.97% of airborne particles and droplets with a size of 0.3 microns or larger. The effectiveness of these units may be amplified by the use of pre-filters or activated carbon filters.



ELECTROSTATIC AIR PURIFIERS

This type of purifier contains positively and negatively-charged plates. As contaminants, pathogens, and particulates enter, they pass through and collect on the plates. Although these units are sometimes referred to as filterless, the plates must be carefully cleaned regularly to maintain efficiency.



OZONE-GENERATING AIR PURIFIERS

These purifiers generate ozone, which may be created from oxygen in the ambient air by a number of mechanisms, such as corona discharge (an electrical discharge, not related to coronavirus) and some wavelengths of UV light. Ozone is a highly unstable molecule that readily forms free radicals, which in turn react with organic materials (including VOCs and airborne pathogens) causing them to chemically break down. However, some scientists consider ozone creation to be harmful in its own right and ozone discharging units are prohibited in some jurisdictions.



IONIZERS

Ionizers add electrons to the oxygen molecules passing through the device, giving them a negative electrical charge. These negative ions attract airborne contaminants, which are normally positively charged. As these particles collect, their size and mass increase so they settle out of the air quickly. Regular cleaning and maintenance is critical to ensuring that ionizers continue to work properly.



ULTRAVIOLET GERMICIDAL IRRADIATION PURIFIERS

Ultraviolet germicidal irradiation, or UVGI, is one scientifically proven way to deactivate airborne pathogens. These air purifiers use a spectrum of ultraviolet light called UV-C to deactivate the genetic material (DNA or RNA) present in pathogens. Effectiveness depends on numerous factors such as the light wavelength, the intensity of the light, and exposure time.

Photocatalytic oxidation (PCO) purifiers are a special type of UVGI purifiers that have a coating or plates containing titanium dioxide are added to the inside of the unit. UV-C light interacts with this coating to free radicals, sometimes called plasma. These free radicals react with organic molecules, causing VOCs, viruses, and other airborne pathogens, to break down.