

## Traditional Air Cleaners

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### Is a 99.97% efficient filter really better than a 95% efficient filter?

Designers of traditional air purifiers have a tough job. There are lots of different air purifiers, so how to stand out from the crowd? Well, a little like high end music systems, 'measures of performance' are created which appear important to potential buyers but which are pretty meaningless in practice, and then competing products can be compared, and superiority claimed, based on that same measure.

One such misleading measure is 'filter efficiency' where you often see a focus on the percentage of particulates (pollens, mould spores, pet dander and house dust mite excretions) captured by the filter in the air purifier. For example "my filter captures 99.97% of all particles and yours only captures 99.2%", or "my filter captures smaller particles than yours does" and so on.

However, the fact is that such measures are pretty much meaningless in the real world. But, you say, surely it matters how much of the particulates in the air, which may well be allergens, irritants and other pollution, the device filters out?

My reply is that there are at least two major problems with using this measure of air purifier effectiveness, both of which make the number, be it 90%, 95% or 99.9%, pretty much meaningless!

### The filter % measures the wrong thing

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Measuring the percentage of particulates that are captured from the air passing through the filter measures only that, the percentage of particulates captured from the air passing through the filter. It doesn't measure the percentage reduction of particulates in the air in the room, and the relationship between the two is tenuous at best!

The unfortunate truth is that the air in the room is constantly changing (typically it is replaced hourly with contaminated air from outside and elsewhere in the home), the air passing through the device is immediately remixed with unclean air in the room and some of the air in the room never goes through the device at all. Some air never goes through the device because of insufficient air flow, temperature stratification and the formation of eddies (where the air in parts of the room rotates in a circular motion without ever moving through the air purifier).

Furthermore, as pointed out by the US Environmental Protection Agency;

"for typical room sizes, most portable air cleaners currently on the market do not have high enough air flows to effectively remove large particles such as pollen, dust mite and cockroach allergens"

The reason being that the larger (and heavier) particles, such as pollen, simply sink to the floor or onto other surfaces, ready to be re-distributed into the air when they are next disturbed!



If you model how air cleaners work and include the constant infiltration of polluted air from elsewhere, they can take hours to reach a stable minimum of pollution and that minimum is related to many factors, but only marginally to the efficiency of the filter itself.

Think of it this way, imagine that an air filter, which captures 99.7% of particulates, effectively reduces the amount of particulates in the air of a room, after several hours, by 50%. Changing the filter to one which captures only 90% will only have a marginal effect, perhaps limiting the reduction to, say, only 46%.

50% or 46% doesn't matter – neither are nearly enough!

## **What about gasses?**

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Well, a HEPA filter only 'traps' particles down to a particular size, below that size they are not captured at all. And all of the basic technologies, HEPA, electrostatic and ionic completely fail to capture or neutralise polluting gasses which can themselves be breathing irritants and cause asthma attacks.

## **So, what is the answer?**

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The problems outlined above have earned traditional air purifiers a poor reputation, to the point where physicians will generally only say "well try one, it might help".

So, we at Airora have come at the problem of purifying the air in a typical room from an entirely new direction. Clearly, we need to do more than try and capture particulates in a device. We need to clean the air in the room directly and not just the air that passes through the device. To achieve this, we needed new thinking and new technology.

The bad news is that it took us ten years. The good news is that we got there!

Find out more at [Airora.com](http://Airora.com).