

## HEPA vs Electrostatic

Many articles try to compare HEPA and Electrostatic filtration. It seems that every article chooses one or the other rather than comparing the two. Sometimes HEPA is the clear choice for a filtration system. Other times an Electrostatic precipitator is a better fit for the air quality issues in a space. In this article we will try to present a clear comparison without bias. The only goal is to help you become a well-informed consumer.

## Getting terms and technologies right

Before we get started let's clarify our terms and technologies. Not all manufacturers use the right terms when describing the technologies. To more clearly understand our comparison, we will take a brief look at both technologies in the HEPA vs Electrostatic comparison.

### HEPA type and true HEPA

Many air purifier manufacturers misuse the term HEPA. They refer to air filters that remove less than 99.97% of dust particles as a HEPA filter. While many of these [HEPA type](#) filters may do an adequate job, they should not be referred to as HEPA. When comparing a HEPA Air filter to an electrostatic air purifier, be sure the filter contained is true HEPA. Be certain that it is rated for 99.97% removal of dust particles 0.3 to 10 microns.

### Electrostatic precipitator and electrostatic media

There it is a common misunderstanding that all Electrostatic filtration is the same. There are two basic types of Electrostatic filtration. One is electrostatically charged filter media, and the other is an Electrostatic precipitator. Electrostatic media is created by giving a normal filter an electrostatic charge. The electrostatic charge may increase the filters ability to capture certain particles. These filters are disposable and do not fit into the HEPA vs Electrostatic comparison

An electrostatic precipitator is a metal filter which has two stages. The first stage is the ionizing section. Here are particles are given electrostatic charge. The particles then moves through the collection area where the particles are deposited on aluminum plates. The trapped particles are washed away with regular maintenance. In your comparison use electrostatic precipitators.

### Efficiency: Only the start

A true HEPA filter is 99.97% efficient on removing dust particles from 0.3 microns to 10 microns. An Electrostatic cell is 97% efficient on removing dust particles from 0.1 micron to 10 microns. These numbers are very similar. Based on the efficiency numbers alone the HEPA is clearly a better filtration type. It is important to look at all variables when deciding which the best air purification technology. Each individual circumstance is likely to be different and the best filter choice may change. One important note is that the Electrostatic cells need to be cleaned regularly.

## Cost of operation

To compare the cost of operation, let's look at two kinds of air purifiers. The [HEPA](#) and [Electrostatic](#) air purifiers are used in many commercial locations throughout the World. These air purifiers filter approximately the same amount of air. The HEPA removes 99.97%, the Electrostatic removes 97%. In a normal year we would expect that the HEPA filter would need to be replaced twice. In that same amount of time we would expect that the Electrostatic cells would need to be clean 4 to 6 times. The HEPA filters would have the cost of about \$500 per year; the time required to clean the electrostatic cells would be about 12 hours. The question to be asked is "can you clean your Electrostatic cells for less than \$500?" The cost of operation is important in the HEPA vs Electrostatic comparison

## Pressure drop

In air purification systems the pressure drop is the amount of air pressure that is lost when the air filter is placed into the device. Each air purifier model will be somewhat different. We'll give you an example by taking into consideration 2 kinds of air purifiers produced by the same manufacturer. The HEPA Air purifier has an initial pressure drop of one. That results in a 22% loss CFM. If an Electrostatic cell were placed in that same unit that pressure drop would be about 4%. The Electrostatic cell allows more air to pass through it and therefore has a lower pressure drop.

If the pressure drop of the filter is too great it will cause too much strain on the blower and it may fail prematurely. HEPA filters require special blowers to overcome their higher pressure drop. So, it is important to consider what type of blower you have and how powerful it is when choosing between HEPA and Electrostatic.



The photo above shows the Electrostatic filter along side of the HEPA filter we mentioned before. Note how much free air can pass through the Electrostatic vs the HEPA. The HEPA produces a 22% pressure drop where the Electrostatic only 4%.

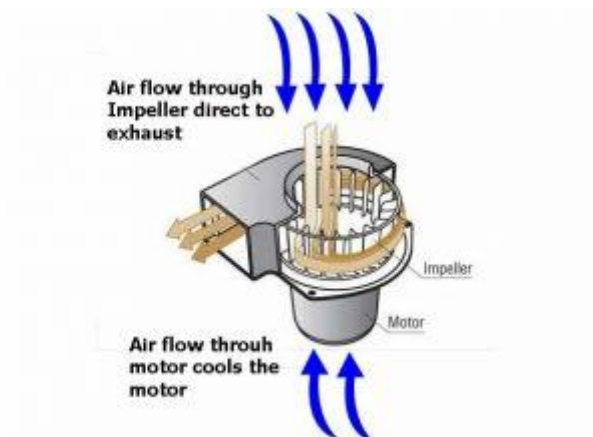
## Noise

Because an Electrostatic cell has less pressure drop, the amount of fan power to produce the same amount of clean air as a HEPA is less. Generally speaking, the amount of fan power is equal to the amount of noise. Electrostatic precipitating air purifiers are likely to be quieter and then there equal HEPA counter parts. This statement is a generalization

and each unit should be compared by actual sound levels reported by the manufacture. Use specifications in your view of HEPA vs Electrostatic.

## Motor wear

Another aspect of pressure drop is motor wear. The [harder a motor or blower](#) has to work, the shorter its life. The HEPA filter makes a blower work much harder and therefore we should expect that its life will be shorter. Using the comparison between the 2 kinds of air purifiers we described before, we find that the HEPA version is 3 times as likely to fail compared the electrostatic models. The majority of these failures are caused by not replacing the HEPA filter regularly. The movement of air through the motor is the main source of motor cooling. Without sufficient air flow the motor overheats and fails.



## Eco Friendly Considerations

Which filtration type is more [eco-friendly](#)? There is an open debate on this topic as well. HEPA filters cannot be recycled. They by their nature are filled with undesirable elements removed from the air. They have to be thrown in the garbage and will sit in a land fill for years. In a comparison using the HEPA and Electrostatic, we have determined that over the life of the product a HEPAs waste would occupy upwards towards 30,000 cubic inches of landfill. On the other hand The Electrostatic would produce a small amount of Ozone. That amount is less than 50 parts per million. The air outside our homes often contains more ozone than that, but there is still an environmental impact to be considered. As goes with many of these considerations, it is important that we look all the contributing factors and make a product decision that fits our needs and beliefs.

## Product Break Down

	HEPA	Electrostatic
Efficiency	99.97%	97%
Operation cost	\$500.00 annual	12 Man Hours
Pressure drop	22%	4%
Noise	54 dB(A) average	45 dB(A) average
Blower wear	30% more	30% less
Eco Friendly	30,000 Cu In Landfill	50 part per million / ozone

There is no clear winner; there is simply an informed decision to be made.  
HEPA vs Electrostatic: Both technologies have their place.

Discover which is best for your unique air purification situation.