

Advanced 3-Step Filtration Technology with TrueCLEAN™ Enhanced Air Cleaner

The Best of Media and Electronic Air Cleaners

THREE MAIN FACTORS CONSIDERED IN CHOOSING AN AIR CLEANER:

Professionals consider three primary performance factors when evaluating an air cleaner; particle capture efficiency, airflow through the air cleaner and maintenance. Honeywell recommends TrueCLEAN™ because it optimizes high capture efficiency with high air flow and is easy to maintain.



Particle Capture Efficiency

Particle capture efficiency (“Air Cleaner Efficiency” as defined by ASHRAE 52.2) is a measure of how well the air cleaner can filter particles of three different sizes every time the air passes through the heating and cooling system. These sizes, as well as, with common particle types in each size range, are as follows:

- E1 – 0.3 to 1.0 microns (bacteria, tobacco smoke, smog)
- E2 – 1.0 to 3.0 microns (pet dander, certain allergens)
- E3 – 3.0 to 10.0 microns (dust, pollen, mold spores)

Air Cleaners are given a MERV¹ (Minimum Efficiency Reporting Value) rating based on their ability to capture a certain percentage of each of the particle sizes. The MERV scale rates from 1 to 16, with a higher value meaning it captures more and smaller particles.

High efficiency air cleaners not only capture smaller particles, but can more quickly bring down the particle levels stirred up by family activities in the home.

Air Flow

Professionals also understand the importance of keeping air flowing freely through the heating and cooling system to maintain comfort in all areas of the home. Traditional higher efficiency media air cleaners tend to have a larger restriction to air flow (measured by pressure drop across the filter). This was because a media filter was made more efficient by packing more fibers into the area, to “catch” more of the particles passing through.

Maintenance Requirements

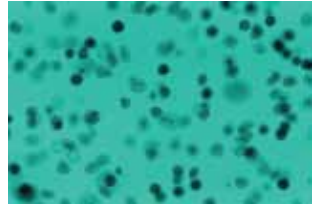
Finally, professionals consider the question of how often routine maintenance needs to be done and how easy that maintenance is to perform. The higher the capacity of the filter, the more particles it can capture from the air before it reduces air flow. A typical 4” high efficiency filter can be expected to last between six to twelve months, while a similar efficiency 1” filter may need to be replaced every one to three months.

The maintenance requirements for the air cleaners can vary widely. With most media cleaners, the only maintenance requirement is to slide in a new filter when the old one becomes too dirty. In some cases, with more advanced electronic filters, there are additional requirements to clean the individual components.

Honeywell recommends TrueCLEAN because it optimizes high capture efficiency with high air flow and is easy to maintain.

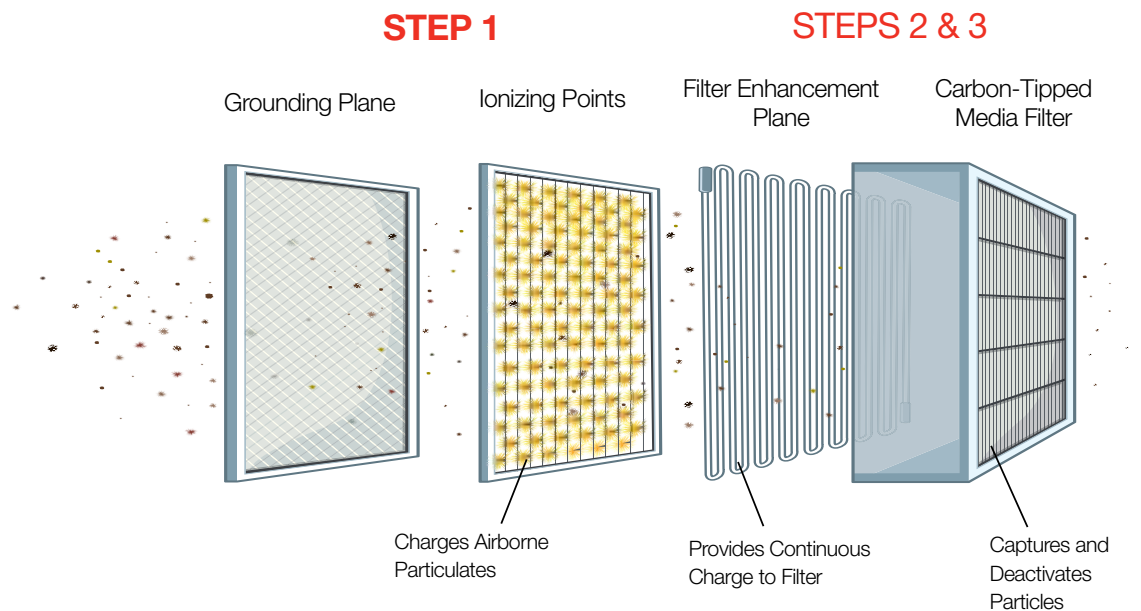
IMPROVING THE AIR IN YOUR HOME WITH TrueCLEAN

Homeowners' top three concerns about air quality in their homes are airborne dust, allergens and virus/bacteria². The Honeywell TrueCLEAN Enhanced Air Cleaner helps address all three of these concerns by filtering 90 percent of small, medium and large particles from the air passing through the filter³. TrueCLEAN does not stop with capturing particles; it goes one step further and destroys certain bacteria and viruses (see table on back page). TrueCLEAN bathes the captured particles in a weak electric field that deactivates certain germs captured on the filter⁴.



HOW TrueCLEAN WORKS

TrueCLEAN delivers cleaner air by taking a high airflow media filter and enhancing it with electronic technology in a 3-step process.



Step 1: Charge.

Air full of particles enters TrueCLEAN through an array of ionizer wires where the particles become electrically charged.

Step 2: Capture.

Next, the air travels into the electrically charged media filter where the particles are captured in the media fibers. Just like magnetism, the charged particles are attracted by oppositely charged media fibers and stick to the fiber, removing 90 percent of the particles from the air passing through the filter.

Step 3: Destroy.

Once particles are captured, they sit in the electric field of the charged media filter. Germs are trapped and destroyed inside the filter, with deactivation rates of certain captured germs exceeding 99 percent (see table on back page).

Because of this advanced, 3-step air filtration process, TrueCLEAN has superior performance in efficiency, air flow, and capacity compared to a standard media filter.

Air Cleaner Efficiency

TrueCLEAN has been rated at a MERV 15 efficiency, much higher than the standard MERV 8-11 efficiency that you see on a typical media air cleaner. The higher efficiency design enables TrueCLEAN to target the smallest particles, and capture 90 percent of all particle sizes passing through the filter.

Air Flow

Typically, a higher MERV media filter has a larger resistance to airflow. Fortunately, TrueCLEAN works differently. By charging the particles as they pass through the system, they become electrically “attracted” to the fibers in the media filter. This allows TrueCLEAN to use a filter that is less restrictive to air flow, but still captures a high percentage of the particles passing through the air cleaner. TrueCLEAN has an initial pressure drop of approximately 0.22” w.c., which is about the same as a standard 4” Honeywell trade filter.

Maintenance Requirements

TrueCLEAN uses a combination of media and electronic technology to capture particles from the air passing through the filter, greatly simplifying the maintenance compared to a traditional electronic air filter. The capacity of the unit is estimated at 120 grams of dust at 0.50” w.c. (the recommended stopping point), giving the filter an average life of between 6 and 12 months. The TrueCLEAN filter can hold more dust than a traditional media filter because of the charge on the media fibers allows the dust to cling to all sides of the fiber, rather than just collecting on the front. And since the TrueCLEAN air cleaner has a disposable media filter, maintenance is as simple as throwing away the old filter and replacing it with a new one.

Germ Deactivation Test Results

Testing was done at third party labs to determine TrueCLEAN's⁵ efficiency at destroying specific viruses and bacteria. The test procedure involved applying specific viruses and bacteria to filter disks cut from the TrueCLEAN media filter. The filter media was then exposed to a continuous weak electric field and compared to a non-exposed filter disk to determine the deactivation rate of the organisms. Tests show a reduction of certain virus numbers of greater than 99 percent within 8 hours of exposure and a reduction of certain bacteria numbers of greater than 99 percent within 24 hours (see table on next page). Test results are based on controlled conditions and continuous operation. Results may vary under household conditions if the unit is used intermittently.

Results of the testing verify that the weak electric field applied to the Honeywell TrueCLEAN filter not only enhances the capture of particles on the filter, but also acts to deactivate certain germs captured on the filter.

Pathogens deactivated by Honeywell's TrueCLEAN Enhanced Air Cleaner in these tests include Human and Avian Flu, Cold Virus Surrogate, Measles, Tuberculosis Surrogate and SARS among others.

Organism	Reason Chosen	Deactivation Rate	Exposure Time
Wild type Human Influenza Virus	Highly contagious airborne pathogen which is a contemporary public health and economic threat.	99% ⁶ 99.9% ⁷	50 minutes 5 hours
Wild type Avian Influenza Virus (H1N1)	Highly contagious airborne pathogen which is a contemporary public health and economic threat.	99.9% ⁸	5 hours
Encephalomyocarditis Picornaviridae (Human cold virus surrogate)	Contagious human pathogen which is physiologically and genetically similar to many common "cold" viruses.	99.99% ⁹	6 hours
Human Measles Virus (Stabilized Vaccine Strain)	Highly contagious airborne pathogen.	99.9% ¹⁰ 99.99% ¹¹	45 minutes 90 minutes
Vaccinia Virus (Stabilized Live Vaccine Strain for Human Small Pox)	Opportunistic pathogenic analogue of airborne Small Pox virus.	99% ¹² Nearly 99.9% ¹³	8 hours 18 hours
SARS-CoV coronavirus	Readily transmitted via respiratory droplets by inhalation or through contact with contaminated surfaces.	96% ¹⁴ 99.9% ¹⁵	1 hour 2 hours
Staphylococcus aureus	Representative of gram positive bacteria	99.9% ¹⁶	12 hours
Serratia marcescens	Representative of gram negative bacteria to conservatively approximate disinfection response of bioaerosols containing common pulmonary pathogens.	99.9% ¹⁷ 99.99% ¹⁸	6 hours 24 hours
Pseudomonas aeruginosa	Used as a model for the environmental behavior of pneumonia-causing bacteria.	99.98% ¹⁹	24 hours
Mycobacterium parafortuitum	Used as a surrogate for Tuberculosis-causing bacteria.	99.9% ²⁰	24 hours

¹ More information on MERV can be found at <http://www.nafahq.org/LibraryFiles/Articles/Article006.htm>.

² 2008 American Home Comfort Study by Decision Analyst's American Consumer Opinion Panel.

³ LMS Technologies, Inc., test performed at 492 FPM.

⁴ Lachendro, E et al, Indoor Air 2008, Factors affecting bioaerosol inactivation through electrically enhanced germicidal air filters.

⁵ TrueCLEAN is a successor product of the Strion Air System tested by the University of Colorado, Southwest Foundation for Biomedical Research and LMS Technologies. It is functionally equivalent to the Strion Air System.

⁶ Mark Hernandez, "Results Summary for Static Inactivation of Human Influenza Wild Type A Under Defined Environmental Conditions (21C @ 40% RH) Through Strion Air System", University of Colorado at Boulder, January 21 2007.

⁷ Mark Hernandez, "Results Summary for Static Inactivation of Side-by-Side wild type Human Influenza Virus and wild type Avian Influenza Virus (H1N1) Tests Under Defined Environmental Conditions: (20C @ 40% RH) Through Static Strion Air System", University of Colorado at Boulder, May 29 2007.

⁸ Ibid.

⁹ Mark Hernandez, "Results Summary for Static Inactivation of Encephalomyocarditis picornaviridae (Human cold virus surrogate) Tests Under Defined Environmental Conditions: (20C @ 40% RH) Through Static Strion Air System, University of Colorado at Boulder, September 29 2007.

¹⁰ Mark Hernandez, "Results Summary for Static Inactivation of Human Measles Virus (Stabilized Vaccine Strain) Under Defined Environmental Conditions (21C @ 60% RH) Through Strion Air System, University of Colorado at Boulder, November 30 2005.

¹¹ Ibid.

¹² Ricardo Carrion, Jr, "Virocidal Effect of the StrionAir Filtration System on Vaccinia virus", Southwest Foundation for Biomedical Research, November 21 2006.

¹³ Mark Hernandez, "Results Summary for Static Inactivation of Vaccinia virus (Stabilized Live Vaccine Strain for Human Small Pox) Under Defined Environmental Conditions (21C @ 60% RH) Through Strion Air System, University of Colorado at Boulder, July 14 2006.

¹⁴ Ricardo Carrion, Jr, "Virocidal Effect of the StrionAir Filtration System on SARS", Southwest Foundation for Biomedical Research, November 6 2006.

¹⁵ Ibid.

¹⁶ John Cherne and Al Vatine, "Test of the Germicidal Effect of the StrionAir GC Filter on Bacteria", LMS Technologies, Inc., April 17 2004.

¹⁷ Ibid.

¹⁸ Mark Hernandez, "Results Summary for Static Inactivation of Monodispersed Pure Culture Serratia marcescens Under Defined Environmental Conditions (25C @ 40% RH) Through Strion Air System, University of Colorado at Boulder, October 19 2005.

¹⁹ Mark Hernandez, "Results Summary for Static Inactivation of Monodispersed Pure Culture Pseudomonas aeruginosa Under Defined Environmental Conditions (25C @ 40% RH) Through Strion Air System, University of Colorado at Boulder, October 19 2005.

²⁰ Mark Hernandez, "Results Summary for Static Inactivation of Monodispersed Pure Culture Mycobacterium Parafortuitum Under Defined Environmental Conditions (25C @ 40% RH) Through Strion Air System, University of Colorado at Boulder, July 26 2005.