
VitaShield IPS



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# *Breathe easily indoors*

Philips VitaShield Intelligent Purification System –
healthier clean air in your home, naturally

VitaShield IPS



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# Philips VitaShield Intelligent Purification System
## *- healthier clean air in your home, naturally*

The Philips VitaShield Intelligent Purification System (IPS) is a unique, high-performance air purification technology that reduces the effect of unhealthy air in the home on you and your family. A feature of all Philips air purifiers, it is proven effective against common indoor contaminants that affect human health and well-being. Contaminants like PM (particulate matter) 2.5[1], allergens, bacteria, viruses, formaldehyde and harmful TVOC (total volatile organic compound) gases like toluene.

Every home and individual is unique, so VitaShield IPS offers a comprehensive range of advanced filters optimized for different environments and needs. The New Home filter improves your protection against formaldehyde and other TVOC gases produced by new homes and renovation. The Multicare filter works in combination with a hypoallergenic HEPA filter – an allergy-friendly filter designed to lessen allergic reactions – to remove ultrafine particles as small as 20 nanometers (0.00002 mm) in size, including bacteria, dust, allergens and viruses[2].

# *Removes indoor contaminants naturally and powerfully*

## Virtually nothing escapes from VitaShield IPS - except purer, healthier air

The Activated Carbon filter is engineered to remove a wide spectrum of harmful gases. Furthermore, the range of VitaShield IPS products is growing all the time.

As a global leader in healthcare, Philips is trusted to help people lead healthier lives with its technologies and innovations. That's why not only is Philips VitaShield IPS a powerful and effective air purification process, it's a natural one too, helping to protect the health of you and your family.

Philips VitaShield IPS technology is designed to harness the safe and trusted power of natural air purification technology, helping to remove indoor contaminants from your home or indoor space. Unlike many other air purification technologies, it does not use harsh chemicals, or emit ozone or plasma-formed species into the air as a result of its process, all of which can be harmful to health. Instead VitaShield IPS uses the simplest and safest of technologies – natural filtration – to collect and retain many contaminants, leaving indoor air fresh and clean.

BENEFITS OF PHILIPS VITASHIELD IPS TECHNOLOGY

- Removes formaldehyde and other TVOC gasses like toluene
- Removes fine dust, pollen and PM 2.5
- Removes viruses and bacteria
- No harsh chemicals
- No ozone or plasma-formed species
- Low noise and low energy consumption

**How does it work?**


VitaShield IPS



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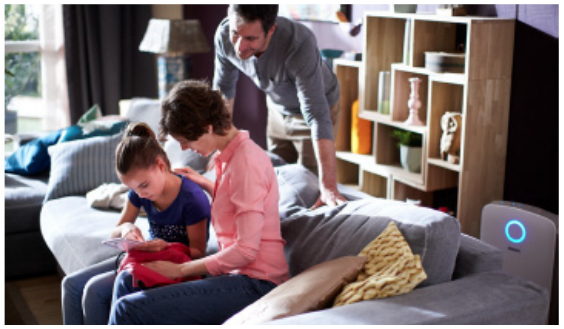
# *The health effects of indoor air pollutants*


Unfortunately, indoor air pollutants are a fact of life. Many are odourless and invisible to the human eye. World Health Organization (WHO) studies show[3] that indoor air is often 10-30 times more polluted than outdoor air.

In metropolitan areas with serious air pollution, such as Beijing, the amount of formaldehyde measured indoors was around 2 to 6 times as great as the amount of formaldehyde measured outdoors in the summer months, and around 2 to 11 times as great in the winter months[3].

In a separate study conducted in 14 Hangzhou homes, indoor levels of the TVOC gas toluene exceeded outdoor levels by an average of approximately twice the outdoor level, with a maximum of more than 10 times[4].



## PARTICULATE MATTER (PM) 2.5

Particles smaller than 2.5 micrometers (PM 2.5) can penetrate and settle in the deepest areas of the lungs and cause health problems[5]. A study published in the Journal of the American Medical Association indicates that high PM 2.5 exposure also leads to high plaque deposits in arteries, causing vascular inflammation and atherosclerosis – a hardening of the arteries that can lead to heart attacks and other cardiovascular problems[6]. There has been much news coverage in China about PM 2.5 levels. A recent study demonstrated that high PM 2.5 levels in several big Chinese cities led to an increase in mortality rates by several percentage points.

The World Health Organization (WHO) estimates that *"fine particulate air pollution (PM 2.5) causes about 3% of mortality from cardiopulmonary disease, about 5% of mortality from cancer of the trachea, bronchus, and lung, and about 1% of mortality from acute respiratory infections in children under 5 years, worldwide.[7]"* Experts show that improving PM 2.5 levels in the largest Chinese cities of Beijing, Shanghai, Guangzhou and Xi'an to the safe levels suggested by the WHO Air Quality Guideline would reduce death rates by between 1.7% and 6.2%[8].

## FORMALDEHYDE

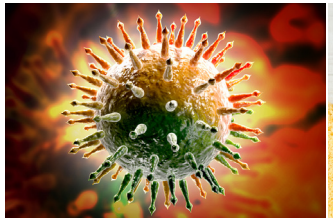
A colorless gas released from paints, solvents and adhesives, formaldehyde typically leaches from furniture, soft furnishings, wood products and construction materials. It is an irritant and a known carcinogen[9], with prolonged exposure considered a serious health risk[10]. High temperature and humidity promote the release of formaldehyde[11].

## TOTAL VOLATILE ORGANIC COMPOUNDS (TVOCS)

TVOCs are hazardous gases containing airborne organic chemical compounds from cleaning agents, disinfectants, paints, coatings, solvents, adhesives and hazardous chemical materials used in the manufacturing of indoor decorations such as carpets, seats and mattresses. Examples include toluene, benzene, xylene, higher alkenes and aldehydes. Many TVOCs are toxic, with long-term health effects. The United States Environmental Protection Agency (EPA) has found concentrations of TVOCs in indoor air to be two to five times greater than in outdoor air, and sometimes much greater[12].

## AIRBORNE PATHOGENS

Bacteria, fungi (molds) and viruses are all present in indoor air. Bacteria cause coughs, colds and more serious illnesses like tuberculosis. Indoor viruses include influenza and SARS. Molds grow in the home and release irritating spores that cause common allergic reactions such as sneezing, sore eyes, runny nose and congestion. Mycotoxin molds can cause headaches, concentration troubles, shortened attention span, memory loss and dizziness.



## PET HAIR AND DUST MITES

Pet hair and dust mites collect in the floors and carpets of indoor spaces. Pet hair, saliva and urine can cause allergies in the eyes and the airways. House dust mites are a common cause of allergies and asthma.

## OUTDOOR PARTICULATES (PARTICULATE MATTER, FINE DUST, POLLEN)

One of the biggest problems with indoor air is outdoor air. Tiny airborne particles such as pollen, fine dust and particulate matter (PM) can cause allergies, sore throat and red eyes, and long-term asthma and respiratory issues. Particulate matter is very fine particles produced by fossil-fuel burning and industrial processes. Gases like nitrogen dioxide (NO2), sulphur dioxide (SO2), carbon dioxide (CO2) and ozone are also caused by human pollution.

## SHORT TERM SYMPTOMS
allergies & asthma

sore red eyes

coughing

skin irritation

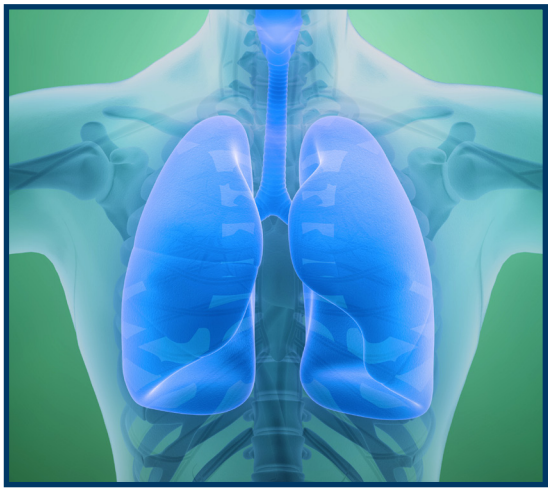
hay fever

nose irritation

sneezing

The most vulnerable are children, the elderly and pregnant woman. Often histamine from pollen/pets and so on, causes swelling and irritation of the upper airways.

## MAJOR LONG TERM DAMAGES



Lung tissue damages

Impacting life expectancy.

#03

# *The proven benefits of Philips VitaShield IPS technology*

Effective against many indoor contaminants

VitaShield IPS



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# Philips VitaShield IPS is a class-leading filtration technology that is proven to act on many of the causes of unhealthy air in the home. Its multi-layer filter system diminishes airborne particles like pollen, PM 2.5, viruses, bacteria, formaldehyde and TVOCs like toluene.







| | AC4014 | AC4006 | AC4072 | AC4076 | AC4091 | AC4086 | AC4081 |
|---|---|---|---|---|---|---|---|
| **PARTICLES** | | | | | | | |
| CADR for particles (cigarette smoke) | 234 | 150 | 270 | 250 | 340 | 270 | 223 |
| PM2.5 CADR | 260 | 163 | 309 | 307 | 421 | 320 | 244 |
| PM2.5 removal efficiency (1hr) | >99% | >99% | >99% | >99% | >99% | >99% | >99% |
| **GAS** | | | | | | | |
| Formaldehyde removal efficiency | 74% (3hr) | 99% (3hr) | 75% (3hr) | >99% (2hr) | >99% (0.5hr) | 45% (3hr) | 90% (3hr) |
| Toluene removal efficiency | 96% (3hr) | >99% (1hr) | >99% (3hr) | >99% (0.5hr) | >99% (0.5hr) | 95% (3hr) | >99% (3hr) |
| TVOC removal efficiency | 96% (3hr) | >99% (1hr) | >99% (3hr) | >99% (1hr) | >99% (0.5hr) | 96% (3hr) | >99% (3hr) |
| **BACTERIA & VIRUS** | | | | | | | |
| Bacterial removal rate ($30m^3$) | >99% | >99% | >99% | >99.9% | >99.9% | >99.9% | >99.9% |
| Bacterial removal rate ($1m^3$, 1hr) | 99,97% | 99,97% | 99,98% | 99,98% | >99,99% | 99,97% | |
| Anti-virus | N/A | N/A | N/A | N/A | N/A | N/A | 99.1%(2hr) MS-2 in $11m^3$ |

The information in the table is based on standard international and Chinese accepted testing methods and protocols (GB/T 18801, APIAC/LM01, GB215551.3 and Intertek)

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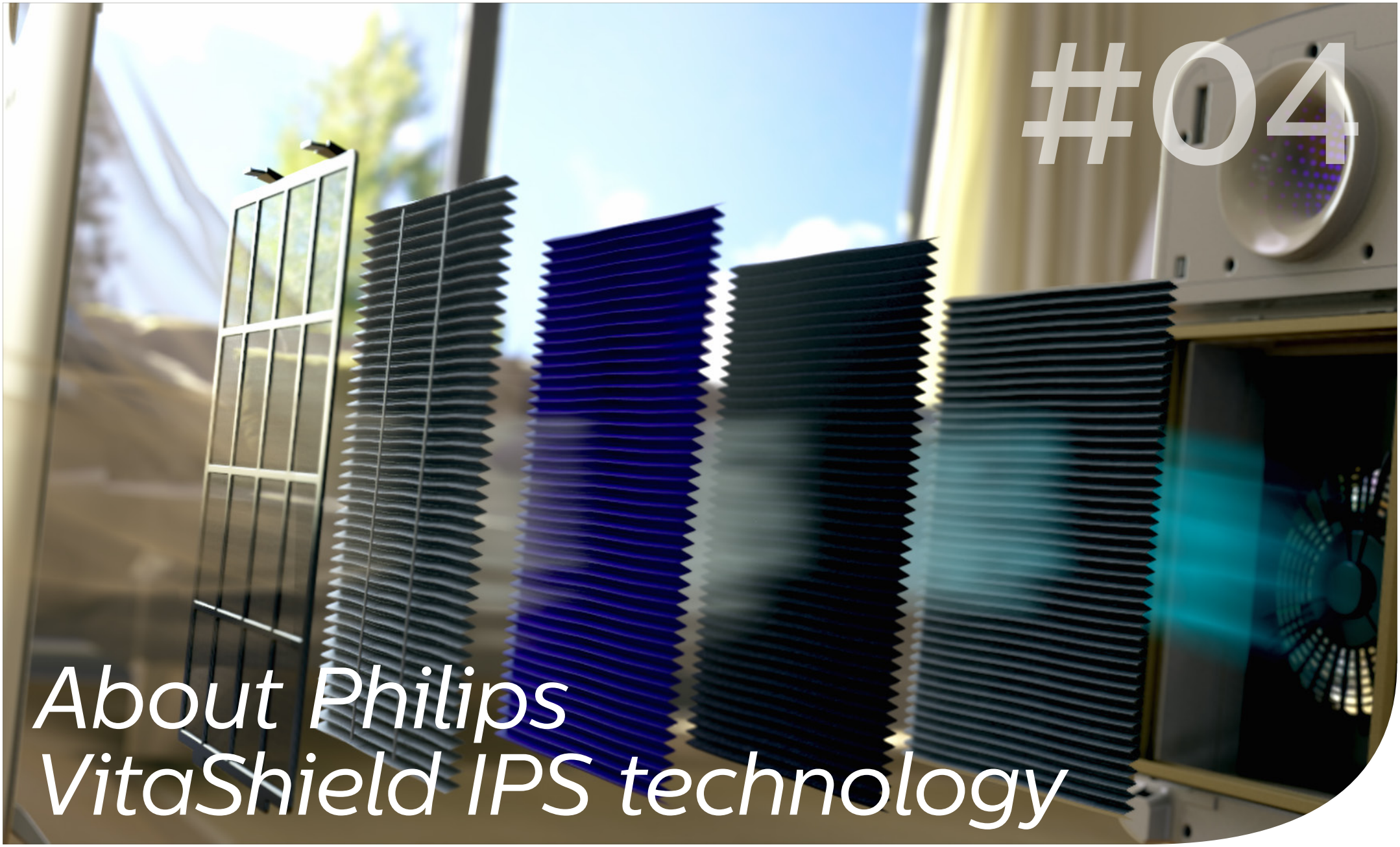
## AS NATURAL AS BREATHING

VitaShield IPS is a tried and tested technology that poses no risk to health. Developed by Philips, a leading healthcare company for more than 80 years, VitaShield IPS uses specially-treated activated carbon and a traditional filtration process based on decades of home use worldwide. Its absorption technology cleans the air naturally, improving the purity of indoor air. This technology is so reliable and effective that it has been used for years in military-grade gas masks.

Other air purification technologies emit contaminants like ozone, plasma-formed species and other chemicals. These contaminants bind to airborne particles and cause them to fall to the ground, where they gather. The long-term effects of these contaminants are not fully understood. VitaShield IPS does not emit unnatural artificial compounds. VitaShield IPS is a natural technology that is safe for you. The effectiveness of its filter system is maintained by helpful features like Healthy Air Protect Alert, which indicates when the filters are ready for cleaning and changing, and Healthy Air Protect Lock, which shuts down the purifier when the filters are full. These innovations keep you and your family safer, helping you to lead a healthier life.

## PHILIPS AIR PURIFIERS HAVE WON MANY AWARDS FOR INNOVATION DUE TO THEIR ADVANCED DESIGN AND PERFORMANCE.



# #04

# *About Philips VitaShield IPS technology*

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At the heart of Philips VitaShield IPS technology is a class-leading multi-stage active filtration system that is designed to remove a wide range of contaminants. This improves the cleanness of air by filtering out harmful agents with a series of ever-finer filters. Philips VitaShield IPS air purifiers are also available with a range of special new filters designed for specific environments like new homes.

## PRE-FILTER

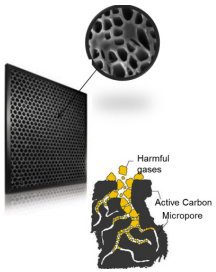
*Catches bigger particles.* The antibacterial pre-filter catches big particles like hairs and dust.

## MULTICARE FILTER

*Removes ultrafine particles, allergens, viruses and bacteria.* The Multicare filter works together with the HEPA filter on pollutants as small as 20 nanometers (0.00002 mm) in size, such as fine particles, allergens, bacteria and viruses[2].

## ACTIVATED CARBON FILTER

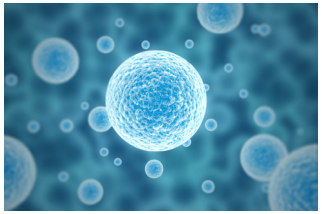
*Removes harmful gases.* The Activated Carbon filter acts on a wide spectrum of harmful gases, such as formaldehyde, toluene and TVOCs. Activated carbon is a form of carbon full of tiny pores that increase the surface area available for adsorption. Philips' activated carbon incorporates a special active compound that improves the removal of formaldehyde significantly.



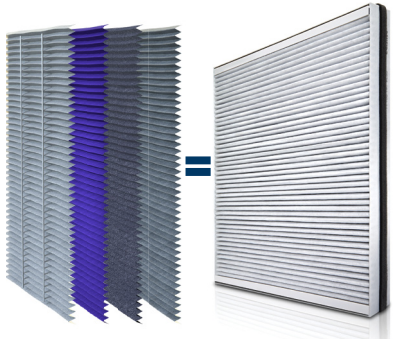

The Activated Carbon filter has a vast surface area due to its hyper-porous structure. This ensures many harmful airborne gasses are scooped up as the air passes through the activated carbon.

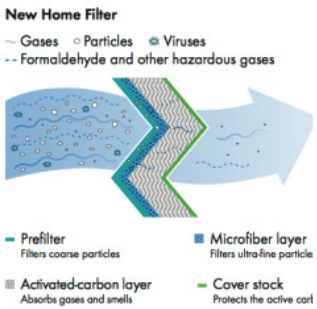
## HEPA FILTER

*Removes ultrafine particles.* The ultrafine HEPA filter is designed for ultrafine particles as small as 20 nanometers (0.00002 mm) in size, including some viruses[2].



# Philips VitaShield IPS has special filters designed for specific environments and needs.

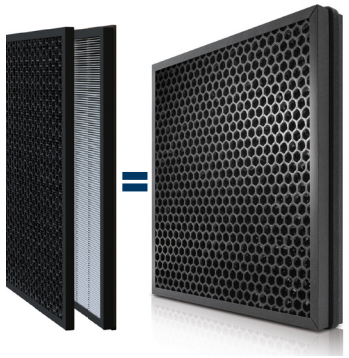


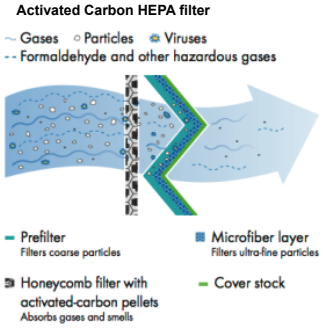



## NEW HOME FILTER

*Extra protection against formaldehyde and TVOCs associated with new homes.*

The New Home filter combines our HEPA filter with a unique active carbon filter developed in partnership with world-class filter experts from Germany. The New Home filter's unique active carbon layer results in superior purification efficiency and reliable long-term performance against formaldehyde, toluene, TVOCs and other harmful gases. In addition, the HEPA filter acts on airborne particles as small as 20 nanometers (0.00002 mm) in size[2], including PM 2.5, viruses, bacteria, allergens and dust.

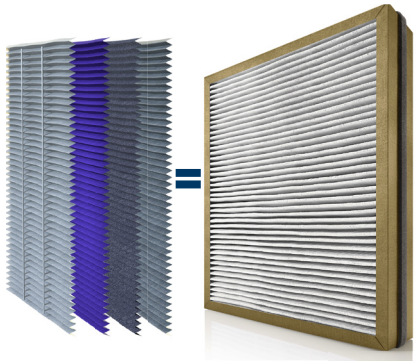


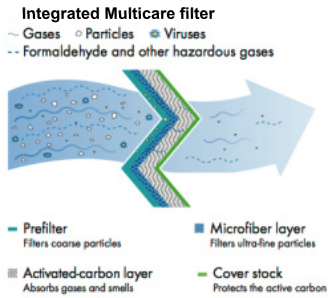



## ACTIVATED CARBON HEPA FILTER

*Extra protection against bacteria and viruses.*

The Activated Carbon HEPA filter acts on ultrafine particles, allergens, bacteria and viruses as small as 20 nanometers (0.00002 mm)[2], as well as formaldehyde, toluene, TVOCs and other harmful gases. This high-performance filter was developed in partnership with world-class filter experts from Germany.






## INTEGRATED MULTICARE FILTER

*Added protection against bacteria and viruses.*

The Integrated Multicare filter acts on ultrafine particles, allergens, bacteria and viruses as small as 20 nanometers (0.00002 mm) in size. Advanced German technology enhances its efficiency and capacity to filter out formaldehyde, toluene, TVOCs and other harmful gases.


# *Intelligent purification technology from the experts in filtration*

Philips VitaShield IPS technology captures many types of indoor contaminants

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# Philips VitaShield IPS filters use state-of-the-art filter grades to trap and collect a wide range of indoor air contaminants. This involves four separate actions, each with its own effect: Sieving, Inertial impaction, Interception and Diffusion.

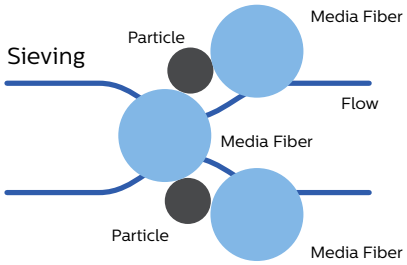
1. The biggest particles (greater than 1 micron) experience SIEVING. Dust, bacteria, mold and pollen often become stuck between the filter fibers as they flow through the filter stack.

2. INERTIAL IMPACTION works on particles of around 0.5 microns. As these particles pass through the filter stack they are forced to collide with and stick to its fibers.

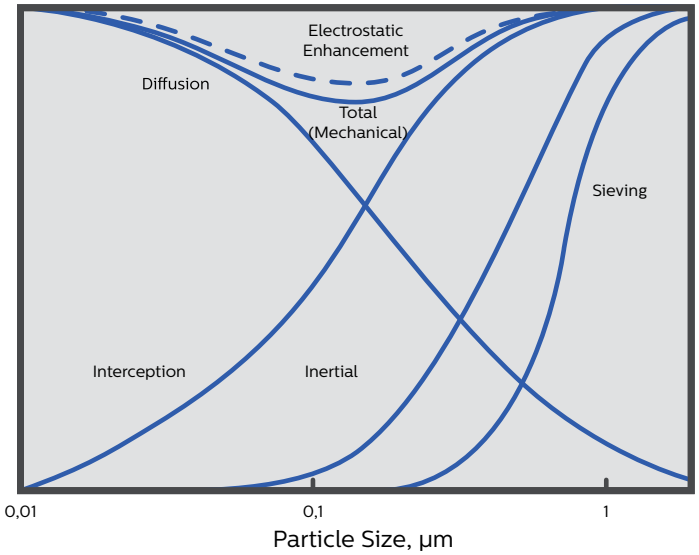
3. Similar to inertial impaction, INTERCEPTION is when very small particles of around 0.1-0.2 microns like TVOCs and cigarette smoke stick onto fibers instead of flowing around them. However, these particles are so small that electrostatic forces come into play, causing the particles to cling to the fibers.

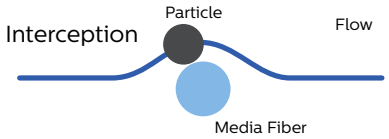
4. The very smallest particles like viruses do not follow airflow. Instead, they observe DIFFUSION, floating freely through the filter stack like gas molecules until they hit and attach to a fiber surface.

# FILTER EFFICIENCY

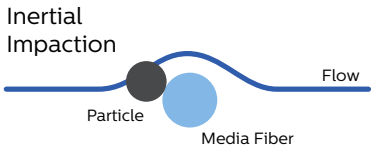



SIEVING
Particles stick between fibers.
(≥ 1 micron)

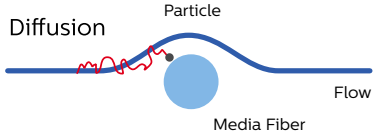



INTERCEPTION
Particles attracted to fibers by electrostatic forces.
(≥ 0.1-0.2 microns)



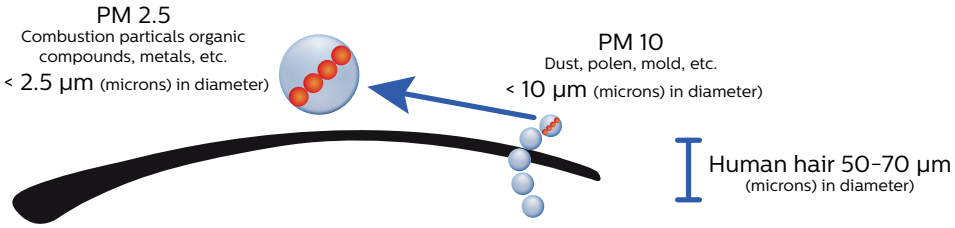

INERTIAL IMPACTION
Particles stick to filter fibers.
(≥ 0.5 micron)



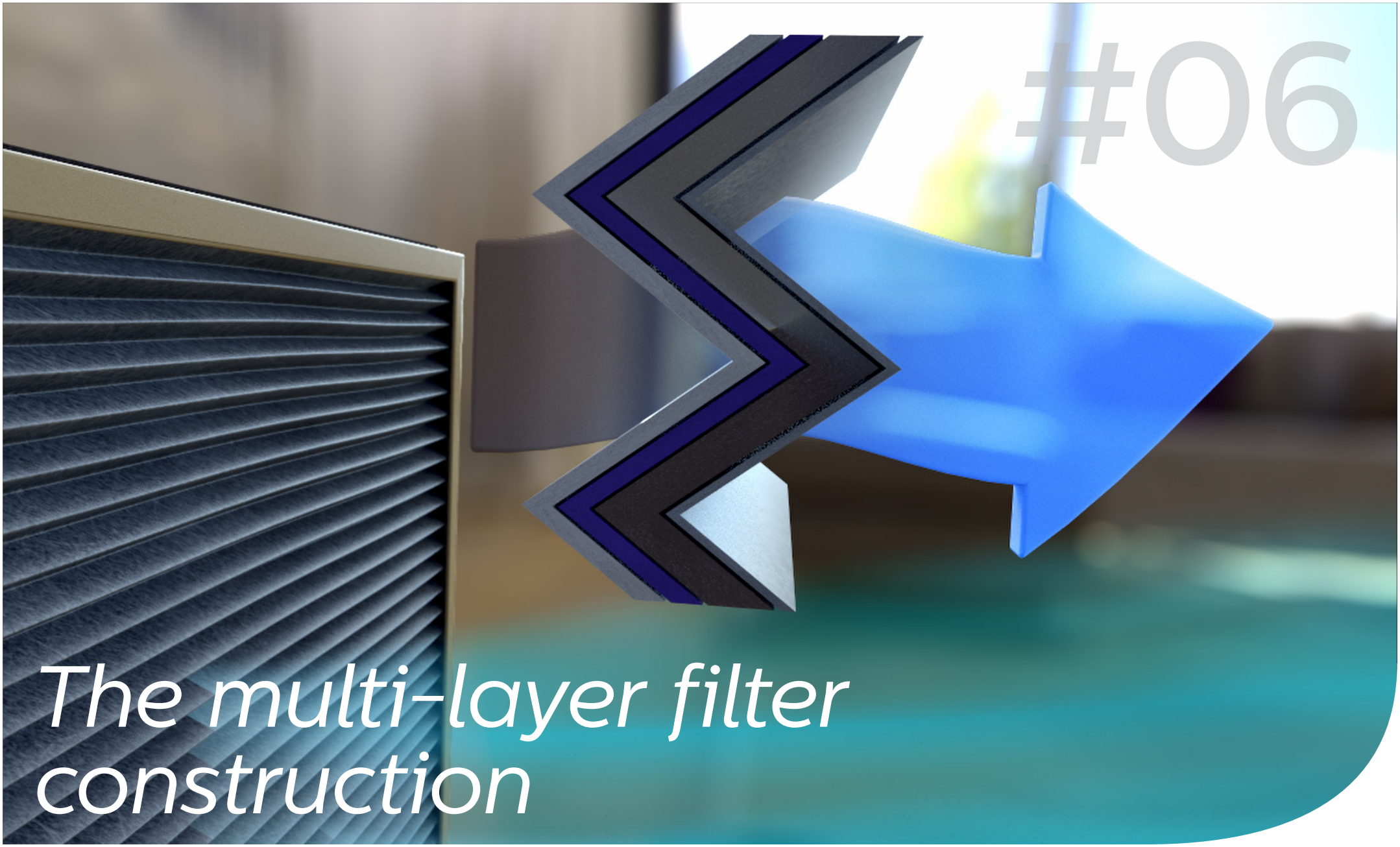

DIFFUSION
Particles are so small they move like a gas until they hit a fiber surface. (< 50-100 nanometers)

## Relative size of PM 2.5

PM 2.5 particles are 20 times smaller than the diameter of the human hair




PM 2.5 particles are 36 times smaller than the diameter of fine beach sand




# *The multi-layer filter construction*

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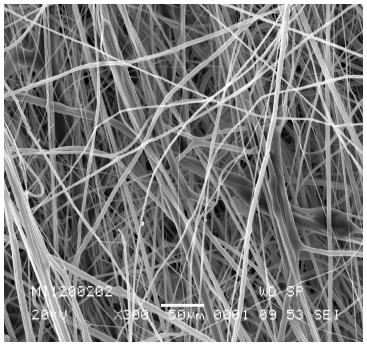
Each Philips VitaShield IPS multi-layer filter comprises a carrier layer, a micron fiber layer and an activated carbon layer, as well as a pre-filter. These four layers are engineered to filter out contaminants as small as 20 nanometers (0.00002 mm) in size[13].

The carrier-layer pre-filters big particles like dust, pollen and allergens; it also shields the other filter stages, preserving filter lifetime.

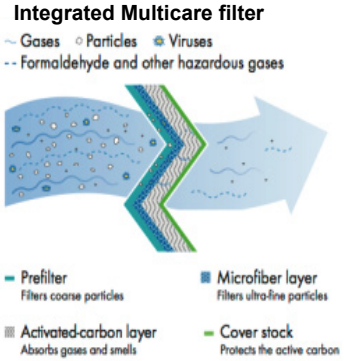
The micron fiber layer removes ultrafine particles like viruses from the air. It is made from electrostatically-charged non-woven polymer fibers. These attract and capture the smallest particles.

The activated carbon layer contains densely-packed activated carbon pellets that are effective against the major hazardous TVOCs present in newly decorated rooms. In addition, the activated carbon is impregnated with an additional chemical to further increase its effectiveness in purifying the air of formaldehyde.



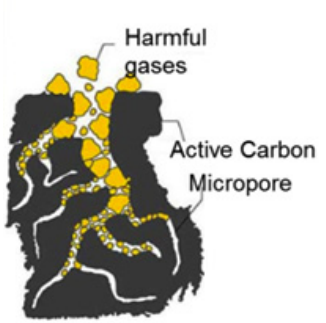
THE MICRON-FIBER LAYER STRUCTURE

The effectiveness of the micron-fiber layer is driven by fiber density and layer thickness.



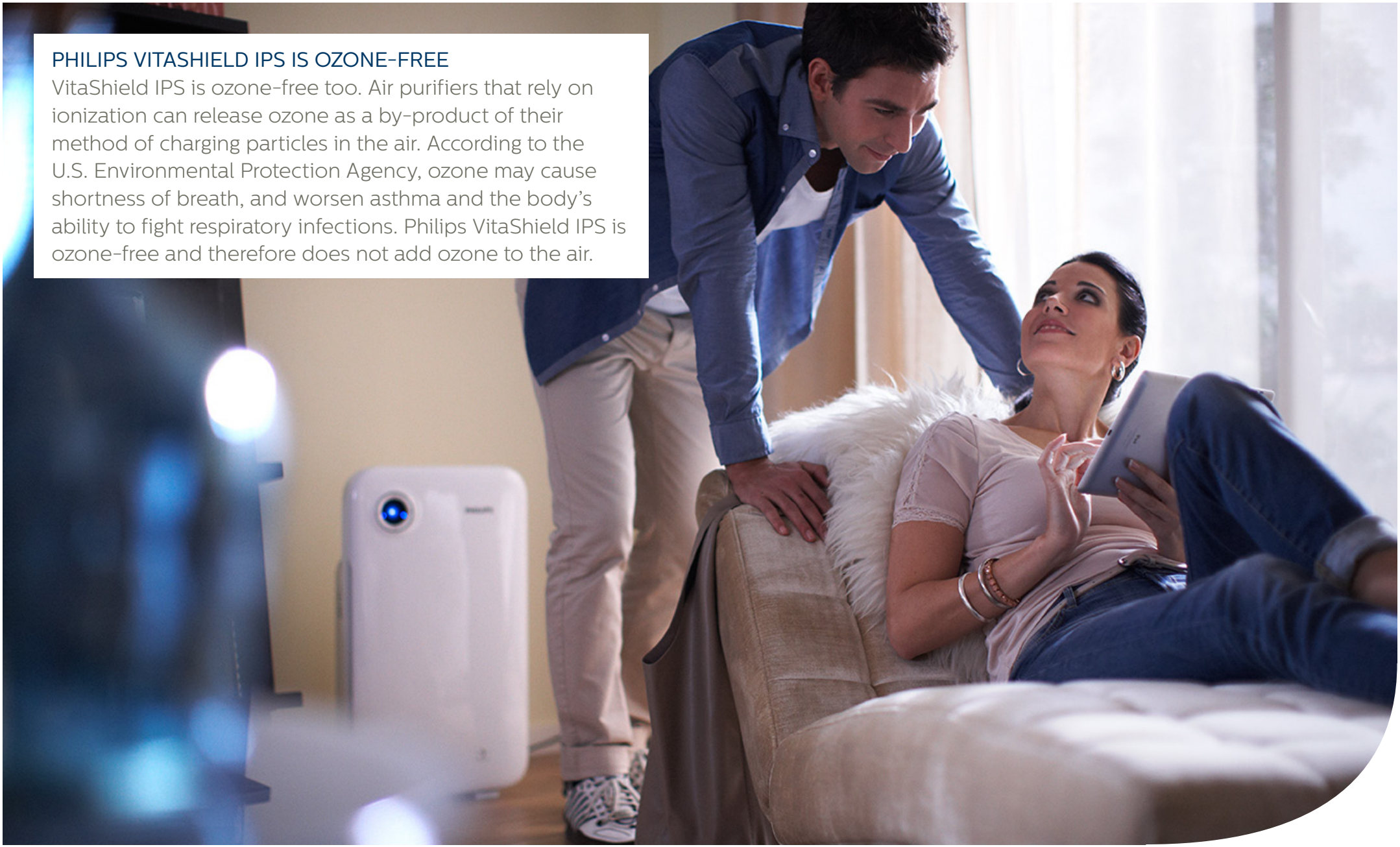

SPECIAL FILTERS

Special filters, such as this Integrated Multicare filter, combine the carrier and microfiber layers with an additional active carbon layer for added protection.




THE ACTIVATED CARBON LAYER STRUCTURE

The activated carbon contains micropores that are engineered to lessen hazardous gasses in indoor air.



## PHILIPS VITASHIELD IPS IS OZONE-FREE

VitaShield IPS is ozone-free too. Air purifiers that rely on ionization can release ozone as a by-product of their method of charging particles in the air. According to the U.S. Environmental Protection Agency, ozone may cause shortness of breath, and worsen asthma and the body's ability to fight respiratory infections. Philips VitaShield IPS is ozone-free and therefore does not add ozone to the air.

# *Maximum performance with low noise*

#07

Cleaning air by improving airflow and purifier performance

VitaShield IPS



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Improving the design of the purifier unit and motor gets more out of the filter with lower noise and energy consumption, contributing to leading performance. To reach the full potential of a high-quality HEPA filter, for example, the design of the unit and the operation of the engine should ensure that the filter is perfectly placed and sealed to prevent air leakage.

With decades of home product design expertise, Philips has a team of specialists at its research and development centers in Shanghai and the Netherlands working on these innovations. Their extensive testing and refinement of each and every element of our purifiers optimizes performance through precision-engineered design. Most manufacturers focus only on the filter – very few consider the whole purifier as Philips does.

This same attention to product design, filter and motor means that Philips VitaShield IPS technology is supported by a quiet but powerful engine capable of filtering and cleaning a very high volume of air quickly and efficiently. This provides class-leading performance for removal of a range of particles and formaldehyde and TVOC.

The volume of filtered clean air delivered by an air purifier is expressed as the Clean Air Delivery rate (CADR)[14], and measured in cubic meters per hour (m3/hour), with the number referring to the volume of air cleaned of cigarette smoke, pollen and dust in one hour by the purifier. The higher the CADR number, the faster the air purifier is able to clean indoor air, and the bigger the room it is able to clean.

| Model | AC4026 | AC4006 | AC4016 | AC4076 | AC4091 | AC4025 | AC4012 | AC4014 | AC4072 | AC4074 | AC4090 | AC4084 | AC4085 | AC4086 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CADR Cigarette (m3/h) | 127 | 150 | 224 | 250 | 340 | 127 | 128 | 237 | 270 | 270 | 360 | 210 | 240 | 270 |

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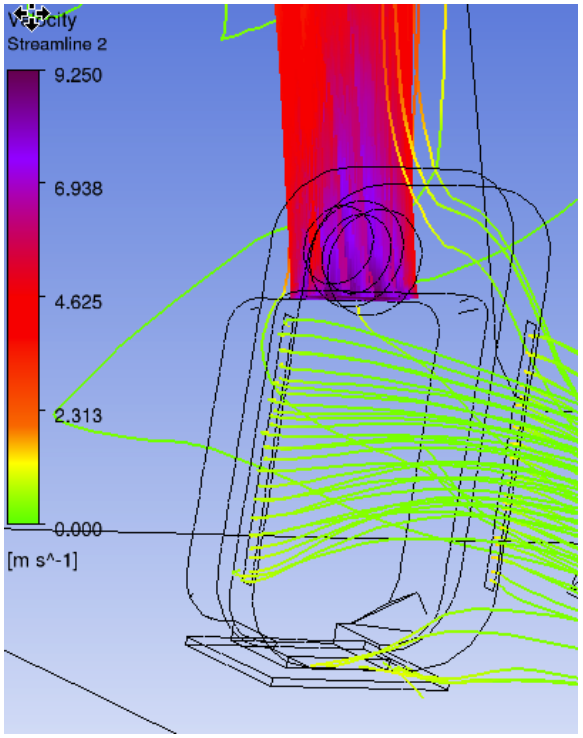
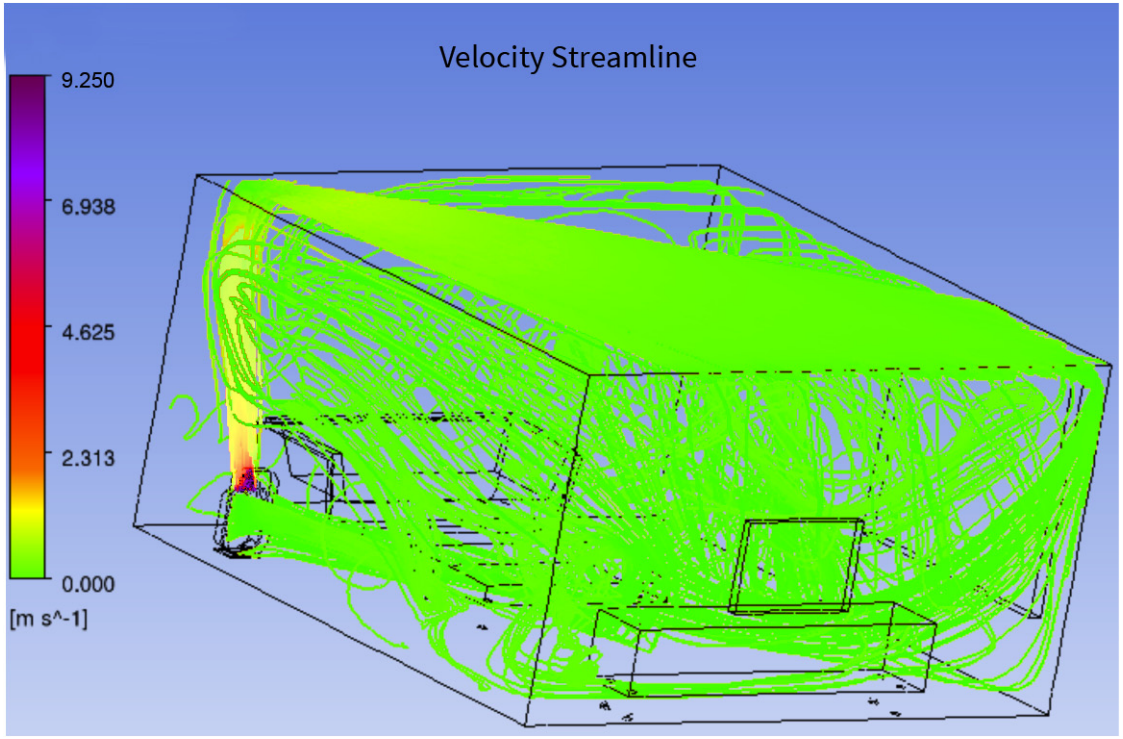
# FULL ROOM CLEANING

Streamlines to inlet of air purifier and leaving from outlet. Colors indicating velocities.




# Clean air is vital to good health

#08

Helping to create an allergy-friendly environment in your home

Philips VitaShield IPS is an excellent choice for allergy sufferers because it acts on the allergens that cause coughs and sneezes, red eyes, itchy nose, asthma and skin irritations like eczema, maintaining an allergy-friendly environment in the home[1]. In fact, VitaShield IPS is certified allergy-friendly by the European Centre for Allergy Research Foundation (ECARF), a foundation committed to improving the quality of life for allergy sufferers by identifying products and services that are allergy-friendly.

## ALLERGIES CAUSED BY AIRBORNE PARTICLES

Allergies in the home triggered by dust, pollen, pet dander, PM 2.5, mold spores and other airborne particles are a growing problem in industrialized countries. *"Allergy related illnesses and discomfort are increasingly common. Currently, one third of the European population suffers from at least one allergy,"* says Prof. Dr. med. Dr. H. C. Torsten Zuberbier, head of ECARF.

Philips VitaShield IPS reduces allergies because its multi-stage active filtration system traps up to 99.7% of airborne particles, removing many of the irritants that trigger allergic reactions. Its pre-filter acts on large heavy particles like pet hair, dust mites and dust. Meanwhile, a HEPA filters mold, dust mite spores, pollen and microscopic particles of dust from the air. These fine particles trigger allergy and asthma symptoms. In addition, the Active Carbon filter is designed for hazardous gases such as formaldehyde and TVOCs like toluene.

These filters are complemented with the Smart Sensor and light indicators that measure and show the air quality in your room, plus the HealthyAir Protect and HealthyAir Lock, which warn and then shut down when the filter requires replacement, keeping you safer.

ECARF
Allergy-friendly Quality Tested
www.ecarf.org
European Centre for Allergy Research Foundation

Philips VitaShield IPS technology is certified allergy-friendly by the European Centre for Allergy Research Foundation (ECARF).
The European Centre for Allergy Research Foundation (ECARF) tests and certifies allergy-friendly quality products and services (http://www.ecarf.org/).

# Dealing with sick house syndrome in your home

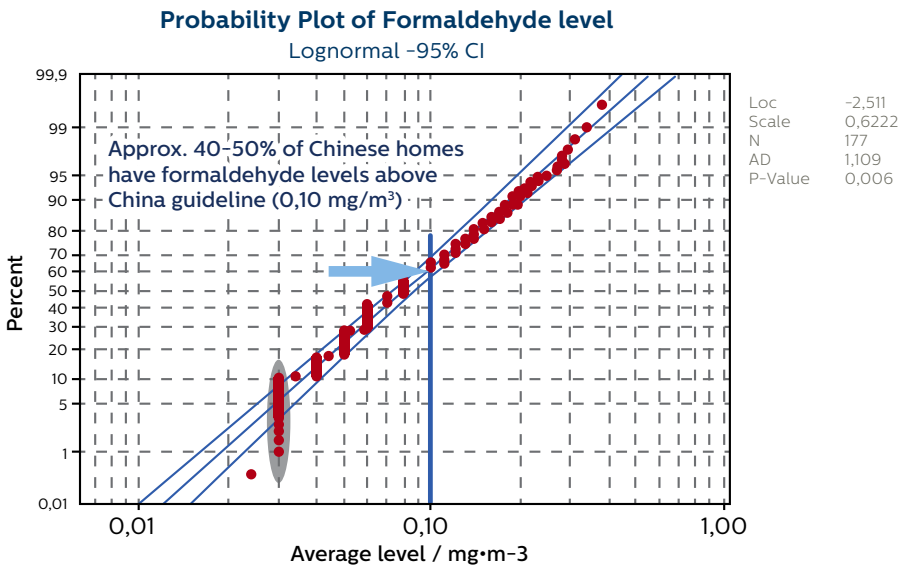
#09

Formaldehyde and toxic TVOC gases like toluene

Sick house syndrome is associated with new homes and buildings, new furniture, painting and home renovation. It is caused by the build up of formaldehyde and harmful toxic TVOC (total volatile organic compound) gasses like toluene, which slowly leach into the air from the synthetic materials used in home construction and renovation, for anything up to four years after work has finished. Symptoms include headaches, blurred vision and runny nose. Long-term effects can include a skin disorder known as atopic dermatitis, chronic obstructive pulmonary disease (COPD) and even cancer.

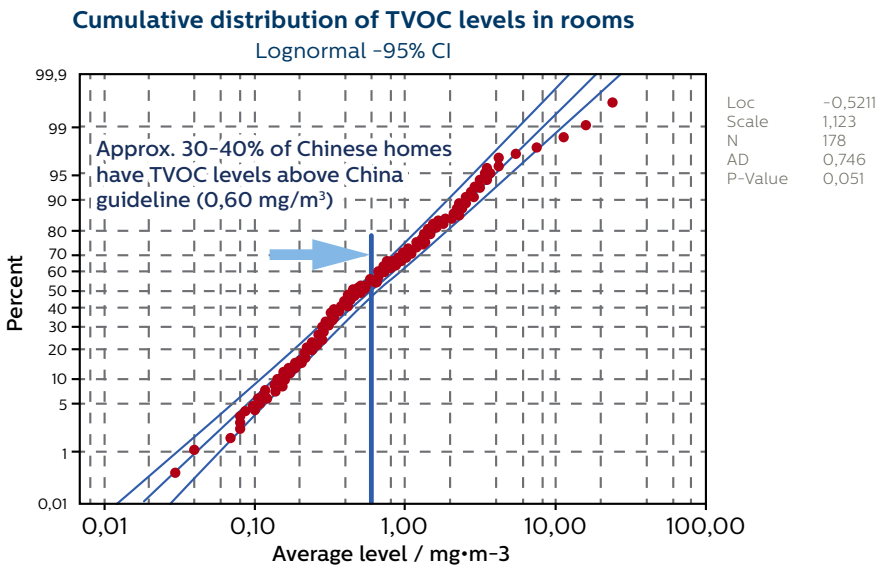
## AVERAGE FORMALDEHYDE LEVELS IN CHINESE HOMES

IAQ measurement data from 300 Chinese homes




## AVERAGE TVOC LEVELS IN CHINESE HOMES

IAQ measurement data from 300 Chinese homes



With construction and urbanization on the rise, sick house syndrome is spreading. Worryingly, up to 50% of homes in China fall short of China's formaldehyde guideline[15] and up to 40% do not fulfil its TVOC guideline[16]. In Europe, an average of 30% of homes fall short of European TVOC guidelines in France, the Netherlands, Germany and Greece, according to a recent study[17]. Children are especially vulnerable, with the same study finding that 40% of baby rooms in Europe had formaldehyde or TVOC levels above European guidelines of 10µg/m3 formaldehyde and 200 µg/m3 total TVOC.

Since formaldehyde and many TVOCs cannot be seen or smelt, many people are not aware of a problem until they suffer the symptoms of sick house syndrome. And while opening a window helps to blow away the cobwebs, it does little to improve the quality of indoor air, since outdoor air is often less healthy than indoor air in many large cities.
In metropolitan areas with serious air pollution, such as Beijing, formaldehyde indoor-outdoor ratios of 1.62–6.37 were measured for the summer months and 2.05–10.99 for the winter months[18].

### THE FOUR MAIN COMPOUNDS ASSOCIATED WITH SICK HOUSE SYNDROME

These preservatives and solvents are found in many everyday household glues, varnishes, paints, and cleaning products in the furniture, carpets and textiles in our homes.

FORMALDEHYDE is known to irritate the eyes, nose, and throat, as well as triggering allergies, asthma and even cancer.
ALCOHOLS like ethanol, methanol and isopropanol cause headache, irritation of they eyes, throat, skin and mucous membranes.
KETONES like acetone irritate the eye, nose, throat and adverse effects on the central nervous system.
HYDROCARBONS like toluene are known to cause eye irritations, digestive problems, headaches, and even cancer.

## THE HEALTHY HOME CHECKUP

Tell-tale signs of sick house syndrome

HIGH FORMALDEHYDE LEVELS:
- Home decorated in the last 6 months
- Decorative pressed wood materials
- High temperature

HIGH TVOC LEVELS:
- Home decorated in the last 6 months
- High temperature
- Many people present
- Smoking
- Cooking and frying
- Cleaning with chemicals

HIGH PARTICLE LEVELS:
- Smoking
- Cooking and frying
- Room ventilation with air that contains outdoor particles


# *Dealing with sick house syndrome and its causes*

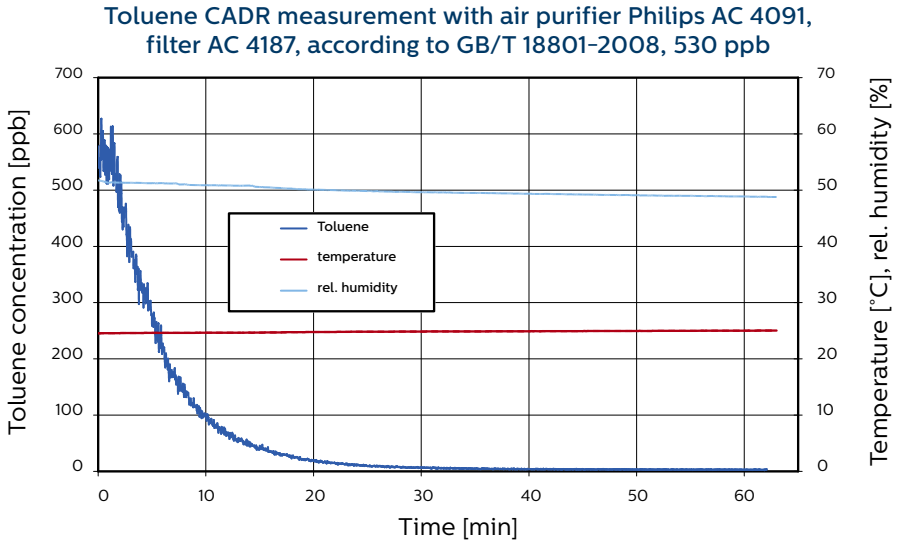
Philips VitaShield IPS is proven effective for TVOC and formaldehyde capture

VitaShield IPS



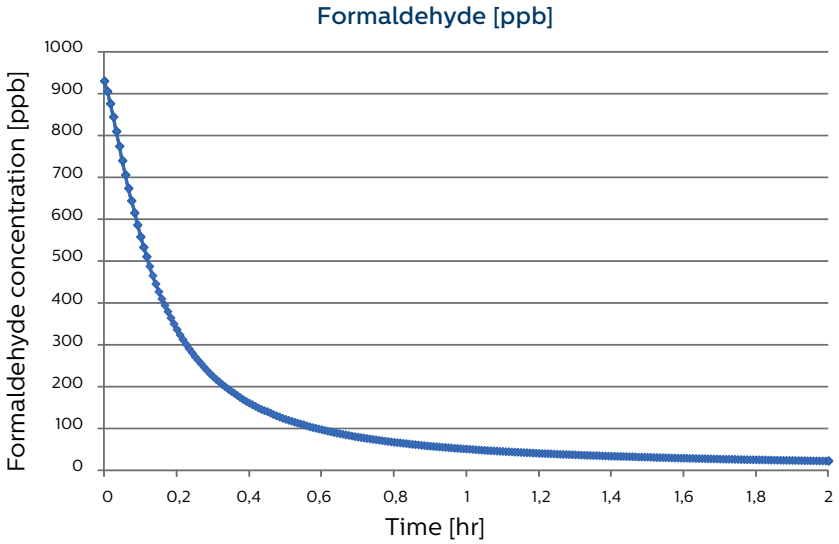
PHILIPS

Thankfully, a solution to sick house syndrome is at hand with the extra-strength New Home filter available in Philips VitaShield IPS technology. Developed in partnership with world class filter experts from Germany, this is proven effective against many of the contaminants responsible for sick house syndrome, according to several benchmark studies. It captures formaldehyde and harmful TVOC gasses like toluene using a unique catalyst and a high-performance activated carbon filter.




## CAPTURING TOLUENE

Philips AC4091 air purifier with VitaShield IPS technology removed almost all toluene within 20 minutes, with a CADR of 327 m3/hr, as tested by IUTA Germany (Modified GB/T 18801-2008 procedure)




## CAPTURING FORMALDEHYDE

Philips AC4076 air purifier with VitaShield IPS technology removed 95% of formaldehyde within 1.1 hours, as tested by Fraunhofer Germany (Modified GB/T 18801-2008 procedure)

VitaShield IPS



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## THE NEW HOME FILTER – TRIPLE PROTECTION AGAINST FORMALDEHYDE AND HAZARDOUS GASSES

The New Home filter contains a special extra-capacity activated carbon material designed to capture formaldehyde, TVOCs like toluene and other hazardous gasses. This highly absorbent activated carbon material – developed from natural carbonaceous sources such as fine hardwoods, peat, coir and lignite – provides triple protection against toxic pollutants.

1. First, the outside of the activated carbon is coated with a special agent that reacts with formaldehyde particles, "chaining" them to the outside of the activated carbon so they cannot escape.

2. Secondly, the activated carbon material itself has an enormous surface area of around 1000m2 per gram of material. Much like the tightly-packed structure of the human lung, the effect of this is to take in a massive amount of air, and thus filter out a large quantity of contaminants.

3. The third aspect of the New Home filter's triple protection is precisely-designed nano-pores in the activated carbon. As air enters the activated carbon, these tiny pores trap and collect many hazardous gases.





| | AC4006 | AC4016 | AC4076 | AC4026 | AC4091 |
|---|---|---|---|---|---|
| Removal Efficiency* | 99% | 99% | 99% | 96% | 99% |
| Time | 3 hrs | 2 hrs | 2 hrs | 3 hrs | 0.5 hrs |

RESULTS MATTER – THE NEW HOME FILTER IS PROVEN TO CAPTURE FORMALDEHYDE

* Test results air purifiers according to test protocol GB/T 18801 in 30$m^3$ room.

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INCREASING POPULATION DENSITY, GLOBALIZATION AND DRUG RESISTANCE ALL CONTRIBUTE TO AIRBORNE DISEASES. Buildings – particularly office spaces – concentrate the airborne pathogens that transmit contagious diseases, including avian flu, influenza, SARS, tuberculosis, pneumonia and meningitis, highlighting our increasing vulnerability to epidemic disease. There are almost no guidelines, standards or laws that describe what precautions you and your family should take against airborne pathogens indoors. Organizations and government agencies involved in the control of disease include the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and National Institute of Occupational Safety and Health (NIOSH). However, none is responsible for regulating indoor environments.

## THE DIFFERENT KINDS OF PATHOGENS IN THE HOME

| | Pathogen / Allergen | Rationale | Average size [nm] |
|---|---|---|---|
| VIRUSES | Measles virus | Measles | 158[3] |
| | Varicella zoster | Chicken pox | 158[2] |
| | Influenza | Influenza (the "flu") | 80-120[1] |
| | Rhinovirus<br>Respiratory syncytical virus<br>Parainfluenza virus | Common<br>catching cold<br>symptoms | 25-30[1]<br>220[2]<br>230[2] |
| | Norovirus | Stomach flu | 28-35[5] |
| | SARS coronavirus | SARS | 80-90[4] |
| | MS2 | Non-hazardous virus used in tests | 23-26[7] |

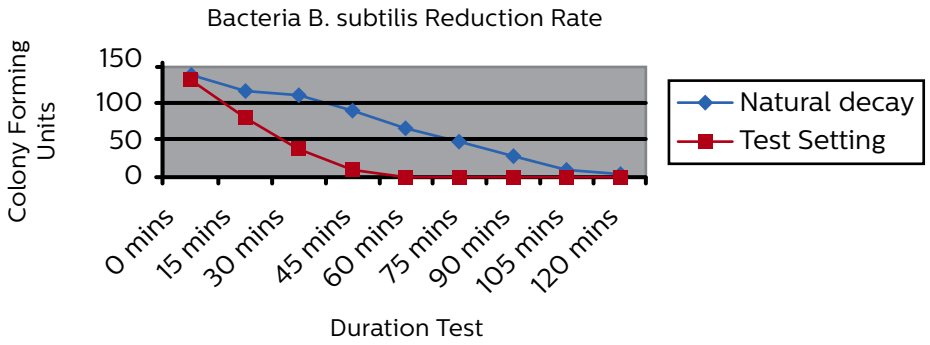
| | Pathogen / Allergen | Rationale | Average size [nm] |
|---|---|---|---|
| BACTERIA | Mycobacterium tuberculosis | TB | 860[2] |
| | Streptococcus pneumoniae | Pneumococcal pneumonia, meningitis | 900[2] |
| | Staphylococcus aureus | Skin infections, pneumonia, meningitis | 900[2] |
| | Haemophilus influenza | Bacteremia, pnemonia, meningitis | 430[2] |
| | Neisseria meningitis | Meningitis, Meningococcus | 800[2] |
| | Clostridium difficile | Diarrhea | 1250[6] |
| | Moraxella catarrhalis | Bronchitis | 1250[2] |
| | | | |

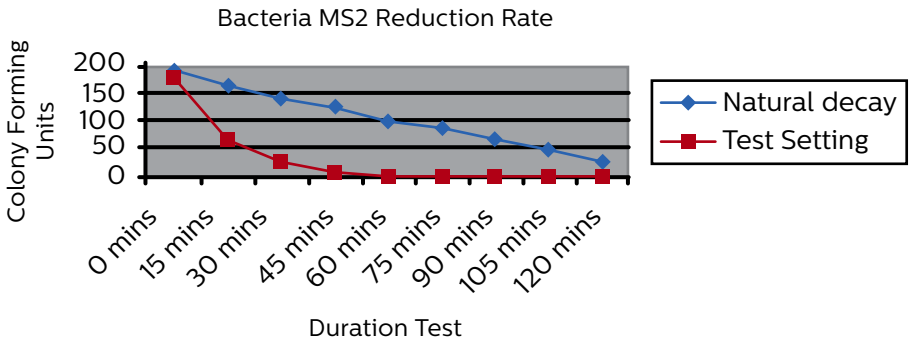
1 D. Verreault et al. Microbiol. Mol. Biol. Rev. 2008, 72; 413 2 W.J. Kowalski et al. ASHRAE Transactions, 1999, 105; 4 3 W.J Kowalski Design and Optimization of UVGI Air Disinfection Systems, PhD Thesis, 2001
4 I.E. Agranovski, Atmospheric Environment 2004, 38; 3879 5 C.E. Wobus, Science, 2003, 299, 5612; 1575 6 A.M. Snelling Clin Infect Dis. 2010, 51; 1104 7 Wick, C. H. Toxicol. Methods, 1999. 9,245–252.

WITH NO CLEAR OFFICIAL GUIDANCE ON HOW TO PROTECT YOURSELF AGAINST AIRBORNE PATHOGENS, PHILIPS VITASHIELD IPS OFFERS PEACE-OF-MIND.

It purifies indoor air of contaminants as small as 20 nanometers (0.00002 mm) in size[2] – small enough to capture pathogens like bird flu, the cold virus, Legionella and many other common germs. In tests, it is proven to remove 99.9% of bacteria and viruses from the air within 1 hour19. That will keep you and your family safe from many airborne pathogens and safe from worry.

## PHILIPS VITASHIELD IPS REDUCES 99.9% OF BACTERIA AND VIRUSES IN 1 HOUR [19]



# *Healthier air, guaranteed*

Smart safety features allow you to understand and control the air quality in your home

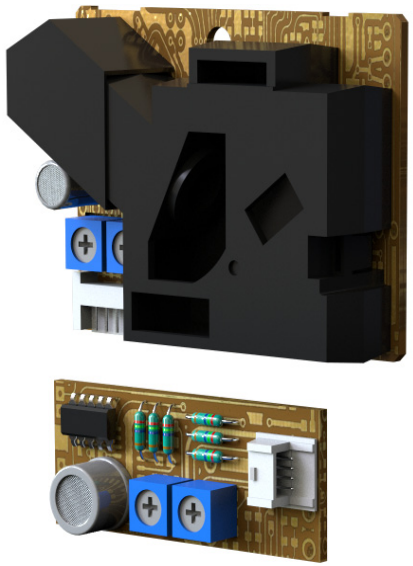

VitaShield IPS



PHILIPS

Most contaminants cannot be seen or smelt. That's why the IPS in Philips VitaShield IPS is short for Intelligent Purification System, a set of advanced safety features that will help you to control the quality of the air in your home.

The IPS is designed to protect you. Smart air quality sensors and fully automatic operation continually monitor and adjust the air in your room. A prominent four-step air quality LED halo light keeps you updated on progress by indicating the quality of the air – providing reassurance that VitaShield IPS is doing its job.



## MAKING THE INVISIBLE VISIBLE

New filters are very effective but over time this decreases. To address this issue, Philips has pioneered the Healthy Air Protect Alert and Healthy Air Protect Lock features. These unique protection features work together with VitaShield IPS to warn you in advance when the filters are wearing out and then shut down the appliance automatically in the event of an exhausted filter.

Developed by Philips, an expert in consumer technologies, these features and more like them ensure that your appliance is set correctly to provide effective protection for you and your family. As a result, you can be confident that VitaShield IPS provides healthier purified air.


VitaShield IPS



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| FEATURE | FUNCTION | BENEFIT |
|---|---|---|
| **HealthyAirAlert** | Indicates when the efficiency of the particle filter has reduced over time with natural wear and tear. | An early-warning system that provides plenty of advance notice to replace an old filter. |
| **HealthyAirLock** | Shuts off the appliance automatically when the filter is spent. | Prevents purifier operating with worn out filter. |
| **Smart Air Quality Sensor** | Built-in gas and particle sensors measure the air quality in the room and automatically select the appropriate filter speed setting. | Fully automatic operation so your appliance is always set correctly. |
| **Feedback Halo LED** | Four-step LED halo light changes color to indicate quality of indoor air, from unhealthy to very healthy, based on national indoor air quality standards. | Reassurance that the appliance is working and air is being purified. |
| **Variable speed fan** | The variable speed fan allows you to purify the air in a room quickly or slowly. Slow settings are quieter and ideal for night time or sleeping infants. | Ensures correct balance between purifier power and noise. |
| **Turbo power (selected models)** | Turbo power provides rapid air purification for when circumstances demand it. | Fast and powerful purification for when you need it most. |
| **Night mode (selected models)** | Quiet, power-efficient one-touch setting for night-time. | A comfortable bedroom environment that promotes sleep. |
| **Silent mode (selected models)** | One-touch setting for silent operation. | Silent operation. |
| **Child lock (selected models)** | Locks appliance controls so they cannot be used. | Child-proof operation. |
| **Long filter lifetime of 3 years (selected models)** | Appliance is optimized to automatically preserve filter life for as long as possible without compromising performance. | Reduces filter material use and replacement costs. |
| **Green energy certificate (selected models)** | Maintains efficient power consumption of 38W when working, and less than 0.6W in standby. | Saves energy and costs. |
| **Timer (selected models)** | Allows purifier to be set to run 1, 2, 4 or 8 hours in advance. | Allows automatic air purification when you are busy or out. |


VitaShield IPS



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The quality of indoor air is affected by home and room size, building age and materials, local climate and geography and how many buildings there are where you live. These are important considerations when choosing a purifier – as is the size, age and general health of the members of your family. That's why Philips has systems for different needs.

## PURIFIER

## COMBI

### LARGE ROOM

AC4091

AC4374

AC4076

AC4090

AC4372

AC4074

AC4072

AC4016

AC4014

AC4005

AC4086

AC4084

AC4082

AC4081

AC4080

### SMALL/MEDIUM ROOM

AC4006

AC4026

AC4004

AC4002

AC4012

AC4001

AC4025

**EFFECTIVE AIR PURIFICATION FOR EVERYONE**
No two homes are the same, which is why Philips VitaShield IPS air purifiers have a wide range of models designed for every kind of air quality issue. No matter what kind of home you have, or what the city or climate is like where you live, there's a VitaShield IPS purifier that's ideal for your air quality needs.

VitaShield IPS



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# Sources


1. PM 2.5 is defined as fine dust particles of a diameter of 2.5 micrometers or less.
2. According to a 2008 Microbiological Risk Assessment Report by the World Health Organization (WHO), the avian influenza, human influenza, Legionella and hepatitis viruses and the SARS coronavirus are larger than 20 nanometers (0.00002 mm).
3. Actual values were indoor/outdoor ratios of 1.62–6.37 for the summer months and 2.05–10.99 for the winter months. Text and Figure from: T. Salthammer Angewandte Chemie Int. Ed. 52, (2013), 3320; Original data from: B. Wang et al. / Atmospheric Environment 41 (2007) 2851–2861.
4. Ohura, Atmospheric Environment 43 (2009) 6352–6359
5. Region 4: Laboratory and Field Operations – PM 2.5 (2008). PM 2.5 Objectives and History. U.S. Environmental Protection Agency.
6. Pope, C Arden; et al. (2002). "Cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution". J. Amer. Med. Assoc. 287 (9): 1132–1141. doi:10.1001/jama.287.9.1132. PMID 11879110.
7. doi:10.1080/15287390590936166 PMID 16024504.
8. "Systematic review of Chinese studies of short-term exposure to air pollution and daily mortality", Yu Shang a, Zhiwei Sun b, Junji Cao c, Xinming Wang d, Liuju Zhong e, Xinhui Bi d, Hong Li f, Wenxin Liu g, Tong Zhu h, Wei Huang I, 19 February, 2013, Environment International 54 (2013) 100–111
9. National Toxicology Program (10 June 2011). "Report On Carcinogens – Twelfth Edition – 2011" (PDF). National Toxicology Program. Retrieved 2011-06-11.
10. "Formaldehyde" (PDF). Formaldehyde, 2-Butoxyethanol and 1-tert-Butoxypropan-2-ol. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 88. Lyon, France: International Agency for Research on Cancer. pp. 39–325. 2006. ISBN 92-832-1288-6. "Formaldehyde (gas)", Report on Carcinogens, Eleventh Edition, U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, 2005
11. Wolkoff, P., & KjÃ¦ rgaard, S. K. (2007). The dichotomy of relative humidity on indoor air quality. Environment International, 33(6), 850-857.
12. http://www.epa.gov/iaq/TVOC.html
13. IUTA test certificate number 55959.00 awarded July-August, 2013 for 1-pass removal efficiency of NaCL aerosol (particle size distribution from 10 nm to 100 nm) by Philips VitaShield IPS models AC4181, AC4372, AC4174, AC4080, AC4086, AC4006, AC4083, AC4084, AC4085, AC4076, AC4091, AC4014, AC4072, AC4074, AC4004, AC4012, AC4016, AC4026, AC4025, AC4002, AC4090, as tested with aerosol spectrometer TSI FMPS according to DIN 71460-1.
14. According to the online encyclopaedia Wikipedia's definition of CADR.
15. China's formaldehyde guideline is 100 µgr/m3 = 83 ppb

16. F. Shen “Indoor Air Quality at Newly Decorated Homes in Shanghai”, PRAS
17. ”Indoor air quality in Europe” conducted by Women in Europe for a Common Future (WECF) and INC/60 Millionis de Consommateurs
18. Text and Figure from: T. Salthammer Angewandte Chemie Int. Ed. 52, (2013), 3320; Original data from: B. Wang et al. / Atmospheric Environment 41 (2007) 2851–2861.
19. In tests, VitaShield IPS reduces 99.9% of bacteria and viruses in 1 hour. A Microbial Reduction Rate Test was performed at the Intertek microbiology lab in Columbus, Ohio. The samples were received in good condition on April 27, 2012. The Philips AC4072 air purifier was tested for its ability to reduce the number of microorganisms aspirated into a 411.4 cu ft test room. The AC4072 showed a 99.9% reduction of virus MS2 and bacteria B. subtilis from natural decay after 1 hour. Report no. 100815892COL-001, July 30, 2012


VitaShield IPS

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