BONECO
healthy air

TRADITION SINCE 1956
A SWISS COMPANY

Filter systems
for Air Purifiers

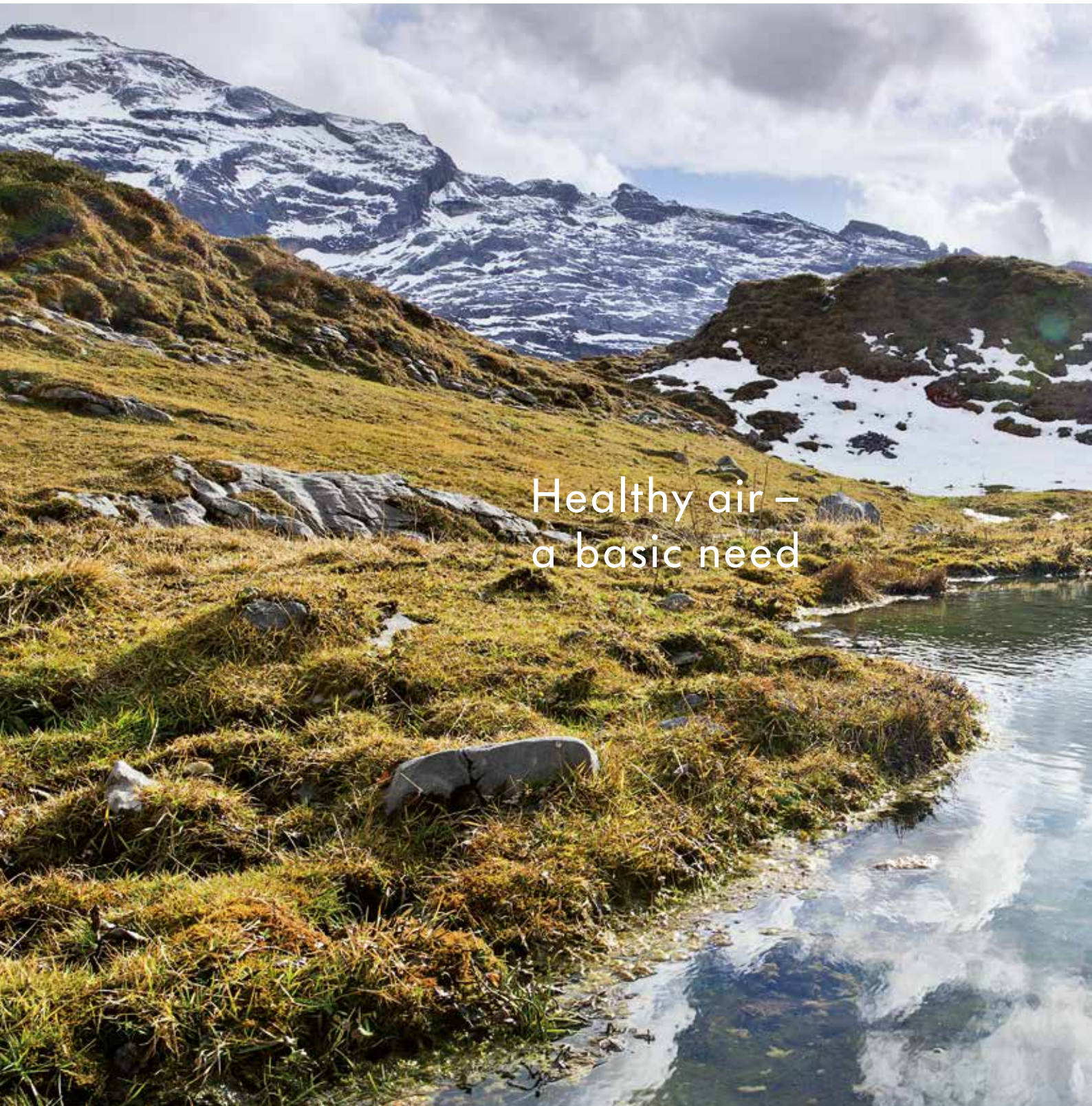

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IMAGE NICO SCHAERER ZURICH • ZERVREILA LAKE • VALS • SWITZERLAND

Why good air is so important for us

Our lungs perform a Herculean task

Every day we need around 20,000 breaths to extract the essential oxygen from 12,000 liters of air. The quality of this air has a direct impact on our well-being. Untreated air is not only dry, but often also polluted by house dust, pollen, cigarette smoke and bacteria.

What does our room air actually consist of?

Our air not only consists of oxygen and other gases, it also contains many different particles which cause us problems. Some of these particles are the product of our civilization, for example smog. Although other particles occur naturally, they are no less problematic. The number of people suffering from a pollen allergy in summer is therefore increasing continuously. This leads to hay fever and even asthma at times.

On the following pages you will find out how to create your own comfortable climate. Using the right systems and filters, you can eliminate harmful influences, reduce unpleasant smells and create pleasant air humidity.

Our room air is not as clean as we think

Our living rooms are extremely polluted

We block out noise and smells when we close windows. We enjoy the quiet and cleanliness in our own four walls. In many areas of the world, however, the air outside is not so highly polluted as the air in a living room. Whereas the air in an average town contains around 100,000 particles per cubic meter of air, the corresponding figure in our living rooms is up to 2,000,000 particles.


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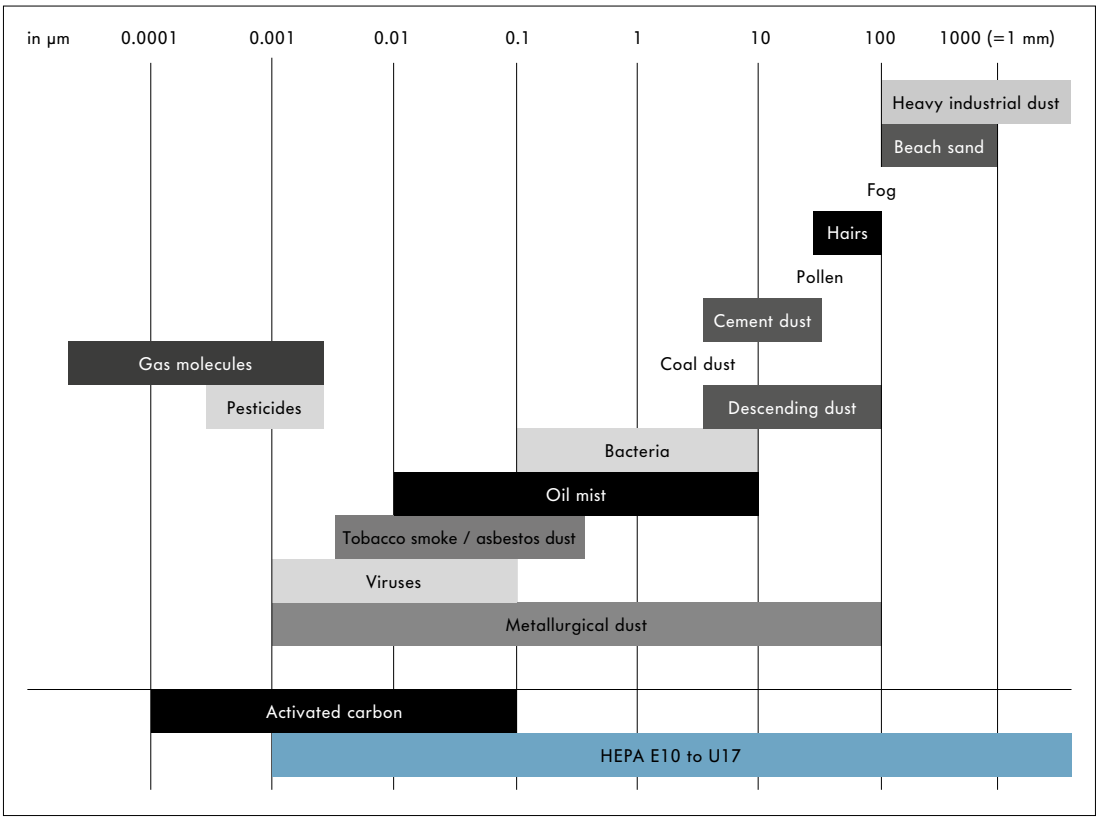
Composition of air pollution

What we generally call "air pollution" is a complex mixture of small particles and small drops. The extent to which they adversely affect our health largely depends on their size. Particles measuring up to 10 µm penetrate the lung and can cause breathing problems. Particles which are smaller than 2.5 µm actually get into the bloodstream where they can cause serious health problems.

The majority of BONECO Air Purifiers are therefore fitted with a HEPA filter. Its special structure can filter out particles measuring up to 0.3 µm - and therefore even minute objects such as bacteria.



Useful information about BONECO air filters

HEPA and activated carbon

How do HEPA filters work?

HEPA filters are primarily made of multiple arranged fibers with a diameter of between 0.5 and 2 mm. These fibers form the actual filter medium. Just like a sieve, the particles get caught in these structures.

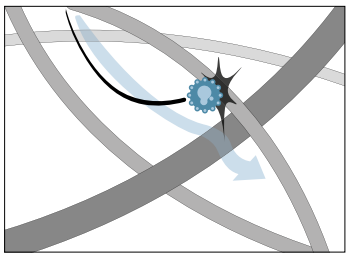
The dirt particles can be filtered out of the air by means of three different methods:

- Barrier effect (interception)
- Inertia effect (impaction)
- Diffusion effect (diffusion)

All these effects can be found in the BONECO filters depending on the equipment variant (ALLERGY, BABY, SMOG).

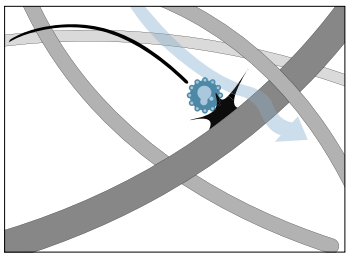
HEPA air filters ("High Efficiency Particulate Arrestance") work with an efficiency level of at least 99.97%. Particles measuring up to 0.3 µ are retained. HEPA filters are divided into different classes and are distinguished by "MPPS" (Most Penetrating Particle Size) from E10 to U17. BONECO filters are assigned to the classes E11 (ALLERGY, SMOG) and E12 (BABY).

Barrier effect



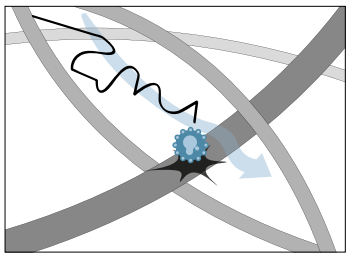
Smaller particles (0.1 – 0.4) are trapped when they follow the air flow around the fibers and come too close to the filter fibers.

Inertia effect



Particles measuring more than 0.3 µm are too large and therefore too inert to follow the air flow. They are filtered directly because they are caught in the fibers.

Diffusion effect



This effect is extremely efficient with very small particles (<0.1 µm), for example gases. Their movement line largely depends on the surrounding molecules. The particles are guided and slowed down through the filter until they get caught in the fibers through the barrier effect or the inertia effect.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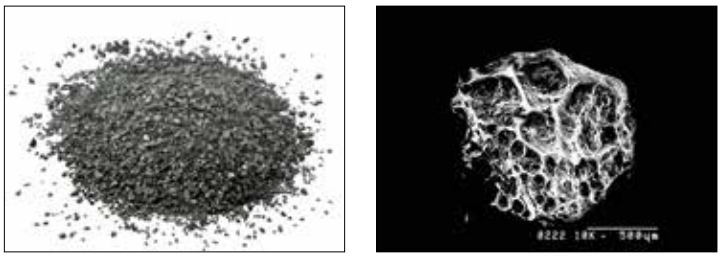
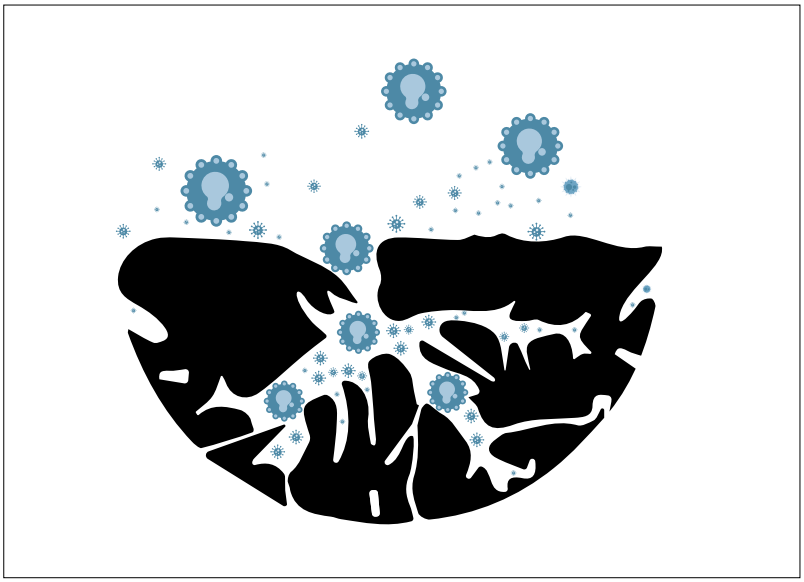
Activated carbon

If a pleasant room climate is to be created, unpleasant smells must first be eliminated. All BONECO filters are therefore fitted with an additional activated carbon filter. This "filter in a filter" is made of carbon granules. Its micropores are able to trap and neutralize different smell molecules.

In order to achieve an ideal effect, over 270 grams of activated carbon are used in the ALLERGY and BABY filters. Thanks to their special design, these filters are also able with the same amount of carbon to absorb up to four times more particles or molecules than normal carbon.



The carbon particles (left) and their structures under a microscope.



The "pore" structure of the charcoal traps and neutralizes different molecules and small dust particles.

Overview of BONECO filters

The three filter types

The BONECO filter system comprises the ALLERGY, BABY and SMOG filter types. All three models ensure that the air is cleaned very efficiently. The filters are compatible with one another. If the requirements change because you move, for example, from the town to the country, the SMOG model can be replaced at any time by the ALLERGY model.

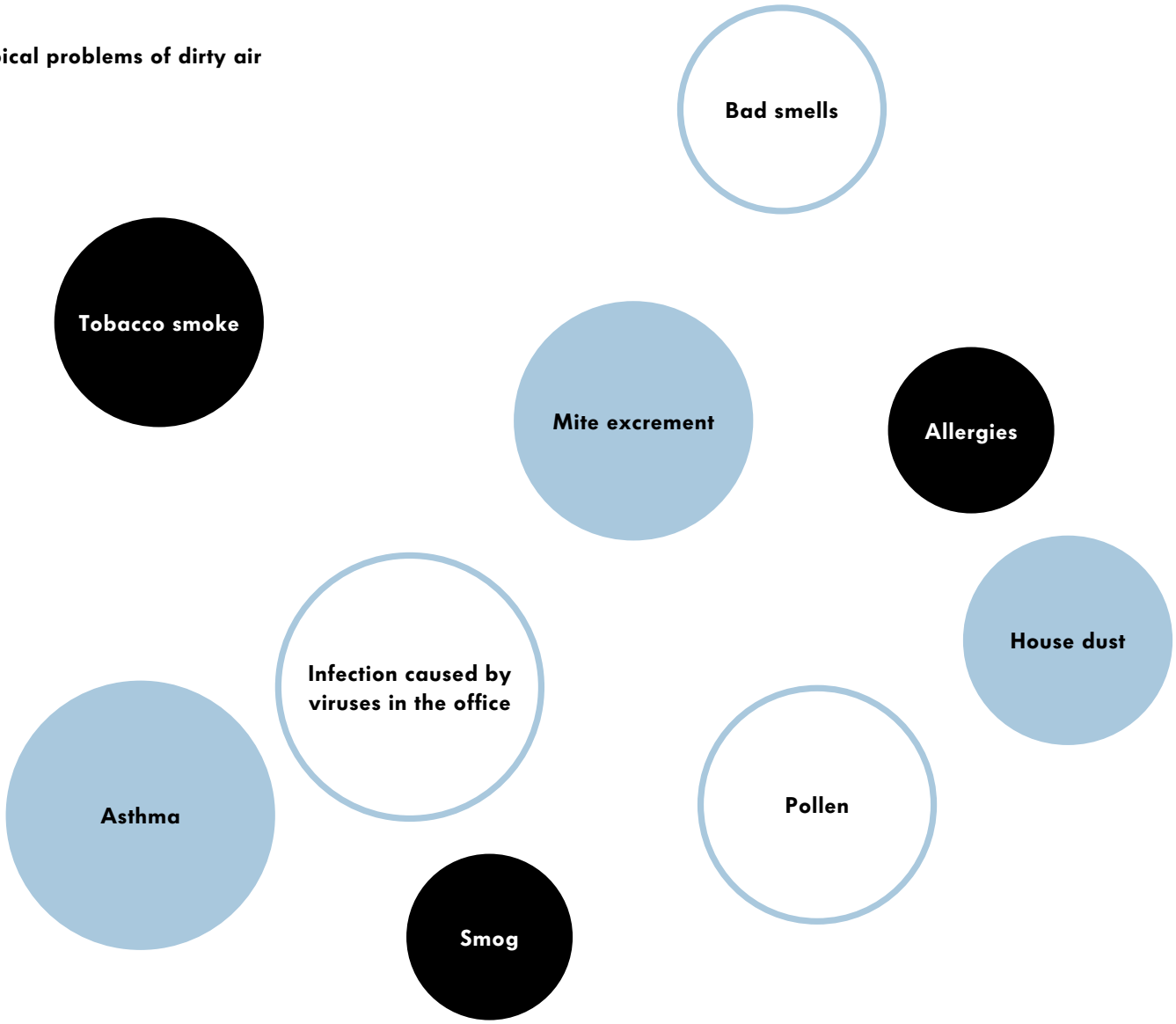
All three filters have similar properties. The ALLERGY filter therefore not only removes pollen from the air, but also dust and smoke to name but one example. Every filter type also features special properties which predestine it for a specific task.

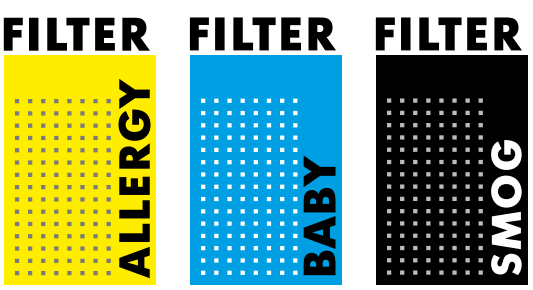
- **ALLERGY**
  The ALLERGY filter was developed to filter allergens out of the air. They primarily include pollen, mites, fine particles or other particles which are found in every living environment.

- **BABY**
  The BABY filter was developed specially for young families since babies and children react very sensitively to or are actually at risk from bacteria and germs.

- **SMOG**
  The SMOG filter is the first choice for city dwellers or heavy smokers. This high-performance filter has a slightly lower effect against pollen or germs. Instead, it develops its effect with high air pollution such as smog, tobacco smoke, kitchen smells or paint work.

Typical problems of dirty air

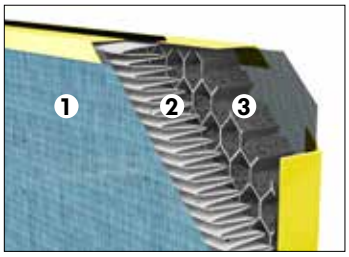




Clean air
is a question of technology

"Our products are developed according to your needs in order to prevent allergies. We attach maximum priority to the quality, performance and user-friendliness of the systems."

ALLERGY



1 Anti-allergy level
2 HEPA filter (E11)
3 Activated carbon filter

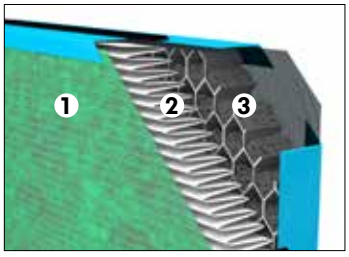
Advantages

Only someone who personally suffers from allergies can understand the problems which the affected persons must combat. The ALLERGY filter is designed to filter allergens out of the air with maximum efficiency. Pollen, fine particles, house dust, mite excrement and other allergens are trapped and neutralized. In order to achieve the maximum effect, it is recommended that the BONECO Air Purifier be placed in the bedroom at night.

How it works

Most allergens consist of water-soluble proteins which can penetrate the body very quickly and lead to allergic reactions. These allergens are stopped in the ALLERGY filter by a fleece made of natural polyphenol. Thanks to its special chemical structure, the compound "H2N-C-COO" is created. The allergens become water-insoluble and are therefore deactivated.

BABY

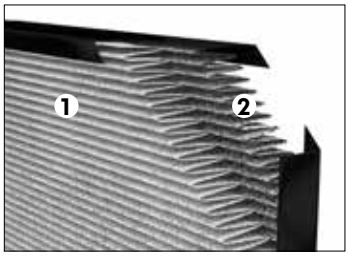


1 Enzyme filter level
2 HEPA filter (E12)
3 Activated carbon filter

Babies and small children are especially prone to illnesses. The BABY filter is therefore designed to eliminate viruses and bacteria. This prevents older family members from becoming a disease carrier when they come home, for example, after work or from school. The special enzyme coating of the BABY filter effectively neutralizes airborne pathogens.

Most viruses require bacteria as "couriers" to survive. The enzyme coating of the BABY filter kills these bacteria and thus the viruses too. The lytic enzyme also kills pathogenic bacteria such as colon bacillus, staphylococcus aureus and others. In a patented process the enzyme is produced using natural material which does not harm people or the environment.

SMOG

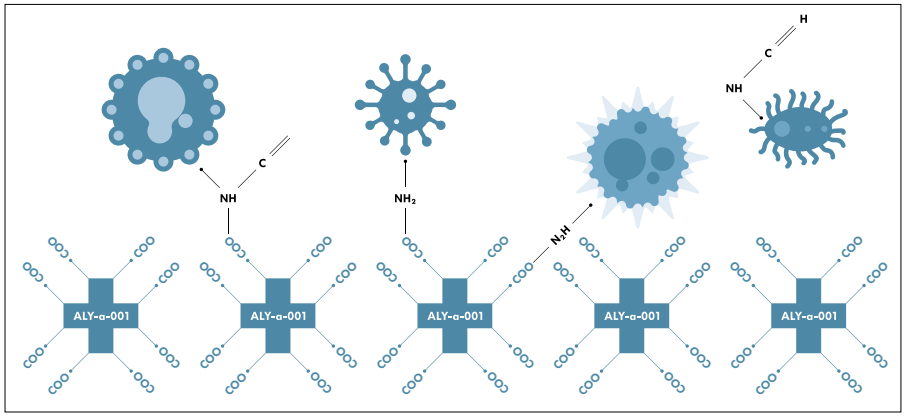


1 Electrically charged HEPA filter (E11)
2 Filter level flocked with activated carbon

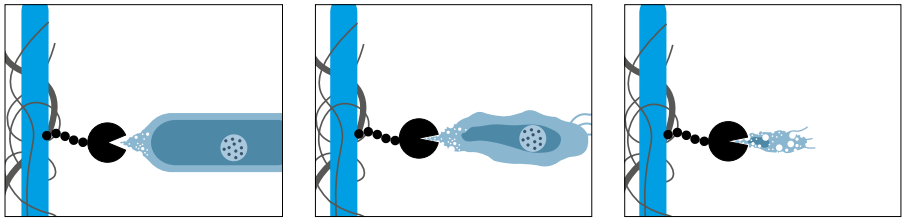
The principal task of the SMOG filter is to clean highly polluted air. It is ideally used in cities, but also reliably removes tobacco smoke and smells which occur, for example, during cooking or painting. Its activated carbon filter is designed for above-average pollution, which substantially increases the service life of the SMOG filter.

The SMOG filter consists of a special HEPA filter and an activated carbon filter layer. The electrostatically charged HEPA fibers improve efficiency significantly compared with conventional HEPA filters. In a patented process the HEPA fibers and the activated carbon particles are combined to achieve the best possible results. The activated carbon is also made of coconut charcoal which is regarded as the best material for removing gases.

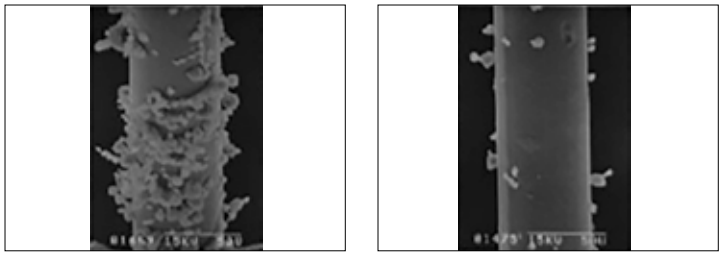
How it works



Different allergens are deactivated by the compound "H2N-C-COO" at the anti-alllergy level (ALY-a-001).



Lytic enzymes destroy the cell wall of the bacteria; the bacteria are therefore deactivated and then killed.



The quality differences between different filter fibers can be seen under a microscope. Whereas the medium used by BONECO (left photo) can bind and filter more particles due to electrostatic charging, the fibers in commercially available HEPA filters can be seen on the right.

Proof of efficiency

Japan Food Research Laboratories
(Rep. No. 03488), tested on staphylococcus aures (99.92%), klebsiella pneumoniae (99.92%), aspergillus niger (93%)

Sumika
(Rep. No. SF07-M530A) Mite allergens (99%), pollen, allergens (99%)

Tokyo Toshoku Eisei Kyokai
(Rep. No. A02758), tested on: escherichia coli (99.92%), staphylococcus aureus subsp. aureus (99.95%)

The efficiency of the SMOG filter was tested by the Shanghai Environmental Protection Product Inspection Station according to Chinese Standard GB18801-2008 with the following result: Formaldehyde cleaning efficiency 92%


FILTER
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Information regarding filter change

Filters are consumables. Dust, smells, harmful substances and bacteria are deposited in filters. After a few months the filters become less efficienct because they are clogged.

The durability of the filter depends on the filter type and the current air quality. An average service life has been defined based on our experiences and global statistics. It is based on families who predominantly live in cities with high smog pollution.

Your BONECO Air Purifier automatically calculates the utilization period and shows when a filter change is due through the symbol "Filter".

After the filter has been replaced, the interval is reset using a key combination.- The symbol is extinguished.

In order to maintain the efficiency of your BONECO Air Purifiers, the filter should be replaced as soon as possible after the symbol appears. Ideally you should always have a packed filter in reserve.

All BONECO air filters can also be purchased online at:
www.shop.boneco.com

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