

## Scientific Verification Of

# GENANO TECHNOLOGY®

## INNOVATIVE AIR PURIFICATION

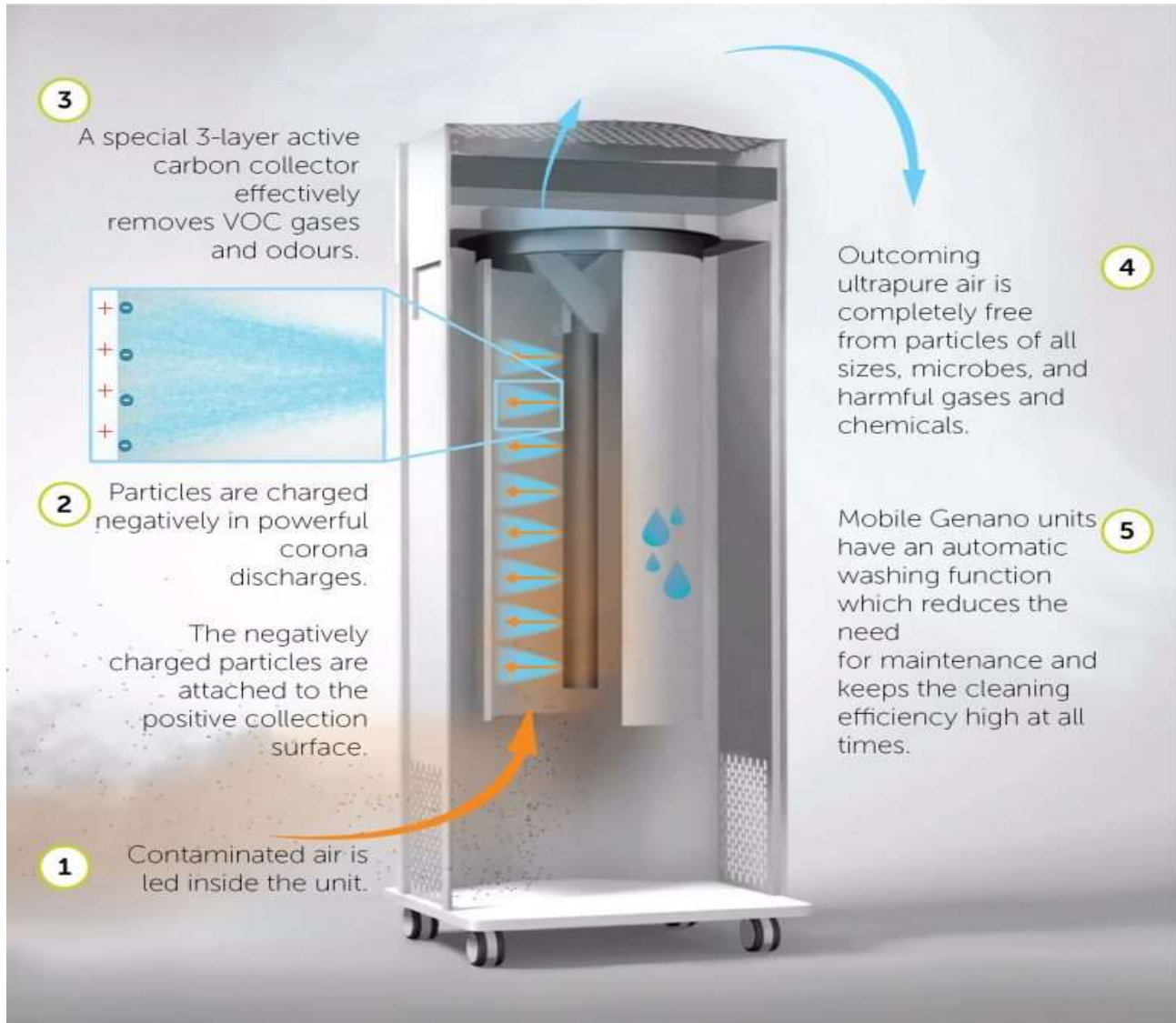
The superior performance of **GENANO TECHNOLOGY®** is based on a **globally patented** method for indoor air ultra-purification. It eliminates microbes, catching particles down to a nanometer scale – **.001 microns** – while it also removes gases and odors.

**This unique patented GENANO Technology® is based on co-operation between the process of \*ionization and \*electrostatic precipitation (attraction of particles) combined with a precise controlling influence and killing power of \*cold plasma.**

**\*GENANO Technology®** was originally developed in Finland for Clean Room air purification.

## THE OPERATION OF GENANO TECHNOLOGY:

- 1. First, contaminated air is drawn into the unit.** Particles are charged *negatively* in powerful **corona discharges**. The negatively charged particles are attached to the positive collection surfaces.
- 2. Particle-free air is then moved by a small efficient fan through a special 3-layer active carbon capsule,** which effectively removes VOC gases and odors.
- 3. Outgoing ultrapure air** is completely free from microbes and other particles as well as VOC's/other gaseous substances and odors.
- 4. Two portable GENANO models – the G310 and G5250 – have an automatic washing function,** which reduces the need for maintenance and keeps the cleaning efficiency high at all times.
  - ❖ **GENANO 120** is the exception, utilizing instead a special collector module which captures both particulate matter and gaseous substances.



## A CLOSED, SAFE SYSTEM

One of the main advantages of the unique, globally patented GENANO<sup>®</sup> system is that air purification takes place entirely *inside the device* and no particles or ions are distributed into the ambient room air.

Other technologies, with mere ionization-based air purification methods, are typically accused of ozone production as a process by-product.

When it comes to GENANO, this claim is irrelevant. Though it is true that a small amount of ozone can be formed in GENANO'S ionization process, the units themselves *do not produce a net increase of ozone*. They actually *reduce* the concentration of ozone in ambient indoor air produced by other devices such as printers.

This is possible because the very small amount of ozone released in the closed cleaning process inside a GENANO air purifier is captured by the effective Active Carbon Collector.

A major advantage of a **closed purification mechanism** is that dead microbes, mold spores, and ionized particles *cannot escape* the unit and re-enter the room.

In addition, the powerful Active Carbon Capsule ensures that harmful gases and odors are removed from the indoor air.

Only *ultrapure air* comes out!

## PROVEN AIR PURIFICATION EFFICIENCY

### BASED ON EXTENSIVE RESEARCH

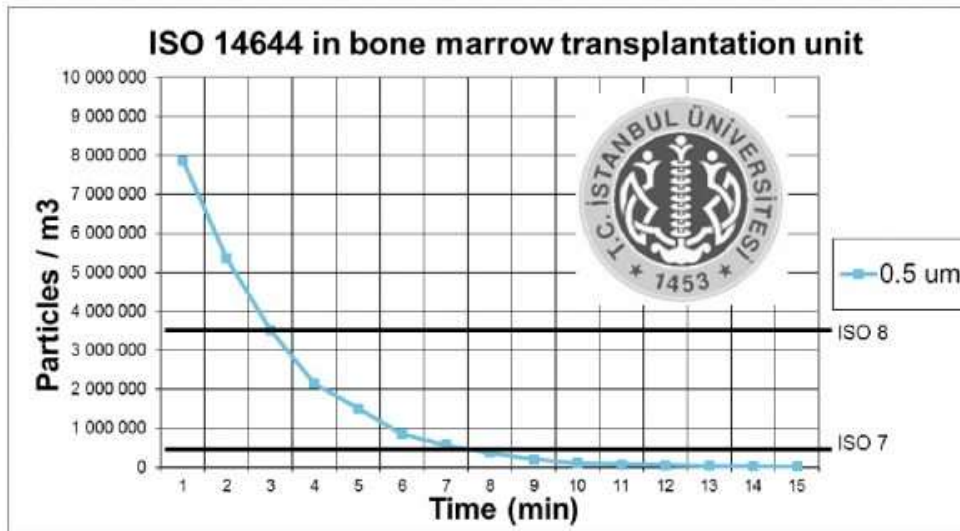
The purification efficiency and performance of GENANO Technology has been researched comprehensively. GENANO air purifiers have been tested in versatile laboratory conditions, as well as in real use conditions.

- The particle removal efficiency of GENANO Technology® has been measured by **Finnish Institute of Occupational Health**. The reported efficiency was better than **99.5%** for all sizes between 0.003 - 10.0 µm and for all air flow rates.

**Note:**  
**SINCE THAT TIME (2002),  
 MORE RECENT INTERNATIONAL LAB TESTS IN  
 FRANCE (2007) AND THE USA (2012)  
 HAVE PROVEN THAT THE  
 ULTIMATE EFFICIENCY OF **99.95%**  
 IS ACCOMPLISHED BY GENANO TECHNOLOGY®**

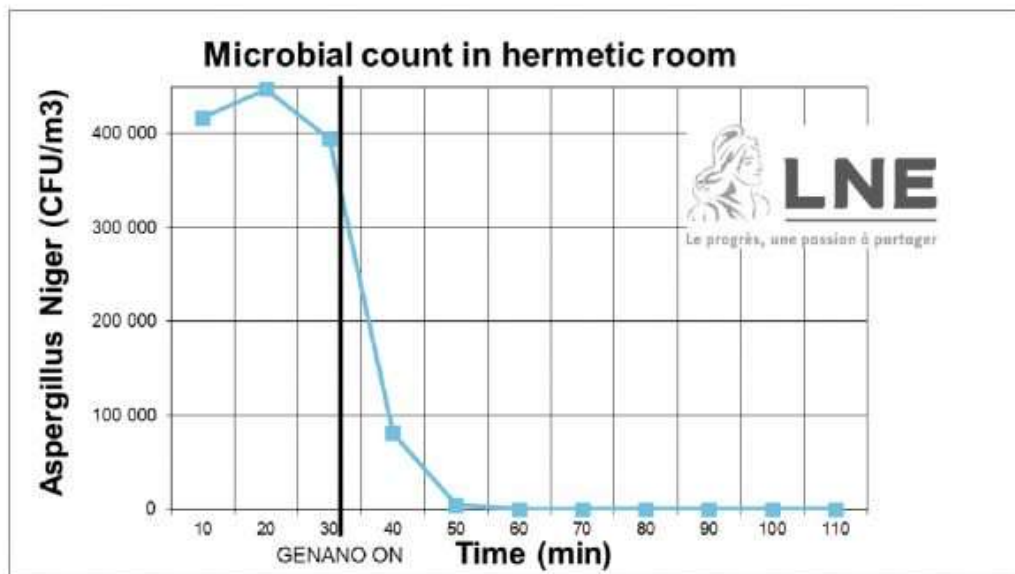
- The particle removal efficiency of a Portable GENANO Air Purifier was studied in a high-risk hospital room in a bone marrow transplantation unit by **Istanbul University** (Biomedical Device Technology).

**The GENANO 310 portable unit** reduced the particle count from 8 million to negligible within 15 minutes.



Time (min)	Particles / m <sup>3</sup>
1	7 866 142
2	5 354 485
3	3 512 979
4	2 148 775
5	1 514 567
6	845 789
7	576 222
8	374 082
9	211 116
10	103 002
11	74 664
12	51 257
13	

- **Cleanroom ISO 6 class** was reached with a GENANO air purifier in study made by an indoor air expert company Epitek Ltd. The particle concentration in the air was reduced to 1% in 13 minutes.
- **Tests by research company MetropoliLab** showed that GENANO air purifiers are able to eliminate microbes. *No viable microbes* were observed in the decontaminated air or in the washing liquid inside the unit. *None!*
- In a research setting by **Laboratoire National d'Essai**, different microorganisms were spread in the air to study the purification ability of GENANO air purifiers. The entire population of bacteria Gram-, yeast and mold was removed in less than 40 min.



Time (min)	Aspergillus Niger (CFU/m <sup>3</sup> )
10	417 582
20	447 390
30	394 982
40	81 301
50	4 938
60	0
70	0
80	0
90	0
100	0
110	0

GENANO air purifiers have been tested with these microorganisms:

- Acinetobacter
- Aspergillus niger
- Bacillus cereus
- Bacillus subtilis var.niger
- Candidas albicans
- Enterobacter
- Escherichia coli
- Klebsiella
- Micrococcus luteus
- Pseudomonas aeruginosa
- Saccharomyces cerevisiae
- Serratia marcescens
- Staphylococcus aureus
- Streptomyces

## CONTINUOUS CIRCULATION & PURIFICATION

GENANO<sup>®</sup> Air Purifiers are designed to continuously recycle and ultra-purify indoor air, steadily improving the air quality using a normal air ventilation system. The portable stand-alone units are easy to move around when mobility is needed.

**Note:** Devices based on filter technologies are penalized in the use of normal air ventilation systems because of increased pressure drop from the additional filtering mechanism. Unlike devices based on filter technologies, GENANO technology cleans the air in **free air flow**, so the **air volume and the purification level are constant at all times**.

GENANO air purifiers do not get clogged up even by large amounts of particles, and no exchange of expensive filters is ever involved.

GENANO Technology<sup>®</sup> in each of its models – portable and In-Line – is therefore a durable, economical solution with low need for maintenance.



All GENANO air purifiers are designed and manufactured in Finland.

## GENANO TECHNOLOGY'S CORE ADVANTAGES

- Eliminates all microbes and collects particles down to **0.001 µm size**.
- Removes gases and odors with an effective active carbon capsule.
  - Cost-effective maintenance with no disposable filters.

## Research Results

The purification efficiency and performance of GENANO Technology® have been researched comprehensively. GENANO air purifiers have been tested in versatile laboratory conditions, as well as in real use conditions.

All reports shown below are given by unbiased research facilities.

### Microbial Control

#### Microbial Elimination MetropoliLab, 2014

Tests by **MetropoliLab** shows that GENANO air purifiers are able to eliminate microbes. No viable microbes were observed in the decontaminated air or in the washing liquid inside the unit.

---

### Air Purification in Hospital Critical Areas

#### Istanbul University, 2014

ISO 6 class cleanroom standards were achieved with GENANO air purifiers in a research by the Istanbul University. Decontamination time of 12-13 minutes was measured for the rooms.

---

### Recommendation for Hospital Critical Areas

#### Ministry of Health, Saudi Arabia, 2012

Ministry of Health in Saudi Arabia recommends using GENANO air purifiers in eliminating microbes (e.g. tuberculosis) from the critical areas in hospitals.

---

### Microbiological Purification

#### LNE, Paris 2005



In a research setting by **Laboratoire National d'Essai**, different microorganisms were spread in the air to study the purification ability of GENANO air purifiers. The entire population of bacteria Gram-, yeast, and mold was removed in less than 40 minutes.

---

## Laboratories and Cleanrooms

### **Ability to Remove DNA Fragments from the Air VTT, 2005**

VTT tested the ability of GENANO unit to remove DNA fragments from the air. The test setting included the spreading of 264 base pair long fragments as an aerosol in the air.

---

## Cleanroom rating and reduction in particles concentration

### **Epitek Oy, 2013**

**Cleanroom ISO 6 class** was reached with GENANO air purifier. The particle concentration of air was reduced to 1 % in 13 minutes.

## Particle Measurements

### **Air delivery rate and particle measurements VTT, 2014**

VTT measured the air delivery rate and particle filtration capacity of GENANO 450 air purifier. Measurements were done using a system according to the European particle measurement standard EN779.

---

## Particle removal efficiency

### **TTL, 2003**

**Finnish Institute of Occupational Health** measured the particle removal efficiency of the GENANO air purifier. The reported efficiency was better than 99.5 % for all particulate sizes between 0.003 – 10.0 µm and for all air flow rates.