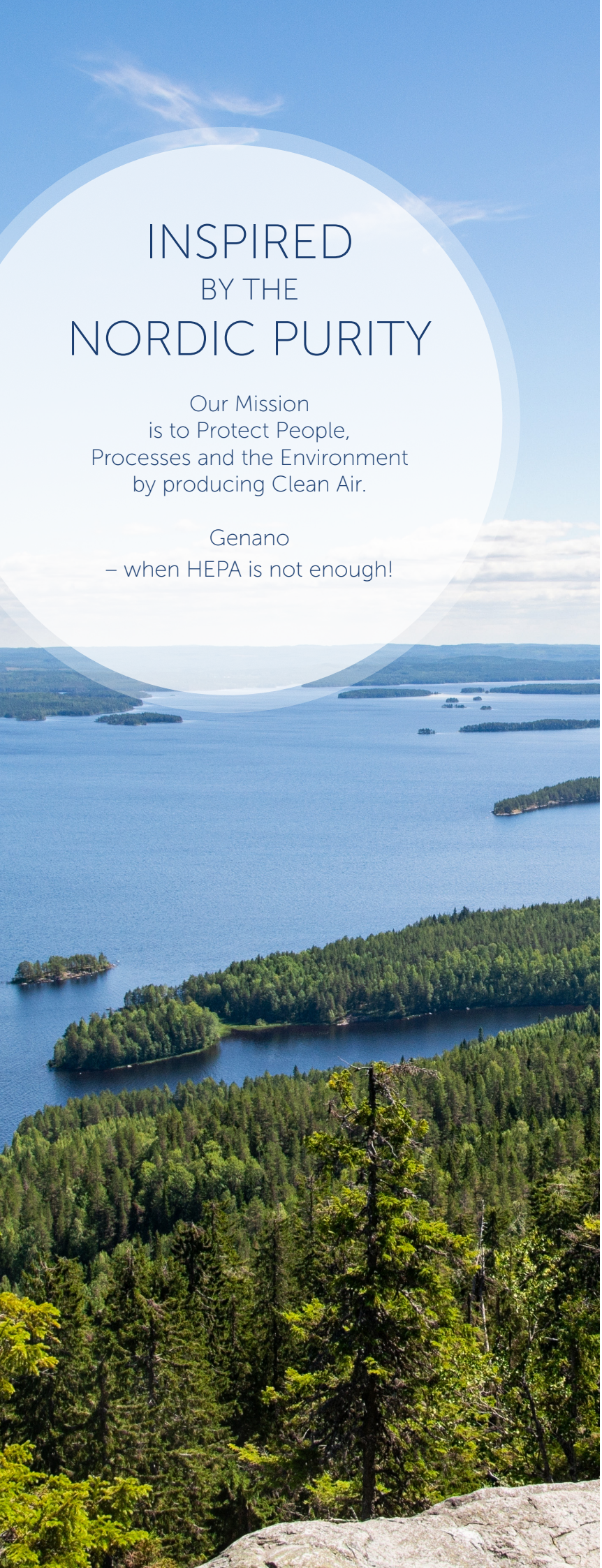
WHERE SUPERIOR AIR DECONTAMINATION IS NEEDED

Genano



INSPIRED
BY THE
NORDIC PURITY

Our Mission
is to Protect People,
Processes and the Environment
by producing Clean Air.

Genano
– when HEPA is not enough!

Finnish
Health Technology since

1960

Company Established

1999

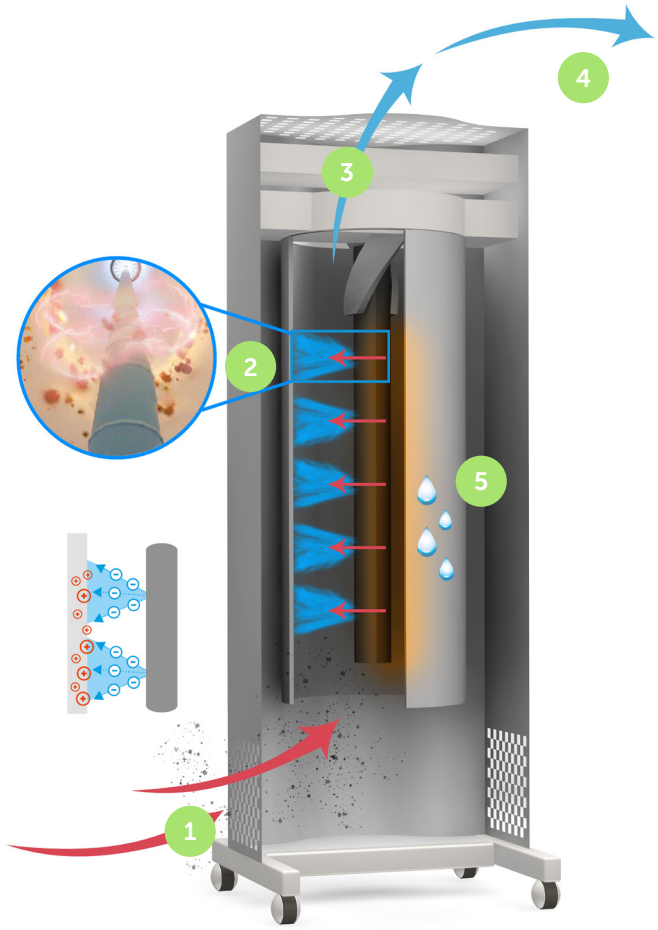
Operates in

30+
Countries

>50
Distributors
Worldwide

OWN
Patented
Technology

GENANO TECHNOLOGY®



1. Contaminated air is led inside the unit.
2. Particles are ionised and they attach to the collection tube. Microbes are destroyed in a powerful high voltage process.
3. Next, the air is led to active carbon collector which effectively removes ambient ozone, VOC-gases, other gaseous contaminants and odors.
4. Outcoming ultra-pure air is completely free from particles of all sizes, microbes; bacteria and viruses, and harmful gaseous compounds.
5. The units have automatic washing function which reduced the need for maintenance and keep the cleaning efficiency high at all times.

The only changeable part is the active carbon collector.

Genano Technology has been tested by various Research Institutes, such as:

Finnish Institute of Occupational Health

HYGIENE NORD GMBH

EPITEK OY

LNE
Le progrès, une passion à partager

VTT

SGS

MetropoliLab

Beyond existing solution

HOSPITALS

Healthcare facilities have range of Critical Areas, where poor air decontamination can lead to a disaster. Healthcare Associated Infections lead to a prolonged length of stay, increased use of antibiotics, and to unnecessary human suffering. Genano is a cost-efficient way to improve air hygiene in healthcare facilities, by preventing transmission of airborne pathogens. In contrast to HEPA filters, Genano also eliminates airborne microbes.

PREVENTING CONTAMINATION

- Raising hygiene in Critical Areas
- Preventing Surgical Site Infections
- Protecting & isolating immuno-compromised patients
- Preventing transmission of infectious airborne agents
- Decreasing the cost of HAI

APPLICATION AREAS

- Isolation Wards
- ICU/OT
- Protective Environment Rooms
- Bone Marrow Transplantation
- Haematology
- Oncology
- Organ Transplantation
- Pharma
- Opthaomology
- Burn Wards.

LABORATORIES & CLEANROOMS

With Genano Laboratory Air Decontamination Units, ISO class 5–7 cleanrooms can be reached cost-efficiently and quickly. Genano air purification technology meets ISO 14644 Standard. The solution can be designed to fit any room-spesific needs for ACH, pressurization or other demands. Genano Air Decontamination Units also work as additional purification system in existing cleanrooms and clean zones, where nanoscale decontamination is needed.

WHY AIR DECONTAMINATION

- Reach a specific particulate classification (ISO/Federal Standard))
- Minimize contamination and impurities in products and results
- Eliminate cross contamination from room to room
- Reduce false positive results in DNA analytics
- Protect personnel against infections
- Prevent contamination from mold and bacteria toxins

WHERE GENANO IS NEEDED

- PCR-testing
- Biosafety
- Genetics
- Virology
- Molecular
- Microbiology
- Labs handling infectious (i.e. SARS-CoV-2) samples
- In vitro fertilization treatments

R&D PRODUCTION AREAS

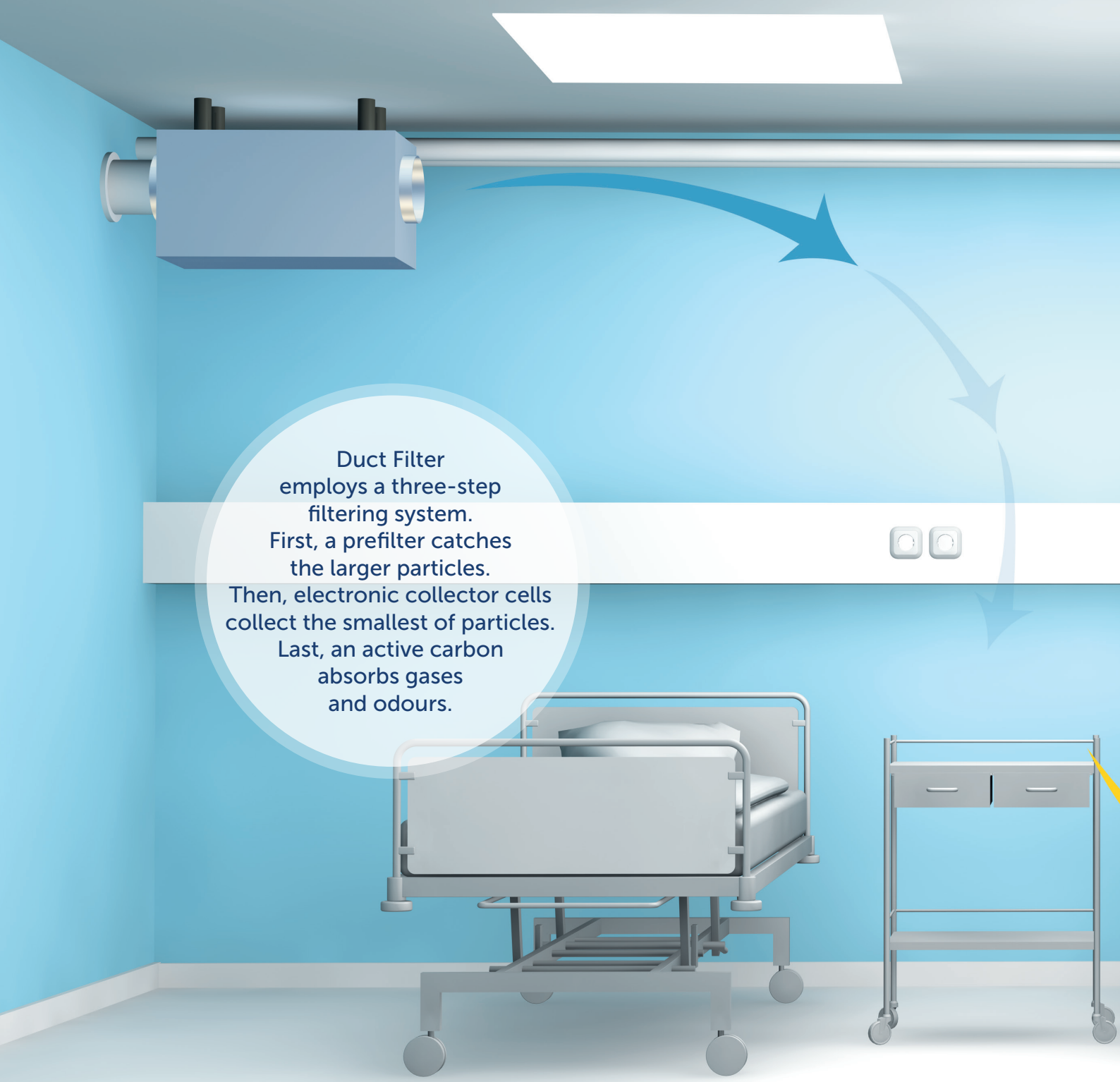
In cleanrooms, air quality is an important factor in assuring production and research quality. Airborne contamination can, at worst, lead to product recalls, expensive investigations and cleaning procedures, not to mention a weakened image and credibility caused by poor product quality. Reliability and repeatability of research results, and protecting the staff from particles in the air, are also a concern.

SECURING PRODUCTION AND STAFF FROM PARTICLES

- To improve production quality by removing airborne particles, chemicals, and biological organisms.
- Dust control.
- Protection of people from process emissions.

APPLICATION AREAS

Micro chips, Electronics, Optical, Bioindustry, Foodindustry, Pharma R&D rooms, Semiconductors, Silicon wafers, Nano technology, ALD, coatings, Food & Agricultural, Drug & Pharma, General industry labs i.e. petrochemical, etc.

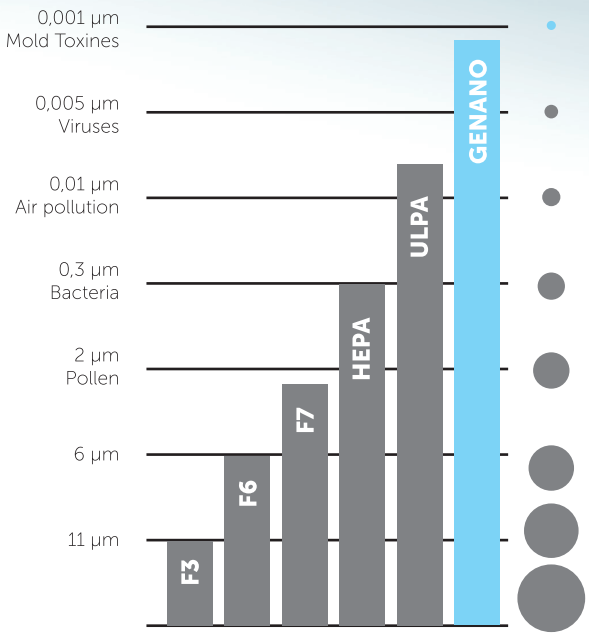


Easy Cleanroom set-up

modular solution when ever needed

	5250 Manual	5250 Automatic	E416 Duct Filter	E1250 Duct Filter
Cleaning Capacity	Max 500 m^3 / h	Max 500 m^3 / h	Max 400 m^3 / h	Max 1000 m^3 / h
Particle Removal	> 0,003 µm	> 0,003 µm		
Cleaning Efficiency	99,5 %	99,5 %	99,8 %	99,8 %
Gas Removal	800 g active carbon, 60 mm	800 g active carbon, 60 mm	Active carbon	Active carbon
Sound level	30–42 dBa	30–42 dBa		

High Capacity
Genano
Air Decontamination
Unit ensures contaminants
within the room will be
eliminated by killing all microbes,
capturing even nano-sized
particles and removing
gases and odors.



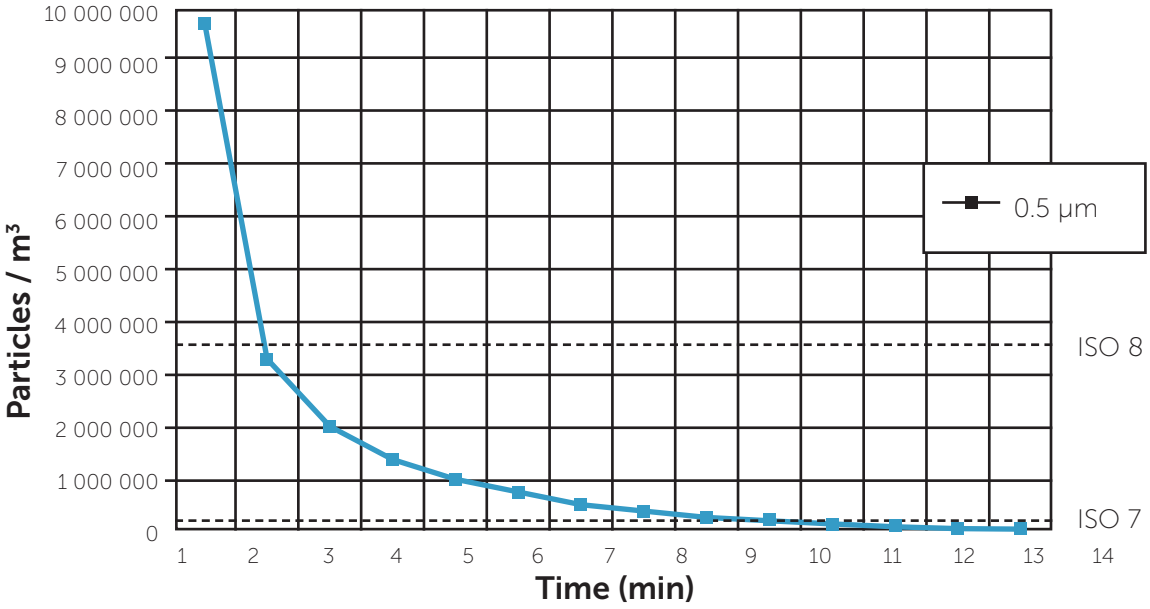
Epitek, Finland

ISO 14644 RECOVERY TIME

Cleanroom classification and recovery time meterings were performed in the ASTQ's lightweight structure test room.

Nanoscale Particle Purification

RECOVERY TIME METERINGS IN ASTQ



ISO-CLASS 6: AT REST, 0,5 µm

(10 SAMPLING LOCATIONS, THE MEAN OF VALUES)

	Particles / m³	ISO-Class	ISO-Class limit particles / m³	Sampling locations
0,5 µm	**10 725**	**6**	**35 200**	**10**

Class	**Maximum particles/m³**						**FED STD 209E**
	≥ 0,1 µm	**≥ 0,2 µm**	**≥ 0,3 µm**	**≥ 0,5 µm**	**≥ 1 µm**	**≥ 5 µm**	**EQUIVALENT**
ISO 1	10	2,37	1,02	0,35	0,083	0,0029	
ISO 2	100	23,7	10,2	3,52	0,83	0,029	
ISO 3	1000	237	102	35	8,3	0,29	Class 1
ISO 4	10 000	2370	1020	352	83	2,9	Class 10
ISO 5	100 000	23700	10200	3520	832	29	Class 100
ISO 6	$1,0 \times 10^6$	237000	102000	35200	8320	293	Class 1,000
ISO 7	$1,0 \times 10^7$	$2,37 \times 10^6$	$1,02 \times 10^6$	352000	83200	2930	Class 10,000
ISO 8	$1,0 \times 10^8$	$2,37 \times 10^7$	$1,02 \times 10^7$	3520000	832000	29300	Class 100,00
ISO 9	$1,0 \times 10^9$	$2,37 \times 10^8$	$1,02 \times 10^8$	35200000	8320000	293000	Room air

VTT Research Center Finland

- Measurement of particle filtrarion efficiency with Genano 5250.
- Flow-through method; particles generated by nucleation mode particle generator.
- Smallest measured particle size 5 nm.

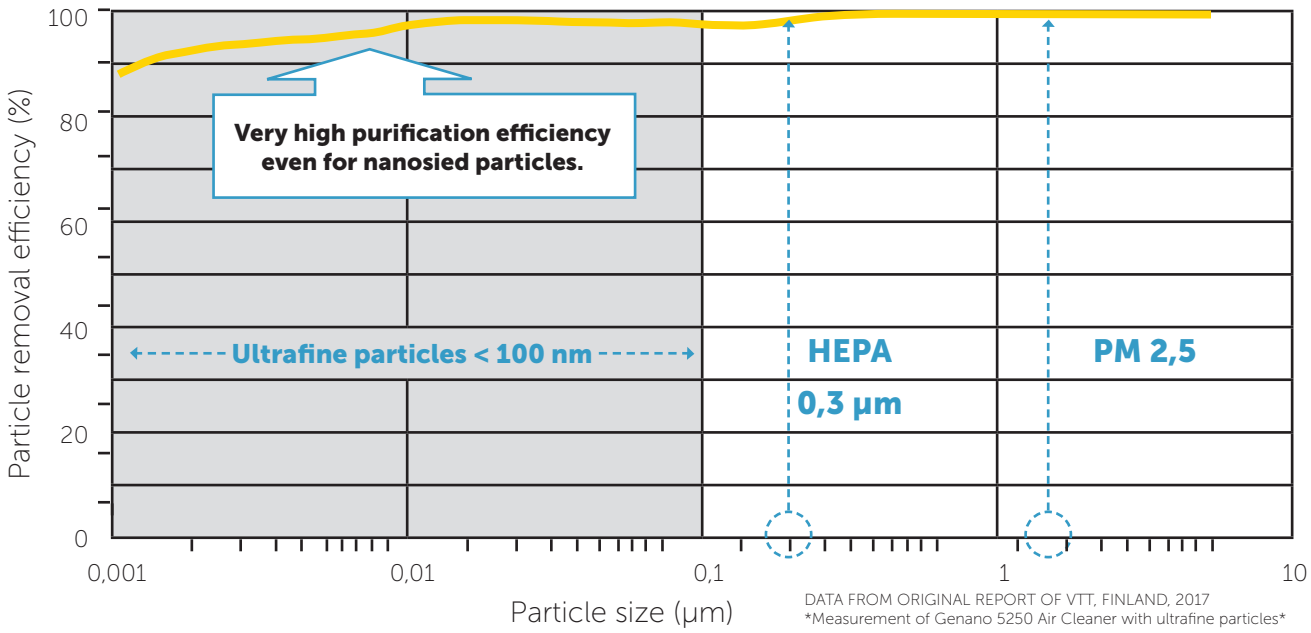
VTT Research Center Finland

REMOVING AIRBORNE DNA FRAGMENTS

Nanoscale Particle Purification

Particle removal efficiency, VTT

GENANO PURIFICATION EFFICIENCY AS A FUNCTION OF PARTICLE SIZE



DATA FROM ORIGINAL REPORT OF VTT, FINLAND, 2017
Measurement of Genano 5250 Air Cleaner with ultrafine particles

TEST SETUP

- DNA fragments produced by PCR
  - Length 264 base pairs (90 nm)
- Nebulised with a Laskin-type aerosol generator
  - Diluted with purified air
- Filtration efficiency
  - Determined by comparing DNA concentrations downstream of the air decontamination unit when purification on / off
  - Nuclepore 0.4 µm sample filters, qPCR analysis of filters, stirred in 4 ml of TE buffer

**The washing liquid was collected after the run of the tests no 1–5 (test 6) and after the test no 7 (test 8).*

GENANO AIR DECONTAMINATION UNITS HAVE BEEN TESTED WITH THESE MICRO ORGANISMS

- Acinetobacter
- Aspergillus niger
- Bacillus cereus
- Bacillus subtilis var.niger
- Candidas albicans
- Enterobacter
- Escherichia coli
- Klebsiella
- Micrococcus luteus
- MS2
- Pseudomonas aeruginosa
- Saccharomyces cerevisiae
- Serratia marcescens
- Staphylococcus aureus
- Streptomyces

Elimination of Microbes

VTT Research Center Finland

MICRTOBIAL EFFICACY OF GENANO AIR PURIFICATION TECHNOLOGY

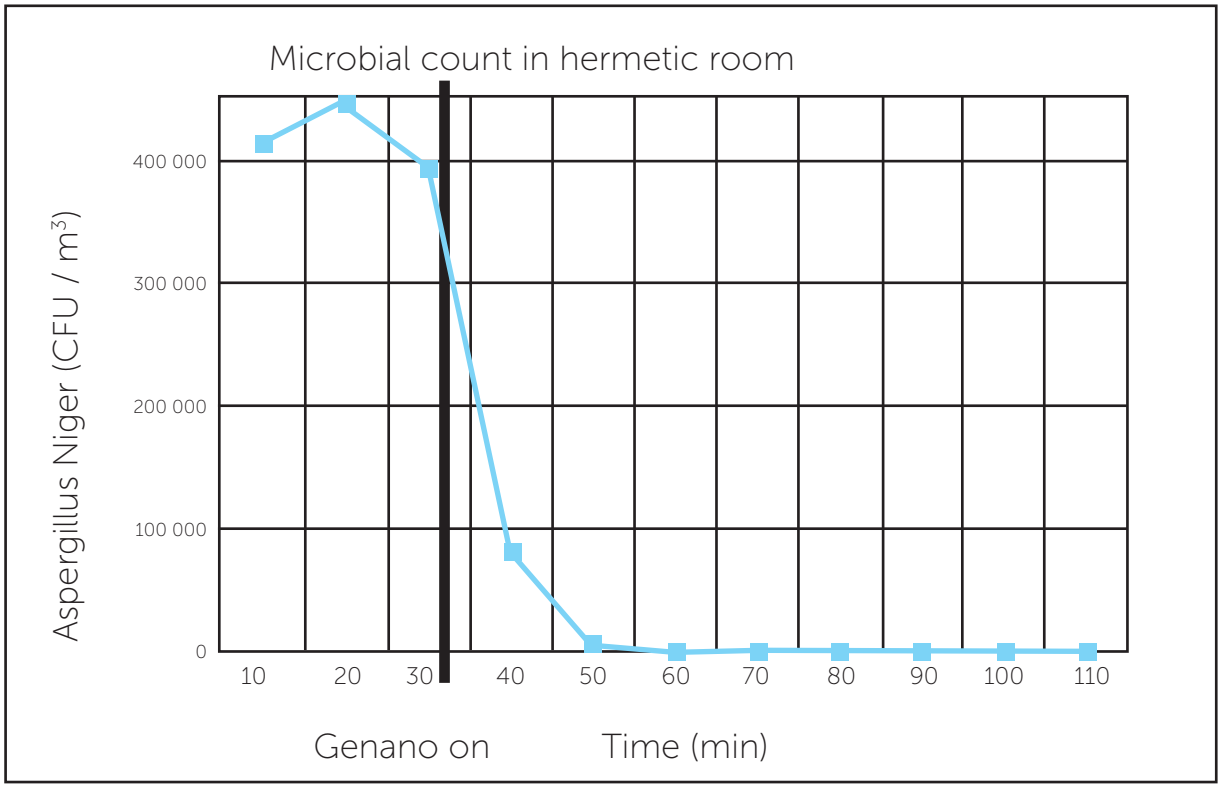
- Genano technology eliminates 99,999% of viruses and bacteria from indoor air

Type	Name	Reduction	Unit
Viruses	MS2 (SARS-CoV-2, SARS, Influenza, norovirus)	99,999%	G5250 & G350
Bacteria	Bacillicus atrophaeus	99,999%	G5250 & G350
	Staphylococcus epidermidis	99,999%	G5250 & G350
Mold	Aspergillus niger, "black mold"	99,999%	G5250 & G350

Laboratoire National d´Essai (LNE), France

MEASUREMENT OF THE KINETICS OF MICROBIOLOGICAL DECONTAMINATION

- Removal of all population in less than 30 min.




Hygiene Nord,
Germany
MICROBIAL
DECONTAMINATION
PERFORMANCE
Metropoli Lab,
Finland
ELIMINATION OF
AIRBORNE
MICROBES

Elimination of Microbes

Overview of the determined decontamination performance of the Genano 310 based on the average reduction factors.

	Immediate values (averaged over 3 rounds, if possible)			
Test organisms	CFU / plate or 100 l air		Reduction factor log^{10} RF	REduction factor log^{10} RF
	Without ionization	With ionization		
S.aureus	410	0	≥ 2,61	≥ 2,05 (average)
E.coli	123	0	≥ 2,09	
A.niger	256	6	1,63	
C.albicans	428	4,67	1,96	
P.aeruginosa	95	0	≥ 1,98	

MetropoliLab

- Washing liquid and the cleaned air was tested by MetropoliLab
- Microbes used: Staphylococcus aureus, Bacillus cereus, Saccharomyces cerevisiae and Streptomyces
- Results after a three hour test

> **No viable microbes were observed in the decontaminated air or in the washing liquid inside the unit.**

Microbe	Air output / 100 cm^2	Washing liquid / ml
Staphylococcus aureus	>5	0
Bacillus cereus	>5	0
Saccharomyces cerevisiae	>5	0
Streptomyces	>5	0

ADSORBTION OF ODORS

In addition, Genano Active Carbon removes smells and odors such as:

- Adhesives, paint, plastic and solvent vapours
- Antiseptic vapours, anesthetic gases, disinfectants and other smells in medical settings
- Animal odors, poultry smells
- Body smells, decaying odors, burned flesh
- Exhaust gases, combustion, diesel smells
- Mould smells
- Tobacco smoke odor

Elimination of VOC’s

Genano Air Decontamination Units utilize a high-quality active carbon collector with a highly porous structure. Each gram of active carbon has a surface area of approx. 900 m^2.

Genano active carbon collector has been tested for adsorbtion efficiency for hundreds of chemical compounds. It has a high adsorption efficiency for instance for VOC’s that can be dangerous for one’s health.

Volatile Organic Compounds (VOC’s) are emitted as gases from certain solids or liquids. VOC’s include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOC’s are consistently higher indoors (up to ten times higher) than outdoors. VOC’s are emitted by a wide array of products, such as Aromatic Hydrocarbon (toluene, benzene), Aldehydes, Halogenated Compounds, Esters and Alcohols (etanol, n-butanol, propanol).

These Airborne gaseous chemicals, have a significant negative impact on health.

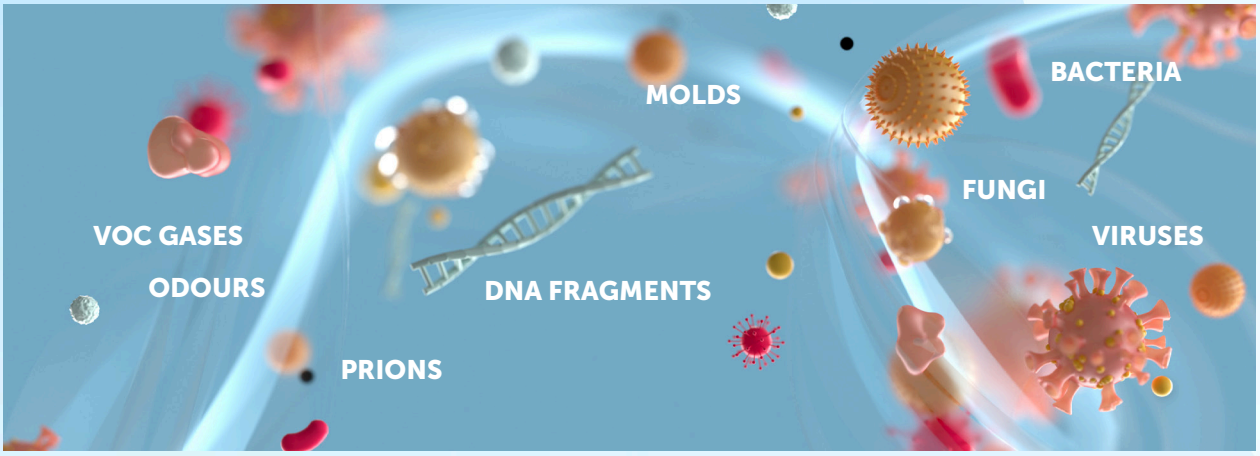
These substances are emitted from new furniture, construction materials, detergents and microbes. VOC’s are, for example, plasticizers used in various polymer materials that cause “new plastic smell”.

Genano Technology®

Patented Superior Air Decontamination

Patented Genano electric air filtration technology removes even nanoscale impurities. This unique method eliminates organic microbes, such as viruses, bacteria and mold. In addition, the method removes VOC gases and odors.

WHAT GENANO REMOVES FROM AIR



11/2022

genano

www.genano.com

Fore more information about Genano Air Decontamination Units, please visit www.genano.com, or contact us at info@genano.com.