Clean Air Solutions for a Healthier Indoor Environment

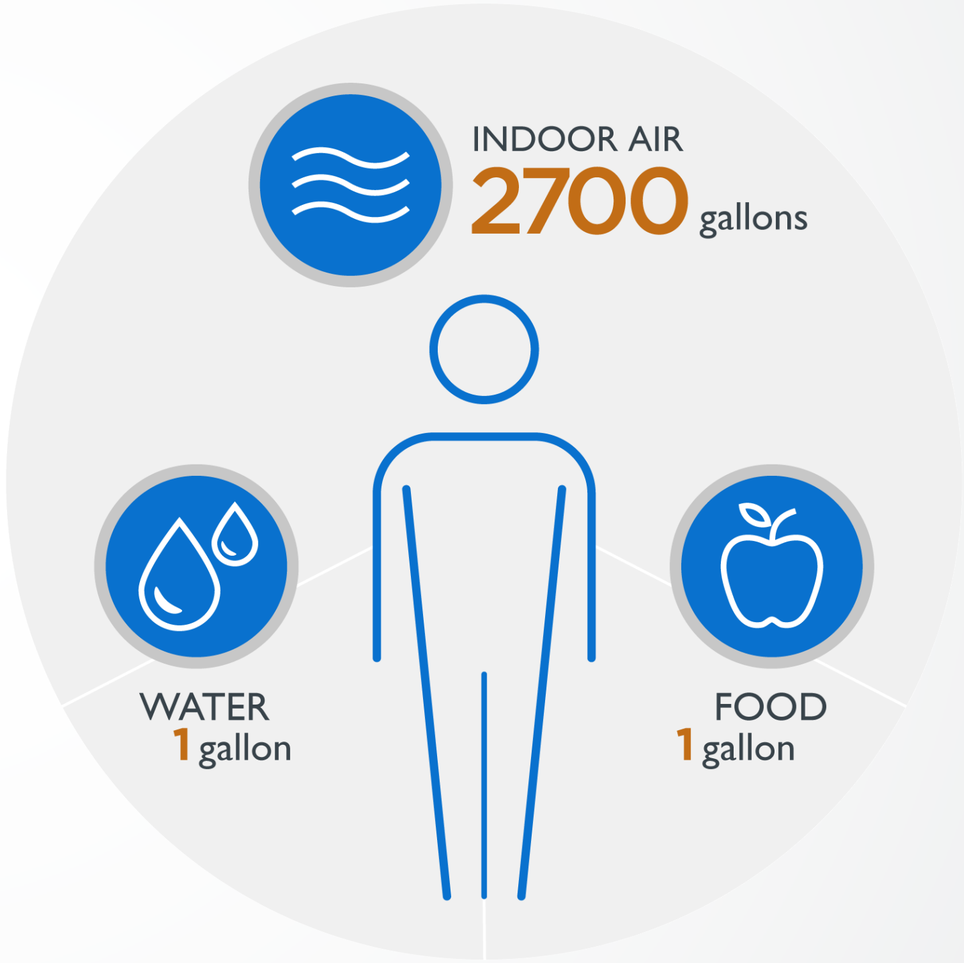
ViraTech

Why Purify Indoor Air?

People spend 90% of their time indoors inhaling up to 2700 gallons of air.

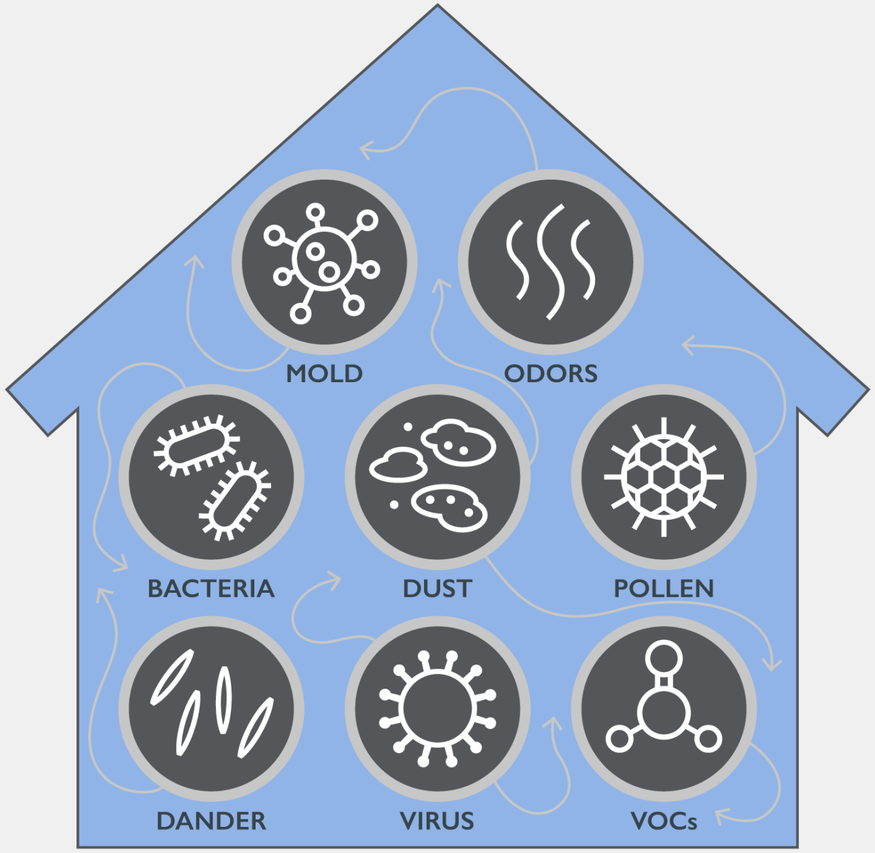
Indoor air is 10 times more contaminated than outdoor air.

EPA



What is in the air in an Average Home or Office?

- Viruses
- Bacteria
- Odors
- Mold Spores
- Volatile organic compounds (VOCs) such as formaldehyde and benzene
- Dust, pollen and pet dander
- Gaseous chemicals
- Particulate matter 2.5 microns (PM2.5) and smaller



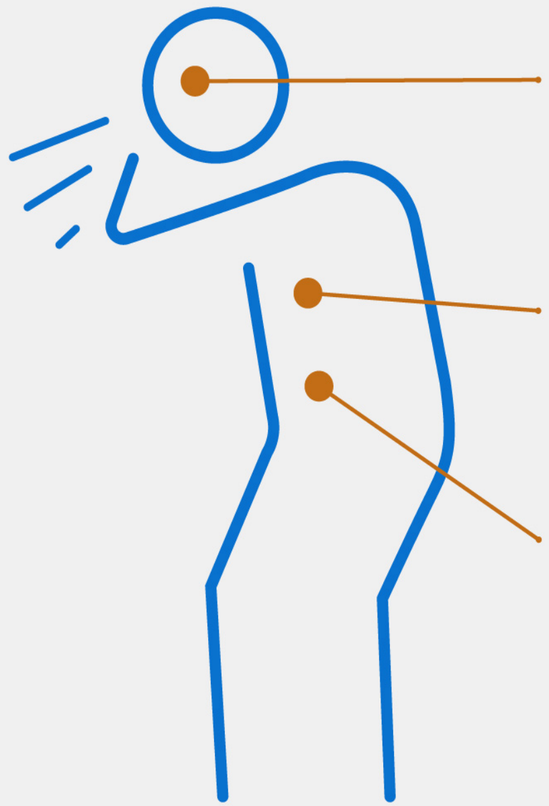
What Creates Indoor Air Pollutants & Odors in Home or Office

- Smoking
- Cooking
- Combustion products
  (wood stove, fireplaces, gas stoves)
- Building materials
- Human effluents / illness
- Lack of ventilation / stale air
- Cleaning chemicals
- Personal care products
- Paint, carpet, furniture
- Pollen, fungal spores, mold
- Pets/Pet dander

Air Pollutants & Pathogens Harm Human Health

Pollutants and pathogens suspended in the air can be absorbed into our throats, eyes, lungs and blood stream, negatively impacting our health. Poor indoor air quality can lead to allergies, asthma, and even affect cognition and performance.

A clean indoor environment begins with purified, fresh air.



Headaches
Allergies
Eye & Throat Irritation

Respiratory Infection
Asthma
Influenza

Norovirus

PURIFICATION TECHNOLOGY & SOLUTIONS

ViraTech Provides
Safe Purified Air Throughout Your Customer's Whole Home

ViraTech is committed to providing the best air purification solutions to the residential and commercial markets. Our HVAC and portable air purifiers are deployed worldwide, tackling some of the most challenging indoor air quality issues.

Our scientifically-proven bipolar ionization-based plasma technology outperforms carbon filters, UV and photocatalytic oxidation (PCO), in odor removal and other categories of pollutants from well-known allergens like dust, pollen, and pet dander to microscopic pollutants like viruses, bacteria, and gaseous chemicals.

Technology Comparison

Bipolar Ionization vs. UV Light, PCO and carbon filters

Applications using ViraTech treatment will realize a higher success rate compared to traditional solutions including UV Light, PCO and carbon filters. And this performance is realized at lower pressure drop, decreased energy consumption and at a competitive installed cost.

Traditional air filtration only provides a partial solution, removing only the largest of particles and allowing the smaller, more dangerous particles and pathogens to pass right through. Furthermore, filtration technology does not remove odors or VOCs — neglecting a major component of indoor air contamination.

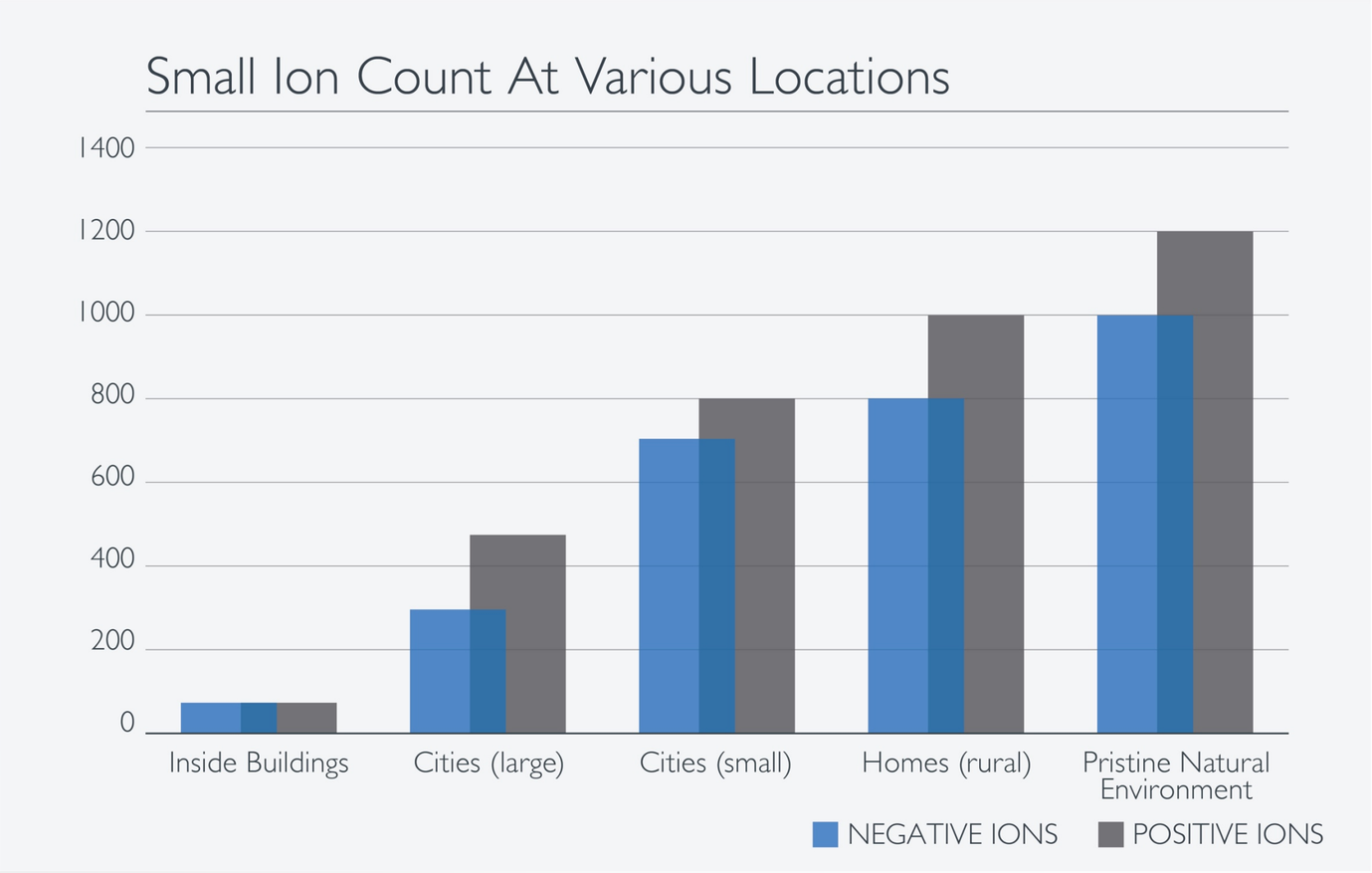
Technology Comparison

Bipolar Ionization vs. PCO, Ozone, Filters, UV Light

	Bipolar Ionization	PCO	Ozone Generators	Traditional Filtration	HEPA / Fine Grain Filters	Carbon	UV Lights
Success Rates	99%	Marginal	99%	Minimal	0 - 99.7%	Marginal	Marginal
Particle Size	Small < 2.5µm	Large > 5µm	Small < 2.5µm	Large > 5µm	Small > 0.3µm	N/A	N/A
Treats in Room Air	YES	YES	YES	NO	NO	NO	NO
Replacement Parts Needed	NO	YES	YES	YES	YES	YES	YES
Maintenance Required	NO	YES	YES	YES	YES	YES	YES
Produces Harmful Byproducts	NO	YES	YES	NO	NO	NO	NO
Energy Costs	$	$$	$	$$	$$$	$$$	$

ViraTech Bipolar Ionization Technology

THE POTENT POWER OF POSITIVE AND NEGATIVE IONS



At higher elevations, the sun's energy produces an abundance of oxygen ions. These ions contribute to fresh, clean air found in pristine natural environments. Similar to the effect sunlight has in the atmosphere, ViraTech technology produces a natural bio-climate rich in active oxygen molecules also known as ions.

ViraTech Bipolar Ionization Technology

HOW IT WORKS

IN-DUCT System Mounted

In-Room Occupied Space

1. Energy from the brush ionizer produces millions of positively and negatively charged oxygen ions. These ions purify the air within the system.

2. The ions travel out of the duct, into occupied space, neutralizing bacteria, viruses, and odor.

3. The ions also charge airborne particles such as smoke, dust, and pollen — causing them to cluster and be filtered out of the air stream.

Monthly Filter Changes Before and After BPI Installation

EFFICACY TESTING & LAB RESULTS

Independent Testing Partners

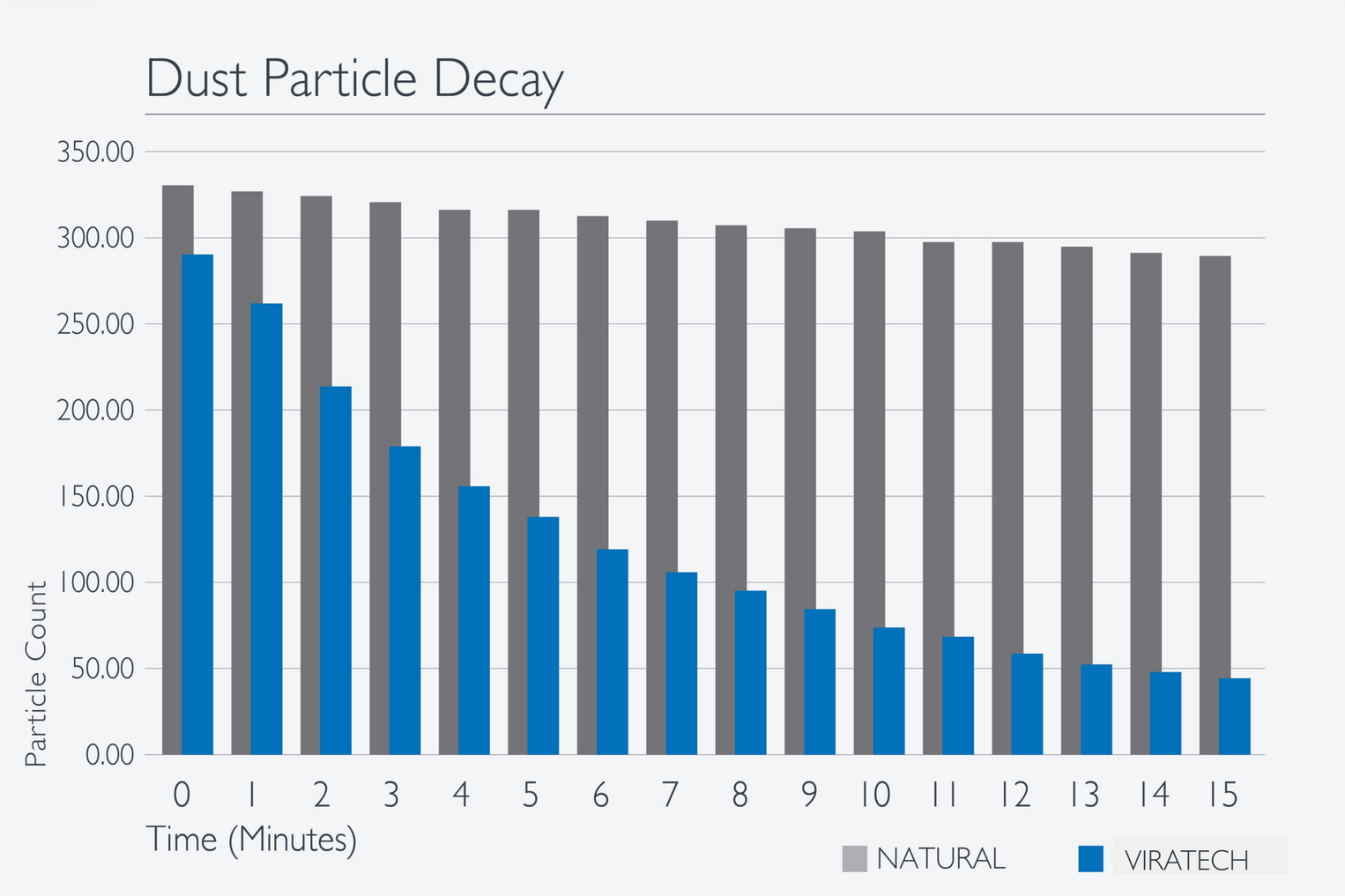
Pathogen Type	Pathogen Name	Testing Organization
Virus	Influenza H1N1	Kitasato Research Center, Japan
	MS2 virus	Aerosol Research and Engineering Laboratories
	Multiple organisms including bacteria, mold, spores and virus.	Microsearch Laboratories Ltd.
Bacteria	Escherichia Coli	EMSL Analytical, USA Istanbul University, Turkey
	Staphylococcus Aureus	EMSL Analytical, USA
	MRSA	EMSL Analytical, USA
	Pseudomonas Aeruginosa	Istanbul University, Turkey
	Staph aureus	Microbac
	Bacteria microorganism	NASA
	Staph epidermidis	Aerosol Research and Engineering Laboratories
	Multiple organisms including bacteria, mold, spores and virus.	Microsearch Laboratories Ltd.
Mold/Fungus	Cladosporium Cladosporioides	EMSL Analytical, USA
	Dichobotrys Abundans	Professor Joseph F. Boatman, USA
	Penicillium	Professor Joseph F. Boatman, USA
	Aspergillus Niger	EMSL Analytical, USA
	Allergen Testing	Indoor Biotechnologies
	Multiple organisms including bacteria, mold, spores and virus.	Microsearch Laboratories Ltd.
Spore	Bacillus Subtilis var Niger	Istanbul University, Turkey
	Multiple organisms including bacteria, mold, spores and virus.	Microsearch Laboratories Ltd.

Test Results

TYPE	NAME	VIRATECH RESULTS	TIME	TESTING PARTNER
VOCs	Total VOCs	98.6%	1 hr	LAWN Environmental Protection
	Formaldehyde	95.3%	1 hr	LAWN Environmental Protection
PARTICULATE	Smoke	96.3%	1 hr	LAWN Environmental Protection
	Dust	85.8%	15 min	Intertek
BACTERIA & VIRUSES	MRSA[1]	99.96%	3 hrs	Aerosol Research & Engineering Laboratories
	Pseudomonas aeruginosa	99.99%	1 hr	Istanbul Faculty of Medicine, Department of Microbiology and Clinical Microbiology
	Escherichia coli	99.43%	1 hr	Istanbul Faculty of Medicine, Department of Microbiology and Clinical Microbiology
	Bacillus subtilis var. niger	89.3%	1 hr	Istanbul Faculty of Medicine, Department of Microbiology and Clinical Microbiology
	Influenza A (H1N1)	86.6%	1 hr	Kitasato Research Center for Environmental Science
MOLD SPORES	*Aspergillus niger*	97.14%	2 hrs	EMSL Analytical
	Candida albicans	97.69%	2 hrs	EMSL Analytical
	Aspergillus fumigatus	91.1%	9 min	Intertek

Product Performance – Laboratory Testing

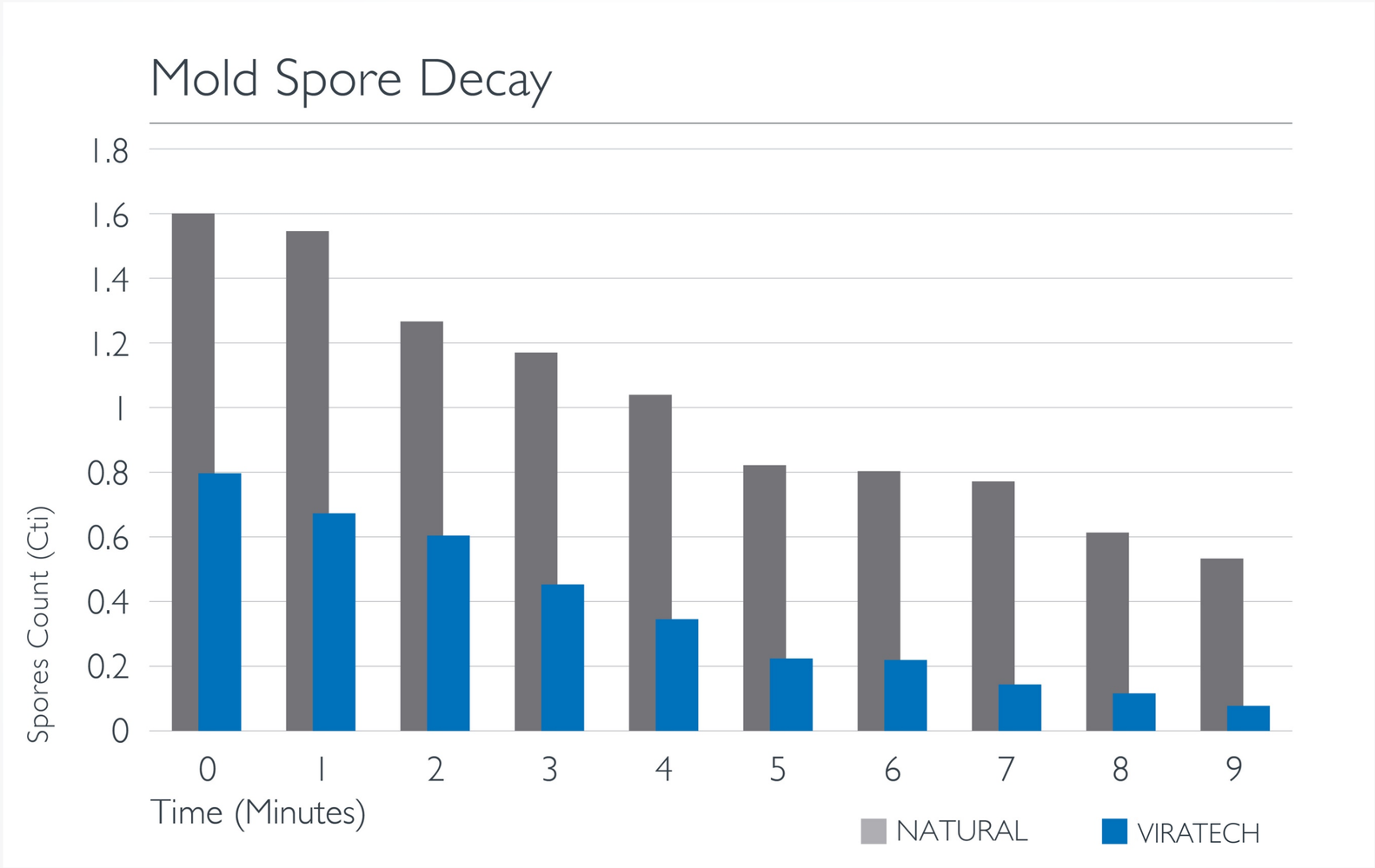
Effectiveness on Airborne Particles



Natural Decay 12.8% **ViraTech 85.8%**

Product Performance – Laboratory Testing

Effectiveness on Airborne Particles



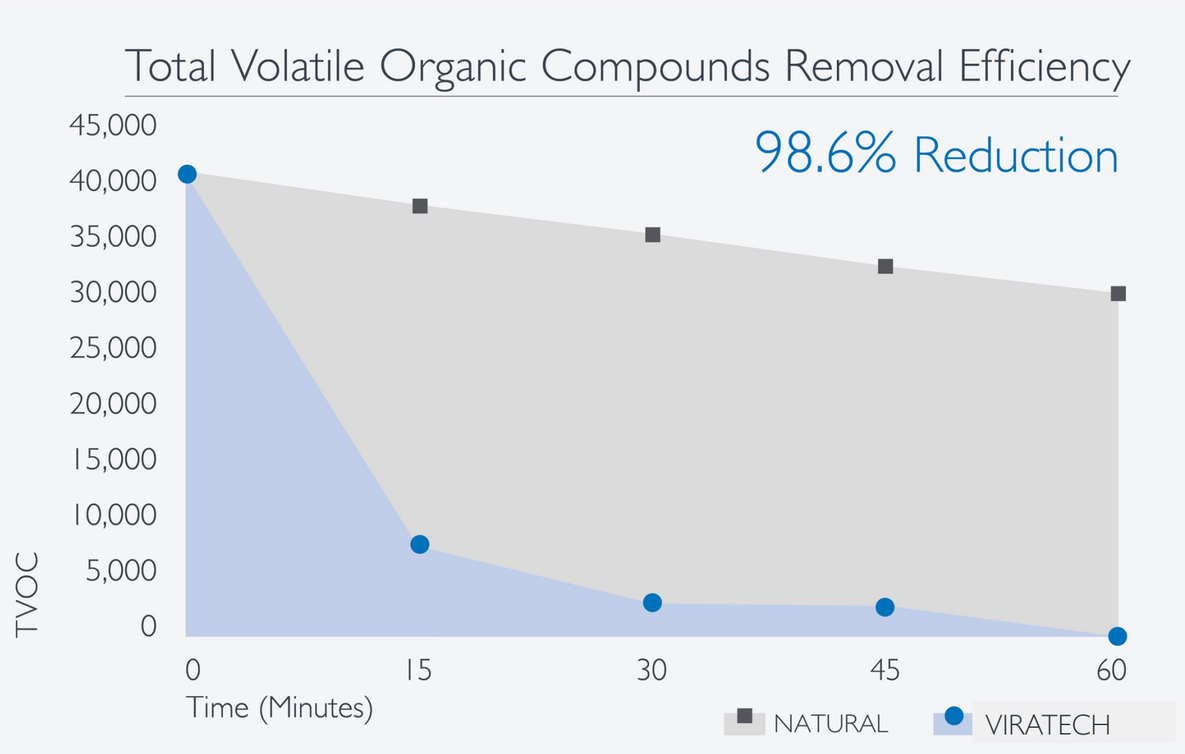
Natural Decay 67.1% **ViraTech 91.1%**

Product Performance – Laboratory Testing

Effectiveness on Volatile Organic Compounds

›

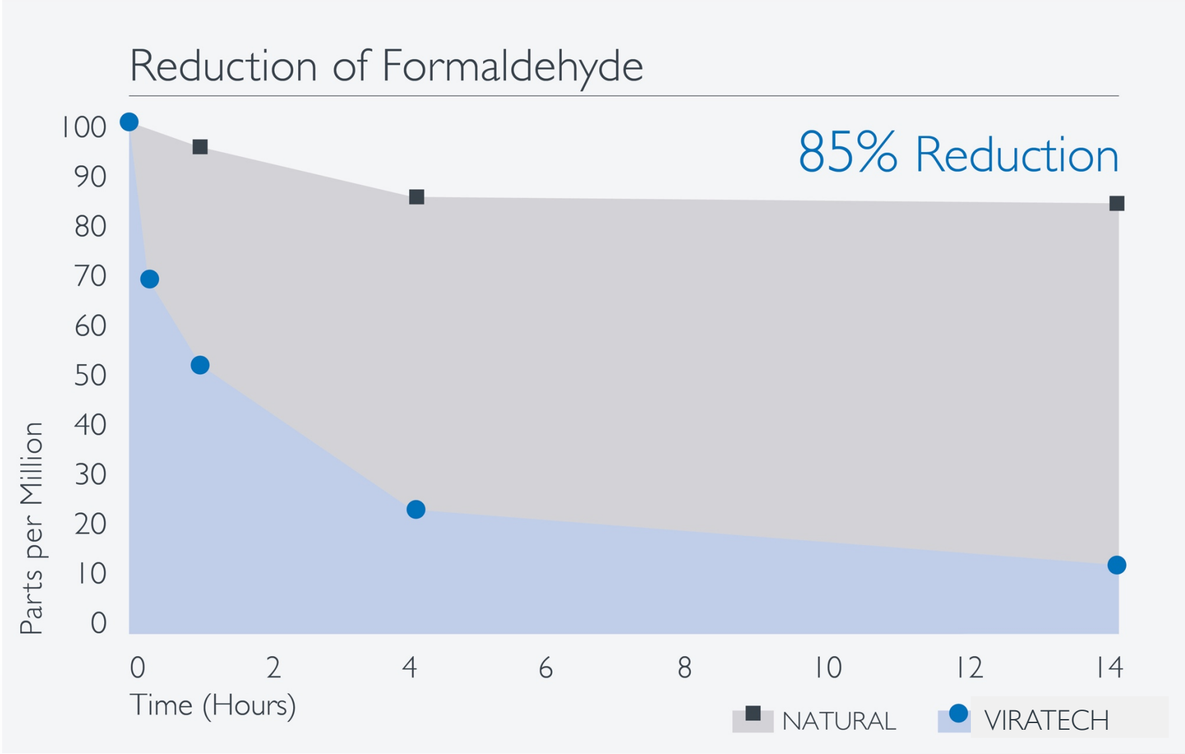
Effectiveness on TVOC



Removal rate at 1 hour: 98.6%

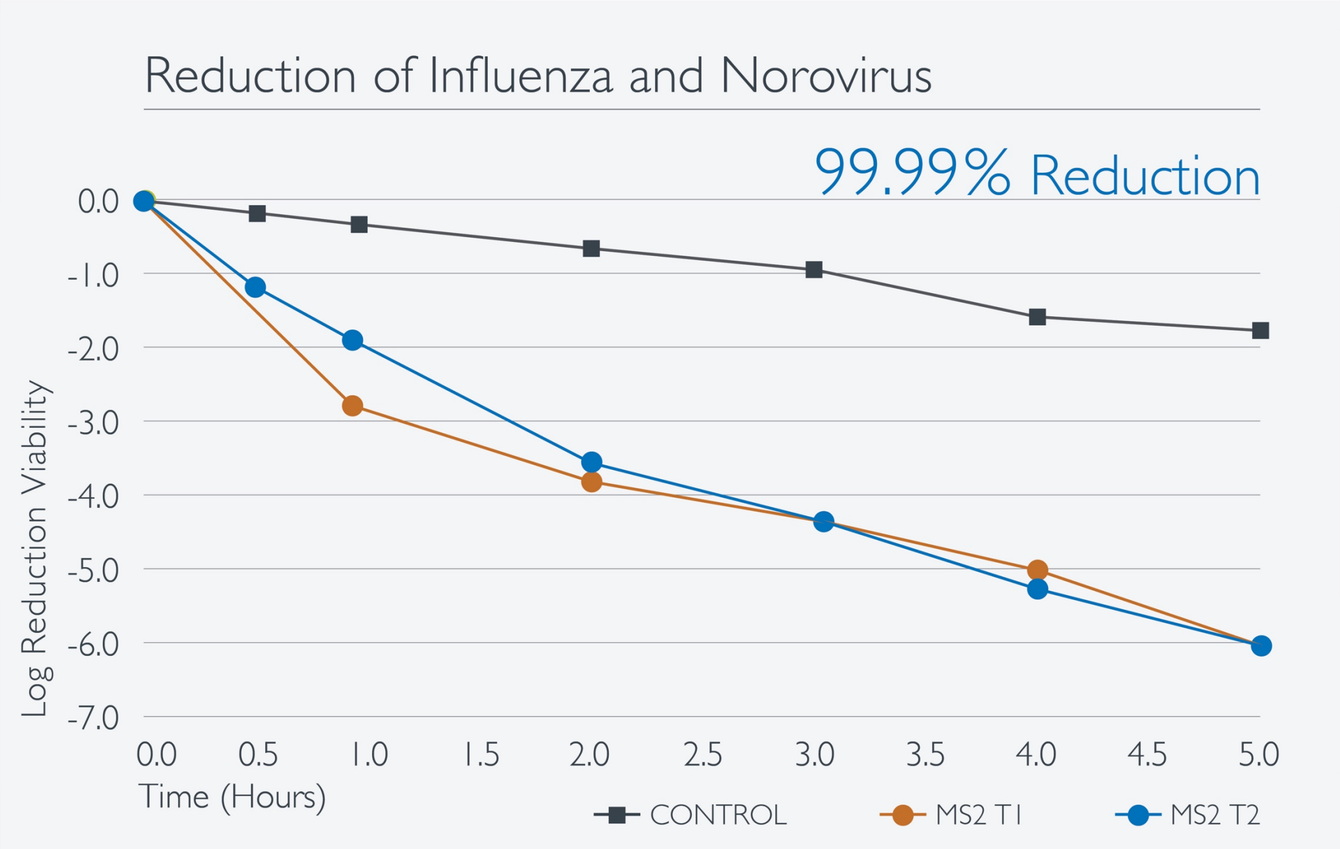
Effectiveness on Formaldehyde

HCHO Removal Efficiency



Removal rate at 1 hour: 95.3%

Product Performance – Laboratory Testing
Effectiveness on Influenza & Norovirus



MS2 virus

- Surrogate for influenza and norovirus

Results

- 4.4 log (> 99.99%) reduction

Test Lab

- Aerosol Research and Engineering labs (ARE Labs, Olathe, Kansas)

Product Performance – Laboratory Testing

Effectiveness on Microorganisms

Microorganism: A. niger mold spores

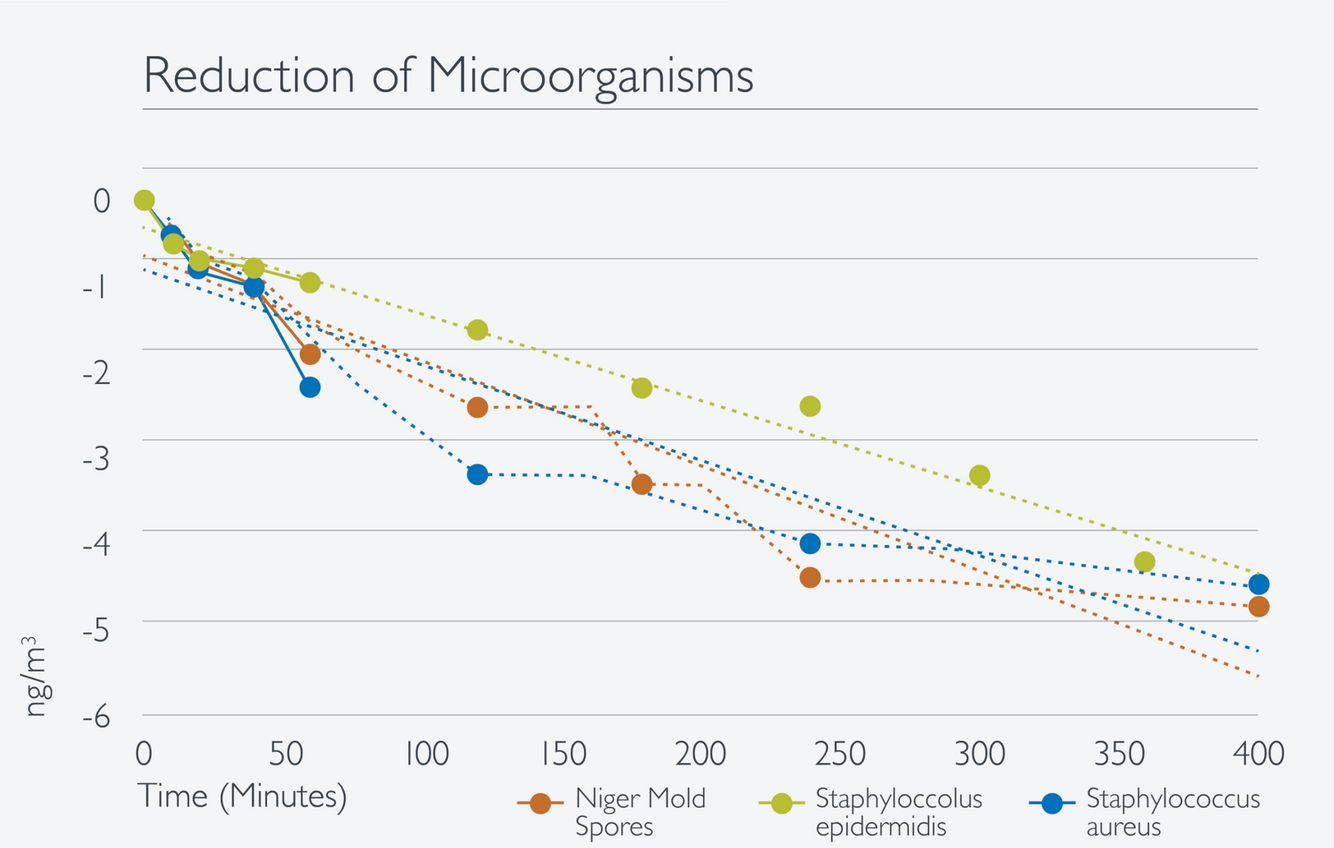
Time (Minutes)	Reduction (%)	Reduction (Log)
240	99%	2

Microorganism: Staphylococcus aureus

Time (Minutes)	Reduction (%)	Reduction (Log)
10	60%	0.4
20	84%	0.8
60	99.4%	2.2
120	99.94%	3.2
240	99.99%	4

Microorganism: Staphylococcus epidermidis

Time (Minutes)	Reduction (%)	Reduction (Log)
180	96.8%	1.5
360	99.8%	2.8



Safety & Compliance

- Listed / Certified by Underwriters Laboratories (UL) or Intertek-Nationally Recognized Test Laboratories (NRTL) approved by OSHA.
- Tested and certified to UL 867 for Electrical Safety and to UL 1995 for Air Hander Application Safety.
- Manufacturing facilities are audited quarterly by UL/Intertek to ensure product safety and integrity.
- Portables are compliant with California Air Resource Board

CALIFORNIA
AIR RESOURCES BOARD

For more information, visit our website www.viratechusa.com or email us at info@viratechusa.com or call us at 800-705-6265

Thank you!