

Air Guardian UVC Disinfection Chamber

ANTI-VIRAL & ANTI-BACTERIAL
KILLS >99% COVID-19

Virus Fan 
FIRST LINE DEFENSE 

**AIR
GUARDIAN**

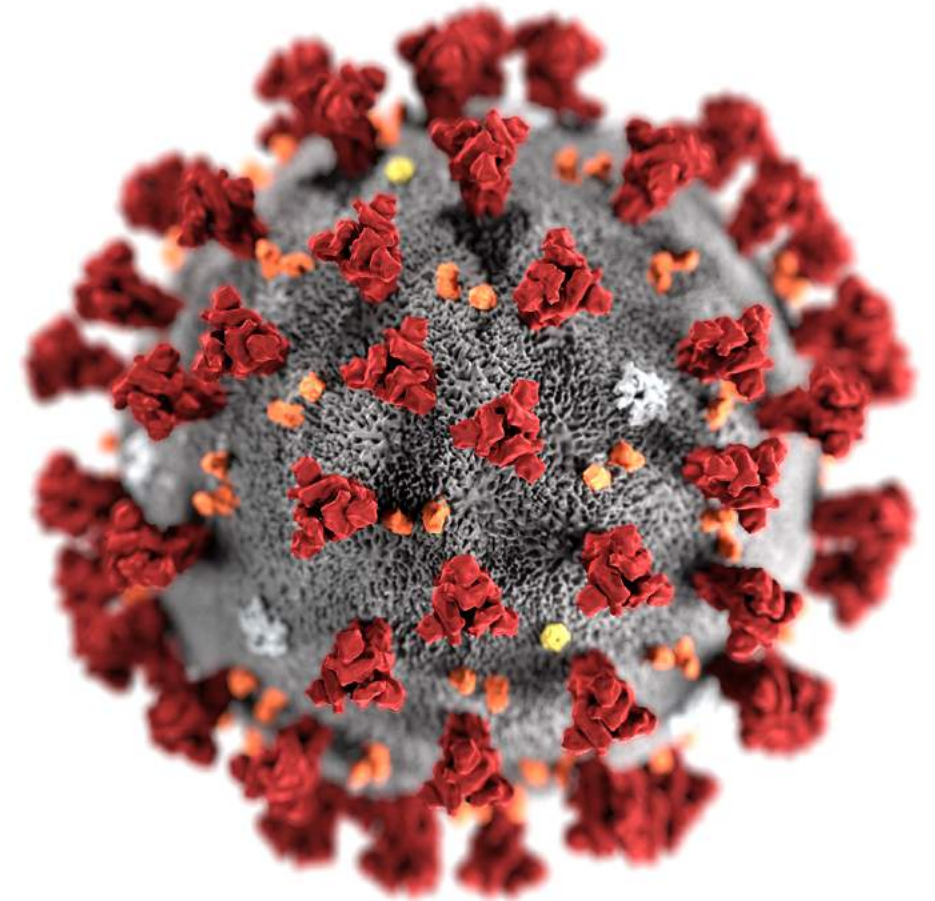


THE CHALLENGE

Throughout the current pandemic of COVID-19, applications of this technology are being leveraged to create products for every day commercial use. With the education market being heavily affected, businesses are now actively seeking a long-term strategy to ensure a safe working environment for employees and their customers

THE SOLUTION

UVC has been a staple within the scientific community for over 100+ years and is one of the few proven methods to kill viruses, mold, bacteria, and fungus. This technology has been widely used and embraced by the military and defense agencies, along with healthcare professionals worldwide



Air Guardian 5 Key Differentiators

1



Technology that leverages a UVC light spectrum. Proven and widely used technology that kills viruses, mold, bacteria, and fungus. Been used for 50+ years by military/defense organizations and healthcare professionals

2



The Air Guardian has an **EPA registration** number to verify capabilities of killing pathogens. It is **certified with the FDA** as a Class 1 - Disinfectant Medical Device

3



The Air Guardian has been 3rd party tested by Seoul Semiconductor, one of the largest electronic manufacturers in the world. The Study concluded the technology to **kill the COVID-19 virus in 13 seconds**

4



Comes with a 5-year warranty with a 25 year useful life.
No other technology comes with this warranty

5



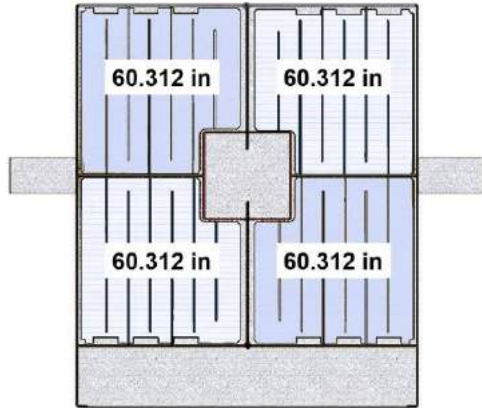
Provides continuous disinfection, while occupants are in the room

Air Guardian Overview

- Registered with the EPA & certified with the FDA as a Class I Disinfectant Medical Device
- 3rd party tested by Seoul Semiconductor to kill COVID-19 in 13 seconds
- Connects to existing electrical infrastructure for installation
- Serves as the highest level of disinfection technology available on the market today
- Provides continuous disinfection while occupants are in the room
- Long term solution with little to no maintenance or servicing (Set it and forget it dynamic)
- Projects roughly 45 decibels of sound output while running
- Includes HEPA type carbon glass filters providing increased indoor air quality
- Carbon glass filter change outs required 1-2 times per year
- ASHREA compliant. Made in Houston, Texas.



Air Travel Distance



Pathogens are forced through a chambered system of UVC chip lined channels to kill the COVID-19 Coronavirus in 13 seconds

INITIAL AIRFLOW
Room air is ingested by the Air Guardian Fixture and is forced through a titanium dioxide and filtered through the enclosed system

AIR GUARDIAN BOX DESIGN
The structural design of the Air Guardian **creates a turbulent airflow and increases the exposure to ROS** (Reactive Oxygen Species) and other destructive agents created by the UV - activated catalytic process

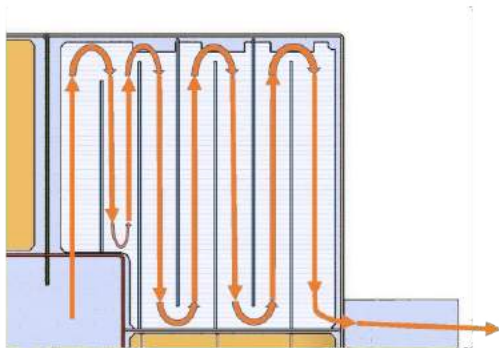
UVC DISINFECTION
During the time inside the Air Guardian, which is extended by flow design, room air **is exposed to the disinfection and destruction forces of the high-energy UV light** emitted within the sealed device

Distance Travelled by Air

Sub-Total:

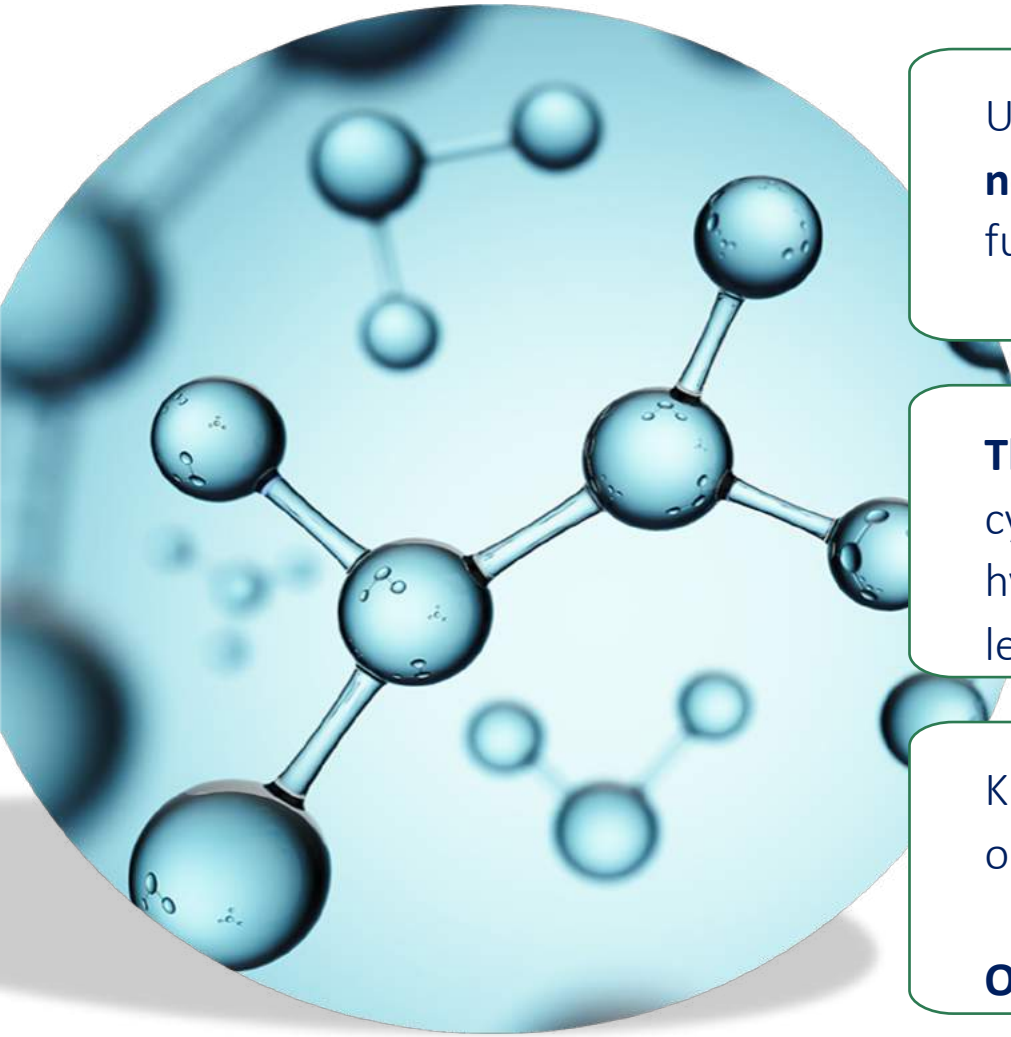
- 7.656 in
- + 5.688 in
- + 5.688 in
- + 7.656 in
- + 7.656 in
- + 7.656 in
- + 7.656 in
- + 3 in

- 60.312 in



Air travels 19.2 feet through the 2x4 device, allowing for extended duration of disinfection

TiO₂ – Oxidation in the Air Guardian



UV-activated TiO₂ **oxidation can kill a wide range of Gram-negative and Gram-positive bacteria**, filamentous and unicellular fungi, algae, protozoa, mammalian viruses and bacteriophages



The killing mechanism involves degradation of the cell wall and cytoplasmic membrane due to the production of ROS such as hydroxyl radicals and hydrogen peroxide. This initially leads to leakage of cellular contents then cell lysis



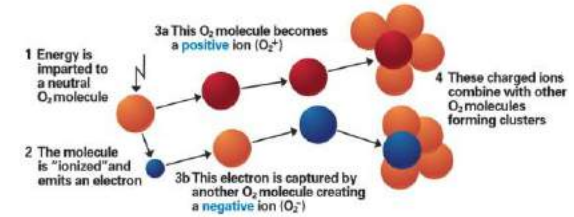
Killing is most efficient when there is close contact between the organisms and the TiO₂ catalyst

Oxidized = Disassembled



Alternative Technologies

How do others in the market compare to the Air Guardian?



HVAC Unit UV Light

Portable Air Purifying Unit

Light Anti-Bacterial Disinfection Spray (Electrostatic)

Bipolar Ionization

Creates O₃ and releases endotoxins back into classroom

Short term solution

Very labor intensive and increased amount of maintenance costs and staff needed to provide adequate cleaning services or requires hiring of 3rd party sanitation firms with expensive contracts

Ionization can emit harmful Ozone (UV Irvine Case Study)

Increased cost as have to install UVC lights at every point within the ductwork

Requires a greater amount of time for full room air filtration

Requires continuous manual applications

Ionizations validated studies fall short of accuracy and accreditation

Decreased air changes per hour / not continuous filtration, would have to run your AC the entire time

Disinfection rates on bacterial particulates will provide much lower effectiveness <99.9%

Creates ongoing costs for purchasing of cleaning solution (refills) and additional materials

Causes CO₂ buildup in classrooms negatively impacting students in the room & causing potential impairment

Decreased treatment time due to HVAC air flow having higher CFM, not effective for high levels of disinfection capabilities

Will not provide both surface level and airborne bacterial disinfection

Short term solution; only addresses surface level bacteria without continuous disinfection










Significant degradation of product effectiveness over time, creating an unreliable solution for disinfection

Endotoxins back into the classroom, small particles back into the space

Can't disinfect while occupants are in the room

Alternative Technology Comparison Chart

DEVICE OR SOLUTION	Air Guardian	GENERIC 405 VIOLET SPECT	UC-ONLY SEALED BOX	BIPOLAR IONS	UPPER AIR UVC	UVC 222 LIGHT - DIRECT	HVAC INTERNAL UV
CONTINUOUS AIR DISINFECTION	Y	X	Y	Y	Y	Y	Y
CONTINUOUS SURFACE DISINFECTION (in disinfection mode)	Y	Y	X	Y	X	Y	X
ACTIVE ROOM AIR CHANGES VIA INGESTION	Y	X	Y	X	Passive Only	X	HVAC assisted
DISTANCE VENTING AT NEUTRAL PRESSURE	Y	X	X	Variable	X	X	X
KILLS MERS, SAR-COV-2, SARS-1, WITH SINGLE ACH AT LOG 2-6	Y	X	X	X	X	X	X
KILLS SARS-COV-2 VIRUS	Y	X	Y	NO ACH	Y	Y	Y
KILLS PLANKTONIC BACTERIAL, MOLD, SPORE, FUNGI	Y	Y SURFACE	Y AIR	Y	Y	Y	Y
PM 2.5 PARTICLE LOG 4-6 REMOVAL	Y	X	Unknown or unproven	Y	X	UNPROVEN AT MATERIAL LEVELS	X
DESTROYS OR REMEDIATES VOLATILE COMPOUNDS AT LOG 2-4 LEVELS	Y	X	X	Unknown or unproven	X	X	UNPROVEN AT MATERIAL LEVELS
OXIDATION BY UV-ACTIVATED CATALYSIS OF NONPARTICLES	Y	X	X	X	X	X	X
DOES NOT EMIT OZONE OR CHEMICAL COMPOUNDS	Y	NA	Possible due to MOA	Possible due to MOA	Possible due to MOA	Possible due to MOA	Possible due to MOA

-  Continuous air disinfection
-  Continuous surface disinfection
-  Active room air changes via ingestion
-  Distance venting at neutral pressure
-  Kills MERS, SAR-COV-2, SARS-1, with Single ACH at Log 2-6
-  Kills SARS-COV-2 Virus
-  Kills Planktonic Bacterial, Mold, Spore, Fungi
-  PM 2.5 Particle Log 4-6 Removal
-  Destroys or remediates volatile compounds at log 2-4 levels
-  Oxidation by UV-Activated catalysis of non particles
-  Does not emit ozone or chemical compounds

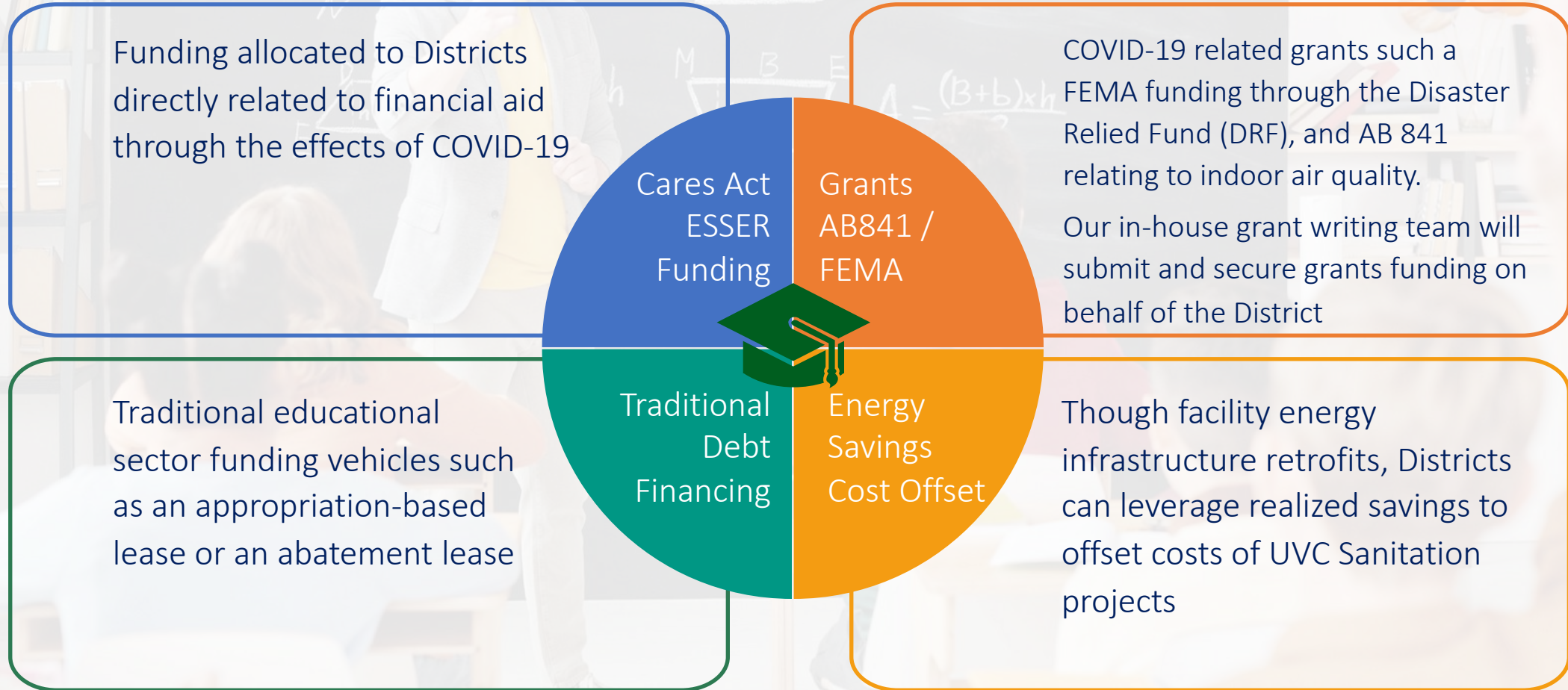
What The Air Guardian Kills

Proven to kill COVID-19 (SARS-CoV-2) Coronavirus in 13 seconds!

BACTERIA		VIRUS / YEAST	MOLD
Acinetobacter baumannii ⁶	Salmonella typhosa - Typhoid fever ¹	Bacteriophage - E. Coli (MS2) ¹	Aspergillus flavus ¹
Bacillus anthracis - Anthrax ¹	Pseudomonas aeruginosa ^{1,2}	Coronavirus (SARS-CoV-2)⁴	Aspergillus glaucus ¹
Bacillus anthracis spores - Anthrax spores ¹	Pseudomonas fluorescens ¹	Infectious Hepatitis ¹	Aspergillus niger ¹
Bacillus magaterium sp. (spores) ¹	Salmonella enteritidis ¹	Influenza ¹	Mucor racemosus A ¹
Bacillus magaterium sp. (veg.) ¹	Salmonella paratyphi - Enteric fever ¹	Poliovirus - Poliomyelitis ¹	Mucor racemosus B ¹
Bacillus paratyphus ¹	Proteus vulgaris ^{1,2}	Tobacco mosaic ¹	Oospora lactis ¹
Bacillus subtilis spores ¹	Salmonella typhimurium ¹	Brewers yeast ¹	Penicillium expansum ¹
Clostridium difficile ⁵	Sarcina lutea ¹	Candida albicans ³	Penicillium roqueforti ¹
Corynebacterium diphtheriae ¹	Serratia marcescens ¹	Common yeast cake ¹	Penicillium digitatum ¹
Ebertelia typhosa ¹	Shigella dysenteriae - Dysentery ¹	Saccharomyces carevisiae ¹	Rhizopus nigricans ¹
Escherichia coli ^{1,2}	Shigella flexneri - Dysentery ¹	Saccharomyces ellipsoideus ¹	Protozoa
Leptospira canicola - infectious Jaundice ¹	Shigella paradysenteriae ¹	Saccharomyces spores ^{1,2}	Chlorella Vulgaris ¹
Micrococcus candidus ¹	Spirillum rubrum ¹		Nematode Eggs ¹
Micrococcus sphaeroides ¹	Staphylococcus albus ¹		Paramecium ¹
Mycobacterium tuberculosis ¹	Staphylococcus aureus ^{1,2}		
Neisseria catarrhalis ¹	Staphylococcus hemolyticus ¹		
Phytomonas tumefaciens ¹			



Project Funding



Recent Funding Vehicles

2021 FEDERAL STIMULUS BILL

COVID-19 Relief Stimulus

Federal stimulus package of **\$908 Billion** to address COVID-19 emergency relief & recovery

\$4 BILLION \$10 BILLION \$62 BILLION \$160 BILLION



STUDENT
LOANS



CHILD
CARE







EDUCATION



STATE &
LOCAL GOV

ASSEMBLY BILL AB 841

School Reopening Ventilation & Energy Efficiency Verification & Repair Program

-  **Bill directs roughly \$600M+ in energy efficiency funding** to test, adjust, repair & replace heating, air conditioning & ventilation (HVAC) systems in public schools over the next three years
-  **Overall Program Goal:** To incentive Districts to invest into solutions providing increased indoor air quality
-  Districts can address Millions of dollars in old, inefficient, and failing HVAC / mechanical infrastructure **AT NO COST**
-  **First Come-First Serve** / Application to secure funding



SEOUL

RE: Clean Box & Clean White Anti-Viral & Anti-Microbial Disinfection Lighting

Who would have thought 2020 would leave such a scar in our country as it has? K-12 schools have had to re-think safety standards to protect both staff and students on top of newly emerging education challenges.

My name is Ricky Shelton and I am the Energy Manager for Barbers Hills Independent School District in Houston Texas. I serve as the vice president of TEMA "Texas Energy Managers Association", an organization created from the State Energy Conservation Office "CECO" in Austin Texas, which is designed to guide school, and public entities to not only reduce energy consumption but also build safe learning environments.

Barbers Hill ISD Introduction to the NEW Air Guardian UV Clean Box product a month after the COVID pandemic shut the city of Houston down. I am writing this letter on behalf of a new product line from IllumiPure / Calyx for their Air Guardian UV Fixture made in Houston Texas.

We have used the Air Guardian Light technology several months back before COVID and have been delighted with the Microbial Disinfection from this product. There is no chemical spraying, or waist of custodial man-hours to do a less than stellar job. We started the installation process in the athletic departments, nurse's stations, and administration offices as an introduction that proved to be very successful. Because of the success, we have two new Intermediate Schools that will be coming online 2021-2022 with the intentions of installing two units per classroom. I thought bad people with guns was a revelation, nothing compares to the way COVID has changed our educational processes.

School started back mid-August for in school learning, but before students arrived, we put new policies in place. We installed on each desk a three-sided shield, students wear masks between classes, and lunchtime, staff wear masks as normal daily routine, hand sanitizers, and there is nightly cleaning, and disinfecting. The districts original attendance numbers started at 87% in the classroom and 13% online, six weeks later we are at 93% in the classroom. Our staff feels that the Air Guardian products play a crucial role in keeping people safe knowing it is disinfecting while class is in session. To date, we have had ZERO cases of the COVID virus.

Not only does the Air Guardian Product Line present an immediate answer to the current pandemic our students and faculty face, but we have also future proofed our ceilings in our yearly fight against

Influenza. Safe student attendance is our main priority and with this installation we have provided a long-term battle plan that can face the unforeseen future of viruses.

After reviewing several different UV product lines, numerous scrubbers and filters, we are extremely proud with our choice to move forward with the Air Guardian products. Just knowing the district is doing all it can to keep people safe is comforting to the parents, students, and our community within or district. I feel it is my responsibility to not only our community, but to our city, and states to inform other districts in making good decisions when purchasing products that affect people's lives.

Please feel free to reach out to me for any questions you may have before making the decision to protect your schools and spend your local taxpayer dollars.

Ricky Shelton

Energy Manager Barbers Hill ISD 832-784-2496

Seoul Semiconductor stands as one of the largest electronic manufacturers in the world. The Firm conducted a third-party study on the Air Guardian and it proved to **Kill COVID-19 in 13 seconds**
Data report available upon request



Case Study: Barbers Hill Independent School District

Texas School District's have been on the forefront of adopting this technology. *Barbers Hill ISD* has installed the Air Guardian fixture District-wide and have been back in school since August 2020 →

The Result: District has had **0 Confirmed COVID-19 Cases to date**








Air Guardian is registered with the FDA & approved as a medical device
Class 1 Registration / Disinfection Medical Device
Registration Device Number: **D420497 / EPA**
EPA Illumipure Company # **98105-TX-1**



System Benefits & Takeaways

District's are able to take advantage this new patented technology to address health and safety concerns throughout the effects of COVID-19 to ensure a safe learning environment for students



-  Addresses classroom sanitation measures to combat COVID-19 effects whilst keeping staff & students safe within your facilities
-  Additional benefits of technology killing influenza, mold, and other pathogens that could reduce the potential of employees getting sick in the workplace
-  Communicates to the community that your District is taking the necessary precautions in COVID-19 prevention
-  Increases precaution measures to help get kids back into the classroom, increasing ADA funding
-  Huge marketing dynamic and PR benefits

Virus Fan

FIRST LINE DEFENSE



For more information, contact:

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**CARES
ACT**



**KILL 99.99% OF CORONAVIRUS
SARS-COV-2 (CAUSES COVID-19)
AND OTHER AIRBORNE PATHOGENS**