

# AirBox Comprehensive Safe Air Plan®

## Objective:

To Create a Pathogen Hardened Environment

## Applicable Environments:

Schools, Government Buildings, Commercial Office Space & Private Business

The following plan is intended to provide a long-term solution for schools, enterprises, and other institutions to address the threat of Pathogenic Outbreaks so as to minimize disruption in attendance. This plan addresses the potential contamination of breathing air with pathogens through the exhalation of infected respiratory aerosols. Specifically, the plan provides simple and efficient design changes to existing building ventilation systems to effectively and efficiently mitigate the spread infectious diseases and illnesses through respiratory aerosols. These simple changes can easily be made by commercial HVAC contractors and maintained by the building's janitorial/sanitation contractor.

Pathogen	Baseline Concentration	Removal Efficiency	Removal Time (Min.)
MS2 Bacteriophage (SARS-CoV-2 Representative Virus)	1.34E+09	>99.99%	21
Staphylococcus aureus (Gram-positive bacteria)	3.08E+07	>99.99%	11
Escherichia Coli (E.Coli) (Gram-negative bacteria)	4.84E+07	>99.99%	25
Bacillus Subtilis (Bacteria Spores)	4.22E+07	>99.99%	15

\*Testing and removal times based in a 800 cubic foot room.

The plan is comprised of four primary steps:

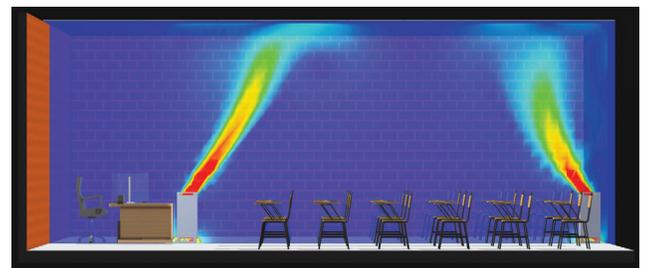
- Assure optimum operation of existing HVAC systems under normal conditions i.e. - no additional make up air, design level filtration such as Merv 8, 30/30 filters
- Placement of standalone professional grade air purifiers to increase equivalent ventilation rates and to effect preferred room air flow dynamics
- Integrate HEPA\* filtration to scrub 100% of recirculated air (return air).
- Measure Respiratory Aerosol Load. Using CO2 as a respiratory aerosol proxy, install local CO2 monitors to alert and alarm unsafe conditions caused by local area overpopulation or ventilation systems failure

### Step 1: Assure Optimum Operation of Existing HVAC System

Utilizing a test and balance contractor or capable HVAC contractor, balance the existing HVAC systems to optimum performance using highest available fan speeds in accordance to ASHRAE recommendations. Set fans to operate continuously. Note that the airflow volume or velocity of all supply and return air locations is recorded to be utilized in Step 3.

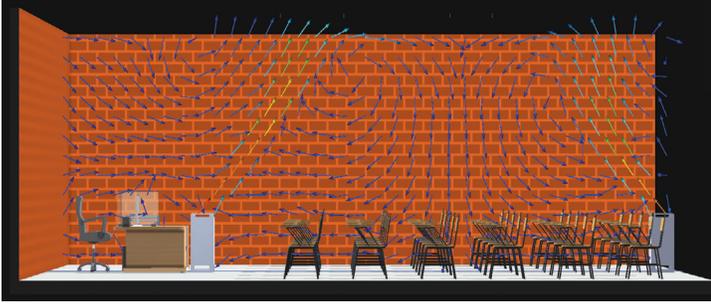
### Step 2: Placement of Standalone Professional Grade Air Purifiers

Utilizing an HVAC contractor, test and balance contractor, or other airflow professional, calculate the Total Supply Air for each room individually using the data captured in Step 1. Select standalone HEPA\* air purifier(s)\*\* capable of matching the



\*HEPA filters as defined by Department of Energy (DOE) and certified in accordance with the Institute of Environmental Science and Technology (IEST).

\*\*To affect room airflow dynamics and purge the breathing zone, the direction and velocity of the purified air should be upward and a minimum of 300fpm.  
(Air Purifiers must be commercial or industrial grade only)



Total Supply Air as calculated above and place them in the room. Placement should be as far away from the return air locations as possible. This provides the necessary dynamic airflow and additional ventilation equivalent for desired results.

If the HVAC contractor has the capability to model each room using Computational Fluid Dynamics (CFD) technology, placement and velocities should be

established to maximize vertical airflow in the breathing zone.

It is important to eliminate impediments to “sweeping” airflow such as plexiglass dividers to allow complete displacement and dilution of all areas within the room by supply and purified air.

### Step 3: Integrate HEPA\* Filtration into Return Air Ducts

Utilizing an HVAC contractor, install fan powered HEPA filter modules such as the AirBox Anchor into all return air ducts as close to the return air grill as possible. Adjust fan speed to provide desired static pressure. This will reduce the probability of Respiratory Pathogen Migration by 100% and maintain the Biological Integrity of the HVAC system. By contrast, MERV-13 efficiency is approximately 80%.



### Step 4: Measure Room Air Respiratory Aerosol Load

Using HVAC, janitorial, or security system contractor, install CO2 monitors in each room. Set alert to 1000 ppm. Set evacuation alarm to 2000ppm. Given that the level of CO2 in an occupied room is proportional to the respiratory aerosol level of that room, the safe occupancy of the room can be determined in real time under existing ventilation conditions. Accordingly, if the ventilation system is operating as designed then high CO2 levels indicate over population. Otherwise, high CO2 levels indicate that the ventilation is not operating to design.

**AIRBOX**  
CLEAN AIR. PURE & SIMPLE.

#### ROOM AEROSOL LOAD

ACTIVE CO2 MONITORING



**CALL US TODAY!**

Let our Indoor Air Quality experts and Engineers assist in putting together a Safe Air Plan for your establishment. We will be happy to work alongside your HVAC contractor, architect or engineer to implement our Safe Air Plan and become pathogen hardened.

**(855) 927-1386**