AIRBOX™

CLEAN AIR. PURE & SIMPLE.

Bringing Americans Back to School and Work Safely

Third Party Testing

Third Party Bioaerosol testing was performed by Microchem Laboratories in Round Rock, Texas. Testing was performed in an 800 cu. Ft. air chamber. Each Microorganism was aerosolized into the chamber at extraordinary concentrations to ensure efficacy in real life situations.

ANAB

CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board

11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

Microchem Laboratory, LLC

1304 W. Industrial Blvd.
Round Rock, TX 78681

has been assessed by ANAB and meets the requirements of international standard

ISO/IEC 17025:2017

while demonstrating technical competence in the field of

TESTING

Refer to the accompanying Scope of Accreditation for information regarding the types of activities to which this accreditation applies

L2450
Certificate Number

ANAB Approval

Certificate Valid Through: 04/20/2021
Version No. 003 Issued: 03/25/2019

ANAB

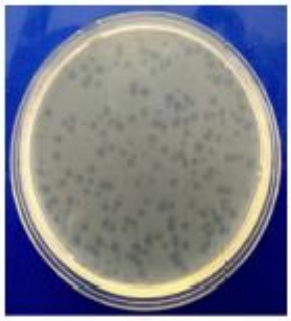
ilac-MRA

ANAB

Third Party Testing Summary

Test Microorganism Information

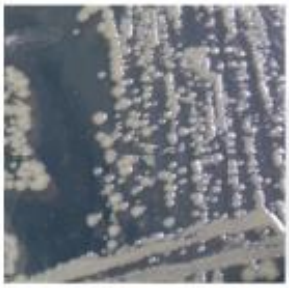
The following test microorganisms were selected for this test:



MS2 Bacteriophage (MS2), ATCC 15597-B1

This virus is a non-enveloped positive-stranded RNA virus of the bacteriophage family Leviviridae. Bacterial cells are the hosts for bacteriophages, and *E. coli* 15597 serves this purpose for MS2 bacteriophage. Its small size, icosohedral structure, and environmental resistance has made MS2 ideal for use as a surrogate virus (particularly in place of picornaviruses such as poliovirus and human norovirus) in water quality and disinfectant studies.

Permissive Host Cell System for MS2: *Escherichia coli*, 15597



Escherichia coli

This bacteria is a Gram-negative, rod shaped, facultative anaerobe commonly found in the gastrointestinal tract of mammals. Although most serotypes of this microorganism are harmless there are pathogenic groups of *E. coli* such as enterohemorrhagic (EHEC), verocytotoxin producing (VTEC) and Shiga-like toxin producing (STEC) that can cause a multitude of illnesses. *E. coli* is relatively susceptible to disinfection when dried on a surface, yet it can be a challenging microorganism to mitigate in solution.

Staphylococcus aureus 6538

This bacterium is a Gram-positive, spherical-shaped, facultative anaerobe. *Staphylococcus* species are known to demonstrate resistance to antibiotics such as methicillin. *S. aureus* pathogenicity can range from commensal skin colonization to more severe diseases such as pneumonia and toxic shock syndrome (TSS). *S. aureus* is commonly used in several test methods as a model for gram positive bacteria. It can be difficult to disinfect but does demonstrate susceptibility to low level disinfectants.

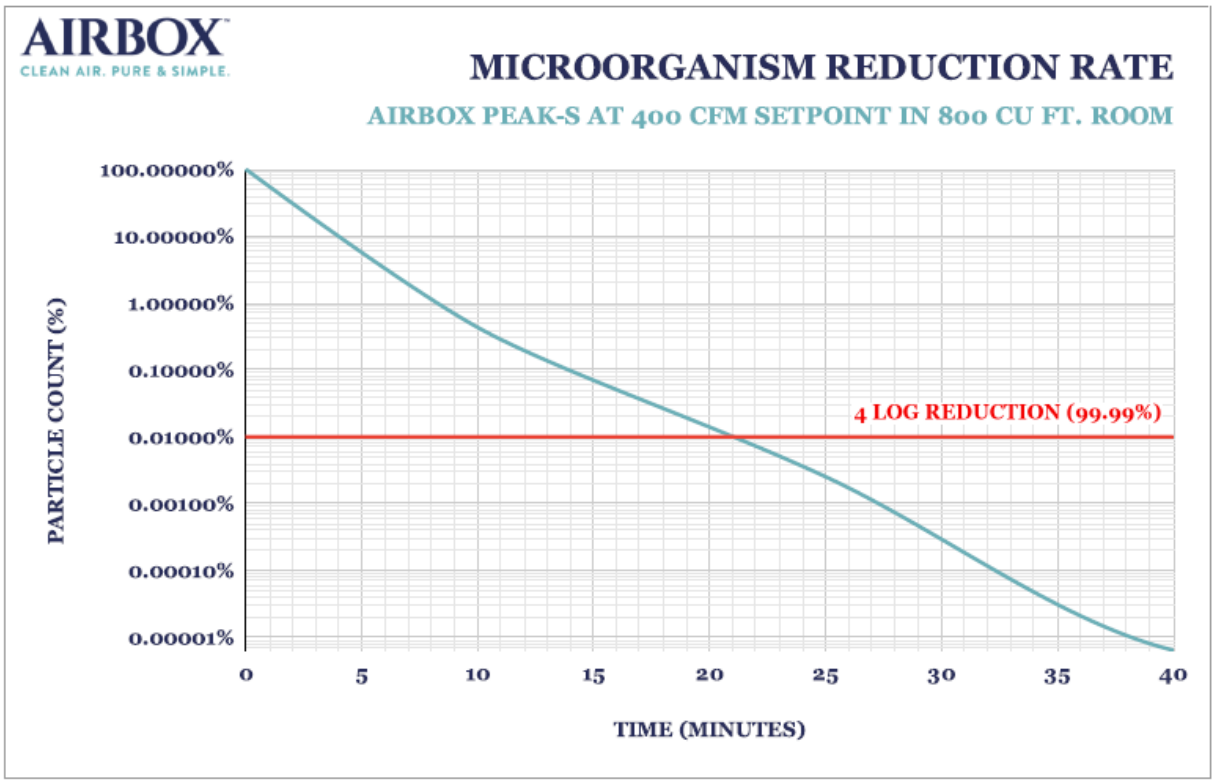
Bacillus subtilis

This bacteria is Gram-positive, rod shaped, capable of forming endospores. Endospores of *Bacillus subtilis* can tolerate harsh environmental conditions such as UV exposure and high temperatures. Typically found in soil, this species is not known to cause disease in healthy individuals, but can be considered an opportunistic pathogen among the immuno-compromised. *Bacillus subtilis* endopores serve as one of the models for evaluating the effectiveness of sporicides and sterilants.

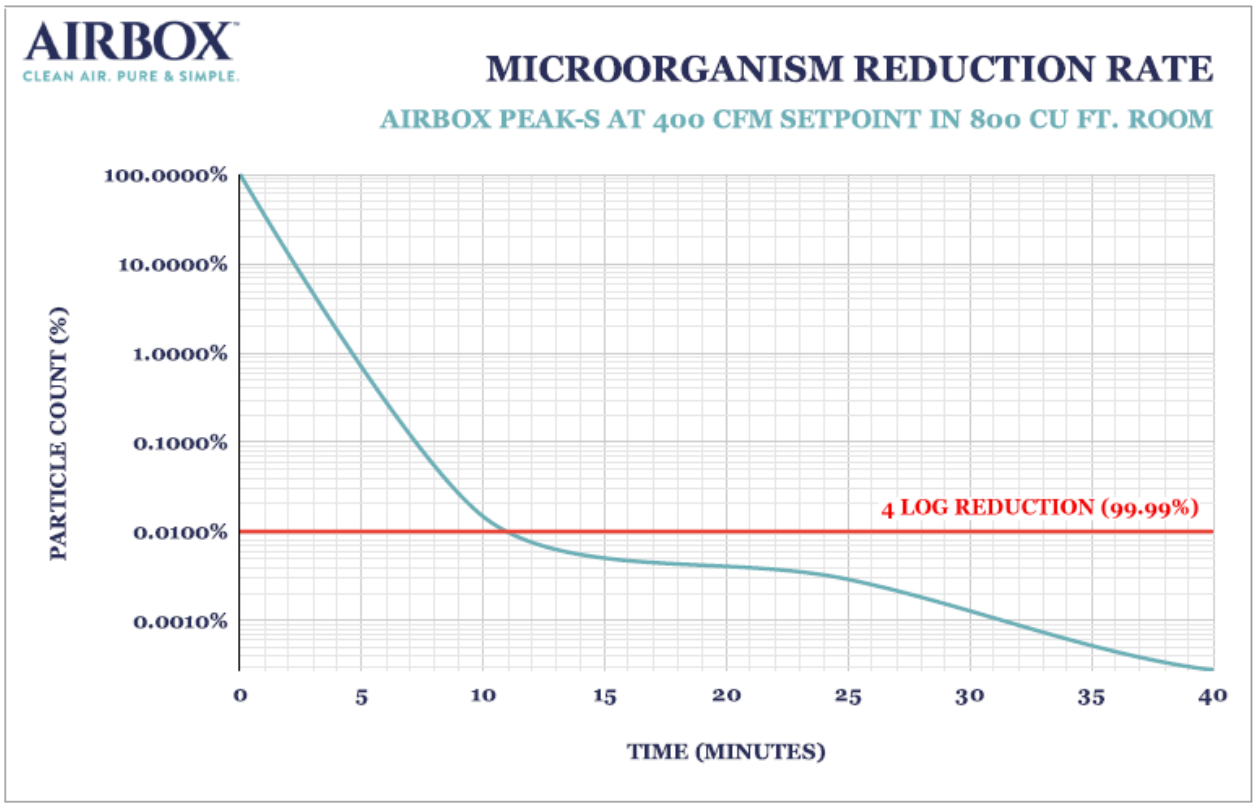
Efficacy Data

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

Third Party Testing Results

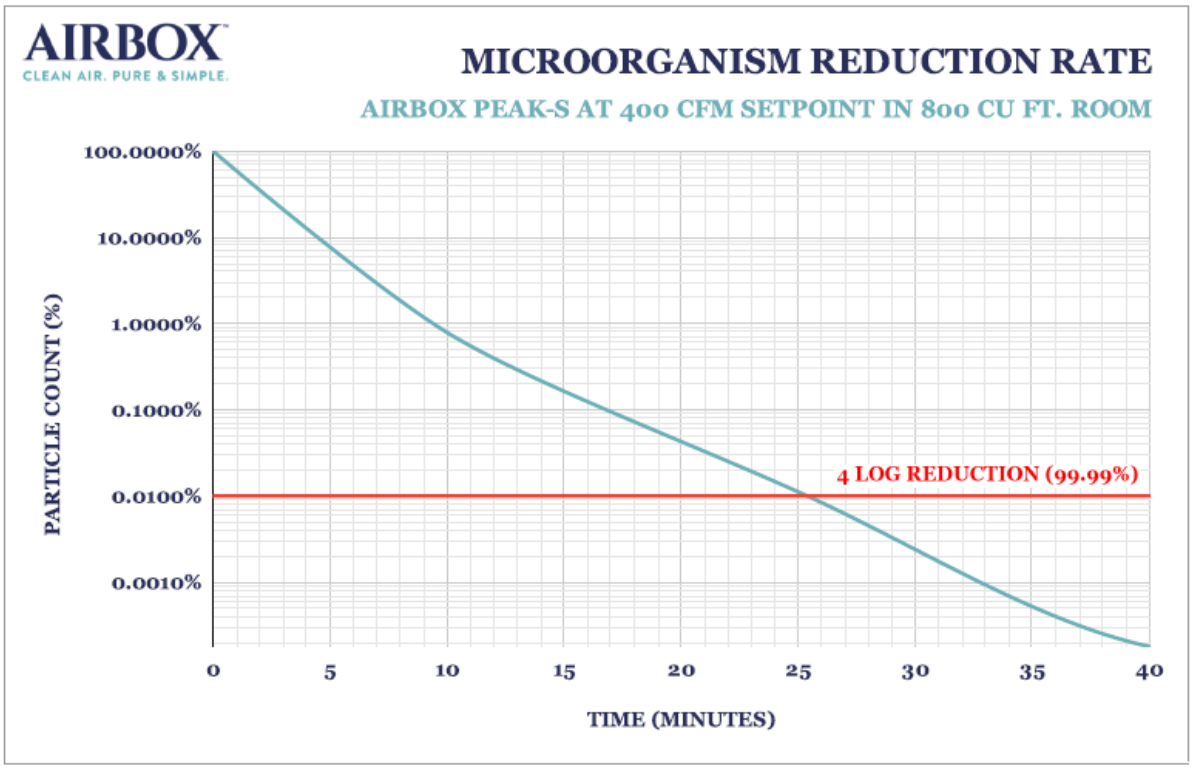


Microorganism	Initial Concentration (PFU/cu ft.)
MS2 Bacteriophage	37,944,538.68

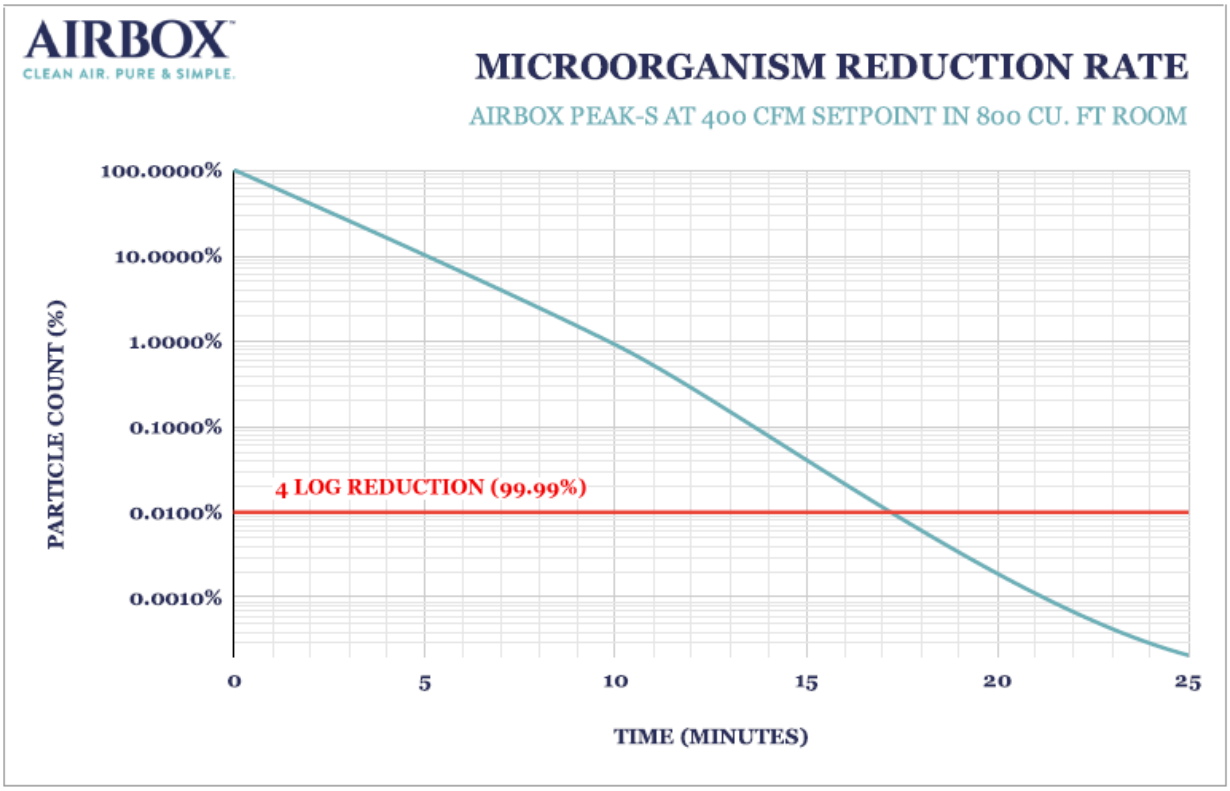


Microorganism	Initial Concentration (PFU/cu ft.)
S. Aereus	872,158.05

Third Party Testing Results



Microorganism	Initial Concentration (PFU/cu ft.)
E. coli	1,370,534.08



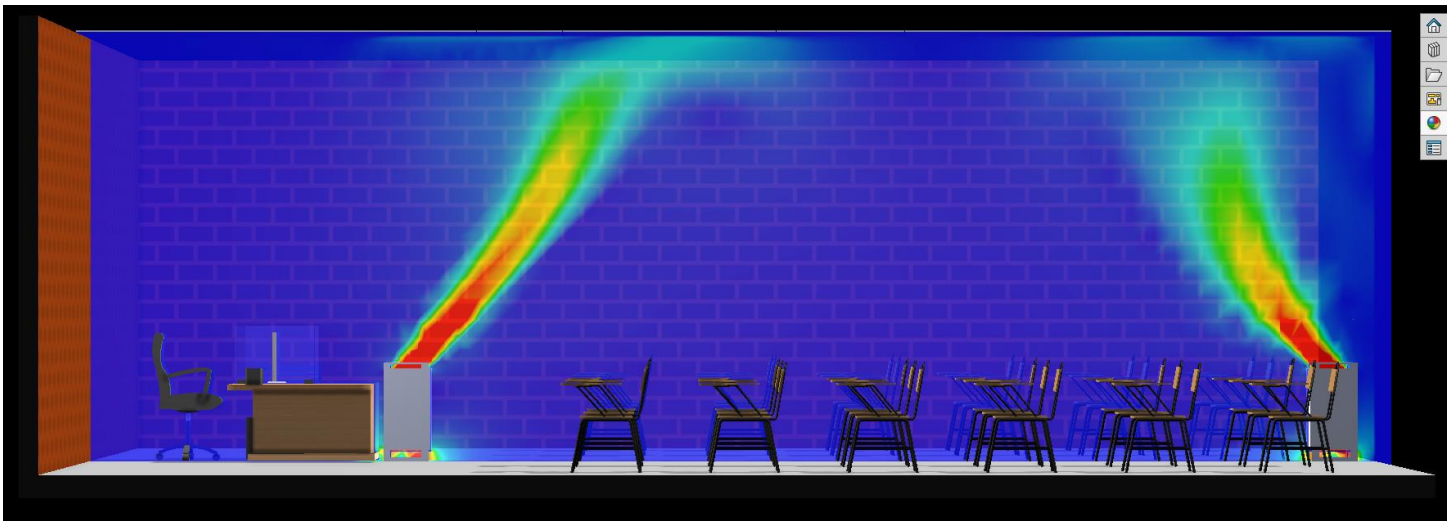
Microorganism	Initial Concentration (PFU/cu ft.)
B. subtilis	1,194,969.80

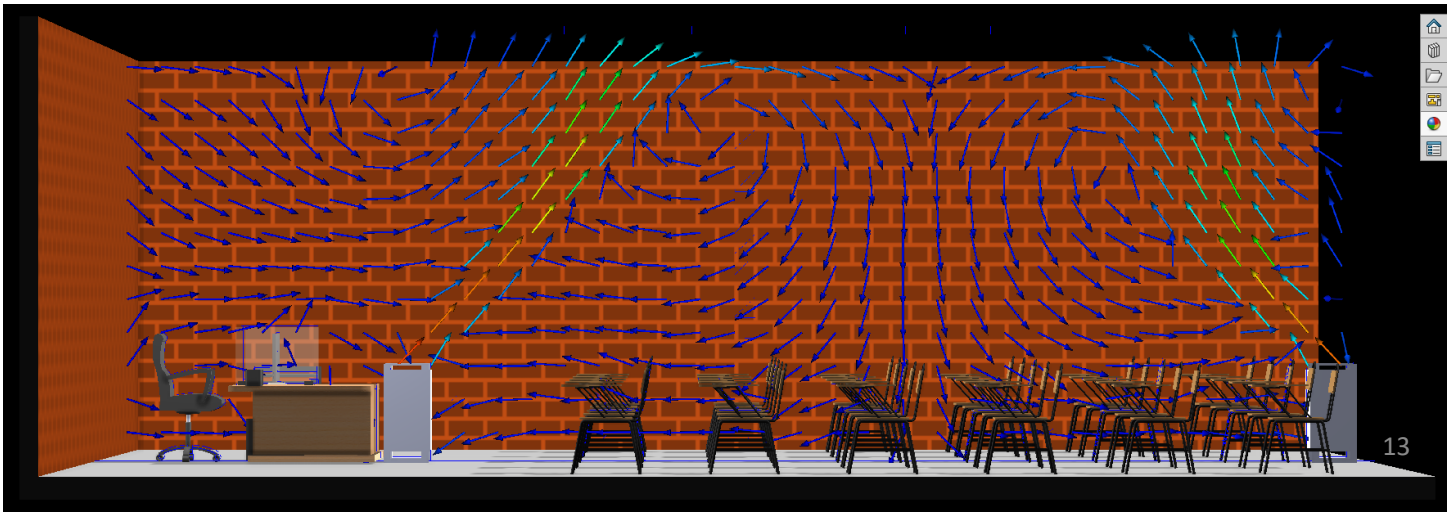
Engineering Support

Branching from a background in the High-Tech Cleanroom Industry with a focus on Micro Contamination, the AIRBOX Team has extensive knowledge of Indoor Air Quality and can offer the engineering support needed to make sound decisions related to achieving acceptable Indoor Air Quality in real-life applications.

AIRBOX's Engineering team uses Computational Fluid Dynamics (CFD) Modeling and works alongside HVAC partners to ensure the correct positioning and recommendations are made in relation to each client's specifications.

The AIRBOX Team then prepares a Safe Air Plan for clients to keep on record demonstrating the recommendations that have been put in place to achieve a safer, clean air environment for all occupants in the facility.





AIRBOX Safe Air Plan

IAQ – Safe Air Plan
Following CDC & OSHA Coronavirus Guidance/Recommendations
Educational Facilities

ABSTRACT

The Center for Disease Control and Prevention (CDC) provides Coronavirus Guidance for Businesses and Employers to Mitigate the Transmission of Coronavirus Disease. Specifically:

Coronavirus Disease 2019 (COVID-19)
- Interim Guidance for Businesses and Employers
  - Maintain a Healthy Work Environment
  - Improve Engineering Controls using the Building Ventilation System. This may include some or all of the following:
    - Increase ventilation rates.
    - Increase the percentage of outdoor air that circulates into the system

Reference also:

OSHA Guidance for Employers
Guidance on Preparing Workplaces for COVID-19
U.S. Department of Labor Occupational Safety and Health Administration
OSHA 3990-03 2020
Engineering Controls Engineering controls involve isolating employees from work related hazards. In workplaces where they are appropriate, these types of controls reduce exposure to hazards without relying on worker behavior and can be the most cost-effective solution to implement. Engineering controls for SARS-CoV-2 include:
- Installing high-efficiency air filters.
- Increasing ventilation rates in the work environment

PURPOSE

The Purpose of this Plan is to reduce airborne chemical, physical and biological contaminants within the enclosed environment, thereby, mitigating the transmission of Airborne Diseases and improving the health and safety of the Employees, Customers and Visitors within.

It is accepted that Respiratory droplets (droplet nuclei) containing infectious agents can remain in suspension for up to 3 hours and migrate throughout the environment via normal air currents and centralized HVAC recirculation, thereby increasing the risk of transmission accordingly. This Plan is intended to substantially reduce migration as well as time in suspension.

SCOPE

Extrapolating existing building Ventilation Standards for Acceptable Indoor Air Quality (IAQ), the Plan utilizes 'Recirculating Devices with Certified HEPA' as defined by ANSI.ASHRAE/ASHE Standard 170-2017 Section 7.1. Normative Notes for table 7.1:a strategically placed to direct HEPA filtered Air into the Breathing Zone. The Plan effectively doubles the equivalent amount of Outdoor Air and substantially increases Air Recirculation.

Applicable Standards:
- ANSI/ASHRAE Standard 62..1-2019 'Ventilation for Acceptable indoor Air Quality'
- ANSI.ASHRAE/ASHE Standard 170-2017 'Ventilation of Health Care Facilities'

ANSI: American National Standards Institute
ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASHE: American Society for Health Care Engineering

AIRBOX Safe Air Plan Continued

DEFINITIONS

Airborne Infectious Agents: Organisms spread by airborne droplet nuclei less than 5 microns in diameter.

***High Efficiency Particulate Air (HEPA) Filter*:** An air filter that removes 99.97% of particles whose diameter is equal to 0.3 micron; with the filtration efficiency increasing for particle diameters both less than and greater than 0.3 micron in accordance with Testing methods IEST RPCC001.6- 2016.

Recirculating Device with HEPA: Supplemental Environmental control designed to control airborne infectious agents and allows for easy access for scheduled preventative maintenance and cleaning.

***Breathing Zone*:** the region within and occupied space between the planes 3 and 72" above the floor and more than 2 ft from the walls or fixed air-conditioning equipment.

PLAN

1. Calculate the Outdoor Airflow required in the Breathing Zone of the occupied space in accordance with ANSI/ASHRAE Standard 62.1- section 6.2.1.1 and utilizing Table 6.1. For Educational Facilities/Schools the calculation is as follows:

   V_{OD} = # of Occupants * 10.0 + area ft^2 * 0.12
   i.e. – School classroom

   SW Schools – Mangum (100% occupancy)
   Classroom: (27 Occupants * 10) + (753 sq. ft. * 0.12) = 360 CFM

2. Install sufficient quantity of *Recirculating Devices with HEPA* to provide the Outdoor Airflow V_{OD} equivalent to that calculated in Step 1 above.

   SW Schools – AirBox Safe Air Plan – Implementation

   <u>AirBox Recommendation</u>

   2 Peak units per classroom provide 500 CFM on a medium/moderate level (250 CFM each)
   **each Peak unit has a capacity of 450 CFM on turbo level)

   <u>SW Schools – Mangum</u>

   Classrooms – average size 753 square feet (w/ 27 people)

   Occupancy levels:
   25% - 158 CFM
   50% - 226 CFM
   75% - 294 CFM
   100% - 360 CFM

   <u>Summary</u>

   1 AirBox Peak unit per classroom will satisfy ASHRAE's recommendation for ventilation of acceptable Indoor Air Quality at 25% and 50% capacity within the classroom. To surpass the CFM requirement at 75% and 100% occupancy, 2 AirBox Peak units will be needed per classroom.

3. Device placement shall be carefully selected to prevent stagnation and short circuiting of airflow:
   - Place Devices immediately adjacent to Return Air Openings.
   - Place Devices such that HEPA filtered Air is delivered directly into the Breathing Zone.
   - When possible, vertical top to bottom airflow/displacement is preferable.

4. Migration and Suspension Time of Airborne Respiratory Droplets are reduced in the Breathing Zone by the following mechanisms:
   a. Overriding Air currents Induced by the Recirculating Device.
   b. Displacement and Transfer from air to surface* by airflow currents.

AIRBOX Safe Air Plan Continued

5. The concentrations of airborne contaminants are reduced in the Breathing Zone by the following mechanisms:
   a. Displacement and Net reduction through entrapment by the Recirculating Device.
   b. Displacement and Transfer from air to surface* by airflow currents.

*Infectious agents are inactivated by surface disinfectant.

Supplemental
Applicable Excerpts from OSHA Document:
Guidance on Preparing Workplaces for COVID-19

Engineering Controls Engineering controls involve isolating employees from work-related hazards. In workplaces where they are appropriate, these types of controls reduce exposure to hazards without relying on worker behavior and can be the most cost-effective solution to implement. Engineering controls for SARS-CoV-2 include:

■ Installing high-efficiency air filters.
■ Increasing ventilation rates in the work environment
■ Installing a drive-through window for customer service.
■ Specialized negative pressure ventilation in some settings, such as for aerosol generating procedures (e.g., airborne such as for aerosol generating procedures (e.g., airborne infection isolation rooms in healthcare settings and specialized autopsy suites in mortuary settings).

Applicable Excerpts from 'Interim Guidance for Businesses and Employers Responding to Coronavirus Disease 2019 (COVID-19), May 2020'

Maintain a healthy work environment
Since COVID-19 may be spread by those with no symptoms, businesses and employers should evaluate and institute controls according to the hierarchy of controls to protect their employees and members of the general public.

Consider improving the engineering controls using the building ventilation system. This may include some or all of the following activities:

- Increase ventilation rates.
- Ensure ventilation systems operate properly and provide acceptable indoor air quality for the current occupancy level for each space.
- Increase outdoor air ventilation, using caution in highly polluted areas. With a lower occupancy level in the building, this increases the effective dilution ventilation per person.
- Disable demand-controlled ventilation (DCV).
- Further open minimum outdoor air dampers (as high as 100%) to reduce or eliminate recirculation. In mild weather, this will not affect thermal comfort or humidity. However, this may be difficult to do in cold or hot weather.
- Improve central air filtration to the MERV-13 or the highest compatible with the filter rack, and seal edges of the filter to limit bypass.
- Check filters to ensure they are within service life and appropriately installed.
- Keep systems running longer hours, 24/7 if possible, to enhance air exchanges in the building space.

Note: Some of the above recommendations are based on the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Guidance for Building Operations During the COVID-19 Pandemic external icon Review these ASHRAE guidelines for further information on ventilation recommendations.

AIRBOX Satisfied Clients Include: