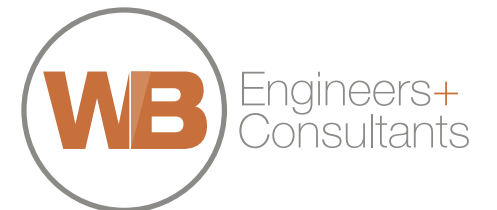




Improving Indoor Air Quality to Reduce **COVID-19** Exposure.



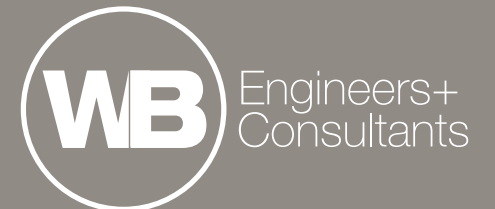
We're navigating a changing world, and we know you are too. But what hasn't changed is our commitment to delivering quality information. Our team - mechanical, electrical, and plumbing engineering experts - has worked together to research what really matters. We've analyzed the research - and sorted out the misinformation - to put together these guidelines for best practices for reducing exposure to harmful particles in the air to building occupants.



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What can buildings do **short-term** to improve air quality?



Electrostatic Precipitation Cleaning



- + Sprays an electrostatically charged mist onto surfaces and objects that adheres to surfaces and objects

Why this is more effective than traditional cleaning?

- + Dry dusting kicks up resting particles, redistributing them into the air and onto other surfaces
- + Wet dusting can involve harmful cleaning chemicals and make it hard to reach certain spots or objects
- + Clean all high contact surfaces: doorknobs, light switches, bathroom surfaces, locker rooms, toilets and urinals, sinks and faucets, kitchen areas/ appliances, lobby floors, doors, benches, and all elevator buttons, panels, and associated walls

Plumbing Systems

- + Confirm that all traps in floor drains are primed to prevent odors and sewage gases from entering the spaces
- + To prevent stagnant water, turn on faucets every 2-3 days



Dilution Ventilation

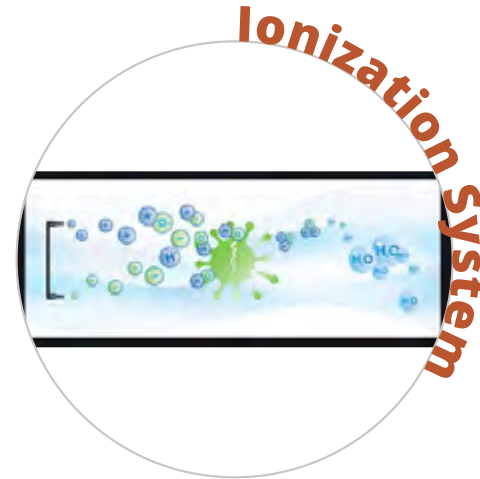
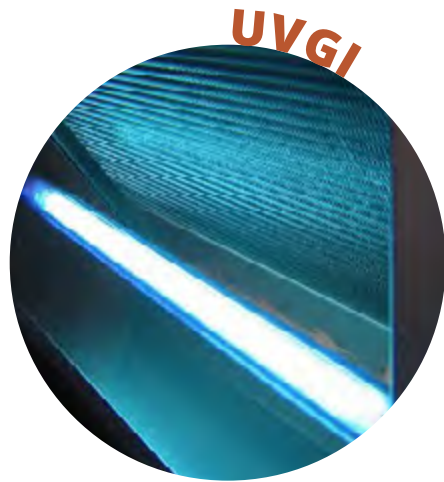
(increase outdoor air)



- + Deactivate demand control ventilation: this system controls the amount of outdoor air being supplied to building systems, deactivate it to have manual control over outside air flow
- + Operate systems at 100% outside air (conditions permitting)
- + Maximize outdoor air flow rates: 100% outside air is preferable in this situation, but some systems cannot accommodate it - so run the system at maximum outdoor air available (again, conditions permitting)

All of the following **MEP options are subjective and will vary greatly in cost and approach, dependent on both the existing systems in the building and any new systems to be introduced.**

What buildings should consider in the **long-term** to limit occupant's potential exposure to viruses.



Filtration

(increased)



Did you know?

MERV stands for minimum efficiency reporting value.

Options

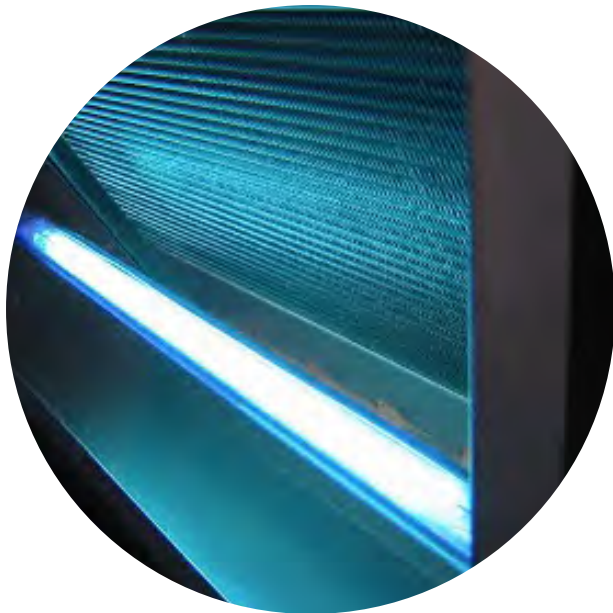
- + Use higher level MERV filters within existing or new mechanical systems (typically buildings use filter from MERV 6 to MERV 8)

Keep in mind

- + Higher level MERV filters should have pre-filters
- + They can create large pressure drops in the system which can impact operations and cost
- + They will enhance the indoor air quality (but are not effective in removing biological contaminants from the air)

UVGI

(ultraviolet germicidal irradiation)



Incorrect design
and installation
can render systems
very dangerous
to personnel
and ineffective
in particulate
irradiation



Options

- + UVC lamps installed at coils in air handling units, air conditioning units
- + UVC lamps mounted at terminal air units

Concerns

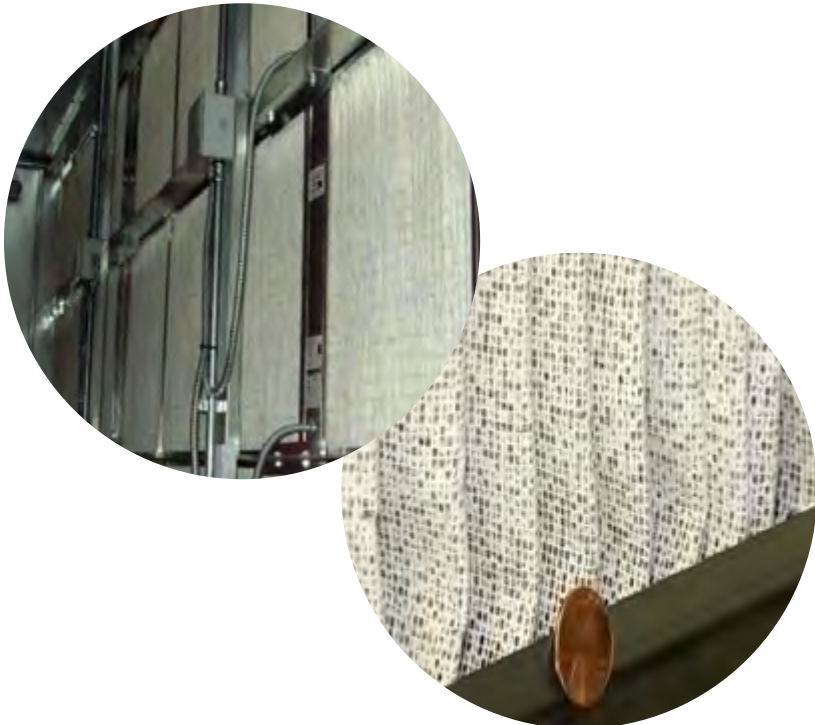
- + Proper installation and control is critical for effective operation of system
- + Not recommended as an effective method in ductwork installations
- + Systems must be designed correctly to be effective

Ultraviolet-C (UVC) lighting methods integrated into mechanical systems to capture and eliminate viral particles.

Requires proper design & installation in accordance with ASHRAE Standards & Guidelines

PCO

(photocatalytic oxidation)



PCO reduces airborne virus, biologic and VOCs with every volumetric air change through the system.

PCO air cleaning technologies can be implemented in any building type in almost any air handling system.

Options

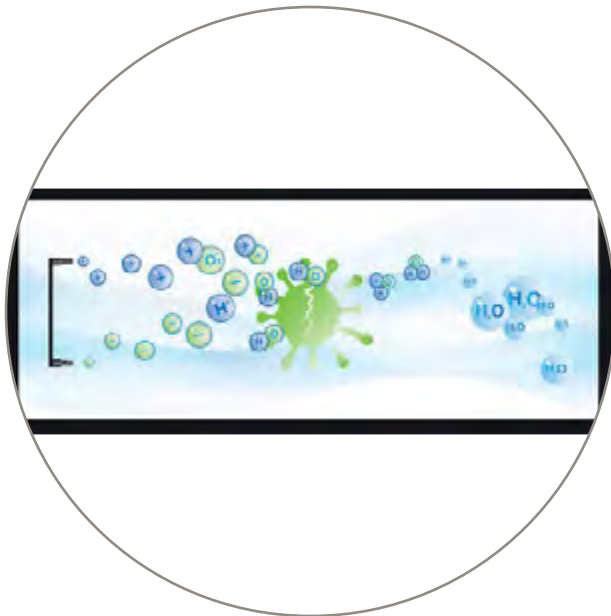
- + PCO systems are adaptable and scalable to fit in air handling units, return air ducts, and fan powered VAVs
- + Combining PCO with UV protection at coils would improve indoor air quality
- + Location of panels and velocity of airflow across the panel will determine effectiveness

Concerns

- + Systems must be designed correctly to be effective
- + Not as effective if all recirculated air is not treated
- + PCO has not been endorsed by ASHRAE

Ionization System

Operates by emitting positively and negatively charged ions into the space.



Options

- + Locate generator in AHU, Duct, or Space
- + Occupied or unoccupied operation

Concerns

- + Confirm zero Ozone generation
- + Ionization has not been endorsed by ASHRAE

Humidification

40-60% RH is the natural solution to reduce the transmission of viruses.



Options

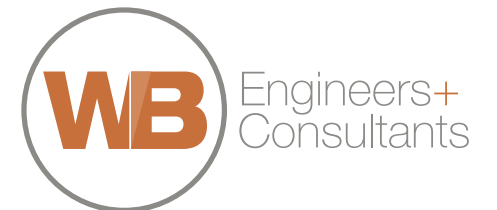
- + Entire Building or Zone Control
- + Steam Generator Types
- + Location Dispersion Tubes

Concerns

- + Condensation due to lack of appropriate building envelope
- + Vapor Barrier
- + Thermal Breaks
- + Water Quality

References

- + Electrostatic Cleaning: Clorox®Total 360® System:
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- + ASHRAE Standards 185.1 (2014) & 185.2 (2015)
- + Fischer, Mark, et al. COVID 19: Maintaining Building Operations During Shutdown and Preparing for Re-Occupancy. Building Owner and Managers Association (BOMA) International, 8 Apr. 2020. Webinar.
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Engineers+
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