Safe Return to the Workplace and Public Buildings

Alaska House
State Affairs Committee

Preface:

Service-providers, businesses and institutions face the necessity of creating Covid-responsive workplaces and public buildings, addressing an array of infection-control safety measures. These impact space utilization and planning, building sustainability and wellness, individual comfort and safety, cleanliness and disinfection, mitigating touchpoint contamination, and promotion of operational-procedural interventions.

ASID Presentation Statement:

Commercial interior design is rooted in the concept of Evidence-Based Design, especially applicable as science evolves on the novel Coronavirus, Covid-19. How we address infection mitigation in the design and outfitting of workplace environments is based on best practices learned through current science as it continues to evolve. Although we can't eliminate risk in the workplace, we can implement flexible approaches and solutions that allow us to feel safe and comfortable in the places we work, learn, live, heal, and recreate.

December 2, 2020

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Frequently Asked Questions

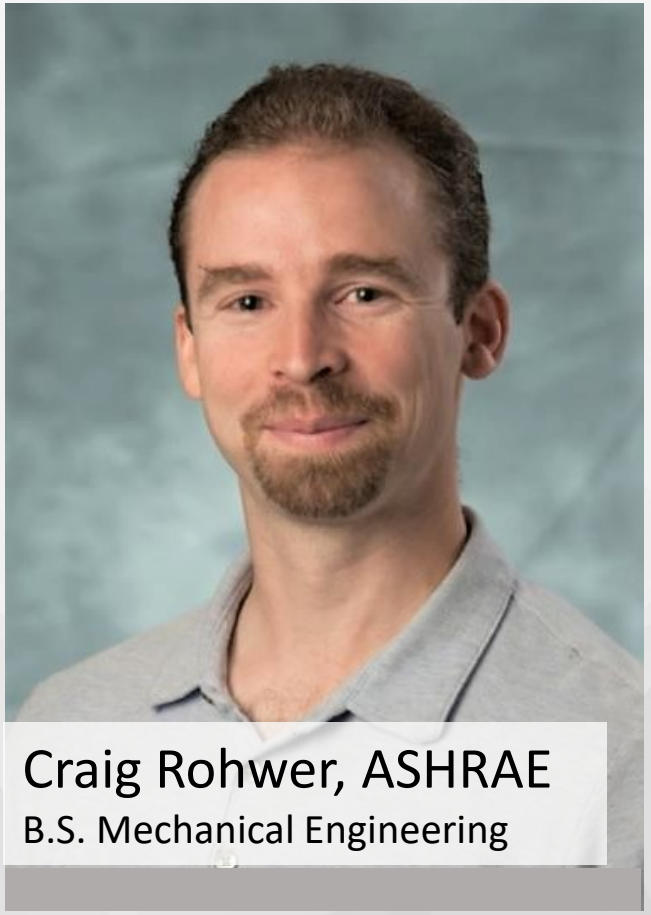
1. *How do we determine if our workplace is ready for re-occupancy?*
2. *If our building owners don't replace or update our air system, how might we mitigate airborne infection within our individual suite?*
3. *Do portable air purifiers disinfect the air? Could we use multiples around the office?*
4. *How can we mitigate touchpoint contamination?*
5. *I think our staff is nervous about returning to the office building. How can we make sure it's safe and help them feel ok about it?*
6. *What modifications can be implemented with very limited funds?*
7. *How do these solutions vary for schools, prisons, hotels, restaurants?*
8. *What is HVAC and how can it help me get back to work?*
9. *Why is the finish on our waiting area furniture suddenly failing?*

Presenters

American Society of Interior Designers (ASID)
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Dana Nunn, ASID
NCIDQ, LEED AP, WELL AP, RID (TX)

Mary Knopf, FASID
IIDA, NCIDQ, ALEP, LEED AP



Craig Rohwer, ASHRAE
B.S. Mechanical Engineering

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Presentation Outline

I. **Workplace Screening, Circulation, Space Planning, Partitions**
   Presenter: Dana Nunn, ASID

II. **Sustainable, Healthy Buildings, and the Human Factor**
   Presenter: Mary Knopf, FASID

III. **Cleaning, Sanitizing, Disinfecting; Operational interventions**
   Presenter: Dana Nunn, ASID

IV. **Mechanical Systems and Air Filtration**
   Presenter: Craig Rohwer, ASHRAE

V. **Questions & Discussion**

I. Workplace: Screening, Circulation, Space Planning, and Work Areas

1. **Regulations, Emergency Orders & Mandates**
    a. CDC/WHO
    b. State & Local Mandates
2. **Entry Screening**
    a. Health Screening
    b. Contact Tracing Logs
3. **Circulation Modifications**
    a. Separate ingress / egress
    b. One-way corridor traffic
    c. Wider circulation
4. **Space Analysis & Planning**
    a. Layout: occupant density, spacing & screening
    b. Circulation
    c. Promote virtual connectivity
    d. Hygiene, Cleaning and Disinfection
5. **Work Areas**
    a. Private offices & open work areas
    b. Shared spaces

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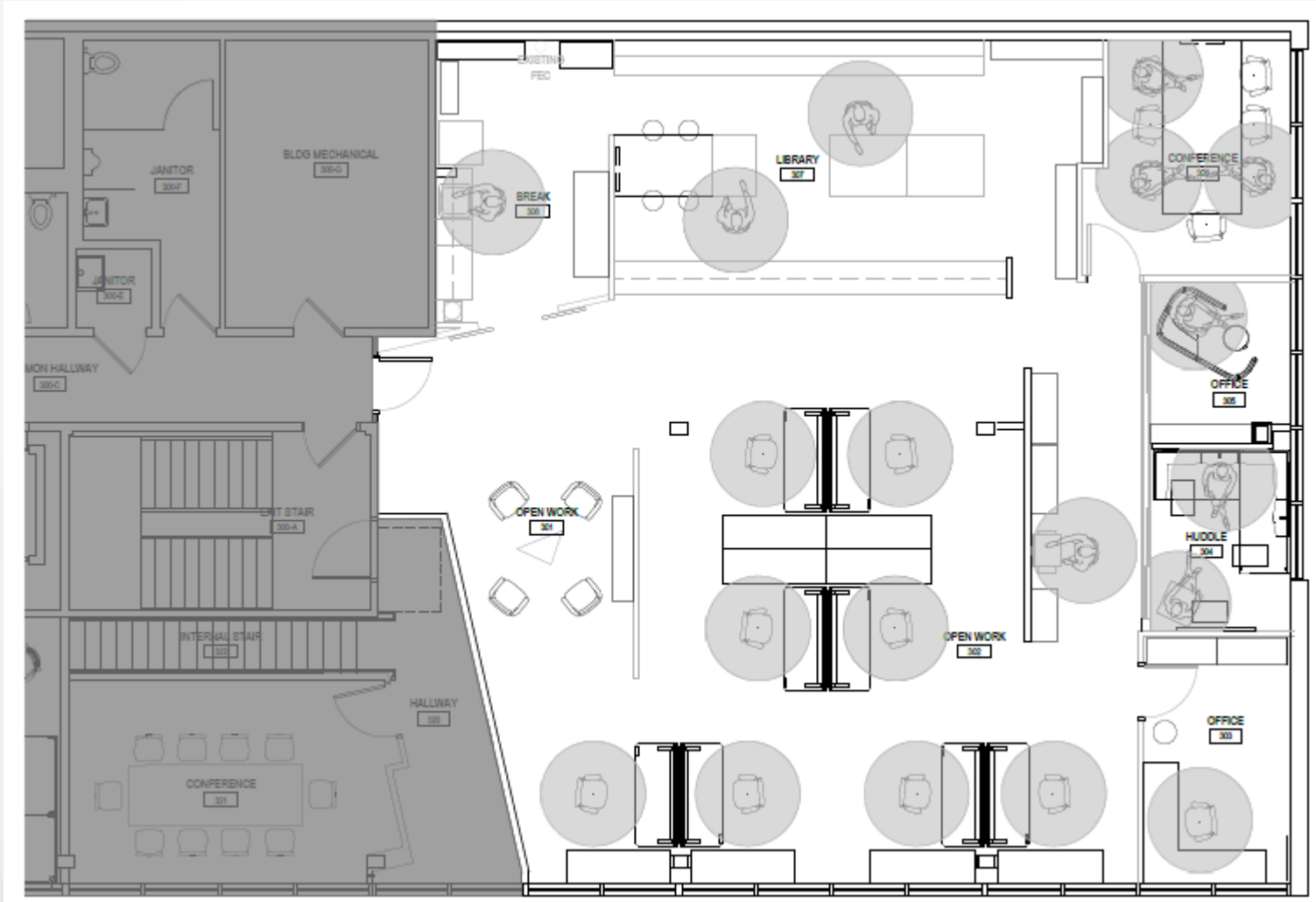

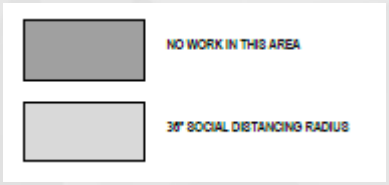

Workplace Practices:

- **6ft minimum distance:** maintain 6ft distance in the workplace at desks, pathways, shared spaces
- **Reduce Occupant Density:** limit number of occupants especially in enclosed spaces
- **Add Screening:** install screens between workstations where maintaining the 6ft distance guideline is not feasible
- **Reduce Ancillary/Shared Space Use**: Limit use of ancillary & shared spaces and implement clean-in/clean-out practices
- **PPP and Cleaning**: wear masks at work; establish procedures for cleaning workstations, high touch surfaces & shared spaces
- **Virtual Collaboration**: Encourage online meetings; reduce frequency of in-person meetings and collaboration
- **Work from Home**: to reduce virus transmission by physical interactions, encourage working from home

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II. Sustainable, Healthy Buildings, and the Human Factor

The Center for Disease Control (CDC) defines Indoor Environmental Quality (IEQ) as "The building's environment in relation to the health and wellbeing of those who occupy space within it".

1. **Human Factor – Returning to the Workplace**
    a. Stress, physical and mental safety
    b. Life stages - structure, mentorship
2. **Indoor Air Quality**
    a. Select materials and Furnishings that support a healthy environment:
        i. Limit VOCs, caustic chemicals and plastics
        ii. Mitigate dust, mold, and mildew habitats
3. **Thermal and Acoustic Comfort**
    a. Furniture configurations/space plan to improve air circulation
    b. Locate respite zones
    c. Introduce acoustic support
4. **Nature, Daylighting, Views and Glare**
    a. Power of Nature proven to reduce Anxiety
    b. Provide access to natural light and to outdoor views

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Mary Knopf, FASID, IIDA, NCIDQ, ALEP, LEED AP

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III. Cleaning, Sanitizing, Disinfecting; Operational Interventions

1. **Touchpoint contamination**
    a. Cleaning vs. sanitizing vs. disinfecting
    b. Dwell time & product effectiveness
    c. Material compatibility
        i. Hard vs. soft, porous vs. non-porous
        ii. Textiles & plastics
    d. Reduce or eliminate surface touchpoints; replace the surface, implement cleaning protocols
2. **Operational/procedural**
    a. Cleaning and sanitization procedures
    b. Emergency preparedness
    c. Health services resources
    d. HR considerations and stakeholder engagement & communication
        i. Solicit input
        ii. Establish internal & external communication
        iii. Continue employee training
        iv. Build buy-in through consensus building

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IV. Mechanical Systems, Air Filtration and Disinfecting

1. **COVID: WHO/CDC and ASHRAE Recommendations**
    a. Modes of Transmission
        i. Close Contact/large droplet transmission **“Most Common”**
        ii. Airborne/small droplet transmission **“Sometimes”**
        iii. Surface/contact points – **“less common”**

2. **The Four Key Areas of Indoor Air Quality**
    a. Dilute – Increase Ventilation with outdoor air
    b. Exhaust – Keep exhausts running
    c. Contain – Control indoor humidity
    d. Clean – Safely use air cleaning technology

3. **Mitigation Technologies**
    a. GOOD – MERV 1-8, Electrostatic filters, Surface Coatings
    b. BETTER – MERV 9-16, UV, H2O2, Air Ionization & Ozone Generators
    c. BEST – HEPA, Photo Catalytic Oxidation

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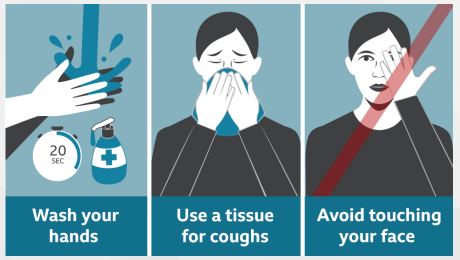
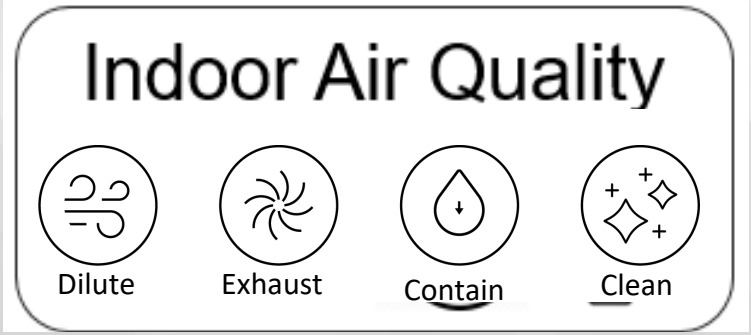
IV. Mechanical Systems, Air Filtration and Disinfecting

1. WHO/CDC and ASHRAE Recommendations

Vector	Mitigation Measures
 Direct	
 Fomite	
 Aerosol	

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IV. Mechanical Systems, Air Filtration and Disinfecting

Dilute

- Disable CO2 control
- Increase minimum outdoor-air airflow
- Operate air-handling equipment with 100% outdoor air (no recirculation), when outdoor conditions allow
- Provide Temporary and Permanent Solutions for additional capacity
- Keep ventilation systems operating 24/7, even if at lower airflows
- Implement pre- and post-occupancy purge sequences to flush building with outdoor air

Exhaust

- Keep restroom exhaust operating 24/7

Contain

- Modify system to maintain indoor humidity between 40% and 60% relative
- Add humidifiers where appropriate and possible to increase humidity in winter

Clean

- Upgrade filters to MERV-13 (or higher, if possible) and ensure effective air seals
- Add portable room air cleaners with HEPA or high-MERV filters
- Add ultraviolet (UV) lamps in ductwork, air-handling units, or upper region of the room

summary based on the *ASHRAE Position Document on Infectious Aerosols*, updated 14 April 2020
www.ashrae.org/covid19

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IV. Mechanical Systems, Air Filtration and Disinfecting

1. **GOOD:**
    a. <u>MERV 1-8 Filters</u>
        a. Install filters if none are present

    b. <u>Electrostatic Filters</u>
        a. Charged filters to “attract” particulates in the air stream
        b. More costly than standard filters but can replace existing filters or augment HEPA filtration

    c. <u>Surface Coatings</u>
        a. Potential for microbiological destruction on surfaces such as coils, countertops, door handles, etc.
        b. Does not effectively counter airborne micro-biologicals

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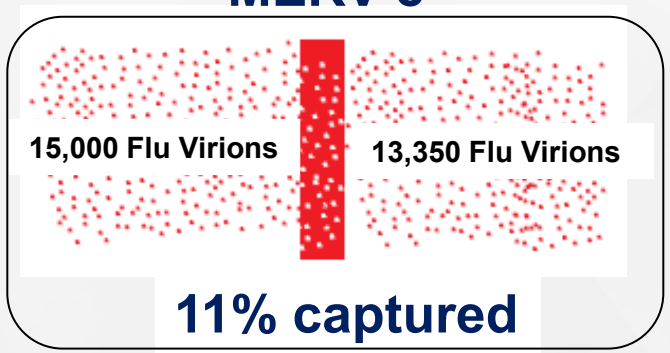
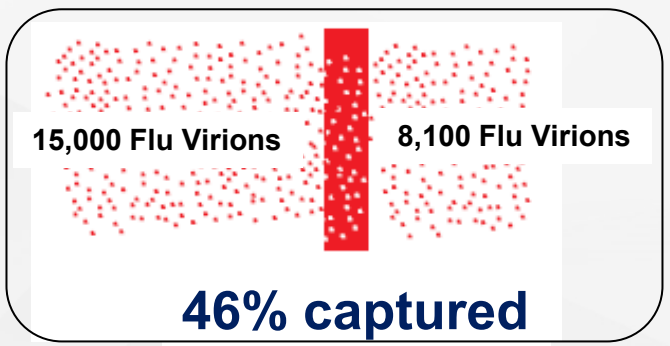
Effect on Influenza A Virus

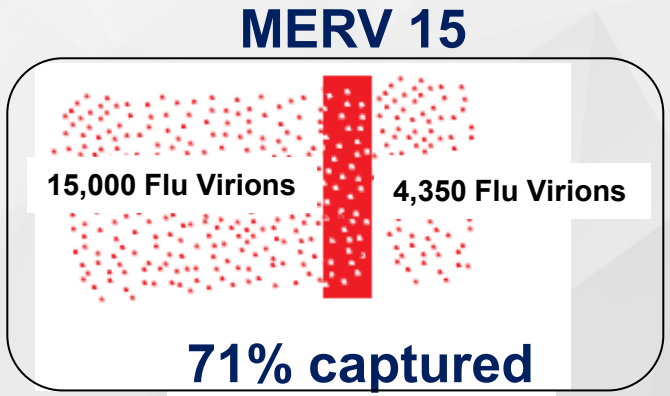
MERV 8



MERV 13



MERV 15



HEPA*

HEPA is the most effective filter to remove virus particles

Source: Modeling Immune Building Systems for Bioterrorism Defense; Kowalski, Bahnfleth, Musser, Journal of Architectural Engineering, June 2003, v9(2), pp222-227.

* HEPA was not part of the study above. It's a graphical representation of 99.97% efficiency HEPA filter (defined by DOE) with particulates in 0.3µm which is the toughest size to catch.

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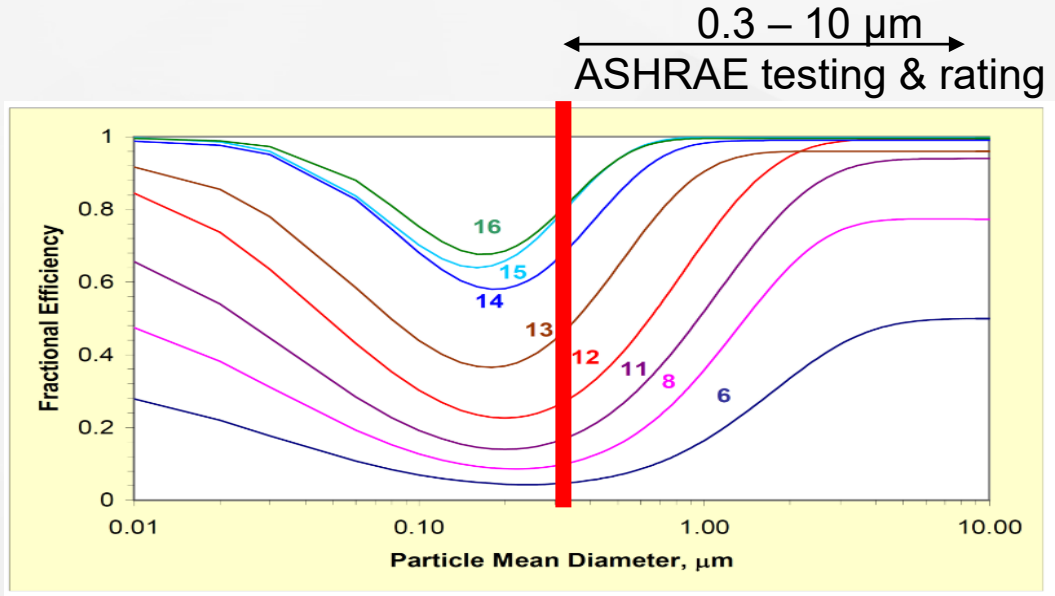
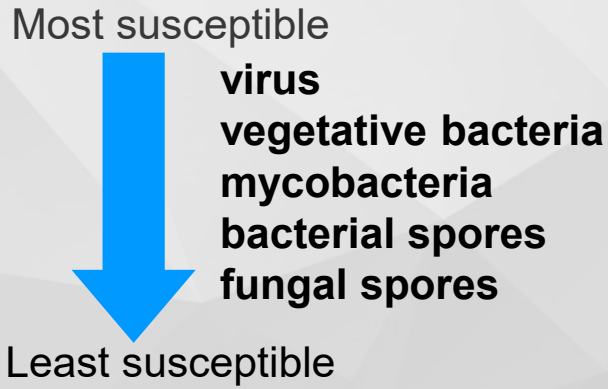
2. BETTER:

a. <u>MERV 9-16 Filters</u>: ASHRAE® 52.2 Minimum Efficiency Reporting Value (MERV)



b. <u>Ultraviolet Germicidal Irradiation (UVGI)</u>
   a. C-band ultraviolet, 254 nm
   b. Surfaces: low intensity, effective
   c. On-the-fly: reduced effectiveness



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2. BETTER:

a. Hydrogen Peroxide Generators
   a. Introduces gas phase hydrogen peroxide directly to the space to provide active reaction in the zone (air does NOT need to return to air unit to be treated)
   b. Actively treats both air and surfaces

b. Bipolar Ionization & Ozone Generation
   a. Ion Production - Produces both Positive and Negative Ion
   b. Pathogen Control - Ions kill Virus, Mold/Fungus and Bacteria in the plenum, ductwork & the work/living space.
   c. Allergen Control - Ions allows particles to agglomerate making particles larger for more effective filtration.
   d. Odor & Smoke Control - Odors & smoke are converted into atmospheric gases.
   e. VOC's - are broken down in the Cold Plasma Field.
   f. UL 867 certification for ozone production (<50ppb)

ASHRAE's current recommendations focus primarily on high-efficiency particulate filters and UV-C lamps, due to the existence of peer-reviewed research studies.
ASHRAE Position Document on Infectious Aerosols, updated 14 April 2020, www.ashrae.org/covid19

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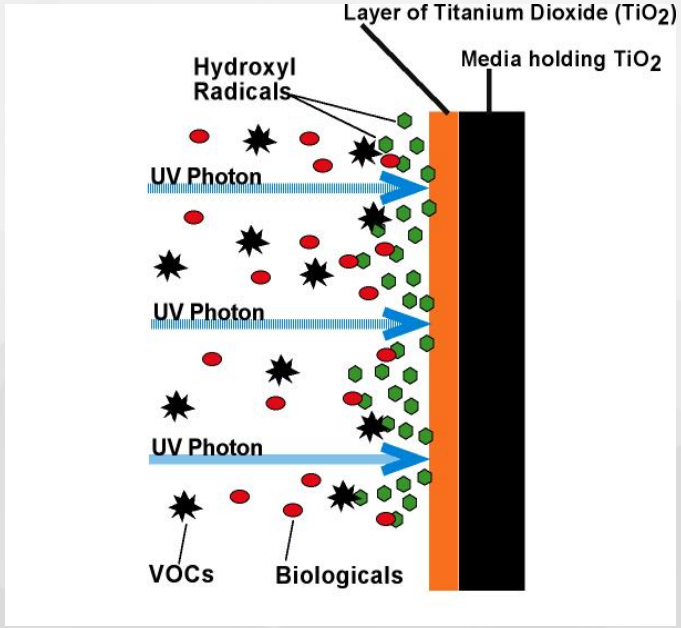
3. BEST:

a. Technologies for Microbiological Air Cleaning

i. HEPA – High Efficiency Particulate Filter 99.97%
HEPA filters, as defined by the United States Department of Energy (DOE), remove at least 99.97% of airborne particles 0.3 micrometers (µm) in diameter.
https://www.standards.doe.gov/standards-documents/3000/3020-astd-2015

ii. Photo Catalytic Oxidation
UV light creates photons, photons "catalyze" by the TiO_2, radicals last 1/10 second and react with carbon-based compounds (viruses, bacteria, etc.)
Organic compounds reduced to CO_2 or H_20



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Thank You!

Q/A and Discussion

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