

COVID-19 (SARS-COV-2) PRE- OCCUPANCY BUILDING WELLNESS

A proactive approach

Presented by:
Hygieneering Inc.

PRE-OCCUPANCY BUILDING WELLNESS

Indoor Air Quality

Water Quality

COVID-19 (SARS-CoV-2) Building Preparedness

INDOOR AIR QUALITY

EPA...INDOOR AIR

90% of our time spent indoors

2-5 times contaminant levels inside versus outdoor

EPA calls IAQ as one of the top five environmental health risks

An important component of “Green Buildings”

The indoor environment is a perfect setting for the spread of COVID-19

WHY THE INCREASE IN IAQ PROBLEMS?

Energy Efficient Construction (tight buildings)

Increase in allergies & asthma

Reduced allocations for facility maintenance

Increased occupant awareness of environmental problems (mold)...

Did someone say global pandemic?

EPA — “IAQ & STUDENT PERFORMANCE”

Evidence continues to emerge showing that poor indoor air quality (IAQ) can cause illness requiring absence from school and can cause acute health symptoms that decrease performance while at school. In addition, recent data suggest that poor IAQ may directly reduce a person’s ability to perform specific mental tasks requiring concentration, calculation, or memory.

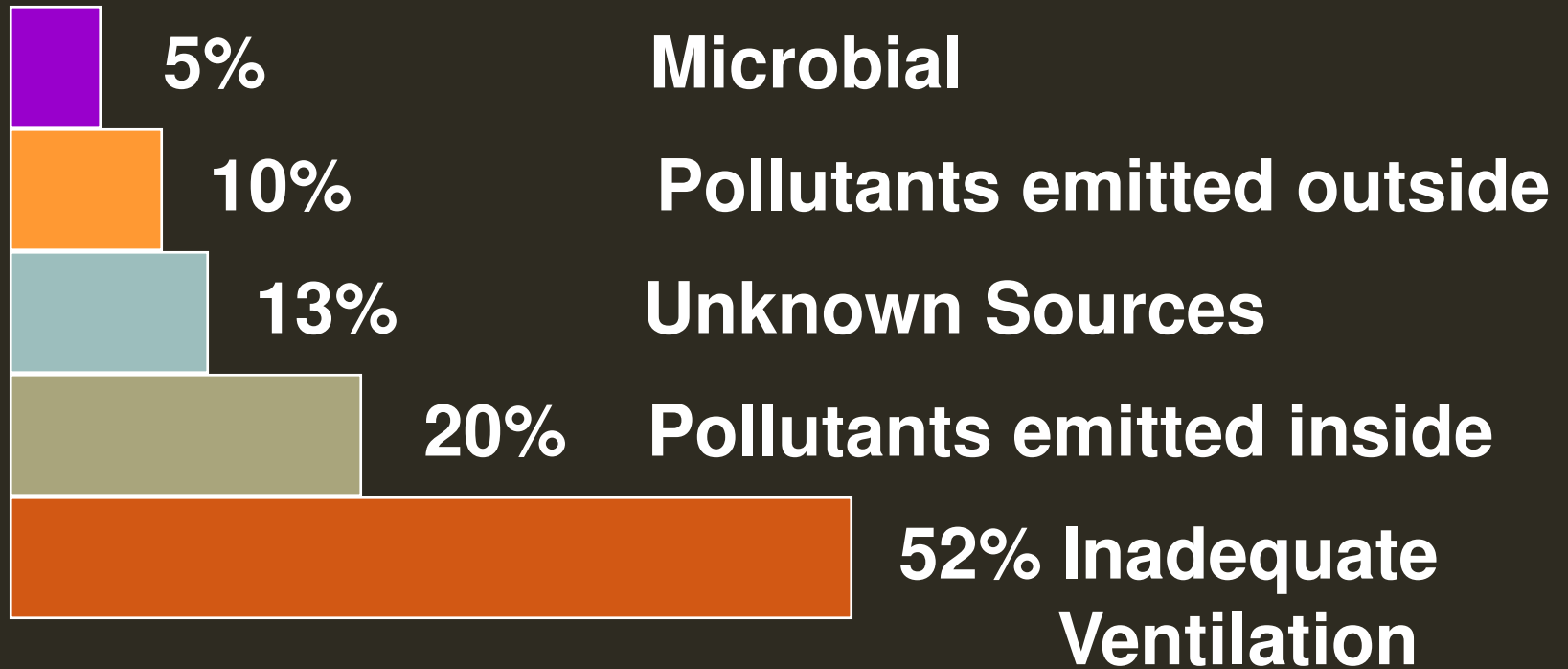
IAQ ECONOMICS

OSHA: buildings with poor IAQ could expect a 3% decrease in productivity

BOMA estimated poor IAQ to have a 2 to 16% negative impact on productivity

PRIMARY SOURCES OF IAQ PROBLEMS

(NIOSH STUDY OF 600+ BUILDINGS)



INDOOR AIR QUALITY ASSESSMENT COMPONENTS

Poor IAQ Risk Factor Review and Prevention

- Facility Inspection
- HVAC System Inspection
- Air Monitoring
- IAQ Training – Written Program

IDENTIFY POTENTIAL OUTDOOR SOURCE POLLUTANTS

Motor vehicle exhaust

Plumbing vent exhaust

Building exhaust from kitchens or restrooms

Neighboring facilities

Loading docks, dumpsters, alleys

Emergency Generators

GREAT PLACES FOR AN OUTSIDE AIR INTAKE



Ventilation system
air intakes in
relation to traffic
and smoking areas.

Photograph 1

FACILITY INSPECTION

General housekeeping

Occupancy

High moisture areas

Chemical use & storage

Unique facility operations

Renovations in progress
/recently completed

Odors



MOISTURE PROBLEMS = MOLD

Roof leaks

Pipe leaks/ condensation

Sprinkler head release

Sewer/toilet backups

Flood events

High relative humidity



Aerotech Laboratories, Inc.



Aerotech Laboratories, Inc.

WE TOOK CARE OF THE LEAK



MOLD INDOORS

Visible mold growth or bio-amplification is not acceptable in the indoor environment.



DUST & ALLERGENS

Up to 40% of the population is sensitive to environmental allergens.

Outdoor seasonal allergens enter the indoor environment.

Co-workers may unknowingly be transporting allergens from their home into the workplace.

High humidity promotes dust mites indoors.

Lack of adequate pest management may result in mouse or cockroach allergens in the workplace.

Inadequate housekeeping practices allow for the accumulation of allergens in the workplace.

A NEW FIRST IMPRESSION

Tenants are returning to their offices after a prolonged absence;
what will their mindset be about returning?

Will the 2-year-old water stain above the copier go unnoticed?

What about that dried sewer trap in the bathroom floor drain?

Does it smell funny in here?

Why is there a layer of dust on my desk?

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ASHRAE STATEMENT ON AIRBORNE TRANSMISSION OF SARS-COV-2

Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled.

Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.

The virus is transmissible through the air; improving ventilation will reduce the likelihood of transmission.

HVAC INSPECTION

- Filtration Issues
 - Improper Type/Efficiency
 - Improper Fit
 - Lack of Maintenance
 - Overloaded
 - Degraded
 - Damaged
 - Water
 - Physical



COILS & CONDENSATE SYSTEM

Coil Cleanliness

Condensate Issues

- Condensate pan pitch off
- Condensate line clogged



HVAC INSPECTION- SYSTEM CLEANLINESS

- National Air Duct Cleaning Association (NADCA)
- Dirty Ducts
 - Inhibit flow
 - Microbial growth
 - Significant dust/debris



**MOLD GROWTH WITHIN YOUR HVAC SYSTEM
WILL END UP ON SOMEONE'S DESK**



ASHRAE COVID-19 GUIDANCE

Increase outdoor air ventilation (use caution in highly polluted areas); with a lower population 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%, thus eliminating recirculation (in the mild weather season, this need not affect thermal comfort or humidity, but clearly becomes more difficult in extreme 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.

Keep systems running longer hours, if possible 24/7, to enhance the two actions above.

Consider portable room air cleaners with HEPA filters.

Consider UVGI (ultraviolet germicidal irradiation), protecting occupants from radiation, particularly in high-risk spaces such as waiting rooms, prisons and shelters.

THINGS TO CONSIDER

Can your building's supply and exhaust fans be modified to maximize outside air and minimize return air?

How will improved filtration impact my supply and exhaust fans?

What will happen if fan speeds are increased?

What will happen to my energy efficiency?

What will the impact be on my indoor air quality?

INDOOR AIR QUALITY ASSESSMENT COMPONENTS

Poor IAQ Risk Factor Analysis

- Facility Inspection
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AIR MONITORING (DIRECT READ INSTRUMENTATION)

Temperature &
Relative Humidity

Carbon Dioxide

Carbon Monoxide

Volatile Organic Compounds
(VOCs)

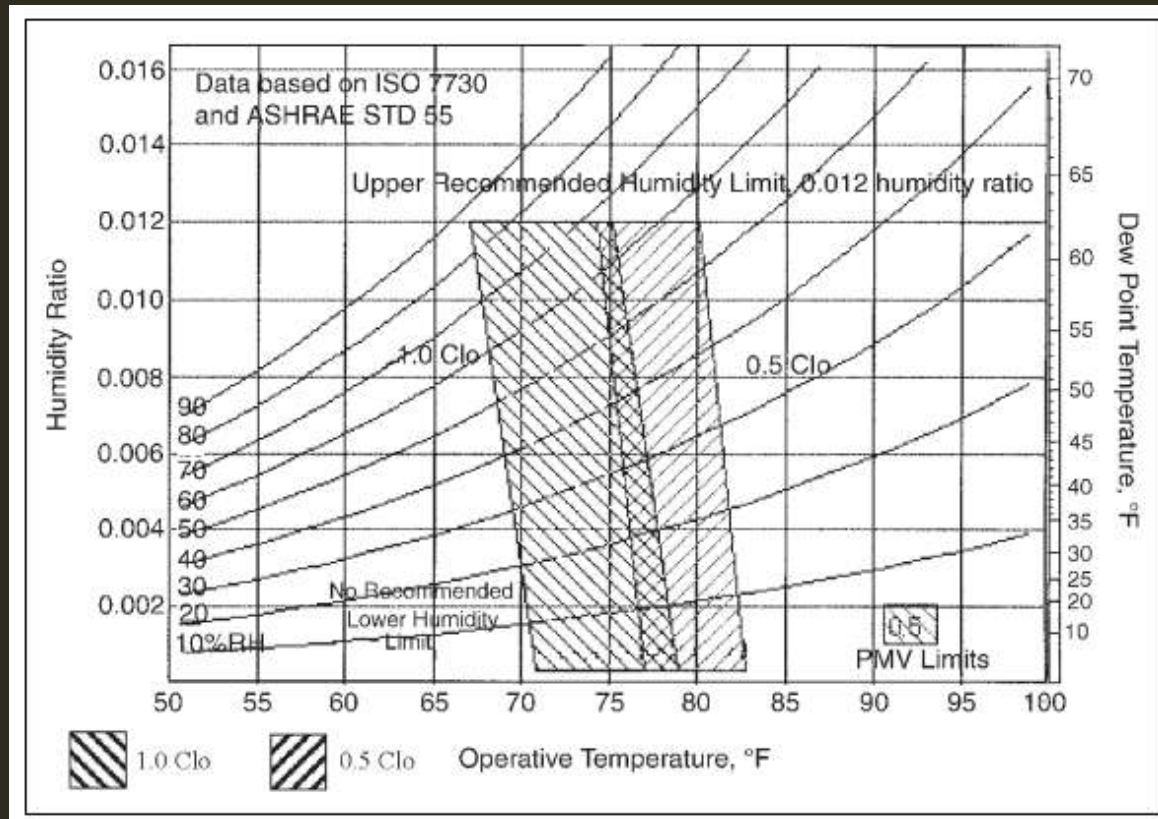


THERMAL COMFORT-ASHRAE STANDARD 55-2017

Designed to appease 8 out of 10 occupants

Drafts

Drifts



AIHA REOPENING GUIDANCE DOCUMENT

Ensure that temperature and humidity are set at range that are comfortable for most people.

Some ways to do this are:

- Maintain temperature at 68.5-75°F in the winter, and from 75-80.5°F in the summer.
- Maintain relative humidity at 40-60%.

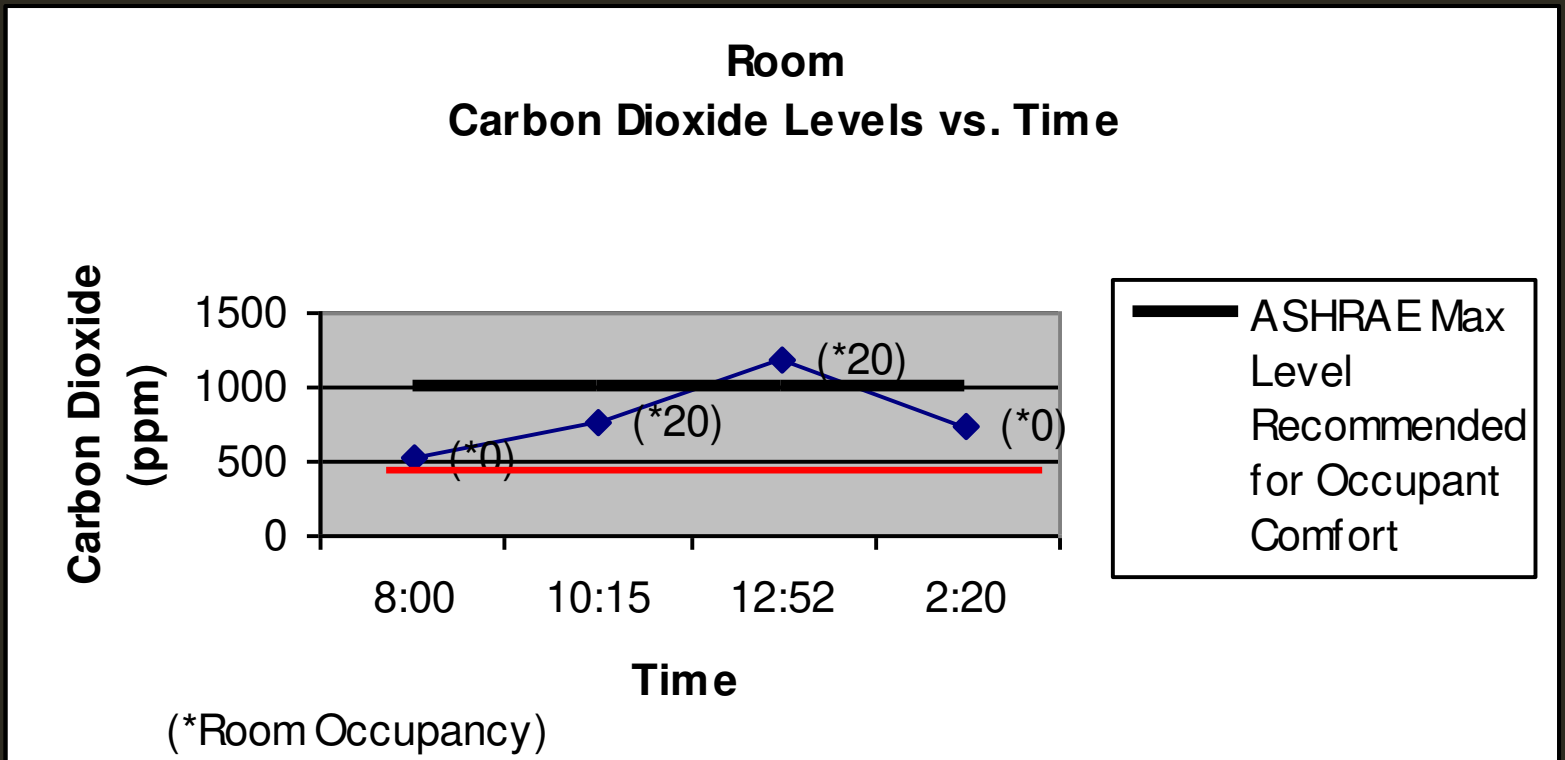
https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/Reopening-Guidance-for-General-Office-Settings_GuidanceDocument.pdf

CARBON DIOXIDE AS AN INDICATOR OF VENTILATION

- Released during exhalation
- Causes drowsiness and stale air
- ASHRAE recommends outside air levels (typically 350-400)+ 700ppm Maximum for indoor spaces (~1100ppm)
- Indicator of outdoor air supply/ventilation
- **Increase ventilation to reduce the virus transmission**



CARBON DIOXIDE



CARBON MONOXIDE



Combustion sources

- Vehicle exhaust
- Emergency generators
- Cracked heat exchangers
- Exhaust issues

Ensure natural gas systems that have been underutilized or not used are still functioning properly

COMMON INDOOR AIR POLLUTANTS (VOCS)

Adhesives

Paints

Carpeting

Furniture fabrics

Treated wood products

Cleaning products

Pesticides

Toner, inks & solvents



WHEN ARE THERE IAQ PROBLEMS?

Chemical product misuse

Improper storage

Accidental spills

Unforeseen Events



CLEANING & DISINFECTANTS

The U.S. Environmental Protection Agency (EPA) has developed a list of cleaning products that can be used against COVID-19 <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

Ensure that the chemicals are being used per the manufacturer's instructions:

- Proper dilution
- Dwell time
- Application method
- Exposure
- Disposal

CLEANING & DISINFECTANTS

Frequency of cleaning can depend upon occupant usage patterns, population of the facility, and surfaces that are frequently touched by multiple people. Establish a specific, detailed list of items, surfaces, equipment, and locations to be cleaned and disinfected, and a schedule of how often that should occur.

CLEANING & DISINFECTANTS

Identify “high-touch” areas that require frequent treatment, as well as any other areas that should be frequently cleaned (such as bathrooms and elevator lobbies).

Ensure proper dwell time for disinfectants.

Improper dwell time = lack of disinfection

Ensure proper dilutions for disinfectants.

Improper dilution can cause air quality issues, worker exposure issues and potential surface residues – dermatitis (rashes)

CLEANING & DISINFECTION - AIHA

To minimize the risk of exposure to contagious viral deposits from infected employees, contractors, or vendors, the American Industrial Hygiene Association (AIHA) encourages employers to use the approach of routine enhanced cleaning and disinfection of workplace surfaces and equipment, in combination with other risk mitigation measures to slow the spread of the SARS-CoV-2 virus.

EPA'S GUIDANCE FOR CLEANING AND DISINFECTING

- Coronaviruses on surfaces and objects naturally die within hours to days. Warmer temperatures and exposure to sunlight will reduce the time the virus survives on surfaces and objects.
- Normal routine cleaning with soap and water removes germs and dirt from surfaces. It lowers the risk of spreading COVID-19 infection.
- Disinfectants kill germs on surfaces. By killing germs on a surface after cleaning, you can further lower the risk of spreading infection. EPA-approved disinfectants are an important part of reducing the risk of exposure to COVID-19.
 - Store and use disinfectants in a responsible and appropriate manner according to the label. Do not mix bleach or other cleaning and disinfection products together--this can cause fumes that may be very dangerous to breathe in. Keep all disinfectants out of the reach of children.
 - Do not overuse or stockpile disinfectants or other supplies. This can result in shortages of appropriate products for others to use in critical situations.

https://www.epa.gov/sites/production/files/2020-04/documents/316485-c_reopeningamerica_guidance_4.19_6pm.pdf

OSHA COMPLIANCE CONSIDERATIONS

- Ensure a safety data sheet (SDS) is available for all products/chemicals and requirements for safe use are followed.
- Cleaning staff must be trained on proper disinfecting guidelines and potential hazards.
- Cleaning staff must be trained on proper PPE usage.

COMMON RENOVATION INDOOR AIR POLLUTANTS

Dust/Silica

Fiberglass

Asbestos

Lead

Welding fumes

Formaldehyde

Mold

Odors



WHEN ARE THERE PROBLEMS?

Lack of proper controls

Lack of communication with
contractors

Poor event timing

Selection of products

Are they wearing PPE?

How are they entering and
exiting the building?



INDOOR AIR QUALITY ASSESSMENT COMPONENTS

Poor IAQ Risk Factor Analysis

- Facility Inspection
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MAINTENANCE & ENGINEERING STAFF TRAINING

Understand importance of
HVAC system maintenance

Identify potential poor IAQ
risk factors

Understand how their
activities can affect IAQ

Housekeeping and
renovation procedures



IAQ OPERATIONS & MAINTENANCE PROGRAM

Policy statement

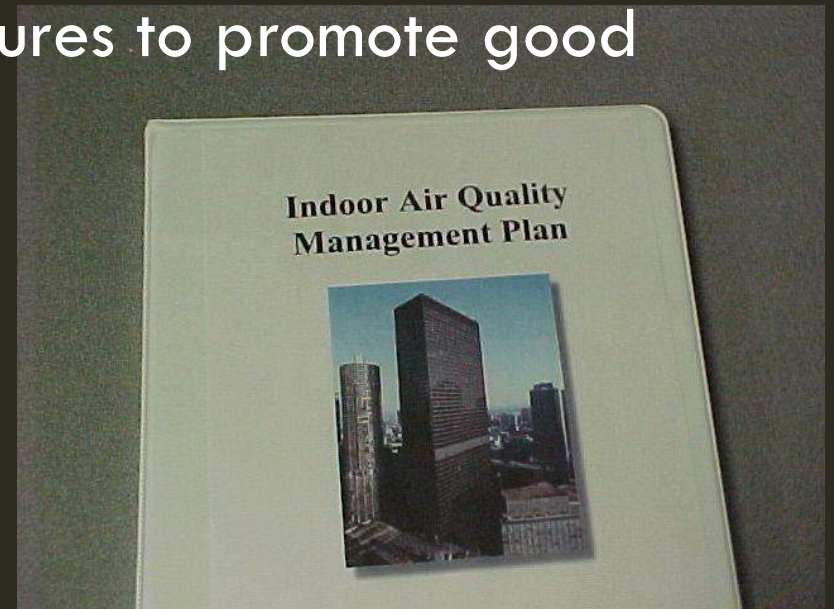
Establish and maintain IAQ guidelines

Develop and follow procedures to promote good IAQ

IAQ training

Record keeping

IAQ resources



SUMMARY

Many potential air quality related building issues, including SARS-CoV-2

Most indoor air quality problems are preventable; take a proactive stance!

Efforts to prevent IAQ problems typically well outweigh response efforts

WATER QUALITY |

THINGS TO CONSIDER

A typical office worker uses 15 gal/day according to the US Department of Energy

The domestic water system in your building has been underutilized during the extended period of unoccupancy.

This condition may have led to the opportunistic growth of Legionella bacteria in your building's domestic and facility maintenance water systems.

Domestic water supply may have a palatability issue.

LEGIONELLA RISK - AIHA

“Water that sits stagnant for an extended period of time in water mains, building plumbing lines, and water heaters loses residual chlorine disinfectant, which increases the risk of *Legionella* colonization. The risk of an outbreak of Legionnaires’ disease, after buildings that have been closed for as little as a week or two are reoccupied, is real.”

https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Public-Resources/RecoveringFromCOVID-19BuildingClosures_GuidanceDocument.FINAL.pdf

PROACTIVE MEASURES

Continue to operate the building's domestic water systems and flush on a regular basis.

Can your building's domestic water systems be drained during periods of disuse?

Can your building's domestic water systems be disinfected?

Consider water sampling to assess water quality

**COVID-19 (SARS-COV-2)
BUILDING PREPAREDNESS**



WORKPLACE REOPENING

The system used by the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) consists of five steps, with the use of personal protective equipment being the last, Allen said. They include:

Hazard elimination, which means keeping employees home, a tactic that works for some, but not others, and won't lead to full economic recovery.

Personnel substitution, in this case initially bringing back just those key employees who need to be physically present to get and keep the business running.

Engineering controls, including healthy-building strategies such as increasing the flow of outside air, using portable air purifiers, and swapping existing filters in air circulating systems for ones that can capture smaller particles.

Administrative controls, such as de-densify buildings by having portions of the workforce come in on alternate days or staggering shifts within a day. This might also include spreading workers out in space and limiting the use of conference rooms for large gatherings.

Use of personal protective equipment (PPE), such as the now-familiar cloth face coverings, respirators, and other gear in common areas and situations where other controls don't achieve the required level of safety.

ELIGIBILITY TO REOPEN

Federal, State (Illinois), and City (Chicago) guidelines have been issued for commercial building reopening

Government and Organizations have issued guidance documents in anticipation of reopening.

https://aiha-assets.sfo2.digitaloceanspaces.com/AIHA/resources/Guidance-Documents/Reopening-Guidance-for-General-Office-Settings_GuidanceDocument.pdf

https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7_4#:~:text=The%20incubation%20period%20for%20COVID,occur%20before%20symptom%20onset

<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>

<https://www.osha.gov/SLTC/covid-19/controlprevention.html>

CONSIDERATIONS

Enhanced cleaning and disinfection

- How often
- Where
- High-touch areas

Arrival Times

Common area usage

Elevator Lobbies-Elevators

Bottlenecking

Entrance Screening (Contractors)

THE HUMAN COMPONENT

Proper Hygiene

- Provide soap and water and post signs to encourage frequent handwashing
- Provide hand sanitizer at multiple locations in the workplace
- Discourage handshakes and other forms of physical contact
- Provide tissues and no-touch trash bins.

Proper PPE

- Employers should consider requiring or encouraging the use of face coverings such as surgical masks
- Employers should provide face coverings for employees to use.

TO DO LIST FOR RE-OCCUPANCY

- ✓ Ventilation system
- ✓ Filtration
- ✓ Poor indoor air quality indicators
- ✓ Air monitoring
- ✓ Housekeeping Protocols
- ✓ Water systems
- ✓ Re-opening documentation
- ✓ Re-opening policy and procedure

CONCLUSIONS

Establish a proactive approach to your building's reopening

- This is your chance at making a great first impression!
- Improve facility's relationship with occupants
- Reduce IAQ complaints
- Minimize risks of virus transmission
- Do your part to flatten the curve!

QUESTIONS?



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