EMCOR Government Services | **WHITE PAPER**

EVOLVING FACILITIES ENVIRONMENTS

Recommendations for Achieving Greater ***Safety, Comfort, and Trust***

EMCOR Government Services

Now more than ever, it's vital to provide building occupants the peace of mind in knowing they are in a clean, healthy environment. Cleanliness, indoor air quality, and facility configuration all leave an immediate impression on individuals entering your facility, informing their view of your brand and impacting their opinion of how you care for your building and its occupants. Maintenance procedures, disinfecting processes, and daily operations all need to be reevaluated to ensure they meet the demands of our current health crisis.

As one of the industry's most trusted facilities services providers, EMCOR Government Services (EGS) is here to help you navigate the path ahead and offer assistance as you evolve your operations to best promote the health, wellness, and safety of your building occupants, as well as the financial stability of your business.

This document provides our recommendations for preventive measures, reactive measures, and other guidelines for businesses proceeding beyond the re-opening phase.

From adjusting HVAC and ventilation to enhancing cleaning processes and much more, this guide offers key considerations and well-informed best practices that can help ensure facilities environments are achieving the highest levels of safety and fostering comfort and trust with occupants.

The landscape encompassing COVID-19 is rapidly developing and changes from day-to-day. These recommendations are based upon the latest available research. However, they will require updates as applicable government orders are issued and new Center for Disease Control and Prevention (CDC) guidelines are released and should be read in conjunction with such orders and guidelines.

PART 1:

General Facility Considerations

Before considering any upgrades to HVAC equipment or adjustments to janitorial processes, EGS recommends looking at changes that can be immediately implemented, such as promoting social distancing and establishing communication plans for the building's occupants.

PROMOTING SOCIAL DISTANCING

Reconfigure Space and Add Partitions

For offices, government, and commercial spaces, reconfigure workspace environments to increase distance to six feet between employees and identify high-traffic areas where groups of 10 or more people congregate and adapt them to minimize congestion. Wherever possible, incorporate technologies and measures that distance clients from employees, like plexiglass partitions.

Have a variety of contingency plans so that you can quickly adjust as capacity and foot traffic ebbs and flows. Your organization and facilities team will need flexible processes in place in order to maximize efficiency while also ensuring a healthy, safe environment for everyone who enters your building.

Utilize Occupancy Sensors or Foot Counting Devices

Occupancy sensors for government or commercial office space or foot tracking technologies are also useful tools for measuring activity, which can help inform space configuration, cleaning procedures, and HVAC operations.

Foot tracking and occupancy sensors determine which spaces in your facility are the most frequently used and at what times. This can help you develop circulation plans that match the needs of your space. You can also leverage this information to develop usage-based cleaning processes. Adjusting the frequency of deep-cleaning procedures according to occupant use helps you streamline resources and avoid wasting time cleaning vacant spaces.

This data also allows you to adjust HVAC system operation based upon occupancy, promoting system efficiency, and helping you make decisions about your ventilation, filtration, and disinfection needs.

Following CDC guidelines, we recommend these social distancing procedures:

- Keep individuals six feet away from one another at all times
- Frequently wash hands with soap and water
- Restrict gatherings of 10 or more people
- Limit in-person meetings and utilize digital communication whenever possible
- When social distancing measures are difficult to maintain, wear CDC-recommended face masks or coverings

COMMUNICATING CHANGES

Display Signage and Determine Communication Strategy

To help employees, occupants, customers, and visitors safely navigate your space, it is essential to have clear, concise, and prominent communications. From team meetings and printed guides for employees, to signage and decals for building navigation, to posters explaining enhanced building measures for visitor comfort, your communications strategy will help everyone understand what is expected of them.

Communication tactics to consider, include:

- Utilize floor signage for distancing recommendations or one-way circulation patterns
- Post occupancy and usage guidance in elevators and stairways
- Post CDC-recommendations for staying home when feeling ill, social distancing, handwashing, face coverings, etc.
- Define cleaning protocols and frequency
- Display signage explaining enhanced building measures, like:
  - -Indoor air quality (IAQ) solutions
  - -Hand sanitizing stations
  - -Touchless fixture implementations
- Conduct frequent virtual meetings and post bulletins for employees, covering policies, procedures, and CDC updates

PART 2:

Enhanced Cleaning and Disinfecting Solutions

An enhanced cleaning and disinfection routine is another fundamental practice for helping improve the health and safety of your facility. Increasing the frequency and thoroughness of your janitorial regimen provides occupants peace of mind in knowing that you are actively taking steps to promote their comfort and wellbeing.

Implement Enhanced Cleaning Program

At EGS, we recommend that building owners work with their facilities services partner to design a cleaning and disinfecting program tailored to their unique building needs. **Some fundamental practices applicable to virtually every facility type, include:**

- Review specifications and cleaning frequencies for high-touch areas like desks, restrooms, door handles, etc.
- Increase daytime cleaning to occur around staff occupancy
- Review cleaning chemicals:

  -Add chemicals that are on the EPA N-List

  -Ensure chemicals are being applied correctly
- Increase training on chemical cleaning applications and cleaning procedures
- Review correct cleaning procedures to minimize crossing into disinfected space
- Ensure use of appropriate personal protective equipment (PPE) per facility/ jurisdiction protocols

Our Approach

At EGS, our enhanced cleaning program focuses on increasing the frequency of cleaning and intensity of disinfection across three primary fields: high-touch surfaces, restrooms, and floor care. Focusing on these three core areas lays a foundation for thorough sanitation and cleanliness throughout the entire facility.

1. High Touch Point Service

- Dust furniture and other surfaces
- Damp wipe heavily soiled surfaces and disinfect high touch surfaces
- Clean and disinfect plexiglass shields and reflective surfaces
- Clean litter and empty trash, disinfect trash receptacles
- Vacuum, dust and/or damp mop floors with disinfectant

2. Restroom Sanitation Services

- Pick up litter and remove trash
- Refill towels, toilet paper, soap, feminine products
- Clean mirrors
- Disinfect sinks, faucets, counters, urinals, toilets, walls, and partitions around urinals and toilets
- Disinfect doorknobs, and soap and towel dispensers
- Empty and disinfect trash receptacles and sanitary napkin bins
- Sweep, mop, and sanitize floor

3. Floor Care Sanitation Services

- Remove chairs/furniture where possible
- High dust areas before proceeding to the floors
- Dust floors, remove litter, and scrape up gum or other materials
- Disinfect floors with wet mop or auto scrubber, as required for the space

Deep-Cleaning and Disinfection

For facilities looking to take extra precautions—especially those that have experienced a positive COVID-19 case—there are additional deep-cleaning methods and technologies to consider that offer broader disinfection of larger areas.

Misting and fogging services offer total surface coverage. It is important to note that Safety Data Sheets must be certified for fogging. Electrostatic disinfection is another advanced technology that uses ionization particles to clean surfaces. Both of these deep-cleaning methods should be seen as a supplement, and not a replacement, to a standard cleaning and disinfecting routine.

Deep-cleaning methods can be a great way to help restore occupant comfort after a positive case of COVID-19. Some clients have even implemented these solutions as part of a periodic comprehensive disinfection process, providing occupants confidence that their environment is being cleaned to a higher standard on a consistent basis.

High-Contact Surfaces and Touchless Fixtures

As building codes allow, consider leaving interior doors open or install automatic door openers to prevent the frequency that door knobs or handles need to be touched. Make sure there are trash cans throughout your facility and add trash cans near, or just outside, restroom doors for paper towel disposal. Installing hand sanitizing stations is another practical way to minimize cross contamination.

Faucets, water fountains, and flushing mechanisms are some of the most frequently touched areas of a facility and, as such, persistent points of cross contamination.

For more thorough safety, consider installing touchless fixtures, which are among the best tools for eliminating the spread of illnesses in a facility. With many buildings at low- or no-occupancy, now is the ideal time to consider installing the latest in touchless technologies. Not only do they help make facilities more sanitary, that can also significantly improve energy efficiency.

Common touchless fixtures include:

- Water closets
- Toilets
- Urinals
- Faucets
- Hand dryers
- Towel dispensers
- Soap dispensers
- Water fountains

No matter the surface or program, cleaning protocols should be implemented by skilled cleaning professionals who are equipped with the training, knowledge, tools, materials, and appropriate PPE to help keep your facilities safer, cleaner, and healthier.

PART 3:

HVAC and Mechanical Systems Operations

According to ASHRAE, when operated and maintained effectively, ventilation and filtration provided by HVAC systems can help reduce the airborne concentration of SARS-CoV-2 (the virus that causes COVID-19) and thus the risk of transmission within a building. There are a range of strategies for HVAC system operations, maintenance, and service that can help promote the health and safety of your building's occupants.

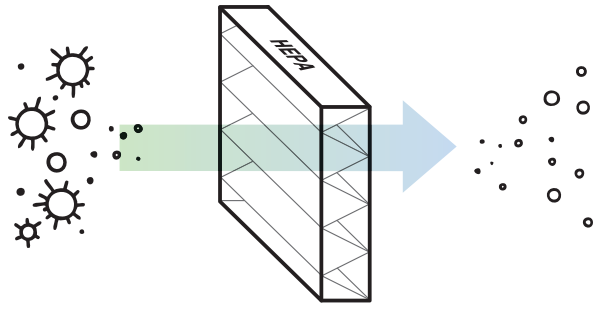
Review Maintenance and Cleaning Procedures

Before considering any major changes to HVAC systems, filtration, or other mitigation technology, the first thing all buildings should do is review their mechanical maintenance and cleaning procedures.

Make sure all air filters are being replaced on a consistent basis. Routine maintenance should be more frequent and should regularly include an inspection of the cleanliness of the system's entire air path. If your building has been at low- or no-occupancy for the past few months, include an indoor air quality (IAQ) analysis in your plans. Also consider thoroughly cleaning air ducts and vents.

Consider following these recommendations when reviewing cleaning procedures:

- Change filters regularly, as recommended by your specific system operating requirements.
- Ensure that components related to outdoor/ventilation air are working properly. Consider supplemental duct/system cleaning.
- Where present, verify proper operation of other IAQ-related components (humidification or UV light systems, for example) to confirm they are functioning at peak performance.
- Consider supplemental air cleaning measures. These could include: higher MERV ratings for filters, UVGI, or Ionization systems, to name a few.



Improve Ventilation and Circulate Outside Air

After settling your maintenance routine, improvements to ventilation and outside air intake should be considered next.

Maximizing the use of outside air to displace contaminated air is one of the most fundamental ways to minimize the transmission of airborne viruses and pathogens through a building's HVAC system.

While the amount of increased outside air required to achieve your ventilation needs will be application specific and require consultation from a professional, **there are a few general guidelines to consider.**

- More outdoor/ventilation air is better for IAQ.
- Ensure that outdoor air dampers/ economizers (and return or relief air components) are functioning properly and appear properly set.
- For buildings with controlled pressurization levels (often used in laboratories, healthcare, or pharmaceutical environments) consult your facilities provider or mechanical contractor prior to making any changes.

Keep in mind that mixed-air HVAC systems looking to maximize occupant health and safety should be operated with a focus on increased outside air ventilation, rather than energy conservation.

Be Aware of Relative Humidity

While changes to ventilation and circulation may help improve IAQ, they may also affect relative humidity in unexpected ways. An ASHRAE report on infectious disease has shown that lower relative humidity can result in microbes and pathogens staying airborne longer.

To mitigate this phenomenon, make sure your systems are capable of keeping relative humidity below reasonable levels in warmer climates or during summer months. If practical, consider adding humidification to maintain at least 30% relative humidity in colder climates or during the winter months. Above all, if you have a humidification system, make sure it's being properly maintained.

Upgrade Existing Filters

Alongside ventilation and circulation, filtration is another fundamental way HVAC systems can help improve IAQ and promote occupant health and comfort.

Poor filtration is a key culprit in the spread of airborne viruses, and indoor air pollutants can also cause serious health problems for occupants who have respiratory conditions, autoimmune disorders, or environmental allergies.

Depending on system type and application, the efficiency and effectiveness of a filter—regardless of its rating—can vary widely.

According to the National Air Filtration Association, filters below MERV 15 have a minimal ability to trap virus microbes. The filters that are located upstream of your coils typically do not have more than a MERV 13 rating, and the performance of even the highest rated filter will deteriorate over time.

However, increasing the MERV rating too much—without also increasing filter surface area—will require a fan speed adjustment and additional energy or the system will suffer a decrease in airflow. Furthermore, most commercial equipment will also run into practical limitations and even excessive filter loading. Increasing filtration while decreasing airflow and circulation, may not have any positive impact on IAQ or occupant health.

This is why we always recommend consulting a professional HVAC representative, who can assess your system's performance capabilities and building needs, before making major filtration upgrades.

If you believe higher filter efficiency is warranted, most systems can upgrade to MERV 11 without changing fan-speed. However, professional consultation is almost always needed when considering an upgrade to MERV 13 or higher or if you have larger equipment, like built-up air handling units (AHUs).

HEPA filters offer an outstanding level of filtration, which can be critical and even required in certain environments (hospitals, healthcare facilities, etc.). Just remember, they are a site-specific solution designed for equipment with specific available fan power, filter rack construction, and ventilation needs. Again, consult an expert when considering any filter upgrade.

Consider Air Cleaning Technologies

No single technology can guarantee that viruses and pathogens will be 100-percent eliminated. As it is so new, information on SARS-CoV-2's survivability in air and on surfaces is being updated regularly. We recommend a balanced approach that utilizes multiple techniques in order to maximize your protection from the virus and promote optimal IAQ.

Along with more standard maintenance, circulation, and filtration improvements, there are a number of additional air cleaning technologies we recommend to clients depending on the specific requirements of their facility environments.

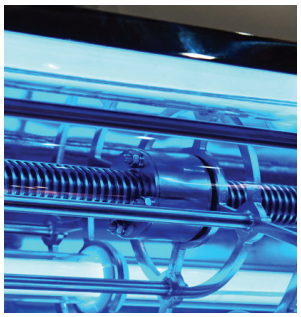
AIR IONIZATION

Air ionization is gaining popularity as a viable active air treatment option, and, in recent years, we have seen multiple successful applications of the technology for our customers.

The solution we recommend utilizes needlepoint bipolar ionization technology to purify air inside industrial, commercial, and residential buildings. The patented technology uses an electronic charge to create ions that can kill pathogens, breakdown harmful compounds, and accumulate micro-particles into larger filterable particles.

After passing through the HVAC system, the ions enter a building's air stream, cleaning air throughout the entirety of a facility. Make sure any ionization product you use is UL and CE approved, producing neither ozone nor other harmful by-products, so they are considered safe for continuous operation and can be deployed anywhere throughout a building.

ULTRAVIOLET GERMICIDAL IRRADIATION



Ultraviolet C (UV-C) technology has been a popular method for preventing the accumulation of airborne pathogens on HVAC equipment for many years now. UV-C bulbs are typically placed on the backside of cooling coils or in ductwork, where they offer continuous 24/7 protection from pathogen buildup.

Fighting the accumulation of airborne contaminants not only promotes IAQ but can also help minimize maintenance costs and restore cooling capacity. Without contaminant buildup, cooling coils preserve their original heat transfer and pressure drop levels, often resulting in significant energy savings.

We recommend two primary UV-C options:

- Surface Decontamination: To help ensure equipment receives continuous exposure, lamps are placed downstream of cooling coil and drain pan on mounting brackets installed in the coil segment.
- Airstream Decontamination: Designed to fight pathogens in the airstream, lamps are placed end-to-end in ductwork, increasing the total time that air particles are exposed to light. This is typically reserved for certain environments such as hospitals and healthcare facilities.

The "typical" lifespan of a UV bulb is one year, and the efficiency of the bulbs can be up to 50% less after one year in use, so contact your contractor to verify their performance and determine when a replacement is necessary.

Other Solutions

Heavily populated areas—such as waiting rooms, small patient rooms, lobbies in commercial buildings, conference rooms, convention centers, etc.—can also consider independent filtration devices and equipment, in order to further increase air filtration in these targeted zones.

There are a variety of independent cleaning devices on the market, including upper air UVGI fixtures, small HEPA filter recirculating/ portable air systems, and larger cleaning systems. These machines help eliminate viruses and bacteria that have not yet cycled through filtration in central systems.

Communicate the Change

Should you make adaptations to your HVAC systems or implement a new IAQ technology, be sure to let your building occupants know. Simple signage can help foster a stronger feeling of safety in trust in all of the people who enter your facilities.

HVAC Precautions if Occupants are Infected

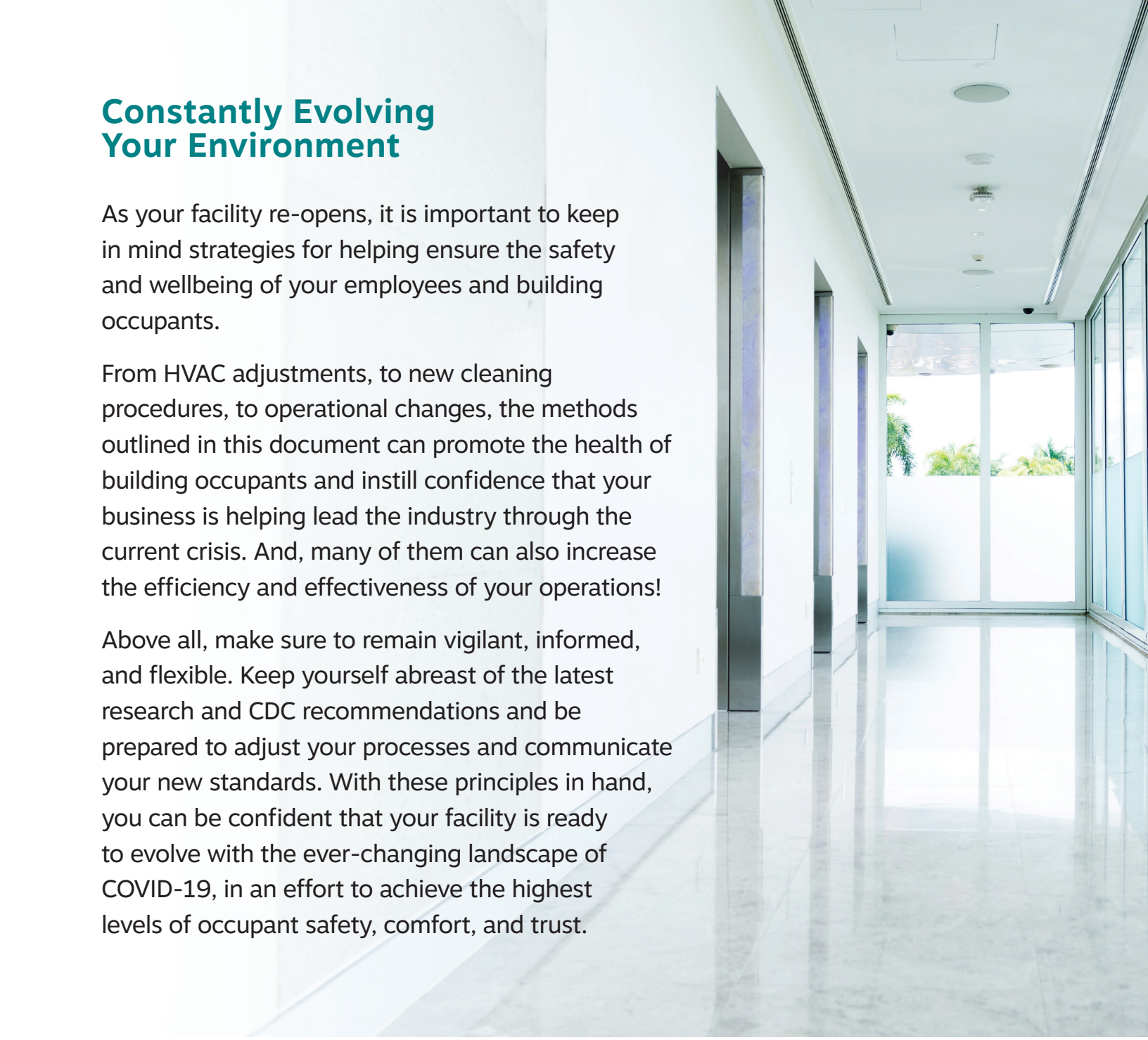
If a regular building occupant, visitor, or employee tests positive for COVID-19, there are some precautions that can be taken to ensure that your HVAC system is not promoting further transmission of the virus.

First, shutting down an HVAC system entirely, is not always necessary. An HVAC system will have very little effect on surface contamination, so the focus should be on its impact to airborne spread.

Additionally, unless your system has particularly high air velocity or humidity, viruses typically won't be re-entrained from HVAC equipment because there is not a mechanism for the creation of aerosols to carry them.

Regardless, mechanical cleaning and UV sterilization should be performed, as maintaining adequate filtration and clean filters is paramount. Sanitation of AHUs and a UV retrofit may also be a viable option. Do not utilize aqueous cleaning because the process may create aerosols that re-entrain the virus.

While the survivability of the virus on different surfaces is still being studied, filters that are removed should be immediately bagged and sealed. For extra precaution, special handling may be required by persons trained to perform this work.



Constantly Evolving Your Environment

As your facility re-opens, it is important to keep in mind strategies for helping ensure the safety and wellbeing of your employees and building occupants.

From HVAC adjustments, to new cleaning procedures, to operational changes, the methods outlined in this document can promote the health of building occupants and instill confidence that your business is helping lead the industry through the current crisis. And, many of them can also increase the efficiency and effectiveness of your operations!

Above all, make sure to remain vigilant, informed, and flexible. Keep yourself abreast of the latest research and CDC recommendations and be prepared to adjust your processes and communicate your new standards. With these principles in hand, you can be confident that your facility is ready to evolve with the ever-changing landscape of COVID-19, in an effort to achieve the highest levels of occupant safety, comfort, and trust.

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