UC RIVERSIDE | Environmental Health & Safety

UCR GUIDANCE FOR PHYSICAL BARRIERS IN SUPPORT OF COVID-19 PREVENTION EFFORTS

Updated September 2, 2021

The Environmental Health & Safety Department (EH&S), in partnership with UCR Facilities Services, has reviewed the benefits, limitations, and performance standards for physical barriers, as well as guidance on the installation where there is an increased potential for close contact with others. Physical barriers have over time been proven to be ineffective for preventing COVID-19 exposure and are considered a last resort when other precautions cannot be implemented. If people are vaccinated and wearing face coverings, barriers do not add any additional protection. Barriers can reduce the effectiveness of ventilation systems by disrupting air flow and fire sprinkler coverage. University units considering the use of physical barriers (plexiglass or other similar materials such as polycarbonate) are not encouraged to consider barriers as a protective measure. EH&S does not recommend barriers unless there are no other effective options for mitigation. If a unit wishes to purchase barriers anyway we will evaluate the location and determine if it is safe to install and provide specific requirements.

Video discussing the changes in plastic barrier recommendations:
https://youtu.be/cPUMvBEJPgA

BACKGROUND & RISK REDUCTION

On May 5, 2021, the CDC updated its information regarding how COVID-19 exposure occurs. Exposure occurs in three principal ways in order of prevalence:

1. Inhalation of very fine respiratory droplets and aerosol particles. These aerosols can remain infective for many hours. This is the most common and most likely method for becoming infected.
2. Deposition of respiratory droplets and particles on exposed mucous membranes in the mouth, nose, or eye by direct splashes and sprays. Likely only when unmasked and within six feet.
3. Touching mucous membranes with hands that have been soiled either directly by virus-containing respiratory fluids or indirectly by touching surfaces with virus on them. This method is not very likely but still possible.

To effectively minimize COVID-19 risk, it is important to implement multi-layered strategies. In order of effectiveness, workplaces should focus on:

- Allowing staff to work remote when feasible.
- Ensure entire staff has complied with the University of California vaccine policy.
- Encouraging employees, no matter their vaccination status, who have any symptoms or who have had possible exposure to notify their supervisor and stay home or go home if already at work.
- Verifying all employees complete the UCR Daily Wellness Survey prior to their arrival on campus.
- Verifying current face covering guidance is being followed. Face coverings when required must cover the mouth and nose.
- Distancing at least 6-feet whenever possible.
- Encouraging frequent handwashing.
- Stagger shifts, start times, and break times as feasible to reduce the number of employees in common areas.
- Scheduling required indoor meetings in larger rooms when possible. If privacy is not required, leave doors and windows open (except for labs), if possible. If private, keep meetings as short as possible (30 minutes or less) and allow time for the air in the room to exchange (45 minutes or more for larger spaces) before the next scheduled meeting.
- Discourage indoor social interaction. Schedule breaks, walks, meals, and meetings outdoors whenever possible.
- Assign workstations to individuals for their use only whenever possible. Mark the area to delineate with masking tape and allow for buffer zones for pathways between work stations.
- Minimize the sharing of equipment, if possible.
- Encouraging disinfection of Large shared equipment (copier, printers, etc.) Have supplies available and post disinfection instructions to make clear the expectation.
- Encouraging individuals to clean and disinfect their work areas before beginning work, following a visit from another person, and before leaving at the end of the day.
- Assign extra high-touch area disinfection duties as feasible. This is to supplement Facilities Services enhanced cleaning.

Workplaces should use these types of interventions together and along with general hygiene recommendations. All strategies must be customized for the work

environment and should include methods that address multiple modes of transmission. It must be clear that barriers are a last resort in case that other precautions are not possible.

Physical barriers, are typically used as a tool to provide a physical barrier between people and to help capture large respiratory droplets when individuals cannot distance or wear face coverings. Lexan is a common name for polycarbonate which has high-strength properties and is often used as an alternative to glass. Plexiglass does not offer as much strength, ultraviolet light tolerance, ability to polish, or heat and chemical resistance. Plexiglass is less expensive than Lexan. The application will determine the type of barrier material.

BENEFITS OF PLEXIGLASS BARRIERS

- Barriers can block large respiratory droplets produced by a person who is within six feet and not wearing a face covering.
- Barriers provide a physical separation between people where physical distancing is not an option.
- Barriers are most appropriate for indoor areas like public transit areas, retail settings, and spaces where it is difficult to maintain 6 feet of separation between individuals.
- Use of barriers are consistent with recommendations from CDC as a component of exposure controls for areas where other measures are not possible.
- Barriers cause minimal disruption to work and business practices in many workplaces.
- Barriers can serve as a component of a long-term strategy to reduce risk for other viruses that spread by similar modes of transmission (e.g., influenza).
- Plexiglass barriers are nonporous and may be disinfected.
- Barriers can provide a sense of safety assurance for workers and customers, and visitors.

LIMITATIONS OF PLEXIGLASS BARRIERS

- Barriers do not provide a zero-risk solution. They do not address all possible modes of transmission, such as aerosol transmission, or fully protect anyone from COVID- 19. https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html

- Article: "*Those Anti-Covid Plastic Barriers Probably Don't Help and May Make Things Worse*", New York Times https://www.nytimes.com/2021/08/19/well/live/coronavirus-restaurants-classrooms-salons.html
- If all people in the room are vaccinated and wearing a face covering the barrier does not add any additional safety.
- Aerosols containing virus particles move more like smoke than a spray. They float up and over or around barriers and can stay airborne for hours.
- Barriers do not replace the need to maintain 6 feet or more of separation between individuals when possible.
- Barriers do not replace the need to follow other public health requirements such as practicing good hygiene (e.g., washing hands, not touching your face, staying home if you are ill), the need to wear face coverings and PPE, or other requirements and recommendations.
- There may be constraints in the physical/structural environment that prevent installation of appropriately sized barriers.
- Barriers may not be feasible or appropriate for most workspaces or work activities. The cost versus the actual effectiveness do not make them the best solution.
- If not designed or installed properly for the specific work environment, barriers may obstruct or interfere with the ventilation system airflow, and fire and life safety protection systems (e.g., fire alarm notification devices, fire sprinklers, fire pull stations).
- Barriers may break if individuals lean against the material which may expose sharp edges. Consider polycarbonate if the barrier may be subjected to individuals leaning or pushing against it.
- Barriers need to be disinfected often which may add additional exposure to employees.
- Frequent disinfection or other contaminants like grease from food preparation can cause scratching or clouding of the plastic which may necessitate periodic replacement or polishing.

GUIDELINES FOR INSTALLATION

Barriers should be sized to block face-to-face pathways between individuals and must create a distance of at least 6 feet for any indirect pathways.

Below are examples of University environments and circumstances in which barriers may be beneficial. This list is not exhaustive and serves to generate conversations about potential implementation.

- Retail point of sale
- Grocery or dining checkout
- Shuttle driver protection
- Buffet lines if a sneeze barrier is not built-in
- Ticket sales and ticket scanners
- Reception desks with high traffic

When considering barrier installation, it is important to determine the risk level, frequency, and volume of contact with the public and coworkers, and where adequate controls (face coverings and distancing) are not able to be implemented at the installation location.

Barrier dimensions

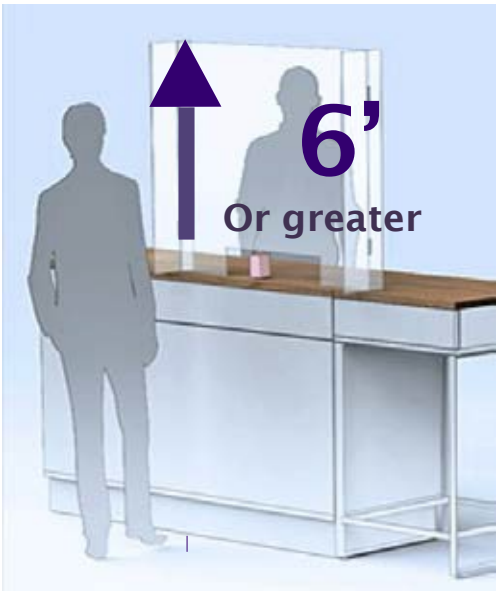
Each installation area will require individual considerations regarding specific barrier dimensions based upon specific building or furniture layout, and occupant or visitor stationing. The overall goal is to prevent respiratory droplets from one individual travelling through the air and landing on another individual and potentially causing infection. The barriers will need to be of a certain minimum size, determined by the specific installation area.

The following spatial arrangements between individuals will need to be considered during installation of plexiglass barriers:

- Sitting near sitting
- Sitting near standing
- Standing near standing
- Individual movements within area
- High density pedestrian flow
- Multiple individuals providing services at a single location

To block the majority of respiratory droplets from standing individuals, the top horizontal edge **height of the barrier should be at least 72 inches, or 6 feet**, above

the floor and accounts for the tallest average individual height with the addition of a buffer.



ADDITIONAL INSTALLATION CONSIDERATIONS

Ventilation design interference potential

The installation of physical barriers may require customization at each specific location where deemed necessary. Due to the variation in physical barrier dimensions, it is important to consider how the barrier will affect building airflow and overall ventilation of the space. During the design phase of the installation process, it is important to examine the ventilation design with regard to the location of supply and return air registers so that the barriers do not block air flow within spaces. Depending on the scope and location of the project, a review by the UCR Building & Safety, and/or UCR Facilities Services may be needed as part of the process to determine potential ventilation impacts and solutions.

Seismic securing

All barriers that stand over 5 feet in height have to be seismically secured to prevent tip over. This can be done using clamps, straps, or other fasteners to attach the barrier to secured furniture or walls. If attaching to a wall a building permit may be required.

Regulated building materials

Many older buildings may be constructed of materials that may contain asbestos or surfaces coated with lead-containing paint. UCR EH&S will consult historical

data and/or conduct a hazardous materials survey to ensure building materials containing regulated materials are managed properly prior to disturbance through the installation process. Additional information about regulated building materials may be found on the EH&S Safety & Industrial Hygiene webpage.

PLEXIGLASS (ACRYLIC SHEETING) PERFORMANCE STANDARDS AND INSTALLATION CONSIDERATIONS

Plexiglass installed in UCR-owned buildings should meet certain standards to ensure proper performance for the intended application. Prior to installation, the following should be referenced to verify the type of plastic will meet the requirements of the installation purpose and location.

- Barrier construction material must be compatible with the cleaning and disinfectant products used to clean the barrier and surrounding area.
- Barrier frames must be rigid and able to be secured to prevent tip-over.
- Flexible plastic sheeting is not allowed.
- All materials need to be fire retardant and acceptable to the fire marshal.
- ASTM D4802-16 Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet
- ANSI Z97.1-2015 Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test (as applicable)
- Food Service Areas
    - ANSI 2-2014 Food Equipment
- Location specific requirements and considerations
    - Radiation safety considerations:
        - Lead-lined plexiglass or lead acrylic barriers must meet the minimum lead equivalences for radiation shielding.
    - Building and fire safety considerations:
        - Ensure 18 inches below ceiling to prevent interference with fire sprinkler spray patterns. They must be 24 inches below if the building or area is without fire sprinkler protection.
        - If full height barriers are needed, EH&S will need to assess and determine if new fire safety devices will be required. Installation of new fire sprinkler or fire alarm devices required will be the responsibility of the requesting department.

- All full height barriers will need a building permit.
- Barriers must not interfere with existing corridors, aisles or other similar open pathways intended for exiting. Barriers that interfere with existing exit routes must be reviewed by EH&S and the Fire Marshal.

CLEANING AND DISINFECTING

Facilities Services may or may not agree to clean barriers. It is best to discuss with UCR custodial supervisors whether they can add the additional cleaning to the weekly scheduled session. It is the department's responsibility to clean and disinfect the barrier daily no matter the arrangement with Facilities.

It is important to consider the appropriate cleaning and disinfecting chemicals for the barrier material installed in your area. Using compatible cleaning and disinfecting chemicals will help prevent abrasion and damage to the plexiglass barriers.

Cleaning

First, clean the plastic barrier by using mild soap and water to remove any bulk dirt and debris buildup if necessary. Soap and water is a safe effective disinfection method. Lightly scrub the plastic surface with a non-abrasive sponge or clean cloth such as microfiber. Use a dry non-abrasive or microfiber cloth to dry the surface. If the barrier is clean you can also use one of the disinfection methods below.

Disinfecting

Acrylic Materials

- Do not use alcohols (e.g., ethanol or isopropanol) or solvents (e.g., acetone).
- Use dilute quaternary ammonium-based compounds, 5-6% dilute bleach, or 3-5% dilute hydrogen peroxide.

Polycarbonate Materials

- Do not use ammonia-based compounds (e.g., ammonia, quaternary ammonium-based chemicals).
- Use dilute solutions such as less than 10% sodium hypochlorite, ethanol, isopropanol, or 3-5% dilute hydrogen peroxide.

Sources:

- *Eykelbosh, Angela.* Physical Barriers for COVID-19 Infection Prevention and Control in Commercial Settings. *13 May 2020, https://ncceh.ca/content/blog/physical-barriers-covid-19-infection-prevention-and-control-commercial-settings*

- *"Guidance for Plexiglass Barriers in the Workplace (Updated June 15, 2020)."* University of Washington, *Environmental Health & Safety, 4 June 2020.*

- "Space Alterations and Barriers for SARS-CoV-2." Cornell University, Environment, Health and Safety.

- "Putting Plexiglass to the Test (December 2020)." ABC News Good Morning America.