



UNIVERSITY OF WASHINGTON GUIDANCE FOR PLEXIGLASS BARRIERS IN SUPPORT OF COVID-19 PREVENTION EFFORTS

October 29, 2020

The Environmental Health & Safety Department (EH&S), in partnership with UW Facilities, conducted a review of the benefits, limitations and performance standards for plexiglass barriers, as well as guidance on prioritizing the installation where there is an increased potential for close contact with others. University units considering the use of physical barriers (plexiglass or other similar materials such as polycarbonate) may consider this alternative strategy as a component of their overall COVID-19 prevention efforts to help reduce the risk of COVID-19 transmission in public areas and worksites.

BACKGROUND & RISK REDUCTION

The modes of COVID-19 transmission occurs from mucous membrane exposure to respiratory droplets during close contact with an infected individual. Close contact includes being within 6 feet of a person with COVID-19 for a cumulative total of at least 15 minutes during a 24 hour period (even if both individuals are wearing face coverings). This is the primary route of COVID-19 transmission identified by the [Centers for Disease Control and Prevention](#) (CDC).

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

- Eliminating the hazard (keep sick people at home)
- Isolating people from the hazard (engineering controls, e.g., use equipment such as plexiglass barriers)
- Changing the way people work (e.g., implement 6-foot distance rule between individuals, conduct environmental surface disinfection, reduce density)
- Using personal protective equipment appropriate for the task (e.g., face covering, facemask, gloves).

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.

Plexiglass, has been used as a tool to provide a physical barrier between people and to help capture respiratory droplets when individuals are in close contact. Plexiglass (acrylic sheet) is a common name for poly (methyl methacrylate) or PMMA and is a transparent



thermoplastic often used as an alternative to glass. PMMA is an alternative to polycarbonate, but does not offer as much strength, ultraviolet light tolerance, ability to polish, heat or chemical resistance.

BENEFITS OF PLEXIGLASS BARRIERS

- Barriers can block respiratory droplets produced by a person who is in close contact with the barrier.
- Barriers can provide a physical separation between people to support social and physical distancing efforts.
- Barriers are appropriate in a variety of settings, including public areas, retail settings and spaces where it is difficult to maintain 6 feet of separation between individuals.
- Barriers can provide a level of protection from surface contamination in the personal workspace.
- Use of barriers are consistent with recommendations from CDC as a component of exposure controls.
- Barriers may 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

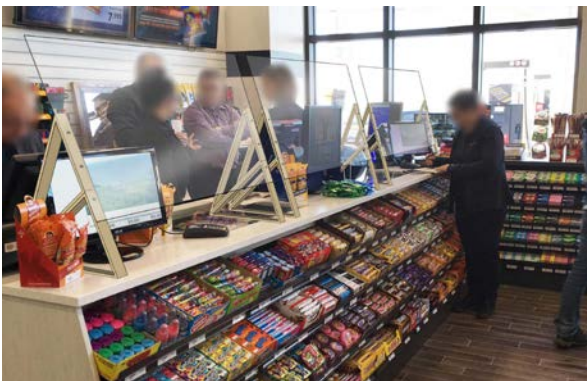
- Barriers do not provide a zero-risk solution. They do not address all possible modes of transmission, such as aerosol transmission, or fully protect anyone from COVID-19.
- Barriers do not replace the need to maintain 6 feet of separation between individuals when possible.
- Barriers do not replace 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 from UW EH&S, CDC, or the state of Washington.
- There may be constraints in the physical/structural environment that prevent installation of appropriately sized barriers.



- Barriers may not be feasible or appropriate in all workspaces or for all work activities.
- 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.

GUIDELINES FOR INSTALLATION

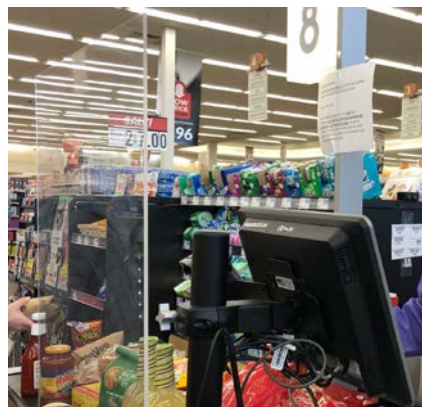
Barriers should be sized to block face-to-face pathways between individuals and must create a distance of at least 6 feet for any indirect pathways.



[Business Wire](#)



[Mass Transit](#)



[Quad City Times](#)



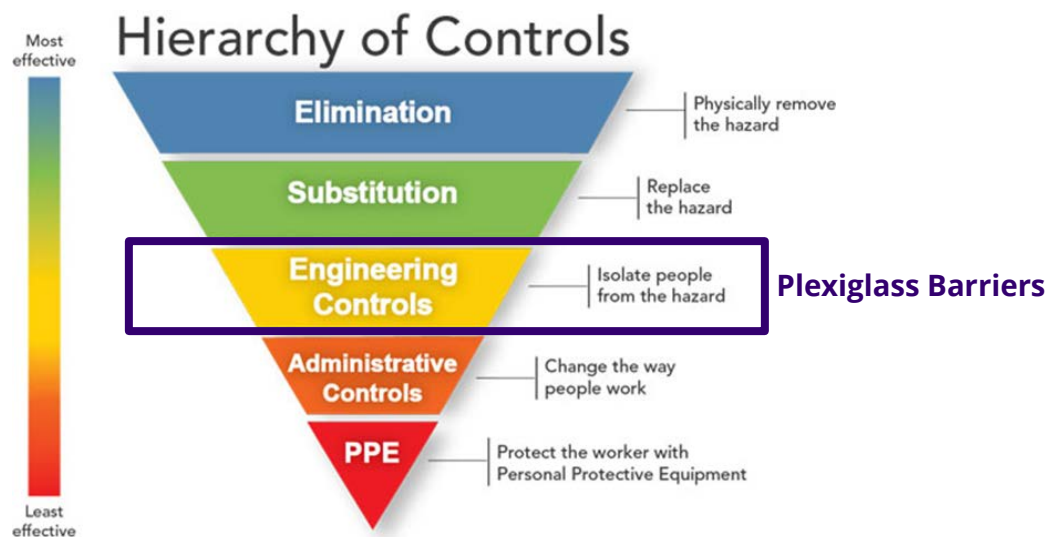
Below are examples of possible University environments and circumstances in which barriers can be beneficial. This list is not exhaustive and serves to generate conversations about potential implementation.

- Retail point of sale
- Grocery or dining checkout
- Shuttle driver protection
- Library circulation
- Reception desks
- Pharmacy pick up or drop off
- Buffet lines if a sneeze barrier is not built-in
- Ticket sales and ticket scanners
- Resident hall front desks
- Between undivided cubicles and workstations
- Facilities Stores equipment/supply desk locations

PRIORITIZATION OF PLEXIGLASS BARRIERS

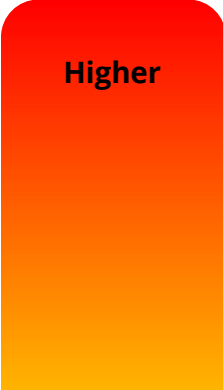

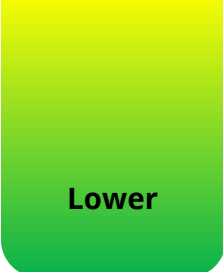
Plexiglass barriers offer the ability to separate individuals that may need to be in close proximity to others. Due to increased requests for plexiglass barrier installation it is important to prioritize the areas of installation to ensure higher risk areas receive barriers first. Prioritization considerations should include certain factors such as workplace type and risk level, occupant and visitor frequency, density, placement, and pedestrian pathway density.

The prioritization of plexiglass barriers falls within the engineering controls section of the hierarchy of controls. Eliminating the hazard altogether is the best option, however, it is not always possible and therefore engineering controls may be implemented to reduce the hazard risk.





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

Prioritization Level	Area Description
 <p data-bbox="253 569 350 604">Higher</p>	<p data-bbox="423 541 1421 604">Areas of high frequency and high volume of contact with members of the general public, and lack of other controls</p> <p data-bbox="423 625 553 653">Examples:</p> <ul data-bbox="456 657 1372 877" style="list-style-type: none"> • Food service – cashiers, serving counters • Higher volume retail cashier lanes • Higher volume screening and check-in areas (e.g., medical facilities, first point of entry) • Ticketing/transportation desks/kiosks • Higher volume reception or information desks • Transportation shuttles and buses (high volume)
 <p data-bbox="245 1020 358 1056">Medium</p>	<p data-bbox="423 919 1421 982">Areas of frequent contact with members of the general public or coworkers, and lack of other controls</p> <p data-bbox="423 1003 553 1031">Examples:</p> <ul data-bbox="456 1035 1360 1192" style="list-style-type: none"> • Lower volume reception, information and administrative stations • Open work areas with close proximity workstations that lack barriers and other controls • Lower volume retail locations • Transportation vehicles, including research vessels
 <p data-bbox="256 1392 347 1428">Lower</p>	<p data-bbox="423 1226 1421 1289">Areas that do not require contact with people and/or areas with minimal occupational contact with members of the general public or coworkers.</p> <p data-bbox="423 1310 553 1337">Examples:</p> <ul data-bbox="456 1341 1421 1467" style="list-style-type: none"> • Lower volume and density offices where social/physical distancing is strictly adhered to and minimal contact with others • Areas with other installed engineering controls that are as effective or more effective than plexiglass barriers

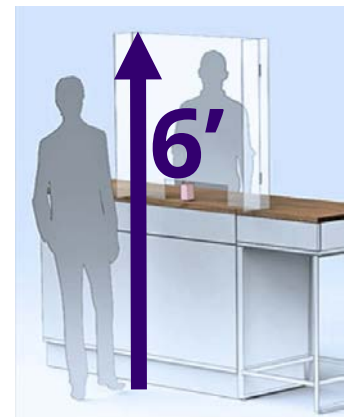
Plexiglass dimensions

Each plexiglass installation area will require individual considerations regarding specific plexiglass 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 plexiglass 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

Anthropometric data provided by the [CDC](#) states that the measured average height for adults aged 20 and over in the United States is between 63.6 and 69.0 inches. The average sitting height for individuals varies based on chair height and type; therefore, plexiglass vertical heights will need to be designed specific to the location, unless the vertical height dimensions can be applied across similar workstations in a single Work Request. To block 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.



Ergonomics and communication considerations

The installation of plexiglass barriers has the potential for increasing the risk of musculoskeletal injuries in certain settings where the plexiglass barrier diverts normal body motion. If the plexiglass barrier consists of a pass-through or other penetration in which body mechanics are altered from normal motion to forceful motion, over time those deviations from more natural and comfortable body motion may cause musculoskeletal pain or injury.

Another factor to consider is how the plexiglass shield will affect communication between individuals. The plexiglass barrier may interfere with voice communication causing individuals to lean forward from the natural sitting or standing position to project their voice. The combination of the barrier with facemasks or cloth face coverings may also cause communication issues. In areas where plexiglass barriers are determined to interfere with communication, the installation of a no-draft speak-through or an electronic communication device should be considered.



[DK Hardware](#)



For barriers already in place, employees that need ergonomic assistance can contact EH&S at ehsergo@uw.edu or 206.543.7388.

ADDITIONAL INSTALLATION CONSIDERATIONS

Ventilation design interference potential

The installation of plexiglass barriers may require customization at each specific location where deemed necessary. Due to the variation in plexiglass 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 [UW Facilities Engineering Services](#) may be needed as part of the Work Order process to determine potential ventilation impacts and solutions.

Regulated building materials

Many older buildings may be constructed of materials that may contain asbestos or surfaces coated with lead-containing paint. UW Facilities 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 [Asbestos and Other Regulated Building Materials](#) webpage.

PLEXIGLASS (ACRYLIC SHEETING) PERFORMANCE STANDARDS AND INSTALLATION CONSIDERATIONS

Plexiglass installed in UW-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 plexiglass type 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.
- [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.
 - 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 may be necessary.
 - 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.

CLEANING AND DISINFECTING

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 plexiglass barrier by using mild soap and water to remove any bulk dirt and debris buildup. Lightly scrub the plexiglass surface with a non-abrasive sponge or clean cloth such as microfiber. Use a dry non-abrasive or microfiber cloth to dry the plexiglass surface in preparation for disinfectant application.

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.



PLEXIGLASS INSTALLATION REQUEST PROCESS

To request plexiglass installation, complete and submit the [Plexiglass Barrier Installation Request Form](#) (attached) that has been signed by the unit head or designee to UW Facilities. It is important to provide the requested information on the form to assist UW Facilities with prioritizing and streamlining the installation.

- UW Seattle: Submit the request form to the UW Facilities Care Team at careteam@uw.edu.
- UW Bothell: Submit the request form to [UW Bothell Facilities Services via the Online Work Order Request](#).
- UW Tacoma: Submit the request form to [UW Tacoma Facilities Services via the Online Work Order Request](#).

The UW Facilities units will consult with EH&S and as needed, Engineering Services on the installation requests. For general questions about plexiglass use and installation, contact EH&S at 206-543-7262 or ehsdept@uw.edu.

Please note: UW Medicine has an internally established barrier installation process. Please consult with UW Medicine for barrier installation at UW Medicine facilities.

RESOURCES

	UW EH&S Asbestos and Other Regulated Building Materials UW EH&S Cleaning & disinfection UW COVID-19 Facts & Resources UW EH&S Ergonomics
	2015 Seattle Building Code
	What to do if you're sick Guidance for barriers at pharmacies

ATTACHMENT: PLEXIGLASS BARRIER INSTALLATION FORM



Appendix A:

PLEXIGLASS BARRIER INSTALLATION REQUEST FORM

The Environmental Health & Safety department (EH&S), in partnership with UW Facilities provides guidance on prioritizing the installation of barriers where there is an increased potential for close contact with others. Review the Guidance for Plexiglass Barriers in Support of COVID-19 Prevention Efforts prior to completing this form.

Please note: UW Medicine has an internally established barrier installation process. Please do not complete this form for UW Medicine facilities.

Organization/Department:	Unit:
Building/ Installation Location:	Room(s):
Completed by / Contact Person:	COVID-19 Supervisor Name and Job Title:
Approved by Department/Unit Leader or Designated Person? Yes <input type="checkbox"/>	Budget Number:

Plexiglass Barrier Installation Description: (Include quantity, number of areas, dimensions)

I am aware that plexiglass barriers do not replace the need to maintain 6 feet of separation between individuals (when possible), or the need to follow other COVID-19 prevention practices such as practicing good hygiene, or the need to wear face coverings and personal protective equipment.	<input type="checkbox"/> (select)
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Proposed Installation Area		
H i g h e r	<input type="checkbox"/> Food service – cashiers, serving counters	<input type="checkbox"/> Higher volume retail cashier lane
	<input type="checkbox"/> Higher volume screening and check-in area	<input type="checkbox"/> Ticketing/transportation desk/kiosk
	<input type="checkbox"/> Higher volume reception or information desk	<input type="checkbox"/> Transportation shuttle and/or bus
	<input type="checkbox"/> Other – Please describe:	
M e d i u m	<input type="checkbox"/> Lower volume reception, information, and administrative stations	<input type="checkbox"/> Open work area with close proximity workstation that lacks barriers or other controls
	<input type="checkbox"/> Lower volume retail location	<input type="checkbox"/> Transportation vehicle (e.g., research vessel)
	<input type="checkbox"/> Other – Please describe:	
L o w e r	<input type="checkbox"/> Lower volume/density office where social/physical distancing is strictly adhered with minimal contact	<input type="checkbox"/> Area with other installed engineering controls that are as effective or more effective than plexiglass barriers
	<input type="checkbox"/> Other – Please describe:	

Installation Evaluation Questions	Yes	No	N/A	Unknown
Does the barrier need to be fixed in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the barrier need to be full height, floor to ceiling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the barrier need to be rated for radiation shielding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Will the barrier interfere with fire sprinkler spray patterns? (i.e., less than 18 inches from sprinkler head)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Could the barrier interfere with emergency egress routes or fire life safety equipment (e.g., strobes, audible alarms)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Could the barrier interfere with building ventilation supply or exhaust?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Could the barrier interfere with voice communication? (i.e., potential need for no-draft speak-through or electronic communication device)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a potential for individuals to lean against the barrier?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the barrier need to provide privacy? (i.e., opaque material)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Photographs (please include photos to assist UW Facilities with work order process)	

Please submit the completed and signed **Plexiglass Barrier Installation Request Form** to:

UW Seattle: UW Facilities Care Team at careteam@uw.edu

UW Bothell: [UW Bothell Facilities Services Online Work Order Request](#)

UW Tacoma: [UW Tacoma Facilities Services Online Work Order Request](#)