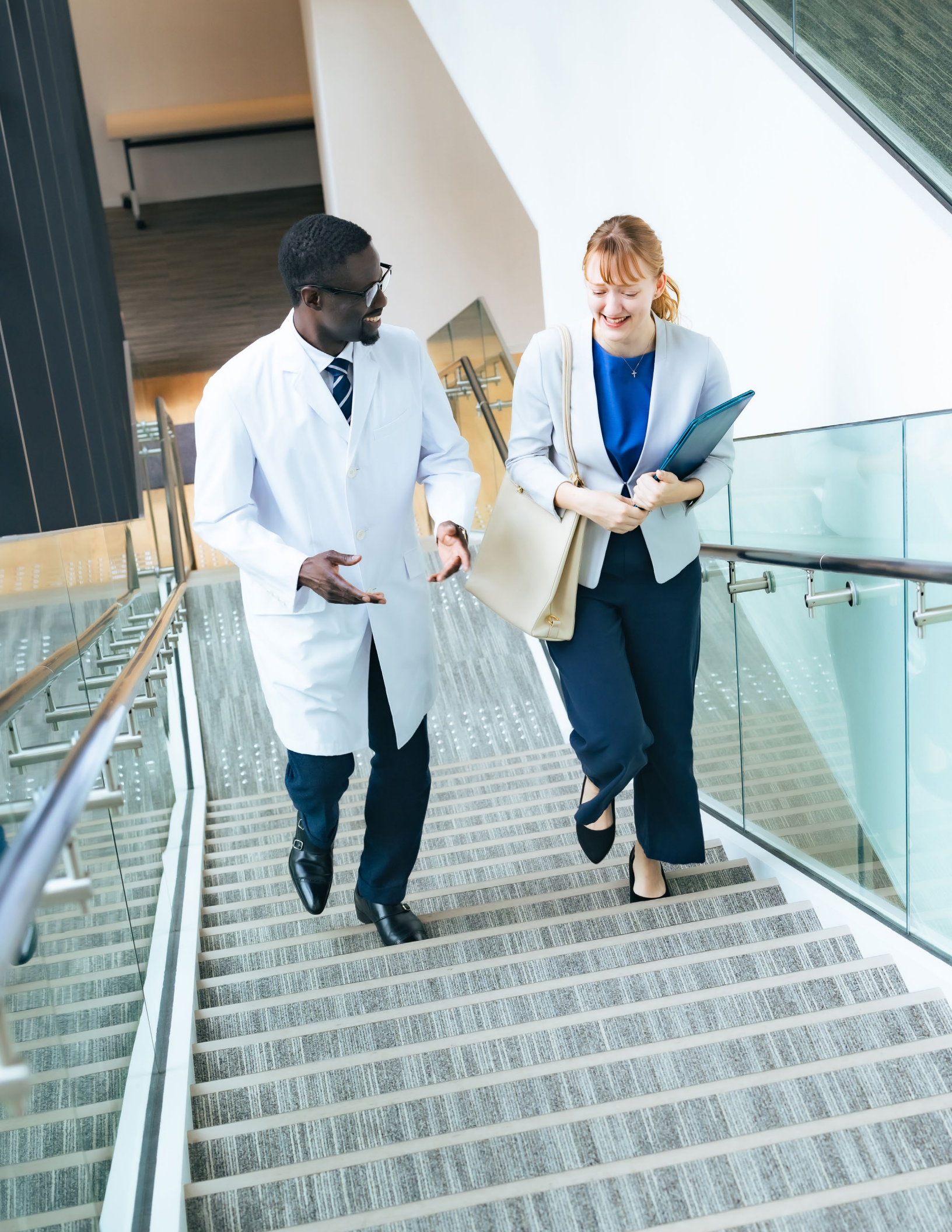
CHUBB®

Preventing Slip, Trip, and Fall Accidents

A Guide for Life Sciences

Chubb Risk Consulting



Slip, trip, and fall accidents on the premises of life sciences companies represent a significant cost. They pose risks to employees, visitors, and other individuals at the facility.

In addition to direct liability payouts, slip, trip, and fall incidents have significant hidden costs, such as lost productivity, increased administrative activity, and potential negative publicity within the community. These costs negatively impact an organization's bottom line and are largely preventable. The fact that so many life sciences companies have experienced slip, trip, and fall incidents should motivate management teams to review their risk management programs and to take action to enhance their slip, trip, and fall accident prevention practices.

Chubb has created this resource to help life sciences companies take steps to reduce their liability and other losses from slips, trips, and falls.

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Indoors

Flooring Selection

Choosing flooring materials and treatments is one of the most critical decisions in preventing slip, trip, and fall accidents. Many factors go into the selection process, including cost, aesthetics, maintenance requirements, disinfectant resistance, and the type of activities taking place. Considering these factors, time should be taken to thoroughly evaluate the advantages and disadvantages of different flooring materials, whether the project involves new construction or renovation.

Research studies of how people walk show that even a slight elevation change can result in a trip. Best practices indicate elevation changes of up to 1/4-inch can be left untreated. Changes between 1/4-inch and 1/2-inch should be beveled with a slope of 1:2 (rise:run), and changes more significant than 1/2-inch should be accomplished utilizing a ramp (Source: ASTM 1637, NFPA 101-7.1.6.2, ADA Stds for Accessible Design, Part 303).

Another important consideration is how well a floor surface performs under expected environmental conditions. A best practice is to compare different flooring samples under the expected conditions using a properly validated, calibrated and maintained slip meter operated by a person trained in accordance with the manufacturer's instructions. For example, flooring that could become wet with water should be tested under similar wet conditions. Using the same slip meter and conditions is the best way to compare several different types of flooring. Two standards that can be referenced by qualified slip and fall risk engineers include ANSI 1264.2 and NFSI B101.1.

The location of the installed flooring material should also be considered. Reviewing the manufacturer's ratings and warnings ensures flooring material is used in a compatible environment. For example, the slip-resistant rating and qualities of any material used near entrance/exit doors should be reviewed to ensure it will function with minimal maintenance under wet and snowy conditions and maintain high slip resistance. Materials with lower ratings under wet conditions may not be a good choice for this area. Materials in break rooms and kitchenette areas should provide high traction ratings under wet and greasy conditions. Ramps should not be coated with slippery sealants or waxes.

Many life sciences companies have an eye toward sustainability. Green building standards such as the United States Green Building Council (USGBC) and their LEED certification program have a credit in the environmental quality category that focuses explicitly on entranceway contaminant control. When achieving this credit option, it is important that it doesn't create an unintended consequence in reducing the entranceway's slip resistance.

Floor Maintenance

Improper floor maintenance is another element that can lead to slip-and-fall accidents. Flooring is typically damaged during normal wear, through settling of the building structure, or by physical damage such as dropping or dragging heavy objects. Failure to quickly identify and repair these deficiencies can lead to injuries.

Improper cleaning and finishing techniques by janitorial personnel can turn floors into slip-and-fall hazards. To prevent unintended consequences, any floor cleaner or wax should be applied per the manufacturer's recommendations with a high slip resistance in mind. When wax is necessary, care should be taken to use a high-traction nonslip wax, as many wax products can reduce the floor's slip-resistant rating. Furthermore, many floor waxes are not designed for high-speed buffing, which can further reduce the floor's slip resistance. It is critical to ensure that a floor wax is compatible with the maintained flooring material and to follow the application instructions carefully.

Staircases
Injuries on staircases are a significant source of trip and fall accidents. Several factors contribute to these types of accidents, including:

- Irregular steps
- Busy floor patterns
- Poor illumination
- Poor maintenance
- Slippery steps
- Improperly positioned, absent, or broken handrails
- Doors that open directly onto stairs
- Articles left on stairs
- Broken or eroded treads
- Loose floor covering
- A step in an unexpected place
- Distracting views.

Contact the local building authority for building codes regarding staircases to ensure the building complies.

Escalators
When not operating, escalator steps do not generally meet the standard step geometry for stairs, which could increase the exposure to a slip, trip, or fall. Therefore, do not allow escalators to be used as stairs when not working.

Elevators
Elevator thresholds should be level with the elevator carriage at each level and slip resistant.

Manufacturing, Research, and Warehouse Areas
Production and laboratory environments in a life sciences facility have unique slip-and-fall hazards, including gowning protocols, personal protective equipment requirements, and cleaning specifications.

In these areas, consideration should be given when selecting disposable shoe covers and how this may impact the potential for employees to slip, trip, or fall. The material shoe covers are made from can influence slip resistance. Seating should be provided where individuals will be donning and doffing the shoe covers. Once shoe covers are donned, companies may wish to use a system of painted lines or varied floor coloring to delineate zones of the facility rather than requiring individuals to step over a bench to move through zones. If disinfectant spray is used as part of the gowning protocol, ensure overspray is carefully managed so it does not cause the floor surface to become wet.

There may be a need for stairs, ladders, or step stools in laboratory and manufacturing areas. Caution should be taken to select equipment with handrails, wheel locks, and steps with slip-resistant treads to address slip and fall potential. Ladder use should comply with OSHA 1910.23.

In areas where material handling may occur, ensure floors are free of debris, such as shrink wrap and idle pallets, which can pose a trip hazard. Keeping materials well organized with clear paths of travel can prevent trip and fall injuries. Loading dock doors should be closed when not in use or provided with barriers to prevent individuals from falling from heights.

Material handling carts should be loaded so the operator can see the path of travel. If specialty carts or rolling racks are needed in vivaria or other areas, they should be properly maintained. If ramps are required, they should be slip-resistant, and the threshold should be level.

Outdoors

Walkways
The most essential characteristic of walkways is that they must be smooth without being slippery. However, walkways may crack due to settling surfaces, storm damage, or tree roots.

Walkways should be level wherever possible, well-maintained, and free of debris. In geographies with an autumn season, regular attention should be given at the time of year to tree-covered walkways due to heavy leaf shedding. Walkways should also be pitched enough to provide proper drainage so that puddles and ice do not collect on them and be adequately illuminated at night. If external walkways are too slippery, chemical treatments and other coatings are available that will increase the slip resistance of these surfaces.

Ramps
Slip, trip, and fall accidents commonly occur on ramps, which are used to allow access by those unable to negotiate steps easily. Ramps may need higher levels of slip resistance due to environmental factors and the increased slope. This can be accomplished using brushed concrete, cross cleats (cuts by a concrete saw), friction strips, and nonslip paints or coatings. Generally, wheelchairs can navigate a slope of 7° or less without excessive effort. Ramps with a slope of less than 4° may be difficult to detect visually and can surprise a pedestrian, especially when handrails are absent.

Parking Lots
Slip, trip, and fall exposures can be mitigated in parking lots by making sure that:

- The surface is regular and smooth
- Speed bumps, which are tripping hazards, are eliminated. (If speed bumps are necessary, make sure they are correctly designed—see next section)
- Safe, conspicuously marked access routes are provided for pedestrians
- Illumination is adequate

Life sciences facilities have unique slip-and-fall hazards, including gowning protocols, personal protective equipment requirements, and cleaning specifications.

Parking lots should be included in any formal slip, trip, and fall inspection program to determine their condition and schedule maintenance. An adequate budget should be maintained for parking lot repair and maintenance.

Companies may consider installing pervious paving to allow water to penetrate the ground, thus reducing water runoff. As with other green building options, it is important to ensure that adding these features doesn't create an additional risk of slips and falls.

Speed Bumps and Wheel Stops

Speed bumps, if necessary, should be located in areas not in the pedestrians' direct walkway. They should be painted a bright color (such as safety yellow) with slip-resistant paints. They should be designed to provide a flat, three-foot walking area at both ends.

Wheel stops present tripping hazards, usually because they are out of sight when the driver exits the vehicle. When possible, wheel stops should be eliminated using good parking lot design and engineering. If they must be used, paint them a bright color, and also ensure that they are positioned in such a way as to prevent parked vehicles from extending into the pedestrian walkway.

Conducting a Hazard Analysis

Taking control of slip, trip, and fall hazards, like any other systemic problem, requires a methodical and coordinated process. Fully document the process to ensure management control and to demonstrate management's commitment to eliminating this hazard.

A good starting point in a safety program is to conduct a complete hazard analysis of the workplace. The elements of a hazard analysis include:

- Identifying the type of floor in each area to ensure that it is compatible with the environment in which it resides
- Reviewing maintenance procedures for floors, staircases, walkways, parking areas, etc.
- Observing the overall physical condition of walking surfaces to ensure they are not damaged by routine use, sanitation protocols or foundation settlement
- Identifying changes in levels of walk surfaces or in the type of flooring materials along walkways
- Analyzing prior claim and incident reports. These may contain actual accidents, near misses, and/or maintenance records that point to areas that have already resulted in injuries

The information derived from the hazard analysis can provide the necessary information to develop the following ongoing accident-prevention activities.

Self-Inspections

Using checklists, such as the sample checklist in this guide, can be valuable in identifying slip, trip, and fall hazards. A good, detailed checklist not only helps identify hazards but also translates the hazards into work orders that can be quickly corrected. Ensure a knowledgeable person is responsible for conducting detailed inspections and providing the results to management for review and follow-up.

To augment these inspections, conduct informal daily walk-through inspections to identify serious hazards that can pop up between formal inspections, such as lighting failures, poor housekeeping practices, damage to walking surfaces, furnishings that may have been moved, dust accumulation, etc.

Maintenance Protocol
All walking surfaces should be maintained on a regular schedule. However, it is essential to realize that maintenance procedures can cause slip, trip, and fall accidents. For example, an untrained custodian may need to learn that specific types of flooring require particular types of care, as discussed in the previous section on floor maintenance. Continually monitor maintenance procedures followed by janitorial staff, whether they are in-house staff, contract personnel, or personnel employed by building management.

Safe Use of Mats
Selection and proper use of mats are essential aspects of slip, trip, and fall prevention. Mats are made of various materials, including rubber, polypropylene, and carpet, to help remove water and dirt from shoes. Each is intended for use in a specific circumstance. Debris removal mats are located on the exterior of the building, while absorbent mats would be best suited to locations inside the building entrances. Honeycomb mats are commonly used in potentially wet areas of an operation, such as kitchen or cagewash areas.

The color of the mat should contrast with the flooring, and the edges should taper down to the floor for a smooth transition to the floor's surface.

Proper positioning of the mats can increase their effectiveness. Debris removal mats should be located so pedestrians can walk on the mat before entering the building. Absorbent mats should be located lengthwise to accommodate at least three steps when entering the building. Absorbent mats should be located at all entrances to the building, including employee entrances and loading docks.

It is important to ensure that mats do not add new risks to the facility. Mats should be secure and in good condition, with no curling or buckling at the edges. Any mat that is not in good condition or does not lay flat should immediately be removed from service.

Inclement Weather Precautions
Develop precautions and assign them to specific employees to enact under certain poor weather conditions. One important precaution is placing walk-off mats at all entrance doors.

The Carpet & Rug Institute's "Carpet Maintenance Guidelines" state that extending mats 6' - 15' inside the entrance will trap 80% of the soil and moisture from the first five or six steps. Remember, footprints or waterprints should not be seen on the floor beyond the last mat. Mats should be inspected regularly during heavy rainstorms to ensure they haven't become saturated, rendering them ineffective.

Having a well-managed slip, trip, and fall prevention program makes good business sense.

Under severe conditions, consider posting a janitorial staff member at each entrance to warn employees and visitors entering the area about the slipping hazard and to mop any excess water that may accumulate manually.

In geographies prone to cold weather, ensure procedures are in place to remove snow and ice at all building entrance points–visitor/main entrances, employee entrances, and loading dock delivery areas. Procedures should include methods to verify that melted snow or ice has not refrozen to create new slippery areas.

Employee Training
Train employees to identify and report all slip, trip, and fall hazards so they can be corrected quickly. This is an important element of the program due to the constant change in the workplace environment.

Also, to avoid employee slip, trip, and fall accidents, educate employees on the role of shoe selection and encourage them to wear shoes compatible with the flooring surfaces in their areas.

Monitoring Results
Finally, monitor the safety program's results. Review audit procedures for all activities noted above to ensure they are correctly and consistently followed. Furthermore, implement and regularly review a thorough accident and incident investigation procedure to ensure that the actions being taken prevent slips and falls.

Conclusion
Because severe slip, trip, and fall accidents occur frequently at many life sciences companies, it is reasonable to suggest that it may be only a matter of time until such an accident occurs at a facility without the proper precautions being taken. Given the potential for injury and liability and the comparatively low cost of implementing a slip, trip, and fall prevention program, having a well-managed program makes good business sense.

Sample Checklist
A detailed checklist can help identify hazards and translate them into work orders for quick correction. The following sample is offered to help illustrate how a checklist might look and be used to minimize slip, trip, and fall incidents; the actual checklist should be tailored to the particular facility. Follow the checklist routinely, perhaps weekly. Any "No" answer should have an entry in the "Action/Comment" column.

Requirement	Yes	No	N/A	Action/Comment
Flooring and Stairs				
Are flooring surfaces inspected regularly?				
Are flawed flooring surfaces promptly repaired or replaced?				
Are caution signs posted for all wet floors? (Are signs selected with large open bottoms to cover hazards, or are cones used to mark off hazardous areas?)				
Are the floor signs used above knee height, visible from 360 degrees, and located near areas that are subject to wetness?				
Is loose debris swept up?				
Are tracked-in water and spilled liquids mopped up promptly?				
Is electrical wiring that runs across the floor secured with tape?				
Is water/condensation-producing equipment in public and staff areas checked for leaks daily and repaired if needed?				
Are all physical hazards, including inclines and drop-offs, marked using yellow safety paint?				
Are aisles clear?				
Are staircases, ramps, and landings well-illuminated?				
Is the carpet pattern plain, not “busy”?				
Are all cover plates flush with the surrounding flooring?				
Are restroom floors made of non-skid material?				
Are paper towel and soap dispensers installed close to sinks so people don’t drip water from their hands on the way to the dispenser?				
Cleaning Chemicals and Floor Finishes				
Are “high-risk” areas maintained using slip-resistant cleaners?				
Is non-skid floor wax used and applied in a thin coating?				
Are non-skid flooring and deck paint used where appropriate?				
Are maintenance employees trained to apply floor-finishing products correctly?				

Requirement	Yes	No	N/A	Action/Comment
Matting				
Are absorbent walk-off mats used at all doorways that lead from the outside?				
Are the mats changed frequently during inclement weather?				
Are mats in good condition?				
Do all the mats lie flat?				
Are thick mats constructed with beveled edges to minimize tripping?				
Are mats used with a nonslip backing?				
Are additional mats stored on-site to replace worn and wet mats?				
Parking Lots and Sidewalks				
Are supplies available for snow shoveling and to melt ice during winter months (where applicable)?				
Are safe access routes well-marked?				
Are these areas free of ice, snow, and grease?				
Are these areas well-lit?				
Are receiving areas, ramps, stairs, and walkways in good condition and free of debris or contaminants (to include snow and ice)?				
Are parking lot dividers, curbs, and speed bumps well-marked?				
Are walking surfaces subject to wet or icy conditions coated with a rough, textured finish?				
Are automatic lawn sprinkler heads oriented so excess water doesn't puddle on walkways?				
Are speed bumps painted using non-skid paints that contrast with the driving surfaces?				
Are wheel stops situated so they do not permit vehicles to extend into walkways and do not present a tripping hazard to pedestrians?				
Are bike racks situated so they do not cross pedestrian paths or create a slip-and-fall hazard?				
Are parking lots regularly checked for potholes, cracks, and depressions, and are they routinely patched?				
Are islands identified with signs?				
Are parking lot lights checked nightly to identify bulbs that need replacing?				
Are catch basins cleaned on a regular schedule?				
Is snow removal done before employees report to work and before the facility opens to the public?				
Are curbs painted with contrasting colors?				

Requirement	Yes	No	N/A	Action/Comment
Parking Lots and Sidewalks				
Does maintenance staff regularly remove leaves and debris?				
Are charger cables for electric vehicles stored on racks or holsters?				
Are warning signs indicating the presence of cables posted near vehicle charging stations?				
Housekeeping Procedures				
Are all passageways, storerooms, restrooms, and manufacturing and research areas kept clean, sanitary, orderly, dry, and free of protrusions (such as nails or splinters)?				
Is a rigid cleaning and mopping schedule in place to keep floors clean and dry?				
Are "Use Caution: Wet Floor" signs used when mopping floors?				
Have floor cleaning solutions been selected based on their compatibility with the floor surface and are applied according to the manufacturer's instructions?				
Does someone keep a log of all cleanings/repairs? (A log should record products used, when and by whom tasks are performed, surfaces cleaned/repaired, and cleaning/repair procedures used.)				
Are mats used with a nonslip backing?				
Employee Training				
Are employees trained about slip, trip, and fall prevention and offered ongoing training and education as necessary?				
Are maintenance employees provided with product usage training?				
Do trainees sign a form acknowledging that they received and understand training?				
Are written slip/trip/fall-prevention and accident-handling policies posted on employee bulletin boards?				
Are employees trained to provide prompt attention to visitors or employees who slip/trip/fall, including securing or directing them to proper medical treatment?				
Miscellaneous				
Are awnings or blinds used to block the sun's rays in areas where sun glare inhibits a person's ability to see walking surfaces or obstacles?				
Are file drawers closed when not in use?				
Are there enough electrical outlets to eliminate the use of extension cords?				
Are electrical outlets installed where they do not pose a tripping hazard?				

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