

Chapter 1 | **Cleaning Procedures and Products**

INTRODUCTION

Public housing authorities (PHAs) should provide a safe and healthy environment for residents and visitors, and cleaning of common spaces plays a vital role. Cleaning should be an environmental enhancement, not a source of unintended pollution. By definition, cleaning is the removal of unwanted matter, contaminants, or pollutants from the environment, or the prevention of soiling; thus, it is—or should be—green. Cleaning is about *removing* pollution, not *adding* to it.

The chapter covers two aspects of cleaning:

- **CLEANING PROCEDURES**, redefining the processes or the ways in which cleaning is performed, to enable the effective removal of contaminants without adding unwanted substances to the environment or otherwise causing harm;
- **CLEANING PRODUCTS**, using tools or agents that do not add or spread pollutants or cause other unintended effects.

CLEANING AT-A-GLANCE

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The chapter concludes with appendices on:

- Housing complex-specific green cleaning plans
- Environmentally preferable cleaning products and supplies
- Powered equipment use and maintenance plan
- Acronyms and definitions
- Toxicity categories for pesticide and disinfectant products.

Throughout the section on Cleaning Procedures, applicable cleaning products are mentioned, with their environmentally preferable selection criteria elaborated upon in the Cleaning Products section and in the Appendices.

The term “green cleaning” highlights the need to *clean up* the cleaning processes and products themselves, because many commonly used interventions contain, add, or leave environmental pollutants or may cause harm in other ways. Green cleaning benefits the environment and helps protect people, especially vulnerable populations such as the elderly, the infirm, children, and the chemically-sensitive (see Appendix D for a definition). Their long- or short-term exposure to toxic chemicals or harmful particles, gases, or vapors can have serious consequences such as asthma, allergies, depression, hormonal changes, or even cancer.

CLEANING PROCEDURES

Before starting to clean, read product and equipment labels and usage instructions. Wear recommended Personal Protective Equipment (PPE), which may include rubber or surgical-type gloves, goggles, dust mask or respirator, earplugs, or other equipment.

Improving and Standardizing the Way to Clean

Improving cleaning procedures involves changing the way—or the focus with which—cleaning is performed to better prevent or remove soils, contaminants, or pollutants, and to select and use less toxic products. These processes should be integrated into a system of Standard Operating Procedures (SOPs) that are part of the overall operations and maintenance plan for the building.

Building managers ideally should develop and maintain SOPs as a set of written guidelines that govern:

- Cleaning procedures
- Chemical handling and tracking requirements
- Equipment maintenance and operation procedures
- Communication protocols and requirements
- Training and inspection programs, and
- Reporting and record-keeping procedures.

These guidelines should be made available to all cleaning personnel and occupants. In addition, if desired, a more in-depth housing complex-specific Green Cleaning Plan (see Appendix A) may be developed for every building or building-set to be cleaned.

Chemical Management: Reducing Waste, Efficient Use

Minimizing the effects of toxic cleaning chemicals requires building managers to work and communicate with cleaning staff, the PHA management or owners, and occupants.

Suggested Activities in a Green Cleaning Program

Give clear guidance to cleaning staff on handling cleaning chemicals:

- Provide easily understood directions to cleaning staff in appropriate written languages or graphic representation for the dilution of chemical cleaning products.
- Track the quantities of cleaning chemicals used over time on at least a quarterly basis.
- Use a chemical measuring and dilution control system that limits worker exposure to chemical concentrates while facilitating the proper dilution of these concentrates (e.g., wall-mounted dispensing systems where concentrates are sequestered and dispensed remotely and cleaning chemical is automatically mixed with water for proper end-use dilution without the worker needing to touch concentrates).
- Use the appropriate technology (coarse spray or squirt bottles, automatic chemical dispensers on powered equipment, etc.) for applying the chemical product to avoid aerosolization, overuse, or waste.
- Provide directions for the proper rinsing and disposal of expended or empty chemical solution containers.

- Prevent other building areas from being adversely affected.
- Reduce, minimize, or eliminate the need for using cleaning chemicals if possible.

Train new and current employees:

- Provide employees with initial, on-site, site-specific, and annual in-service training. Training should be done in a manner that respects unique needs of the employee, such as limited English proficiency, physical challenges, or learning disabilities. All employees should receive training and/or education on an annual basis to maintain knowledge of correct procedures for safety, tools, techniques, and pertinent environmental standards.
- Train cleaning personnel in the proper handling of chemicals, proper use and maintenance of equipment, and proper cleaning procedures.
- Train purchasing personnel in the selection of green cleaning materials.
- Train management/supervisors through in-service training and/or education on an annual basis on policies and procedures.
- Train new cleaning personnel on standard operating procedures, the proper sequencing of cleaning steps, and the proper use of personal protective equipment. This training may occur before personnel are assigned to a facility or at the site before beginning independent work. Follow up with in-service training, continuing education, and/or professional development opportunities on an annual basis.
- Give all personnel standard safety training, including how to reduce and prevent ergonomic injuries and exposure to hazardous materials.
- Provide site-specific training focusing on standards for the facility to which workers will be assigned. This site-specific training should cover: facility-specific cleaning instructions, tailored procedural training (e.g., servicing areas for vulnerable populations) based on the needs of the facility and occupants, and hazardous communication standards.
- Maintain records of training on each employee. The documentation should include a general outline of information covered, the name and qualifications of the trainer, and the date(s) and duration of the training or courses. It is recommended that records be retained for two years from the hiring date of current employees, and one year for former employees. PHAs that contract green cleaning services may want to consider requiring GS-42 Certification (see Appendix D—Definitions) or evidence of GS-42 compliance from their service provider. Criteria from LEED-EBOM and CIMS-GB are also helpful guides (see Appendix D—Definitions).

Encourage communication with building management/owners, employees, and occupants:

- Develop a system for cleaning service employees to provide comments and suggestions about workplace issues and suggestions for improvements in the provision of services.
- Communicate to the public housing management or owners of the building the presence of pests and any maintenance issues discovered during cleaning operations.
- Provide materials to occupants that define opportunities to reduce the need for more intensive cleaning processes or treatments (e.g., reporting spills and making attempts to reduce clutter in common areas).
- Notify occupants about all cleaning products used in the facility. This should include a list of all chemicals that may be used. It also should include the name, address, and phone number of the PHA contact person; a statement that the contact person maintains the product labels and Material Safety Data Sheets (MSDSs) of each product used in the building; and that the labels or MSDSs are available for review upon request. The contact person should be available for additional information and comment.
- Provide product MSDSs in a timely manner upon request.
- Identify building occupants with special needs or sensitivities (to dust, chemicals, noise levels, etc.) and have a process in place to work with PHA management, cleaning staff, and individuals to mitigate the problem.

Highly Concentrated Products

Special care is needed for highly concentrated cleaning products. These products reduce environmental impacts from packaging and transportation, and typically reduce actual use-cost compared to less concentrated alternatives.

Products should always be diluted accurately according to manufacturers' directions. This can be achieved through a variety of methods including measuring cups, simple dispensing pumps, and more complicated automated dilution equipment. Dilution equipment should be periodically checked for accuracy (consult the manufacturer or supplier for assistance).

Cleaning personnel should understand that adding extra amounts of concentrated cleaning products generally does not make the work go better or faster; on the contrary, it

ACTION ITEMS

1. Use appropriate protective equipment as recommended by the manufacturer when mixing concentrated cleaning products.
2. Follow the manufacturer's dilution directions. Do not under- or over-dilute concentrated cleaning products.
3. Make sure spray or squirt bottles (and other secondary containers) have OSHA-compliant labels.
4. Never mix different cleaning products together.

can result in longer task times (e.g., removing residues), slippery floors and surfaces, and other complications. Overuse wastes product and raises the cost of chemicals. Finally, never mix cleaning products together.

See Products Section and Appendices for more information about:

- Dilution control units and proportioners.

Entryways and Lobbies

Entryways are the first line of defense against many contaminants. Thus, special effort should be focused in these areas. Begin by cleaning outside walkways leading into the facility, especially during inclement weather.

Sweep outside entry walkways daily (weather permitting) with a mechanized sweeper for larger areas or with a wide push broom for smaller ones. Alternately, walkways may be cleaned using a backpack vacuum or blower. Outdoor areas should also be periodically cleaned with a pressurized water hose or a high-pressure power washer.

During snow and ice events, establish procedures to protect occupants and visitors from slips and falls (including placing of warning signs or caution cones). Select appropriate ice melting compounds (e.g., non-corrosive, non-phosphate) and use extra matting to help dry shoes and avoid excess tracking into the building.

Use walk-off mats outside entryways, immediately inside exterior doors, and in lobbies. Mats should be long enough so adults can take several steps on them. Walk-off mats should not just be used during inclement weather, but all year round. Matting inside and outside the entryways should, at a minimum, meet the following requirements: 6–10 feet of scraper/wiper matting, followed by 6–10 feet of wiper matting, for an overall total of 12–20 feet of matting for every entry point to the building.

Vacuum the matting daily or more frequently if required (e.g., in very high traffic areas or soiling conditions) to prevent migration of contaminants into the building. Use a vacuum with a beater bar, and vacuum in both directions. Walk-off mats should be wet-cleaned frequently as needed (e.g., indoors with a carpet extractor or outdoors with a hose or pressure washer and wet vac, and allowed to dry before being put back into service), including periodic cleaning of the underside.

Regularly sanitize or disinfect touch points (door handles, push plates, telephone receivers, etc.) to prevent cross-contamination and spread of germs.

Microfiber cloths enable cleaning entrance glass effectively using just water. A window-washing sleeve that fits over an applicator handle enables cleaning glass with just water mixed with a small amount of mild detergent, followed by use of a squeegee for drying the glass.

See *Products Section and Appendices* for more information about:

- Glass cleaners
- All-purpose cleaners
- General disinfectants
- Chrome cleaners/polish
- Gum remover
- Equipment

Dusting, Dust Mopping, and Dry Floor Cleaning

Traditional dusting and dust mopping techniques frequently move dust and other contaminants from one area to another, such as from a countertop to the floor. It is important to recognize that moving the dust around is more than just an efficiency issue. Dusting and dust mopping activities that do not capture soils frequently stir them into the air where people can inhale the particles, creating a potential health hazard.

Dusting

It is preferable to dust with water-dampened lint-free or untreated microfiber cloths that are neatly folded like a handkerchief to expose multiple sides for absorbing dust, or to use a vacuum cleaner with high-efficiency filters and proper dusting attachments. For tight spots, lambs wool or flexible microfiber dusters are helpful substitutes for feather dusters.

Minimize dust-capturing treatments that contain petroleum products, high VOCs, or solvents, and select a water-based treatment instead. Consider a vacuum cleaner fitted with a brush or hard floor attachment rather than a treated cloth or dust mop. If a dust mop is used, choose the widest mop possible (based on the size of the area and the physical abilities of the custodial worker) to optimize productivity.

Dust Mopping

Each pass with a properly treated dust mop helps to remove dirt, dust, and abrasive particles, without leaving the floor dull or slippery. Cleaning staff should dust-mop as follows:

ACTION ITEMS

1. Clean entryways starting outside the building.
2. Use walk-off matting at the outside (bi-level, scraper mat construction to remove and trap soil) and inside entry (smooth carpet-like mat surface to dry and wipe shoes). Vacuum, sweep, clean, and replace mats frequently (weekly, daily, or as needed), especially during inclement weather.
3. Make sure floor-cleaning or mopping solutions are effective by using the correct amount of cleaning chemical (follow label directions) and by frequent solution changes. Do not overuse chemicals. Remake as necessary and dispose spent solution appropriately.
4. Use high-efficiency vacuums, such as those approved by the Carpet and Rug Institute (CRI). Dispose of captured material, or empty or change bags before half full.

1. Fill a properly labeled (per OSHA requirements) trigger-spray bottle with a water-based dust mop treatment prepared according to label directions, and spray (using a course stream rather than a mist to avoid aerosolizing chemical) the treatment onto a clean dust mop. Follow the manufacturer's directions for application rate, and apply next to the backing at the base of the yarn, without overtreating it.
2. Roll the dust mop, treated side in. Place it in a plastic bag to help the mop head fibers absorb the treatment for at least 24 hours. After 24 hours, place the treated dust mop on the frame.
3. Dust mop the area, using a continuous motion, without lifting the mop from the floor. Begin at the perimeter (next to the wall) and walk to the other end of the work area. At the opposite end, rotate the dust mop so that the leading edge remains the same. Return to the opposite end and repeat. Overlap the previously mopped path by 2–4 inches to ensure complete coverage.
4. Sweep accumulated soil to a collection area, lightly shake the loose soil from the dust mop, and continue. Remove gum, tape, or other sticky residue with a scraper, using care not to mar or scratch the floor finish. Continue the dust-mopping process until the entire area has been dust mopped. When finished, pick up the collected debris using a counter brush and dustpan, or vacuum.
5. Clean excess dust from the mop head. Place the mop over a trash container. Brush with a stiff bristle brush in a firm, downward motion and/or vacuum.
6. Store the mop in a hanging position. Do not store the dust mop on the floor. The mop treatment may discolor the floor, and the mop fibers may become matted.
7. When the dust mop no longer attracts adequate soil, it may be re-treated. Spray the mop at the end of a work shift, and allow the treatment to be thoroughly absorbed.
8. Launder soiled dust mop heads monthly, weekly, or as needed. Soak mop heads overnight in a neutral pH cleaning solution. Rinse thoroughly, wring out, and hang them to dry. Machine washing and drying following manufacturer's recommendations is another option.
9. Re-treat as directed above for initial treatment.

Non-microfiber dust cloths may also be treated with some dust mop treatments. (See their label instructions.) Spray lightly and allow fibers to absorb the treatment for 24 hours before use.

Dry Floor Cleaning

Depending on the type of equipment (canister, backpack, wide-area sweeper, etc.), follow the manufacturer's recommendations for hard floor vacuuming. Typically, a canister or backpack vacuum cleaner equipped with a suction-only hard floor brush-tool may be used to remove dry dust and dirt from floors. In some cases, this method cleans more thoroughly than dust mopping, while removing more fine dust from the surface and debris from cracks and crevices.

ACTION ITEMS

1. Ensure dusters and dust mops are selected based on their ability to capture and remove dust, and are treated with a non-toxic water-based dust-removal treatment as warranted to capture dust.
2. Use vacuums with high-efficiency bags/filters.
3. Use lint-free wipes, microfiber cloths or tools, and/or properly filtered and sealed vacuums instead of feather dusters.

See Products Section and Appendices for more information about:

- Dusting treatments
- Furniture polish
- Janitorial equipment

Floor Care

The procedures for floor care in a green maintenance program are similar in most instances to those of a traditional program. Floor care in a green maintenance program addresses the selection of environmentally preferable products and equipment (see Products Section and Appendices), along with minor modifications of the procedures themselves.

In a green maintenance program, the primary effort should be a pollution prevention strategy, or one that minimizes the need to use strong chemicals, scrub, strip and recoat a floor, or extract (e.g., deep clean) a carpet. Thus, the focus is on preventative measures. As described above to keep outside entryways and mats clean and vacuumed, a dust mop or vacuum will clean resilient tile floors, especially those close to entryways and other sources of particulates (i.e., near copier rooms). Periodically cleaning underneath floor mats reduces the potential for moisture leading to bacterial and fungal growth. (Floor mats should be replaced with dry mats when saturated with moisture.) In summary, the goal is intensive cleaning of entryways to capture soils at the entries rather than to remove them after they have spread throughout the facility.

Hard Floor Maintenance

Hard floors include stone, tiles, resilient flooring, and other non-carpeted surfaces.

For routine hard floor maintenance, the cleaning staff should:

- Vacuum to remove and contain particulate matter from flooring surfaces, or alternatively, use mops equipped with reuseable/cleanable collection heads.
- Clean both on a predetermined schedule and as needed to restore floors to a clean condition. At a minimum, the schedule for cleaning should be:
 - Daily: heavy traffic areas, including entrances, corridors, community centers, break areas, congested areas, main passageways, and primary work or office areas.
 - Scheduled, as appropriate, to maintain cleanliness: gymnasiums, light traffic areas including conference rooms, administrative offices, limited access areas, and other areas or spaces with limited or periodic use.

For periodic hard floor maintenance, the cleaning staff should:

- Provide reasonable notice to building occupants prior to the commencement of non-routine floor cleaning operations. The timing and method of the notice should be established by building management in consultation with the cleaning crew.
- Perform periodic maintenance only if sufficient floor finish exists on the floor surface to protect the underlying flooring from being degraded during the restoration process.
- Apply floor restoration chemicals, when used, by mop, an automatic scrubbing machine, or autoscrubber, rather than by manual spray application (to avoid exposure to aerosol or vapors).
- Use burnishing or buffing equipment with controls or other devices sufficient for capturing and collecting particulates generated during the use of the equipment.

For restorative hard floor maintenance, the cleaning staff should:

- Perform restoration on an as-needed basis to maintain the cleanliness, appearance, and integrity of the floor finish, rather than on a rigid schedule.
- Ventilate the area, to the outside if possible, both during and after stripping or floor scrubbing and recoating operations to ensure adequate fresh air.

- Schedule floor stripping and refinishing to coincide with a period of minimum use or occupancy.
- Provide reasonable notice to occupants prior to the commencement of non-routine floor maintenance operations. The timing and method of the notice should be established by building management in consultation with the cleaning crew.

When floors need to be spray-buffed (or carpets, spot-cleaned), solutions should be applied from a sprayer in a course spray or stream rather than as a fine mist. This will minimize the amount of material that is atomized and potentially inhaled, as well as minimize over-spray. When floors need to be stripped and recoated or carpets extracted, it is important that occupants be notified. Use the least toxic products possible. Use the least amount of water and ventilate the area with fans if necessary for rapid drying to minimize both the possibility of mold growth and slip-fall incidents.

It is preferable to conduct major cleaning activities in a time period when traffic is minimal or the area can be closed off. This allows maximum time for the building to be ventilated (flushed with fresh air) prior to the return of the majority of occupants.

Floor Stripping

Removing floor finishes is perhaps one of the most labor-intensive and hazardous of maintenance operations, placing both cleaning personnel and occupants at risk. Furthermore, frequent stripping can cause health, safety, and environmental impacts through the use and disposal of products.

The objective of a green floor maintenance program is to minimize the frequency of stripping/removing and maximize the longevity of coatings. In some cases, newer equipment that relies on special floor pads, high-speed oscillations, or wet orbital sander technology enables stripping floors without harsh chemicals, or in some cases, without the use of chemicals at all.

For chemical-based stripping, the cleaning staff should:

- 1. PREPARE THE AREA.** Place "Floor Hazard" signs at entrances to the area being stripped. Move or work around heavy furniture or equipment that cannot be moved. Sweep the floor with a treated dust mop or vacuum.

ACTION ITEMS

1. Consult with your janitorial supplier for newer finish or floorcare options that may or may not require stripping and are also environmentally preferable (check for green certification or recognition). Otherwise, select appropriate zinc- or metal-free floor finishes. Choose the most durable finish available to minimize the need for stripping and recoating.
2. If using a water-based polymer coating, build a solid base, which can be between 6 and 12 coats for a 20% solids floor finish.
3. Develop a system to maintain floors daily, using walk-off mats, dust mopping or vacuuming, and spot cleaning.
4. Develop an interim restoration program (e.g., scrubbing and recoating) to maintain adequate levels of floor finish (as applicable), cleanliness, and appearance.

Remove gum, tape, and other foreign matter with a scraper, taking care not to mar or scratch the surface of the floor.

- 2. PREPARE THE EQUIPMENT.** Assemble two mop heads and handles. Label one "Strip Mop." Label the other "Rinse Mop." Assemble two mop buckets and wringers, labeling one "Strip Bucket" and the other "Rinse Bucket." Place a black or high-productivity stripping pad on the rotary floor machine. Fill the Strip Bucket with a solution of floor stripper (see Products Section and Appendices) following the manufacturer's recommendations for dilution rates and water temperature. Fill the Rinse Bucket with clean, cold water. Add a small amount of a neutral pH cleaner following the manufacturer's recommendations for dilution rates. Equip a wet vacuum with a floor squeegee tool. Place the equipment in the area where the work will begin.
- 3. APPLY STRIPPING SOLUTION** to the floor, using the Strip Mop and Strip Bucket. Dip the mop in stripping solution. Lift the mop and allow excess stripper to drain back into the bucket. Fan out the mop head on the floor and initially apply stripping solution along the edges. Continue applying solution in other areas using an arc motion from right to left, covering the area between the edges. Apply sufficient solution to thoroughly wet the floor, but *do not* flood it. Do not allow solution to dry on the floor. Immediately wipe off splashes from walls, baseboards, glass partitions, etc. with a damp cloth. Allow the solution to remain on the floor 5–10 minutes. Re-apply as necessary to keep the floor wet.
- 4. SCRUB THE FLOOR** with the rotary floor machine and stripping pad. Overlap the strokes made by the machine. Again, keep the floor wet, re-applying the solution as necessary.
- 5. REMOVE THE STRIPPING SOLUTION** from the floor with the wet vacuum and floor squeegee tool. Examine the floor for complete finish removal. Re-strip any areas that have finish remaining on them.

ACTION ITEMS

1. Notify occupants beforehand if a strip-out is scheduled.
2. Select the least toxic products available (see Products Section and Appendices). Mix and use products according to the manufacturer's directions.
3. Use the appropriate personal protective equipment. Gloves, goggles, and non-slip footwear may be required. Aprons and respirators may be necessary depending on products and methods selected.
4. Ventilate both during and after stripping.

6. RINSE THE FLOOR. Apply rinse solution using the Rinse Mop and Rinse Bucket. Apply sufficient water to thoroughly wet the floor, but *do not* flood it. Remove the rinse solution from the floor using the wet vacuum and floor squeegee tool.

7. DAMP MOP THE FLOOR WITH CLEAN WATER. Empty the Rinse Bucket and refill it with clean water. Rinse the Rinse Mop with clean water, and use it to damp mop the floor. Remove floor hazard signs only when floor is completely dry.

Note: An automatic scrubbing machine or autoscrubber, which applies cleaning and rinse solutions, scrubs, and vacuums/squeegees away soiled solutions, can be used in place of manual or rotary scrubber methods.

Floor Restoration, Buffing, and Burnishing

Select products for restoration that are water-based or low in VOCs (see Products Section and Appendices). Consult the finish manufacturer or janitorial supplier for product and procedural assistance. When applying the restorer from a spray bottle, use a stream or coarse spray. Do not use a fine mist as this increases the potential for fine particles to enter the breathing zone and to over-spray walls, furniture, carpets, and other objects.

Some floors do not require a separate finish applied by the owner or cleaning service. Check with your supplier to determine the maintenance requirements of the type of floor you have. Do not apply finish to a surface not intended for it.

Many options in finishes are available. Some newer coatings require very little maintenance. However, the cleaning and restoration process is a huge factor in the longevity of most coatings.

To maximize the life of finishes and floors, make sure there is a solid foundation of water-based finish (as applicable) on the floor. Dry buffing and burnishing is slightly abrasive and increases the appearance level by removing thin layers of finish to smooth out the surface—the smoother the surface, the shinier its appearance. However, if too much floor finish is removed, dry buffing and burnishing can damage floor tile and send flooring particles into the air, which may be harmful if inhaled. Important: Dry buffing on asbestos tile should only be performed when there is an adequate coat of intact floor finish to prevent abrading the floor itself. Non-buffable coatings (those that shine to a certain degree without buffing) may be a better choice for asbestos-containing tile.

Match the appropriate pad to the equipment and floor finish. Especially when using high-speed burnishers, it is important to use vacuum attachments to minimize particles in the air. If machine floor or pad pressure is adjustable, set the level to achieve appearance goals while minimizing the amount of finish removed from the floor.

See Products Section and Appendices for more information about:

- Floor finishes
- Floor strippers

ACTION ITEMS

1. Make sure adequate finish is on the floor. Determine if it is time for a scrub and recoat. Consult the finish manufacturer or janitorial supplier for procedural assistance.
2. Select the appropriate restoration product. Water-based or low-VOC products are recommended (see Products Section and Appendices). Consult the finish manufacturer or janitorial supplier for assistance.
3. Select appropriate equipment (see Products Section and Appendices). If burnishing, use a vacuum attachment to prevent particles from becoming airborne where they can be inhaled. Use recommended buffing/burnishing pads (overly aggressive pads will abrade the finish and create more dust).

- Wood floor finishes
- Janitorial equipment

Carpet Maintenance

In a green maintenance program for carpets, the primary effort should be a pollution prevention strategy, or one that minimizes the need to extract a carpet. Thus, a specific focus should be on preventative measures, as described earlier, such as:

1. Frequently vacuuming entryway mats and entry grating systems.
2. Frequently dust mopping or vacuuming hard floors, especially close to entryways and other sources of particles (e.g., near copier rooms) to reduce tracked soiling on surrounding carpeted areas.
3. Establishing a specific daily routine for vacuuming and spotting carpets.
4. Establishing an interim cleaning process to address the needs of high traffic areas.
5. Minimizing the need for large-scale extraction or deep cleaning of carpet.

For routine carpet maintenance, the cleaning staff should:

- Vacuum carpets on a predetermined schedule of frequency, and as needed, to keep them clean and restore appearance. At a minimum, the schedule for vacuuming should be:
 - Daily: heavy traffic areas, including entrances, corridors, community rooms, break areas, congested areas, main passageways, and primary work or office areas.
 - Scheduled, as appropriate, to maintain cleanliness: light traffic areas including conference rooms, administrative offices, limited access areas, and other areas or spaces with limited or periodic use.

Periodic light carpet cleaning is necessary to clean the tops of carpet fibers and maintain the appearance of carpeted floors. Restorative deep carpet cleaning is needed to extract embedded and sticky soils.

For periodic and restorative cleaning, the building manager should:

- Provide reasonable notice to building occupants prior to the commencement of non-routine carpet cleaning operations. The timing and method of the notice should be established by building management in consultation with the cleaning crew.
- Perform carpet extraction (see below) on an as-needed basis, rather than according to a rigid schedule.

- Remove sufficient water from the carpet and provide sufficient airflow (e.g., use of blowers, increased outdoor air exchange) so that the carpet will dry in less than 12 hours when interim cleaning carpets or performing carpet extraction.
- Schedule carpet extraction to coincide with a period of minimum building occupancy.

When carpets require spot cleaning, apply solutions from a sprayer in a stream or coarse spray, not a fine mist. This minimizes the amount of material that is atomized and potentially inhaled, as well as over-spray.

It is preferable to conduct major cleaning activities when common area occupancy is low. This allows maximum time for the building to be ventilated (flushed with fresh air) prior to the return of the majority of occupants.

See Products Section and Appendices for more information about:

- Carpet cleaners
- Solvent spot removers
- Equipment

Carpet Extraction Cleaning

Carpets act as a “sink” that allows particles and other unwanted material to filter down to the base of the fibers and sometimes into the carpet backing. Once deep in the carpet and walked on, gritty soil can damage carpet fibers and backing, causing excess wear, degraded appearance, and ultimately the need to replace carpets prematurely.

Moisture provides an opportunity for unwanted biological contaminants in carpet—such as mold spores and bacteria—to become active, multiply, and contaminate the indoor environment.

Extraction is a carpet-cleaning process in which a water-based cleaning solution is applied to the carpet and vacuumed (extracted) from the carpet nap, taking soil with it. Extraction helps remove unwanted contaminants deep in the carpet before they cause problems. But extraction cleaning can also add large amounts of water to the carpet, especially if the equipment is not functioning properly. Care must be taken to service equipment regularly by an authorized maintenance and repair center and to ensure adequate passes during use to remove the most water from the carpet.

ACTION ITEMS

1. Select appropriate vacuums and ensure they are in good working order by changing belts as needed, having the vacuums professionally serviced by authorized repair centers at regular intervals, and using and maintaining the correct bags and/or filters.
2. Empty or replace vacuum bags when half-full or less to maintain vacuum airflow. Dispose of dust and bags properly. Bagless vacuums also have filters that need cleaning or changing to maintain performance. Consult the supplier for assistance.
3. Clean up spills while they are still fresh.
4. Minimize the amount of moisture used during cleaning.

For carpet extraction, the cleaning staff should:

- **MIX CLEANING SOLUTION PROPERLY.** Using too much concentrated cleaner not only wastes product, but also can lead to more rapid resoiling of the carpet. Do not apply too much solution.
- **MAKE SURE THAT THE VACUUM PICK-UP IS WORKING PROPERLY** and no holes or leaks in wands, hoses, or other attachments are decreasing suction. When vacuuming spent solution, repeat the process multiple times in both directions.

ACTION ITEMS

1. Correctly dilute and use the proper amount and type of cleaning chemicals. Excess or incorrect use of chemicals may result in rapid resoiling and other issues.
2. Use equipment that will maximize the amount of water or solution extracted from carpet, such as equipment approved by the Carpet and Rug Institute, to minimize moisture and potential for mold and bacterial growth.
3. Increase ventilation, run the HVAC unit, or open windows if weather allows and use fans to dry carpets quickly. Carpets should be completely dry within 12 hours.
4. Dispose of cleaning solutions properly.

- **USE INCREASED VENTILATION AND AIRFLOW** to help dry carpets. This can be accomplished by opening windows when weather permits, increasing building ventilation, turning on air conditioning or heating systems, and using floor-level drying fans. Carpets should dry within 12 hours to minimize the potential for mold and other microbes to grow.
- **NOTIFY OCCUPANTS** before a large-scale extraction procedure as this activity can affect sensitive individuals. Proper scheduling is recommended to ensure minimum traffic. The building should also be ventilated or flushed with fresh air prior to being reopened.

Restrooms

While procedures for cleaning restrooms in a green maintenance program are similar to those in a traditional cleaning program, restrooms should be cleaned frequently using appropriate products because of their heavy use and moisture.

The cleaning must be done thoroughly, including hard-to-reach areas such as behind toilets and around urinals. Periodically deep- or machine-scrub restroom floors with a disinfectant, following the label directions for appropriate dilution and recommended dwell time to enable thorough germ-kill. Dwell time for many disinfectants is from several to 10 minutes.

Many restroom cleaning products are hazardous, such as drain cleaners and toilet bowl cleaners, although less toxic alternatives are available (see Products Section and Appendices). Make sure that appropriate personal protective equipment recommended by product manufacturers is used. Never mix chemical products.

Paper dispensers and trash cans used in restrooms to dispense or dispose of paper hand towels should be “touch free,” which reduces the potential for cross-contamination of bacteria and other potentially harmful pathogens. Large trash cans can minimize overflow and reduce the frequency for policing the area.

For a restroom cleaning process, staff should clean from high to low, towards the doorway, and do dry work before wet work, through a process such as the following:

- Check the supply cart for proper equipment and supplies.
- Prepare the area. Place a “Restroom Closed” sign at the door, if applicable.
- Re-stock supplies and clean the exterior of all dispensers including paper towel, feminine hygiene, toilet tissue, and hand soap dispensers.
- Remove trash from waste receptacles. Clean receptacles with a disinfectant cleaner, and replace the liners.
- Dust mop, sweep, or vacuum the floor, and pick up collected debris with a dustpan.
- Clean sinks using a disinfectant cleaner and abrasive sponge, first making sure they safe for surfaces including chrome. Leave disinfectant on surfaces according to the manufacturer’s dwell-time directions.
- Clean mirrors with glass cleaner and soft, clean cloths, or use an applicator and squeegee. Microfiber cloths enable cleaning glass and mirrors with water only and without chemicals.
- Clean and disinfect toilets and/or urinals. Remove urinal screens. Using a bowl swab, force the water level down in urinals and toilet bowls by repeatedly pushing the swab down the throat or flush path. Apply bowl cleaner to the exposed interior surfaces of the bowls and urinals, especially under the rim. Allow time for the chemical to work, while cleaning partitions and showers (several to 10 minutes, based on the manufacturer’s directions).
- Remove graffiti from walls and stall partitions. Clean stall partitions and walls as needed with disinfectant cleaner.
- Clean both sides of entrance/exit doors with a disinfectant cleaner, paying special attention to hand contact areas.
- Return to scrub the inside of the bowls and urinals with a bowl swab or brush. Use a brush or abrasive sponge for difficult soils. Clean the exterior of the bowls and urinals with disinfectant cleaner. Clean both sides of the toilet seat. Clean the walls around the bowls or urinals with disinfectant cleaner. Flush bowls and urinals. Polish all chrome surfaces with a dry cloth after cleaning with a disinfectant cleaner.

- Scrub the floor with a disinfectant cleaner using a wet mop, bucket, and wringer. If needed, scrub the floor grout with a tile and grout brush. Rinse with clear water. Squeegee or vacuum up water, if necessary. Note: Floors, since they are not considered to be hand touch points, may not need to be disinfected if properly maintained.
- Treat sink, shower, or floor drains with drain maintainer, if necessary.
- Inspect the work. If satisfactory, allow the floor to dry and re-open the restroom. Return the cart to the supply area and restock.

The following additional requirements apply:

- On surfaces touched by hands (e.g., door knobs, light switches, handles, etc.), clean and disinfect more frequently as traffic requires.
- Control and remove standing moisture from floor and restroom surfaces in a timely manner.
- Use equipment specifically for restroom cleaning. Restroom cleaning equipment, except for powered equipment, should not be used to clean any other areas of the building.
- Pull restroom trash liners daily at a minimum and disinfect the trash receptacle. Fill all drain traps on a regular basis.

Non-chemical interventions are also available to assist with sanitizing or disinfecting restrooms (see Products Section and Appendices).

ACTION ITEMS

1. Make sure sanitizing and disinfecting solutions are prepared and used properly (e.g., dwell time) and remix as required.
2. Frequently clean surfaces that hands touch (touch points) to eliminate the spread of germs (such as door knobs, light switches, and handles).
3. Eliminate moisture buildup through good cleaning practices and by ensuring that adequate exhaust ventilation is supplied.
4. Keep floors as dry as possible to eliminate slips and falls and the build-up of bacteria, mold, and mildew.

See Products Section and Appendices for more information about:

- Lime and scale remover
- Restroom cleaners
- Restroom disinfectants
- Urinal deodorizers
- Graffiti removers
- Janitorial equipment

Disinfection

Disinfection is particularly important on touch points in restrooms, community rooms, gymnasium and workout areas, daycare / preschool surfaces (e.g., desks and toys), and other high-touch locations.

Cleaning staff should:

- Perform disinfection in areas or on surfaces where pathogens collect and breed, such as in restrooms, on door handles, exercise and playground equipment, and other fomites (inanimate surfaces that can harbor and transmit germs). However, use disinfectants only where required to minimize their use.
- Disinfect using only disinfectants or devices that can document disinfecting properties.
- Follow product label directions for preparation of chemical disinfecting solutions (e.g., dilution rate), and the appropriate disinfecting and cleaning method for the area to be cleaned (e.g., dwell time and pre-cleaning as required).

See Products Section and Appendices for more information about:

- General disinfectants
- Janitorial equipment

OSHA Bloodborne Pathogen Standard

As part of its mission to protect employees from hazardous work environments, OSHA maintains standards that cover safe handling of bloodborne pathogens for people who encounter bodily fluids on the job. Bloodborne pathogens are disease-causing microbes transmitted by blood or other body fluids.

OSHA recommends the use of a disinfectant that is tuberculocidal (kills TB) and proven effective against the Hepatitis B virus (HBV) to disinfect surfaces potentially contaminated by bloodborne pathogens. Check disinfectant labeling for EPA registration to determine whether or not the product is tuberculocidal. In certain instances, products that kill HBV may serve this purpose, but using an EPA-registered tuberculocide is safer in most cases. Certain hydrogen peroxide-based products are effective but less toxic disinfectants, and make tuberculocidal claims (check for EPA registration) that may meet OSHA requirements for bloodborne pathogen cleanup.

Careful attention should be given to the use and application of these federally required products under a green maintenance program. Chemicals reserved for compliance with OSHA's Bloodborne Pathogen Standard should be clearly separate from those used for general disinfecting/sanitizing. This dedicated use and special focus will help meet OSHA requirements, differentiate the procedures for the different types of disinfecting/sanitizing, reduce the potential for confusion, and minimize overall health and environmental impacts.

ACTION ITEMS

1. Use safety cones or other means to make sure that occupants do not come in contact with a spill that might contain bloodborne pathogens.
2. Use proper personal protective equipment (i.e., gloves, goggles).
3. Disinfect the area with appropriate solution.
4. Dispose of cleanup materials properly in a red bio-hazard bag.

See Products Section and Appendices for more information about:

- Disinfectants

Spills

ACTION ITEMS

1. Clean spills while still fresh.
2. Use the proper cleaning solutions and only the amount that is necessary.
3. Dispose properly.
4. Ensure that occupants know whom to contact in case of spills.

It is generally preferable to address spills as soon as possible to minimize impacts on both health and the environment. Work with building occupants so they communicate quickly about spills.

See Products Section and Appendices for more information about:

- Solvent spot removers/absorbents

Food Areas: Cafeterias, Breakrooms, and Other Areas

Particular attention should be paid to sanitizing touch points in food areas. It is also important to manage and remove food waste and to sanitize trash receptacles containing food debris, recyclables such as soda cans, and other objects that contain food residues, which can attract pests. Making every effort to eliminate wastes and residues that attract pests is critical to protecting occupant health by reducing or eliminating the need for pesticides inside the building. Ask occupants to rinse out food and drink containers before placing them in recyclable

collection areas. Occupants should empty and clean refrigerators to avoid food going bad. Integrated Pest Management (IPM) should be followed.

Cleaning food areas, such as dining areas and break rooms, should include the following:

- Clean and sanitize surfaces in food preparation and consumption areas on a daily basis or as required to protect human health.
- Clean and sanitize daily surfaces that hands touch (e.g., faucet handles, drinking fountains, and cafeteria lines).
- Equip waste containers likely to collect food waste with a cover, and empty once per day or when full; clean and sanitize daily.

See Products Section and Appendices for more information about:

- Sanitizers
- General degreasers

ACTION ITEMS

1. Clean and sanitize tables, floors, and other surfaces.
2. Separate recyclables from trash and make sure recyclable areas are kept clean (i.e., rinse soda cans) to prevent attracting pests.
3. Make sure occupants understand how to properly separate trash and recyclables and dispose of each.
4. Make sure waste containers are covered and emptied at least daily.

Reducing Solid Waste from Cleaning Operations

Another aspect of a green maintenance program is to reduce solid waste throughout the building, including in cleaning operations.

To reduce solid waste while cleaning, staff should:

- Purchase chemical products and supplies in quantities that minimize the amount of packaging and container waste generated.
- Use reusable cleaning cloths or microfiber technology, whenever practicable, in lieu of paper products. Within 2 hours of use, rinse and/or place cleaning towels, cloths, and other reusable cleaning materials in a sealable container (e.g., metal flammable rag canister, locking plastic bag, etc.) to minimize evaporation of the cleaning product. Reusable cleaning cloths or microfibers should be cleaned or laundered prior to reuse.

ACTION ITEMS

1. Purchase products in quantities that minimize packaging and waste.
2. Use reusable cleaning cloths or microfiber instead of paper.
3. Segregate all waste from cleaning operations and dispose of properly.

- Segregate and recycle all waste items from cleaning operations, including paper, glass, plastics, cardboard, other packaging materials, empty chemical containers, and worn equipment, that are acceptable for recycling in the community.

The chapters on Resident Education and on Recycling and Special Waste Programs contain information on setting up a recycling program.

Pest Management

Traditional pest management practices are being replaced by an “integrated pest management,” or an IPM, approach. As defined by the EPA, IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices.

Two keys to IPM are removing the food supply of pests via effective cleaning and housekeeping, and sealing up places where pests can enter the public housing complex or migrate between buildings.

Bed bugs are a particular concern in many complexes. Although they can cause itchy bites on people and pets, according to the EPA, they are not known to transmit or spread diseases, unlike most public-health pests. Pesticides are only one tool to get rid of bed bugs. A comprehensive approach that includes prevention and non-chemical treatment of infestations is the best way to avoid or eliminate a problem. (See also chapter on Unit Turnaround.) A few examples of non-chemical methods of control (which may serve as advice to residents) include:

- Removing clutter where bed bugs can hide
- Using mattress covers designed to contain bed bugs
- Sealing cracks and crevices
- Vacuuming rugs and upholstered furniture thoroughly and frequently, as well as

ACTION ITEMS

1. Store trash in covered receptacles outside and away from buildings.
2. Caulk holes and cracks to prevent pests from entering or moving between buildings.
3. Seal openings around pipes under sinks (pests are attracted to water).
4. Cover exhaust or vent openings exposed to the outside with wire mesh.
5. Establish rules for food cleanup and storage in community centers.
6. Remove clutter so pests have fewer hiding places.
7. Use sticky or mechanical traps rather than pesticides where possible.
8. Hire only trained, licensed, and certified pest control professionals experienced with IPM.
9. Use pesticides only where infestations occur and never as a “just-in-case” measure.
10. Use a targeted (pest-specific) EPA-registered pesticide and the least toxic product that will do the job (see Appendix E). Follow label directions carefully and use sparingly.
11. Avoid fogging or broadcast spraying of pesticides.
12. Provide clear advance notice to building occupants of scheduled pesticide use and apply pesticides when areas are closed or occupancy is low.

vacuuming under beds (taking the vacuum bag outside immediately and dispose in a sealed trash bag)

- Washing and drying clothing and bed sheets at high temperatures (heat can kill bed bugs)
- Placing clean clothes in sealable plastic bags when possible
- Being alert and monitoring for bed bugs so they can be treated before a major infestation occurs.

If pesticides are used to control pests, follow these tips to ensure safety and product effectiveness:

- *Read the product label first*, then follow the directions for use.
- Any pesticide product label without an EPA registration number has not been reviewed by EPA to determine how well the product works.
- Make sure that the pesticide has been approved for indoor use.
- For control of bed bugs in particular, check the product label. If bed bugs are not listed on the label, the pesticide has not been tested for bed bugs and it may not be effective.

Indoor Plants

Indoor plants are a wonderful addition to any facility. Building staff charged with watering and caring for plants may also be called upon to address spills from watering, mold growth in carpets from dampness, pest control, and other problems. Use of indoor pesticides and fertilizers should be managed with care because these products can impact health. Thus, the staff should be educated on the proper and appropriate care for plants. Plants on carpets should be placed on stands to keep moisture from building up in carpeting. Unit ventilators should not be used as plant stands.

Maintenance of indoor plants includes the following:

- Collect and dispose of plant debris, such as fallen leaves and flower petals.
- Ensure that plants are not in direct contact with carpet.
- Move plants away from HVAC vents.

ACTION ITEMS

1. Educate workers on appropriate care guidelines for indoor plants.
2. Ensure that plants are not in direct contact with carpets and unit ventilators.

If indoor plant care is not the responsibility of the onsite manager, the manager should notify the responsible party when indoor plants are interfering with or compromising cleaning, or when other issues such as those noted above require attention.

People with Special Needs

One of the primary goals of a green cleaning and maintenance program is to protect the health of building occupants. This is done in many ways, including the identification and removal of harmful contaminants, such as particulates, mold spores, bacteria, and viruses.

While the cleaning process is intended to reduce exposure to these and other harmful contaminants, improper methods and cleaning products themselves can cause adverse health impacts. This is especially true for people sensitive to fragrances, those with asthma and allergies, and those with impaired immune systems because of cancer and other health conditions.

For these individuals, accommodations should be made relative to byproducts of cleaning activities, such as VOCs, dust, noise levels, and other factors. Pet dander is often carried on clothing and by other means throughout facilities, affecting people with sensitivities to pet allergens.

Understanding these sensitivities is essential for accommodating occupants. In some cases, different product selection may be necessary, the time of day that cleaning takes place may need to be altered, occupants who are reacting to substances may need to be relocated or diverted to other areas within the building, or other interventions may be required, such as vacuuming with HEPA-filtered vacuums to remove or reduce pet dander and other particulates.

In most cases, effective accommodations cannot be achieved by the cleaning staff alone, but require everyone, including the affected individuals, to work together to achieve the best outcome.

In situations where cleaning operations have the potential to adversely affect members of a vulnerable population, the building manager should:

ACTION ITEMS

1. Identify building occupants with specific needs or sensitivities.
2. Develop a plan to address these issues.
3. Change products and/or cleaning schedules as necessary to accommodate them.
4. Address ventilation requirements to help mitigate problems related to indoor air quality (IAQ).

- Schedule daily cleaning activities to avoid their exposure to the cleaning process.
- Adopt alternative cleaning practices that minimize or make unnecessary the use of cleaning chemicals.
- Use cleaning chemicals in areas only where sufficient ventilation is present to allow airborne substances to dissipate before the area becomes repopulated.

- Provide additional ventilation through the use of blowers to enhance the rate of chemical dissipation.
- Conduct cleaning operations in a manner that prevents the transfer of impacts to other areas of the building that may contain vulnerable populations.

CLEANING PRODUCTS

In addition to cleaning procedures, the selection and use of cleaning products is important in a green maintenance program. General guidelines for purchasing decisions include:

- **pH:** Prefer cleaners that have a neutral pH (closer to 7) compared to those with extreme pH (closer to 1 or 14).
- **BIODEGRADABILITY:** Prefer cleaners that are readily biodegradable (check for green certification or recognition) compared to those that are slower to degrade. Unfortunately, many older formulations use excellent performing ingredients that have been found to have serious environmental and health concerns.
- **DYES AND FRAGRANCES:** Prefer those with no or low levels of dyes and fragrances compared to those products that are heavily dyed or fragranced (check for green certification or recognition). If dyes are necessary, use those that are approved for foods and cosmetics (F&C).
- **VOCS:** Prefer those that have no or low VOCs. These requirements will vary depending on the product type, usage, actual outgassing rates, and other factors (consult recognized green guidelines in Appendix B) compared to those with higher levels.
- **BIO-BASED/RENEWABLE RESOURCES:** Prefer products that use materials derived from renewable resources compared to those from non-renewable resources (check for green certification or recognition).
- **FLASHPOINT:** Prefer products that have a high flashpoint compared to those with a low flashpoint (see the product's MSDS).
- **HMS (HAZARDOUS MATERIALS IDENTIFICATION SYSTEM) RATING:** Look for a product with a zero hazard rating (see Appendix B).

The final component in selecting products is consideration of the supplier. The supplier plays an important role as part of the green cleaning and maintenance team and may be intimately involved in training. Therefore, consideration should be given to suppliers' ability to train cleaning personnel and their expertise

with green janitorial products and cleaning, in addition to price, reputation, and other traditional considerations.

Below are additional considerations related to 21 product categories:

1. All-purpose cleaners
2. Restroom cleaners
3. Restroom disinfectants
4. Carpet cleaners
5. Chrome cleaners/polish
6. Dusting treatments
7. Floor finishes
8. Floor strippers
9. Furniture polish
10. General degreasers
11. General disinfectants
12. Glass cleaners
13. Graffiti remover
14. Gum remover
15. Lime and scale remover
16. Sanitizers
17. Solvent spot removers / absorbents (for spill cleanup)
18. Urinal deodorizers
19. Wood floor finishes
20. Choosing disposable paper and plastic bags
21. Selecting and using janitorial equipment

1. All-Purpose Cleaners

All-purpose cleaners consist of a broad array of possible formulations. Select products that have been recognized by green certification or recognition programs, such as DfE, EcoLogo, Green Seal, and others (see Appendix B). The following are some of the specific issues to compare in this product category:

- Consider detergent-based products versus those containing solvents.
- Preferable ingredients include surfactants containing terms such as lauryl, amides, and glycosides.

- If possible, do not purchase cleaners containing Nonyl Phenol Ethoxylates, NTA, EDTA, glycol ethers, sodium hydroxide, potassium hydroxide, sodium metasilicate, or phosphates.

2. Restroom Cleaners

Restroom cleaners often contain strong acids because of the need to remove mineral deposits from sinks, bowls, and urinals. Frequently, they are heavily dyed and strongly fragranced. Select products recognized by green certification or recognition programs (see Appendix B). The following are some specific issues to look for:

- Preferable ingredients include surfactants containing terms such as lauryl, amides, glycosides; citric acid; acetic acid as found in vinegar; and lactic acid.
- If possible, avoid purchasing products containing nonyl phenol ethoxylates, NTA, EDTA, hydrochloric acid, phosphoric acid.

3. Restroom Disinfectants

Restroom disinfectants are similar to general disinfectants, but typically may have an acidic pH (closer to 1) to remove hard water deposits in sinks, bowls, and urinals. The selection issues include both those under General Disinfectants and Restroom Cleaners. Care in selection and use is important. The following are some of the specific issues to compare in this product category:

- See Restroom Cleaners for similar attributes.
- Antimicrobial ingredients: Prefer antimicrobial ingredients that have a lower potential for persistence in the environment and accumulation in living tissue compared to those with a greater potential (check for DfE recognition* ¹if available).
- Preferable active ingredient: hydrogen peroxide.
- If possible, avoid purchasing products containing sodium hypochlorite (chlorine bleach), quaternary ammonium compounds, alcohols, or phenolic compounds.

¹ Currently, the U.S. EPA does not permit disinfectants to be certified as green. However, the EPA Design for the Environment (DfE) program has launched a pilot program that may lead to certain disinfectant products being permitted to carry the DfE logo on their labels as recognition of environmental preferability under new rules.

- Look for disinfectants in Toxicity Category IV (see Appendix E).

Non-chemical interventions, such as steam vapor devices, can also help sanitize or disinfect restrooms. In larger restrooms, using water-only spray-and-vac type equipment that applies water under pressure and then vacuums off the solution has been demonstrated to effectively clean and sanitize both floor and above-floor surfaces by removal of soil and germs rather than by chemical intervention. Ionized or activated water devices have also shown effectiveness in sanitizing surfaces without added chemicals. Check with your janitorial supplier for these and other options.

4. Carpet Cleaners

See also All-Purpose Cleaners. Select products that have been recognized by green certification or recognition programs (see Appendix B) and have received a Green Label or Seal of Approval (SOA) for soil removal effectiveness and other attributes by the Carpet and Rug Institute (CRI).

5. Chrome Cleaner/Polish

Chrome cleaners and polishes frequently use petroleum distillates, which are poisonous and derived from a non-renewable resource. Select products recognized by green certification or recognition programs (see Appendix B). The following are some of the specific issues to compare for in this product category:

- Preferable ingredients: essential plant oils and non-toxic abrasives such as baking soda.
- If possible, avoid purchasing products containing petroleum distillates or ammonia.

6. Dusting Treatments

Dusting treatments often contain petroleum distillates and solvents. Select products recognized by green certification or recognition programs (see Appendix B).

- Preferable ingredients or attributes: water-based, non-flammable.
- If possible, avoid purchasing products containing petroleum distillates, high-VOCs, or that leave slippery residue.

7. Floor Finishes

Floor finishes should be durable and appropriate for the prescribed maintenance method, but they typically contain heavy metals such as zinc. Importantly, floor finishes should be compatible with the stripping solution. Select products recognized by green certification or recognition programs (see Appendix B). The following are some of the specific issues to compare in this product category:

- Durability: Prefer finishes that are more durable (require less maintenance such as buffing, restoring, and recoating) than less durable finishes that require more frequent maintenance.
- Heavy metals: Prefer non-metal cross-linked polymers (e.g., zinc-free) as compared to those containing heavy metals. Another significant benefit of non-metal polymer formulas is that frequently they can be removed with less hazardous floor strippers.
- Preferable ingredients: metal-free polymers.
- If possible, avoid purchasing products containing metal-crosslinked (containing heavy metal) polymers.

8. Floor Strippers

Floor strippers typically have extreme (alkaline) pH, solvents, and ammoniated compounds to remove metal cross-linked floor finishes. Floor strippers should be compatible with the floor finish. Select products recognized by green certification or recognition programs (see Appendix B). The following are some of the specific issues to compare in this product category:

- pH: Prefer those with a pH closer to neutral (in the range of 10 to 12) as compared to those with extreme pH (closer to 14).
- Preferable ingredients: d-Limonene (citrus solvent) and methyl esters. If possible, avoid purchasing products containing ethylene glycol mono butyl ether (butyl cellusolve), 2-butoxyethanol, ammonia, and sodium hydroxide.

9. Furniture Polishes

Furniture polishes frequently use petroleum distillates, which are poisonous and derived from a non-renewable resource. Select products recognized by green

certification or recognition programs (see Appendix B). The following are some of the specific issues to compare for in this product category:

- Preferable ingredients: citrus (lemon and orange) oils.
- If possible, avoid purchasing products containing petroleum distillates.

10. General Degreasers

General degreasers are typically heavy-duty cleaners that include solvents for removing oil-based soils. Traditional solvents are typically derived from a non-renewable sources (e.g., petroleum), can be flammable, and have high VOC levels that can cause respiratory irritation and contribute to environmental pollution; some cause severe health impacts. Select products recognized by green certification or recognition programs. The following are some of the specific issues to compare in this product category:

- See All-Purpose Cleaners for additional considerations.
- Preferable ingredients: d-Limonene (derived from citrus fruits) and methyl esters from soy and corn.
- If possible avoid purchasing products containing glycol ethers in general, ethylene glycol mono butyl ether (butyl cellusolve), and sodium hydroxide.

11. General Disinfectants

General disinfectants are similar to cleaners (see All-Purpose Cleaners) with additional ingredients to kill bacteria and other unwanted organisms (see Restroom Disinfectants). Because disinfectants kill organisms, they are toxic by definition. Some are persistent in the environment and accumulate in living tissue. Care in selection and use is important. The following are some of the specific issues to compare in this product category:

- See Restroom Disinfectants for similar attributes.
- Antimicrobial ingredients: Prefer antimicrobial ingredients that have a lower potential for persistence in the environment and accumulation in living tissue compared to those with a greater potential (check for DfE recognition²).

² Currently, the U.S. EPA does not permit disinfectants to be certified as green. However, the EPA Design for the Environment (DfE) program has launched a pilot program that may lead to certain disinfectant products being permitted to carry the DfE logo on their labels as recognition of environmental preferability under new rules.

- Preferable active ingredient: hydrogen peroxide.
- If possible, avoid purchasing products containing sodium hypochlorite (chlorine bleach), quaternary ammonium compounds, and phenolic compounds.
- Look for disinfectants in Toxicity Category IV (see Appendix E).

Non-chemical interventions, such as steam vapor devices, are also available to assist with sanitizing or disinfecting. Floors, since they are seldom touched by hands, may not need to be disinfected if properly maintained. Cleaning in shower areas using water-only spray-and-vac type equipment that applies water under pressure, then vacuums off the solution has been demonstrated to effectively clean and sanitize both floor and above-floor surfaces by removal of soil and germs rather than by chemical intervention. Ionized or activated water devices have also shown effectiveness in sanitizing surfaces without added chemicals. Check with your janitorial supplier for these and other options.

12. Glass Cleaners

Glass cleaners have ingredients added to reduce streaking and to evaporate quickly. Traditional glass cleaners can contain alcohol and other solvents (typically glycol ethers) or ammonia. The following are some of the specific issues to compare in this product category:

- Preferable ingredients: surfactants containing terms such as lauryl, amides, and glycosides.
- If possible, avoid purchasing products containing ammonia, alcohols, propylene glycol, ethylene glycol, and other glycol ethers.

Microfiber cloths enable cleaning glass effectively using just water. A window-washing sleeve that fits over an applicator handle cleans glass with water mixed with a small amount of mild detergent, followed by use of a squeegee for drying the glass.

13. Graffiti Removers

Graffiti Removers used to be formulated with chlorinated solvents (e.g., methylene chloride) before those solvents were banned due to their environmental impact. Many graffiti removers are packaged in aerosols that often contain hydrocarbon propellants (e.g., propane, butane), are highly flammable, and can

contribute to indoor air quality problems. The following are some of the specific issues to compare in this product category:

- Preferable ingredients: n-Methyl-2-Pyrrolidone, d-Limonene.
- If possible, avoid purchasing products containing methylene chloride, petroleum distillates, propane, butane, isobutene, and sodium hydroxide.

14. Gum Removers

Gum removers used to be formulated with chlorinated solvents (e.g., Freon) before those solvents were banned due to their environmental impact. Dry ice and carbon dioxide are preferable replacements. Degreasers can be used in some situations (see section on General Degreasers). The following are some of the specific issues to compare in this product category:

- Preferable ingredients: dry ice, carbon dioxide.
- If possible, avoid purchasing products containing Freon, dichloro-difluoromethane, trichloro-fluoromethane.

15. Lime and Scale Removers

Lime and scale removers are acids because of the need to remove mineral deposits from sinks, bowls, and urinals. The following are some of the specific issues to compare in this product category:

- Environmentally preferable lime and scale removers fall more in the range of pH 4 as compared to traditional products that have a pH below 1 (check for green certification or recognition).
- Preferable ingredients: citric, acetic, or lactic acid.
- If possible, avoid purchasing products containing hydrochloric or phosphoric acid.

16. Sanitizers

Sanitizers are used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations. Sanitizers include:

- Food contact products: These products are important because they are used on sites where consumable food products are placed and stored. Sanitizing rinses are used for dishes and cooking utensils, including those in eating and drinking establishments.
- Non-food contact products: Non-food contact surface sanitizers include carpet sanitizers, air sanitizers, laundry additives, and in-tank toilet bowl sanitizers.

The following are ingredients to compare:

- Antimicrobial ingredients: Prefer antimicrobial ingredients that have a lower potential for persistence in the environment and accumulation in living tissue compared to those with a greater potential.
- Preferable active ingredient: hydrogen peroxide.

17. Solvent Spot Removers/Absorbents (for spill cleanup)

Solvent spot removers may be necessary for oily spot removal, particularly on carpets. Use detergent-based spotters if possible, followed by extraction or other method to remove/absorb the detergent).

Select products that have been recognized by green certification or recognition programs and/or have received a Green Label or Seal of Approval (SOA) for soil removal effectiveness and other attributes by the Carpet and Rug Institute (CRI). The following are some of the specific issues to compare in this product category:

- Preferable ingredients for spot removers: d-Limonene (derived from citrus fruits) and methyl esters from soy and corn.
- Preferable ingredients for absorbents: recycled corncobs, kitty litter.
- If possible, avoid purchasing products containing mineral spirits or 2-butoxyethanol.

18. Urinal Deodorizers

Urinal deodorizers are blocks placed in urinals to reduce odors. Preferably, these deodorizers should be eliminated altogether through more frequent cleaning and other methods of deodorizing (eliminating the source of the odor is best).

However, if urinal deodorizers are still required, preference should be given to those with the safest ingredients:

- Preferable ingredients: surfactants containing terms such as lauryl, amides, glycosides.
- If possible, avoid purchasing products containing nonyl phenol ethoxylates, paradichlorobenzene.

19. Wood and Stone Floor Coatings

Wood and stone floor coatings have traditionally been solvent-based. While extremely durable to protect flooring materials that are expensive to replace, these coatings can be hazardous during the drying and curing period. It is preferable to use zero or low-VOC-containing materials to address indoor air quality concerns (check for green certification or recognition). Unfortunately, lower VOC formulas often have lower product durability and flooring protection, and raise product and application costs. Also, many janitorial firms lack specific expertise in application of these types of finishes. Thus, supplier support (e.g., instruction and training) is very important. The following are some of the specific issues to compare in this product category:

- Durability: Prefer durable finishes that require less maintenance (e.g., recoating) than less durable finishes that require more frequent recoating.
- Preferable ingredients: water- or epoxy-based finishes.
- If possible, avoid purchasing products containing xylene, stoddard solvent.

20. Choosing Disposable Paper and Plastic Bags

The issues associated with selecting paper products, compared to cleaning products, are simpler. Whereas cleaners may have more than a dozen individual ingredients that can vary significantly between and within categories, concerns related to paper are primarily focused at the manufacturing stage of the product. Paper has less emphasis on health issues during the product-usage stage or environmental impacts as a result of disposal.

The three basic issues of concern for paper are total recovered material (recycled content), post-consumer recycled content, and the bleaching process. Environmentally preferable (check for green certification or recognition) paper products should meet the following standards for each of the following product categories:

- Restroom tissue—100% recovered materials and 20% post-consumer content.
- Toilet seat covers—100% recovered materials and 40% post-consumer content.
- Paper towels and general-purpose industrial wipes—100% recovered materials and 40% post-consumer content.

Two further recommendations for paper:

- No use of de-inking solvents containing chlorine or any other chemicals listed in the Toxics Release Inventory in the manufacture of paper products.
- No use of chlorine or chlorine derivatives in bleaching processes for paper products.

When selecting plastic trash bags, look for a minimum of 10% post-consumer content.

21. Selecting and Using Janitorial Equipment

Powered janitorial equipment includes powered floor scrubbers, burnishers, carpet extractors, vacuum cleaners, power washers, and other powered cleaning equipment.

Building managers should select equipment that, at a minimum, meets the following specifications:

- Vacuum cleaners should meet, at a minimum, the Carpet and Rug Institute (CRI) Green
- Label or Seal of Approval (SOA) Program requirements and should operate at a sound level of less than 70 dBA.
- Carpet extraction equipment should meet at a minimum the Carpet and Rug Institute (CRI) Bronze Seal of Approval.
- Powered floor maintenance equipment should be equipped with controls or other devices for capturing and collecting particulates and should operate at a sound level less than 70 dBA.
- Propane-powered floor equipment should have low-emission engines certified by the California Air Resources Board under the Small Off-Road Engines or Equipment (SORE) program, and should be equipped with catalytic and exhaust monitoring systems in addition to other requirements for floor equipment set out in the section.

- Current in-use propane-powered equipment should only be used when the building is unoccupied, and under conditions allowing for as much air circulation and exchange as possible.
- Powered scrubbing machines should be equipped with a control method for variable rate dispensing to optimize the use of cleaning fluids.

Other considerations for equipment selection include the following:

- To accommodate people with sensitivities, consider vacuums with High Efficiency Particulate Air (HEPA) filtration capable of trapping 99.97% of all airborne particles 0.3 micron and larger entering the vacuum. In some cases, it is preferable to use vacuums with a beater bar to increase the amount of soil removal on certain carpet types.
- Floor machines should have guards and filters.

In selection of all equipment, it is preferable to select those that are durable, energy-efficient and quiet, as compared to less durable, less efficient, and noisier alternatives. Appendix C also discusses powered equipment.

APPENDICES

Appendix A: Housing Complex-Specific Green Cleaning Plan

The building manager may wish to develop a written housing complex-specific Green Cleaning Plan that comprehensively describes the methods by which a particular facility is cleaned effectively while protecting human health and the environment. In addition to typical cleaning concerns, the Green Cleaning Plan should:

- Define a comprehensive communications plan established with occupants. The plan should describe procedures for cleaning personnel to communicate with building occupants, as well as a system for providing feedback from building occupants.
- Develop and implement a floor cleaning and maintenance plan, consistent with manufacturers' recommendations, to extend the life and appearance of flooring through routine, periodic, and restorative cleaning operations.
- Determine schedules of routine cleaning operations, activities performed periodically, equipment operation and maintenance, cleaning inspections, and accident preparedness plans.
- Schedule cleaning operations to ensure the minimum frequency required to clean and maintain the area to a level that adequately protects human health and the environment.
- Include a review of cleaning operations at least twice per year to adjust the program as needed in response to the changing needs of the building/complex and its occupants.

The Green Cleaning Plan may also provide a detailed description of how green cleaning operations address:

- Cleaning procedure requirements for such special areas as entryways, lobbies, community centers, daycare and preschools, gymnasiums, workout rooms, and playgrounds.
- Storage and use of chemicals within the facility, including consideration of proper ventilation, dilution control procedures, adequate security, and proper management of the area.
- Vulnerable populations such as children, asthmatics, the elderly, and pregnant women.

- Indoor sources of contaminants or pollution, both temporary and permanent, such as building renovations, indoor plants (e.g., potential for mold growth), and new carpet or flooring installations.
- Special requirements for operations involving potentially hazardous materials such as the maintenance of floors containing asbestos or compliance with the OSHA Bloodborne Pathogen Standard.
- Cleaning in areas with special engineering concerns such as those with inadequate ventilation, poor lighting, and restricted access.
- Seasonal or periodic conditions and periods of increased or decreased use.
- Requirements of the building Integrated Pest Management (IPM) System.
- Special cleaning requirements or conditions that may affect the frequency of cleaning or negatively impact human health or the environment.

Appendix B: Environmentally Preferable Cleaning Products and Supplies

The building manager should strive to use environmentally preferable products, which are defined as “products that have a lesser or reduced harmful effect on human health and the environment compared with products or services that serve the same purpose” (Source: U.S. Executive Order 13101).

The majority of products are not yet *certified* as environmentally preferable by a credible body. This does not mean that they are necessarily harmful or bad, but that a reliable third party has not validated them. In these cases, check product labels for undesirable ingredients (see the section on Cleaning Products), ask the manufacturer for full disclosure of ingredients and proof that they are safe, and/or whether product ingredients were selected using EPA’s Design for the Environment (DfE) safer ingredient criteria (located at <http://www.epa.gov/dfe/pubs/projects/gfcp/index.htm#GeneralScreen>).

Products may include:

- General or all-purpose cleaners, floor cleaners, restroom cleaners, glass cleaners, and carpet cleaners
- Floor finishes and floor strippers
- Liquid hand soap
- Toilet tissue and facial tissue
- Paper towels and napkins
- Plastic trash can liners.

Ideally, to determine which products are environmentally preferable, look for established green certification, recognition, and/or health and safety labels on the product packaging. Some of these programs and their criteria are described below.

Recognized Products— EPA’s Design for the Environment (DfE)

- The EPA DfE Program is for product formulators.
- DfE screens each ingredient for potential human health and environmental effects; the product must contain only those ingredients that are least harmful in their class.
- DfE provide formulators information on safer substitutes for chemicals of concern.
- The program will be strengthened by annual desk or paper audits and on-site audits.

Certified Products—EcoLogo

The EcoLogo™ program, under Canada’s Environmental Choice, is a North American multi-attribute, lifecycle environmental standard and certification. EcoLogo is a Type I eco-label (see Appendix D, Abbreviations and Definitions), as defined by the International Organization for Standardization (ISO).

- Environmental Choice CCD-110, for cleaning and degreasing compounds
- Environmental Choice CCD-146, for hard surface cleaners
- Environmental Choice CCD-148, for carpet and upholstery care
- Environmental Choice CCD-112, for biological digestion additives
- Environmental Choice CCD-113, for drain or grease trap additives
- Environmental Choice CCD-115, for odor control additives
- Environmental Choice CCD-147, for hard floor care
- Environmental Choice CCD-82, for toilet tissue
- Environmental Choice CCD-86, for hand towels
- Environmental Choice CCD-104, for hand cleaners and hand soaps

Certified Products—Green Seal

The Green Seal® program is a North American multi-attribute, lifecycle environmental standard and certification. Green Seal is a Type I eco-label, as defined by the International Organization for Standardization (ISO).

Green Seal® provides environmental standards and certification for cleaning products including bathroom cleaners, carpet cleaners, general purpose cleaners, glass cleaners, hand soaps, floor-care products, and a variety of janitor paper products. Green Seal has also established a standard and certification process for environmentally preferable cleaning services (GS-42).

- GS-37, for cleaning products for industrial and institutional use
- GS-40, for floor care products (floor strippers, finishes) for industrial and institutional use
- GS-41, for hand cleaners for industrial and institutional use
- GS-9, for paper towels and napkins
- GS-1, for tissue paper

Certified Products—GREENGUARD

The GREENGUARD Environmental Institute (GEI) was founded in 2001 and seeks to protect human health through programs that reduce chemical exposure and improve indoor air quality.

GEI oversees third-party certification programs that identify acceptable product emission standards and certify low-emitting products. GEI also establishes building standards designed to control mold and moisture.

- GREENGUARD Indoor Air Quality Certified®: A product certification program for low-emitting building materials, furniture, furnishings, finishes, cleaning products, electronics, and consumer products.
- GREENGUARD Children & Schools(SM) Certified: A certification program for low-emitting building materials, furniture, finishes, cleaning products, electronics and consumer products in environments where children and sensitive populations spend extended periods of time.

Certified Products—Information-Based Environmental Labeling (IBEL)

The cleaning association ISSA's Information-Based Environmental Labeling (IBEL) program will serve as a single environmental label that embraces existing labels while filling gaps that exist. It will:

- Help purchasers make informed decisions
- Harmonize product data gathering and how it appears on labels
- Expand third-party verification to products not represented in current third-party labeling systems
- "Reward continuous improvement by innovative manufacturers producing leadership products that continue to reduce potential adverse health and environmental impacts" (Source: ISSA).

Certified Products—UL®

UL Environment (ULE) offers Environmental Claims Validation™ (ECV), a service for testing and validating manufacturers' self-declared environmental claims, and Sustainable Products Certification™ (SPC), a service for testing and certifying products to accepted industry standards for environmental sustainability. A partial list of claims it will test and validate:

- Recycled content
- Rapidly renewable materials
- Volatile organic compound (VOC) emissions
- Volatile organic compound (VOC) content
- Energy efficiency
- Water efficiency
- Hazardous or toxic substances
- Mold resistance
- Degradability

Health and Safety Rating—HMIS

HMIS (Hazardous Materials Identification System) is a hazard rating system using a label with four color-coded bars representing hazard categories (Blue-Health, Red-Flammability, Orange-Physical Hazard, White-Personal Protection). Each category is assigned a numerical value from 0–4, with 4 being the most hazardous.

Certified Performance—CRI Seal of Approval

The CRI Seal of Approval (SOA) program identifies effective carpet-cleaning equipment and solutions:

- Vacuum cleaners
- Extractors and truck mounts
- Cleaning solutions/carpet-spotting products
- Carpet cleaning systems (solutions and equipment)

Recognized Performance—IEHA High Performance Cleaning Product (HPCP) with UMass Lowell TURI Lab

The High Performance Cleaning Product (HPCP) recognition is the International Executive Housekeepers Association's (IEHA's) voluntary fee-based program, which tests green hard surface cleaning product performance on real-world soils.

Appendix C: Powered Equipment Use and Maintenance Plan

The building manager should develop, adopt, and maintain a plan for the use of powered janitorial equipment that maximizes the effective reduction of building contaminants with minimum environmental impact. Building managers should determine that the janitorial equipment currently used is functioning properly (as validated by the equipment manufacturer or by a reputable third-party service organization) or that it is tagged out of service.

A component of this plan should include a quarterly maintenance program that inspects and maintains the performance of janitorial equipment, as defined by the equipment vendor and records results in a maintenance log.

The following requirements apply to the use of vacuum cleaners:

- Vacuums should be equipped with the proper filter or bag; the filters should be changed or cleaned consistent with the manufacturer's recommendations. Bagless vacuums may be acceptable (even if they do not have Carpet and Rug Institute approval) if they are able to remove and capture particles efficiently (ask for independent test data), and if care is exercised in the emptying of dust bins.
- Vacuum bags or canisters should be inspected at least every 2 hours and changed or replaced when half-full or less or when indicated by a bag sensor, if the vacuum is so equipped.

- Precautions should be taken to limit worker exposure to dust and particulate matter when cleaning and replacing bags and filters, or emptying dust bins.

Appendix D: Acronyms and Definitions in This Chapter

Definitions

CHEMICAL SENSITIVITY: Chemical sensitivity is hypersensitivity or intolerance to many chemicals at very low exposures or concentrations. Chemical sensitivity differs from an allergic reaction because while medical tests can confirm allergies, effective tests are not available for chemical sensitivity. Physicians hold a wide range of views about the causes, diagnosis, and treatment of this condition; also referred to as “Multiple Chemical Sensitivity” or MCS.

CIMS-GB: To help meet the growing demand for green and “Leadership in Energy and Environmental Design” (LEED) certification, the ISSA’s Cleaning Industry Management Standard & Certification Program has expanded to include “Green Building” (GB) criteria and an optional GB designation. (Excerpted and adapted from ISSA.com.)

CONCENTRATE: A product that should be substantially diluted with water to form the appropriate solution for use (typically at least 1:8, or as appropriate for the particular product category).

DISINFECT: A process for hard inanimate surfaces undertaken to destroy or irreversibly inactivate infectious fungi and bacteria, but not necessarily their spores.

ENVIRONMENTALLY PREFERABLE PRODUCT: A product certified as such by a Type 1 (i.e., third-party) environmental label that was developed in accordance with the ISO 14024 Environmental Labeling Standard. Alternatively, a

ACRONYMS IN THIS CHAPTER

CRI	Carpet and Rug Institute
dBA	Decibels
EPA	Environmental Protection Agency
F&C	Food and cosmetics
HMIS	Hazardous Materials Identification System
HVAC	Heating, ventilation, and air conditioning
IPM	Integrated pest management
LEED	Leadership in Energy and Environmental Design (U.S. Green Building Council)
MSDS	Material safety data sheet
OSHA	Occupational Safety and Health Administration
PHA	Public Housing Authority
PPE	Personal protective equipment
SOP	Standard operating procedure
VOC	Volatile organic compound

product may be designated as environmentally preferable by an established and legitimate, nationally recognized program developed with the purpose of identifying environmentally preferable products. The program should not have any financial interest or stake in sales of the product, or other conflict of interest. Such designation should be based on consideration of human health and safety, ecological toxicity, other environmental impacts, and resource conservation, as appropriate, for the product and its packaging, on a life cycle basis. Product criteria should distinguish market leadership for that product category, and be publicly available and transparent.

GS-42 CERTIFICATION: Green Seal, a non-profit certification body, has established GS-42, the environmental practice standard for commercial cleaning services. The program involves onsite audits and other criteria for certification of a service as environmentally preferable.

INTEGRATED PEST MANAGEMENT (IPM): An integrated approach to controlling pests—and keeping populations at an acceptable level using prevention, observation, and intervention—with the goal of reducing or eliminating pesticide use.

LEED-EBOM: The LEED for Existing Buildings Operations and Maintenance (LEED-EBOM) Rating System helps building owners and operators measure operations, improvements and maintenance on a consistent scale, with the goal of maximizing operational efficiency while minimizing environmental impacts. LEED for Existing Buildings addresses whole-building cleaning and maintenance issues (including chemical use), recycling programs, exterior maintenance programs, and systems upgrades. It can be applied both to existing buildings seeking LEED certification for the first time and to projects previously certified under LEED. (adapted from LEED)

Example Credits

Credit 3.1 Green Cleaning—High Performance Cleaning Program 1

Credit 3.2 Green Cleaning—Custodial Effectiveness Assessment 1

Credit 3.3 Green Cleaning—Purchase of Sustainable Cleaning Products and Materials 1

Credit 3.4 Green Cleaning—Sustainable Cleaning Equipment 1

Credit 3.5 Green Cleaning—Indoor Chemical and Pollutant Source Control 1

Credit 3.6 Green Cleaning—Indoor Integrated Pest Management

MATERIAL SAFETY DATA SHEET (MSDS): MSDS forms are required for a wide range of products, mainly chemicals, under the laws of the U.S., Canada, and several other nations, to promote occupational health and safety. Material Safety Data Sheets are specific to each applicable product. They contain manufacturer contact information, hazardous ingredients, fire safety, explo-

sion and reactivity data, health hazards, precautions for safe handling, and use and control measures, such as protection for skin, eyes, or lungs.

SANITIZE: A process intended to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations.

TYPE I ECO-LABEL: Defined by the International Organization for Standardization (ISO) as a certification program that compares products/services with others in the same category, applies stringent scientific criteria reflecting the full life-cycle impact of the product, and identifies products or services in compliance with the criteria as verified by an independent third party.

VULNERABLE POPULATIONS: Vulnerable populations represent people who are more susceptible than the general population to chemicals and products that might pose a risk to human health. These populations include but are not limited to children, pregnant women, the elderly and infirm, people sensitive to chemical exposures (e.g., fragrances), and other occupants, customers, or employees that may have a higher susceptibility to cleaning operations.

Appendix E: Toxicity Categories for Pesticide and Disinfectant Products

The U.S. Environmental Protection Agency has established four Toxicity Categories for acute hazards of pesticide or disinfectant products. Category I is the highest toxicity category.

Signal words such as Danger, Poison, Warning, or Caution designate the level of toxicity. Most human hazard, precautionary, and human personal protective equipment statements are based upon the Toxicity Category of the pesticide or disinfectant product as sold or distributed.

In addition, toxicity categories may be used for regulatory purposes other than labeling, such as classification for restricted use and requirements for child-resistant packaging. In certain cases, statements based upon the Toxicity Category of the product as diluted for use are also permitted.

A Toxicity Category is assigned for each of five types or routes of acute exposure:

1. Oral
2. Inhalation
3. Dermal toxicity
4. Skin irritation
5. Eye irritation

Toxicity Category I

Any pesticide or disinfectant product meeting the criteria of Toxicity Category I for any route of exposure must bear on the front panel the signal word "DANGER." In addition, if the product is assigned to Toxicity Category I on the basis of its oral, inhalation, or dermal toxicity (as distinct from skin and eye irritation), the word "Poison" must appear in red on a background of distinctly contrasting color, and the skull and crossbones symbol must appear in immediate proximity to the word "Poison."

Toxicity Category II

Any pesticide or disinfectant product meeting the criteria of Toxicity Category II as the highest category by any route of exposure must bear on the front panel the signal word "WARNING."

Toxicity Category III

Any pesticide or disinfectant product meeting the criteria of Toxicity Category III as the highest category by any route of exposure must bear on the front panel the signal word "CAUTION."

Toxicity Category IV

A pesticide or disinfectant product meeting the criteria of Toxicity Category IV by all routes of exposure is not required to bear a signal word. If a signal word is used, it must be "CAUTION."