

Environmentally Preferable Floor Cleaners: Alternatives to Floor Finishes and Strippers (and Vinyl Flooring)



Overview

Historically, many institutional buildings have used vinyl composition tile (VCT) flooring in the hallways and public areas. VCT flooring requires substantial on-going maintenance and requires routine stripping and finishing to maintain a rich glossy appearance.¹ While flooring is typically finished more frequently, it is also periodically stripped of the wax finish, soils and debris – using toxic strippers – and then resurfaced with new coats of finish. The process of stripping and finishing can off-gas hazardous chemicals in patient areas.

Stripping and finishing is also labor intensive and requires the use of various types of equipment. Typically the following pieces of equipment are needed:

- Floor machine and stripping pads - used to strip the wax
- A wet/dry vacuum - used to vacuum up the stripper and floor finish solution from the floor
- Buckets to dilute stripper chemicals, contain neutralizer chemicals, and water for rinsing
- Mops to apply liquids (stripper, neutralizer and water)
- Floor finish applicators and burnishing equipment

Why are floor finishes and strippers a concern for health care?

Floor Strippers

Floor strippers and finishes are among the most dangerous chemical products that floor-care staff come in contact with.² Chemicals used in floor strippers contain butoxyethanol which when absorbed through the skin can damage blood, liver and kidneys as well as developing babies.³ Floor strippers can also contain volatile organic compounds (VOCs) that affect indoor air quality and can cause eye, nose and throat irritation, headaches, and nausea.⁴ VOCs also contribute to photochemical smog. So-called green strippers with lower pH have been developed in recent years but some still have high levels of VOCs. In the process of stripping floors, dust exposure can be a concern depending on the equipment used. Strippers all contain solvents and amines. Monoethanolamine, the most common amine in floor strippers, can cause asthma and it is a sensitizer (those exposed may become more sensitive to future exposures).⁵

Floor Finishes

Floor finishes are synthetic and, like strippers, contain volatile organic compounds (VOCs) that off-gas harmful odors as they dry.⁶ VOCs, such as formaldehyde (a carcinogen), affect indoor air quality for workers, patients and staff and can cause eye, nose and throat irritation and respiratory issues, particularly for sensitive populations. Most modern floor finishes have zinc

in them. While only a small percentage of the total product, zinc makes the floor finish harder.⁷ Zinc, a bluish-white metal, is a concern in floor finish because zinc is difficult to remove from waste water discharge and impacts water quality in local communities.

What are the environmentally preferable purchasing opportunities?

While there are opportunities for reducing the impacts from floor finish and strippers, none of the options completely eliminate health concerns or suggest a clear environmentally preferable solution. But there are choices that can be made to minimize impacts to health and the environment through procedural and purchasing paths. Elimination and substitution are inherently safer and the most effective at reducing hazard.⁸

Procedural Opportunities:

- Minimize the amount of stripping; strip only as needed, not on a routine basis
 - Prevent abrasive dust particles from reaching the floor in the first place
 - Use walk-off mats and clean them frequently
 - Use dust mops and vacuums to sweep up dirt frequently
 - Wet mop the floor with liquid cleaner or surface buffing product
- Reduce Worker Exposure through training, proper protective equipment, etc.

Purchasing Opportunities:

- Use alternative floor finish and floor strippers
 - Look for products that are Green Seal (GS-40) or UL EcoLogo (UL 2777) certified. These certifications include performance requirements as well as environmental and human health criteria.
 - Look for products certified to the Green Seal's Standard for Floor-Care Products for Industrial and Institutional Use; [GS-40 product list](#)
 - Look for products certified to UL's ECOLOGO Standard for Sustainable Hard Floor Care Products; [UL EcoLogo 2777 product list](#)
- Use Alternative Flooring
 - While any resilient flooring material will likely require stripping and refinishing as part of eventual restorative maintenance, alternative flooring does not require the routine stripping and finishing that VCT does.



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Alternatives⁹

Vinyl flooring products, including VCT, are not preferable materials for those concerned about human and environmental health. Vinyl requires the use of hazardous processes and chemicals, requires additives, and can include contaminated recycled content that bring additional hazards into built spaces.¹⁰ The following alternative flooring choices are highlighted because they can offer comparable performance to VCT with fewer and less severe hazards. As noted below, these alternatives may cost more than VCT to purchase yet can cost less over the ownership period because of reduced maintenance costs when finishes and strippers are not required.¹¹

First Choice: Linoleum: Linoleum is a compressed and heat-cured mixture of linseed oil, wood flour, and color pigments pressed on a burlap, felt or polyethylene mesh backing.¹² Linoleum is PVC-free and does not contain the chemicals of concern that may be used in VCT.¹³ Read product literature carefully to select linoleum options that do not require waxing and stripping.¹⁴

Initial installed cost: A little higher than VCT to about two times VCT

Annual cost (including maintenance): About 40% less than VCT

Runner Up: Rubber Floors: Rubber floors are a homogenous layer of vulcanized synthetic rubber. Colorful chips of pigmented rubber or other pattern may be applied to the surface for design.¹⁵ Rubber flooring is available in both tile and sheets, and depending on the manufacturer, may only require a dry buffing to achieve a high shine if desired.¹⁶ Review operational maintenance for selected flooring to

ensure appropriate cleaning protocols are met. To avoid the introduction of hazardous contaminants from the incorporation of recycled tires,¹⁷ prefer rubber flooring products that do not contain "crumb rubber."

Initial installed cost: About two-five times more than VCT

Annual cost (including maintenance): About 40% less than VCT

Runner Up: Ceramic Tile: Ceramic tiles are made from a clay or porcelain body, and a typically smooth protective glaze on the top and sides.¹⁸ Depending on the application, ceramic tiles that do not require a sealant may offer a viable alternative to VCT in a healthcare setting. Prefer tiles that are made in the USA or specifically labeled as lead-free. Tiles that are rated for high traffic abrasion will have the most resilient surfaces.¹⁹ Tiles are installed with mortar and grout rather than traditional flooring adhesives. Choose grouts that do not require sealing and that are compatible with cleaning products that will be used for regular upkeep.²⁰

Initial installed costs: About three-five times more than VCT

Annual cost (including maintenance): Estimate of maintenance cost not available, but expected to be much lower than VCT for tile systems not requiring regular sealing.

For additional insight into the experience and attitudes of hospital architects, installers, facility managers and users have on alternative, green resilient flooring materials, see [Sustainable Resilient Flooring Choices for Hospitals: Perceptions and Experiences of Users, Specifiers and Installers](#), by the Health Care Research Collaborative.

What are Practice Greenhealth members doing to reduce health impacts and/or use alternatives?

Dartmouth-Hitchcock Medical Center

- Purchased floor cleaning machines that charge water to clean instead of using floor degreaser.
- Installed track off mats at every door that leads to an outside entrance and at the base of stairwells that are located beside these outside doors to reduce the amount of dirt and debris tracked into the facility.
- Hard floors, including tile, vinyl, concrete, and wood surfaces, are cleaned with only Green Seal certified cleaning products.
- Microfiber mops are used throughout the facility for all floor mopping. Microfiber mop heads use up to 95% less water and chemical and can be washed and reused.
- Automated scrubbing machines are equipped with variable-speed feed pumps and are either (1) equipped with on-board chemical metering to optimize the use of cleaning fluids or (2) use only tap water with no added cleaning products.



Get Started With “Greener” Floor Cleaning Options

Step 1: Create a project team. Hospitals often have logistical and contractual ties to Group Purchasing Organizations and direct vendors and their janitorial supplies. Many hospitals use contracted services for all of their environmental services. Form an internal taskforce made up of individuals from a broad range of stakeholders.

Step 2: Develop a baseline or conduct annual assessment. A critical first step in creating a green floor cleaning program is an audit of current practice and a review of the operational needs of the building. This will give managers the data they need to create a clear plan.

Step 3: Identify strategies to reduce environmental and health impacts. After the audit, choose at least two of the listed strategies linked to either procedural changes or purchasing alternatives (listed above). If you are just getting started with these changes, target the area that has the least impact on the budget first.

Step 4: Work with vendors and construction/remodeling. The facility's environmental services program must be sustainable and flexible in order to meet the organization's changing health and community environmental goals. Therefore, it is important to communicate clearly with vendors and other internal departments about the facility's goals by developing a plan with specifications and a statement of the facility's commitment to keeping a clean environment without harmful effects to staff, patients and visitors.

- To purchase certified floor finishes and strippers, specify cleaners be certified to Green Seal's GS-40 or UL EcoLogo UL 2777.
- In selecting alternative flooring, work with the team to develop flooring guidelines for remodeling and construction contracts that specify the use of non-vinyl flooring and the acceptable options.
 - University Hospitals has created sustainable flooring guidelines. For a copy, email info@practicegreenhealth.org.

Step 5: Addressing the financials. Reducing the use of harsh floor finishes and strippers can have financial implications. Facilities could see significant savings in staff time reductions as well as cost of the floor maintenance chemicals. Consider assessing the total costs of ownership associated with greener floor cleaning options to identify the savings. (Refer to [Practice Greenhealth's Cost of Ownership Calculator](#))

Step 6: Communications. It is important to maintain consistent messaging with support from senior management. The message: The hospital supports healthier environmental services and protects staff and patients from the effects of harsh chemical floor strippers. Most important is to inform environmental services personnel and clinical staff that their health and well being are considered in the decision to purchase sustainable flooring. Some facilities have provided notifications about this work in the hospital newsletter, education in patient rooms and common area, and emails from senior leadership. Public relations departments may interface with local and social media about accomplishments and challenges.

Step 7: Track progress and celebrate success. It is important to track greener floor cleaning costs. Tracking this by impacted areas and overall financial impact helps to make the case to senior leadership for the program's continuation. Celebrate successes with staff, visitors and the community by highlighting overall green cleaning in the staff newsletter and emphasize the initiative's contribution to community health and increasing environmental sustainability.

Consider: **Dollars spent on green floor cleaners/ Dollars Spent on conventional floor cleaners.**

34% of 2017 Partner For Change award applicant pool reported some green spending on floor cleaners. 55% of these applicants spent 100% of their floor cleaning budget on green cleaning.

Step 8: Make the program sustainable. An internal policy regarding the hospital's commitment to healthier environmental services will help make the program sustainable. A policy can be a part of a larger chemical management or purchasing plan or an independent effort.

Sample Green Cleaning Policies

- U.S Green Building Council [Green Cleaning Policy Template](#)
- Appalachian State University [Green Cleaning Policy](#)

Additional Resources

- [Sustainable Resilient Flooring Choices for Hospitals: Perceptions and Experiences of Users, Specifiers and Installers](#), Healthcare Research Collaborative, December, 2010
- [Resilient Flooring and Chemical Hazards: A Comparative Analysis of Vinyl and Other Alternatives for Health Care](#), Healthy Building Network, April 2009
- Wolfe, Katy, [Safer Alternatives to Current Floor Wax Strippers for Schools and Public Buildings](#), Institute for Research and Technical Assistance, Prepared for: University of Nevada Reno (Western Sustainability and Pollution Prevention Network) Bay Area Air Quality Management District EPA Region IX, October 2015

Endnotes

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- 17 Vallette, Jim. "Avoiding Contaminants in Tire-Derived Flooring." Healthy Building Network, April 2013. <http://healthybuilding.net/uploads/files/avoiding-contaminants-in-tire-derived-flooring.pdf>.
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- 20 See for example, Daltile. "Care and Maintenance," 2015. http://www.daltile.com/upload/information/Daltile_Care_And_Maintenance_2015.pdf.