

## FLOOR-CARE PRODUCTS: Finishes & Strippers



- Annually, Americans spend over \$1 billion on floor-care products.
- The institutional/commercial cleaning industry employs 2-3 million janitors.
- From 1993 to 1997, 12% of work-related cases in four major states were associated with exposure to cleaning products.
- Most people spend 90% of their time indoors.

**C**hoosing appropriate floor-care chemicals can be complex, largely because you must select a compatible stripper, finish, cleaner, restorer, equipment, pads, mats, and a good maintenance program for the flooring's type and level of use.

Floor finishes are the heart of a care program for resilient flooring—these finishes put a protective, safe, and attractive coating over the surface of the tile, which protects the floor, increases stain and water resistance, and makes cleaning easier. But over time, foot traffic, coffee spills, moving furniture, etc., all take their toll on floors, and their appearance begins to deteriorate. This is where floor strippers come into play, removing finishes for a thorough cleaning of the floor surface. The ideal stripper formulation dissolves and suspends the floor finish without damaging the floor surface itself.

The products used to strip—and

then refinish—resilient flooring vary widely in their formulations, levels of performance, and potential health and environmental impacts. Creating an environmentally responsible (“green”) floor finish or stripper that performs effectively can be challenging; green products are those that contain fewer harmful components than their counterparts. For example, a traditional floor-finish stripper has a VOC (volatile organic compound) level greater than 10%, commonly between 15% and 30%. A green floor finish remover, by contrast, may have a VOC content of 6% or less and still be effective in removing finish. In addition to reducing or eliminating toxic ingredients

According to some estimates, one-third of the cleaning products used today include ingredients that have negative impacts on indoor air quality and human health. These ingredients may include carcinogens, asthmagens, skin and eye irritants, and endocrine disruptors, which are associated with cancer, reproductive disorders, and other human health issues. Floor-care products contain many of the same ingredients.

from floor finishes and strippers, a floor-care system can be made environmentally preferable by increasing finish durability, thus reducing the need to strip and recoat as frequently. This also helps to reduce the release of chemicals that may affect plants and animals, as well as harmful chemicals that can accumulate in the environment.

For this report, Green Seal examined acrylic polymer floor finishes and strippers available on the market for resilient/vinyl tile flooring (not including floor cleaners, sealers, or spray buff products). We surveyed the manufacturers of these products to gather information on the ingredients found in their finishes and strippers and reviewed potential environmental and health impacts. The result of this survey and evaluation is a list of recommended floor-care products and the criteria used in their selection. It is important to note that floor finishes and strippers must be designed to work together in an overall system of environmentally preferable floor care.

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Original printed on Green Seal-certified Mohawk Satin Cool White Recycled Paper, 30% postconsumer content

This *Choose Green Report* was produced with assistance from the U.S. Environmental Protection Agency's Pollution Prevention Division.

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## What are floor finishes and floor strippers, and how are they used?

Until the last few decades, a typical floor-covering maintenance system consisted of a sealer, a finish, a stripper, and compatible cleaners. Natural waxes were used through the 1930s as floor finishes and have been around since the days of the Romans and the Egyptians. These were primarily carnuba waxes, which consist of a hard, brittle vegetable wax (from the carnuba palm) blended with resin. These are buffable, drying to a slight haze, and abrasive-resistant. Synthetic wax/polymer finishes followed carnuba wax, and were sometimes used in conjunction with carnauba wax in the 1940s and 1950s. The improved result was a dry, bright finish. Acrylic polymers were introduced in the 1950s. During the 1950s and '60s, polymeric chains and zinc cross-linkages in those chains were introduced to improve the resistance of finishes to alkaline cleaners used in daily mopping.

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ratory irritant, other amines are now commonly used in place of ammonia to reduce odor. But zinc, which may be present in concentrations up to 5,000 parts per million in floor finish, is coming under scrutiny because of its inclusion in the U.S. Environmental Protection Agency's (EPA) 65 Toxic Pollutants and 126 Priority Pollutant lists associated with the Clean Water Act. Although early metal-free finishes were less glossy, less durable, and more expensive than zinc-containing finishes, technological advances have brought the performance and price of metal-free finishes to comparable levels. But finishes with metal-free polymers are still less common than conventional finishes containing zinc.

## Basic characteristics of finishes

Floor finishes are water-based products suitable for use on almost all floors not harmed by water and typically consist of polymers, waxes, solvents, plasticizers, and other components. A finish is basically a plastic film that is applied to a floor.

**Solids.** In water-based floor coatings, solids are whatever is left on the floor after the coating cures. Solids are usually expressed as a percentage of weight. The higher the solids content, the more coating left on the floor after it dries.

More solids do not necessarily equate to better performance, durability, gloss, or finish coats required. These may be urethane resins, acrylics, or a blend, which contribute to various performance characteristics described below.



**Polymer Emulsions.** The solids portion of floor finishes generally contains a minimum of 50% polymer. A polymer is a very large molecule that is made of smaller units called monomers. In acrylic floor finishes, an acrylic or acrylic/styrene polymer eventually forms the film. Floor-finish polymers have specific characteristics of hardness, leveling, film-forming temperature, gloss, and durability. The polymer (plastic) emulsion backbone of the floor finish is most responsible for the floor's strength, durability, and shine, as well as other performance characteristics such as scuff, detergent, and slip resistance. Consequently, the inherent properties of the polymer determine to a large degree the performance of the floor finish itself. Metal cross-linked polymers (most commonly zinc) were developed to help maintain an acceptable level of floor protection and appearance. Prior to using metal cross-linking, floor-finish manufacturers used polymers that were frequently damaged by daily mopping with alkaline cleaners. Today's polymer finishes generally are made with zinc cross-linked polymers. Zinc was selected over other metals because it is inexpensive, non-reactive, has no color attributes, and is efficient.

**Wax Emulsions.** The primary function of wax (5%-20%) in the formulation is to provide a more buffable finish. Wax emulsions are crucial to durability, burnishability, black-mark resistance, and slip resistance. Wax emulsion choices can also affect the color of the finish. But wax also makes the film softer and more susceptible

to scuffing and dirt pickup. Synthetic polyethylene or polypropylene waxes have replaced natural waxes in many finishes because of their improved consistency in color, performance, and availability.

**Solvents and plasticizers.** These consist primarily of coalescing agents (glycol ethers, glycol ether esters, and ester-alcohols) and plasticizers (tributoxyethyl phosphate and dibutyl phthalate).

Coalescing



agents allow the polymer molecules suspended in the emulsion to come together into a continuous film without flaws or imperfections on the floor, and they stay behind for a short time after the water has evaporated to soften and bring the polymer molecules together into a continuous and tough film. Plasticizers are less volatile than coalescing agents and make the floor finish more flexible, impact resistant, and less susceptible to powdering during burnishing.

**Other components of floor finishes.** The primary function of the other ingredients in the formulation of high-speed finishes is to promote application or wetting and leveling properties of the finish on the floor. Alkali-soluble resins (5%-15%) are added to improve the ability of a finish to level and are mixed with ammonia or other amines. Surfactants are used as wetting agents and help the liquid spread. Waterborne urethanes are used in floor finishes where chemical and water resistance, impact resistance, and flexibility are required. Co-solvents, defoamers, ultraviolet stabilizers, and preservatives make up the balance of the finish. All of these ingredients play an important role in producing a safe, attractive, easy-to-use, and easy-to-remove finish.

## Basic characteristics of strippers

The goal of stripper formulation is to dissolve and suspend the floor finish without damaging the floor surface itself. There are two basic mechanisms that occur simultaneously to remove finish. The first involves an amine attacking the zinc crosslinking. The second involves a solvent—usually glycol ethers and/or alcohols—that dissolves and reliquifies the finish. Strippers of years past used ammonia as an amine source. Modern-day strippers more commonly use monoethanolamine (MEA), often referred to as “odorless ammonia.” Amines unlock the polymers and improve the performance of the second mechanism. Alkaline builders (e.g., trisodium phosphate, sodium carbonate, sodium metasilicate) and caustic (sodium hydroxide or potassium hydroxide) are sometimes used to assist in this process. Surfactants are also used to assist in “wetting”

the finish film.

Most strippers have a high pH (a measure of hydrogen ions in a solution), from about 10 to 14, often higher than 12. Strippers need to be alkaline (pH 10 or higher) because they are generally more effective in an alkaline environment.

Strippers are formulated to work with specific types of floor finishes. For example, green strippers may not be as effective at removing a traditional floor finish with metal crosslinks. For that reason, the stripper should be specific to the system it is being used with.

The pH scale is based on a range from 0-14, with 7 representing neutral solutions. 0 represents the most acidic pH level, and 14 represents the most alkaline pH level. Each step away from neutral in either direction is 10 times as strong as the previous number. A solution with a pH of 11 is 10,000 times more alkaline than a 7.

## ENVIRONMENTAL & HUMAN HEALTH CONCERNS OF FLOOR-CARE PRODUCTS

Many floor-maintenance products contain high levels of VOCs that contribute to indoor air pollution. These greatly affect human health since most people spend up to 90% of their time indoors. VOCs can cause nose and lung irritation, rashes, headaches, nausea, and asthma. Volatile organic compounds are also precursors to photochemical smog, causing the VOC content of certain consumer products to be tightly regulated in ozone-prone locations such as Southern California. Many floor-care and janitorial products have been formulated to minimize VOC content.

Glycol ethers are VOCs used in floor-maintenance products. Three commonly used glycol ethers—2-butoxy ethanol (also known as ethylene glycol butyl ether or EGBE), ethylene glycol methyl ether (EGME), and ethylene glycol ethyl ether (EGEE)—are potentially hazardous through both inhalation and skin contact during use and through possible ingestion by children. The U.S. EPA considers 2-butoxy ethanol, a common ingre-

dient in floor strippers, a possible human carcinogen; it is easily absorbed through the skin, can break down red blood cells, and can also damage the liver and kidneys. Human exposure to EGME and EGEE (found primarily in floor finishes) has been found to cause birth defects and damage to reproductive organs.

Zinc, a component of many floor finishes, can be toxic to aquatic life in streams, rivers, and lakes. Sewer districts monitor certain zinc-using industrial and institutional customers so they do not exceed threshold levels of zinc in their wastewater. At the treat-

Endocrine disruptors are synthetic chemicals that can create changes in the hormones in humans and animals. These "hormone disruptors" can cause cancer, birth defects, and immune problems. Even very small concentrations can interfere

with reproduction and many other biological processes.



ment plant, most of the zinc precipitates out with sewage sludge, which is then either landfilled or used as fertilizer. Because plants can absorb heavy metals, there is a potential route of exposure to humans and animals. Zinc that is not precipitated out may be discharged to local receiving waters, especially during heavy rains.

Although the floor-finish industry's contribution to total zinc input may be relatively small, it is widely recognized that the technology is available to manufacture zinc-free floor finishes. As a result, many companies have developed quality products that do not contain this metal. An added incentive for making zinc-free products is the fact that many U.S. cities, states, and universities, as well as the U.S. Green Building Council, have begun to require the use of zinc-free finishes in their custodial cleaning products and service contracts.

Another trend has been the continuing elimination of alkylphenol ethoxylate (APE) surfactants because of the environmental concerns they pose. APEs are surfactants found in floor finishes and are also widely used in the formulation of detergents and other products. The most commonly used APEs are nonylphenol ethoxylates (NPEs)

and octylphenol ethoxylates (OPEs). Bioaccumulation of APE surfactants—and the possibility of these surfactants acting as environmental endocrine disruptors—has been the driver behind reduction in the use of APEs.

Floor strippers may contain aqueous ammonia, which is used to dissolve and

Volatile organic compounds (VOCs) are a major contributor to smog. VOC emissions from cleaning products occur when organic solvents evaporate. It is estimated that for every 100 janitors who switch to less volatile cleaning products, VOC emissions could drop by 1 ton a year.



remove highly resistant polymer floor finishes. In these alkaline (high pH) formulations, ammonia evaporates from the solution. Ammonia is a severe respiratory tract irritant, and exposure to its fumes may trigger immediate attacks in chemically sensitive individuals such as asthmatics. For that reason, monoethanolamine (MEA) is often used to replace aqueous ammonia in strippers. Although MEA is free of a strong ammonia odor, direct contact may cause severe eye irritation or burns, it may be ab-

sorbed through the skin in harmful amounts, and inhalation may irritate the respiratory tract and cause central nervous system effects such as dizziness or headache.

Finally, in a very small number of floor finishes using older, wax-based technologies, solvents may be present in high enough concentrations to cause a floor finish to be flammable. Flash point is a commonly used measure of flammability and is defined as the temperature at which vapor will ignite when an external flame is applied under specified test conditions. The undiluted floor-care product should have a flashpoint above 150° F.

#### VOCs AKA...

There are many different names for glycol ethers, so the easiest way to be sure you are identifying them correctly is by their Chemical Abstract Service (CAS) numbers (listed on the material safety data sheet or MSDS).

EGBE = 111-76-2

EGME = 109-86-4

EGEE = 110-80-5

# PICKING FLOOR FINISHES AND FLOOR STRIPPERS

Green Seal’s survey of companies that make floor finishes and floor strippers has identified a number of products with less-toxic chemicals or other positive health and

environmental attributes. Environmentally preferable formulations minimize the use of VOCs and non-biodegradable compounds and are free of known carcinogens and

chemicals listed on the Federal Toxics Release Inventory.

Toxic substances and characteristics prohibited from recommended floor finishes and strippers are listed below.

**TABLE 1. PROHIBITED INGREDIENTS**

INGREDIENT	PURPOSE	RISK TO HUMANS [FROM DIRECT CONTACT]	RISK TO ENVIRONMENT
Zinc	Used to make the floor finish harder	None.	High amounts usually prohibited by sewer agency. Low concentrations of zinc in wastewater lessen the ability of specific bacteria to decompose sewage, inhibiting sewage plant efficiency. Toxic to aquatic life.
2-Butoxy ethanol (EGBE)	Ingredient commonly found in strippers	Absorbs through skin; damages blood, liver, kidneys; possible human carcinogen.	Breaks down more slowly in water and soil than it does in air; does not build up in plants and animals.
Aqueous ammonia	Ingredient found in strippers to break metal cross-linking bonds	Causes damage to eyes or skin, which if not treated promptly will be permanent. Inhalation can cause severe irritation. Chronic effects to kidneys/liver/central nervous system.	Freshwater organisms are most at risk from releases of ammonia into the aquatic environment, especially in high pH, summertime, slow-flowing bodies of water.
Alkylphenol ethoxylates (APEs): e.g., octylphenol ethoxylate, and nonylphenol ethoxylate	Ingredient found in floor finishes	Endocrine disruptor; irritant to eyes and skin.	Persists in the environment and even in very small amounts can damage the hormone systems of animals. It is strongly suspected that humans eating these animals or drinking from supply systems that draw river water downstream of sewage treatment plants will be harmed as well.
2-Methoxyethanol or ethylene glycol monomethyl ether (EGME)	Ingredient found in floor finishes	Adverse effects on the reproductive system*; irritation of the skin, eyes, nose and throat; dermal exposure harmful to health; kidney damage.	May be harmful to aquatic or terrestrial organisms at high concentrations.
2-Ethoxyethanol or ethylene glycol monoethyl ether (EGEE)	Ingredient found in floor finishes	Adverse effects on the reproductive system*; kidney damage; irritant to skin.	May be harmful to aquatic or terrestrial organisms at high concentrations.

\*On the State of California list: “Chemicals Known to the State to Cause Reproductive Toxicity.”





Chemical substitution involves changing from products with highly toxic ingredients to ones that are less hazardous. A number of effective, low-toxicity floor finishes and floor strippers are now becoming available. In addition to the elimination of the compounds listed in Table 1, other changes in the formulations may be made to reduce toxicity and safety concerns, as suggested in the checklist at right.

<b>CHECKLIST</b>	
<b>How to choose a floor finish/stripper system</b>	
<input type="radio"/>	Select products that do not contain carcinogens or reproductive toxins.
<input type="radio"/>	Select floor finishes free of zinc or other metals.
<input type="radio"/>	Avoid purchasing products that contain ammonia, ammonium hydroxide, or ammonium salts.
<input type="radio"/>	Select products that do not contain dibutyl phthalate or alkylphenol ethoxylates.
<input type="radio"/>	Choose finish products with a VOC concentration no more than 7% by weight and strippers with no more than 7% VOCs when diluted for use as directed.
<input type="radio"/>	Choose products with a total phosphorus concentration of 0.5% by weight or less.
<input type="radio"/>	Select products with a pH no higher than 11.5.
<input type="radio"/>	Select products with a flash point above 150° F.
<input type="radio"/>	Choose products in recyclable or refillable containers.
<input type="radio"/>	Select both the floor finish and a compatible stripper to meet these criteria.

## PRODUCT RECOMMENDATIONS

<b>TABLE 2. RECOMMENDED FLOOR FINISHES</b>		
All of the recommended floor finishes listed in this table do not contain...		
<ul style="list-style-type: none"> <li>■ Zinc-based cross-linking agents</li> <li>■ VOCs exceeding 7%</li> <li>■ Alkylphenol ethoxylate surfactants</li> <li>■ Dibutyl phthalate</li> <li>■ Ammonia</li> <li>■ Ethylene glycol monomethyl ether (EGME)</li> <li>■ Ethylene glycol monoethyl ether (EGEE)</li> <li>■ Total phosphorus concentrations over 0.5% by weight</li> <li>■ 2-Butoxy ethanol (class C carcinogen)</li> </ul>		
Manufacturer	Product Names	VOC concentration (by weight)
Enviro Solutions	High Gloss Finish #80	1-5%
	High Traffic Floor Finish #96	1-5%
Hillyard Industries	Super Hil-Brite	1.1-2.0%
JohnsonDiversey, Inc.	Butcher's Neon Floor Finish	3.0%
	Johnson Wax Professional ZF1500+ UHS Floor Finish	3.0%
M.D. Stetson	Transcend Floor Finish	4-5%
Pioneer Eclipse Corporation	EnviroStar Green Floor Coating	2.6%
Rochester Midland Corporation	EC Resilient Tile Coating	5.1%
Spartan Chemical Company	Green Solutions Floor Seal & Finish	0.5%

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**TABLE 3. RECOMMENDED FLOOR STRIPPERS**

All of the recommended floor strippers listed in this table do not contain...

- 2-Butoxy ethanol (class C carcinogen)
- VOCs exceeding 7% after dilution
- A pH greater than 11.5
- Total phosphorus concentrations over 0.5% by weight
- Akyphenol ethoxylate surfactants
- Dibutyl phthalate
- Ammonia
- Ethylene glycol monomethyl ether (EGME)
- Ethylene glycol monoethyl ether (EGEE)

Manufacturer	Product Names	pH	VOC concentration (by weight, after minimum recommended dilution)	Recommended Dilution Rate
Enviro Solutions	ES-85 Scrub Free Floor Stripper	11.4	3.9%	1:6
Fuller Brush	T.E.T. Power Stripper	11.4	4.2%	1:8 to 1:16
M.D. Stetson	EPS (Environmentally Preferable Stripper)	11-11.5	0.25%	1:12
Orison Marketing, LLC	Eco Natural Floor Stripper	8.8 - 9.5	0.14%	1:10
Pioneer Eclipse Corporation	Envirostar Green Floor Stripper	10.5 +/- 0.5	0%	1:4
Rochester Midland Corporation	EC Floor Finish Remover	9.5 - 10	2.4%	1:8 to 1:2

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**MANUFACTURER CONTACT INFORMATION**

Company	Telephone	Web Site
Enviro Solutions	(800) 864-6843	enviro-solution.com
Fuller Brush	(800) 551-3030	www.fuller.com
Hillyard Industries	(800) 365-1555	www.hillyard.com
JohnsonDiversey, Inc.	(800) 558-2332	www.johnsondiversev.com
M.D. Stetson	(800) 255-8651	mdstetson.com
Orison Marketing, LLC	(800) 460-2403	orisonllc.com
Pioneer Eclipse Corporation	(800) 367-3350	pioneer-eclipse.com
Rochester Midland Corporation	(800) 836-1627	rochestermidland.com
Spartan Chemical Company	(800) 537-8990	green-solution.com





## Packaging

Beyond evaluating the product itself, give some thought to how a product is packaged. When evaluating the packaging of a floor-care product, keep in mind that there are several attributes that make one product preferable over another.

- Make sure the package is recyclable—specifically, ensure that it is readily recyclable in your area. The most common product containers are made of high-density polyethylene (HDPE), a plastic commonly recycled.
- Check that the packaging has been made out of recycled materials. Many manufacturers already use plastic containers that are made from some amount of post-consumer recycled materials.
- Look for products that are sold in bulk or as concentrates, which often saves on the total amount of packaging needed as well as energy needed to transport the product, since your order will require fewer shipments.

## Performance of Floor-Maintenance Systems

A floor finish may have the desired initial aesthetics and environmentally preferable attributes, but users of these products need to consider the application properties for a particular surface, as well as whether it will be durable for the traffic conditions of the facility. In addition, with labor accounting for

up to 95% of a building's operating costs, any product characteristics that reduce labor are very attractive. Properly formulated floor finishes can save labor time by easing finish application and reducing the frequency of stripping and recoating operations.

Due to the large number of



possible floor-maintenance products, traffic patterns, and soil types, the compatibility of floor finishes with the user's maintenance requirements is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility with the floor surface to be finished and other floor maintenance products to be used. Environmentally preferable products may require initial training of janitorial staff to ensure appropriate application and consequent performance. Remember that these products are attempting to avoid many of the harsh chemicals that make other products work so quickly. As a result, environmentally preferable floor-care products

may require different methods.

Many modern acrylic polymers do not need to be removed as often because of improved wear characteristics—sometimes allowing facilities to go two or more years without replacing the finish. The avoidance of stripping or the increase in intervals between strip-

pings represents an important contribution to environmental and health protection and also helps to save money.

A common concern of those responsible for floor care is the durability and performance of zinc-free floor finishes.

Although zinc-free finishes may have

less-toxic formulations, some users contend that they may be less durable and thus require more frequent stripping and refinishing. This could result in increased exposure for floor-maintenance personnel and introduce more toxins to the environment in the long run. Life-cycle analysis (LCA) is used to address the full environmental and health impacts of this type of scenario. The goal of LCA is responsible design of products that does not undermine the

environmental and health goals that manufacturers and users of green products seek to promote. An industry-sponsored LCA is currently underway that is evaluating how zinc-free and zinc-formulated finishes compare with regard to overall performance.

*Life-cycle analysis (LCA) is used to address the full environmental and health impacts in order to lead to responsible design of products.*

## USING FLOOR-CARE SYSTEMS PROPERLY

Proper floor maintenance will increase the life of a floor finish and decrease the frequency of stripping and refinishing. Education of janitorial workers in proper floor cleaning and maintenance methods can reduce the amount of floor-care products used over the long term and concomitantly reduce other building hazards such as slippery floors. In some applications, even an environmentally preferable product may still pose some type of health hazard or environmental risk. Training workers to handle hazardous products correctly, to avoid spraying or otherwise contaminating the air with maintenance products, and to dilute products correctly can reduce the risk of chemical injury and the amount of product required for the job.

Proper maintenance procedures can reduce human and environmental exposure to floor-maintenance products in the following ways:

- Modify the techniques used by janitorial staff to result in use of smaller quantities of the product.
- Give consideration to the set-up of floor-maintenance schedules. For example, schedule floor-renewal work according to wear patterns rather than simply following a calendar schedule.
- If a stripper is to be diluted, follow the label directions for proper dilution amounts and procedures.
- Thoroughly rinse the stripped floor to neutralize the surface prior to applying the new floor finish.
- Wet-mop, dust, and vacuum regularly to preserve the finish and avoid too-frequent stripping.



- Place appropriately sized doormats at entryways to minimize dirt and grit, taking into account weather and soil conditions.

While great strides have been made in developing environmentally preferable floor-maintenance products, many compounds and materials may still have a harmful effect on human health if applied improperly. It can't be over-empha-

sized that a floor-maintenance professional must know the proper use and potential hazards of floor-care products they are using. This is because even environmentally preferable floor-care products may harm skin or eyes if not used properly. It is recommended to:

- Always use personal protective equipment such as gloves, eye protection, and suitable footwear.

If you want more information about a specific floor-care product consult its Material Safety Data Sheet (MSDS) or MSDSs for specific product ingredients. Manufacturers are required by law to list those ingredients that make up 1% or more of the product, except for carcinogens, which must be listed at 0.1% concentration. An MSDS contains information on the product name and manufacturer, ingredients listed by chemical and Chemical Abstract Service (CAS) number, health hazards of handling the product, protective gear needed, pH, flashpoint, reactivity data, what to do in the event of a spill, and any other special precautions that need to be taken around the product.

- Ensure adequate ventilation when using these products. Some building occupants may be sensitive to the vapors or residues from floor-care products. If that is the case, do your stripping and refinishing work at night, on weekends, or during holidays. Also, open windows if possible and use fans to increase the amount of outside air flowing into the area where you are working. Take care that these fans don't make the new floor finish dry unevenly.

*Proper floor maintenance will increase the life of a floor finish and decrease the frequency of stripping and refinishing.*

- Floor finish and stripper products should never be disposed of outdoors. It is illegal to pour strippers or any other chemicals on the ground, in a parking lot, or in any other outdoor area.

Environmentally preferable floor-maintenance products help protect the environment by reducing toxics, air and water pollution, and solid waste (generated by excessive packaging). The use of environmentally preferable floor-care products also protects



responsible products, they can benefit from positive public relations, productivity gains, and avoidance of adverse health effects. The evolution of technology in floor care is an

human health by reducing exposure to harmful chemicals.

Organizations in all sectors are learning that when they use environmentally

on-going process and is resulting in many new products that are raising the bar for green design of floor finishes and strippers. Purchasers using the information in this *Choose Green Report* can help encourage this trend in green floor-care products as well as reap benefits for their building occupants and the environment at large.

Green Seal is in the process of developing an environmental standard for floor finishes and strippers, and it expects to begin certifying products that meet the standard in late 2004 or early 2005. This *Choose Green Report* is being published now to provide guidance to purchasers in the interim so that they will be able to identify finishes and strippers that meet the screening criteria here and are likely to meet the future standard.



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Green Seal is a non-profit organization whose mission is to achieve significant environmental benefits by encouraging environmentally responsible products and purchasing. We accomplish this goal in several ways. We set rigorous environmental standards for products and services and award a seal of approval to manufacturers meeting the standards. When purchasers select products bearing the Green Seal, they know they are buying products that have a lessened impact on the environment, without sacrificing performance. Through our Green Seal Environmental Partners Program and the *Choose Green Reports*, we help large and small institutions become environmentally sensitive purchasers by providing detailed guidance, such as this report. Green Seal also works directly with institutions and government agencies to help them green their purchasing and operations. Please contact us to find out how you can become a partner and receive our reports or receive our purchasing assistance.

