



THE MARK OF ENVIRONMENTAL RESPONSIBILITY

GS-40

**GREEN SEAL™ ENVIRONMENTAL STANDARD FOR
INDUSTRIAL AND INSTITUTIONAL
FLOOR CARE PRODUCTS**

**FOURTH EDITION
NOVEMBER 12, 2004**

Green Seal, Inc. • 1001 Connecticut Ave. NW, Ste 872 • Washington, DC USA 20036-5525
(202) 872-6400 • FAX (202) 872-4324 • www.green Seal.org

Green Seal's Environmental Standards are copyrighted to protect Green Seal's publication rights,
not to restrict their use in product design or evaluation.

GREEN SEAL™

Green Seal is a non-profit organization devoted to environmental standard setting, product certification, and public education. Green Seal's mission is to work towards environmental sustainability by identifying and promoting environmentally responsible products, purchasing, and production. Through its standard setting, certification and education programs, Green Seal:

- identifies products that are designed and manufactured in an environmentally responsible manner;
- offers scientific analyses to help consumers make educated purchasing decisions regarding environmental impacts;
- ensures consumers that any product bearing the Green Seal Certification Mark has earned the right to use it; and
- encourages manufacturers to develop new products that are significantly less damaging to the environment than their predecessors.

The intent of Green Seal's environmental requirements is to reduce, to the extent technologically and economically feasible, the environmental impacts associated with the manufacture, use and disposal of products. Set on a category-by-category basis, Environmental Standards focus on significant opportunities to reduce a product's environmental impact.

Green Seal offers certification to all products covered by its Standards. Manufacturers may submit their products for evaluation by Green Seal. Those which comply with Green Seal's requirements may be authorized to use the Green Seal Certification Mark on products and in product advertising. Manufacturers authorized to use the Green Seal Certification Mark on their product are subject to an ongoing program of testing, inspection, and enforcement.

For additional information on Green Seal or any of its programs, contact:

Green Seal 1001 Connecticut Avenue, NW,
Suite 827 Washington, DC 20036-5525

(202) 872-6400

www.greenseal.org

FOREWORD

A. Certification. This Environmental Standard contains the basic requirements for certain products (as defined in the Scope section below) to be certified by Green Seal™ and for their manufacturers to receive authorization to use the Green Seal Certification Mark on products and their packaging, and in product advertising. The requirements are based on an assessment of the environmental impacts of product manufacture, use, and disposal and reflect information and advice obtained from industry, trade associations, users, government officials, environmental and other public interest organizations, and others with relevant expertise. These requirements are subject to revision as further experience and investigation may show is necessary or desirable.

B. Compliance with the Standard. Compliance with this Standard is one of the conditions of certification of a product by Green Seal.

C. Compliance with Government Rules. In order to be authorized to use the Green Seal Certification Mark, the manufacturer of the certified product must disclose all governmental allegations or determinations of violation of federal, state, or local environmental laws or regulations with respect to facilities in which the product is manufactured. Certification will be denied any product manufactured in violation of environmental laws or regulations if, in Green Seal's judgment, such violations indicate that the environmental impacts of the product significantly exceed those contemplated in the setting of the standard.

D. Limitations on Purpose of Standard. Green Seal's Standards provide basic criteria to promote environmental quality. Provisions for product safety have not been included in this Standard because government agencies and other national standard-setting organizations establish and enforce safety requirements.

E. Substantially Equivalent Products. Products that are substantially similar to those covered by this standard in terms of function and environmental impact may be evaluated and certified by Green Seal against the intent of the requirements of this standard.

F. Unanticipated Environmental Impacts. A product which complies with this Standard will not necessarily be certified by Green Seal if, when examined and tested, it is found to have other features which significantly increase its impact on the environment. In such a situation, Green Seal will ordinarily amend its standards to account for the unanticipated environmental impacts.

G. Certification Agreement and Green Seal Rules. In order to be authorized to apply the Green Seal Certification Mark to a product or its packaging, or to use the Green Seal Certification Mark in product advertising, the manufacturer of the product must (1) undergo an initial product evaluation to determine that the product complies with Green Seal's requirements, (2) sign a Green Seal Certification Agreement that, among other things, defines how and where the Green Seal may be used, (3) pay fees to cover the costs of testing and monitoring, (4) agree to an ongoing program of factory inspections and product testing, and (5) comply with the requirements found in the most recent version of "Rules Governing the Use of the Green Seal Certification Mark."

H. Disclaimer of Liability. Green Seal™, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. Green Seal shall not incur any obligations or liability for damages, including consequential damages, arising out of or in connection with the interpretation of, reliance upon, or any other use of this Standard.

I. Care in Testing. Many tests required by Green Seal's Standards involve safety considerations. Adequate safeguards for personnel and property should be employed in conducting such tests.

J. Referenced Standards. Standards referenced in this document may have been superseded by a later edition, and it is intended that the most recent edition of all referenced standards be used in determining compliance of a product with this standard.

K. Labeling Requirements. This standard neither modifies nor supersedes government labeling requirements. Labeling language which varies in form from the requirements of this section may be used with the written approval of Green Seal.

ENVIRONMENTAL STANDARD

1. Scope

This standard establishes environmental requirements for industrial and institutional floor-care products. The floor-care products addressed by this standard include floor finish and floor finish stripper. For purposes of this standard, floor finish (also called floor polish) is defined as any product designed to polish, protect, or enhance floor surfaces by leaving a protective wax, polymer, or resin coating that is designed to be periodically removed (stripped) and reapplied. Floor finish stripper (or floor finish remover – referred to here as “stripper”) is defined as a product designed to remove floor finish through breakdown of the finish polymers, or by dissolving or emulsifying the finish, polish, or wax. This standard does not address general-purpose cleaners that can be used to clean floors¹, floor sealers, spray buffing products, or products designed to remove floor wax solely through abrasion.

Product users should follow the manufacturers’ instructions on compatibility. Each application must be designed to work together in an environmentally preferable system of overall floor care. Therefore, both the finish and its compatible stripper(s) must meet all of these criteria unless otherwise indicated.

Each criterion states whether it applies to the undiluted product or to the product as used. All criteria pertain to both finishes and strippers unless otherwise indicated.

2. Definitions

Carcinogen. A chemical listed as a known, probable, or possible human carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), the U.S. Environmental Protection Agency, or the Occupational Health and Safety Administration.

Corrosive. A substance that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. **Dispensing-system concentrate.** Products that are designed to be used in dispensing systems that cannot be practically accessed by users.

Ingredient. Any constituent of a product that is intentionally added or known to be a contaminant that comprises at least 0.01% by weight of the product. **Mutagen.** A chemical that meets the criteria for Category 1: Chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification Of Chemicals Which Cause Mutations in Germ Cells (UN, 2003).

Optical brighteners. Additives designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. Also known as fluorescent whitening agents.

Ozone-depleting compounds. Any compound with an ozone-depletion potential greater than 0.01 (CFC 11 = 1).

¹ GS-37 addresses general-purpose cleaners, including those that are used to clean floors.

Primary packaging. This packaging is the material physically containing and coming into contact with the product, not including the cap or lid of a bottle. **Product as used.** This is the most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a concentrated floor-stripping product be diluted 1:4 with water, the product shall meet the environmental and performance requirements at a dilution of 1:4.

Recyclable package. This package can be diverted from the waste stream through available processes and programs, and can be collected, processed, and returned to use in the form of raw materials or products.

Reproductive toxin. A chemical listed as a reproductive toxin by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et seq.).

Undiluted product. This is the most concentrated form of the product produced by the manufacturer for transport outside its facility.

3. Product-Specific Performance Requirements

3.1 Slip Resistance. Floor finish products shall have a static coefficient of friction [SCOF] of at least 0.5 as measured by either ASTM D2047-99 or UL Method 410.

3.2 Additional Performance Requirements. Each product shall perform effectively, as measured by the following standard test methods:

- **Removability:** The floor finish and compatible stripper shall achieve a removal ease rating of "good" as measured by ASTM D 1792-82, Standard Test Method for Long-Term Removability Properties of Floor Polishes. In the case of a floor finish and stripper proposed for certification together, they should be tested together, with the candidate stripper replacing the ASTM standard-defined stripper. In the case of a floor finish alone proposed for certification, it should be tested with a Green Seal-certified stripper, with the Green Seal-certified stripper replacing the ASTM standard-defined stripper. In the case of a stripper alone proposed for certification, it should be tested with a Green Seal-certified finish, with the candidate stripper replacing the ASTM standard-defined stripper.
- **Soil Resistance:** The floor finish shall perform as well as a nationally recognized product of its type in its category as measured by ASTM D 3206-92, Standard Test Method for Soil Resistance of Floor Polishes.
- **Detergent Resistance:** The floor finish shall demonstrate minimal deterioration by achieving a detergent resistance rating of "very good", as measured by ASTM D 3207-92, Standard Test Method for Detergent Resistance of Floor Polish Films. The floor finish shall be tested using a GS-37 certified floor cleaner at the recommended dilution rate for routine floor maintenance as listed on packaging, or the ASTM cleaning solution specified in ASTM D 3207-9.

Products shall be tested as used, and if diluted, products shall be diluted with water from the cold tap at no more than 50 °F.

4. Product-Specific Health and Environmental Requirements Toxic Compounds

4.1 *The undiluted product shall not be toxic to humans. Dispensing-system concentrates shall be tested as used. A product is considered toxic if any of the following criteria apply:*

Oral lethal dose 50 (LD₅₀) ≤ 2,000 mg/kg Inhalation lethal concentration (LC₅₀) ≤ 20 mg/L*

* If the vapor-phase concentration of the product at room temperature is less than 20 mg/L, it should be tested at its saturation concentration. If it is not toxic at this concentration, it passes the inhalation criterion.

The toxicity testing procedures shall follow the protocols put forth by the Organization for Economic Cooperation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include: Acute Oral Toxicity Test (TG 401) and Acute Inhalation Toxicity Test (TG 403). Toxicity shall be measured on the product as a whole.

To demonstrate compliance with this requirement, a mixture need not be tested if existing toxicological information demonstrates that each of the ingredients complies. It is assumed that the toxicity of the individual ingredients is additive and that there are no synergistic effects. The toxicity values are adjusted by the weight of the ingredient in the product and summed using the following formula:

Where, TP = toxicity of the product w_i = the weight fraction of the ingredient TV = the toxicity value for each ingredient (LD₅₀, LC₅₀) n = number of ingredients

Inhalation toxicity will not be required for any ingredient with a vapor pressure of 1 mmHg or less.

4.2 Carcinogens, Mutagens, and Reproductive Toxins

The undiluted product shall not contain any ingredients that are carcinogens, mutagens, or reproductive toxins. For purposes of this standard, naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply and that are listed as carcinogens, mutagens, or reproductive toxins may be present as impurities if the concentrations are below the applicable maximum contaminant levels in the *National Primary Drinking Water Standards* found in 40 Code of Federal Regulations (CFR) Part 141.

4.3 Corrosiveness

The *undiluted* product shall not be corrosive to the skin or eyes. Dispensing-system concentrates shall be tested as used. The undiluted product shall not be corrosive to the skin, as tested using the Human Skin Construct systems (Liebsch et al. 2000; Fentem et al. 1998). The undiluted product shall also not be corrosive to the eye as tested using the bovine opacity and permeability test (BCOP) (Sina et al. 1995) after a 10-minute exposure. Green Seal will also accept the results of other peer-reviewed or standard in vitro or in vivo test methods demonstrating that the product mixture is not corrosive.

If the pH of the product exceeds 11.5, the whole product shall be tested for corrosiveness. The pH is measured using a pH meter and Method 9040 in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846.

4.4 Skin Sensitization

The *undiluted* product shall not be a skin sensitizer, as tested by the OECD Guidelines for Testing Chemicals, Section 406. Dispensing-system concentrates shall be tested as used. Green Seal shall also accept the results of other standard test methods, such as those described in Buehler (1994) or Magnusson and Kligman (1969), as proof that the product or its ingredients are not skin sensitizers. If a product contains a known skin sensitizer at or above a concentration of 0.1%, then the product as a whole shall be considered a skin sensitizer, except where explicit data demonstrate that it is not a skin sensitizer.

4.5 Flammability

The undiluted product or 99% by volume of the product ingredients shall have a flashpoint above 150°F, as tested using either the Cleveland Open Cup Tester (ASTM D92-97) or a closed-cup method International Organization for Standardization (ISO) 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.

4.6 Air Quality

The product as used shall not contain substances that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality. Therefore, the volatile organic content of the finish product, as used, shall not exceed 7% by weight, and the volatile organic content of the stripper product, as used, shall not exceed 3% by weight at the greatest recommended amount of dilution (suitable for light to medium buildup), and shall not exceed 7% by weight for the least recommended amount of dilution (suitable for heavy buildup). Total VOC content shall be determined according to California Air Resources Board Method 310.

4.7 Toxicity to Aquatic Life

The product as used shall not be toxic to aquatic life. A compound is considered not toxic to aquatic life if it meets one or more of the following criteria:

Acute LC50 for algae, daphnia, or fish >100 mg/L





For purposes of demonstrating compliance with this requirement, aquatic toxicity testing is not required if sufficient aquatic toxicity data exist for each of the product's ingredients to demonstrate that the product mixture complies. Aquatic toxicity tests shall follow the appropriate protocols put forth in ISO 7346.2 or OECD test guidance 203 for fish and in OECD test guidance 201 and 202 for algae and daphnia, respectively.

4.8 Eutrophication

Phosphates and phosphonates shall not be present in the product as used in quantities above 0.5% by weight of total phosphorus.

4.9 Aquatic Biodegradability

Each of the organic ingredients *in the product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for the polymer, wax, and/or resin portion of a floor finish. Biodegradability shall be measured by one of the following methods: OECD TG 301A-F, ISO 9439 carbon dioxide (CO₂) evolution test, ISO 10708 (two-phase closed-bottle test), ISO 10707 (closed bottle test), or ISO 7827 (dissolved organic carbon removal). Specifically, within a 28-day test, the ingredient shall meet one of the following criteria within 10 days of the time when biodegradation first reaches 10%:

-  Removal of dissolved organic carbon (DOC) > 70%
-  Biological oxygen demand (BOD) > 60%
-  % of BOD of theoretical oxygen demand (ThOD) > 60%
-  % CO₂ evolution of theoretical > 60%

For organic ingredients that do not exhibit ready biodegradability in these tests, the manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating dissolved organic carbon (DOC) removal > 90%.






Testing is not required for any ingredient for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases or by proving that the ingredient was tested in accordance with standard test procedures.

4.10 Packaging

The primary package shall be recyclable. An exception may be made for lightweight flexible packaging (e.g., pouches or bags) that represents a significant reduction in material use.

4.11 Prohibited Ingredients

The product shall not contain the following ingredients:

-  Alkylphenol ethoxylates
-  Phthalates
-  Zinc or other heavy metals, including arsenic, lead, cadmium, cobalt, chromium, mercury, nickel, selenium
-  Optical brighteners
-  Ozone-depleting compounds (ODCs)

4.12 Training

The product manufacturer, its distributor, or a third party shall offer training or training materials in the proper use of the product. These shall include step-by-step instructions for the proper dilution, use, disposal, the use of equipment, and proper ventilation.

Manufacturers shall have product-labeling systems to assist non-English-speaking or illiterate personnel.

4.13 Fragrances

Manufacturers shall identify any fragrances on their material safety data sheets (MSDSs). Any ingredient added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.

4.14 Animal Testing

Green Seal™ wants to discourage animal testing and will accept the results of past peer-reviewed or standard tests demonstrating compliance with a criterion. A mixture need not be tested if existing information demonstrates that each of the ingredients complies with a criterion. Additionally, non-animal (in-vitro) test results may be accepted, providing that the test methods are referenced in peer-reviewed literature and the manufacturer provides the reasons for selecting the particular test method.

5. Labeling Requirements

Where dilution is required, the manufacturer's label shall clearly and prominently direct the user to dilute with water from the cold tap and shall state the recommended level of dilution. The manufacturer shall also include detailed instructions for proper use and disposal and for the use of personal protective equipment.

Whenever the Green Seal™ certification mark appears on a package, the package shall contain a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. Unless otherwise approved in writing by Green Seal, the description shall read as follows:

“This product meets the Green Seal™ standard for industrial and institutional floor-care products based on its reduced human and aquatic toxicity and reduced smog production potential.