



GS-40

GREEN SEAL® STANDARD FOR FLOOR-CARE PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE

EDITION 2.5

July 31, 2020

Green Seal, Inc. • greenseal.org

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THE MARK OF ENVIRONMENTAL RESPONSIBILITY

GREEN SEAL®

Green Seal is a nonprofit organization whose mission is to use science-based programs to empower consumers, purchasers, and companies to create a more sustainable world. Green Seal sets leadership standards that aim to reduce, to the extent technologically and economically feasible, the environmental, health, and social impacts throughout the life-cycle of products, services, and companies. The standards may be used for conformity assessment, purchaser specifications, and public education.

Green Seal offers certification of products, services, and companies in conformance with its standards. For additional information on Green Seal and contact information, visit greenseal.org.

**GREEN SEAL STANDARD FOR FLOOR-CARE PRODUCTS
FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-40**

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FOREWORD

Edition. Edition 2.5 was issued on July 31, 2020 and replaces Edition 2.4 from November 17, 2017. Corrections and clarifications were last made to this standard on July 26, 2023. Information on changes made to this standard can be found on Green Seal's website.¹

General. The final issued standard was developed in an open and transparent process with stakeholder input that included producers, users, and general interests.

Social impacts associated with the products, services, or organizations covered in the scope of the standard. These requirements are subject to revision, and generally cover aspects above and beyond regulatory compliance. This standard neither modifies nor supersedes laws and regulations. Any conformity assessment to this standard requires compliance with all applicable laws and regulations for the manufacturing and marketing of the products.

Provisions for safety have not been included in this standard, since they are supervised by regulatory agencies. Adequate safeguards for personnel and property should be employed for all stages of production, and for all tests that involve safety considerations.

Products, services, or organizations that are substantially similar to those covered by this standard in terms of function and life cycle considerations may be evaluated against the intent of the requirements of this standard, accounting for relevant differences between the intended scope of the Standard and the actual product, service, or organization to be evaluated.

This standard may not anticipate a feature of the product that may significantly, and undesirably, increase its impact on the environment, health, or society. In such a situation, Green Seal will ordinarily amend a standard to account for the unanticipated environmental, health, or societal impacts.

Normative references (e.g., other standards) in this standard intend to refer to the most recent edition of the normative reference. Test methods may be required for product evaluation. Unless explicitly stated that a specified method is the only acceptable one, the intent of the standard is that an equivalent test method may be accepted at Green Seal's sole discretion.

Certification to this standard shall be awarded only by Green Seal, or, with Green Seal's explicit written permission, by a third-party certification program conducting on-site audits.

Disclaimer of Liability. Green Seal, as the developer of this standard, shall not incur any obligations or liability for any loss or damages, including, without limitation, indirect, consequential, special, or incidental damages, arising out of or in connection with the interpretation or adoption of, reliance upon, or any other use of this Standard by any party. Green Seal makes no express or implied warranty of merchantability or fitness for a particular purpose, nor any other express or implied warranty with respect to this Standard.

¹ Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section13

ACRONYMS AND ABBREVIATIONS

ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials

BOD. Biological Oxygen Demand

CARB. Air Resources Board for the State of California

DOC. Dissolved Organic Carbon

GHS. Globally Harmonized System of Classification and Labelling

ISO. International Organization for Standardization

OECD. Organization for Economic Co-operation and Development

VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR FLOOR-CARE PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-40

1.0 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 floors², floor sealers, spray buffing products, or products designed to remove floor wax solely through abrasion. See Appendix 1 for an example list of products included in this standard.

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.

Words and phrases described in the standard that appear in *italics* have a corresponding definition located in the definition section of the standard, Annex A.

2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

2.1 Slip Resistance. Floor finish products shall have a static coefficient of friction of at least 0.5 as measured by either ASTM International (ASTM) D2047 or Underwriters Laboratories Method 410.

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

For each of the below tests, products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50°F.

- **Removability:** The floor finish and compatible stripper shall achieve a removal ease rating of “good” as measured by ASTM D1792, 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

² GS-37 addresses general-purpose cleaners, including those that are used to clean floors.

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 or market-leading product of its type as measured by ASTM D3206, 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 D3207, 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 D3207.

3.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS

3.1 Acute Toxicity. 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 (LD ₅₀)	≤ 2,000 mg/kg
Inhalation lethal concentration (LC ₅₀)	≤ 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:

$$TP = \left(\sum_{i=1}^n \frac{wt_i}{TV_i} \right)^{-1}$$

Where,

TP = toxicity of the product

wt_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.

3.2 Carcinogens, Mutagens, and Reproductive Toxins. The *undiluted product* shall not contain any *ingredients* that are *carcinogens, mutagens, or reproductive toxins*.

3.3 Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. *Dispensing-system concentrates* shall be tested as used. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *ingredients*. If the *ingredients* at their concentrations in the *undiluted product* are not shown to cause *skin corrosion* or *serious eye damage*, then the product will not be considered to cause *skin corrosion* or *serious eye damage*. Results from peer-reviewed studies or standard in vitro or in vivo test methods may be accepted. Testing is not required for any *ingredient* for which sufficient information exists.

Further, a product is considered to cause *skin corrosion* or to cause *serious eye damage* if it has a pH less than or equal to 2.5 or greater than or equal to 11.0, unless data prove otherwise.

3.4 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.

3.5 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) 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 D4206.

3.6 Volatile Organic Compound (VOC) Content. VOCs include all organic compounds that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20° C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

For floor finish *products as used* the VOC content shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

For floor finish strippers, the *product as used* shall meet both of the following criteria:

- For the greatest recommended amount of dilution (suitable for light to medium buildup), the VOC content shall not exceed the current CARB regulatory limit.
- For the least recommended amount of dilution (suitable for heavy buildup), the VOC content shall not exceed 7% by weight or the current CARB regulatory limit, whichever is lower.

The VOC content shall be determined in one of the following ways:

- By summing the percent by weight contribution from all volatile organic *ingredients*.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all volatile organic *ingredients*³.

Current CARB regulatory limits for VOCs⁴.

Product Category	Effective Date	Limit (%)
Floor polish or wax (floor finish)	12/31/2010	1
Floor wax stripper (non aerosol), dilution for light or medium buildup	1/1/2002	3
Floor wax stripper (non aerosol), dilution for heavy buildup	1/1/2002	12

3.7 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.

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

3.9 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

³ Evaluation of the VOC content in this standard includes all *fragrances* and volatile organic compounds present in the product at 0.01% or more. Evaluation of the VOC content under Method 310 exempts *fragrances* and all volatile organic compounds present below 0.1%.

⁴ These limits are a reference to the current CARB regulatory limits and will be updated to reflect any amendments made by CARB in the future.

following methods: OECD Methods 301A–F, OECD 310, ISO 7827, 9408, 9439, 1070, 10708, or 14593.

Specifically, within a 28-day test, the *ingredient* in the *product as used* 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%
- Biochemical Oxygen Demand (BOD) > 60%
- BOD, as % of Theoretical Oxygen Demand (ThOD) > 60%
- CO₂ evolution, as % of theoretical CO₂ > 60%

Per OECD guidance the 10-day window requirement does not apply to structurally-related surfactant homologues.

Alternative Evaluation Options: Substances that Do Not Exhibit Ready Biodegradability.

For organic *ingredients* in the *product as used* that do not exhibit ready biodegradability, one of the following options may be acceptable:

1. The manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating DOC removal > 90%.
2. The manufacturer may demonstrate that the compound has low aquatic toxicity (acute LC₅₀ ≥ 100 mg/L for algae, daphnia, or fish) and exhibits inherent ultimate biodegradability with biodegradation rates above 70% (measured as BOD, DOC, or COD), per ISO test methods 9887 or 9888 or OECD 302A-C.

Note: Testing is not required for any *ingredient* for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases. In the absence of experimental data, Quantitative Structure-Activity Relationship data from EPA’s BioWin (EpiSuite) models may be considered.

3.10 Plastic Package. A plastic *primary package* shall be one of the following:

- *A source-reduced package*
- *Recyclable*
- *Contain at least 25% post-consumer material*
- *A refillable package with an effective take-back program*
- *An alternative approach that has been independently proven to have a similar life cycle benefit as one of the options listed above*

3.10.1 Resin Identification Code

3.10.1 Resin Identification Code. The package must be marked with the appropriate Resin Identification Code.

3.11 Non-Plastic Package. For materials other than plastic, the *primary package* shall contain at least 25% *post-consumer material* or be *recyclable*.

3.12 Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced* to the *primary package*. Further, the sum of the concentration levels of these metals shall not exceed 100 ppm by weight (0.01%); an exception is allowed for *refillable packages* or packages that would not exceed this maximum level but for the addition of *post-consumer material*.

3.13 Other Restrictions. Phthalates, bisphenol A, and chlorinated packaging materials are prohibited from being *intentionally introduced* to plastic *primary packaging*. An exception is allowed for *primary packaging* that would not have added phthalates, bisphenol A, or chlorinated packaging material but for the addition of *post-consumer material*.

3.14 Prohibited Ingredients. The product shall not contain the following *ingredients*:

- Alkylphenol ethoxylates
- Phthalates
- The heavy metals arsenic, zinc, lead, cadmium, cobalt, chromium, mercury, nickel, or selenium
- *Optical brighteners*
- *Ozone-depleting compounds*

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

3.16 Animal Testing. To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data are not available, the preferred methods for new testing include methods that replace, reduce, or refine animal use, particularly those recommended by the Interagency Coordinating Committee on the Validation of Alternative Methods or the European Centre for the Validation of Alternative Methods, unless indicated otherwise. In addition, other non-animal (in vitro) test results, modeling data, data from structural analogs, and other lines of evidence may be accepted, provided that the methods are peer-reviewed and applicable. Specific in vitro or modeling methods may be noted in the standard, but additional options may be accepted by the certification program.

Further, a mixture need not be tested if existing information demonstrates that each of the applicable components complies with the criterion.

4.0 USER INFORMATION AND PRODUCT LABEL REQUIREMENTS

4.1 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.

4.2 User Instructions. 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.

5.0 TRADEMARK USE REQUIREMENTS

5.1 Trademark Use. Any use of the Green Seal® Certification Mark or the Green Seal name, e.g., on the product, product label, packaging, secondary documents, or promotional materials, must be in accordance with Green Seal's Trademark Use Guidelines.⁵

5.2 Misleading Claims. Green Seal trademarks shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the certification.

⁵ www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

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

Dispensing-system concentrate. Products that are designed to be used in dispensing systems that cannot be practically accessed by users.

Ingredient. Any constituent that comprises at least 0.01% by weight of a product, whether it is intentionally added or present as a contaminant.⁶

Intentionally Introduced. The use of substances for their desired or deliberate presence in the *primary package* for the purpose of providing a specific characteristic or quality. It does not refer to the use of substances as processing aids or the use of an intermediate that imparts certain chemical or physical changes during manufacturing, as long as the substance or intermediate is present in the *primary package* at concentrations below 100 ppm.

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).

Post-Consumer Material. Material that would otherwise be destined for solid waste disposal, having completed its intended end-use and product life cycle. Post-consumer material does not include materials and by-products generated from, and commonly reused within, an original manufacturing and fabrication process.

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

⁶ Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply that 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 Part 141.

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. The package can be collected in a substantial majority of communities, separated or recovered from the solid waste stream and used again, or reused in the manufacture or assembly of another package or product through an established recycling program.

Refillable Package. A package that is routinely returned to and refilled by the product manufacturer at least five times with the original product held by the package, and demonstrated in practice. For the purpose of this standard, the product manufacturer or the product manufacturer's agent may refill a package.

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.).

Serious Eye Damage. The production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible within 21 days of application. Substances classified as Category 1 for Serious Eye Damage/Eye Irritation (H318) under the GHS are also considered to cause serious eye damage.

Skin Corrosion. The production of irreversible damage to the skin, namely visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia, and scars. Substances classified as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the GHS are also considered to cause skin corrosion.

Source-Reduced Package. A package that has at least 20% less material (by weight) compared to containers commonly used for that product type. For bag-in-the-box type packages, the box is included in the weight if the box is used during product use or in product merchandising.

Take-Back Program. A program sponsored by the original product manufacturer that has been demonstrated to receive at least 50% of sold packages for recycling or reuse.

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

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-40:

Products Included in GS-40

- Floor finish (also called floor polish)
- Floor finish stripper (or floor finish remover – referred to here as “stripper”)

Products Excluded from GS-40

- Cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications without enzymes or microorganisms (included in GS-34)
- Floor sealers
- General-purpose, restroom, glass and carpet cleaners for industrial and institutional use (included in GS-37)
- General-purpose, bathroom, glass, and carpet cleaner products marketed specifically for household use (included in GS-8)
- Hand cleaning products for industrial and institutional use (covered in GS-41) or household use (covered in GS-44)
- Products designed to remove floor wax solely through abrasion
- Specialty cleaning products for industrial and institutional use (GS-53)
- Specialty cleaning products for household use (GS-52)
- Spray buffing products