



**GS-41**

**GREEN SEAL™ STANDARD FOR  
HAND CLEANERS FOR  
INDUSTRIAL AND INSTITUTIONAL USE**

**Edition 2.2  
September 8, 2017**

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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 or any of its programs, contact:

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**TABLE OF CONTENTS**

<b>FOREWORD</b> .....	<b>4</b>
<b>ACRONYMS AND ABBREVIATIONS</b> .....	<b>5</b>
<b>1.0 SCOPE</b> .....	<b>6</b>
<b>2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS</b> .....	<b>6</b>
<b>3.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS</b> .....	<b>6</b>
<b>3.1 SKIN SENSITIZATION</b> .....	<b>6</b>
<b>3.2 SKIN IRRITATION</b> .....	<b>6</b>
<b>3.3 ANTIMICROBIAL CLAIMS</b> .....	<b>7</b>
<b>3.4 PROHIBITED INGREDIENTS</b> .....	<b>7</b>
<b>3.5 FRAGRANCES</b> .....	<b>7</b>
<b>3.6 COLORANTS</b> .....	<b>7</b>
<b>3.7 CARCINOGENS</b> .....	<b>7</b>
<b>3.8 VOLATILE ORGANIC COMPOUND (VOC) CONTENT</b> .....	<b>7</b>
<b>3.9 AQUATIC BIODEGRADABILITY</b> .....	<b>8</b>
<b>3.10 TOXICITY TO AQUATIC LIFE</b> .....	<b>9</b>
<b>3.11 PLASTIC PACKAGING</b> .....	<b>9</b>
<b>3.12 NON-PLASTIC PACKAGE</b> .....	<b>9</b>
<b>3.13 HEAVY METAL RESTRICTIONS</b> .....	<b>10</b>
<b>3.14 OTHER RESTRICTIONS</b> .....	<b>10</b>
<b>3.15 ANIMAL TESTING</b> .....	<b>10</b>
<b>4.0 CERTIFICATION AND LABELING REQUIREMENTS</b> .....	<b>10</b>
<b>4.1 INSTRUCTIONS FOR USE</b> .....	<b>10</b>
<b>4.2 CERTIFICATION MARK</b> .....	<b>10</b>
<b>4.3 USE WITH OTHER CLAIMS</b> .....	<b>11</b>
<b>4.4 STATEMENT OF BASIS FOR CERTIFICATION</b> .....	<b>11</b>
<b>ANNEX A – DEFINITIONS</b> .....	<b>12</b>
<b>APPENDIX 1 – SCOPE</b> .....	<b>14</b>

## FOREWORD

**Edition.** This version of the standard, Edition 2.2 issued on September 8, 2017, replaces Edition 2.1 from July 12, 2013. This revision includes substantive changes.

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

The requirements in the standard are based on an assessment of the environmental, health, or 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.

## ACRONYMS AND ABBREVIATIONS

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

**CARB.** California Air Resources Board

**EPA.** United States Environmental Protection Agency

**FDA.** United States Food and Drug Administration

**ISO.** International Organization for Standardization

**NIOSH.** National Institute for Occupational Safety and Health

**OECD.** Organization for Economic Co-operation and Development

**VOC.** Volatile Organic Compound

## GREEN SEAL STANDARD FOR HAND CLEANERS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-41

### 1.0 SCOPE

This standard establishes environmental requirements for *institutional hand cleaners* (GS-41 A) and *industrial heavy-duty hand cleaners* (GS-41 B). For purposes of this standard, *industrial heavy-duty hand cleaners* are defined as those products advertised for heavy-duty use to remove oil, grease, ink or other hard to remove soils in garages, print shops, and other industrial settings. *Institutional hand cleaners* are defined as those products advertised for routine, nonspecialized hand cleaning in office buildings, schools, retail and other public buildings. The standard does not include hand cleaners in households, food preparation operations, or medical facilities. See Appendix 1 for an example list of products included in this standard.

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

Using a fixed, repeatable procedure, the product shall demonstrate efficacy against a nationally-recognized or market-leading product of its type, showing equivalent or better performance. The testing protocol shall include, at a minimum: cleaning ability, lathering/rinsing, and skin condition after use. A standard soil shall be used and conclusions shall be derived from at least six separate samples. All results, a summary of conclusions and a description of how panelists are chosen shall be submitted.

### 3.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS

**3.1 Skin Sensitization.** The product shall not be a *skin sensitizer* as tested by Organization for Economic Co-operation and Development (OECD) Guidelines for Testing Chemicals, Section 406, Buehler (1994), or Magnusson and Kligman (1969) or other peer-reviewed or standard test methods. The product shall not be considered a *skin sensitizer* under the following scenarios:

- if test data shows that the whole-product is not a *skin sensitizer*,
- if test data shows that each *ingredient* present at or above a concentration of 0.1% is not a *skin sensitizer*, or
- if test data shows that any known *skin sensitizers* are non-sensitizing when present at 0.1% or greater in the product.

**3.2 Skin Irritation.** The product shall not be a *skin irritant* as tested by OECD Guidelines for Testing Chemicals, Section 404 or other peer-reviewed or standard test methods. The product shall not be considered a *skin irritant* under the following scenarios:

- if test data shows that the whole-product is not a *skin irritant*,
- if test data shows that each *ingredient* present at or above a concentration of 5% is not a *skin irritant*, or
- if test data shows that any known *skin irritants* are non irritating when present at 5% or greater in the product.

**3.3 Antimicrobial Claims.** The product shall make no antibacterial, *disinfecting*, *antiseptic* or *sanitizing* product claims.

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

- Phosphates
- *Nitrilotriacetic acid*
- *Ethylene diaminetetra-acetic acid*
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- Butoxy-ethanol

**3.5 Fragrances.** The product shall declare any fragrances on the product label and on material safety data sheets. Any fragrances used shall have been produced or handled following the code of practice of the International Fragrance Association.

**3.6 Colorants.** Each *colorant* shall meet one of the following:

- Be certified by the U.S. Food and Drug Administration (FDA) and permitted for ingestion
- Be a *natural colorant*
- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

**3.7 Carcinogens.** The product shall not be formulated or manufactured with any *carcinogens*.

**3.8 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 *industrial heavy-duty hand cleaners*, 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 *institutional hand cleaners*, VOCs shall not exceed the lower of the following options:

- 1% by weight.
- The current CARB regulatory limit.

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*<sup>1</sup>.

Current CARB regulatory limits for VOCs<sup>2</sup>.

Product Category	Effective Date	Limit (%)
<i>Industrial heavy-duty hand cleaners</i> or soap	1/1/2005 (12/31/2013)	8 (1)

**3.9 Aquatic Biodegradability.** Each of the individual organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. For the evaluation of organic *ingredients*, biodegradability shall be measured by one of the following methods:

- ISO 7827, 9439, 10707, 10708, 9408, or 14593
- OECD Methods 301A–F
- OECD 310

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%
- Biochemical Oxygen Demand (BOD) > 60%
- BOD, as % of Theoretical Oxygen Demand (ThOD) > 60%
- CO<sub>2</sub> evolution, as % of theoretical CO<sub>2</sub> > 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 *components* at 0.01% 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%.

<sup>1</sup> Evaluation of the VOC content in this standard includes all *fragrances* and VOCs 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%.

<sup>2</sup> 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.



2. The manufacturer may demonstrate that the compound has low aquatic toxicity (acute LC<sub>50</sub> ≥ 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 Toxicity to Aquatic Life.** The *product as used* shall not be toxic to aquatic life. A product is considered not toxic to aquatic life if the lowest available and most representative acute LC<sub>50</sub> data for fish, daphnia, or algae is greater than or equal to 100 mg/L. For purposes of demonstrating compliance with this requirement, data for each of the product's *ingredients* may be used to calculate a weighted average.

The toxicity values are adjusted by the weight of the *ingredients* 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<sub>i</sub> = the weight fraction of the *ingredient*  
 TV = the toxicity value for each *ingredient* (LC<sub>50</sub>)  
 n = number of *ingredients*

The preferred sources of data come from the following appropriate protocols in ISO 7346-2 for fish, OECD TG 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

**3.11 Plastic Packaging.** 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

**3.11.1 Plastic Labeling.** The package must be marked with the appropriate Resin Identification Code.

**3.12 Non-Plastic Package.** For materials other than plastic, the *primary package* shall be one of the following:

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

**Note:** *Bag in box* packaging is acceptable if the bag and the box each meet the relevant requirements in Section 3.11 and 3.12.

**3.13 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 present shall not exceed 100 parts per million 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*.

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

**3.15 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 CERTIFICATION AND LABELING REQUIREMENTS

**4.1 Instructions for Use.** The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste.

**4.2 Certification Mark.** The Green Seal® Certification Mark may appear on the product, packaging, secondary documents, and promotional materials, only in conjunction with the certified product. Use of the Mark must be in accordance with *Rules Governing the Use of the Green Seal Certification Mark*<sup>3</sup>.

The Green Seal Certification Mark 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.

Green Seal must review all uses of the Certification Mark prior to printing or publishing.

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<sup>3</sup> [www.greenseal.org/TrademarkGuidelines](http://www.greenseal.org/TrademarkGuidelines)

**4.3 Use With Other Claims.** The Green Seal Certification Mark shall not appear in conjunction with any human health or environmental claims, unless verified and approved in writing by Green Seal.

**4.4 Statement of Basis for Certification.** Wherever the Green Seal Certification Mark appears, it shall be accompanied by 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, unless an alternate version is approved in writing by Green Seal:

For products certified under GS-41 A:

This product meets Green Seal™ Standard GS-41A based on effective performance and protective limits on VOCs and human & environmental toxicity. GreenSeal.org.

For products certified under GS-41 B:

This product meets Green Seal™ Standard GS-41B based on effective performance and protective limits on VOCs and human & environmental toxicity. GreenSeal.org.

## ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

**Antimicrobial.** Substances which can kill or inhibit the growth of microorganisms.

**Antiseptic.** Preventing or arresting the growth of microorganisms.

**Bag in box.** A flexible bag held inside a rigid outside container (box) that is not removed prior to use of the bag.

**Carcinogen.** A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (IARC Groups 1, 2A, and 2B).

**Colorant.** A product *ingredient*, such as a dye or pigment, whose only function is to change the product's color.

**Disinfectant.** An *antimicrobial* agent capable of destroying pathogenic and potentially pathogenic microorganisms on inanimate surfaces.

**Ethylene Diaminetetra-Acetic Acid.** Ethylene diaminetetra-acetic acid (also known as ethylene dinitrilotetraacetic acid, EDTA) or any of its salts.

**Halogenated Organic Solvent.** Any organic solvent containing halogens including fluorine, chlorine, bromine and iodine.

**Industrial Heavy-Duty Hand Cleaner.** A product advertised for heavy-duty use to remove oil, grease, ink or other hard to remove soils in industrial settings.

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

**Institutional Hand Cleaner.** A product advertised for routine, non-specialized hand cleaning in office buildings, schools, retail and other public buildings.

**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.

**Natural Colorant.** A *colorant* that comes from biological products, forestry, or agricultural materials (including plant, animal, and marine materials), or minerals.

**Nitrilotriacetic Acid.** Nitrilotriacetic acid or any of its salts.

**Primary Package.** Package material that physically contains and contacts the product, not including the cap or lid. For products that meet the annex requirements for Products as Powders/Solids/Non-Aqueous Liquids, the primary package is the material that holds the individually packaged product units or the entire product.

**Product as Used.** The amount of product directed for use and diluted in 1 liter of tap water. If no dose is suggested, 5 ml of liquid hand soap shall be used and 0.9 ml of foam soap shall be used.

**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.

**Sanitizer.** A product that reduces the level of microorganisms present to acceptable levels established by federal or provincial health authorities.

**Skin Irritant.** The substance causes erythema or edema of the skin graded at 2 or more as defined by OECD 404.

**Skin Sensitizer.** A substance that causes an immunologically mediated cutaneous reaction, also known as allergic contact dermatitis.

**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.

**APPENDIX 1 – SCOPE (Informative)**

Examples of products included in or excluded from the scope of GS-41:

**Products Included in GS-41**

- *A: Institutional hand cleaners*
- *B: Industrial heavy-duty hand cleaners*

**Products Excluded from GS-41**

- 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 household use (covered in GS-44)
- Hand cleaning products in food preparation operations or medical facilities.
- Shampoo, conditioner and related shower products for baby, child, adult, commercial, and professional use (GS-44)
- Personal care products (left on the body) (GS-50)