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All Product Standards Update to Core Elements Framework

August 23, 2024

Background
In keeping with our mission to accelerate the adoption of safer and more sustainable products, Green Seal strives to ensure our standards are useful tools for market transformation. As part of our commitment to this effort, we recently re-evaluated how the sections of our standards are named. Our goals were to ensure our standards are easy to understand and better communicate the intended impact of the standard criteria. The result of this effort is Green Seal's new Core Elements Framework, which describes the five elements of a product that is safer and more sustainable: 1) Safer Chemicals, 2) Responsible Sourcing, 3) Low-Impact Manufacturing, 4) Sustainable Packaging, and 5) Verified Performance and Claims.

What is Being Updated?
Green Seal is updating all existing product standards to include the new Core Elements Framework headers and sub-headers to improve clarity. None of these changes are substantive and will not require any changes from currently certified products. The changes included in this update are summarized below:

- The five new Core Elements headers have been added, along with clarifying sub-headers, where applicable in each standard.
- Criteria have been re-organized under the appropriate new headers and sub-headers.
- When needed, small non-substantive text updates have been made to ensure clarity in the new structure.

Table of Contents
Each standard's red-line updates can be found below. No criteria have been added, deleted, or modified. The red-lines are meant to serve as a record of how criteria have moved under the new framework.

GS-1

GREEN SEAL® STANDARD FOR
SANITARY PAPER PRODUCTS

EDITION 6.4

(New Format)

August 25, 2021

Green Seal, Inc. • www.greenseal.org

THE MARK OF ENVIRONMENTAL RESPONSIBILITY

GREEN SEAL

Green Seal is a nonprofit organization with a mission to transform the economy for a healthier, greener world. Green Seal sets leadership standards that aim to reduce the environmental and health impacts throughout the lifecycle of products, services, and companies, to the extent technologically and economically feasible. The standards may be used for conformity assessment and public education.

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

GREEN SEAL STANDARD FOR SANITARY PAPER PRODUCTS, GS-1

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FOREWORD

Edition. Edition 6.4 was issued on August 25, ~~2021~~2021, and replaces Edition 6.3 from July 31, 2020. Corrections and/or clarifications were last made to this standard on August ~~16~~23, 2024~~July 26, 2023~~. Information on changes made to this standard are available 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. 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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section1

LIST OF ACRONYMS AND ABREVIATIONS

BOD. Biochemical Oxygen Demand.
BTU. British Thermal Unit.
CD. Cross direction.
CFR. Code of Federal Regulations.
DOC. Dissolved Organic Carbon.
EPA. United States Environmental Protection Agency.
gf. Gram force.
GHS. Globally Harmonized System for Classification and Labeling of Chemicals.
in. inch.
ISO. International Organization for Standardization.
lb. pound.
m^2 or m^3. Square meters or cubic meters.
MD. Machine direction.
MDIP. Market De-Inked Pulp.
MT. Metric ton.
N. Newton.
OECD. Organization for Economic Co-operation and Development.
PCF. Processed Chlorine Free.
ppm. Parts per million.
SDS. Safety Data Sheet
SIC. Standard Industrial Classification.
TAPPI. Technical Association of the Pulp and Paper Industry.
TCF. Totally Chlorine Free.
$Yield_{PC}$. Post-Consumer Material Yield.
$Yield_{R}$. Recovered Material or Agricultural Residue Yield.

GREEN SEAL STANDARD FOR SANITARY PAPER PRODUCTS, GS-1

1.0 SCOPE

This standard establishes environmental, health, and social requirements for *sanitary paper products* including *paper towels*, *general-purpose wipers*, *paper napkins*, *bathroom tissue*, *facial tissue*, *toilet seat covers*, *placemats*, tray liners, *table coverings*, and other *sanitary paper products*. The standard covers products for *institutional* as well as *retail* markets. This standard does not include *nonwoven sanitary products*, general-purpose disposable and flushable wipes containing cleaning agents or *fragrances*, disposable diapers, or sanitary napkins and tampons. See Appendix 1 for an example list of products included in the standard.

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

~~2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS~~

~~**2.1 Product Performance.** Product performance requirements shall be consistently measured on either the unconverted (*parent roll*) or *converted product* depending on facility procedures. Testing shall be conducted under controlled and reproducible laboratory conditions. In addition to the measured performance requirements, the product shall be made in accordance with reasonable industry practice.~~

~~As an exception, products may exceed the upper ranges for tensile strength or stretch, provided the manufacturer demonstrates that the product meets market expectations for usability.~~

~~**2.1.1 Basis Weight (grammage).** Basis weight (grammage) shall be measured according to Technical Association of the Pulp and Paper Industry (TAPPI) T 410 or International Organization for Standardization (ISO) 536. It shall also meet the following requirements when measured as grams per square meter (g/m^2, SI Units) or pounds/ream (lbs/ream, English units):~~

~~Product~~	~~Basis Weight~~	~~Grammage[a]~~
	~~(lbs/ream[b])~~	~~(g/m^2)~~
~~*Institutional paper towels* – hard wound~~	~~15 – 35~~	~~24.4 – 56.9~~
~~*Institutional paper towels* – center pull~~	~~11 – 28~~	~~17.9 – 45.6~~
~~*Institutional paper towels* – folded~~	~~15 – 35~~	~~24.4 – 56.9~~
~~*Institutional paper towels* – kitchen roll~~	~~11 – 30~~	~~17.9 – 48.8~~
~~*General-purpose wipers*~~	~~15 – 35~~	~~24.4 – 56.9~~

Product	Basis Weight	Grammage[a]
Retail paper towels – folded	15 – 35	24.4 – 56.9
Retail paper towels – kitchen roll	11 – 30	17.9 – 48.8
Paper napkins	9 – 28.5	14.6 – 46.4
Bathroom tissue	7.5 – 22	12.2 – 35.8
Facial tissue	7.5 – 19	12.2 – 30.9
Toilet seat covers	7.5 – 10.5	12.2 – 17.1
*Placemats/*Tray Liners	26 – 40	38.5 – 59.2
Table coverings	15 – 22	22.2 – 32.6

(a) See TAPPI T 1210 Table 1, Section 1.1 for conversion factors (Basis weight[pounds/ream]*1.6275 = Grammage [grams per square meter]).

(b) Based on a 24-inch x 36-inch -500 sheet ream, or 3000 sq. ft.

2.1.2 Tensile Strength (Dry and Wet). Product characteristics shall be measured for tensile strength in the machine direction (MD) and cross direction (CD) using the methods described in either section 2.1.2.1 or section 2.1.2.2.

2.1.2.1 Tensile strength using TAPPI T 494/456. Product characteristics shall meet the following requirements when tested according to TAPPI T 494 or ISO 1924/3 (dry tensile strength) and TAPPI T 456 (wet tensile strength), as measured in gram force/inch (gf/in, English units):

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
	(gf/in)	(gf/in)	(gf/in)	(gf/in)
Institutional paper towels – hard wound	1700 – 3100	600 – 2000	250 – 850	100 – 700
Institutional paper towels – center pull	400 – 1500	100 – 800	100 – 500	50 – 200
Institutional paper towels – folded	800 – 2700	200 – 1300	230 – 600	90 – 400
Institutional paper towels – kitchen roll	400 – 1300	100 – 650	100 – 350	50 – 200
General purpose wipers	800 – 2700	200 – 1300	230 – 600	90 – 400
Retail paper towels – folded	800 – 2700	200 – 1300	230 – 600	90 – 400
Retail paper towels – kitchen roll	400 – 1200	100 – 640	100 – 300	50 – 170
Paper napkins	400 – 1100	230 – 570	–	–
Bathroom tissue	140 – 900	50 – 450	–	–
Facial tissue	250 – 750	80 – 250	15 – 80	8 – 40

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
Toilet seat covers	800 – 2250	200 – 1100	–	–
Placemats/Tray liners	–	–	–	–
Table coverings	–	–	–	–

(a) See TAPPI T 1210, Table 1, Section 2.1 for conversion factors
(b) Wet tensile strength data needs to be provided only in one direction (MD or CD)
(1 gf/in = 0.3886 newton/meter (N/m); 1 ozf/in = 10.945 N/m) – = no requirement

2.1.2.2 Tensile strength using TAPPI T 576. Product characteristics shall meet the following requirements when tested according to TAPPI T 576 (dry and wet tensile strength), as measured in gf/3in (English units):

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
	(gf/3in)	(gf/3in)	(gf/3in)	(gf/3in)
Institutional paper towels – hard wound	5100 – 9300	1800 – 6000	750 – 2550	300 – 2100
Institutional paper towels – center pull	1200 – 4500	300 – 2400	300 – 1500	150 – 600
Institutional paper towels – folded	2400 – 8100	600 – 3900	690 – 1800	270 – 1200
Institutional paper towels – kitchen roll	1200 – 3900	300 – 1950	300 – 1050	150 – 600
General purpose wipers	2400 – 8100	600 – 3900	690 – 1800	270 – 1200
Retail paper towels – folded	2400 – 8100	600 – 3900	690 – 1800	270 – 1200
Retail paper towels – kitchen roll	1200 – 3600	300 – 1920	300 – 900	150 – 510
Paper napkins	1200 – 3300	690 – 1710	–	–
Bathroom tissue	420 – 2700	150 – 1350	–	–
Facial tissue	750 – 2250	240 – 750	45 – 240	24 – 120
Toilet seat covers	2400 – 6750	600 – 3300	–	–
Placemats/Tray liners	–	–	–	–
Table Coverings	–	–	–	–

(a) See TAPPI T 1210, Table 1, Section 2.1 for conversion factors
(b) Wet tensile strength data needs to be provided only in one direction (MD or CD)
(1 gf/3in = 0.3886 newton/meter (N/m); 1 ozf/in = 10.945 N/m) – = no requirement

2.1.3 Stretch and Water Absorbency. Product characteristics shall meet the following requirements when tested according to TAPPI T 494 or ISO 1924/3, or TAPPI T 576 for stretch, and TAPPI T 432 for water absorbency, as measured in % stretch or seconds of water absorbency:

Product	Stretch	Water Absorbency
	(%)	(seconds)
Paper towels - institutional	2 - 22	0 - 160
Paper towels - retail	2 - 22	0 - 160
General-purpose wipers	2 - 22	0 - 160
Paper napkins	2 - 22	0 - 180
Bathroom tissue	2 - 24	--
Facial tissue	2 - 24	--
Toilet seat covers	1 - 10	--
Placemats/Tray liners	1 - 10	--
Table Coverings	--	--

-- = no requirement

2.2 Alternative Product Performance. Alternative test methods may be allowed for *sanitary paper products* or for categories not specified in this standard. A manufacturer must provide documented rationale for use of the method. The method must be an objective, scientifically-validated method, conducted under controlled and reproducible laboratory conditions. The results of the testing must meet performance ranges that are considered reasonable industry practice.

2.3 Product Specifications. Products must contain the following minimum material specifications, (i.e., minimum product per roll/package). Note that the conversion basis, consisting of the number of sheets and the sheet size, is provided so that a manufacturer can convert between the product in square feet and sheets per roll[(a)]. Any combination of sheet size and number of sheets is acceptable, as long as the minimum product per roll/package is met:

Product	Single Ply Specification[(b)]		Multi Ply Specification[(b)]	
	Minimum product per roll/package	Conversion Basis	Minimum product per roll/package	Conversion Basis
INSTITUTIONAL PRODUCTS				
Bathroom Tissue	62 ft^2/roll	600 3.75" x 4" sheets	31 ft^2/roll	300 3.75" x 4" sheets
Facial Tissue - Flat Box	--	--	41 ft^2/box	100 7.5" x 8" sheets

Product	Single Ply Specification[b]		Multi Ply Specification[b]	
	Minimum product per roll/package	Conversion Basis	Minimum product per roll/package	Conversion Basis
Facial Tissue – Cube/ Dispenser Boxes	–	–	35 ft^2/box	80 – 8" x 8" sheets
Paper Towels – Hard wound or Center Pull	125 ft^2/roll	200 feet – 7.5 inch wide roll	62 ft^2/roll	100 feet – 7.5 inch wide roll
Paper Towels – Folded	84 ft^2/package	150 – 9" x 9" sheets	42 ft^2/package	75 – 9" x 9" sheets
Paper Towels – Kitchen Rolls (full sheet or select a size)	67 ft^2/roll	160 – 11" x 5.5" sheets	35 ft^2/roll	85 – 11" x 5.5" sheets
Paper Towels – General Purpose Wipers	125 ft^2/box	200 – 9" x 10" sheets	62 ft^2/box	100 – 9" x 10" sheets
Paper Napkins – Folded (used with or without a dispenser)	330 ft^2/package	200 – 14" x 17" sheets	165 ft^2/package	100 – 14" x 17" sheets
Paper Napkins – Small Dispensing	62 ft^2/package	200 – 5" x 9" sheets	31 ft^2/package	100 – 5" x 9" sheets
Paper Napkins – Beverage	69 ft^2/package	100 – 10" x 10" sheets	34 ft^2/package	50 – 10" x 10" sheets
Paper Napkins – Luncheon	117 ft^2/package	100 – 13" x 13" sheets	58 ft^2/package	50 – 13" x 13" sheets
Paper Napkins – Dinner/Guest Towel	97 ft^2/package	50 – 16.75" x 16.75" sheets	48 ft^2/package	25 – 16.75" x 16.75" sheets
***RETAIL* PRODUCTS**				
Bathroom Tissue	36 ft^2/roll	350 – 3.75" x 4" sheets	18 ft^2/roll	175 – 3.75" x 4" sheets
Facial Tissue – Flat Box	–	–	41 ft^2/box	100 – 7.5" x 8" sheets
Facial Tissue – Cube/ Dispenser Boxes	–	–	35 ft^2/box	80 – 8" x 8" sheets
Paper Towels – Folded	35 ft^2/roll	60 – 9.1" x 9.25" sheets	17.5 ft^2/roll	30 – 9.1" x 9.25" sheets
Paper Towels – Kitchen Rolls (full sheet or select a size)	67 ft^2/roll	160 – 11" x 5.5" sheets	35 ft^2/roll	85 – 11" x 5.5" sheets
Paper Napkins – Beverage	62 ft^2/package	100 – 9.5" x 9.5" sheets	31 ft^2/package	50 – 9.5" x 9.5" sheets
Paper Napkins – Luncheon	91 ft^2/package	100 – 11" x 12" sheets	45 ft^2/package	50 – 11" x 12" sheets
Paper Napkins – Dinner/Guest Towel	88 ft^2/package	50 – 15" x 17" sheets	44 ft^2/package	25 – 15" x 17" sheets
MISCELLANEOUS PRODUCTS				
Toilet Seat Covers	–	–	–	–
Placemats, tray liners, and Other *Table Coverings*	–	–	–	–

For example, *bathroom tissue*: number of sheets per roll − square feet per roll divided by sheet size (in^2) multiplied by 144 (in^2/ft^2)).

(a) —

~~(b) The single ply and multi ply headings are meant to identify the typical product category type. However, a product intended for an equivalent use would be allowed due to practicality concerns (e.g., a thicker, heavier basis weight single ply product could be evaluated as a multi ply product for an equivalent use).~~

~~- - = no requirement~~

~~Alternatively, different sizes that generate better package or shipping efficiency may be permitted provided that the manufacturer submits specifications to demonstrate that they have improved the packaging and shipping efficiency.~~

2.0 SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Biodegradability. Any *functional papermaking additives* present above 100 ppm by weight in the finished product or *contaminants* used in the *papermaking process*, except for inorganic compounds, polymers, *optical brighteners*, and *biocides*, shall exhibit ready biodegradability in accordance with the Organization for Economic Co-operation and Development (OECD) definition, as follows. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the ingredient shall meet one of the following criteria:

- Removal of Dissolved Organic Carbon (DOC) > 70%
- Biochemical Oxygen Demand (BOD) > 60%
- BOD, as % of Theoretical Oxygen Demand (ThOD) > 60%
- CO_2 evolution, as % of theoretical CO_2 > 60%

For *functional papermaking additives* or *contaminants* 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 DOC removal > 90%.

An exception shall be made for *functional papermaking additives* or *contaminants* that do not exhibit ready biodegradability, if the additive has low aquatic toxicity (acute LC50 ≥ 100 mg/L for algae, daphnia, or fish) and exhibits inherent biodegradability per ISO test methods 9887 or 9888 or OECD 302A-C.

Testing is not required for any *functional papermaking additives* or *contaminants* 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.

2.1.2 Carcinogens, Mutagens, and Reproductive Toxins. The product shall not contain any *functional papermaking additives* or *contaminants* that are *carcinogens*, *mutagens*, or *reproductive toxins* or that are known to produce or release *carcinogens*. An exception shall be made for titanium dioxide and carbon black used in *colorants*.

2.1.3 Chlorine Free. Products made from *recovered fibers* shall be *Processed Chlorine Free (PCF)*. Products made from *agricultural residue* shall be *Totally Chlorine Free (TCF)*.

Additionally, chlorine or chlorine derivatives (e.g., elemental chlorine, chlorine dioxide, sodium hypochlorite, sodium chlorite) shall not be used during the following steps of the *papermaking process*: re-pulping, screening, deinking, and washing.[2]

Exemption: Chlorine and chlorine derivatives can be used during the re-pulping process if necessary to break down *recovered material* with wet-strength resins.

2.1.4 Colorants in Product. The product shall not contain any *colorants* as *functional papermaking additives*; an exception shall be made for products that would not contain *colorants* but from the addition of *recovered materials*.

Further, the following types of *converted products* may be printed with *colorants* provided that these *colorants* contain a sum concentration of less than 100 ppm by weight (0.01%) of the heavy metals lead, mercury, cadmium, and hexavalent chromium: *paper towels, general-purpose wipers, paper napkins, placemats*, tray liners, and *table coverings*.

2.1.5 Optical Brighteners. *Optical brighteners* may be used as a *functional papermaking additive* at a dosage not to exceed 200 ppm (0.02%) by weight in the finished product. This level does not include any *optical brighteners* that may be present in the *furnish* through the use of *recovered materials*.

2.1.6 Water Disinfection. Chlorine derivatives and *biocides* may be used to disinfect the incoming fresh water supply and recycled process water. Product testing is not required, as long as the residual concentration of the chlorine derivatives and *biocides* used for disinfection is below the applicable maximum residual disinfectant levels in the National Primary Drinking Water Regulations found in 40 Code of Federal Regulations (CFR), Part 141 at any location where chlorine derivatives and *biocides* are added to the *papermaking process*. *Biocides* must be registered with the United States Environmental Protection Agency (EPA) or the Pest Management Regulatory Agency.

2.1.7 Additional Prohibited Substances. The product shall not contain the following substances as *functional papermaking additives* or *contaminants*:

- *Fragrances*

[2] There are no restrictions on the use of chlorine or its derivatives in the cleaning of production equipment.

- The heavy metals lead, chromium, or selenium both in the elemental form or compounds

The *papermaking process* shall not use the following substances:

- Chlorophenolic *Biocides*
- *Ozone-depleting compounds*

2.2 Safer Products

2.2.1 Added Lotion. *Added lotion* may be used on *sanitary paper products* for product softening or other reasons. Such lotions shall not contain any *fragrances* or *colorants* and shall meet the requirements of Section 2.0 Safer Chemicals in the Green Seal Standard for Personal Care and Cosmetic Products, GS-50.[3]

2.2.2 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.

3.0 ~~PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS~~ RESPONSIBLE SOURCING

3.~~1~~1 Fiber Requirements. The fiber source shall meet one of the following:

a) The product shall be made from 100% *recovered material*, subject to the applicable requirement in section 3.4~~3~~2~~2~~;
b) The product shall be made from 100% *agricultural residue*;
c) The product shall be made from any combination of *recovered material* and *agricultural residue*, provided that the *recovered material* is 100% *post-consumer material*, or the product meets the applicable requirement in section 3.4~~3~~2~~2~~ herein.

For *recovered material* produced by *integrated mills* where *whitewater* and/or *wastewater* recovery may cause contamination of the incoming *recovered material furnish* (stock), reclaimed mixed fibers containing *virgin material* may be acceptable as long as it can be shown, through mass balance calculations, that the amount of *virgin fiber* in the reclaimed mixed fibers is less than 0.5% of the incoming *recovered material furnish* (stock).

[3] Other Personal Care and Cosmetic Products within the scope of GS-50, which were added to impart certain properties to the product, would have to meet the same conditions.

When using *agricultural residue*, the manufacturer shall document the original source of the material, and the *agricultural residue* shall originate from a crop certified to the Rainforest Alliance Sustainable Agriculture Standard or other approved *third--party certification program.*

3.22 Post-Consumer Material Requirements. Products made from *recovered material* shall meet the following requirements:

Product Type	***Post-Consumer Material*** **Requirement (% in product)**
Paper Towels, *General-Purpose Wipers*, and Napkins	50%
Bathroom Tissue	25%
Facial Tissue	15%
Toilet Seat Covers	25%
Placemats/Tray liners	40%
Table Coverings	40%

3.33 Post-Consumer Material Calculations. The percentage of *post-consumer material* shall be calculated and certified based on the fiber weight of the paper. The calculation of recycled content based on fiber weight shall be performed using the following formula for *post-consumer material*:

$$\frac{\textit{Post-consumer Material} \times \text{Yield}_{PC}}{\textit{Recovered Material} \text{ or } \textit{Agricultural Residue} \times \text{Yield}_{R}}$$

Yield will depend on the product manufactured, the raw material, the level of contaminants and the cleaning and deinking technology employed. The percentage yield shall be calculated by dividing the total material output by the total material input.[4] The percentage of *recovered material* or *agricultural residue* and *post-consumer material* shall be calculated based on a weighted average of the materials used for a period of time not to exceed the previous three months.

3.44 Source Reduction. Reserved.

~~**3.5 Material Processing.**~~

~~**3.5.1 Chlorine Free.** Products made from *recovered fibers* shall be *Processed Chlorine Free (PCF).* Products made from *agricultural residue* shall be *Totally Chlorine Free (TCF).*~~

[4] If a particular manufacturer's operating procedures do not provide for accurate yield measurements, the following shall be used as default values:
Default *Recovered Material* or *Agricultural Residue* yield (Yield_R): 75%
Default *Post-Consumer Material* yield (Yield_{PC}): 75%

Additionally, chlorine or chlorine derivatives (e.g., elemental chlorine, chlorine dioxide, sodium hypochlorite, sodium chlorite) shall not be used during the following steps of the *papermaking process*: re-pulping, screening, deinking, and washing.[5]

Exemption: Chlorine and chlorine derivatives can be used during the re-pulping process if necessary to break down *recovered material* with wet-strength resins.

3.5.2 Water Disinfection. Chlorine derivatives and *biocides* may be used to disinfect the incoming fresh water supply and recycled process water. Product testing is not required, as long as the residual concentration of the chlorine derivatives and *biocides* used for disinfection is below the applicable maximum residual disinfectant levels in the National Primary Drinking Water Regulations found in 40 Code of Federal Regulations (CFR), Part 141 at any location where chlorine derivatives and *biocides* are added to the *papermaking process*. *Biocides* must be registered with the United States Environmental Protection Agency (EPA) or the Pest Management Regulatory Agency.

3.5.3 Carcinogens, Mutagens, and Reproductive Toxins. The product shall not contain any *functional papermaking additives* or *contaminants* that are *carcinogens*, *mutagens*, or *reproductive toxins* or that are known to produce or release *carcinogens*. An exception shall be made for titanium dioxide and carbon black used in *colorants*.

3.5.4 Optical Brighteners. *Optical brighteners* may be used as a *functional papermaking additive* at a dosage not to exceed 200 ppm (0.02%) by weight in the finished product. This level does not include any *optical brighteners* that may be present in the *furnish* through the use of *recovered materials*.

3.5.5 Colorants. The product shall not contain any *colorants* as *functional papermaking additives*; an exception shall be made for products that would not contain *colorants* but from the addition of *recovered materials*.

Further, the following types of *converted products* may be printed with *colorants* provided that these *colorants* contain a sum concentration of less than 100 ppm by weight (0.01%) of the heavy metals lead, mercury, cadmium, and hexavalent chromium: *paper towels*, *general-purpose wipers*, *paper napkins*, *placemats*, tray liners, and *table coverings*.

3.5.6 Biodegradability. Any *functional papermaking additives* present above 100 ppm by weight in the finished product or *contaminants* used in the *papermaking process*, except for inorganic compounds, polymers, *optical brighteners*, and *biocides*, shall exhibit ready biodegradability in accordance with the Organization for Economic Co-operation and Development (OECD) definition, as follows. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods

[5] There are no restrictions on the use of chlorine or its derivatives in the cleaning of production equipment.

301A – F; or OECD 310. Specifically, within a 28-day test, the ingredient shall meet one of the following criteria:

- Removal of Dissolved Organic Carbon (DOC) > 70%
- Biochemical Oxygen Demand (BOD) > 60%
- BOD, as % of Theoretical Oxygen Demand (ThOD) > 60%
- CO_2 evolution, as % of theoretical CO_2 > 60%

For *functional papermaking additives* or *contaminants* 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 DOC removal > 90%.

An exception shall be made for *functional papermaking additives* or *contaminants* that do not exhibit ready biodegradability, if the additive has low aquatic toxicity (acute LC50 ≥ 100 mg/L for algae, daphnia, or fish) and exhibits inherent biodegradability per ISO test methods 9887 or 9888 or OECD 302A-C.

Testing is not required for any *functional papermaking additives* or *contaminants* 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.

3.5.7 Additional Prohibited Substances. The product shall not contain the following substances as *functional papermaking additives* or *contaminants*:

- *Fragrances*
- The heavy metals lead, chromium, or selenium both in the elemental form or compounds

The *papermaking process* shall not use the following substances:

- Chlorophenolic *Biocides*
- *Ozone-depleting compounds*

3.6 Added Lotion. *Added lotion* may be used on *sanitary paper products* for product softening or other reasons. Such lotions shall not contain any *fragrances* or *colorants* and shall meet the requirements of Section 3.0 Product-Specific Sustainability Requirements in the Green Seal Standard for Personal Care and Cosmetic Products, GS-50[6].

3.7 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)

[6] Other Personal Care and Cosmetic Products within the scope of GS-50, which were added to impart certain properties to the product, would have to meet the same conditions.

~~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 ~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~ LOW-IMPACT MANUFACTURING

4.1 Social Responsibility. Documentation must be provided that the production of the product meets the following social responsibility requirements:

4.1.1 Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected.

4.1.2 Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union membership, political opinion, national extraction or social origin such that it affects the opportunity or treatment in employment, and there shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation or exploitation.

4.1.4 Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

4.2 Manufacturing and Converting Requirements – Water and Energy Use. Manufacturers shall meet the following fresh-water and *energy use* criteria, for combined processes including pulping, re-pulping, deinking, papermaking, product converting, and waste treatment (on-site or offsite facilities).

If a manufacturer only does converting, then the energy and water use for the other processes (pulping, re-pulping, deinking, papermaking, and waste treatment) shall be supplied by the manufacturer of the *parent roll*.

If a manufacturer purchases market de-inked pulp (MDIP), then the supplier of the MDIP will be required to provide the energy and water use data associated with production of the MDIP. This supplier data regarding energy and water use in production of MDIP shall meet the criteria in this section separately and in addition to the data from the paper manufacturer itself.

The data shall represent either the total annual resource used divided by the total annual production of paper,[5] or the total annual resource used to produce all grades of certified paper divided by the total annual production of all grades of certified paper.[6] This implies that estimation and allocation methods are acceptable.

Fresh Water Use **(gallons/ton of final product)** [(a)]	**Total *Energy Use* (millions BTUs/ ton of final product)** [(b)]
19,250	**17.0**

(a) gallons/T = 0.00417 m3/MT
(b) millions of British Thermal Units (BTUs)/T = 1.16 Gigajoules/MT = 323.2 kilowatt-hour /MT

5.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~ SUSTAINABLE PACKAGING

5.1 Packaging Materials

5.1.1 Primary and Secondary Packaging. *Primary* and *Secondary packaging* shall meet the following requirements based on the packaging material type:

- Packaging made from paper or paperboard shall be *recyclable* and made from 100% *recovered material*.
- Packaging made from containerboard (corrugated cardboard) shall be *recyclable* and made from at least 30% *recovered material*.
- Packaging made from plastic shall be *recyclable*, or a *source -reduced package*, or shall contain 25% *recovered material* (*pre-* or *post-consumer material*). Where a product's packaging is below these levels, the manufacturer shall demonstrate that efforts have been made to use the maximum available *pre-* or *post-consumer material* in packaging. An exception shall be made for packaging with an effective *take-back program*.

~~**5.1.1 Resin Identification Code.** If plastic, the packaging shall be marked with the appropriate Resin Identification Code.~~

5.1.2 Colorants In Packaging. *Primary* and *secondary packaging* may be printed using *colorants* provided that these *colorants* contain a sum concentration of less than 100 ppm by weight of lead, mercury, cadmium, and hexavalent chromium.

5.2 Packaging Label

[5] Total production represents the gross production of paper from the machines, and not sales of paper.
[6] Total production represents the gross production of certified paper from the machines, and not sales of certified paper.

5.2.1 Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code.

5.3 Restricted Substances

5.3.1 Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced* in *primary* and *secondary packaging*. Further, the sum of the concentration levels of these metals shall not exceed 100 ppm by weight (0.01%); an exception is allowed for packaging that would not exceed this maximum level but for the addition of *recovered materials*.

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

6.0 ~~PRODUCT LABEL REQUIREMENTS~~VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance. Product performance requirements shall be consistently measured on either the unconverted (*parent roll*) or *converted product* depending on facility procedures. Testing shall be conducted under controlled and reproducible laboratory conditions. In addition to the measured performance requirements, the product shall be made in accordance with reasonable industry practice.

As an exception, products may exceed the upper ranges for tensile strength or stretch, provided the manufacturer demonstrates that the product meets market expectations for usability.

6.1.1 Basis Weight (grammage). Basis weight (grammage) shall be measured according to Technical Association of the Pulp and Paper Industry (TAPPI) T 410 or International Organization for Standardization (ISO) 536. It shall also meet the following requirements when measured as grams per square meter (g/m^2, SI Units) or pounds/ream (lbs/ream, English units):

Product	Basis Weight	Grammage[a]
	(lbs/ream[b])	(g/m^2)
Institutional paper towels –hard wound	15 – 35	24.4 – 56.9
Institutional paper towels – center pull	11 - 28	17.9 – 45.6
Institutional paper towels –folded	15 - 35	24.4 – 56.9
Institutional paper towels –kitchen roll	11 - 30	17.9 – 48.8
General-purpose wipers	15 - 35	24.4 – 56.9

Product	Basis Weight (lbs/ream[b])	Grammage[a] (g/m^2)
Retail paper towels – folded	15 - 35	24.4 – 56.9
Retail paper towels – kitchen roll	11 - 30	17.9 – 48.8
Paper napkins	9 – 28.5	14.6 – 46.4
Bathroom tissue	7.5 – 22	12.2 – 35.8
Facial tissue	7.5 – 19	12.2 – 30.9
Toilet seat covers	7.5– 10.5	12.2 – 17.1
Placemats/Tray Liners	26 – 40	38.5 – 59.2
Table coverings	15 - 22	22.2 – 32.6

(a) See TAPPI T 1210 Table 1, Section 1.1 for conversion factors (Basis weight[pounds/ream]*1.6275 = Grammage [grams per square meter]).

(b) Based on a 24-inch x 36 inch -500 sheet ream, or 3000 sq. ft.

6.1.2 Tensile Strength (Dry and Wet). Product characteristics shall be measured for tensile strength in the machine direction (MD) and cross direction (CD) using the methods described in either section 6.1.2.1 or section 6.1.2.2.

6.1.2.1 Tensile strength using TAPPI T 494/456. Product characteristics shall meet the following requirements when tested according to TAPPI T 494 or ISO 1924/3 (dry tensile strength) and TAPPI T 456 (wet tensile strength), as measured in gram force/inch (gf/in, English units):

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
	(gf/in)	(gf/in)	(gf/in)	(gf/in)
Institutional paper towels – hard wound	1700 - 3100	600 - 2000	250 - 850	100 - 700
Institutional paper towels – center pull	400 - 1500	100 - 800	100 - 500	50 - 200
Institutional paper towels – folded	800 - 2700	200 - 1300	230 - 600	90 - 400
Institutional paper towels – kitchen roll	400 - 1300	100 - 650	100 - 350	50 - 200
General-purpose wipers	800 - 2700	200 - 1300	230 - 600	90 - 400
Retail paper towels – folded	800 - 2700	200 - 1300	230 - 600	90 - 400
Retail paper towels – kitchen roll	400 - 1200	100 - 640	100 - 300	50 - 170
Paper napkins	400 - 1100	230 - 570	--	--

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
Bathroom tissue	140 - 900	50 – 450	--	--
Facial tissue	250 - 750	80 - 250	15 - 80	8 - 40
Toilet seat covers	800 - 2250	200 - 1100	--	--
Placemats/Tray liners	--	--	--	--
Table coverings	--	--	--	--

(a) See TAPPI T 1210, Table 1, Section 2.1 for conversion factors
(b) Wet tensile strength data needs to be provided only in one direction (MD or CD)
(1 gf/in = 0.3886 newton/meter (N/m); 1 ozf/in = 10.945 N/m) -- = no requirement

6.1.2.2 Tensile strength using TAPPI T 576. Product characteristics shall meet the following requirements when tested according to TAPPI T 576 (dry and wet tensile strength), as measured in gf/3in (English units):

Product	Dry Tensile Strength[a]		Wet Tensile Strength[b]	
	MD	CD	MD	CD
	(gf/3in)	(gf/3in)	(gf/3in)	(gf/3in)
Institutional paper towels – hard wound	5100 - 9300	1800 - 6000	750 - 2550	300 - 2100
Institutional paper towels – center pull	1200 - 4500	300 - 2400	300 - 1500	150 - 600
Institutional paper towels – folded	2400 - 8100	600 - 3900	690 - 1800	270 - 1200
Institutional paper towels – kitchen roll	1200 - 3900	300 - 1950	300 - 1050	150 - 600
General-purpose wipers	2400 - 8100	600 - 3900	690 - 1800	270 - 1200
Retail paper towels – folded	2400 - 8100	600 - 3900	690 - 1800	270 - 1200
Retail paper towels – kitchen roll	1200 - 3600	300 - 1920	300 - 900	150 - 510
Paper napkins	1200 - 3300	690 - 1710	--	--
Bathroom tissue	420 - 2700	150 - 1350	--	--
Facial tissue	750 - 2250	240 - 750	45 - 240	24 - 120
Toilet seat covers	2400 - 6750	600 - 3300	--	--
Placemats/Tray liners	--	--	--	--
Table Coverings	--	--	--	--

(a) See TAPPI T 1210, Table 1, Section 2.1 for conversion factors
(b) Wet tensile strength data needs to be provided only in one direction (MD or CD)
(1 gf/3in = 0.3886 newton/meter (N/m); 1 ozf/in = 10.945 N/m) -- = no requirement

6.1.3 Stretch and Water Absorbency. Product characteristics shall meet the following requirements when tested according to TAPPI T 494 or ISO 1924/3, or TAPPI T 576 for stretch, and TAPPI T 432 for water absorbency, as measured in % stretch or seconds of water absorbency:

Product	Stretch	Water Absorbency
	(%)	(seconds)
Paper towels- institutional	2 - 22	0 - 160
Paper towels - retail	2 - 22	0 - 160
General-purpose wipers	2 - 22	0 - 160
Paper napkins	2 - 22	0 - 180
Bathroom tissue	2 - 24	--
Facial tissue	2 - 24	--
Toilet seat covers	1 - 10	--
Placemats/Tray liners	1 - 10	--
Table Coverings	--	--

-- = no requirement

6.2 Alternative Product Performance. Alternative test methods may be allowed for *sanitary paper products* or for categories not specified in this standard. A manufacturer must provide documented rationale for use of the method. The method must be an objective, scientifically-validated method, conducted under controlled and reproducible laboratory conditions. The results of the testing must meet performance ranges that are considered reasonable industry practice.

6.3 Product Design

6.23.1 Product Specifications. Products must contain the following minimum material specifications, (i.e., minimum product per roll/package). Note that the conversion basis, consisting of the number of sheets and the sheet size, is provided so that a manufacturer can convert between the product in square feet and sheets per roll.[(a)] Any combination of sheet size and number of sheets is acceptable, as long as the minimum product per roll/package is met:

Product	Single Ply Specification[(b)]		Multi Ply Specification[(b)]	
	Minimum product per roll/package	Conversion Basis	Minimum product per roll/package	Conversion Basis
***INSTITUTIONAL* PRODUCTS**				
Bathroom Tissue	62 ft^2/roll	600–3.75” x 4” sheets	31 ft^2/roll	300 –3.75” x 4” sheets

Product	Single Ply Specification[b]		Multi Ply Specification[b]	
	Minimum product per roll/package	Conversion Basis	Minimum product per roll/package	Conversion Basis
Facial Tissue –Flat Box	--	--	41 ft^2/box	100 – 7.5" x 8" sheets
Facial Tissue – Cube/ Dispenser Boxes	--	--	35 ft^2/box	80 – 8" x 8" sheets
Paper Towels –Hard wound or Center Pull	125 ft^2/roll	200 feet– 7.5-inch-wide roll	62 ft^2/roll	100 feet – 7.5-inch-wide roll
Paper Towels –Folded	84 ft^2/package	150–9" x 9" sheets	42 ft^2/package	75 – 9" x 9" sheets
Paper Towels – Kitchen Rolls (full sheet or select-a-size)	67 ft^2/roll	160–11" x 5.5" sheets	35 ft^2/roll	85 – 11" x 5.5" sheets
Paper Towels –General Purpose Wipers	125 ft^2/box	200–9" x 10" sheets	62 ft^2/box	100–9" x 10" sheets
Paper Napkins – Folded (used with or without a dispenser)	330 ft^2/package	200–14" x 17" sheets	165 ft^2/package	100–14" x 17" sheets
Paper Napkins – Small Dispensing	62 ft^2/package	200–5" x 9" sheets	31 ft^2/package	100–5" x 9" sheets
Paper Napkins –Beverage	69 ft^2/package	100–10" x 10" sheets	34 ft^2/package	50–10" x 10" sheets
Paper Napkins–Luncheon	117 ft^2/package	100–13" x 13" sheets	58 ft^2/package	50–13" x 13" sheets
Paper Napkins – Dinner/Guest Towel	97 ft^2/package	50–16.75" x 16.75" sheets	48 ft^2/package	25–16.75" x 16.75" sheets
***RETAIL* PRODUCTS**				
Bathroom Tissue	36 ft^2/roll	350–3.75" x 4" sheets	18 ft^2/roll	175–3.75" x 4" sheets
Facial Tissue –Flat Box	--	--	41 ft^2/box	100–7.5" x 8" sheets
Facial Tissue – Cube/ Dispenser Boxes	--	--	35 ft^2/box	80–8" x 8" sheets
Paper Towels – Folded	35 ft^2/roll	60–9.1" x 9.25" sheets	17.5 ft^2/roll	30–9.1" x 9.25" sheets
Paper Towels – Kitchen Rolls (full sheet or select-a-size)	67 ft^2/roll	160–11" x 5.5" sheets	35 ft^2/roll	85–11" x 5.5" sheets
Paper Napkins –Beverage	62 ft^2/package	100–9.5" x 9.5" sheets	31 ft^2/package	50–9.5" x 9.5" sheets
Paper Napkins–Luncheon	91 ft^2/package	100–11" x 12" sheets	45 ft^2/package	50–11" x 12" sheets
Paper Napkins – Dinner/Guest Towel	88 ft^2/package	50–15" x 17" sheets	44 ft^2/package	25–15" x 17" sheets
MISCELLANEOUS PRODUCTS				
Toilet Seat Covers	--	--	--	--
Placemats, tray liners, and Other *Table Coverings*	--	--	--	--

(a) For example, *bathroom tissue*: number of sheets per roll = square feet per roll divided by sheet size (in^2) multiplied by 144 (in^2/ft^2)).
(b) The single ply and multi ply headings are meant to identify the typical product category type. However, a product intended for an equivalent use would be allowed due to practicality concerns (e.g., a thicker, heavier basis weight single ply product could be evaluated as a multi ply product for an equivalent use).
- - = no requirement

Alternatively, different sizes that generate better package or shipping efficiency may be permitted provided that the manufacturer submits specifications to demonstrate that they have improved the packaging and shipping efficiency.

6.4 Product Label

6.4.1 Disposal. The manufacturer's label shall include a statement encouraging recycling of appropriate *primary* and *secondary packaging*.

7.0 TRADEMARK USE REQUIREMENTS

7.1 Trademark Use. 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.[7]

7.2 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.

[7] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Added Lotion. Material applied to the finished surface of the paper or tissue to provide softness to the touch. Techniques to add lotion include dipping or spraying. A softener or debonder added to the furnish as a *functional papermaking additive* is not considered an *added lotion*.

Agricultural Residue. Process waste material remaining from ~~a~~ harvesting *nonwood* plants used to produce food or fiber, which would otherwise be incinerated or disposed of *in situ* or in a landfill. Material that would normally be used as compost/fertilizer *in situ* is excluded.

Bathroom Tissue. A class of soft paper products used to maintain personal hygiene, designed to disperse in septic tanks. Products typically come in rolls.

Biocide. A chemical used to kill biological organisms.

By-Product. A secondary or incidental product deriving from a manufacturing process.

Carcinogen. A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), National Toxicology Program (Groups 1 and 2), EPA IRIS weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential), by the Occupational Safety and Health Administration (as carcinogens under 29 CFR 1910.1003(a)(1)), or under the Globally Harmonized System for Classification and Labeling of Chemicals (GHS) Hazard Categories 1 (H350, may cause cancer) and 2 (H351, suspected of causing cancer).

Child Labor. Work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. To avoid child labor the International Labour Organization provides the following instruments: Minimum Age Convention (e.g., a minimum age not less than 15 for standard work and 18 for hazardous work) and the Worst Forms of Child Labour Convention.

Colorant. Inks, dyes, or pigments which are capable of imparting color when added in the paper-making process or to the finished product.

Contaminant. A substance in a *functional papermaking additive* that was not intentionally added but is known to be present above 100 ppm by weight, in the finished product.

Converted Product. Manufactured paper that has been further processed and converted into a finished product that is saleable.

Energy Use. The total energy used to manufacture *sanitary paper products*, including the net energy consumption during re-pulping of *recovered material* or *agricultural residue* pulping, throughout the paper making process, during waste treatment, and during converting and/or

packaging. Net energy consumption is considered energy purchased and generated less sales. It does not include transportation.

Facial Tissue. A class of soft, absorbent, disposable paper products suitable for use on the face. Products may come in flat, cube, or dispenser type boxes. Flat and dispenser boxes are typically rectangular in shape and wider than they are tall. Cube boxes are typically an upright package with a square base and an elongated height.

Finishing Broke. Discarded paper resulting from any finishing (converting) operation, including, but not limited to, winding, slitting, cutting, sorting, counting, cartoning, palletizing, and wrapping.

Fragrance. A constituent, often (but not limited to) a multi-component constituent, used in a product for the purpose of imparting a scent to the product.

Fresh Water Use. The total amount of steam, process, and cooling water used in the manufacture of *sanitary paper products*, including water used during re-pulping of *recovered material* or pulping of *agricultural residue*, throughout the paper making process; and during converting (if applicable). Fresh water does not include *whitewater* or other recycled water streams.

Functional Papermaking Additives. *Functional papermaking additives* are those that are added to the paper machine *furnish* primarily for retention within or on the product, such as fillers, sizing agents, retention aids, wet- and dry-strength resins, *colorants*/dyes, and *optical brighteners*. Other materials added to the process through the water to facilitate the papermaking process, during drying, or in wastewater treatment, are not considered functional paper making additives, including, but not limited to, cooling tower or boiler chemicals, paper machine cleaners, surfactants, detergents, defoamers, dispersants, foaming agents, collectors, dryer coating or release aids, and flocculants.

Furnish. The mixture of *recovered material* fiber or *agricultural residue* fiber and other chemicals that is blended in a water suspension, or slurry, from which paper products are made. Also referred to as stock.

General-Purpose Wipers. A class of absorbent disposable paper products suitable for use as industrial or retail wipers and containing no cleaning agents (e.g., surfactants) or *fragrances*.

Institutional. A category of products manufactured for use at institutional facilities, such as schools, hospitals, hotels, or offices, sold to professional purchasing staff and not to consumers.

Integrated Mill. A facility with either a pulp mill or the capability to re-pulp virgin or recovered fiber and a paper mill on the same site.

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.

Mill Broke. Paper discarded from any point in the manufacturing process, which is subsequently re-pulped and reprocessed. "Wet broke" is typically generated from the wire or presses, while "dry broke" emanates from the dryers, reel, and winder.

Mutagen. Substances designated as known to induce heritable mutations, regarded as if they induce heritable mutations in the germ cells of humans, and thus meet~~s~~ the criteria for categories 1 and 2 (H340 and H341) under the GHS.

Nonwood Fiber. Fiber from plants that can be used in the manufacture of *sanitary paper products*, including: bamboo, hemp, flax, wheat straw, cotton, kenaf, sugar cane, or other plants that are botanically not considered trees.

Nonwoven Sanitary Products. A product category that incorporates nonwoven fabrics in the manufacturing process. A product is considered nonwoven when the fibers (synthetic or pulp) used in fabrication are bonded together instead of woven, using either an adhesive or a chemical reaction. Nonwoven products include, but are not limited to, disposable diapers, feminine hygiene products, or premoistened tissues.

Optical Brightener. Additives designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents.

Ozone-Depleting Compound. Any compound with an ozone-depletion potential greater than 0.01 (chlorofluorocarbon 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances; or any substances or mixtures falling into category 1 (H420), hazardous to the ozone layer, under the GHS.

Papermaking Process. The process of using fiber, water and additives to make paper, including, but not limited to, pulping, re-pulping, cleaning, screening, deinking, washing, bleaching, and papermaking.

Paper Napkins. A class of absorbent, disposable paper products that is typically folded and is suitable for wiping hands and mouth, including, but not limited to: *retail* beverage, luncheon, dinner, and guest towel napkins; *institutional* folded napkins used with or without a dispenser; small *institutional* dispenser napkins; and *institutional* beverage, luncheon, dinner, and guest towel napkins.

Paper Towels. A class of absorbent, disposable paper products suitable for use in drying hands, wiping windows, cleaning equipment, or cleaning up spills, including, but not limited to: *retail*, perforated roll towels; *retail*, folded towels; *institutional*, hardwound roll towels; *institutional*, folded towels, and *institutional*, perforated roll towels.

Parent Roll. The full-width roll produced from a paper machine, prior to any further finishing or converting.

Placemats. A protective layer made from paper for a portion of a table or other surface. Tray liners are considered the same as placemats for the purposes of this standard.

Post-Consumer Material. Material that would otherwise be disposed of as *solid waste*, having completed its intended end-use by the consumer. *Post-consumer material* does not include materials or *by-products* generated from, and commonly reused within, an original manufacturing and fabrication process.

Pre-Consumer Material. Material diverted from a waste stream during the manufacturing process, excluding material such as rework, regrind, or scrap generated in a process and capable of being reused within the same process that generated it.

Primary Packaging. Material physically containing and coming into physical contact with the product, including, but not limited to: paper and paperboard material such as roll cores, brown papers, wrappers, bands, and folding cartons; and plastic materials such as film wrappers and roll core inserts.

Processed Chlorine Free (PCF). Paper products made from *recovered materials* that may have been, in their original manufacturing process, bleached using chlorine or chlorine-derivatives (e.g., elemental chlorine, chlorine dioxide, sodium hypochlorite, sodium chlorite), but were not re-bleached with chlorine or chlorine-derivatives. Any virgin fiber[8] or agricultural residue incorporated into the final product is *Totally Chlorine Free*.

Recovered Material. Either material recovered from or otherwise diverted from the *solid waste* stream, that is generated after the completion of the paper manufacturing process; or fiber and broke recovery that contains 100% *recovered material* and is integral to the manufacturing process from which it was generated.

Recovered material may include:

- *Pre-consumer materials* such as finishing waste generated after completion of the *papermaking process* (i.e., during converting), such as envelope cuttings; bindery trimmings; printing waste; cuttings and other converting waste (*finishing broke*); butt rolls and mill wrappers; obsolete inventories; and rejected unused stock.
- *Post-consumer materials* such as paper, paperboard, and fibrous materials from *retail* stores, office buildings, homes, etc., after they have completed their intended end-use.
- Fibers recovered from *whitewater* or *wastewater*, or *mill broke* (wet or dry) generated from the manufacturing process used only to make the certified product (i.e., *mill broke* containing 100% *recovered material*).

Recovered material does not include:

[8] This definition is consistent with common use in industry. GS-1 only covers products that are made from waste materials (i.e., *recovered material* and *agricultural residue*). Virgin fiber is not an acceptable raw material for products certified to GS-1.

- Fibers recovered from *whitewater* or *wastewater*, or *mill broke* (wet or dry) generated from the manufacturing process used to make non-certified products containing virgin material (i.e., *mill broke* containing any virgin material), regardless of whether such materials are used by the same or another company.
- Forest residue such as fibrous *by-products* of harvesting, extractive, or woodcutting processes.

Recyclable. The package or product 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 product package through an established recycling program.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male reproductive toxins) 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., also known as Proposition 65), substances designated as category 1 (H360), known or presumed reproductive toxicant, or category 2 (H361), suspected human reproductive toxicant, under the GHS, or a substance designated as having adverse effects on or via lactation (H362), under the GHS.

Retail. A category of products typically manufactured for use in residential homes and sold to consumers.

Sanitary Paper Products. Products covered by the Standard Industrial Code (SIC) 2676. Products including *facial* and *bathroom tissues*, *toilet seat covers*, *paper towels* and *general-purpose wipes*, *paper napkins*, paper *placemats* and *table coverings*. Products that are technically in this category by SIC code, but not covered by this standard, include *nonwoven sanitary products*, general-purpose disposable and flushable wipes containing cleaning agents or *fragrances*, disposable diapers, sanitary napkins, and tampons.

Secondary Packaging. Packaging used to contain primary package/s and typically used for merchandizing or labeling. This does not include the *primary package* or additional shipping packaging.

Solid Waste. Waste materials from the manufacturing of the product not included in the finished product, which are not salable and are discarded. Sanitary waste (e.g., restrooms, etc.) and materials that are recycled are excluded.

Source-Reduced Package. A package or packaging item that has at least 20% less material by weight for a given product unit (e.g., paper towel roll, box of tissue) compared to the packaging for a given product unit (of the same size), commonly used for that product.

Source Reduction. Altering the design, manufacture, or use of *sanitary paper products* to reduce the amount that would be disposed of in a landfill.

Table Coverings. A lightweight, protective layer made from paper intended to cover an entire table or other surface.

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

Third-Party Certification Program. A program without any financial interest or stake in the sales of the product or service being certified or other conflict of interest. The basis for certification must be a publicly-available standard that was developed with stakeholder input. Certification to the standard must be completed by an independent party (i.e., not the product company), include site inspections, where applicable, and have a monitoring program to verify ongoing compliance.

Toilet Seat Covers. A class of soft, thin paper product used to cover toilet seats for personal hygiene protection, designed to disperse in septic tanks.

Totally Chlorine Free (TCF). Virgin-content papers, including those made from *agricultural residue*, that have not been bleached using chlorine or chlorine-derivatives (e.g., elemental chlorine, chlorine dioxide, sodium hypochlorite, sodium chlorite).

Virgin Fiber/Material. Fiber/material that is not of recovered or post-consumer origin.

Wastewater. Wastewater effluent from the manufacturing of the product, that is not salable and is treated and disposed at an onsite or offsite wastewater treatment facility.

Whitewater. Whitewater is a general term for any *furnish* (stock) filtrate or process water that contains fiber fines. On a paper machine, whitewater is produced during the forming and dewatering of the paper sheet.

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-1:

Products included in GS-1

- *Paper towels* (hardwound, folded, or kitchen roll)
- *Paper napkins* (beverage, luncheon, dinner)
- *General-purpose wipers* that do not contain any added cleaning agents or fragrances
- *Bathroom tissue*
- *Facial tissue* (flat box and cube box)
- *Facial tissue* with *added lotion*
- *Toilet seat covers*
- *Placemats* or tray liners
- *Table coverings*

Products excluded from GS-1

Nonwoven sanitary products
General purpose disposable and flushable wipes that contain added cleaning agents or *fragrances*
Facial tissue (travel packs)
Cotton balls, cosmetic pads
Disposable diapers
Sanitary napkins and tampons
Printing and writing paper (included in GS-7)
Newsprint
Paper products used in the preparation of food (included in GS-18)
Coated groundwood paper and coated groundwood free printing paper (included in GS-10)
Specialty paper such as thermal or carbon paper
Packaging materials

GS-7

GREEN SEAL® STANDARD FOR

PRINTING AND WRITING PAPER

EDITION 6.1

(New Format)

JULY 12, 2013

Green Seal, Inc. • www.greenseal.org

GREEN SEAL®

Green Seal is a non-profit 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~~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 PRINTING AND WRITING PAPER, GS-7

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FOREWORD

Edition. Edition 6.1 was issued on July 12, 2013 and replaces the Sixth Edition from November 12, 1999. This revision included substantive changes. Corrections and/or clarifications were last made to this standard on August 2316, 2024 ~~July 26, 2023~~. Information on changes made to this standard are available 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section2

GREEN SEAL STANDARD FOR PRINTING AND WRITING PAPER, GS-7

1.0 SCOPE

This standard establishes requirements for:

1.1 Printing and writing paper. The subcategories of paper included in this Standard are:

1.1.1 Blanks including papers for printed signs, point of purchase displays, window displays, posters and calendar backs.

1.1.2 Bond paper including letterhead, stationery, invoices, self-adhesive note paper, statement papers and duplicating papers for gelatin type of hectographic reproduction.

1.1.3 Bristols including file folders, index cards, ruled forms, mailing cards, tag papers, wedding invitations, and postal bristol.

1.1.4 Business forms including papers sold to be used in business forms and computer printout paper.

1.1.5 Copy paper including paper made for use in the ~~high speed~~high-speed electrostatic reproduction process.

1.1.6 Cover paper including heavy papers sold for use as covers for books, catalogs, brochures, pamphlets and similar purposes.

1.1.7 Drawing paper including papers for architects, artists, and draftsmen for pen or pencil drawings and paper used primarily by school children for sketching, crayon, or watercolor work.

1.1.8 Labels including labels for file folders, mailing, shipping, and similar purposes.

1.1.9 Ledger paper including paper used in bound and loose-leaf ledger books, accounting record systems, and legal paper.

1.1.10 Lightweight printing paper including high quality, high opacity lightweight papers used in bibles, dictionaries, manuals, and professional reference books to reduce bulk.

1.1.11 Manifold and onionskin paper including paper used for airmail stationery, catalogs, manuals, envelope enclosures, advertisements and carbon copies of correspondence and legal documents.

1.1.12 Tablet paper including loose leaf paper, notebooks, note pads, adding machine rolls, and cash register rolls.

1.1.13 Text paper including paper used in annual reports, booklets, menus, announcements, advertising and corporate advertising circulars.

1.1.14 Uncoated groundwood free papers including uncoated paper used for personalized ~~computer generated~~computer-generated letters and promotional mailings in the business forms industry, book manufacturing, magazine blow cards, and duplicating paper for spirit machines.

1.1.15 Gift wrapping paper including plain and decorated wrapping papers, not including packaging or packaging materials.

1.1.16 Other recycled printing and writing paper including all other paper sold primarily for use in printing and writing.

1.2 Paper specifically excluded from this Standard. This standard specifically does not include the following paper:

1.2.1 Uncoated groundwood papers including Newsprint. [Newsprint is covered by Green Seal Standard GS-15.]

1.2.2 Packaging materials.

1.2.3 Tissue products. [Tissue Products area covered by Green Seal Standard GS-1.]

1.2.4 Specialty papers such as carbon paper and carbonless carbon paper.

1.2.5 Coated groundwood paper and coated groundwood free printing paper. [These products are covered by Green Seal Standard GS-10.]

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.~~

~~The product must be made in accordance with reasonable industry practice with respect to quality and performance.~~

23.0 ~~PRODUCT-SPECIFIC ENVIRONMENTAL REQUIREMENTS.~~SAFER CHEMICALS

The product must meet the requirements under **either** section 3.1 (Recycled Content Requirements) **or** section 23.1.1~~2~~ (Production Process Requirements.).

2.1 Safer Ingredients

23.1.12 Production Process Requirements

32.12.21 If *recovered material* is used to manufactured the product, it shall not be deinked using a solvent containing chlorine or one listed by the Environmental Protection Agency pursuant to Section 313 of the Emergency Planning and Community Right to Know Act, 40 Code of Federal Regulations Section 372.

32.12.32 Neither chlorine nor any of its derivatives (such as hypochlorite and chlorine dioxide) shall be used in the bleaching agent if bleaching is employed in the manufacturing of virgin pulp used in the product, in the processing of *recovered material*, or in the manufacturing of the product itself.

~~**3.1 Recycled Content Requirements**~~

~~**3.1.1** For high-speed copy paper, offset paper, forms bond, computer printout paper, file folders, and white woven envelopes, and for other uncoated printing and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock, the product shall contain at least 30 percent *post-consumer materials.*~~

~~**3.1.2** The percentage of *recovered material* and *post-consumer material* shall be calculated and certified based on the fiber weight of the paper. Calculations will also be performed based on the total weight of the paper.~~

~~**3.1.3** The calculation of *recycled material* content based on fiber weight shall be performed using the following formulas.~~

~~**3.1.3.1** *Recovered Material:*~~

~~$$\frac{(\textit{Recovered Material} \times \text{Yield})}{[(\text{Virgin Pulp} \times \text{Yield}) + (\textit{Recovered Material} \times \text{Yield})]}$$~~

~~**3.1.3.2** *Post-Consumer Material:*~~

~~$$\frac{(\textit{Post-Consumer Material} \times \text{Yield})}{[(\text{Virgin Pulp} \times \text{Yield}) + (\textit{Recovered Material} \times \text{Yield})]}$$~~

~~**3.1.4** The calculation of *recycled material* content based on total weight shall be performed using the following formulas:~~

~~**3.1.4.1** *Recovered Material*:~~

~~(Recovered Material x Yield)~~
~~[(Non-Fibrous Material x Yield) + (Virgin Pulp x Yield) + (*Recovered Material* x Yield)]~~

~~**3.1.4.2** *Post-Consumer Material*:~~

~~(Postconsumer Material x Yield)~~
~~[(Non-Fibrous Material x Yield) + (Virgin Pulp x Yield) + (*Recovered Material* x Yield)]~~

~~**3.1.5** Yield loss will depend on the product manufactured, the raw material, the level of contaminants and the cleaning and deinking technology employed. The percentage yield shall be calculated by dividing the total material output by the total material input.~~[2]

~~**3.1.6** The percentage of *recovered material* and *post-consumer material* shall be calculated based on a weighted average of the materials used for a period of time not to exceed the previous three months.~~

3.0 RESPONSIBLE SOURCING

3.1 Recycled Content Requirements

3.1.1 For high-speed copy paper, offset paper, forms bond, computer printout paper, file folders, and white woven envelopes, and for other uncoated printing and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock, the product shall contain at least 30 percent *post-consumer materials*.

3.1.2 The percentage of *recovered material* and *post-consumer material* shall be calculated and certified based on the fiber weight of the paper. Calculations will also be performed based on the total weight of the paper.

3.1.3 The calculation of *recycled material* content based on fiber weight shall be performed using the following formulas.

3.1.3.1 *Recovered Material*:

(*Recovered Material* x Yield)
[(Virgin Pulp x Yield) + (*Recovered Material* x Yield)]

~~[2] If a particular manufacturer's operating procedures do not provide for accurate yield measurements, the following shall be used as default values: *Recovered/Post-Consumer Material*: 70% Virgin Pulp: 100% Non-fibrous material: 100%~~[2]

3.1.3.2 *Post-Consumer Material*:

$$\frac{\text{(Post-Consumer Material x Yield)}}{\text{[(Virgin Pulp x Yield) + (Recovered Material x Yield)]}}$$

3.1.4 The calculation of *recycled material* content based on total weight shall be performed using the following formulas:

3.1.4.1 *Recovered Material*:

$$\frac{\text{(Recovered Material x Yield)}}{\text{[(Non-Fibrous Material x Yield) + (Virgin Pulp x Yield) + (Recovered Material x Yield)]}}$$

3.1.4.2 *Post-Consumer Material*:

$$\frac{\text{(Postconsumer Material x Yield)}}{\text{[(Non-Fibrous Material x Yield) + (Virgin Pulp x Yield) + (Recovered Material x Yield)]}}$$

3.1.5 Yield loss will depend on the product manufactured, the raw material, the level of contaminants and the cleaning and deinking technology employed. The percentage yield shall be calculated by dividing the total material output by the total material input.[2]

3.1.6 The percentage of *recovered material* and *post-consumer material* shall be calculated based on a weighted average of the materials used for a period of time not to exceed the previous three months.

~~**3.2 Production Process Requirements**~~

~~**3.2.1** If *recovered material* is used to manufactured the product, it shall not be deinked using a solvent containing chlorine or one listed by the Environmental Protection Agency pursuant to Section 313 of the Emergency Planning and Community Right to Know Act, 40 Code of Federal Regulations Section 372.~~

~~**3.2.2** Neither chlorine nor any of its derivatives (such as hypochlorite and chlorine dioxide) shall be used in the bleaching agent if bleaching is employed in the manufacturing of virgin pulp used in the product, in the processing of *recovered material*, or in the manufacturing of the product itself.~~

4.0 ~~PACKAGING REQUIREMENTS~~SUSTAINABLE PACKAGING

4.1 Restricted Substances

[2] If a particular manufacturer's operating procedures do not provide for accurate yield measurements, the following shall be used as default values: *Recovered/Post-Consumer Material*: 70% Virgin Pulp: 100% Non-fibrous material: 100%

4.1.1~~1~~ Heavy Metals. The sum of the concentration levels of lead, cadmium, mercury, and hexavalent chromium present in any package or packaging component shall not exceed 100 parts per million by weight.

5.0 VERIFIED PERFORMANCE AND CLAIMS.

5.1 Product Performance. The product must be made in accordance with reasonable industry practice with respect to quality and performance

6~~5~~.0 TRADEMARK USE REQUIREMENTS

6~~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.[3]

6~~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.

[3] ~~3~~ www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS OF TERMS (Normative)

Note that the defined terms are italicized throughout the standard.

Post-Consumer Material. Those finished products, packages or materials generated by a business or consumer that have served their intended end uses and that have been recovered from or otherwise diverted from the waste stream for the purpose of recycling.

Recovered Material. Waste materials and by-products which have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-7:

Products Included in GS-7

- Blanks including papers for printed signs, point of purchase displays, window displays, posters and calendar backs.
- Bond paper
- Bristols
- Business forms
- Copy paper
- Cover paper
- Drawing paper
- Labels including labels for file folders, mailing, shipping, and similar purposes.
- Ledger paper
- Lightweight printing paper
- Manifold and onionskin paper
- Tablet paper
- Text paper
- Uncoated groundwood free papers
- Gift wrapping paper
- Other recycled printing and writing paper including all other paper sold primarily for use in printing and writing.

Products Excluded from GS-7

- Paper towels (included in GS-1)
- Napkins (included in GS-1)
- Nonwoven sanitary products
- General purpose disposable and flushable wipes
- Bathroom tissue (included in GS-1)
- Facial tissue (travel packs)
- Facial tissue (flat box and cube box) (included in GS-1)
- Toilet seat covers (included in GS-1)
- Placemats or tray liners (included in GS-1)
- Table coverings (included in GS-1)
- Paper products used in the preparation of food (included in GS-18)
- Coated groundwood paper and coated groundwood free printing paper (included in GS-10)
- Newspaper (included in GS-15)
- Inserts made from newsprint (included in GS-15)
- Miscellaneous published material made from newsprint (e.g., flyers) (included in GS-15)
- Specialty paper such as thermal or carbon paper
- Packaging materials

GS-8

GREEN SEAL® STANDARD FOR

CLEANING PRODUCTS FOR HOUSEHOLD USE

EDITION 5.7

(New Format)

June 23, 2022

Green Seal, Inc. • greenseal.org

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~~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 CLEANING PRODUCTS FOR HOUSEHOLD USE, GS-8 TABLE OF CONTENTS

FOREWORD

Edition. Edition 5.7 was issued on June 23, 2022. It replaces Edition 5.6 from November 11, 2021. Corrections and/or clarifications were last made to this standard on ~~July 26,~~August 23, 2024. Information on changes made to this standard is available 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section3

ACRONYMS AND ABBREVIATIONS

AATCC. American Association of Textile Chemists and Colorists
AISE. Association for Soaps, Detergents and Maintenance Products
ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials
CARB. Air Resources Board for the State of California
CFR. Code of Federal Regulations
CFU. Colony Forming Unit
CO_2. Carbon Dioxide
HCPA. ~~Housechld~~Household and Commercial Products Association
EN. European Standard
GHS. Globally Harmonized System of Classification and Labelling of Chemicals
GMM. Genetically Modified Microorganism
ISO. International Organization for Standardization
JECFA. Joint Food and Agricultural Organization of the United Nations/ WHO Expert Committee on Food Additives
SDS. Safety Data Sheet
OECD. Organization for Economic Co-operation and Development
VOC. Volatile Organic Compound
WHO. World Health Organization

GREEN SEAL STANDARD FOR CLEANING PRODUCTS FOR HOUSEHOLD USE, GS-8

1.0 SCOPE

This standard establishes requirements for *general-purpose*, *bathroom*, *glass*, and *carpet cleaners* marketed specifically for use in households or similar residential settings. This standard includes *general-purpose*, *bathroom*, *glass* and *carpet* cleaning products that contain *enzymes* or *microorganisms*. This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. This standard does not include antimicrobial pesticide products such as those requiring registration with the U.S. Environmental Protection Agency (EPA) under the Federal Insecticide Fungicide and Rodenticide Act, such as those making claims as sterilizers, disinfectants, or sanitizers[2]. See Appendix 1 for an example 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~~

~~**2.1 Standard Performance Requirements.** Each *product as used*, when diluted with water from the cold tap at no more than 50°F, shall clean common soils and surfaces in its category effectively, as measured by a standard test method. *Carpet cleaners* may be diluted with warm or hot water where required by the test method or performance considerations. The following test methods are recommended:~~

- ~~General-purpose cleaners. The *general-purpose cleaner* product shall remove at least 80% of the particulate soil in the American Society for Testing and Materials (ASTM) D4488-95, A5.~~
- ~~Bathroom cleaners. The *bathroom cleaner* product shall remove at least 75% of the soil in ASTM D5343 as measured by ASTM D5343.~~
- ~~Carpet cleaners. Using a standard test method, the manufacturer must demonstrate that its *carpet cleaner* product performs as well as a nationally recognized or marketing-leading product in its category in both cleaning efficiency and resoiling resistance. Acceptable test methods/procedures to demonstrate performance include, but are not limited to, the following sources: the American Association of Textile Chemists and Colorists (AATCC), ASTM, the Institute of Inspection, Cleaning and Restoration Certification, the International Organization for Standardization (ISO), WoolSafe, the Carpet and Rug Institute or laboratory testing conducted as part of a bid evaluation by a government purchasing entity.~~

[2] Antimicrobial pesticide products such as EPA-registered products are included in the Green Seal Standard for Specialty Cleaning Products for Household Use, GS-52.

- ~~Glass cleaners. The *glass cleaner* product shall achieve at least a rating of three in each of the following HCPA method DCC 09 categories: soil removal, smearing, and streaking.~~

~~**2.2 Alternative Performance Requirements.** Alternatively, using standard test methods conducted under objective, reproducible laboratory conditions, a manufacturer can demonstrate that its product performs as well as or better than a nationally recognized or market-leading product of its type or achieves the removal efficiency defined in this section with alternate test methods and has a documented rationale for the method modification for Green Seal's review.~~

23.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Aquatic Biodegradability. Each of the organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers.

Biodegradability shall be measured according to any of the following methods:

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

Specifically, within a 28-day test, the organic *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_2 evolution, as % of theoretical CO_2 > 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 $LC_{50} \geq 100$ 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.

2.1.2 Aquatic Toxicity. 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 LC_{50} for algae, daphnia, or fish >100 mg/L. Aquatic toxicity tests shall follow the appropriate protocols in ISO 7346.2 for fish or OECD test guidance 203 for fish, OECD test guidance 201 for algae, and OECD test guidance 202 for daphnia.

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.

2.1.3 Combustibility. The undiluted product shall not be combustible. The 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 ISO 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D4206.

2.1.4 Fragrances. Manufacturers shall disclose the use of any added fragrances on their safety data sheets (SDSs) and product labels. Any *ingredient* added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.

2.1.5 Other Prohibited Ingredients. The undiluted product shall not contain the following *ingredients*:

- 2-Butoxyethanol
- Alkylphenol ethoxylates
- Phthalates
- The heavy metals lead, hexavalent chromium, or selenium, either in the elemental form or compounds.
- *Ozone-depleting compounds*
- *Optical brighteners*

2.1.6 Per- and Polyfluoroalkyl Substances (PFAS). The undiluted product shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS).*

2.1.7 Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex C criteria.

2.1.8 Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex D criteria.

2.1.9 Prohibition of Carcinogens, Mutagens, and Reproductive Toxins. The undiluted product shall not contain any *ingredients* that are *carcinogens*, *mutagens* or

reproductive toxins. For the purposes of this standard, naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered *ingredients* if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Note: Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.

2.1.10 Skin and Eye Damage. The undiluted product shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the *ingredients* in the undiluted product. 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 also 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

Note: Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

2.1.11 Skin Sensitization. The undiluted product shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *ingredients*. If the *ingredients* at the concentrations in the undiluted product are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

2.2 Safer Products

2.2.1~~3.1~~ Acute Toxicity. The undiluted product shall not be toxic to humans. A product is considered toxic if either of the following apply:

Oral lethal dose 50 (LD_{50})	$\leq$ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	$\leq$ 20 mg/L at 1 hr

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *ingredients* in the undiluted product may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *ingredients* is additive. The toxicity values are adjusted by the weight of the *ingredients* in the product and summed using the following formula:

Where,

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

TP = toxicity of the product
wt_i = the weight fraction of the *ingredient*
TV_i = the toxicity value for each *ingredient* (LD_{50})
n = number of *ingredients*

Inhalation toxicity shall be determined from all *ingredients* with a vapor pressure greater than 1 mm Hg at ambient conditions (1 atm pressure and 20-25° C).

Note: Refer to Annex B for potential alternative thresholds for products as *powders/solids/non-aqueous liquids.*

2.2.2 Eutrophic Agents. The *product as used* shall not contain more than 0.5% by weight of total phosphorus.

2.2.3 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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

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

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 VOCs[4].

Product Category	Effective Date	Limit (%)
Carpet cleaners (dilutable)	1/1/2001	0.1
Carpet cleaners (ready-to-use)	12/31/2010	1
General purpose cleaners	12/31/2012	0.5
Glass cleaners	12/31/2012	3

[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.

Product Category	Effective Date	Limit (%)
Bathroom/Restroom *cleaners*	12/31/2008	1
Spot Removers	12/31/2012	3

2.2.4 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.

~~**3.2 Prohibition of Carcinogens, Mutagens, and Reproductive Toxins.** The undiluted product shall not contain any *ingredients* that are *carcinogens*, *mutagens* or *reproductive toxins*. For the purposes of this standard, naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered *ingredients* if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.~~

~~**Note:** Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.~~

~~**3.3 Skin and Eye Damage.** The undiluted product shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the *ingredients* in the undiluted product. 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 also 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.~~

~~**Note:** Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.~~

~~**3.4 Skin Sensitization.** The undiluted product shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *ingredients*. If the *ingredients* at the concentrations in the undiluted product are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.~~

3.5 Aquatic Toxicity. 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 LC_{50} for algae, daphnia, or fish ≥100 mg/L. Aquatic toxicity tests shall follow the appropriate protocols in ISO 7346.2 for fish or OECD test guidance 203 for fish, OECD test guidance 201 for algae, and OECD test guidance 202 for daphnia.

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.

3.6 Aquatic Biodegradability. Each of the organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers.

Biodegradability shall be measured according to any of the following methods:

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

Specifically, within a 28-day test, the organic *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_2 evolution, as % of theoretical CO_2 > 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 $LC_{50} \geq 100$ 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.

3.7 Eutrophic Agents. The *product as used* shall not contain more than 0.5% by weight of total phosphorus.

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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

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

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*[5].

Current CARB regulatory limits for VOCs[6].

Product Category	**Effective Date**	**Limit (%)**
Carpet cleaners (dilutable)	1/1/2001	0.1
Carpet cleaners (ready-to-use)	12/31/2010	1
General purpose cleaners	12/31/2012	0.5
Glass cleaners	12/31/2012	3
Bathroom/Restroom *cleaners*	12/31/2008	1
Spot Removers	12/31/2012	3

3.9 Per- and Polyfluoroalkyl Substances (PFAS). The undiluted product shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.10 Other Prohibited Ingredients. The undiluted product shall not contain the following *ingredients*:

- 2-Butoxyethanol
- Alkylphenol ethoxylates
- Phthalates
- The heavy metals lead, hexavalent chromium, or selenium, either in the elemental

[5] 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%.

[6] 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.

~~form or compounds.~~

- ~~*Ozone-depleting compounds*~~
- ~~*Optical brighteners*~~

~~**3.11 Combustibility.** The undiluted product shall not be combustible. The 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 ISO 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D4206.~~

~~**3.12 Fragrances.** Manufacturers shall disclose the use of any added fragrances on their safety data sheets (SDSs) and product labels. Any *ingredient* added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.~~

~~**3.13 Products Containing Enzymes.** Products that contain *enzymes* shall meet all Annex C criteria.~~

~~**3.14 Products Containing Microorganisms.** Products that contain *microorganisms* shall meet all Annex D criteria.~~

~~**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.~~

3.0 RESPONSIBLE SOURCING

3.1~~6~~ Disposable Wipes. Products may contain disposable wipes/towelettes/sheets or other disposable single-use materials if they are made from agricultural products, wood pulp, and other cellulosic materials. An exception shall be made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

4.0 ~~PACKAGING REQUIREMENTS~~ SUSTAINABILE PACKAGING

4.1 Packaging Materials

4.1.1 Primary Package. The *primary package* shall be at least one of the following:

- A *source-reduced package*

- *Recyclable*
- Contain 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

4.1.2 Secondary Package. A s*econdary package* shall only be used for *concentrates.* An exception may be made for packaging of multiple units when at least one of the units is a ready-to-use form, and the total packaging (*primary package* plus *secondary package*) is a reduction in overall packaging material use.

~~**4.3 Concentrated Product Packaging.** *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use *primary package* forms.~~

4.1.34 Aerosol Cans. Aerosol cans shall be *recyclable* packages. Further, manufacturers of products packaged in aerosol cans must show that recycling programs are widely available where the product is sold. In addition, manufacturers of products packaged in aerosol cans must demonstrate why aerosol cans are the most suitable packaging for a given product considering environmental, health, and performance considerations.

4.2 Packaging Label

4.2.1 Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code.

4.3 Restricted Substances

4.3.14.5 Heavy Metal Restrictions. There shall be no *intentional introduction* of lead, mercury, cadmium, and hexavalent chromium to *primary packaging*. 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 *recovered material*.

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

~~**4.7 Resin Identification Code.** If plastic, the packaging shall be marked with the appropriate Resin Identification Code.~~

5.0 ~~PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

5.1 Product Performance

5.1.1~~2.1~~ Standard Performance Requirements. Each *product as used*, when diluted with water from the cold tap at no more than 50°F, shall clean common soils and surfaces in its category effectively, as measured by a standard test method. *Carpet cleaners* may be diluted with warm or hot water where required by the test method or performance considerations. The following test methods are recommended:

- **General-purpose cleaners.** The *general-purpose cleaner* product shall remove at least 80% of the particulate soil in the American Society for Testing and Materials (ASTM) D4488-95, A5.
- **Bathroom cleaners.** The *bathroom cleaner* product shall remove at least 75% of the soil in ASTM D5343 as measured by ASTM D5343.
- **Carpet cleaners**. Using a standard test method, the manufacturer must demonstrate that its *carpet cleaner* product performs as well as a nationally recognized or marketing-leading product in its category in both cleaning efficiency and resoiling resistance. Acceptable test methods/procedures to demonstrate performance include, but are not limited to, the following sources: the American Association of Textile Chemists and Colorists (AATCC), ASTM, the Institute of Inspection, Cleaning and Restoration Certification, the International Organization for Standardization (ISO), WoolSafe, the Carpet and Rug Institute or laboratory testing conducted as part of a bid evaluation by a government purchasing entity.
- **Glass cleaners.** The *glass cleaner* product shall achieve at least a rating of three in each of the following HCPA method DCC 09 categories: soil removal, smearing, and streaking.

5.1.2~~2.2~~ Alternative Performance Requirements. Alternatively, using standard test methods conducted under objective, reproducible laboratory conditions, a manufacturer can demonstrate that its product performs as well as or better than a nationally recognized or market-leading product of its type or achieves the removal efficiency defined in this section with alternate test methods and has a documented rationale for the method modification for Green Seal's review.

5.2 Product Label

5.2.1~~5.1~~ Use Instructions. The label must include detailed instructions for proper use to maximize product performance and minimize waste.

5.2.2~~5.2~~ Dilution Instructions. Where the product is intended to be diluted with water prior to use, the label shall not instruct users to dilute with hot or warm water. Carpet cleaner labels may instruct users to use hot or warm water if dilution in cold water results in significant performance degradation. The label shall include the recommended level of dilution in commonly understood measurements.

5.2.3~~5.3~~ Disposal Instructions. The label must include proper disposal instructions. If the product is a towelette or other disposable wipe product, the label must clearly indicate proper disposal of the wipes.

5.2.45.4 Protective Equipment. The label shall also include instructions for proper use of personal protective equipment.

Note: Additional Product Label Requirements
For products formulated with fragrances, refer to Criterion 2.1.43.11.
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex B.
For products containing *enzymes*, refer to Annex C.
For products containing *microorganisms*, refer to Annex D.

5.3 Product Design5.3

5.3.1 Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use *primary package* forms.

6.0 TRADEMARK USE REQUIREMENTS

6.1 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.Guidelines.[5]

6.2 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.

Aerosol Packaging. A *package* that requires a pressurized propellant to dispense product through a nozzle.

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Asthmagen. A substance designated as an *asthma* causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

Bathroom Cleaner. A product used to clean hard surfaces in a household bathroom such as counters, walls, floors, fixtures, basins, tubs, and tile.

Carpet Cleaner. A product used for routine cleaning of household carpets and rugs. This category may include, but is not limited to, products used in cleaning by means of extraction, shampooing, dry foam, bonnet, or absorbent compound. It does not include products intended primarily for spot removal.

Carcinogen. A chemical listed as a known, probable, or possible human *carcinogen* by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), the National Toxicology Program (Groups 1 and 2), the EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, and C), or the Occupational Safety and Health Administration.

Child-Resistant Packaging. Child-resistant packaging, as defined by the Poison Prevention Packaging Act, is packaging that is designed or constructed to be significantly difficult for children under five years of age to open to obtain a toxic or harmful amount of the substance contained in therein within a reasonable time, and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, part 1700 and Title 40, Part 157.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality.[6]

[6] Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply, are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Concentrate. A product that must be diluted by water prior to its intended use, or a product that is diluted during use.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

General-Purpose Cleaner. A product specifically marketed as suitable for cleaning common household surfaces. They do not include task-specific cleaners, such as scouring cleaners, toilet bowl cleaners, upholstery cleaners, laundry and dishwashing detergents, spot/stain removers, oven cleaners, furniture polish, or drain cleaners.

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which *GMM* are produced are listed by the European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Glass Cleaner. A product used to clean windows, glass, and mirrored surfaces.

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

Intentional Introduction. 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.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

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~~of Chemicals Which Cause Mutations in Germ Cells (UN, 2003).

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation; including but not limited to fluorescent whitening agents.

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

Package. This includes the *primary package* used for the product.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Primary Cleaning Function. For the purposes of this standard, a cleaning product's primary function is to remove soil.

Primary Package. The material physically containing and coming into contact with the product, not including the cap, lid, or nozzle of a package. 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. This is the most commonly used form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a floor cleaner *concentrate* be diluted 1:8 with water, the product shall meet the environmental and performance requirements that specify 'as used' at a dilution of 1:8.

Post-Consumer Material. Finished products, packages or materials generated by a business or consumer that have served their intended end uses, and that have been recovered from or otherwise diverted from the waste stream for the purpose of recycling.

Recovered Material. Material that has been recovered from or otherwise diverted from the waste generated after a material manufacturing process. Recovered material may include *post-consumer* material, cuttings, trimmings, obsolete inventories, and rejected unused stock, but does not include material capable of being re-used within the process that generated it.

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 rigid plastic packaging container that can be refilled by the product manufacturer at least five times with the original product held by that package and is proven to be routinely returned to the product manufacturer by the consumer for such a purpose.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male toxins) 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.).

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 respiratory sensitization (H334) in accordance with the GHS.

Secondary Function. For the purposes of this standard, the secondary function of a cleaning product may be to enhance the primary cleaning function through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

Secondary Package. Any packaging or material other than the primary package, including wrappers, boxes, and blister packs, but excluding shipping containers.

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 designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the GHS are also considered to cause skin corrosion.

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

Source-Reduced Package. A *primary 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 *primary packages*, the box is included in the weight if the box is used during product use or in product merchandising.

Spray Packaging. A *package* that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a ~~foam~~foam, or a liquid stream are not considered spray packaging.

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

World Health Organization (WHO) Risk Group 1. Microorganisms that are unlikely to cause human or animal disease under the basis for classification defined by the World Health Organization in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health (NIH)
- European Commission
- Singapore
- Japan

ANNEX B – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (2.1.10~~3.3~~) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (2.2.1~~3.1~~) herein.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye corrosion.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word “WARNING” or ‘CAUTION” on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
    - May cause skin corrosion, do not get on skin
    - May cause serious eye damage, do not get in eyes
    - ~~o~~ Harmful if swallowed, do not ingest
    - o
- Instruction, when necessary or appropriate, for first-aid treatment
- The statement “KEEP OUT OF REACH OF CHILDREN” or its practical equivalent in capitalized text

ANNEX C – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in Annex D herein.

D. Exemptions. *Enzymes* are exempt from being categorized as *asthmagens* or *respiratory sensitizers*. Titanium dioxide[7] is exempt from the prohibition on *carcinogens* (3.2 herein) when it is present only due to the use of *enzymes*. For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product or enzyme matrix or bonded to other *ingredients*.

E. Labeling Requirements. Products containing *enzymes* shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line
- A statement that immune-compromised individuals or those with asthma should avoid exposure to products containing *enzymes* from both direct use and incidental contact during or shortly after application of these products and instruction, when necessary or appropriate, for follow-up treatment

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzyme/s* and worker illness/sensitization due to the *enzyme/s*. An example of best practices that may be applicable for this plan is available at AISE.

[7] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

ANNEX D – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following with any specified testing conducted with an objective, ~~scientifically-validated~~scientifically validated method under controlled and reproducible laboratory conditions (and appropriate testing details provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as a deliberate addition or as a contaminant above 0.01% in the finished product is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby-Bauer disk method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the undiluted product shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count shall be conducted in accordance with the methods for microbiological analyses listed in the

JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the undiluted product.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms.* An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold for use in *spray packaging*,[8] the product label shall include a statement that the product should not be sprayed into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*[9] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[10]

[8] Or designed for use in *spray packaging*
[9] Or designed for use in *spray packaging*
[10] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-8:

Household Products Included in GS-8

- *Bathroom cleaners*
- Floor cleaning products
- *Glass cleaners* and mirror cleaning products
- *General-purpose cleaners*
- *Carpet cleaners*
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*

Products Excluded from GS-8

- Air fresheners
- Cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications (included in GS-34)
- Deck and outdoor furniture products for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Antimicrobial pesticide products (disinfectants or sanitizers) for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Floor finish and finish strippers (included in GS-40)
- Furniture polish products (included in GS-52 and GS-53)
- General-purpose, restroom, glass and carpet cleaners for industrial and institutional use (included in GS-37)
- Hand cleaning products for industrial and institutional use (covered in GS-41) or *household use* (covered in GS-44)
- Motor vehicle cleaning products for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Oven cleaning products for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Paint remover/thinner products
- Specialty cleaning products for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Upholstery cleaning products for household use (covered in GS-52) and industrial and institutional use (covered in GS-53)
- Products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*

GS-11

GREEN SEAL® STANDARD FOR

PAINTS, COATINGS, STAINS, AND SEALERS

EDITION 4.0

(New Format)

September 7, 2021

Green Seal, Inc. • www.greenseal.org

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.

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FOREWORD

Edition. Edition 4.0 was issued on September 7, 2021. It replaces Edition 3.2 from October 26, 2015. Corrections and/or clarifications were last made to this standard on August ~~16~~23, 2024~~October 27, 2023~~. Information on changes made to this standard are available on Green Seal's website.[1]

General. The final issued standard was developed in an open and transparent process involving a balanced group of stakeholders including 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 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 overseen 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 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 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 unless explicitly stated otherwise. 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

[1] https://greenseal.org/green-seal-standards/library#section5

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

ANSI. American National Standards Institute
ASTM. ASTM International (formerly American Society for Testing and Materials)
BHMA. Builders Hardware Manufacturers Association
CARB. California Air Resources Board
CDPH. California Department of Public Health
CFR. Code of Federal Regulations
CREL. Chronic Reference Exposure Levels
CRRC. Cool Roof Rating Council
EPA United States Environmental Protection Agency
GHS Globally Harmonized System of Classification and Labeling of Chemicals
NFPA. National Fire Protection Association
ISO. International Organization for Standardization
oz. Ounce(s)
ppm. Parts Per Million
psi. Pounds Per Square Inch
SCAQMD. South Coast Air Quality Management District
SCM 2007 Suggested Control Measures (set by CARB in 2007)
SSPC Society for Protective Coatings (formerly Steel Structures Painting Council)
UN. United Nations
UV. ~~Ultra Violet~~Ultraviolet
VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR PAINTS, COATINGS, STAINS, AND SEALERS, GS-11

1.0 SCOPE

This standard establishes environmental, health, and performance requirements for certain *architectural coatings* that are intended to be applied on-site, and for *stains, finishes,* and *sealers*.

The standard covers the following product categories for *interior* and *exterior* architectural use: wall and ceiling *coatings*, including *paints* and *reflective wall coatings; anticorrosive coatings*, including rust-preventive *coatings*; *floor paints; primers* (undercoats); *stains*; *finishes*; and *sealers*, including *concrete and masonry sealers* (both *penetrating* and *film-forming* products) for *interior* and *exterior* use and *basement specialty coatings* for *interior* use. The standard also covers *floor coatings* intended for general purposes in commercial and residential settings,[2] as well as *fire-resistive coatings*, including *intumescent coatings* for *interior* architectural use and *reflective roof coatings* for *exterior* architectural use.

The standard includes products intended to be applied to wallboard, tile, metal, wood, composite wood, concrete, stone, masonry, and terrazzo substrates, as well as other architectural substrates. Also included are *stains*, *finishes*, and *sealers* generally applied to non-architectural metal and wood substrates.

All product categories may be clear, *transparent*, or opaque.

The standard does not include recycled (consolidated or reprocessed) latex *paint*, floor *finishes*/polishes intended to be stripped and reapplied periodically, specialty non-architectural *coatings* (e.g., coatings for industrial equipment, marine or automotive use), products sold in aerosol cans, or anti-graffiti coatings.[3] The standard is not intended to define leadership criteria for *industrial maintenance coatings*, intended for resistance in challenging environments, such as acid/base/corrosive surroundings or extreme temperatures. However, products that are labeled as *industrial maintenance coatings* may be certified to this standard if they meet all the criteria for the product category whose function most closely aligns with them.

See Appendix 1 for a sample list of products that are or are not included in this standard.

Words and phrases that appear in *italics* are defined in Annex A.

[2] *f*~~F~~*loor coatings* that are not intended for resistance in challenging environments, such as acid/base/corrosive surroundings or extreme temperatures. General purposes may include shopping centers, airport lobbies, grocery stores, office buildings, homes, and garages.

[3] Green Seal has not conducted a comprehensive review of the chemistry, health, and environmental effects or the performance of anti-graffiti coatings. These product categories may be addressed in a future revision of this standard.

2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

All criteria apply to the product produced by the manufacturer for all labeled and marketed uses that apply and do not include additives introduced at the point-of-sale.

2.1 Wall and Ceiling Coatings for Interior Use

2.1.1 General Requirements

2.1.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.
- Products not intended to be applied on concrete shall demonstrate a minimum of 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.1.1.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown as tested by ASTM D4400.

2.1.2 Interior Topcoats shall also meet the following requirements:

2.1.2.1 Scrubbability (Abrasion Resistance). Using a shim, the product shall demonstrate 400 scrub cycles before failure per Leneta Calibration Scrub Panel Form P121-C, as determined by ASTM D2486.

2.1.2.2 Washability (Stain Removal). The product shall demonstrate the following minimum requirements for stain removal, as determined by ASTM D4828.

Flat Topcoat	5 minimum rating
Non-Flat Topcoat	7 minimum rating

2.1.3 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

2.1.4 Impact Resistance. Products intended to provide impact resistance shall demonstrate impact resistance that is equivalent to or better than that of a *benchmark product* in its *product class* when tested according to ASTM D2794.

2.2 Wall and Ceiling Coatings for Exterior Use

2.2.1 General Requirements

2.2.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.
- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.2.1.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

2.2.2 Exterior Topcoats shall also meet the following requirements:

2.2.2.1 Fade Resistance. Using 4 oz. of red iron oxide pigment per gallon of product, the product shall demonstrate a minimum durability total color change of $\Delta E < 5$ over 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, following the guidelines in ASTM G151.

2.2.2.2 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

2.2.2.3 Water Resistance. The product shall show no signs of washing off, lifting, or wrinkling, as tested by ASTM D1735.

2.2.3 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the untinted product having a minimum 80% reflectance.

2.3 Floor Paints

2.3.1 General Requirements

2.3.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.

- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.3.1.2 Applicability (Flow and Leveling) shall be demonstrated by a minimum 7 rating, as determined by ASTM D4062.

2.3.1.3 Dry Film Thickness. The product shall have a dry film thickness of 10 mils (0.25 mm) or less.

2.3.1.4 Alkali Resistance. The product shall show no signs of lifting, wrinkling, disintegration, or more than a slight color change after 16 hours of exposure to 0.5N sodium hydroxide solution by spot test, as determined by ASTM D1308.

2.3.1.5 Scrubbability (Abrasion Resistance). Using a C-17 wheel and 500-gram weight, the product shall demonstrate a wear index of 200 or less, as determined by ASTM D4060.

2.3.2 Exterior Topcoats shall also meet the following requirements:

2.3.2.1 Fade Resistance. Using 4 oz. of red iron oxide pigment per gallon of product, the product shall demonstrate a minimum durability total color change of $\Delta E < 5$ over 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, following the guidelines in ASTM G151.

2.3.2.2 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

2.3.2.3 Water Resistance. The product shall show no signs of washing off, lifting, or wrinkling, as tested by ASTM D1735.

2.3.3 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

2.4 Floor Coatings. For testing purposes, the dry film thickness of the product and curing duration shall be consistent with the manufacturer-recommended application.

2.4.1 Adhesion. The product shall demonstrate dry pull-off adhesion of at least 400 psi, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.

2.4.2 Abrasion Resistance. Using a CS-17 wheel, 1,000-gram weight, and 1,000 cycles, the product shall have a weight loss of 100 mg or less, as determined by ASTM D4060.

2.4.3 Slip Resistance. The product shall have a dry static coefficient of friction of at least 0.5, as measured by either ASTM D2047 or UL 410.

2.4.4 Water and Salt Water Resistance. The product shall show no signs of lifting, wrinkling, disintegration, or color change after 7 days of exposure to water when tested according to ASTM D1308. Products that will be subject to vehicular traffic shall also show no signs of lifting, wrinkling, disintegration, or color change after 7 days of exposure to a 15% sodium chloride solution when tested according to ASTM D1308.

2.4.5 Chemical Resistance. The product shall demonstrate chemical resistance that is equivalent to or better than that of a *benchmark product* in its *product class* for the majority of tested chemicals. Testing shall be conducted according to ASTM D1308 with a 16-hour exposure period. Testing shall include a minimum of 7 representative chemicals covering at least 3 of the following classes: detergents, acids, alkalis, alcohols, and aliphatic solvents. The selection of test chemicals shall be based on the marketed uses of the product.

2.4.6 Hot Tire Resistance. Products that will be subject to tire traffic shall demonstrate hot tire resistance with no loss of adhesion at a temperature of 140°F and a force that is representative of the product's marketed use. Testing shall be conducted using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.[4]

2.5 Anti-Corrosive Coatings[5]

2.5.1 Adhesion. The product shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.5.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

2.5.3 Corrosion Resistance. Using manufacturer-recommended minimum dry film thickness and application to hot rolled steel panels,[6] the product shall have a minimum rust rating of 9 per SSPC-VIS 2 after 300 hours of exposure, as determined by ASTM D5894.

2.6 Non-Elastomeric Reflective Wall Coatings

[4] Test methodology should typically include use of a tire material sample. Tire pressure should be representative of the intended application for the *floor coating* (e.g., 50 to 150 psi) based on typical loads.

[5] These include rust-preventative coatings.

[6] The hot rolled steel test panels should adhere to Society for Protective Coatings (SSPC) Paint 23 or Paint 24 specifications. If there is no recommended film thickness, then the DFT of each coat shall be 60 to 90 micrometers (2.5 to 3.5 mils).

2.6.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234.
- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.6.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

2.6.3 Accelerated Weathering. The product shall show no signs of blistering, chalking, checking, cracking, flaking, or loss of adhesion with a maximum change of 10 gloss level units after 500 hours using QUV-A bulb, as measured by ASTM D714.

2.6.4 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

2.6.5 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

Characteristic	Performance Specification	
	Light Tones	Dark Tones
Solar Reflectance	≥ 0.65	≥ 0.40

2.6.6 Thermal Emittance. The product shall have a thermal emittance of 75% or more, as determined by ASTM C1371.

2.6.7 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

2.7 Elastomeric Reflective Wall Coatings

2.7.1 Dry Film Thickness. The product shall have a dry-film thickness of at least 17 mils.

2.7.2 Accelerated Weathering. The product shall show no signs of cracking or checking after 1,000 hours, as determined by ASTM G155.

2.7.3 Elongation and Tensile Strength. The product shall show minimum 100% elongation and minimum 200 psi tensile strength, as determined by ASTM D2370.

2.7.4 Flexibility. The product shall demonstrate 0.5 mandrel bend at -15°F, as determined by ASTM D522 with cure conditions of 3 days' air dry followed by 1 week at 50°C.

2.7.5 Fungi Resistance. The product shall show zero rating, according to ASTM G21.

2.7.6 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

Characteristic	Performance Specification	
	Light Tones	Dark Tones
Solar Reflectance	≥ 0.65	≥ 0.40

2.7.7 Thermal Emittance. The product shall have a thermal emittance of 75% or more, as determined by ASTM C1371.

2.8 Reflective Roof Coatings

2.8.1 Physical Properties. The product shall meet the requirements in ASTM D6083.

2.8.2 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

Characteristic	Performance Specification	
	Low-Slope Roofs	Steep-Slope Roofs
Initial Solar Reflectance	≥ 0.65	≥ 0.25
Maintenance of Solar Reflection	≥ 0.50 (three years after installation under normal conditions)	≥ 0.15 (three years after installation under normal conditions)

2.8.3 Thermal Emittance. The product shall have a thermal emittance of 80% or more, as determined by ASTM C1371.

2.9 Fire Resistive and Intumescent Coatings

2.9.1 Adhesion. The product shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

2.9.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,
  OR
- a 12–14 minimum drawdown, as tested by ASTM D4400.

2.9.3 Fire Resistance.[7] The product shall demonstrate a fire resistance rating that is consistent with the labeling,[8] as determined by ASTM Designation E119.

2.9.4 Flame Spread and Smoke Development. The product shall demonstrate a Flame Spread Index of 0–25 (Class A) and a Smoke Development Index of 0–450 (Class A), based on the Life Safety Code (NFPA 101)[5] and Section 803.1 of the International Building Code, as determined using ASTM E84.

2.10 Concrete and Masonry Sealers

2.10.1 General Requirements. Except for *basement specialty coatings*, the product shall be tested for each performance parameter in this section that is included on the product label or marketing. Each test shall demonstrate that the product performs as well as or better than a *benchmark product* in its *product class*.

For purposes of the test, the curing duration of the *concrete/masonry sealer* shall be similar to that of the *benchmark product*, and for *film forming* products, the dry-film thickness of the *concrete/masonry sealer* shall be similar to that of the *benchmark product*. Both shall be representative of the manufacturer-recommended application. Testing shall be performed according to the following standard test methods or equivalent test methods:

2.10.1.1 Water Resistance. ASTM C67, ASTM C97, or ASTM C140
2.10.1.2 Fungi Resistance. ASTM D3273 or ASTM D3274
2.10.1.3 Abrasion Resistance /Hardening of Cured Concrete. ASTM D4060
2.10.1.4 Alkali Resistance. ASTM D1308
2.10.1.5 Acid Resistance. ASTM D1308
2.10.1.6 Staining Resistance. ASTM D1308
2.10.1.7 UV Light Resistance. ASTM G151[9]
2.10.1.8 Water Vapor Transmission. ASTM E96/E96M

2.10.2 Basement Specialty Coatings shall meet the following performance requirements and demonstrate any of the additional parameters (2.10.1.3–2.10.1.8) included on the product label or marketing:

2.10.2.1 Water Resistance. The product must be capable of withstanding at least 10 psi of hydrostatic pressure, as determined according to ASTM D7088.

[7] *Fire-resistive coatings* and the agencies that test them must be approved by building code officials.
[8] For example, 1-hour, 2-hour, or 4-hour.
[9] Suggested test parameters include 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, unless otherwise appropriate for the product.

~~**2.10.2.2 Fungi Resistance.** The product must be resistant to mold and mildew growth and must achieve a microbial growth rating of 8 or more, as determined according to ASTM D3273 and ASTM D3274.~~

~~**2.11 Wood Stains for Interior Use**~~

~~**2.11.1 Blush Resistance.** When prepared and tested on a dry film thickness of 1 mil according to ASTM D1735 for 2 hours, the product shall have a rating of 8 as per ASTM STP500 after a 24-hour recovery period.~~

~~**2.11.2 Chemical Resistance.** When tested according to ASTM D1308 using the covered spot test for 1-hour exposure over the intended substrate, and after a 1-hour recovery period, the product shall demonstrate a rating of 8 as per ASTM STP500.~~

~~**2.12 Wood Stains for Exterior Use**~~

~~**2.12.1 Exterior Penetrating Stains**~~

~~**2.12.1.1 Blush Resistance.** When prepared and tested on a 1 mil thick dry film according to ASTM D1735 for 2 hours, the product shall have a rating of 8 as per ASTM STP500 after a 24-hour recovery period.~~

~~**2.12.2 Exterior Film-Forming Stains**~~

~~**2.12.2.1 Blush Resistance**. When prepared and tested on a 1 mil thick dry film according to ASTM D1735 for 2 hours, the product shall have a rating of 7 as per ASTM STP500 after a 24-hour recovery period.~~

~~**2.12.2.2 Pencil Hardness.** When prepared and tested on a 1 mil thick dry film according to ASTM D3363, the product shall have a pencil hardness of 2H or greater.~~

~~**2.12.2.3 Adhesion.** The product shall have an adhesion of 3B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.~~

~~**2.13 Wood Finishes for Interior Use**~~

~~**2.13.1 Pencil Hardness.** When prepared and tested on a 1 mil thick dry film according to ASTM D3363-92a, the product shall have a pencil hardness of 2H or greater.~~

~~**2.13.2 Chemical Resistance.** When tested according to ASTM D1308 for 1 hour with the covered spot test and a 1-hour recovery period over the intended substrate, the product shall demonstrate a rating of 8 as per ASTM STP500.~~

~~**2.13.3 Adhesion.** The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.~~

2.13.4 Water Resistance. If intended as a *waterproofing sealer*, the product shall show a minimum 60% water repellent efficiency when tested according to ASTM D4446.

2.14 Wood Finishes for Exterior Use

2.14.1 Pencil Hardness. When prepared and tested on a 1 mil thick dry film according to ASTM D3363, the product shall have a pencil hardness of 2H or greater.

2.14.2 Dry Time. When tested according to ASTM D1640, the product shall have a maximum dry-to-touch time of 4 hours.

2.14.3 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

2.14.4 Blister Resistance. The product shall have a rating of 10 as per ASTM D714 when tested according to ASTM D4585 for 24 hours at 100°F.

2.14.5 Water Resistance. If intended as a *waterproofing sealer*, the product shall show a minimum of 60% water repellent efficiency when tested according to ASTM D4446.

2.15 Interior Clear Metal Lacquers

2.15.1 Chemical Resistance. When tested according to ASTM D1308 for 1 hour with the covered spot test and a 1-hour recovery period over the intended substrate, the product shall demonstrate a rating of 8 as per ASTM STP500.

2.15.2 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

2.15.3 Surface Hardness. The product shall have a minimum surface hardness of 3H when tested according to ASTM D3363 (7.1.1) on a dried film of 1/3 to 1 mil thickness.

2.15.4 Moisture Resistance. The product shall have a moisture resistance of a minimum of 48 hours when tested according to ASTM D2247.

2.15.5 Salt Spray Resistance. The product shall have a minimum salt spray resistance of 24 hours when tested according to ASTM B117.

2.15.6 Wear Resistance. The wear resistance shall be 8 liters or higher when tested according to ASTM D968, applying the product according to ASTM D823 with silica, and on a 1/3- to 1-mil dry film thickness measured according to ASTM D1005, ASTM D1186, or ASTM D1400.

2.15.7 Reversibility. When tested according to ASTM D4752 with a maximum 20 double rubs for complete removal on a 1/3- to 1-mil dry film, the product must be able to be removed by nothing stronger than acetone after an air dry of 72 hours.

2.15.8 Perspiration Resistance. The product shall have a minimum of 2 cycles when tested according to ANSI/ BHMA A156.18.

2.16 Exterior Clear Metal Lacquers

2.16.1 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

2.16.2 Surface Hardness. The product shall have a minimum surface hardness of 3H or higher when tested according to ASTM D3363 (7.1.1) on a dried film of 1/3 to 1 mil thickness.

2.16.3 Moisture Resistance. The product shall have a moisture resistance of a minimum of 96 hours (4 days) when tested according to ASTM D2247.

2.16.4 Chemical Resistance. The product shall demonstrate a rating of 10 when tested in accordance to ASTM D-1308; 3-1-2; 6-1-7 for a minimum 15 minutes.

2.16.5 Salt Spray Resistance. The product shall have a minimum salt spray resistance of 96 hours (4 days) when tested in accordance to ASTM B117.

2.16.6 Wear Resistance. The wear resistance shall be 4 liters or higher when tested according to ASTM D968, applying the product according to ASTM D823 with silica, and on a 1/3- to 1-mil dry film thickness measured according to ASTM D1005, ASTM D1186, or ASTM D1400.

2.16.7 Reversibility. When tested according to ASTM D4752 with a maximum 20 double rubs for complete removal on a 1/3 to 1 mil dry film, the product must be able to be removed by nothing stronger than acetone after an air dry of 72 hours.

2.16.8 UV Resistance. The product shall have an ultraviolet (UV) resistance of a minimum of 144 hours when tested with ASTM G154. The test specimen must be prepared and exposed according to ASTM G151.

2.17 Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs as well as or better than a *benchmark product* in its *product class* for the key parameters required for it to fulfill the intended function(s), as defined in the appropriate subsections of Section 2.0.

This comparison shall be conducted using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.

23.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SAFER CHEMICALS

All requirements pertain to the product produced by the manufacturer and do not include additives introduced at the point-of-sale, unless otherwise specified.

2.1 Safer Ingredients

2.1.1~~3.1~~ Carcinogens, Mutagens, and Reproductive Toxins. The product shall not contain any *ingredients* that are *carcinogens*, *mutagens*, or *reproductive toxins*.

Exemption: An exception shall be made for titanium dioxide and, for products that are pre-tinted by the manufacturer, carbon black. As allowed under this exception, carbon black shall be less than or equal to 1% by weight of the product.[4]

Exemption: Free crystalline silica[5] shall not be *intentionally added* to the product as an *ingredient*. Crystalline silica present as a naturally occurring contaminant in mineral-based raw materials[6] is not included in this prohibition.

Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered *ingredients* if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR, Part 141.

2.1.2 Nanoparticles. Reserved. [7]

2.1.3~~3.2~~ Prohibited Ingredients. The product shall not contain the following *ingredients*:

- 1,2-dichlorobenzene
- Alkylphenol ethoxylates
- Formaldehyde donors
- *Hazardous air pollutants*
- *Halogenated organic solvents*
    - Additionally, methylene chloride[8] and perchloroethylene[9] shall not be *intentionally added* to the product.

[4] Titanium dioxide: EC Number 236-675-5, CAS Number 13463-67-7; carbon black: EC Number 215-609-9, CAS Number 1333-86-4.
[5] Crystalline silica is currently listed as a known human carcinogen when respired.
[6] Examples of mineral-based raw materials include mined extender pigments, calcium carbonate, and diatomaceous earth.
[7] Green Seal has not conducted a comprehensive review of the chemistry, health, and environmental effects or the performance of products that contain engineered nanoparticles. Products with engineered nanomaterials may be addressed in a future revision of this standard.
[8] CAS Number 75-09-2, EC Number 200-838-9.
[9] CAS Number 127-18-4, EC Number 204-825-9.

- *Ozone-depleting compounds*
- Heavy metals: lead, mercury, cadmium, hexavalent chromium, and antimony in the elemental form or compounds
- The phthalate esters:
  - di (2-ethylhexyl) phthalate
  - butyl benzyl phthalate
  - di-n-butyl phthalate
  - di-n-octyl phthalate
  - diethyl phthalate
  - dimethyl phthalate
- Triphenyl tins and tributyl tins
- Triclosan

Exemption: For the following product categories, cobalt and manganese are allowed at levels that do not exceed 0.06% (as total metal) in the product: wood stains, wood finishes, and clear metal lacquers (Sections ~~2.11~~4.1.11 ~~–2~~4.1.16 in this standard).

Exemption: For *lacquers* intended for metal substrates only, PCBTF (parachlorobenzotrifluoride, CAS# 98-56-6), a *halogenated organic solvent*, is allowed at levels that do not exceed 10% by weight in the product.

2.1.4~~3.3~~ Volatile Aromatic Hydrocarbons. The product shall contain no more than 0.5% by weight of sum total of *volatile aromatic hydrocarbons*.[10]

2.2 Safer Products

2.2.1~~3.4~~ Volatile Organic Compounds (VOCs) Content Limits. The *VOC* content of the product shall not exceed the content limits for its product category as set by CARB Suggested Control Measure for Architectural Coatings (2007).[11]

Exception: For *low-solids coatings*, the CARB *VOC* limit for *low-solids coatings* shall apply instead of the *VOC* limit that would otherwise apply for the product category (as mandated by CARB).[12]

Exception: Products labeled as *industrial maintenance coatings* shall meet the *VOC* limits for their relevant product category.[13]

[10] Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.
[11] See Appendix 2 for the *VOC* limits specified in California Air Resources Board Suggested Control Measure for Architectural Coatings (2007).
[12] Note that *low-solids coatings* have a separate *VOC* limit and that their *VOC* content is calculated differently.
[13] That is, they will not be allowed to meet the higher *VOC* limits set by CARB for *industrial maintenance coatings*. This standard is not intended to establish leadership criteria for *industrial maintenance coatings* per se (see Section 1.0).

Exception: Products sold in containers equal to or smaller than 1 liter are not exempted from the *VOC* content limit for their product category (even though exempted by CARB).[14]

For other product categories not regulated by CARB, the *VOC* level shall not exceed a limit set by CARB for a similar product category. If no CARB category, or similar CARB product category exists, the *VOC* limit shall not exceed the limit for the applicable product category in the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

2.2.1.13.4.1 Calculation of VOC Content.

Coating VOC: For all product categories except *low-solids coatings*, the *VOC* content of the product shall be calculated according to "VOC Regulatory,"[15]

$$\text{VOC Regulatory} = \frac{(Ws - Ww - Wec)}{(Vm - Vw - Vec)}$$

Where:

VOC Regulatory = grams of VOC per liter of coating, less water and exempt compounds (also known as "Coating VOC")
Ws = weight of volatiles, in grams
Ww = weight of water, in grams
Wec = weight of exempt compounds, in grams
Vm = volume of coating, in liters
Vw = volume of water, in liters
Vec = volume of exempt compounds, in liters

VOCs for Low-Solids Coatings: For *low-solids coatings*, the *VOC* content of the product shall be calculated according to "VOC Actual,"[16]

$$\text{VOC Actual} = \frac{(Ws - Ww - Wec)}{(Vm)}$$

Where:

VOC Actual = grams of VOC per liter of coating (also known as "Material VOC")
Ws = weight of volatiles, in grams
Ww = weight of water, in grams
Wec = weight of exempt compounds, in grams
Vm = volume of coating, in liters

[14] CARB currently grants an exemption from *VOC* limits to products sold in containers equal to or smaller than 1 liter (known as the Small Container Exemption).
[15] As defined in SCM, 2007, Subsection 4.66.
[16] As defined in SCM, 2007, Subsection 4.64.

Exempt compounds shall be those defined as such by the U.S. EPA.[17]

VOC content shall exclude *colorants* added at the point-of-sale and any *VOC*s generated as a result of chemical or curing reactions on-site.

For multi-component products, *VOC* content shall be determined based on the sum of all components added together, using the appropriate calculation.

2.2.1.2 ~~3.4.2~~ **Methods for Determining VOCs.** The *VOC* content shall be determined in one of the following ways for compounds present in the product at 0.01% or more:

- **Product Formulation**
  By summing the percentage by weight contribution from all *VOC ingredients* listed in the formulation of the product, and which have a boiling point of less than or equal to 280°C at 1 standard atmosphere (101.3 kPa).

- **Mass Difference Methods**
  According to EPA Method 24, ASTM D2369, SCAQMD Method 304, or ISO 11890-1 (or equivalent), modified to include all *VOC ingredients*.

- **GC/MS Methods**
  According to ASTM D6886, SCAQMD Method 313, or ISO 11890-2 (or equivalent), summing all those *VOC ingredients* that have a boiling point of less than or equal to 280°C at 1 standard atmosphere (101.3 kPa).

Another scientifically validated test method may be used if it is justified and documented in sufficient detail.

2.2.2~~3.5~~ **VOCs of Colorant Added at Point-of-Sale.** The *VOC* concentration of the product including the colorant added at the point-of-sale shall not exceed 50 grams of *VOC* per liter of product above the levels allowed for the product without colorant.[18]

An average *VOC* level calculation for a colorant shall be applied unless a manufacturer can provide documentation of the *VOC* levels of the colorant(s) and assurance that only those colorant(s) tested shall be used with the product.[19]

2.2.3~~3.6~~ **VOCs Emissions Evaluation.** Products intended for *interior* application shall be tested according to, and meet the emissions limits[20] specified in, the California

[17] According to the definition of *VOCs* in this standard, exempt compounds are considered those listed by EPA in 40 CFR §51.100 (s). The current version of this regulation can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=049f1f9562e072c158ad6e4a47d076a2&node=pt40.2.51&rgn=div5#se40.2.51_1100.

[18] *VOC* limits and measurement methods for the products are specified in Section ~~3.4~~2.2.1.

[19] If information is not available about the *VOC* content in the *colorants*, an average of 70 grams/liter from the *colorant* will be added to the *VOC* content of the base paint product, for each paint type (*flat*, *nonflat*, *primer*, etc.).

Department of Public Health (CDPH) Standard Method v1.2 (2017).[21] As specified within the CDPH Standard Method, product specimens must undergo testing for the full 14-day (336-hour) period.

Products marketed for use in school classrooms must be evaluated using the classroom scenario. Products marketed for use in other spaces must be evaluated using the default private office scenario.

Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.

Note: See Appendix 3 for CDPH v1.2 emissions limits.

~~**3.7 Nanoparticles.** Reserved.~~ [22]

34.0 ~~PACKAGING REQUIREMENTS~~ SUSTAINABLE PACKAGING

3.1 Packaging

3.1.1~~4.1~~ Packaging. The *primary packaging* shall be one of the following:

- contain a minimum of 20% *recovered material* content.
- recyclable as part of a manufacturer's *take-back program.*
- a *source-reduced package*.

Exemption: Plastic packaging containers may be exempted from the requirements of this section if they are manufactured for use in the shipment of hazardous materials and

- are prohibited from being manufactured with used material by federal packaging material specifications set forth in CFR 49, Sections 178.509 and 178.522,

OR

- are subject to testing standards set forth in CFR 49, Sections 178.600 to 178.609, inclusive,

OR

- are addressed by recommendations of the UN on the transport of dangerous goods.

3.2 Restricted Substances

3.2.1~~4.2~~ Material Restrictions.

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[20] See Appendix 3 for the maximum allowable concentrations, specified in the CDPH Standard Method v1.2.
[21] https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/CDPH%20Document%20Library/CDPH-IAQ_StandardMethod_V1_2_2017_ADA.pdf.
~~[22] Green Seal has not conducted a comprehensive review of the chemistry, health, and environmental effects or the performance of products that contain engineered nanoparticles. Products with engineered nanomaterials may be addressed in a future revision of this standard.~~

3.2.1.14.2.1 Phthalates and the heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced* in the packaging.

3.2.1.24.2.2 The sum of the concentrations of lead, mercury, cadmium, and hexavalent chromium in the packaging shall not exceed 100 ppm by weight (0.01%).

An exception to 3.2.1.14.2.1 and 3.2.1.24.2.2 is allowed for packages that would not contain these compounds except for the addition of *recovered material*.

5.0 USER INFORMATION AND PRODUCT LABEL REQUIREMENTS
4.0 VERIFIED PERFORMANCE AND CLAIMS

4.1 Product Performance

All criteria apply to the product produced by the manufacturer for all labeled and marketed uses that apply and do not include additives introduced at the point-of-sale.

4.1.1 Wall and Ceiling Coatings for Interior Use

4.1.1.1 General Requirements

4.1.1.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.
- Products not intended to be applied on concrete shall demonstrate a minimum of 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.1.1.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,
  OR
- a 12–14 minimum drawdown as tested by ASTM D4400.

4.1.1.2 Interior Topcoats shall also meet the following requirements:

4.1.1.2.1 Scrubbability (Abrasion Resistance). Using a shim, the product shall demonstrate 400 scrub cycles before failure per Leneta Calibration Scrub Panel Form P121-C, as determined by ASTM D2486.

4.1.1.2.2 Washability (Stain Removal). The product shall demonstrate the following minimum requirements for stain removal, as determined by ASTM D4828.

Flat Topcoat	5 minimum rating
Non-Flat Topcoat	7 minimum rating

4.1.1.2 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

4.1.1.3 Impact Resistance. Products intended to provide impact resistance shall demonstrate impact resistance that is equivalent to or better than that of a *benchmark product* in its *product class* when tested according to ASTM D2794.

4.1.2 Wall and Ceiling Coatings for Exterior Use

4.1.2.1 General Requirements

4.1.2.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.
- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.2.1.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,
  OR
- a 12–14 minimum drawdown, as tested by ASTM D4400.

4.1.2.2 Exterior Topcoats shall also meet the following requirements:

4.1.2.2.1 Fade Resistance. Using 4 oz. of red iron oxide pigment per gallon of product, the product shall demonstrate a minimum durability total color change of $\Delta E < 5$ over 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, following the guidelines in ASTM G151.

4.1.2.2.2 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

4.1.2.2.3 Water Resistance. The product shall show no signs of washing off, lifting, or wrinkling, as tested by ASTM D1735.

4.1.2.3 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the untinted product having a minimum 80% reflectance.

4.1.3 Floor Paints

4.1.3.1 General Requirements

4.1.3.1.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.
- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.3.1.2 Applicability (Flow and Leveling) shall be demonstrated by a minimum 7 rating, as determined by ASTM D4062.

4.1.3.1.3 Dry Film Thickness. The product shall have a dry film thickness of 10 mils (0.25 mm) or less.

4.1.3.1.4 Alkali Resistance. The product shall show no signs of lifting, wrinkling, disintegration, or more than a slight color change after 16 hours of exposure to 0.5N sodium hydroxide solution by spot test, as determined by ASTM D1308.

4.1.3.1.5 Scrubbability (Abrasion Resistance). Using a C-17 wheel and 500-gram weight, the product shall demonstrate a wear index of 200 or less, as determined by ASTM D4060.

4.1.3.2 Exterior Topcoats shall also meet the following requirements:

4.1.3.2.1 Fade Resistance. Using 4 oz. of red iron oxide pigment per gallon of product, the product shall demonstrate a minimum durability total color change of $\Delta E < 5$ over 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, following the guidelines in ASTM G151.

4.1.3.2.2 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

4.1.3.2.3 Water Resistance. The product shall show no signs of washing off, lifting, or wrinkling, as tested by ASTM D1735.

4.1.3.3 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

4.1.4 Floor Coatings. For testing purposes, the dry film thickness of the product and curing duration shall be consistent with the manufacturer-recommended application.

4.1.4.1 Adhesion. The product shall demonstrate dry pull-off adhesion of at least 400 psi, as determined by ASTM D7234, with concrete samples prepared according to ASTM F710 or SSPC SP-13.

4.1.4.2 Abrasion Resistance. Using a CS-17 wheel, 1,000-gram weight, and 1,000 cycles, the product shall have a weight loss of 100 mg or less, as determined by ASTM D4060.

4.1.4.3 Slip Resistance. The product shall have a dry static coefficient of friction of at least 0.5, as measured by either ASTM D2047 or UL 410.

4.1.4.4 Water and Salt Water Resistance. The product shall show no signs of lifting, wrinkling, disintegration, or color change after 7 days of exposure to water when tested according to ASTM D1308. Products that will be subject to vehicular traffic shall also show no signs of lifting, wrinkling, disintegration, or color change after 7 days of exposure to a 15% sodium chloride solution when tested according to ASTM D1308.

4.1.4.5 Chemical Resistance. The product shall demonstrate chemical resistance that is equivalent to or better than that of a *benchmark product* in its *product class* for the majority of tested chemicals. Testing shall be conducted according to ASTM D1308 with a 16-hour exposure period. Testing shall include a minimum of 7 representative chemicals covering at least 3 of the following classes: detergents, acids, alkalis, alcohols, and aliphatic solvents. The selection of test chemicals shall be based on the marketed uses of the product.

4.1.4.6 Hot Tire Resistance. Products that will be subject to tire traffic shall demonstrate hot tire resistance with no loss of adhesion at a temperature of 140°F and a force that is representative of the product's marketed use. Testing shall be conducted using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.[22]

4.1.5 Anti-Corrosive Coatings[23]

[22] Test methodology should typically include use of a tire material sample. Tire pressure should be representative of the intended application for the *floor coating* (e.g., 50 to 150 psi) based on typical loads.
[23] These include rust-preventative coatings.

4.1.5.1 Adhesion. The product shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.5.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

4.1.5.3 Corrosion Resistance. Using manufacturer-recommended minimum dry film thickness and application to hot rolled steel panels,[24] the product shall have a minimum rust rating of 9 per SSPC-VIS 2 after 300 hours of exposure, as determined by ASTM D5894.

4.1.6 Non-Elastomeric Reflective Wall Coatings

4.1.6.1 Adhesion

- Products intended to be applied on concrete shall demonstrate 200 psi failure in the concrete, as determined by ASTM D7234.
- Products not intended to be applied on concrete shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.6.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

4.1.6.3 Accelerated Weathering. The product shall show no signs of blistering, chalking, checking, cracking, flaking, or loss of adhesion with a maximum change of 10 gloss level units after 500 hours using QUV-A bulb, as measured by ASTM D714.

4.1.6.4 Flexibility. The product shall show no signs of cracking, peeling, or loss of adhesion, as determined by ASTM D522 under the following cure conditions: 3 days' air dry followed by 1 week at 50°C.

4.1.6.5 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

[24] The hot rolled steel test panels should adhere to Society for Protective Coatings (SSPC) Paint 23 or Paint 24 specifications. If there is no recommended film thickness, then the DFT of each coat shall be 60 to 90 micrometers (2.5 to 3.5 mils).

Characteristic	Performance Specification	
	Light Tones	Dark Tones
Solar Reflectance	≥ 0.65	≥ 0.40

4.1.6.6 Thermal Emittance. The product shall have a thermal emittance of 75% or more, as determined by ASTM C1371.

4.1.6.7 Hiding Power (Opacity). Products intended to be opaque shall also demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon, as determined by ASTM D2805. Compliance will be determined on dried film of the un-tinted product having a minimum 80% reflectance.

4.1.7 Elastomeric Reflective Wall Coatings

4.1.7.1 Dry Film Thickness. The product shall have a dry-film thickness of at least 17 mils.

4.1.7.2 Accelerated Weathering. The product shall show no signs of cracking or checking after 1,000 hours, as determined by ASTM G155.

4.1.7.3 Elongation and Tensile Strength. The product shall show minimum 100% elongation and minimum 200 psi tensile strength, as determined by ASTM D2370.

4.1.7.4 Flexibility. The product shall demonstrate 0.5 mandrel bend at –15°F, as determined by ASTM D522 with cure conditions of 3 days' air dry followed by 1 week at 50°C.

4.1.7.5 Fungi Resistance. The product shall show zero rating, according to ASTM G21.

4.1.7.6 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

Characteristic	Performance Specification	
	Light Tones	Dark Tones
Solar Reflectance	≥ 0.65	≥ 0.40

4.1.7.7 Thermal Emittance. The product shall have a thermal emittance of 75% or more, as determined by ASTM C1371.

4.1.8 Reflective Roof Coatings

4.1.8.1 Physical Properties. The product shall meet the requirements in ASTM D6083.

4.1.8.2 Solar Reflectance. The product shall meet the requirements in the following table, as determined by ASTM C1549 or ASTM E1918.

Characteristic	Performance Specification	
	Low-Slope Roofs	Steep-Slope Roofs
Initial Solar Reflectance	≥ 0.65	≥ 0.25
Maintenance of Solar Reflection	≥ 0.50 (three years after installation under normal conditions)	≥ 0.15 (three years after installation under normal conditions)

4.1.8.3 Thermal Emittance. The product shall have a thermal emittance of 80% or more, as determined by ASTM C1371.

4.1.9 Fire Resistive and Intumescent Coatings

4.1.9.1 Adhesion. The product shall demonstrate a minimum 50% or better rating for wet and dry adhesion over the intended substrate, as determined by ASTM D3359.

4.1.9.2 Applicability (Flow and Leveling) shall be demonstrated by either

- a minimum 6 rating for foaming, leveling, and spatter resistance, as determined by ASTM D7073,

OR

- a 12–14 minimum drawdown, as tested by ASTM D4400.

4.1.9.3 Fire Resistance.[25] The product shall demonstrate a fire resistance rating that is consistent with the labeling,[26] as determined by ASTM Designation E119.

4.1.9.4 Flame Spread and Smoke Development. The product shall demonstrate a Flame Spread Index of 0–25 (Class A) and a Smoke Development Index of 0-450 (Class A), based on the Life Safety Code (NFPA 101)[5] and Section 803.1 of the International Building Code, as determined using ASTM E84.

4.1.10 Concrete and Masonry Sealers

4.1.10.1 General Requirements. Except for *basement specialty coatings*, the product shall be tested for each performance parameter in this section that is included

[25] *Fire-resistive coatings* and the agencies that test them must be approved by building code officials.
[26] For example, 1-hour, 2-hour, or 4-hour.

on the product label or marketing. Each test shall demonstrate that the product performs as well as or better than a *benchmark product* in its *product class*.

For purposes of the test, the curing duration of the *concrete/masonry sealer* shall be similar to that of the *benchmark product*, and for *film forming* products, the dry-film thickness of the *concrete/masonry sealer* shall be similar to that of the *benchmark product*. Both shall be representative of the manufacturer-recommended application. Testing shall be performed according to the following standard test methods or equivalent test methods:

4.1.10.1.1 Water Resistance. ASTM C67, ASTM C97, or ASTM C140

4.1.10.1.2 Fungi Resistance. ASTM D3273 or ASTM D3274

4.1.10.1.3 Abrasion Resistance /Hardening of Cured Concrete. ASTM D4060

4.1.10.1.4 Alkali Resistance. ASTM D1308

4.1.10.1.5 Acid Resistance. ASTM D1308

4.1.10.1.6 Staining Resistance. ASTM D1308

4.1.10.1.7 UV Light Resistance. ASTM G151[27]

4.1.10.1.8 Water Vapor Transmission. ASTM E96/E96M

4.1.0.2 Basement Specialty Coatings shall meet the following performance requirements and demonstrate any of the additional parameters (~~2~~4.1.10.1.3–~~2~~4.1.10.1.8) included on the product label or marketing:

4.1.10.2.1 Water Resistance. The product must be capable of withstanding at least 10 psi of hydrostatic pressure, as determined according to ASTM D7088.

4.1.10.2.2 Fungi Resistance. The product must be resistant to mold and mildew growth and must achieve a microbial growth rating of 8 or more, as determined according to ASTM D3273 and ASTM D3274.

4.1.11 Wood Stains for Interior Use

4.1.11.2 Blush Resistance. When prepared and tested on a dry film thickness of 1 mil according to ASTM D1735 for 2 hours, the product shall have a rating of 8 as per ASTM STP500 after a 24-hour recovery period.

[27] Suggested test parameters include 1,000 hours using QUV-A bulbs with a moisture and/or condensation cycle, unless otherwise appropriate for the product.

4.1.11.2 Chemical Resistance. When tested according to ASTM D1308 using the covered spot test for 1-hour exposure over the intended substrate, and after a 1-hour recovery period, the product shall demonstrate a rating of 8 as per ASTM STP500.

4.1.12 Wood Stains for Exterior Use

4.1.12.1 Exterior Penetrating Stains

4.1.12.1.1 Blush Resistance. When prepared and tested on a 1 mil–thick dry film according to ASTM D1735 for 2 hours, the product shall have a rating of 8 as per ASTM STP500 after a 24-hour recovery period.

4.1.12.2 Exterior Film-Forming Stains

4.1.12.2.1 Blush Resistance. When prepared and tested on a 1 mil–thick dry film according to ASTM D1735 for 2 hours, the product shall have a rating of 7 as per ASTM STP500 after a 24-hour recovery period.

4.1.12.2.2 Pencil Hardness. When prepared and tested on a 1 mil–thick dry film according to ASTM D3363, the product shall have a pencil hardness of 2H or greater.

4.2.12.2.3 Adhesion. The product shall have an adhesion of 3B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

4.1.13 Wood Finishes for Interior Use

4.1.13.1 Pencil Hardness. When prepared and tested on a 1 mil–thick dry film according to ASTM D3363–92a, the product shall have a pencil hardness of 2H or greater.

4.1.13.2 Chemical Resistance. When tested according to ASTM D1308 for 1 hour with the covered spot test and a 1-hour recovery period over the intended substrate, the product shall demonstrate a rating of 8 as per ASTM STP500.

4.1.13.3 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

4.1.13.4 Water Resistance. If intended as a *waterproofing sealer*, the product shall show a minimum 60% water repellent efficiency when tested according to ASTM D4446.

4.1.14 Wood Finishes for Exterior Use

4.1.14.1 Pencil Hardness. When prepared and tested on a 1 mil–thick dry film according to ASTM D3363, the product shall have a pencil hardness of 2H or greater.

4.1.14.2 Dry Time. When tested according to ASTM D1640, the product shall have a maximum dry-to-touch time of 4 hours.

4.1.14.3 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

4.1.14.4 Blister Resistance. The product shall have a rating of 10 as per ASTM D714 when tested according to ASTM D4585 for 24 hours at 100°F.

4.1.14.5 Water Resistance. If intended as a *waterproofing sealer*, the product shall show a minimum of 60% water repellent efficiency when tested according to ASTM D4446.

4.1.15 Interior Clear Metal Lacquers

4.1.15.1 Chemical Resistance. When tested according to ASTM D1308 for 1 hour with the covered spot test and a 1-hour recovery period over the intended substrate, the product shall demonstrate a rating of 8 as per ASTM STP500.

4.1.15.2 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

4.1.15.3 Surface Hardness. The product shall have a minimum surface hardness of 3H when tested according to ASTM D3363 (7.1.1) on a dried film of 1/3 to 1 mil thickness.

4.1.15.4 Moisture Resistance. The product shall have a moisture resistance of a minimum of 48 hours when tested according to ASTM D2247.

4.1.15.5 Salt Spray Resistance. The product shall have a minimum salt spray resistance of 24 hours when tested according to ASTM B117.

4.1.15.6 Wear Resistance. The wear resistance shall be 8 liters or higher when tested according to ASTM D968, applying the product according to ASTM D823 with silica, and on a 1/3- to 1-mil dry film thickness measured according to ASTM D1005, ASTM D1186, or ASTM D1400.

4.1.15.7 Reversibility. When tested according to ASTM D4752 with a maximum 20 double rubs for complete removal on a 1/3- to 1-mil dry film, the product must be able to be removed by nothing stronger than acetone after an air dry of 72 hours.

4.1.15.8 Perspiration Resistance. The product shall have a minimum of 2 cycles when tested according to ANSI/ BHMA A156.18.

4.1.16 Exterior Clear Metal Lacquers

4.1.16.1 Adhesion. The product shall have an adhesion of 4B or higher after 7 days' cure time when tested according to ASTM D3359 on a dried film of 0.5 to 1 mil thickness.

4.1.16.2 Surface Hardness. The product shall have a minimum surface hardness of 3H or higher when tested according to ASTM D3363 (7.1.1) on a dried film of 1/3 to 1 mil thickness.

4.1.16.3 Moisture Resistance. The product shall have a moisture resistance of a minimum of 96 hours (4 days) when tested according to ASTM D2247.

4.1.16.4 Chemical Resistance. The product shall demonstrate a rating of 10 when tested in accordance with ASTM D-1308; 3-1-2; 6-1-7 for a minimum 15 minutes.

4.1.16.5 Salt Spray Resistance. The product shall have a minimum salt spray resistance of 96 hours (4 days) when tested in accordance with ASTM B117.

4.1.16.6 Wear Resistance. The wear resistance shall be 4 liters or higher when tested according to ASTM D968, applying the product according to ASTM D823 with silica, and on a 1/3- to 1-mil dry film thickness measured according to ASTM D1005, ASTM D1186, or ASTM D1400.

4.1.16.7 Reversibility. When tested according to ASTM D4752 with a maximum 20 double rubs for complete removal on a 1/3 to 1 mil dry film, the product must be able to be removed by nothing stronger than acetone after an air dry of 72 hours.

4.1.16.8 UV Resistance. The product shall have an ultraviolet (UV) resistance of a minimum of 144 hours when tested with ASTM G154. The test specimen must be prepared and exposed according to ASTM G151.

4.1.17 Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs as well as or better than a *benchmark product* in its *product class* for the key parameters required for it to fulfill the intended function(s), as defined in the appropriate subsections of Section ~~2~~4.0.

This comparison shall be conducted using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.

4.2 Product Label

4.2.1~~5.1~~ User Information. The manufacturer shall provide information to the consumer through print, online, or other accessible media, including:

- Instructions for purchasing the necessary amount of product needed for a specific job.
- Instructions for adequate ventilation during application and drying.
- Instructions on proper use of the product.
- A statement encouraging consultation with local authorities for proper disposal or recycling opportunities for leftover product and packaging.
- If a manufacturer provides a *take-back program*, instructions on how the product and packaging can be returned.

4.2.2~~5.2~~ Product Label. The manufacturer's label shall include a statement encouraging consultation with local authorities regarding proper disposal or recycling opportunities for leftover product and packaging.

The label shall include:

- instructions for appropriate purchasing, adequate ventilation during drying time, and proper use of the product,

OR

- a reference to consumer education information by print, online, or other accessible media.

If the manufacturer provides a *take-back program*, the label shall include instructions on how the product and packaging can be returned.

5~~6~~.0 TRADEMARK USE REQUIREMENTS

5~~6~~.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.[28]

5~~6~~.2 Misleading Claims. Green Seal trademarks shall not appear in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the certification.

[28] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (NORMATIVE)

The following terms are italicized throughout the standard.

Anti-corrosive Coating. A *coating* formulated and recommended for use in preventing the corrosion of metal substrates. Rust-preventative coatings are a subset of this class.

Architectural Coating. A *coating* applied at the site of installation to stationary structures and their accessories, to mobile homes, to pavements, or to curbs. Accessories may include bathroom and kitchen fixtures; cabinets; concrete forms; doors; elevators; fences; hand railings; heating equipment, air-conditioning equipment, and other fixed mechanical equipment or stationary tools; lampposts; partitions; pipes and piping systems; rain gutters and downspouts; stairways, fixed ladders, catwalks, and fire escapes; and window screens.

Basement Specialty Coating. A clear, *transparent,* or opaque coating that is labeled and formulated for application to concrete and masonry surfaces to provide a hydrostatic seal for basements and other below-grade surfaces.

Benchmark Product. A product used for comparison in performance testing. For the purposes of this standard, this is considered a national market-leading product, typically selected from the three or four top-selling brands or companies for its *product class* from nationwide data.[29]

Carcinogen. A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), the National Toxicology Program (Groups 1 and 2), the U.S. Environmental Protection Agency's Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, and C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or the U.S. Occupational Safety and Health Administration.

Clear Brushing Lacquer. A clear, protective *finish* intended exclusively for application by brush, excluding clear *lacquer* sanding *sealers*. This product is typically formulated with nitrocellulose or synthetic resins to dry by solvent evaporation, providing a solid, protective film.

Clear Metal Lacquer. Ferrous and nonferrous ornamental metal *lacquer* and surface protectants as classified under EPA, 40 CFR Part 59, 48848 Vol. 63, No. 176, September 1998, last amended 9-99. This classification refers specifically to clear *coatings* for the protection of polished and satin metal, such as brass, bronze, aluminum, and stainless steel.

Coating. A material applied onto or impregnated into a substrate for decorating, protecting, identifying, filling or concealing surface irregularities, modifying light and heat radiation characteristics, or other functional purposes.

[29] It is recommended that manufacturers discuss their product testing with Green Seal before the testing is performed to ensure that the choice of comparison product(s) is appropriate.

Colorant. Concentrated color (dyes or pigments) that can be added to finished *products* to make specific colors. Unless otherwise specified, it is the maximum amount recommended for use by the manufacturer.

Concrete and Masonry Sealer. A clear, *transparent*, or opaque *coating* that is intended primarily for application to concrete and masonry surfaces to perform one or more of the following functions: prevent penetration of water; provide resistance against abrasion, alkalis, acids, mildew, staining, or ultraviolet light; or harden or dustproof the surface of aged or cured concrete. Examples include *penetrating* and *film-forming* products for *interior* and *exterior* use and *basement specialty coatings* for *interior* use.

Conjugated Oil Varnish. A clear or *transparent* wood *coating* labeled as such, excluding *lacquers* or *shellacs*, based on a naturally occurring conjugated vegetable oil (tung oil), determined using ASTM D2245, modified with other natural or synthetic resins. A minimum 50% of the resin solids consist of conjugated oil.

Elastomeric Reflective Wall Coating. A *coating* that is designed and intended for the modification of light and heat radiation characteristics and has elastic properties allowing it to stretch in the summertime heat and return to its original shape without damage.[30]

Exterior. An exterior product is formulated and intended for application on outdoor surfaces. If a product is multipurpose (i.e., for *interior* and exterior application), the stricter requirement applies, and the product must meet all the appropriate performance criteria.

Film-forming. Providing a solid dry film on a substrate by creating a pliable, cohesive, and continuous covering.

Finish. A clear, *transparent*, or opaque *coating* that is intended for wood or metal substrates and forms a film that sits on or in the surface of the substrate. Examples include *varnishes*, *shellacs*, *waterborne* finishes, polyurethane, and *lacquer* (including *lacquer* sanding *sealers*).

Fire-resistive Coating. A *coating* that reduces the spread of fire by increasing the fire endurance of structural materials. Examples include sprayed fire-resistive materials and intumescent fire-resistive coatings that are used to bring structural materials into compliance with federal, state, and local building code requirements.

Flat. Having a specular gloss that registers less than 15 on an 85-degree meter or less than 5 on a 60-degree meter, according to ASTM D523.

Floor Paint. A paint that is intended for floors and applied by roller or brush. For the purposes of this standard, floor paints do not include epoxy or urethane flooring systems, or those that include coarse aggregates, color chips, or flakes as part of a multipart flooring system.

[30] From the U.S. EPA Heat Island Effect Glossary.

Floor Coating. A clear, *transparent*, or opaque coating that is intended to provide long-term durability on general-purpose flooring, such as concrete, masonry, tile, and terrazzo, typically found on floor surfaces in hallways, lobbies, stores, garages, or steps. For the purposes of this standard, floor coatings do not include finishes intended for wood floors, floor care products designed to be periodically removed and reapplied, or products designed to meet the extreme environments in the definition for *industrial maintenance coating*.

Halogenated Organic Solvent. An organic *solvent* containing halogens, including, but not limited to, fluorine, chlorine, bromine, astatine, and iodine.

Hazardous Air Pollutant. Any compound listed as a hazardous air pollutant by U.S. EPA in the Clean Air Act, Section 112(b) (1). Ethylene glycols are included on this list, as of late 2015, while propylene glycols are not.

Industrial Maintenance Coating. A high-performance coating designed to meet extreme conditions, such as immersion in water, exposure to corrosive chemicals, temperatures above 121ºC, frequent heavy abrasion, or *exterior* exposure of metal structural components. Note: CARB allows higher *VOC* levels in products labeled as *Industrial Maintenance Coatings* than for the product category whose function most closely aligns with them.

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. For products comprised of multiple parts that are mixed on site (multi-component products), this 0.01% ingredient threshold or any other similar threshold applies to the total weight of all parts added together (i.e., the combined parts).

Intentional Introduction. The act of deliberately using a material where its continued presence is desired in the final product to provide a specific characteristic, appearance, or quality. Intentional introduction does not include the use of the material as a processing aid or intermediate during manufacturing, where the presence of a residual of that material in the final product is not desired or deliberate.

Interior. An interior product is designed, formulated, and intended for application on indoor surfaces within the building's waterproofing membrane. If a product is multipurpose (i.e., for interior and *exterior* application), the stricter requirement applies, and the product must meet all the appropriate performance criteria.

Intumescent Coating. A type of *fire-resistive coating* that reduces the spread of fire on combustible and noncombustible substrates through a chemical reaction that causes the coating to swell and form a protective barrier. Under this standard, such coatings must meet the *VOC* limits for *fire-resistive coatings*.

Lacquer. A clear or *transparent finish*, including clear lacquer sanding *sealers*, formulated with cellulosic or synthetic resins to dry by evaporation without chemical reaction and to provide a solid, protective film.

Low Solids Coating. A product containing 120 grams or less of solids per liter (1 pound or less of solids per gallon) of *coating* material as recommended for application by the manufacturer. Solids are the nonvolatile portion that remains after the *coating* dries.

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 Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).

Nonelastomeric Reflective Wall Coating. A latex and thermoplastic *coating* intended to modify light and heat radiation characteristics with a dry film thickness of 5 mils or greater.
Nonflat. Having a specular gloss that registers 15 or greater on an 85-degree meter or 5 or greater on a 60-degree meter according to ASTM D523.

Ozone-depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.
Paint. A type of pigmented *coating.*

Penetrating. Suffusing the substrate without forming a surface film and without hiding the grain.

Pigment. A composition of dyes, colorants, or combinations that do not fully obscure the texture of the substrate when applied.

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

Primary Package. Packaging material that physically contains and touches the product, not including any cap or lid.

Primer or Undercoat. A *coating* that is intended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent *coating*; to prevent a subsequent *coating* from being absorbed into the substrate; to prevent harm to a subsequent *coating* from materials in the substrate; or to provide a smooth surface for application of a subsequent *coating*.

Product Class. A category of products that are formulated and labeled to perform similar performance functions on similar substrates. *Coatings* in the same class are intended for equivalent function and performance, such as similar levels of durability and similar dry film thicknesses.

Recovered Material. Matter that has been diverted from the waste stream. Recovered material may include pre- and *postconsumer material*, cuttings, trimmings, obsolete inventories, and

rejected unused stock; it excludes material capable of being reused within the process that generated it.

Reflective Roof Coating. A nonbituminous *coating* intended for application to roofs for the primary purpose of reflecting ultraviolet light or reflecting solar radiation.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65).

Sealer. A *coating*, either *penetrating* or *film-forming*, that blocks materials from penetrating into or leaching out of a substrate.

Shellac. A clear or *pigmented finish* formulated with the resinous secretions of the lac beetle (*Lacifer lacca*) and formulated to dry by evaporation without a chemical reaction.

Solvent. The liquid portion of paints and coatings that dissolves the functional components and evaporates as the coating dries.

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.

Stain. A clear, *transparent*, or opaque *coating* intended to change the color of a surface but not conceal the grain pattern or texture. Stains can be either *penetrating* or *film-forming* and may include *toners* and *sealers*.

Take-back Program. A company program that has been demonstrated to receives at least 50% of sold containers for recycling or reuse.

Toner. A *pigmented penetrating stain* intended for use on surfaces to produce a uniform *coating* that does not obscure the grain or texture of the wood.

Topcoat. The outermost layer of a *paint* or *coating* system

Transparent. A *pigmented coating* that does not fully obscure the surface texture of the substrate.

Varnish. A clear or *transparent finish*, excluding *lacquer* and *shellac*, formulated to dry by chemical reaction on exposure to air. Varnish may contain small amounts of *pigment* to color a surface or to control the final sheen or gloss of the *finish.*

Volatile Aromatic Hydrocarbon. Any hydrocarbon (comprising only H and C atoms) containing one or more 6-carbon benzene rings in the molecular structure with a boiling point of less than or equal to 250°C measured at 1 standard atmosphere (101.3 kPa)

Volatile Organic Compound (VOC). Any organic compound that participates in atmospheric photochemical reactions as defined by the U.S. EPA in 40 CFR §51.100(s).[31] VOC Exempt Compounds, which are not considered VOCs for the purposes of calculating VOC content, are those listed in 40 CFR §51.100(s).

Waterborne. A *coating* that contains 5% or more water as the volatile constituent.

Waterproofing Sealer. A *coating* formulated for the primary purpose of preventing water from penetrating porous substrates.

Waterproofing Concrete or Masonry Sealer. A clear or pigmented sealer that is formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, or staining.

[31] The current version of this regulation can be found at http://www.ecfr.gov/cgi-bin/text-idx?SID=049f1f9562e072c158ad6e4a47d076a2&node=pt40.2.51&rgn=div5#se40.2.51_1100

APPENDIX 1 – SCOPE (INFORMATIVE)

Examples of products included in or excluded from the scope of GS-11:

Products included in GS-11

- paints (interior and exterior)
- wall and ceiling coatings
- anti-corrosive coatings
- floor paints
- floor coatings
- primers or undercoats
- reflective roof coatings
- reflective wall coatings (elastomeric and non-elastomeric)
- fire resistive and intumescent coatings
- concrete and masonry sealers
- clear brushing lacquers
- conjugated oil varnishes
- finishes
- lacquers
- low-solids coatings
- sealers
- shellacs
- stains
- varnishes
- hygienic wall coatings
- decorative wall coatings
- impact resistant wall coatings

Products excluded from GS-11

- products sold in aerosol cans
- industrial, marine, or automotive coatings
- paint strippers
- bituminous coatings
- concrete curing compounds
- anti-graffiti coatings
- mastic texture coatings
- reactive penetrating sealers (as defined by SCAQMD)
- graphic arts coatings (sign paints)
- recycled latex paint (covered in GS-43)
- floor finish and finish strippers for industrial and institutional use (included in GS-40)
- graffiti remover (included in GS-52 and GS-53)
- dry film products

APPENDIX 2 – CARB SCM 2007 VOC LIMITS (INFORMATIVE)

Coating Category	VOC Limits g/L
Flat Coatings	50
Nonflat Coatings	100
Nonflat - High Gloss Coatings	150
Specialty Coatings	
Basement Specialty Coatings	400
Concrete/Masonry Sealers	100
Fire Resistive Coatings (GS-11: *Intumescent coatings*)	350
Floor Coatings (GS-11: *Floor paints*)	100
Low-Solids Coatings [a]	120
Primers, Sealers, and Undercoaters	100
Roof Coatings	50
Rust Preventative Coatings (GS-11: *Anti-corrosive coatings*)	250
Shellacs, Clear	730
Shellacs, Opaque	550
Stains	250
Wood Coatings (GS-11: Includes s*ealers* and *water-proofing sealers* labeled for use on wood or metal substrates)	275

[a] **Low-Solids Coatings**. As per CARB,[32] the *VOC* content of *Low-Solids Coatings* (120 grams or less of solids per liter) is calculated differently, as *VOC* Actual, and shall meet the *VOC* limit specified here, rather than the *VOC* limit specified for its product category.

[32] CARB Suggested Control Measures for Architectural Coatings, Sub-section 4.65 VOC Content. https://ww2.arb.ca.gov/sites/default/files/2020-10/2007%20SCM.pdf

APPENDIX 2 CONTINUED

The following CARB categories are not included in GS-11

- Aluminum roof coatings
- Bituminous roof coatings
- Bituminous roof primers
- Bond breakers
- Concrete curing compounds
- Driveway sealers
- Dry fog coatings
- Faux finishing coatings
- Form-release compounds
- Graphic arts coatings (sign paints)
- High -temperature coatings
- Industrial maintenance coatings
- Magnesite cement coatings
- Mastic texture coatings
- Metallic pigmented coatings
- Multi-color coatings
- Pre-treatment wash primers
- Reactive penetrating sealers
- Recycled coatings
- Stone consolidants
- Swimming pool coatings
- Traffic marking coatings
- Tub and tile refinish coatings
- Waterproofing membranes
- Wood preservatives
- Zinc-rich primers

APPENDIX 3 – CDPH V~~V~~1.2 TARGET CREL VOCS (INFORMATIVE)

The following table is taken from the CDPH Standard Method, v1.2 (2017).[33] CRELs are Chronic Reference Exposure Levels.

Table 4-1 Target CREL VOCs and their maximum allowable concentrations

No.	Compound Name	CAS No.	Allowable Conc.[a] ($\mu g/m^3$)
1	Acetaldehyde	75-07-0	70
2	Benzene	71-43-2	1.5 [b]
3	Carbon disulfide	75-15-0	400
4	Carbon tetrachloride	56-23-5	20
5	Chlorobenzene	108-90-7	500
6	Chloroform	67-66-3	150
7	Dichlorobenzene (1,4-)	106-46-7	400
8	Dichloroethylene (1,1)	75-35-4	35
9	Dimethylformamide (N,N-)	68-12-2	40
10	Dioxane (1,4-)	123-91-1	1,500
11	Epichlorohydrin	106-89-8	1.5
12	Ethylbenzene	100-41-4	1,000
13	Ethylene glycol	107-21-1	200
14	Ethylene glycol monoethyl ether	110-80-5	35
15	Ethylene glycol monoethyl ether acetate	111-15-9	150
16	Ethylene glycol monomethyl ether	109-86-4	30
17	Ethylene glycol monomethyl ether acetate	110-49-6	45
18	Formaldehyde	50-00-0	9 [c]
19	Hexane (n-)	110-54-3	3,500
20	Isophorone	78-59-1	1,000
21	Isopropanol	67-63-0	3,500
22	Methyl chloroform	71-55-6	500
23	Methylene chloride	75-09-2	200
24	Methyl *t*-butyl ether	1634-04-4	4,000
25	Naphthalene	91-20-3	4.5
26	Phenol	108-95-2	100
27	Propylene glycol monomethyl ether	107-98-2	3,500
28	Styrene	100-42-5	450
29	Tetrachloroethylene	127-18-4	17.5
30	Toluene	108-88-3	150
31	Trichloroethylene	79-01-6	300
32	Vinyl acetate	108-05-4	100
33-35	Xylenes, technical mixture (m-, o-, p-xylene combined)	108-38-3, 95-47-6, 106-42-3	350

[33] https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/CDPH%20Document%20Library/CDPH-IAQ_StandardMethod_V1_2_2017_ADA.pdf

APPENDIX 4 – LIST OF TEST METHODS (INFORMATIVE)

ANSI/BHMA A156.18 American National Standard for Materials and Finishes
ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM C67 Standard Test Method for Sampling and Testing Brick and Structural Clay Tile
ASTM C97 Standard Test Method for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C140 Standard Test Method for Sampling and Testing Concrete Masonry Units and Related Units
ASTM C1371 Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
ASTM C1549 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
ASTM D522 Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
ASTM D523 Standard Test Method for Specular Gloss
ASTM D523 Standard Test Method for Specular Gloss Paint
ASTM D714 Standard Test Method for Evaluating Degree of Blistering of Paints
ASTM D823 Standard Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D968 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1005 Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
ASTM D1186 Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
ASTM D1308 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D1400 Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base
ASTM D1640 Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings
ASTM D1735 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
ASTM D2047 Standard Test Method Static Coefficient of Friction
ASTM D2245 Standard Test Method for Identification of Oils and Oil Acids in Solvent-Reducible Paints.
ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity
ASTM D2369 Standard Test Method for Volatile Content of Coatings.
ASTM D2370 Standard Test Method for Tensile Properties of Organic Coatings
ASTM D2486 Standard Test Method for Scrub Resistance of Wall Paints
ASTM D2794 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D2805 Standard Test Method for Hiding Power of Paints by Reflectrometry
ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
ASTM D3274 Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation
ASTM D3359 Standard Test Methods for Measuring Adhesion by Tape Test
ASTM D3363 Standard Test Method for Film Hardness by Pencil Test
ASTM D4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

ASTM D4062 Standard Test Method for Leveling of Paints by Draw-Down Method
ASTM D4400 Standard Test Method for Sag Resistance of Paints Using a Multinotch Applicator
ASTM D4446 Standard Test Method for Anti-Swelling Effectiveness of Water-Repellent Formulations and Differential Swelling of Untreated Wood When Exposed to Liquid Water Environments
ASTM D4585 Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation
ASTM D4752 Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
ASTM D4828 Standard Test Method for Practical Washability of Organic Coatings
ASTM D5894 Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
ASTM D6083 Standard Specification for Liquid Applied Acrylic Coating Used in Roofing.
ASTM D6886 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography
ASTM D7073 Standard Guide for Application and Evaluation of Brush and Roller Applied Paint Films
ASTM D7088 Standard Practice for Resistance to Hydrostatic Pressure for Coatings Used in Below Grade Applications Applied to Masonry
ASTM D7234 Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
ASTM E-84 Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M Standard Test Method for Water Vapor Transmission of Materials
ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E1918 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
ASTM G151 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM G155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials
ASTM STP500 Paint Testing Manual
CDPH Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2
EPA METHOD 24—Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
ISO 11890-1: Paints and varnishes – Determination of volatile organic compound (VOC) content – Part 1: Difference method
ISO 11890-2 Paints and varnishes – Determination of volatile organic compound (VOC) content – Part 2: GC/MS method
SCAQMD Method 304: Determination of volatile organic compounds (VOC) in various materials.
SCAQMD Method 313-91: Determination of volatile organic compounds (VOC) by gas chromatography/mass spectrometry (GC/MS)

SSPC-VIS 2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces
SSPC SP-13 Standard Method for Surface Preparation of Concrete.
UL 410 Slip Resistance of Floor Surface Materials

GS-20

GREEN SEAL® STANDARD FOR
ENVIRONMENTAL INNOVATION

EDITION 2.1

(New Format)

April 30, 2021

Green Seal, Inc. • www.greenseal.org

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~~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 ENVIRONMENTAL INNOVATION, GS-20

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FOREWORD

Edition. Edition 2.1 was issued on April 30, 2021. It replaces Edition 2.0 from April 1, 2019. Corrections and/or clarifications of this edition were also made on August 23, 2024~~July 26, 2023~~. Information on changes made to this standard can be found on Green Seal's website. [1]

General. Green Seal believes that product manufacturing breakthroughs in performance, health and environmental safety transform the economy to better serve people and the planet. Green Seal's Standard for Product Environmental Innovation establishes a process for evaluating products, comparing them to conventional products of the same function, and verifying that they reduce significant human health and environmental impacts in an innovative way.

Under this standard, Green Seal provides a framework for the development of criteria, with resulting criteria as the basis for certification of environmental innovations. This certification demonstrates that an independent third party has verified a product contains an innovative aspect resulting in a significant reduction of human health and environmental impacts compared to products of the same functional class and not previously demonstrated within the product category. The criteria documents that are the result of the Green Seal Environmental Innovation standard (GS-20) are not designed to function as a product category standard or industry-wide sustainability benchmark. Applicants within a product category are neither required to nor eligible to certify against the same innovation as one already verified through the framework within this standard.

Normative references (e.g., other standards) in this standard intend to refer to the most recent edition published.

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#section7

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
ASTM. ASTM International.
BCF. Bioconcentration Factor
BOD. Biochemical Oxygen Demand
CARB. Air Resources Board for the State of California
CAS. Chemical Abstracts Service
CO2. Carbon Dioxide
CFR. Code of Federal Regulations.
DFG. German Deutsche Forschungsgemeinschaft
DOC. Dissolved Organic Carbon
ECVAM. European Centre for the Validation of Alternative Methods
EPA. United States Environmental Protection Agency
GHS. Globally Harmonized System for the Classification and Labelling of Chemicals
ICCVAM. Interagency Coordinating Committee on the Validation of Alternative Methods
IFRA. International Fragrance Association
INCI. International Nomenclature of Cosmetic Ingredients.
ISO. International Organization for Standardization.
MAK. Maximum Allowable Concentrations
OECD. Organisation for Economic Co-operation and Development.
SDS. Safety Data Sheet
ThOD. Theoretical Oxygen Demand.
TG. Test Guidance
TLV. Threshold Limit Value.
VOC. Volatile Organic Compound.

GREEN SEAL STANDARD FOR ENVIRONMENTAL INNOVATION, GS-20

1.0 ELIGIBILITY

All eligibility requirements shall be met in order for a manufacturer to register an applicant product under this standard.

Commercially Available. The product shall be commercially available.

Comparable Alternatives. There must be products that provide the same function as the applicant product in order to make comparisons.

Legal Compliance. Manufacturer shall not be in violation of any applicable environmental regulations or laws nor any applicable regulations under the authority of the U.S. Federal Trade Commission, U.S. Food and Drug Administration, or the U.S. Environmental Protection Agency (or equivalent if based outside the United States).

Established Lifecycle Impacts. Studies on the environmental and/or health impacts of the raw material extraction, manufacturing, transportation, use, and disposal of the applicant product, must be readily available. Green Seal reserves the right to require studies conducted by independent authorities.

Compliance with Existing Green Seal Standards. Products for which a Green Seal standard exists shall be certified under the requirements for that standard before attempting certification under GS-20, except when Green Seal determines the product innovation demonstrates impact reduction above the applicable standard and is the first of its kind in the North American market.

Exclusions. This standard does not cover services, processes, proofs of concept, or products for which there is insufficient technical, lifecycle, or market information.

2.0 PRODUCT LIFE CYCLE IMPACT REVIEW

Citing authoritative sources, applicant shall submit statements that define all possible, anticipated, or known environmental and health impacts for each phase in the product lifecycle, (i.e., raw material acquisition, production, use, end-of-life, and disposal), in alignment with the guidelines specified in ISO 14040.

3.0 ENVIRONMENTAL INNOVATION REVIEW

The applicant shall demonstrate that a product is environmentally innovative via the following process: the applicant shall provide evidence demonstrating that a specific new approach to the product results in reductions of significant health or environmental impacts with at least a 30%

reduction of one or 20% in each of two or more significant environmental or human health impacts, as identified in Section 2.0, as compared to available alternatives.

All innovations considered for certification must meet the following requirements.

3.1 Product Differentiation. The innovation shall distinguish the applicant product from products that provide the same function and are available on the US market, and applicants must disclose in the Final Criteria Document how the innovation is differentiated.

3.2 Reduces Impacts. The innovation shall reduce significant environmental and human health impacts compared to products that provide the same function, as established in the Product Life Cycle Impact Review (Section 2.0, herein).

3.3 First to Market. The product shall be the first within its functional class sold on the North American market to demonstrate this innovation.

3.4 Mitigates Burden Shifting. As needed, the applicant shall implement mitigation requirements, as determined by Green Seal, to account for *burden shifting* that results from the innovation.

~~**4.0 EVALUATION OF FUNCTIONAL PERFORMANCE AND FITNESS FOR PURPOSE**~~

~~**4.1 Product Performance.** Applicant shall demonstrate effective performance through one of the options below.~~

~~**4.1.1** The product functions as well as or better than at least one nationally recognized or market-leading *benchmark product* of its type. The *benchmark product* shall be approved by Green Seal.~~

~~**4.1.2** The product meets existing performance standards for the product type. The applicant shall provide evidence that the test is used as an industry standard, and that any referenced thresholds are accepted as sufficient to demonstrate performance in that product category.~~

~~**4.2 Test Methods.** If available for the product category, test methods shall comply with relevant industry standards, American National Standards, ASTM standards, ISO standards, or other equivalent methodology. Alternatively, if standard test methods are unavailable and the applicant is demonstrating performance through option 4.1.1 above, another objective, scientifically validated method conducted under controlled and reproducible laboratory conditions may be used, subject to Green Seal approval. Test methodology and results must be documented in sufficient detail for this determination to be made.~~

~~**4.3 Independent Testing.** Green Seal reserves the right to require third-party testing by an *independent laboratory* as needed, and in the following cases:~~

~~Public records from the last five years exist that demonstrate legal misconduct regulated by institutions such as the U.S. Federal Trade Commission, U.S. Food and Drug Administration, or environmental regulations reported by the U.S. Environmental Protection Agency, or is not in good standing according to groups such as Better Business Bureau, Consumer Reports, and Truth in Advertising.~~

45.0 ~~HUMAN HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SAFER CHEMICALS

Green Seal maintains the discretion to evaluate applications and products on a case-by-case basis and to add to or disregard any of the requirements as appropriate. Any variances from the requirements in this section granted to an applicant—e.g., for a hazardous functional ingredient with no available alternative or substitute—will be publicly documented and technically justified.

Green Seal uses the following factors to determine the level of disclosure required (i.e., to comply with Section 4.1.1~~5.1~~), and which subsequent requirements are applicable to the product (i.e., Section 4.1.1-4.2.6~~5.2 – 5.21~~):

- Product Form (e.g., Gas, Aerosol, Water-Based Solution, Nonaqueous Liquid or Solution, Paste, Gel, Powder, Solid, Assembly of Parts, Some Combination of the Above, etc.)
- Direct Human *Exposure Pathway* (e.g., Skin Absorption, Inhalation, Ingestion)
- ~~•~~ Environmental Releases (e.g., into Air, Water, Wastewater, Land, Landfill)
- ~~•~~

The following Environmental and Human Health requirements apply when *possible exposure pathways* exist for the whole product or any product *component*(s). The requirements are designed to prevent human exposure to and environmental releases of hazardous chemicals during product use and disposal lifecycle stages, through regular handling and use.

Unless specified otherwise, *components* at 0.01% or more (by weight) shall meet the requirements below.

When there is more than one criterion that applies to a product *component*, the more stringent criterion applies, unless otherwise determined by Green Seal.

Electronic *components* of products shall comply with appropriate environmental standards available for the product category.

4.1 Safer Ingredients

4.1.1~~5.1~~ Disclosure. All relevant product *components* shall be disclosed to the certification program. For example, for products sold in liquid form, provide the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by

weight) present in the product. For products sold as solid material, provide a list of chemical *components* and preassembled parts.

4.1.2 Aquatic Biodegradability. Each of the individual organic *components* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the *component* 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 *components* in the *product as used* that do not exhibit ready biodegradability, one of the following options may be acceptable:

The manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating DOC removal > 90%.

OR

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 *component* 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.

4.1.3 Asthmagens. The product shall not contain any *components* that have been identified as *asthmagens.*

4.1.4 Bioaccumulating Compounds. The product shall not contain any *components* that bioaccumulate or are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log Kow ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, Section 4.1.2 herein, it may be considered to not bioaccumulate.

4.1.5 Bleaching. Fiber-based materials used in the product shall not be bleached with chlorine during the manufacturing process.

4.1.6~~5.2~~ Carcinogens, Mutagens, and Reproductive Toxins. The product shall not contain any *components* that are *carcinogens*, *mutagens*, or *reproductive toxins*. An exemption may be made if the *component* is critical for product function.

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

- Be U.S. Food and Drug Administration-certified 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.

4.1.8 Combustibility. The product shall not be combustible. The product or 99% by weight of the product *components* shall have a flashpoint above 65.5°C (150°F), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

4.1.9 Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

4.1.10~~5.3~~ Prohibited Components. The product shall not contain the following *components*. An exemption may be made if the *component* is necessary for product function and no likely *exposure pathway* exists. Green Seal maintains the discretion to add relevant, scientifically valid prohibitions on a case-by-case basis.

- 1,2-dichlorobenzene
- 2-butoxyethanol
- Alkylphenol ethoxylates
- Formaldehyde donors
- The heavy metals lead, mercury, cadmium, hexavalent chromium, and antimony in the elemental form or compounds
- o-Phenylphenol
- Neonicotinoid pesticides
- Nitro-musks
- Phthalates
- Polycyclic musks
- Triclosan
- Triphenyl tins and tributyl tins

4.1.11 Respiratory Sensitization. The product shall not contain any *components* that have been identified as *respiratory sensitizers*.

4.1.12 Skin Absorption. The *undiluted product* shall not contain *component*s present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

4.1.13 Skin and Eye Damage. The product shall not cause *skin corrosion* or cause *serious eye damage*.

For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components*. If these *components*, 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 vivo or in vitro test methods may also be accepted. Testing is not required for any *component* 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

4.1.14 Skin Sensitization. The product shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components*. If these *components* are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

~~**5.4 Volatile Organic Compounds (VOCs).** VOCs include all organic compounds that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category. If no CARB limit exists for the product category, Green Seal will determine the acceptable VOC content.~~

~~**5.5 Animal Testing.** To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation of Alternative Methods (ECVAM), 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.~~

4.2 Safer Products

4.2.1~~5.6~~ ~~——~~Acute Toxicity. The product shall not be toxic to humans when inhaled or ingested. A product is considered toxic if either of the following criteria apply:

- Oral lethal dose (LD50) < 5,000 mg/kg
- Inhalation lethal concentration (LC50) < 20,000 ppmV at 1 hr

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* may be used.

4.2.2 Chronic Inhalation Toxicity. The *product as used* shall not contain *components* that are classified as producing significant toxic effects in mammals via inhalation, with a possible inhalation *exposure pathway* which shall be determined from all components at 0.01% or more in the undiluted product, when the component has a vapor pressure greater than 1mm Hg at 1 atm pressure and 20°C, from repeated inhalation exposure at or below 1.0 mg/L as a vapor, according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures.

4.2.3 Eutrophication. The product shall not contain phosphorus at more than 0.5% by weight.

4.2.4 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 LC50 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 *components* may be used to calculate a weighted average. The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

4.2.5 Volatile Organic Compounds (VOCs). VOCs include all organic compounds that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category. If no CARB limit exists for the product category, Green Seal will determine the acceptable VOC content.

4.2.6 Animal Testing. To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation

of Alternative Methods (ECVAM), 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.

4.2.7 Product-Specific Requirements. Green Seal reserves the right to include requirements for applicants in addition to Section 4.1-4.2.5 to effectively address significant environmental or human health lifecycle impacts within a product category.

~~**5.7 Skin and Eye Damage.** The product shall not cause *skin corrosion* or cause *serious eye damage*.~~

~~For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components*. If these *components*, 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 vivo or in vitro test methods may also be accepted. Testing is not required for any *component* 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.~~

~~**5.8 Asthmagens.** The product shall not contain any *components* that have been identified as *asthmagens*.~~

~~**5.9 Respiratory Sensitization.** The product shall not contain any *components* that have been identified as *respiratory sensitizers*.~~

~~**5.10 Skin Sensitization.** The product shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components*. If these *components* are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.~~

~~**5.11 Skin Absorption.** The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.~~

~~**5.12 Chronic Inhalation Toxicity.** The *product as used* shall not contain *components* that are classified as producing significant toxic effects in mammals via inhalation, with a possible~~

inhalation *exposure pathway* which shall be determined from all components at 0.01% or more in the undiluted product, when the component has a vapor pressure greater than 1mm Hg at 1 atm pressure and 20°C, from repeated inhalation exposure at or below 1.0 mg/L as a vapor, according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures.

5.13 Combustibility. The product shall not be combustible. The product or 99% by weight of the product *components* shall have a flashpoint above 65.5°C (150°F), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open Cup Apparatus.

5.14 Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

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

- Be U.S. Food and Drug Administration-certified 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.

5.16 Bioaccumulating Compounds. The product shall not contain any *components* that bioaccumulate or are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log Kow ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, Section 5.18 herein, it may be considered to not bioaccumulate.

5.17 Eutrophication. The product shall not contain phosphorus at more than 0.5% by weight.

5.18 Aquatic Biodegradability. Each of the individual organic *components* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the *component* 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 *components* in the *product as used* that do not exhibit ready biodegradability, one of the following options may be acceptable:~~

~~The manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating DOC removal > 90%.~~

~~OR~~

~~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 *component* 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.~~

~~**5.19 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 LC50 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 *components* may be used to calculate a weighted average. The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.~~

~~**5.20 Bleaching.** Fiber-based materials used in the product shall not be bleached with chlorine during the manufacturing process.~~

~~**5.21 Product-Specific Requirements.** Green Seal reserves the right to include requirements for applicants in addition to Section 5.1 – 5.20 to effectively address significant environmental or human health lifecycle impacts within a product category.~~

5~~6~~.0 ~~PACKAGING REQUIREMENTS~~ SUSTAINABLE PACKAGING

Green Seal maintains the discretion to determine which requirements must be addressed and reserves the right to add to or disregard any of the requirements below to appropriately evaluate products on a case-by-case basis. Any variances from the below requirements will be publicly documented.

5.1 Packaging Materials

5.1.1~~6.1~~ Primary and Secondary Packaging. *Primary* and *secondary packaging* shall meet the following requirements, based on the packaging material type:

5.1.1.1~~6.1.1~~ Packaging made from paper or paperboard shall be *recyclable* and made from 100% recovered material.

5.1.1.2~~6.1.2~~ Packaging made from containerboard (corrugated cardboard) shall be *recyclable* and made from at least 30% recovered material.

5.1.1.3~~6.1.3~~ Packaging made from plastic shall be *recyclable*, or *source-reduced* by 20%, or shall contain 25% recovered material content (pre- or post-consumer material).

~~**6.2 Resin Identification Code.** Plastic packaging shall be marked with the appropriate Resin Identification Code.~~

5.1.2~~6.3~~ **Concentrated Product Packaging.** Concentrates are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use package types.

5.2 Packaging Label

5.2.1~~6.2~~ **Resin Identification Code.** Plastic packaging shall be marked with the appropriate Resin Identification Code.

5.3 Restricted Substances

5.3.1~~6.4~~ **Heavy Metal Restrictions.** The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced*. Further, the sum of the concentration levels of these metals shall not exceed 100 ppm; an exception is allowed for *refillable packages* or packages that would not exceed this maximum level but for the addition of *post-consumer material.*

5.3.2~~6.5~~ **Other Restrictions.** Phthalates, bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced* to plastic packaging; an exception is allowed for packages that would not have added phthalates, bisphenol A, or chlorinated packaging material but for the addition of *post-consumer material*.

6~~7~~.0 ~~PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance

6.1.1 **Product Performance.** Applicant shall demonstrate effective performance through one of the options below.

6.1.1.1 The product functions as well as or better than at least one nationally recognized or market-leading *benchmark product* of its type. The *benchmark product* shall be approved by Green Seal.

6.1.1.2 The product meets existing performance standards for the product type. The applicant shall provide evidence that the test is used as an industry standard, and that any referenced thresholds are accepted as sufficient to demonstrate performance in that product category.

6.1.2 Test Methods. If available for the product category, test methods shall comply with relevant industry standards, American National Standards, ASTM standards, ISO standards, or other equivalent methodology. Alternatively, if standard test methods are unavailable and the applicant is demonstrating performance through option 64.1.1 above, another objective, scientifically validated method conducted under controlled and reproducible laboratory conditions may be used, subject to Green Seal approval. Test methodology and results must be documented in sufficient detail for this determination to be made.

6.1.3 Independent Testing. Green Seal reserves the right to require third-party testing by an *independent laboratory* as needed, and in the following cases:

Public records from the last five years exist that demonstrate legal misconduct regulated by institutions such as the U.S. Federal Trade Commission, U.S. Food and Drug Administration, or environmental regulations reported by the U.S. Environmental Protection Agency or is not in good standing according to groups such as Better Business Bureau, Consumer Reports, and Truth in Advertising.

6.2 Product Label

6.2.~~7.~~1 Labeling Requirements for Products Sold as Liquids.

6.2.1.1~~7.1.1~~ Label Language. The use instructions shall be in English and another language or English and a graphical representation or icons.

6.2.1.2~~7.1.2~~ Label Dilution or Dosage Directions for Concentrates. For concentrates, the manufacturer's label shall state clearly and prominently that dilution with water from the unheated tap is recommended, unless tested otherwise to meet product performance requirements, and shall state the recommended level of dilution or dosage (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, or capfuls.

6.2.1.3~~7.1.3~~ Label Use and Disposal Directions. The product label shall have explicit disposal, recycling, reuse, or refill instructions, proper and clear directions for

use, and appropriate precautions and recommendations for the use of personal protective equipment.

6.2.2~~7.2~~ **Ingredient Line.** The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI) in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.

6.2.3 Claims and Transparency

6.2.3.1~~7.3~~ **Fragrance Labeling.** The product label and SDS shall declare if a *fragrance* has been added or if no *fragrance* has been added. If applicable, liquid products with no *fragrance* added shall state that no *fragrance* has been added.

Note: Solid products with no *fragrance* added are exempt from this requirement.

6.2.3.2~~7.4~~ **Allergen Labeling.** The product label and SDS shall indicate any allergen *components* present in the product at 0.01% or more (e.g., "Contains allergen [allergen's INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.

7~~8~~.0 TRADEMARK USE REQUIREMENTS

7~~8~~.1 **Trademark Use.** Any use of the Green Seal® Certification Mark or 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.[2]

7~~8~~.2 **Misleading Claims.** 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.

[2] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard

Asthmagen. A substance designated as an *asthma*-causing agent as specifically listed by Chemical Abstracts Service (CAS) number by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC has met the AOEC sensitization criteria (i.e., A with Rs or Rrs), or if classified as a *respiratory sensitizer*, and with a probable/plausible route of inhalation exposure.

Benchmark Product. A product used for comparison in performance testing; for the purposes of this standard either a *reference product* could be used, or else a national market-leading product, typically selected from the top three or four selling brands or companies for its category from nation-wide data.

Burden Shifting. A concept within product lifecycle review frameworks that defines an unintentional consequence of a change in the system that results in a reduction in one impact category and a significant increase in another impact category, e, g., carbon emissions.

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human *carcinogen* by any of the following agencies or programs: International Agency for Research on Cancer (Groups 1, 2A, and 2B); National Toxicology Program (Groups 1 and 2); EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (as *carcinogens* under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); or under the GHS (hazard categories 1 (H350, may cause cancer) and 2 (H351, suspected of causing cancer)).

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality, or a contaminant that was not deliberately added but is present in the product at least at 0.01% by weight.

Exposure Pathway. The way in which a person can be exposed to a hazardous substance. A complete *exposure pathway* includes (1) the source of chemical and mechanism for release, (2) the exposure point, (3) the transport medium (i.e., from source to exposure point, if different), and (4) the exposure route (e.g., ingestion, inhalation, absorption, etc.).

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Independent Laboratory. A laboratory that (1) has been recognized by a laboratory accrediting organization to test and evaluate products to a related product standard, and (2) is free from commercial, financial, and other pressures that may influence the testing and evaluation process.

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 GHS.

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

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 Package. Package material that physically contains and contacts the product, not including the cap or lid.

Product As Used. The most concentrated form of the product that the manufacturer recommends for a product's intended use.

Recyclable. The package can be collected in a substantial majority of communities, ~~separated~~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 container 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 substance listed as a *reproductive toxin* (including developmental, female, and male toxins) 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., also known as Proposition 65).

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 *respiratory sensitization* (H334), in accordance with the GHS.

Secondary Packaging. Packaging used to contain *primary package/s* and typically used for merchandizing. This does not include case or shipping packaging or the *primary package*, cap, or lid.

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*.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under Category 1 for skin sensitization (H317) under the GHS.

Source-Reduced Package. A *primary package* that has at least 20% less material (by weight) compared to containers commonly used for that product type.

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

GS-34

GREEN SEAL® STANDARD FOR
CLEANING AND DEGREASING AGENTS

EDITION 2.2
(New Format)

September 8, 2017

Green Seal, Inc. • greenseal.org

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~~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 CLEANING AND DEGREASING AGENTS, GS-34

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FOREWORD

Edition. Edition 2.2 was issued on September 8, 2017. It replaces Edition 2.1 from July 12, 2013. Corrections and/or clarifications were last made on August ~~16~~23, 2024~~October 27, 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. 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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section9

ACRONYMS AND ABBREVIATIONS

ASTM. American Society for Testing and Materials
CARB. Air Resources Board for the State of California
CFR. Code of Federal Regulations
EPA. United States Environmental Protection Agency
GHS. Globally Harmonized System of Classification and Labelling of Chemicals
HSDB. Hazardous Substances Data Bank
ISO. International Organization for Standardization
OECD. Organization for Economic Cooperation and Development
RTECS. Registry of Toxic Effects of Chemical Substances
VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR CLEANING AND DEGREASING AGENTS, GS-34

1.0 SCOPE

This standard establishes requirements for cleaning/degreasing agents. For purposes of this standard, cleaning/degreasing agents are defined as cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications. Suitable agents do not include those for specialized cleaning/degreasing operations such as the removal of paints, sealants, rust, and adhesives; ~~handwiping~~hand wiping parts; preparation of surfaces for electroplating, organic coatings, and parts testing; or the cleaning of hydraulic components, medical supplies, electronics, and optics. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, compatibility of cleaning/degreasing agents with surface materials is not specifically addressed in this standard. Product users shall follow the manufacturer's instructions on compatibility.

Military users of this standard are reminded that it only covers the ~~environment~~environment, and that the selection of a specific degreaser may require clearance from necessary channels such as the appropriate commodity managers and U.S. Army Center for Health Promotion & Preventive Medicine.

All criteria, unless otherwise specified, are based on the stated final degreasing agent concentration.

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~~

~~The cleaning/degreasing agent shall clean a steel coupon to a level of 2,000 mg/m2 by the test method presented in Annex B for both types of soil specified in the test method. The 2,000 mg/m2 level of cleanliness is intended to be a minimum level of performance. Degreaser users may need to conduct their own performance testing to determine if a degreasing agent meets specific cleaning requirements. Aqueous degreasers shall also meet the 95% separation level set out in Annex C.~~

2~~3~~.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SSAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Aquatic Biodegradability. Each of the organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any 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 *organic 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 2 evolution, as % of theoretical CO_2 > 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* at 0.01% in the *product as used* that do not exhibit ready biodegradability, one of the following options may be acceptable:

1. ~~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. ~~2.~~ The manufacturer may demonstrate that the compound has low aquatic toxicity (acute $LC_{50} \geq 100$ 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.

2.1.2 Carcinogens and Reproductive Toxins. The *product as used* shall not contain any *ingredients* that are *carcinogens* 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 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.

2.1.3 Flammability and Ignitability. The *undiluted product* shall not be ignitable (i.e., the flashpoint for the compound is above 140° F). In addition, the flash point of the final concentration of the degreasing product shall not be less than 40° F above the manufacturer's recommended usage temperature. The flash point of the degreasing agent

shall be determined using either ASTM International (ASTM) Cleveland Open Cup Tester (ASTM D92-97), or a Tag Closed Tester (ASTM D56-97).

2.1.4 Ozone Depletion. The *product as used* shall not contain any *ingredients* that are *ozone-depleting substances*.

2.1.5 Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. 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 also 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.

2.2 Safer Products

2.2.1~~3.1~~ Acute Toxicity. The *product as used* shall not be toxic to humans. A product is considered toxic if any of the following lethal dose (LD) criteria apply:

Oral LD_{50}	$\leq$ 5,000 mg/kg
Inhalation LC_{50} (mist, dust, or fumes)	$\leq$ 20,000 ppm of vapor or gas or 500 mg/L
Dermal LD_{50}	$\leq$ 2,000 mg/kg

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *ingredients* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *ingredients* is additive. 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_i = the toxicity value for each *ingredient* (LD_{50})
n = number of *ingredients*

Inhalation toxicity shall be determined from all *ingredients* in the *product as used* when the *ingredient* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20° C.

2.2.2 Eutrophication. Phosphates and phosphonates, including sodium salts and potassium salts, shall not be present in the *product as used* in quantities above 0.5% by weight of total phosphorus.

2.2.3 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_{50} 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 (as in section 2.2.13~~.1~~).

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

2.2.4 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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the *product as used* shall not exceed the lower of the following options:

- 5% by weight.
- The current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

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

- By summing the percent by weight contribution from all VOCs present in the product at 0.01% or more.
- According to the EPA Method 24, or equivalent.

2.2.5 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.

3.2 Carcinogens and Reproductive Toxins. The *product as used* shall not contain any *ingredients* that are *carcinogens* 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 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.

3.3 Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. 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 also 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 Flammability and Ignitability. The *undiluted product* shall not be ignitable (i.e., the flashpoint for the compound is above 140° F). In addition, the flash point of the final concentration of the degreasing product shall not be less than 40° F above the manufacturer's recommended usage temperature. The flash point of the degreasing agent shall be determined using either ASTM International (ASTM) Cleveland Open Cup Tester (ASTM D92-97), or a Tag Closed Tester (ASTM D56-97).

3.5 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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the *product as used* shall not exceed the lower of the following options:

- 5% by weight.
- The current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

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

- By summing the percent by weight contribution from all VOCs present in the product at 0.01% or more.
- According to the EPA Method 24, or equivalent.

3.6 Ozone Depletion. The *product as used* shall not contain any *ingredients* that are *ozone-depleting substances*.

3.7 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_{50} 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 (as in section 3.1).

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

3.8 Aquatic Biodegradability. Each of the organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any 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 *organic 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 2 evolution, as % of theoretical CO_2 > 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* 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%.

2. The manufacturer may demonstrate that the compound has low aquatic toxicity (acute $LC_{50} \geq$ 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.

3.9 Eutrophication. Phosphates and phosphonates, including sodium salts and potassium salts, shall not be present in the *product as used* in quantities above 0.5% by weight of total phosphorus.

~~**3.10 Disposal.** The manufacturer shall either take back unused or spent products for recycling or disposal or provide the user with specific recycling and disposal instructions.~~

~~**3.11 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.~~

3.04.0 ~~PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

3.1 Product Performance. The cleaning/degreasing agent shall clean a steel coupon to a level of 2,000 mg/m2 by the test method presented in Annex B for both types of soil specified in the test method. The 2,000 mg/m2 level of cleanliness is intended to be a minimum level of performance. Degreaser users may need to conduct their own performance testing to determine if a degreasing agent meets specific cleaning requirements. Aqueous degreasers shall also meet the 95% separation level set out in Annex C.

3.2 Product Label

~~**3.2.14.1 Instructions for Dilution.** Where a product is intended to be diluted with water by the user prior to use, the manufacturer label must state clearly and prominently that dilution is recommended and must state the recommended level of dilution.~~

3.2.214.2 Instructions for Use. The label must include detailed instructions for proper use, particularly with regard to the temperature at which the degreasing agent may safely be used and to the use of personal protective equipment.

3.2.324.3 Instructions for End of Use. A label must give specific instructions for recycling or disposal.

3.2.43 Disposal. The manufacturer shall either take back unused or spent products for recycling or disposal or provide the user with specific recycling and disposal instructions.

3.3 Product Design

3.3.1 Instructions for Dilution. Where a product is intended to be diluted with water by the user prior to use, the manufacturer label must state clearly and prominently that dilution is recommended and must state the recommended level of dilution.

45.0 TRADEMARK USE REQUIREMENTS

45.1 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.[2]

45.2 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.

[2] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

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).

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

Ozone-Depleting Substance. An ozone-depleting substance is any compound with an ozone depletion potential greater than 0.01 (CFC-11 = 1).

Product As Used. The most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a product be diluted 1:4 or 1:8 for use, the product shall meet the health and environmental requirements at a dilution of 1:4.

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65).

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.

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

ANNEX B – TEST METHOD FOR CLEANING EFFECTIVENESS (Normative)

Test Method for Evaluating the Cleaning Effectiveness of Degreasing Agents

B.1 Scope

This test method is a procedure for evaluating the ability of a degreaser to remove soil. This method is based on ASTM G-122, (1996), MIL-PRF-87937C (DOD, 1997) and MIL-C-29602 (DOD, 1995). It is intended to provide information about the relative cleaning ability of a degreaser. Because cleaning effectiveness depends on a variety of cleaning conditions (e.g., temperature, agitation, and rinse conditions), as well as on the characteristics of parts (e.g., size and shape), the final evaluation of a cleaning agent should include testing under actual cleaning conditions.

This procedure can be used to test aqueous-, semiaqueous-, and solvent-based degreasers. A minimum of four tests must be completed for each degreaser/soil combination. For the two soil types recommended in this method, eight 304 stainless coupons are used to test each degreaser.

This method does not address compatibility of degreasers with various surfaces. It is the responsibility of the manufacturer of the degreaser to provide the user with this type of information. In addition, this method does not address all safety issues. The testing laboratory is responsible for establishing the appropriate health and safety practices as well as the applicability of regulatory limitations.

Note that certain precautions may be required when working with low flash point degreasers. For example, an inert-gas blanket may be required, or heating and agitation may not be possible. The tester must consult the manufacturer's operating and safety instructions concerning specific precautions before conducting this test.

B.2 Materials and Equipment Needed

B.2.1 Materials

- 100 mL WD-40
- 100 mL Marvel Lubricating Oil
- 100 mL AW32 Hydraulic Oil
- 100 mL Hypoid SAE 140 Gear Oil
- 100 mL MAR-TEMP 355 Quench Oil
- 100 mL Honing and Cutting Oil
- 10 grams of carbon black
- 10 grams iron oxide (98% purity)

- 4 L reagent-grade 2-propanol
- Distilled/deionized water (ASTM D1193, Specification for Reagent Water)
- Degreasing agent. If the manufacturer recommends dilution, the product must be diluted to comply with these instructions using distilled/deionized water
- Eight 304 stainless steel coupons. The coupons should measure 0.3175 cm thick with a surface area of 7.0 cm by 5.0 cm. Tests also require either a 0.5 cm diameter hole in the coupons or tabs measuring 1.5 cm by 1.5 cm with a hole measuring 0.5 cm in diameter in the middle of the tab (Figure B.1). The tabs, centered on top of the coupons, enable them to be suspended in liquid without touching the sides of the beaker. The coupons should be made of 304 stainless steel according to metal characterization guidelines set forth by the American Society for Metals (ASM). The coupons should be free of soils, stains, or surface imperfections. Furthermore, all coupons should have similar surface characteristics. Sources for test coupons can be found in Table B.2.

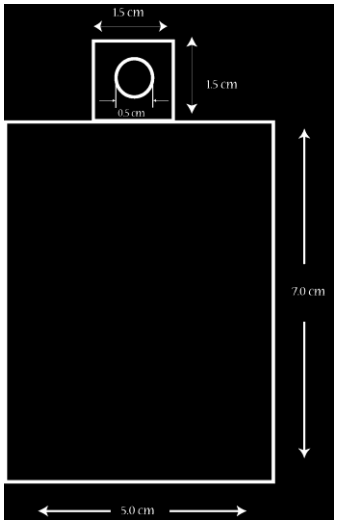

Figure B.1

B.2.2 Equipment

- One five-gallon tank equipped with both a heating device capable of heating to 85° C, and an ultrasonic generator capable of emitting ultrasonic energy at 40 kHz;[3]
- Two magnetic stirrers

[3] Industrial ultrasonic cleaning is commonly conducted at 40 kHz [MFASC (1997)].

- One oven capable of heating to 105° C
- Two 750 mL glass beakers
- Eight identical glass beakers capable of holding a 5.0 cm by 7.0 cm by 0.3175 cm piece of metal completely submerged in liquid
- Four beaker holders. Beaker holders support beakers in the 5-gallon ultrasonic tank so that the beakers do not contact the bottom or sides of the tank
- Ring stand and clamp assembly
- Mass balance, capable of measuring to 0.1 mg
- Paint brush
- Timer

B.2.3 Safety Items

- Hearing protection to be worn during operation of ultrasonic bath.

B.3 Soil

Two types of soils need to be prepared individually.

Label one 750 mL beaker with "maintenance soil." Place in it 10 grams of carbon black, 10 grams iron oxide, 100 mL WD-40, 100 mL AW32 Hydraulic Oil, and 100 mL Hypoid SAE 140 Gear Oil. Stir the mixture for 20 minutes at room temperature using a magnetic stirrer.

Label another 750 mL glass beaker "production soil." Place in it 200 mL MAR-TEMP 355 Quench Oil and 200 mL Honing and Cutting Oil. Stir the mixture for 20 minutes at room temperature using a magnetic stirrer.

B.4 Soil/Degreaser Combinations

The steps presented in Sections B.6 to B.9 must be repeated for each soil type. In other words, the steps must be completed once for the maintenance soil, and once for the production soil.

B.5 Preparation of the Ultrasonic Tank

The 5-gallon ultrasonic tank should be filled with water up to about 5 cm from the top when four 400 mL beakers are suspended in the water (Figure B.2). To do this, fill the tank halfway with water, place the beakers in holders over the water, and then adjust the water level (5 cm below the top of the tank and so that the water from the ultrasonic tank does not enter the beaker). Fill the four beakers ~~half way~~halfway with reagent-grade 2-propanol. Suspend each coupon in a beaker so that it does not come into contact with the beaker. Adjust the level of the 2-propanol to make certain it covers the entire coupon.

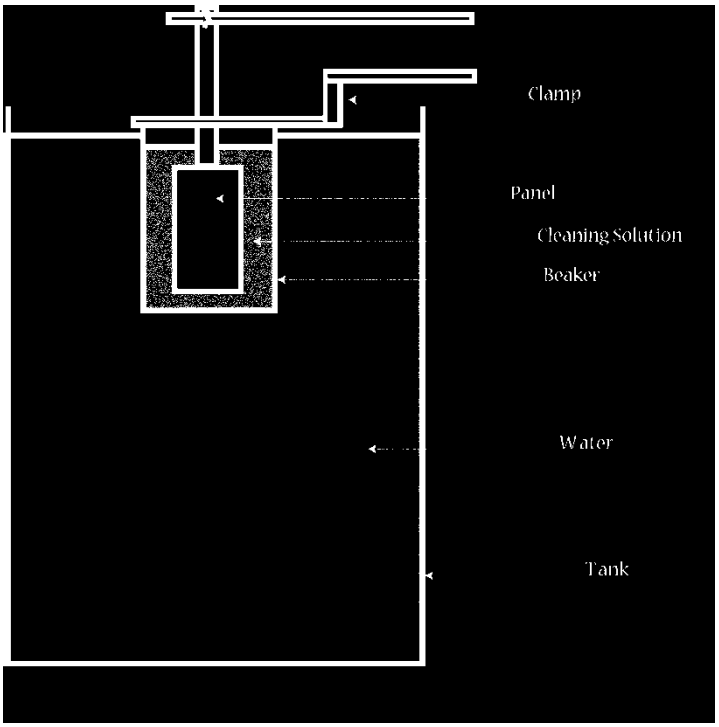

Figure B.2

Put on hearing protection. Turn the ultrasonic generator on and allow it to emit ultrasonic energy for 30 minutes at room temperature to degas the tank. After degassing the tank, clean the panels in the 2-propanol for five minutes. The coupons should be air dried for 30 minutes, and then dried in an oven for 30 minutes at a temperature of 105° C.[4] Allow the coupons to cool to room temperature. A minimum of four coupons should be prepared for each degreaser/soil combination.

Label each coupon. Coupons that will be soiled with maintenance soil should be labeled M1, M2, M3, and MC. Coupons that will be soiled with production soil should be labeled P1, P2, P3, and PC. One common method for labeling coupons is to etch the label into the back face of the coupon. Weigh each coupon with a ~~balance, and~~balance and record this weight (initial mass = A).

B.6 Soiling of Test Coupons

Apply approximately 100 mg of soil onto one side only of each of three precleaned coupons with a brush. Do not apply any soil to the control coupons. The maintenance soils for all three coupons should be baked in an oven for 30 minutes at a temperature of 40° C. For the production soil, all three coupons should be baked in an oven for thirty minutes at 105° C.~~2~~ 4 Allow the coupons to cool to room temperature and weigh them (soiled mass = B).

[4] **Warning**. Do not place coupons directly in the oven if residual material is present.

Only coupons with between 85 mg and 115 mg (100 ± 15 mg) of soil should be used for testing the cleaners (B-A). If the soil falls outside this range, the test coupon should be cleaned and soiled again.

B.7 Cleaning Procedure

Preheat the cleaning bath in the ultrasonic tank to the manufacturer's recommended operating temperature. Fill four 400 mL beakers with enough fresh degreaser solution to completely submerge the coupons in the degreasing solution without any overflow.

The four beakers should then be suspended in the ultrasonic tank (Figure ~~A.2~~ B.2). Note that the size and configuration of the beakers in the ultrasonic tank must be consistent throughout the testing.

Allow the temperature in the cleaning bath and beakers to equilibrate. Put on hearing protection and degas the ultrasonic tank again. Each coupon should then be suspended in a beaker, allowing the entire 7.0 cm by 5.0 cm soiled face of the coupon to be submerged in the cleaning solution (Figure ~~A~~B.2). Adjust the amount of degreaser solution to cover the test coupon if necessary. The coupons should be washed for 20 minutes. If the degreaser manufacturer's instructions permit, the solution should be agitated with ultrasonics at 40 kHz.

The initial washing step is followed by two rinse steps. The coupons should be drained for 30 seconds prior to each rinse step. This draining time will minimize carry-over into the next tank. For each rinse step repeat the following:

After the test coupons are removed from the beakers, pour distilled/deionized water into clean beakers and suspend them in the 5-gallon ultrasonic tank (Figure ~~A~~B.2). Make certain that the temperature of the water in the ultrasonic tank and the beakers is the same as it was in the original washing stage, unless different temperatures for rinsing are recommended by the cleaning agent supplier. In that case, the manufacturer's recommended rinse temperature shall be used. The wash and rinse temperatures shall be appended to the tabulation of test results (Table ~~A~~B.1). Then suspend the test coupons in the beakers. Adjust the level of distilled/deionized water so that the surface of the coupons is completely covered.

If ultrasonics were used in the washing step, turn the 40 kHz ultrasonic generator on for 20 minutes. Allow the coupons to drain for 30 seconds prior to transfer to the next step.

After the two rinse steps are completed, all coupons should be allowed to air dry for 30 minutes and then dried in an oven at 105° C for 30 minutes.[5] Allow the coupons to cool to room temperature and weigh the coupons (mass of the coupon after cleaning = C).

[5] **Warning**. Do not place coupons directly in the oven if residual material is- present.

B.8 Cleanliness Evaluation

B.8.1 Control Test

First examine the control coupon to determine if there are any visible signs of corrosion. Next, determine if the control coupon lost mass, which might occur if corrosion was in progress; or gained mass, which might occur if the degreaser had left a residue on the coupons. Apply the following equation.

$$|MC_C - MC_B| < 0.1 \text{ mg (which is the maximum balance error).}$$

Where:

MC_C = mass of the control coupon after washing and rinsing
MC_B = mass of the control coupon before washing and rinsing

If the control coupon's mass differs by more than 0.1 mg, conduct two more control tests. If the coupon's mass differs by more than 0.1 mg in two out of three tests, the degreaser does not meet the cleaning performance criteria.

B.8.2 Cleaning Effectiveness

Calculate the amount of residual soil per surface area, using the following formula:

$$RS = (C-A)/ Ar$$

Where:

RS = amount of residual soil (mg/m^2)
C = mass of the coupon after cleaning
A = initial coupon mass
Ar = surface area = 0.0035 m^2

B.9 Compiling Results

Enter all of the mass values collected during the testing in Table B.1. If the average residual maintenance soil loading, and the average residual performance soil loading are each less than 2,000 mg/m^2, the degreaser meets the cleaning performance criteria.

Table B.1

Coupon	Initial mass of coupon (A)	Mass of coupon after soiling (B)	Mass of coupon after cleaning (C)	Residual soil (mg/m^2)	Mass difference control
M1					-
M2					-
M3					-
MC				-	
Average					
P1					-
P2					-
P3					-
PC				-	
Average					

Summary of Test Conditions:

Test Step	Temp., °C	Time, min.	Ultrasonics used? (Y/N)	Remarks
Wash				
Drain Time				
Rinse #1				
Drain Time				
Rinse #2				
Drain Time				
Air Drying				
Oven Drying				

Table B-2

Materials	Company	Address	Phone Number
100 mL WD-40	WD-40 Company	1061 Cudahy Place San Diego, CA 92110	619-275-1400
100 mL Marvel Lubricating Oil	Marvel Oil Co., Inc.	Port Chester, NY 10573	914-937-4000
100 mL AW32 Hydraulic Oil	American Lubricating Company	Memphis, TN 38101	901-527-4707
100 mL Hypoid SAE 140 Gear Oil	Sta-Lube (a subsidiary of) CRC Industries	Warminster, PA 18974	215-674-4300
100 mL MAR-TEMP 355 Quench Oil	E. F. Houghton Co.	Valley Forge, PA 19482	610-666-4000
100 mL Honing and Cutting Oil	Sta-Lube	Rancho-Dominguez, CA 90224	215-674-4300
Test coupons	Metaspec Metal Samples Company Q-Panel Company	San Antonio, TX Munford, AL Cleveland, OH	210-923-5999 256-358-4202 440-835-8700

ANNEX C – TEST METHOD FOR OIL SEPARATION ABILITY (Normative)

Test Method for Evaluating the Oil Separation Ability of Aqueous Degreasers

C.1 Scope

This method measures the ability of a mixture of soil and an aqueous degreaser to separate from water. This is an important characteristic for a degreaser because good separating ability enables the degreaser and water to be reused and recycled. Conduct each degreaser test described in Sections ~~B~~C.2 to ~~B~~C.4 three times to ensure repeatability.

C.1.1 Applicability

This test method is not applicable to semi-aqueous cleaning agents, semi-aqueous cleaning agent emulsions, or solvents, since these systems are designed to hold significant amounts of oils and/or greases in solution.

C.2 Materials and Equipment

C.2.1 Materials

- Distilled/deionized water (ASTM D1193, Specification for Reagent Water)
- 20 mL Degreasing agent (final concentration). This 720 mL includes the volume of water if the manufacturer recommends that the degreasing agent be diluted. The product must be diluted according to the manufacturer's instructions with distilled/deionized water
- 80 mL Hypoid SAE 140 Gear Oil

C.2.2 Equipment

- Volumetric cylinder. This cylinder should be 25 cm tall and have a diameter of 8 cm.
- Magnetic stirrers
- Ring stand and clamp assembly
- Timer

C.3 Mixing

This shall be performed at the temperature suggested by the degreaser supplier for best separation performance. Dilute the degreaser to the manufacturer's recommended dilution with distilled/deionized water. Pour 720 mL of the diluted aqueous degreaser solution into the volumetric cylinder, which has been previously clamped in place on the magnetic stirrer. Do not dilute the degreaser if the manufacture does not recommend it. To this add 80 mL of the Hypoid SAE 140 Gear Oil. Measure the initial total height of the liquids in the cylinder (A = initial height). It should be close to 16 cm. Stir the mixture for 30 minutes with a magnetic stirrer at the highest setting that does not result in any of the mixture spilling from the container.

Upon completion of the 30-minute stirring time, turn off the stirrer. Set a timer for 20 ~~minutes, and~~minutes and allow the liquid mixture in the cylinder to sit for that period of time without stirring. As the mixture sits, three phases will form. The top phase will be the oil, the middle phase will be the dispersed phase, which consists of both the oil and the cleaning solution, and the bottom phase will consist only of the cleaning solution and water. After the 20 minutes has elapsed, measure the height of the dispersed, or middle, phase (B = final height).

C.4 Determining Separation Ability

The percent of separation can be determined by the following formula:

$$[(A-B)/A]100 = \text{percent separation.}$$

If the percent separation exceeds 95% in two out of three tests, the degreaser meets the performance standard for separation.

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-34:

Products Included in GS-34

- Cleaning agents marketed as suitable for cleaning soils in production and maintenance applications
- Degreasing agents marketed as suitable for cleaning soils in production and maintenance applications

Products Excluded from GS-34

- Floor finish and finish strippers (included in GS-40)
- General-purpose, restroom, glass and carpet cleaners for household use (included in GS-8) and 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 (included in GS-41) or household use (included in GS-44)
- Medical supply cleaning products
- Laundry care products
- Paint thinners or removers
- Specialty cleaning products for household use (included in GS-52) and industrial and institutional use (included in GS-53)

GS-36

GREEN SEAL® STANDARD FOR
ADHESIVES FOR COMMERCIAL USE

EDITION 2.1
(New Format)

July 12, 2013

Green Seal, Inc. • www.greenseal.org

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 ADHESIVES FOR COMMERCIAL USE, GS-36

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FOREWORD

Edition. Edition 2.1 was issued on May 10, 2013. It replaces the Second Edition from September 1, 2011. Corrections and/or clarifications were last made to this standard on August 23~~16~~ ~~January 26~~, 2024. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section11

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

CARB. California Air Resources Board
CFR. Code of Federal Regulations
EPA. United States Environmental Protection Agency
OECD. Organization for Economic Cooperation and Development
PBT. Persistent, Bioaccumulative, and Toxic Compounds
VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR ADHESIVES FOR COMMERCIAL USE, GS-36

1.0 SCOPE

This environmental standard establishes environmental requirements for *adhesives*, *adhesives* applied onto substrates, and *aerosol adhesives*. *Adhesives* covered by the standard shall be intended and labeled for use as a *commercial adhesive*. The standard specifically does not cover *adhesive* tapes or tape strips, textile *adhesives*, optical *adhesives*, *adhesives* used with electronics, packaging *adhesives*, or aerospace *adhesives*. 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~~

~~Product shall be approved by the manufacturer for use as an *adhesive* type outlined in Section 1.0.~~

~~3~~2.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~SAFER CHEMICALS

~~2.1~~ Safer Ingredients

~~3~~2.1.1 **Carcinogens.** The product shall not be formulated with any *carcinogens*. Any carcinogen that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.

~~2~~3.1.2~~2~~ **Reproductive Toxins.** The product shall not be formulated with any *reproductive toxins*. Any *reproductive toxin* that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.

~~2~~3.1.3~~3~~ **Persistent, Bioaccumulative, and Toxic Compounds.** The product shall not be formulated with any *persistent, bioaccumulative, and toxic compounds* (PBTs). Any *PBT* that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.

~~2~~3.1.4~~4~~ **Ozone-Depleting Substances.** The product shall not be formulated with any *ozone-depleting substances*. Any *ozone-depleting substance* that is known to be present as a contaminant shall not exceed 0.1% by weight of the product.

~~2.2~~ Safer Products

2~~3~~.2.1~~5~~ Volatile Organic Compounds (VOC) Content. VOCs include all organic compounds that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the product as applied according to the manufacturer's recommendations shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

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

- By summing the percent by weight contribution from all volatile organic components present in the product at 0.01% or more.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all volatile organic components present in the product at 0.01% or more[2].

Additionally, for specialty applications not defined by CARB, the current regulatory limits and determination method of the South Coast Air Quality Management District (SCAQMD) Rule 1168 shall be used.

Current CARB regulatory limits for VOCs[3].

Product Category	Effective Date	Limit (%)
Aerosol Adhesives (all types)	1/1/95	75
Mist Spray Adhesive (general purpose)	1/1/2017	30
Web Spray Adhesive (general purpose)	1/1/2017	40
Mounting, Automotive Engine Compartment, and Flexible Vinyl Spray Adhesive	1/1/2002	70
Polystyrene Foam and Automobile Headliner Spray Adhesive	1/1/2002	65
Polyolefin and Laminate Repair/Edgebanding Spray Adhesive	1/1/2002	60
Construction, Panel, and Floor Covering	12/31/2008	7

[2] Evaluation of total VOCs in this standard includes all volatile organic compounds present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts fragrances and all organic compounds present below 0.1%.

[3] 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.

Product Category	Effective Date	Limit (%)
Contact Adhesive – General Purpose	12/31/2006	55
Contact Adhesive – Special Purpose	12/31/2006	80
General Purpose Adhesives	1/1/95	10

Current SCAQMD regulatory limits for VOCs[4].

Product Category	Effective Date	Limit (%)
PVC Welding	1/1/2005	51
CPVC Welding	1/1/2005	49
ABS Welding	7/1/2005	32
Plastic Cement Welding	1/1/2005	25
Adhesive Primer for Plastic	7/1/2005	55
Computer Diskette Manufacturing	1/1/2005	35
Special Purpose Contact Adhesive	1/1/2005	25
Tire Retread	1/1/2005	10
Adhesive Primer for Traffic Marking Tape	1/1/2005	15
Structural Wood Member Adhesive	1/1/2005	14
Sheet Applied Rubber Lining Operations	1/1/2005	85
Top and Trim Adhesive	1/1/2007	25

23.2.26 **Toxic Compounds.** The solvent portion of the *adhesive* shall not be toxic to humans when inhaled. A product is considered toxic if the following lethal dose (LD) criterion applies:

Inhalation $LC_{50} \leq 2{,}000$ ppm of vapor or gas or 20 mg/L of mist, dust, or fumes

The toxicity testing procedures shall follow the protocols put forth in the Organization for Economic Cooperation and Development (OECD) Guidelines for the Testing of Chemicals, which includes: Acute Inhalation Toxicity Test (TG 403). To demonstrate compliance with this requirement, a solvent need not be tested if existing toxicological

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

information demonstrates that it complies. Data from the Registry of Toxic Effects of Chemical Substances and from the Hazardous Substances Data Bank will be accepted as well as peer-reviewed primary data.

2.2.3~~3.8~~ **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.

3.0 SUSTAINABLE PACKAGING

~~3.1~~ Packaging Materials.

3.1.1~~7~~ Packaging. Product packaging shall be resealable after the first use except for single-use packaging. Shipping packaging shall be reusable, recyclable or reconditionable. Corrugated shipping packaging shall contain 30% minimum postconsumer recycled content.

~~**3.8 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 VERIFIED PERFORMANCE AND CLAIMS

4.1. Product Performance. Product shall be approved by the manufacturer for use as an *adhesive* type outlined in Section 1.0.

54.0 TRADEMARK USE REQUIREMENTS

54.1 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]

54.2 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.

Adhesive. A substance capable of holding materials together by surface attachment.

Carcinogens. Chemicals classified by the International Agency for Research on Cancer as Group I (carcinogenic to humans), Group 2A (probably carcinogenic to humans), or Group 2B (possibly carcinogenic to humans) agents (http://www.iarc.fr), with the exception of crystalline silica.

Commercial Adhesive. An *adhesive* product that is designed for use in the maintenance or operation of an establishment that manufactures, transports, or sells goods or commodities, or provides services for profit; or is engaged in the nonprofit promotion of a particular public, educational, or charitable cause. Establishments include, but are not limited to, government agencies, military organizations, factories, schools, hospitals, sanitariums, prisons, libraries, office complexes, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, or transportation companies. *Commercial Adhesives* do not include products that are incorporated into or used exclusively in the manufacture or construction of the goods or commodities that are produced by the establishment.

Ozone-Depleting Substances. Any compound with an ozone depletion potential greater than 0.01 (CFC 11=1), as determined by the EPA (http://www.epa.gov/ozone/ods.html).

Persistent, Bioaccumulative, and Toxic Compounds. Compounds identified by the EPA Waste Minimization Branch as being persistent, bioaccumulative, and toxic (http://www.epa.gov/minimize/chemlist.htm).

Reproductive Toxins. Chemicals known to cause reproductive toxicity as listed 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.*, http://www.oehha.ca.gov/prop65.html).

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-36:

Products Included in GS-36

- *Acrylonitrile-butadiene-styrene welding adhesive*
- *Carpet pad installation adhesive*
- *Ceramic tile installation adhesive*
- *Contact bond adhesive*
- *Contact bond-specialty substrates adhesive*
- *Cove base installation adhesive*
- *Chlorinated polyvinyl chloride welding adhesive*
- *Indoor floor covering installation adhesive*
- *Multipurpose construction adhesive*
- *Nonmembrane roof installation/repair adhesive*
- *Other plastic cement welding adhesive*
- *Outdoor floor covering installation adhesive*
- *Polyvinyl chloride welding adhesive*
- *Rubber floor installation adhesive*
- *Single-ply roof membrane installation/repair adhesive*
- *Structural glazing adhesive*
- *Perimeter bonded sheet vinyl flooring installation adhesive*
- *Waterproof resorcinol glue*
- *Wood flooring adhesive*

Products Excluded from GS-36

- Aerospace *adhesives*
- Consumer/office *adhesives*
- Electronic *adhesives*
- Label *adhesives*
- Office *adhesives*
- Optical *adhesives*
- Packaging *adhesives*
- Tape *adhesives*
- Textile *adhesives*

GS-37

GREEN SEAL® STANDARD FOR

CLEANING PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE

EDITION 7.8
(New Format)

June 23, 2022

Green Seal, Inc. • greenseal.org

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 lifecycle 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 CLEANING PRODUCTS FOR INDUSTIAL AND INSTITUTIONAL USE, GS-37

CONTENTS

FOREWORD

Edition. Edition 7.8 was issued on June 23, 2022. It replaces Edition 7.7 from November 11, 2021. Corrections and/or clarifications were last made on August 23, 2024~~July 26, 2024~~. 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.

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.

[1] Standards Document Library, www.greenseal.org/green-seal-standards/library#section12

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
AOEC. Association of Occupational and Environmental Clinics
ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials
BCF. Bioconcentration Factor
BOD. Biological Oxygen Demand
CARB. Air Resources Board for the State of California
CFC. Chlorofluorocarbon
CFR. Code of Federal Regulations
CFU. Colony Forming Unit
CO_2. Carbon Dioxide
DOC. Dissolved Organic Carbon
EN. European Standard
EPA. United States Environmental Protection Agency
GHS. Globally Harmonized System for Classification and Labelling of Chemicals
GMM. Genetically Modified Microorganism
GREENGUARD Gold. Certification from UL EcoLogo focusing on chemical emission rates. (https://www.ul.com/services/ul-greenguard-certification)
HCPA. Household & Commercial Products Association
ISO. International Organization for Standardization
JECFA. Joint Food and Agricultural Organization of the United Nations/ WHO Expert Committee on Food Additives
LLNA. Local Lymph Node Assay
LOAEL. Lowest-Observed Adverse Effect Level
NOAEL. No-Observed Adverse Effect Level
OECD. Organization for Economic Co-operation and Development
SDS. Safety Data Sheet
VOC. Volatile Organic Compound
WHO. World Health Organization

GREEN SEAL STANDARD FOR CLEANING PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-37

1.0 SCOPE

This standard establishes requirements for industrial and institutional *general-purpose*, *restroom*, *glass*, and *carpet cleaners*. For purposes of this standard, industrial and institutional cleaners are defined as those cleaners intended for routine cleaning of offices, institutions, warehouses, and industrial facilities. This standard includes *general-purpose*, *bathroom*, *glass* and *carpet* cleaning products that contain *enzymes* or *microorganisms.* Furthermore, the criteria in this standard include consideration of vulnerable populations in institutional settings such as schools, day-care facilities, nursing homes, and other facilities. The standard does not include cleaners for household use, air fresheners, or products required to be registered under the Federal Insecticide, Fungicide, and Rodenticide Act, such as those making claims as sterilizers, disinfectants, or sanitizers. This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of cleaners with surface materials is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility.

Each criterion states whether it applies to the *undiluted product* or to the *product as used*. Where there is more than one criterion that applies to a product *component*, the more stringent criterion applies.

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 Product Performance.** Each product shall clean common soils and surfaces in its category effectively, at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning,[2] as measured by the following applicable standard test methods. Products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50°F. *Carpet cleaners* may be diluted with warm or hot water where required by the test method or performance considerations.~~

~~[2] The dilution level for routine cleaning is considered the medium dose or normal dose on the label for the typical use of the product. For general-purpose or multi-purpose cleaners labeled with different dilutions by use, routine cleaning would be the general surface cleaning (e.g., spray and wipe) category.~~

~~**2.1.1 General-Purpose Cleaners**. *General-purpose cleaners* shall remove at least 80% of the particulate soil in ASTM International (ASTM) D4488, A5.[3]~~

~~**2.1.2 Restroom Cleaners.** *Restroom cleaners* shall remove at least 75% of the soil in ASTM D5343 as measured by the method. If the product is used for toilet bowl or urinal cleaning, then it must also demonstrate efficacy for water hardness stain removal with an appropriate method following the requirements outlined in 2.2 for Alternative Performance Requirements.~~

~~**2.1.3 Carpet Cleaners.** *Carpet cleaners* shall have a pH between 3–10 and be tested following the requirements with an appropriate method as outlined in 2.2, Alternative Performance Requirements, for cleaning efficacy and re-soiling resistance. Alternatively, products that have WoolSafe certification or a Carpet and Rug Institute Cleaning Solutions Seal of Approval, or equivalent, will be accepted.~~

~~**2.1.4 Glass Cleaners.** *Glass cleaners* shall achieve at least a rating of three in each of the following HCPA method DCC 09 categories: soil removal, smearing, and streaking.~~

~~**2.2 Alternative Performance Requirements.** Alternatively, using another objective, scientifically validated method conducted under controlled and reproducible laboratory conditions, the product performs as well as or better than a nationally recognized or market-leading product of its type and at equivalent product-specific use directions. Test methodology and results must be documented in sufficient detail for this determination to be made.~~

2~~3~~.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Aquatic Biodegradability. Each of the individual organic ingredients in the product as used, except for polymers, shall exhibit ready biodegradability in accordance with the OECD definition. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or 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_2 evolution, as % of theoretical CO_2 > 60%

~~[3] ASTM D4488 has been withdrawn, however, it is still the best available method for this performance testing, it is available for purchase, and it is regularly used by laboratories to test performance.~~

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.

2.1.2 Bioaccumulating Compounds. The *product as used* shall not contain any *ingredients* that bioaccumulate or that form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) greater than 100 (or log BCF >2) as determined by ASTM E1022 Standard Guide for Conducting Bioconcentration test with Fishes and Saltwater Bivalve Mollusks or OECD 305 Bioconcentration: Flow-through Fish Test. If the chemical meets the requirement for biodegradability, 3.13, it may be considered to not bioaccumulate. Testing is not required for any *ingredient* for which sufficient information exists.

2.1.3 Carcinogens, Mutagens, and Reproductive Toxins. The *undiluted product* shall not contain any *ingredients* or *components* that are *carcinogens*, *mutagens*, or *reproductive toxins*. The *undiluted product* shall not contain any *ingredients* that, according to published uses,[2] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.

Note: Refer to Annex D for the exemption of titanium dioxide in products that contain *enzymes*.

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

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

[2] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

2.1.5 Combustibility. The *undiluted product* shall not be combustible. The 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 D92-05a), the Abel Closed-Cup method (ISO 13736) or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.

2.1.6 Fragrances. *Fragrances* added to the product must follow the Code of Practice of the International Fragrance Association. All *fragrance components* must be disclosed to the certifying body. The product label and material safety data sheets shall reflect the use of *fragrances* (present or not) in accordance with section 5.5.

2.1.7 Ingredients that Cause Asthma. The *undiluted product* shall not contain any *ingredients* that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

2.1.8 Optical Brighteners. The *undiluted product* shall not contain any *ingredients* that are *optical brighteners*.

2.1.9 Ozone Depleting Compounds. The *undiluted product* shall not contain any *ingredients* that are *ozone-depleting compounds*.

2.1.10 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

2.1.11 Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex D criteria.

2.1.12 Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex E criteria.

2.1.13 Prohibited Ingredients. The *undiluted product* shall not contain the following *ingredients*[3]:

- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- 2-butoxyethanol
- Alkylphenol ethoxylates
- Phthalates

2.1.14 Skin Absorption. The *undiluted product* shall not contain *ingredients*, present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value list (TLV) carrying a skin notation, or substances that are listed on the German Deutsche

[3] The listed ingredients are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

Forschungsgemeinschaft (DFG) Maximum Allowable Concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *ingredients* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.15 Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. 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 also 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 of 2.0 or less or a pH of 11.5 or greater, unless data prove otherwise.

Note: Refer to Annex B for potential alternative thresholds for products packaged in *closed dilution-control systems*.

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*

2.1.16 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*, as tested by the Local Lymph Node Assay (LLNA) or following U.S. Environmental Protection Agency (EPA) test guidelines for skin sensitization (OECD Guideline 429, OPPTS 870.2600). The results of other standard test methods, such as the guinea pig maximization test (OECD Guideline 406) or the Buehler test (OECD 406), will be accepted as proof that the product in its most concentrated form is not a *skin sensitizer* when data from LLNA tests are not available. Any new product or *ingredient* testing should use the LLNA. Testing is not required for any *ingredient* for which sufficient information exists.

2.2 Safer Products

2.2.1~~3.1~~ Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if either of the following criteria apply:

Oral lethal dose 50 (LD_{50})	≤ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	≤ 20 mg/L at 1 hr

Toxicity shall be measured on the product as a whole. The toxicity testing procedures should meet the requirements put forth by the Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403). Testing is not required for any *ingredient* for which sufficient information exists.

For purposes of demonstrating compliance with this requirement, acute toxicity testing is not required if sufficient acute toxicity data exist for each of the product's *ingredients* to demonstrate that the product mixture complies, using a weighted average approach that assumes that the toxicity of the individual *ingredients* is additive. 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_i = the toxicity value for each *ingredient* ((LD_{50})
n = number of *ingredients*

Inhalation toxicity shall be determined from all *ingredients* with a vapor pressure greater than 1 mm Hg at ambient conditions (1 atm pressure and 20-25° C).

Note: Refer to Annex B for potential alternative thresholds for products packaged in *closed dilution-control systems.*

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*

2.2.2 Eutrophication. The *product as used* shall not contain more than 0.5% by weight of total phosphorus.

2.2.3 Inhalation Toxicity. The product shall meet either 2.2.3.1 or 2.2.3.2.

2.2.3.1 Chronic Inhalation Toxicity. The *product as used* shall not contain *ingredients* with a vapor pressure above 1 mm mercury (1 atm pressure and 20-25° C) that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to OECD Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the Lowest-Observed Adverse Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).

2.2.3.2 Chamber Testing. A *product as used* shall meet the inhalation criteria and as tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions

from Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers which includes office, school, and restroom models.

2.2.4 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 LC_{50} 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, using a weighted average approach (as in section 3.1.1). Aquatic toxicity tests shall follow the appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OECD test guidance 203 for fish, OECD test guidance 201 for algae, or OECD test guidance 202 for daphnia.

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

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

For *glass cleaners* the VOC content for the *product as used* 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*[4].

Current CARB regulatory limits for VOCs[5].

Product Category	Effective Date	Limit (%)
Carpet cleaners (dilutable)	1/1/2001	0.1
Carpet cleaners (ready-to-use)	12/31/2010	1

[4] 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%.

[5] 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.

General purpose cleaners	12/31/2012	0.5
Bathroom/Restroom *cleaners* (all forms)	12/31/2008	1
Spot removers	12/31/2012	3

2.2.6 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.

~~**3.2 Skin and Eye Damage**. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. 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 also 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 of 2.0 or less or a pH of 11.5 or greater, unless data prove otherwise.~~

~~**Note:** Refer to Annex B for potential alternative thresholds for products packaged in *closed dilution-control systems*.~~

~~**Note:** Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.~~

~~**3.3 Carcinogens, Mutagens, and Reproductive Toxins.** The *undiluted product* shall not contain any *ingredients* or *components* that are *carcinogens*, *mutagens*, or *reproductive toxins*. The *undiluted product* shall not contain any *ingredients* that, according to published uses,[6] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.~~

~~**Note:** Refer to Annex D for the exemption of titanium dioxide in products that contain *enzymes*.~~

~~[6] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.~~

3.4 Ingredients that Cause Asthma. The *undiluted product* shall not contain any *ingredients* that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

3.5 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*, as tested by the Local Lymph Node Assay (LLNA) or following U.S. Environmental Protection Agency (EPA) test guidelines for skin sensitization (OECD Guideline 429, OPPTS 870.2600). The results of other standard test methods, such as the guinea pig maximization test (OECD Guideline 406) or the Buehler test (OECD 406), will be accepted as proof that the product in its most concentrated form is not a *skin sensitizer* when data from LLNA tests are not available. Any new product or *ingredient* testing should use the LLNA. Testing is not required for any *ingredient* for which sufficient information exists.

3.6 Skin Absorption. The *undiluted product* shall not contain *ingredients*, present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value list (TLV) carrying a skin notation, or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) Maximum Allowable Concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *ingredients* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

3.7 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.8 Prohibited Ingredients. The *undiluted product* shall not contain the following *ingredients*[7]:

- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- 2-butoxyethanol
- Alkylphenol ethoxylates
- Phthalates

3.9 Ozone Depleting Compounds. The *undiluted product* shall not contain any *ingredients* that are *ozone-depleting compounds*.

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

[7] The listed ingredients are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

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

~~For *glass cleaners* the VOC content for the *product as used* 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*[8].~~

~~Current CARB regulatory limits for VOCs[9].~~

~~**Product Category**~~	~~**Effective Date**~~	~~**Limit (%)**~~
~~*Carpet cleaners* (dilutable)~~	~~1/1/2001~~	~~0.1~~
~~*Carpet cleaners* (ready-to-use)~~	~~12/31/2010~~	~~1~~
~~*General purpose cleaners*~~	~~12/31/2012~~	~~0.5~~
~~*Bathroom*/Restroom *cleaners* (all forms)~~	~~12/31/2008~~	~~1~~
~~Spot removers~~	~~12/31/2012~~	~~3~~

~~**3.11 Inhalation Toxicity.** The product shall meet either 3.11.1 or 3.11.2.~~

~~**3.11.1 Chronic Inhalation Toxicity.** The *product as used* shall not contain *ingredients* with a vapor pressure above 1 mm mercury (1 atm pressure and 20-25° C) that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to OECD Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a~~

~~[8] 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%.~~

~~[9] 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.~~

NOAEL, the Lowest-Observed Adverse Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).

3.11.2 Chamber Testing. A *product as used* shall meet the inhalation criteria and as tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions from Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers which includes office, school, and restroom models.

3.12 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 LC_{50} 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, using a weighted average approach (as in section 4.1). Aquatic toxicity tests shall follow the appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OECD test guidance 203 for fish, OECD test guidance 201 for algae, or OECD test guidance 202 for daphnia.

3.13 Bioaccumulating Compounds. The *product as used* shall not contain any *ingredients* that bioaccumulate or that form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) greater than 100 (or log BCF >2) as determined by ASTM E1022 Standard Guide for Conducting Bioconcentration test with Fishes and Saltwater Bivalve Mollusks or OECD 305 Bioconcentration: Flow-through Fish Test. If the chemical meets the requirement for biodegradability, 3.13, it may be considered to not bioaccumulate. Testing is not required for any *ingredient* for which sufficient information exists.

3.14 Aquatic Biodegradability. Each of the individual organic *ingredients* in the *product as used*, except for polymers, shall exhibit ready biodegradability in accordance with the OECD definition. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or 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_2 evolution, as % of theoretical CO_2 > 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.

3.15 Eutrophication. The *product as used* shall not contain more than 0.5% by weight of total phosphorus.

3.16 Combustibility. The *undiluted product* shall not be combustible. The 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 D92-05a), the Abel Closed-Cup method (ISO 13736) or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.

3.17 Fragrances. *Fragrances* added to the product must follow the Code of Practice of the International Fragrance Association. All *fragrance components* must be disclosed to the certifying body. The product label and material safety data sheets shall reflect the use of *fragrances* (present or not) in accordance with section 5.5.

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

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

3.19 Optical Brighteners. The *undiluted product* shall not contain any *ingredients* that are *optical brighteners*.

3.20 Concentrates. The product, except for toilet bowl/urinal cleaners, dry/absorbent compound *carpet cleaners*, or products solely labeled as carpet spot removers, must be concentrated to at least the following levels:

- *General-purpose cleaners*: 1:32
- *Glass*, *restroom*, and *carpet cleaners*: 1:16

~~**3.21 Products Containing Enzymes.** Products that contain *enzymes* shall meet all Annex D criteria.~~

~~**3.22 Products Containing Microorganisms.** Products that contain *microorganisms* shall meet all Annex E criteria.~~

~~**3.23 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.~~

34.0 ~~PACKAGING REQUIREMENTS~~ SUSTAINABLE PACKAGING

3.1 Packaging Materials

3.1.1 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.

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

3.1.3 Concentrated Product Packaging. Concentrated products are prohibited from being packaged in spray-dispenser bottles or other *ready-to-use package types*.

3.1.4 Aerosol Cans. Aerosol cans are prohibited.

3.2 Packaging Label

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

3.3 Restricted Substances

3.3.1 Heavy Metal Restrictions. Lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced* to *primary packaging*. 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*.

3.3.2 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*.

~~**4.1 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.~~

~~**4.1.1 Resin Identification Code.** The *package* must be marked with the appropriate Resin Identification Code.~~

~~**4.2 Non-Plastic Package.** For materials other than plastic, the *primary package* shall contain at least 25% *post-consumer material* or be *recyclable*.~~

~~**4.3 Concentrated Product Packaging.** Concentrated products are prohibited from being packaged in spray-dispenser bottles or other *ready-to-use package types*.~~

~~**4.4 Aerosol Cans.** Aerosol cans are prohibited.~~

~~**4.5 Heavy Metal Restrictions.** Lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced* to *primary packaging*. 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*.~~

~~**4.6 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*.~~

~~**5.0 USER INFORMATION AND PRODUCT LABEL REQUIREMENTS**~~

4.0 VERIFIED PERFORMANCE AND CLAIMS

4.1 Product Performance. Each product shall clean common soils and surfaces in its category effectively, at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning, as measured by the following applicable standard test methods. Products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50ºF. *Carpet cleaners* may be diluted with warm or hot water where required by the test method or performance considerations.

4.1.1 General-Purpose Cleaners. *General-purpose cleaners* shall remove at least 80% of the particulate soil in ASTM International (ASTM) D4488, A5.[6]

4.1.2 Restroom Cleaners. *Restroom cleaners* shall remove at least 75% of the soil in ASTM D5343 as measured by the method. If the product is used for toilet bowl or urinal cleaning, then it must also demonstrate efficacy for water hardness stain removal with an appropriate method following the requirements outlined in 4.2 for Alternative Performance Requirements.

4.1.3 Carpet Cleaners. *Carpet cleaners* shall have a pH between 3–10 and be tested following the requirements with an appropriate method as outlined in 4.2, Alternative Performance Requirements, for cleaning efficacy and re-soiling resistance. Alternatively, products that have WoolSafe certification or a Carpet and Rug Institute Cleaning Solutions Seal of Approval, or equivalent, will be accepted.

4.1.4 Glass Cleaners. *Glass cleaners* shall achieve at least a rating of three in each of the following HCPA method DCC 09 categories: soil removal, smearing, and streaking.

4.2 Alternative Performance Requirements. Alternatively, using another objective, scientifically validated method conducted under controlled and reproducible laboratory conditions, the product performs as well as or better than a nationally recognized or market-leading product of its type and at equivalent product-specific use directions. Test methodology and results must be documented in sufficient detail for this determination to be made.

4.3 Product Label

4.3.1~~5.1~~ Training. The product manufacturer, its distributor, or a third party shall offer training or training materials on the proper use of the product. This shall include step-by-step instructions for the proper dilution, use, consequences of improper use or improper dilution, disposal of the product, and the use and maintenance of equipment, as well as recommended personal protection equipment for each stage of the product or equipment's use. Product manufacturers shall make the appropriate product and/or equipment training information, including Safety Data Sheets (SDSs) and technical data sheets, available electronically as well as in hard copy.

[6] ASTM D4488 has been withdrawn, however, it is still the best available method for this performance testing, it is available for purchase, and it is regularly used by laboratories to test performance.

4.3.25.2Label Language. The manufacturer's label shall include English and another language or English and a graphical representation or icons, in order to assist illiterate or non-English-speaking personnel.

4.3.3 5.3Label Dilution Directions. The manufacturer's label shall state clearly and prominently that dilution with water from the cold tap is recommended and shall state the recommended level of dilution. *Carpet cleaner* labels shall specify the use of cold water for products that do not suffer significant performance degradation in cold water.

4.3.45.4Label Use and Disposal Directions. The manufacturer's label shall have explicit disposal, recycling, reuse, or refill instructions, proper and clear directions for use, and appropriate precautions and recommendations for the use of personal protective equipment.

4.3.55.5 Label and Material Safety Data Sheet Fragrance Declaration. The product shall declare on the product label and on the SDS if a *fragrance* has been added or if no *fragrance* has been added.

4.3.65.6 Safety Data Sheet pH Declaration. The SDS shall declare the pH of the *undiluted product* and the *product as used*. Refer to Annex C for potential exemptions for products as *powders/solids/non-aqueous liquids*.

Note: Additional Product Label Requirements
For products formulated with *fragrances*, refer to Criterion 2.1.63.16.
For products packaged in *closed dilution control systems*, refer to Annex B.
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex C.
For products containing *enzymes*, refer to Annex D.
For products containing *microorganisms*, refer to Annex E

4.4 Product Design

4.4.1 Concentrates. The product, except for toilet bowl/urinal cleaners, dry/absorbent compound *carpet cleaners*, or products solely labeled as carpet spot removers, must be concentrated to at least the following levels:

- *General-purpose cleaners*: 1:32
- *Glass*, *restroom*, and *carpet cleaners*: 1:16

56.0 TRADEMARK USE REQUIREMENTS

56.1 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.7[7]F

[7] www.greenseal.org/trademark-use-guidelines

5~~6~~.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.

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Aerosol Packaging. A *package* that requires a pressurized propellant to dispense product through a nozzle.

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Asthma. Asthma is a chronic inflammatory disorder of the airways that impairs breathing. *Asthma* affects children and adults, may be intermittent or persistent, and is further classified as mild, moderate, or severe. The chronic inflammation associated with variable airflow obstruction commonly causes difficulty breathing, coughing, wheezing, shortness of breath, and/or chest pain. Symptoms may resolve completely between active episodes. Symptoms may occur during exposure, immediately after exposure, or up to 24 hours later in a "late phase," frequently interrupting sleep.

Asthmagen. A substance designated as an *asthma* causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

Carcinogen. A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), National Toxicology Agency (Groups 1 and 2), EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or by Occupational Safety and Health Administration (as carcinogens under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)).

Carpet Cleaner. A product developed to perform routine cleaning or spot cleaning of carpets and rugs. This category may include, but is not limited to, products used in cleaning by means of wet extraction, shampooing, dry foam, bonnet or absorbent compound.

Child-Resistant Packaging. Child-resistant packaging, as defined by the Poison Prevention Packaging Act, is packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Closed Dilution-Control System. A system that controls the dilution of a *concentrate* product so that the *undiluted product* cannot be *practically accessed* by users.

Closed Dilution-Control System Concentrate. A product designed to be used in *closed dilution-control system*s that are contained in *spill-resistant packaging* and cannot be *practically accessed* by users.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality.~~8~~[8]~~F~~

Concentrate. A product, as sold, that must be diluted by water prior to its intended use.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting a scent to the product.

General-Purpose Cleaner. A product used for routine cleaning of hard surfaces, including impervious flooring such as concrete, stone surfaces, or tile. It does not include cleaners intended primarily for the removal of rust, mineral deposits, or odors. It does not include products intended primarily to strip, polish, or wax floors, and it does not include cleaners intended primarily for cleaning dishes, laundry, toilets, restrooms, glass, carpets, upholstery, wood, or polished surfaces. Other cleaners may be included if they meet the requirements and are marketed as general purpose cleaners. Another term used for these cleaners may be multi-surface cleaners.

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which *GMM* are produced are listed by the European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Glass Cleaner. A product used to clean windows, glass, dry erase boards, and mirrored surfaces.

[8] Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply, are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Haber's Rule. For a given toxic gas, the concentration of the gas multiplied by the duration of exposure equals a constant (C x t = k); for example, doubling the concentration will halve the time for a given toxic effect.

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

Intentional Introduction. 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.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

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 GHS.

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

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (Chlorofluorocarbon (CFC) 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances.

Package. This includes the *primary package* used for the product.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Practically Accessed. Packaging that allows for access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, after opening a cap or lid, or when connecting to the dispensing system.

Primary Cleaning Function. For the purposes of this standard, a cleaning product's primary function is to remove soil.

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 most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a product be diluted 1:64 or 2:64 for use as a *general-purpose cleaner*, the product shall meet the health and environmental requirements at a dilution of 2:64.

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 container that is routinely returned to and refilled by the product manufacturer at least five times with the original product held by the ~~package, and~~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 (including developmental, female, and male toxins) 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., also known as Proposition 65).

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 respiratory sensitization (H334) in accordance with the GHS.

Restroom Cleaner. A product used to clean hard surfaces in a restroom such as counters, walls, floors, fixtures, basins, tubs, toilets, urinals, and tile. Other terms used for these cleaning products may include bathroom cleaning products, toilet bowl cleaners, or urinal cleaners.

Secondary Function. For the purposes of this standard, the secondary function of a cleaning product may be to enhance the primary cleaning function through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

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 identified under 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 designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the GHS are also considered to cause skin corrosion.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact.

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.

Spill-Resistant Packaging. Packaging that requires coupling to a specially designed device in order to dispense product.

Spray Packaging. A package that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a ~~foam~~foam, or a liquid stream are not considered spray packaging.

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. The most concentrated form of the product produced by the manufacturer for transport outside its facility.

World Health Organization (WHO) Risk Group 1. Microorganisms that are unlikely to cause human or animal disease under the basis for classification defined by the World Health Organization in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health (NIH)

- European Commission
- Singapore
- Japan

ANNEX B – CLOSED DILUTION-CONTROL SYSTEM (Normative)

Closed Dilution-Control System. *Closed dilution-control system* products that meet all of the following requirements may be evaluated for acute toxicity (3.1) and skin and eye damage (3.2) with the *product as used* (rather than with the *undiluted product*).

A. Practically Inaccessible. The *primary package* shall not allow for access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, after opening a cap or lid, or when connecting to the dispensing system.

B. Spill Resistant. The *primary package* shall require coupling to a specially designed device in order to dispense product.

C. Drop Test. The *primary package*, with the lid on, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

D. Backflow Prevention. The product shall have backflow prevention included in the *closed dilution-control system* that meets the American Society of Sanitary Engineering's (ASSE) 1055B standard.

E. SDS. The product label and SDS shall include the applicable text “meets Green Seal’s requirements for acute toxicity and/or skin and eye damage at the as-used dilution”.

F. Certifier’s Web Site. The Web site of the certification program listing certified products shall identify which products were evaluated as-used, and which health criteria were evaluated as-used.

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

ANNEX C – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (3.2) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (2.2.13~~.1~~) herein. They shall also be exempt from pH declaration (4.3.6(~~5.6~~) for the *undiluted product*.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye damage.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word “WARNING” or ‘CAUTION” on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
  - May cause skin corrosion, do not get on skin
  - May cause serious eye damage, do not get in eyes
  - Harmful if swallowed, do not ingest
- Instruction, when necessary or appropriate, for first-aid treatment
- The statement “KEEP OUT OF REACH OF CHILDREN” or its practical equivalent in capitalized text

ANNEX D – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in Annex D herein.

D. Exemptions. *Enzymes* are exempt from being categorized as *asthmagens* (3.4 herein) or *respiratory sensitizers.* Titanium dioxide[10] is exempt from the prohibition on *carcinogens* (3.5 herein) when it is present only due to the use of *enzymes.* For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product or enzyme matrix or bonded to other *ingredients*.

E. Labeling Requirements. Products containing *enzymes* shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line.
- A statement that immune-compromised individuals or those with asthma should avoid exposure to products containing *enzymes* from both direct use and incidental contact during or shortly after application to these products and instruction, when necessary or appropriate, for follow-up treatment.

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzyme/s* and worker illness/sensitization due to the *enzyme/s*. An example of best practices that may be applicable for this plan is available at AISE.

ANNEX E – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following with any specified testing conducted with an objective, scientifically-validated method under controlled and reproducible laboratory conditions (and appropriate testing details provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as a deliberate addition or as a contaminant above 0.01% in the finished product is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby Bauer disk method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the *undiluted product* shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count

shall be conducted in accordance with the methods for microbiological analyses listed in the JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the *undiluted product*.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms*. An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold for use in *spray packaging*,[9] the product label shall include a statement that the product should not be spray into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*[10] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.
-
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[11]

[9] Or designed for use in *spray packaging*
[10] Or designed for use in *spray packaging*
[11] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-37:

Industrial and Institutional Products Included in GS-37

- *Carpet cleaner* products
- Carpet spot cleaning products
- Dry erase board cleaning products
- Floor cleaning products
- *General-purpose cleaner* and multi-purpose cleaning products
- General-purpose surface degreasers
- *Glass cleaner* and mirror cleaning products
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*
- *Restroom cleaner* products
- Toilet or urinal cleaning products

Products Excluded from GS-37

- Air fresheners
- Boat cleaning products (included in GS-52 and GS-53)
- Cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications (included in GS-34)
- Deck and outdoor furniture products (included in GS-52 and GS-53)
- Dish cleaning products (included in GS-52 and GS-53)
- Disinfectants or sanitizers (included in GS-52 and GS-53)
- Drain additive/cleaning products
- Floor finish and finish strippers (included in GS-40)
- Furniture polish products (included in GS-52 and GS-53)
- Graffiti remover (included in GS-52 and GS-53)
- Hand cleaners (covered in GS- 41 and GS-44)
- Household versions of those included on the left column (included in GS-8)
- Laundry care products
- Metal cleaning products (included in GS-52 and GS-53)
- Motor vehicle cleaning products (included in GS-52 and GS-53)
- Oven cleaning products (included in GS-52 and GS-53)
- Paint removers/thinners
- Products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*.
- Specialty cleaning products (included in GS-52 and GS-53)
- Upholstery cleaning products (included in GS-52 and GS-53)

GS-40

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

EDITION 2.5

(New Format)

July 31, 2020

Green Seal, Inc. • greenseal.org

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 August 2316 ~~January 26~~, 2024. 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 floors,[2] 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 50ºF.

- Removability: The floor finish and compatible stripper shall achieve a removal ease rating of "good" as measured by ASTM D1792, Standard Test Method for

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

~~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 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.~~

23.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~SAFER CHEMICALS

2.1 Safer Ingredients.

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

2.1.23.3 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.

2.1.3~~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.

2.1.4~~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 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%
- CO_2 evolution, as % of theoretical CO_2 > 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 $LC_{50} \geq 100$ 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.

2.1.5~~3.10~~ 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*

2.1.6~~3.11~~ 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.

2.1.7~~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.

2.2 Safer Products.

2~~3~~.2.1~~4~~ 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* (LD_{50}, LC_{50})
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.~~

2.2.2~~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 20º 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 VOCs.[4]

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

~~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] 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.

2.2.3~~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 LC_{50} 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.

2.2.4~~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 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%~~
- ~~CO_2 evolution, as % of theoretical CO_2 > 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%.~~

~~2.1. The manufacturer may demonstrate that the compound has low aquatic toxicity (acute $LC_{50} \geq 100$ 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 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*~~

~~**3.11 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.~~

2.2.5~~3.12~~ **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.

34.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~SUSTAINABLE PACKAGING

3.1 Packaging Materials.

34.1.1 **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

34.1.2~~2~~ **Non-Plastic Package.** For materials other than plastic, the *primary package* shall contain at least 25% *post-consumer material* or be *recyclable*.

3.2 Packaging Label.

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

3.3 Restricted Substances.

~~**4.2 Non-Plastic Package.** For materials other than plastic, the *primary package* shall contain at least 25% *post-consumer material* or be *recyclable*.~~

34.3.1 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*.

3.3.24.4 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*.

4.0 VERIFIED PERFORMANCE AND CLAIMS

4.1 Product Performance

4.1.1 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.

4.1.2 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 50ºF.

- **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 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.

4.2 Product Label

~~5.0 USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~

4.2.1~~5.1~~ 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. The product label shall include English and another language or English and a graphical representation or icons.

4.2.2~~5.2~~ 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~~6~~.0 TRADEMARK USE REQUIREMENTS

5~~6~~.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~~6~~.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

GS-41

GREEN SEAL® STANDARD FOR HAND CLEANERS AND HAND SANITIZERS FOR INDUSTRIAL AND INSTITUTIONAL USE

EDITION 2.4
(New Format)

June 23, 2022

Green Seal, Inc. • greenseal.org

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 lifecycle 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 HAND CLEANERS AND HAND SANITIZERS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-41

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FOREWORD

Edition. Edition 2.4 was issued on June 23, 2022. It replaces Edition from September 10, 2020. Corrections and/or clarifications to this edition were made on August 23, 2024.~~July 26, 2024.~~ 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section14

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 AND HAND SANITIZERS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-41

1.0 SCOPE

This standard establishes environmental requirements for *institutional hand cleaners* (GS-41 A), *industrial heavy-duty hand cleaners* (GS-41 B), and alcohol-based antiseptic rubs, referred to herein as *hand sanitizers* (GS-41 C). 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~~

~~**2.1 Hand Cleaners.** 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.~~

~~**2.2 Hand Sanitizers.**~~

~~**In Vitro Testing.** *Hand Sanitizers* shall demonstrate at least a 3-log reduction (99.9 percent) of the test organism within 30 seconds. Acceptable methods for in vitro testing include ASTM E2783 and ASTM E2315.~~

~~A test organism shall be representative of microorganisms that commonly exist in consumer or healthcare settings.[2]~~

~~[2] Appendix C, List of organisms for consumer and health care in-vitro testing https://www.fda.gov/media/135559/download~~

~~3.0 PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~
2.0 SAFER CHEMICALS

Note: *Hand sanitizers* are exempt from certain requirements. See Annex B.

2.1 Safer Ingredients

2.1.1 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_2 evolution, as % of theoretical CO_2 > 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* 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%.
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.

2.1.2 Carcinogens. The product shall not be formulated or manufactured with any *carcinogens*. Ethyl alcohol[2] in *hand sanitizers* is exempt from this prohibition.

[2] Ethyl alcohol, CAS No. 64-17-5, EC No. 200-578-6

2.1.3 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

2.1.4 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.

2.1.5 Per- and Polyfluoroalkyl Substances (PFAS). The undiluted product shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS).*

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

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

2.1.7 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.

Note: See separate requirements for *hand sanitizers* in Annex B.

2.1.8 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.

Note: See separate requirements for *hand sanitizers* in Annex B.

2.2 Safer Products

2.2.1 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_{50} 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_i = the weight fraction of the *ingredient*
TV = the toxicity value for each *ingredient* (LC_{50})
n = number of *ingredients*

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

2.2.2 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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content shall not exceed the lower of the following options:

- 1% by weight.
- The current regulatory limit set by the California Air Resources Board (CARB) for its product category.

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]

Hand sanitizers are exempt from this requirement.

[3] 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%.

2.2.3 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.

~~**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.~~

~~Note: See separate requirements for *hand sanitizers* in Annex B.~~

~~**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.~~

~~**Note:** See separate requirements for *hand sanitizers* in Annex B.~~

~~**3.3 Antimicrobial Claims.** The product shall make no antibacterial, *disinfecting*, *antiseptic* or *sanitizing* product claims. *Hand sanitizers* are exempt from this requirement.~~

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

- Inorganic 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*. Ethyl alcohol[4] in *hand sanitizers* is exempt from this prohibition.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The undiluted product shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.9 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 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content shall not exceed the lower of the following options:

- 1% by weight.
- The current regulatory limit set by the California Air Resources Board (CARB) for its product category.

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

- By summing the percent by weight contribution from all volatile organic *ingredients*.

[4] Ethyl alcohol, CAS No. 64-17-5, EC No. 200-578-6

- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all volatile organic *ingredients*[5].

Hand sanitizers are exempt from this requirement.

3.10 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_2 evolution, as % of theoretical CO_2 > 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* 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%.
2. The manufacturer may demonstrate that the compound has low aquatic toxicity (acute $LC50 \geq 100$ 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.

3.11 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_{50} data for fish, daphnia, or algae is greater than or equal to 100 mg/L. For purposes of

[5] 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%.

~~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_i = the weight fraction of the *ingredient*~~
~~TV = the toxicity value for each *ingredient* (LC_{50})~~
~~n = number of *ingredients*~~

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

3.0 SUSTAINABLE PACKAGING

3.1 Packaging Materials

3.1.1~~2~~ 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.

~~**3.12.1 Resin Identification Code.** The package must be marked with the appropriate Resin Identification Code. *Hand sanitizers* are exempt from this requirement.~~

~~**3.12.2 Hand Sanitizer Wipes Per Package.** *Hand sanitizers* sold as wipes shall not be individually packaged or individually wrapped. The *primary package* for *hand sanitizers* sold as wipes must contain at least 20 wipes.~~

3.1.2~~3~~ 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 3.1.1~~3.11~~ and 3.1.2~~3.12~~.

3.2 Packaging Label

3.2.1~~12.1~~ Resin Identification Code. The package must be marked with the appropriate Resin Identification Code. *Hand sanitizers* are exempt from this requirement.

3.2.2~~12.2~~ Hand Sanitizer Wipes Per Package. *Hand sanitizers* sold as wipes shall not be individually packaged or individually wrapped. The *primary package* for *hand sanitizers* sold as wipes must contain at least 20 wipes.

3.3 Restricted Substances

3.3.1~~14~~ 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*.

3.3.2~~15~~ 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*.

~~**3.16 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 REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

4.1 Product Performance

4.1.1 Hand Cleaners. 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.

4.1.2 Hand Sanitizers.

In Vitro Testing. *Hand Sanitizers* shall demonstrate at least a 3-log reduction (99.9 percent) of the test organism within 30 seconds. Acceptable methods for in vitro testing include ASTM E2783 and ASTM E2315.

A test organism shall be representative of microorganisms that commonly exist in consumer or healthcare settings.[4]

4.2 Product Label

4.2.14.1 **Instructions for Use.** The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste. *Hand sanitizers* are exempt from this requirement.

4.2.2 Claims and Transparency

4.2.2.13.3 Antimicrobial Claims. The product shall make no antibacterial, *disinfecting*, *antiseptic* or *sanitizing* product claims. *Hand sanitizers* are exempt from this requirement.

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.

[4] Appendix C, List of organisms for consumer and health care in-vitro testing https://www.fda.gov/media/135559/download
[5] www.greenseal.org/trademark-use-guidelines

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.

Asthmagen. A substance designated as *asthma* causing agents by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

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

Biobased. The content of a product that is from biological products or renewable materials, forestry, or agricultural materials (including plant, animal, and marine materials).

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). For *hand sanitizers*, *carcinogens* shall also be identified via the following lists and classifications: National Toxicology Agency (Groups 1 and 2), EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or by Occupational Safety and Health Administration (as carcinogens under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)).

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality.[6]

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

Endocrine Disruptors. Chemicals identified by the U.S. Environmental Protection Agency (EPA) List of Chemicals for Tier 1 Screening due to their ability to disrupt hormones (e.g., have estrogen-or androgen-mediated effects), as tested according to the EPA Series 890 -Endocrine Disruptor Screening Program Test Guidelines.

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

[6] Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply, are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

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

Hand Sanitizer. A product intended to be applied topically to intact human hands to slow or stop the growth of pathogenic microorganisms. These products are regulated by the US FDA under the term "consumer antiseptic rubs" and "healthcare antiseptic rubs."

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.

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 GHS Chemicals Which Cause Mutations in Germ Cells.

Natural Ingredient. An *ingredient* that comes from materials and found in nature including mineral, forestry, agricultural, or biological materials; do not contain transgenic hybrid organisms; have been processed without irradiation; and are not chemically altered.

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

Naturally Derived Ingredient. An *ingredient* that is partially chemically altered without petroleum and has been minimally processed such that it remains biodegradable and non-toxic.

Nitrilotriacetic Acid. Nitrilotriacetic acid or any of its salts.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances.

Per and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

Post-Consumer Material. Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.[7]

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 or *hand sanitizer* 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.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65).

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. This includes substances identified under Category 1 for Serious Eye Damage/Eye Irritation (H318) under the *GHS*.

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

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. This includes substances designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the *GHS*.

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

[7] ISO 14021:2016 Section 7.8.1.1

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.

ANNEX B – HAND SANITIZERS (Normative)

Hand sanitizers. *Hand sanitizers* shall meet the requirements and undergo evaluation according to the stipulations below.

A. Alcohol Concentration. Documentation shall be provided to demonstrate the following:

- Ethyl alcohol-based *hand sanitizers* shall be formulated with at least 60 percent ethyl alcohol by volume, which shall be Specially Denatured Alcohol (SDA). Documentation must also demonstrate a purity that meets or exceeds USP certification levels.
- Isopropyl alcohol-based *hand sanitizers* shall be at least 70 percent isopropyl alcohol by volume.

B. Ingredient Prohibitions. *Hand sanitizers* shall not contain any of the following *ingredients*, in addition to those listed in Criterion 2.1.63.4, herein:

Butylated hydroxytoluene
Endocrine Disruptors
The heavy metals lead, hexavalent chromium, or selenium, both in the elemental form or compounds
Methyldibromo glutaronitrile
Monoethanolamine (MEA) and Diethanolamine (DEA)
Nitromusks
Parabens
Phthalates
Polycyclic musks

C. Additional Health and Environmental Requirements:

i. Acute Toxicity
ii. Carcinogen Releasers
iii. Mutagens and Reproductive Toxins
iv. Mutagen and Reproductive Toxin Releasers
v. Ingredients that Cause Asthma
vi. Skin Corrosion and Serious Eye Damage
vii. Skin Irritation
viii. Skin Sensitization
ix. Ozone Depleting Compounds
x. Bioaccumulating Compounds

(i) Acute Toxicity. The product shall not be toxic to humans. A product is considered toxic if any of the following criteria apply:

Oral lethal dose (LD_{50})	$\leq$ 5,000 mg/kg

Inhalation lethal concentration (LC_{50})	≤ 20 mg/L at 1 hr
Dermal lethal dose (LD_{50})	≤ 2,000 mg/kg

Toxicity shall be measured on the product as a whole. Alternatively, a mixture need not be tested if existing toxicity information demonstrates that each of the *ingredients* complies. The toxicity testing procedures should meet the requirements put forth by the Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402).

Testing is not required for any *ingredient* for which sufficient information exists.

To demonstrate compliance with this requirement. It is assumed that the toxicity of the individual *ingredients* is additive. The toxicity values are adjusted by the weight of the *ingredient* in the product and summed using the following formula:

Where,

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

TP = toxicity of the product
wt_i = the weight fraction of the *ingredient*
TV = the toxicity value for each *ingredient* (LD_{50})
n = number of *ingredients*

For inhalation toxicity, it is determined from all *ingredients* with a vapor pressure greater than 1 mm Hg at standard conditions (1 atm and 20-25°C).

Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

(ii) Carcinogen Releasers. The product shall not contain any *ingredients* known to produce or release *carcinogens*.

(iii) Mutagens and Reproductive Toxins. The product shall not contain any *ingredients* that are *mutagens* or *reproductive toxins*.

(iv) Mutagen and Reproductive Releasers. The product shall not contain any *ingredients* known to produce or release *mutagens*, or *reproductive toxins*.

(v) Ingredients that Cause Asthma. The product shall not contain any *ingredients* that have been identified as *asthmagens*. Triethanolamine (TEA)[8] is exempt for gel *hand sanitizers*.

[8] Triethanolamine (TEA), CAS Number 102-71-6, EC Number: 203-049-8

(vi) Skin Corrosion and Serious Eye Damage. A product shall be evaluated for *skin corrosion* and *serious eye damage* following the testing and evaluation strategy described in the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). Green Seal prefers that an in vitro test validated by the Interagency Coordinating Committee on the Validation of Alternative ~~Methods~~Methods, or the European Centre for the Validation of Alternative Methods be used. 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 does not cause *skin corrosion* or *serious eye damage*. Testing is not required for any *ingredient* for which sufficient information exists.

(vii) Skin Irritation. The product shall not cause skin irritation. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's ingredients. If the ingredients at 5% or more in the product are not shown to cause skin irritation at the concentrations used, then the product will not be considered to cause skin irritation.

For hand sanitizers under this standard, skin irritants are identified under hazard categories 2 or 3 for skin irritation/mild skin irritation (H315 and H316) by the Globally Harmonized System for Classification and Labelling of Chemicals (GHS).

(viii) Skin Sensitization. The product shall not be a *skin sensitizer*, as tested by the Local Lymph Node Assay (LLNA) or following the U.S. Environmental Protection Agency (EPA) test guidelines for skin sensitization (OECD Guideline 429, OPPTS 870.2600). The results of other standard test methods, such as the guinea pig maximization test (OECD Guideline 406) or the Buehler test (OECD 406), will be accepted as proof that the product in its most concentrated form is not a skin sensitizer when data from LLNA tests are not available. Any new product or ingredient testing should use the LLNA. Testing is not required for any ingredient for which sufficient information exists.

(ix) Ozone Depleting Compounds. The product shall not contain any *ingredients* that are *ozone-depleting compounds*.

(x) Bioaccumulating Compounds. The product as used shall not contain any ingredients that bioaccumulate or that form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a BCF greater than 100 (or log BCF >2) as determined by ASTM E-1022-94(2007) Standard Guide for Conducting Bioconcentration test with Fishes and Saltwater Bivalve Mollusks or OECD 305 Bioconcentration: Flow-through Fish Test. If the chemical meets the requirement for biodegradability, 3.12, it may be considered to not bioaccumulate. Testing is not required for any ingredient for which sufficient information exists. If no test results are available, a chemical with a log octanol/water partition coefficient.

Claims Requirements for Hand Sanitizers

(xi) Organic Claims. Organic claims must be supported with documentation that they meet the U.S. Department of Agriculture National Organic Program or meet the NSF International 305 standard.

(xii) Natural and Biobased Claims**.** Only the following *natural* and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural," "All Natural," "100 percent Biobased," or "All Biobased" shall only contain *natural* or *biobased components*, respectively, with no synthetic, petroleum, silicone, or artificial *ingredients*.
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased ingredients*, respectively.
- Claims on specific product *ingredients* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased ingredient*.

APPENDIX 1 – SCOPE (Informative)

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

Products Included in GS-41	Products Excluded from GS-41
• *A: Institutional hand cleaners* • *B: Industrial heavy-duty hand cleaners* • *C:* Alcohol-based *hand sanitizers*	• 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. • *Hand sanitizers* formulated with benzalkonium chloride as the active ingredient • *Hand sanitizers* sold within aerosol cans • Shampoo, conditioner and related shower products for baby, child, adult, and professional use (GS-44) • Personal care (GS-50)

GS-44

GREEN SEAL® STANDARD FOR

SOAPS, CLEANSERS, HAND SANITIZERS, AND SHOWER PRODUCTS

EDITION 4.3

(New Format)

June 23, 2022

Green Seal, Inc. • www.greenseal.org

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 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 SOAPS, CLEANSERS, HAND SANITIZERS, AND SHOWER PRODUCTS, GS-44

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FOREWORD

Edition. Edition 4.3 was issued on June 23, 2022. It replaces Edition 4.2 from September 10, 2020. Corrections and/or clarifications were last made to this standard on August 23, 2024~~July 26, 2024~~. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section17

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
AOEC. Association of Occupational and Environmental Clinics
ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials
BOD. Biological Oxygen Demand
CFR. Code of Federal Regulations
DFG. German Deutche Forschungsgemeinschaft
DOC. Dissolved Organic Carbon
EN. European Standard
EPA. United States Environmental Protection Agency
FDA. United States Food and Drug Administration
GHS. Globally Harmonized System for Classification and Labeling of Chemicals
ISO. International Organization for Standardization
LLNA. Local Lymph Node Assay
NOAEL. No-Observed Adverse Effect Level
OECD. Organization for Economic Co-operation and Development
VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR SOAPS, CLEANSERS, AND SHOWER PRODUCTS, GS-44

1.0 SCOPE

This standard establishes environmental requirements for hand, hair, and body *soaps* and *cleansers* used and rinsed after use. This includes liquid and solid *soap* and *cleansers*, *shampoo*, *conditioner*, and related *shower products* for baby, child, adult, and ~~*professional use*~~*professional use*. This standard also establishes health and environmental requirements for alcohol-based antiseptic rubs, referred to herein as *hand sanitizers*. This standard does not apply to products used for animal or pet use, those used in commercial or institutional facilities where the products are not intended to be sold to consumers, or products required to be registered under the Federal Insecticide, Fungicide, and Rodenticide Act, such as those making claims as sterilizers, *disinfectants*, or *antimicrobial soaps* and *cleansers*. 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**~~

~~**2.1 Soaps, Cleansers, and Shower Products**. The product shall perform as well as or better than a conventional, nationally recognized product in its category and at equivalent concentration using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. The testing protocol shall include, at a minimum: cleaning ability, lathering/rinsing, and skin or hair 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 were chosen shall be submitted.~~

~~**2.2 Hand Sanitizers.**~~

~~**In Vitro Testing.** *Hand Sanitizers* shall demonstrate at least a 3-log reduction (99.9 percent) of the test organism within 30 seconds. Acceptable methods for in vitro testing include ASTM E2783 and ASTM E2315.~~

~~A test organism shall be representative of microorganisms that commonly exist in consumer or healthcare settings.[2]~~

23.0 ~~PRODUCT-SPECIFIC HEALTH AND ENVIRONMENTAL REQUIREMENTS~~ SAFER CHEMICALS

~~[2] FDA Briefing Document (2020), Appendix C, List of organisms for consumer and health care in-vitro testing https://www.fda.gov/media/135559/download~~

2.1 Safer Ingredients

2.1.1 Aquatic Biodegradability. Each of the individual organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or 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_2 evolution, as % of theoretical CO_2 > 60%

Per OECD guidance the 10-day window requirement does not apply to structurally related surfactant homologues. 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 DOC removal > 90%.

An exception shall be made for *natural* or *naturally-derived components* that do not exhibit ready biodegradability if it does not have acute aquatic toxicity <100 mg/L (according to 2.2.1), does not have a chronic toxicity <100 mg/L (tested according to OECD 210, 211, or 201), is not bioaccumulating (3.11), and exhibits biodegradation rates above 70% (measured as BOD, DOC, or COD), per ISO test methods 9887 or 9888; or OECD 302A, B, or C.

Testing is not required for any *ingredient* for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases.

2.1.2 Bioaccumulating Compounds. The *product as used* shall not contain any *ingredients* that bioaccumulate or that form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a BCF greater than 100 (or log BCF >2) as determined by ASTM E-1022-94(2007) Standard Guide for Conducting Bioconcentration test with Fishes and Saltwater Bivalve Mollusks or OECD 305 Bioconcentration: Flow-through Fish Test. If the chemical meets the requirement for biodegradability, 2.1.1, it may be considered to not bioaccumulate. Testing is not required for any *ingredient* for which sufficient information exists. If no test results are available, a chemical with a log octanol/water partition coefficient log Kow > 3 may be considered to bioaccumulate.

2.1.3 Carcinogens, Mutagens, and Reproductive Toxins. The *undiluted product* shall not contain any *ingredients* or *components* that are *carcinogens*, *mutagens*, or *reproductive toxins*. The product shall not contain any *ingredients* or *components* known to produce or release *carcinogens*, *mutagens*, or *reproductive toxins*. Ethyl alcohol[2] in *hand sanitizers* is exempt from this prohibition.

[2] Ethyl alcohol, CAS No. 64-17-5, EC No. 200-578-6

The product shall not contain any *ingredients* that, according to published uses,[3] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens.*

2.1.4 Components that Cause Asthma. The *undiluted product* shall not contain any *components* that have been identified as *asthmagens*. Triethanolamine[4] is exempt for gel *hand sanitizers*.

2.1.5 Fragrances. All *fragrance components* shall be disclosed to the certifying body. Any *fragrances* used shall have been produced and handled following the code of practice of the International Fragrance Association. The product shall declare any *fragrances* on the product label in the ingredient line (see 4.2.2 and 4.2.3.2).

2.1.6 Optical Brighteners. The *undiluted product* shall not contain any *ingredients* that are *optical brighteners*.

Hand sanitizers are exempt from this requirement.

2.1.7 Ozone Depleting Compounds. The *undiluted product* shall not contain any *ingredients* that are *ozone-depleting compounds*.

2.1.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS).*

2.1.9 Preservatives. The use of preservatives for purposes other than preservation of the product is not allowed. Documentation must be provided to demonstrate the dosage necessary to preserve the product.

2.1.10 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Butylated hydroxytoluene
- Ethoxylated chemicals
- Ethylene diaminetetra-acetic acid or any of its salts
- Formaldehyde donors
- Heavy metals including lead, hexavalent chromium, or selenium both in the elemental form or compounds
- *Halogenated organic solvents*
- Methyldibromo glutaronitrile

[3] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.
[4] Triethanolamine (TEA), CAS Number 102-71-6, EC Number: 203-049-8

- Monoethanolamine, Diethanolamine, and Triethanolamine alone or in compounds. Note: Triethanolamine[5] is exempt in gel *hand sanitizers*.
- Nitro-musks
- Parabens
- Phthalates
- Polycyclic musks

2.1.11 Skin Absorption. The *undiluted product* shall not contain *ingredients*, present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists **(**ACGIH) Threshold Limit Value carrying a skin notation, or substances that are listed on the German Deutche Forschungsgemeinschaft (DFG) Maximum Allowable Concentrations list with a skin absorption H notation. Further, the product shall not contain *ingredients* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

Hand sanitizers are exempt from this requirement.

2.1.12 Skin and Eye Irritation. The *undiluted product* shall not cause skin irritation, *skin corrosion*, or *serious eye damage* as defined by the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). Further, a product is considered to cause skin irritation, *skin corrosion*, or *serious eye damage* if it has a pH of 2 or less or a pH of 11.5 or greater, unless proven otherwise.

The product shall not cause skin irritation as tested by OECD Guidelines for Testing Chemicals, Section 404 or other peer-reviewed or standard test methods. The product shall not be considered to cause skin irritation 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.

Further, a product shall be evaluated for *skin corrosion* and *serious eye damage* following the testing and evaluation strategy described in the GHS. Green Seal prefers that an *in vitro* test validated by the Interagency Coordinating Committee on the Validation of Alternative Methods or the European Centre for the Validation of Alternative Methods be used. 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 does not cause *skin corrosion* or *serious eye damage*. Testing is not required for any *ingredient* for which sufficient information exists.

Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

[5] Triethanolamine (TEA), CAS Number 102-71-6, EC Number: 203-049-8

2.1.13 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*, as tested by the Local Lymph Node Assay (LLNA) or following the U.S. Environmental Protection Agency (EPA) test guidelines for skin sensitization (OECD Guideline 429, OPPTS 870.2600). The results of other standard test methods, such as the guinea pig maximization test (OECD Guideline 406) or the Buehler test (OECD 406), will be accepted as proof that the product in its most concentrated form is not a *skin sensitizer* when data from LLNA tests are not available. Any new product or *ingredient* testing should use the LLNA. Testing is not required for any *ingredient* for which sufficient information exists.

2.1.14 Colorants. [Reserved]

2.1.15 Nanoscale Components. [Reserved]

2.2 Safer Products

Note: *Hand sanitizers* are exempt from certain requirements. See Appendix 3.

2.2.1~~3.1~~ Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply:

Oral lethal dose (LD_{50})	$\leq$ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	$\leq$ 20 mg/L at 1 hr
Dermal lethal dose (LD_{50})	$\leq$ 2,000 mg/kg

Toxicity shall be measured on the product as a whole. Alternatively, a mixture need not be tested if existing toxicity information demonstrates that each of the *ingredients* complies. The toxicity testing procedures should meet the requirements put forth by the Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402).

Testing is not required for any *ingredient* for which sufficient information exists.

To demonstrate compliance with this requirement. It is assumed that the toxicity of the individual *ingredients* is additive. The toxicity values are adjusted by the weight of the *ingredient* in the product and summed using the following formula:

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

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

Where,
TP = toxicity of the product
wt_i = the weight fraction of the *ingredient*
TV = the toxicity value for each *ingredient* (LD_{50})
n = number of *ingredients*

For inhalation toxicity, it is determined from all *ingredients* with a vapor pressure greater than 1 mm Hg at standard conditions (1 atm and 20-25°C).

Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

2.2.2 Chronic Inhalation Toxicity. The *product as used* shall not contain *ingredients* with a vapor pressure above 1 mm mercury at ambient conditions (1 atm pressure and 20-25° C) that cause chronic inhalation toxicity as evidenced by either of the following:

- Listed by the European Chemicals Bureau as R48/23: Danger of serious damage to health by prolonged exposure through inhalation.
- Classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to OECD Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the LOAEL can be used with a ten-fold safety factor (i.e., LOAEL/10).

Hand sanitizers are exempt from this requirement.

2.2.3 Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.2% by weight.

2.2.4 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 LC_{50} 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, using a weighted average approach (as in section 3.1.1). Aquatic toxicity tests shall follow the appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OECD test guidance 203 for fish, OECD test guidance 201 for algae, and OECD test guidance 202 for daphnia.

Alternatively, the product shall not be toxic to aquatic life defined as IC_{50}>1000 mg/L as measured by whole formulation short-term sensitive toxicity test performed on the bacteria *Photobacterium phosphoreum.* Aquatic toxicity shall be measured by one of the following test methods: *Biological Test Method: Toxicity Test Using Luminescent Bacteria (Photobacterium phosphoreum)*, Report EPS 1/RM/24, November 1992, Environment Canada, ASTM International (ASTM) D5660-96 or ISO 11348.

2.2.5 Volatile Organic Compound Content. The *undiluted product* shall contain no more than 1% of volatile organic compound (VOC) content, in order to avoid significant contribution to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality.

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

- By summing the percent by weight contribution from all organic *components* of the product that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components*[6].

Hand sanitizers are exempt from this requirement.

2.2.6 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.

~~**3.2 Carcinogens, Mutagens, and Reproductive Toxins.** The *undiluted product* shall not contain any *ingredients* or *components* that are *carcinogens*, *mutagens*, or *reproductive toxins*. The product shall not contain any *ingredients* or *components* known to produce or release *carcinogens*, *mutagens*, or *reproductive toxins*. Ethyl alcohol[7] in *hand sanitizers* is exempt from this prohibition.~~

~~The product shall not contain any *ingredients* that, according to published uses,[8] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.~~

~~**3.3 Per- and Polyfluoroalkyl Substances (PFAS).** The *undiluted product* shall not contain any *ingredients* or *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.~~

[6] Evaluation of total VOCs in this standard includes all *fragrances* and all organic compounds present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.

~~[7] Ethyl alcohol, CAS No. 64-17-5, EC No. 200-578-6~~

~~[8] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.~~

3.4 Skin and Eye Irritation. The *undiluted product* shall not cause skin irritation, *skin corrosion*, or *serious eye damage* as defined by the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). Further, a product is considered to cause skin irritation, *skin corrosion*, or *serious eye damage* if it has a pH of 2 or less or a pH of 11.5 or greater, unless proven otherwise.

The product shall not cause skin irritation as tested by OECD Guidelines for Testing Chemicals, Section 404 or other peer-reviewed or standard test methods. The product shall not be considered to cause skin irritation 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.

Further, a product shall be evaluated for *skin corrosion* and *serious eye damage* following the testing and evaluation strategy described in the GHS. Green Seal prefers that an *in vitro* test validated by the Interagency Coordinating Committee on the Validation of Alternative Methods or the European Centre for the Validation of Alternative Methods be used. 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 does not cause *skin corrosion* or *serious eye damage*. Testing is not required for any *ingredient* for which sufficient information exists.

Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

3.5 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*, as tested by the Local Lymph Node Assay (LLNA) or following the U.S. Environmental Protection Agency (EPA) test guidelines for skin sensitization (OECD Guideline 429, OPPTS 870.2600). The results of other standard test methods, such as the guinea pig maximization test (OECD Guideline 406) or the Buehler test (OECD 406), will be accepted as proof that the product in its most concentrated form is not a *skin sensitizer* when data from LLNA tests are not available. Any new product or *ingredient* testing should use the LLNA. Testing is not required for any *ingredient* for which sufficient information exists.

3.6 Skin Absorption. The *undiluted product* shall not contain *ingredients*, present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists **(**ACGIH) Threshold Limit Value carrying a skin notation, or substances that are listed on the German Deutche Forschungsgemeinschaft (DFG) Maximum Allowable Concentrations list with a skin absorption H notation. Further, the product shall not contain *ingredients* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

Hand sanitizers are exempt from this requirement.

3.7 Components that Cause Asthma. The *undiluted product* shall not contain any *components* that have been identified as *asthmagens*. Triethanolamine[9] is exempt for gel *hand sanitizers*.

3.8 Ozone Depleting Compounds. The *undiluted product* shall not contain any *ingredients* that are *ozone-depleting compounds*.

3.9 Volatile Organic Compound Content. The *undiluted product* shall contain no more than 1% of volatile organic compound (VOC) content, in order to avoid significant contribution to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality.

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

- By summing the percent by weight contribution from all organic *components* of the product that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components*[10].

Hand sanitizers are exempt from this requirement.

3.10 Chronic Inhalation Toxicity. The *product as used* shall not contain *ingredients* with a vapor pressure above 1 mm mercury at ambient conditions (1 atm pressure and 20-25° C) that cause chronic inhalation toxicity as evidenced by either of the following:

- Listed by the European Chemicals Bureau as R48/23: Danger of serious damage to health by prolonged exposure through inhalation.
- Classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to OECD Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the LOAEL can be used with a ten-fold safety factor (i.e., LOAEL/10).

Hand sanitizers are exempt from this requirement.

3.11 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:

[9] Triethanolamine (TEA), CAS Number 102-71-6, EC Number: 203-049-8

[10] Evaluation of total VOCs in this standard includes all *fragrances* and all organic compounds present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.

Acute LC_{50} 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, using a weighted average approach (as in section 4.1). Aquatic toxicity tests shall follow the appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OECD test guidance 203 for fish, OECD test guidance 201 for algae, and OECD test guidance 202 for daphnia.

Alternatively, the product shall not be toxic to aquatic life defined as IC_{50}>1000 mg/L as measured by whole formulation short-term sensitive toxicity test performed on the bacteria *Photobacterium phosphoreum*. Aquatic toxicity shall be measured by one of the following test methods: *Biological Test Method: Toxicity Test Using Luminescent Bacteria (Photobacterium phosphoreum),* Report EPS 1/RM/24, November 1992, Environment Canada, ASTM International (ASTM) D5660-96 or ISO 11348.

3.12 Bioaccumulating Compounds. The *product as used* shall not contain any *ingredients* that bioaccumulate or that form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a BCF greater than 100 (or log BCF >2) as determined by ASTM E-1022-94(2007) Standard Guide for Conducting Bioconcentration test with Fishes and Saltwater Bivalve Mollusks or OECD 305 Bioconcentration: Flow-through Fish Test. If the chemical meets the requirement for biodegradability, 3.12, it may be considered to not bioaccumulate. Testing is not required for any *ingredient* for which sufficient information exists. If no test results are available, a chemical with a log octanol/water partition coefficient log Kow > 3 may be considered to bioaccumulate.

3.13 Aquatic Biodegradability. Each of the individual organic *ingredients* in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or 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_2 evolution, as % of theoretical CO_2 > 60%

Per OECD guidance the 10-day window requirement does not apply to structurally-related surfactant homologues. 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 DOC removal > 90%.

An exception shall be made for *natural* or *naturally-derived components* that do not exhibit ready biodegradability if it does not have acute aquatic toxicity <100 mg/L

(according to 3.10), does not have a chronic toxicity <100 mg/L (tested according to OECD 210, 211, or 201), is not bioaccumulating (3.11), and exhibits biodegradation rates above 70% (measured as BOD, DOC, or COD), per ISO test methods 9887 or 9888; or OECD 302A, B, or C.

Testing is not required for any *ingredient* for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases.

3.14 Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.2% by weight.

3.15 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Butylated hydroxytoluene
- Ethoxylated chemicals
- Ethylene diaminetetra-acetic acid or any of its salts
- Formaldehyde donors
- Heavy metals including, lead, hexavalent chromium, or selenium both in the elemental form or compounds
- *Halogenated organic solvents*
- Methyldibromo glutaronitrile
- Monoethanolamine, Diethanolamine, and Triethanolamine alone or in compounds. Note: Triethanolamine[11] is exempt in gel *hand sanitizers*.
- Nitro-musks
- Parabens
- Phthalates
- Polycyclic musks

3.16 Fragrances. All *fragrance components* shall be disclosed to the certifying body. Any *fragrances* used shall have been produced and handled following the code of practice of the International Fragrance Association. The product shall declare any *fragrances* on the product label in the ingredient line (see 5.2 and 5.5).

3.17 Preservatives. The use of preservatives for purposes other than preservation of the product is not allowed. Documentation must be provided to demonstrate the dosage necessary to preserve the product.

3.18 Colorants. [Reserved]

3.19 Nanoscale Components. [Reserved]

[11] Triethanolamine (TEA), CAS Number 102-71-6, EC Number: 203-049-8

~~**3.20 Optical Brighteners.** The *undiluted product* shall not contain any *ingredients* that are *optical brighteners*.~~

~~*Hand sanitizers* are exempt from this requirement.~~

~~**3.21 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.~~

34.0 ~~PACKAGING REQUIREMENTS~~ SUSTAIANBLE PACKAGING

3.1 Packaging Materials

3.1.14.1 Primary Package.

3.1.4.1.1 Source Reduction in Primary Package. The *primary package* shall be a *source-reduced package* or *recyclable* and contain at least 25% *post-consumer material* or demonstrate that efforts were made to use the maximum available *post-consumer material* in the package.

3.1.4.1.2 Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in ready-to-use forms, including but not limited to pump-dispenser bottles.

~~**4.1.3 Heavy Metal Restrictions.** Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be *intentionally introduced*. 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 recovered materials. Further, *intentional introduction* does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final packaging or packaging *component* is not desired or deliberate, if the final packaging or packaging *component* complies with the incidental concentration restrictions of 100 ppm.~~

~~**4.1.4 Other Restrictions.** Phthalates, Bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced*; an exception is allowed for packages that would not have these added compounds but for the addition of recovered material.~~

3.1.1.3~~4.1.5~~ Hand Sanitizer Wipes Per Package. *Hand sanitizers* sold as wipes shall not be individually packaged or individually wrapped. The *primary package* for *hand sanitizers* sold as wipes must contain at least 20 wipes.

3.1.2~~4.2~~ Secondary Package. A s*econdary package* shall only be used for *concentrates*. An exception may be made for packaging of multiple units when up to one of the units is a ready-to-use form, including but not limited to pump-dispenser bottles, and total packaging (*primary* plus *secondary package*) is a reduction in packaging material use.

Hand sanitizers are exempt from this requirement.

3.2 Packaging Label

3.2.1 Disposal Labeling. The label must include proper disposal instructions including clear package recycling instructions, if applicable.

3.2.2 Resin Identification Code. If plastic, the packaging must be clearly marked with the appropriate Society of the Plastics Industry symbol to identify the type of plastic for recycling and appropriate qualification of recyclability as referenced in 3.1.1.1 such as "may be *recyclable*, see if accepted by your local program" or "only a few communities accept this package for recycling, check with your local program."

Hand sanitizers are exempt from this requirement.

Note: Additional Product Label Requirements
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex B.

3.3. Restricted Substances

3.3.1 Heavy Metal Restrictions. Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be *intentionally introduced*. 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 recovered materials. Further, *intentional introduction* does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final packaging or packaging *component* is not desired or deliberate, if the final packaging or packaging *component* complies with the incidental concentration restrictions of 100 ppm.

3.3.2 Other Restrictions. Phthalates, Bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced*; an exception is allowed for packages that would not have these added compounds but for the addition of recovered material.

45.0 ~~USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

4.1. Product Performance

4.1.1 Soaps, Cleansers, and Shower Products. The product shall perform as well as or better than a conventional, nationally recognized product in its category and at equivalent concentration using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. The testing protocol shall include, at a minimum: cleaning ability, lathering/rinsing, and skin or hair 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 were chosen shall be submitted.

4.1.2 Hand Sanitizers.

In Vitro Testing. *Hand Sanitizers* shall demonstrate at least a 3-log reduction (99.9 percent) of the test organism within 30 seconds Acceptable methods for in vitro testing include ASTM E2783 and ASTM E2315.

A test organism shall be representative of microorganisms that commonly exist in consumer or healthcare settings.[7]

4.2 Product Label

4.2.1 Use Labeling. The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste.

Hand sanitizers are exempt from this requirement.

4.2.2 Ingredient Line. The product shall list the product *components* using the naming convention of the International Nomenclature of Cosmetic Ingredients in order of predominance. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. The general term '*fragrance*' may be used for *fragrance components*.

Hand sanitizers are exempt from this requirement.

[7] FDA Briefing Document (2020), Appendix C, List of organisms for consumer and health care in-vitro testing https://www.fda.gov/media/135559/download

4.2.2.1 Consumer Communication. The product ingredient line (4.2.2) shall be made available to consumers in an easily accessible means besides the product package, such as the company website.

Hand sanitizers are exempt from this requirement.

4.2.3 Claims and Transparency

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

Hand sanitizers are exempt from this requirement.

4.2.3.2 Fragrance and Allergen Labeling. The product label shall declare, separate from the ingredient line, if a *fragrance* has been added or if no *fragrance* has been added and if the product contains any *allergen ingredients*. *Hand sanitizers* are exempt from these requirements but are required, per Fragrances (2.1.5), to declare within the ingredient line if a *fragrance* has been added.

Hand sanitizers are exempt from this requirement.

4.2.3.3 Natural and Biobased Claims. Only the following *natural* and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural," "All Natural," "100 percent Biobased," or "All Biobased" shall only contain *natural* or *biobased components*, respectively, with no synthetic, petroleum, silicone, or artificial *components*. An exception is permitted for lye used to produce *soap*.
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally derived*, or *biobased components*, respectively.
- Claims on specific product *ingredients* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased ingredient*.

4.2.3.4 Organic Claims. Organic claims must be supported with documentation that they meet the U.S. Department of Agriculture National Organic Program or meet the NSF International 305 standard.

~~**5.2 Ingredient Line.** The product shall list the product *components* using the naming convention of the International Nomenclature of Cosmetic Ingredients in order of predominance. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. The general term '*fragrance*' may be used for *fragrance components*.~~

~~*Hand sanitizers* are exempt from this requirement.~~

~~**5.3 Organic Claims.** Organic claims must be supported with documentation that they meet the U.S. Department of Agriculture National Organic Program or meet the NSF International 305 standard.~~

5.4 Natural and Biobased Claims. Only the following *natural* and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural," "All Natural," "100 percent Biobased," or "All Biobased" shall only contain *natural* or *biobased components*, respectively, with no synthetic, petroleum, silicone, or artificial *components*. An exception is permitted for lye used to produce *soap*.
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively.
- Claims on specific product *ingredients* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased ingredient*.

5.5 Fragrance and Allergen Labeling. The product label shall declare, separate from the ingredient line, if a *fragrance* has been added or if no *fragrance* has been added and if the product contains any *allergen ingredients*. *Hand sanitizers* are exempt from these requirements but are required, per Fragrances (3.16), to declare within the ingredient line if a *fragrance* has been added.

Hand sanitizers are exempt from this requirement.

5.6 Consumer Communication. The product ingredient line (5.2) shall be made available to consumers in an easily accessible means besides the product package, such as the company website.

Hand sanitizers are exempt from this requirement.

5.7 Use Labeling. The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste.

Hand sanitizers are exempt from this requirement.

5.8 Disposal Labeling. The label must include proper disposal instructions including clear package recycling instructions, if applicable.

5.8.1 Resin Identification Code. If plastic, the packaging must be clearly marked with the appropriate Society of the Plastics Industry symbol to identify the type of plastic for recycling and appropriate qualification of recyclability as referenced in 4.1.1 such as "may be *recyclable*, see if accepted by your local program" or "only a few communities accept this package for recycling, check with your local program."

Hand sanitizers are exempt from this requirement.

Note: Additional Product Label Requirements
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex B.

56.0 TRADEMARK USE REQUIREMENTS

56.1 Trademark Use. Any use of the Green Seal® Certification Mark or 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.[8]

56.2 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.

[8] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Allergen. Allergenic substances listed by the European Commission in the Cosmetic Directive and those listed by the U.S. Food and Drug Administration (including food allergens).

Antimicrobial. Substances that are intended to kill or inhibit the growth of microorganisms including *antiseptic*, *disinfectant*, and *sanitizer* substances.

Asthma. Asthma is a chronic inflammatory disorder of the airways that impairs breathing. Asthma affects children and adults, may be intermittent or persistent, and is further classified as mild, moderate, or severe. The chronic inflammation associated with variable airflow obstruction commonly causes difficulty breathing, coughing, wheezing, shortness of breath, and/or chest pain. Symptoms may resolve completely between active episodes. Symptoms may occur during exposure, immediately after exposure, or up to 24 hours later in a "late phase," frequently interrupting sleep.

Asthmagen. A substance designated as *asthma* causing agents by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

Biobased. The content of a product that is from biological products or renewable materials, forestry, or agricultural materials (including plant, animal, and marine materials).

Carcinogen. A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), National Toxicology Agency (Groups 1 and 2), EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or by Occupational Safety and Health Administration (as carcinogens under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)).

Child-Resistant Packaging. Child-resistant packaging, as defined by the Poison Prevention Packaging Act, is packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Cleanser. A product intended to clean the body or hair that has detergent properties that are not necessarily due to alkali-fatty acid compounds and may contain synthetic detergents.

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

Component. A deliberate addition to the product, where it is added for its continued presence in the final product to provide a specific characteristic, appearance, or quality. Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered intentional *components* if the concentrations are below the applicable maximum *contaminant* levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Concentrate. A product, as sold, that must be diluted by water prior to its intended use.

Conditioner. A product that is intended to alter the texture or appearance of hair or scalp, used after *shampoo* and rinsed off after use. This can include products called rinses but does not include leave-in products.

Contaminant. A product constituent that was not added for its functionality but is known to be present.

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

Endocrine Disruptor. Chemicals identified by the U.S. Environmental Protection Agency (EPA) List of Chemicals for Tier 1 Screening due to their ability to disrupt hormones (e.g., have estrogen-or androgen-mediated effects), as tested according to the EPA Series 890 -Endocrine Disruptor Screening Program Test Guidelines.

Haber's Rule. For a given toxic gas, the concentration of the gas multiplied by the duration of exposure equals a constant (C x t = k); for example, doubling the concentration will halve the time for a given toxic effect.

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

Hand Sanitizer. A product intended to be applied topically to intact human hands to slow or stop the growth of pathogenic microorganisms. These products are regulated by the US FDA under the term "consumer antiseptic rubs" and "healthcare antiseptic rubs."

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Ingredient. Any *component* of a product that is intentionally added or known to be a *contaminant* that comprises at least 0.01% by weight of the product.

Intentional Introduction. The act of deliberately utilizing a material in the formation of a package or packaging *component* where its continued presence is desired in the final package or packaging *component* to provide a specific characteristic, appearance, or quality.

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 GHS Chemicals Which Cause Mutations in Germ Cells.

Nanoscale Component. A *component* that is roughly 1 to 100 nanometers in size, enabling novel applications that a larger-sized version of the *component* could not achieve.

Natural Component. A *component* that comes from materials and found in nature including mineral, forestry, agricultural, or biological materials; do not contain transgenic hybrid organisms; have been processed without irradiation; and are not chemically altered.

Naturally Derived Component. A *component* that is partially chemically altered without petroleum *components* and has been minimally processed such that it is not altered to such an extent that it is are no longer biodegradable and non-toxic (examples of potentially acceptable processes are included in Appendix B).

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances.

Per and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

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 *soap* or *cleansers*, or *hand sanitizers*, shall be used and 0.9 ml of foam *soap* or *cleansers* shall be used, or the equivalent for solid or semi-solid products.

Professional-Use. Trained or paid workers, such as, but not limited to, hair stylists, that use the products included in the scope of this standard and such products are available for sale to the consumer.

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.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65).

Secondary Package. Package used to contain *primary package/s* and typically used for merchandizing. This does not include case or shipping packaging or the *primary package*, cap, or lid.

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. This includes substances identified under Category 1 for Serious Eye Damage/Eye Irritation (H318) under the *GHS*.

Shampoo. A *soap* or *cleanser* used to clean the hair and scalp and rinsed off after use. This can include combination shampoo and *conditioner* or shampoo and rinse products.

Shower Product. A product that is used on the body or hair with the intention that they are washed off the body. This may include bubble bath, exfoliating scrubs, and other rinse-off products**.**

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. This includes substances designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the *GHS*.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact.

Soap. A product used to clean the body or hair in which most of the nonvolatile matter consists of an alkali salt of fatty acids and whose detergent properties are due to these alkali-fatty acid compounds (21 CFR 701.20).

Source-Reduced Package. A package that has at least 50% less material (by weight) compared to containers commonly used for that product type.

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

ANNEX B – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye corrosion criterion (2.1.123.3) and may have an alternate threshold of 300 mg/kg for oral acute mammalian toxicity (2.2.13.1) herein.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye corrosion.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word "WARNING" or 'CAUTION" on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute mammalian toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
  - o May cause skin corrosion, do not get on skin
  - o May cause serious eye damage, do not get in eyes
  - o Harmful if swallowed, do not ingest
  - o
- Instruction, when necessary or appropriate, for first-aid treatment

- The statement "KEEP OUT OF REACH OF CHILDREN" or its practical equivalent in capitalized text

ANNEX C – HAND SANITIZERS (Normative)

Hand sanitizers. *Hand sanitizers* shall meet the requirements and undergo evaluation according to the stipulations below.

A. Alcohol Concentration. Documentation shall be provided to demonstrate the following:

- Ethyl alcohol-based *hand sanitizers* shall be formulated with at least 60 percent ethyl alcohol by volume, which shall be Specially Denatured Alcohol (SDA). Documentation must also demonstrate a purity that meets or exceeds USP grade requirements.
- Isopropyl alcohol-based *hand sanitizers* shall be at least 70 percent isopropyl alcohol by volume.

B. Evaluation level. *Hand sanitizers* shall be evaluated according to all criteria, herein, based on evaluations of the product as a whole or each of the *ingredients*; chemicals in the product at less than 100 ppm shall not be restricted or prohibited.

C. Ingredient Prohibitions.

(1) *Hand sanitizers* shall not contain the following *ingredients*:

(i) Endocrine Disruptors

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-44:

Products included in GS-44

- Body wash
- Bubble bath and bath salts
- *Cleansers*
- *Conditioner*
- Exfoliant products (if intended to rinse off)
- Alcohol-based *hand sanitizers* sold as liquids, gels, foams, or lotions
- Face wash
- Makeup remover (if intended to rinse off)
- Moisturizing products (if intended to rinse off)
- *Shampoo*
- Shaving cream, gel, and foam
- *Shower products*
- *Soap*

Products excluded from GS-44

- Aftershave (included in GS-50)
- Astringent/toner (included in GS-50)
- Cleaning wipes that don't require rinsing after use (included in GS-50)
- Cuticle cream, lotion, and oil (included in GS-50)
- Deodorant and antiperspirant (included in GS-50)
- Feminine deodorant
- Fragrance Products/perfume and body spray
- Hair shine products (included in GS-50)
- Hair spray (included in GS-50)
- Hair styling products (e.g., balm, gel, mousse) (included in GS-50)

Products excluded from GS-44, Continued

- Hair dye, color, and bleach
- Hair relaxant
- Hand cleaning products for industrial and institutional use (covered in GS-41)
- *Hand sanitizers* formulated with benzalkonium chloride as the active ingredient
- *Hand sanitizers* sold within aerosol cans
- Insect repellents (included in GS-50)
- Leave-on hair *conditioner* (included in GS-50)
- Lip products (included in GS-50)
- Makeup and bronzers (e.g., foundation, concealer, bronzer, mascara, eyeliner, eye shadow, blush) (included in GS-50)
- Massage oil (included in GS-50)
- Nail polish remover
- Skin care products (e.g., lotions) (included in GS-50)
- Sunless tanning products (included in GS-50)
- Sunscreen (included in GS-50)

APPENDIX 2 – PROCESSING METHODS OF NATURALLY-DERIVED COMPONENTS (Informative)

Examples of Potentially Acceptable Processing Methods of *Naturally-Derived Components* (which must also meet all the requirements in the standard)

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponafication (to produce *soap*)

APPENDIX 3 – EXEMPT CRITERIA FOR HAND SANITIZERS (Informative)

Hand sanitizers are exempt from the following criteria:

~~**Product-Specific Health and Environmental Requirements**~~ **Safer Chemicals**

Skin absorption (2.1.11~~3.5~~)
Volatile Organic Compound Content (2.2.5~~3.8~~)
Chronic Inhalation Toxicity (2.2.2~~3.9~~)
Optical Brighteners (2.1.6~~3.19~~).

~~**Ingredient-Specific Exemptions**~~
Ethyl alcohol shall be exempt from the *carcinogens* prohibition (2.1.3~~3.2~~)
Triethanolamine shall be exempt from the *asthmagens* prohibition (2.1.4~~3.6~~)
Triethanolamine is noted as exempt for *hand sanitizers* in the Prohibited Components list (2.1.10~~3.14~~)

~~**Packaging Requirements**~~ **Sustainable Packaging**

Secondary Package (3.1.2~~4.2~~)

~~**User Information and Product Labeling Requirements**~~ **Verified Performance and Claims**
Antimicrobial Claims (4.2.3.1~~5.1~~)
Allergen Labeling (4.2.3.2~~5.5~~)
Consumer Communication (4.2.2.1~~5.6~~)
Use Labeling (4.2.1~~5.7~~)
Disposal Labeling (3.2.1~~5.8~~)

GS-48

GREEN SEAL® STANDARD FOR

LAUNDRY CARE PRODUCTS FOR HOUSEHOLD USE

EDITION 1.7

(New Format)

June 23, 2022

Green Seal, Inc. • www.greenseal.org

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 lifecycle 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 LAUNDRY CARE PRODUCTS FOR HOUSEHOLD USE, GS-48

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FOREWORD

Edition. Edition 1.7 was issued on June 23, 2022. It replaces Edition 1.6 from November 11, 2021. Corrections and/or clarifications were last made on August- ~~16~~23, 2024~~July 26, 2024~~. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section18

ACRONYMS AND ABBREVIATIONS

AATCC. American Association of Textile Chemists and Colorists.
ACGIH. American Conference of Governmental Industrial Hygienists.
AISE. Association for Soaps, Detergents and Maintenance Products.
AOEC. Association of Occupational and Environmental Clinics.
ASTM. ASTM International.
BCF. Bioconcentration Factor.
BOD. Biochemical Oxygen Demand.
BTU. British Thermal Unit.
CARB. Air Resources Board for the State of California.
CAS. Chemical Abstracts Service.
CFR. Code of Federal Regulations.
CFU. Colony Forming Unit.
DFG. German Deutsche Forschungsgemeinschaft.
DOC. Dissolved Organic Carbon.
EN. European Standard.
EPA. United States Environmental Protection Agency.
FDA. United States Food and Drug Administration.
FIFRA. Federal Insecticide, Fungicide, and Rodenticide Act.
GHS. Globally Harmonized System for the Classification and Labelling of Chemicals.
GMM. Genetically Modified Microorganism.
HCPA. Household & Commercial Products Association
IFRA. International Fragrance Association.
INCI. International Nomenclature of Cosmetic Ingredients.
ISO. International Organization for Standardization.
IUPAC. International Union of Pure and Applied Chemistry.
JECFA. Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives.
NOP. National Organic Program.
OECD. Organisation for Economic Co-operation and Development.
PMRA. Health Canada's Pesticide Management Regulatory Agency.
SOP. Standard Operating Procedure.
TG. Test Guidance.
ThOD. Theoretical Oxygen Demand.
USDA. U.S. Department of Agriculture.
VOC. Volatile Organic Compound.
WHO. World Health Organization.

GREEN SEAL STANDARD FOR LAUNDRY CARE PRODUCTS FOR HOUSEHOLD USE, GS-48

1.0 SCOPE

This standard establishes environmental, health, and social requirements for products that are used to clean, remove stains, and/or otherwise treat the softness, static, or wrinkle characteristics of *laundry*. This standard covers and is limited to products designed for *household use*, including *laundry detergent products*, fine washable *laundry detergent products* (for delicates), *stain* and *spot removing products* (pre-treatment and stand-alone), *laundry* additives (*bleaching and softening products*), fabric softener (liquids and sheets), *anti-static products* (liquid and sheets), *fabric refresher* products, anti-wrinkle products, *laundry prewash* products, *laundry starch/sizing/fabric finish products*, and combination products that may serve several of these functions. This standard includes products used in home health care, which may include *antimicrobial pesticide products* (e.g., products covered by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)). This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. This standard includes *fabric protectant* products but does not address impregnating products with flame retardant or waterproofing properties. This standard does not address carpet or upholstery cleaning and maintenance products or footwear or leather care products. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of the products with materials is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility.

Where there is more than one criterion that applies, the more stringent criterion applies.

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

Criteria that include an asterisk (*) in the title are considered foundational criteria.[2]

~~**2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS**~~

~~**2.1 Product Performance.** Each product shall demonstrate that it performs its intended use effectively at the most dilute/least concentrated manufacturer-recommended dilution level for routine use. Concentrate products shall be diluted, as required, just prior to testing using unheated water from the tap. Performance tests shall be conducted as comparison tests against a *benchmark product* under the following test conditions:~~

[2] Foundational criteria are set up to be the same across Green Seal's cleaning product standards, though some unique exceptions may be included for each standard. Revisions to these criteria in the future will apply to all standards that include the identified foundational criteria (excluding unique exceptions).

Product	Wash Cycle Temperature	Rinse Cycle Temperature	Water Hardness
Benchmark Product	Set to the temperature specified by ASTM D4265 for the machine type being used[3]	Tap Cold[4]	Moderately hard water (120 – 150 ppm)‡ The calcium/ magnesium ratio of the hardness minerals (expressed as calcium carbonate) should be adjusted for different water hardness according to ASTM D4265[5]
Test Product	Cold water (68 +/- 5°F, 20 +/- 3°C)‡ or the lowest claimed effective temperature, if lower than cold water		

‡ **Exception to Wash Cycle Temperature:** For *antimicrobial pesticide products*, the Test Product shall be evaluated at the temperature needed for antimicrobial activity. If the antimicrobial activity does not contribute to other functions of this product, then the *cold water* temperature shall be used for testing those other purposes.

‡ **Exception to Water Hardness:** Where a manufacturer can demonstrate marketing is regional in an area of lower or higher water hardness, an alternate hardness range similar to the regional average shall be recommended to the certifying body for review on a case-by-case basis.

The following criteria include test methods that are applicable to some product categories, as specified below; for all other product categories, follow section 2.2, Alternative Performance Requirements. Products specifically addressed in section 2.1 may use an alternate test under section 2.2 as long as the relevant characteristics specified under 2.1.1, 2.1.2, and 2.1.3 are tested.

2.1.1 Laundry Detergent Performance. *Laundry detergent products* shall demonstrate performance equivalent to or better than a *benchmark product*. The *benchmark product* shall be the appropriate American Association of Textile Chemists and Colorists (AATCC) standard reference laundry detergent[6] or a national market-leading product in its category.

[3] ASTM D4265 Standard Guide for Evaluating Stain Removal Performance in Home Laundering. ASTM D4265 specifies these temperatures: Section 8.5.1: Conventional Deep-fill Top Loader – 86 +/- 5°F (30 +/- 3°C) wash cycle, ambient rinse. Section 8.5.2: Front-loading HE – 77 +/- 5°F (25 +/- 3°C) wash cycle, ambient rinse. Section 8.5.3: Top-loading HE – 75 +/- 5°F (23.8+/- 3°C) wash cycle, ambient rinse.

[4] Tap cold temperature for Rinse is not meant to be controlled. Tap cold is equivalent to the water temperature entering the home or representative laboratory which is dependent on geography and time of year. The tap water temperature can vary globally in customer homes. This variation can have a wide range between 5 to 49ºC (40 to 120ºF).

[5] ASTM D4265, Section 8.2.1. Water Hardness Ranges, Calcium/Magnesium Ratio: 0 – 60 ppm, 4:1. 61 – 120 ppm, 3.1. 121 ppm and over, 2:1.

[6] Powder – 1993 AATCC Standard Reference Detergent WOB, at 66 g/test for a 4 lb load
Liquid – AATCC Standard Reference High Efficiency Detergent WOB at 50 mL/test for a 4 lb load, without optical brighteners

2.1.1.1 Cleaning. *Laundry detergent products* shall demonstrate general detergency and stain removal on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis, for a minimum of four of the following stains: tea, blueberry, grass, ballpoint pen ink, used motor oil, blood, wine, coffee, mustard, spaghetti sauce, gravy, makeup, chocolate syrup, grape juice, or a modified Spangler artificial sebum soil. Any stains marketed for use by the product shall be included in the four stains.

2.1.1.2 Color Care. *Laundry detergent products* shall demonstrate that they maintain color fastness of manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the procedure in ASTM D4265 or AATCC 124 (using machine washing and a 4 or 6 pound load size) by assessing color change after 5 wash cycles, with appropriate instrumental or visual analysis.

2.1.2 Stain and Spot Removal Performance.[7] *Stain removing products* and *bleaching products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category for removing stains on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis, for four of the following stains: tea, blueberry, grass, ballpoint pen ink, used motor oil, blood, wine, coffee, mustard, spaghetti sauce, gravy, makeup, chocolate syrup, grape juice, or a modified Spangler artificial sebum soil. Any stains marketed for use by the product shall be included in the four stains.

2.1.3 Softening Performance. *Softening products* shall demonstrate that they perform equivalent to or better than an appropriate *benchmark product* in their category on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the Household & Commercial Products Association (HCPA) DCC-13 series evaluating softness (13B), water absorbency (13D), and static control (13F, using one of described evaluation methods).

2.2 *Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs equivalent to or better than a nationally recognized or market-leading product of its type, compared at the most dilute/least concentrated manufacturer-recommended dilution level for routine use, using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. The requirements for test conditions in 2.1 shall apply, unless otherwise needed for antimicrobial activity for *antimicrobial pesticide products*. Test methodology and summarized results shall be documented in report format and provided to the certification program.

23.0 PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTSSAFER CHEMICALS

2.1 Safer Ingredients

[7] This method is the same as 2.1.1.1 Cleaning for *laundry detergent products*, thus it does not need to be repeated for *laundry detergent products* that are also intended for stain and spot removal.

2.1.1 *Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.

2.1.2 *Aquatic Biodegradability. Each of the individual organic *components* present at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.
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 organic *component* present at 0.01% or more in the *product as used* 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.

2.1.3 *Asthmagens. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

2.1.4 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* present at 0.01% or more that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The

preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.14 herein, it may be considered to not bioaccumulate.

2.1.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[3] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.

Note: Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.

2.1.6 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 component*
- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

2.1.7 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* present at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F (65.5°C), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

2.1.8 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the U.S. Environmental Protection Agency (EPA) List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

2.1.9~~3.1~~ *Formula Disclosure for Certification. For certification to this standard, all of the formula *components* shall be disclosed to the certification program, including the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by weight) of each *component* in the formula.

2.1.10 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

2.1.11 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

[3] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

2.1.12 Optical Brighteners. The *undiluted product* shall not contain any *components* present at 0.01% or more that are *optical brighteners*.

2.1.13 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS).*

2.1.14 *Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex C criteria.

2.1.15 *Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex D criteria.

2.1.16 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
- Triclosan

2.1.17 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as respiratory sensitizers. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

2.1.18 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value list carrying a skin notation, or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations list with a skin absorption H notation. Further, the product shall not contain *components* present at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.19 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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 of peer-reviewed studies or standard in vitro or in vivo test methods may also be accepted. Testing is not required for any *component* 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

Note: Refer to Annex B for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

2.1.20 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizer*s, then the product will not be considered to be a *skin sensitizer*.

~~**3.2 *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.~~

2.2 Safer Products

2.2.1~~3.3~~ *Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply:[4, 5]

Oral lethal dose (LD_{50})	≤ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	≤ 20,000 ppmV at 1 hour
Dermal lethal dose (LD_{50})	≤ 2,000 mg/kg

[4] Products meeting the requirements in 2.2.1 will not fall into hazard categories 1 through 5 for acute oral and dermal toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the GHS when the whole product is evaluated using the weighted average approach.

[5] Recognizing the need to protect animal welfare, testing to demonstrate conformance should only be done after consulting with the certification program to ensure that other means of determining/estimating conformance have been exhausted, as provision 2.2.5~~63.2~~ outlines, including existing data, modeling data, data from structural analogs, and other lines of evidence.

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* present at 0.01% or more in the *undiluted product* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* present at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

Refer to Annex B for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

~~**2.2.2 Concentration and Compaction.** The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled *laundry* of the *undiluted product* to be at the following levels:~~

~~**Products shall have a 2.7 kg (or 6 pound) normal/medium load size, unless rationale for an alternate load size is accepted by the certification program such as for hand washing *laundry detergent products.*~~

~~Other products do not have to meet concentration or compaction requirements.~~

2.2.32 *Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.5% by weight.

2.2.34 *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_{50} 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 *components* present at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 2.2.1).

The preferred sources of data come from the following protocols: International Organization for Standardization (ISO) 7346-2 for fish, Organization for Economic Co-operation and Development (OECD) Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, and OECD TG 201 for algae.

2.2.54 *Volatile Organic Compound (VOC) Content. The VOC content of the *product as used* shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for VOCs in its product category. For product

categories not regulated by CARB, the following limitations on VOC level (by weight) shall not be exceeded:

- *Laundry detergent products*: 4%
- *Bleaching products*, not sold as *laundry detergent products*: 8%
- *Softening products*: 4%
- Other products: 1%

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

- By summing the percent by weight contribution from all organic *components* present in the product at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components* present in the product at 0.01% or more.[6]

Current CARB regulatory limits for VOCs.[7]

Product Category	**Effective Date**	**Limit (%)**
Laundry Prewash Aerosol/solid	1/1/1994	22
Laundry Prewash All other forms	1/1/1994	5
Laundry Starch/Sizing/Fabric Finish Product	1/31/2008	4.5

2.2.65 *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.

[6] Evaluation of total VOCs in this standard includes all *fragrances* and all *VOCs* present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all *organic compounds* present below 0.1%.

[7] 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.

3.4 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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 of peer-reviewed studies or standard in vitro or in vivo test methods may also be accepted. Testing is not required for any *component* 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

Note: Refer to Annex B for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

3.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[8] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.

Note: Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.

3.6 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

3.7 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the U.S. Environmental Protection Agency (EPA) List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.9 *Asthmagens. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

3.10 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as respiratory sensitizers. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

[8] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

3.11 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

3.12 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value list carrying a skin notation, or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations list with a skin absorption H notation. Further, the product shall not contain *components* present at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

3.13 *Volatile Organic Compound (VOC) Content. The VOC content of the *product as used* shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for VOCs in its product category. For product categories not regulated by CARB, the following limitations on VOC level (by weight) shall not be exceeded:

- *Laundry detergent products*: 4%
- *Bleaching products*, not sold as *laundry detergent products*: 8%
- *Softening products*: 4%
- Other products: 1%

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

- By summing the percent by weight contribution from all organic *components* present in the product at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20° C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components* present in the product at 0.01% or more.[9]

Current CARB regulatory limits for VOCs.[10]

Product Category	**Effective Date**	**Limit (%)**
Laundry Prewash Aerosol/solid	1/1/1994	22
Laundry Prewash All other forms	1/1/1994	5

[9] Evaluation of total VOCs in this standard includes all *fragrances* and all *VOCs* present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all *organic compounds* present below 0.1%.

[10] 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.

Product Category	Effective Date	Limit (%)
Laundry Starch/Sizing/Fabric Finish Product	1/31/2008	4.5

3.14 *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_{50} 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 *components* present at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 3.3).

The preferred sources of data come from the following protocols: International Organization for Standardization (ISO) 7346-2 for fish, Organization for Economic Co-operation and Development (OECD) Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, and OECD TG 201 for algae.

3.15 *Aquatic Biodegradability. Each of the individual organic *components* present at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.
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 organic *component* present at 0.01% or more in the *product as used* 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.

3.16 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* present at 0.01% or more that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.14 herein, it may be considered to not bioaccumulate.

3.17 *Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.5% by weight.

3.18 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
- Triclosan

3.19 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* present at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F (65.5°C), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

3.20 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

3.21 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 component*

- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

3.22 Optical Brighteners. The *undiluted product* shall not contain any *components* present at 0.01% or more that are *optical brighteners*.

3.23 Concentration and Compaction. The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled *laundry* of the *undiluted product* to be at the following levels:

Product	**Concentrated****	**Ultra-Concentrated**
Liquid *laundry detergent products*	16.2 ml/kg (0.25 fl.oz./lb) or less	8.1 ml/kg (0.125 fl.oz./lb) or less
Solid/Powder *laundry detergent products*. (An exception shall be made for products sold as sheets)	13.7 g/kg (0.22 oz/lb) or less.	5.0 g/kg (0.08 oz/lb) or less
Softening products, not sold as *laundry detergent products* (An exception shall be made for products sold as sheets)	8.4 ml/kg (0.13 fl.oz./lb) or less.	4.5 ml/kg (0.07 fl.oz./lb) or less

**Products shall have a 2.7 kg (or 6 pound) normal/medium load size, unless rationale for an alternate load size is accepted by the certification program such as for hand washing *laundry detergent products*.

Other products do not have to meet concentration or compaction requirements.

3.24 *Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex C criteria.

3.25 *Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex D criteria.

3.26 *Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.

3.27 *Disposable Wipes. Products that are sold in a ready-to-use format may contain disposable wipes/towelettes/sheets or other disposable, single-use materials if they are made from agricultural products, wood pulp, and other cellulosic materials. An exception shall be made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

3.0 RESPONSIBLE SOURCING

3.1 *Disposable Wipes. Products that are sold in a ready-to-use format may contain disposable wipes/towelettes/sheets or other disposable, single-use materials if they are made from agricultural products, wood pulp, and other cellulosic materials. An exception shall be

made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

4.0 ~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~ LOW-IMPACT MANUFACTURING

4.1 *Social Responsibility. Documentation shall be provided that the production of the product meets the following social responsibility requirements:

4.1.1 ~~–~~Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected. An exception shall be made for inmate workers.

4.1.2 ~~–~~Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 ~~–~~Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union membership, political opinion, national extraction, or social origin such that it affects the opportunity or treatment in employment. There shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation, or exploitation.

4.1.4 ~~–~~Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 ~~–~~Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

5.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~ SUSTAINABLE PACKAGING

5.1 Packaging Materials

5.1.1 Primary Package. The *primary package* shall be one of the following:

- A *source-reduced primary package*
- *Recyclable*
- Contain 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 to at least two of the above approaches for a substantial majority of communities may be acceptable

~~**5.1.1 *Resin Identification Code.** If plastic, the *primary package* shall be marked with the appropriate Resin Identification Code.~~

5.1.2 Secondary package. Secondary packaging shall only be used for *concentrates*. An exception shall be made for packaging of multiple units when at least one of the units is a ready-to-use form, including but not limited to spray-dispenser bottles, and when total packaging (primary plus secondary) is a reduction in overall packaging material use.

5.1.3 *Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use *primary package* types.

5.1.4 Aerosol Packaging. Aerosol packaging shall meet the following:

- Manufacturers shall demonstrate that recycling programs for *aerosol packaging* are available to a substantial majority of communities where the product is sold
- Manufacturers shall provide documentation establishing why *aerosol packaging* is necessary for a given product addressing environmental, health, and performance considerations
- *Aerosol packaging* propellant shall meet all of the product-specific sustainability requirements in section 3.0 herein and shall not be a *hazardous air pollutant*
- For Section 3.3 Acute Toxicity herein, *aerosol packaging components* will be evaluated regardless of vapor pressure level
- The product contents from the nozzle to the point-of-delivery shall be in a form that does not contain any inhalable or respirable particles, such as but not limited to foams. If the product contents are delivered in particle form, the particles between 10-2.5 microns shall not comprise more than 1% of the total particles and no particles shall be below 2.5 microns

5.2 Packaging Label

5.2.1 *Resin Identification Code. If plastic, the *primary package* shall be marked with the appropriate Resin Identification Code.

5.3 Restricted Substances

5.3.1~~5~~ *Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced*. Further, the sum of the concentration levels of these metals shall not exceed 100 ppm; an exception is allowed for *primary packages* that would not exceed this maximum level but for the addition of *post-consumer material*.

5.3.2~~6~~ *Other Restrictions. Phthalates, bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced* to plastic packaging; 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*.

6.0 ~~USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance. Each product shall demonstrate that it performs its intended use effectively at the most dilute/least concentrated manufacturer-recommended dilution level for routine use. Concentrate products shall be diluted, as required, just prior to testing using unheated water from the tap. Performance tests shall be conducted as comparison tests against a benchmark product under the following test conditions:

Product	Wash Cycle Temperature	Rinse Cycle Temperature	Water Hardness
Benchmark Product	Set to the temperature specified by ASTM D4265 for the machine type being used[8]	Tap Cold[9]	Moderately hard water (120 – 150 ppm)‡ The calcium/ magnesium ratio of the hardness minerals (expressed as calcium carbonate) should be adjusted for different water hardness according to ASTM D4265[10]
Test Product	Cold water (68 +/- 5°F, 20 +/- 3°C)† or the lowest claimed effective temperature, if lower than cold water		

† Exception to Wash Cycle Temperature: For *antimicrobial pesticide products*, the Test Product shall be evaluated at the temperature needed for antimicrobial activity. If the antimicrobial activity does not contribute to other functions of this product, then the *cold water* temperature shall be used for testing those other purposes.

[8] ASTM D4265 Standard Guide for Evaluating Stain Removal Performance in Home Laundering. ASTM D4265 specifies these temperatures: Section 8.5.1: Conventional Deep-fill Top Loader—86 +/- 5°F (30 +/- 3°C) wash cycle, ambient rinse. Section 8.5.2: Front-loading HE—77 +/- 5°F (25 +/- 3°C) wash cycle, ambient rinse. Section 8.5.3: Top-loading HE—75 +/- 5°F (23.8+/- 3°C) wash cycle, ambient rinse.

[9] Tap cold temperature for Rinse is not meant to be controlled. Tap cold is equivalent to the water temperature entering the home or representative laboratory which is dependent on geography and time of year. The tap water temperature can vary globally in customer homes. This variation can have a wide range between 5 to 49ºC (40 to 120ºF).

[10] ASTM D4265, Section 8.2.1. Water Hardness Ranges, Calcium/Magnesium Ratio: 0 – 60 ppm, 4:1. 61 – 120 ppm, 3.1. 121 ppm and over, 2:1.

‡ **Exception to Water Hardness:** Where a manufacturer can demonstrate marketing is regional in an area of lower or higher water hardness, an alternate hardness range similar to the regional average shall be recommended to the certifying body for review on a case-by-case basis.

The following criteria include test methods that are applicable to some product categories, as specified below; for all other product categories, follow section 6.2, Alternative Performance Requirements. Products specifically addressed in section 6.1 may use an alternate test under section 6.2 as long as the relevant characteristics specified under 6.1.1, 6.1.2, and 6.1.3 are tested.

6.1.1 Laundry Detergent Performance. *Laundry detergent products* shall demonstrate performance equivalent to or better than a *benchmark product*. The *benchmark product* shall be the appropriate American Association of Textile Chemists and Colorists (AATCC) standard reference laundry detergent[11] or a national market-leading product in its category.

6.1.1.1 Cleaning. *Laundry detergent products* shall demonstrate general detergency and stain removal on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis, for a minimum of four of the following stains: tea, blueberry, grass, ballpoint pen ink, used motor oil, blood, wine, coffee, mustard, spaghetti sauce, gravy, makeup, chocolate syrup, grape juice, or a modified Spangler artificial sebum soil. Any stains marketed for use by the product shall be included in the four stains.

6.1.1.2 Color Care. *Laundry detergent products* shall demonstrate that they maintain color fastness of manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the procedure in ASTM D4265 or AATCC 124 (using machine washing and a 4- or 6-pound load size) by assessing color change after 5 wash cycles, with appropriate instrumental or visual analysis.

6.1.2 Stain and Spot Removal Performance.[12] *Stain removing products* and *bleaching products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category for removing stains on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis, for four of the following stains: tea, blueberry, grass, ballpoint pen ink, used motor oil, blood, wine, coffee, mustard, spaghetti sauce, gravy, makeup, chocolate syrup, grape juice, or a modified Spangler artificial sebum soil. Any stains marketed for use by the product shall be included in the four stains.

[11] Powder – 1993 AATCC Standard Reference Detergent WOB, at 66 g/test for a 4 lb load
Liquid – AATCC Standard Reference High Efficiency Detergent WOB at 50 mL/test for a 4 lb load, without optical brighteners

[12] This method is the same as 2.1.1.1 Cleaning for *laundry detergent products*, thus it does not need to be repeated for *laundry detergent products* that are also intended for stain and spot removal.

6.1.3 Softening Performance. *Softening products* shall demonstrate that they perform equivalent to or better than an appropriate *benchmark product* in their category on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the Household & Commercial Products Association (HCPA) DCC-13 series evaluating softness (13B), water absorbency (13D), and static control (13F, using one of described evaluation methods).

6.2 *Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs equivalent to or better than a nationally recognized or market-leading product of its type, compared at the most dilute/least concentrated manufacturer-recommended dilution level for routine use, using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. The requirements for test conditions in 6.1 shall apply, unless otherwise needed for antimicrobial activity for *antimicrobial pesticide products*. Test methodology and summarized results shall be documented in report format and provided to the certification program.

6.3 Product Label

6.3.1 Label Language.

6.3.1.1 Dilution for Concentrates. For *concentrates*, the manufacturer's label shall not instruct users to dilute with hot or warm water unless tested otherwise to meet the performance requirements in Section 62.0 herein~~,~~ and shall state the recommended level of dilution (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).

6.3.1.2 Dosing Directions. For products that are used with wash water,[13] the product label shall clearly and prominently provide directions for dosing normal loads, small loads or those with light soils, and large loads or those with heavy soils (e.g., state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).

6.3.1.2.1 Water Hardness Dosing. For products that are used with wash water,[13] the product label shall clearly and prominently provide recommended dosing requirements for the expected water hardness levels.

6.3.1.3 Use Directions. The product label shall clearly and prominently provide directions for use and any appropriate precautions or recommendations for the use of personal protective equipment.

6.3.1.3.1 Cold Water Wash Directions. For products that are used with wash water,[13] the product label shall clearly and prominently provide directions for using *cold water* wash temperatures or lower temperatures when possible; an

[13] Products that are used with wash water include *laundry detergent, softening, bleaching*, sour, and *laundry prewash products*.

exception shall be made for *antimicrobial pesticide products*, which should state the temperature needed for antimicrobial activity.

6.3.1.3.2 Full Loads. For products that are used with wash water,[13] the product label shall clearly and prominently provide the recommendation to run full loads of *laundry*.[14]

6.3.1.4 Disposal Directions. The product label shall clearly and prominently provide directions for applicable disposal, recycling, reuse, or refill instructions for the package.

6.3.2 *Ingredient Line. The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used.[15] Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.

6.3.2.1 *Consumer and User Communication. The product ingredient line shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.

6.3.3 Claims and Transparency

6.3.3.1~~2~~ *Antimicrobial Claims. Except for *antimicrobial pesticide products*, antimicrobial, antibacterial, *disinfecting*, or *sanitizing* product claims are prohibited.

6.3.3.1.~~2.~~1 Products Making Antimicrobial Claims. *Antimicrobial pesticide products* shall have label instructions that the product should only be used on fabric soils or *laundry* conditions that have been identified to be at risk for disease transmission or where required by regulation. Equivalent language may be approved by the certification program.

6.3.3.2 *Organic Claims. Organic claims shall only be based on *certified-organic component* content and shall be supported with documentation that they meet the U.S. Department of Agriculture (USDA) National Organic Program (NOP~~)~~), or programs determined to be equivalent by or have recognition agreements with the USDA NOP.

6.3.3.3~~4~~ *Natural and Biobased Claims. Only the following *natural* ~~and *biobased*~~and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

[14] If this recommendation is followed, it will reduce the environmental impact from doing laundry.
[15] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, HCPA Dictionary name, and or the common chemical name.

- "100 percent Natural", "All Natural", "100 percent Biobased", or "All Biobased" shall only contain *natural* or *biobased components*, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.
- Claims on specific product *components* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased component*

~~**6.5 *Ingredient Line. The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used.[16] Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.**~~

~~**6.5.1 *Consumer and User Communication. The product ingredient line shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.**~~

~~**6.5.2 *Fragrances. The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List,[17] or a subset of this list.**~~

6.3.3.4~~6~~ *Fragrance and Allergen Labeling. The product label shall declare if a *fragrance* has been added or if no *fragrance* has been added and shall also indicate any *allergen components* present in the product at 0.01% or more (e.g., "Contains allergen [*allergen's* INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.[15]

6.3.3.4.1 *Fragrances. The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively,

~~[16] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, HCPA Dictionary name, and or the common chemical name.~~
~~[17] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw~~

the company may provide a link to the IFRA Transparency List,[16] or a subset of this list.

Note: Additional Product Label Requirements
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex B.
For products containing *enzymes*, refer to Annex C.
For products containing *microorganisms*, refer to Annex D.

6.4 Product Design.

~~2~~6.4~~2~~.1~~2~~ **Concentration and Compaction.** The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled *laundry* of the *undiluted product* to be at the following levels:

Product	Concentrated**	Ultra-Concentrated
Liquid *laundry detergent products*	16.2 ml/kg (0.25 fl.oz./lb) or less	8.1 ml/kg (0.125 fl.oz./lb) or less
Solid/Powder *laundry detergent products.* (An exception shall be made for products sold as sheets)	13.7 g/kg (0.22 oz/lb) or less.	5.0 g/kg (0.08 oz/lb) or less
Softening products, not sold as *laundry detergent products* (An exception shall be made for products sold as sheets)	8.4 ml/kg (0.13 fl.oz./lb) or less.	4.5 ml/kg (0.07 fl.oz./lb) or less

**Products shall have a 2.7 kg (or 6 pound) normal/medium load size, unless rationale for an alternate load size is accepted by the certification program such as for hand washing *laundry detergent products*.

Other products do not have to meet concentration or compaction requirements.

7.0 TRADEMARK USE REQUIREMENTS

7.1 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.[17]

7.2 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.

[16] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw
[17] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard

Aerosol Packaging. A *primary package* that requires a pressurized propellant to dispense product through a nozzle.

Allergen. Allergenic substances included in Annex III of the European Union Regulation 1223/2009 on Cosmetic Products, 30 November 2009, and those listed by the FDA (including food allergens Food Allergen Labeling and Consumer Protection Act of 2004 (Public Law 108-282, Title II).

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Antimicrobial Pesticide Product. A product intended for and capable of *disinfecting*, *sanitizing*, reducing, or mitigating growth or development of *microorganisms* and protecting inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Anti-Static Product. A product that is intended to eliminate, prevent, or inhibit the accumulation of static electricity.

Asthmagen. A substance designated as an *asthma*-causing agent as specifically listed by Chemical Abstracts Service (CAS) number by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC has met the AOEC sensitization criteria (i.e., A with Rs or Rrs), or if classified as a *respiratory sensitizer*, and with a probable/plausible route of inhalation exposure.

Benchmark Product. A product used for comparison in performance testing; for the purposes of this standard either a *reference product* could be used, or else a national market-leading product, typically selected from the top three or four selling brands or companies for its category from nation-wide data.[18]

Biobased. The content of a product that is from biological products, forestry, or agricultural materials (including plant, animal, and marine materials)**.**

Bleaching Product. A product that is intended to clean and remove stains from textiles and fabric by either oxidatively or reductively modifying the stain such that it becomes more water soluble and easier to remove, or by decolorizing the stain such that it is no longer visible.

[18] It is suggested that manufacturers discuss their product testing with Green Seal before the testing is performed to ensure that the choice of comparison product(s) is appropriate.

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human *carcinogen* by any of the following agencies or programs: International Agency for Research on Cancer (Groups 1, 2A, and 2B); National Toxicology Program (Groups 1 and 2); EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (as *carcinogens* under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); or under the GHS (hazard categories 1 (H350, may cause cancer) and 2 (H351, suspected of causing cancer)).

Certified-Organic Components. A *component* certified as organic (by meeting the USDA organic standards) by a USDA-accredited certifying agent, or by programs determined to be equivalent or have recognition agreements with the USDA National Organic Program (NOP).

Child Labor. Work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. To avoid child labor the International Labour Organization provides the following instruments: Minimum Age Convention (e.g., a minimum age not less than 15 for standard work and 18 for hazardous work) and the Worst Forms of Child Labour Convention.

Child-Resistant Packaging. As defined by the Poison Prevention Packaging Act: packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly. This does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Closed Dilution-Control System. Systems that control the dilution of a product so that the *undiluted product* cannot be practically accessed by users.

Cold Water. For the purposes of this standard this refers to wash water temperatures of 68°F +/- 5°F (20ºC +/- 3°C) for *household use*.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality, or a contaminant that was not deliberately added but is present in the product at least at 0.01% by weight.[19]

[19] This definition excludes substances that are intentionally added to a raw material but not intended for their continued presence in the final product. Examples include residual monomers, preservatives, anti-caking agents, and raw material byproducts or contaminants. Naturally occurring elements and chlorinated organics that may be present

Concentrate. A product that must be diluted by water prior to its intended use (e.g., a *laundry detergent product* that must be diluted before putting into a washing machine).

Disinfecting. Destroying or irreversibly inactivating infectious *microorganism*s but not necessarily their spores on inanimate objects or surfaces.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

Fabric Protectant. A product intended to be applied to textile or fabric substrates to protect the surface from soiling or to reduce absorption of liquid into the fabric's fibers. This does not include flame retardant or waterproofing products.

Fabric Refresher. A product intended to neutralize or eliminate odors on non-laundered textiles or fabric. This does not include *anti-static products*, *spot removers*, or *antimicrobial pesticide products*.

Fabric Softener - Single Use Dryer Product. A product intended for single use in the dryer to impart softness to, or control static cling of, a load of washable fabrics. For the purpose of this definition, "single use" means a product that is intended for one-time use during a single drying cycle and is removed after completion of the drying cycle. This does not include products applied to washable fabrics prior to placing the washable fabrics in the clothes dryer.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which GMM are produced are listed by the European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Halogenated Organic Solvents. An organic solvent containing halogens, including, but not limited to, fluorine, chlorine, bromine, astatine, and iodine.

Hazardous Air Pollutant. A substance listed by the EPA in the Clean Air Act Section 112(b)(1) as a hazardous air pollutant.

Household Use. Use of products that are typically sold to consumers (usually through retail outlets such as stores or online sites) for their own personal use rather than for professional/*institutional use*. This typically includes, but is not limited to, cleaning and treating their personal property.

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as a result of chlorination of the water supply, are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Institutional Use. Use of products that are typically sold to cleaning professionals for cleaning in commercial or institutional facilities. This typically includes, but is not limited to, cleaning for government agencies, factories, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, transportation companies, hospitals, schools, libraries, auditoriums, office complexes, and similar properties where any resident's personal property is typically cleaned/treated by professionals (e.g., in-house or contract service providers rather than when the residents are responsible for cleaning tasks). This is typically referred to as commercial or professional use.

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.

Laundry. Textile and fabric materials that require removal of soils or stains or require freshening or treatment (e.g., anti-static, anti-wrinkle, protectant, starch) for use. For the purposes of this standard, this does not include furniture or carpet.

Laundry Detergent Product. A product intended for use in *laundry* washing machines or for hand-laundering to enhance the cleansing action of water for textile and fabric substrates. These products are usually based on *surfactants* and builders and may be combined with additional functions like bleaching or softening and may include *biobased* detergents.

Laundry Prewash. A product that is intended for application to a textile or fabric prior to laundering in a wet-cleaning process, and that supplements and contributes to the effectiveness of *laundry detergent products* and/or provides specialized performance.

Laundry Starch/Sizing/Fabric Finish Product. A product that is intended for application to a textile or fabric, either during or after laundering, to impart and prolong a crisp, fresh look and may also act to help ease ironing of the fabric.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

Minimum Risk Pesticide. A special class of *antimicrobial pesticide products* that are not subject to federal registration requirements through the EPA because they meet specific requirements under section 25(b) of FIFRA, including, but not limited to, that the *components*, both active and inert, are demonstrably safe for the intended use.

Mutagen. A substance designated as known to induce, be regarded as if they induce, or which cause concern for humans owing to the possibility that they may induce heritable mutations in the germ cells of humans and thus meet the criteria for germ cell mutagenicity hazard categories 1 and 2 (H340 and 341) under the GHS.

Natural Component. A *component* that comes from materials found in nature including mineral, forestry, agricultural, or biological materials such as, but not limited to, animal products produced by the animal but not part of the animal; do not contain petroleum or petroleum-derived compounds; do not contain transgenic hybrid organisms (inserted deoxyribonucleic acid that originated in a different species); have been processed without irradiation; and are not chemically altered.

~~Naturally-Derived~~Naturally Derived **Component.** A *component* that is partially chemically altered without petroleum *components* and have been minimally processed such that they not be altered to such an extent that they are substantially less biodegradable or more toxic (examples of potentially acceptable processes are included in Appendix 2).

Neurotoxin/Systemic Toxin. A substance designated as producing a specific target organ toxicity arising from either single exposure or repeated exposure and meets the criteria for hazard categories 1 or 2 (H370, H371, H372, H373) under the GHS.

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents**.**

Organic Compound. Any member of a large class of chemical compounds whose molecules contain carbon, with the exception of carbides, carbonates, cyanides, ~~diamond~~diamond, and graphite.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (~~ChloroflourocarbonChlorofluorocarbon~~ - CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances, or any substances or mixtures falling into category 1 (H420), hazardous to the ozone layer, under the GHS.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar

soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Primary Cleaning Function. For the purposes of this standard, the *primary cleaning function* of a product is to remove soil.

Primary Package. Package material that physically contains and contacts the product, not including the cap or lid. For products that meet ~~the annex~~Annex B 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 contents, but does not include the protective packaging or wrap.

Product As Used. For products used with wash water it is the dilution of the product at a rate of 25 liters of wash water per kg (3 gallons per lb) of *laundry* washed.[20] For products that are not used with wash water it is the most concentrated form of the product that the manufacturer recommends for a product's intended use.

Recyclable. The package can be collected in a substantial majority of communities, ~~separated~~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.

Reference Product. A standardized product formula that was developed through a consensus-based process.

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

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65); or a substance designated as Category 1 (H360), known or presumed reproductive toxicant, or Category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the GHS.

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 *respiratory sensitization* (H334), in accordance with the GHS.

Sanitizing. Reducing, but not necessarily eliminating, *microorganisms* from the inanimate environment to levels considered safe as determined by public health codes or regulations.

[20] Products for use initially with wash water include *laundry detergent, softening, bleaching*, sour, and *laundry prewash products*.

Secondary Function. For the purposes of this standard, the secondary function of a product may be to enhance the *primary cleaning function* through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

Secondary Packaging. Packaging used to contain *primary package/s* and typically used for merchandizing. This does not include case or shipping packaging or the *primary package*, cap, or lid.

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.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under Category 1 for skin sensitization (H317) under the GHS.

Spot Remover. A product intended to clean localized areas or remove localized spots or stains on textiles or fabric. These products may or may not require subsequent laundering to achieve stain removal. This standard does not include carpet spot removers.

Softening Product. A product used to make fabric softer and prevent static. This may be a standalone product or a combination product (e.g., detergent plus softener product).

Source-Reduced Package. A *primary 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 *primary packages*, the box is included in the weight if the box is used during product use or in product merchandising.

Spray Packaging. A *primary package* that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a foam or liquid stream are not considered spray packaging.

Stain Removing Product. A product that is intended to remove stains from textiles and fabric. This includes, but is not limited to, products making stain removing claims, *laundry detergent products*, *spot removers*, *bleaching products*, and combination products.

Surfactant. A compound that reduces interfacial tension between two liquids or a liquid and a solid. This includes detergents, wetting agents, and emulsifiers.

Synthetic Component. A *component* created artificially rather than naturally or from *natural components*. For the purposes of this standard, ~~*naturally-derived*~~*naturally derived components* are not considered synthetic *components*.

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

Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals. The chemicals listed by the EPA on the Toxic Release Inventory as Persistent, Bioaccumulative and Toxic (PBT) Chemicals.

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

World Health Organization (WHO) Risk Group 1. *Microorganisms* that are unlikely to cause human or animal disease under the basis for classification defined by the WHO in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health
- European Commission
- Singapore
- Japan

ANNEX B – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (2.1.193.4) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (2.2.133.3) herein.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye damage.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word “WARNING” or ‘CAUTION” on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
  - May cause skin corrosion, do not get on skin
  - May cause serious eye damage, do not get in eyes
  - Harmful if swallowed, do not ingest
- Instruction, when necessary or appropriate, for first-aid treatment
- The statement “KEEP OUT OF REACH OF CHILDREN” or its practical equivalent in capitalized text

ANNEX C – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15 mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in section Annex D herein.

D. Exemptions. *Enzymes* are exempted from the requirements for *Asthmagens* (~~3.8~~2.1.3) and *Respiratory Sensitization* (~~3.9~~2.1.17) herein. Titanium dioxide[21] is exempt from the prohibition on *carcinogens* (~~3.5~~2.1.5 herein) when it is present only due to the use of *enzymes.* For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product matrix or bonded to other *ingredients*.

E. Labeling Requirements. Products containing *enzymes* shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line
- A statement that "This product contains material that may cause or aggravate asthma." and instruction, when necessary or appropriate, for follow-up treatment

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzyme/s* and worker illness/sensitization due to the *enzyme/s*. An example of best practices that may be applicable for this plan is available at AISE.

[21] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

ANNEX D – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following with any specified testing conducted with an objective, scientifically validated method under controlled and reproducible laboratory conditions (appropriate testing details shall be provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as *components* in finished products is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, ~~tetracycline~~tetracycline, and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby-Bauer disk method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the *undiluted product* shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count

shall be conducted in accordance with the methods for microbiological analyses listed in the JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the *undiluted product*.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms*. An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold for use in *spray packaging*,[22] the product label shall include a statement that the product should not be sprayed into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*[23] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- ~~Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.~~
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[24]

[22] Or designed for use in *spray packaging*
[23] Or designed for use in *spray packaging*
[24] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of *household use* products included in or excluded from the scope of GS-48:

Products Included

- *Anti-static products*
- Anti-wrinkle products
- *Antimicrobial pesticide products* for *laundry* care
- *Biobased* detergents (e.g. soap nuts)
- *Bleaching products*
- *Fabric protectant* products
- *Fabric refreshers*
- *Fabric softener-single use dryer product*
- *Laundry* additives (e.g., *bleaching and softening products*)
- *Laundry detergent products* (and combination products)
- *Laundry detergent products* sold in Laundromat dispensers
- *Laundry prewash* products
- *Laundry starch/sizing/fabric finish products*
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*
- *Softening products*
- Spot removing products (for *laundry*)
- *Stain removing products*

Products Excluded

- Commercial and *institutional use laundry* products (e.g., those used in dry cleaning facilities) (included in GS-51)
- Home-style detergents used in a home-style machine in the industrial and institutional market (e.g., those used in a nursing home or with automated product dispensers) (included in GS-51)
- Air fresheners (designed to mask odor)
- Cleaning products for *laundry* machines for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- Fabric impregnating treatments such as flame retardants or waterproofing
- Floor finish and finish strippers (included in GS-40)
- Footwear care products
- General-purpose, bathroom, glass, and carpet cleaner products marketed specifically for *industrial and institutional use* (included in GS-37) and *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)
- *Laundry* and washing machines
- Leather care products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- Ozone generation and use
- Products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*
- Solvents used in dry cleaning operations
- Specialty cleaning products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- Upholstery cleaning and maintenance products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)

APPENDIX 2 – PROCESSING METHODS OF NATURALLY-DERIVED COMPONENTS – (Informative)

Examples of Potentially Acceptable Processing Methods of ~~*Naturally-Derived*~~*Naturally Derived Components* (which must also meet all the requirements in the standard):

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponification (to produce soap)

GS-50

GREEN SEAL® STANDARD FOR

PERSONAL CARE AND COSMETIC PRODUCTS

EDITION 1.3

(New Format)

June 23, 2022

Green Seal, Inc. • www.greenseal.org

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 lifecycle of products, services, and companies. The standards may be used for conformity assessment, purchaser specifications, and public education.

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GREEN SEAL STANDARD FOR PERSONAL CARE AND COSMETIC PRODUCTS, GS-50

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FOREWORD

Edition. Edition 1.3 was issued on June 23, 2022. It replaces Edition 1.2 from April 8, 2020. Corrections and/or clarifications to this edition were last made on August 23, 2024~~July 26, 2024~~. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section20

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
ANSI. American National Standards Institute
AOEC. Association of Occupational and Environmental Clinics
BCF. Bioconcentration Factor
BOD. Biochemical oxygen demand, also known as Biological Oxygen Demand
BTU. British thermal unit
CFC. Chlorofluorocarbon
CFR. Code of Federal Regulations
CO_2. Carbon dioxide
DFG. German ~~Deutche~~Deustche Forschungsgemeinschaft
EPA. United States Environmental Protection Agency
FD&C. Food, Drug, and Cosmetic
FDA. The United States Food and Drug Administration
GHS. Globally Harmonized System for the Classification and Labeling of Chemicals
INCI. International Nomenclature of Cosmetic Ingredients
ISO. International Organization for Standardization
LLNA. Local Lymph Node Assay
LOAEL. Lowest-Observed Adverse Effect Level
MAK. Maximum Allowable Concentrations
NOAEL. No-Observed Adverse Effect Level
NSF. NSF International
OECD. Organization for Economic Co-operation and Development
OPPTS. Office of Prevention, Pesticides and Toxic Substances
OTC. Over The Counter
PPM. Parts per million
SPF. Sun Protection Factor
ThOD. Theoretical oxygen demand
TLV. Threshold Limit Value
USDA. United States Department of Agriculture
UVA. Ultraviolet A rays/radiation
UVB. Ultraviolet B rays/radiation
VOC. Volatile Organic Compound

GREEN SEAL STANDARD FOR PERSONAL CARE AND COSMETIC PRODUCTS, GS-50

1.0 SCOPE

This standard establishes environmental, health, and social requirements for products that are intended to enhance the appearance, cleanliness, health/well-being, and feel of the body and hair and may provide other personal care and hygiene functions. These products are left on the body and hair and include, but are not limited to: *lotions*, *hair spray*, *hair styling products*, *sunscreen*, *nail polish*, *insect repellant*, *makeup*, *antiperspirant*, and *deodorant*. The products are intended for use by adults, babies, and children for personal use or for institutional and professional use. See Appendix 1 for an example list of products included in this standard.

This standard excludes *fragrance products* (e.g., perfumes, colognes, body sprays), tattoo products, hair dye and hair permanent or relaxer products, oral hygiene products (e.g., mouthwash, toothpaste), or products intended to be rinsed off (e.g., soap, shampoo)[2].

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 Product Performance.** The product shall demonstrate satisfactory performance for the *primary product characteristics* (see Appendix 2 for examples) following the Guidelines for Performance Testing in Annex B.~~

~~**2.2 Antiperspirant.** The *antiperspirant* product shall demonstrate at least a 20% reduction in sweat according to the United States Food and Drug Administration (FDA) Guidelines for Effectiveness Testing of Over-the-Counter (OTC) Antiperspirant Drug Products and meet 2.1 herein for additional *primary product characteristics*.~~

~~**2.3 Insect Repellent.** The product shall include *active components* that are registered with the United States Environmental Protection Agency (EPA) for use as an *insect repellent* on skin or clothing. Note that EPA may specify use levels or *packaging* types for registered *components*. Alternatively, *minimum risk pesticide* based products shall demonstrate that they meet the guidance in the EPA Office of Prevention, Pesticides and Toxic Substances (OPPTS) 810.3700 Insect Repellents for Human Skin and Outdoor Premise.~~

~~**2.4 Sunscreen.**~~

[2] Personal care products that are rinsed off are covered under the Green Seal Standard for Soaps, Cleansers, and Shower Products, GS-44.

~~**2.4.1 Sun Protection Factor (SPF).** *Sunscreen* products shall achieve an SPF rating of 15 or higher tested according to 21 Code of Federal Regulations (CFR) 352 for *sunscreens*.~~

~~**2.4.2 Broad Spectrum.** *Sunscreen* products shall be tested according to the European Commission Recommendation of 22 September 2006 on the Efficacy of Sunscreen Products and the Claims Made Relating Thereto for *ultraviolet A (UVA)* protection achieving at least 1/3 of the SPF and at least 370 nm for the critical wavelength.~~

~~**2.4.3 Photostability.** *Sunscreen* products shall be tested for *photostability* using an objective, scientifically-validated method conducted under controlled and reproducible conditions to measure sun protection from *UVA* and *UVB* radiation exposure that is representative of a sunny, mid-summer day at noon at sea level and up to 55º North latitude. The sun protection of the product after at least 120 minutes of radiation exposure shall be at least 80% of the sun protection before radiation exposure.~~

23.0 ~~PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS~~SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Aquatic Biodegradability. Each of the individual *organic compounds* at 0.01% or more in the *product as rinsed-off* shall exhibit ready biodegradability in accordance with the OECD definition, expect for polymers, chelating agents, and colorants. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the *organic compounds* 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_2 evolution, as % of theoretical CO_2 > 60%

Testing is not required when sufficient information exists. Per OECD guidance the 10-day window requirement does not apply to structurally-related surfactant homologues. For *organic compounds* at 0.01% or more in the *product as used* 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 DOC removal > 90%.

An exception shall be made for *organic compounds* that do not exhibit ready biodegradability, if the compound has low aquatic toxicity (acute LC50 ≥ 100 mg/L for

algae, daphnia, and/or fish) and exhibits inherent biodegradability per ISO test methods 9887 or 9888 or OECD 302A-C.

2.1.2 Bioaccumulating Compounds. The *product as rinsed-off* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, ~~3.15~~2.1.1 herein, it may be considered to not bioaccumulate.

2.1.3 Biocides. The use of *biocides* for purposes other than preservation of the product is not allowed. Documentation and testing results shall be provided to demonstrate the dosage necessary to preserve the product. An exception shall be made for *deodorant* and *antiperspirant* products such that they are permitted to include *biocides* for purposes other than preservation.

2.1.4 Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The product shall not contain any *components* known to produce or release *carcinogens* or *reproductive toxins*. An exception shall be made for titanium dioxide. An exception shall also be made for essential vitamins and minerals, which shall not exceed the lowest *tolerable upper limit* in the product.

2.1.5 Colorants. *Colorants* are prohibited. An exception shall be made for *makeup*, *nail polish*, and *sunless tanning products*.

2.1.6 Components That Cause Asthma. The *undiluted product* shall not contain any *components* that have been identified as *asthmagens*. An exception shall be made for zinc oxide.

2.1.7 Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

2.1.8 Formula Disclosure for Certification. For certification to this standard, all of the formula *components* shall be disclosed to the certifying body including the chemical name, the Chemical Abstracts Service registry number, and the levels (% by weight) of each *component* in the formula.

2.1.9 Fragrances. All *fragrance components* shall have been produced and handled following the code of practice of the International Fragrance Association (IFRA).

2.1.10 Makeup and Nail Polish Lead Contamination Limits. The lead content of *undiluted makeup* and *nail polish products* shall not exceed 0.05 parts per million (ppm).

2.1.11 Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*. An exception shall be made for essential vitamins and minerals, which shall not exceed the lowest *tolerable upper limit* in the product.

2.1.12 Nanoscale Components. The use of *nanoscale components* shall only be permitted when the European Commission Scientific Committee on Consumer Safety (formerly known as the Scientific Committee for Consumer Products) provides an opinion that allows for their safe use for products included in the scope of this standard. If the opinion allows for the safe use of *nanoscale components*, then the product label shall indicate that the *component* is "nanoscale" or "nanoparticle" on the ingredient line.

2.1.13 Ozone Depleting Compounds. The *undiluted product* shall not contain any *components* that are *ozone-depleting compounds*.

2.1.14 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

2.1.15 Prohibited Components. The *undiluted product* shall not contain any of the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Benzophenone and its derivatives
- Bisphenol A
- Butylated hydroxytoluene
- Ethoxylated chemicals
- Ethylene-diamine-tetra-acetic acid or any of its salts
- Formaldehyde donors
- *Halogenated organic solvents*
- *Hazardous air pollutants*
- Heavy metals including, lead, hexavalent chromium, or selenium both in the elemental form or compounds
- Methyldibromo glutaronitrile
- Mercury-containing compounds
- Mineral oils
- Monoethanolamine, Diethanolamine, and Triethanolamine alone or in compounds
- Nitrilotriacetic acid
- Nitro-musks
- *Optical brighteners*
- Parabens
- Paraffin wax
- Petrolatum
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals

- Triclosan

2.1.16 Respiratory Sensitization. The *undiluted product* shall not contain any *components* that have been identified as *respiratory sensitizers*.

2.1.17 Skin Absorption. The *undiluted product* shall not contain *components* present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) carrying a skin notation, or substances that are listed on the German Deustche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.18 Skin and Eye Corrosion and Irritation.

2.1.18.1 Skin and Eye Corrosion. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If the *components* at 0.01% or more in the *undiluted product* are not shown to cause *skin corrosion* or *serious eye damage* at the concentrations used, then the product will not be considered to cause *skin corrosion* or *serious eye damage*, unless the product is required to be labeled as such. Further, a product is considered to cause *skin corrosion* or to cause *serious eye damage* if it has a pH of 2 or less or a pH of 11.5 or greater, unless data prove otherwise.

2.1.18.2 Skin Irritation. The *undiluted product* shall not cause *skin irritation*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 5% or more in the *undiluted product*. If the *components* at 5% or more in the *undiluted product* are not shown to cause *skin irritation* at the concentrations used, then the product will not be considered to cause *skin irritation*.

2.1.19 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If the *components* at 0.01% or more in the *undiluted product* are not shown to be *skin sensitizers* at the concentrations used, then the product will not be considered to be a *skin sensitizer*.

2.2 Safer Products

2.2.1 Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply[3]:

Oral lethal dose (LD_{50})	< 5,000 mg/kg
Inhalation lethal concentration (LC_{50}) (dusts, mists and vapours)	< 200 mg/L at 1 hr
Inhalation lethal concentration (LC_{50}) (gases)	< 20,000 ppmV at 1 hr
Dermal lethal dose (LD_{50})	< 2,000 mg/kg

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* at 0.01% or more in the *undiluted product* will be used. This data is used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

2.2.2 Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.2% by weight.

2.2.3 Toxicity to Aquatic Life. The *product as rinsed-off* shall not be toxic to aquatic life. A product is considered not toxic to aquatic life if[4]:

Acute LC_{50} for fish, daphnia, and/or algae	≥100 mg/L

For purposes of demonstrating compliance with this requirement, data for each of the product's *components* at 0.01% or more in the *product as rinsed-off* can be used to calculate a weighted average (as in section 2.2.1). The preferred sources of data come from the following appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

[3] Products meeting the requirements in 2.2.1 will not fall into hazard categories 1 through 5 for acute oral and dermal toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the Globally Harmonized System for the Classification and Labeling of Chemicals (*GHS*) when the whole product is evaluated using the weighted average approach described.

[4] Products meeting the above will not fall into in categories 1, 2 or 3 for acute (short-term) hazards to the aquatic environment (H400, 401, and 402) under the *GHS*.

2.2.4 Chronic Aquatic Toxicity. The *product as rinsed-off* shall not contain any components at 0.01% or more that have *chronic aquatic toxicity*. The preferred sources of data are from OECD TG 210 for fish, OECD TG 211 for daphnia, or OECD TG 201 for algae. If adequate *chronic aquatic toxicity* data is not available, the guidance in *GHS* shall be followed for classification of the chemical.

2.2.5 Volatile Organic Compound (VOC) Content.

2.2.5.1 Total VOC Content. The *undiluted product* shall contain no more than current VOC regulatory limits of the Air Resources Board for the State of California (CARB) or the following VOC content (% by weight), whichever is more stringent:

Products	VOC Content (% by weight)
Astringent/toner	35%
Hair spray, *hair shine*, and *insect repellent*	55%
Hair styling products not sold in *pump spray packaging*	2%
Hair styling products sold in *pump spray packaging*	5%
Nail polish	75%
All other products	1%

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

- By summing the percent by weight contribution from all organic *components* of the product that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components*[5].

2.2.5.2 High and Medium Volatility Organic Compound Content. *Antiperspirant* and *deodorant undiluted products* shall meet the CARB Regulation for Reducing Volatile Organic Compound Emissions from Antiperspirants and Deodorants, specifically those regulations pertaining to *high and medium VOCs* and including the exceptions provided in the regulations.

2.2.6 Sunscreen.

[5] Evaluation of total VOCs in this standard includes all *fragrances* and all organic compounds present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.

2.2.6.1 Enhanced Sensitivity to UV. *Sunscreen* products shall not contain *components* that are known to enhance the skin's sensitivity to UV radiation including, but not limited to, *alpha hydroxy acids* and *retinoids*.

2.2.6.2 Product Form. *Sunscreen* products shall not be sold as powders or in *pump spray packages*.

2.2.7 Insect Repellent. *Insect repellent* shall not be combined into *sunscreen* products (or vice versa).

2.2.8 Animal Testing. Animal testing of the product or its *components* in order to meet the provisions in the standard is prohibited.

To avoid new animal testing, existing data from previous testing will be accepted as evidence of meeting a criterion, preferably tests following the methods accepted 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, 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, applicable, and the manufacturer provides rationale for the particular method.

~~**3.1 Formula Disclosure for Certification.** For certification to this standard, all of the formula *components* shall be disclosed to the certifying body including the chemical name, the Chemical Abstracts Service registry number, and the levels (% by weight) of each *component* in the formula.~~

~~**3.2 Animal Testing.** Animal testing of the product or its *components* in order to meet the provisions in the standard is prohibited.~~

~~To avoid new animal testing, existing data from previous testing will be accepted as evidence of meeting a criterion, preferably tests following the methods accepted 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, 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, applicable, and the manufacturer provides rationale for the particular method.~~

~~**3.3 Acute Toxicity.** The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply[6]:~~

~~Oral lethal dose (LD_{50}) ≤ 5,000 mg/kg~~
~~Inhalation lethal concentration (LC_{50}) ≤ 200 mg/L at 1 hr~~

~~[6] Products meeting the requirements in 3.3 will not fall into hazard categories 1 through 5 for acute oral and dermal toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the Globally Harmonized System for the Classification and Labeling of Chemicals (*GHS*) when the whole product is evaluated using the weighted average approach described.~~

(dusts, mists and vapours)
Inhalation lethal concentration (LC_{50}) ≤ 20,000 ppmV at 1 hr
(gases)
Dermal lethal dose (LD_{50}) ≤ 2,000 mg/kg

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* at 0.01% or more in the *undiluted product* will be used. This data is used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

3.4 Skin and Eye Corrosion and Irritation.

3.4.1 Skin and Eye Corrosion. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If the *components* at 0.01% or more in the *undiluted product* are not shown to cause *skin corrosion* or *serious eye damage* at the concentrations used, then the product will not be considered to cause *skin corrosion* or *serious eye damage*, unless the product is required to be labeled as such. Further, a product is considered to cause *skin corrosion* or to cause *serious eye damage* if it has a pH of 2 or less or a pH of 11.5 or greater, unless data prove otherwise.

3.4.2 Skin Irritation. The *undiluted product* shall not cause *skin irritation*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 5% or more in the *undiluted product*. If the *components* at 5% or more in the *undiluted product* are not shown to cause *skin irritation* at the concentrations used, then the product will not be considered to cause *skin irritation*.

3.5 Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The product shall not contain any *components* known to produce or release *carcinogens* or *reproductive toxins*. An exception shall

be made for titanium dioxide. An exception shall also be made for essential vitamins and minerals, which shall not exceed the lowest *tolerable upper limit* in the product.

3.6 Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*. An exception shall be made for essential vitamins and minerals, which shall not exceed the lowest *tolerable upper limit* in the product.

3.7 Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 – Endocrine Disruptor Screening Program Test Guidelines.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.9 Components That Cause Asthma. The *undiluted product* shall not contain any *components* that have been identified as *asthmagens*. An exception shall be made for zinc oxide.

3.10 Respiratory Sensitization. The *undiluted product* shall not contain any *components* that have been identified as *respiratory sensitizers*.

3.11 Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If the *components* at 0.01% or more in the *undiluted product* are not shown to be *skin sensitizers* at the concentrations used, then the product will not be considered to be a *skin sensitizer*.

3.12 Skin Absorption. The *undiluted product* shall not contain *components* present at greater than or equal to 1% in the product, that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) carrying a skin notation, or substances that are listed on the German Deutche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

3.13 Ozone Depleting Compounds. The *undiluted product* shall not contain any *components* that are *ozone-depleting compounds*.

3.14 Volatile Organic Compound (VOC) Content.

3.14.1 Total VOC Content. The *undiluted product* shall contain no more than current VOC regulatory limits of the Air Resources Board for the State of California (CARB) or the following VOC content (% by weight), whichever is more stringent:

Products	VOC Content (% by weight)
Astringent/toner	35%
Hair spray, *hair shine*, and *insect repellent*	55%
Hair styling products not sold in *pump spray packaging*	2%
Hair styling products sold in *pump spray packaging*	5%
Nail polish	75%
All other products	1%

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

- By summing the percent by weight contribution from all organic *components* of the product that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components*[7].

3.14.2 High and Medium Volatility Organic Compound Content. *Antiperspirant* and *deodorant undiluted products* shall meet the CARB Regulation for Reducing Volatile Organic Compound Emissions from Antiperspirants and Deodorants, specifically those regulations pertaining to *high and medium VOCs* and including the exceptions provided in the regulations.

3.15 Toxicity to Aquatic Life. The *product as rinsed-off* shall not be toxic to aquatic life. A product is considered not toxic to aquatic life if[8]:

Acute LC_{50} for fish, daphnia, and/or algae ≥100 mg/L

For purposes of demonstrating compliance with this requirement, data for each of the product's *components* at 0.01% or more in the *product as rinsed-off* can be used to calculate a weighted average (as in section 3.3). The preferred sources of data come from the following appropriate protocols in International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

3.16 Aquatic Biodegradability. Each of the individual *organic compounds* at 0.01% or more in the *product as rinsed-off* shall exhibit ready biodegradability in accordance

[7] Evaluation of total VOCs in this standard includes all *fragrances* and all organic compounds present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.

[8] Products meeting the above will not fall into in categories 1, 2 or 3 for acute (short-term) hazards to the aquatic environment (H400, 401, and 402) under the *GHS*.

with the OECD definition, expect for polymers, chelating agents, and colorants. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the *organic compounds* 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_2 evolution, as % of theoretical CO_2 > 60%

Testing is not required when sufficient information exists. Per OECD guidance the 10-day window requirement does not apply to structurally-related surfactant homologues. For *organic compounds* at 0.01% or more in the *product as used* 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 DOC removal > 90%.

An exception shall be made for *organic compounds* that do not exhibit ready biodegradability, if the compound has low aquatic toxicity (acute LC50 ≥ 100 mg/L for algae, daphnia, and/or fish) and exhibits inherent biodegradability per ISO test methods 9887 or 9888 or OECD 302A-C.

3.17 Bioaccumulating Compounds. The *product as rinsed-off* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.15 herein, it may be considered to not bioaccumulate.

3.18 Chronic Aquatic Toxicity. The *product as rinsed-off* shall not contain any components at 0.01% or more that have *chronic aquatic toxicity*. The preferred sources of data are from OECD TG 210 for fish, OECD TG 211 for daphnia, or OECD TG 201 for algae. If adequate *chronic aquatic toxicity* data is not available, the guidance in *GHS* shall be followed for classification of the chemical.

3.19 Eutrophication. The *undiluted product* shall not contain phosphorus at more than 0.2% by weight.

3.20 Prohibited Components. The *undiluted product* shall not contain any of the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Benzophenone and its derivatives
- Bisphenol A

- ~~Butylated hydroxytoluene~~
- ~~Ethoxylated chemicals~~
- ~~Ethylene-diamine-tetra-acetic acid or any of its salts~~
- ~~Formaldehyde donors~~
- ~~*Halogenated organic solvents*~~
- ~~*Hazardous air pollutants*~~
- ~~Heavy metals including, lead, hexavalent chromium, or selenium both in the elemental form or compounds~~
- ~~Methyldibromo glutaronitrile~~
- ~~Mercury-containing compounds~~
- ~~Mineral oils~~
- ~~Monoethanolamine, Diethanolamine, and Triethanolamine alone or in compounds~~
- ~~Nitrilotriacetic acid~~
- ~~Nitro-musks~~
- ~~*Optical brighteners*~~
- ~~Parabens~~
- ~~Paraffin wax~~
- ~~Petrolatum~~
- ~~Phthalates~~
- ~~Polycyclic musks~~
- ~~Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals~~
- ~~Triclosan~~

~~**3.21 Makeup and Nail Polish Lead Contamination Limits.** The lead content of *undiluted makeup* and *nail polish products* shall not exceed 0.05 parts per million (ppm).~~

~~**3.22 Sunscreen.**~~

~~**3.22.1 Enhanced Sensitivity to UV.** *Sunscreen* products shall not contain *components* that are known to enhance the skin's sensitivity to UV radiation including, but not limited to, *alpha hydroxy acids* and *retinoids*.~~

~~**3.22.2 Product Form.** *Sunscreen* products shall not be sold as powders or in *pump spray packages*.~~

~~**3.23 Insect Repellent.** *Insect repellent* shall not be combined into *sunscreen* products (or vice versa).~~

~~**3.24 Fragrances.** All *fragrance components* shall have been produced and handled following the code of practice of the International Fragrance Association (IFRA).~~

~~**3.25 Biocides.** The use of *biocides* for purposes other than preservation of the product is not allowed. Documentation and testing results shall be provided to demonstrate the dosage necessary to preserve the product. An exception shall be made for *deodorant* and~~

~~*antiperspirant* products such that they are permitted to include *biocides* for purposes other than preservation.~~

~~**3.26 Colorants.** *Colorants* are prohibited. An exception shall be made for *makeup*, *nail polish*, and *sunless tanning products*.~~

~~**3.27 Nanoscale Components.** The use of *nanoscale components* shall only be permitted when the European Commission Scientific Committee on Consumer Safety (formerly known as the Scientific Committee for Consumer Products) provides an opinion that allows for their safe use for products included in the scope of this standard. If the opinion allows for the safe use of *nanoscale components*, then the product label shall indicate that the *component* is "nanoscale" or "nanoparticle" on the ingredient line.~~

3.0 RESPONSIBLE SOURCING

3.1 Disposable Wipes. Products may contain disposable towelettes or other disposable wiping materials if they are made from 100% renewable materials including, but not limited to cellulosic materials, and meet the state-of-the-art amount of recovered material content.

4.0 ~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~LOW-IMPACT MANUFACTURING

4.1 Social Responsibility. Documentation shall be provided that product production meets the following social responsibility requirements:

4.1.1 Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected. An exception shall be made for inmate workers.

4.1.2 Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union membership, political opinion, national extraction or social origin such that it affects the opportunity or treatment in employment and there shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation or exploitation.

4.1.4 Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

5.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~SUSTAINABLE PACKAGING

5.1 Packaging Materials

5.1.1 Source Reduction in Packaging. The *primary* and *secondary packaging* shall be at least one of the following:

- *Source-reduced package*
- *Recyclable* and contain at least 25% *post-consumer material* or demonstrate that efforts were made to use the maximum available *post-consumer material* in the *package*
- *Packaging* with an effective *take-back program*
- Contain at least 50% *post-consumer material*
- ~~An alternative approach may be acceptable that has been independently proven to have a similar life cycle benefit as at least two of the above approaches for a substantial majority of communities~~
- ~~**5.2 Disposable Wipes.** Products may contain disposable towelettes or other disposable wiping materials if they are made from 100% renewable materials including, but not limited to cellulosic materials, and meet the state-of-the-art amount of recovered material content.~~

5.1.2~~3~~ Concentrated Product Packaging. *Concentrates* are prohibited from being *packaged* in ready-to-use forms, including but not limited to *pump spray packages*.

5.1.3~~4~~ Aerosol Packaging. Aerosol *packages* are prohibited.

5.1.4~~5~~ Pump Spray Packaging. *Pump spray packages* are prohibited for *antiperspirants*, *deodorants*, *sunless tanning products*, and *sunscreen products.*

Exemption: *Antiperspirants* and *deodorants* that are not formulated with aluminum compounds or titanium dioxide~~*~~[6] may be sold in *pump spray packages*.

~~* CAS Number 13463-67-7~~

5.2 Packaging Label

5.2.1 Use Labeling. The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste.

[6] CAS Number 13463-67-7

5.2.2 Resin Identification Code. If plastic, the *packaging* shall be marked with the appropriate Society of the Plastics Industry symbol to identify the type of plastic for recycling. If the symbol is in a conspicuous location, the appropriate qualification of recyclability is required such as "this product may not be recyclable in your area, see if accepted by your local program" or "only a few communities accept this package for recycling, check with your local program."

5.3 Restricted Substances

5.3.16 Heavy Metal Restrictions. Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be *intentionally introduced* in *packaging* and *applicators*. Further, the sum of the concentration levels of these metals present shall not exceed 100 ppm by weight (0.01%); an exception is allowed for refillable *packages* or *packages*/*applicators* that would not exceed this maximum level but for the addition of recovered materials. Further, *intentional introduction* does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of a residual of that metal in the final *packaging*/*applicator* or *packaging*/*applicator component* is not desired or deliberate, if the final *packaging*/*applicator* or *packaging*/*applicator component* complies with the incidental concentration restrictions of 100 ppm.

5.3.27 Other Restrictions. Phthalates, bisphenol A, and chlorinated *packaging* and *applicator* material are prohibited from being intentionally introduced; an exception is allowed for *packages* and *applicators* that would not have these added compounds but for the addition of recovered material.

6.0 ~~USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~ VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance. The product shall demonstrate satisfactory performance for the *primary product characteristics* (see Appendix 2 for examples) following the Guidelines for Performance Testing in Annex B.

6.1.1 Antiperspirant. The *antiperspirant* product shall demonstrate at least a 20% reduction in sweat according to the United States Food and Drug Administration (FDA) Guidelines for Effectiveness Testing of Over-the-Counter (OTC) Antiperspirant Drug Products and meet 2.1 herein for additional *primary product characteristics*.

6.1.2 Insect Repellent. The product shall include *active components* that are registered with the United States Environmental Protection Agency (EPA) for use as an *insect repellent* on skin or clothing. Note that EPA may specify use levels or *packaging* types for registered *components*. Alternatively, *minimum risk pesticide*-based products shall demonstrate that they meet the guidance in the EPA Office of Prevention, Pesticides and

Toxic Substances (OPPTS) 810.3700 Insect Repellents for Human Skin and Outdoor Premise.

6.1.3 Sunscreen.

6.1.3.1 Sun Protection Factor (SPF). *Sunscreen* products shall achieve an SPF rating of 15 or higher tested according to 21 Code of Federal Regulations (CFR) 352 for *sunscreens*.

6.1.3.2 Broad Spectrum. *Sunscreen* products shall be tested according to the European Commission Recommendation of 22 September 2006 on the Efficacy of Sunscreen Products and the Claims Made Relating Thereto for *ultraviolet A (UVA)* protection achieving at least 1/3 of the SPF and at least 370 nm for the critical wavelength.

6.1.3.3 Photostability. *Sunscreen* products shall be tested for *photostability* using an objective, scientifically-validated method conducted under controlled and reproducible conditions to measure sun protection from *UVA* and *UVB* radiation exposure that is representative of a sunny, mid-summer day at noon at sea level and up to 55º North latitude. The sun protection of the product after at least 120 minutes of radiation exposure shall be at least 80% of the sun protection before radiation exposure.

6.2 Product Label

6.2.1 Ingredient Line. The product label on each *package* shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI) in order of predominance. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. The general term 'fragrance' may be used for *fragrance components.*

6.2.1.1 Nanoscale Component Labeling. Products that contain *nanoscale components* shall indicate that the *component* is "nanoscale" or "nanoparticle" on the ingredient line.

6.2.1.2 Consumer Communication. The product ingredient line (6.2.1~~6.1~~ herein) shall be made available to consumers in an easily accessible means besides the label on each *package*, such as the company website.

6.2.2 Precautionary Statements. Products that contain *components* that are known to enhance the skin's sensitivity to UV radiation including, but not limited to, *alpha hydroxy acids* and *retinoids* shall include a labeling statement about the increased risk of sun damage possible when exposed to sun. Further, statements about protecting the skin from the sun shall be included on the label such as, but not limited to: staying out the sun as much as possible, wearing protective clothing, and using *sunscreen* appropriately, such

as the language in the FDA Guidance: Labeling for Cosmetics Containing Alpha Hydroxy Acids.

6.2.3 Disposal Labeling. The label shall include proper disposal instructions including clear *package* recycling instructions, if applicable.

6.2.4 Efficacy Labeling.

6.2.42.1 Antiperspirant Efficacy Labeling. The product shall meet the requirements for a claim made on *antiperspirant* effectiveness (e.g., extra-effective, enhanced duration) according to the FDA Guidelines for Effectiveness Testing of OTC Antiperspirant Drug Products.

6.2.42.2 Insect Repellent. The label for *insect repellent* products shall indicate the *protection time* as determined by the EPA OPPTS 810.3700 Insect Repellents for Human Skin and Outdoor Premise.

6.2.42.3 Sunscreen Efficacy Labeling. The label for *sunscreen* products is permitted to claim "broad spectrum" since it meets appropriate performance requirements (6.1.3.22.4.2 herein).

6.2.4.4 Small Packages. *Packages* containing less than one-eighth fluid ounce (or equivalent for other product forms) is exempt from labeling for each *package* the information included in the following provisions herein: 6.2.1 Ingredient Line; 5.2.2 Precautionary Statements. However, all of the information from these provisions shall be available to the consumer through other means (e.g., package, website).

6.2.5 Claims and Transparency

6.2.5.13 Antimicrobial Claims. The product shall make no *antimicrobial*, *disinfecting*, *antiseptic*, or *sanitizing* product claims. An exception shall be made for *deodorant* and *antiperspirant* products.

6.2.5.24 Organic Claims. Organic claims shall only be based on *certified-organic component* content and shall be supported with documentation that they meet the United States Department of Agriculture (USDA) National Organic Program, programs determined to be equivalent by or have recognition agreements with the USDA National Organic Program, orProgram or meet the NSF International (NSF)/American National Standards Institute (ANSI) 305 standard.

6.2.5.35 Natural and Biobased Claims. Only the following *natural* and *biobased*, or related, claims are allowed when the product meets the following criteria:

- "100 percent Natural", "All Natural", "100 percent *Biobased*", or "All *Biobased*" shall only contain *natural* or *biobased components*, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*.

- "Natural" or "*Biobased*" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.
- Claims on specific product *components* being "natural" or "*biobased*" may be permitted if it is a *natural* or *biobased component*.

6.2.5.4~~6~~ Fragrance and Allergen Labeling. The label for each *package* shall declare, separate from the ingredient line, if a *fragrance* has been added or if no *fragrance* has been added and shall also indicate any *allergen components* in the product (e.g., Contains allergen [allergen's INCI name]).

~~**6.7 Use Labeling.** The product shall be accompanied by detailed instructions for proper use to maximize product performance and minimize waste.~~

~~**6.8 Precautionary Statements.** Products that contain *components* that are known to enhance the skin's sensitivity to UV radiation including, but not limited to, *alpha hydroxy acids* and *retinoids* shall include a labeling statement about the increased risk of sun damage possible when exposed to sun. Further, statements about protecting the skin from the sun shall be included on the label such as, but not limited to: staying out the sun as much as possible, wearing protective clothing, and using *sunscreen* appropriately, such as the language in the FDA Guidance: Labeling for Cosmetics Containing Alpha Hydroxy Acids.~~

~~**6.9 Disposal Labeling.** The label shall include proper disposal instructions including clear *package* recycling instructions, if applicable.~~

~~**6.9.1 Resin Identification Code**. If plastic, the *packaging* shall be marked with the appropriate Society of the Plastics Industry symbol to identify the type of plastic for recycling. If the symbol is in a conspicuous location, the appropriate qualification of recyclability is required such as "this product may not be recyclable in your area, see if accepted by your local program" or "only a few communities accept this package for recycling, check with your local program."~~

~~**6.10 Small Packages.** *Packages* containing less than one-eighth fluid ounce (or equivalent for other product forms) is exempt from labeling for each *package* the information included in the following provisions herein: 6.1 Ingredient Line; 6.8 Precautionary Statements. However, all of the information from these provisions shall be available to the consumer through other means (e.g., package, website).~~

7.0 TRADEMARK USE REQUIREMENTS

7.1 Trademark Use. Any use of the Green Seal® Certification Mark or 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.[7]

[7] www.greenseal.org/trademark-use-guidelines

7.2 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.

ANNEX A – DEFINITIONS (Normative)

Note: the defined terms are italicized throughout the standard.

Active Component. A component in a product that provides, or partly provides, the primary product characteristic.

Allergen. Allergenic substances listed by the European Commission Directive76/768/EEC, 27 July 1976 on the Approximation of the Laws of the Member States relating to Cosmetic Products (also known as the Cosmetic Directive) in Annex III and those listed by the FDA (including food allergens Food Allergen Labeling and Consumer Protection Act of 2004 (Public Law 108-282, Title II).

Alpha Hydroxy Acid. Substances that are organic carboxylic compounds substituted with a hydroxyl group on the adjacent carbon. This includes, but is not limited to, glycolic acid, lactic acid, malic acid, citric acid, and tartaric acid. These may be *natural* or *synthetic*.

Antimicrobial. Substances that are intended to kill or inhibit the growth of microorganisms including *antiseptic*, *disinfectant*, and *sanitizer* substances.

Antiperspirant. A product that is applied topically to the body that reduces the production of perspiration at that site. These products are regulated as *drugs* by the FDA. These products may also function as *deodorants*.

Antiseptic. Substances that are intended to prevent or arrest the growth of microorganisms.

Applicator. An item included in the *packaging* that is intended to be used to apply the product on the body or hair. It is typically, but not necessarily, a separate item in the *package*. This includes, but is not limited to, brushes, sponges, and swabs. This does not include tubes or bottles that can be used to apply the product (e.g., lip products). While the applicator may be part of the *primary package* (e.g., *nail polish*, mascara), for the purposes of this standard it is not considered *primary packaging*. An exception is for pencil-like products (e.g., eye liner), the material in direct contact with the product is considered the applicator and any material used around this is considered either *primary* or *secondary packaging*.

Asthma. Asthma is a chronic inflammatory disorder of the airways that impairs breathing. Asthma affects children and adults, may be intermittent or persistent, and is further classified as mild, moderate, or severe. The chronic inflammation associated with variable airflow obstruction commonly causes difficulty breathing, coughing, wheezing, shortness of breath, and/or chest pain. Symptoms may resolve completely between active episodes. Symptoms may occur during exposure, immediately after exposure, or up to 24 hours later in a “late phase,” frequently interrupting sleep.

Asthmagen. A substance designated as an *asthma* causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

Astringent/Toner. A product applied to the skin for the purpose of cleaning or tightening pores and are not rinsed off of the skin. This category does not include any hand, face, or body cleaner or soap products that are rinsed off of the body**.**

Biobased. The content of a product that is from biological products or renewable materials, forestry, or agricultural materials (including plant, animal, and marine materials).

Biocide. Substances intended to destroy, deter, render harmless, prevent the action of, or otherwise exert a controlling effect on any harmful organism by chemical or biological means. These are considered *antimicrobial*, *antiseptic*, *disinfectant*, or sanitizing agents.

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), National Toxicology Program (Groups 1 and 2), EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential), by the Occupational Safety and Health Administration (as carcinogens under 29 CFR 1910.1003(a)(1)), or under the *GHS* (hazard categories 1 (H350, may cause cancer) and 2 (H351, suspected of causing cancer)).

Certified-Organic Component. A *component* certified as organic (by meeting the USDA organic standards) by a USDA-accredited certifying agent, or by programs determined to be equivalent or have recognition agreements with the USDA National Organic Program (NOP).

Child Labor. The minimum age for admission to employment as outlined in the Convention Concerning Minimum Age for Admission to Employment such as, but limited to, a minimum age not less than 15 or the age of completion of compulsory schooling in the country of production, whichever is older, and for work that is likely to jeopardize health, safety, and morals of young persons the minimum age not less than 18.

Chronic Aquatic Toxicity. Substances that cause long-lasting adverse effects to aquatic organisms and classified in hazard categories 1 through 4 for long-term hazards to the aquatic environment (H410 through H413) under the *GHS*.

Colorant. A product *component* that is included primarily to deliver color to the product or user.

Component. A deliberate addition to the product added at any level or a contaminant that was not deliberately added but is known to be present above 0.01% (100 parts per million), by weight, in the product. Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Concentrate. A product, as sold, that must be diluted with water prior to its intended use.

Deodorant. A product that is applied topically to the body to reduce the body odor caused by the bacterial breakdown of perspiration.

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

Drug. The Federal Food, Drug and Cosmetic (FD&C) Act defines drugs, in part, by their intended use, as "articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease" and "articles (other than food) intended to affect the structure or any function of the body of man or other animals" [FD&C Act, sec. 201(g)(1)].

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used for the purpose of imparting or neutralizing a scent in the product.

Fragrance Product. Products with the primary function of imparting and diffusing a fragrant odor, such as, but not limited to, perfumes, colognes, and body sprays. These products are typically highly volatile. For the purposes of this standard, skin care, *deodorant*, and *antiperspirant* products are not considered fragrance products.

Globally Harmonized System for the Classification and Labeling of Chemicals. The GHS established hazard classes and means for classifying substances; substance classification based on these hazard classes has been listed by the European Chemicals Agency and the ex-European Chemicals Bureau, or is disclosed on a Safety Data Sheet.

Good Manufacturing Practices. Incorporation of quality practices and procedures, such as those included in the FDA's Inspection Operations Manual, to minimize the risk of adulterated or misbranded products.

Hair Shine Product. A product designed for the primary purpose of creating a shine when applied to the hair.

Hair Styling Product. A product that is designed or labeled for the application to wet, damp, or dry hair to aid in defining, shaping, lifting, styling, and sculpting of the hair. This also includes leave-in volumizers, detanglers, and conditioners that make styling claims.

Hair Spray. A product that is applied to styled hair, and is designed or labeled to provide sufficient rigidity, to hold, retain, and finish the style of the hair for a period of time.

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

Hazardous Air Pollutant. A substance listed by the EPA in the Clean Air Act Section 112(b)(1) as a hazardous air pollutant.

High and Medium Volatility Organic Compound. An *organic compound* that exerts a vapor pressure greater than 2 mm mercury at 1 atm pressure and 20ºC.

Insect Repellent. A product that is intended to be applied to the skin, hair, or clothing to help reduce exposure to insects or prevent insect bites.

Intentional Introduction. The act of deliberately utilizing a material in the formation of a *package* or *packaging component* where its continued presence is desired in the final *package* or *packaging component* to provide a specific characteristic, appearance, or quality.

Lotion. Products that are left on the body to enhance the appearance or feel of the body including, but not limited to: creams, moisturizers, powders, serums, oils, and sprays for use on the face and neck, body, hand, cuticle, foot, and hair.

Makeup. Products that are applied topically and are used to temporarily color and enhance the appearance of facial and body features. Lip balm may be considered makeup if it has colorant *components* intended to temporarily color or enhance the appearance of the lips.

Minimum Risk Pesticide. A special class of pesticides (including *insect repellents*) that are not subject to federal registration requirements through the EPA because they meet specific requirements under section 25(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), including, but not limited to, that the *components*, both active and inert, are demonstrably safe for the intended use.

Mutagen. A substance designated as known to induce, be regarded as if it induces, or which causes concern for humans owing to the possibility that it may induce heritable mutations in the germ cells of humans and thus meets the criteria for hazard categories 1 and 2 (H340 and 341) under the GHS.

Nail Polish. Products that are applied to and form a film on the nail. They are used to color the nails, harden the nails, protect the nails, or nail treatments to address specific nail conditions, such as peeling or brittleness. These products may include top coats and base coats and may also be referred to as lacquers or enamels.

Nanoscale Component. Insoluble or biopersistent *components* that are intentionally manufactured to be roughly 1 to 100 nanometers in size in at least one dimension externally or within the internal structure (i.e., primary particle). This size typically enables novel applications that a larger-sized version of the *component* could not achieve.

Natural Component. A *component* that comes from materials found in nature including mineral, forestry, agricultural, or biological materials such as, but not limited to, animal products produced by the animal but not part of the animal; they do not contain petroleum or petroleum-derived compounds; they do not contain transgenic hybrid organisms (inserted deoxyribonucleic acid that originated in a different species); they have been processed without irradiation; and they are not chemically altered.

Naturally-Derived Component. A *component* that is partially chemically altered without petroleum *components* and have been minimally processed such that they not be altered to such

an extent that they are substantially less biodegradable or more toxic (examples of potentially acceptable processes are included in Appendix 3).

Neurotoxin/Systemic Toxin. A substance designated as producing a specific target organ toxicity arising from either single exposure or repeated exposure and thus meets the criteria for hazard categories 1 or 2 (H370, H371, H372, H373) under the *GHS*.

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents.

Organic Compound. Any member of a large class of chemical compounds whose molecules contain carbon, with the exception of carbides, carbonates, cyanides, diamond and graphite.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (Chlorofluorocarbon - CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances or any substances or mixtures falling into hazard category 1 (H420) under the *GHS*.

Package/Packaging. This includes the *applicator*, *primary package*, and any *secondary package* used for the product. It does not include case or shipping material.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

Photostability. The ability of a product to retain its initial level of sun protection efficacy after *ultraviolet A and B (UVA and UVB*) radiation exposure.

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 Package. A *package* that is the material physically containing and typically coming into contact with the product. This does not include the cap or lid of a bottle. Product *applicators* are not considered part of the primary *package*.

Primary Product Characteristic. The main function for which the product category is intended for use. See Appendix 2 for an example list of primary product characteristics of products included in this standard.

Product As Rinsed-Off. The dilution of the product for removal from the body at a rate of 5 ml per liter of water, or equivalent measure for another product form (e.g., solid, foam).

Protection Time. The time from application of the *insect repellent* to the time until the first bite or until the repellent no longer reduces bites by 95%, as determined by the EPA Office of

Prevention, Pesticides and Toxic Substances (OPPTS) 810.3700 Insect repellents for human skin and outdoor premise. This is the period of time a repellent is expected to remain effective. For ticks and chiggers, this refers to the period between the time of application of the repellent to time of a tick or chigger crawling onto human skin.

Pump Spray. A *package* that dispenses the product through a nozzle after a pump was triggered. It does not require a pressurized propellant to dispense the product.

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.

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65) or a substance designated as hazard category 1 (H360), known or presumed reproductive toxicant, category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the *GHS*.

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance from human evidence or appropriate animal test and thus meets the hazard criteria for category 1 (H334) under the *GHS*.

Retinoid. Vitamin A (all-*trans*-retinol; retinol), its metabolites, analogues, and derivatives. This includes, but is not limited to, retinyl palmitate, retinol, retinaldehyde, and retinoic acid. These may be *natural* or *synthetic*.

Sanitizer. A product intended to reduce the level of microorganisms present to acceptable levels established by federal or provincial health authorities.

Secondary Packaging. *Packaging* used to contain *primary package/s* and typically used for merchandizing. This does not include case or shipping packaging or the *primary package*, cap, or lid.

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. Identified under hazard category 1 for serious eye damage/eye irritation (H318) by the *GHS*.

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. Identified under hazard categories 1A, 1B or 1C for skin corrosion/irritation (H314) by the *GHS*.

Skin Irritation/Irritant. The production of reversible damage to the skin following the application of a test substance for up to 4 hours. Identified under hazard categories 2 or 3 for skin irritation/mild skin irritation (H315 and H316) by the *GHS.*

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under hazard category 1 for skin sensitization (H317) under the *GHS.*

Source-Reduced Package. A *package* that has at least 20% less material (by weight) compared to containers commonly used for that product type.

Sunscreen. Products that intend to protect the body from UV radiation by absorbing, scattering, or reflecting radiation.

Sunless Tanning Product. Products applied to the skin to produce an effect similar in appearance to a traditional suntan without exposure to UV radiation. These products are also known as self-tanning products.

Synthetic Component. *Components* that are created artificially rather than naturally or from *natural components*. For the purposes of this standard, *naturally-derived components* are not considered synthetic *components*.

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

Tolerable Upper Limit. The highest level of daily nutrient intake that is likely to pose no risk of adverse health effects to almost all individuals in the general population, as established by the Food and Nutrition Board, Institute of Medicine, National Academies.

Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals. The chemicals listed by the EPA on the Toxic Release Inventory as Persistent, Bioaccumulative, and Toxic (PBT) Chemicals.

Undiluted Product. The most concentrated form of the product produced by the manufacturer for distribution outside its facility.

Ultraviolet A. A type of solar radiation within the region of the electromagnetic spectrum from 320 to 400 nanometers (nm) that penetrate deep within the skin causing damage.

Ultraviolet B. A type of solar radiation within the region of the electromagnetic spectrum from 290 to 320 nm that cause redness and burning of the skin.

ANNEX B – GUIDELINES FOR PERFORMANCE TESTING (Normative)

The product shall demonstrate satisfactory performance, which includes at a minimum the *primary product characteristics* (see Appendix 2 for examples). Testing may be completed through one of the following means:

1. A quality test using an objective, scientifically-validated method conducted under controlled and reproducible conditions. This may be conducted by the manufacturer or an external laboratory that has ISO 9001 registration or equivalent quality control verification.

2. A comparative test demonstrating performance equivalent to or better than a nationally recognized or market-leading product in its product category. This may be conducted by the manufacturer or an external laboratory that has ISO 9001 registration or equivalent quality control verification.

3. A consumer-based product comparison test. The test shall have a minimum of ten (10) panelists that may be internal or external to the organization, but should maintain a neutral position (i.e., chosen at random). The consumers shall be surveyed about the product's efficacy compared to a market-leading product. A summary of conclusions and a description of how panelists are chosen shall be submitted. The following are some example questions that could be used:

1. How well does the product perform in comparison with the market-leading product with regard to *primary product characteristics*?
2. How does the condition of the hair and/or skin feel after use in comparison with the market-leading product?

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-50:

Products included in GS-50

- Aftershave
- *Astringent/toner*
- Cleaning wipes that don't require rinsing after use
- Cuticle cream, *lotion*, and oil
- *Deodorant* and *antiperspirant*
- *Hair shine products*
- *Hair spray*
- *Hair styling products* (e.g., balm, gel, mousse)
- *Insect repellents*
- Leave-on hair conditioner
- Lip products
- *Makeup* and bronzers (e.g., foundation, concealer, bronzer, mascara, eyeliner, eye shadow, blush)
- Massage oil
- *Nail polish*
- Skin care products (e.g., *lotions*, moisturizers, creams, oils, serums)
- *Sunless tanning products*
- *Sunscreen*

Products excluded from GS-50

- Artificial nails, glues, and removers
- Artificial lashes
- Bubble bath and bath salts (included in GS-44)
- Exfoliant products (if rinsed off, included in GS-44)
- Feminine deodorant
- *Fragrance Products*/perfume and body spray
- Hair dye, color, and bleach
- Hair relaxants
- Hand sanitizers
- Nail polish remover
- Oral care products (toothpaste)
- Products intended to be edible
- Shaving cream, gel, and foam (included in GS-44)
- Soap and cleansers (included in GS-44)
- Tattoos

APPENDIX 2 – PRIMARY PRODUCT CHARACTERISTICS (Informative)

Examples of *primary product characteristics*:

Antiperspirant: Meet FDA guidelines for standard effectiveness of sweat reduction, malodor reduction

Deodorant: Malodor reduction

Hair Spray: Quick drying, hold power, removability (brushing, shampooing)

Hair Styling Products: Styling power, removability (brushing, shampooing)

Insect Repellent: Meet the EPA guidelines for Insect Repellents for Human Skin and Outdoor Premise.

Lotions: Hydration, smoothness/softness

Makeup: Last, removability

Nail Polish: Quick drying, nail appearance, durability

Sunless Tanning Products: Suntan appearance

Sunscreen: SPF, *UVA* protection, broad UV protection, *photostability*

Refer to the European Cosmetics Association, COLIPA "Guidelines for the Evaluation of the Efficacy of Cosmetic Products", May 2008 for information on test design and data evaluation.

APPENDIX 3 – PROCESSING METHODS OF NATURALLY-DERIVED COMPONENTS (Informative)

Examples of Potentially Acceptable Processing Methods of *Naturally-Derived Components* (which must also meet all the requirements in the standard):

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponification (to produce soap)

GS-51

GREEN SEAL® STANDARD FOR

LAUNDRY CARE PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE

EDITION 1.8

(New Format)

June 23, 2022

Green Seal, Inc. • www.greenseal.org

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 LAUNDRY CARE PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-51

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FOREWORD

Edition. Edition 1.8 was issued on June 23, 2022. It replaces Edition 1.7 from November 11, 2021. Corrections and/or clarifications were last made to this standard on August 23, 2024~~July 26, 2024~~. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section21

ACRONYMS AND ABBREVIATIONS

AATCC. American Association of Textile Chemists and Colorists.
ACGIH. American Conference of Governmental Industrial Hygienists.
AISE. Association for Soaps, Detergents and Maintenance Products.
AOEC. Association of Occupational and Environmental Clinics.
ASSE. American Society of Sanitary Engineering.
ASTM. ASTM International.
BCF. Bioconcentration Factor.
BOD. Biochemical Oxygen Demand.
BTU. British Thermal Unit.
CARB. Air Resources Board for the State of California.
CAS. Chemical Abstracts Service.
CFR. Code of Federal Regulations.
CFU. Colony Forming Unit.
DFG. German Deutsche Forschungsgemeinschaft.
DOC. Dissolved Organic Carbon.
EN. European Standard.
EPA. United States Environmental Protection Agency.
FDA. United States Food and Drug Administration.
FIFRA. Federal Insecticide, Fungicide, and Rodenticide Act.
GHS. Globally Harmonized System for the Classification and Labelling of Chemicals.
GMM. Genetically Modified Microorganism.
HCPA. Household and Commercial Products Association
IFRA. International Fragrance Association.
INCI. International Nomenclature of Cosmetic Ingredients.
ISO. International Organization for Standardization.
IUPAC. International Union of Pure and Applied Chemistry.
JECFA. Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives.
NOP. National Organic Program.
OECD. Organisation for Economic Co-operation and Development.
PMRA. Health Canada's Pesticide Management Regulatory Agency.
SDS. Safety Data Sheets.
SOP. Standard Operating Procedure.
TG. Test Guidance.
ThOD. Theoretical Oxygen Demand.
USDA. U.S. Department of Agriculture.
VOC. Volatile Organic Compound.
WHO. World Health Organization.

GREEN SEAL STANDARD FOR LAUNDRY CARE PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-51

1.0 SCOPE

This standard establishes environmental, health, and social requirements for products that are used to clean, remove stains, and/or otherwise treat the softness, static, or wrinkle characteristics of *laundry*. This standard covers and is limited to *laundry detergent products* (home-style detergent, complete detergent, or multi-component system) for *industrial and institutional use*, as well as pre-treatment *stain* and *spot removing products*, *softening products* (liquids and sheets), *laundry* additives (*bleaching*, *softening*, sour, antichlor, and alkali booster *products*), *anti-static products* (liquid and sheets), *fabric refresher* products, anti-wrinkle products, *laundry prewash* products, and *laundry starch/sizing/fabric finish products*. This standard addresses the products listed above but not the facility where *laundry* care occurs, such as a dry cleaner or commercial laundry. The standard also does not address any equipment, equipment maintenance, or processes used at a laundry (e.g., ozone generation/use). The solvent used at a dry cleaner is considered part of the process; therefore, it is also excluded. This standard includes products used in laundries for health care and food settings, which may include *antimicrobial pesticide products* (e.g., products covered by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)). This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. This standard includes *fabric protectant* products but does not address impregnating products with flame retardant or waterproofing properties. This standard does not address carpet or upholstery cleaning and maintenance products or footwear or leather care products. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of the products with materials is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility.

Where there is more than one criterion that applies, the more stringent criterion applies.

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

Criteria that include an asterisk (*) in the title are considered foundational criteria.[2]

[2] Foundational criteria are set up to be the same across Green Seal's cleaning product standards, though some unique exceptions may be included for each standard. Revisions to these criteria in the future will apply to all standards that include the identified foundational criteria (excluding unique exceptions).

2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

2.1 Product Performance.[3] Each product or a combination of products[4] shall demonstrate effective performance for their intended use following the Framework for Performance Testing in Annex B. All performance tests shall be conducted as comparison tests against *benchmark product(s)* with comparable functions.

The test methods included in the following criteria refer to *household use* machines, but *institutional use* machines can be used with appropriate modifications to the method, as detailed and provided to the certification program.

The following criteria include test methods that are applicable to some product categories, as specified below; for all other product categories, follow section 2.2, Alternative Performance Requirements. Products specifically addressed in section 2.1 may use an alternate test under section 2.2 as long as the relevant characteristics specified under sections 2.1.1, 2.1.2, and 2.1.3 are tested.

2.1.1 Laundry Detergent Performance. *Laundry detergent products* shall demonstrate performance equivalent to or better than a *benchmark product(s)*, and shall be tested for the following characteristics on manufacturer-recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend).

2.1.1.1 Cleaning. *Laundry detergent products* shall demonstrate general detergency and stain removal using ASTM D4265, with instrumental or visual analysis for determination, for a minimum of four stains. Any stains marketed for use by the product shall be included in the four stains.

2.1.1.2 Color Care. *Laundry detergent products* shall demonstrate that they maintain color fastness using the procedure in ASTM D4265 or AATCC 124 (using machine washing), by assessing color change after 5 wash cycles, with appropriate instrumental or visual analysis for determination.

2.1.2 Stain and Spot Removal Performance.[5] Products sold solely as *stain removing products* and *bleaching products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category for cleaning and removing stains on manufacturer-recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis for determination, for a minimum of four stains. Any stains marketed for use by the product shall be included in the four stains.

[3] It is generally acknowledged that standard methods have not been developed for measuring performance of laundry care products in the industrial and institutional market. The methods provided in this section may be used, but are not a requirement as long as the method used complies with Annex B.

[4] If a combination of products is to be tested for a multi-component system the same combination must be tested for the *benchmark products*. The entire multi-component system does not need to be tested if performance can be measured with a portion of the products (e.g., detergent, builder, and booster).

[5] This method is the same as 2.1.1.1 Cleaning for *laundry detergent products*, thus does not need to be repeated for *laundry detergent products* that are also intended for stain and spot removal.

~~**2.1.3 Softening Performance.** Products sold solely as *softening products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the Household & Commercial Products Association (HCPA) DCC-13 series evaluating softness (13B), water absorbency (13D), and static control (13F, using one of described evaluation methods).~~

~~**2.2 *Alternative Performance Requirements.** Alternatively, the product(s) shall demonstrate effective performance equivalent to or better than appropriate *benchmark product(s)* with comparable functions, following the Framework for Performance Testing in Annex B. Relevant characteristics[6] specified in sections 2.1.1, 2.1.2, and 2.1.3 shall apply for those product categories.~~

~~**3.0 PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS**~~
2.0 SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 *Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for preservation or stabilization of the product.

2.1.2 *Aquatic Biodegradability. Each of the individual organic *components* present at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.

~~[6] The relevant characteristics are the assessment endpoint (e.g., detergency & stain removal), the method of determination (e.g., instrumental), the number of cycles, and the number and type of stains, if applicable.~~

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 *component* 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.

2.1.3 *Asthmagens. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *asthmagens*. Refer to Annex E, Requirement D for potential exemptions for *enzymes*.

2.1.4 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* present at 0.01% or more that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.14 herein, it may be considered to not bioaccumulate.

2.1.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[3] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens.*

2.1.6 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 component*
- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

2.1.7 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* present at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F (65.5°C), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

2.1.8 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the U.S. Environmental Protection Agency (EPA) List of

[3] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

2.1.9~~3.1~~ *Formula Disclosure for Certification. For certification to this standard, all of the formula *components* shall be disclosed to the certification program, including the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by weight) of each *component* in the formula.

2.1.10 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

2.1.11 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

2.1.12 Optical Brighteners. The *product as used* shall not contain any *components* present at 0.01% or more that are *optical brighteners*.

2.1.13 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

2.1.14 *Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex E criteria.

2.1.15 *Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex F criteria.

2.1.16 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
- Triclosan

2.1.17 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex E, Requirement D for potential exemptions for *enzymes*.

2.1.18 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.19 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at present 0.01% or more in the *undiluted product*. If these *components*, 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 testing methods may also 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 or greater than or equal to 11.5, unless data prove otherwise.

Note: Refer to Annex C for potential alternate thresholds for *closed dilution-control systems*.

Note: Refer to Annex D for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

2.1.20 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

~~**3.2 *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.~~

2.2 Safer Products

2.2.1~~3.3~~ *Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply.[4,5]

Oral lethal dose (LD_{50})	≤ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	≤ 20,000 ppmV at 1 hour
Dermal lethal dose (LD_{50})	≤ 2,000 mg/kg

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* present at 0.01% or more in the *undiluted product* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* present at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

Note: Refer to Annex C for potential alternate thresholds for *closed dilution-control systems*.

Note: Refer to Annex D for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

~~**2.2.2 Concentration and Compaction.** The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled laundry of the undiluted product to be at the following levels:~~

[4] Products meeting the requirements in 2.2.1~~3.3~~ will not fall into hazard categories 1 through 5 for acute oral and dermal toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the Globally Harmonized System for the Classification and Labeling of Chemicals (*GHS*) when the whole product is evaluated using the weighted average approach.

[5] Recognizing the need to protect animal welfare, testing to demonstrate conformance should only be done after consulting with the certification program to ensure that other means of determining/estimating conformance have been exhausted as provision 2.2.5~~6~~3.2 outlines including existing data, modeling data, data from structural analogs, and other lines of evidence.

~~Product[6]~~	~~Concentrated~~	~~Ultra-Concentrated~~
~~Liquid *laundry detergent products*~~	~~5.2 ml/kg (0.08 fl.oz./lb) or less~~	~~2.6 ml/kg (0.04 fl.oz./lb) or less~~
~~Solid/Powder *laundry detergent products*~~	~~9.4 g/kg (0.15 oz/lb) or less~~	~~5.0 g/kg (0.08 oz/lb) or less~~
~~*Softening products, not sold as laundry detergent products*~~	~~5.2 ml/kg (0.08 fl.oz./lb) or less~~	~~2.6 ml/kg (0.04 fl.oz./lb) or less~~

~~Other products do not have to meet concentration and compaction requirements.~~

2.2.32 *Eutrophication. The *product as used* shall not contain phosphorus at more than 0.5% by weight.

2.2.43 *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_{50} 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 *components* present at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 2.2.1).

The preferred sources of data come from the following protocols: International Organization for Standardization (ISO) 7346-2 for fish, Organization for Economic Co-operation and Development (OECD) Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, and OECD TG 201 for algae.

2.2.54 *Volatile Organic Compound (VOC) Content. The VOC content of the *product as used* shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for VOCs in its product category. For product categories not regulated by CARB, the following limitations on VOC level (by weight) shall not be exceeded:

- *Laundry detergent products* (as part of a multi-component system): 4%
- *Laundry detergent products* (as a complete detergent): 12%
- *Bleaching products*, not sold as *laundry detergent products*: 8%
- *Softening products*: 4%
- *Sour products*: 4%
- Other products: 1%

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

[6] ~~If the *laundry detergent product* is a multi-component system, only the detergent and *softening product* must meet the concentration and compaction requirements.~~

- By summing the percent by weight contribution from all organic *components* in the product at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components* in the product at 0.01% or more.[6]

Current CARB regulatory limits for VOCs.[7]

Product Category	**Effective Date**	**Limit (%)**
Laundry Prewash Aerosol/solid	1/1/1994	22
Laundry Prewash All other forms	1/1/1994	5
Laundry Starch/Sizing/Fabric Finish Product	1/31/2008	4.5

2.2.56 *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.

~~**3.4 *Skin and Eye Damage.** The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at present 0.01% or more in the *undiluted product*. If these *components*, 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 testing methods may also be accepted. Testing is not required for any ingredient for which sufficient information exists.~~

[6] Evaluation of total VOCs in this standard includes all *fragrances* and all VOCs present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.

[7] 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.

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 or greater than or equal to 11.5, unless data prove otherwise.

Note: Refer to Annex C for potential alternate thresholds for *closed dilution control systems*.

Note: Refer to Annex D for potential alternate thresholds for *powder/solid/non-aqueous liquid* products.

3.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[8] are typically added for the purpose of releasing substances into a raw material or the final product, if those substances are *carcinogens*.

3.6 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

3.7 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the U.S. Environmental Protection Agency (EPA) List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.9 *Asthmagens. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *asthmagens*. Refer to Annex E, Requirement D for potential exemptions for *enzymes*.

3.10 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* present at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex E, Requirement D for potential exemptions for *enzymes*.

3.11 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

3.12 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations list with a skin absorption H notation. Further, the product shall not contain

[8] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

~~*components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.~~

~~**3.13 *Volatile Organic Compound (VOC) Content.** The VOC content of the *product as used* shall not exceed the current regulatory limits of the Air Resources Board for the State of California (CARB) for VOCs in its product category. For product categories not regulated by CARB, the following limitations on VOC level (by weight) shall not be exceeded:~~

- ~~*Laundry detergent products* (as part of a multi-component system): 4%~~
- ~~*Laundry detergent products* (as a complete detergent): 12%~~
- ~~*Bleaching products*, not sold as *laundry detergent products*: 8%~~
- ~~*Softening products*: 4%~~
- ~~*Sour products*: 4%~~
- ~~Other products: 1%~~

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

- ~~By summing the percent by weight contribution from all organic *components* in the product at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C.~~
- ~~According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all organic *components* in the product at 0.01% or more.[9]~~

~~Current CARB regulatory limits for VOCs.[10]~~

~~**Product Category**~~	~~**Effective Date**~~	~~**Limit (%)**~~
~~Laundry Prewash Aerosol/solid~~	~~1/1/1994~~	~~22~~
~~Laundry Prewash All other forms~~	~~1/1/1994~~	~~5~~
~~Laundry Starch/Sizing/Fabric Finish Product~~	~~1/31/2008~~	~~4.5~~

~~**3.14 *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_{50} 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 *components* present at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 3.3).~~

~~[9] Evaluation of total VOCs in this standard includes all *fragrances* and all VOCs present in the product at 0.01% or more. Evaluation of total VOCs under Method 310 exempts *fragrances* and all organic compounds present below 0.1%.~~

~~[10] 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.~~

~~The preferred sources of data come from the following protocols: International Organization for Standardization (ISO) 7346-2 for fish, Organization for Economic Co-operation and Development (OECD) Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, and OECD TG 201 for algae.~~

~~**3.15 *Aquatic Biodegradability.** Each of the individual organic *components* present at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A – F; or OECD 310. Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.~~
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 *component* 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.~~

~~**3.16 *Bioaccumulating Compounds.** The *product as used* shall not contain any *components* present at 0.01% or more that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.14 herein, it may be considered to not bioaccumulate.~~

~~**3.17 *Eutrophication.** The *product as used* shall not contain phosphorus at more than 0.5% by weight.~~

3.18 Prohibited Components. The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
- Triclosan

3.19 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* present at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F (65.5°C), as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

3.20 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

3.21 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 component*
- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

3.22 Optical Brighteners. The *product as used* shall not contain any *components* present at 0.01% or more that are *optical brighteners*.

3.23 Concentration and Compaction. The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled laundry of the undiluted product to be at the following levels:

~~Product[11]~~	~~Concentrated~~	~~Ultra-Concentrated~~
~~Liquid *laundry detergent products*~~	~~5.2 ml/kg (0.08 fl.oz./lb) or less~~	~~2.6 ml/kg (0.04 fl.oz./lb) or less~~
~~Solid/Powder *laundry detergent products*~~	~~9.4 g/kg (0.15 oz/lb) or less~~	~~5.0 g/kg (0.08 oz/lb) or less~~
~~*Softening products*, not sold as *laundry detergent products*~~	~~5.2 ml/kg (0.08 fl.oz./lb) or less~~	~~2.6 ml/kg (0.04 fl.oz./lb) or less~~

~~Other products do not have to meet concentration and compaction requirements.~~

~~**3.24 *Products Containing Enzymes.** Products that contain *enzymes* shall meet all Annex E criteria.~~

~~**3.25 *Products Containing Microorganisms.** Products that contain *microorganisms* shall meet all Annex F criteria.~~

~~**3.26 *Antimicrobial Agents.** Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for preservation or stabilization of the product.~~

3.0 RESPONSIBLE SOURCING

3.1~~2~~7 *Disposable Wipes. Products that are sold in a ready-to-use format may contain disposable wipes/towelettes/sheets or other disposable, single-use materials if they are made from agricultural products, wood pulp, and other cellulosic materials. An exception shall be made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

4.0 ~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~ LOW-IMPACT MANUFACTURING

4.1 *Social Responsibility. Documentation shall be provided that the production of the product meets the following social responsibility requirements:

4.1.1 Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected. An exception shall be made for inmate workers.

~~[11] If the *laundry detergent product* is a multi-component system, only the detergent and *softening product* must meet the concentration and compaction requirements.~~

4.1.2 Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union membership, political opinion, national extraction, or social origin such that it affects the opportunity or treatment in employment. There shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation, or exploitation.

4.1.4 Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

5.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~ SUSTAINABLE PACKAGING

5.1 Packaging Materials

5.1.1 Primary Package. A plastic *primary package* shall be one of the following:

- A source-reduced primary package
- *Recyclable*
- Contain 25% post-consumer material
- A refillable package with an effective take-back program
- Alternative approaches may be acceptable, if an independent evaluation has shown that, for a substantial majority of communities, their life-cycle benefits are similar to at least two of the approaches listed above.

For materials other than plastic, the primary package shall contain at least 25% post-consumer material or demonstrate that efforts were made to use the maximum available post-consumer material in the package.

~~**5.1.1 *Resin Identification Code.** If plastic, the packaging shall be marked with the appropriate Resin Identification Code.~~

5.1.2 *Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use primary package types.

5.1.3 Aerosol Packaging. *Aerosol packaging* shall meet the following:

- Manufacturers shall demonstrate that recycling programs for *aerosol packaging* are available to a substantial majority of communities where the product is sold
- Manufacturers shall provide documentation establishing why *aerosol packaging* is necessary for a given product addressing environmental, health, and performance considerations
- *Aerosol packaging* propellant shall meet all of the product-specific sustainability requirements in section ~~3~~2.0 herein and shall not be a *hazardous air pollutant*
- For Section ~~3.3~~2.2.1 Acute Toxicity herein, *aerosol packaging components* will be evaluated regardless of vapor pressure level
- The product contents from the nozzle to the point-of-delivery shall be in a form that does not contain any inhalable or respirable particles, such as but not limited to foams. If the product contents are delivered in particle form, the particles between 10-2.5 microns shall not comprise more than 1% of the total particles and no particles shall be below 2.5 microns

5.2 Packaging Label

5.2.1 *Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code.

5.2.2 Use Directions. The product label shall clearly and prominently provide directions for use, and any appropriate precautions or recommendations for the use of personal protective equipment. A product certified from a multi-component system shall include a statement on the label that the manufacturer recommends the product be used with a multi-component system.

5.2.2.1 Cold Water Wash Directions. For products that are used with wash water,[8] [9]the product label shall clearly and prominently provide directions for using *cold water* wash temperatures or lower temperatures when possible; an exception shall be made for *antimicrobial pesticide products*, which should state the temperature needed for antimicrobial activity.

5.2.2.2 Full Loads. For products that are used with wash water,[8] the product label shall clearly and prominently provide the recommendation to run full loads of *laundry*.[9]

5.2.3 Disposal Directions. The product label shall clearly and prominently provide directions for applicable disposal, recycling, reuse, or refill instructions for the package.

5.3 Restricted Substances

[8] Products that are used with wash water include *laundry detergent*, *softening*, *bleaching*, sour, and *laundry prewash products.*

[9] If this recommendation is followed, it will reduce the environmental impact from doing laundry.

5.3.14 *Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced*. Further, the sum of the concentration levels of these metals present in the packaging shall not exceed 100 ppm; an exception is allowed for *primary packages* that would not exceed this maximum level but for the addition of *post-consumer materials*.

5.3.25 *Other Restrictions. Phthalates, bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced* to plastic packaging; 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*.

6.0 USER INFORMATION AND PRODUCT LABEL REQUIREMENTS VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance.[10] Each product or a combination of products[11] shall demonstrate effective performance for their intended use following the Framework for Performance Testing in Annex B. All performance tests shall be conducted as comparison tests against *benchmark product(s)* with comparable functions.

The test methods included in the following criteria refer to *household use* machines, but *institutional use* machines can be used with appropriate modifications to the method, as detailed and provided to the certification program.

The following criteria include test methods that are applicable to some product categories, as specified below; for all other product categories, follow section 6.2, Alternative Performance Requirements. Products specifically addressed in section 6.1 may use an alternate test under section 6.2 as long as the relevant characteristics specified under sections 6.1.1, 6.1.2, and 6.1.3 are tested.

6.1.1 Laundry Detergent Performance. *Laundry detergent products* shall demonstrate performance equivalent to or better than a *benchmark product(s)*, and shall be tested for the following characteristics on manufacturer-recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend).

6.1.1.1 Cleaning. *Laundry detergent products* shall demonstrate general detergency and stain removal using ASTM D4265, with instrumental or visual analysis for determination, for a minimum of four stains. Any stains marketed for use by the product shall be included in the four stains.

[10] It is generally acknowledged that standard methods have not been developed for measuring performance of laundry care products in the industrial and institutional market. The methods provided in this section may be used, but are not a requirement as long as the method used complies with Annex B.

[11] If a combination of products is to be tested for a multi-component system, the same combination must be tested for the *benchmark products*. The entire multi-component system does not need to be tested if performance can be measured with a portion of the products (e.g., detergent, builder, and booster).

6.1.1.2 Color Care. *Laundry detergent products* shall demonstrate that they maintain color fastness using the procedure in ASTM D4265 or AATCC 124 (using machine washing), by assessing color change after 5 wash cycles, with appropriate instrumental or visual analysis for determination.

6.1.2 Stain and Spot Removal Performance.[12] Products sold solely as s*tain removing products* and *bleaching products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category for cleaning and removing stains on manufacturer-recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using ASTM D4265, with instrumental or visual analysis for determination, for a minimum of four stains. Any stains marketed for use by the product shall be included in the four stains.

6.1.3 Softening Performance. Products sold solely as *softening products* shall demonstrate performance equivalent to or better than an appropriate *benchmark product* in their category on manufacturer recommended *laundry* (e.g., cotton, polyester, or cotton/polyester blend) using the Household & Commercial Products Association (HCPA) DCC-13 series evaluating softness (13B), water absorbency (13D), and static control (13F, using one of described evaluation methods).

6.2 *Alternative Performance Requirements. Alternatively, the product(s) shall demonstrate effective performance equivalent to or better than appropriate *benchmark product(s)* with comparable functions, following the Framework for Performance Testing in Annex B. Relevant characteristics[13] specified in sections 6.1.1, 6.1.2, and 6.1.3 shall apply for those product categories.

6.3 Product Label

6.3.1 Label Language. The product label shall include English and another language, or English and a graphical representation or icons.

6.3.1.1 Dilution for Concentrates. For *concentrates*, the manufacturer's label shall state clearly and prominently that dilution with water from the unheated tap is recommended, unless tested otherwise to meet the performance requirements in Section ~~2~~6.0 herein, and shall state the recommended level of dilution (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).

[12] This method is the same as 6.1.1.1 Cleaning for *laundry detergent products*, thus does not need to be repeated for *laundry detergent products* that are also intended for stain and spot removal.
[13] The relevant characteristics are the assessment endpoint (e.g., detergency & stain removal), the method of determination (e.g., instrumental), the number of cycles, and the number and type of stains, if applicable.

6.3.1.2 Dosing Directions. For products that are used with wash water,[14] the product label shall clearly and prominently provide directions for dosing normal loads, small loads or those with light soils, and large loads or those with heavy soils (e.g., state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).

6.3.1.2.1 Water Hardness Dosing. For products that are used with wash water,[8] the product label shall clearly and prominently provide recommended dosing requirements for expected water hardness levels.

6.3.21 Training Requirements. The product manufacturer, its distributor, or a third party shall offer training or training materials on the proper use of the product. This shall include applicable step-by-step instructions for the proper dilution/dosing and use, consequences of improper use or improper dilution/dosing, disposal of the product, and relevant use or maintenance of equipment, as well as recommended personal protection equipment for each stage of use for the product or equipment. Product manufacturers shall make the appropriate product and/or equipment training information, including safety data sheets (SDSs) and technical data sheets, available electronically as well as in hard copy.

6.3.3 *Ingredient Line. The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used.[15] Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.

6.3.3.1 *Consumer and User Communication. The product ingredient line shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.

6.3.3.2 *Fragrances. The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List,[16] or a subset of this list.

~~**6.2 Label Language.** The product label shall include English and another language, or English and a graphical representation or icons.~~

[14] Products that are used with wash water include *laundry detergent*, *softening*, *bleaching*, sour, and *laundry prewash products*.
[15] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, or the common chemical name.
[16] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw

~~**6.2.1 Dilution for Concentrates.** For *concentrates*, the manufacturer's label shall state clearly and prominently that dilution with water from the unheated tap is recommended, unless tested otherwise to meet the performance requirements in Section 2.0 herein, and shall state the recommended level of dilution (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).~~

~~**6.2.2 Dosing Directions.** For products that are used with wash water,[12] the product label shall clearly and prominently provide directions for dosing normal loads, small loads or those with light soils, and large loads or those with heavy soils (e.g., state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, pumps, or capfuls).~~

~~**6.2.2.1 Water Hardness Dosing.** For products that are used with wash water,[13] the product label shall clearly and prominently provide recommended dosing requirements for expected water hardness levels.~~

6.3.4 Claims and Transparency

~~**6.2.3 Use Directions. The product label shall clearly and prominently provide directions for use, and any appropriate precautions or recommendations for the use of personal protective equipment. A product certified from a multi-component system shall include a statement on the label that the manufacturer recommends the product be used with a multi-component system.**~~

~~**6.2.3.1 Cold Water Wash Directions. For products that are used with wash water,[13] the product label shall clearly and prominently provide directions for using *cold water* wash temperatures or lower temperatures when possible; an exception shall be made for *antimicrobial pesticide products*, which should state the temperature needed for antimicrobial activity.**~~

~~**6.2.3.2 Full Loads. For products that are used with wash water,[13] the product label shall clearly and prominently provide the recommendation to run full loads of *laundry*.[13]**~~

~~**6.2.4 Disposal Directions. The product label shall clearly and prominently provide directions for applicable disposal, recycling, reuse, or refill instructions for the package.**~~

6.3.4.1 *Antimicrobial Claims. Except for *antimicrobial pesticide products*, antimicrobial, antibacterial, *disinfecting*, or *sanitizing* product claims are prohibited.

~~[12] Products that are used with wash water include *laundry detergent*, *softening*, *bleaching*, sour, and *laundry prewash products*.~~

~~[13] If this recommendation is followed, it will reduce the environmental impact from doing laundry.~~

6.3.4.1~~1~~ Products Making Antimicrobial Claims. *Antimicrobial pesticide products* shall have label instructions that the product should only be used on fabric soils or *laundry* conditions that have been identified to be at risk for disease transmission or where required by regulation. Equivalent language may be approved by the certification program.

6.3.4.2 *Fragrance and Allergen Labeling. The product label and SDS shall declare if a *fragrance* has been added or if no *fragrance* has been added. The product label and SDS shall also indicate if any *allergen components* are present in the product at 0.01% or more (e.g., "Contains allergen [allergen's INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.[17]

6.3.4.3 *Natural and Biobased Claims. Only the following natural and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural", "All Natural", "100 percent Biobased", or "All Biobased" shall only contain *natural* or *biobased component*s, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.
- Claims on specific product *components* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased component*

6.3.4.4~~4~~ *Organic Claims. Organic claims shall only be based on *certified-organic component* content and shall be supported with documentation that they meet the U.S. Department of Agriculture (USDA) National Organic Program (NOP) or programs determined to be equivalent by or have recognition agreements with the USDA NOP.

~~**6.5 *Natural and Biobased Claims.** Only the following natural and *biobased*, or related, claims are allowed when the product meets the criteria outlined:~~

- ~~"100 percent Natural", "All Natural", "100 percent Biobased", or "All Biobased" shall only contain *natural* or *biobased components*, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*~~
- ~~"Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.~~
- ~~Claims on specific product *components* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased component*~~

~~**6.6 *Ingredient Line.** The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an~~

[17] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, HCPA Dictionary name, and or the common chemical name.

~~ingredient, alternative nomenclature may be used[14]. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.~~

~~**6.6.1 *Consumer and User Communication.** The product ingredient line shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.~~

~~**6.6.2 *Fragrances.** The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List,[15] or a subset of this list.~~

~~**6.7 *Fragrance and Allergen Labeling.** The product label and SDS shall declare if a *fragrance* has been added or if no *fragrance* has been added. The product label and SDS shall also indicate if any *allergen components* are present in the product at 0.01% or more (e.g., "Contains allergen [allergen's INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.[16]~~

6.3.4.5~~8~~ pH Declaration. Products shall declare the pH of the product, both the *undiluted product* and the *product as used*, on the SDS. Refer to Annex D for potential exemptions for products as *powders/solids/non-aqueous liquids*.

Note: Additional Product Label Requirements
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex D.
For products containing *enzymes*, refer to Annex E.
For products containing *microorganisms*, refer to Annex F.

6.4 Product Design

2~~6~~.4~~2~~.1~~2~~ Concentration and Compaction. The following products shall be concentrated or compacted in order for the normal/medium load dose per kg of dry, soiled laundry of the undiluted product to be at the following levels:

~~[14] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, or the common chemical name.~~
~~[15] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw~~
~~[16] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, CAS name, HCPA Dictionary name, and or the common chemical name.~~

Product[18~~6~~]	Concentrated	Ultra-Concentrated
Liquid *laundry detergent products*	5.2 ml/kg (0.08 fl.oz./lb) or less	2.6 ml/kg (0.04 fl.oz./lb) or less
Solid/Powder *laundry detergent products*	9.4 g/kg (0.15 oz/lb) or less	5.0 g/kg (0.08 oz/lb) or less
Softening products, not sold as *laundry detergent products*	5.2 ml/kg (0.08 fl.oz./lb) or less	2.6 ml/kg (0.04 fl.oz./lb) or less

Other products do not have to meet concentration and compaction requirements.

7.0 TRADEMARK USE REQUIREMENTS

7.1 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.[19]~~.~~

7.2 Misleading Claims. Green Seal trademarks shall not appear in conjunction with any human health or environmental claims, unless verified and approved in writing by Green Seal.

[18] If the *laundry detergent product* is a multi-component system, only the detergent and *softening product* must meet the concentration and compaction requirements.
~~[6] If the *laundry detergent product* is a multi-component system, only the detergent and *softening product* must meet the concentration and compaction requirements.~~
[19] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Aerosol Packaging. A *primary package* that requires a pressurized propellant to dispense product through a nozzle.

Allergen. Allergenic substances included in Annex III of the European Union Regulation 1223/2009 on Cosmetic Products, 30 November 2009, and those listed by the FDA (including food allergens Food Allergen Labeling and Consumer Protection Act of 2004 (Public Law 108-282, Title II).

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Antimicrobial Pesticide Product. A product intended for and capable of *disinfecting*, *sanitizing*, reducing, or mitigating growth or development of *microorganisms* and protecting inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Anti-Static Product. A product that is intended to eliminate, prevent, or inhibit the accumulation of static electricity.

Asthmagen. A substance designated as an *asthma*-causing agent as specifically listed by Chemical Abstracts Service (CAS) number by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC has met the AOEC sensitization criteria (i.e., A with Rs or Rrs), or if classified as a *respiratory sensitizer*, and with a probable/plausible route of inhalation exposure.

Benchmark Product. A product used for comparison in performance testing; for the purposes of this standard this is considered a nationally recognized or market-leading product, typically selected from the top three or four selling brands or companies for its category from nation-wide data.[20]

Biobased. The content of a product that is from biological products, forestry, or agricultural materials (including plant, animal, and marine materials)**.**

Bleaching Product. A product that is intended to clean and remove stains from textiles and fabric by either oxidatively or reductively modifying the stain such that it becomes more water soluble and easier to remove, or by decolorizing the stain such that it is no longer visible.

[20] It is recommended that manufacturers discuss their product testing with Green Seal before the testing is performed to ensure that the choice of comparison product(s) is appropriate.

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by any of the following agencies or programs: International Agency for Research on Cancer (Groups 1, 2A, and 2B); National Toxicology Program (Groups 1 and 2); EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (as *carcinogens* under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); or under the *GHS* (hazard categories 1 (H350, may cause cancer) and 2 (H351, suspected of causing cancer)).

Certified-Organic Components. A *component* certified as organic (by meeting the USDA organic standards) by a USDA-accredited certifying agent, or by programs determined to be equivalent or have recognition agreements with the USDA National Organic Program (NOP).

Child Labor. Work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. To avoid child labor the International Labour Organization provides the following instruments: Minimum Age Convention (e.g., a minimum age not less than 15 for standard work and 18 for hazardous work) and the Worst Forms of Child Labour Convention.

Child-Resistant Packaging. As defined by the Poison Prevention Packaging Act: packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly. This does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Closed Dilution-Control System. Systems that control the dilution of a product so that the *undiluted product* cannot be practically accessed by users.

Cold Water. For the purposes of this standard, this refers to water wash temperatures of 68°F +/- 5°F; 20ºC +/- 3°C for *household use* and of 105°F +/- 5°F; 41°C +/- 3°C for *institutional use*.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality, or a contaminant that was not deliberately added but is present in the product above 0.01% by weight.[21]

[21] This definition excludes substances that are intentionally added to a raw material but not intended for their continued presence in the final product. Examples include residual monomers, preservatives, anti-caking agents, and raw material byproducts or contaminants. Naturally occurring elements and chlorinated organics that may be present

Concentrate. A product that must be diluted by water prior to its intended use (e.g., *laundry detergent products* that must be diluted before putting into a washing machine).

Disinfecting. Destroying or irreversibly inactivating infectious *microorganism*s but not necessarily their spores on inanimate objects or surfaces.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

Fabric Protectant. A product intended to be applied to textile or fabric substrates to protect the surface from soiling or to reduce absorption of liquid into the fabric's fibers. This does not include flame retardant or waterproofing products.

Fabric Refresher. A product intended to neutralize or eliminate odors on non-laundered textiles or fabric. This does not include *anti-static products*, *spot removers*, or *antimicrobial pesticide products*.

Fabric Softener – Single Use Dryer Product. A product intended for single use in the dryer to impart softness to, or control static cling of, a load of washable fabrics. For the purpose of this definition, "single use" means a product that is intended for one-time use during a single drying cycle and is removed after completion of the drying cycle. This does not include products applied to washable fabrics prior to placing the washable fabrics in the clothes dryer.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which GMM are produced are listed by the European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Halogenated Organic Solvents. An organic solvent containing halogens, including, but not limited to, fluorine, chlorine, bromine, astatine, and iodine.

Hazardous Air Pollutant. A substance listed by the EPA in the Clean Air Act Section 112(b) (1) as a hazardous air pollutant.

Household Use. Use of products that are typically sold to consumers (usually through retail outlets such as stores or online sites) for their own personal use rather than for professional/*institutional use*. This typically includes, but is not limited to, cleaning and treating their personal property.

as a result of chlorination of the water supply, are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Industrial and Institutional Use. Use of products that are typically sold to cleaning professionals for cleaning in commercial or institutional facilities. This typically includes, but is not limited to, cleaning for government agencies, factories, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, transportation companies, hospitals, schools, libraries, auditoriums, office complexes, and similar properties where any resident's personal property is typically cleaned/treated by professionals (e.g., in-house or contract service providers rather than when the residents are responsible for cleaning tasks). This is typically referred to as commercial or professional use compared to *household use*.

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.

Laundry. Textile and fabric materials that require removal of soils or stains or require freshening or treatment (e.g., anti-static, anti-wrinkle, protectant, starch) for use. For the purposes of this standard, this does not include furniture or carpet.

Laundry Detergent Products. A detergent used to enhance the cleansing action of water for textile and fabric substrates. This can consist of a home-style detergent intended for use in a home-style machine in a commercial setting, or a complete detergent or multi-component system intended for use in commercial or industrial washing machines. The complete detergent or multi-component system is typically based on a combination of detergent (*surfactants* and builders) with additives (e.g., *bleaching*, *softening*, sour, antichlor, and alkali booster products) and may include *biobased* detergents.

Laundry Prewash. A product that is intended for application to a textile or fabric prior to laundering in a wet-cleaning process, and that supplements and contributes to the effectiveness of *laundry detergent products* and/or provides specialized performance.

Laundry Starch/Sizing/Fabric Finish Product. A product that is intended for application to a textile or fabric, either during or after laundering, to impart and prolong a crisp, fresh look and may also act to help ease ironing of the fabric.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

Minimum Risk Pesticide. A special class of *antimicrobial pesticide products* that are not subject to federal registration requirements through the EPA because they meet specific requirements under section 25(b) of FIFRA, including, but not limited to, that the *components*, both active and inert, are demonstrably safe for the intended use.

Mutagen. A substance designated as known to induce, be regarded as if they induce, or which cause concern for humans owing to the possibility that they may induce heritable mutations in the germ cells of humans and thus meet the criteria for germ cell mutagenicity hazard categories 1 and 2 (H340 and 341) under the *GHS*.

Natural Component. A *component* that comes from materials found in nature including mineral, forestry, agricultural, or biological materials such as, but not limited to, animal products produced by the animal but not part of the animal; do not contain petroleum or petroleum-derived compounds; do not contain transgenic hybrid organisms (inserted deoxyribonucleic acid that originated in a different species); have been processed without irradiation; and are not chemically altered.

Naturally Derived Component. A *component* that is partially chemically altered without petroleum *components* and have been minimally processed such that they not be altered to such an extent that they are substantially less biodegradable or more toxic (examples of potentially acceptable processes are included in Appendix 2).

Neurotoxin/Systemic Toxin. A substance designated as producing a specific target organ toxicity arising from either single exposure or repeated exposure and meets the criteria for hazard categories 1 or 2 (H370, H371, H372, H373) under the *GHS*.

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents**.**

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (~~Chloroflourocarbon~~Chlorofluorocarbon - CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances, or any substances or mixtures falling into category 1 (H420), hazardous to the ozone layer, under the *GHS*.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar

soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Primary Cleaning Function. For the purposes of this standard, the *primary cleaning function* of a product is to remove soil.

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 (Annex D), the primary package is the material that holds the individually packaged product units or the entire product contents~~,~~ but does not include the protective packaging or wrap.

Product As Used. For products that are used with wash water it is the dilution of the product at a rate of 25 liters of wash water per kg (3 gallons per lb) of *laundry* washed.[22]~~,~~ For products that are not used with wash water it is the most concentrated form of the product that the manufacturer recommends for a product's intended use.

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.

Reference Product. A standardized product formula that was developed through a consensus-based process.

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

Registered Antimicrobial Pesticide Product. A product registered with the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 U.S.C. 136) or registered with Health Canada's Therapeutic Products Directorate or Pesticide Management Regulatory Agency (PMRA).

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65); or a substance designated as Category 1 (H360), known or presumed reproductive toxicant, or Category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the *GHS.*

[22] Products for use initially with wash water include, but are not limited to, *laundry detergent*, *softening*, *bleaching*, *sour*, and *laundry prewash products*.

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 *respiratory sensitization* (H334), in accordance with the *GHS.*

Sanitizing. Reducing, but not necessarily eliminating, *microorganisms* from the inanimate environment to levels considered safe as determined by public health codes or regulations.

Secondary Function. For the purposes of this standard, the secondary function of a product may be to enhance the *primary cleaning function* through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

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.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under Category 1 for skin sensitization (H317) under the *GHS.*

Spot Remover. A product intended to clean localized areas or remove localized spots or stains on textiles or fabric. These products may or may not require subsequent laundering to achieve stain removal. This standard does not include carpet spot removers.

Softening Product. A product used to make fabric softer and prevent static. This may be a standalone product or a combination product (e.g., detergent plus softener product).

Sour Product. A product used to change the pH of *laundry* wash from alkaline conditions down to more safe and neutral conditions.

Source-Reduced Package. A *primary 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 *primary packages*, the box is included in the weight if the box is used during product use or in product merchandising.

Spray Packaging. A *primary package* that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a foam or a liquid stream are not considered spray packaging.

Stain Removing Product. A product that is intended to remove stains from textiles and fabric. This includes, but is not limited to, products making stain removing claims, *laundry detergent products*, *spot removers*, and *bleaching products*.

Surfactant. A compound that reduces interfacial tension between two liquids or a liquid and a solid. This includes detergents, wetting agents, and emulsifiers.

Synthetic Component. A *component* created artificially rather than naturally or from *natural components*. For the purposes of this standard, *naturally derived components* are not considered synthetic *components*.

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

Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals. The chemicals listed by the EPA on the Toxic Release Inventory as Persistent, Bioaccumulative and Toxic (PBT) Chemicals.

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

World Health Organization Risk Group 1. *Microorganisms* that are unlikely to cause human or animal disease under the basis for classification defined by the WHO in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health
- European Commission
- Singapore
- Japan

ANNEX B – FRAMEWORK FOR PERFORMANCE TESTING (Normative)

The purpose of performance testing shall be to demonstrate that the product or combination of products[23] performs equivalent to or better than appropriate *benchmark product(s)*[24] in the category. The framework allows for a wide range of test procedures as long as the requirements below are part of the test procedure as documented in the test report.

Test Method

Testing shall be performed using an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. This may be conducted by the manufacturer or an external laboratory that has ISO 9001 certification or equivalent quality control verification, or ISO 17025 accreditation,

Test Report

Test methodology and summarized results shall be documented in report format and provided to the certification program. The test report must contain the following requirements and shall note any parameter variations between the test product(s) and the *benchmark product(s)*.

Product Parameters

- Include a description of the test product(s) and *benchmark product(s)*
- Provide the dosage and method of dosing for both the product(s) and the comparison *benchmark product(s)* following manufacturer recommendations (*concentrate* products shall be diluted, as required, just prior to testing using unheated water from the tap)
- Identify the target soil level (e.g., light, normal, heavy)

Water Parameters

- Identify the water hardness, specified as parts per million (ppm) or grains per gallon (gpg), and the calcium/magnesium ratio (as calcium carbonate), as well as the method of producing hardness
- Report the water temperature of the wash cycle and rinse cycle in °F (°C), including any differences between the test product and *benchmark product*
- Indicate the water level or amount of water in the main wash

Test Parameters

- Report the type and size of washing machine
- Identify the laundry load by weight and composition
- Include the characteristics of the soils and stains to be tested and the fabric substrates
- Report the number of repetitions

Test Results

[23] If a combination of products is to be tested for a multi-component system, the same combination must be tested for the *benchmark products*. The entire multi-component system does not need to be tested if performance can be measured with a portion of the products (e.g., detergent, builder, and booster).

[24] It is recommended that manufacturers discuss their product testing with Green Seal before the testing is performed to ensure that the choice of comparison product(s) is appropriate.

- Report the final test results and provide any significant observations or statistical analysis, if applicable

ANNEX C – CLOSED DILUTION-CONTROL SYSTEM (Normative)

Closed Dilution-Control System. *Institutional use* products in *closed dilution-control systems* that meet all of the following requirements may be evaluated for acute toxicity (~~3.3~~2.2.1) and skin and eye damage (~~3.4~~2.1.19) herein with the *product as used* (rather than with the *undiluted product*).

A. Practically Inaccessible. The *primary package* shall not allow for access/exposure of the product during routine handling of the *primary package*, such as while transferring from shipping cartons, after opening a cap or lid, or when connecting to the dispensing system.

B. Spill Resistant. The *primary package* shall require coupling to a specially designed device in order to dispense product.

C. Drop Test. The *primary package*, with the lid on, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the *primary packages* must not leak, contents must be retained, and no damage to the outer *primary package* likely to adversely affect safety must be sustained.

D. Backflow Prevention. The product shall have backflow prevention included in the *closed dilution-control system* that meets the American Society of Sanitary Engineering's (ASSE) 1055B standard.

E. Safety Data Sheet. The product label and SDS shall include the applicable text “meets Green Seal’s requirements for acute toxicity and/or skin and eye damage at the as-used dilution”.

F. Certifier’s Website. The website of the certification program listing certified products shall identify which products were evaluated as-used, and which health criteria were evaluated as-used.

ANNEX D – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (~~3.4~~2.1.19) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (~~3.3~~2.2.1) herein. They shall also be exempt from pH declaration (~~6.9~~6.3.4.5) for the *undiluted product*.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye damage.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word "WARNING" or 'CAUTION" on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
  - May cause skin corrosion, do not get on skin
  - May cause serious eye damage, do not get in eyes
  - Harmful if swallowed, do not ingest

- Instruction, when necessary or appropriate, for first-aid treatment
- The statement “KEEP OUT OF REACH OF CHILDREN” or its practical equivalent in capitalized text

ANNEX E – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in section Annex F herein.

D. Exemptions. *Enzymes* are exempted from the requirements for *Asthmagens* (~~3.8~~2.1.3) and *Respiratory Sensitization* (~~3.9~~2.1.17) herein. Titanium dioxide[25] is exempt from the prohibition on *carcinogens* (~~3.5~~2.1.5 herein) when it is present only due to the use of *enzymes.* For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product matrix or bonded to other *ingredients*.

E. Enzyme Labeling. Products containing *enzymes* shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line
- A statement that "This product contains material that may cause or aggravate asthma" and instruction, when necessary or appropriate, for follow-up treatment

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzyme/s* and worker illness/sensitization due to the *enzyme/s*. An example of best practices that may be applicable for this plan is available at AISE.

[25] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

ANNEX F – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following with any specified testing conducted with an objective, scientifically validated method under controlled and reproducible laboratory conditions (appropriate testing details shall be provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as *components* in finished products is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations/WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby-Bauer disc method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the *undiluted product* shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count

shall be conducted in accordance with the methods for microbiological analyses listed in the JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the *undiluted product*.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms.* An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold in *spray packaging*,[26] the product label shall include a statement that the product should not be sprayed into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*,[27] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- ~~Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.~~
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[28]

[26] Or designed for use in *spray packaging*
[27] Or designed for use in *spray packaging*
[28] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of *industrial use* products included in or excluded from the scope of GS-51:

Products Included

- *Anti-static products*
- Anti-wrinkle products
- *Antimicrobial pesticide products* for *laundry* care
- *Bleaching products*
- Commercial and *institutional use laundry* products (e.g., those used in dry cleaning facilities or commercial laundries)
- Home-style detergents used in a home-style machine in the industrial and institutional market ((e.g., those used in a nursing home or with automated product dispensers)
- *Fabric protectant* products
- *Fabric refreshers*
- *Fabric softener-single use dryer product*
- *Laundry* additives (e.g., *bleaching products, softeners*, *sour products*, antichlors, water conditioners, alkali boosters)
- *Laundry detergent products* (complete detergent and multi-component systems)
- *Laundry prewash* products
- *Laundry starch/sizing/fabric finish products*
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*
- Soap nuts/*biobased* detergents
- *Softening products*
- Spot removing products (for *laundry*)
- *Stain removing products*

Products Excluded

- Air fresheners (designed to mask odor)
- Carpet cleaning, spot remover, and maintenance products (included in GS-37)
- Cleaning products for *laundry* machines for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- *Laundry detergent products* sold in Laundromat dispensers (included in GS-48)
- Fabric impregnating treatments such as flame retardants or waterproofing
- Floor finish and finish strippers (included in GS-40)
- Footwear care products
- General-purpose, bathroom, glass, and carpet cleaner products marketed specifically for *industrial and institutional use* (included in GS-37) and *household use* (included in GS-8)
- Hand cleaning products for *industrial and institutional use* (covered in GS-41), *household use* (covered in GS-44)
- *Laundry* and washing machines
- Ozone generation and use
- Solvents used in dry cleaning operations
- Leather care products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- Products that contain *enzymes* and are sold in, or designed for use in, spray packaging
- Specialty cleaning products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)
- Upholstery cleaning and maintenance products for *industrial and institutional use* (included in GS-53) and *household use* (included in GS-52)

APPENDIX 2 – PROCESSING METHODS OF NATURALLY-DERIVED COMPONENTS -(Informative)

Examples of Potentially Acceptable Processing Methods of *Naturally-Derived Components* (which must also meet all the requirements in the standard):

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponification (to produce soap)

GS-52

GREEN SEAL® STANDARD FOR
SPECIALTY CLEANING PRODUCTS FOR HOUSEHOLD USE

EDITION 2.7

(New Format)

June 23, 2022

Green Seal, Inc. • greenseal.org

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 SPECIALTY CLEANING PRODUCTS FOR HOUSEHOLD USE, GS-52

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FOREWORD

Edition. Edition 2.7 was issued on June 23, 2022. It replaces Edition from November 11, 2021. Corrections and/or clarifications were last made to this standard on August 23, 2024~~July 26, 2024~~. Information on changes to the 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section22

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
AISE. Association for Soaps, Detergents and Maintenance Products
AOEC. Association of Occupational and Environmental Clinics
ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials
ATTC. American Type Culture Collection
BCF. Bioconcentration Factor
BOD. Biological Oxygen Demand
CARB. Air Resources Board for the State of California
CAS. Chemical Abstracts Service
CDC. United States Centers for Disease Control
CFC. Chlorofluorocarbon
CFU. Colony Forming Unit
CO_2. Carbon Dioxide
CFR. Code of Federal Regulations
DOC. Dissolved Organic Carbon
ECHA. European Chemicals Agency
ECVAM. European Centre for the Validation of Alternative Methods
EN. European Standard
EPA. United States Environmental Protection Agency
Ex-ECB. ex-European Chemicals Bureau
FAO. Food and Agricultural Organization of the United Nations
FDA. United States Food and Drug Administration
GHS. Globally Harmonized System of Classification and Labelling of Chemicals
GMM. Genetically Modified Microorganism
GREENGUARD Gold. Certification from UL EcoLogo focusing on chemical emission rates. (https://www.ul.com/services/ul-greenguard-certification)
HCPA. Household and Commercial Products Association
IARC. International Agency for Research on Cancer
ICCVAM. Interagency Coordinating Committee on the Validation of Alternative Methods
ILO. International Labour Organization
INCI. International Nomenclature of Cosmetic Ingredients
IRIS. Integrated Risk Information System.
ISO. International Organization for Standardization
JECFA. Joint Food and Agricultural Organization of the United Nations/ WHO Expert Committee on Food Additives
LOAEL. Lowest-Observed Adverse Effect Level
NIH. United States Department of Health and Human Services, National Institutes of Health
NOAEL. No-Observed Adverse Effect Level
NOP. National Organic Program
NTP. National Toxicology Program
OECD. Organization for Economic Co-operation and Development
OPP. Office of Pesticide Programs of the United States Environmental Protection Agency
OSHA. Occupational Safety and Health Administration

ThOD. Theoretical Oxygen Demand.
TRI PBT. EPA Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
USDA. United States Department of Agriculture
VOC. Volatile Organic Compound
WHO. World Health Organization

GREEN SEAL STANDARD FOR SPECIALTY CLEANING PRODUCTSFOR HOUSEHOLD USE, GS-52

1.0 SCOPE

This standard establishes environmental, health, and social requirements for *specialty cleaning products* intended for *household use*. For the purposes of this standard, this includes, but is not limited to: *boat cleaning products*; *boat wax, polish, sealant, or glaze products*; *deck, siding, and outdoor furniture cleaning products*; *dish cleaning products (automatic and hand)*; *furniture polish products*; *graffiti remover products*; holding tank treatment products; *metal cleaning products*; *motor vehicle cleaning products*; *motor vehicle wax, polish, sealant, or glaze products*; *motor vehicle dressing products; waterless motor vehicle cleaning products; tire and wheel cleaning products; motor vehicle windshield washing fluid*; *odor remover products*; *optical lens cleaning products*; *oven cleaning products*; *drain additive/cleaning products;* recreational vehicle tank treatment products; septic tank treatment products; *chewing gum remover; upholstery cleaning products*; *antimicrobial pesticide products* (e.g., products covered by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)), and other household cleaning products sold for specialty uses[2]. This standard includes specialty cleaning products that contain *enzymes* or *microorganisms*. This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. This standard does not apply to products intended for industrial and institutional use, printing press cleaning products, laundry care products, *air fresheners*, or products that serve as sporicides, sterilizers, or used to sterilize *critical* and *semicritical medical devices* and equipment. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of cleaning products with surface materials is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility

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.

Criteria that include an asterisk (*) in the title are considered foundational criteria[3].

[2] Products that are sold for routine cleaning functions including *general purpose*, floor, *restroom*, toilet, glass and carpet cleaning with or without *enzymes* and *microorganisms* are covered under the Green Seal Standard for Cleaning Products for Household Use, GS-8.

[3] Foundational criteria are set-up to be the same across Green Seal's cleaning product standards, though some unique exceptions may be included for each standard. Revisions to these criteria in the future will apply to all standards that include the identified foundational criteria (excluding unique exceptions).

2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

2.1 PRODUCT PERFORMANCE. **EACH PRODUCT SHALL CLEAN SOILS AND SURFACES SPECIFIC TO THE INTENDED USE OF THE *SPECIALTY CLEANING PRODUCT* EFFECTIVELY, AT THE MOST DILUTE/LEAST CONCENTRATED MANUFACTURER-RECOMMENDED DILUTION LEVEL FOR ROUTINE CLEANING.[4] PRODUCTS SHALL BE DILUTED, AS REQUIRED, JUST PRIOR TO TESTING USING WATER FROM THE COLD TAP AT NO MORE THAN 50ºF (10ºC). EXCEPTIONS SHALL BE MADE FOR *DISH CLEANING PRODUCTS* AND *UPHOLSTERY CLEANING PRODUCTS*, WHICH SHALL PERFORM AT THE TEMPERATURES SPECIFIED IN THE CORRESPONDING CRITERIA THAT FOLLOW. THE FOLLOWING CRITERIA INCLUDE TEST METHODS THAT ARE APPLICABLE TO SOME PRODUCT CATEGORIES, FOR ALL OTHER PRODUCT CATEGORIES FOLLOW SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN. REQUIREMENTS FOR *ANTIMICROBIAL PESTICIDE PRODUCTS* ARE INCLUDED IN SECTION 2.3 HEREIN.**

2.1.1 DECK, SIDING, AND OUTDOOR FURNITURE CLEANING PRODUCTS. ***DECK, SIDING, AND OUTDOOR FURNITURE CLEANING PRODUCTS* SHALL REMOVE AT LEAST 80% OF THE PARTICULATE SOIL IN ASTM INTERNATIONAL (ASTM) D4488, A5[5].**

2.1.2 BOAT, MOTOR VEHICLE, TIRE AND WHEEL, AND WATERLESS MOTOR VEHICLE CLEANING PRODUCTS. ***BOAT, MOTOR VEHICLE, TIRE AND WHEEL, AND WATERLESS MOTOR VEHICLE CLEANING PRODUCTS* SHALL REMOVE AT LEAST 80% OF THE PARTICULATE SOIL IN ASTM D4488, A5.**

2.1.3 BILGE CLEANING PRODUCTS. ***BILGE CLEANING PRODUCTS* SHALL DEMONSTRATE EFFICACY FOR DEGREASING (EMULSIFYING OIL, GREASE, AND FUEL) AND CLEANING (REMOVAL OF SOILS AND MOLD STAINS) WITH AN APPROPRIATE TEST METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN.**

2.1.4 BOAT WAX, POLISH, SEALANT, OR GLAZE PRODUCTS. ***BOAT WAX, POLISH, SEALANT, OR GLAZE PRODUCTS* SHALL BE TESTED FOR GLOSS AND SMEAR RESISTANCE WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN.**

2.1.5 MOTOR VEHICLE WAX, POLISH, SEALANT, OR GLAZE PRODUCTS. ***MOTOR VEHICLE WAX, POLISH, SEALANT, OR GLAZE PRODUCTS* SHALL PERFORM EQUIVALENT TO OR BETTER THAN THE CONTROL PRODUCT IN ASTM D 3836**

[4] The dilution level for routine cleaning is considered the medium dose or normal dose on the label for the typical use of the product.

[5] ASTM D4488 has been withdrawn, however it is still the best available method for this performance testing, is still available for purchase, and is regularly used by laboratories to test performance.

~~OR ASTM D6625. THE CONTROL PRODUCT SHALL BE A NATIONAL MARKET-LEADING PRODUCT.~~

~~2.1.6 DISH CLEANING PRODUCTS. *DISH CLEANING PRODUCTS* ARE EXEMPT FROM THE WATER TEMPERATURE REQUIREMENT IN 2.0 FOR PERFORMANCE TESTING, BUT SHALL FOLLOW ANY TEMPERATURE SPECIFICATIONS IN THE CRITERIA BELOW.~~

~~2.1.6.1 AUTOMATIC DISH CLEANING PRODUCTS. *AUTOMATIC DISH CLEANING PRODUCTS* SHALL DEMONSTRATE SOIL REMOVAL EFFICACY WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN. THE PRODUCT SHALL BE TESTED ON THE FOLLOWING TYPES OF SOILS: COLORED, BLEACHABLE SOIL; DRY STARCHY SOIL (AMYLASE-SPECIFIC); AND DRY PROTEINACEOUS SOIL (PROTEASE-SPECIFIC). THE METHOD SHALL BE PERFORMED IN A HOUSEHOLD MACHINE AND BE TESTED AT 130 ± 5 DEG F (54.4 ± 3.8 DEG C).~~

~~2.1.6.2 RINSE AGENT PRODUCTS AND COMBINED DISH CLEANING/RINSE AGENT PRODUCTS FOR AUTOMATIC DISHWASHERS. *RINSE AGENT PRODUCTS* SHALL ACHIEVE A VISUAL RATING OF AT LEAST TWO (2) WHEN EVALUATED ACCORDING TO THE METHOD IN ASTM D3556 OR CONSUMER SPECIALTY PRODUCTS ASSOCIATION (CSPA) DCC-05A.~~

~~2.1.6.3 HAND DISH CLEANING PRODUCTS. *HAND DISH CLEANING PRODUCTS* SHALL DEMONSTRATE SOIL REMOVAL EFFICACY WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN. THE SOILS USED IN THE COMPARISON TESTING SHALL BE SOILS B AND D AS DEFINED IN ASTM D4009, OR EQUIVALENT. THE PRODUCT SHALL BE TESTED AT 110 °F (43°C).[6]~~

~~2.1.7 FURNITURE POLISH PRODUCTS. *FURNITURE POLISH PRODUCTS* SHALL BE TESTED FOR GLOSS, WATER AND SMEAR PROTECTION, AND CLEAN-ABILITY (I.E., BUFFING, SOIL AND DUST REMOVAL) WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN.~~

~~2.1.8 GRAFFITI REMOVERS. *GRAFFITI REMOVER PRODUCTS* SHALL DEMONSTRATE EFFECTIVENESS IN REMOVING GRAFFITI MARKINGS (E.G., AEROSOL PAINT, FELT TIP PEN, CRAYON, LIPSTICK) WHILE MAINTAINING THE APPEARANCE OF THE UNDERLYING SUBSTRATE (E.G., BRICK, SANDSTONE, METAL, WOOD) FOR ITS MARKETED USE, WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE TESTING HEREIN.~~

~~[6] Lowest effective temperature as specified in the current FDA Food Code regulations.~~

2.1.9 METAL CLEANING PRODUCTS. ***METAL CLEANING PRODUCTS*** **SHALL HAVE A CLEANING EFFECTIVENESS FACTOR (CEF) OF AT LEAST 0.80 AS MEASURED ACCORDING TO ASTM G122.**

2.1.10 MOTOR VEHICLE WINDSHIELD WASHING FLUID PRODUCTS. ***MOTOR VEHICLE WINDSHIELD WASHING FLUID PRODUCTS*** **SHALL BE TESTED ACCORDING TO CSPA DCC-09 AND ACHIEVE AT LEAST A RATING OF THREE (3) IN EACH OF THE FOLLOWING CATEGORIES: SOIL REMOVAL, SMEARING, AND STREAKING. ADDITIONALLY, "WINTER FORMULA"** ***PRODUCTS AS USED*** **SHALL REMAIN A LIQUID FOR AT LEAST TWENTY-FOUR (24) HOURS AT 0°F (-17.8°C).**

2.1.11 OPTICAL LENS CLEANING PRODUCTS. ***OPTICAL LENS CLEANING PRODUCTS*** **SHALL BE TESTED ACCORDING TO CSPADCC-09 AND ACHIEVE AT LEAST A RATING OF THREE IN EACH OF THE FOLLOWING CATEGORIES: SOIL REMOVAL, SMEARING, AND STREAKING.**

2.1.12 OVEN CLEANING PRODUCTS. ***OVEN CLEANING PRODUCTS*** **SHALL ACHIEVE AT LEAST A 90% SOIL REMOVAL IN CSPA DCC-12 USING TEST SOILS A OR B.**

2.1.13 UPHOLSTERY CLEANING PRODUCTS. ***UPHOLSTERY CLEANING PRODUCTS*** **SHALL BE TESTED FOR CLEANING EFFICIENCY AND RESOILING RESISTANCE WITH AN APPROPRIATE METHOD FOLLOWING SECTION 2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS HEREIN.** ***UPHOLSTERY CLEANING PRODUCTS*** **MAY BE DILUTED WITH WARM OR HOT WATER WHERE REQUIRED BY THE TEST METHOD OR PERFORMANCE CONSIDERATIONS IF THE PRODUCT IS PROVEN TO SUFFER SIGNIFICANT PERFORMANCE DEGRADATION IN COLD WATER.**

2.2 ALTERNATIVE PERFORMANCE REQUIREMENTS. **ALTERNATIVELY, THE PRODUCT SHALL DEMONSTRATE THAT IT PERFORMS EQUIVALENT TO OR BETTER THAN A NATIONALLY RECOGNIZED OR MARKET-LEADING PRODUCT OF ITS TYPE, COMPARED AT THE MOST DILUTE/LEAST CONCENTRATED MANUFACTURER-RECOMMENDED DILUTION LEVEL FOR ROUTINE CLEANING,[7] USING AN OBJECTIVE, SCIENTIFICALLY-VALIDATED METHOD CONDUCTED UNDER CONTROLLED AND REPRODUCIBLE LABORATORY CONDITIONS. THE WATER TEMPERATURE REQUIREMENT IN 2.0 SHALL APPLY, UNLESS THE NOTED EXCEPTIONS IN 2.1.6 FOR** ***DISH CLEANING PRODUCTS*** **AND 2.1.13 FOR** ***UPHOLSTERY CLEANING PRODUCTS*** **APPLY. TEST METHODOLOGY AND RESULTS SHALL BE DOCUMENTED IN SUFFICIENT DETAIL AND PROVIDED TO THE CERTIFICATION PROGRAM.**

[7] The dilution level for routine cleaning is considered the medium dose or normal dose on the label for the typical use of the product.

~~2.3 ANTIMICROBIAL PESTICIDE PRODUCTS. **ANY PRODUCT THAT MAKES AN ANTIMICROBIAL, *DISINFECTING*, OR *SANITIZING* CLAIM SHALL BE A *REGISTERED ANTIMICROBIAL PESTICIDE PRODUCT*, OR AN ON-SITE, DEVICE-GENERATED SOLUTION, OR *A MINIMUM RISK PESTICIDE*-BASED PRODUCT. *MINIMUM RISK PESTICIDE*-BASED PRODUCTS SHALL DEMONSTRATE THAT THEY MEET THE EFFICACY REQUIREMENTS FOR THE TARGET ORGANISM IN ACCORDANCE WITH APPROPRIATE FIFRA EFFICACY TEST PROTOCOLS.**~~

~~**PRODUCTS THAT ARE MANUFACTURED AND SOLD OUTSIDE OF THE US SHALL DEMONSTRATE THAT THEY MEET APPROPRIATE EFFICACY REQUIREMENTS FOR THE TARGET ORGANISM(S).**~~

2.0 SAFER CHEMICALS~~3.0 PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS~~

2.1 Safer Ingredients

2.1.1 *Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.

2.1.2 *Aquatic Biodegradability. Each of the organic *components* at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or OECD 310.

Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.
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 *component* 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.

2.1.3 *Asthmagens. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

2.1.4 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A *component* is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the *component* meets the requirement for biodegradability, 2.1.2 herein, it may be considered to not bioaccumulate.

2.1.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[4] are typically added for the purpose of releasing substances into a raw material or final product, if those substances are *carcinogens*.

Note: Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.

2.1.6 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

2.1.7 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product c*omponents* at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F, as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

[4] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

2.1.8 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

2.1.9~~3~~.1 *Formula Disclosure for Certification. For certification to this standard, all of the formula *components* shall be disclosed to the certification program including the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by weight) of each *component* in the formula.

2.1.10 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

2.1.11 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted* product shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins.*

2.1.12 Optical Brighteners. The *undiluted product* shall not contain any *components* at 0.01% or more that are *optical brighteners*.

2.1.13 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Alkyl Substances (PFAS).*

2.1.14 *Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex C criteria.

2.1.15 *Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex D criteria.

2.1.16 *Prohibited Components. The *undiluted* product shall not contain the following *components*[5]:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks

[5] The listed *components* are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals
- Triclosan

2.1.17 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

2.1.18 *Skin Absorption. The *undiluted product* shall not contain *components* at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.19 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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*.

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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

Results from peer-reviewed studies or standard in vivo or in vitro test methods may also be accepted. Testing is not required for any *component* at 0.01% for which sufficient information exists.

Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*

2.1.20 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

~~**3.2 *Animal Testing.** To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation of Alternative Methods~~

~~(ECVAM), 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.~~

2.2 Safer Products

2.2.1~~3.3~~ *Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply[6,7]~~:~~

Oral lethal dose (LD_{50})	≤ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	≤ 20,000 ppmV at 1 hr
Dermal lethal dose (LD_{50})	≤ 2,000 mg/kg

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* at 0.01% or more in the *undiluted product* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV_i = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

Note: Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*

2.2.3 *Eutrophication. The product *as used* shall not contain phosphorus at more than 0.5% by weight.

[6] Products meeting the requirements in 2.2.1~~3.3~~ will not fall into hazard categories 1 through 5 for acute oral and dermal toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the GHS when the whole product is evaluated using the weighted average approach.
[7] Recognizing the need to protect animal welfare, testing to demonstrate conformance should only be done after consulting with the certification program to ensure that other means of determining/estimating conformance have been exhausted as provision 2.2.7~~3.2~~ outlines including existing data, modeling data, data from structural analogs, and other lines of evidence.

2.2.4 *Inhalation Toxicity. The product shall meet either 2.2.4.1 or 2.2.4.2.

2.2.4.1 Chronic Inhalation Toxicity. The *product as used* shall not contain *components* at 0.01% or more with a vapor pressure above 1 mm mercury at 1 atm pressure and 20°C that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the Lowest-Observed Adverse Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).

2.2.4.2 Chamber Testing. A *product as used* shall be tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions from Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers and meet the inhalation toxicity criteria in the method (noted in the table referencing Green Seal Standard GS-37).

2.2.5 *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 LC50 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 *components* at 0.01% or more in the product as used may be used to calculate a weighted average (as in section 2.2.1).

The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

2.2.6 *Volatile Organic Compound (VOC) Content. VOCs include all organic *components* at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

For product categories not regulated by CARB, the VOC content shall not exceed the higher of the following options:

- 1% by weight.
- A limit set by CARB or the South Coast Air Quality Management District for a similar product category, which the manufacturer can prove is more appropriate.

Additionally, the following shall apply:

- CARB VOC requirements for glass cleaners shall apply to *optical lens cleaning products*.
- CARB VOC requirements for *motor vehicle wax, polish, sealant, or glaze products* shall apply to *motor vehicle dressing products*.
- CARB VOC requirements for bug and tar removers shall apply to chewing *gum remover products*.

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

- By summing the percent by weight contribution from all volatile organic *components* present in the product at 0.01% or more.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all volatile organic *components* present in the product at 0.01% or more[8].

Current CARB regulatory limits for VOCs[9].

Product Category	**Effective Date**	**Limit (%)**
Adhesive Remover		
(Floor or Wall Covering)	12/31/2006	5
(Gasket or Thread Locking)	12/31/2006	50
(General Purpose)	12/31/2006	20
(Specialty)	12/31/2006	70
Dual Purpose Air Freshener/Disinfectant		
(aerosol)	1/1/1994	60
(liquid/pump spray)	1/1/1993	18
(solid/semisolid)	1/1/1993	3
Automotive Wax/Polish/Sealant/Glaze		
(hard paste wax)	1/1/2005	45
(instant detailer)	1/1/2001	3
(all other forms)	1/1/2005	15
Brake Cleaner	12/31/2010	10
Bug and Tar Remover	1/1/2002	40
Carburetor or Fuel-injection Air Intake Cleaner	12/31/2010	10

[8] 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%.

[9] 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.

Product Category	Effective Date	Limit (%)
Upholstery Cleaner		
(aerosol)	12/31/2010	5
(nonaerosol - dilutable)	1/1/2001	0.1
(nonaerosol - ready-to-use)	12/31/2010	1
Disinfectant		
(aerosol)	12/31/2008	70
(nonaerosol)	12/31/2008	1
Dusting Aid		
(aerosol)	12/31/2010	17
(nonaerosol)	12/31/2010	3
Electrical Cleaner	12/31/2006	45
Electronic Cleaner	12/31/2007	75
Engine Degreaser		
(aerosol)	12/31/2010	10
(nonaerosol)	12/31/2004	5
Fabric Refresher		
(aerosol)	12/31/2006	15
(nonaerosol)	12/31/2006	6
Footwear or Leather Care Product		
(aerosol)	12/31/2006	75
(solid)	12/31/2006	55
(all other forms)	12/31/2006	15
Furniture polish		
(aerosol)	12/31/2004 (12/31/2013)	17 (12)
(nonaerosol - except solid/paste forms)	1/1/1994	7
(all other forms- except solid/paste forms)	12/31/2008	3
Glass cleaners	12/31/2012	3
Graffiti Remover		
(aerosol)	12/31/2006	50
(nonaerosol)	12/31/2006	30
Metal Polish or Cleanser		
(aerosol)	12/31/2012	15
(nonaerosol)	12/31/2012	3
Motor Vehicle Wash (nonaerosol)	12/31/2010	0.2
Odor Remover/Eliminator		
(aerosol)	12/31/2010	25
(nonaerosol)	12/31/2010	6
Oven or Grill Cleaner		
(aerosol/pump spray)	1/1/1993	8
(liquid)	1/1/1993	5
(nonaerosol)	12/10/2011	4

Product Category	Effective Date	Limit (%)
Sanitizer		
(aerosol)	12/31/2008	70
(nonaerosol)	12/31/2008	1
Spot Remover		
(aerosol)	12/31/2012	15
(nonaerosol)	12/31/2012	3
Tire or Wheel Cleaner		
(aerosol)	12/31/2010	8
(nonaerosol)	12/31/2010	2
Wood Cleaner		
(aerosol)	12/31/2006	17
(nonaerosol)	12/31/2006	4

2.2.7 *Animal Testing. To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation of Alternative Methods (ECVAM), 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.

~~**3.4 *Skin and Eye Damage.** The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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*.~~

~~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 2.0 or greater than or equal to 11.5, unless data prove otherwise.~~

~~Results from peer-reviewed studies or standard in vivo or in vitro test methods may also be accepted. Testing is not required for any *component* at 0.01% for which sufficient information exists.~~
~~Refer to Annex B for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*~~

~~**3.5 *Carcinogens and Reproductive Toxins.** The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall~~

not contain any *components* at 0.01% or more that, according to published uses,[10] are typically added for the purpose of releasing substances into a raw material or final product, if those substances are *carcinogens*.

Note: Refer to Annex C for the exemption of titanium dioxide in products that contain *enzymes*.

3.6 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted* product shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

3.7 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Alkyl Substances (PFAS)*.

3.9 *Asthmagens. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *asthmagens*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

3.10 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex C, Requirement D for potential exemptions for *enzymes*.

3.11 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

3.12 *Skin Absorption. The *undiluted product* shall not contain *components* at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

3.13 *Volatile Organic Compound (VOC) Content. VOCs include all organic *components* at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

[10] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

~~The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.~~

~~For product categories not regulated by CARB, the VOC content shall not exceed the higher of the following options:~~

- ~~1% by weight.~~
- ~~A limit set by CARB or the South Coast Air Quality Management District for a similar product category, which the manufacturer can prove is more appropriate.~~

~~Additionally, the following shall apply:~~

- ~~CARB VOC requirements for glass cleaners shall apply to *optical lens cleaning products*.~~
- ~~CARB VOC requirements for *motor vehicle wax, polish, sealant, or glaze products* shall apply to *motor vehicle dressing products*.~~
- ~~CARB VOC requirements for bug and tar removers shall apply to chewing *gum remover products*.~~

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

- ~~By summing the percent by weight contribution from all volatile organic *components* present in the product at 0.01% or more.~~
- ~~According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all volatile organic *components* present in the product at 0.01% or more[11].~~

~~Current CARB regulatory limits for VOCs[12].~~

~~**Product Category**~~	~~**Effective Date**~~	~~**Limit (%)**~~
~~Adhesive Remover~~		
~~(Floor or Wall Covering)~~	~~12/31/2006~~	~~5~~
~~(Gasket or Thread Locking)~~	~~12/31/2006~~	~~50~~
~~(General Purpose)~~	~~12/31/2006~~	~~20~~
~~(Specialty)~~	~~12/31/2006~~	~~70~~
~~Dual Purpose Air Freshener/Disinfectant~~		
~~(aerosol)~~	~~1/1/1994~~	~~60~~
~~(liquid/pump spray)~~	~~1/1/1993~~	~~18~~
~~(solid/semisolid)~~	~~1/1/1993~~	~~3~~

~~[11] 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%.~~

~~[12] 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.~~

~~Product Category~~	~~Effective Date~~	~~Limit (%)~~
~~*Automotive Wax/Polish/Sealant/Glaze*~~		
~~(hard paste wax)~~	~~1/1/2005~~	~~45~~
~~(instant detailer)~~	~~1/1/2001~~	~~3~~
~~(all other forms)~~	~~1/1/2005~~	~~15~~
~~Brake Cleaner~~	~~12/31/2010~~	~~10~~
~~Bug and Tar Remover~~	~~1/1/2002~~	~~40~~
~~Carburetor or Fuel-injection Air Intake Cleaner~~	~~12/31/2010~~	~~10~~
~~*Upholstery Cleaner*~~		
~~(aerosol)~~	~~12/31/2010~~	~~5~~
~~(nonaerosol - dilutable)~~	~~1/1/2001~~	~~0.1~~
~~(nonaerosol - ready-to-use)~~	~~12/31/2010~~	~~1~~
~~*Disinfectant*~~		
~~(aerosol)~~	~~12/31/2008~~	~~70~~
~~(nonaerosol)~~	~~12/31/2008~~	~~1~~
~~Dusting Aid~~		
~~(aerosol)~~	~~12/31/2010~~	~~17~~
~~(nonaerosol)~~	~~12/31/2010~~	~~3~~
~~Electrical Cleaner~~	~~12/31/2006~~	~~45~~
~~Electronic Cleaner~~	~~12/31/2007~~	~~75~~
~~Engine Degreaser~~		
~~(aerosol)~~	~~12/31/2010~~	~~10~~
~~(nonaerosol)~~	~~12/31/2004~~	~~5~~
~~Fabric Refresher~~		
~~(aerosol)~~	~~12/31/2006~~	~~15~~
~~(nonaerosol)~~	~~12/31/2006~~	~~6~~
~~Footwear or Leather Care Product~~		
~~(aerosol)~~	~~12/31/2006~~	~~75~~
~~(solid)~~	~~12/31/2006~~	~~55~~
~~(all other forms)~~	~~12/31/2006~~	~~15~~
~~*Furniture polish*~~		
~~(aerosol)~~	~~12/31/2004~~ ~~(12/31/2013)~~	~~17~~ ~~(12)~~
~~(nonaerosol - except solid/paste forms)~~	~~1/1/1994~~	~~7~~
~~(all other forms - except solid/paste forms)~~	~~12/31/2008~~	~~3~~
~~Glass cleaners~~	~~12/31/2012~~	~~3~~
~~*Graffiti Remover*~~		
~~(aerosol)~~	~~12/31/2006~~	~~50~~
~~(nonaerosol)~~	~~12/31/2006~~	~~30~~

Product Category	Effective Date	Limit (%)
Metal Polish or Cleanser		
(aerosol)	12/31/2012	15
(nonaerosol)	12/31/2012	3
Motor Vehicle Wash (nonaerosol)	12/31/2010	0.2
Odor Remover/Eliminator		
(aerosol)	12/31/2010	25
(nonaerosol)	12/31/2010	6
Oven or Grill Cleaner		
(aerosol/pump spray)	1/1/1993	8
(liquid)	1/1/1993	5
(nonaerosol)	12/10/2011	4
Sanitizer		
(aerosol)	12/31/2008	70
(nonaerosol)	12/31/2008	1
Spot Remover		
(aerosol)	12/31/2012	15
(nonaerosol)	12/31/2012	3
Tire or Wheel Cleaner		
(aerosol)	12/31/2010	8
(nonaerosol)	12/31/2010	2
Wood Cleaner		
(aerosol)	12/31/2006	17
(nonaerosol)	12/31/2006	4

3.14 *Inhalation Toxicity. The product shall meet either 3.14.1 or 3.14.2.

3.14.1 Chronic Inhalation Toxicity. The *product as used* shall not contain *components* at 0.01% or more with a vapor pressure above 1 mm mercury at 1 atm pressure and 20°C that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed-Adverse-Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the Lowest-Observed-Adverse-Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).

3.14.2 Chamber Testing. A *product as used* shall be tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions from Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers and meet the inhalation toxicity criteria in the method (noted in the table referencing Green Seal Standard GS-37).

3.15 *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 LC50 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 *components* at 0.01% or more in the product as used may be used to calculate a weighted average (as in section 3.3).

The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

3.16 *Aquatic Biodegradability. Each of the organic *components* at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or OECD 310. Specifically, within a 28-day test, the organic *component* 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_2 evolution, as % of theoretical CO_2 > 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%.
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 *component* 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.

3.17 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A *component* is considered to bioaccumulate when it has a bioconcentration

factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the *component* meets the requirement for biodegradability, 3.15 herein, it may be considered to not bioaccumulate.

3.18 *Eutrophication. The product *as used* shall not contain phosphorus at more than 0.5% by weight.

3.19 *Prohibited Components. The *undiluted* product shall not contain the following *components*[13]:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone-depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals
- Triclosan

3.20 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F, as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

3.21 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

3.22 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

3.23 Optical Brighteners. The *undiluted product* shall not contain any *components* at 0.01% or more that are *optical brighteners*.

[13] The listed *components* are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

~~**3.24 Concentrates and Dosing.** Products may be sold in a ready-to-use form except for *boat cleaning products*, *motor vehicle cleaning products*, and *deck, siding*, and *outdoor furniture cleaning products*, which shall be concentrated to at least 1:8.~~

~~**3.25 *Products Containing Enzymes.** Products that contain *enzymes* shall meet all Annex C criteria.~~

~~**3.26 *Products Containing Microorganisms.** Products that contain *microorganisms* shall meet all Annex D criteria.~~

~~**3.27 *Antimicrobial Agents.** Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.~~

3.0 RESPONSIBLE SOURCING

3.1~~28~~ *Disposable Wipes. Products that are sold in a ready-to-use format may contain disposable towelettes or other disposable single-use materials if the wipes are made from agricultural products, wood pulp, and other cellulosic materials. An exception shall be made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

4.0 LOW-IMPACT MANUFACTURING~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~

4.1 *Social Responsibility. Documentation shall be provided that the production of the product meets the following social responsibility requirements:

4.1.1 Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected. An exception shall be made for inmate workers.

4.1.2 Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union membership, political opinion, national extraction or social origin such that it affects the opportunity or treatment in employment and there shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation or exploitation.

4.1.4 Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

5.0 SUSTAINABLE PACKAGING~~PACKAGING SUSTAINABILITY REQUIREMENTS~~

5.1 Packaging Materials

5.1.1 Primary Package. The *primary package* shall be at least one of the following[10]:

- A *source-reduced package*
- *Recyclable*
- Contain 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
-

~~**5.1.1 *Resin Identification Code.** If plastic, the packaging shall be marked with the appropriate Resin Identification Code to identify the type of plastic for recycling.~~

5.1.2 *Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use package types.

5.1.3 Secondary Package. A *secondary package* shall only be used for *concentrates* such as solid dish tablets. An exception may be made for packaging of multiple units when at least one of the units is a ready-to-use form and total packaging (*primary* plus *secondary*) is a reduction in overall packaging material use.

5.1.4 Aerosol Packaging. *Aerosol packaging* shall meet the following:

- Manufacturers shall demonstrate that recycling programs for *aerosol packaging* are available to a substantial majority of communities where the product is sold

[10] For products sold in a ready-to-use format, there is currently no requirement for product refills; however, Green Seal encourages that efforts be taken to provide product refills in concentrate (with explicit instructions for safe dilution and use), as a source reduced package, or in another manner that minimizes resources used in the packaging and transport of product refills.

- Manufacturers shall provide documentation establishing why *aerosol packaging* is necessary for a given product addressing environmental, health, and performance considerations
- *Aerosol packaging* propellant shall meet all of the product-specific sustainability requirements in section 3.0 herein and shall not be a *hazardous air pollutant* (HAP)
- For Section 2.2.1~~3.3~~ Acute Toxicity and 2.2.4~~3.13~~ Inhalation Toxicity, *aerosol packaging components* will be evaluated regardless of vapor pressure level
- The product contents from the nozzle to the point-of-delivery shall be in a form that does not contain any inhalable or respirable particles, such as but not limited to foams, or if the product contents are delivered in particle form the particles between 10-2.5 microns shall not comprise more than 1% of the total particles and no particles shall be below 2.5 microns

5.2 Packaging Label

5.2~~1~~.1 *Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code to identify the type of plastic for recycling.

5.3 Restricted Substances

5.3.1~~5~~ *Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced.* Further, the sum of the concentration levels of these metals shall not exceed 100 ppm; an exception is allowed for *refillable packages* or packages that would not exceed this maximum level but for the addition of *post-consumer material*.

5.3.2~~6~~ *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*.

6.0 ~~USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~VERIFIED PERFORMANCE AND CLAIMS

6.1~~2.1~~ Product Performance. Each product shall clean soils and surfaces specific to the intended use of the *specialty cleaning product* effectively, at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning.[11] Products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50ºF (10ºC). Exceptions shall be made for *dish cleaning products* and *upholstery cleaning products*, which shall perform at the temperatures specified in the corresponding criteria that follow. The following criteria include test methods that are applicable to some product categories, for all

[11] The dilution level for routine cleaning is considered the medium dose or normal dose on the label for the typical use of the product.

other product categories follow section 6.2 ~~2.2~~ Alternative Performance Requirements herein. Requirements for *antimicrobial pesticide products* are included in section 6.3.4.2 ~~5.1.3~~2.3 herein.

6.12.1.1 Deck, Siding, and Outdoor Furniture Cleaning Products. *Deck, siding, and outdoor furniture cleaning products* shall remove at least 80% of the particulate soil in ASTM International (ASTM) D4488, A5[12].

6.12.1.2 Boat, Motor Vehicle, Tire and Wheel, and Waterless Motor Vehicle Cleaning Products. *Boat, motor vehicle, tire and wheel, and waterless motor vehicle cleaning products* shall remove at least 80% of the particulate soil in ASTM D4488, A5.

6.12.1.3 Bilge Cleaning Products. B*ilge cleaning products* shall demonstrate efficacy for degreasing (emulsifying oil, grease, and fuel) and cleaning (removal of soils and mold stains) with an appropriate test method following section 6.2 ~~2.2~~ Alternative Performance Requirements herein.

6.12.1.4 Boat Wax, Polish, Sealant, or Glaze Products. *Boat wax, polish, sealant, or glaze products* shall be tested for gloss and smear resistance with an appropriate method following section 6.2 ~~2.2~~ Alternative Performance Requirements herein.

6.12.1.5 Motor Vehicle Wax, Polish, Sealant, or Glaze Products. *Motor vehicle wax, polish, sealant, or glaze products* shall perform equivalent to or better than the control product in ASTM D 3836 or ASTM D6625. The control product shall be a national market-leading product.

6.12.1.6 Dish Cleaning Products. *Dish cleaning products* are exempt from the water temperature requirement in 2.0 for performance testing, but shall follow any temperature specifications in the criteria below.

6.1.2.1.6.1 Automatic Dish Cleaning Products. *Automatic dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 2.2 Alternative Performance Requirements herein. The product shall be tested on the following types of soils: colored, bleachable soil; dry starchy soil (amylase-specific); and dry proteinaceous soil (protease-specific). The method shall be performed in a household machine and be tested at 130 ± 5 deg F (54.4 ± 3.8 deg C).

6.1.2.1.6.2 Rinse Agent Products and Combined Dish Cleaning/Rinse Agent Products for Automatic Dishwashers. *Rinse agent products* shall achieve a visual rating of at least two (2) when evaluated according to the method in ASTM D3556 or Consumer Specialty Products Association (CSPA) DCC-05A.

6.1.2.1.6.3 Hand Dish Cleaning Products. *Hand dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 2.2

[12] ASTM D4488 has been withdrawn, however it is still the best available method for this performance testing, is still available for purchase, and is regularly used by laboratories to test performance.

Alternative Performance Requirements herein. The soils used in the comparison testing shall be soils B and D as defined in ASTM D4009, or equivalent. The product shall be tested at 110 °F (43°C).[13]

6.1.~~2.1.~~7 Furniture Polish Products. *Furniture polish products* shall be tested for gloss, water and smear protection, and clean-ability (i.e., buffing, soil and dust removal) with an appropriate method following section 2.2 Alternative Performance Requirements herein.

6.1.~~2.1.~~8 Graffiti Removers. *Graffiti remover products* shall demonstrate effectiveness in removing graffiti markings (e.g., aerosol paint, felt tip pen, crayon, lipstick) while maintaining the appearance of the underlying substrate (e.g., brick, sandstone, metal, wood) for its marketed use, with an appropriate method following section 2.2 Alternative Performance Testing herein.

6.1.~~2.1.~~9 Metal Cleaning Products. *Metal cleaning products* shall have a Cleaning Effectiveness Factor (CEF) of at least 0.80 as measured according to ASTM G122.

6.1.~~2.1.~~10 Motor Vehicle Windshield Washing Fluid Products. *Motor vehicle windshield washing fluid products* shall be tested according to CSPA DCC-09 and achieve at least a rating of three (3) in each of the following categories: soil removal, smearing, and streaking. Additionally, "winter formula" *products as used* shall remain a liquid for at least twenty-four (24) hours at 0°F (-17.8°C).

6.1.~~2.1.~~11 Optical Lens Cleaning Products. *Optical lens cleaning products* shall be tested according to CSPADCC-09 and achieve at least a rating of three in each of the following categories: soil removal, smearing, and streaking.

6.1.~~2.1.~~12 Oven Cleaning Products. *Oven cleaning products* shall achieve at least a 90% soil removal in CSPA DCC-12 using test soils A or B.

6.1.~~2.1.~~13 Upholstery Cleaning Products. *Upholstery cleaning products* shall be tested for cleaning efficiency and resoiling resistance with an appropriate method following section 6~~2~~.2 Alternative Performance Requirements herein. *Upholstery cleaning products* may be diluted with warm or hot water where required by the test method or performance considerations if the product is proven to suffer significant performance degradation in cold water.

6~~2~~.2 Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs equivalent to or better than a nationally recognized or market-leading product of its type, compared at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning,[14] using an objective, scientifically-validated method conducted under

[13] Lowest effective temperature as specified in the current FDA Food Code regulations.
[14] The dilution level for routine cleaning is considered the medium dose or normal dose on the label for the typical use of the product.

controlled and reproducible laboratory conditions. The water temperature requirement in 2.0 shall apply, unless the noted exceptions in 62.1.6 for *dish cleaning products* and 62.1.13 for *upholstery cleaning products* apply. Test methodology and results shall be documented in sufficient detail and provided to the certification program.

~~**2.3 Antimicrobial Pesticide Products.** Any product that makes an antimicrobial, *disinfecting*, or *sanitizing* claim shall be a *registered antimicrobial pesticide product*, or an on-site, device-generated solution, or *a minimum risk pesticide* based product. *Minimum risk pesticide* based products shall demonstrate that they meet the efficacy requirements for the target organism in accordance with appropriate FIFRA Efficacy Test Protocols.~~

~~Products that are manufactured and sold outside of the US shall demonstrate that they meet appropriate efficacy requirements for the target organism(s).~~

6.3 Product Label

~~**6.1 Label Dilution or Dosage Directions for Concentrates.** For *concentrates*, the label shall not instruct users to dilute with hot or warm water unless tested otherwise to meet the performance requirements in Section 2 herein (e.g., u*pholstery cleaning products* and *dish cleaning products)*, and shall state the recommended level of dilution or dosage (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, teaspoons, or capfuls).~~

6.3.12 Label Use and Disposal Directions. The product label shall have explicit disposal, recycling, reuse, or refill instructions, proper and clear directions for use, and appropriate precautions and recommendations for the use of personal protective equipment. *Direct release products* shall include instructions describing best management practices (such as choosing a site with the potential for runoff to be diverted to a sanitary sewer or detention pond) for recapture of waste water. *Boat cleaning products* and *bilge cleaning products* shall be labeled with explicit instructions that bilges should be pumped out at marina facilities and not overboard and that the boat should be cleaned away from shorelines.

6.3.2 Label Dilution or Dosage Directions for Concentrates. For *concentrates*, the label shall not instruct users to dilute with hot or warm water unless tested otherwise to meet the performance requirements in Section 6 herein (e.g., u*pholstery cleaning products* and *dish cleaning products)*, and shall state the recommended level of dilution or dosage (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, teaspoons, or capfuls).

6.3.3 Labeling of Dish Cleaning Products for Resource Conservation.

6.3.31 Hand Dish Cleaning Product. The *hand dish cleaning product* label shall include a statement encouraging energy and water conservation during the use of the *hand dish cleaning product*, such as, “Conserve energy and water and avoid

running the water continuously when washing dishes," or equivalent language as approved by the certification program.

6.3.32.2 Automatic Dish Cleaning Product. *Automatic dish cleaning product* labels shall include a statement encouraging energy and water conservation, such as, "Conserve energy and water and run a full load of dishes whenever possible," or equivalent language as approved by the certification program.

6.3.4 *Ingredient Line. The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used[15]. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.

6.3.4.1 Consumer and User Communication. The product ingredient line (6.3.4 herein) shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.

6.3.4.2 Fragrances. The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List,[16] or a subset of this list.

6.3.5 Claims and Transparency

6.3.54.1 *Antimicrobial Claims. Except for antimicrobial pesticide products, antimicrobial, antibacterial, disinfecting, or sanitizing product claims are prohibited.

6.3.54.1.1 Products Making Antimicrobial Claims. *Antimicrobial pesticide products* shall have label instructions that the product should only be used on surfaces that have been identified to be at risk for disease transmission or where required by regulation. Equivalent language may be approved by the certification program.

6.3.54.1.2 Minimum Risk Pesticides. *Minimum risk pesticide* labels shall include a statement indicating that a pre-cleaning step is needed for heavily soiled surfaces.

[15] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, Chemical Abstract Service (CAS) name, or the common chemical name.
[16] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw

6.3.5.2 Antimicrobial Pesticide Products. Any product that makes an antimicrobial, *disinfecting*, or *sanitizing* claim shall be a *registered antimicrobial pesticide product*, or an on-site, device-generated solution, or *a minimum risk pesticide*-based product. *Minimum risk pesticide*-based products shall demonstrate that they meet the efficacy requirements for the target organism in accordance with appropriate FIFRA Efficacy Test Protocols.

Products that are manufactured and sold outside of the US shall demonstrate that they meet appropriate efficacy requirements for the target organism(s).

6.3.5.3~~5~~ *Organic Claims. Organic claims shall only be based on *certified-organic component* content and shall be supported with documentation that they meet the United States Department of Agriculture (USDA) National Organic Program (NOP) or programs determined to be equivalent by or have recognition agreements with the USDA NOP.

6.3.5.4~~6~~ *Natural and Biobased Claims. Only the following natural and *biobased*, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural", "All Natural", "100 percent Biobased", or "All Biobased" shall only contain *natural* or *biobased components*, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*.
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.
- Claims on specific product *components* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased component*.

~~**6.7 *Ingredient Line.** The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI), or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used[17]. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.~~

~~**6.7.1 Consumer and User Communication.** The product ingredient line (6.8 herein) shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.~~

~~**6.7.2 Fragrances.** The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to~~

~~[17] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, Chemical Abstract Service (CAS) name, or the common chemical name.~~

~~protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List,[18] or a subset of this list.~~

6.3.5.5~~8~~ Fragrance and Allergen Labeling. The product label shall declare if a *fragrance* has been added or if no *fragrance* has been added, and shall also indicate any *allergen components* present in the product at 0.01% or more (e.g., "Contains allergen [*allergen's* INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used[14].

Note: Additional Product Label Requirements
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex B.
For products containing *enzymes*, refer to Annex C.
For products containing *microorganisms*, refer to Annex D.

6.4 Product Design

6.4.1 Concentrates and Dosing. Products may be sold in a ready-to-use form except for *boat cleaning products*, *motor vehicle cleaning products*, and *deck, siding,* and *outdoor furniture cleaning products*, which shall be concentrated to at least 1:8.

7.0 TRADEMARK USE REQUIREMENTS

7.1 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.[17]

7.2 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.

[18] ~~IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw~~
[17] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Aerosol Packaging. A *package* that requires a pressurized propellant to dispense product through a nozzle.

Air Freshener. A product designed or labeled for the purpose of masking odors, freshening, or scenting the air, but providing no cleaning or odor removal function.

Allergen. Allergenic substances included in Annex III of the European Union Regulation 1223/2009 on Cosmetic Products, 30 November 2009, and those listed by the FDA (including food allergens Food Allergen Labeling and Consumer Protection Act of 2004 [Public Law 108-282, Title II]).

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Antimicrobial Pesticide Product. A product intended for and capable of *disinfecting*, *sanitizing*, reducing, or mitigating growth or development of *microorganisms* and protecting inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Asthma. *Asthma* is a chronic inflammatory disorder of the airways that impairs breathing. *Asthma* affects children and adults, may be intermittent or persistent, and is further classified as mild, moderate, or severe. The chronic inflammation associated with variable airflow obstruction commonly causes difficulty breathing, coughing, wheezing, shortness of breath, and/or chest pain. Symptoms may resolve completely between active episodes. Symptoms may occur during exposure, immediately after exposure, or up to 24 hours later in a "late phase," frequently interrupting sleep.

Asthmagen. A substance designated as an *asthma* causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria**.**

Automatic Dish Cleaning Product. A product intended to clean dishes, utensils, pots, pans, glasses, cups or other food service tools for use in household automatic dishwashers.

Bilge Cleaning Product. A product intended to clean the lowest interior compartment in a boat.

Biobased. The content of a product that is from biological products, forestry, or agricultural materials (including plant, animal, and marine materials)**.**

Boat Cleaning Product. A product designed to clean aluminum, fiberglass, and wood surfaces of boats. These products are designed to remove algae and marine residues, grease and rust. Hull cleaning products are considered *boat cleaning products*.

Boat Wax, Polish, Sealant, or Glaze Product. A product designed to seal out moisture, increase gloss, or otherwise enhance a boat's surface. For the purposes of this standard, products that are intended as wash and wax products are considered *boat vehicle wax, polish, sealant or glaze* and *boat cleaning products***.**

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by any of the following agencies or programs: International Agency for Research on Cancer (IARC Groups 1, 2A, and 2B); National Toxicology Program (NTP Groups 1 and 2); U.S. Environmental Protection Agency Integrated Risk Information System (EPA IRIS weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (OSHA as *carcinogens* under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); and those chemicals that fall into Carcinogenicity Hazard Category 1A and 1B under the *Globally Harmonized System for Classification and Labeling of Chemicals (*GHS*).*

Certified-Organic Component. A *component* certified as organic (by meeting the USDA organic standards) by a USDA-accredited certifying agent, or programs determined to be equivalent by or have recognition agreements with the USDA National Organic Program (NOP).

Chewing Gum Remover Product. A product designed to remove chewing gum from floors, carpets, furniture, and upholstery.

Child Labor. Work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. To avoid *child labor* the International Labour Organization (ILO) provides the following instruments: Minimum Age Convention (e.g., a minimum age not less than 15 and 18 for hazardous work) and the Worst Forms of Child Labour Convention.

Child-Resistant Packaging. Child-resistant packaging, as defined by the Poison Prevention Packaging Act, is packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality, or a contaminant that was not deliberately added but is present above 0.01% by weight.[18]

Concentrate. A product, as sold that must be diluted by water prior to its intended use or that is diluted during use, such dishwasher detergents.

Critical Medical Device. An item used in medical procedures that confers a high risk for infection if it is contaminated with any *microorganism*. This includes objects that enter sterile tissue or the vascular system, which must be sterile, including, but not limited to: surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities.

Deck, Siding, and Outdoor Furniture Cleaning Product. A product intended to remove common soils from outdoor surfaces including wooden, brick, concrete, or stone decks, patios, furniture, siding, and fences.

Direct Release Product. A product that are intended for use outdoors that are likely to bypass sewage treatment with a high likelihood of being discharged directly to storm sewers or the aquatic environment, shortening the time for degradation prior to entering sensitive environments. This may include, but is not limited to, *boat cleaning products*, *deck, siding, and outdoor furniture cleaning products, graffiti removers*, *waterless motor vehicle cleaning products*, and *motor vehicle cleaning products*. For the purposes of this standard, *motor vehicle windshield washing fluid* is not considered a direct release product.

Dish Cleaning Product. A product intended to clean dishes, utensils, pots, pans, glasses, cups, and other food service tools in household settings. This includes *automatic dish cleaning product* and *hand dish cleaning products* and for the purposes of this standard it also includes *rinse agent products* used in automatic dishwashers.

Disinfecting. Destroying or irreversibly inactivating infectious *microorganism*s but not necessarily their spores on inanimate objects or surfaces.

Drain Additive/Cleaning Products. Products designed to remove soil or grease from drains, pipes, or traps through chemical, biological, or enzymatic action. Products designed to remove soil or grease from drains, pipes, or traps through physical action, such as air pressure devices, plungers, or augurs, are not included.

[18] This definition excludes substances that are intentionally added to a raw material but not intended for their continued presence in the final product. Examples include residual monomers, preservatives, anti-caking agents, and raw material byproducts or contaminants. Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Furniture Polish Product. A product used for cleaning and improving the appearance of furniture finishes. It does not include products designed solely for the purpose of cleaning or dusting, floor polish products, or products designed to leave a permanent finish (e.g., stains, finishes).

General Purpose Cleaning Product. A product used for routine cleaning of hard surfaces, including impervious flooring such as concrete, stone surfaces, or tile. This does not include cleaning products intended primarily for the removal of rust, mineral deposits, or odors. This does not include products intended primarily to strip, polish, or wax floors, and it does not include cleaning products intended primarily for cleaning dishes, laundry, toilets, restrooms, glass, carpets, upholstery, wood, or polished surfaces, nor does it include biological cleaning products. Another term used for these cleaning products may be multi-surface cleaning products.[19]

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which *GMM* are produced are listed by the European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Graffiti Remover Product. A product used to remove graffiti markings (spray paint, ink, marker, crayon, lipstick, nail polish, or shoe polish) from masonry and a variety of non-cloth or non-fabric substrates. Products labeled for use as both a paint remover and graffiti remover are included, however products labeled for use only as paint removers are not included.

Haber's Rule. For a given toxic gas, the concentration of the gas multiplied by the duration of exposure equals a constant (C x t = k); for example, doubling the concentration will halve the time for a given toxic effect.

Hand Dish Cleaning Product. A product labeled and intended for manual washing of dishes, utensils, pots, pans, glasses, cups, and other food service tools.

Halogenated Organic Solvent. An organic solvent containing halogens, including, but not limited to, fluorine, chlorine, bromine, astatine, and iodine.

Hazardous Air Pollutant (HAP). A substance listed by the EPA in the Clean Air Act Section 112(b) (1) as a hazardous air pollutant.

[19] General purpose cleaning products for household use are included in the scope of the Green Seal Standard for Household Cleaning Products, GS-8.

Household Use. Use of products that are typically sold to consumers (usually through retail outlets such as stores or online sites) for their own personal use rather than for professional use. This typically includes, but is not limited to, cleaning their households or their personal property.

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.

Metal Cleaning Product. A product designed primarily to remove tarnish (the oxidation of metal) or other surface blemishes from finished metal, metallic, or metalized surface (e.g., steel or aluminum surfaces) by physical or chemical action. Products marketed as suitable for cleaning soils in production and maintenance applications are included in the GS-34 Standard for Cleaning and Degreasing Agents and are not included in this product category unless they include *microorganisms* or *enzymes* at greater than 0.01% of the formulation. Products marketed as suitable for cleaning soils from metalized surfaces are included in the GS-37 Standard for Cleaning Products for Industrial and Institutional Use and the GS-8 Standard for Cleaning Products for Household Use.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

Minimum Risk Pesticide. A special class of *antimicrobial pesticide products* that are not subject to federal registration requirements through the EPA because they meet specific requirements under section 25(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), including, but not limited to, that the *components*, both active and inert, are demonstrably safe for the intended use.

Motor Vehicle Cleaning Product. A detergent, shampoo, rinse, and multipurpose cleaning product used to clean and maintain the interior and exterior surfaces of cars, trucks, motorcycles, recreational vehicles and other motor vehicles. For the purposes of this standard, *tire and wheel cleaning products* are separate from motor vehicle cleaning products.

Motor Vehicle Dressing Product. A product designed to enhance gloss and create a protective barrier on internal and external rubber vinyl and plastic surfaces of motor vehicles.

Motor Vehicle Windshield Washing Fluid Product. A *motor vehicle cleaning product* designed or labeled for use in a motor vehicle windshield washer fluid system for the purpose of cleaning, washing, bug removal, or wetting the windshield. Winter formula products include *components* to depress the freezing point.

Motor Vehicle Wax, Polish, Sealant, or Glaze Product. A product designed to seal out moisture, increase gloss, or otherwise enhance a motor vehicle's painted surfaces including, but not limited to, rubbing and polishing compounds, instant detailer, and hard paste wax. Products

designed for use on unpainted surfaces such as bare metal, chrome, glass, or plastic are excluded. For the purposes of this standard, products that are intended as wash and wax products are considered both motor vehicle wax, polish, sealant, or glaze and *motor vehicle cleaning products*.

Mutagen. A substance designated as known to induce, be regarded as if they induce, or which cause concern for humans owing to the possibility that they may induce heritable mutations in the germ cells of humans and thus meet the criteria for germ cell mutagenicity hazard categories 1 and 2 (H340 and 341) under the GHS.

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

Natural Component. A *component* that comes from materials found in nature including mineral, forestry, agricultural, or biological materials such as, but not limited to, animal products produced by the animal but not part of the animal; do not contain petroleum or petroleum-derived compounds; do not contain transgenic hybrid organisms (inserted deoxyribonucleic acid (DNA) that originated in a different species); have been processed without irradiation; and are not chemically altered.

Naturally-Derived Component. A *component* that is partially chemically altered without petroleum *components* and have been minimally processed such that they not be altered to such an extent that they are substantially less biodegradable or more toxic (examples of potentially acceptable processes are included in Appendix 2).

Neurotoxin/Systemic Toxin. A substance designated as producing a specific target organ toxicity arising from either single exposure or repeated exposure and meets the criteria for hazard categories 1 or 2 (H370, H371, H372, H373) under the GHS.

Odor Remover Product. A product designed or labeled to inhibit the ability of soils to create malodors, or functions to entrap, encapsulate, neutralize, convert, or eliminate malodor molecules through a physio-chemical process that is not simply masking or overpowering odors.

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents.

Optical Lens Cleaning Product. A product designed to remove oil, grease, and other common soils from exposed hard surfaces of optical equipment including glasses, photography equipment, and microscopes. Cleaning products for contact lenses are excluded.

Oven Cleaning Product. A product intended for use in removing organic soil from metallic or porcelain surfaces of ovens, barbeques, fryers, and grills.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (Chloroflourocarbon - CFC 11=1) according to the EPA list of Class I and Class II Ozone-

Depleting Substances, or any substances or mixtures falling into category 1 (H420), hazardous to the ozone layer, under the GHS.

Package. This includes the *primary package* and any *secondary package* used for the product.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Primary Cleaning Function. For the purposes of this standard, a cleaning product's primary function is to remove soil.

Primary Package. *Package* material that physically contains and contacts the product, not including the cap or lid. For products sheathed in a dissolvable film, the film components are considered product *components* rather than packaging material. 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 most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a product be diluted 1:64 or 2:64 for use, the product shall meet the health and environmental requirements at a dilution of 2:64.

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*.

Registered Antimicrobial Pesticide Product. A product registered with the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 U.S.C. 136) or registered with Health Canada's Therapeutic Products Directorate or Pesticide Management Regulatory Agency (PMRA).

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65); or a substance designated as Category 1 (H360), known or presumed reproductive toxicant, or Category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the GHS.

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 respiratory sensitization (H334) in accordance with the GHS.

Restroom Cleaning Product. A product used to clean hard surfaces in a restroom such as counters, walls, floors, fixtures, basins, tubs, toilets, urinals and tile. Other terms used for these cleaning products may include bathroom cleaning products, toilet bowl cleaning products, or urinal cleaning products.[20]

Rinse Agent Product. A product which is formulated to improve the drying effect and the appearance of articles cleaned by means of automatic household dishwashing machines.

Sanitizing. Reducing, but not necessarily eliminating, *microorganisms* from the inanimate environment to levels considered safe as determined by public health codes or regulations.

Secondary Function. For the purposes of this standard, the secondary function of a cleaning product may be to enhance the primary cleaning function through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

Secondary Package. Any packaging or material other than the primary package, including wrappers, boxes, and blister packs, but excluding shipping containers.

Semicritical Medical Device. An item used in medical procedures that contacts mucous membranes or non-intact skin. This category includes respiratory therapy and anesthesia equipment, some endoscopes, laryngoscope blades, esophageal manometry probes, cystoscopes, anorectal manometry catheters, and diaphragm fitting rings.

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

[20] Restroom cleaning products for household use are included in the scope of the Green Seal Standard for Household Cleaning Products, GS-8.

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 designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the GHS are also considered to cause skin corrosion.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under Category 1 for skin sensitization (H317) under the GHS.

Specialty Cleaning Product. Products marketed and intended for specialized cleaning functions and *antimicrobial pesticide products.*

Spray Packaging. A *package* that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a foam or a viscous liquid stream are not considered spray packaging.

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.

Surfactant. A compound that reduces interfacial tension between two liquids or a liquid and a solid. This includes detergents, wetting agents, and emulsifiers.

Synthetic Component. A *component* created artificially rather than naturally or from *natural components*. For the purposes of this standard, *naturally-derived components* are not considered synthetic *components*.

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.

Tire and Wheel Cleaning Product. A product designed or labeled exclusively to clean either tires, wheels, or both.

Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals. The chemicals listed by the EPA on the Toxic Release Inventory as Persistent, Bioaccumulative and Toxic (PBT) Chemicals.

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

Upholstery Cleaning Product. A product designed or labeled for the purpose of eliminating dirt or stains on objects upholstered or covered with fabrics such as wool, cotton, nylon, or other synthetic fabrics, including but not limited to products used on household furniture.

Waterless Motor Vehicle Cleaning Product. A *motor vehicle cleaning product* that is not rinsed with water following application. For the purposes of this standard, products that are intended as waterless wash and wax products are considered both *motor vehicle wax, polish, sealant, or glaze* and *waterless motor vehicle cleaning products*. These products may also be known as spray and wipe products.

World Health Organization (WHO) Risk Group 1. Microorganisms that are unlikely to cause human or animal disease under the basis for classification defined by the World Health Organization in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health (NIH)
- European Commission
- Singapore
- Japan

ANNEX B – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (3.4) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (3.3) herein.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or serious eye damage.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word "WARNING" or 'CAUTION" on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:
    - May cause skin corrosion, do not get on skin
    - May cause serious eye damage, do not get in eyes
    - Harmful if swallowed, do not ingest
- Instruction, when necessary or appropriate, for first-aid treatment
- The statement "KEEP OUT OF REACH OF CHILDREN" or its practical equivalent in capitalized text

ANNEX C – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in Annex D herein.

D. Exemptions. *Enzymes* are exempted from the requirements for *Asthmagens* (3.8) and *Respiratory Sensitization* (3.9) herein. Titanium dioxide[21] is exempt from the prohibition on *carcinogens* (3.5 herein) when it is present only due to the use of *enzymes.* For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product matrix or bonded to other *ingredients*.

E. Labeling Requirements. Products containing *enzymes* shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line
- A statement that immune-compromised individuals or those with asthma should avoid exposure to products containing enzymes from both direct use and incidental contact during or shortly after application to these products and instruction, when necessary or appropriate, for follow-up treatment

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzymes* and worker illness/sensitization due to the *enzymes*. An example of best practices that may be applicable for this plan is available at AISE.

[21] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

ANNEX D – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following, with any specified testing conducted with an objective, scientifically-validated method under controlled and reproducible laboratory conditions (and appropriate testing details provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as *components* in finished products is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations /WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline, and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby-Bauer disc diffusion method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the *undiluted product* shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count

shall be conducted in accordance with the methods for microbiological analyses listed in the JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the *undiluted product*.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms*. An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold for use in *spray packaging*,[22] the product label shall include a statement that the product should not be sprayed into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*,[23] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[24]

[22] Or designed for use in *spray packaging*
[23] Or designed for use in *spray packaging*
[24] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-52:

Household Products Included in GS-52

- Adhesive remover products
- *Boat cleaning products* (e.g., hull or bilge)
- *Boat wax, polish, sealant, or glaze products*
- *Chewing gum remover product*
- *Deck, siding, and outdoor furniture cleaning products*
- *Dish cleaning products* (e.g., *hand dish, automatic dish, rinse agent* products)
- *Antimicrobial pesticide products (e.g.,* disinfectant and sanitizer products)
- *Drain additive/cleaning products*
- Dusting aid products
- Electronic cleaning products
- Fruit and vegetable wash products
- *Furniture polish products*
- *Graffiti remover products*
- Grout cleaning products
- Holding tank treatment products
- Leather cleaning products
- *Metal cleaning products*
- Mold and mildew stain remover products
- *Motor vehicle cleaning products*
- *Motor vehicle dressing products*
- *Motor vehicle windshield washing fluid products*
- *Motor vehicle wax, polish, sealant, or glaze products*
- *Odor remover products*
- *Optical lens cleaning products*
- *Oven cleaning product*
- Pressurized gas dusting products
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*
- Recreational vehicle tank treatment products
- Rust stain remover products
- Septic tank treatment products
- Stone cleaning products
- *Tire and wheel cleaning products*

Products Excluded from GS-52

- *Air freshener*s (designed to mask odor)
- Cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications without *enzyme*s or *microorganisms* (included in GS-34)
- Dry erase board cleaning products (included in GS-37)
- Floor finish and finish strippers for industrial and institutional use (included in GS-40) and for household use
- General-purpose, restroom, glass and carpet cleaners for industrial and institutional use with or without *enzymes* or *microorganisms* (included in GS-37)
- General-purpose, bathroom, glass, and carpet cleaner products marketed specifically for *household use* with or without *enzymes* or *microorganisms* (included in GS-8)
- Hand cleaning products for industrial and institutional use (covered in GS-41) or *household use* (covered in GS-44)
- *Hand dish cleaning products* formulated with *antimicrobial agents* to support antimicrobial claims
- Industrial and institutional versions of those included on the left column
- Laundry care products (included in the standard in development, GS-48)
- Paint remover/thinner products
- Products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*
- Pump and sewer treatment products
- Sterilizers or high level disinfectants for *critical medical devices*

- *Upholstery cleaning products*
- *Waterless motor vehicle cleaning products*

APPENDIX 2 – NATURALLY DERIVED COMPONENTS (Informative)

Examples of Potentially Acceptable Processing Methods of Naturally-Derived *Components* (which must also meet all the requirements in the standard):

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponification (to produce soap)

GS-53

GREEN SEAL® STANDARD FOR

SPECIALTY CLEANING PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE

EDITION 2.8

(New Format)

June 23, 2022

Green Seal, Inc. • greenseal.org

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 SPECIALTY CLEANING PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-53

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FOREWORD

Edition. Edition 2.8 was issued on June 23, 2022. It replaced Edition 2.7 from November 11, 2021. Corrections and/or clarifications were last made to this standard on August 23, 2024~~July 26, 2024~~. 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.

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.

[1] Library of Standards Documents, www.greenseal.org/green-seal-standards/library#section23

ACRONYMS AND ABBREVIATIONS

ACGIH. American Conference of Governmental Industrial Hygienists
AOEC. Association of Occupational and Environmental Clinics
ASSE. American Society of Sanitary Engineering
ASTM. ASTM International, a standard setting organization formerly known as the American Society for Testing and Materials
ATTC. American Type Culture Collection
BCF. Bioconcentration Factor
BOD. Biological Oxygen Demand
CARB. Air Resources Board for the State of California
CAS. Chemical Abstracts Service
CDC. United States Centers for Disease Control
CFC. Chlorofluorocarbon
CFU. Colony Forming Unit
CO_2. Carbon Dioxide
CFR. Code of Federal Regulations
DOC. Dissolved Organic Carbon
ECHA. European Chemicals Agency
ECVAM. European Centre for the Validation of Alternative Methods
EN. European Standard
EPA. United States Environmental Protection Agency
Ex-ECB. ex-European Chemicals Bureau
FAO. Food and Agricultural Organization of the United Nations
FDA. United States Food and Drug Administration
GHS. Globally Harmonized System of Classification and Labelling of Chemicals
GMM. Genetically Modified Microorganism
GREENGUARD Gold. Certification from UL ~~EcoLogo~~ ECOLOGO focusing on chemical emission rates. (https://www.ul.com/services/ul-greenguard-certification)
HCPA. Household and Commercial Products Association
IARC. International Agency for Research on Cancer
ICCVAM. Interagency Coordinating Committee on the Validation of Alternative Methods
ILO. International Labour Organization
INCI. International Nomenclature of Cosmetic Ingredients
IRIS. Integrated Risk Information System.
ISO. International Organization for Standardization
JECFA. Joint Food and Agricultural Organization of the United Nations/ WHO Expert Committee on Food Additives
LOAEL. Lowest-Observed Adverse Effect Level
NIH. United States Department of Health and Human Services, National Institutes of Health
NOAEL. No-Observed Adverse Effect Level
NOP. National Organic Program
NTP. National Toxicology Program
OECD. ~~Organization~~ Organisation for Economic Co-operation and Development
OPP. Office of Pesticide Programs of the United States Environmental Protection Agency
OSHA. Occupational Safety and Health Administration

SDS. Safety Data Sheet
ThOD. Theoretical Oxygen Demand.
TRI PBT. EPA Toxic Release Inventory Persistent, Bioaccumulative, and Toxic Chemicals
USDA. United States Department of Agriculture
VOC. Volatile Organic Compound
WHO. World Health Organization

GREEN SEAL STANDARD FOR SPECIALTY CLEANING PRODUCTS FOR INDUSTRIAL AND INSTITUTIONAL USE, GS-53

1.0 SCOPE

This standard establishes environmental, health, and social requirements for *specialty cleaning products* intended for *industrial and institutional use*. For the purposes of this standard, this includes, but is not limited to: *boat cleaning products*; *boat wax, polish, sealant or glaze products*; *deck, siding, and outdoor furniture cleaning products*; *dish cleaning products (automatic and hand)*; *furniture polish products*; *graffiti remover products*; holding tank treatment products; *metal cleaning products*; *motor vehicle cleaning products*; *motor vehicle wax, polish, sealant, or glaze products*; *motor vehicle dressing products; waterless motor vehicle cleaning products; tire and wheel cleaning products; motor vehicle windshield washing fluid*; *odor remover products*; *optical lens cleaning products*; *oven cleaning products*; *drain additive/cleaning products*; recreational vehicle tank treatment products; septic tank treatment products; *upholstery cleaning products*; *printing press cleaning products; chewing gum remover products; adhesive remover products; rust stain remover products;* dishwasher cleaning products*; electronic cleaning products; leather cleaning products; pressurized gas duster products; dusting aid products; antimicrobial pesticide products* (e.g., products covered by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)) and other *industrial and institutional use* products sold for specialty uses.[2] This standard includes specialty cleaning products that contain *enzymes* or *microorganisms*. This standard does not include products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*. This standard does not apply to products intended for household use, laundry care products, *air fresheners*, or products that serve as sporicides, sterilizers, or used to sterilize *critical* and *semicritical medical devices* and equipment. See Appendix 1 for an example list of products included in this standard.

Due to the large number of possible cleaning products, processes, soil types, and cleaning requirements, the compatibility of cleaning products with surface materials is not specifically addressed in this standard. Product users should follow the manufacturer's instructions on compatibility.

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.

Criteria that include an asterisk (*) in the title are considered foundational criteria.[3]

[2] Products that are sold for routine cleaning functions in a building including *general purpose*, floor, *restroom*, toilet, glass and carpet cleaning with or without enzymes and microorganisms are covered under the Green Seal Standard for Cleaning Products for Industrial and Institutional Use, GS-37.

[3] Foundational criteria are set-up to be the same across Green Seal's cleaning product standards, though some unique exceptions may be included for each standard. Revisions to these criteria in the future will apply to all standards that include the identified foundational criteria (excluding unique exceptions).

2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS

2.1 Product Performance. Each product shall clean soils and surfaces specific to the intended use of the *specialty cleaning product* effectively, at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning. Products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50ºF (10ºC). Exceptions shall be made for *dish cleaning products*, *motor vehicle cleaning products*, and *upholstery cleaning products*, which shall perform at the temperatures specified in the corresponding criteria that follow. The following criteria include test methods that are applicable to some product categories, for all other product categories follow section 2.2 Alternative Performance Requirements herein. Requirements for *antimicrobial pesticide products* are included in section 2.3 herein.

2.1.1 Deck, Siding, and Outdoor Furniture Cleaning Products. *Deck, siding, and outdoor furniture cleaning products* shall remove at least 80% of the particulate soil in ASTM International (ASTM) D4488, A5[4].

2.1.2 Boat, Motor Vehicle, Tire and Wheel, and Waterless Motor Vehicle Cleaning Products. *Boat, motor vehicle, tire and wheel, and waterless motor vehicle cleaning products* shall remove at least 80% of the particulate soil in ASTM D4488, A5. *Motor vehicle cleaning products* may be diluted with warm or hot water where required by performance considerations if the product is proven to suffer significant performance degradation in cold water.

2.1.3 Bilge Cleaning Products. *Bilge cleaning products* shall demonstrate efficacy for degreasing (emulsifying oil, grease, and fuel) and cleaning (removal of soils and mold stains) with an appropriate test method following section 2.2 Alternative Performance Requirements herein.

2.1.4 Boat Wax, Polish, Sealant, or Glaze Products. *Boat wax, polish, sealant, or glaze products* shall be tested for gloss and smear resistance with an appropriate method following section 2.2 Alternative Performance Requirements herein.

2.1.5 Motor Vehicle Wax, Polish, Sealant, or Glaze Products. *Motor vehicle wax, polish, sealant, or glaze products* shall perform equivalent to or better than the control product in ASTM D3836 or ASTM D6625. The control product shall be a national market-leading product.

2.1.6 Dish Cleaning Products. *Dish cleaning products* and *rinse agent products* are exempt from the water temperature requirement in 2.0 for performance testing. *Automatic* and *hand dish cleaning products* shall be tested at the lowest effective temperature as per FDA Food Code regulations. *Rinse agent products* shall be tested at the temperature specified in the method cited in 2.1.6.2 herein.

[4] ASTM D4488 has been withdrawn, however it is still the best available method for this performance testing, is still available for purchase, and is regularly used by laboratories to test performance.

2.1.6.1 Automatic Dish Cleaning Products. *Automatic dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 2.2 Alternative Performance Requirements herein. The product shall be tested on the following types of soils: colored, bleachable soil; dry starchy soil; and dry proteinaceous soil. The method shall be performed in an institutional machine.

2.1.6.2 Rinse Agent Products and Combined Dish Cleaning/Rinse Agent Products for Automatic Dishwashers. *Rinse agent products* shall achieve a visual rating of at least two (2) when evaluated according to the method in ASTM D3556, or Consumer Specialty Products Association (CSPA) DCC-05A.

2.1.6.3 Hand Dish Cleaning Products. *Hand dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 2.2 Alternative Performance Requirements herein. The soils used in the comparison test shall be soils B and D as defined in ASTM D4009, or equivalent.

2.1.7 Furniture Polish Products. *Furniture polish products* shall be tested for gloss, water and smear protection, and clean-ability (i.e., buffing, soil and dust removal) with an appropriate method following 2.2 Alternative Performance Requirements herein.

2.1.8 Graffiti Remover Products. *Graffiti remover products* shall demonstrate effectiveness in removing graffiti markings (e.g., aerosol paint, felt tip pen, crayon, lipstick) while maintaining the appearance of the underlying substrate (e.g., brick, sandstone, metal, wood) for its marketed use, with an appropriate method following section 2.2 Alternative Performance Testing herein.

2.1.9 Metal Cleaning Products. *Metal cleaning products* shall have a Cleaning Effectiveness Factor (CEF) of at least 0.80 as measured according to ASTM G122.

2.1.10 Motor Vehicle Windshield Washing Fluid Products. *Motor vehicle windshield washing fluid products* shall be tested according to CSPA DCC-09 and achieve at least a rating of three in each of the following categories: soil removal, smearing, and streaking. Additionally, "winter formula*" products as used* shall remain a liquid for at least twenty-four (24) hours at 0°F (-17.8°C).

2.1.11 Optical Lens Cleaning Products. *Optical lens cleaning products* shall be tested according to CSPA DCC-09 and achieve at least a rating of three (3) in each of the following categories: soil removal, smearing, and streaking.

2.1.12 Oven Cleaning Products. *Oven cleaning products* shall achieve at least a 90% soil removal in CSPA DCC-12 using test soils A or B.

2.1.13 Upholstery Cleaning Products. *Upholstery cleaning products* shall be tested for cleaning efficiency and resoiling resistance with an appropriate method following section 2.2 Alternative Performance Requirements herein. *Upholstery cleaning products* may be

~~diluted with warm or hot water where required by the test method or performance considerations if the product is proven to suffer significant performance degradation in cold water.~~

~~**2.2 *Alternative Performance Requirements.** Alternatively, the product shall demonstrate that it performs equivalent to or better than a nationally recognized or market-leading product of its type, compared at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning[5], using an objective, scientifically-validated method conducted under controlled and reproducible laboratory conditions. The water temperature requirement in 2.0 shall apply, with an exception for the products in the following sections: in 2.1.2 *motor vehicle cleaning products*, 2.1.6 for *dish cleaning products*, and 2.1.13 for *upholstery cleaning products* apply. Test methodology and results shall be documented in sufficient detail and provided to the certification program.~~

~~**2.3 Antimicrobial Pesticide Products.** Any product that makes an antimicrobial, *disinfecting*, or *sanitizing*, claim shall be a *registered antimicrobial pesticide product*, or an on-site, device-generated solution, or a *minimum risk pesticide*-based product. *Minimum risk pesticide*-based products shall demonstrate that they meet the efficacy requirements for the target organism in accordance with appropriate FIFRA Efficacy Test Protocols.~~

~~Products that are manufactured and sold outside of the US shall demonstrate that they meet appropriate efficacy requirements for the target organism(s).~~

~~3.0 PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS~~ 2.0 SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 *Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.

2.1.2 *Aquatic Biodegradability. Each of the organic *components* at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or OECD 310. Specifically, within a 28-day test, the organic *components* at 0.01% or more 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%
- CO_2 evolution, as % of theoretical CO_2 > 60%

[5] ~~The dilution level for routine cleaning is considered the medium dose or the normal dose on the label for the typical use of the product.~~

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%.
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 substance 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.

2.1.3 *Asthmagens. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *asthmagens*. Refer to Annex D, Requirement D for potential exemptions for *enzymes*.

2.1.4 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, ~~3.15~~2.1.2 herein, it may be considered to not bioaccumulate.

2.1.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*.

The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses, [4] are typically added for the purpose of releasing substances into a raw material or final product, if those substances are *carcinogens*.

Note: Refer to Annex D for the exemption of titanium dioxide in products that contain *enzymes*.

2.1.6 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*

[4] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

- Not have any of the following heavy metals intentionally added: arsenic, cadmium, cobalt, hexavalent chromium, lead, manganese, mercury, nickel, and selenium

2.1.7 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product c*omponents* at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F, as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

2.1.8 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 - Endocrine Disruptor Screening Program Test Guidelines.

2.1.9 *Formula Disclosure for Certification. For certification to this standard, all formula *components* shall be disclosed to the certification program including the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by weight) of each *component* in the formula.

2.1.10 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

2.1.11 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins.*

2.1.12 Optical Brighteners. The *undiluted product* shall not contain any *components* at 0.01% or more that are *optical brighteners*.

2.1.13 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS).*

2.1.14 *Products Containing Enzymes. Products that contain *enzymes* shall meet all Annex D criteria.

2.1.15 *Products Containing Microorganisms. Products that contain *microorganisms* shall meet all Annex E criteria.

2.1.16 Prohibited Components. The *undiluted product* shall not contain the following *components*:[5] ÷

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals
- Triclosan

2.1.17 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex D, Requirement D for potential exemptions for *enzymes*.

2.1.18 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

2.1.19 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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 vivo or in vitro test methods may also be accepted. Testing is not required for any *component* at 0.01% 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

[5] The listed *components* are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

Note: Refer to Annex B for potential alternate thresholds for *closed dilution-control systems*.

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

2.1.20 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

2.2 Safer Products

2.2.1 *Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply:[6,7]

Oral lethal dose (LD_{50})	< 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	< 20,000 ppmV at 1 hr

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* at 0.01% or more in the *undiluted product* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV_i = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

Note: Refer to Annex B for potential alternate thresholds for *closed dilution-control systems*.

[6] Products meeting the requirements in ~~3.3~~2.2.1 will not fall into hazard categories 1 through 5 for acute oral toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the Globally Harmonized System for the Classification and Labeling of Chemicals (*GHS*) when the whole product is evaluated using the weighted average approach.

[7] Recognizing the need to protect animal welfare, testing to demonstrate conformance should only be done after consulting with the certification program to ensure that other means of determining/estimating conformance have been exhausted as provision 2.2.6~~7~~ outlines including existing data, modeling data, data from structural analogs, and other lines of evidence.

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

~~**2.2.2 Concentrates and Dosing.** The following products may be sold in a ready-to-use form:~~

- ~~*Adhesive remover products*~~
- ~~*Antimicrobial pesticide products*~~
- ~~*Boat wax, polish, sealant or glaze products*~~
- ~~*Chewing gum remover products*~~
- ~~Crème/cream cleansers~~
- ~~Dishwasher cleaning products~~
- ~~*Electronic cleaning products*~~
- ~~*Furniture polish products*~~
- ~~*Graffiti remover products*~~
- ~~*Leather cleaning products*~~
- ~~*Metal cleaning products*~~
- ~~Microbial and enzyme-based drain cleaning products~~
- ~~Microbial and enzyme-based septic, holding, and recreational vehicle tank treatment products~~
- ~~*Motor vehicle dressing products*~~
- ~~*Motor vehicle wax, polish, sealant, or glaze products* for hand detailing~~
- ~~*Optical lens cleaning products*~~
- ~~*Oven cleaning products*~~
- ~~*Printing press cleaning products*~~
- ~~*Pressurized gas duster products*~~
- ~~*Rust stain remover products*~~
- ~~*Upholstery cleaning products* solely labeled as spot or stain removers~~
- ~~*Waterless motor vehicle cleaning products*~~

~~All the other products shall be concentrated to at least the following:~~

2.2.32 *Eutrophication. The *product as used* shall not contain phosphorus at more than 0.5% by weight.

2.2.43 *Inhalation Toxicity. The product shall meet either 2.2.43.1 or 2.2.43.2.

2.2.43.1 Chronic Inhalation Toxicity. The *product as used* shall not contain *components* at 0.01% or more with a vapor pressure above 1 mm mercury at 1 atm pressure and 20° C that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below

1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the Lowest-Observed Adverse Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).

2.2.34.2 Chamber Testing. A *product as used* shall be tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions From Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers and meet the inhalation toxicity criteria in the method (noted in the table referencing Green Seal Standard GS-37).

2.2.54 *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_{50} 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 *components* at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 2.2.76).

The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.

2.2.56 *Volatile Organic Compound (VOC) Content. VOCs include all organic *components* present at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

For product categories not regulated by CARB, the VOC level shall not exceed the higher of the following options:

- 1% by weight.
- A limit set by CARB or the South Coast Air Quality Management District for a similar product category, which the manufacturer can prove is more appropriate.

Additionally, the following shall apply:

- CARB VOC requirements for glass cleaners shall apply to *optical lens cleaning products*.
- CARB VOC requirements for *motor vehicle wax, polish, sealant, or glaze products* shall apply to *motor vehicle dressing products*.
- CARB VOC requirements for bug and tar removers shall apply to chewing *gum remover products*.

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

- By summing the percent by weight contribution from all volatile organic *components* present in the product at 0.01% or more.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all VOCs present in the product at 0.01% or more.[8]

Current CARB regulatory limits for VOCs.[9]

Product Category	**Effective Date**	**Limit (%)**
Adhesive Remover		
(Floor or Wall Covering)	12/31/2006	5
(Gasket or Thread Locking)	12/31/2006	50
(General Purpose)	12/31/2006	20
(Specialty)	12/31/2006	70
Dual Purpose Air Freshener/Disinfectant		
(aerosol)	1/1/1994	60
(liquid/pump spray)	1/1/1993	18
(solid/semisolid)	1/1/1993	3
Automotive Wax/Polish/Sealant/Glaze		
(hard paste wax)	1/1/2005	45
(instant detailer)	1/1/2001	3
(all other forms)	1/1/2005	15
Brake Cleaner	12/31/2010	10
Bug and Tar Remover	1/1/2002	40
Carburetor or Fuel-injection Air Intake Cleaner	12/31/2010	10
Upholstery Cleaner		
(aerosol)	12/31/2010	5
(nonaerosol - dilutable)	1/1/2001	0.1
(nonaerosol - ready-to-use)	12/31/2010	1
Disinfectant		
(aerosol)	12/31/2008	70
(nonaerosol)	12/31/2008	1

[8] 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%.

[9] 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.

Product Category	Effective Date	Limit (%)
Dusting Aid		
(aerosol)	12/31/2010	17
(nonaerosol)	12/31/2010	3
Electrical Cleaner	12/31/2006	45
Electronic Cleaner	12/31/2007	75
Engine Degreaser		
(aerosol)	12/31/2010	10
(nonaerosol)	12/31/2004	5
Fabric Refresher		
(aerosol)	12/31/2006	15
(nonaerosol)	12/31/2006	6
Footwear or Leather Care Product		
(aerosol)	12/31/2006	75
(solid)	12/31/2006	55
(all other forms)	12/31/2006	15
Furniture polish		
(aerosol)	12/31/2004	17
	(12/31/2013)	(12)
(nonaerosol - except solid/paste forms)	1/1/1994	7
(all other forms- except solid/paste forms)	12/31/2008	3
Glass cleaners	12/31/2012	3
Graffiti Remover		
(aerosol)	12/31/2006	50
(nonaerosol)	12/31/2006	30
Metal Polish or Cleanser		
(aerosol)	12/31/2012	15
(nonaerosol)	12/31/2012	3
Motor Vehicle Wash (nonaerosol)	12/31/2010	0.2
Odor Remover/Eliminator		
(aerosol)	12/31/2010	25
(nonaerosol)	12/31/2010	6
Oven or Grill Cleaner		
(aerosol/pump spray)	1/1/1993	8
(liquid)	1/1/1993	5
(nonaerosol)	12/10/2011	4
Sanitizer		
(aerosol)	12/31/2008	70

Product Category	Effective Date	Limit (%)
(nonaerosol)	12/31/2008	1
Spot Remover (aerosol) (nonaerosol)	 12/31/2012 12/31/2012	 15 3
Tire or Wheel Cleaner (aerosol) (nonaerosol)	 12/31/2010 12/31/2010	 8 2
Wood Cleaner (aerosol) (nonaerosol)	 12/31/2006 12/31/2006	 17 4

2.2.67 *Animal Testing. To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation of Alternative Methods (ECVAM), 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.

~~**3.1 *Formula Disclosure for Certification.** For certification to this standard, all formula *components* shall be disclosed to the certification program including the chemical name, the Chemical Abstracts Service (CAS) registry number, and the levels (% by weight) of each *component* in the formula.~~

~~**3.2 *Animal Testing.** To avoid new animal testing, previous test results will be accepted as evidence of meeting a criterion. When existing data is 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 (ICCVAM) or the European Centre for the Validation of Alternative Methods (ECVAM), 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.~~

3.3 *Acute Toxicity. The *undiluted product* shall not be toxic to humans. A product is considered toxic if any of the following criteria apply[10,11]:

Oral lethal dose (LD_{50})	≤ 5,000 mg/kg
Inhalation lethal concentration (LC_{50})	≤ 20,000 ppmV at 1 hr

For purposes of demonstrating compliance with this requirement, existing acute toxicity data for each of the product's *components* at 0.01% or more in the *undiluted product* may be used. These data are used to calculate a weighted average that assumes that the toxicity of the individual *components* is additive. The toxicity values are adjusted by the weight of the *components* 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 *component*
TV_i = the toxicity value for each *component* (LD_{50})
n = number of *components*

Inhalation toxicity shall be determined from all *components* at 0.01% or more in the *undiluted product*, when the *component* has a vapor pressure greater than 1 mm Hg at 1 atm pressure and 20°C.

Note: Refer to Annex B for potential alternate thresholds for *closed dilution control systems.*

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids.*

3.4 *Skin and Eye Damage. The *undiluted product* shall not cause *skin corrosion* or cause *serious eye damage*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* present at 0.01% or more in the *undiluted product*. If these *components*, 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 vivo or in vitro test methods may also be accepted. Testing is not required for any *component* at 0.01% 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 2.0 or greater than or equal to 11.5, unless data prove otherwise.

[10] Products meeting the requirements in 3.3 will not fall into hazard categories 1 through 5 for acute oral toxicity and will not fall into hazard categories 1 through 4 for acute inhalation toxicity under the Globally Harmonized System for the Classification and Labeling of Chemicals (*GHS*) when the whole product is evaluated using the weighted average approach.

[11] Recognizing the need to protect animal welfare, testing to demonstrate conformance should only be done after consulting with the certification program to ensure that other means of determining/estimating conformance have been exhausted as provision 3.2 outlines including existing data, modeling data, data from structural analogs, and other lines of evidence.

Note: Refer to Annex B for potential alternate thresholds for *closed dilution control systems*.

Note: Refer to Annex C for potential alternate thresholds for products as *powders/solids/non-aqueous liquids*.

3.5 *Carcinogens and Reproductive Toxins. The *undiluted product* shall not contain any *components* that are *carcinogens* or *reproductive toxins*. The *undiluted product* shall not contain any *components* at 0.01% or more that, according to published uses,[12] are typically added for the purpose of releasing substances into a raw material or final product, if those substances are *carcinogens*.

Note: Refer to Annex D for the exemption of titanium dioxide in products that contain *enzymes*.

3.6 *Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

3.7 *Endocrine Disruptors. The *undiluted product* shall not contain any *components* that are on the EPA List of Chemicals for Tier 1 Screening that have been shown to disrupt hormones (e.g., have estrogen- or androgen-mediated effects), tested according to the EPA Series 890 – Endocrine Disruptor Screening Program Test Guidelines.

3.8 Per- and Polyfluoroalkyl Substances (PFAS). The *undiluted product* shall not contain any *components* that are *Per- and Polyfluoroalkyl Substances (PFAS)*.

3.9 *Asthmagens. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *asthmagens*. Refer to Annex D, Requirement D for potential exemptions for *enzymes*.

3.10 *Respiratory Sensitization. The *undiluted product* shall not contain any *components* at 0.01% or more that have been identified as *respiratory sensitizers*. Refer to Annex D, Requirement D for potential exemptions for *enzymes*.

3.11 *Skin Sensitization. The *undiluted product* shall not be a *skin sensitizer*. For purposes of demonstrating compliance with this requirement, data may be evaluated for each of the product's *components* at 0.01% or more in the *undiluted product*. If these *components*, at their concentrations in the *undiluted product*, are not shown to be *skin sensitizers*, then the product will not be considered to be a *skin sensitizer*.

3.12 *Skin Absorption. The *undiluted product* shall not contain *components* present at 1% or more in the product that are listed on the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) list carrying a skin notation or substances that are listed on the German Deutsche Forschungsgemeinschaft (DFG) maximum allowable concentrations (MAK) list with a skin absorption H notation. Further, the product shall not contain *components* at 0.01% or more in the *undiluted product* that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.

[12] Published uses include sources such as peer-reviewed research, industry practice, or manufacturer documentation.

3.13 *Volatile Organic Compound (VOC) Content. VOCs include all organic *components* present at 0.01% or more that have a vapor pressure of greater than 0.1 mm mercury at 1 atm pressure and 20º C. "VOC content" means the total weight of VOCs in a product expressed as a percentage of the product weight.

The VOC content of the *product as used* shall contain no more than the current regulatory limits of the Air Resources Board for the State of California (CARB) for its product category.

For product categories not regulated by CARB, the VOC level shall not exceed the higher of the following options:

- 1% by weight.
- A limit set by CARB or the South Coast Air Quality Management District for a similar product category, which the manufacturer can prove is more appropriate.

Additionally, the following shall apply:

- CARB VOC requirements for glass cleaners shall apply to *optical lens cleaning products*.
- CARB VOC requirements for *motor vehicle wax, polish, sealant, or glaze products* shall apply to *motor vehicle dressing products*.
- CARB VOC requirements for bug and tar removers shall apply to chewing *gum remover products*.

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

- By summing the percent by weight contribution from all volatile organic *components* present in the product at 0.01% or more.
- According to the California Air Resources Board Method 310 (or equivalent), modified to include all *fragrances* and all VOCs present in the product at 0.01% or more[13].

Current CARB regulatory limits for VOCs[14].

Product Category	**Effective Date**	**Limit (%)**
Adhesive Remover		
(Floor or Wall Covering)	12/31/2006	5
(Gasket or Thread Locking)	12/31/2006	50
(General Purpose)	12/31/2006	20
(Specialty)	12/31/2006	70

[13] 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%.

[14] 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.

~~Product Category~~	~~Effective Date~~	~~Limit (%)~~
~~Dual Purpose Air Freshener/Disinfectant~~ ~~(aerosol)~~ ~~(liquid/pump spray)~~ ~~(solid/semisolid)~~	 ~~1/1/1994~~ ~~1/1/1993~~ ~~1/1/1993~~	 ~~60~~ ~~18~~ ~~3~~
~~*Automotive Wax/Polish/Sealant/Glaze*~~ ~~(hard paste wax)~~ ~~(instant detailer)~~ ~~(all other forms)~~	 ~~1/1/2005~~ ~~1/1/2001~~ ~~1/1/2005~~	 ~~45~~ ~~3~~ ~~15~~
~~Brake Cleaner~~	~~12/31/2010~~	~~10~~
~~Bug and Tar Remover~~	~~1/1/2002~~	~~40~~
~~Carburetor or Fuel-injection Air Intake Cleaner~~	~~12/31/2010~~	~~10~~
~~*Upholstery Cleaner*~~ ~~(aerosol)~~ ~~(nonaerosol - dilutable)~~ ~~(nonaerosol - ready-to-use)~~	 ~~12/31/2010~~ ~~1/1/2001~~ ~~12/31/2010~~	 ~~5~~ ~~0.1~~ ~~1~~
~~*Disinfectant*~~ ~~(aerosol)~~ ~~(nonaerosol)~~	 ~~12/31/2008~~ ~~12/31/2008~~	 ~~70~~ ~~1~~
~~Dusting Aid~~ ~~(aerosol)~~ ~~(nonaerosol)~~	 ~~12/31/2010~~ ~~12/31/2010~~	 ~~17~~ ~~3~~
~~Electrical Cleaner~~	~~12/31/2006~~	~~45~~
~~Electronic Cleaner~~	~~12/31/2007~~	~~75~~
~~Engine Degreaser~~ ~~(aerosol)~~ ~~(nonaerosol)~~	 ~~12/31/2010~~ ~~12/31/2004~~	 ~~10~~ ~~5~~
~~Fabric Refresher~~ ~~(aerosol)~~ ~~(nonaerosol)~~	 ~~12/31/2006~~ ~~12/31/2006~~	 ~~15~~ ~~6~~
~~Footwear or Leather Care Product~~ ~~(aerosol)~~ ~~(solid)~~ ~~(all other forms)~~	 ~~12/31/2006~~ ~~12/31/2006~~ ~~12/31/2006~~	 ~~75~~ ~~55~~ ~~15~~
~~*Furniture polish*~~ ~~(aerosol)~~	 ~~12/31/2004~~ ~~(12/31/2013)~~	 ~~17~~ ~~(12)~~

Product Category	**Effective Date**	**Limit (%)**
(nonaerosol – except solid/paste forms) (all other forms- except solid/paste forms)	1/1/1994 12/31/2008	7 3
Glass cleaners	12/31/2012	3
Graffiti Remover (aerosol) (nonaerosol)	 12/31/2006 12/31/2006	 50 30
Metal Polish or Cleanser (aerosol) (nonaerosol)	 12/31/2012 12/31/2012	 15 3
Motor Vehicle Wash (nonaerosol)	12/31/2010	0.2
Odor Remover/Eliminator (aerosol) (nonaerosol)	 12/31/2010 12/31/2010	 25 6
Oven or Grill Cleaner (aerosol/pump spray) (liquid) (nonaerosol)	 1/1/1993 1/1/1993 12/10/2011	 8 5 4
Sanitizer (aerosol) (nonaerosol)	 12/31/2008 12/31/2008	 70 1
Spot Remover (aerosol) (nonaerosol)	 12/31/2012 12/31/2012	 15 3
Tire or Wheel Cleaner (aerosol) (nonaerosol)	 12/31/2010 12/31/2010	 8 2
Wood Cleaner (aerosol) (nonaerosol)	 12/31/2006 12/31/2006	 17 4

3.14 *Inhalation Toxicity. The product shall meet either 3.14.1 or 3.14.2.

3.14.1 Chronic Inhalation Toxicity. The *product as used* shall not contain *components* at 0.01% or more with a vapor pressure above 1 mm mercury at 1 atm pressure and 20° C that are classified as producing significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor according to Organization for Economic Co-operation and Development (OECD) Harmonized Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures. For the purposes of this standard, significant toxic effects in mammals from repeated inhalation exposure at or below 1.0 mg/L as a vapor shall be established by a No-Observed Adverse Effect Level (NOAEL), based on a test

~~duration of 90 days at 6 hours per day; values from other exposure regimes shall be estimated (extrapolated) per the principles of *Haber's rule*. In lieu of a NOAEL, the Lowest-Observed Adverse Effect Level (LOAEL) can be used with a ten-fold safety factor (i.e., LOAEL/10).~~

~~**3.14.2 Chamber Testing.** A *product as used* shall be tested according to the method used for the GREENGUARD Gold Certification Program Method for Measuring and Evaluating Chemical Emissions From Cleaners And Cleaning Maintenance Systems Using Dynamic Environmental Chambers and meet the inhalation toxicity criteria in the method (noted in the table referencing Green Seal Standard GS-37).~~

~~**3.15 *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_{50} 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 *components* at 0.01% or more in the *product as used* may be used to calculate a weighted average (as in section 3.3).~~

~~The preferred sources of data come from the following appropriate protocols in the International Organization for Standardization (ISO) 7346-2 for fish, OEDC Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, or OECD TG 201 for algae.~~

~~**3.16 *Aquatic Biodegradability.** Each of the organic *components* at 0.01% or more in the *product as used* shall exhibit ready biodegradability in accordance with the OECD definition, except for polymers. Biodegradability shall be measured according to any of the following methods: ISO 7827, 9439, 10707, 10708, 9408, 14593; OECD Methods 301A–F; or OECD 310. Specifically, within a 28-day test, the organic *components* at 0.01% or more 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%~~
- ~~CO_2 evolution, as % of theoretical CO_2 > 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%.~~
~~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 substance 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.

3.17 *Bioaccumulating Compounds. The *product as used* shall not contain any *components* at 0.01% or more that bioaccumulate or that are known to form degradation products that bioaccumulate. A chemical is considered to bioaccumulate when it has a bioconcentration factor (BCF) ≥ 500 (or log K_{ow} ≥4). The preferred source of data is from OECD TG 305 (for BCF). If the chemical meets the requirement for biodegradability, 3.15 herein, it may be considered to not bioaccumulate.

3.18 *Eutrophication. The *product as used* shall not contain phosphorus at more than 0.5% by weight.

3.19 Prohibited Components. The *undiluted product* shall not contain the following *components*[15]:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- *Halogenated organic solvents*
- The heavy metals lead, hexavalent chromium, or selenium; either in the elemental form or compounds
- Nitro-musks
- o-Phenylphenol
- *Ozone depleting compounds*
- Phthalates
- Polycyclic musks
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals
- Triclosan

3.20 *Combustibility. The *undiluted product* shall not be combustible. The product or 99% by volume of the product *components* at 0.01% or more in the *undiluted product* shall have a flashpoint above 150°F, as tested using either the Cleveland Open Cup Tester (ASTM D92-05a), the Abel Closed-Cup method (ISO 13736), or the Pensky-Martens Closed-Cup method (ISO 2719). Alternatively, the product shall not sustain a flame when tested using ASTM D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

[15] The listed *components* are prohibited because they have demonstrated one or more of the following health concerns: endocrine disruption, neurotoxicity, and systemic toxicity. Other chemicals may have such health concerns but are not listed because they may already be prohibited through other criteria in the standard.

3.21 *Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

3.22 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

3.23 Optical Brighteners. The *undiluted product* shall not contain any *components* at 0.01% or more that are *optical brighteners*.

3.24 Concentrates and Dosing. The following products may be sold in a ready-to-use form:

- *Adhesive remover products*
- *Antimicrobial pesticide products*
- *Boat wax, polish, sealant or glaze products*
- *Chewing gum remover products*
- Crème/cream cleansers
- Dishwasher cleaning products
- *Electronic cleaning products*
- *Furniture polish products*
- *Graffiti remover products*
- *Leather cleaning products*
- *Metal cleaning products*
- Microbial and enzyme-based drain cleaning products
- Microbial and enzyme-based septic, holding, and recreational vehicle tank treatment products
- *Motor vehicle dressing products*
- *Motor vehicle wax, polish, sealant, or glaze products* for hand detailing
- *Optical lens cleaning products*
- *Oven cleaning products*
- *Printing press cleaning products*
- *Pressurized gas duster products*
- *Rust stain remover products*
- *Upholstery cleaning products* solely labeled as spot or stain removers
- *Waterless motor vehicle cleaning products*

All the other products shall be concentrated to at least the following:

Product Category	**Concentration Requirement**
Boat cleaning products	1:64
Motor vehicle cleaning products	1:100

~~Product Category~~	~~Concentration Requirement~~
~~*Motor vehicle wax, polish, sealant, or glaze products* for conveyor, rollover, in-bay automatic and self-service car washes~~	~~1:100~~
~~*Deck, siding, or outdoor furniture cleaning products*~~	~~1:32~~
~~*Hand* and *automatic dish cleaning products*~~	~~1:200~~
~~*Rinse agent products*~~	~~1:400~~
~~*Tire and wheel cleaning products*~~	~~1:4~~
~~*Dusting aid products*~~	~~1:4~~
~~All other products~~	~~1:16~~

~~**3.25 *Products Containing Enzymes.** Products that contain *enzymes* shall meet all Annex D criteria.~~

~~**3.26 *Products Containing Microorganisms.** Products that contain *microorganisms* shall meet all Annex E criteria.~~

~~**3.27 *Antimicrobial Agents.** Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* is permitted only for the preservation or stabilization of the product.~~

3.0 RESPONSIBLE SOURCING

3.1~~2~~8 *Disposable Wipes. Products that are sold in a ready-to-use format may contain disposable wipes/towelettes/sheets or other disposable single-use materials if the wipes are made from agricultural products, wood pulp, or other cellulosic materials. An exception shall be made for reusable wipes/towelettes/sheets that are intended to be used multiple times (e.g., three or more uses).

4.0 LOW-IMPACT MANUFACTURING~~MANUFACTURING SUSTAINABILITY REQUIREMENTS~~

4.1 *Social Responsibility. Documentation shall be provided that the production of the product meets the following social responsibility requirements:

4.1.1 Freedom of Association and Collective Bargaining. Workers shall have the right to join or form trade unions of their own choosing and their right to bargain collectively shall be recognized and respected. An exception shall be made for inmate workers.

4.1.2 Freedom of Labor. There shall not be forced or bonded labor or use of *child labor*.

4.1.3 Freedom from Discrimination. There shall not be discrimination in terms of race, color, sex, religion, age, disability, gender, marital status, sexual orientation, union

membership, political opinion, national extraction or social origin such that it affects the opportunity or treatment in employment and there shall be no support or tolerance of corporal punishment, physical or verbal coercion, sexual or other harassment, intimidation or exploitation.

4.1.4 Occupational Health and Safety. A safe and hygienic workplace environment shall be provided with access to potable water. Adequate steps shall be taken to minimize the hazards of the workplace and workers shall receive health and safety training to prevent accidents and injury.

4.1.5 Conditions of Employment. Workers shall work under fair conditions of employment. Wages, working hours and overtime shall meet at a minimum the national legal or industry benchmark standard and regular employment shall be provided.

5.0 ~~PACKAGING SUSTAINABILITY REQUIREMENTS~~SUSTAINABLE PACKAGING

5.1 Packaging Materials

5.1.1 Plastic Package. A plastic *primary package* shall be one of the following:[10] ~~:~~

- A *source-reduced package*
- *Recyclable*
- Contain 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.

~~**5.1.1 *Resin Identification Code.** If plastic, the packaging shall be marked with the appropriate Resin Identification Code.~~

5.1.2 Non-Plastic Package. For materials other than plastic, the *primary package* shall contain at least 25% *post-consumer material* or demonstrate that efforts were made to use the maximum available *post-consumer material* in the package or shall be *recyclable*.

5.1.3 *Concentrated Product Packaging. *Concentrates* are prohibited from being packaged in spray-dispenser bottles, disposable wipes, or other ready-to-use package types.

5.1.4 Aerosol Packaging. *Aerosol packaging* shall meet the following:

- Manufacturers shall demonstrate that recycling programs for *aerosol packaging* are available to a substantial majority of communities where the product is sold

[10] For products sold in a ready-to-use format, there is currently no requirement for product refills, however, Green Seal encourages that efforts be taken to provide product refills in concentrate (with explicit instructions for safe dilution and use), a source reduced package, or in another manner that minimizes resources used in the packaging and transport of product refills.

- Manufacturers shall provide documentation establishing why *aerosol packaging* is necessary for a given product addressing environmental, health, and performance considerations
- *Aerosol packaging* propellant shall meet all of the product-specific sustainability requirements in section ~~3.0~~ 2.0 herein and shall not be a *hazardous air pollutant* (HAP)
- For Section ~~3.3~~ 2.2.1 Acute Toxicity and 2.2.~~4~~ 3 Inhalation Toxicity, *aerosol packaging components* will be evaluated regardless of vapor pressure level
- The product contents from the nozzle to the point-of-delivery shall be in a form that does not contain any inhalable or respirable particles, such as but not limited to foams, or if the product contents are delivered in particle form the particles between 10-2.5 microns shall not comprise more than 1% of the total particles and no particles shall be below 2.5 microns

5.2 Packaging Label

5.2~~1~~.1 *Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code.

5.3 Restricted Substances

5.3.1~~5~~ *Heavy Metal Restrictions. The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced.* Further, the sum of the concentration levels of these metals shall not exceed 100 ppm; an exception is allowed for *refillable packages* or packages that would not exceed this maximum level but for the addition of *post-consumer material*.

5.3.2~~1~~6 *Other Restrictions. Phthalates, bisphenol A, and chlorinated packaging material are prohibited from being *intentionally introduced* to plastic packaging; an exception is allowed for packages that would not have added phthalates, bisphenol A, or chlorinated packaging material but for the addition of *post-consumer material*.

6.0 ~~USER INFORMATION AND PRODUCT LABEL REQUIREMENTS~~VERIFIED PERFORMANCE AND CLAIMS

6.1 Product Performance. Each product shall clean soils and surfaces specific to the intended use of the *specialty cleaning product* effectively, at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning. Products shall be diluted, as required, just prior to testing using water from the cold tap at no more than 50ºF (10ºC). Exceptions shall be made for *dish cleaning products*, *motor vehicle cleaning products*, and *upholstery cleaning products*, which shall perform at the temperatures specified in the corresponding criteria that follow. The following criteria include test methods that are applicable to some product categories, for all other product categories follow section 6.2 Alternative Performance Requirements herein. Requirements for *antimicrobial pesticide products* are included in section 6.3.5.~~6~~ 2 herein.

6.1.1 Deck, Siding, and Outdoor Furniture Cleaning Products. *Deck, siding, and outdoor furniture cleaning products* shall remove at least 80% of the particulate soil in ASTM International (ASTM) D4488, A5.[11]

6.1.2 Boat, Motor Vehicle, Tire and Wheel, and Waterless Motor Vehicle Cleaning Products. *Boat, motor vehicle, tire and wheel, and waterless motor vehicle cleaning products* shall remove at least 80% of the particulate soil in ASTM D4488, A5. *Motor vehicle cleaning products* may be diluted with warm or hot water where required by performance considerations if the product is proven to suffer significant performance degradation in cold water.

6.1.3 Bilge Cleaning Products. *Bilge cleaning products* shall demonstrate efficacy for degreasing (emulsifying oil, grease, and fuel) and cleaning (removal of soils and mold stains) with an appropriate test method following section 2.2 Alternative Performance Requirements herein.

6.1.4 Boat Wax, Polish, Sealant, or Glaze Products. *Boat wax, polish, sealant, or glaze products* shall be tested for gloss and smear resistance with an appropriate method following section 6.2 Alternative Performance Requirements herein.

6.1.5 Motor Vehicle Wax, Polish, Sealant, or Glaze Products. *Motor vehicle wax, polish, sealant, or glaze products* shall perform equivalent to or better than the control product in ASTM D3836 or ASTM D6625. The control product shall be a national market-leading product.

6.1.6 Dish Cleaning Products. *Dish cleaning products* and *rinse agent products* are exempt from the water temperature requirement in 6.1 for performance testing. *Automatic* and *hand dish cleaning products* shall be tested at the lowest effective temperature as per FDA Food Code regulations. *Rinse agent products* shall be tested at the temperature specified in the method cited in 6.1.6.2 herein.

6.1.6.1 Automatic Dish Cleaning Products. *Automatic dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 6.2 Alternative Performance Requirements herein. The product shall be tested on the following types of soils: colored, bleachable soil; dry starchy soil; and dry proteinaceous soil. The method shall be performed in an institutional machine.

6.1.6.2 Rinse Agent Products and Combined Dish Cleaning/Rinse Agent Products for Automatic Dishwashers. *Rinse agent products* shall achieve a visual rating of at least two (2) when evaluated according to the method in ASTM D3556, or Consumer Specialty Products Association (CSPA) DCC-05A.

[11] ASTM D4488 has been withdrawn, however it is still the best available method for this performance testing, is still available for purchase, and is regularly used by laboratories to test performance.

6.1.6.3 Hand Dish Cleaning Products. *Hand dish cleaning products* shall demonstrate soil removal efficacy with an appropriate method following section 2.2 Alternative Performance Requirements herein. The soils used in the comparison test shall be soils B and D as defined in ASTM D4009, or equivalent.

6.1.7 Furniture Polish Products. *Furniture polish products* shall be tested for gloss, water and smear protection, and clean-ability (i.e., buffing, soil and dust removal) with an appropriate method following 2.2 Alternative Performance Requirements herein.

6.1.8 Graffiti Remover Products. *Graffiti remover products* shall demonstrate effectiveness in removing graffiti markings (e.g., aerosol paint, felt tip pen, crayon, lipstick) while maintaining the appearance of the underlying substrate (e.g., brick, sandstone, metal, wood) for its marketed use, with an appropriate method following section 6.2 Alternative Performance Testing herein.

6.1.9 Metal Cleaning Products. *Metal cleaning products* shall have a Cleaning Effectiveness Factor (CEF) of at least 0.80 as measured according to ASTM G122.

6.1.10 Motor Vehicle Windshield Washing Fluid Products. *Motor vehicle windshield washing fluid products* shall be tested according to CSPA DCC-09 and achieve at least a rating of three in each of the following categories: soil removal, smearing, and streaking. Additionally, "winter formula*" products as used* shall remain a liquid for at least twenty-four (24) hours at 0°F (-17.8°C).

6.1.11 Optical Lens Cleaning Products. *Optical lens cleaning products* shall be tested according to CSPA DCC-09 and achieve at least a rating of three (3) in each of the following categories: soil removal, smearing, and streaking.

6.1.12 Oven Cleaning Products. *Oven cleaning products* shall achieve at least a 90% soil removal in CSPA DCC-12 using test soils A or B.

6.1.13 Upholstery Cleaning Products. *Upholstery cleaning products* shall be tested for cleaning efficiency and resoiling resistance with an appropriate method following section ~~2~~6.2 Alternative Performance Requirements herein. *Upholstery cleaning products* may be diluted with warm or hot water where required by the test method or performance considerations if the product is proven to suffer significant performance degradation in cold water.

6.2 *Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs equivalent to or better than a nationally recognized or market-leading product of its type, compared at the most dilute/least concentrated manufacturer-recommended dilution level for routine cleaning,[12]~~;~~ using an objective, scientifically-validated method conducted under controlled and reproducible laboratory conditions. The water temperature requirement in 6.1 shall apply, with an exception for the products in the following sections: in 6.1.5 *motor vehicle*

[12] The dilution level for routine cleaning is considered the medium dose or the normal dose on the label for the typical use of the product.

cleaning products, 6.1.6 for *dish cleaning products*, and 6.1.13 for *upholstery cleaning products* apply. Test methodology and results shall be documented in sufficient detail and provided to the certification program.

6.3 Product Label

6.3.1 Training Requirements. The product manufacturer, its distributor, or a third party shall offer training or training materials on the proper use of the product. This shall include applicable step-by-step instructions for the proper dilution and use, consequences of improper use or improper dilution, disposal of the product, and relevant use or maintenance of equipment, as well as recommended personal protection equipment for each stage of the product or equipment's use. Product manufacturers shall make the appropriate product and/or equipment training information, including SDSs and technical data sheets, available electronically as well as in hard copy. *Direct release products* shall include instructions describing best management practices for recapture of wastewater (such as choosing a site with the potential for runoff to be diverted to a sanitary sewer or detention pond).[13] ~~.~~ *Boat cleaning products* and *bilge cleaning products* shall be labeled with explicit instructions that bilges should be pumped out at marina facilities and not overboard and that the boat should be cleaned away from shorelines.

6.3.2 Label Language. The product label shall include English and another language or English and a graphical representation or icons.

6.3.2.1 Label Dilution or Dosage Directions for Concentrates. For *concentrates*, the manufacturer's label shall state clearly and prominently that dilution with water from the unheated tap is recommended, unless tested otherwise to meet the performance requirements in Section 6.0 herein (e.g., *upholstery cleaning products*, *motor vehicle cleaning products*, and *dish cleaning products*), and shall state the recommended level of dilution or dosage (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, or capfuls.

~~6.3.2.1 Label Dilution or Dosage Directions for Concentrates. **For *concentrates*, the manufacturer's label shall state clearly and prominently that dilution with water from the unheated tap is recommended, unless tested otherwise to meet the performance requirements in Section 2.0 herein (e.g., *upholstery cleaning products, motor vehicle cleaning products,* and *dish cleaning products*), and shall state the recommended level of dilution or dosage (e.g., for products that use manual dilution or dosage, state amount of product in common and measurable terms such as milliliters, ounces, teaspoons, or capfuls.**~~

6.3.2.~~2~~2 Label Use and Disposal Directions. The product label shall have explicit disposal, recycling, reuse, or refill instructions, proper and clear directions for use,

[13] This applies only when the use-scenario may result in a direct release of wash water effluent (e,g., mobile car washers and detailers), but not to those facilities required by law to capture and treat effluent prior to discharge (e.g., commercial car wash and fleet maintenance facilities).

and appropriate precautions and recommendations for the use of personal protective equipment.

6.3.3 Labeling of Dish Cleaning Products for Resource Conservation.

6.3.3.1 Hand Dish Cleaning Product. The *hand dish cleaning product* label shall include a statement encouraging energy and water conservation during the use of the *hand dish cleaning product*, such as, "Conserve energy and water and avoid running the water continuously when washing dishes," or equivalent language as approved by the certification program.

6.3.3.2 Automatic Dish Cleaning Product. *Automatic dish cleaning product* labels shall include a statement encouraging energy and water conservation, such as, "Conserve energy and water and run a full load of dishes whenever possible," or equivalent language as approved by the certification program.

6.3.47 *Ingredient Line. The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI) or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature may be used.[14] Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.

6.3.47.1 *Consumer and User Communication. The product ingredient line (6.3.4 herein) shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.

6.3.47.2 *Fragrances. The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List[15] or a subset of this list.

6.3.5 –Claims and Transparency

6.3.5.14 *Antimicrobial Claims. Except for *antimicrobial pesticide products*, antimicrobial, antibacterial, *disinfecting*, or *sanitizing* product claims are prohibited.

6.3.5.14.1 Products Making Antimicrobial Claims. *Antimicrobial pesticide products* shall have label instructions that the product should only be

[14] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, Chemical Abstract Service (CAS) name and or the common chemical name.
[15] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw

used on surfaces that have been identified to be at risk for disease transmission or where required by regulation. Equivalent language may be approved by the certification program.

6.3.5.14.2 Minimum Risk Pesticides. *Minimum risk pesticide* labels shall include a statement indicating that a pre-cleaning step is needed for heavily soiled surfaces.

6.3.5.22.3 Antimicrobial Pesticide Products. Any product that makes an antimicrobial, *disinfecting*, or *sanitizing*, claim shall be a *registered antimicrobial pesticide product*, or an on-site, device-generated solution, or a *minimum risk pesticide*-based product. *Minimum risk pesticide*-based products shall demonstrate that they meet the efficacy requirements for the target organism in accordance with appropriate FIFRA Efficacy Test Protocols.

Products that are manufactured and sold outside of the US shall demonstrate that they meet appropriate efficacy requirements for the target organism(s).

6.3.5.3 *Fragrance and Allergen Labeling. The product label and SDS shall declare if a *fragrance* has been added or if no *fragrance* has been added. The product label and SDS shall also indicate any *allergen components* present in the product at 0.01% or more (e.g., "Contains allergen [*allergen's* INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.[14]

~~6.5 *Organic Claims. Organic claims shall only be based on *certified organic component* content and shall be supported with documentation that they meet the United States Department of Agriculture (USDA) National Organic Program (NOP) or programs determined to be equivalent by or have recognition agreements with the USDA NOP.~~

6.3.5.46 *Natural and Biobased Claims. Only the following natural and biobased, or related, claims are allowed when the product meets the criteria outlined:

- "100 percent Natural", "All Natural", "100 percent Biobased", or "All Biobased" shall only contain *natural* or *biobased components*, respectively, excluding water, and with no petroleum, silicone, or *synthetic components*.
- "Natural" or "Biobased" products shall contain 95% *natural*, *naturally-derived*, or *biobased components*, respectively, excluding water.
- Claims on specific product *components* being "natural" or "biobased" may be permitted if it is a *natural* or *biobased component*.

~~**6.7 *Ingredient Line.** The product label shall list the product ingredients using the naming convention of the International Nomenclature of Cosmetic Ingredients (INCI) or the HCPA Ingredient Dictionary, in order of predominance. Where an INCI name does not exist for an ingredient, alternative nomenclature~~

~~may be used[16]. Ingredients in concentrations of less than 1% may be listed in any order after those in concentrations of more than 1%. A chemical function or chemical class descriptor may be used to protect trade secret information.~~

~~**6.7.1 *Consumer and User Communication.** The product ingredient line (6.8 herein) shall be made available to end-users in an easily accessible means in addition to the product label, such as the company website or technical data sheet.~~

~~**6.7.2 *Fragrances.** The general term 'fragrance' may be used for *fragrance components*; in this case, the product label shall direct end-users to additional information. A list of the *fragrance components* that are present in the product at 0.01% or more shall be made available to end-users in an easily accessible means, such as the company website or technical data sheet. Chemical class descriptors may be used to protect trade secret information. Alternatively, the company may provide a link to the IFRA Transparency List[17] or a subset of this list.~~

6.3.5.5 *Organic Claims. Organic claims shall only be based on *certified-organic component* content and shall be supported with documentation that they meet the United States Department of Agriculture (USDA) National Organic Program (NOP) or programs determined to be equivalent by or have recognition agreements with the USDA NOP.

~~6.8 *Fragrance and Allergen Labeling. The product label and SDS shall declare if a *fragrance* has been added or if no *fragrance* has been added. The product label and SDS shall also indicate any *allergen components* present in the product at 0.01% or more (e.g., "Contains allergen [*allergen's* INCI name]"). Where an INCI name does not exist, alternative nomenclature may be used.[13][14].~~

6.3.5.6~~9~~ pH Declaration. Products shall declare the pH of the product, both the *undiluted product* and the *product as used*, on the SDS. Refer to Annex C for potential exemptions for products as *powders/solids/non-aqueous liquids*.

Note: Additional Product Label Requirements
For products packaged in closed dilution control systems, refer to Annex B.
For products sold as *powders/solids/non-aqueous liquids*, refer to Annex C.
For products containing *enzymes*, refer to Annex ~~E~~D.
For products containing *microorganisms*, refer to Annex E.

6.4 Product Design

~~[16] Alternative nomenclature may include International Union of Pure and Applied Chemistry (IUPAC) name, Chemical Abstract Service (CAS) name and or the common chemical name.~~
~~[17] IFRA's Transparency List, http://www.ifraorg.org/en-us/ingredients#.VjpTmitWLxw~~

6~~2~~.4~~2~~.1~~2~~ Concentrates and Dosing. The following products may be sold in a ready-to-use form:

- *Adhesive remover products*
- *Antimicrobial pesticide products*
- *Boat wax, polish, sealant or glaze products*
- *Chewing gum remover products*
- Crème/cream cleansers
- Dishwasher cleaning products
- *Electronic cleaning products*
- *Furniture polish products*
- *Graffiti remover products*
- *Leather cleaning products*
- *Metal cleaning products*
- Microbial and enzyme-based drain cleaning products
- Microbial and enzyme-based septic, holding, and recreational vehicle tank treatment products
- *Motor vehicle dressing products*
- *Motor vehicle wax, polish, sealant, or glaze products* for hand detailing
- *Optical lens cleaning products*
- *Oven cleaning products*
- *Printing press cleaning products*
- *Pressurized gas duster products*
- *Rust stain remover products*
- *Upholstery cleaning products* solely labeled as spot or stain removers
- *Waterless motor vehicle cleaning products*

All the other products shall be concentrated to at least the following:

Product Category	**Concentration Requirement**
Boat cleaning products	1:64
Motor vehicle cleaning products	1:100
Motor vehicle wax, polish, sealant, or glaze products for conveyor, rollover, in-bay automatic and self-service car washes	1:100
Deck, siding, or outdoor furniture cleaning products	1:32
Hand and *automatic dish cleaning products*	1:200
Rinse agent products	1:400
Tire and wheel cleaning products	1:4
Dusting aid products	1:4
All other products	1:16

7.0 TRADEMARK USE REQUIREMENTS

7.1 Trademark Use. Any use of the Green Seal® Certification Mark or 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.[16]

7.2 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.

[16] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

Note that the defined terms are italicized throughout the standard.

Adhesive Remover Product. A product intended for the purpose of removing adhesive from either a specific substrate or a variety of substrates. For the purposes of this standard this includes general purpose adhesive remover, floor or wall covering adhesive remover, gasket or thread locking adhesive remover and other specialty adhesive removers. This does not include products that remove adhesives intended for use on humans or animals.

Aerosol Packaging. A *package* that requires a pressurized propellant to dispense product through a nozzle.

Air Freshener. A product designed or labeled for the purpose of masking odors, freshening, or scenting the air, but providing no cleaning or odor removal function.

Allergen. Allergenic substances included in Annex III of the European Union Regulation 1223/2009 on Cosmetic Products, 30 November 2009, and those listed by the FDA (including food allergens Food Allergen Labeling and Consumer Protection Act of 2004 [Public Law 108-282, Title II]).

Antimicrobial Agent. A substance intended to disinfect, sanitize, reduce, or mitigate growth or development of *microorganisms* and protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Antimicrobial Pesticide Product. A product intended for and capable of *disinfecting*, *sanitizing*, reducing, or mitigating growth or development of *microorganisms* and protecting inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.

Asthma. *Asthma* is a chronic inflammatory disorder of the airways that impairs breathing. *Asthma* affects children and adults, may be intermittent or persistent, and is further classified as mild, moderate, or severe. The chronic inflammation associated with variable airflow obstruction commonly causes difficulty breathing, coughing, wheezing, shortness of breath, and/or chest pain. Symptoms may resolve completely between active episodes. Symptoms may occur during exposure, immediately after exposure, or up to 24 hours later in a "late phase," frequently interrupting sleep.

Asthmagen. A substance designated as an *asthma*-causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria**.**

Automatic Dish Cleaning Product. A product intended to clean dishes, utensils, pots, pans, glasses, cups or other food service tools for use automatic dishwashers operated in institutional establishments.

Bilge Cleaning Product. A product intended to clean the lowest interior compartment in a boat.

Biobased. The content of a product that is from biological products, forestry, or agricultural materials (including plant, animal, and marine materials)**.**

Boat Cleaning Product. A product designed to clean aluminum, fiberglass, and wood surfaces of boats. These products are designed to remove algae and marine residues, grease and rust.

Boat Wax, Polish, Sealant, or Glaze Product. A product designed to seal out moisture, increase gloss, or otherwise enhance a boat's surface. For the purposes of this standard, products that are intended as wash and wax products are considered *boat vehicle wax, polish, sealant, or glaze* and *boat cleaning products***.**

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by any of the following agencies or programs: International Agency for Research on Cancer (IARC Groups 1, 2A, and 2B); National Toxicology Program (NTP Groups 1 and 2); U.S. Environmental Protection Agency Integrated Risk Information System (EPA IRIS weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (OSHA as *carcinogens* under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); and those chemicals that fall into Carcinogenicity Hazard Category 1A and 1B under the GHS.

Certified-Organic Components. A *component* certified as organic (by meeting the USDA organic standards) by a USDA-accredited certifying agent, or programs determined to be equivalent by or have recognition agreements with the USDA National Organic Program (NOP).

Chewing Gum Remover Product. A product designed to remove chewing gum from floors, carpets, furniture, and upholstery.

Child Labor. Work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. To avoid *child labor* the International Labour Organization (ILO) provides the following instruments: Minimum Age Convention (e.g., a minimum age not less than 15 and 18 for hazardous work) and the Worst Forms of Child Labour Convention.

Child-Resistant Packaging. Child-resistant packaging, as defined by the Poison Prevention Packaging Act, is packaging that is designed or constructed to be significantly difficult for children under five years of age to open or obtain a toxic or harmful amount of the substance contained therein within a reasonable time, and not difficult for normal adults to use properly, but does not mean packaging which all such children cannot open or obtain a toxic or harmful

amount within a reasonable time. Code of Federal Regulations, Title 16, Part 1700 and Title 40, Part 157.

Closed Dilution-Control System. Systems that control the dilution of a *concentrate* product so that the *undiluted product* cannot be practically accessed by users.

Colony Forming Unit (CFU). A measure of bacteria concentration assuming that each bacterium is capable of forming a colony.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality or a contaminant that was not deliberately added but is present above 0.01% by weight in the product.[17]

Concentrate. A product, as sold that must be diluted by water prior to its intended use.

Critical Medical Devices. An item used in medical procedures that confers a high risk for infection if it is contaminated with any microorganism. This includes objects that enter sterile tissue or the vascular system, which must be sterile, including, but not limited to: surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities.

Deck, Siding and Outdoor Furniture Cleaning Product. A product intended to remove common soils from outdoor surfaces including wooden, brick, concrete, or stone decks, patios, furniture, siding, and fences.

Direct Release Product. A product that is intended for use outdoors that is likely to bypass sewage treatment with a high likelihood of being discharged directly to storm sewers or the aquatic environment, shortening the time for degradation prior to entering sensitive environments. This may include, but is not limited to, *motor vehicle cleaning products*, *boat cleaning products, deck, siding, and outdoor furniture cleaning products* and *graffiti removers*. For the purposes of this standard *motor vehicle windshield washing fluid* is not considered a direct release product.

Dish Cleaning Product. A product intended to clean dishes, utensils, pots, pans, glasses, cups, and other food service tools in household settings. This includes *automatic dish cleaning product* and *hand dish cleaning products* and for the purposes of this standard it also includes *rinse agents* used in automatic dishwashers.

[17] This definition excludes substances that are intentionally added to a raw material but not intended for their continued presence in the final product. Examples include residual monomers, preservatives, anti-caking agents, and raw material byproducts or contaminants. Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Disinfecting. Destroying or irreversibly inactivating infectious *microorganism*s but not necessarily their spores on inanimate objects or surfaces.

Drain Additive/Cleaning Products. Products designed to remove soil or grease from drains, pipes, or traps through chemical, biological, or enzymatic action. Products designed to remove soil or grease from drains, pipes, or traps through physical action, such as air pressure devices, plungers, or augurs, are not included.

Dusting Aid Product. A product designed or labeled to assist in removing dust and other soils from floors and other surfaces without leaving a wax or silicone–based coating.

Electronic Cleaning Product. For the purposes of this standard, this includes electronic and electrical cleaners included in the CARB Consumer Product Regulation. Electronic cleaning products are designed and labeled for the removal of dirt, moisture, dust, flux, or oxides from the internal components of electronic or precision equipment such as circuit boards, and the internal components of electronic devices, including but not limited to, radios, CD players, DVD players, and computers. Electrical cleaning products are designed and labeled to remove heavy soils such as grease, grime, or oil from electrical equipment, including, but not limited to, electric motors, armatures, relays, electric panels, or generators.

Enzyme. A protein that acts as a catalyst in biochemical reactions. Each enzyme is specific to a particular reaction or group of similar reactions.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Furniture Polish Product. A product used for cleaning and improving the appearance of furniture finishes. It does not include products designed solely for the purpose of cleaning or dusting, floor polish products, or products designed to leave a permanent finish (e.g., stains, finishes).

General Purpose Cleaning Product. A product used for routine cleaning of hard surfaces, including impervious flooring such as concrete, stone surfaces, or tile. This does not include cleaning products intended primarily for the removal of rust, mineral deposits, or odors. This does not include products intended primarily to strip, polish, or wax floors, and it does not include cleaning products intended primarily for cleaning dishes, laundry, toilets, restrooms, glass, carpets, upholstery, wood, or polished surfaces, nor does it include biological cleaning products. Another term used for these cleaning products may be multi-surface cleaning products.[18]

Genetically Modified Microorganism (GMM). A *microorganism* in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. The methods or techniques by which *GMM* are produced are listed by the

[18] General-purpose cleaning products for industrial and institutional use are included in the scope of the Green Seal Standard for Industrial and Institutional Cleaning Products, GS-37.

European Commission Directive 2009/41/EC on the Contained Use of Genetically Modified Microorganisms.

Graffiti Remover Product. A product used to remove graffiti markings (spray paint, ink, marker, crayon, lipstick, nail polish, or shoe polish) from masonry and a variety of non-cloth or non-fabric substrates. Products labeled for use as both a paint remover and graffiti remover are included, however products labeled for use only as paint removers are not included.

Haber's Rule. For a given toxic gas, the concentration of the gas multiplied by the duration of exposure equals a constant (C x t = k); for example, doubling the concentration will halve the time for a given toxic effect.

Hand Dish Cleaning Product. A product labeled and intended for manual washing of dishes, utensils, pots, pans, glasses, cups, and other food service tools.

Halogenated Organic Solvents. An organic solvent containing halogens, including, but not limited to, fluorine, chlorine, bromine, astatine, and iodine.

Hazardous Air Pollutant (HAP). A substance listed by the EPA in the Clean Air Act Section 112(b) (1) as a hazardous air pollutant.

Industrial and Institutional Use. Use of products that are typically sold to cleaning professionals for cleaning of commercial or institutional facilities. This typically includes, but is not limited to cleaning government agencies, factories, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, transportation companies, hospitals, schools, libraries, auditoriums, office complexes, and similar properties where any residential areas and common/public space are typically cleaned by professionals (e.g., in-house or contract service providers rather than when the residents are responsible for cleaning tasks).

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 intermediary 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.

Leather Cleaning Product. A product designed to clean or improve the appearance of leather.

Metal Cleaning Product. A product designed primarily to remove tarnish (the oxidation of metal) or other surface blemishes from finished metal, metallic, or metalized surface (e.g., steel or aluminum surfaces) by physical or chemical action. Products marketed as suitable for cleaning soils in production and maintenance applications are included in the GS-34 standard for Cleaning and Degreasing Agents and are not included in this product category unless they include *microorganisms* or *enzymes* at greater than 0.01% of the formulation. Products marketed as suitable for cleaning soils from metalized surfaces are included in the GS-37 Standard for Cleaning Products for Industrial and Institutional Use and the GS-8 Standard for Cleaning Products for Household Use.

Microorganism. An organism that cannot be seen by the naked eye (microscopic organisms) including, but not limited to, bacteria, fungi, archaea, and protists. Also included in this category are viruses or virus-like particles, although they are generally regarded as non-living.

Minimum Risk Pesticide. A special class of *antimicrobial pesticide products* that are not subject to federal registration requirements through the EPA because they meet specific requirements under section 25(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), including, but not limited to, that the *components*, both active and inert, are demonstrably safe for the intended use.

Motor Vehicle Cleaning Product. A detergent, shampoo, rinse, or multipurpose cleaning product used to clean and maintain the exterior surfaces of cars, trucks, motorcycles, recreational vehicles, trains, aircrafts, and other motor vehicles. This includes, but is not limited to, products designed for use in fleet maintenance, professional conveyer and rollover car washes, in-bay automatic washes, self-service car washes, repair shops, commercial tuck washing or large vehicle stations, and professional hand detailing. For the purposes of this standard, *tire and wheel cleaning products* are separate from motor vehicle cleaning products.

Motor Vehicle Dressing Product. A product designed to enhance gloss and create a protective barrier on internal and external rubber, vinyl, and plastic surfaces of motor vehicles.

Motor Vehicle Windshield Washing Fluid Product. A *motor vehicle cleaning product* designed or labeled for use in a motor vehicle windshield washer fluid system for the purpose of cleaning, washing, bug removal, or wetting the windshield. Winter formula products include *components* to depress the freezing point.

Motor Vehicle Wax, Polish, Sealant, or Glaze Product. A product designed to seal out moisture, increase gloss, or otherwise enhance a motor vehicle's painted surfaces and includes, but is not limited to, rubbing and polishing compounds, instant detailer, and hard paste wax. This includes, but is not limited to, products designed for use in fleet maintenance, professional conveyer and rollover car washes, in-bay automatic washes, self-service car washes, repair shops, commercial tuck washing or large vehicle stations, and professional hand detailing. Products designed for use on unpainted surfaces such as bare metal, chrome, glass, or plastic are excluded. For the purposes of this standard, products that are intended as wash and wax products are considered both *motor vehicle wax, polish, sealant, or glaze products* and *motor vehicle cleaning products***.**

Mutagen. A substance designated as known to induce, be regarded as if they induce, or which cause concern for humans owing to the possibility that they may induce heritable mutations in the germ cells of humans and thus meet the criteria for germ cell mutagenicity hazard categories 1 and 2 (H340 and 341) under the GHS.

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

Natural Component. A *component* that comes from materials found in nature including mineral, forestry, agricultural, or biological materials such as, but not limited to, animal products produced by the animal but not part of the animal; do not contain petroleum or petroleum-derived compounds; do not contain transgenic hybrid organisms (inserted DNA that originated in a different species); have been processed without irradiation; and are not chemically altered.

Naturally-Derived Component. A *component* that is partially chemically altered without petroleum *components* and have been minimally processed such that they not be altered to such an extent that they are substantially less biodegradable or more toxic (examples of potentially acceptable processes are included in Appendix 2).

Neurotoxin/Systemic Toxin. A substance designated as producing a specific target organ toxicity arising from either single exposure or repeated exposure and meets the criteria for hazard categories 1 or 2 (H370, H371, H372, H373) under the GHS.

Odor Remover Product. A product designed or labeled to inhibit the ability of soils to create malodors, or functions to entrap, encapsulate, neutralize, convert, or eliminate malodor molecules through a physio-chemical process that is not simply masking or overpowering odors.

Optical Brightener. An additive designed to enhance the appearance of colors and whiteness in materials by absorbing ultraviolet radiation and emitting blue radiation. These compounds are also known as fluorescent whitening agents**.**

Optical Lens Cleaning Product. A product designed to remove oil, grease, and other common soils from exposed hard surfaces of optical equipment including glasses, photography equipment, and microscopes. Cleaning products for contact lenses are excluded.

Oven Cleaning Product. A product intended for use in removing organic soil from metallic or porcelain surfaces of ovens, barbeques, fryers, and grills.

Ozone-Depleting Compound. A compound with an ozone-depletion potential greater than 0.01 (~~Chloroflourocarbon~~Chlorofluorocarbon - CFC 11=1) according to the EPA list of Class I and Class II Ozone-Depleting Substances, or any substances or mixtures falling into category 1 (H420), hazardous to the ozone layer, under the GHS.

Package. This includes the *primary package* used for the product.

Pathogenic Microorganism. For the purposes of this standard this includes microorganisms that cause disease and can be classified as World Health Organization (WHO) Risk Group 2, 3, or 4, including, but not limited to: coliforms, Escherichia coli, Salmonella, Staphylococcus aureus, Pseudomonas aeruginosa, and some yeasts and molds.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

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.

Powders/Solids/Non-Aqueous Liquids. Products that cannot be formulated with additional water due to the form of the product, including, but not limited to: powdered detergents, solid bar soaps, detergents in tablet form, detergents as extruded or cast solids, non-aqueous liquid products in a dissolvable shell.

Pressurized Gas Duster Product. A pressurized product labeled to remove dust from a surface solely by means of mass air or gas flow, including surfaces such as photographs, photographic film negatives, computer keyboards, and other types of surfaces.

Primary Cleaning Function. For the purposes of this standard, a cleaning product's primary function is to remove soil.

Primary Package. *Package* material that physically contains and contacts the product, not including the cap or lid. For products that meet the ~~annex~~ Annex B 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.

Printing Press Cleaning Product. A product designed to remove loosely held uncured inks uncured coatings and contaminants from ink application equipment.

Product As Used. The most concentrated form of the product that the manufacturer recommends for a product's intended use. For example, if a manufacturer recommends a product be diluted 1:64 or 2:64 for use, the product shall meet the health and environmental requirements at a dilution of 2:64.

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*.

Registered Antimicrobial Pesticide Product. A product registered with the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 U.S.C. 136) or registered with Health Canada's Therapeutic Products Directorate or Pesticide Management Regulatory Agency (PMRA).

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65); or a substance designated as Category 1 (H360), known or presumed reproductive toxicant, or Category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the GHS.

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 respiratory sensitization (H334) in accordance with the GHS.

Restroom Cleaning Product. A product used to clean hard surfaces in a restroom such as counters, walls, floors, fixtures, basins, tubs, toilets, urinals and tile. Other terms used for these cleaning products may include bathroom cleaning products, toilet bowl cleaning products, or urinal cleaning products.[19]

Rinse Agent Product. A product which is formulated to improve the drying effect and the appearance of articles cleaned by means of automatic dishwashers operated in institutional establishments.

Rust Stain Remover Product. A product designed to remove rust stains from a variety of surfaces including but not limited to, toilet bowls, toilet tanks, sinks, tubs, tile and showers, appliances, water softeners, and concrete and exterior walls. This product category includes water softener cleaners.

Sanitizing. Reducing, but not necessarily eliminating, *microorganisms* from the inanimate environment to levels considered safe as determined by public health codes or regulations.

Secondary Function. For the purposes of this standard, the secondary function of a cleaning product may be to enhance the primary cleaning function through bubble or foam formation or to provide some other added functional enhancement (e.g. longer-term cleaning effect).

Semicritical Medical Devices. An item used in medical procedures that contacts mucous membranes or non-intact skin. This category includes respiratory therapy and anesthesia equipment, some endoscopes, laryngoscope blades, esophageal manometry probes, cystoscopes, anorectal manometry catheters, and diaphragm fitting rings.

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

[19] Restroom cleaning products for industrial and institutional use are included in the scope of the Green Seal Standard for Industrial and Institutional Cleaning Products, GS-37.

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.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact. Identified under Category 1 for skin sensitization (H317) under the GHS.

Specialty Cleaning Products. Products marketed and intended for specialized cleaning functions and *antimicrobial pesticide products.*

Spray Packaging. A *package* that dispenses the product through a nozzle and the product is in small droplets (i.e., a spray). It does not require a pressurized propellant to dispense the product. Trigger bottles or squeeze bottles that dispense a foam or liquid stream are not considered to be spray packaging.

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.

Surfactant. A compound that reduces interfacial tension between two liquids or a liquid and a solid. This includes detergents, wetting agents, and emulsifiers.

Synthetic Component. A *component* created artificially rather than naturally or from *natural components*. For the purposes of this standard, *naturally-derived components* are not considered synthetic *components*.

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.

Tire and Wheel Cleaning Product. A *product* designed or labeled exclusively to clean either tires, wheels, or both. This includes, but is not limited to, products designed for use in fleet maintenance, professional conveyer and rollover car washes, in-bay automatic washes, self-service car washes, repair shops, commercial tuck washing or large vehicle stations, and professional hand detailing.

Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals. The chemicals listed by the EPA on the Toxic Release Inventory as Persistent, Bioaccumulative and Toxic (PBT) Chemicals.

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

Upholstery Cleaning Product. A product designed or labeled for the purpose of eliminating dirt or stains on objects upholstered or covered with fabrics such as wool, cotton, nylon, or other synthetic fabrics, including but not limited to products used on furniture.

Waterless Motor Vehicle Cleaning Product. A *motor vehicle cleaning product* that is not rinsed with water following application. For the purposes of this standard, products that are intended as waterless wash and wax products are considered both *motor vehicle wax, polish, sealant or glaze* and *waterless motor vehicle cleaning products***.** These products may also be known as spray and wipe products.

World Health Organization (WHO) Risk Group 1. Microorganisms that are unlikely to cause human or animal disease under the basis for classification defined by the World Health Organization in the Laboratory Biosafety Manual. In the case that a particular strain has conflicting risk group designations on various international lists, the most hazardous (highest level) designation will be utilized. The biosafety designation lists that will be consulted include:

- Australia/New Zealand
- Belgium
- Switzerland
- United Kingdom
- Germany
- United States Department of Health and Human Services, National Institutes of Health (NIH)
- European Commission
- Singapore
- Japan

ANNEX B – CLOSED DILUTION-CONTROL SYSTEM (Normative)

Closed Dilution-Control System. *Closed dilution-control system* products that meet all of the following requirements may be evaluated for acute toxicity (3.3) and skin and eye damage (3.4) herein with the *product as used* (rather than with the *undiluted product*).

A. Practically Inaccessible. The *primary package* shall not allow for access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, after opening a cap or lid, or when connecting to the dispensing system.

B. Spill Resistant. The *primary package* shall require coupling to a specially designed device in order to dispense product.

C. Drop Test. The *primary package*, with the lid on, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

D. Backflow Prevention. The product shall have backflow prevention included in the *closed dilution-control system* that meets the American Society of Sanitary Engineering's (ASSE) 1055B standard.

E. SDS. The product label and SDS shall include the applicable text “meets Green Seal’s requirements for acute toxicity and/or skin and eye damage at the as-used dilution”.

F. Certifier’s Website. The website of the certification program listing certified products shall identify which products were evaluated as-used, and which health criteria were evaluated as-used.

ANNEX C – POWDERS/SOLIDS/NON-AQUEOUS LIQUIDS (Normative)

Products as Powders/Solids/Non-Aqueous Liquids. *Powder/solid/non-aqueous liquid* products that meet all of the following requirements may be exempt from the skin and eye damage criterion (~~3.4~~2.1.19) and may have an alternate threshold of 300 mg/kg for oral acute toxicity (~~3.3~~2.2.1) herein. They shall also be exempt from pH declaration (~~6.10~~6.3.5.6) for the *undiluted product*.

A. Packaging Requirements. The product shall meet the requirements under **either** A(1) Child-Resistant Packaging Requirements **or** A(2) Packaging Durability Requirements.

(1) Child-Resistant Packaging. The product shall be packaged in *child-resistant packaging* following the ASTM D3475 classification. *Child-resistant packaging* must be tested per ISO 8317 or European Standard (EN) 862.

(2) Packaging Durability. The product shall meet the following requirements to be considered durable.

i. Drop Test. The *primary package*, including any lid, shall be durable as demonstrated by passing the following drop test: drop the product from a height of 48 inches with 4 drops scenarios: flat-on-bottom, flat-on-top, flat-on-side, and corner; with passing results including that the packages must not leak, contents must be retained, and no damage to the outer package likely to adversely affect safety must be sustained.

ii. Spill Resistant. The *primary package* shall not spill when tipped over, turned upside down or shaken and shall not leak when exposed to water.

iii. Practically Inaccessible. The *primary package* shall not allow for easy access/exposure of the product during routine handling of the package, such as while transferring from shipping cartons, during storage, or after opening (e.g. the user still cannot get at the contents, or the contents are protected or wrapped).

B. Dispensing Exposure Requirements. Documentation shall be provided to demonstrate that expected dispensing situations will not result in incidental contact exposure to oral consumption/toxicity, skin corrosion, or eye corrosion.

C. Labeling Requirements. The product label shall include the following in a conspicuous location:

- The signal word “WARNING” or ‘CAUTION” on products which cause *skin corrosion*, cause *serious eye damage*, or have an acute mammalian toxicity greater than or equal to 300 mg/kg and less than or equal to 5,000 mg/kg, with the applicable precautionary measures:

  - May cause skin corrosion, do not get on skin
  - May cause serious eye damage, do not get in eyes
  - Harmful if swallowed, do not ingest
- Instruction, when necessary or appropriate, for first-aid treatment
- The statement “KEEP OUT OF REACH OF CHILDREN” or its practical equivalent in capitalized text

ANNEX D – ENZYMES (Normative)

Products Containing Enzymes. Products that contain *enzymes* shall meet all of the following:

A. Enzyme Form. *Enzymes* in the product shall be in liquid form or an encapsulated solid (or other dust-free solid) with a minimum diameter of 0.15 mm. Smaller diameters may be permitted for solid products if they are demonstrated to result in airborne *enzyme* concentrations equivalent to or less than encapsulated solids with a 0.15mm diameter.

B. Enzyme Source. The source from which *enzyme*s were derived shall be identified to a species level and disclosed to the certification program.

C. Enzyme Source Microorganisms. For *enzymes* derived from *microorganisms*, documentation shall be provided that the source *microorganism* is absent from the finished product. Test methodology and results shall be documented in sufficient detail and provided to the certification program. If the product does not conform to this provision, then all *microorganism*s shall meet the requirements in Annex E herein.

D. Exemptions. *Enzymes* are exempted from the requirements for *Asthmagens* (~~3.8~~2.1.3) and *Respiratory Sensitization* (~~3.9~~2.1.17) herein. Titanium dioxide[20] is exempt from the prohibition on *carcinogens* (~~3.5~~2.1.5 herein) when it is present only due to the use of *enzymes.* For products sold in solid form, e.g., powders, bars, tablets, titanium dioxide must be bound within the product matrix or bonded to other *ingredients*.

E. Labeling Requirements. Products containing enzymes shall include the following on the product label:

- A declaration that the "product contains enzymes", in addition to the listing in the ingredient line
- A statement that immune-compromised individuals or those with asthma should avoid exposure to products containing *enzymes* from both direct use and incidental contact during or shortly after application to these products and instruction, when necessary or appropriate, for follow-up treatment

F. Industrial Hygiene. Documentation shall be provided to the certification organization that demonstrates that the manufacturer has implemented an industrial hygiene plan intended to minimize concentrations of and exposure to airborne *enzymes* (e.g., engineering controls, work practices, and personal protective equipment) and monitor the air concentrations of the *enzyme/s* and worker illness/sensitization due to the *enzyme/s*. An example of best practices that may be applicable for this plan is available at AISE.

[20] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

ANNEX E – MICROORGANISMS (Normative)

Products Containing Microorganisms. Products that contain *microorganisms* shall meet all of the following with any specified testing conducted with an objective, scientifically-validated method under controlled and reproducible laboratory conditions (and appropriate testing details provided to the certification program):

A. Genetically Modified Microorganisms in Microbial Products. The presence of *GMM* as *components* in finished products is prohibited.

B. Microorganism Biosafety. All *microorganisms* shall be classified as *WHO Risk Group 1* or equivalent biosafety designation. For strains that do not appear on any international biosafety designation lists, alternative means may be acceptable; consultation with the certifying organization may be required.

C. Microorganism Strain Identification. *Microorganism* strains shall be identified through a taxonomic review (e.g., genetic or phenotypic analysis) that is provided by a full-service culture collection listed with the World Federation of Culture Collections, whether or not the strain is part of the collection.

D. Absence of Contaminants. *Pathogenic microorganisms* shall not be present in the microbial strain, finished product, or at the end of the product's intended shelf life. Testing for the presence of *pathogenic microorganisms* shall be conducted according to the Joint Food and Agriculture Organization of the United Nations /WHO Expert Committee on Food Additives (JECFA) Combined Compendium of Food Additive Specifications standard microbiological analytical methods or comparable method and a Certificate of Analysis shall be provided to the certification program.

E. Effective Prevention Measures and Treatment. All *microorganisms* shall be demonstrated to be susceptible to the following prevention and treatment measures:

- An *antimicrobial agent*, as demonstrated by testing the microbial strain in the product against an acceptable substance (i.e., an EPA general disinfectant, Center for Disease Control low-level disinfectant, or a registered *antimicrobial agent* by Health Canada). The test method should be modeled on the EPA/Office of Pesticide Programs Standard Operating Procedure (SOP) or the AOAC International Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04, but replace the pathogenic strains specified in these SOPs with the microbial strain(s) in the product.
- One of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline, and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with the Kirby-Bauer disc method.

F. Microbial Count. A *microorganism* used to serve the *primary cleaning function* in the *undiluted product* shall have a plate count that is greater than or equal to $1x10^7$ *CFU* per milliliter for liquid products and $1x10^9$ *CFU* per gram for solid products. A total plate count

shall be conducted in accordance with the methods for microbiological analyses listed in the JECFA Combined Compendium of Food Additive Specifications or comparable method. An exception shall be made for *microorganisms* used to serve a *secondary function* in the *undiluted product*.

G. Product Label and User Information. The product label shall disclose that the product contains *microorganisms*. An alternative phrase for *microorganisms* may be approved by the certification program, e.g., "bacterial cultures." The product label shall include a statement that the product will not function effectively when used in conjunction with disinfectants, such as chlorine bleach. For products that are sold for use in *spray packaging*,[21] the product label shall include a statement that the product should not be sprayed into the air.

H. Additional Requirements for Products in Spray Packaging. Products that are sold in *spray packaging*,[22] shall not be formulated with any fungal or mold species. Yeast species are acceptable. Additionally, at least one of the following requirements shall be met:

- Microbial species in the product shall only be those that are listed on the European Food Safety Authority's (EFSA) Qualified Presumption of Safety (QPS) List.
- The product shall undergo inhalation exposure testing. The total airborne concentration of microorganisms shall not be above 10,000 CFU/m^3. Testing parameters shall be in alignment with the A.I.S.E. Spray Protocol (2020).[23]

[21] Or designed for use in *spray packaging*
[22] Or designed for use in *spray packaging*
[23] Spray Protocol," https://www.aise.eu/our-activities/standards-and-industry-guidelines/safe-handling-of-enzymes.aspx

APPENDIX 1 – SCOPE (Informative)

Examples of products included in or excluded from the scope of GS-53:

Industrial and Institutional Products Included in GS-53

- *Adhesive remover products*
- *Boat cleaning products* (e.g., hull or bilge)
- *Boat wax, polish, sealant, or glaze products*
- *Chewing gum remover product*
- Crème/cream cleansers
- *Deck, siding and outdoor furniture cleaning products*
- *Dish cleaning products* (e.g., *hand dish, automatic dish, rinse agent* products)
- *Antimicrobial pesticide products (e.g.,* disinfectant and sanitizer products)
- *Drain additive/cleaning products*
- *Dusting aid products*
- *Electronic cleaning products*
- Fruit and vegetable wash products
- *Furniture polish products*
- *Graffiti remover products*
- Grout cleaning products
- Holding tank treatment products
- *Leather cleaning product*
- *Metal cleaning products*
- Mold and mildew stain remover products
- *Motor vehicle cleaning products*
- *Motor vehicle dressing products*
- *Motor vehicle windshield washing fluid products*
- *Motor vehicle wax, polish, sealant or glaze products*
- *Odor remover products*
- *Optical lens cleaning products*
- *Oven cleaning products*
- *Pressurized gas dusting products*
- *Printing press cleaning products*
- Products that contain *microorganisms*
- Products that contain *enzymes* and are sold and/or designed for use in non-*spray packaging*
- Recreational vehicle tank treatment products
- *Rust stain remover products*
- Septic tank treatment products
- Stone cleaning products
- *Tire and wheel cleaning products*
- *Upholstery cleaning product*
- *Waterless motor vehicle cleaning products*

Products Excluded from GS-53

- *Air freshener*s (designed to mask odor)
- Cleaners/degreasers marketed as suitable for cleaning soils in production and maintenance applications without *enzyme*s or *microorganisms* (included in GS-34)
- Dry erase board cleaning products (included in GS-37)
- Floor finish and finish strippers for industrial and institutional use (included in GS-40) and for household use
- General-purpose, restroom, glass and carpet cleaners for industrial and institutional use with and without *enzymes* or *microorganisms* (included in GS-37)
- General-purpose, bathroom, glass, and carpet cleaner products marketed specifically for *household use* with and without *enzymes* or *microorganisms* (included in GS-8)
- Hand cleaning products for industrial and institutional use (covered in GS-41) or *household use* (covered in GS-44)
- *Hand dish cleaning products* formulated with *antimicrobial agents* to support antimicrobial claims
- Household versions of those included on the left column
- Laundry care products (included in the standard in development, GS-48)
- Paint remover/thinner products
- Products that contain *enzymes* and are sold in, or designed for use in, *spray packaging*
- Pump and sewer treatment products
- Sterilizers or high-level disinfectants for critical medical devices

APPENDIX 2 – NATURALLY DERIVED COMPONENTS (Informative)

Examples of Potentially Acceptable Processing Methods of Naturally-Derived *Components* (which must also meet all the requirements in the standard):

- Esterification, Etherification, and Transesterification (to produce esters and ethers like polyglycerols)
- Glucosidation (to produce glucosides)
- Hydrogenation (of fats and oils)
- Hydrolysis and Hydrogenolysis (to produce hydrolyzed proteins, glycerin and fatty acids, and fatty alcohols)
- Other Condensation Reactions like Acylation of proteins and Sulfation of fatty alcohols
- Saponification (to produce soap)

GS-60

GREEN SEAL® STANDARD FOR
PLASTIC TRASH BAGS AND CAN LINERS

August 20, 2024

EDITION 1.1
(New Format)

Green Seal, Inc.• www.greenseal.org

GREEN SEAL

Green Seal is a nonprofit organization with a mission to transform the economy for a healthier, greener world. Green Seal sets leadership standards that aim to reduce the environmental and health impacts throughout the life cycle of products, services, and companies, to the extent technologically and economically feasible. The standards may be used for conformity assessment and public education.

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

GREEN SEAL STANDARD FOR PLASTIC TRASH BAGS AND CAN LINERS

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FOREWORD

General. The final issued standard was developed in an open and transparent process with stakeholder input that included producers, users, and general interests. Edition 1.1 was issued on August 20, 2024, and replaces Edition 1.0 from April 6, 2023. Corrections and/or clarifications were last made to this standard on August ~~16~~23 ~~July 26~~, 2024.[1]

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.

[1] https://greenseal.org/green-seal-standards/library/

LIST OF ACRONYMS AND ABBREVIATIONS

APR. Association of Plastic Recyclers
ASTM. ASTM International (formerly American Society of Testing and Materials)
BTU. British Thermal Unit
CFC. Chlorofluorocarbon
EPA. U.S. Environmental Protection Agency
GHS. Globally Harmonized Systems for Classification and Labelling of Chemicals
ISO. International Organization for Standardization
PCR. Post-Consumer Recycled Content
PFAS. Per- and Polyfluoroalkyl Substances
TRI PBT. Toxic Release Inventory Persistent, Bioaccumulative, and Toxic

GREEN SEAL STANDARD FOR PLASTIC TRASH BAGS AND CAN LINERS, GS-60

1.0 SCOPE

This standard establishes environmental, health, and social requirements for plastic trash bags and can liners for both *household* and *industrial and institutional use*. For the purposes of this standard, the product category includes but is not limited to wastepaper basket liners, can liners, kitchen garbage bags, bags for outdoor and yard waste, contractor bags, compactor bags, and drum liners. This standard does not include products that are made in part or wholly from biobased materials, products designed for industrial or household composting, or medical waste bags. See Appendix 1 for a list of example products covered by this standard.

Words and phrases used in the standard that appear in *italics* have a corresponding definition in Annex A.

2.0 SAFER CHEMICALS

2.1 Safer Ingredients

2.1.1 Prohibited Components. The product shall not contain any of the following *components*; an exception shall be made for products that would not contain these *components* but for the addition of *post-consumer material*.

- *Carcinogens*, *mutagens*, and *reproductive toxins*
- Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals
- Phthalates
- The heavy metals lead, cadmium, mercury, or hexavalent chromium; either in the elemental form or compounds
- *Per- and Polyfluoroalkyl Substances (PFAS)*
- *Fragrances*
- Chlorinated compounds
- Biocides and antimicrobial agents

Exemption: An exception shall be made for titanium dioxide and, for products that are pretinted by the manufacturer, carbon black. As allowed under this exception, carbon black shall be less than or equal to 1% by weight of the product.[2]

~~**2.0 PRODUCT-SPECIFIC PERFORMANCE REQUIREMENTS**~~

~~Products shall comply with either the criteria in 2.1 or 2.2 below.~~

[2] Titanium dioxide: EC Number 236-675-5, CAS Number 13463-67-7; carbon black: EC Number 215-609-9, CAS Number 1333-86-4.

~~**2.1 Product Performance.** The product shall demonstrate that it performs effectively as marketed for its intended use, as measured by the following standard test methods.~~

~~**2.1.1 Puncture Resistance.** The product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* when tested according to ASTM D1709.~~

~~**2.1.2 Tear Resistance.** The product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* when tested according to ASTM D1922.~~

~~**2.2 Alternative Performance Requirements.** Alternatively, the product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* for the key parameters required for it to fulfill its intended functions, as defined above. Comparison testing shall use an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.~~

3.0 ~~PRODUCT-SPECIFIC SUSTAINABILITY REQUIREMENTS~~RESPONSIBLE SOURCING

3.1 Maximum Allowed Virgin Material. Products that use virgin material shall not exceed the amount of virgin material per liner, as outlined in the table below:

Product Size Category	Maximum Weight of Virgin Plastic in Liner (lbs)[(a)]
7 - 10 gallons	0.012
11 - 19 gallons	0.018
20 - 39 gallons	0.045
40 - 49 gallons	0.059
≥ 50 gallons	0.071

[(a)] represents the top 30% of the market per size category.

3.1.1 Liner Weight Calculations. The weight of virgin plastic in a product shall be calculated following the equations in Annex B.

3.2 Post-Consumer Material Requirements. Products shall contain a minimum amount of 10% *post-consumer material.*

Exemption: Products below 0.7 mil (17.8 microns) in thickness are exempt from containing *post-consumer material*.

3.2.1 Post-Consumer Material Certification. The manufacturer shall provide sufficient documentation that the *post-consumer material* in the product is certified as such via one of the following methods:

- The *post-consumer material* shall be certified by the Association of Plastic Recyclers' PCR Certification Program.
- The manufacturer shall demonstrate the *post-consumer material* has been evaluated against all relevant attributes for determining validity of PCR content by an independent third-party certifier that conducted an audit and has a valid ISO 17065 accreditation.

3.2.2 Post-Consumer Material Calculations. The manufacturer shall demonstrate it purchases and uses sufficient supplies of *post-consumer material* to produce the amount of product reported. The percentage of *post-consumer material* shall be calculated using the following equation:

$$\%\ \text{of } \textit{post-consumer material} = \frac{\text{Mass of } \textit{post-consumer material}}{\text{Mass of finished product}}$$

This calculation shall be based on a mass balance analysis over a period of time not to exceed the previous twelve months.

4.0 LOW-IMPACT MANUFACTURING

~~3.3 Prohibited Components. The product shall not contain any of the following components; an exception shall be made for products that would not contain these components but for the addition of post-consumer material.~~

- ~~Carcinogens, mutagens, and reproductive toxins~~
- ~~Toxic Release Inventory Persistent, Bioaccumulative, and Toxic (TRI PBT) Chemicals~~
- ~~Phthalates~~
- ~~The heavy metals lead, cadmium, mercury, or hexavalent chromium; either in the elemental form or compounds~~
- ~~Per- and Polyfluoroalkyl Substances (PFAS)~~
- ~~Fragrances~~
- ~~Chlorinated compounds~~
- ~~Biocides and antimicrobial agents~~

~~Exemption: An exception shall be made for titanium dioxide and, for products that are pretinted by the manufacturer, carbon black. As allowed under this exception, carbon black shall be less than or equal to 1% by weight of the product.[3]~~

~~[3] Titanium dioxide: EC Number 236-675-5, CAS Number 13463-67-7; carbon black: EC Number 215-609-9, CAS Number 1333-86-4.~~

43.14 Manufacturing Requirements - Energy Use Reporting. For each facility that manufactures the product, manufacturers shall disclose the annual *energy intensity*, in BTUs[3]/year/ton of all products produced at the facility. The estimated percentage of the certified product produced at the facility shall also be provided.

54.0 SUSTAINABLE PACKAGING~~PACKAGING SUSTAINABILITY REQUIREMENTS~~

5.1 Packaging Materials

54.1.1 Primary and Secondary Packaging. *Primary* and *secondary packaging* shall meet the following requirements, based on the packaging material type:

- Packaging made from paper, paperboard, cardboard, or other non-plastic material shall be *recyclable* and contain at least 30% *post-consumer material or* demonstrate that efforts were made to use the maximum available *post-consumer material*.
- Packaging made from plastic shall be *recyclable*, be a *source-reduced package*, contain at least 25% *post-consumer material*, or shall be a *refillable package* with an effective *take-back program*.

Alternatively, the *primary* and *secondary packaging* may use an alternative approach that has been independently proven to have a similar life cycle benefit as one of the options listed above for the packaging type.

5.2 Packaging Label

54.21.1 Resin Identification Code. If plastic, the packaging shall be marked with the appropriate Resin Identification Code.

5.3 Restricted Substances

5.3.14.2 Colorants. *Primary* and *secondary packaging* may be printed using *colorants*, provided that these *colorants* contain a sum concentration of less than 100 ppm by weight of lead, mercury, cadmium, and hexavalent chromium.

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

[3] Millions of British Thermal Units (BTUs)/T = 1.16 Gigajoules/MT = 323.2 kilowatt-hour /MT

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

6.0 VERIFIED PERFORMANCE AND CLAIMS

Products shall comply with either the criteria in 6.1 or 6.2 below.

6.1 Product Performance. The product shall demonstrate that it performs effectively as marketed for its intended use, as measured by the following standard test methods.

6.1.1 Puncture Resistance. The product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* when tested according to ASTM D1709.

6.1.2 Tear Resistance. The product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* when tested according to ASTM D1922.

6.2 Alternative Performance Requirements. Alternatively, the product shall demonstrate that it performs as well as or better than a nationally recognized or market-leading product in its *product class* for the key parameters required for it to fulfill its intended functions, as defined above. Comparison testing shall use an objective, scientifically validated method conducted under controlled and reproducible laboratory conditions. Test methodology and results shall be documented in sufficient detail.

75.0 TRADEMARK USE REQUIREMENTS

75.1 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.[4]

75.2 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.

[4] www.greenseal.org/trademark-use-guidelines

ANNEX A – DEFINITIONS (Normative)

The following terms are italicized throughout the standard.

Carcinogen. A substance listed as a known, probable, reasonably anticipated, or possible human carcinogen by any of the following agencies or programs: International Agency for Research on Cancer (IARC Groups 1, 2A, and 2B); National Toxicology Program (NTP Groups 1 and 2); U.S. Environmental Protection Agency Integrated Risk Information System (EPA IRIS weight-of-evidence classifications A, B1, B2, C, carcinogenic, known/likely human carcinogen, likely to be carcinogenic to humans, and suggestive evidence of carcinogenicity or carcinogen potential); Occupational Safety Health Administration (OSHA as carcinogens under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)); and those chemicals that fall into Carcinogenicity Hazard Category 1A and 1B under the GHS.

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

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality, or a contaminant that was not deliberately added but is present in the product at least at 0.01% by weight.

Energy Intensity. The quantity of energy required per unit of output or activity.

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting or neutralizing a scent in the product.

Household Use. Use of products that are typically sold to consumers (usually through retail outlets, such as stores or online sites) for their own personal use rather than for professional use. This typically includes, but is not limited to, cleaning their households or personal property.

Industrial and Institutional Use. Use of products that are typically sold to cleaning professionals for use in commercial and institutional facilities. This typically includes, but is not limited to cleaning government buildings, factories, sanitariums, prisons, restaurants, hotels, stores, automobile service and parts centers, health clubs, theaters, transportation companies, hospitals, schools, libraries, auditoriums, office complexes, and similar properties where any residential areas and common or public spaces are typically cleaned by professionals (e.g., in-house or contract service providers rather than when the residents are responsible for cleaning tasks).

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 substance designated as known to induce, is regarded as if it induces, or which causes concern for humans because it may induce heritable mutations in human germ cells and thus meets the criteria for germ cell mutagenicity hazard categories 1 and 2 (H340 and 341) under the GHS.

Per- and Polyfluoroalkyl Substances (PFAS). A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

Post-Consumer Material. Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.[5] Also referred to as post-consumer recycled content.

Pre-Consumer Material. Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.[6] Also referred to as post-industrial recycled content, or pre-consumer recycled content.

Primary Package. Material that physically contains and is in physical contact with the product.

Product Class. A category of products that are manufactured and labeled for similar use scenarios.

Recyclable. The package can be collected in a substantial majority of communities,[6] separated or recovered from the solid waste stream for reuse or used in the manufacture of another package or product through an established recycling program.[7]

Refillable Package. A package that has been demonstrated to be routinely (at least five times) returned and refilled with the same product it originally contained. For the purpose of this standard, either the product manufacturer or its agent may refill a package.

Reproductive Toxin. A substance listed as a reproductive toxin (including developmental, female, and male toxins) 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., also known as Proposition 65); or a substance designated as Category 1 (H360), known or presumed reproductive toxicant, or Category 2 (H361), suspected human reproductive toxicant, or having adverse effects on or via lactation (H362), under the GHS.

[5] ISO 14021:2016 Section 7.8.1.1
[6] Substantial Majority is considered to mean at least 60% of consumers or communities where the item is sold have access to recycling facilities for that item, as defined in the U.S. Federal Trade Commission Green Guides.
[7] Established recycling programs include municipal collection programs and front-of-house recycling (i.e., store drop-off programs).

Secondary Package. Packaging that contains the primary package(s), typically used for merchandizing or labeling. It does not include the primary package itself or any additional shipping packaging.

Source-Reduced Package. A package or packaging item that has at least 20% less material by weight for a given product unit compared to the packaging for a given product unit (of the same size), commonly used for that product.

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.

ANNEX B – CALCULATING THE WEIGHT OF A LINER

The weight of virgin material in a liner shall be calculated using the following equations.

Overall Weight of Liner

$$\text{Overall Weight (lbs)} = ((A \times B \times C)/15/1000))$$

Where:

A = product width
B = product length
C = product gauge (mil)

Amount of Non-Virgin Material in Liner

$$\text{Non-Virgin Material Weight (lbs)} = (D \times E)$$

where:

D = Overall weight of liner
E = % of non-virgin material in product*

*Non-virgin material includes *pre-consumer material*, *post-consumer material*, and mineral additives.

Virgin Weight in Liner

$$\text{Virgin Weight (lbs)} = (D–E)$$

where:

D = Overall Weight of Liner
E = Amount of Non-Virgin Material in Liner

Example:

A= 28 in wide
B= 45 in long
C= 0.8 mil gauge
E = 30% non-virgin material

Overall Weight of Liner

((28in x 45in x 0.8 mil)/15/1000) = 0.067 lbs of plastic per liner

Amount of Non-Virgin Material in Liner

0.067 lbs x 30% = 0.020 lbs non-virgin plastic material

Virgin Weight in Liner

0.067 lbs overall plastic – 0.020 lbs non-virgin plastic = **0.047 lbs of virgin plastic in the liner**

APPENDIX 1 – SCOPE (Informative)

The product types in each section below are identified as eligible or not to pursue certification under GS-60. The most commonly available gallon sizes per type are shown below but other gallon sizes are also eligible. This is not an exhaustive list of all possible sizes or products in or out of scope.

Eligible Product Types

- Wastepaper basket liners at 10 gallons or above in capacity
- Can liners (generic term, often 13 gallons)
- Kitchen garbage bags (13, 20 gallons)
- Compactor bags (18 gallons)
- Bags for outdoor and yard waste (39 gallons)
- Contractor bags (42 gallons)
- Drum liners (55 gallons)

Ineligible Product Types

- Products with a gallon capacity below 10 gallons
- Products made from fiber material
- Pet waste bags
- Products made from bioplastic materials
- Products labeled as “oxo-degradable” or “oxo-biodegradable”
- Products intended for household or industrial compost
- Grocery carry-out bags
- Retail carry-out bags (e.g., bags for merchandise from retail stores)
- Shrink film case wrap
- Industrial stretch wrap
- Agricultural films
- Construction films
- Bags designed for medical waste isolation such as infectious waste or soiled linens