August 29, 2009

Version Comparison of Green Seal's Environmental Standard for Industrial and Institutional Cleaners, GS-37 Third Edition from 2006 vs. Fourth Edition from 2008

This is not the complete standard or criteria, but rather differences between the two versions. Please refer to the complete standard for exact criteria and the list of acronyms and abbreviations, available at www.greenseal.org.

(For the criteria included in the Third Edition that were modified in the Fourth Edition, the revisions are in red text.)

Category	**GS-37 Third Edition (February 27, 2006)**	**GS-37 Fourth Edition (August 29, 2008)**
Scope/Product Categories	Industrial and institutional general-purpose, bathroom, glass, and carpet cleaners • FIFRA bathroom cleaners included	Industrial and institutional general-purpose, bathroom, glass, and carpet cleaners • FIFRA cleaners excluded • Toilet bowl cleaners added • Carpet spot cleaners added
Product Performance Testing	*General-purpose cleaners.* Remove at least 80% of the particulate soil in the American Society for Testing and Materials (ASTM) D4488-95, A5. *Bathroom cleaners.* Remove at least 75% of the soil in ASTM D5343 as measured by ASTM D5343	*General-purpose cleaners.* No change. *Bathroom cleaners.* Remove at least 75% of the soil in ASTM D5343 as measured by ASTM D5343. If the product is used for toilet bowl or urinal cleaning, then it must also demonstrate efficacy for water hardness removal.

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	Carpet cleaners. Using a standard test method test cleaning efficiency and resoiling resistance. *Glass cleaners.* Rating of three in each of the following Consumer Specialty Products Association (CSPA) DCC 09 categories: soil removal, smearing, and streaking. *Alternatively*, using standard test methods, a manufacturer can also demonstrate that its product performs as well as a nationally recognized product in its category or achieves the removal efficiency defined in this section.	*Carpet cleaners.* The product shall have a pH between 3-10 and using a standard test method test for cleaning efficacy and resoiling resistance. *Glass cleaners.* No change. *Alternatively*, using another objective, scientifically-validated method conducted under controlled and reproducible laboratory conditions, the product performs as well as or better than a conventional, nationally-recognized product in its category and at equivalent product-specific use directions. Test methodology and results must be documented in sufficient detail for this determination to be made.
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}) $\leq$ 2,000 mg/kg • Inhalation lethal concentration (LC_{50}) $\leq$ 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 *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}) $\leq$ 5,000 mg/kg • Inhalation lethal concentration (LC_{50}) $\leq$ 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 OECD

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	The toxicity testing procedures should meet the requirements 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), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402). Green Seal will evaluate the toxicity of a product if toxicity data for each of the product ingredients exists. The toxicity values are adjusted by the weight of the ingredient in the product and summed Inhalation toxicity will not be required for any compound with a vapor pressure of 1 mmHg or less.	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. The toxicity values are adjusted by the weight of the ingredient in the product and summed 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).
Carcinogens, Mutagens, and Reproductive Toxins	The *undiluted* product shall not contain any ingredients that are carcinogens or that are known to cause reproductive toxicity.	The *undiluted* product shall not contain any ingredients or components that are carcinogens, mutagens or reproductive toxins. The product shall not contain any ingredients known to produce or release carcinogens, mutagens or reproductive toxins.
Ingredients that Cause Asthma	No criterion.	The *undiluted* product shall not contain any ingredients that have been identified as asthmagens, per the definition in this standard.
Skin Sensitization	The *undiluted* product shall not be a skin sensitizer, as tested by the OECD Guidelines for	The *undiluted* product shall not be a skin sensitizer, as tested by the LLNA or following

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	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.	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.
Skin Absorption	No criterion.	The *undiluted* product shall not contain ingredients, present at greater than or equal to 1% in the product, that are listed on the ACGIH Threshold Limit Value list (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 ingredients that sum to 1% in the formula that are listed on ACGIH or DFG with the same target organ.
Prohibited Ingredients	The product shall not contain the following ingredients: • Alkylphenol ethoxylates • Dibutyl phthalate • Heavy metals including arsenic, lead,	The *undiluted* product shall not contain the following ingredients[1]: • Heavy metals including, lead, hexavalent chromium, or selenium; either in the elemental form or compounds

[1] 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.

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	cadmium, cobalt, chromium, mercury, nickel, or selenium • Ozone-depleting compounds • Optical brighteners	• 2-butoxyethanol • Alkylphenol ethoxylates • Phthalates • Ozone depleting compounds • Optical brighteners
Volatile Organic Content	The product *as used* shall not contain substances that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality. The volatile organic content of the product as used shall not exceed the following • 0.1% by weight for dilutable carpet cleaners • 1% by weight for general-purpose and bathroom cleaners • 3% by weight for glass cleaners • 3% by weight for ready-to-use carpet cleaners The volatile organic content shall be determined by California Air Resources Board Method 310.	The product *as used* shall not contain components that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality; i.e., the volatile organic compound content of the product as used shall not exceed the following: • 0.1% by weight for dilutable carpet cleaners • 1% by weight for general-purpose cleaners • 1% by weight for restroom cleaners • 1% by weight for glass cleaners • 1% by weight for ready-to-use carpet cleaners The volatile organic compound content shall be determined either by summing the percent by weight contribution from all components of the product that have a vapor pressure of greater than 0.1 mm mercury at standard conditions or by the California Air Resources Board Method 310, modified to not allow the exemption for fragrances specified under Method 310.

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Inhalation Toxicity	No criterion.	The product shall meet either 1 or 2. **1 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 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

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		NOAEL, the LOAEL can be used with a ten-fold safety factor (i.e., LOAEL/10). **2 Chamber Testing**. A product *as used* shall meet the inhalation criteria and as tested according to the method used for the GREENGUARD Children and Schools Certification for Cleaners and Cleaning Maintenance Products and Systems, which includes office, school, and restroom models (also called the GREENGUARD Standard Method for Measuring and Evaluating Chemical Emissions from Cleaners and Cleaning Maintenance Systems Using Dynamic Environmental Chambers).
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 $\geq$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 in ISO 7346.2 for fish and in 40 CFR 797, Subpart B for other aquatic organisms.	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 $\geq$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 ISO 7346-2 for fish,

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		OECD test guidance 203 for fish, OECD test guidance 201 for algae, or OECD test guidance 202 for daphnia.
Bioaccumulating Compounds	No criterion.	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, 4.13, it may be considered to not bioaccumulate. Testing is not required for any ingredient for which sufficient information exists.
Aquatic Biodegradability	Each of the organic ingredients in the product *as used* shall exhibit ready biodegradability in accordance with the OECD definition except for a FIFRA-registered ingredient in a bathroom cleaner and the polymer portion of a carpet cleaner. However, all other ingredients in a FIFRA-registered bathroom cleaner or carpet cleaner must comply. Biodegradability shall be measured by one of the following methods: ISO 9439 carbon dioxide (CO_2) evolution test, ISO	Each of the individual organic ingredients in the product *as used*, except for the polymer portion of a carpet cleaner, 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

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	10708 (two-phase closed-bottle test), ISO 10707 (closed bottle test), or ISO 7827 (dissolved organic carbon removal). Specifically, within a 28-day test, the ingredient shall meet one of the following criteria within 10 days of the time when biodegradation first reaches 10%: • Removal of dissolved organic carbon (DOC) > 70% • Biological oxygen demand (BOD) > 60% • % of BOD of theoretical oxygen demand (ThOD) > 60% • % CO_2 evolution of theoretical > 60% For organic ingredients that do not exhibit ready biodegradability in these tests, the manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating dissolved organic carbon (DOC) removal > 90%. Testing is not required for any ingredient for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases or proving that the ingredient was tested in accordance with standard test procedures.	the time when biodegradation first reaches 10%: • Removal of DOC > 70% • BOD > 60% • % of BOD of ThOD > 60% • % CO2 evolution of theoretical > 60% Per OECD guidance (2003) 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 an organic ingredient that does not exhibit ready biodegradability if it has low aquatic toxicity, is not bioaccumulating (4.12), and exhibits biodegradation rates above 70% (measured as BOC, DOC, or COD), per ISO test methods 9887 or 9888; or OECD 302A, B, or C. For purposes of this section, low aquatic toxicity is defined as having an acute *and* chronic aquatic toxicity >100 mg/L where chronic aquatic (fish) toxicity is measured per OECD Method 204.

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		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, QSAR data from EPA's BioWin (EpiSuite) models may be considered.
Eutrophication	The product *as used* shall not contain more than 0.5% by weight of total phosphorus.	No change.
Combustability	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 D92-97) or a closed-cup method International Standards Organization (ISO) 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.	No change.
Fragrances	Manufacturers shall identify any fragrances on their material safety data sheets (MSDSs). Any ingredient added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.	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 6.3.
Color Components	No criterion.	Any color component shall be FDA certified and permitted for food, drug, and cosmetic (FD&C) use or be a natural ingredient.
Concentrates	The product must be a concentrate, except for FIFRA-registered bathroom cleaners and	The product, except for toilet bowl/urinal

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	absorbent compound carpet cleaners.	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
Closed Dilution Control Systems and Concentrates	No criterion.	Products that meet the definition for closed dilution-control systems (2.5) and concentrates (2.6) and the closed dilution-control system and concentrate packaging requirements (5.4) may be evaluated *as-used* for skin and eye irritation (4.2) and acute toxicity (4.1), but must meet the closed dilution-control concentrate labeling requirements in 6.5 and 6.7. **2.5 Closed Dilution-Control System.** Systems that control the dilution of a concentrate product so that the undiluted product cannot be practically accessed by users. **2.6 Closed Dilution-Control System Concentrate.** Products that are designed to be used in closed dilution-control systems that are contained in spill-resistant packaging and cannot be practically accessed by users. **2.22 Practically Accessed.** Packaging that allows for access/exposure of the product during

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		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. **2.33 Spill-Resistant Packaging.** Packaging that requires coupling to a specially designed device in order to dispense product. **6.5 Closed Dilution-Control Concentrate Labeling.** Products that are evaluated as outlined in 4.20 shall meet the following labeling and communication requirements: • The MSDS shall include the applicable text "meets Green Seal's requirements for skin and eye irritation and acute toxicity at the as-used dilution" • The Web site of the certifying body listing certified products shall identify which products were evaluated as-used, and which health criteria were evaluated as-used. **6.7 Statement of Basis for Certification.** Whenever the Green Seal certification mark appears on a package, the package shall contain a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. Unless

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		otherwise approved in writing by Green Seal, the description shall read as follows: "This product meets the Green Seal™ environmental standard for industrial and institutional cleaners based on its reduced human and environmental toxicity and reduced volatile organic compound content, with skin and eye irritation and acute toxicity met at the as-used dilution". [whichever health criteria apply to the product]
Animal Testing	This section applies to Sections 4.1, 4.3, and 4.7. Green Seal wants to discourage animal testing and will accept the results of past peer-reviewed or standard tests demonstrating compliance with a criterion. A mixture need not be tested if existing information demonstrates that each of the ingredients complies with a criterion. Additionally, Green Seal may accept non-animal (in-vitro) test results, providing that the test methods are referenced in peer-reviewed literature and the manufacturer provides the reasons for selecting the particular test method.	To discourage animal testing the results of past peer-reviewed or standard tests demonstrating compliance with a criterion will be accepted. A mixture need not be tested if existing information demonstrates that each of the ingredients complies with a criterion. Additionally, non-animal (in-vitro) test results may be accepted, providing that the test methods are referenced in peer-reviewed literature and the manufacturer provides the reasons for selecting the particular test method.
Packaging Requirements	The primary package shall be recyclable. Alternatively, manufacturers may provide for returning and refilling of their packages. An exception may be made for lightweight flexible packaging (e.g., pouches or bags) that represents a significant reduction in material use when compared with rigid packaging.	*Plastic Package***.** A plastic primary package shall be recyclable, a refillable package, a source-reduced package, or contain at least 25% post-consumer material. The package must be clearly marked with the appropriate Society of the Plastics Industry symbol to identify the type

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		of plastic for recycling. *Post-Consumer Material***.** The primary package, for materials other than plastic, 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. *Concentrated Product Packaging***.** Concentrated products are prohibited from being packaged in spray-dispenser bottles or other ready-to-use package types. *Aerosol Cans***.** Aerosol cans are prohibited. *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 post-consumer 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

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		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. *Other Restrictions*. Phthalates and chlorinated packaging material are prohibited from being intentionally introduced; an exception is allowed for packages that would not have added phthalates or chlorinated packaging material but for the addition of post-consumer material
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, and the use of equipment. Manufacturers shall have product labeling systems to assist non-English-speaking or illiterate personnel.	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 MSDSs and technical data sheets, available electronically as well as in hard copy
Labeling	The manufacturer's label shall state clearly and prominently that dilution with water from the cold tap is recommended and shall state the	*Label Language*. The manufacturer's label shall include English and another language or English and a graphical representation or icons, in order

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	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. The manufacturer shall also include detailed instructions for proper use and disposal and for the use of personal protective equipment. Whenever the Green Seal certification mark appears on a package, the package shall contain a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. Unless otherwise approved in writing by Green Seal, the description shall read as follows: "This product meets Green Seal's environmental standard for industrial and institutional cleaners based on its reduced human and aquatic toxicity and reduced smog production potential."	to assist illiterate or non-English-speaking personnel. • Label 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. • Label 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. *Label and Material Safety Data Sheet Fragrance Declaration*. The product shall declare on the product label and on the MSDS if a fragrance has been added or if no fragrance has been added. *Material Safety Data Sheet pH Declaration.* The MSDS shall declare the pH of the product, both undiluted and as used. *Certification Mark.* The Green Seal

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		Certification Mark may appear on the packaging and may appear on the product itself. 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. *Statement of Basis for Certification.* Whenever the Green Seal certification mark appears on a package, the package shall contain a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. Unless otherwise approved in writing by Green Seal, the description shall read as follows: "This product meets the Green Seal™ environmental standard for industrial and institutional cleaners based on its reduced human and environmental toxicity and reduced volatile organic compound content." If the product was evaluated in accordance with 4.20, the description shall read as follow: "This product meets the Green Seal™ environmental standard for industrial and institutional cleaners based on its reduced human and environmental toxicity and reduced volatile organic compound content, with skin

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		and eye irritation and acute toxicity met at the as-used dilution". [whichever health criteria apply to the product]