Environmental specifications

Contract release C-983(5) dish and laundry cleaning compounds

The specifications for dishwashing detergents and compounds were adapted from the Green Seal Standard for Specialty Cleaning Products for Industrial and Institutional Use (GS-53).

The specifications for laundry detergents and compounds were adapted from the Green Seal Standard for Laundry Care Products for Industrial and Institutional Use (GS-51).

Dishwashing detergents and compounds

(Mandatory) 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.

(Mandatory) Acute Mammalian 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})	≤ 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 = 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.

(Mandatory) 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 less than or equal to 2 or greater than or equal to 11.5, unless data prove otherwise.

(Mandatory) 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*.

(Mandatory) Mutagens and Neurotoxins/Systemic Toxins. The undiluted product shall not contain any components that have been identified as mutagens or neurotoxins/systemic toxins.

(Mandatory) Volatile Organic Compound (VOC) Content. 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 1% by weight. *Printing press cleaning products* shall meet the South Coast Air Quality Management District requirements for solvent cleaning of ink application equipment found in Rule 1171- Solvent Cleaning Operations. 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 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 1 atm pressure and 20º C or by the California Air Resources Board Method 310, modified to not allow the exemption for *fragrances* specified under Method 310.

(Mandatory) 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.

(Mandatory) Aquatic Biodegradability. Each of the individual *organic compounds* 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 compound* shall meet one of the following criteria within 10 days of 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 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 $LC_{50} \geq 100$ mg/L for algae, daphnia, or fish) and exhibits

inherent biodegradability above 70% (measured as BOD, DOC, or COD) per ISO test methods 9887 or 9888 or OECD 302A-C.

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.

(Mandatory) Chronic Aquatic Toxicity. The product *as used* shall not contain any *components* at 0.01% or more that have *chronic aquatic toxicity*.

(Mandatory) Eutrophication. The product *as used* shall not contain phosphorus at more than 0.5% by weight.

(Mandatory) Prohibited Components. The *undiluted* product shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Halogenated organic solvents
- Heavy metals, including: 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

(Mandatory) 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.

(Mandatory) Fragrances. All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

(Mandatory) Concentrates and Dosing. Products shall be concentrated to at least the following:

Product Category	**Concentration Requirement**
Hand and *automatic dish cleaning products*	1:200
Rinse agent products	1:400

(Desirable) 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.

(Desirable) 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.

(Desirable) Asthmagens. The *undiluted product* shall not contain any *components* that have been identified as *asthmagens*.

(Desirable) Respiratory Sensitization. The *undiluted product* shall not contain any *components* that have been identified as *respiratory sensitizers*.

(Desirable) 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.

(Desirable) 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.

(Desirable) Inhalation Toxicity. The product shall meet either 1) or 2).

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. **Chamber Testing.** A *product as used* shall be tested according to the method used for the GREENGUARD Children and Schools Certification for Cleaners and Cleaning Maintenance Products and Systems (also called the GREENGUARD Standard 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).

(Desirable) 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 (above), it may be considered to not bioaccumulate.

(Desirable) Color Components. Each color component shall meet one of the following:

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

(Desirable) Optical Brighteners. The *undiluted product* shall not contain any *component*s at 0.01% or more that are *optical brightener*s.

(Desirable) Products Containing Enzymes. Products that contain *enzyme*s shall meet the following:

A. Enzyme Form. *Enzyme*s 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

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 *enzyme*s derived from *microorganism*s, 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 of the "Products Containing Microorganisms" criterion below.

D. Sensitization and Asthma. *Enzyme*s are exempted from the requirements for *Asthmagen*s and *Respiratory Sensitization* herein.

E. Spray Packaging. *Enzyme* products in *spray packaging*, or designed for use in *spray packaging* shall demonstrate airborne *enzyme* exposure for users below 1 ng/m^3 when sampling is conducted according to the protocol described in the international Association for Soaps, Detergents and Maintenance Products (AISE) document "Exposure measurements of *enzyme*s of risk assessment of spray products."

F. 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.

G. 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 *enzyme*s (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.

(Desirable) Products Containing Microorganisms. Products that contain *microorganisms* shall meet the following:

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:

- Antimicrobial agents, as demonstrated by testing the microbial strain 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) in accordance with 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
- Each of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with Beckman Dickinson BBL antimicrobial susceptibility 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*.

H. Labeling Requirements. Products containing *microorganisms* shall include the following on the label:

- A declaration that the product contains *microorganisms*
- A statement that the product should not be used in patient areas of hospitals and that immune-compromised individuals should avoid exposure to products containing *microorganisms* from both direct use and incidental contact during or shortly after application to these products, especially when the treated areas are still wet
- Contact with open cuts or sores should be avoided
- Users should wash their hands after using the product
- Instructions that *microorganisms* may not be effective in the presence of *antimicrobial agents* such as chlorine bleach
- Instructions that the product shall not be used on food-contact surfaces
- Instructions that products containing *microorganisms* should not be sprayed directly into the air

(Desirable) Antimicrobial Agents. Except for *antimicrobial pesticide products*, the use of *antimicrobial agents* for the purposes other than preservation or stabilization of the product is prohibited. Documentation or test results shall be provided to the certification program demonstrating the dosage necessary to preserve the product.

Laundry compounds and detergents

(Mandatory) 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.

(Mandatory) Acute Mammalian 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})	$\leq$ 20,000 ppmV at 1 hour
Dermal lethal dose (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 *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:

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

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.

(Mandatory) 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 less than or equal to 2 or greater than or equal to 11.5, unless data prove otherwise.

(Mandatory) 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.*

(Mandatory) Mutagens and Neurotoxins/Systemic Toxins. The *undiluted product* shall not contain any *components* that have been identified as *mutagens* or *neurotoxins/systemic toxins*.

(Mandatory) Volatile Organic Compound (VOC) Content. 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 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 detergents* (as part of a multi-component system): 4%
- *Laundry detergents* (as a complete detergent): 12%
- *Bleaching products*, not sold as *laundry detergents*: 8%
- *Softening products*: 4%
- *Sour products*: 4%
- Other products: 1%

The VOC 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 1 atm pressure and 20º C or by the CARB Method 310, modified to not allow the exemption for *fragrances* specified under Method 310.

(Mandatory) 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: International Organization for Standardization (ISO) 7346-2 for fish, Organisation for Economic Co-operation and Development (OECD) Test Guidance (TG) 203 for fish, OECD TG 202 for daphnia, and OECD TG 201 for algae.

(Mandatory) Aquatic Biodegradability. Each of the individual organic compounds 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 compound 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%
- % of BOD of Theoretical Oxygen Demand (ThOD) > 60%
- % CO_2 evolution of theoretical > 60%

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 $LC_{50} \geq 100$ 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.

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.

(Mandatory) **Chronic Aquatic Toxicity**. The *product as used* shall not contain any *components* at 0.01% or more that have *chronic aquatic toxicity*.

(Mandatory) **Eutrophication**. The *product as used* shall not contain phosphorus at more than 0.5% by weight

(Mandatory) **Prohibited Components.** The *undiluted product* shall not contain the following *components*:

- 2-butoxyethanol
- Alkylphenol ethoxylates
- Halogenated organic solvents
- Heavy metals, including: 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

(Mandatory) **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 (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 D 4206 Standard Test Method for Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus.

(Mandatory) **Fragrances.** All *fragrances* used shall be produced and handled following the code of practice of the International Fragrance Association (IFRA).

(Mandatory) **Concentration and Compaction.** The product may be sold ready-to-use, except for the following that 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*	5.28 ml or less	2.64 ml or less
Solid *laundry detergent*	9.9 g or less	5.06 g or less
Softening products, not sold as *laundry detergent*	5.28 ml or less	2.64 ml or less

(Desirable) **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.

Desirable) 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.

(Desirable) Asthmagens. The *undiluted product* shall not contain any components at 0.01% or more that have been identified as *asthmagens*.

(Desirable) Respiratory Sensitization. The *undiluted product* shall not contain any *components* that have been identified as *respiratory sensitizers*.

(Desirable) 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*.

(Desirable) 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.

(Desirable) 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 Kow ≥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

(Desirable) Color Components. Each *color component* shall meet one of the following:

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

(Desirable) Optical Brighteners. The *product as used* shall not contain any components at 0.01% or more that are *optical brighteners*

(Desirable) Products Containing Enzymes. Products that contain *enzymes* shall meet 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 microorganisms shall meet the requirements of the "Products Containing Microorganisms" criterion below.

D. Sensitization and Asthma. *Enzymes* are exempted from the requirements for *Asthmagens* and *Respiratory Sensitization* herein.

E. Spray Packaging. *Enzyme* products in *spray packaging*, or designed for use in *spray packaging* shall demonstrate airborne *enzyme* exposure for users below 1 ng/m^3 when sampling is conducted according to the protocol described in the international Association for Soaps, Detergents and Maintenance Products (AISE) document "Exposure measurements of *enzymes* of risk assessment of spray products."

F. 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

G. 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.

(Desirable) Products Containing Microorganisms. Products that contain *microorganisms* shall meet the following:

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:

- Antimicrobial agents, as demonstrated by testing the microbial strain 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) in accordance with 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

- Each of the five major antibiotic classes (aminoglycoside, macrolide, beta-lactam, tetracycline and fluoroquinolones), as demonstrated by testing the microbial strain in accordance with Beckman Dickinson BBL antimicrobial susceptibility 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. Spray Packaging. Products containing *microorganisms* in *spray packaging*, or designed for use in *spray packaging* shall demonstrate airborne *enzyme* exposure for users below 1 ng/m^3 when sampling is conducted according to the protocol described in the international AISE document "Exposure measurements of enzymes of risk assessment of spray products." Products containing *microorganisms* in *aerosol packaging* shall not be in particle form.

H. Labeling Requirements. Products containing *microorganisms* shall include the following on the label:

- A declaration that the product contains *microorganisms*
- A statement that the product should not be used in patient areas of hospitals and that immune-compromised individuals should avoid exposure to products containing *microorganisms* from both direct use and incidental contact during or shortly after application to these products, especially when the treated areas are still wet
- Contact with open cuts or sores should be avoided
- Users should wash their hands after using the product
- Instructions that *microorganisms* may not be effective in the presence of *antimicrobial agents* such as chlorine bleach
- Instructions that the product shall not be used on food-contact surfaces
- Instructions that products containing *microorganisms* should not be sprayed directly into the air.

(Desirable) Antimicrobial Agents. Except for antimicrobial pesticide products, the use of antimicrobial agents for the purposes other than preservation or stabilization of the product is prohibited. Documentation or test results shall be provided to the certification program demonstrating the dosage necessary to preserve the product.

(Desirable) 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 100% renewable materials and meet the state-of-the-art amount of recovered material content. An exception shall be made for reusable wipes/towelettes/sheets that are intended for multiple uses (e.g., three or more uses).