



Environmental Standard - Certification Criteria Document

CCD 110:  
Cleaning and Degreasing  
Compounds: Biologically-  
Based  
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# EcoLogo Standard: CCD-110

## Cleaning and Degreasing Compounds: Biologically-based



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## Cleaning and Degreasing Compounds: Biologically-based

### Introduction

The EcoLogo® Program is designed to support a continuing effort to improve and/or maintain environmental quality by reducing energy and materials consumption and by minimizing the impacts of pollution generated by the production, use and disposal of goods and services.

EcoLogo® is a Government of Canada official mark used under license from Environment Canada. TerraChoice is not an agent of Environment Canada.

Selection of a cleaner / degreaser is influenced primarily by the nature of the surface to be cleaned, the nature of the soil and the degree of cleanliness required. The active ingredients in conventional cleaner formulations are surfactants, builders, alkalis and organic solvents. Conversely, biologically-based cleaning and degreasing compounds contain microbial cultures that promote microbial digestion of hydrocarbons, organic contaminants and other undesirable substances. Biologically-based products may also contain surfactants and other compounds, which increase their efficacy. Additionally, the use of aqueous or semi-aqueous cleaners, rather than those made primarily of organic solvents, results in a reduction in volatile organic compounds and ozone depleting substances emitted.

This document for biologically-based cleaning and degreasing compounds addresses human health issues, toxicity to aquatic and mammalian life, biodegradation, performance in the presence of soil, low risk for promoting microbial resistance, restricted ingredients, human health and product labeling.

Based on a review of currently available life cycle information, the product category requirements will produce an environmental benefit through: reduced impacts to human, aquatic and mammalian life; reduced water pollution; and reduced air impacts.

Life cycle review is an ongoing process. As information and technology change, the product category requirements will be reviewed and possibly amended.

### Notice

Any reference to a standard means to the latest edition of that standard.

The EcoLogo® Program reserves the right to accept equivalent test data for the test methods specified in this document.

### Notice of Intent

It is the intent of the EcoLogo® Program to consider criteria to address asthma related issues associated with the use of products certified under this standard in due course.

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#### Definitions

1) In this standard:

**"approved strain identification protocol"** means the method by which microbial strains have been identified by DNA sequencing (full length 1500+<sup>1</sup> base pair analysis) and have been named following the naming conventions set in place by the International Code for Nomenclature of Bacteria (ICNB). This protocol shall use the program CLUSTALX (or any other suitable multiple alignment tool such as CLUSTALW, MEGA, PHYLIP) to align the sequence to other closely related species indicated by an initial Basic Local Alignment Search Tool (BLAST) analysis of the sequence. A BLAST search or analysis compares a query sequence with a library or database of sequences, and identifies library sequences that resemble the query sequence above a certain threshold.

**"aromatic solvent"** means a hydrocarbon solvent comprised of 80% or greater aromatic hydrocarbon compounds by mass. An aromatic hydrocarbon as used here is defined as an unsaturated ring of carbon atoms; this includes compounds such as benzene, xylene and toluene and their derivatives.

**"colony forming unit"** means a measure of bacteria concentration assuming that each bacterium is capable of forming a colony;

**"consortium"** means the physical association between the cells of two or more types of microorganisms, with the results usually being advantageous to at least one of them;

**"genetically modified organism" or "GMO"** means an organism that is produced within a laboratory setting, and a gene from one organism is purposely moved to improve or change another organism;

**"ingredient"** means any chemical or compound present in greater than 0.01% by weight in a product formulation;<sup>2</sup>

**"LC<sub>50</sub>"** means median lethal concentration, and is the concentration of material that is estimated to be lethal to 50% of the test organisms;

**"ODP" or "ozone depleting potential"** means the ratio of calculated ozone column change for each mass unit of a gas emitted into the atmosphere relative to the calculated depletion for a mass unit of the reference gas CFC-11;

**"OECD"** means the Organization for Economic Co-operation and Development;

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<sup>1</sup> Following further research and discussions with stakeholders, EcoLogo® has determined that a 600+ base pair sequence is sufficient as identification, until further notice (Revised March 27<sup>th</sup>, 2012).

<sup>2</sup> Definition added December 17<sup>th</sup> 2012

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**“readily biodegradable”** material is described or classified as ‘readily biodegradable’ if when there is evidence using standard tests defined by the OECD, that at least 60-70% of the material must be broken down within ten days.

**“Risk Group”** means one of the four tiers of microorganism classification defined by the World Health Organization in their *Laboratory Biosafety Manual*, 3<sup>rd</sup> edition, 2004. These classifications are based on the relative hazard of infection in an occupational setting, to the community, to animal livestock and to the environment. The four tiers of classification are:

- Risk Group I (low individual and community risk) – micro-organisms that are unlikely to cause human or animal disease,
- Risk Group II (moderate individual risk, low community risk) – pathogens that can cause human or animal disease but are unlikely to be a serious hazard to laboratory workers, the community, livestock, or the environment. Laboratory exposures may cause serious infection, but effective treatment and preventive measures are available and the risk of spread is limited,
- Risk Group III (high individual risk, low community risk) - pathogens that usually cause serious human disease but does not ordinarily spread from one infected individual to another. Effective treatment and preventative measures are available, and
- Risk Group IV (high individual and community risk) - pathogens that usually produce serious human or animal disease and may be readily transmitted from one individual to another, either directly or indirectly. Effective treatment and preventative measures are not usually available.

**“surfactant”** (or surface-active agent) means any compound that reduces interfacial tension between two liquids or between a liquid and a solid. The three categories of surfactants are detergents, wetting agents and emulsifiers;

**“volatile organic compound”** or **“VOC”** means any organic compound which participates in atmospheric photochemical reactions. It excludes those organic compounds, also referred to as **“exempt”** compounds that the EcoLogo<sup>®</sup> Program designates as having negligible photochemical reactivity (see Appendix 1).

Cleaning and degreasing agents manufactured and sold in the United States are also regulated by California’s Air Resources Board (ARB) which classifies compounds with vapour pressures of less than 0.1 mm Hg at 20 °C or boiling points that are greater than 216°C, determined in accordance with the ARB Method 310, as exempt, low-vapour pressure (LVP) VOC, meaning these are not counted in calculating the VOC content of the products.

For indoor environments, VOC means any carbon-containing compound that evaporates easily at room temperature, including exempt compounds because these have the potential to adversely impact the health of people that are exposed, despite their negligible photochemical reactivity.

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#### Category Definition

- 2) This category includes all biologically-based cleaning and degreasing compounds as further defined in the subcategories in this section. The subcategories are:
- (a) products sold to individual consumers for use in the home:
    - CCD-110A biologically-based household cleaners and degreasers; and
  - (b) products sold for use in institutional and industrial settings:
    - CCD-110B, biologically-based general facility maintenance cleaners,
    - CCD-110C, biologically-based parts cleaners.

Note: Other subcategories may be added at a later date. The EcoLogo® Program reserves the right to determine which subcategory will be assigned to a particular applicant.

#### General Requirements

- 3) To be authorized to carry the EcoLogo®, the biologically-based cleaning and degreasing compound must:
- (a) meet or exceed all applicable governmental and industrial safety and performance standards; and
  - (b) be provided in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations.

#### Product Specific Requirements

- 4) To be authorized to carry the EcoLogo®, the biologically-based cleaning and degreasing compound must:

##### Microbial Components

- (a) (i) for liquid formulation, have a plate count greater than or equal to  $1 \times 10^7$  colony forming units per milliliter, when the count is measured in the product at its as-sold, concentrated form;<sup>3</sup>
- (ii) for dry product formulation, have a plate count greater than or equal to  $1 \times 10^8$  colony forming units per milliliter, when the count is measured in the product at its as-sold, concentrated form;<sup>3</sup>
- (b) use only those bacterial cultures that are derived from a Risk Group I microbial culture;

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<sup>3</sup> Amended May 2, 2013.

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- (c) not contain the following pathogenic strains when screened through the test methods specified below or alternates that have been approved by the EcoLogo<sup>®</sup> Program:
  - (i) *E. Coli*, when tested using Method 9222G or 9213D from *Standard Methods for the Examination of Water and Wastewater*, 19<sup>th</sup>/20<sup>th</sup> editions,
  - (ii) *Streptococcus* (*Enterococcus*), when tested using Method 9230B or 9230C from *Standard Methods for the Examination of Water and Wastewater*, 18<sup>th</sup>/19<sup>th</sup>/ 20<sup>th</sup> editions,
  - (iii) *Staphylococcus aureus*, when tested using the test or rapid detection methods accepted in the US Food and Drug Administration's *Bacteriological Analytical Manual*, Chapter 12,
  - (iv) *Bacillus cereus*, when as tested using the test or rapid detection methods accepted in the US Food and Drug Administration's *Bacteriological Analytical Manual*, Chapter 14, and
  - (v) *Salmonella*, when tested using the test or rapid detection methods accepted in the US Food and Drug Administration's *Bacteriological Analytical Manual*, Chapter 5 and a MacConkey Test for detecting gram negatives.
- (d) not be formulated or manufactured with genetically modified organisms;
- (e) contain only those microbial strains that have been identified in accordance with an approved strain identification protocol;
- (f) be susceptible to anti-microbial agents, as demonstrated by testing the microbial strain against an acceptable substance (i.e. a US EPA general disinfectant, Center for Disease Control (CDC) low-level disinfectant, or a registered antimicrobial agent by Health Canada) in accordance with the EPA/OPP Standard Operating Procedure for AOAC Use Dilution Method for Testing Disinfectants, SOP Number: MB-05-04;
- (g) be susceptible to 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;

#### Product Characteristics

- (h) before dilution, not have a pH less than 2.0 or greater 11.5 when measured directly in a liquid formulation;
- (i) not have a flash point lower than 61°C below flash point;
- (j) have a maximum temperature usage which does not exceed 17°C below flash point;

#### Prohibited Compounds

- (k) have a zero ODP;
- (l) not be formulated or manufactured with:
  - (i) alkylphenol ethoxylates (APEOs) including nonylphenol, octylphenol and their ethoxylates,
  - (ii) aromatic solvents,
  - (iii) chlorinated organic solvents,

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- (iv) butoxy-ethanol,
  - (v) nitrilotriacetic acid (NTA), or
  - (vi) phosphorus-based builders.
- (m) not be formulated or manufactured with ethylene diaminetetracetic acid, ethylene dinitrilotetracetic acid, nitrilotriacetic acid or the salts of these compounds. The only exception to this prohibition is when one of the above compounds is used as a preservative and is present in concentrations of less than 100 ppm in the undiluted product;
- (n) not be formulated with any ingredient that is listed as a Group 1 (known), Group 2a (possible), or Group 2b (probable) carcinogen in the International Agency for Research on Cancer (IARC) *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*;

#### Restricted Compounds

- (o) not contain more than the following levels of volatile organic compounds:
- (i) 1% by weight, for biologically-based household cleaners and degreasers (CCD-110A),
  - (ii) 1% by weight, for biologically-based facility maintenance cleaners (CCD-110B), and
  - (iii) 5% by weight, for biologically-based parts cleaners (CCD-110C).

VOCs must have been determined using the following method-: California ARB Method 310. Determination of Volatile Organic Compounds (VOC) in Consumer Products, as last amended on August 6, 2010.

LVP-VOC status of compound or mixtures used in the product shall be determined using ASTM Method D2879-97 as modified in Appendix B of ARB Method 310 and ASTM E 1719-97 to verify exemption.

Aromatic compound content shall be determined using the ARB Method 310,. Determination of Volatile Organic Compounds (VOC) in Consumer Products, as last amended on August 6, 2010.

Fragrances, considered exempt under ARB, shall be treated and included as VOC content for the purpose of this EcoLogo® standard.

For products for which the label specifies dilution prior to use, VOCs should be measured after the minimum recommended dilution has taken place. The minimum recommended dilution shall not include recommendations for the incidental use of a concentrated product to deal with limited special applications, such as hard to remove soils and stains.

- (p) not contain more than the following levels of surfactants:
- (i) 1% by volume, for biologically-based household cleaners and degreasers (CCD-110A),
  - (ii) 1% by volume, for biologically-based facility maintenance cleaners and degreasers (CCD-110B), and
  - (iii) 3% by volume, for biologically-based parts cleaners and degreasers (CCD-110C).

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For products for which the label specifies dilution prior to use, surfactants should be measured after the minimum recommended dilution has taken place. The minimum recommended dilution shall not include recommendations for the incidental use of a concentrated product to deal with limited special applications, such as hard to remove soils and stains.

- (q) use only those surfactants that are readily biodegradable;

#### Product Performance

- (r) perform as well as at least two conventional, functionally equivalent products that are available in North America when tested against one of the following methods (noting that testing should follow any application and time requirements stated on the product label to allow time for the microbial components to react):
  - (i) ASTM D4488-95 A5, *Particulate and Oily Soil/Vinyl Tiles Test Method*<sup>4</sup>, or
  - (ii) CAN/CGSB-2.11-94, *Method 20.3, Methods of Sampling and Testing of Soaps and Detergents: Cleaning Efficiency*,

#### Packaging and Labeling

- (s) be packaged in materials, including primary and secondary packaging, that meet the following criteria<sup>5</sup>

If plastic:

- (i) polystyrene and chlorinated plastics shall not be used;
- (ii) be clearly marked in accordance with ISO 11469 or the appropriate Society of Plastics Industry recycling classification,
- (iii) be recyclable, refillable, represent a source-reduced package, or;
- (iv) contain a minimum post-consumer content of 25%;

If non-plastic:

- (i) paper used in packaging must not be bleached with any compounds containing or giving rise to elemental chlorine;
- (ii) comprise at least 90% by weight recyclable or compostable materials;

- 5) To be authorized to carry the EcoLogo<sup>®</sup>, those biologically-based cleaning and degreasing compound manufactured in Canada or destined for the Canadian market (i.e. intended for sale and use in Canada) must:

#### Microbial Components

- (a) provide evidence that indicates the microbiological strains are listed in the *Canadian Domestic Substances List* and are in compliance with the *New Substances Notification Regulations* as per the *Canadian Environmental Protection Act, 1999*;

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<sup>4</sup> Test method ASTM has been retired and EcoLogo is no longer accepting test data from this methodology (March, 27<sup>th</sup>, 2012)

<sup>5</sup> Criteria amended following comments received from stakeholders (March 27<sup>th</sup>, 2012)

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#### Toxicity and Labeling

- (b) *for category CCD-110A, not require labeling for being harmful or an irritant as described in Part 1 and Part 2 the Consumer Chemicals and Containers Regulations (SOR/2001 –269) of the Hazardous Products Act; and*
  - (c) *for categories CCD-110B and CCD-110C, at a minimum not be considered hazardous as described under Class D (Division 1 Subdivision A and Division 2 Subdivision A) or Class E of the Controlled Products Regulations (SOR/88-66) of the Hazardous Products Act.*
- 6) To be authorized to carry the EcoLogo<sup>®</sup>, ALL biologically-based cleaning and degreasing compounds must:

#### Manufacturing

- (a) be manufactured in a facility that has a documented quality control / quality assurance system.

#### Toxicity and Biodegradation

- (b) demonstrate ingredients of product are readily biodegradable using procedures defined in Part 4 of the Globally Harmonized System for Classification and Labeling of Chemicals (GHS). In the absence of published data for individual ingredients, QSAR data from EPA's EpiSuite may be considered;
- (c) based on the recommended dose for typical use, the full formulation should demonstrate low potential for human toxicity (Category 4) using procedures defined in Part 3 of the Globally Harmonized System for Classification and Labeling of Chemicals (GHS);
- (d) demonstrate low potential to bioaccumulate in aquatic organisms ( $\log kow \geq 4$  or  $BCF < 500$ ), for all individual ingredients or the whole formulation, using procedures defined in the Globally Harmonized System for Classification and Labeling of Chemicals (GHS);
- (e) based on the recommended dose for typical use, the full formulation should have low acute aquatic toxicity (Category 3 toxicity) using procedures defined in the Globally Harmonized System for Classification and Labeling of Chemicals (GHS);
- (f) no individual ingredients should be classified under Category 1 for acute toxicity using procedures defined in both Part 3 & Part 4 the Globally Harmonized System for Classification and Labeling of Chemicals (GHS);
- (g) *Asthma related issues: The EcoLogo<sup>®</sup> Program is currently working on criteria to address this issue and will bring an amendment to this standard in due course.*

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#### Verification

- 7) To verify a claim that a product meets the criteria listed in the document, the EcoLogo® Program will require access, as is its normal practice, to relevant quality control and production records and the right of access to production facilities on an announced basis.
- 8) Compliance with section 3(b) shall be attested to by a signed statement of the Chief Executive Officer or the equivalent officer of the manufacturer. The EcoLogo® Program shall be advised in writing immediately by the licensee of any non-compliance which may occur during the term of the license. On the occurrence of any non-compliance, the license may be suspended or terminated as stipulated in the license agreement.

#### Conditions for EcoLogo® Use

- 9) The EcoLogo® may appear on wholesale or retail packaging, or on the product itself, provided that the product meets the requirements in this document.
- 10) It is required that a criteria statement appear with the EcoLogo® whenever the EcoLogo® is used in association with the biologically based cleaning and degreasing compounds. The intent of this statement is to provide clarification as to why the product was certified and to indicate constraints to which the certification is limited. This is to ensure no ambiguity over, or misrepresentation of, the reason(s) for certification.

The suggested criteria statement wording for this product type is "*Biologically-based Cleaning and Degreasing Compound*". The licensee may propose other wording for the criteria statement, but any such proposed wording must be approved by the EcoLogo® Program.

- 11) All licensees and authorized users must comply with the Program's *Guide to Proper Use of the EcoLogo®* regarding the format and usage of the EcoLogo®.
- 12) Any accompanying advertising must conform with the relevant requirements stipulated in this document, the license agreement and the Program's *Guide to Proper Use of the EcoLogo®*.

**For additional copies of this criteria document or for more information about the EcoLogo® Program, please contact:**

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### Appendix 1: VOCs Determined to be of Negligible Photochemical Reactivity

Source :U.S. ENVIRONMENTAL PROTECTION AGENCY 40 CFR Part 51 [FRL-5466-9] 2009.<sup>6</sup>  
[http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?tpl=/ecfrbrowse/Title40/40tab\\_02.tpl](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?tpl=/ecfrbrowse/Title40/40tab_02.tpl)

- |                                                                 |                                                                                                                |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| (a) acetone                                                     | (hh) 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)                                                    |
| (b) ammonium carbonate                                          | (ii) perfluorocarbons (classes of):                                                                            |
| (c) carbon monoxide                                             | (a) cyclic, branched, or linear, completely fluorinated alkanes                                                |
| (d) carbonic acid                                               | (b) cyclic, branched, or linear, completely fluorinated ethers with no unsaturations                           |
| (e) ethane                                                      | (c) cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations                  |
| (f) metallic carbides or carbonates                             | (d) sulfur-containing perfluorocarbons with no unsaturations with the sulfur bonds only to carbon and fluorine |
| (g) methane                                                     | (jj) difluoromethane (HFC-32)                                                                                  |
| (h) methylene chloride (dichloromethane)                        | (kk) ethylfluoride (HFC-161)                                                                                   |
| (i) methyl acetate                                              | (ll) 1,1,1,3,3,3-hexafluoropropane (HFC-236fa)                                                                 |
| (j) methyl formate                                              | (mm) 1,1,2,2,3-pentafluoropropane (HFC-245ca)                                                                  |
| (k) dimethyl carbonate                                          | (nn) 1,1,2,3,3-pentafluoropropane (HFC-245ea)                                                                  |
| (l) propylene carbonate                                         | (oo) 1,1,1,2,3-pentafluoropropane (HFC-245eb)                                                                  |
| (m) cyclic, branched, or linear completely methylated siloxanes | (pp) 1,1,1,3,3-pentafluoropropane (HFC- 245fa)                                                                 |
| (n) parachlorobenzotrifluoride (PCBTF)                          | (qq) 1,1,1,2,3,3-hexafluoropropane (HFC-236ea)                                                                 |
| (o) perchloroethylene (tetrachloroethylene)                     | (rr) 1,1,1,3,3-pentafluorobutane (HFC-365mfc)                                                                  |
| (p) 1,1,1-trichloroethane                                       | (ss) chlorofluoromethane (HCFC-31)                                                                             |
| (q) trichlorofluoromethane (CFC-11)                             | (tt) 1-chloro-1-fluoroethane (HCFC-151a)                                                                       |
| (r) dichlorodifluoromethane (CFC-12)                            | (uu) 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)                                                            |
| (s) trichlorotrifluoroethane (CFC-113)                          |                                                                                                                |
| (t) dichlorotetrafluoroethane (CFC-114)                         |                                                                                                                |
| (u) chloropentafluoroethane (CFC-115)                           |                                                                                                                |
| (v) chlorodifluoromethane (HCFC-22)                             |                                                                                                                |
| (w) dichlorotrifluoroethane (HCFC-123)                          |                                                                                                                |
| (x) dichlorofluoroethane (HCFC-141b)                            |                                                                                                                |
| (y) chlorodifluoroethane (HCFC-142b)                            |                                                                                                                |
| (z) 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124)               |                                                                                                                |
| (aa) trifluoromethane (HFC-23)                                  |                                                                                                                |
| (bb) 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC-43-10mee)       |                                                                                                                |
| (cc) pentafluoroethane (HFC-125)                                |                                                                                                                |
| (dd) 1,1,2,2-tetrafluoroethane (HFC-134)                        |                                                                                                                |
| (ee) 1,1,1-trifluoroethane (HFC-143a)                           |                                                                                                                |
| (ff) 1,1-difluoroethane HFC-152a)                               |                                                                                                                |
| (gg) 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)     |                                                                                                                |

<sup>6</sup> Revised March 27, 2012, to reflect EPA's 2009 revision of VOC definition

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- (vv) 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane (C<sub>4</sub>F<sub>9</sub>OCH<sub>3</sub> or HFE-7100)
- (ww) 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-Heptafluoropropane ((CF<sub>3</sub>)<sub>2</sub>CF<sub>2</sub>OCH<sub>3</sub>)
- (xx) 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane (C<sub>4</sub>F<sub>9</sub>OC<sub>2</sub>H<sub>5</sub> or HFE-7200)
- (yy) 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF<sub>3</sub>)<sub>2</sub>CF<sub>2</sub>OC<sub>2</sub>H<sub>5</sub>)
- (zz) 1,1,1,2,2,3,3-heptafluoro-3-methoxypropane (n-C<sub>3</sub>F<sub>7</sub>OCH<sub>3</sub> or HFE-7000)
- (aaa) 3-ethoxy-1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500)
- (bbb) 1,1,1,2,3,3,3-heptafluoropropane (HFC -227ea)
- (ccc) 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300)

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## Appendix 2 Interpretation Document: Definition of Aromatic Solvents

### Interpretation:

EcoLogo® certification criteria documents may include requirements that address aromatic solvents. These documents generally define aromatic solvents as organic compounds containing at least one ring structure consisting of six carbon atoms joined by alternating single and double bonds. To further refine this definition for certification criteria documents for cleaning products, the EcoLogo® Program has added a second clause:

Aromatic solvents means those organic compounds containing:

- at least one ring structure consisting of six carbon atoms joined by alternating single and double bonds AND
- two or less simple substitutions (additional chemical groups) to the basic benzene ring.

### Basis for Interpretation:

Once a certification criteria document has been published, EcoLogo® may be requested to clarify the intention behind a particular criterion, the relevance of a particular criterion to a particular market segment, and/or how an applicant product will be assessed for compliance against a particular criterion. Furthermore, EcoLogo® reserves the right to determine what evidence is both appropriate and adequate to prove compliance.

The rationale for prohibiting aromatic solvents is to limit highly volatile solvents that are very close in chemical structure to aromatic carcinogens (e.g. benzene) or to those with reproductive effects (e.g. toluene, xylene). In general, the more substituted an aromatic compound is, the lower its volatility (or the more chemical group substitutions on the basic ring structure, the more likely the compound will not volatilize).

For example, the following compounds would be considered aromatic:

- Benzene (C<sub>6</sub>H<sub>6</sub>). This is the basic aromatic ring structure with zero substitutions. Therefore it would be considered aromatic.
- Toluene (C<sub>7</sub>H<sub>8</sub>). This compound has one substitution – methyl (CH<sub>3</sub>). Although methyl is considered a simple substitution, there is still only one. Therefore, the solvent is considered aromatic.
- Phenol (C<sub>6</sub>H<sub>6</sub>O). This compound has one substitution – alcohol (OH). Although alcohol is considered a simple substitution, there is still only one. Therefore, the solvent is considered aromatic.
- Xylenes (C<sub>8</sub>H<sub>10</sub>). This group of compounds includes *o*-Xylene, *m*-Xylene and *p*-Xylene. These compounds have two additional substitutions of methyl (CH<sub>3</sub>). Although methyl is considered a simple substitution, there are still only two. Therefore, the solvent is considered aromatic.
- Benzyl alcohol (C<sub>7</sub>H<sub>8</sub>O). This compound has two substitutions – one alcohol (OH) and one methyl (CH<sub>3</sub>). Although both are considered to be simple substitutions, there are still only two. Therefore, the solvent is considered aromatic.

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### Cleaning and Degreasing Compounds: Biologically-based

The following compounds would not be considered aromatic:

- Phenyl ethyl alcohol ( $C_8H_{10}O$ ). This compound has two substitutions - one ethyl ( $C_2H_6$ ) and one alcohol (OH). Ethyl is not considered a simple substitution. Therefore, the solvent is not considered aromatic.
- Phenoxyethanol ( $C_8H_{10}O_2$ ). This compound has three substitutions - one ether (R-O-R), one alcohol (OH) and one methyl ( $CH_3$ ). Although all substitutions are simple, there are more than two. Therefore the solvent is not considered aromatic.