



EcoLogo®

Environmental Standard - Certification Criteria Document

CCD-171: Pool and Spa Water Treatment Products

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EcoLogo Standard: CCD-171 Pool and Spa Treatment Products



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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.

According to a survey by the National Spa and Pool Institute (NSPI), there are 6 million hot tub owners in the United States alone. Another survey found that 49 percent of these owners use their hot tubs four to six times each week. There are approximately 7.6 million backyard pools in the United States and 650 000 in Canada. As more and more swimmers and bathers are spending time in these residential spas and pools, necessary attention needs to be paid to the chemicals used to treat them, and their impacts on the environment.

The scope of this standard has been established to encompass water treatment products used to maintain above and below ground conventional residential pool and residential spas. Public (i.e. municipal, hotels, etc.) pools and spas are not covered in this standard as they typically follow government and other best practices guidelines, and may also use non-chemical alternative technologies to treat water such as electric oxidation, salt chlorination, ozone and mineral sanitation systems.

There are a vast number of different products for residential pool and spas and they are often classified in specific subcategories. The need for distinct subcategories is due to the fact that these different products are designed for specific water treatment needs or functions. The subcategories included in this standard are Oxidizers, Algaecides, Balancers (pH increasers, pH decreasers, or alkalinity increasers), Enhancers (clarifying agents, flocculants, metal sequestrers, or conditioners), and Phosphate Removers. It should be noted that while water sanitizers such as chlorine – and bromine – based chemicals are also needed to efficiently treat pool and spa water, they are not included in this standard. Moreover, EcoLogo® currently has another separate active standard that speaks to pool and spa cleaning products designed for cleaning hard surfaces (see CCD-146).

Based on a review of currently available life cycle information, the product category requirements will produce an environmental benefit through a substitution of less intrusive raw materials, a reduction of environmental hazards, and an increase in renewable resource and biobased products. Although the proposed scope does not address water sanitizers and chemical-free technologies, should effective alternatives gain more traction in the market place, and their use continue to increase, EcoLogo® will consider their inclusion during future revision of the standard.

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

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Notice

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

The EcoLogo® Program reserves the right to accept equivalent test methods specified in this document. In all cases, equivalent test methods will be identified in the appendix of this document.

Definitions

1) In this criteria document:

“aluminium-based” means, inter alia, products formulated with aluminium such as aluminum salts, aluminum sulfates, ammonium aluminium, or aluminum chlorohydrate;

“biguanide-based” means, inter alia, preservative or disinfectant non halogen chemicals such as polyhexamethylene biguanide or poly (hexamethylene) biguanide hydrochloride or polymeric biguanide hydrochloride polyhexanide or biguanide or those sold under generic names such as Baquacil.

“biobased” means products that are determined to be commercial or industrial goods (other than food or feed) composed in whole or in significant part of biological products, forestry materials, or renewable domestic agricultural materials, including plant, animal, or marine materials;

“bromine-based” means, inter alia, chemicals containing bromine such as sodium perborate, sodium bromide, bromo-chloro-dimethylhydantoin, bromochloro-5,5-dimethylimidazolidine-2,4-dione (BCDMH), bromochloro-5,5-dimethylhydantoin, or 1-bromo-3-chloro-5,5-dimethylhydantoin;

“chlorine-based” means, inter alia, inorganic chlorinating agents such as calcium hypochlorite, lithium hypochlorite, sodium hypochlorite, and, inter alia, organic chlorinating agents such as trichloroisocyanuric acid, potassium dichloroisocyanurate, or sodium dichlorocyanurate. For the purpose of this standard “chlorine-based” does not include quaternary ammonium compounds that contain a chlorine atom;

“expected release concentration” means the approximate concentration at which the detergent would be released into the environment, calculated by dividing the recommended concentration by a dilution factor of 2001;

“IC50” means the inhibiting concentration for a 50% effect on the test organisms. It represents a point estimate of the concentration of test materials that can cause a 50% impairment in a quantitative biological function (e.g. reduced growth, impairment of the reproductive, immune or metabolic systems, and decreased ability to survive). These potential impacts do not kill the organism but may reduce the total population over time thereby decreasing aquatic productivity (see Appendix A);

“LC50” means median lethal concentration. It is the concentration of material that is estimated to be lethal to 50% of the test organisms (see Appendix A);

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"**oxidizers**" means an auxiliary oxidant used in swimming pools and spas for the purpose of reducing the organic content of the water and/or to improve the efficiency of bromine and alternative sanitizer and produce maximum water clarity;

"**polyquaternium**" is the International Nomenclature for Cosmetic Ingredients designation for several polycationic polymers (see Appendix B);

"**quaternary ammonium compound**" or "**quat**" means an active ingredient that chemically is an organic nitrogen compound in which a central nitrogen atom is joined to four organic cations and one anionic acid radical. Such compounds may include benzene rings, inter alia, alkyl dimethyl benzyl ammonium chlorides (a.k.a. benzalkonium chloride);

"**readily biodegradable**" for a component, is determined using any of the six test methods described in OECD Guidelines for Testing of Chemicals, 301A-301F; for a whole formulation, is determined using one of the methods described in OECD Guidelines for the Testing of Chemicals, provided that all measurements and calculations are based on the carbon content of the mixture and its degradation, i.e. dissolved organic carbon (DOC) removal (301A or 301E), CO₂ evolution (301-B) or oxygen consumption in the presence of an inhibitor of nitrogen metabolism (301C, 301D or 301F);

"**recommended concentration**" means the amount of pool or spa product directed for use and diluted in 100 litre of water for spas and 1,000 litres of water for pools

"**renewable material resources**" means, for purposes of this criteria document, a substance of biological origin that can be replenished by natural processes at a rate comparable or faster than its rate of consumption by humans or other users.

"**toxic**" means the degree to which a substance or mixture of substances can harm humans or animals. Acute toxicity is the ability of a substance / mixture to cause harmful effects in an organism through a single or short-term exposure. Subchronic toxicity is the ability of the substance / mixture to cause effects for more than one year but less than the lifetime of the exposed organism. Chronic toxicity is the ability of a substance / mixture to cause harmful effects over an extended period, usually upon repeated or continuous exposure sometimes lasting for the entire life of the exposed organism;

Category Definition

2) This category includes the following subcategories:

- (a) CCD-171A – oxidizers;
- (b) CCD-171B – algaecides;
- (c) CCD-171C – balancers;
- (d) CCD 171D – enhancers; and
- (e) CCD 171E – phosphate removers

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Note: Products such as water sanitizers, water fragrances and dyes, are not covered in this standard. Other specialty products such as concrete and pool and spa cover cleaners may be certified under the EcoLogo® standard for Hard Surface Cleaners, CCD-146.

General Requirements

- 3) To be authorized to carry the EcoLogo®, pool and spa water treatment products must:
 - (a) meet or exceed all applicable governmental and industrial safety and performance standards; and
 - (b) be manufactured and transported 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.

General Pool and Spa Water Treatment Products Requirements

- 4) To be authorized to carry the EcoLogo®, all pool and spa water treatment products must:
 - (a) demonstrate by due diligence, that efforts have been made by the manufacturer to ensure packaging with post-consumer recycled content and recyclability;
 - (b) be accompanied by detailed instructions on maximizing product performance, and indications for the proper waste disposal and recyclability of the container and packaging materials;
 - (c) not be formulated or manufactured with any chemicals that are included in the International Agency for Research on Cancer (IARC) lists for proven (Group 1), probable (Group 2A), or possible (Group 2B) carcinogens;
 - (d) not be formulated or manufactured with toxic metals, such as, arsenic, cadmium, chromium, lead, copper, silver and mercury;
 - (e) not be formulated or manufactured with simazine and/or altrazine;
 - (f) not be a skin irritant. The product shall be not be considered a skin irritant under any of the following scenarios:
 - test data shows that the whole-product is not a skin irritant when tested at the most concentrated at-use dilution. A substance is considered an irritant if it causes erythema or edema of the skin graded at 2 or more as defined by OECD 404;
 - test data shows that each ingredient present at or above a concentration of 5% is not a skin irritant, or
 - if test data shows that any known skin irritants are non-irritating when present at 5% or greater in the product as sold;
 - (g) state the active ingredients and percentage of active ingredients on the label; and

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- (h) as demonstrated by due diligence of the product manufacturer, efforts have been made to ensure that environmental claims made on the label meets the guidelines of the U.S. *Federal Trade Commission* and/or the *Competition Bureau of Canada*.

Product Specific Requirements

All pool and spa products must meet the requirements given in the General Pool and Spa Water Treatment Products Requirements section above AND the applicable requirements given in the Product Specific Requirements section below.

CCD-171A: Oxidizers

- 5) To be authorized to carry the EcoLogo[®], oxidizers must:
- (a) not be manufactured or formulated with:
 - (i) phosphate-based agents,
 - (ii) chlorine-based agents,
 - (iii) bromine-based agents,
 - (iv) biguanide-based agents, and
 - (v) peracetic acid.

CCD-171B: Algaecides

- 6) To be authorized to carry the EcoLogo[®], algaecides must:
- (a) not be manufactured or formulated with:
 - (i) copper-based agents,
 - (ii) silver-based agents (e.g. colloidal silver),
 - (iii) quaternary ammonium compounds containing one or more benzene rings
 - (iv) methylisothiazolinone,
 - (v) chlorine-based agents,
 - (vi) bromine-based agents, and
 - (vii) biguanide or polyhexamethylene biguanide
 - (b) be readily biodegradable
 - (c) not toxic to higher trophic levels (see Appendix A)

CCD-171C: Balancers (pH increasers, pH decreasers, and alkalinity increasers)

- 7) To be authorized to carry the EcoLogo[®], balancers must:
- (a) not be manufactured or formulated with:
 - (i) boric acid,

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- (ii) hydrochloric acid (i.e. muriatic acid), and
- (iii) sodium bisulfate.

- (b) be readily biodegradable
- (c) not toxic to higher trophic levels (see Appendix A)

CCD-171D: Enhancers (clarifying agents, flocculants, metal sequestrers, conditioners)

- 8) To be authorized to carry the EcoLogo[®], enhancers must:
- (a) be formulated or manufactured with 50% biobased content;
 - (b) not be manufactured or formulated with:
 - (i) petroleum-based products,
 - (ii) polyacrylamides,
 - (iii) phosphonate-containing compounds,
 - (iv) quaternary ammonium compounds,
 - (v) aluminium-based compounds,
 - (vi) ethylenediaminetetraacetic acid (EDTA),
 - (vii) 1-hydroxyethylidene-1, 1-diphosphonic acid (HEDP),
 - (viii) nitrilotriacetate,
 - (ix) tetraborate pentahydrate,
 - (x) borates or boric acid,
 - (xi) sodium silicate,
 - (xii) ferric chloride and ferric sulfate, and
 - (xiii) polyethyleneamines

CCD-171E: Phosphate Removers

- 9) To be authorized to carry the EcoLogo[®], phosphate removers must:
- (a) not be manufactured or formulated with aluminium-based products.

Performance Requirements

- 10) The following performance requirements must be met:
- (a) Oxidizer: ORP must be higher than 650 mV when in pool concentration,
 - (b) Algacide: Meet the requirement to be characterised as an algacide for Health Canada,
 - (c) Balancer: demonstrate pH increase or decrease and not using more than 150% of the traditional product,

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(d) Phosphate remover: 90% of initial phosphate should be removed.

Verification

- 11) 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.
- 12) 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

- 13) The EcoLogo® mark may appear on wholesale or retail packaging, or on the product itself, provided that the product meets the requirements in this guideline.
- 14) A criteria statement must accompany the EcoLogo® mark whenever it is used. 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. Moreover, both the EcoLogo® mark and criteria statement must be used in a manner compliant with the most recent edition of the EcoLogo® brand guide.
- 15) 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®. If EcoLogo® certified products are sold in a "kit," the product packaging must identify which products in the "kit" have met the requirement of CCD-171.
- 16) Any accompanying advertising must conform with the relevant requirements stipulated in this guideline, the license agreement and the most recent edition of the EcoLogo® Brand Guide.

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

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Appendix A: Ecotoxicity Requirements

CCD-171 has requirements to test the whole formulation of the product on a range of metabolically diverse aquatic organisms (vertebrates and invertebrates) in order to more accurately capture the potential impact as the product enters the aquatic ecosystem. This approach is also intended to reflect the potential for synergy and potentiation between ingredients.

Part 1 - Whole Formulation Testing:

Based on the recommended dose for typical use, the whole formulation must not adversely inhibit two different species of divergent taxonomic and ecological ranks. These species should be physiologically and ecologically similar to organisms that reside in North American ecosystems. Listed below are required thresholds and acceptable methods.

- an acute toxicity test on an aquatic vertebrate species using one of the following:
 - Report EPA-821-R-02-012, "Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms", 2002, U.S. Environment Protection Agency; or
 - ISO 7346/1:1996 – "Water quality - Determination of the acute lethal toxicity of substances to a freshwater fish [Brachydanio rerio Hamilton-Buchanan (Teleostei, Cyprinidae)] - Part 1: Static method", International Standardization Organization; or
 - ISO 7346/2:1996 – "Water quality - Determination of the acute lethal toxicity of substances to a freshwater fish [Brachydanio rerio Hamilton-Buchanan (Teleostei, Cyprinidae)] - Part 2: Semi-static method", International Standardization Organization; or
 - ISO 7346/3:1996 – "Water quality - Determination of the acute lethal toxicity of substances to a freshwater fish [Brachydanio rerio Hamilton-Buchanan (Teleostei, Cyprinidae)] - Part 3: Flow-through method", International Standardization Organization; or
 - ISO 15088:2007, "Water quality - Determination of the acute toxicity of waste water to zebrafish eggs (Danio rerio)", International Organization for Standardization; or
 - Report EPS 1/RM/9, "Biological Test Method: Acute Lethality Test Using Rainbow Trout", July 1990, Environment Canada.

- on an aquatic invertebrates species using one of the following:
 - Report EPA-821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms", October 2002, U.S. Environment Protection Agency; or
 - Report EPS-1-RM-11, "Biological Test Method: Acute Lethality Test Using Daphnia spp.", July 1990, Environment Canada; or
 - Report OECD/OCDE-202, "Daphnia sp. Acute Immobilisation Test", April 2004, Organization for Economic Cooperation and Development; or
 - ISO 6341:1996, "Water quality - Determination of the Inhibition of the Mobility of Daphnia magna Straus (Cladocera, Crustacea)", International Standardization Organization.

Appendix B: List of Polyquaterniums as defined by the International Nomenclature for Cosmetic Ingredients (INC)

Polyquaternium	Chemical Identity
Polyquaternium-1	Ethanol, 2,2',2''-nitritotris-, polymer with 1,4-dichloro-2-butene and N,N,N',N'-tetramethyl-2-butene-1,4-diamine
Polyquaternium-2	Poly[bis(2-chloroethyl) ether-alt-1,3-bis[3-(dimethylamino)propyl]urea]
Polyquaternium-5	Copolymer of acrylamide and quaternized dimethylammoniumethyl methacrylate
Polyquaternium-6	Poly(diallyldimethylammonium chloride)
Polyquaternium-7	Copolymer of acrylamide and diallyldimethylammonium chloride
Polyquaternium-10	Quaternized hydroxyethylcellulose
Polyquaternium-11	Copolymer of vinylpyrrolidone and quaternized dimethylaminoethyl methacrylate
Polyquaternium-15	Acrylamide-dimethylaminoethyl methacrylate methyl chloride copolymer
Polyquaternium-16	Copolymer of vinylpyrrolidone and quaternized vinylimidazole
Polyquaternium-22	Copolymer of Acrylic Acid and Diallyldimethylammonium Chloride
Polyquaternium-28	Copolymer of vinylpyrrolidone and methacrylamidopropyl trimethylammonium
Polyquaternium-32	Poly(acrylamide 2-methacryloxyethyltrimethyl ammonium chloride)
Polyquaternium-39	Terpolymer of Acrylic Acid, Acrylamide and Diallyldimethylammonium Chloride
Polyquaternium-46	Terpolymer of vinylcaprolactam, vinylpyrrolidone, and quaternized vinylimidazole
Polyquaternium-47	Terpolymer of Acrylic Acid, Methacrylamidopropyl Trimethyl Ammonium Chloride, and Methyl Acrylate