

Environmental Choice^M Program

CERTIFICATION CRITERIA DOCUMENT

CCD-160



Product: Dust Suppressants

Environment Canada's Environmental Choice^M Program is pleased to publish the following certification criteria document on *dust suppressants*.

The Environmental Choice 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 available to Canadians.

Proper management of dusts, tailings and other granular matter is a significant environmental issue. In some industries these materials are generated as an incidental by-product (e.g., mine tailings, boiler ash, exposed construction sites); in other cases granular material is stockpiled for future specific and useful purposes (e.g., stockpiling of sand and salts for construction and maintenance of granular road surfaces). Granular surfaces are subject to erosion by wind and water resulting in the loss of potentially useful material and subsequent pollution of surrounding air, water and soil.

A variety of materials are used to control particulate erosion. Dust suppressants include water, salts and sticky waste materials, such as used motor oil and diesel and bunker oils and by products from pulp and paper manufacture (e.g., tall oil pitch, lignosulfonates and certain cardboard mill wastes). An estimated 75% of the 400,000 tonnes of dust suppressants applied globally annually are chloride salts.

Waste oil products may contain environmentally harmful organic compounds (e.g., benzene, toluene, polychlorinated biphenyls) and metals (e.g., lead, zinc), which in turn can leach out into soil and surface waters. Waste oil is no longer permitted for use as a dust suppressant in some jurisdictions (e.g., Ontario, Yukon, Minnesota). Consequent concern over the use of waste materials as dust suppressants led to greater reliance on a variety of virgin resources, (e.g., chlorides, latex polymers) some of which can also leave behind potentially harmful chemical residues.

Careful processing and quality monitoring of dust suppressants from pulp and paper by-products can minimize the emission of potentially harmful substances and produce a genuinely useful product with minimal environmental impact.

Dust suppressants and stabilizers should strike a balance between biodegradability and efficacy. Ideally, products applied to roads, stockpiles, mine tailings and other granular surfaces should eventually biodegrade without leaving harmful residues. However, they will fail to perform their base function if they do so too quickly. Leading products should therefore be expected to perform their function over a practical period of time and eventually biodegrade naturally to environmentally benign end products.

Based on a review of currently available life cycle information, the product category requirements will produce an environmental benefit through a **reduction in toxic emissions** (particulate matter, leaching of dust suppressant contaminants) to the environment and a **reduction in waste** through responsible reuse of materials.

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

Environment Canada anticipates that **dust suppressants and stabilizers** conforming to this certification criteria document will apply to the Environmental Choice Program for verification and subsequent authority to label the qualifying services with the Environmental Choice EcoLogo^M.

Notice

Throughout this document, any reference to a standard or guideline means to its latest edition.

The Environmental Choice Program (ECP) reserves the right to accept equivalent test data for the test methods specified in this document.

Interpretation

1. In this set of requirements, please note the following definitions:

“**biodegradable**” means that under favorable conditions an organic substance possesses a high capacity to be degraded into smaller molecular components by way of microbial metabolism. There are several levels of biodegradability potential, as follows: A substance may be classified as “**biodegradable**”, if more than 60% or 70% biodegradability (depending on test method) is achieved within the 28-day test duration in any of the six test methods described in Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals, 301A-301F;

“**dust**” means an air suspension of particles (aerosol) of any solid material, usually with particle size less than 100 microns;

“**dust suppressant**” means a substance designed to reduce the loss of particulate matter from a variety of surfaces, such as unpaved roads and parking lots, construction sites, industrial storage areas and yards, material stockpiles, municipal and industrial landfills, mine tailing fields and underground applications. Dust suppressants may utilize various specific modes of action, but in general, serve to cover, sequester, bind or otherwise impede the migration of particulates from their initial location due to wind, water or other weathering actions. For the purposes of this Certification Criteria Document, the general term “dust suppressant” is further classified into three categories: *unpaved surface dust suppressants, stockpile sealants and slope erosion control agents*;

“**endocrine disrupting substance**” or “**EDS**” means a chemical substance that can interact with the endocrine system of domestic animals and wildlife and disrupt crucial physiological processes, including growth, development and reproduction;

“**halogenated organic compounds**” means any organic compound containing halogens including fluorine, chlorine, bromine and iodine;

“**IC₅₀**” means the inhibiting concentration for a 50% effect on the test organisms. It represents a point estimate of the concentration of the test materials that can cause of 50% impairment in a quantitative biological function (e.g., reduced growth). These potential impacts do not kill the organisms, but may reduce the total population over time thereby decreasing aquatic productivity;

“**inherent biodegradability**” is achieved when a substance reaches at least 70% biodegradability within the 28-day test period according to any of the three test methods described in Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals, 302A-302C;

“**inorganic salt**” means a salt that does not contain carbon;

“**LC₅₀**” means the concentration of a test substance that is lethal to 50% of the test organisms;

“**PCDDs and PCDFs**” means polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo-furans, and each are families of chlorinated organic compounds which differ from one another in the number and location of chlorine atoms on a basic structure of carbon, hydrogen and oxygen atoms. These compounds are formed during combustion processes (forest fires, incineration) and as byproducts of certain industrial process. There are 75 PCDDs and 135 PCDFs; of these, 2,3,7,8-tetrachlorodibenzo-p-dioxin (or 2,3,7,8-TCDD) is the most toxic. Toxicity equivalency factors (TEF) have been established for the 17 most toxic PCDDs and PCDFs, and are multiplied by the concentration of each of the 17 PCDDs and PCDFs to obtain the toxic equivalent (TEQ) for each dioxin and furan expressed as 2,3,7,8-TCDD. See “TEQ” below;

“**potential for primary biodegradation**” means more than 20% biodegradability is achieved over the 28-day test period in any of the six test methods described in Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals, 301A-301F;

“**readily biodegradable**” means that an organic substance will be degraded into smaller molecular components by way of microbial metabolism. A substance can be defined as “ready biodegradable” if more than 60% or 70% biodegradability (depending on test method) is achieved within the 10- or 14-day window in any of the six test methods described in Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals, 301A-301F;

“**secondary by product**” means a secondary or incidental product from a manufacturing process. For example, a kraft pulp mill primarily produces pulp, but a secondary product is tall oil, which can be processed for use in manufacturing many medical, industrial and domestic products.

“**slope erosion control agent**” means a subcategory of “dust suppressant”, whose specific purpose is to reduce loss of particulate matter, due to water runoff and/or other weathering action actions, from engineered slopes such as road embankments and levees;

“**stockpile sealant**” means a subcategory of “dust suppressant”, whose specific purpose is to seal the surface area of an industrial stockpile, so as to prevent loss of material through the effects of wind or other weathering actions. For the purposes of this Certification Criteria Document, *stockpile sealants* include, material stockpiles, municipal and industrial landfills and mine tailing fields;

“**substrate**” means a surface to which a dust suppressant is applied, including unpaved roads and parking lots, construction sites, industrial storage areas and yards, material stockpiles, municipal and industrial landfills, mine tailing fields, and underground applications

“**TEQ**” means toxic equivalent, and is determined by multiplying the measured concentration level of a given congener by the appropriate toxicity equivalency factor (see “PCDDs and PCDFs” above). By converting the measured concentration levels to a common basis, the TEQ quantities may be summed to provide a single representative quantity;

“**unpaved surface dust suppressant**” means a subcategory of “dust suppressant” whose specific purpose is to seal the surface area of unpaved surface areas, so as to prevent loss of material through the effects of vehicular traffic wear and weathering actions such as wind. For the purposes of this Certification Criteria Document, unpaved surface dust suppressants, include unpaved roads and parking lots, construction sites, industrial storage areas and yards, agricultural fields, and underground applications;

“**virgin petrochemical**” means a chemical product created directly from the refining of crude oil for its first intended use. Any re-refined oil product is excluded from this definition.

Category Definition

2. This category includes all *dust suppressants and stabilizers* as further defined in the subcategories in this section.
 - (a) *unpaved surface dust suppressants*,
 - (b) *stockpile sealants*, and
 - (c) *slope erosion control agents*.

Note: Other sub-categories may be added at a later date. The ECP reserves the right to determine which sub-category will be assigned to a particular applicant.

General Requirements

3. To be authorized to carry the EcoLogo^M, the *dust suppressant or stabilizer* 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 residues or waste products arising from the process of the product, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the *Fisheries Act* and the *Canadian Environmental Protection Act (CEPA)*, as well as applicable Provincial and Territorial laws and regulations.

Product Specific Requirements

4. To be authorized to carry the EcoLogo^M, the *dust suppressant or stabilizer* must:
 - (a) demonstrate evidence of the product's ability to limit the release of particulates, from at least two distinct types of substrate (See Appendix 1);
 - (b) be accompanied with detailed instructions for maximizing product performance and for safe handling and safe use;
 - (c) notice of any required government registration and/or approvals, permits, certificates or other instruments;
 - (d) be formulated with at least 35% secondary by-product;
 - (e) not be formulated with inorganic salts;
 - (f) not be formulated with virgin petrochemicals;
 - (g) not be formulated with alkylphenol ethoxylate surfactants;

(h) not contain total polychlorinated dioxins (PCDD) and furans (PCDF) in excess of 9 pg I-TEQ/g, when the whole product as sold is tested according to U.S. EPA Method 8290. At minimum the seven dioxin congeners for which 2,3,7,8-TCDD TEQs shall be determined are 2,3,7,8-TCDD; 1,2,3,7,8-P5CDD; 1,2,3,4,7,8-H6CDD; 1,2,3,6,7,8-H6CDD; 1,2,3,7,8,9-H6CDD; 1,2,3,4,6,7,8-H7CDD; and OCDD, and the ten furan congeners for which 2,3,7,8-TCDF TEQs shall be determined are 2,3,7,8-TCDF; 1,2,3,7,8-P5CDF; 2,3,4,7,8-P5CDF; 1,2,3,4,7,8-H6CDF; 1,2,3,6,7,8-H6CDF; 2,3,4,6,7,8-H6CDF; 1,2,3,7,8,9-H6CDF; 1,2,3,4,6,7,8-H7CDF; 1,2,3,4,7,8,9-H7CDF; and OCDF;

(i) not contain the following metals in excess of the concentrations in the table below when whole products as sold are tested according to “Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.I of the Environmental Protection Act”, Ontario, March 9, 2004.;

Metal	Concentration ug/g	Metal	Concentration ug/g
Antimony	13	Lead	200
Arsenic	20	Mercury	10
Cadmium	12	Nickel	150
Chromium	8	selenium	10
Copper	225		

(j) not contain the following polycyclic aromatic hydrocarbons when whole products as sold are tested according to “Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.I of the Environmental Protection Act”, Ontario, March 9, 2004.;

PAH	Concentration ug/g	PAH	Concentration ug/g
acenaphthalene	1000	benzo[j]fluoranthene	12
acenaphthylene	100	chrysene	12
anthracene	28	dibenz[a,h]anthracene	1.2
benzo[a]anthracene	40	fluoranthene	40
benzo[a]pyrene	1.2	indeno[1,2,3-c,d]pyrene	350
benzo[b]fluoranthene	12	phenanthrene	40
benzo[k]fluoranthene	12	pyrene	250

Benzo[g,h,I]perylene	40		
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- (k) not contain PCB's in excess of 5 ug/g when tested whole products as sold are tested according to "Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.I of the Environmental Protection Act", Ontario, March 9, 2004.;
 - (l) demonstrate appropriate biodegradability as follows:
 - i) not be readily biodegradable as determined by whole formulation testing; and
 - ii) either be inherently biodegradable or have the potential for primary biodegradation as determined by whole formulation testing;
 - (m) when tested using the product preparation methods in Appendix 2, the aqueous solution leached from the 0.1 kg product-aggregate mixture prepared in 1L of dilution water must demonstrate minimal toxicity (e.g., LC₅₀ and IC₅₀ > aqueous concentration leached from 0.1 kg product-aggregate mixture/L dilution water) on at least two of the following:
 - i) on a fresh water fish, Rainbow Trout, according to Biological Test Method: Determining Acute Lethality of Effluents to Rainbow Trout, Report EPS 1/RM/13, December 2000, Environment Canada,
 - ii) on invertebrates, according to *Biological Test Method: Determining Acute Lethality of Effluents to Daphnia magna*, Report EPS 1/RM/14, December 2000, Environment Canada, and
 - iii) on the bacteria *Photobacterium phosphoreum*, according to *Biological Test Method: Toxicity Test Using Luminescent Bacteria (Photobacterium phosphoreum)*, Report EPS 1/RM/24, November 1992, Environment Canada.
5. The licensee shall notify Environmental Choice Program of any change in the source of raw material used to manufacture the dust suppressants, for example if sourced from a different pulp and paper manufacturer, and must submit new evidence of compliance with criteria 4h. to 4.m.



Verification

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

Conditions for EcoLogo Use

8. The EcoLogo may appear on wholesale or retail packaging, or on the product itself, provided that the product meets the requirements in this document.
9. All licensees and authorized users must comply with the ECP's *Guide to Proper Use of the EcoLogo[™]* regarding the format and usage of the EcoLogo.
10. Any accompanying advertising must conform with the relevant requirements stipulated in this guideline, the license agreement and the ECP's *Guide to Proper Use of the EcoLogo[™]*.
11. It is recommended that a criteria statement appear with the EcoLogo whenever the EcoLogo is used in association with the **dust suppressant**. 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 criteria statement must be specific to the product's sub-category. For sub-category 2(a) the criteria statement is "*Unpaved surface dust suppressant*"; for sub-category 2(b) the criteria statement is "*stockpile sealant*"; and for sub-category 2(c) the criteria statement is "*Slope Erosion Control Agent*". The applicant may propose other wording for the criteria statement, but any such proposed wording must be approved by the Environmental Choice Program.

	<p>For more information about the EcoLogo[™] Program, please direct your inquiry to: The EcoLogo[™] Program 171 Nepean Street, Suite 400 Ottawa, ON, K2P 0B4 Phone: 1.800.478.0399 www.ecologo.org</p>	
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Appendix 1

Acceptable Test Methods for Efficacy Dust Suppressants and Stabilizers

At the time of publication, the ECP had yet to confirm the existence of one, single, internationally and/or nationally accepted test method available to evaluate the efficacy of *dust suppressants and stabilizers*. The ECP will thus accept efficacy test data that indicate the product is able to effectively suppress or prevent wind and water erosion on particulate surfaces, such as granular-surface roads, particulate stockpiles and/or construction sites. For example, certain Provincial/State Transportation Ministries/Departments may have developed evaluation protocols that meet reasonable expectations for product performance; ECP will consider such protocols for suitability to the Program's intent.

Whatever method is employed, efficacy testing must comply with the following general conditions:

- Testing must be performed by an appropriately, accredited third-party laboratory
- Testing must be carried out under controlled, replicable conditions; in situ or anecdotal data is not acceptable for ECP certification.
- Testing must be performed on a minimum of two substrates with different geophysical properties (e.g., sand- and clay-based soils, sand- and salt-piles, etc.).
- Generated test data must be objective and quantified in recognized metric units; subjective observations are not generally acceptable for ECP certification, unless accompanied by at least one independent objective measure.
- If performance test results cannot be compared to an accepted test standard's criteria, they must be compared to the performance of functionally equivalent products
- All control conditions must be specified and reproducible.
- Ensure the standard application procedures specified for the product are followed during the testing.
- A complete copy of the testing protocol and final report must be made available to the ECP.

Appendix 2

Applied Product Preparation Method for Toxicity Testing

1.0 INTRODUCTION

This method provides instruction for preparation of the product material as it is applied to substrates, so as to meet Product Specific Requirement 4.m.

Toxicity testing is to be performed using water that has been exposed to the product as applied, using two substrates with different geophysical properties. The testing is performed to determine whether the product, and not the substrate is toxic when tested by the methods in 4 (m). For this reason, it is important that the substrate(s) to which the products are added are known to not contribute any toxicity or significant levels.

Typically, aquarium gravel and sand are used as substrates, but any similar material that represents the type of substrate to be sealed or stabilized and which is itself known to be non-toxic and to not contain significant levels of the analytes of concern can be used.

The procedure is based on preparing the test material (product plus aggregate), allowing it to cure or set, and preparing a test solution by adding dilution water (e.g., de-ionized, ground water or other type of water appropriate for the biological test) at a weight-to-weight ratio of one part product-aggregate mixture to ten parts water.

2.0 MATERIALS

- Product.
- Aggregate or other materials to which product will be added.
- Dilution water, if the product is normally diluted prior to use/application.
- Pyrex pie plates or similar inert material for preparing the aggregate and product.

3.0 PROCEDURE

- The procedure involves exposing water to the mixture of product and aggregate, so that the water can be used for biological testing as specified in 4 (m). The goal of the procedure is to produce a sufficient quantity of water at a ratio of one part product-aggregate to ten parts water. Accordingly, since about 30 liters of water will be required for the toxicity and chemical testing, 3 kilograms (Kg) of aggregate will be required for each set of tests.
- Three (3) Kg of the aggregate sample is spread out on a tray and the product (uncut, or diluted to simulate field application dilution) is added at a sufficient quantity to ensure that all of the aggregate particles are completely coated. Surplus product is drained off and the coated aggregate is allowed to dry completely. If normal product usage typically requires application of more than one coat the mixture is stirred prior to applying a second coat. The aggregate is recoated and the surplus product drained off allowing the aggregate to completely dry. Third and subsequent coats (if required) are applied following the same procedure.
- If curing, drying, heating or similar actions are normally required as part of the product application, a clean electric oven, indirect gas fired oven or infrared heating can be used to assist in the curing process.
- The set, dried, cured product-aggregate mixture is broken into pea gravel pieces (0.5 mm), weighed and mixed in a clean beaker with sufficient dilution water to provide a 10:1 ratio of water to product. The

product-aggregate mixture is left in contact with the dilution water for 24 hours, and is separated from the water by decanting.

- The exposed water is then used for the toxicity tests referenced in Product Specific Requirements (4 m).