

Good Environmental Choice Australia.
Managers of the Australian Ecolabel Program

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The Australian Ecolabel Program

Australian Voluntary Environmental Labelling Standard

Machine Dishwashing Detergents



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Use of This Standard

This voluntary environmental labelling standard may be used by competent environmental assessors to establish product compliance to the Australian Ecolabel Program. Products that are certified with the mark of conformity, the "Environmental Choice Label" have been independently tested and demonstrate compliance to the environmental and social performance criteria detailed in this standard. The overall goal of environmental labels and declarations is, through communication of verifiable and accurate information that is not misleading, on environmental aspects of products and services, to encourage the demand for and supply of those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement.

This standard identifies environmental, quality, regulatory and social performance criteria that products sold on the Australian market can meet in order to be considered as best "environment practice". Products that have been certified as complying to this standard may gain greater market recognition and a marketing advantage in government and business procurement programs and broad consumer environmental preference.

This standard can be used by Australian producers to guide their design for environment programs by using the environmental criteria as key performance benchmarks that reduce the environmental loads of their product. The standard is necessarily restricted in its identification of environmental loads from the product life cycle. Producers should consider other environmental improvement along the product cycle not included in this standard for their design for environment programs and aim for even higher levels of environmental performance where technically possible.

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Voluntary Environmental Labelling Standard

Machine Dishwashing Detergents

Abstract

This Standard specifies environmental performance requirements of a broad range of machine dishwashing detergents for the Australian Ecolabel Program. The program generally complies with ISO 14024: "Environmental labels and declarations - Guiding principles" which requires environmental labelling specifications to include criteria that are objective, reasonable and verifiable.

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Definitions:

"AS" means Australian Standard.

"ASTM" means American Society for Testing and Materials.

"Builder" means any substance intended to maintain alkalinity, and/or bind calcium and magnesium ions (soften the water), and/or keep the soil in suspension, increasing the effectiveness of the detergent. It includes substances such as phosphates, NTA, EDTA, zeolites, sodium citrate, sodium silicate and sodium carbonate.

"Carcinogenic" means capable of causing cancer.

"DID" European Union: Detergent Ingredient Database
(http://europa.eu.int/comm/environment/ecolabel/producers/pg_did_list.htm)

"EDTA" means ethylene diamine-tetra-acetic acid or ethylene dinitrilo-tetra-acetic acid or any of its salts.

"Fluorescent whitening agent (FWA)" means a compound which by its presence in or on a near-white surface, creates a visual whitening effect by virtue of fluorescence.

"Formulated or manufactured with" refers to the preparation of the detergent and not to the preparation of the components of the detergent unless the components are specifically mentioned in the product specific requirements. Residual or unreacted components are covered by the product specific requirements.

"Fragrance & Colouring" means organic substances that are added primarily for aesthetic reasons to give colour and smell. Fragrance can also conceal smells from other ingredients and from the washing up itself.

"Genotoxin" means a substance capable of causing damage to genetic material, such as DNA.

"ISO" means International Organisation for Standardisation.

"Label" means the Australian Environmental Choice Label.

“**Mutagenic**” means able to produce a mutation.

“**OECD**” means Organisation for Economic Co-operation and Development.

“**pH**” is a scale of numbers indicating how acidic or alkaline water is. A pH of 7 is neutral, higher pH values are progressively more alkaline and lower pH values are progressively more acidic.

“**Readily biodegradable**” surfactants are those where the average level of biodegradation observed in an aerobic sewage treatment plant is at least 90% during a residence time of not more than 3 hours. In order to meet this requirement the surfactant must either meet the requirement for ready biodegradability when determined using any of the following test methods including the OECD Guidelines for Testing of Chemicals, Test Guidelines 301A-301E, ISO 7827 (1994), AS 4351 (part 2 - 1996) or achieve a biodegradability of at least 80% when tested by the OECD method, published in the OECD technical report of 11 June 1976 on the Proposed Method for the Determination of the Biodegradability of Surfactants used in Synthetic Detergents. The pass level of 80% recognises the inherent experimental variability of the OECD test.

“**Surfactant** or **surface-active agent**” means any substance which is intended to reduce surface tension thereby helping water to surround and remove soils from surfaces.

“**Teratogenic**” means able to produce abnormalities in a developing foetus, that is, causing birth defects.

1.0 Background

Approximately 30% of Australian households are equipped with dishwashing machines, consuming millions of kilograms of machine dishwashing detergents (powder and liquid) each year. This represents a potentially significant burden on the environment in terms of wastewater loading and subsequent treatment, resource consumption and disposal of packaging materials.

The major components in machine dishwashing detergents are alkaline silicates and builders.

Alkaline ingredients such as sodium metasilicate contribute to soil removal and are highly corrosive if accidentally swallowed.

Builders, which serve to control water hardness and improve performance, are a major component of machine dishwashing detergents. Tripolyphosphates are the most commonly used builders and may constitute as much as 30% by weight of machine dishwashing detergents. Soda ash (a sodium carbonate) is frequently a major component, serving as a builder and a source of alkalinity.

Phosphate may be a limiting nutrient in some aquatic environments and in some other countries the use of phosphate in detergents has been discouraged to prevent unsustainable plant growth and oxygen starvation (eutrophication) of lakes and waterways.

Machine dishwashing detergents also contain small amounts of surfactants. Surfactants may accumulate in the environment and may be toxic or otherwise harmful in waterways. The low-foaming surfactants used in machine dishwashing detergents are generally not readily biodegradable but, in Australia, the quantities involved are very small.

Other components may include bleaches, preservatives, dyes, solvents, fillers, perfumes, corrosion inhibitors and enzymes. Some of these ingredients, such as bleaches, contribute to the performance of the detergent. Some have other purposes, such as corrosion inhibitors; while others are merely cosmetic.

A desirable goal is to reduce or eliminate components that do not aid the removal of food from dishes, so reducing stress on sewage systems, in particular, and on the environment, in general. To maintain a balance between consumer acceptability and environmental concerns, the advantages and disadvantages must be weighed for each component.

Based on a review of currently available information, the following product category requirements will produce environmental benefits by reducing water pollution by reducing the volume of total chemicals used in the products and by limiting the use of potentially hazardous ingredients, conserving transport and energy and by minimising waste production by reducing the amount of primary packaging. As information and technology change, product category requirements will be reviewed, updated and possibly amended.

2.0 Product Category Scope

This category “detergents for dishwashers” shall comprise all detergents intended for use exclusively in automatic domestic dishwashers and all detergents intended for use in automatic dishwashers operated by professional users but similar to automatic domestic dishwashers in terms of machine size and usage

3.0 Environmental Performance Criteria

3.1 Fitness for Purpose

Certified products should be good performers in their intended application. It is implied that certain standards of product performance are implicit in the label. Certified product must ensure that the product is fit for its intended purpose and where relevant meets or exceeds international, Australia or industry standards.

3.2 Environmental Scoring Matrix

The following five parameters are included in an environmental matrix and are aggregated and assessed as a whole, as presented below:

- ◆ Critical Dilution Volume, toxicity (CDV_{tox})
- ◆ Total chemicals
- ◆ Phosphates (expressed as sodium tripolyphosphate - STPP)
- ◆ aerobic Non-Biodegradable Organics (aNBD0)
- ◆ anaerobic Non-Biodegradable Organics (anNBDO)

The following table summarises these parameters and their related scoring, their exclusion hurdles and their weighting factors. The formulae for calculating the score for each parameter and the exclusion hurdles are detailed below in points (a)-(f). The parameters are calculated for each ingredient by considering the dosage per wash, water content and mass percentage in the formulation and they are added up for each product formulation.

π Environmental scoring matrix						
Score	4	3	2	1	Excl. Hurdle	Weight Factor
Parameter						
Critical Dilution Volume, toxicity	60	120	180		200	8
Total chemicals	16.5	18	19.5	21	22.5	3
Phosphates (as STPP)	0	2.5	5	7.5	10	2
Aerobically non-Biodegradable Organics	0	0.25	0.5	0.75	1	1
Anaerobically non-Biodegradable Organics	0	0.05	0.10	0.15	0.2	1.5
Minimum score required	30					

Note: All values are expressed in g/wash, except CDV which is expressed in l/wash.

Verification Required

The exact formulation of the product shall be provided, including the exact chemical description of ingredients (e.g. identification according to IUPAC, CAS No, sum and structural formulae, purity, type and percentage of impurities, additives; for mixtures, e.g. surfactants: DID number, composition and spectrum of distribution homologues, isomers, and trade names); analytical evidence of the composition of surfactants, and the exact tonnage of product that is put on the market (reporting on 1 March, related to the year before).

a) Critical Dilution Volume Toxicity

Criteria

The critical dilution volume toxicity (CDV_{tox}) is calculated for each ingredient (i) using the following equation:

$$CDV_{tox}(\text{ingredient } i) = \frac{\text{weight}(i) * LF(i)}{LTE(i)} \cdot 1000$$

where weight (i) is the weight of the ingredient per recommended dose, LF is the loading factor and LTE is the long-term toxicity effect concentration of the ingredient. The CDV_{tox} is summed for each ingredient (i), making the CDV_{tox} for the product:

$$CDV_{tox} = \sum CDV_{tox}(\text{ingredient } i)$$

$$CDV_{tox} \text{ shall be } \leq 200 \text{ l/wash.}$$

$$\text{Score } (CDV_{tox}) = (5 - (CDV_{tox} / 60)) * 8$$

Verification Required

The exact formulation of the product shall be provided together with the details of the CDV_{tox} calculations and the related score. For all ingredients included in the Detergent Ingredient Database (DID-list, see Appendix A), the relevant values given in the DID-list shall be used, and the corresponding ingredient number shall be given. In the case of new chemicals or additional ingredients that are not listed in the DID list the approach described in Appendix B shall be followed.

b) Total chemicals

Criteria

Total chemicals, in g/wash, are the recommended dosage minus water content.

Total chemicals shall be ≤ 22.5 g/wash.

Score (Total chemicals) = $(15 - (\text{Total chemicals} / 1.5)) * 3$

Verification Required

The exact formulation of the product shall be provided together with the details of the total chemical calculations and the related score.

c) **Phosphates** (as STPP - sodium tripolyphosphate)

Criteria

Phosphates are the quantity of phosphates in the formulation calculated as STPP.

Phosphates shall be ≤ 10 g/wash.

Score (Phosphates) = $(4 - (\text{Phosphates} / 2.5)) * 2$

Verification Required

The exact formulation of the product shall be provided together with the details of phosphate calculations and the related score.

d) **Aerobically non-biodegradable organics (aNBD0)**

Criteria

Aerobically non-biodegradable organics is the weight per wash, in g/wash, of all organic ingredients which are aerobically non-biodegradable (see DID-list Appendix A).

aNBDO shall be ≤ 1 g/wash

Score $_{(aNBD0)} = 4 - (\text{aNBD0} / 0.25)$

Verification Required

The exact formulation of the product shall be provided together with the details of the aNBDO calculations and the related score. For all ingredients included in the DID-list (Annex IA), the relevant data given in the DID-list shall be used. For ingredients which are not included in the DID list, the relevant information from literature or other sources, or appropriate test results, showing that they are aerobically biodegradable shall be provided. The tests for ready biodegradability shall be as referred to in Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances¹, and its subsequent amendments, in particular the methods detailed in Annex V.C4, or their equivalent OECD 301 A-F test methods, or their equivalent ISO tests. The 10 days window principle shall not apply. The pass levels shall be 70% for the tests referred to in Annex V.C4-A and C4-B of Directive 67/548/EEC (and their equivalent OECD 301 A and E tests and ISO equivalents), and shall be 60% for tests C4-C, D, E and F (and their equivalent OECD 301 B, C, D and F tests and ISO equivalents).

e) **Anaerobically non-biodegradable organics (anNBDO)**

Criteria

Anaerobically non-biodegradable organics is the weight per wash, in g/wash, of all organic ingredients that are anaerobically non-biodegradable using respective correction factors (see DID-list).

anNBDO shall be ≤ 0.2 g/wash.

Score $_{(anNBDO)} = (4 - (\text{anNBDO} / 0.05)) * 1.5$

Verification Required

The exact formulation of the product shall be provided together with the details of the anNBDO calculations and the related score. For all ingredients included in the DID-list (Appendix A), the relevant data given in the DID-list shall be used. For ingredients which are not included in the DID list, the relevant information from literature or other sources, or appropriate test results, showing that they are anaerobically biodegradable shall be provided. The reference test for anaerobic degradability shall be ISO 11734, ECETOC No. 28 (June 1988) or an equivalent test method, with the requirement of 60% ultimate degradability under anaerobic conditions. Test methods simulating the conditions in a relevant anaerobic environment may also be used to document that 60% ultimate degradability has been attained under anaerobic conditions

Total Score

The sum of Score (CDV_{tox}) + Score (Total chemicals) + Score (Phosphates) + Score (aNBDO) + Score (anNBDO) shall be ≥ 30 .

3.3 Biodegradability of Surfactants

Each surfactant used in the product shall be readily biodegradable.

3.4 Dangerous, Hazardous or Toxic Substances or Preparations

The following ingredients shall not be included in the product, either as part of the formulation or as part of any preparation included in the formulation:

- EDTA; (ethylene-diamine-tetra-acetate)
- alkylphenoethoxylates (APEO's) or other alkyl phenol derivatives (APD's).
- NTA (nitrilotriacetate);
- trichloroethane;
- chlorine or chlorine compounds;
- xylene sulfonate;
- more than 0.1% by weight of formaldehyde or formaldehyde donors expressed as formaldehyde;
- opacifiers; or
- alkyl phenol ethoxylates (APEO) actives
- substances classified as carcinogenic according to the approved criteria for the classification of hazardous substances by the National Industry Chemical Notification and Assessment Scheme;
- greater than 0.1% of any ingredient that is classified or may be classified as mutagenic or tetragenetic according to the approved criteria for the classification of hazardous substances by the National Industry Chemical Notification and Assessment Scheme;

- greater than 1% of any ingredient that is classified as a contact sensitiser or as a possible mutagen according to the approved criteria for the classification of hazardous substances by the National Industry Chemical Notification and Assessment Scheme;

(b) Phosphonates

The quantity of phosphonates that are not readily biodegradable (aerobically) shall not exceed 0.2 g/wash.

3.5 Purity of Enzymes

The enzyme production micro-organism shall be absent from the final enzyme preparation.

3.6 Fragrance

Fragrance must be produced and used in accordance with the “Code of Practice” compiled by the International Fragrance Association (IFRA).

Fragrance containing the following mitromusk compounds must not be used because of their cancer risk:

Common Name	CAS-No
Moskusxylene	81-15-2
Moskusambrette	83-66-9
Moskene	116-66-5
Moskustibetin	145-39-1
Moskusketone	81-14-1

3.7 Colours

Colorants used must be included on the “List of Colouring Agents Allowed for use in Cosmetic Products” in Annex IV of European Commission Directorate 76/768/EEC, 27 July 1976 on the Approximation of the Laws of the Member States relating to Cosmetic Products (OJ L 262, 7.9.1976, p 169). A copy of the Directive is available in the document “The rules governing cosmetic products in the European Union”, Volume 1 Cosmetics legislation, 1999 Edition available at <http://pharmacos.eudra.org/F3/home.html>.

3.8 – Suitability for Local Wastewater Systems

Detergents that seek to be assessed for suitability for compliance environmental criteria for local waste water systems or on-site systems and to declare that environmental characteristic as part of the voluntary environmental labelling declaration use must comply with the following requirements.

- a) The total sodium load per wash shall be less than 21 gram per 150 litre (0.14gr/l)

3.9 Compliance to Environmental Regulations

The applicant is required to comply with relevant environmental legislation and government orders at the Local, State and Commonwealth level, if these have been issued. An applicant’s compliance with this criterion may be established by undertaking a series of random checks and gathering samples of applicant operational procedures and documents by approved assessors as evidence to support compliance during the verification

and /or a statement of self declaration by an executive officer of the applicant organisation. Where an applicant is from an overseas jurisdiction, that jurisdictions environmental regulations apply.

3.10 Compliance to Labour, Anti-Discrimination and Safety Regulations

An applicant shall demonstrate that all employees are covered by a Federal or State award or a certified industrial agreement or a registered workplace agreement as determined by the Industrial Relations Commission, the Employment Advocate or a State or Territory Workplace Relations Agency.

An applicant shall demonstrate general compliance to the terms of State or Territory Legislation concerning Occupational, Health and Safety and/or the *Commonwealth Safety, Rehabilitation and Compensation Act 1988* where applicable. Where the applicant is subject to a breach order by a government agency or a guilty verdict by an Australian Court within the last 24 months on the basis of a breach of State, Territory or Commonwealth Occupational, Health and Safety Legislation there must be evidence of corrective action.

The applicant shall demonstrate general compliance to the requirements of the *Racial Discrimination Act 1975*, *Sex Discrimination Act 1984*, *Disability Discrimination Act 1992*, *Equal Opportunity for Women in the Workplace Act 1999* and complementary State Legislation. Applicants cannot be in the list of 'named' or non-compliant employers under the *Equal Opportunity for Women in the Workplace Act 1999*. Where the applicant is subject to a breach order by a government agency or a guilty verdict by an Australian Court in the last 24 months on the basis of a breach of these Acts there must be evidence of corrective action.

Where an applicant is from an overseas jurisdiction, the applicant shall demonstrate general compliance to that jurisdictions anti-discrimination, occupational health and safety and workers compensations regulations. Where the applicant is subject to a breach order by a government agency or a guilty verdict by a legal court in their respective country within the last 24 months on the basis of a the breach of anti-discrimination, occupational health and safety and workers compensations regulations there must be evidence of corrective action.

An applicant's compliance with these criteria may be established by undertaking a series of random checks and gathering samples of applicant operational procedures and documents by approved assessors as evidence to support compliance during the verification and /or a statement of self declaration by an executive officer of the applicant organisation.

4.0 Packaging Requirements

All plastic containers and plastic components must be made of plastic that are recycled in Australia (or the country to which the product is exported and sold).

Packaging must not be impregnated, labelled, coated or otherwise treated in a manner, which would prevent recycling (i.e. PVC sleeves, metallic labels).

All plastic packaging (i.e. container, cap, measuring devise) must have a plastic resin identification code clearly visible on each item (see Appendix E).

Packaging (including labels) must not contain PVC or any type of chlorinated materials.

The cardboard packaging shall consist of $\geq 80\%$ recycled material.

5.0 Consumer Information

The detergents must be accompanied by instructions for proper use so as to maximise product performance and minimise waste.

The following instructions should be clearly displayed on the packaging (in the exact words shown):

All detergents have an effect on the environment.

Always use the correct dose for maximum efficiency and minimum environmental impact.

All detergents must display on the container a list of product ingredients which complies with the requirements of the EEC Commission Recommendation for Labelling of Detergents and Cleaning Products.

7.0 Compliance Testing

Conformance with this standard shall be demonstrated by undertaking an assessment to the above criteria by an approved assessor following the certification and verification procedures detailed in Good Environmental Choice Australia Documented Quality Management System which generally follows the environmental auditing requirements of ISO 14 011 and 14 012.

The Australian Ecolabel Program classifies approved assessors as:

1. Assessors registered by Good Environmental Choice Australia as environmental professionals that hold expertise relevant for an assessment and which have undertaken training in the procedures of the Australian Ecolabel Program, or
2. Environmental auditors accredited with the Quality Society of Australasia; or
3. Assessors registered with the Environmental Choice New Zealand Trust.

New testing shall be undertaken by a laboratory accredited by the National Association of Testing Authorities (NATA) or similar overseas accreditation to carry out the relevant tests and/or documentation detailing environmental performance against the key indicators for this standard. The tests results should be presented on NATA endorsed reports or from a laboratory acceptable to Good Environmental Choice Australia.

Audit evidence should be of such a quality and quantity that competent environmental auditors working independently of each other will reach similar audit findings from evaluation of the same audit evidence against the same audit criteria

Suitable sources of information to establish compliance may be but are not limited to:

- 1) Technical specification of the product.
- 2) Obvious characteristics of the product from examination.
- 3) Scientific and test results and reports.
- 4) Environmental management system and audit reports and results.
- 5) Life cycle assessment of each stage of the product life cycle via a physical audit and examination.
- 6) Life cycle assessment via scientific testing.
- 7) A statement of confirmation by an executive officer.
- 8) An assessment of company or government records.
- 9) Other material that can be considered objective evidence.

If testing results or environmental auditing results are not available, and/or there is not sufficient data to establish full compliance to the criteria required by this standard then certification cannot be awarded.