GREEN CHOICE PHILIPPINES

GCP-2007013
WATER BASED PAINT

1. ENVIRONMENTAL SCENARIO

Paints are manufactured using a wide range of organic and inorganic materials. These products contain components that can adversely affect the environment at different stages of the product's life cycle such as releasing solvents and toxic substances during production, application, the service life of the coating and disposal.

A range of environmentally harmful substances are used in paint products. Many of these present specific concerns for human health and the environment, for example:

- heavy metals that have human toxicity hazards as well as ecotoxic effects in the environment;
- solvents, such as hydrocarbons, aromatic hydrocarbons, halogenated solvents, ethylene glycols and glycol ethers, which can have toxicity effects on human reproduction and development and impacts on air quality (including ozone depletion or ozone formation);
- substances that are, or are probably, human carcinogens or mutagens or have other significant toxic hazards for humans or ecotoxic effects in aquatic environments; and
- volatile organic compounds can be released at concentrations indoors that can be associated with a variety of illnesses including eye, nose, and throat irritation, headaches, loss of coordination, nausea, and damage to liver, kidney, and central nervous system.

Manufacturing processes, including those for raw materials used in paints can involve significant use of energy (with associated discharge of carbon dioxide contributing to global warming) and may produce significant volumes or hazardous wastes and discharges. Life cycle work completed in Europe has identified production processes for white pigments (in particular titanium dioxide) as one of the main impacts of paint products across their life cycle. Measures to reduce energy use and increase energy efficiency and to minimise the use of titanium dioxide will help to reduce impacts on the environment from production processes.

Restricting and minimising the content of the environmentally harmful substances in paint products reduces the nature and level of hazard and releases of environmentally harmful substances during manufacturing, use and disposal.

2. DEFINITION OF TERMS

2.1. *AROMATIC SOLVENT* – means any organic solvent that has a benzene ring in its molecular structure

2.2. *ASTM* – means American Society for Testing and Materials

2.3. *COMPONENT* – means an intermediate product used in the manufacture of paint

2.4. *DAO* – DENR Administrative Order

2.5. *FORMULATED OR MANUFACTURED WITH* – refers to the preparation of the paint and not to the preparation of the components of the paint unless the components are specifically mentioned in the products specific requirements. Residual or un-reacted components are covered by the product specific requirements.

2.6. *GLYCOL ETHERS* - is a generic name of a group of oxygenated solvents, which includes a variety of chemical products (about 36).

2.7. *HALOGENATED SOLVENT* – means any halogens including fluorine, chlorine, bromine, iodine and associated compounds.

2.8. *INTEGRAL PART* - means a necessary component which is intentionally included in the paint formulation.

2.9. *LATEX PAINTS* - Water-based paint containing latex binders.

2.10. *PAINT* - means a pigmented liquid that is designed for application in single or multiple layers and forms an opaque, continuous film after application to decorate or protect surfaces, as well as to conceal surface irregularities. It also includes varnishes and stains.

2.11. *PNS* – Philippine National Standards

2.12. *RAW MATERIAL* - means a material used in the manufacture of paint.

2.13. *STAIN* - means a transparent, semitransparent or opaque mixture of coloring matter (dyes and/or pigments) in a vehicle designed to color and/or protects a surface by penetration, leaving practically no surface film.

2.14. *VARNISH* - means a liquid composition that is converted to a transparent or translucent, continuous film after application.

2.15. *VOLATILE ORGANIC COMPOUND (VOC)* Volatile organic compound" (VOC) means any organic compound which has a vapour pressure more than 0.1mm Hg at 25^{O}C. This definition excludes reactive diluents, which are designed to be chemically bound into the cured film. It is also defined as all organic compounds that have an initial boiling point below 250^{O}C.

3. SCOPE

These criteria are applicable to water based coatings.

4. GREEN CHOICE REQUIREMENTS

4.1. Product Quality Performance

Products shall be of high quality and perform well in their intended application. High standards of product performance are implicit in the label.

- The product meets the performance requirements of the relevant Philippine Product Standard for its intended application as specified in Table 1; or

Table 1: Applicable Philippine Product Standards for Water Based Paints

Standard No.	Title
PNS 139:1987	Flat latex paint white and light tints for exterior and interior use – Specification
PNS 462:1991	Paints and varnishes - Gloss latex paint (white and light tints for exterior and interior use) – Specifications
PNS 463:1991	Paints and varnishes - Semi-gloss latex paint (white and light tints for exterior and interior use) – Specification
PNS 140:1987	General requirements for packaging, packing and marking of paints and other protective coatings

- The product meets any other internationally accepted standard if it is to be exported.

4.2 Product Environmental Performance

4.2.1 VOC levels

Compliance to these criteria can be demonstrated by the VOC levels of the base paints with or without pigments. The scope of the final certification will reflect the scope of the VOC testing as described in Table 2.

Table 2: VOC limits on architectural coatings covered by this standard. Allowable levels without water content in the formulation.

Product Type	Maximum VOC content (g/litre)
Interior Flat	50
Interior Non Flat	150
Exterior Flat	100
Exterior Non Flat	200

4.2.2 Titanium Dioxide, Zinc Oxide and Lithopone Content

Shall not exceed 38g/m^2 of dry film

4.2.3 Glycol Ethers

Shall not contain the following glycol ethers listed in Table 3 or as specified in DAO 2005-27

Table 3: List of Glycol Ethers and its derivatives

Abbreviated name	Other names
EGME	Ethylene glycol methyl ether, 2-methoxyethanol monomethylic ether, ethylene-glycol, methyl glycol, MG
EGMEA	Ethylene acetate, AMG, monomethylic ether acetate, ethylene-glycol
EGEE	Ethylene glycol ethyl ether, 2-ethoxyethanol, monoethylic ether ethylene-glycol, ethyl glycol, EG
EGEEA	Ethylene acetate glycol ethyl ether, 2-ethoxyethyle acetate, acetate ethylglycol, AEG
EGDME	Ethylene glycol dimethyl ether, 1,2-dimethoxyethane
DEGDEE	diethylene glycol diethyl ether, bis(2-ethoxyethyl)ether
DEGME	diethylene glycol dimethyl ether, bis(2-methoxyethyl)ether
TEGDME	Triethylene glucol dimethyl ether

Thus, products with a higher content than 0.5% of EGEE, EGME, EGEEA, EGMEA or DEGDME, classified as “Toxic for reproduction” .

4.2.4 Heavy Metals

The product shall not contain mercury, lead, cadmium, hexa-valent chromium, barium, antimony, as well as tributyltin (TBT) and triphenyltin (TPT). If the above substances exist in the product as impurities or contaminant, their total weight shall be less than 0.1% of the product. The use of Barium sulfate (Barite) is excluded from this limitation.

4.2.5 Flash point

The flash point of the product shall be equal to or greater than $61^{O}C$.

4.2.6 Restricted Substances

Alkyl phenol alkoxylates (APEO’s) shall not be added during production. Particularly in latex resins and colourants.

4.2.7 Use of Ozone-depleting substances in Industrial Solvents

The solvents used to clean the production equipment of architectural coatings must not contain ozone depleting substances as listed in DAO 2004-08 or in the Montreal Protocol or those described in Table 4.

Table 4: Ozone Depleting Substances (ODS)

Name	Chemical Formula	ODP	Other Names
Hexachlorobutadiene	C_4Cl_6	0.07	HCBD
n-propyl bromide	1-C_3H_7Br or $CH_2BrCH_2CH_3$	0.0033-0.111	1-Bromopropane, $CH_2BrCH_2CH_3$ and nPB
1,1,1-trichloro-2,2,2-trifluoroethane	CFC-113a	0.65	R.113a
6-bromo-2-methoxy-naphtalene	$C_{10}H_2BrOCH_3$		bromo-methoxy-naphtalene, BMN (CAS number 511165-9)
Halon-1202	CBr_2F_2	Best Estimate: 1.25	dibromodifluoromethane, difluorodibromomethane, Freon 12-B2, R12B2 and UN1941
1-bromo-3-chloro-propane	CH_2ClBr_2	0.05	
Bromochloromethane**	CH_2BrCl	0.12	chlorobromomethane

4.2.8 Solvents

4.2.8.1 The paint shall not be formulated or manufactured with aromatic hydrocarbon solvents

4.2.8.2 The paint shall not be formulated or manufactured with more than 20% by weight of hydrocarbon solvents, based on the total formulation.

4.2.8.3 The paint shall not be formulated or manufactured with halogenated solvents.

4.2.8.4 The paint shall not be formulated or manufactured using ethylene glycol as an integral part of the paint formulation.

4.2.9 Carcinogenic substances

Approved paints shall not contain substances listed in Class 1 or 2A by the International Agency for Research on Cancer at a rate of exposure exceeding one twentieth (1/20) of those defined by exposure standards as exhibited in Annex 1.

4.2.10 Compliance to Environmental Regulations

The applicant is required to comply with relevant environmental legislations this includes production process, transport and disposal features of the product.

4.2.11 Material Safety Data sheets (MSDSs)

The applicant shall submit MSDS for the specified product.

4.3 Other Criteria

4.3.1 Label

The packaging shall be accompanied by a brief statement discouraging improper disposal of the material and encouraging consultation with local authorities for disposal requirements or recycling opportunities as specified in RA 9003 under article 4.

5 EVALUATION AND VALIDATION

5.1 For Green Choice requirements under 4.2, the applicant shall submit a certification from recognized/accredited laboratories or testing results are specified in Table 5.

Table 5: Applicable Testing Method for Water Based Paints

Standard No.	Title
PNS 487:1989	Paints and varnishes - Determination of volatile and non-volatile matter
PNS 530-1:1996	Paints and varnishes -- Determination of soluble metal content - Determination of lead content -- Flame atomic absorption spectroscopic method and dithizone spectrometric method
PNS ISO 14680-1:2004	Paints and varnishes -- Determination of pigment content -- Part 1: Centrifuge method
PNS ISO 14680-2:2004	Paints and varnishes -- Determination of pigment content -- Part 2: Ashing method
PNS ISO 14680-3:2004	Paints and varnishes -- Determination of pigment content -- Part 3: Filtration method
PNS ISO 15234:0000	Paints and varnishes -- Testing of formaldehyde-emitting coatings and melamine foams -- Determination of the steady-state concentration of formaldehyde in a small test chamber

5.2 Regarding product requirement 4.2.10, applicable licenses and permits to operate indicating the manufacturer's compliance with agreements on environmental regulations applicable to the area which the plant is located shall be submitted.

5.3 Regarding packaging, the applicant shall provide a sample of their packaging to Green Choice Philippines and shall indicate the requirement there of.

5.4 Regarding product requirement 4.3, the applicant shall submit a certification from BPS.

6 PERIOD OF VALIDITY

The product criteria shall take effect for three (3) years from the date of its approval, and subject to change or withdrawal by the *Green Choice Philippines-ELP Board*, if necessary at any period of time

Reference:

1. Green Seal, Inc: *Green Seal Environmental Standard for Recycled-Content Latex Paint*.
2. http://www.ecolabel.dk
3. Nordic Ecolabelling: Swan labeling of Indoor paints and varnishes; ver 1.1, March 23, 2006- March 31, 2009
4. Bio Intelligence Service S.A*; European Ecolabel to indoor and varnishe*s; September 2002.
5. Good Environmental Choice Australia Ltd; The Australian Ecolabel Program on Architectural and Protective Coatings; March 28, 2006
6. http://www.geca.org.au
7. http://www.epa.gov
8. DENR Administrative Order No. 2005-27
9. Austin, George T.; Surface Coating Industries; Shreve's Chemical Process Industries; McGraw-Hill,Inc.;New York, 1985.