

Hong Kong Green Label Scheme
Product Environmental Criteria for
Ink and Toner Cartridges (GL-005-002)



BACKGROUND

The Hong Kong Green Label Scheme (HKGLS) is an independent and voluntary scheme, which aims to identify products that are, based on life cycle analysis consideration, more environmentally preferable than other similar products with the same function. The Scheme is organized by the Green Council (GC) with contributions from the HKGLS Advisory Committee and a number of supporting organizations.

The prime objectives of HKGLS are:

- For Consumers: assist in making purchases of products that are less harmful to the environment;
- For Industry: stimulate development and production of environmentally preferable alternatives.

This specification sets out the requirements that ink / toner cartridge will be required to meet in order to be licensed to use the HKGLS label. The requirements include environmental criteria and product characteristics. The specification also defines the testing and other means to be used to verify conformance with the environmental criteria and product characteristics.

POTENTIAL ENVIRONMENTAL IMPACTS

Most printers, copying machines, fax machines and multifunctional devices consume toner and/or ink to produce the printed text and images on the paper under controlled conditions. . From simple carbon powder and colorant to carbon melt-mixed with polymer(s) and ink with additives, small toner particles and volatile substances can enter the ambient atmosphere and remain suspended in the air for some time. These can be irritants to people with respiratory conditions such as asthma and bronchitis. In addition, the chemicals constituting the ink / tone may enter the ecosystem through disposal of the containers / cartridges and the printed matters, which in turn would result in bio-accumulation.

LABEL OBJECTIVE

The environmental criteria developed for ink and toner cartridges are primarily focused on waste minimization.

PRODUCT DEFINITION

This product criterion apply to the following three types of ink and toner cartridges which are used in laser / inkjet printer, computer printers, copying machines, fax machines and multifunctional devices.

1. Original toner / ink cartridges: Cartridges manufactured being used in a certain model of output devices;
2. Refilled toner / ink cartridges: Cartridges which are collected, disassembled, cleaned, repaired and refilled with ink / toner; and

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3. Remanufactured toner cartridges: Cartridges which are collected, disassembled, cleaned, repaired, replaced with drum and wiper blades, and refilled with toner.

However, toner / ink cartridges, which have easily refillable structure by users, shall be excluded.

PRODUCT ENVIRONMENTAL CRITERIA

The product shall meet or exceed the applicable and / or accepted standards in its target market. The manufacturer shall meet all relevant environmental regulations.

In addition, the product shall meet the environmental criteria that are set out in the table below for the product category of ink / toner cartridge (GL-005-002) under the HKGLS.^{Note 1}

Criteria	Verification Method(s)*
Core Criteria for Toner	
1. Mercury, lead, cadmium and chromium (VI) compounds shall not be used in toner.	✓ Review of laboratory test report(s).
2. The following substances shall not be used in toner:	
2.1. Substance required marking with the following risk phrases (R number) in accordance with the Annex I of EU Directive 67/548/EEC.	✓ Review of toner composition lists; AND ✓ Review of supporting information
• R 26 : very toxic when inhaled • R 27 : very toxic upon contact with skin • R 40 : possible irreversible damage • R 42 : possible sensitization by inhalation • R 45 : may cause cancer • R 46 : may cause genetic damage • R 49 : may cause cancer when inhaled • R 60 : may impair the reproductiveness • R 61 : may be harmful to the reproductiveness • R 62 : may possibly impair the reproductiveness • R 63 : may possibly be harmful to the embryo • R 64 : may be harmful to the infant via mother's milk	Application shall submit declaration of compliance from manufacturer(s).
2.2. Substances classified as carcinogenicity ('Group 1', 'Group 2A' and 'Group 2B') in the recommendation on allowable concentration by IARC (International Agency for Research on Cancer). However, carbon black shall be excluded.	
2.3. Substances required labeling of the entire product with the danger symbols in accordance with Annex II to EU Directive 67/548/EEC.	
2.4. Substances required marking of the entire product with the risk phrase R43 in accordance with Annex III to EU	

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Criteria	Verification Method(s)*
Directive 67/548/EEC. 2.5. For color toner, the azo colorants used shall not degenerate into following amines through decomposition of one or more of the azo compounds in accordance with the EU Directive 2002/61/EC. • 4-aminobiphenyl (CAS No. 92-67-1) • Benzidine (CAS No. 92-87-5) • 4-chloro-o-toluidine (CAS No. 95-69-2) • 2-naphthylamine (CAS No. 91-59-8) • o-aminoazotoluene (CAS No. 97-59-3) • 2-amino-4-nitrotoluene (CAS No. 99-55-8) • p-chloroaniline (CAS No. 106-47-8) • 2,4-diaminoanisole (CAS No. 615-05-4) • O-aminoazotoluene (CAS No. 97-59-3) • 4,4'-diaminodiphenylmethane (CAS No. 101-77-9) • 3,3'-dichlorobenzidine (CAS No. 91-94-1) • 3,3'-dimethoxybenzidine (CAS No. 119-90-4) • 3,3'-dimethylbenzidine (CAS No. 119-93-7) • 3,3'-dimethyl-4,4'-diaminodiphenylmethane (CAS No. 838-88-0) • p-cresidine (CAS No. 120-71-8) • 4,4'-methylene-bis-(2-chloroaniline) (CAS No. 101-14-4) • 4,4'-oxydianiline (CAS No. 101-80-4) • 4,4'-thiodianiline (CAS No. 139-65-1) • o-toluidine (CAS No. 95-53-4) • 2,4-toluylene diamine (CAS No. 95-80-7) • 2,4,5-trimethylaniline (CAS No. 137-17-7) • o-anisidine (CAS No. 90-04-0) • 4-amino-azobenzen (CAS No. 60-90-3)	
3. The photosensitive layers in the cartridge shall not contain cadmium, lead, mercury and selenium compounds.	✓ Review of laboratory test report(s).
Core Criteria for Ink 4. Mercury, lead, cadmium, nickel and chromium (VI) compounds shall not be used in ink. However, this shall not apply to complex compounds of high molecular weight nickel that are included as a coloring agent 5. The following substance shall not be used in ink: 5.1. Azo colorants used shall not degenerate into following amines through decomposition of one or more of the azo compounds in accordance with the EU Directive 2002/61/EC. • 4-aminobiphenyl (CAS No. 92-67-1) • Benzidine (CAS No. 92-87-5)	✓ Review of laboratory test report(s). ✓ Review of supporting information.

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Criteria	Verification Method(s)*
• 4-chloro-o-toluidine (CAS No. 95-69-2) • 2-naphthylamine (CAS No. 91-59-8) • o-aminoazotoluene (CAS No. 97-59-3) • 2-amino-4-nitrotoluene (CAS No. 99-55-8) • p-chloroaniline (CAS No. 106-47-8) • 2,4-diaminoanisole (CAS No. 615-05-4) • O-aminoazotoluene (CAS No. 97-59-3) • 4,4'-diaminodiphenylmethane (CAS No. 101-77-9) • 3,3'-dichlorbenzidine (CAS No. 91-94-1) • 3,3'-dimethoxybenzidine (CAS No. 119-90-4) • 3,3'-dimethybenzidine (CAS No. 119-93-7) • 3,3'-dimethyl-4,4'-diaminodiphenylmethane (CAS No. 838-88-0) • p-cresidine (CAS No. 120-71-8) • 4,4'-methylene-bis-(2-chloroaniline) (CAS No. 101-14-4) • 4,4'-oxydianiline (CAS No. 101-80-4) • 4,4'-thiodianiline (CAS No. 139-65-1) • o-toluidine (CAS No. 95-53-4) • 2,4-toluylene diamine (CAS No. 95-80-7) • 2,4,5-trimethylaniline (CAS No. 137-17-7) • o-anisidine (CAS No. 90-04-0) • 4-amino-azobenzen (CAS No. 60-90-3) 5.2. Substance required marking with the following risk phrases (R number) in accordance with the Annex I of EU Directive 67/548/EEC. • R 40 : possible irreversible damage • R 45 : may cause cancer • R 46 : may cause genetic damage • R 49 : may cause cancer when inhaled • R 60 : may impair the reproductiveness • R 61 : may be harmful to the reproductiveness • R 62 : may possibly impair the reproductiveness • R 63 : may possibly be harmful to the embryo • R 68 : may possibly cause irreversible effects 5.3. Substances required labeling of the entire product with the danger symbols in accordance with Annex II to EU Directive 67/548/EEC. ^{Note 2} 5.4. Substances required marking of the entire product with the risk phrase R43 in accordance with Annex III to EU Directive 67/548/EEC. ^{Note 2} 6. Ink shall give a negative result in the Ames test.	✓ Review of laboratory test report(s);

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Criteria	Verification Method(s)*
Core Criteria for Packaging	
7. The packaging shall meet the following: 7.1. Packaging shall not contain PVC and halogenated plastics. 7.2. Shock-absorbing materials in packaging shall be made of recycled pulp or paper such as pulp mold. However, following materials are regarded as equivalent. 7.2.1. Shock-absorbing materials manufactured by using more than 50wt% of recycled plastics 7.2.2. EPS (expanded polystyrene), EPE (expanded polyethylene) and EPP (expanded polypropylene) whose foaming agent has zero ODP	✓ Review of supporting information; AND ✓ Inspection of product samples; AND ✓ Interview with relevant personnel.
8. The following information shall be provided either on the package, or in a manual in such a way to be clearly visible for users: 8.1. Proper procedure for use 8.2. Proper information of the ink/toner cartridge types (i.e. remanufactured or original) 8.3. Post-sale service for consumers and contact numbers 8.4. Series of applicable machines 8.5. Method for toner recycle and take back (if any)	✓ Inspection of product samples; AND ✓ Review of supporting information.
Additional Criteria for Original Ink / Toner Cartridges	
9. The cartridges shall meet the following 9.1. Separable plastic parts with weighting 25g or more and with flat surface 200mm² or more shall be visibly marked with material identification. 9.2. Plastic parts of ink/toner cartridge casing shall be made of single homo/copolymer or polymer blends (polymer alloys) in easily separable way. 9.3. Labels/markings/stickers must be made of the same material as the parts to which they are affixed or meet VDI 2243 Part I^{Note 3} requirement if they are difficult to separate.	✓ Inspection of product samples; AND ✓ Review of supporting information; AND ✓ Interview with relevant personnel.

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Criteria	Verification Method(s)*
10. The following plastics additives shall not be used 10.1. Mercury, lead, cadmium shall not be used, except for in electrical or electronic components and wires. 10.2. PBBs (polybrominated biphenyls), PBDEs (polybromodiphenyl ethers), or short-chain chloroparaffins (C= 10~13) whose chlorine concentration is 50% or more shall not be used as flame-retardants. 11. The product shall be easily disassemble: 11.1. Modules must be easily separable. 11.2. There must be sufficient space to insert tools at fixing points/dismantling points. 11.3. Joints between different materials must be easy to find. 11.4. Non-separable joints such as glued or welded joints between different materials may not be used (for case parts and chassis). 11.5. IC chip or other devices or designs shall not be installed or implemented to prevent disassembly and reuse.	✓ Review of laboratory test report(s); AND ✓ Review of supporting information. ✓ Inspection of product samples; AND ✓ Review of supporting information; AND ✓ Interview with relevant personnel.
Additional Criteria for Refilled and Remanufactured Toner / Ink Cartridges 12. CFCs or organic chlorinated compounds shall not be used in the washing process. 13. Printing capacity (PC) shall not be less than 90% of original model.^{Note 4}	✓ Review of supporting information; AND ✓ Interview with relevant personnel. ✓ Performance of on-site factory visit. ✓ Review of laboratory test report(s)

*Analytical testing should be accredited and performed by laboratories that meet the requirement laid out in the IEC/ISO 17025 or EN45001 standards or any equivalent systems e.g. HOKLAS, CNAS. Under special situation and with the approval from GC, test can be performed by in-house method by the accredited laboratory or manufacturer.

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Note 1:

The following table summarized which criteria shall the product be fulfill in order to awarded with the label.

Type	Criteria No.	
	Toner	Ink
Original	1-3, 7-11	4-11
Refilled	1-3, 7-8, 12-13	4-8, 12-13
Remanufactured	1-3, 7-8, 12-13	N/A

Note 2:

Refer to Annex I of Directive 67/548/EEC contains a list of harmonised classifications and labellings for substances or groups of substances, which are legally binding within the EU at <http://www.greencouncil.org/eng/greenlabel/res.asp>

Note 3:

In case synthetic resin is mixed, 'compatibility of thermoplastic resin' for evaluating the recyclability of mixed synthetic resin is as follows. Here, the level which does not cause inconvenience in recycling is set not less than '3'.

Plastic Matrix		Additive of Plastic											
		PE	PVC	PS	PC	PP	PA	POM	SAN	ABS	PBTP	PETP	PMMA
Plastic Matrix	PE	1	4	4	4	1	4	4	4	4	4	4	4
	PVC	4	1	4	4	4	4	4	1	2	4	4	1
	PS	4	4	1	4	4	4	4	4	4	4	4	4
	PC	4	3	4	1	4	4	4	1	1	1	1	1
	PP	3	4	4	4	1	4	4	4	4	4	4	4
	PA	4	4	3	4	4	1	4	4	4	3	3	4
	POM	4	4	4	4	4	4	1	4	4	3	4	4
	SAN	4	1	4	1	4	4	4	1	1	4	4	1
	ABS	4	2	4	1	4	4	3	4	1	3	3	1
	PBTP	4	4	4	1	4	3	4	4	3	1	4	4
	PETP	4	4	3	1	4	3	4	4	3	4	1	4
	PMMA	4	1	3	1	4	4	3	1	1	4	4	1

Remarks

1 : suitable 2 : limitedly suitable 3 : suitable in small amounts 4 : unsuitable

Data: The Association of German Engineers(VDI: Verein Deutscher Ingenieure) VDI 2243 Part 1

Note 4:

Printing yield of the toner cartridge shall be measured base on ISO/IEC 24711. The ratio of the refilled toner printing yield to original model toner printing yield shall be provided.