



Draft Eco Mark Product Category

“Toner Cartridge Version 1.0 (Draft)”Japan Environment Association
Eco Mark Office**1. Environmental Background**

In 2002, the sales of toner cartridges used for printers, copiers, and facsimiles in Japan were estimated to total 17 million units (source: Inter Watch Corporation). The market shows an upward trend with the increasing sales of machine bodies. Meanwhile businesses are showing growing interest in the recycling of used toner cartridges, and this has led to the extensive distribution of recycled toner cartridges.

In early 2003, the Asia Four Label Mutual Recognition Project successfully established common core criteria that mutually certify the eco labels of Korea, Thailand, Taiwan, and Japan based on the agreement of the respective eco labeling secretariats in each country. Defining toner cartridges as original, refilled, and remanufactured toner cartridges, the criteria aim to reduce environmental impact during the manufacture, use, and disposal of toner cartridges. Given that the respective eco labeling secretariats of each country have agreed on the outline of the criteria, and foundations for mutual recognition have more or less been established, the Eco Mark program has also decided to promote the use of eco-friendly toner cartridges in printers, copiers, and facsimiles in Japan by setting a product category for toner cartridges.

In the present review, it was decided that toner cartridges shall be re-examined to give a general evaluation, which is based on the common core certification criteria and the concept of product life cycle. This evaluation incorporates aspects such as reducing environmental impact risks of chemical substances, repeated use, recovery, and recycling, while also taking into consideration social circumstances unique to Japan.

Eco Mark Product Categories No.117 “Copiers” and No.122 “Printers” focus mainly on the actual machines themselves. Although basic criteria on toner cartridges are prescribed in these categories, most are limited to the toner and container. Thus in the present review, it was decided that certification criteria shall also be prescribed on services related to toner cartridges such as refilling and recycling, and adjustments shall be made for consistency with other product categories, taking into consideration how toner cartridges are sold with machines such as printers, etc.

NOTE: This document is a translation of the criteria written in Japanese. In the event of dispute, the original document should be taken as authoritative.

2. Applicable Products

Toner cartridges used in printers, copiers, facsimile machines, and multifunctional copiers, etc., which are based on the electrophotography method. Among cartridges which consist of photo development units and drums, those which are sold with a toner container as a set are only applicable. Toner containers, drums, and photo development units that are sold separately are outside the scope of this product category.

3. Terminology

- Toner cartridge: Cartridge for printing composed of two or more of the following: drum, photo development unit, and toner container filled with toner for electrophotographic printers, copiers, facsimile machines, multifunctional copiers, etc.
- Original toner cartridge: Cartridge manufactured by copier manufacturers or manufactured on consignment by copier manufacturers.
- Remanufactured toner cartridge: Used toner cartridges refilled with toner and whose expendable parts have been replaced as required.
- Prescription constituents: Components intentionally added with the purpose of providing specific characteristics to the product. Impurities that inevitably enter during the manufacturing process are excluded.
- Plastic: Material composed of single or multiple polymers, plus additives, fillers, etc. which are added to the polymer(s) to give specific characteristics.
- Polymer: High molecular material which is a major constituent of the plastics.
- Homopolymer: Single polymer. Polymer of a single kind of monomer.
- Copolymer: Polymer of more than two kinds of monomer.
- Polymer alloy (Polymer blend): Polymer Alloy (Polymer Blend): Generic name of multi element system high molecule obtained by mixture or chemical combination of high molecules more than two elements. Physically mixed different kind of high molecule is called a polymer blend.
- Pre-consumer material: Materials or rejects obtained from the waste route during the manufacturing process. However, this excludes those recycled within the same process as the raw material (same plant).
- Post-consumer material: Materials or products disposed after used as a product.
- Reused parts: Parts that have previously been used.
- Material recycling: Recycling of material, excluding the recovery of energy, conversion to oil, gasification, blast furnace reduction, conversion to chemical materials by coke oven.
- Recovery rate: The mass rate of all parts that are reused, recycled, energy recovered, conversion to oil, gasification, or subject to blast furnace reduction or conversion to chemical materials by coke oven, among the total products which are put into the recovering process after the collection to recover the products disposed of.
- Percentage of waste paper in the pulp mixture: Weight percentage of waste pulp contained in the product. Expressed by $(\text{waste paper pulp}) / (\text{virgin pulp} + \text{waste paper pulp}) \times 100 (\%)$. However, the weight of the pulp is measured under the

condition of containing 10% moisture.

4. Certification Criteria

4-1. Environmental criteria

Products shall meet all requirements of 4-1-1. Products including expendables, instruction manuals, and packaging prescribed in 4-1-2 to 4-1-6 shall also meet all appropriate requirements.

4-1-1. Common criteria

- (1) The production process shall conform to relevant environmental regulations and agreements on preventing air pollution, water contamination, noise, odor and emission of hazardous materials.
- (2) Solvents shall not use the specific chlorofluorocarbons (five CFCs), other CFCs, carbon tetrachloride, trichloroethane, and CFC substitutes (HCFCs), given in Attachment 1, in the final manufacturing stage as well as the final supply stages of products (toner cartridges) or circuit boards.
- (3) .At the time of loading into the unit, dust emission shall not exceed the specified concentration in indoor air 0.075 mg/m³ during continuous two-hour operationsDust emissionshall be measured as designated in the Japan Business Machine Industry Association standards (JBMS-66) or under the test conditions prescribed in Blue Angel RAL-UZ62; 2002 Appendix 3.
- (4) At the time of loading into the unit, styrene emission shall not exceed the specified concentration in indoor air 0.07mg/m³ during continuous two-hour operations. Styrene emission shall be measured as designated in the Japan Business Machine Industry Association standards (JBMS-66) or under the test conditions prescribed in Blue Angel RAL-UZ62; 2002 Appendix 5.
- (5) The photoreceptor of products shall not contain cadmium, lead, mercury,selenium and their compounds as prescription constituents.
- (6) To ensure that products can be disassembled easily, the following points “a.” to “e.” shall be met. However, this applies only to replaced parts of recycled toner cartridges.
 - a. Modules making up products shall be easily separable.
 - b. There must be sufficient space to insert tools at fixing points/dismantling points.
 - c. Joint between different materials shall be easy to find.
 - d. Non-separable joints such as glued or welded joints between different materials may not be used (for case parts and chassis).
 - e. IC chips or other devices that prevent disassembly and reuse shall not be used.
- (7) Systems for collecting and material recycling of products shall be available. The percentage of reuse and material recycling of parts shall be over 75% of the total product weight which are put into the recovering process after collection (excluding the toner).
- (8) The percentage of recovering parts shall be over 95% of the total product weight which are put into the recovering process after collection (excluding the toner). Parts of collected products that cannot be recovered shall be disposed by environmentally soundmethods.

- (9) Instruction manuals and packaging shall indicate the following information (“a.” to “g.”) clearly:
 - a. Name of the product under application
 - b. Company name of applicant
 - c. Contact telephone number
 - d. Product recovery method for users to return used products
 - e. Indication that toner cartridge is a recycled product (Applies only to recycled toner cartridges)
 - f. Correct use of product
 - g. Information on after-sales service for users
- (10) Information on applicable machines and models shall be provided for users clearly on packaging, pamphlets, and company websites. Information on how users can acquire the latest information on applicable machines and models shall also be provided.
- (11) The product shall be clearly labelled with the following:
 - a. Name of the product under application
 - b. Company name of applicant
- (12) Plastic products shall be made of one homopolymer or copolymer. However, polymer blends (polymer alloys) can be used. If labels, markings, or stickers are not easy to separate, these shall be of the same materials as the portion on which they are pasted, or shall satisfy VDI2243:1993 Part 1,30/42(Attachment 2) 1, 2, or 3. This applies only to replaced parts of recycled toner cartridges.
- (13) Cadmium, lead, or mercury shall not be added to plastic parts as prescription constituents, except for electrical and electronic parts including wires. This applies only to replaced parts of recycled toner cartridges.
- (14) Polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs) and chlorinated paraffin (chain carbon number of 10 to 13 and chlorine density of over 50%) shall not be added to plastic parts as prescription constituents. This applies only to replaced parts of recycled toner cartridges.
- (15) Plastic parts shall be marked in accordance with ISO11469, except for products that are less than 25g, parts whose smooth area is less than 200 mm², and reused plastics. This applies only to replaced parts of recycled toner cartridges.
- (16) Recycled toner cartridges shall comply with the “Recycled toner cartridge” defined in 3. Terminology.

4-1-2 Criteria for expendable portions

A. Criteria for toners

- (17) As to heavy metals used on toners, cadmium, lead, mercury and chromium(VI) and their compounds shall not be used as prescription constituents.
- (18) Azo colorants (dyes or pigments) of toner that degenerate into one or more of the amines listed in Attachment 3 through decomposition of one or more azo compounds shall not be used (in accordance with the official test method compilation based on the German Law on Foods and Sundries Article 35).

- (19) Other hazardous substances related to toners shall not contain the following (“a.” to “d.”) substances as prescription constituents:
- a. The following substances which need to be labelled as “R” in accordance with Attachment I of the EC Commission Directive 67/548/EEC, which deals with the comparison of laws, regulations and administrative rules on hazardous substances classifications, packaging, and labelling in the EU.
 - R26 (Very toxic by inhalation)
 - R27 (Very toxic in contact with skin)
 - R40 (Limited evidence of a carcinogenic effect)
 - R42 (May cause sensitisation by inhalation)
 - R45 (May cause cancer)
 - R46 (May cause heritable damage)
 - R49 (May cause cancer by inhalation)
 - R60 (May impair fertility)
 - R61 (May cause harm to the unborn child)
 - R62 (Possible risk of impaired fertility)
 - R63 (Possible risk of unborn child)
 - R64 (May cause harm to breastfed babies)
 - b. Substances classified as carcinogenic (groups 1, 2A, 2B) by IARC (International Agency for Research on Cancer). Excludes carbon black.
 - c. Substances requiring labelling of the designated symbols on the whole product in accordance with Attachment II of the EC Commission Directive 67/548/EEC, which deals with the comparison of laws, regulations and administrative rules on hazardous substances classifications, packaging, and labelling in the EU.
 - d. Substances requiring labelling of the designated R43 warning (risk of causing inflammation in skin contact) on the whole product in accordance with Attachment III of the EC Commission Directive 67/548/EEC, which deals with the comparison of laws, regulations and administrative rules on hazardous substances classifications, packaging, and labelling in the EU.
- (20) Toner shall give a negative result in the Ames test.
- (21) Products shall be equipped with the toner MSDS (Material Safety Data Sheet).

4-1-3 Criteria for instruction manuals

- (22) Instruction manuals shall conform to Eco Mark Product Category “Paper Printed Matter”. The use of hot melt adhesives is not prohibited. If printed overseas, no chlorine gas shall be used during the pulp bleaching process and the binding method shall not impede waste paper recycling.

4-1-4 Criteria on packaging material

- (23) Packaging material shall not use the specific chlorofluorocarbons (five CFCs), other CFCs, carbon tetrachloride, trichloroethane, and CFC substitutes (HCFCs), given in Attachment 1.
- (24) Resins composed of halogens and organic halogenides shall not be added to plastic materials used in packaging as prescription constituents.
- (25) Cardboard used for packaging shall contain over 50% waste paper pulp.
- (26) Packaging materials shall conform to the “Guidelines on Compilation of Pre-Evaluation Manuals in Product Design for Promoting Use of Recycled Resources” (July 1994, Waste Treatment and Recycling Committee, Industrial Structure Council).

4-2 Quality criteria

(27) The printing capacity of the recycled toner cartridge shall be less than 90% of the original model of same type. Use the following equations in calculations:

Number of sheets which can be printed with original cartridge: C1

$$C1 \text{ (in sheets)} = ((M1-M2)/(M1-M3)) \times 1000$$

M1: Weight of new original cartridge

M2: Weight of new cartridge after use

M3: Weight of toner cartridge after printing on 1000 A4-size sheets at 5% of the effective range

Number of sheets which can be printed with a remanufactured cartridge: C2

$$C2 \text{ (Number of sheets)} = ((M4-M5)/(M4-M6)) \times 1000$$

M4: Weight of new recycled cartridge

M5: Weight of recycled cartridge after use

M6: Weight of toner cartridge after printing on 1000 A4-size sheets at 5% of the effective range

$$\text{Printing capacity percentage (\%)} = (C2/C1) \times 100$$

- (28) Quality shall be managed in accordance with in-house standards. Quality assurance shall be provided to deal with poor quality conditions such as poor print quality, jamming, toner leakage, and damaged housing. In addition, quality control shall also be implemented thoroughly in the manufacturing stage based on a quality control system.
- (29) An attachment shall specify the support system and details of quality assurance, including the body.

5. Certification Procedure

- (1) For criterion 4-1(1), a certificate by the manager of the plant manufacturing the product shall be submitted to certify that relevant local environmental laws, regulations, etc. have been observed with no violation for the last five years before the filing of the application.
- (2) For criterion 4-1(2), a certificate issued by the supervisor or plant manager of the manufacturer of the product or final circuit board supplier shall be submitted.
- (3) For criterion 4-1(3), documents and measured values certifying compliance to the measurement methods in JBMS-66 or RAL-UZ62 Annex 3 shall be submitted.
- (4) For criterion 4-1(4), documents and measured values certifying compliance to the measurement methods in JBMS-66 or RAL-UZ62 Annex 5 shall be submitted.
- (5) For criterion 4-1(5), a list indicating whether the concerned substances are added shall be submitted.
- (6) For criterion 4-1(6), a checklist on "a." to "e." shall be submitted.
- (7) For criterion 4-1(7), a certificate indicating the total product weight (excluding the toner), reuse of parts, parts, material recycling purpose, etc. shall be submitted.
- (8) For criterion 4-1(8), Documents describing the recycling percentage and that eco-friendly processing and disposal systems are available (collection system, processing ability, and processing details, etc.) shall be submitted.

- (9) For criteria 4-1(9)-(11), required documents and materials such as relevant portions of instructions manuals carrying the designated information, packaging, printed materials for advertisement, URL of relevant portions of websites, photographs of relevant portions, samples, etc. shall be submitted.
- (10) For criterion 4-1(12), observance of this item shall be indicated, and the list of plastic materials used shall be submitted.
- (11) For criteria 4-1(13) and (14), it shall be clarified in parts purchase contracts, etc. that the concerned substances are not added.
- (12) For criterion 4-1(15), documents certifying conformance to the plastic marking parts list or ISO11469 shall be submitted.
- (13) For criterion 4-1(16), a certificate issued by the supervisor or plant manager of the manufacturer of the product that the reused toner cartridge has been replenished with toner and expendables have been replaced as required shall be submitted.
- (14) For criteria 4-1(17)-(19), a list indicating whether the concerned substances are added, issued by the toner supplier, shall be submitted.
- (15) For criterion 4-1(20), the Ames test report shall be submitted in accordance with laws on the regulations of chemical substance screening and manufacturing, etc.
- (16) For criterion 4-1(21), the MSDS issued by the toner supplier shall be submitted.
- (17) For criterion 4-1(22), documents describing conformance to each criterion in the Eco Mark Product Category "Paper Printed Matter" shall be submitted.

If the product is printed overseas, descriptions certifying that no chlorine gas is used during the pulp bleaching process, and that materials listed as impeding waste paper recycling are not used shall be added.
- (18) For criterion 4-1(23), a certificate issued by the supervisor or plant manager of the manufacturer of the packaging material shall be submitted.
- (19) For criterion 4-1(24), a certificate issued by the manufacturer of the packaging material consisting of a list of plastic materials used for the packaging, which clarifies whether the raw material manufacturer name, resins including halogen, and organic halogenides have been added shall be submitted.
- (20) For criterion 4-1(25), a certificate issued by the manufacturer of the cardboard packaging material shall be submitted. The certificate shall indicate the waste paper pulp content rate.
- (21) For criterion 4-1(26), conformance to guidelines shall be indicated. Specifically, a.) packaging material shall be selected according to the packaging material evaluation manual compiled based on the guidelines (also submit materials that describe the contents of the manual (list of contents, etc.)); and b.) names of material used shall be submitted.
- (22) For criterion 4-2.(27), the calculated printing ability shall be indicated in the Application Form for Eco Mark Certification and Usage.
- (23) For criterion 4-2.(28), certificates and declarations issued by the manager of the plant manufacturing the product that quality control is implemented in the manufacturing stage based on in-house regulations, and that only products passing quality inspections are shipped shall be submitted. Certificates indicating that the quality control system is established shall be submitted.

(Copies are acceptable if the applicant has obtained ISO 9001 or 9002.). Documents to describe the method of quality assurance shall also be presented with test results upon request of the review committee.

6. Other Requirements

- (1) Products shall be grouped by product types (original/manufactured) indicated in Applicable Products and by brand name (product name).
- (2) The following environmental information shall be indicated below the mark. The location and details of the Eco Mark to be indicated shall be submitted when applying for Eco Mark product certification and use. The environmental information indicated shall consist of two lines aligned to the left and enclosed in a rectangular box. The first line shall read, “部品を再使用・再資源化する (Parts shall be reused/recycled)” for new toner cartridges defined in 3. Terminology, and “再生トナーカートリッジ (Recycled toner cartridge)” for recycled toner cartridge. For both new and recycled toner cartridges, the second line shall read “回収ルート確立 (Recovery route available)”.

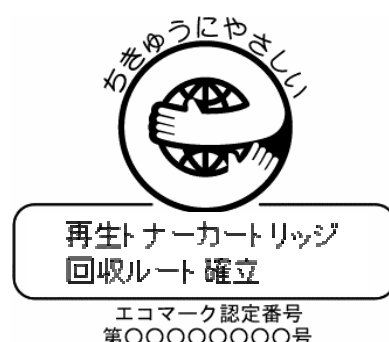
The following are examples:

[Original toner cartridge]



(Indication of numbers only is allowed)

[Remanufactured toner cartridge]



(Indication of numbers only is allowed)

xxx Co. Ltd. (Authorized Eco-Mark user name)

xxx Co. Ltd. (Authorized Eco-Mark user name)

- (3) The Eco Mark labeling method shall be used in accordance with Eco Mark Usage Regulations Article 7 separately prescribed based on the Guidelines for Eco Mark Program Implementation.
- (4) In principle, the products to be applied shall be free of “flame retardant”, “antibacterial agent” materials and “biodegradable plastic” indication. When using these materials reasoning special circumstances, however, the products shall satisfy the provisions contained in the “Eco Mark Business Execution Guideline” concerning “flame retardant”, “antibacterial agent” and “indication of biodegradable plastic”. Specifically, the use of these materials shall be described in the Application Form for Eco Mark Certification and Usage with documents stipulated in the form to be attached.

To be established: January 10, 2004

Validity Period: January 9, 2010

The certification criteria of this product category will be revised as necessary.

Attachment 1 Substances provided in 4-1-1.(2)

5 CFCs	Trichlorofluoromethane	HCFCs	Chloropentafluoropropane
	Dichlorodifluoromethane		Tetrachlorofluoropropane
	Trichlorotrifluoroethane		Trichlorodifluoropropane
	Dichlorotetrafluoroethane		Dichlorotrifluoropropane
	Chloropentafluoroethane		Chlorotetrafluoropropane
Other CFCs	Chlorotrifluoromethane		Trichlorofluoropropane
	Pentachlorofluoromethane		Dichlorodifluoropropane
	Tetrachlorodifluoroethane		Chlorotrifluoropropane
	Heptachlorofluoropropane		Dichlorofluoropropane
	Hexachlorodifluoropropane		Chlorodifluoropropane
	Pentachlorotrifluoropropane	Chlorofluoropropane	
	Tetrachlorotetrafluoropropane		
	Trichloropentafluoropropane		
	Dichlorohexafluoropropane		
	Chloroheptafluoropropane		
	Carbon Tetrachloride		
	1,1,1-Trichloroethane		
HCFCs	Dichlorofluoromethane		
	Chlorodifluoromethane		
	Chlorofluoroethane		
	Tetrachlorofluoroethane		
	Trichlorodifluoroethane		
	Dichlorotrifluoroethane		
	Chlorotetrafluoroethane		
	Trichlorofluoroethane		
	Dichlorodifluoroethane		
	Chlorotrifluoroethane		
	Dichlorofluoroethane		
	Chlorodifluoroethane		
	Chlorofluoroethane		
	Hexachlorofluoropropane		
	Pentachlorodifluoropropane		
	Tetrachlorotrifluoropropane		
	Trichlorotetrafluoropropane		
	Dichloropentafluoropropane		
	Chlorohexafluoropropane		
	Pentachlorofluoropropane		
	Tetrachlorodifluoropropane		
	Trichlorotrifluoropropane		
	Dichlorotetrafluoropropane		

Conformance of Thermal Plastics [49;67]

	Important plastics design for	Additives											
		PE	PVC	PS	PC	PP	PA	POM	SAN	ABS	PBTP	PETP	PMMA
Base material	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

1: Suitable

2: Suitable in restricted use

3: Suitable if used in small amounts

4: Not suitable

Attachment 3 4-1-2.(17) Amines that should not be degenerated during the decomposition of azo compounds

	Substances	CAS No.
1	4-aminobiphenyl	92-67-1
2	Benzedrine	92-87-5
3	4-chloro- <i>o</i> -toluidine	95-69-2
4	2-naphthylamine	91-59-8
5	<i>o</i> -aminoazotoluene	97-56-3
6	2-amino-4-nitrotoluene	99-55-8
7	<i>p</i> -chloroaniline	106-47-8
8	2,4-diaminoanisole	615-05-4
9	4,4'-diaminodiphenylmethane	101-77-9
10	3,3'-dichlorbenzidine	91-94-1
11	3,3'-dimethoxybenzidine	119-90-4
12	3,3'-dimethylbenzidine	119-93-7
13	4,4'-diamino-3,3'-dimethyldiphenylmethane	838-88-0
14	<i>p</i> -cresidine	120-71-8
15	4,4'-Methylene-bis - (2-Chloroaniline)	101-14-4
16	4,4'-oxydianiline	101-80-4
17	4,4'-4-Aminophenyl Sulfide Bis	139-65-1
18	<i>o</i> -toluidine	95-53-4
19	2,4-diaminotoluene	95-80-7
20	2,4,5-trimethylaniline	137-17-7
21	<i>o</i> -anisidine	90-04-0
22	4-amino- azo- benzen	60-90-3

Interpretation

“Toner Cartridge Version 1.0 (Draft)”

To be established: January 10, 2005

1. Environmental Background

The toner cartridge production volume is estimated by the Inter Watch Corporation survey.

The Asia Four Label Common core criteria were developed for implementing partial mutual recognition between Korea's Eco Label, Thailand's Green Label, Taiwan's Green Mark, and Japan's Eco Mark with the aim of deepening cooperation between the Eco Labelling Programs of Asian countries. When products certified by any of these labels apply for Eco Mark certification, they are considered to meet basic criteria corresponding to the Common Core Criteria and need not submit certification documents for such criteria. Depending on the requirements of each respective country, submission of certification documents and screening are required for other criteria as done in normal applications.

2. Applicable Products

The toner cartridge is composed mainly of toner container, development unit, and drum. It consists of four types: (1) integrated cartridge composed of all of these parts, (2) separate drum unit and cartridge which consists of toner container and development unit, (3) toner cartridge integrating the development unit and drum, in which only the toner container can be replaced, and (4) separate development unit and cartridge which consists of toner container and drum. This fourth type is currently not commercialized but has the potential of being introduced into other markets. The life cycles of the toner container, development unit, and drum differ; depending on the architecture of the machine body, all four types were taken up in this category to give as many options as possible. This product category excludes the single toner container, development unit, and drum body. However, depending on the product design of copiers and printers in the future, the inclusion of these single units will be reviewed if they alone may contribute to the reduction of environmental impact.

3. Terminology

Toner cartridges were divided into original and remanufactured toner cartridges in devising the certification criteria of this product category. In addition to these two types, the Asia Four Label Common Core Criteria also prescribe the refillable toner cartridge, which allows refilling of the toner and replacement of only malfunctioning

and worn out parts. This type was not included in the Eco Mark program considering that production volume is still low in Japan and the unique environmental impact of this type of toner cartridge.

Terminology related to plastics is excerpted from Eco Mark product criteria No.118 “Plastic Products Using Recycled Materials”, and those related to paper from No.107 “Printing Paper”.

4. Certification Criteria

4-1. Details of establishing environmental criteria

Chart for selecting environmental impact items at each stage of product life cycle was utilized in establishing these criteria, and after considering, from the standpoint of the environment, the environmental impact for the product lifecycle as a whole, impact items were selected which were thought to be important when establishing the certification criteria, and qualitative and quantitative criteria were set for those items.

Environmental impact items considered for the category of “Toner Cartridge” are as shown in Table 1: Chart for Selecting Environmental Impact at Each Stage of Product Life Cycle (X and XX in the table). Out of these items were finally selected as the environmental criteria: B-3, B-5, B-6, B-8, B-9, C-1, C-3, C-8, D-8, D-9, E-7, E-8 and F-1(items marked by XX in the chart).

The blank columns are either not subject to the review or were reviewed in conjunction with other items. A detailed description of how the environmental criteria were prepared is provided below.

Table: Chart for Selecting Environmental Impact Items at Each Stage of Product Life Cycle

Environmental Impact Item	Product Life Stage					
	A. Resource extraction	B. Manufacturing	C. Distribution	D. Use/Consumption	E. Disposal	F. Recycling
1.Resource consumption	X		XX			XX
2.Discharge of greenhouse gases						
3.Discharge of the ozone layer depleting substances		XX	XX			
4. Impact on eco systems						
5.Discharge of atmospheric pollutants		XX				
6.Discharge of water pollutants		XX				
7. Generation/disposal of wastes					XX	
8.Use/discharge of hazardous materials, etc.		XX	XX	XX	XX	
9.Other environmental impacts		XX		XX		X

A. Resource Extraction Stage

A-1 Resource consumption

The following point was reviewed under this item:

(1) Usage rate of recycled materials and reused parts

The usage rate of recycled materials and reused parts is prescribed in overseas Eco labels such as Scandinavia's Nordic Swan. The inclusion of this item in this product category was reviewed because it can help promote use of recycled materials, and contribute to reducing resource consumption. Questions such as the difficulty of defining usage rate and recycled material usability depending on the design of each product were raised, however. In addition, there was the opinion that selecting this item as a criterion may contradict efforts to reduce environmental impact considering the fact that toner cartridges are not being recovered adequately. Some printers are manufactured by importing recycled materials from overseas because recycled materials (including reused parts) cannot be secured adequately by recovery systems. As a result of review, though promoting the use of recycled materials can serve as a means of reducing waste, it was decided that the reuse and recycling rate of toner cartridges after recovery would be determined by first recognizing the importance of recycling in areas other than the toner cartridge, and the steady reduction of waste originating from used toner cartridges. Regarding recycling methods such as energy recovery, conversion to oil, gasification, blast furnace reduction, and conversion to chemical materials by coke oven, the establishment of similar criteria is also expected to reduce the final waste volume.

B Manufacturing Stage

B-3 Discharge of ozone layer depleting substances

The following point was reviewed under this item:

(1) Use of ozone layer depleting substances in the manufacturing stage
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The Asia Four Label Common Core Criteria prohibit the use of CFCs and organic chlorine compounds in the cleaning process of remanufactured toner cartridges. However, the Eco Mark gives importance to the proper handling of ozone layer depleting substances irrespective of original or remanufactured products, not only in the cleaning process but in all manufacturing processes, and has applied this criterion to all products and all manufacturing processes. The ozone layer depleting substances prohibited in this criterion are CFCs, HCFCs, 1,1,1-trichloroethane, carbon tetrachloride as prescribed in the Montreal Protocol in consideration of consistency with Eco Mark Product Category No. 117 "Copier". Circuit boards are products

supplied to toner cartridge manufacturers, and indicate the state of mounting ICs, etc.

B-5 Discharge of atmospheric pollutants

The following point was reviewed under this item:

(1) Air pollution must be appropriately managed.

For air pollutants emitted during the manufacturing process, since it was determined that environmental impacts can be adequately reduced by strictly adhering to agreements concerning pollution control and other related environmental regulations, this item was included in the list of items that require the establishment of criteria.

B-6 Discharge of water pollutants

The following point was reviewed under this item:

(1) Wastewater must be appropriately managed.

For water pollutants discharged during the manufacturing process, since it was determined that environmental impacts can be adequately reduced by strictly adhering to agreements concerning pollution control and other related environmental regulations, this item was included in the list of items that require the establishment of criteria.

B-8 Use/discharge of hazardous materials, etc

The following points were reviewed under this item:

(1) Hazardous materials
(2) Use of ECF pulp in instruction manuals

For (1), the hazardous materials excreted during the manufacturing process, since it was determined that environmental impacts can be adequately reduced by strictly adhering to agreements concerning pollution control and other related environmental regulations, this item was included in the list of items that require the establishment of criteria.

For (2), instruction manuals were reviewed from the viewpoint of consistency between different product categories since they are undertaken in No.120 "Paper Printed Matters", particularly focusing on ECF (elemental chlorine free) pulp. In No.120 "Paper Printed Matters", the paper used must meet the criteria of No.107 "Printing Paper" and the use of ECF pulp is required. In Japan, the use of ECF pulp has been promoted as a result efforts by the paper manufacturing industry, with a target deadline of the end of F2004. According to a survey by AET (The Alliance for Environmental Technology), the international organization of chemical vendors

engaged in reducing environmental impact related to paper and pulp manufacturing, even in South East Asia where many of the instruction manuals are manufactured, ECF pulp is reported to account for about 2/3 of bleached chemical pulp production volume. This indicates that ECF pulp can be obtained in the manufacture of instruction manuals. It was also concluded that criteria on ink, waste paper content in the pulp mixture, etc. in No.107 “Printing Paper” can be established, and that the criteria on “paper printed matters” should be met.

However, regarding the waste to pulp ratio, because no social systems for recovering waste paper in China and South-East Asia exist, some instruction manuals for Product Category “No. 122 Printers” are actually produced by exporting waste paper from Japan. Concern that the establishment of similar criteria in the certification criteria of toner cartridges may contradict efforts to reduce environmental impact has been voiced. As a result of reviews, it was concluded that although the mixture of waste paper with pulp may be possible in Europe, it is not ideal to implement differentiation only in specific foreign countries; and consequently decided that circumstances shall be verified in future reviews of certification criteria of Product Category No.107 “Printing Paper” and trends of overseas, and the use of waste paper shall not be prescribed for instruction manuals printed overseas.

B-9 Other environmental impacts

The following points were reviewed under this item:

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| (1) Noises and offensive odors shall be appropriately managed.
(2) Complaint rate |
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For (1), since noises and offensive odors was determined that environmental impacts can be adequately reduced by strictly adhering to agreements concerning pollution control and other related environmental regulations, this item was included in the list of items that require the establishment of criteria.

(2) was reviewed from the aspect of quality verification of remanufactured toner cartridges. JIS standards on toner cartridges available include JIS X6930 “Information technology -- Office equipment -- Measurement of image quality attributes for hardcopy output -- Binary monochrome text and graphic images”. The quality prescribed by this standard pertains to the definition of picture quality attributes, such as the brightness of images and line width, and the method of checking the compliance of measuring systems, and does not prescribe the quality that must be satisfied by images obtained in copies. For this reason, the amount of complaints (rate) was given as an alternative method for checking the toner cartridge quality. Eventually, it was decided that complaints shall not be taken up in this certification criterion due to the following reasons: the definition of complaints related to this product and complaints themselves are very likely to be unrelated to quality; the basis for complaints differ by user; response to and the handling of complaints is important and complaints cannot be evaluated based only on figures; and the complaint rate cannot be reported in initial certification. It was also decided that printing performance shall be verified as a quality criterion, and efforts shall be made

to enhance reliability of remanufactured toner cartridges by eliminating inferior quality goods.

C Distribution Stage

C-1 Resource consumption

The following points were reviewed under this item:

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| (1) Waste paper percentage in the pulp mixture of cardboard for packaging
(2) Guidelines on compilation of pre-assessment manuals in product design for promoting use of recycled resources |
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For (1), waste paper content shall follow the level prescribed by the Common Core Criteria, which is over 50%.

(2) is also prescribed in Product Category No.122 “Printers”, and was selected as a criterion from the viewpoint of ensuring consistency among criteria.

C-3 Discharge of the ozone layer depleting substances

The following point was reviewed under this item:

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| (1) Use of ozone depleting substances in packaging material manufacturing stage |
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The Asia Four Label Common Core Criteria prohibit the use of CFCs and HCFCs in packaging materials. As the Eco Mark program also places importance on giving consideration to ozone depleting substances during the manufacture of packaging materials, this item was selected as a criterion. Ozone depleting substances taken up in the criteria follow those prescribed in the Montreal protocol for consistency with Product Category No.117 “Copier”.

C-8 Use/discharge of hazardous materials, etc

The following point was reviewed under this item:

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| (1) Use of halogens and organic halogenides in plastic packaging material |
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(1) was selected as a criterion from the viewpoint of reducing harmful substances during disposal.

D Use and Consumption Stage

D-8 Use/discharge of hazardous materials, etc

The following points were reviewed under this item:

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| (1) Discharge of styrene and dust during mounting to machine body |
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- | |
|--|
| <ul style="list-style-type: none">(2) Emission of volatile organic compounds during mounting to machine body(3) Heavy metals contained in toners, azo pigments, and other harmful substances(4) Ames test(5) MSDS of toners |
|--|

(1) was reviewed due to the fact that restriction of discharged volume is selected as a criterion in Eco Mark Product Categories No.117 “Copier” and No.122 “Printers”. In this respect, there were comments that some remanufactured toner cartridge products can be used on multiple types of machines, and it would be very costly to prepare all these machines to measure the discharged volume during mounting. As a result of discussion, it was decided that there is a need to reduce styrene and dust discharged from toner cartridges by prescribing standards. Consequently, this item was selected as a criterion. Considering the influence of the machine body on the discharge amount, it was pointed out that there is a need to promote consistency with related product categories such as copiers and printers when reviewing these product categories.

Regarding the test method, taking into account the possible burden on manufacturers, it was verified that the implementation of tests based on the requirements of JBMS-66 should not pose as an obstacle to small- and medium-sized manufacturers in terms of size of the chamber, etc. and this item was thus selected as a criterion. The German Eco Labelling scheme “Blue Angel” has changed the test method since the October 2003 edition of its Copier Certification Criteria. Accordingly, it was concluded during the review of this Eco Mark Product Category that there is a need to change the test method in the next review.

For (2), the October 2003 edition of the Blue Angel Copier Certification Criteria sets this item as criteria related to the emission of volatile organic compounds (VOCs) during the standby phase prior to the start of copying and VOCs during the copying process. Efforts are currently being made to reduce VOCs for various products as well, leading to the reinforcement of reduction efforts in the copier industry. Considering that test laboratories are currently being constructed in Japan as part of these efforts, it was decided during this review that efforts will be made to gather the required information and that this item shall be taken up in the next review. Consequently, this item was not selected as a criterion.

For (3), the Common Core Criteria and Eco Mark Product Categories No.117 “Copier” and No.122 “Printers” prescribe that these substances shall not be added, and this requirement was conformed to in this Product Category as well.

(4) was reviewed due to the fact that the German Blue Angel requires toners to undergo the Ames test in its copier and toner cartridge product categories. The Ames test is designed to screen the carcinogenic level of toners, and is implemented commonly by toner manufacturers. The prescreening by some of these manufacturers using two bacteria to determine carcinogenicity was discussed during this review. Considering that screening using five types of bacteria is prescribed by the OECD guidelines, and law on the screening and manufacture of chemical substances, etc., it was decided that the criteria in this product category shall also conform to OECD guidelines, and indication of conformance to the Guidelines shall be required in

certificates.

For (5), considering that the PRTR Law requires the attachment of MSDS in the distribution of specific chemical substances in Japan, this item was reviewed for its potential as an incentive to identify harmful substances contained within, and reduce the amount of toner used. In Asian countries, MSDS is not established as a law, and though it is also not adopted as a criterion in the Asian Four Label Common Core, this item was selected as a criterion in this product category to promote the spread of MSDS in the future.

D-9 Other environmental impacts

The following point was reviewed under this item:

(1) Information for users

This item was reviewed from the perspective of educating users on proper use, promoting product recovery by the provision of information on recovery, and clarifying the responsibilities of manufacturers related to the manufacture of Eco Mark certified products, etc. It is important to clarify where responsibility lies and supply information on recovery methods and inform users of whom to contact in order to promote used product recovery. In the recovery of products, users generally refer to information labeled on products themselves. The labeling of the product name and company name of the Eco Mark applicant was therefore selected as a certification criterion. Such information also needs to be included in instruction manuals and on packaging material. Furthermore, the contact address and recovery method shall be indicated, and the indication of “recycled products” shall be given to avoid confusion between original and remanufactured products.

Though it is important to provide information on usage and after-sales services from the viewpoint of promoting the appropriate use of products, such information is difficult to label on the products themselves due to restricted space. It was therefore decided that information shall be labeled on the packaging or included in instruction manuals. Information on compatible machines and models is required at the time of purchase, and shall be provided on the product packaging, in printed pamphlets for advertisement, and on the website. In addition, since the provision of information on compatible machines and models may increase wastes and costs if regulations are too strict, it was decided that only details as to how to acquire information on the latest compatible machines and models should be provided. Regarding the provision of information on packaging, in printed pamphlets for advertisement, and on the website, the Screening Committee can verify appropriateness when applying for Eco Mark certification and use. This item was selected as a criterion.

E. Disposal Stage

E-7 Generation/disposal of wastes

The following point was reviewed under this item:

(Interpretation)8

(1) Disposal of parts which cannot be reused and recycled

Some parts of recovered used products are not reusable due to severe wear. Though it is strongly desired that such parts should be recycled, those which are difficult to recycle should be reused as resources including energy recovery. If these parts are difficult to reuse as resources, it is important that they be subject to appropriate processing and disposal using eco-friendly methods in order to reduce environmental impact from wastes. As described in A-1, this item was thus selected as a criterion.

E-8 Use/discharge of hazardous materials, etc

The following points were reviewed under this item:

- (1) Heavy metals used for photoreceptors
- (2) Additives for plastics

As (1) is set down as a criterion in the Asia Four Label Common Core Criteria and Eco Mark Product Category No.122 “Printers”, etc., it was also selected as a criterion in this product category.

(2) is prescribed as a criterion applicable to original products only in the Asia Four Label Common Core Criteria. In this product category, deeming it necessary to promote the reduction of environmental impact for replaced parts even if they are recycled, the scope of application was extended to original and recycled replacement parts.

F. Recycling Stage

F-1 Consumption of resources

The following points were reviewed under this item:

- (1) Recovery and recycling systems
- (2) Recovery rate of products
- (3) Material restrictions of plastics
- (4) Material labeling of plastics
- (5) Ease of disassembly

As (1) is set down as a criterion in the Asia Four Label Common Core Criteria and Eco Mark Product Category No.117 “Copier”, etc., it was also selected as a criterion in this product category as described in A-1.

For (2), to prompt efforts to promote the recovery of toner cartridges by manufacturers, criteria on recovery rate were proposed. Regarding the problem of recovery rate, there was the opinion that this issue is related to the procurement of recycled materials for raw materials. It is important for manufacturers to establish recovery systems such as installation of recovery boxes, and as described in (1) above,

this item was therefore selected as a criterion. However, since it should be left to users to decide the recovery vendor of used products, this item was not selected as a criterion.

For (3), it is important to standardize materials as much as possible in promoting the recycling of plastics. As this item is set down as a criterion in the Asia Four Label Common Core Criteria, it was also selected as a criterion in this product category. Regarding labels, marking, stickers, etc., plastics conforming to the parts on which they are pasted shall also be allowed. Conformity between plastics shall conform to VDI2243:1993 Part 1, 30/42. VDI2243 was revised in 2000, and this new version does not carry the table on plastic conformity carried in the 1993 version. Table 2 is an excerpt of this table in the 1993 version. The Asia Four Label Common Core Criteria limits the scope of applicable products to original products, while in this product category, deeming it necessary to promote reduction of environmental impact for replaced parts even if they are recycled, the scope of application was extended to new and recycled replacement parts.

For (4), considering it important to indicate the materials used for the recycling of plastics, and since this item is also set down as a criterion in the Asia Four Label Common Core Criteria, it was also selected as a criterion in this product category. While the Common Core Criteria limits the scope of applicable products to original products, like (3), scope of application for this item has been extended to original and recycled replacement parts.

For (5), which is set down as a criterion in the Common Core Criteria, was reviewed considering the importance of giving consideration to ease of disassembly for reuse and recycling. There was the opinion that voicing the difficulty of certifying ease of disassembly and current designs by manufacturers of authentic products does not impede recovery and reuse efforts. Regarding IC chips, though some types will cause recycling difficulty when mounted, they are designed for use for quality maintenance such as toner remainder management, etc. and do not necessarily impede reuse and recycling. In this product category, this item was selected as a criterion to prohibit programs aimed at disabling the use of toner cartridges that have been refilled with toner.

F-9 Other environmental impacts

The following points were reviewed under this item:

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|---|
| <ul style="list-style-type: none">(1) Display number of times recycling has been performed(2) Provision of information on recycling by manufacturers of authentic products(3) Rejection of after-sales services for remanufactured toner cartridges |
|---|

For (1), the need to display the number of times recycling has been performed as information on remanufactured toner cartridge was reviewed. However, considering that toner cartridges may be recovered by vendors other than the manufacturer in some cases, that it is difficult to accurately determine the number of times this has been performed, and that recycle toner cartridge manufacturers do not take into consideration the number of times recycled to determine whether the reuse of parts is

possible, this item was not selected as a criterion.

(2) was also not selected as a criterion because the provision of such information depends on the machine body such as copiers to a great extent, rather than toner cartridge manufacturers; and because the provision of information depends largely on the architecture of manufacturers, thus certification is difficult.

(3) was also not selected as a criterion for reasons that it concerns the manufacturers of the machine body such as copiers and suppliers to consumers, and not the manufacturers of toner cartridges.

4-2. Details of quality criteria

Quality was reviewed from the perspectives of how to treat products with performance problems as a result of being marketed at low prices due to low quality, and from concerns over adverse effects of use of remanufactured toner cartridges on machine bodies such as copiers, etc., and defects such as soiling by printing ink.

The improvement of printing ability of remanufactured toner cartridges is expected to improve the quality of the remanufactured toner cartridges themselves, as well as contribute to reducing resource consumption. Quality criteria available on printing ability are limited to ISO13660 and criteria for specific evaluation are still in the development stage. On the other hand, an example of available criteria on toner cartridge lifespan measuring methods is ISO19752, but application to remanufactured toner cartridges incurs great costs, and is an issue that needs to be reviewed by related businesses. It was decided that criteria on quality shall be reviewed at the point they have been established, and in the meantime, this item shall conform to items prescribed in the Common core criteria.