Green Label Product
Remanufactured Toner Cartridge
(TGL-30/2-17)

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Green Label Criteria for Refurbished Toner Cartridges
(TGL-30/2-XX)
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1. Introduction

A toner cartridge consists of mainly plastic, metal, and paper tissues, rubber, foam, and toner. Simply chucking this cartridge into a landfill is a senseless waste, as the plastic components will take at least 1,000 years to decompose. This waste is avoidable, however, as 97% of these components can be recycled or reused. Using remanufactured or refurbished toner cartridges keeps these materials out of the landfill, and conserves natural resources by eliminating the need to extract materials to make new toner cartridge. The demand for toner cartridges has been on the rise from its uses with other office appliances such as laser printers, personal printers, photocopiers, facsimile machines and multifunction copiers. Therefore using refurbished toner cartridges will be a good alternative choice for consumer.

The major components of refurbished toner cartridge are the same as the original one with possible part changes and ink toner addition. During handling or replacing toner cartridges, the hazardous substances may be dispersed and put human health at risk from exposure. The empty toner cartridges and toners, which are discarded into the community, may cause hazardous substances contamination to the environment.

Therefore, the Green Label for Refurbished Toner Cartridge is focused on consumer safety, limiting the use of heavy metals in plastic parts for toner cartridge as well as marking of plastic packaging and existence of return policy of used toner cartridge to promote recycling and reduce environmental impact after use and support climate change mitigation policy by monitoring the release of CO_2 over the product life cycle.

2. Scope

The Green Label for Refurbished Toner Cartridge covers only remanufactured toner cartridges.

3. Definition

3.1 **Remanufactured Toner Cartridge** refers to a used toner cartridge that has been cleaned inspected, repaired, tested, and refilled. It contains toner with or without the drum and developing unit for use with laser printers, personal printers, photocopiers, facsimile machines and multifunction copiers.

3.2 **Original Equipment Manufacturer (OEM) Cartridges** refers to a brand name cartridges, are created by a specific printer's manufacturer**.**

3.3 **Printing Toner** is a powder used in laser printers, photocopiers, facsimile machines and multifunction copiers to form the printed text and images on the paper, in general with a toner cartridge.

3.4 **Declaration letter** refers to a document issued by the applicant or the manufacturer to ensure compliance to product environmental requirements for respective products.

3.5 **Certificate** refers to a document issued by a certification body, which has been accredited by the Office of the National Standardization Council (ONSC) or an accreditation body under International Accreditation Forum (IAF).

3.6 **Authorized director** refers to the person who has been authorized to sign on behalf of a juristic person under Civil and Commercial code.

4. General criteria

4.1 The printing capacity of the remanufactured toner cartridge shall be equivalent to or more than an original cartridge of the same type. Specifically, the printing capacity ratio by calculation method[1] 1 or 2 of the following shall not fall below 90% in all test samples.

Calculation 1

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

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

Where; M1: Weight of original cartridge
M2: Weight of original cartridge after use
M3: Weight of toner cartridge after printing on 1000 A4-size sheets at 5% of the effective range

1. Japanese Ecolabel Eco Mark, Product Category No.132 for Toner Cartridges, Version1.5

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

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

Where; M4: Weight of remanufactured cartridge

M5: Weight of remanufactured cartridge after use

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

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

Calculation 2

Under the same conditions/environment, check by performing a use-up print test with an original cartridge and a remanufactured cartridge, respectively, on an A4 size sheet with the effective range of 5%.

C1 (sheet) = Number of printable sheets when printing takes place with an original cartridge under the above conditions

C2 (sheet) = Number of printable sheets when printing takes place with a remanufactured cartridge under the above conditions

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

Remarks

- The machine used for testing of C1 and C2 shall be the same.
- "After use" prescribed in M2 and M5 of [Calculation 1] means: when white lines occur due to toner shortage after the start of test, the cartridge is removed and shaken 5 or 6 times to even the toner; the test is resumed after this work; and the point when white lines occur the second time is defined as "after use". The weight of original and recycled cartridges at this point is defined as M2 and M5, respectively.
- The print test, charts of ISO/IEC19752 (monochrome) and ISO/IEC24712 (color) may be used.

Verification method

The applicant shall submitted declaration letter indicating that printing capacity is comply with the requirement 4.1 together with submit the test results according to Form 4.1

4.2 The manufacturer shall be accredited by Quality Management System such as ISO9001 standard.

Verification Method

The applicant shall submit Quality Management System certificate as specified in requirement 4.2.

4.3 Manufacturing, transportation and post-industrial waste disposal shall comply with national laws and regulations or the manufacturer shall be accredited by ISO14001.

Verification Method

The applicant shall declare one of the following documents:

1. License or evidence ensuring the production, transportation and postindustrial-waste disposal comply with national laws and regulations.
2. Manufacturer's ISO14001 certificate

5. Environmental criteria

5.1 **0**

5.1.1 Refurbished toner cartridge shall not be manufactured with and/or contain intentionally added mercury, lead, cadmium or chromium (VI) as constituent parts of the toner. The content of the heavy metals as impurities (lead, cadmium, mercury, and hexavalent chromium) shall not exceed 100 mg/kg in total toner powder.

Verification method

The applicant shall submit either of the following evidences;

1. A declaration letter together with test reports for mercury, lead, cadmium and hexavalent chromium concentrations, issued by paint or pigment manufacturer.
2. Test reports for mercury, lead, cadmium and hexavalent chromium concentrations using test method according to IEC 62321[2] or acceptable standards such as ISO or ASTM.

5.1.2 Azo colorants that degenerates into one or more of the amines listed in Table 1 shall not be used.

Verification Method

The applicant shall submit a declaration letter from toner cartridge manufacturer ensuring that toners meet requirement 5.1.2

2. International standard IEC 62321: Electrotechnical products - Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers).

Table 1 Aromatic amines (According to EU Assembly/Council Directive 2002/61/EC)

No.	Chemical Substances	CAS No.
1	Biphenyl-4-ylamine, 4-aminobiphenyl xenylamine	92-67-1
2	Benzidine	92-87-5
3	4-chloro-*o*-toluidine	95-69-2
4	2-naphthylamine	91-59-8
5	*o*-aminoazotoluene, 4-amino-2',3-dimethylazobenzene, 4-*o*-tolylazo-*o*-toluidine	97-56-3
6	2-amino-4-nitrotoluene, 2-Methyl-5-nitroaniline, 5-Nitro-o-toluidine	99-55-8
7	*p*-chloroaniline, 4-chloroaniline	106-47-8
8	4-methoxy-*m*-phenylenediamine, 2,4-diaminoanisole	615-05-4
9	4,4'-methylenedianiline , 4,4’-diaminodiphenylmethane	101-77-9
10	3,3’-dichlorbenzidine, 3,3'-dichlorobiphenyl-4,4'-ylenediamine	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	*p*-cresidine	120-71-8
15	4,4’-Methylene-bis - (2-Chloroaniline)	101-14-4
16	4,4’-oxydianiline	101-80-4
17	4,4'-thiodianiline	139-65-1
18	*o*-toluidine, 2-aminotoluene	95-53-4
19	4-methyl-*m*-phenylenediamine	95-80-7
20	2,4,5-trimethylaniline	137-17-7
21	*o*-anisidine	90-04-0
22	4-aminoazobenzene	60-09-3

5.1.3 The following substances shall not be used in toners formula:

(1) Substance required to be marked with hazard symbol “R” in accordance with Annex I of EC Directive 67/548/EEC[3] or “H” in accordance with Appendix VI of Regulation (EC) No.1272/2008[3].

R40 or H351 (Limited evidence of a carcinogenic effect)

R45 or H350 (May cause cancer)

R46 or H340 (May cause heritable genetic damage)
R49 or H350i (May cause cancer by inhalation)
R60 or H360F (May impair fertility)
R61 or H360D (May cause harm to the unborn child)
R62 or H361f (Possible risk of impaired fertility)
R63 or H361d (Possible risk of harm to the unborn child)
R68 or H341 (Possible risk of irreversible effects)

Verification Method
The applicant shall submit a declaration letter from toner cartridge manufacturer ensuring that the substances specified in Annex I of EC Directive 67/548/EEC or Appendix VI of Regulation (EC) No.1272/2008 has not been used in toner formula and meet requirement 5.1.3 (1).

(2) Substances classified as carcinogenic, mutagenic and toxic to reproduction in TRGS905[4].

Verification Method
The applicant shall submit a declaration letter from toner cartridge manufacturer ensuring that substances classified as carcinogenic, mutagenic and toxic to reproduction in TRGS905 has not been used in toner.

(3) Substances required to be marked with hazard symbol on the whole product in accordance with Annex II of EC Directive 67/548/EEC and EC Directive 1999/45/EC.

Verification Method
The applicant shall submit a declaration letter from toner cartridge manufacturer ensuring that toner contains no substances required to be marked with hazard symbol on the whole product in accordance with Annex II of EC Directive 67/548/EEC and EC Directive 1999/45/EC.

(4) Substances required to be marked by R43 (possibly cause irritation when contact to skin) in accordance with Annex III of EC Directive 67/548/EEC.

3. List of chemical substances can refer at Regulation (EC) No. 1272/2008 of the European Parliament and of the council of 16 December2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006, annex VI harmonised classification and labeling – tables, table 3.2 :The list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC (page L 353/923 onward)
4. The German Technical Rule for Hazardous substance

Verification Method

The applicant shall submit a declaration letter from toner cartridge manufacturer ensuring that toner contains no substances required to be marked by R43 in accordance with Annex III of EC Directive 67/548/EEC.

5.2 Requirements for Case parts

5.2.1 Remanufactured toner cartridges should comprise reused/recycled parts for a minimum of 60% by weight of the average weight of remanufactured toner cartridges at least 100 cartridges (excluding toner).

Verification Method

The applicant shall submit the evidence showing the components of the recycled parts and the calculation results showing that reusable parts are not less than 60% by weight.

5.2.2 Replaced plastic parts weighing more than or equal to 25 g or has a flat surface of more than or equal to 200 mm^2 shall comply with the following:

(1) Shall not contain with heavy metals, heavy metal compounds and flame retardants. Heavy metals (lead, mercury, and chromium hexavalent) due to impurities or traces deriving from raw materials in plastic parts shall not exceed 0.1 % (1000 mg/kg) by weight, for cadmium 0.01% (100 mg/kg) by weight, and for flame retardants (PBB and PBDE) 0.1 % (1000 mg/kg) by weight.

Verification Method

The applicant shall submit a declaration letter and test results (from plastic manufacturer or laboratory unit) confirming heavy metal and flame retardants in plastic parts in accordance with IEC 62321 or other equivalent standard.

(2) Shall be made from four or fewer types of mutually separable polymers or polymer blends.

Verification Method

The applicant shall submit a declaration letter ensuring that plastic casing parts meets the requirement 5.2.2 (2).

(3) Shall be marked properly for plastic identification and symbol used shall be in accordance with TIS1310[5] or ISO1043[6] or ISO11469[7].

Verification Method
The applicant shall submit a declaration letter ensuring that plastic parts are marked properly for plastic identification in accordance with TIS1310 or ISO1043 or ISO11469 as well as submitting a picture of plastic symbol on the plastic parts for inspection.

(4) Shall not be composing of PVC or other types of chlorinated polymer compounds.

Verification Method
The applicant shall submit a declaration letter ensuring that plastic casing parts meets the requirement 5.2.2 (4).

5.2.3 The replaced drum and developing unit shall not contain with cadmium, lead, mercury, selenium and compounds of these elements.

Verification Method
The applicant shall submit a declaration letter ensuring that replaced drum and developing unit meets the requirement 5.2.3

5.2.4 Remanufactured toner cartridges shall not be manufactured in a facility which makes use of CFCs or chlorinated organic solvents in the washing process (Table 2).

Verification Method
The applicant shall submit a declaration letter ensuring that product meets the requirement 5.2.4

5. TIS 1310: Symbol standard for recycling plastics
6. ISO 1043: Plastics –Symbols and abbreviated terms
7. ISO 11469: Plastics –Generic identification and marking of plastic products

Table 2 Synthesis chlorinated chemical compound

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

5.3 Take back policy

Collecting systems for toner cartridges shall be available and effective.

Verification method

The explanatory documents for the collecting systems of toner cartridges including a collecting method, documented procedures for legally permitted elimination or the proof that the cartridges has been properly disposed shall be submitted.

5.4 Requirements for packages

5.4.1 Operating instructions shall be provided clearly on the product packaging or in the product user manual with details as follows:

(1) Specify a message indicating that it is "Remanufactured toner cartridges"

(2) After-sales service and contact information

(3) Clear instructions on returns of used toner cartridge and location for return available in user manual, the company's website or other channels.

(4) Safety handling shall include

- Proper package opening
- Suitable storage method and out-of-children's reach
- Measures for accidents or toner ingestion accident
- Measures when the toner adheres to clothing or hands, or enter eyes or mouth
- Caution to avoid toner inhalation or contact

Remark : The instruction shall be printed in Thai. If there is English or any other language, the corresponding body must be identified.

Verification Method

The applicant shall submit a declaration letter as well as provide the product user manual or evidence certifying the compliance with requirement 5.4.1.

5.4.2 Packaging (if relevant)

5.4.2.1 Plastic packaging shall comply either of the following requirements:

(1) be certified to Thai Green Label criteria for plastic packaging (TGL-105) or

(2) be symbolized according to Thai Industrial Standard, TIS 1310 for recycling plastics or be marked according to plastic symbols and abbreviated terms given in ISO 1043 or ISO 11469.

Verification method

The applicant shall submit either of the following evidences:

1. Certificate of Thai Green Label for plastic packaging (TGL-105) or
2. A declaration letter indicating that the plastic packaging has been symbolized according to Thai Industrial Standard, TIS 1310 for recycling plastics or marked according to plastic symbols and abbreviated terms given in ISO 1043 or ISO 11469. The applicant shall submit a photo of plastic packaging that shows the existence of plastic identification for inspection.

5.4.2.2 Paper packaging shall comply either of the following requirements:

(1) be certified to Thai Green Label criteria for paper packaging (TGL-104) or

(2) be made from recycled pulp with specified content given in Environmental criteria 5.1 of Thai Green Label criteria for paper packaging (TGL-104)

Verification method

The applicant shall submit either of the following evidences:

1. Certificate of Thai Green Label for paper packaging (TGL-104)

2. A declaration letter indicating that the paper packaging is made from recycled pulp with specified content given in Environmental criteria 5.1 of Thai Green Label criteria for paper packaging (TGL-104)

5.3.2.3 Paints or pigments used for printing on packaging or for labeling on packaging are permitted to have concentrations of mercury, lead, cadmium and hexavalent chromium due to impurity and contamination not exceeding 0.01% (100 mg/kg) by weight.

Note: *Environmental criteria 5.3.2.3 shall be exempted in the case where the paper or plastic packaging has been certified to Thai Green Label.*

Verification method

The applicant shall submit either of the following evidences;

1. A declaration letter together with test reports for mercury, lead, cadmium and hexavalent chromium concentrations, issued by paint or pigment manufacturer. or
2. Test reports for mercury, lead, cadmium and hexavalent chromium concentrations using test method according to IEC 62321 or acceptable standards such as ISO or ASTM.

6. Testing and certification

6.1 Testing

6.1.1 The laboratory shall be operated by the government or under governmental control as defined by clause 5 of the Industrial Standard Act B.E. 2511 (and its addenda) or certified by TIS 17025[8] or ISO 17025[9].

6.1.2 Test results

6.1.2.1 Test results shall comply with testing methods defined in this document.

6.1.2.2 If "comparable test methods" are submitted, the following documents shall be submitted with the test results:

(1) Declaration letter from the laboratory verifying that the test methods are comparable to the methods defined in this document.

(2) Method validation documents which enable unequivocal scientific verification that the testing methods and requirements defined in this document have been met.

6.1.2.3 Test results shall have been issued no more than 3 year following the application date.

8. TIS 17025 General Requirements for the Competence of Testing and Calibration Laboratories.
9. ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories.

6.2 Declaration letter to verify compliance with Green Label requirements

6.2.1 Shall have been issued no more than 3 year following the application date.

6.2.2 Shall be signed by the authorized directors and have the company seal affixed (if relevant).

Appendix

Form 4.1 **Test result of printing capacity ratio (Electrophotographic)** : **Calculation 1**

Date: ___/___/___

Company : _____

Title, name of a testing manager or a person in charge : _____

This certifies the test on printing capacity ratio as below.

Name of testing laboratory		
Address		
Report number		
Name of cartridge manufacturer		
Model/ product number	Cartridge model/serial number	
	Equipment	
Date of testing		
Monochrome／Color	☐ Monochrome ☐ Color	
Chart for printing test	☐ ISO/IEC 19752 (Monochrome) ☐ ISO/IEC24712 (Color)	

	Cartridge model/serial number	C1(p)	M1(g)	M2(g)	M3(g)	C2(p)	M4(g)	M5(g)	M6(g)	Printing capacity ratio (%)
Bk										
Y										
M										
C										

Authorized to certify test results.

.....

(.....)

Date.....

Form 4.1 **Test result of printing capacity ratio (Electrophotographic)** : **Calculation 2**

Date: ___/___/___

Company : _____

Title, name of a testing manager or a person in charge : _____

This certifies the test on printing capacity ratio as below.

Name of testing laboratory		
Address		
Report number		
Name of cartridge manufacturer		
Model/ product number	Cartridge model/serial number	
	Equipment	
Date of testing		
Monochrome／Color	☐ Monochrome ☐ Color	
Chart for printing test	☐ ISO/IEC 19752 (Monochrome) ☐ ISO/IEC24712 (Color)	

	Cartridge model/serial number	C1(p)	C2(p)	Printing capacity ratio (%)
Bk				
Y				
M				
C				

Authorized to certify test results.

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(……..)

Date……

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